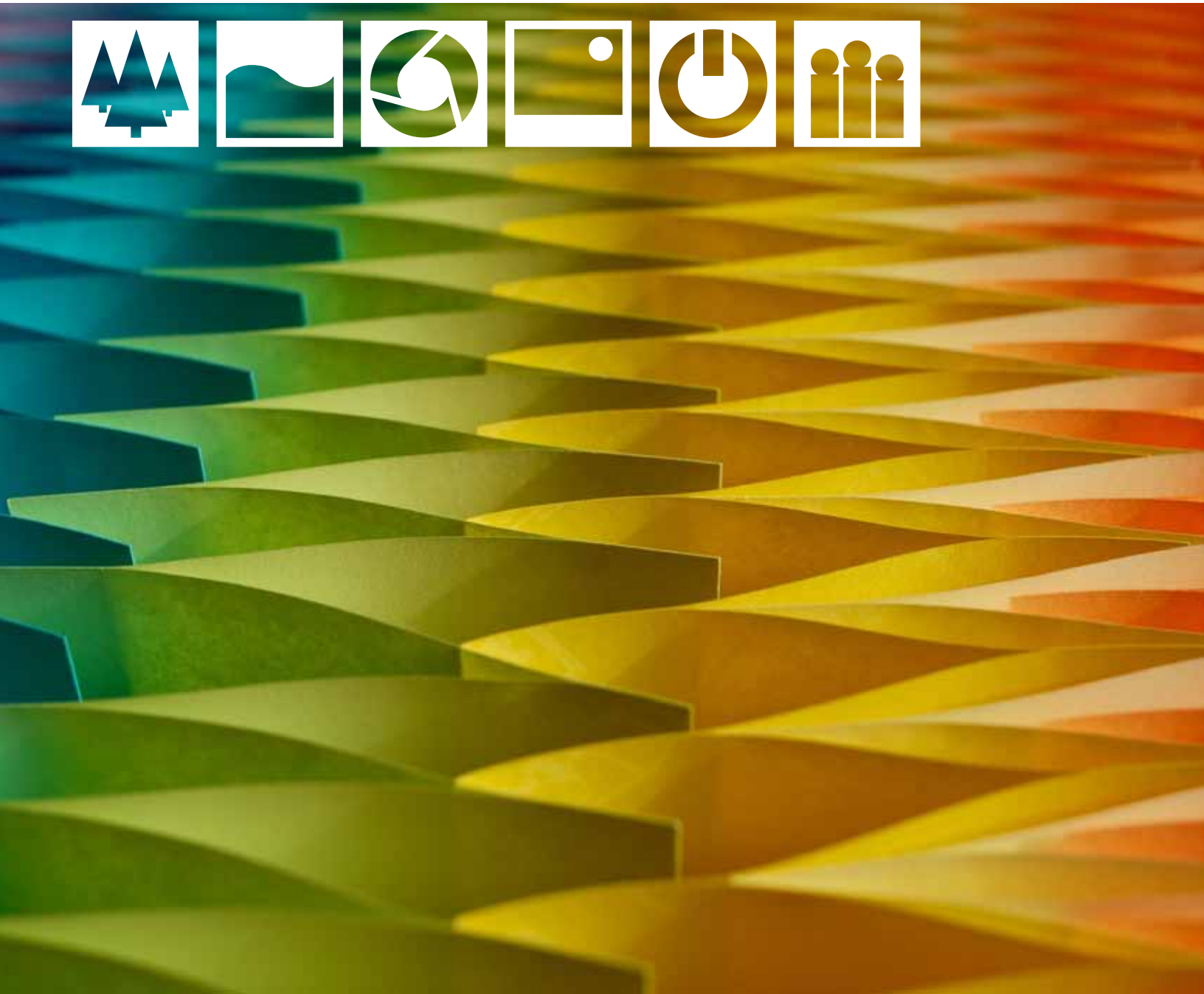
BETTER PRACTICES
BETTER PLANET 2020
Continuing AF&PA's Commitment to Sustainability

American Forest & Paper Association

2014 AF&PA Sustainability Report



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Introduction

The American Forest & Paper Association (AF&PA) has a long history of achievement in, and reporting transparently on, sustainability actions taken by the industry. Our members are committed to using sustainable manufacturing processes to produce reusable and recyclable products from a sustainably-managed renewable resource. People across the country and around the world rely on our products to communicate and inform, provide shelter and hygiene, package and deliver necessities, and capture life's memorable moments.

AF&PA members represent the diverse spectrum of the forest products industry — ranging from large to small, publicly and privately owned, U.S. and global companies that manufacture pulp, paper, packaging and wood products, and some that own and manage forests. These member companies are an integral part of the communities in which they operate, contributing to community leadership, education, health and wellness, and recreational opportunities. The jobs our members provide are a vital driver of the overall economic health of those communities.

AF&PA's sustainability efforts help member companies strive toward their own sustainability goals by providing:

- Environmental, Health & Safety (EHS) Principles, as well as Sustainable Forest Management and Sustainable Procurement Principles for wood sourcing. AF&PA members comply with these principles as a condition of membership;
- Periodic tracking of progress towards sustainability performance through a set of economic, social, and environmental indicators;
- Initiatives such as *Better Practices, Better Planet 2020* that establish sustainability goals for the combined AF&PA membership; and
- Forums for industry, governments, communities, and others to work together towards improved sustainability performance for the benefit of all stakeholders.

We report biennially on AF&PA members' sustainability performance. This reporting reaches beyond environmental performance to also integrate the economic and social elements essential to our industry's viability and the communities and families that we support. We have made great strides to continue our proven performance and push to reach new heights.

One of the best examples of our focus on continued improvement is AF&PA members' commitment to the goals within our sustainability initiative — *Better Practices, Better Planet 2020* — which includes one of the most extensive collections of quantifiable sustainability goals for a major U.S. manufacturing industry.

AF&PA received three **Green Globes®** for the build-out of our new office space in Washington, D.C. The rating system is an online program for green building certification that uses third-party assessors and evaluates environmental impacts. AF&PA's three Green Globes awards demonstrate leadership in applying best practices regarding energy, water, and environmental efficiency. The new offices feature extensive use of daylight; energy-efficient lighting and mechanical systems; low-emitting paints, coatings, adhesives and flooring; and the incorporation of wood and paper-based design elements.

Our members continuously strive for improved performance, which we recognize through annual AF&PA Sustainability Awards. These awards encourage and recognize exemplary industry programs and initiatives contributing to innovation in sustainable processes and procurement.

We are proud to represent member companies who take seriously their commitment to sustainability.

Donna Harman
President and CEO
July 2014

BETTER PRACTICES
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Continuing AF&PA's Commitment to Sustainability

Progress toward the *Better Practices, Better Planet 2020* sustainability goals:

GOAL: Exceed 70 percent rate of paper recovery for recycling by 2020
Paper recovery for recycling reached 63.5 percent in 2013 — exceeding 60 percent for the past 5 years.

GOAL: Improve members' purchased energy efficiency use by at least 10 percent from 2005 to 2020
Improved energy efficiency led to a reduction in purchased energy of 8.8 percent. On average, about two-thirds of our members' energy needed for forest products production comes from the use of carbon-neutral biomass.

GOAL: Reduce our members' greenhouse gas emissions by at least 15 percent from 2005 to 2020
Greenhouse gas emissions were reduced by 14.5 percent — nearly reaching our goal!

GOAL: Increase the amount of fiber procured from certified forestlands or through certified fiber sourcing programs in the U.S. from 2005 to 2020 and work to decrease illegal logging
AF&PA members' procurement of fiber from certified forestlands reached 29 percent, and fiber procured through certified programs reached 95 percent. Members also continue to support programs to decrease illegal logging.

GOAL: A vision for the industry of zero injuries and measuring progress toward that vision by further improving our incidence rate by 25 percent from 2006 to 2020
The safety incidence rate in our facilities improved by 24 percent.

GOAL: Reduce water use in members' pulp and paper mills by 12 percent from 2005 to 2020
Water use at member pulp and paper mills was reduced by 6 percent.

The Forest Products Industry's Sustainable Record

The American Forest & Paper Association (AF&PA) is proud to present our 2014 Sustainability Report documenting the sustainability performance of AF&PA member companies, representing the U.S. pulp, paper, packaging, and wood products manufacturing industry. This report outlines the social, economic, and environmental contributions made by our members, as well as the performance metrics that show the positive actions taken to improve the efficiencies of our processes. Information contained in this report was obtained through AF&PA's most recent surveys collecting data on environment, energy, health and safety, and certified fiber, as well as from public sources.[1]

Our industry seeks to preserve and grow its economic contribution, and that of the individual companies, to society; works to foster the well-being of our communities; and uses sustainable manufacturing and fiber procurement practices to protect the environment, ensuring that our resources will be available to meet the needs of future generations.

Unique qualities that characterize our industry include:

- The essential bio-based products produced by our members that support and protect everyday life in our society;
- Increased efficiencies in our production and use of energy, reductions of our carbon footprint, and substantial reductions in the release of environmental pollutants; and
- Planning for the future through development and production of new bio-based products.

Sustainability advocates and practitioners have worked to refine the concept for decades. In 1987, the United Nations World Commission on Environment and Development (the Brundtland Commission) defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Over time, the understanding of sustainability has matured. While in the past there has been a primary focus on the environmental elements, it is now broadly recognized that the social and economic elements must be pursued equally if we are to achieve long-term sustainability.[2]

[1] Unless stated otherwise, data are from the survey results for the 2012 operating year.

[2] United Nations (2013) *Global Sustainable Development Report – Building the Common Future We Want*. New York: United Nations Department of Economic and Social Affairs, Division for Sustainable Development. 2013, http://sustainabledevelopment.un.org/globalsdreport/

Providing Society's Essential Products

Forest products are essential components of modern life. They are made from a renewable resource — trees. They encompass an incredibly wide range of products with nearly limitless everyday uses from facilitating education, communications, hygiene, food storage, and product protection to providing shelter and homes. New and innovative forest products are being developed while constant improvements are made to existing products.

- Printing and writing papers include paper used for books, magazines, office and home printers, birthday cards, wedding invitations, printed photos and vital documents, such as birth certificates, social security cards, and diplomas. These papers have continually adapted to fit the needs of each new generation, serving an important role in enabling the flow and exchange of information throughout all sectors of society and around the world.

Sustainability Award Winner

Graphic Packaging International developed an innovative packaging solution for 12 and 18 bottle beer packs, reducing greenhouse gas emissions by 30 percent and glass bottle breakage without increasing total packaging materials. The "Tite-Pak® Innovation Beverage Packaging" project won the 2013 Innovation in Sustainability Award from AF&PA.

- Paper-based packaging is a versatile and cost-efficient method to transport, protect and preserve a wide array of items. It is engineered to be sturdy, yet lightweight, and is customizable to meet product- or customer-specific needs. Corrugated containerboard is used to ship and transport everything from electronics to fragile glassware to perishable goods; paperboard packages food, medicine and toiletries for handy storage and display; and paper bags give customers a sustainable option to carry their purchases home.
- Wood provides shelter, furniture, flooring, and cabinetry, as well as smaller items from bowls to toys to chopsticks. It is the building material of choice for strength, aesthetic appeal and environmental responsibility. In addition, wood stores carbon and is less energy- and carbon-intensive to produce than competing materials like concrete and steel.

Economic Contributions — a Critical Element of Sustainability

In 2012, the forest products industry (paper, paperboard, converting and wood products) contributed almost 4 percent of the U.S. manufacturing gross domestic product (GDP). Sector sales totaled $210 billion in 2013, and the industry paid estimated state and local taxes of $4.6 billion.

In the U.S., the industry's employment of nearly 900,000 people exceeds employment levels of the automotive, chemical, and plastics sectors. The forest products industry pays approximately $50 billion a year in wages and other compensation.

