

# Forest Products

## Sector At-a-Glance

Number of Facilities:	15,000
Value of Shipments:	\$210 Billion
Number of Employees:	850,000

Source: U.S. Census Bureau, 2001<sup>1</sup>

**Profile** The forest products<sup>2</sup> sector includes companies that grow, harvest, or process wood and wood fiber for use in products. While the industry has operations in all 50 states, it is concentrated in the southeast and Great Lakes regions of the country.<sup>3</sup>

The forest products sector can be divided into two segments: one manufactures pulp, paper, and paperboard products; and the second produces engineered and traditional wood products. In recent years, decreases in demand from U.S. customers and increased foreign competition have negatively impacted the pulp and paper segment. Losses in the wood products segment have been minimized by the continued boom in the home building and improvement sector. Additional factors, such as improved efficiencies of new equipment and over-capacity in the market, have resulted in the closure of 100 paper mills and 125 wood products facilities and the elimination of more than 127,000 jobs since 1997.<sup>4</sup>

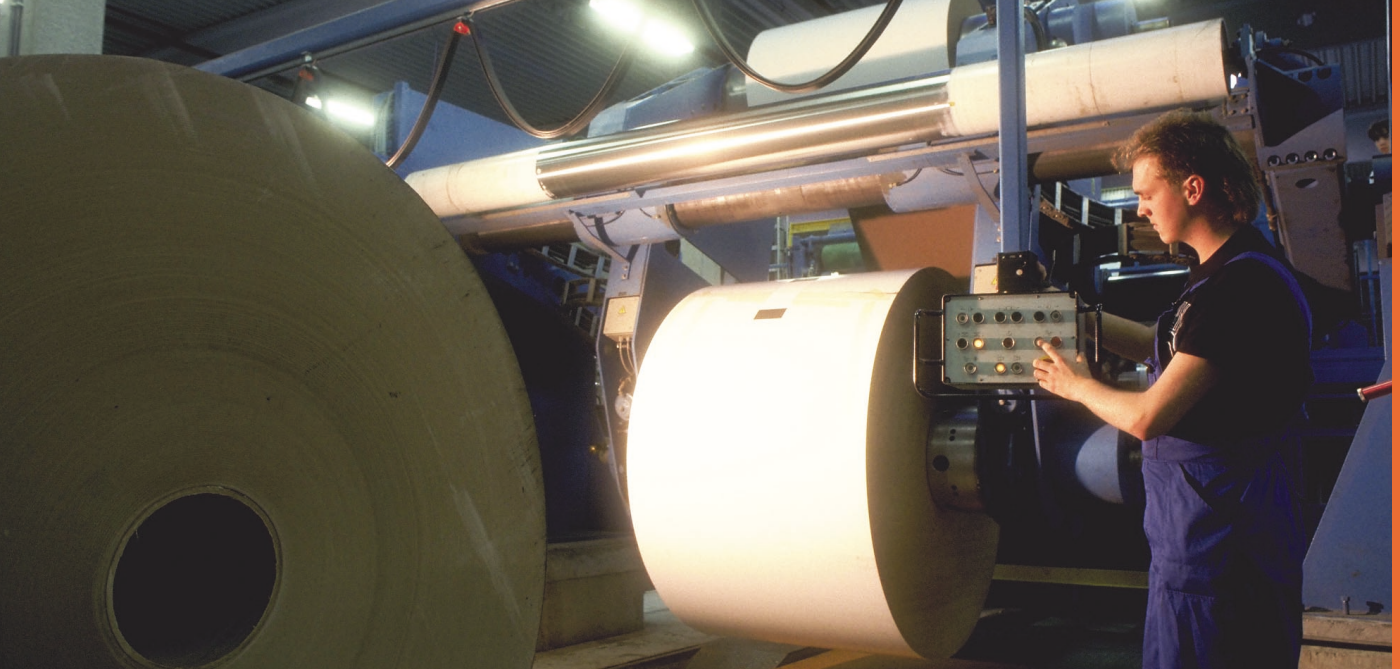
**PRODUCTION PROCESS** Forest products are manufactured through a variety of processes:

- ■ ■ ■ To produce paper and paperboard products, wood material is digested or cooked down to make pulp, then the fibers are separated from impurities, bleached (if necessary), dewatered, pressed, and rolled.
- ■ ■ ■ To produce lumber, logs are debarked and cut first into “cants”, then cut into specific lengths of sawn lumber, dried, and coated with surface protection.
- ■ ■ ■ To produce veneer or plywood, logs are peeled or sliced into thin strips, dried, layered and glued to form panels, then pressed into boards.
- ■ ■ ■ To produce reconstituted wood products (such as medium density fiberboard), raw wood is shredded or ground, mixed with adhesive, then pressed into boards.