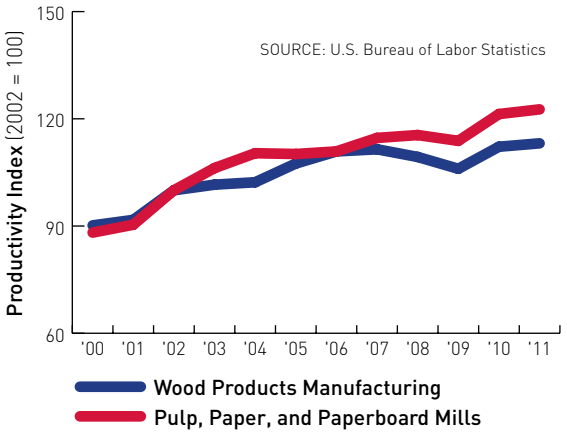
In the small, rural communities where our mills generally are located, these are highly sought after, well-paying jobs. Indeed, more than 75 percent of U.S. pulp and paper mills are located in counties designated by the U.S. Census Bureau as more than 80 percent rural.[3] These jobs play a key role in the standard of living, education, and cultural fabric of the area.

Wages at pulp and paper mills are 50 percent higher than the average private sector job.[4] In addition, every 100 paper industry jobs supports 325 additional jobs in supplier industries and within local communities.[5]

In 2009, the U.S. paper, paperboard, and converted products sector achieved a positive trade balance for the first time in nearly 100 years. In 2013, exports exceeded imports by 2.6 million tons.

Efficiency is essential to international competitiveness. From 2001 to 2011, worker productivity rose 36 percent at pulp, paper, and paperboard mills. The productivity contributions of our workers are critical to the U.S. industry's ability to compete in the world marketplace.

Forest Products Industry Labor Productivity Gains



[3] The U.S. Census Bureau basically defines rural in two forms, as: 1) census designated areas having "less than 2,500 persons"; and 2) "other places" based on housing units and other demographic information.

[4] Calculated by AF&PA using December 2013 Bureau of Labor Statistics payroll data.

[5] *Updated Job Multipliers for the U.S. Economy* (table 9), Economic Policy Institute, August 2003.

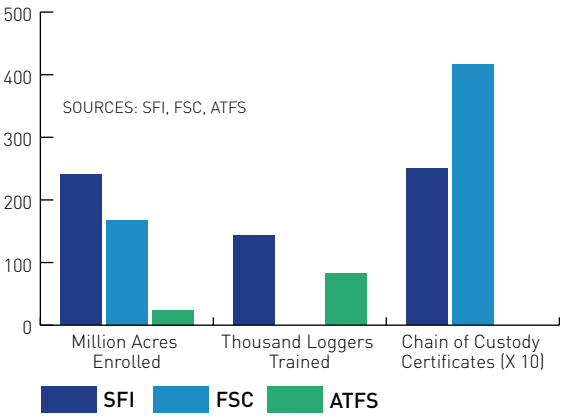
AF&PA members operate in a very competitive global market. To enhance our sustainability, we are working to take advantage of our strengths and to find additional opportunities for our unique bio-based supply chain to produce new products and other applications for our existing products.

Sustainable Use of Wood — Our Basic Raw Material

Trees are the ultimate renewable resource because they can be planted, grown, harvested and replanted. AF&PA members have long supported and followed sustainable forestry practices. More than 20 years ago, members agreed to adhere to a set of Sustainable Procurement Principles that reach far beyond legal requirements. The Principles encourage members to procure wood fiber from suppliers trained in sustainable forestry practices and principles and who use qualified logging professionals; provide research funding for forestry; and seek to improve forest management practices. Additional work led to the development of a sustainable forestry standard, which later became the Sustainable Forestry Initiative (SFI®), an independent non-profit. Today, AF&PA members use standards and methods developed and maintained by the SFI®, the Forest Stewardship Council (FSC®), the American Tree Farm System (ATFS), and the Programme for the Endorsement of Forest Certification (PEFC™). For us, sustainability is not just an option; it's a necessity for maintaining forest resources into the future.

The photosynthesis associated with tree growth captures and converts carbon dioxide from the atmosphere into fiber and other wood components. Wood stores carbon indefinitely, even as a finished product, helping to reduce the effects of greenhouse gas emissions over the long haul. In addition, growing trees

2013 North American Sustainable Forestry Management Program Statistics



Sustainability Award Winner

Domtar formed the Four States Timberland Owners Association in 2010 to educate landowners and managers on how to obtain sustainable forest management certification. Domtar, along with 55 individual landowners owning more than 70,000 acres, achieved certification of their forestland. AF&PA awarded Domtar the 2013 Leadership in Sustainability Sustainable Forestry Management Award for this project.

also release oxygen into the atmosphere, thereby supporting life on our planet. In 2011, U.S. forests and wood products captured and stored roughly 16 percent of all carbon dioxide emitted by fossil fuel consumption in the United States.[6]

More trees are planted annually in the U.S. than are harvested by the forest products industry. Currently, 1.2 billion trees are planted per year according to the U.S. Forest Service.[7] Today, the United States has 20 percent more trees than it did on the first Earth Day celebration more than 40 years ago. One-third of the United States is forested — 751 million acres.

Privately-owned forests supply 91 percent of the wood used by the U.S. forest products industry, while state, tribal and municipal forests supply 7 percent, and federal forests supply only 2 percent. More than 56 percent of U.S. forests are privately owned, much of it by family forest owners who manage their lands to provide value for future generations. Maintaining a healthy and economically viable forest products industry business sector creates a market for wood, providing an incentive for landowners to keep land forested rather than convert it to other uses such as development or agriculture. It also provides a profitable market outlet for removing trees to reduce overcrowding, which helps to maintain healthy, resilient forests, which in turn reduces wildfires and insect and disease infestations.

The reforestation activities that take place on managed lands after harvest provide numerous ecological and social benefits not possible if forest stands are left in the mature state. Each stage of the forest succession process provides unique habitat and environmental protection benefits that would not occur without the rotational harvest and reforestation cycles.

Sustainability Award Winner

Green Bay Packaging achieved 100 percent fiber yield recovery at its Arkansas Kraft Division facility and was recognized by AF&PA with the 2012 Innovation in Sustainability Award. The mill attained zero-landfill of fiber collected in the mill waste treatment system, diverting over 60,000 cubic yards of usable fiber from landfills in 2011.

Sustainable Manufacturing

Our commitment to sustainable manufacturing is one of the most significant of any industrial sector, and AF&PA's *Better Practices, Better Planet 2020* sustainability initiative includes one of the most extensive collections of quantifiable goals for a major U.S. manufacturing industry. Our members created this program to focus on achieving a suite of six sustainability goals (see Part II for a goals progress report).

But progress on our goals only tells part of the story. Sustainable manufacturing is an economic as well as environmental imperative for AF&PA members. Efforts to improve the efficiency of how we use

[6] *Climate Changes in the United States, Third National Climate Assessment*, May 2014.

[7] *Forest nursery seedling production in the United States—fiscal year 2012* – USDA Forest Service, 2013.

resources have resulted in decreased emissions and natural resources needed to manufacture our products. For example, wood fibers used to make a sheet of paper are separated and prepared in water-based slurries. Water and other materials are added and then removed to produce the finished paper, thus recycling and reusing raw materials. Water is reused 10 times before being treated and returned to the environment. Spent pulping chemicals and organic substances from the biomass material are combusted to capture and reuse the pulping chemicals and to generate valuable carbon neutral fuel to power our mills. At kraft pulp mills (the most commonly used process in the U.S.), up to 98 percent of the pulping chemicals are recovered and recycled in virtually a closed loop.

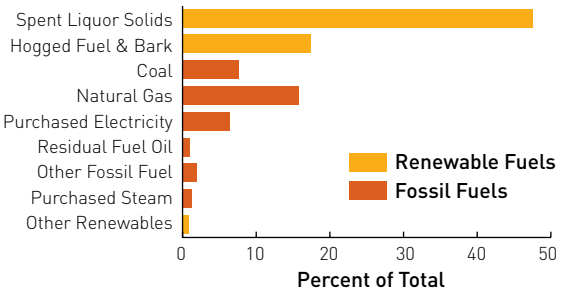
Renewable Energy and Energy Efficiency

AF&PA members strive to minimize energy costs, as energy constitutes the third largest expense category for the forest products industry (with the cost of materials such as fiber ranking number one and employee compensation number two).

Member mills produce solid wood products, pulp, paper, paper-based packaging, and other wood-based materials. Residuals that do not end up in products can be used as an energy source for manufacturing or used to generate electricity that is sold to the grid as green power.

We self-generate most of our energy needs; more importantly, most of that is renewable energy. On average, about 66 percent of the energy used at AF&PA member pulp and paper mills is generated from carbon-neutral biomass. In fact, forest and paper products

2012 Pulp and Paper Mill Energy Sources



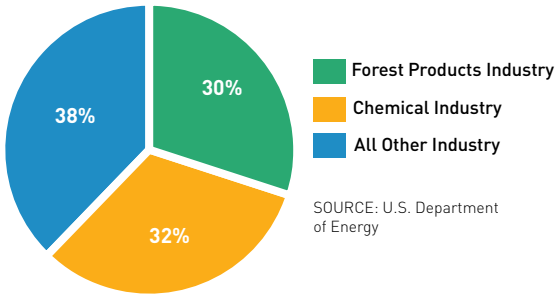
facilities accounted for 62 percent of the renewable biomass energy consumed by all manufacturing facilities in all sectors. Fifty-nine percent of the electricity used by our members was self-generated. Indeed, 42 percent of our members' mills self-generated more than half of their power, and 23 percent sold excess power back to the grid, much of it renewable as well.

The industry has long relied on the much more efficient combined heat and power (CHP) generation process to produce the electricity and steam needed

Sustainability Award Winner

A comprehensive, multi-year energy management program developed for **Georgia-Pacific**'s manufacturing facilities spawned more than 200 energy efficiency projects and other efforts. Collectively, they generated savings of more than $50 million in purchased energy and reduced energy use by over two trillion Btu. These results and the resultant greenhouse gas reductions were recognized by AF&PA with a 2012 Leadership in Sustainability Energy Efficiency/Greenhouse Gas Reduction Award.

2012 CHP Electricity Generation by Industry



SOURCE: U.S. Department of Energy

to manufacture its products. In this process, exhaust steam from electricity-generating turbines is used directly to dry wood and paper and to heat production processes or buildings before being condensed and recycled back to steam generation boilers. The use of CHP results in efficiencies in the range of 50 to 80 percent at forest products plants, in comparison to non-CHP electrical stations, such as utilities, with typical efficiencies around 33 percent. In 2012, 96.4 percent of the electricity the industry generated was through CHP. The forest products industry produced 30 percent of CHP electricity generated by manufacturing facilities in the U.S. Of all manufacturing sectors, only the chemical industry produced more.

Water

Water is a vital part of the papermaking process. Technology and innovation enable water to be reused and recycled ten times throughout the paper mill process.

After water is used inside the mill, it is treated in a wastewater system and then returned to the environment. The forest products industry directly returns to the environment about 88 percent of the water it withdraws and uses in its manufacturing processes. Another 11 percent evaporates, once again becoming part of the water cycle. The remaining one percent is incorporated into our products.

AF&PA shares the global concerns about water scarcity and access to potable water. The environ-

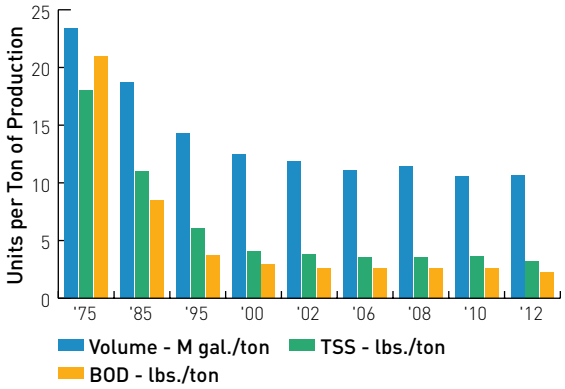
mental impacts of water use and the economic and social aspects of that use are very site-specific. We have actively participated in global water sustainability initiatives to help advance understanding of the impacts of water use at our mills, as we believe that it is the impact of that use — which includes positive economic impacts — that is most important. We have participated in the development of the Alliance for Water Stewardship's International Water Stewardship Standard released in April 2014, as well as the Water Footprint Standard developed by the Water Footprint Network and its partners.

While we focus on achieving our water use reduction goal, we continue to make progress reducing the regulated constituents in our water discharges. For example, compared to 2010, total suspended solids (TSS) releases were reduced by 11.5 percent and Biochemical Oxygen Demand (BOD), a measure of the amount of organic material in the effluent that results in lowered oxygen content of receiving streams, was reduced by 12.9 percent.

Sustainability Award Winner

The 2012 AF&PA Leadership in Sustainability Water Award winner, **MWV's Mahrt Mill** in Cottonton, Alabama, reduced water usage by 20 percent, energy usage by over 8 percent, and CO_2 emissions by 10 metric tons per day while maintaining existing production quality and capacity.

Pulp and Paper Mill Effluent Discharges

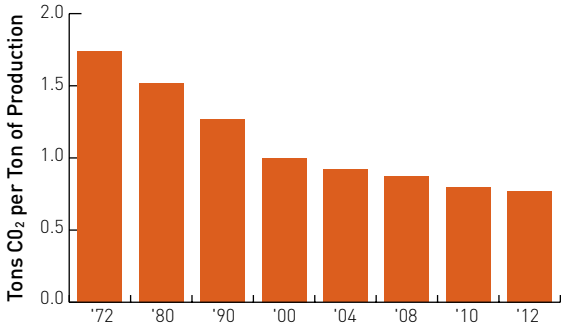


Greenhouse Gas (GHG) Emissions

The carbon-neutral renewable energy generated by our members is equivalent to 200 million barrels of oil annually, and its use avoids fossil fuel-based GHG emissions. Virtually all of this energy comes from biomass residuals left over from the manufacturing process; diverting these residuals from landfills also curbs potential GHG emissions.

At pulp and paper mills, the emission rate expressed in tons of carbon dioxide (CO_2) equivalents per ton of production has been reduced by 55.8 percent since 1972, 23.1 percent since 2000, and 3.9 percent compared to 2010. The emissions intensity rate for pulp and paper mills and wood products facilities combined decreased by 22.5 percent since 2000. Between 2010 and 2012, this rate was reduced by 4.4 percent.

Pulp and Paper Mill Greenhouse Gas Emissions



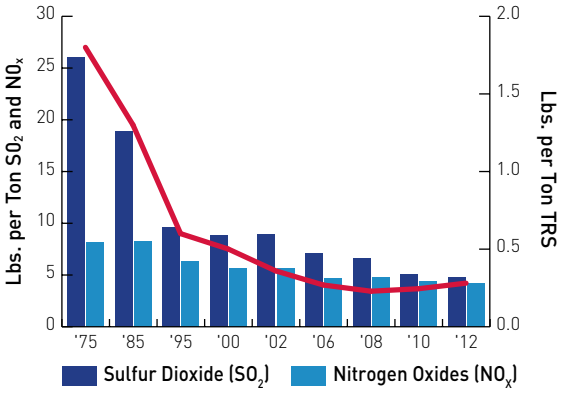
A recent study by the National Council for Air and Stream Improvement (NCASI) shows that the GHG reduction benefits of using biomass residuals for energy by the forest products industry are equivalent to about 218 million tons of carbon dioxide. This is comparable to removing about 40 million cars from the road.

The sustainable management of forests supported by the industry plays a large part in the cycle to offset carbon emissions. In 2011, U.S. forests and wood products captured and stored roughly 16 percent of all carbon dioxide emitted by fossil fuel consumption in the United States.

Air Emissions

EPA's Clean Air Act initiatives have been the focus of AF&PA policy advocacy for the last several years. Some of the emission standards are still not finalized and may not be for several more years. AF&PA members, nonetheless, are continuing to reduce their air emissions. For example, in 2012, sulfur dioxide emissions were 27.4 percent lower than in 2008 due to changes in our fuel mix and continual environmental improvement, and nitrogen oxide emissions were 12.3 percent lower than in 2008.

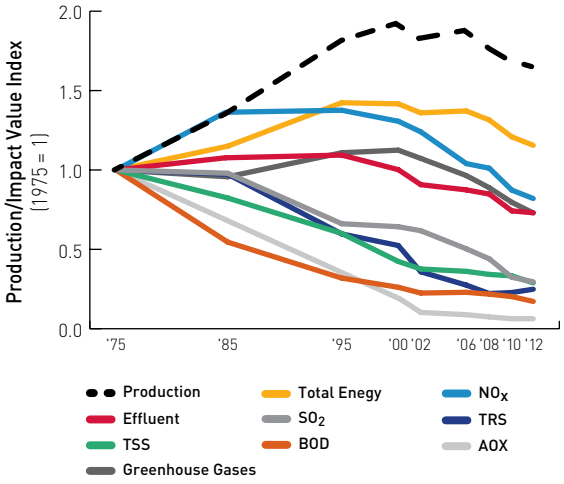
Pulp and Paper Mill Air Emissions



Producing More with Less Environmental and Energy Impact

The result of our sustainable manufacturing efforts has been a "decoupling" over many years of our environmental and energy footprint from our levels of business activity and production. Advances we made in reducing environmental and energy impacts were "decoupled" from the amount of product we produced. The trend plot above shows that while we generally continue to reduce emissions and energy use on a percentage basis (and in some cases, significantly so), as we get closer to background levels of emissions it becomes much more challenging and costly to achieve continued reductions.[8] Appendix I of this report compiles all the environmental metrics on which we are reporting our progress.

Producing More with Less Impact



Sustainability Award Winner

KapStone's Longview Mill received the 2013 AF&PA Leadership in Sustainability Energy Efficiency/Greenhouse Gas Reduction Award for reducing greenhouse gas emissions by 72 percent over the last decade; reducing overall energy use by 37 percent since 2007; reducing overall energy used per ton of paper produced by 17.6 percent since 2007; and increasing total tons of paper produced by 50 percent since 2006.

Paper Recovery for Recycling

Industry-led efforts to increase paper recovery are among the best examples of how we are protecting our environment and preserving and growing the economic contributions of the industry and its businesses. Our industry's 2013 paper recovery rate is 63.5 percent, and we have exceeded 60 percent recovery for the past 5 years. Our goal is to exceed 70 percent recovery by 2020. The amount of paper recovered for recycling has increased by more than 70 percent since our industry committed to setting and achieving recovery goals in 1990. Paper recovery is important to the U.S. economy; it is a success because it is voluntary and market-driven.

[8] Pollutant and energy consumption data have been extrapolated from reporting AF&PA member companies to the entire industry by multiplying weighted average per ton intensities of reporting companies by industry level production.

AF&PA Outreach

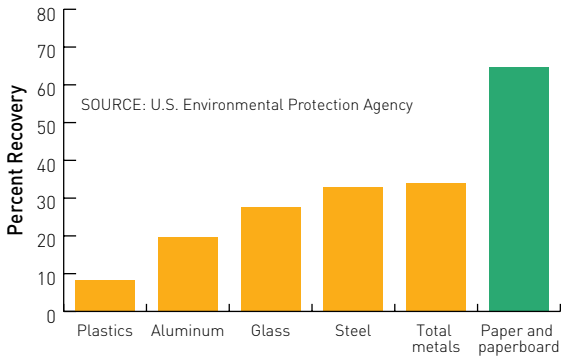
RecycleMania, an annual eight-week competition for colleges and universities, engaged 461 schools across the U.S. and Canada — collecting 89.1 million pounds of recyclables and organic materials. Rutgers, the United States Military Academy, Antioch University, Kalamazoo College and Valencia College were the top award winners. The 2014 competition is sponsored by AF&PA, Alcoa Foundation, the Coca-Cola Company, and SCA. The collection of recyclable materials by contestants prevented the release of 126,597 metric tons of carbon dioxide equivalents.

Paper recovery for recycling extends the useful life of fiber. Approximately 78 percent of all U.S. paper mills use some recovered fiber to make everything from paper-based packaging to tissue to office paper and newspaper.

The paper industry's recycling success leads the way for all other U.S. recycling efforts and also keeps paper out of landfills. Approximately 2.5 times more paper is recycled than is sent to landfills, and every ton of paper recovered for recycling saves 3.3 cubic yards of landfill space. According to the U.S. Environmental Protection Agency (EPA), only 27.7 percent of glass, 19.8 percent of aluminum, and 8.8 percent of plastics consumed were recovered for recycling in 2012, compared to 64.6 percent of paper.

Paper recovery for recycling is also widely accessible: In 2010, 87 percent of Americans had access to community curbside and/or drop-off paper recycling.

2012 Paper Recycling vs. Other Materials



AF&PA member companies' use of recovered fiber resulted in avoided greenhouse gas emissions of nearly 18 million metric tons of CO_2 equivalents in 2013. This has the added benefit to society of reducing other air pollutants that would be released if the paper were to end up in a landfill.

To help educate students and their families about the importance of paper recycling, AF&PA partners with Kaleidoscope to deliver standards-based curricula straight to the classroom. Further, the AF&PA Recycling Awards recognize outstanding paper recycling programs in three categories: Business, Community and School. This year, the program was redesigned to reflect the diversity of paper recycling programs across the country. In each category, there are prizes for creativity, participation, partnerships, and volume of paper collected.

This year's winners in each category are:

Creativity — unique and innovative ways that have been used to market the program, raise awareness and generate interest

- *Community*: Township of Nutley (Nutley, NJ)
- *School*: Greenhill School (Addison, TX)
- *Business*: Michael Dunn Center (Kingston, TN)

Participation — unique and innovative ways successful programs increased participation and tonnage collected

- *Community*: Vance Air Force Base (Enid, OK)
- *School*: Damascus Elementary School (Salem, OH)
- *Business*: Michael Dunn Center (Kingston, TN)

Partnerships — innovative partnerships (community, business, non-profit organizations) used to promote increased recovery

- *Community*: Metro Waste Authority (Des Moines, IA)
- *School*: Ocosta High School (Westport, WA)
- *Business*: Michael Dunn Center (Kingston, TN)

Volume — total amount of paper and paperboard collected

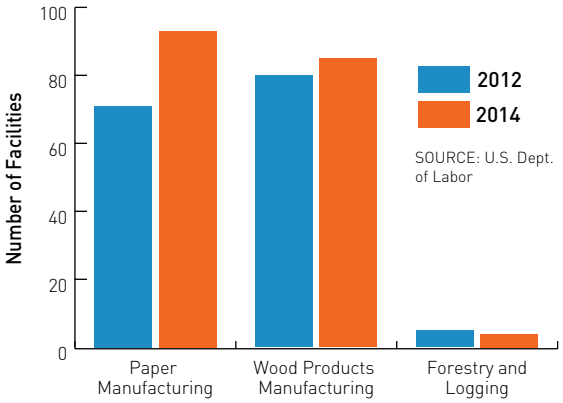
- *Community:* Township of Nutley (Nutley, NJ)
- *School:* Damascus Elementary School (Salem, OH)
- *Business*: Curly's Foods, Inc. (Sioux City, IA)

People

Worker Safety

Because any injuries to our employees are not acceptable, we are continuing to work toward our vision of zero injuries for the industry. Our members continue to look for innovative worker safety programs to realize this vision. Members have increased their participation in the OSHA Voluntary Protection Programs (VPP). Program members are industrial facilities that voluntarily work to maintain job illness and injury rates below national Bureau of Labor Statistics averages.

Member VPP Enrolled Facilities



AF&PA Sustainability Award Winner

International Paper received the 2012 AF&PA Leadership in Sustainability Safety Award for the "It's about...LIFE" campaign. After the campaign was launched in 2010, Life-changing Injuries and Fatality Elimination (LIFE) were reduced across the company. Along with five specific areas of focus, LIFE put a face to safety with its "This is Why I Work Safe" toolkit, video and website, asking employees to bring photos of loved ones into their workplace as a constant reminder to work safely.

Communities

AF&PA member companies remain a vital source of skilled jobs in rural communities throughout the U.S. More than 75 percent of U.S. pulp and paper mills are located in counties designated by the U.S. Census Bureau as more than 80 percent rural. A majority of the workers employed in the forest products industry possess at least a high school diploma (or equivalent).[9] Member companies provide training to their employees either through on-the-job training programs or by providing the opportunity for employees to take courses at local colleges or universities to improve their skill base.

In anticipation of the need for highly skilled and specialized workers, member companies have engaged educational institutions to ensure that future

[9] Source: Employment Projections Program, U.S. Department of Labor, U.S. Bureau of Labor Statistics.

employees have the appropriate skills and vocational training.[10] This support has come through donations to university programs, partnerships with local high schools or universities to provide internship opportunities, mentoring programs, and engagement in the development of curricula and classes that will provide graduates with the proper skill set to succeed in the job market.