**PARTNERSHIP** The American Forest & Paper Association (AF&PA) has formed a partnership with EPA’s Sector Strategies Program to improve the environmental performance of the forest products industry. AF&PA’s more than 200 members manufacture more than 88% of the printing and writing paper and 60% of the structural wood products produced in the U.S.<sup>5</sup>

**KEY ENVIRONMENTAL OPPORTUNITIES** The forest products sector is working with EPA to improve the industry’s performance by:

- Increasing energy efficiency;
- Reducing air emissions;
- Managing and minimizing waste;
- Conserving water;
- Improving water quality;
- Encouraging sustainable forestry; and
- Promoting environmental management systems.



## Increasing Energy Efficiency

Given the energy intensive nature of its manufacturing processes, reducing energy consumption is an important environmental focus for the forest products sector. In 1998, the industry consumed more than 3,200 trillion Btus of energy, making it the third largest industrial consumer of energy among U.S. manufacturing sectors. Within the sector, the pulp and paper segment accounts for 85% of the energy use, while the wood products segment accounts for 15%.<sup>6</sup>

To minimize the environmental impact of its energy consumption, the forest products sector is investing in a variety of generation technologies and alternative fuels, including:

- ■ ■ Cogeneration;
- ■ ■ Biomass fuel; and
- ■ ■ Black liquor gasification.

### Cogeneration

The forest products sector has emerged as a leader in the utilization of cogeneration, a highly efficient process that produces electricity and heat from a single fuel source. Within the forest products sector, 88% of the electricity generated at pulp and paper mills and 99% of the electricity generated at wood products facilities is produced through cogeneration.<sup>7</sup>

### Biomass Fuel

The forest products industry is unique in its ability to use byproducts generated in the manufacture of pulp, paper, lumber, and other wood products as a biomass fuel source. Biomass fuel includes materials such as “hogged fuel”, which comprises logging and wood processing byproducts, and “spent pulping liquor”, which comprises extracts from the pulping process. In 2000, these renewable energy sources comprised 56% of energy consumed at pulp and paper mills and 63% of energy consumed at wood products facilities.<sup>8</sup>

### Black Liquor Gasification

To further reduce its use of fossil fuels, the forest products industry is partnering with the U.S. Department of Energy (DOE) to develop an energy generating process called “black liquor gasification”. Gasification will convert spent pulping liquors and other biomass into combustible gases that can be burned efficiently like natural gas.

Although expensive to develop, biomass gasification technologies have the potential to satisfy the energy needs of the forest products industry and to generate a surplus of almost 22 gigawatts of power per year that could be sent to the electric power grid. In addition, black liquor gasification will reduce emissions of air pollutants, such as nitrogen oxides, sulfur dioxide, and particulate matter. The first state-of-the-art biomass gasifier is now being built by Georgia-Pacific in Big Island, VA.<sup>9</sup>

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## Reducing Air Emissions

The forest products sector is working to reduce emissions of nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), and greenhouse gases (GHG).

### Nitrogen Oxide and Sulfur Dioxide Emissions

Between 1995 and 2000, emissions of NO<sub>x</sub> per ton of production in the forest products sector decreased by 10%, and emissions of SO<sub>2</sub> per ton of production decreased by 7%.<sup>10</sup> The following factors contributed to SO<sub>2</sub> reductions: increased use of lower sulfur content coal, increased use of flue gas desulfurization systems, and the retirement of chemical recovery furnaces with direct contact evaporators.