Member companies also are involved in projects and programs to enhance the well-being of the communities in which they operate. These programs include watershed cleanups, recycling drives, and forest restoration and regeneration. Some programs are yearly events to help beautify a watershed or neighborhood. Others are programs that have both social benefits for the community and benefit the economics of the company, e.g., recycling drives provide companies that manufacture recycled paper products with raw materials, and conservation projects ensure the long-term viability of the forests that provide the raw material for virgin pulp.

AF&PA Member Case Studies

Sappi Fine Paper pledged $250,000 for three initiatives to support Science, Technology, Engineering and Math (STEM) and other education programs at targeted colleges and universities near company mills.

Sonoco has committed $5 million over five years to fund Partners for Unparalleled Local Scholastic Excellence (PULSE), a public/private partnership to expand student development and curriculum opportunities through collaborative academic and social development initiatives, focused on schools located in the company's hometown of Hartsville, South Carolina.

[10] According to a survey conducted by McKinsey & Company, a consultancy, 45 percent of employers in the U.S. believed that there was a lack of skills among graduates, which led to vacancies in entry-level positions. (McKinsey Center for Government, *Education to Employment: Designing a System that Works*).

Building the Bio-based Economy

According to the U.S. Census Bureau, the world population will exceed 9 billion by 2050. All these people will have needs — many of which can be filled by forests. Forests are incredibly rich and complex ecosystems, delivering services that are necessary for human well-being and survival — like fresh water, food, and shelter. Many industries depend on forests for their resources, not just the forest and paper industry.

Bio-based products already help meet the growing global demand for a wide range of existing and new sustainable products. Pulp is used in items as diverse as sanitary products, like diapers and feminine care products; tissue products, such as napkins and wipes; electronics, including the flat screens of televisions and laptops; and car tires.

For decades, the pulp and paper industry also has produced ingredients used in detergents, cleaning aids, asphalt emulsifiers, ink resins, and oil drilling fluids as valuable co-products of papermaking. Extractives in wood include resins and fatty acids that are recovered in the pulp mill, thereby avoiding their release into the atmosphere or surface waters. The recovered components are separated and converted into products tailored to specific market needs. Making these products makes pulp and paper mills more sustainable and supplies green chemicals to global markets.

Through nanotechnology, which manipulates matter on an atomic and molecular scale, scientists are looking into ways that trees can improve the sustainability of existing paper-based products as well as deliver a new generation of sustainable products, including high-tech materials that are only beginning to be imagined. Wood contains cellulosic nanomaterials that provide strength and stiffness to trees. When isolated, these materials can be used to strengthen other items, such as plastic fiber-reinforced composites.

Forest biomass is increasingly becoming an important feedstock for green chemicals. Technologies to convert the sugar-based carbohydrates in wood and the building blocks in lignin to a wide range of plastics and chemicals that now are made from fossil fuels are available, and more efficient methods are under development. The sustainability initiatives of many chemical companies, including several that supply essential raw materials for papermaking, are encouraging new efforts to make chemicals from renewable resources such as wood.

Performance Tracking: The Statistics of Sustainability

AF&PA's ambitious *Better Practices, Better Planet 2020* initiative includes one of the most extensive collections of quantifiable goals for a major U.S. manufacturing industry. We are proud to report that AF&PA members are on track to meet our 2020 sustainability goals, based on the following 2012 calendar year performances (except for recovery for recycling, which is the 2013 rate).[11]

- **Increase paper recovery for recycling:** Currently at 63.5 percent, we have exceeded 60 percent recovery every year since 2009.
- **Increase energy efficiency:** We are more than three-quarters towards meeting our energy efficiency goal to reduce our use of purchased energy by 10 percent between 2005 and 2020. AF&PA members' purchased energy use is currently just 11.8 million BTUs per ton of production,[12] an 8.8 percent reduction from 2005 levels.
- **Reduce greenhouse gas emissions:** AF&PA mills have come very close to achieving the goal to reduce greenhouse gas emissions by at least 15 percent by 2020. Emission rates in 2012 were 14.5 percent lower than those in 2005.
- **Promote sustainable forestry:** Companies continue to seek to increase fiber procured from both third-party certified forestlands and through certified fiber sourcing programs. In 2012, the percentage for each of these wood fiber sources was 29 and 95, respectively, both of which are increases from the 2005 baseline. We are continuing to work with governments and other stakeholders to combat illegal logging.
- **Strive for the safest possible workplace:** Because injuries to our employees are not acceptable, we established a vision for the industry of zero injuries. We are measuring progress toward that vision by setting a goal to further improve our safety incidence rate by 25 percent from 2006 to 2020. AF&PA member companies have reduced their recordable case incidence rate by 24 percent since 2006.
- **Reduce water use:** Member pulp and paper mills are working to reduce water use by 12 percent by 2020. Currently, mills report using 6 percent less water than in the 2005 baseline year.

Reporting Our Progress

AF&PA and its predecessor organization, the American Paper Institute, have tracked paper product production and industry economic performance for decades. Over that time, the paper and wood products markets have grown more global. Consequently, our industry's sustainability depends on our ability to successfully compete in those global markets, increasing the importance of the social and economic metrics, along with the environmental metrics.

Setting relevant and challenging goals is another important step in the sustainability pursuit. AF&PA's first goal, set in 1990, was to achieve a 40 percent paper recovery rate by 1998. This goal was achieved four years early, and a new 50 percent recovery goal was established. After achieving that goal in 2003, two successively higher goals were set — and achieved — before the decade was out. AF&PA's current suite of six goals, established in 2011 through the *Better Practices, Better Planet 2020* program, continues to seek increased paper recovery rates in addition to

[11] Except for the recovery for recycling and safety goals, all numeric goals use a 2005 baseline year. The 2005 baseline is derived from the averaging of 2004 and 2006 data as reported by member companies through our regular biennial data collection process. The recovery goal does not have a baseline, and the safety goal baseline is 2006. Production-based statistics quoted in this report refer only to quantities of pulp, paper, and primary wood products produced. They do not include converted paper or fabricated wood products.

[12] Wood products generally require significantly less energy to manufacture than pulp and paper products. Such differences can distort energy efficiency comparisons if there are major changes in the paper-wood production mix, as occurred between the 2005 base year and 2010, when wood's share of the production mix declined significantly. Thus, the 2005 production mix between wood and paper has been adjusted to be the same as it was in 2010 to ensure a more representative comparison of energy efficiency performance, and we will be using this same 2010 mix in 2012 and in future years.

improved energy efficiency, reduced greenhouse gas emissions, improved sustainable forestry practices, better workplace safety, and reduced water use.

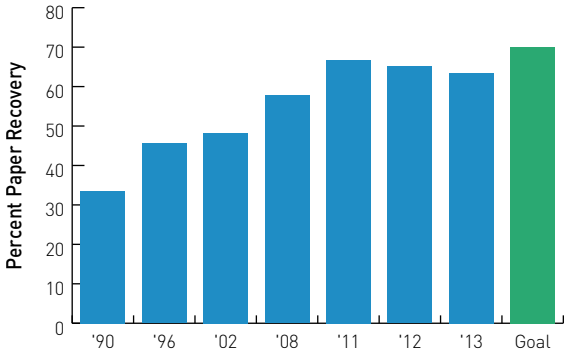
Our progress towards meeting these goals is reported here. Trends associated with all of the other sustainability indicators on which we are reporting are included in the Appendix that follows.

Increase Paper Recovery for Recycling

GOAL: Exceed 70 percent rate of paper recovery for recycling by 2020

U.S. paper recovery has increased by more than 70 percent since 1990 due to the efforts of the industry and the millions of Americans who recycle every day. Recovering valuable resources extends the fiber supply, allowing our industry to reuse its products to make new ones. In addition, paper recovery saves landfill space — an average of 3.3 cubic yards of landfill space is saved for each ton of paper recycled. U.S. paper recovery exceeded 60 percent for the past 5 years, reaching 63.5 percent in 2013. Paper recovery is a success because it is voluntary and market-driven. Recovered paper markets are driven by the same supply-demand dynamics that characterize the broader economy. Recovered paper that was sorted or processed in the U.S. had a 2012 market value of $8.4 billion. The value of U.S. recovered paper exports totaled $3.1 billion in 2013. Paper recovery has fostered a dynamic marketplace that allows recovered fiber to find its highest-value end. That, in turn, helps to encourage more recycling.

Progress Toward Recycling Goal



Sustainability Award Winner

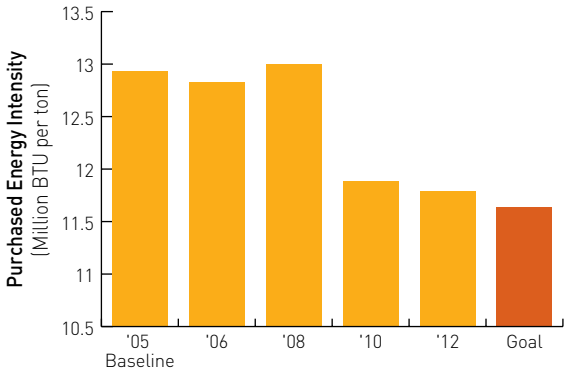
A unique partnership between **RockTenn** and a customer created sustainability awareness and increased recycling through an employee education program that focused on disposal decisions and removal of recyclables from the waste stream. The initiative resulted in 61.6 percent of the customer's waste stream being recycled and reduced waste management expense by 16 percent. The program received a 2013 Leadership in Sustainability Paper Recovery for Recycling Award from AF&PA.

Improve Energy Efficiency

GOAL: Improve members' purchased energy efficiency use by at least 10 percent from 2005 to 2020

Energy generation and use at AF&PA member mills is an exciting success story. Purchased energy use in 2012 was 11.8 million BTUs per ton of production against a goal of 11.6 million BTUs per ton. Improving our industry's energy efficiency in purchased energy allows us to produce more with less, leaves more natural resources for future use, and saves resources, which helps to keep and create jobs. Improved energy efficiency has led to a reduction in purchased energy of 8.8 percent compared to the 2005 baseline of 12.9 million BTU per ton of production.

Progress Toward Energy Goal



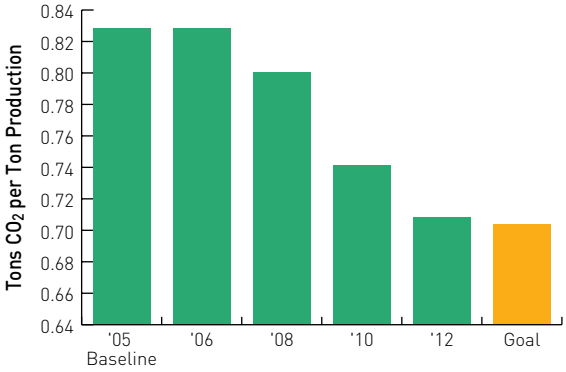
Reduce Greenhouse Gas Emissions

GOAL: Reduce our members' greenhouse gas emissions by at least 15 percent from 2005 to 2020

In 2012, AF&PA members came close to achieving the 15 percent greenhouse gas (GHG) reduction goal. Emissions were 0.709 tons of CO_2 equivalents per ton of production versus a goal of 0.704. This amounts to a decrease of 14.5 percent from the 2005 baseline. Reducing our members' greenhouse gas emissions is part of a global environmental effort. It is closely related to other AF&PA sustainability goals. Recovering paper for recycling keeps paper out of landfills — where it releases GHGs when it decomposes — and improving energy efficiency leads to fewer GHG emissions resulting from the manufacturing process.

Reliance on carbon-neutral biomass derived energy, improvements in energy efficiency, and increases in paper recovery for recycling have all contributed to this reduction. Additionally, promotion of sustainable forestry can increase carbon storage in the managed

Progress Toward Greenhouse Gas Reduction Goal



forests that provide raw materials for our mills. In 2011, U.S. forests and wood products captured and stored roughly 16 percent of all carbon dioxide emitted by fossil fuel consumption in the United States.

Promote Sustainable Forestry

GOAL: Increase the amount of fiber procured from certified forestlands or through certified fiber sourcing programs in the U.S. from 2005 to 2020 and work to decrease illegal logging

All AF&PA members that own forestland are required to conform to a credible forest management program. These credible certification programs include the Sustainable Forestry Initiative® (SFI®), the Forest Stewardship Council (FSC®) program, the American Tree Farm System (ATFS), and the Programme for the Endorsement of Forest Certification (PEFC™)-endorsed programs. In 2012, 29 percent of member fiber was procured from certified forestlands, and 95 percent was procured through certified fiber sourcing programs, both of which are increases from the 2005 baseline.

Individual member companies work diligently to safeguard against procurement of fiber from illegally-logged sources. Illegal logging contributes to global deforestation and climate change, threatens many species with extinction, denies forest-dependent communities access to resources, and undermines legitimate businesses. Companies identify and document sources, require suppliers to sign agreements, use third-party certification of chain-of-custody records, and can conform to sustainable fiber sourcing standards to help in achieving this goal.

AF&PA and its members support and promote efforts to reduce illegal logging in a number of ways. In the U.S., that effort has centered on the implementation of the 2008 Lacey Act amendments, which are helping transform the global marketplace. Those amendments serve to increase transparency and due care, shifting supply chains towards legally-sourced product. AF&PA members are finally able to compete on a more level playing field, and countries and businesses are becoming much more aware and concerned about the legality of their sourcing practices, which helps support good forest governance efforts. Anecdotal information indicates that more and more customers in major wood markets are seeking legal sources of wood and are avoiding sources of wood of questionable origin.

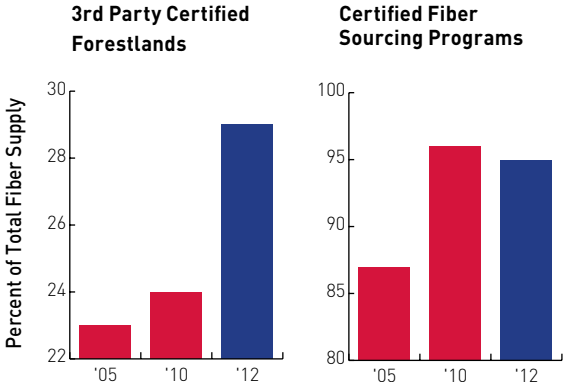
The Lacey Act and other U.S. efforts to curb illegal logging have gained traction; the European Union and Australia both have implemented their own laws to address the illegal timber trade and to encourage trade in legally sourced wood and plant products. However, this shift is far from complete, as illegal logging remains a serious problem in many parts of the globe.

AF&PA and its members are actively promoting measures to maintain the integrity and effectiveness of the amendments. For instance, we have advocated for adequate funding in the federal budget for agencies involved in the implementation and enforcement of the Lacey Act. We also worked with our allies against legislative efforts to reduce the effectiveness of the 2008 Lacey Act amendments. Finally, we have supported provisions in free trade agreements being negotiated by the U.S. government intended to curb illegal logging and associated trade.

Sustainability Award Winner

Through its "Climate Leadership Initiative," **International Paper** aggressively managed and reduced greenhouse gas emissions at its facilities by 40 percent from 2000 to 2011 through investments in capital projects and increased manufacturing efficiencies, new technologies, and encouraging employees to find new ways of working. The company was recognized by AF&PA, through a 2012 Leadership in Sustainability Energy Efficiency/ Greenhouse Gas Reduction Award, and by the U.S. Environmental Protection Agency for its achievement.

Progress Toward Sustainable Forestry Goal

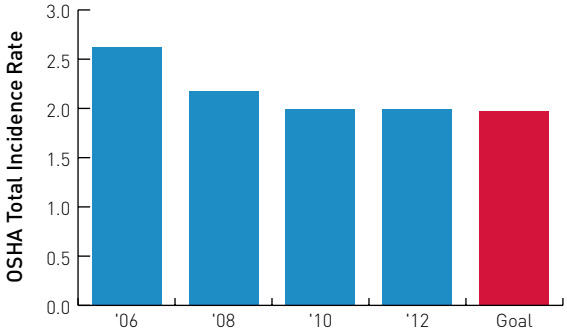


Strive for the Safest Possible Workplace

GOAL: A vision for the industry of zero injuries and measuring progress toward that vision by further improving our incidence rate by 25 percent from 2006 to 2020

The safety of our industry's employees is a priority of our sustainability program, critical to both employee well-being and the success of our businesses. The Occupational Safety & Health Administration (OSHA) recognizes industrial facilities that implement enhanced safety programs and maintain on the job injury and illness rates below national Bureau of Labor Statistics averages for their respective industries. This recognition includes enrollment in OSHA's Voluntary Protection Programs (VPP). The forest products industry has consistently had the second largest number of facilities of any sector registered by VPP. Because any injuries to our employees are not acceptable, we are continuing to work toward our vision of zero injuries for the industry. AF&PA member-implemented worker training initiatives, increased automation, and a host of injury preventive measures and safeguards have resulted in a recordable case incidence rate reduction of 24 percent since 2006. AF&PA's mandatory Environment, Health & Safety Principles require that members have health and safety policies in place and that the companies perform frequent safety audits. Our members continue to look for innovative worker safety programs to realize our vision of zero injuries.

Progress Toward Safety Goal

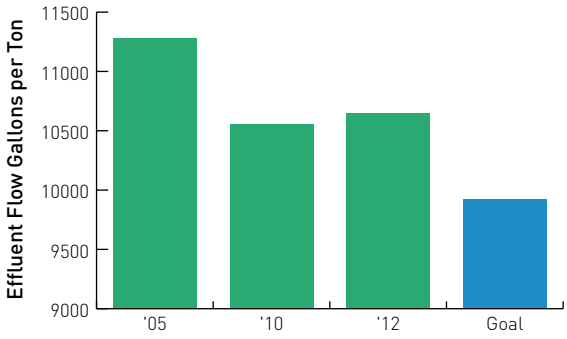


Reduce Water Use

GOAL: Reduce water use in members' pulp and paper mills by 12 percent from 2005 to 2020

Reducing water use in the paper manufacturing process is responsible stewardship of an important local resource. Just like trees, water is a valuable natural resource that our industry strives to manage in a sustainable manner. Water sustainability is achieved, in part, through water reuse and recycling. Because effluent measurements are precise and can be accurately and transparently reported, they serve as the surrogate measure of our water withdrawals. Since 2005, AF&PA member paper mills have reduced water use by 6 percent. AF&PA members continue to seek ways to reduce water use, increase water reuse and recycling, and disseminate information about the role of water in our industry.

Progress Toward Water Goal



Sustainability Award Winner

Domtar received the 2013 Leadership in Sustainability Safety Award for its Hazard Mapping Program at a large mill in Alabama. The company worked with the United Steelworkers Union to bring the Hazard Mapping Program to the mill. The mill was systematically mapped to rate hazards: checklists were developed as well hazard identification symbols. In response, 324 hazards were eliminated and, in the second year, the recordable incident rate was 1.07.

BETTER PRACTICES BETTER PLANET 2020
Continuing AF&PA's Commitment to Sustainability

The AF&PA Sustainability Award Winners 2012-13

2012

Leadership in Sustainability – Energy Efficiency/ Greenhouse Gas Reduction (Large Company)

Georgia-Pacific
Improving Energy Efficiency

International Paper
Climate Leadership Initiative

Leadership in Sustainability – Energy Efficiency/ Greenhouse Gas Reduction (Small Company)

Expera Specialty Solutions
(formerly Thilmany Papers)
Energy and Water Restructuring Program

Leadership in Sustainability – Safety

International Paper
It's about...LIFE

Leadership in Sustainability – Water

MWV
Mahrt Mill Water and Energy Reduction Project

Innovation in Sustainability

Green Bay Packaging
Fiber Reclaim Project

2013

Leadership in Sustainability – Energy Efficiency/ Greenhouse Gas Reduction

KapStone Paper and Packaging Corporation's Longview Mill
A One-Year Snapshot of Longview's Multi-Year Journey

Leadership in Sustainability – Paper Recovery for Recycling

RockTenn
RockTenn & Customer Recycling and Waste Reduction Initiative

Leadership in Sustainability – Safety

Domtar
Hazard Mapping at Ashdown

Leadership in Sustainability – Sustainable Forest Management

Domtar
Four States Timberland Owners Association

Leadership in Sustainability – Water

Georgia-Pacific Brunswick Cellulose Operation
Water Use Reduction Project

Innovation in Sustainability

Graphic Packaging International
Tite-Pak® Innovation Beverage Packaging

Appendix One:

Results from AF&PA's 2012 member survey regarding economic, social, and environmental sustainability indicators, plus information from government sources.

The Economic Indicators of Sustainability

Employment Trends

The forest products industry makes substantial contributions to global, U.S., and, especially, local economies. Pulp, paper, paper converting, and wood products manufacturing plants are major employers. In all, the sector currently employs nearly 900,000 people and is among the top 10 manufacturing employers in 47 of the 50 states.

Although employment in the sector declined sharply in 2008 (8.1 percent) and 2009 (15.8 percent), the rate of decline decreased substantially in 2011 (1.8 percent) and 2012 (0.6 percent). Preliminary data from the Bureau of Labor Statistics suggest that forest products industry employment rose 2.3 percent in 2013. Much of this rebound occurred at wood products plants. At pulp, paper, and paperboard mills, employment stood at about 108,000 people in 2012. This compares to 132,000 in 2007, one year prior to the start of the recession.

Labor Productivity

The forest products industry must operate in a highly competitive world marketplace. Improving worker productivity is an important part of the drive to reduce production costs. Output per man-hour at pulp, paper, and paperboard mills increased 36 percent during the ten-year period 2001 through 2011. The average annual increase for the period was 3.1 percent. At wood products facilities during the same period, labor productivity rose 23 percent, or at an average rate of 2.1 percent per year. The productivity contributions of our workers are critical to the U.S. industry's ability to compete in the world marketplace.

Forest Products Industry Labor Productivity Gains

Compensation

The forest products industry provides skilled jobs paying high wages. According to data compiled by the Bureau of Labor Statistics (BLS) and the Bureau of Economic Analysis, total compensation for the sector in 2012 was approximately $52 billion. These sectors include pulp, paper, and paperboard mills, paper converting, wood products mills, wood kitchen cabinets, and logging.

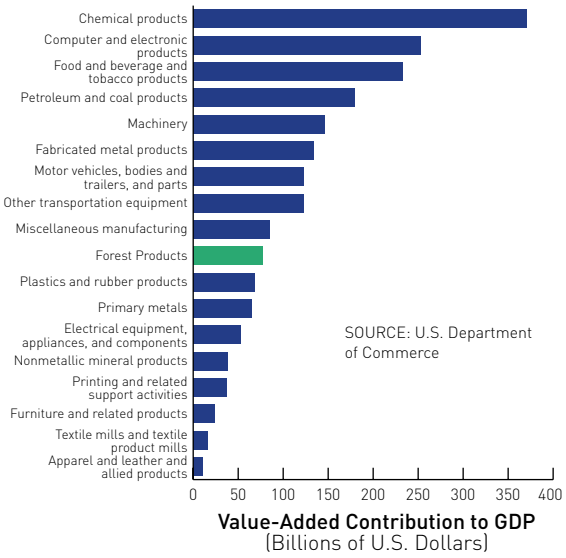
Contribution to Gross Domestic Product (GDP)

In 2012, the forest products industry contributed almost 4 percent of the U.S. manufacturing GDP, according to Census Bureau data. Pulp, paper, and paperboard contributed 2.6 percent and wood products, 1.2 percent.

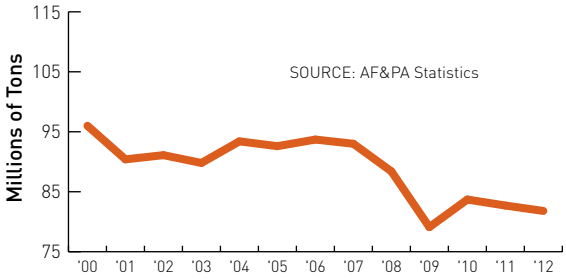
Production

U.S. paper and paperboard production fell sharply during the recession years, declining 4.9 percent in

Forest Products Industry Contribution to U.S. Manufacturing GDP (2012)



Paper Industry Production

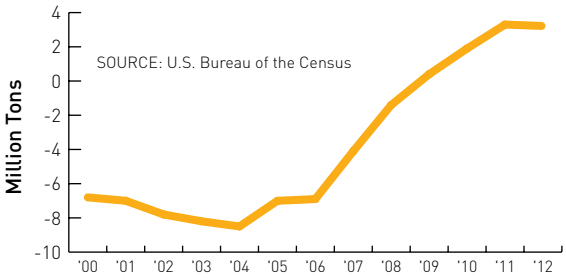


2008 and 10.6 percent in 2009. Though declines have continued, they have been much smaller in recent years. Production was off 1.1 percent in 2012 and, according to preliminary data, 0.8 percent in 2013.