### Greenhouse Gas Emissions

In 2003, AF&PA joined Climate VISION, a voluntary program administered by DOE to reduce U.S. greenhouse gas intensity (the ratio of emissions to economic output).<sup>11</sup>

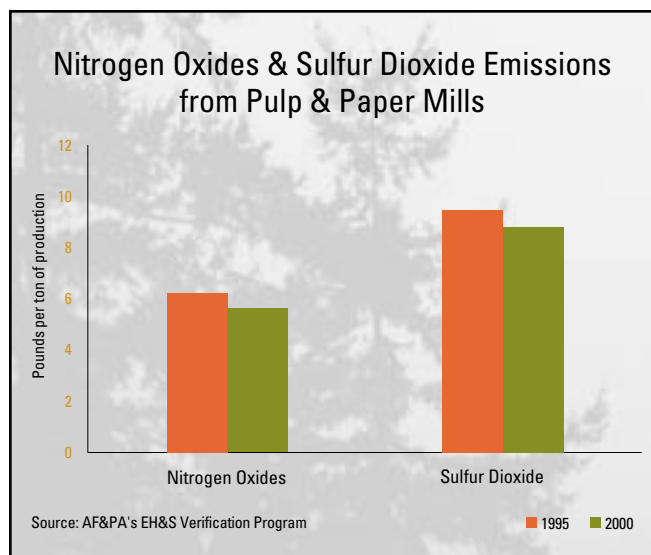
In order to reduce GHG emissions, AF&PA members are undertaking a series of programs, including carbon sequestration in forests and products, and the development of technologies to increase use of renewable biomass fuels. Based on preliminary calculations, AF&PA expects that these programs will reduce the sector's greenhouse gas intensity by 12% by 2012 relative to 2000 levels.<sup>12</sup>

Other voluntary efforts are also underway to reduce GHG emissions by forest products companies.

### Case Study: Chicago Climate Exchange<sup>®</sup>

Launched in December 2003, the Chicago Climate Exchange<sup>®</sup> (CCX) is the world's first multi-national and multi-sector marketplace for reducing and trading greenhouse gas emissions. It represents the first voluntary commitment by a cross-section of North American corporations, municipalities, and other institutions to establish a rules-based market for reducing GHG emissions.

Four companies in the forest products sector have voluntarily joined CCX<sup>®</sup> and committed to reducing their GHG emissions by 4% below the average of their 1998-2001 baseline by 2006. These companies are: International Paper, MeadWestvaco Corp., Stora Enso North America, and Temple-Inland, Inc.<sup>13</sup>

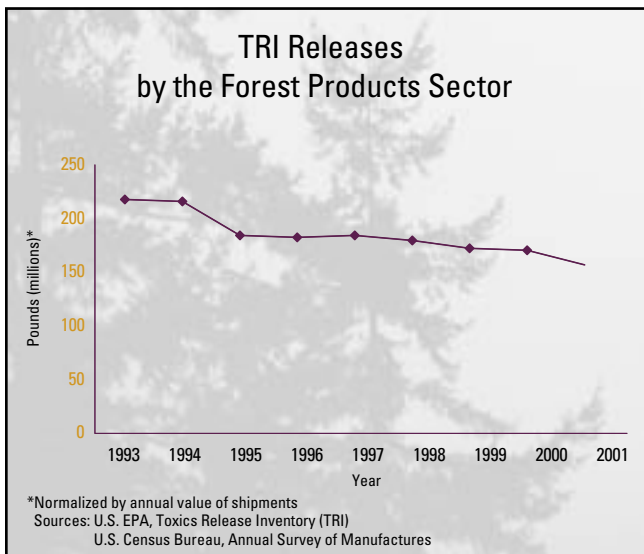


## Managing and Minimizing Waste

The forest products sector is reducing waste by reusing non-hazardous industrial wastes from the production process and by promoting recycling of paper products so that mills can use greater percentages of recycled fibers.

### Reduction in Environmental Releases

Forest products facilities use a variety of chemicals and report on the release and management of many of those materials through EPA's Toxics Release Inventory (TRI). Over the past decade, the sector has made progress in reducing wastes. Between 1993 and 2001, normalized TRI releases by forest products facilities decreased by 28%.<sup>14</sup>



### Beneficial Reuse of Waste

The majority of the forest products sector's wastes consist of non-hazardous wastewaters and sludges from pulp and paper mills. These wastes include wastewater treatment sludges, lime mud and slaker grits, boiler and furnace ash, scrubber sludges, and wood processing residuals. In 2000, more than 40% of this waste was reused rather than being burned, lagooned, or sent to a landfill. Waste from wood products mills includes waste wood particles and adhesive residues, the majority of which (90%) is beneficially reused.<sup>15</sup>

### Recycled Paper Products

AF&PA members are making efforts to increase the recycling of paper products. Their goal is to recover 55% of the paper consumed annually in the U.S. by 2012. AF&PA estimates that 48% of all paper was recovered for recycling in 2002. For some grades, such as corrugated boxes and newspapers, the recovery rate is over 70%.<sup>16</sup>