U.S. Trade Competitiveness

The U.S. has traditionally run a trade deficit with respect to paper and paperboard. That deficit reached 8.5 million tons in 2004 and then began to contract.

Paper Industry Trade Balance Improvement

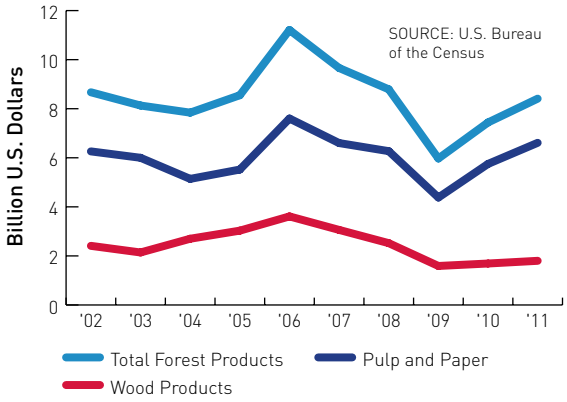


The U.S. recorded a small trade surplus with respect to paper and paperboard in 2009, which continued to grow to reach 3.2 million tons in 2012.

Capital Expenditures

Forest products industry capital expenditures fell from $11.2 billion in 2006 to $6.0 billion in 2009 before beginning to rebound. They reached $7.4 billion in 2010 and increased further to $8.4 billion in 2011, the latest year for which data are available. The 2011 level of expenditures was on par with average forest products industry capital spending of $8.5 billion a year for the period 2002 through 2011. In 2011, paper and paperboard mills spent $6.6 billion on plant and equipment, while wood products facilities spent $1.8 billion.

Forest Products Industry Capital Expenditures



AF&PA Member Case Study

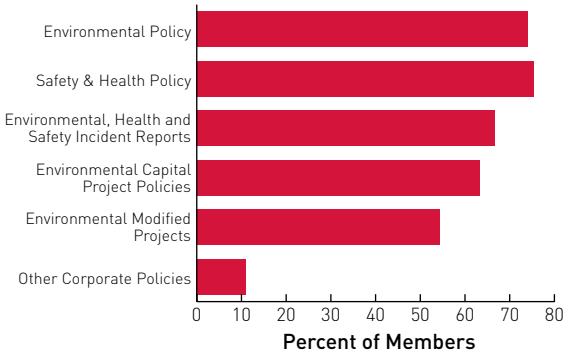
Employees at **Clearwater Paper Corporation**'s Shelby, North Carolina, mill partnered with Communities in Schools to provide backpacks for hundreds of school children in need.

The Social Indicators

Individual Member Policies

Members adhere to AF&PA EHS policies in a variety of ways. These can include formal written internal policies, agreements with employees and other stakeholders, incorporation of principles in meetings and training programs, etc. Safety and health policies were reported by 75.4 percent of members; environmental policies by 73.7 percent. In addition to EHS policies, members also have policies for reporting EHS incidents to senior management, highlighting the need for environmental capital projects, use as

Members Reporting Internal Policies

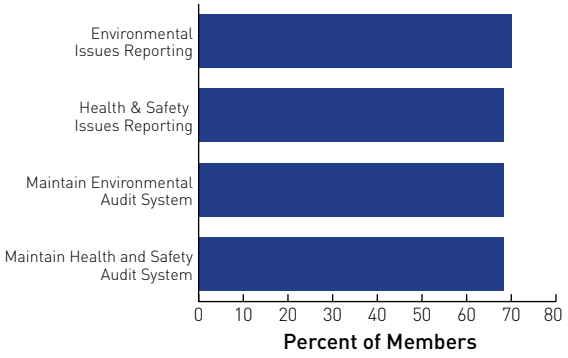


guidance regarding environmentally-oriented product design, and other proclamations (social responsibility policies, stewardship measures, sustainability policy statements, etc.) during 2012.

Internal Reporting

Members establish internal reporting systems to inform senior management, middle management, and line employees of the company's sustainability performance and trends. Details regarding these systems vary member to member but are guided by the AF&PA EHS Principles. Environmental issues reporting systems were recorded by 70.2 percent of members in the 2012 survey. Health and safety reporting systems were recorded by 68.4 percent, while the same number of members also reported having audit systems in place for both health and safety and environmental programs.

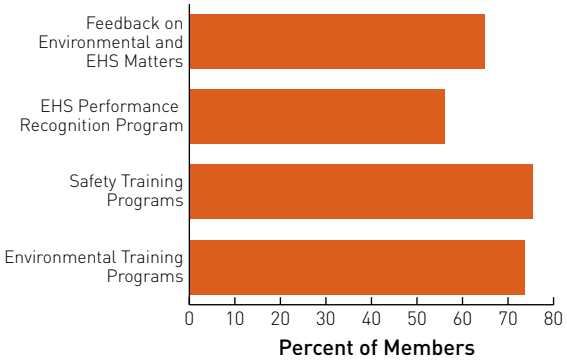
Members Internal Reporting Systems



Employee Programs

Company programs include several measures that aid and encourage employees to follow sustainable practices. These include environmental and safety training programs, employee recognition programs, and confidential feedback arrangements employees can use to report any problematic safety or environmental performance practices that they encounter on the job. In response to the 2012 survey, AF&PA members reported that 73.7 percent utilized environmental training programs, 75.4 percent utilized safety training programs, 56.1 percent sponsored EHS employee performance recognition programs, and 64.9 percent provided employee feedback mechanisms regarding environmental and safety matters.

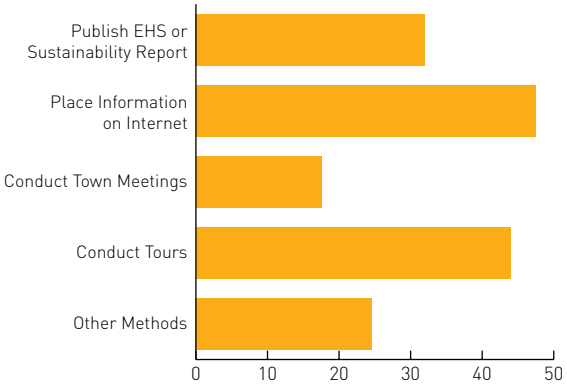
Employee Sustainability Program Measures



Public Reporting

AF&PA members strive to keep stakeholders informed of their sustainability activities through public engagement initiatives. Such initiatives include published reports, Internet postings, town hall meetings, plant tours and other means. Many members use a mix of methods. In 2012, 32 percent of members published EHS or sustainability reports. Nearly half (47.4 percent) made information regarding sustainability performance available on the Internet. Town meetings were held by 17.5 percent, while 43.9 percent conducted plant tours and 24.6 percent used other means for public reporting such as newsletters and newspaper articles, responses to direct stakeholder inquiries, cooperation with trade organizations, and presentations to local civic organizations.

Members Public Engagement Reporting

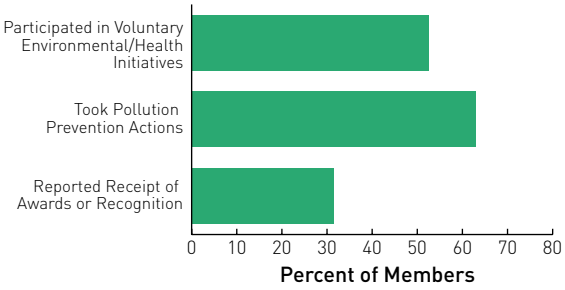


Voluntary Efforts, Pollution Prevention, and External Recognition

AF&PA members actively participate in voluntary pollution reduction and pollution prevention initiatives. Examples include the U.S. EPA's Energy Star program, U.S. EPA's Climate Leadership program relating to greenhouse gas emissions reductions, and others. In response to the 2012 EHS member survey, AF&PA members reported on participation in voluntary environmental and health-related programs and on initiatives taken in the area of pollution prevention. Members also received recognition for their environmental and sustainability accomplishments from outside organizations and officials. Examples of these awards and recognition include:

- Energy excellence awards from public utilities;
- Safety awards from state departments of labor officials and/or governors;
- Awards and recognition from universities;
- Awards and recognition from customers and/or supply chain organizations; and
- Environmental sustainability awards from AF&PA and other associations.

Voluntary Efforts, Pollution Prevention, and External Recognition

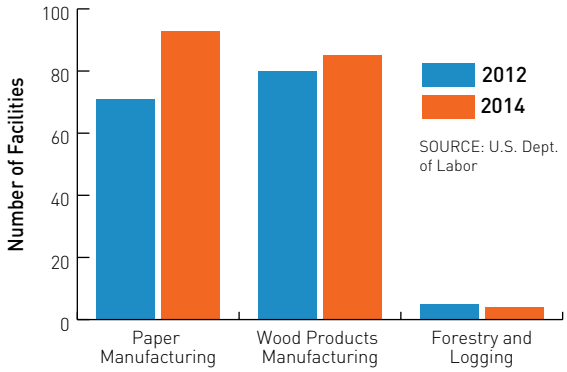


Worker Safety Performance

AF&PA member OSHA incidence rates reported via the EHS Principles Verification Program 2012 Survey show that the number of injury or illness cases per 100 equivalent full-time employees at pulp and paper mills decreased 4.3 percent between 2010 and 2012. However, incidence rates at wood products facilities increased.

The OSHA VPP status is awarded to industrial facilities that voluntarily work to maintain job illness and injury rates below national Bureau of Labor Statistics averages. As of February 2014, AF&PA members had 4 forestry and logging operations, 85 wood products manufacturing plants, and 93 pulp and paper manufacturing facilities awarded VPP status. These numbers compare with 80 wood products plants and 71 pulp and paper facilities recorded in February of 2012. The number of forestry and logging operations recorded as obtaining VPP status was 5 in 2012.

Member VPP Enrolled Facilities



Public Policy and Community Outreach

It is important for AF&PA member companies to be engaged in the development of public policy and in community outreach. In this way, policymakers have an opportunity to hear directly from regulated entities regarding how proposed policies or regulations will affect the industry. Through collaborative processes they get a better understanding of measures likely to produce the best and most cost-effective results. Community members gain the opportunity to become better informed about local facility operations. They can present their own points of view and concerns, as well as have an opportunity to support the company. Based on the 2012 member survey results, 63.2 percent of members reported conducting public policy and community outreach activities.

The Environmental Indicators

AF&PA members have tracked and worked to reduce releases to the environment for decades. This practice has provided an important database from which our substantial progress towards sustainability can be reported.

Energy Production

Renewable biomass fuels at member mills provided 65.9 percent of energy produced at pulp and paper mills and 70.6 percent of energy produced by wood products facilities. These carbon neutral materials include bark, sawdust, wood shavings, and other woody material collectively known as "hogged fuel," as well as spent pulping liquors.

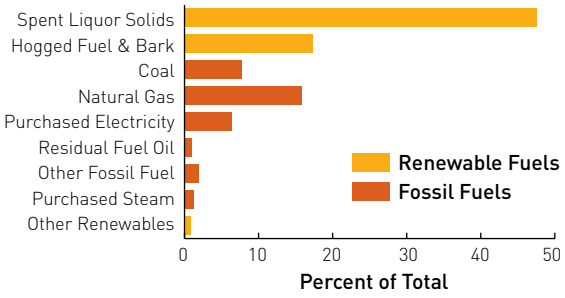
Use of purchased energy (fuels used to produce electricity and steam on-site, as well as steam and electricity purchased directly) at pulp and paper mills has decreased by 44.7 percent since 1972, 25.4 percent since 1990, and 14.6 percent since 2000.

Combined heat and power (CHP) production is an important part of energy generation at forest products manufacturing plants. CHP energy is produced in the forest products industry by utilizing the heat contained in electricity generation turbine exhaust steam in production processes, equipment, and buildings before the condensed steam is returned to boilers for reuse. This process raises the energy production efficiency from 33 percent for non-CHP generation processes to between 50 and 80 percent. In 2012, 96.4 percent of the electricity the industry generated was through CHP, which enabled many members to efficiently generate significant portions of their electricity. Fifty-nine percent of the electricity used by our members was self-generated (the remainder was purchased). Indeed, 42 percent of our members' mills self-generated more than half of their power, and 23 percent sold excess power back to the grid — much of it renewable as well.

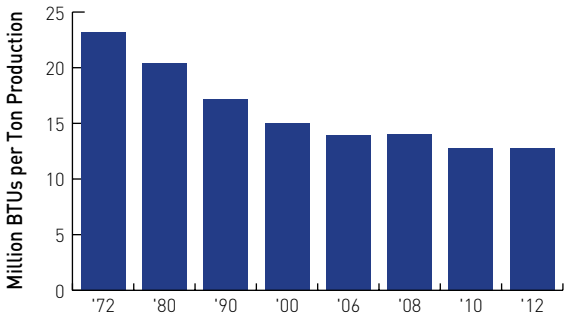
Sustainability Award Winner

Throughout a two-year period, **Expera Specialty Solutions** (formerly Thilmany Papers) completed more than 35 energy-efficiency projects, and its Kaukauna, Wisconsin mill joined the U.S. Department of Energy's (DOE) "Better Buildings Better Plants" program, resulting in a 19 percent reduction in purchased energy intensity. AF&PA awarded them a 2012 Leadership in Sustainability Energy Efficiency/Greenhouse Gas Reduction Award for their accomplishments.

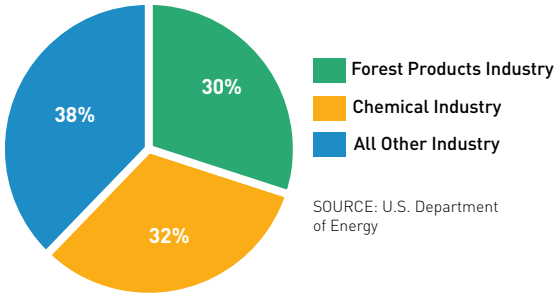
2012 Pulp and Paper Mill Energy Sources



Pulp and Paper Mill Purchased Energy Use



2012 CHP Electricity Generation by Industry



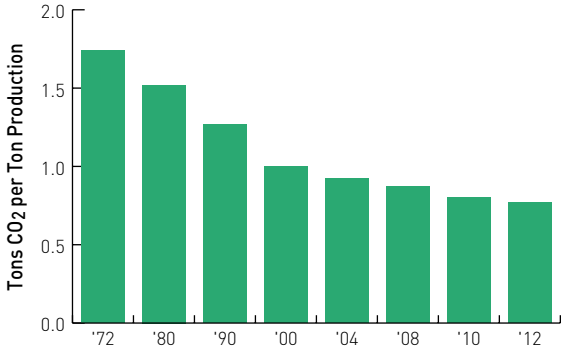
SOURCE: U.S. Department of Energy

The forest products industry is the second largest producer of CHP electricity in the manufacturing sector; only the chemical industry produces more.

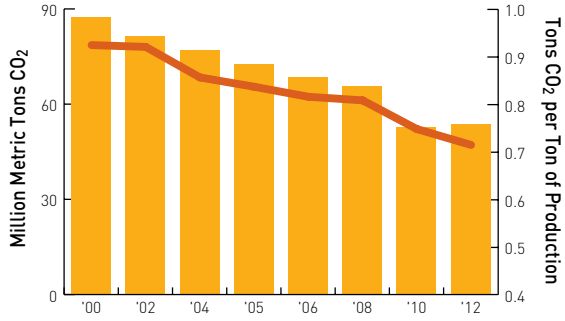
Greenhouse Gas Emissions

Forest products industry greenhouse gas emissions have been significantly reduced. At pulp and paper mills, the emission rate expressed in tons of CO_2 equivalents per ton of production has been reduced by 55.8 percent since 1972, 23.1 percent since 2000, and 3.9 percent compared to 2010. The absolute emis-

Pulp and Paper Mill Greenhouse Gas Emissions Reductions



Member Greenhouse Gas Emissions
(Total Direct and Indirect)

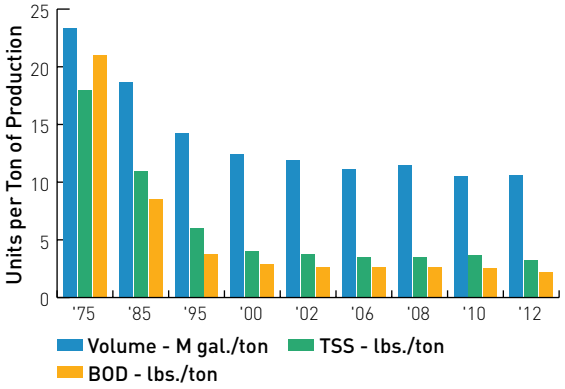


sions from pulp and paper mills and wood products facilities combined, expressed in tons of CO_2 equivalents, have decreased by 38.6 percent since 2000. The emissions intensity rate for pulp and paper mills and wood products facilities combined, expressed in tons of CO_2 equivalents per ton of product, decreased by 22.5 percent since 2000. Between 2010 and 2012, this rate was reduced by 4.4 percent.

Water Discharges

AF&PA member pulp and paper mills utilize sizeable quantities of water in the manufacture of their products. Mills actively seek to employ water conservation and water use reduction practices. Water withdrawn by the mills is recycled and reused up to ten times before being discharged to biological systems for treatment and release back into the environment. Consumptive water use by member mills is low. About 88 percent of water withdrawn for use in the mills is returned after treatment. Since 1975, mills have reduced the quantity of water discharged by 54.5 percent. Since year 2000, water use as measured at the point of release has decreased 14.5 percent. Water use in 2012 was essentially the same as in 2010 — 10,600 gallons per ton of production. Of greater significance is the progress made in effluent quality. Since 1975, the quantity of total suspended solids (TSS) released to receiving waters by mill treatment systems has decreased by 82 percent. Biochemical Oxygen Demand (BOD), a measure of the amount of organic material in the effluent that results in lowered oxygen content of receiving streams, has been reduced by 89.3 percent. BOD reduction since year 2000 is 22.7 percent. Compared to 2010, TSS releases were reduced by 11.5 percent, and BOD releases were reduced by 12.9 percent.

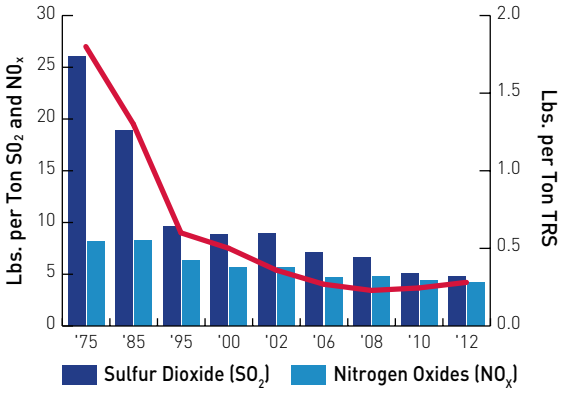
Pulp and Paper Mill Effluent Discharges



Air Emissions

AF&PA member mills have also substantially reduced air emissions. Releases of sulfur dioxide, nitrogen oxides, and total reduced sulfur compounds at pulp and paper mills have been reduced through process modifications and energy conservation measures. Wood products facilities have reduced nitrogen oxide releases compared to those of the late 1990s. Between 1975 and 2012, paper mill sulfur dioxide emissions have been reduced by 81.6 percent. Since 2000, sulfur dioxide emissions were 46 percent lower. For 2012, sulfur dioxide emissions were 6.4 percent lower than 2010, due to changes in our fuel mix and continual environmental improvement. Nitrogen oxide emissions since 1975 were down 48.9 percent in 2012. Since year 2000, nitrogen oxide emissions have been reduced 26.4 percent. The 2012 emissions of these nitrogen compounds were 3.7 percent lower than 2010. Total reduced sulfur (TRS) compound emissions have been reduced 84.5 percent since 1975 and 44.3 percent since 2000. However, compared to 2010, in 2012 these low level TRS emissions increased by 13.9 percent — from 0.245 pounds per ton to 0.279 pounds per ton.

Pulp and Paper Mill Air Emissions



Chemical Releases[13]

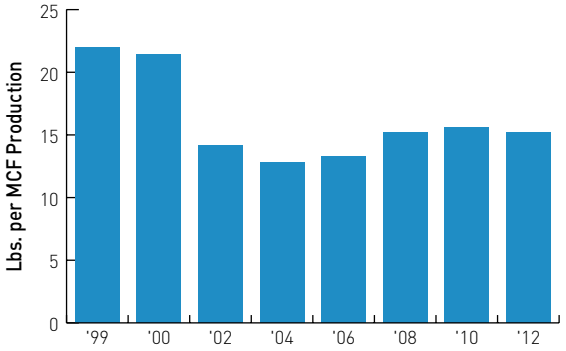
AF&PA members track and report on chemical releases. Compounds of interest include substances listed by U.S. EPA for reporting through the Toxics Release Inventory (TRI) program and compounds specifically related to operations at pulp and paper mills and wood products facilities. These specific compounds include chlorine, chlorine dioxide, chloroform, and methanol

Sustainability Award Winner

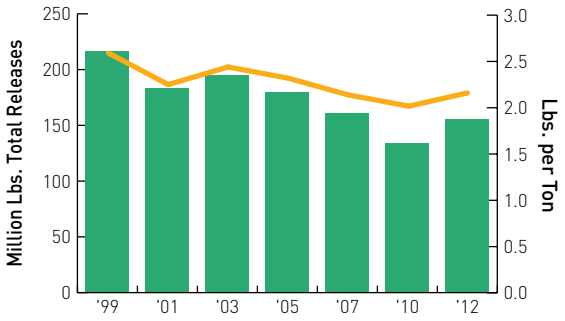
Georgia-Pacific's Brunswick Cellulose, Inc. subsidiary received the 2013 Leadership in Sustainability Water Award for its "Water Use Reduction" project at the Brunswick, Georgia, mill. The mill installed a single-line bleach plant to replace three older pulp bleaching processes, resulting in a reduction in overall groundwater use of nearly 10 million gallons per day, or 30 percent of the mill's total daily use.

[13] The chemical release data in this section are from the EPA TRI database, except for the pulp mill AOX data, which are from the AF&PA EHS Survey. The data are from AF&PA members only. One factor that makes comparison of these data difficult is that AF&PA membership has changed between these benchmarking years. The membership has not consisted of exactly the same set of mills for each of the comparison years.

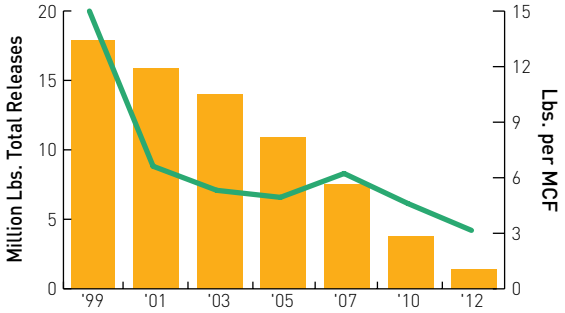
Wood Products Facility NO_X Emissions



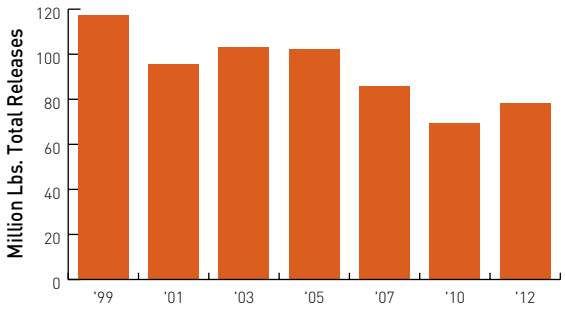
Pulp and Paper TRI Releases



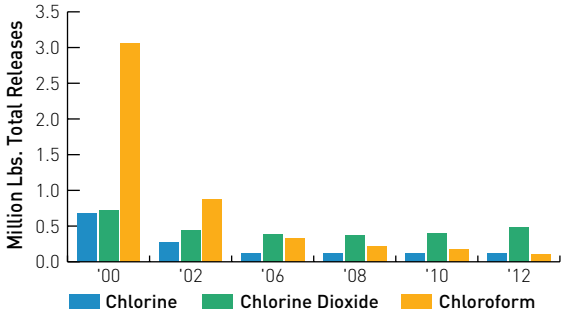
Wood Products TRI Releases



Pulp and Paper Mill Methanol Releases



Pulp and Paper Mill Chlorine Compound Releases



at pulp and paper mills; methanol and formaldehyde at wood products facilities. Since 1999, pulp and paper mill total TRI releases have been reduced by 28.1 percent. Between 2010 and 2012, total TRI releases increased 16 percent. On a pound per ton of product basis, the reduction between 1999 and 2012 has been 16.6 percent. Between 2010 and 2012, pound per ton release rates increased by 7.5 percent.