One hundred percent of recovered paper is utilized, and recovered fiber now accounts for more than one-third of the industry's domestic raw material supply.<sup>17</sup>

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## Conserving Water

The forest products sector is the third largest industrial consumer of water among U.S. manufacturing industries. The pulp and paper segment of the industry accounts for most of this water use. Between 1995 and 2000, the volume of water discharged per ton of production, an indicator of water used, decreased by 1.6% in the pulp and paper industry.<sup>18</sup>

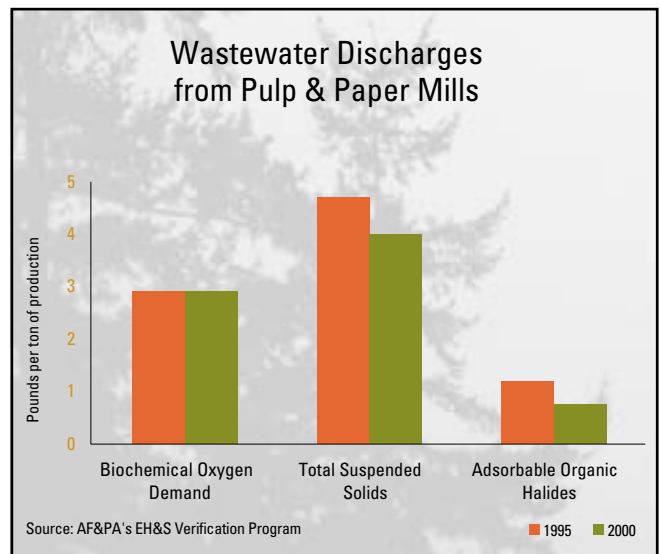
## Improving Water Quality

Due to the large volumes of water used in pulp and paper processes, virtually all U.S. mills have primary and secondary wastewater treatment systems to remove various pollutants from manufacturing process wastewater. Pulp and paper mills measure the total volume of water discharged as well as the quality of the water they discharge to public wastewater treatment facilities or into receiving waters.

Key water quality indicators include:

- ■ ■ Biochemical oxygen demand (BOD);
- ■ ■ Total suspended solids (TSS); and
- ■ ■ Adsorbable organic halides (AOX).

BOD and TSS reduce the amount of oxygen available to fish and other aquatic organisms. Between 1995 and 2000, BOD discharges remained steady, and TSS discharges decreased by 15%.



In compliance with EPA's Pulp and Paper Cluster Rule, which requires the reduction of toxic pollutants released to water and air, the industry has substituted chlorine dioxide for elemental chlorine as a bleaching agent, virtually eliminating dioxin from its wastewater. This substitution has also resulted in a 37% reduction of AOX, which is an indicator of chlorinated organic substances, between 1995 and 2000.<sup>19</sup>



## Encouraging Sustainable Forestry

America's forests cover 747 million acres or 33% of the country. Of this acreage, approximately 504 million acres are classified as timberland, meaning each acre of land is capable of growing 20 cubic feet of commercial wood per year. The majority of the timberland (58%) is owned by private, non-industrial owners, while 13% is owned by the forest products industry.<sup>20</sup> The remaining timberland is publicly owned. Increasingly, timberland is being managed using sustainable forestry practices.

### Case Study:

#### **Sustainable Forestry Initiative®**

*While there are several sustainable forestry management programs, the Sustainable Forestry Initiative® (SFI) program is the most prominent in North America. More than 90% of industrial timberland in the U.S. is enrolled in the SFI program.*

*The goal of the program is to promote sustainable forestry practices that will allow businesses to meet market demands while promoting the protection of wildlife, plants, soil, and air and water quality. Participants certify their land use and harvesting practices to a standard comprised of 6 sustainable forestry principles and 11 operational objectives.*

*Currently, of the more than 169 million acres enrolled in the SFI program in the U.S. and Canada, almost 104 million acres have been independently certified as meeting SFI program criteria by third-party auditors. In addition, participants in the SFI program have trained more than 75,000 loggers and foresters in sustainable forestry practices since 1995.<sup>21</sup>*

## Promoting Environmental Management Systems

As of October 2003, 61 forest products facilities belonging to 12 AF&PA member companies had adopted environmental management systems (EMS) certified to the ISO 14001 standard.<sup>22</sup> Eighteen of these facilities have applied and been accepted into EPA's National Environmental Performance Track.<sup>23</sup>