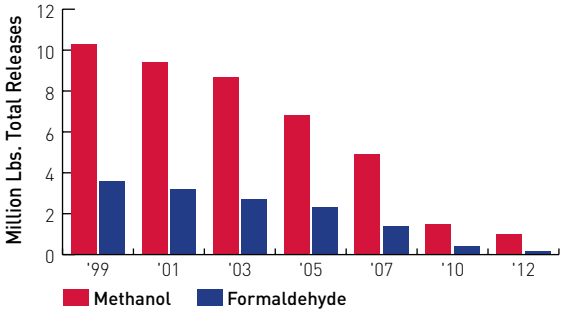
At wood products facilities, TRI total releases have been decreased by 92.2 percent between 1999 and 2012. Between 2010 and 2012, TRI compound total releases decreased 63.2 percent. On a pounds per 1000 cubic feet of product basis, the reductions achieved were 78.6 percent between 1999 and 2012 and 30.4 percent between 2010 and 2012.

Pulp and paper mill releases of chlorine, chlorine dioxide, and chloroform are tracked by looking at total industry release rates as reported by U.S. EPA's TRI Explorer database. Releases of these chlorine compounds have been substantially reduced since 2000. During this period, releases of chlorine have been reduced by 82.6 percent, chlorine dioxide by 32.3 percent, and chloroform by 96.6 percent. Between 2010 and 2012, chlorine releases remained the same at 0.12 million pounds, chlorine dioxide releases increased from 0.40 million pounds to 0.49 million pounds, and chloroform releases decreased 39.3 percent from 0.17 million pounds to 0.10 million pounds.

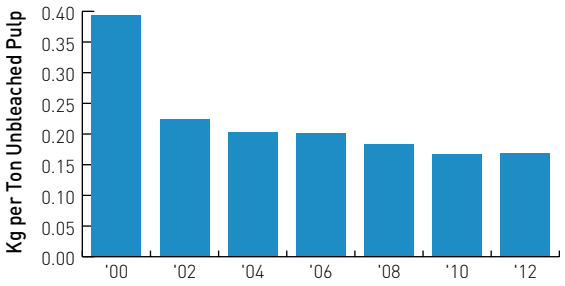
Methanol releases at member pulp and paper mills have been reduced by 33.4 percent between 1999 and 2012. Between 2010 and 2012, methanol releases increased 11.2 percent.

At AF&PA member wood products facilities, methanol releases between 1999 and 2012 decreased by 90.3 percent. Between 2010 and 2012, they decreased by 33.3 percent. Formaldehyde releases decreased by 95.8 percent at wood products facilities between 1999 and 2012. Between 2010 and 2012, formaldehyde releases decreased 50.0 percent, in part because the California Air Resources Board standards, which generally are being met nationally, became effective.

Wood Products Facility Methanol and Formaldehyde Releases



Paper Mill Effluent AOX Discharges

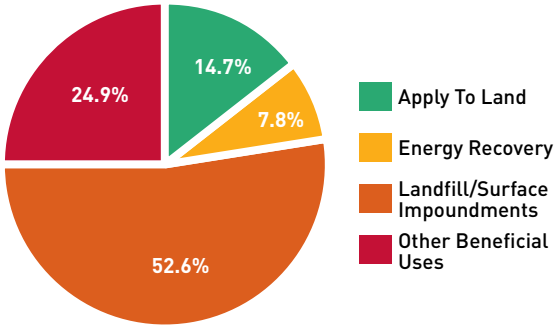


Adsorbable organic halides (AOX) are chlorinated organic compounds that can, under certain conditions, be formed during pulp bleaching. Through process changes, member companies have virtually eliminated AOX releases from pulp mill effluents. Since 1975, AOX releases have been reduced by 95.8 percent and by 57.4 percent since year 2000. Releases recorded in 2012 matched those in 2010, 0.17 kilograms per ton of unbleached pulp.

Beneficial Use of Manufacturing Residuals

Member pulp and paper mills strive to utilize as much raw material brought to the mills as possible. Any materials not utilized for primary products, by-products, or as primary energy sources are known as manufacturing residuals. These include soil contaminated wood yard wastes, wastewater treatment plant residuals, boiler ash, etc. These materials are beneficially used by spreading on land as soil conditioners and amendments, burned for energy recovery with other biomass fuels, or utilized in other ways. Materials that cannot be beneficially used are placed in landfills or surface impoundments. In 2012, 52.6 percent of generated residuals were disposed in landfills, 14.7 percent land spread, 7.8 percent burned for energy recovery, and 24.9 percent utilized in other ways. In 2012, the portion of residuals disposed in landfills decreased, and beneficial use of these materials increased. In 2010, the residuals portion discarded was 58 percent.

Pulp and Paper Mill Residuals Management



Research, Development and Innovation

AF&PA members utilize many technical resources as they seek continued improvements in process efficiency, product quality, and sustainability. In responses to the 2012 EHS Principles Verification Program Corporate survey, AF&PA members reported using a variety of research and development (R&D) and technical innovation resources. These included internal company R&D groups, R&D sponsored at external academic or contract research organizations, and industry-sponsored research organizations or initiatives.

Notable organizations or programs supported by AF&PA members include:

- **National Council for Air and Stream Improvement (NCASI)** — The forest products industry has pioneered environmental improvement measures since 1943 when the National Council for Air and Stream Improvement (NCASI), a non-profit research institute focused on environmental topics relevant to forest management and the manufacture of forest products, was founded.
- **Institute of Paper Science and Technology (IPST)** — The Institute of Paper Science and Technology (IPST) was created in 1929 to provide science, technology, and education in support of the forest products industry. Today, IPST is an industrial research and development center integrated within the vast resources of the Georgia Institute of Technology. IPST is focused on providing solutions to strategic, economic, scientific, and technical challenges facing the forest products industry.
- **Center for Paper Business and Industry Studies (CPBIS)** — Established in 2000 as part of the Alfred P. Sloan Industry Studies Program and now affiliated with the Industry Studies Association,

the Center for Paper Business and Industry Studies (CPBIS) at the Georgia Institute of Technology is one of 23 Industry Studies Program Centers. The CPBIS mission is to create and disseminate knowledge to further the understanding of business, management, organizational and social issues of importance to the paper industry.

- **Agenda 2020 Technology Alliance** — Agenda 2020 is a non-profit organization established for scientific and educational purposes. Agenda 2020 works to transform the forest products industry through innovation in its manufacturing processes and products. Guided by the 2010 Forest Products Industry Technology Roadmap that presents important R&D needs, Agenda 2020's work addresses the priority R&D needs as determined by member companies. Teams of representatives from member companies, universities, and government work together to form an integrated technology strategy. Agenda 2020 members envision a forest products industry that is fully sustainable, has profitable long-term growth, and continues to reduce its environmental footprint and requirements for energy and water — an industry that is transformed through the use of breakthrough technologies.

Appendix Two:

AF&PA Sustainability-Related Requirements for Members

AF&PA Sustainable Procurement Principles

1. Take part in the Sustainable Forestry Initiative® program as a program participant; or

2. Adhere to the following principles:

i. Support programs that supply regionally appropriate information or services to forest landowners, describing the importance of and providing implementation guidance on best management practices (BMPs); reforestation; afforestation; visual quality management; management of harvest residue; control of invasive exotic plants and animals; characteristics of special sites; and conservation of critical wildlife habitat elements and threatened and endangered species, and Forests with Exceptional Conservation Value.

ii. Encourage landowners to utilize the services of qualified resource professionals and qualified logging professionals in applying principles of sustainable forest management.

iii. Maintain a program for the purchase of raw material from wood producers that have completed training programs and are recognized as qualified logging professionals.

iv. Maintain a program to address adverse weather conditions.

v. Monitor and evaluate the use of BMPs across the wood and fiber supply area.

vi. Monitor the use of BMPs by wood producers supplying the company's facilities and use the information to maintain rates of conformance to best management practices and to identify areas for improved performance.

vii. If the company procures wood fiber outside North America, maintain programs to:

- Promote conservation of biodiversity hotspots and major tropical wilderness areas.
- Ensure fiber sourcing programs support the principles of sustainable forestry, including efforts to thwart illegal logging.
- Assess the risk that fiber-sourcing programs could acquire material from illegal logging.
- Assess the risk that fiber-sourcing programs could take place in countries without effective laws addressing worker safety, fair labor practices, indigenous people's rights, anti-discrimination, anti-harassment, prevailing wages, and worker's right to organize.

viii. Individually and/or through cooperative efforts provide support or funding for forest research to improve forest health, productivity, and sustainable management of forest resources, and the environmental benefits and performance of forest products.

ix. Provide funding and other support for training and education programs to foster improvement in the professionalism of wood producers, including awareness and implementation of sustainable forest management practices.

x. Comply with applicable federal, provincial, state, and local forestry and related environmental and social laws and regulations.

3. Participate in one of the qualifying sustainable forest management programs, including chain-of-custody certification.

AF&PA Environmental, Health & Safety (EHS) Principles

The EHS Principles require members:

- To make environmental, health and safety considerations priorities in operating existing facilities, as well as in the planning of new operations.
- To recognize, in developing and designing products to meet customer needs, the environmental, health and safety effects of product manufacture, distribution, use, and disposal.
- To monitor their environmental, health and safety performance and to report regularly on these matters to their Boards of Directors, as well as to confirm their adherence to these principles annually to the American Forest & Paper Association.
- To train employees in their environmental, health and safety responsibilities and to promote awareness and accountability on these matters.
- To improve environmental, health and safety performance through support of research and development that advances the frontiers of knowledge.
- To communicate with employees, customers, suppliers, the community, public officials, and shareholders to build greater understanding on environmental, health and safety matters.
- To participate constructively in the development of public policies on environmental, health and safety matters.
- To continue to pursue energy conservation, increased energy efficiency, greater utilization of alternatives to fossil fuels, and opportunities for cogeneration of electricity.

AF&PA Sustainability Leadership Highlights

1990
Set first paper recovery goal — 40 percent by 1998

1994
Achieved 40 percent recovery goal

1995
Launched mandatory AF&PA EHS Principles

1996
Set higher recovery goal — 50 percent by 2004

1998
Sustainable Forestry Initiative (SFI®) certification and licensing programs

1999
SFI® Program receives national sustainability award from Renew America and President's Council for Sustainable Development

2000
Published first Environmental, Health & Safety (EHS) Report

2002
Partnered with U.S. State Department to eliminate global illegal logging

2003
Achieved 50 percent goal and set new goal to recover 55 percent by 2012

2005
Launched AF&PA Recycling Awards program

2006
AF&PA member companies reach GHG intensity reduction goal 6 years ahead of schedule

2007
Achieved paper recovery goal early by achieving 56 percent

2008
Set goal to recover 60 percent by 2012

2009
Exceeded 60 percent paper recovery goal ahead of schedule

2011
Launched *Better Practices, Better Planet 2020* sustainability program

Set goal to exceed 70 percent recovery by 2020

2012
Released first sustainability goals progress report

2013
Fifth consecutive year of recovering more than 60 percent of paper in the U.S.

Internet Addresses for Forest Products Organizations

American Forest & Paper Association
www.afandpa.org

National Council for Air and Stream Improvement
www.ncasi.org

Technical Association of the Pulp and Paper Industry
www.tappi.org

Institute of Paper Science and Technology
www.ipst.gatech.edu

Center for Paper Business and Industry Studies
www.cpbis.gatech.edu

Agenda 2020 Technology Alliance
www.agenda 2020.org

Society of Wood Science & Technology
www.swst.org

American Forest & Paper Association

1101 K Street, NW, Suite 700, Washington, DC 20005
www.afandpa.org

10% total recycled fiber