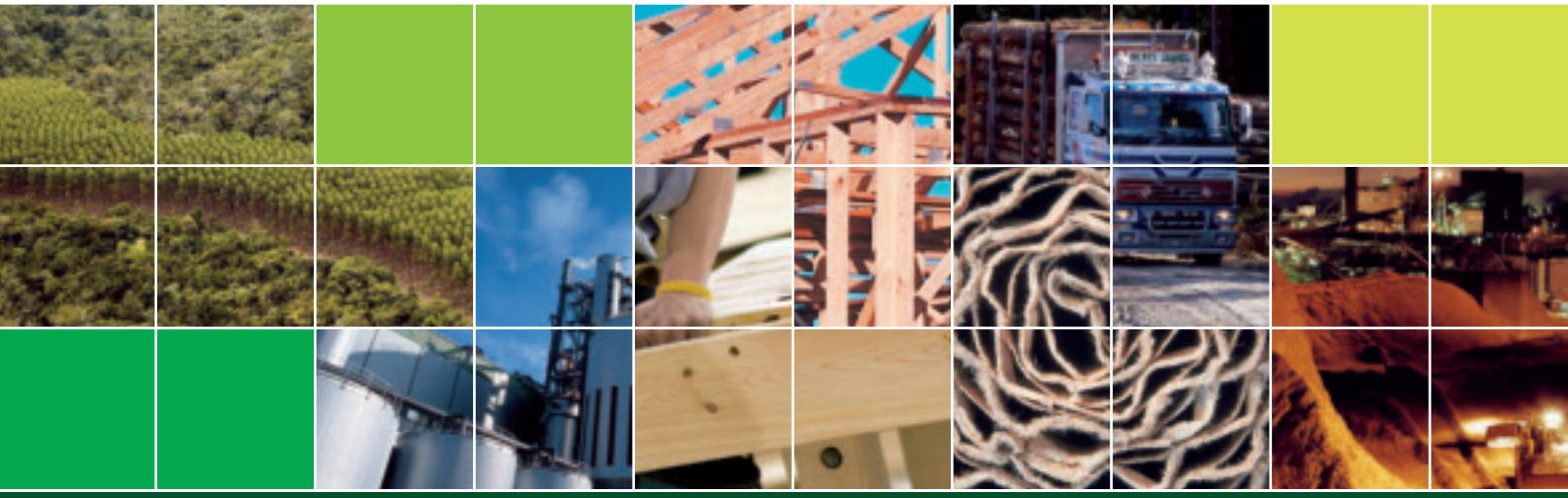
DEDICATED TO MAKING A DIFFERENCE



The Sustainable Forest Products Industry, Carbon and Climate Change

Key messages for policy-makers

World Business Council for Sustainable Development

Technical content developed by ncasi

> Biomass energy is fundamentally different from fossil fuel energy because biomass recycles carbon to the atmosphere, whereas fossil fuels introduce 'new' carbon. This is why biomass is called 'carbon-neutral'.

John Luke Jr., MeadWestvaco, and Elisabet Salander Björklund, Stora Enso, Co-chairs, WBCSD Sustainable Forest Products Industry working group

Global companies leading on carbon management

The World Business Council for Sustainable Development's (WBCSD) Sustainable Forest Products Industry (SFPI) working group consists of leading international forestry and forest product companies with a shared commitment to sustainable development and balancing efforts between economic growth, ecological balance and social progress. Responsible for around 50% of annual global forest, paper and packaging sales (US$ 178 billion, 2006) participating companies are: Aracruz, Grupo Portucel Soporcel, International Paper, MeadWestvaco, Metsäliitto Group, Mondi, Nippon Paper Group, Norske Skog, Oji Paper, Sappi, SCG Paper, Suzano Papel e Celulose, Stora Enso and Weyerhaeuser.

These companies are committed to maximizing their contribution to climate change mitigation by proactively managing their carbon profile. Under Membership Principles and Responsibilities, agreed to in March 2007, these companies commit to:

- Efficient and innovative use of fiber, energy and new technologies;
- Promoting the recyclability, recovery and appropriate reuse of fiber;
- Improving energy efficiency and use of renewable energy;
- Tracking, managing and reporting on carbon dioxide emissions;
- Promoting sustainable forest management and use of forest products as important climate mitigation strategies.

(WBCSD, 2007)

View the full SFPI Membership Principles and Responsibilities on the inside back cover.

Executive summary for policy-makers

The Sustainable Forest Products Industry – Responsible managers of carbon

- **We supply products that are made of renewable raw materials, require lower fossil energy inputs during their life cycle than most alternative non-wood products, are highly recyclable, and store carbon.**
- **Working with private and public landowners, we use forest resources sustainably, maintaining the efficient infrastructure needed to ensure healthy growing forests, the provision of valuable ecosystems services, and the responsible use of forest resources.**
- **We are energy intensive, but meet much of our energy needs with carbon-neutral biomass.**
- **We are committed to working with other stakeholders to maximize the contribution of the sector to climate mitigation.**

Our carbon opportunities

- **Breakthrough technologies are needed to significantly reduce energy consumption within the industry.**
- **To help reduce society's energy use and greenhouse gas emissions (GHG), the forest products industry can:**
  - Become even more energy efficient and increase its use of biomass in energy production;
  - Supply society and industry with increasing amounts of sustainably produced wood and fiber for use as a raw material and for bioenergy;
  - Increase the capture and use of recycled fiber;
  - Plan and provide for increased sustainable managed fiber supply.

Our carbon challenges

- **The connections between our industry and the global carbon cycle are complex –- hastily enacted climate change policies can have unintended consequences on our industry.**
- **We are capital intensive, making it difficult and expensive to change technology in response to short-term policy measures.**
- **Ours is a world marketplace, and we must think in terms of global solutions to business and environmental problems.**
- **The rapidly growing interest in using wood and other types of biomass for fuels and bio-based products creates competition for our primary raw material and the land where it grows.**

Our policy recommendations

- **Support public policies that promote faster turnover of capital stock depreciation so improvements in energy- and carbon-intensity can be accelerated.**
- **Promote the efficient use of biomass through the value chain including recycling, extraction of energy and wise use of limited land resources.**
- **Biomass energy is an important component of policies to control atmospheric CO_2. These policies must be balanced and secure:**
  - An increase in the recovery of used wood and fiber;
  - Adequate supplies of fresh fiber and other biomass for industry and society;
  - The carbon life cycle benefits associated with forest products.
- **Public policies and carbon crediting schemes should recognize all activities that accomplish real and verifiable reductions in atmospheric greenhouse gases – forest-based reductions especially.**
- **Public policies should be carefully evaluated for unintended consequences, particularly those adverse to the goals of achieving reductions in atmospheric concentrations of carbon and supporting a sustainable forest products industry.**
- **Expanded efforts to bring more of the world's forests under sustainable management could reduce carbon emissions caused by deforestation, fire, disease and insects, and conversion to agriculture.**

Responsible managers of carbon

While carbon is stored in forest products, it remains out of the atmosphere. Studies indicate that the amount of carbon stored in forest products is increasing by about 150 million tons per year. This is equivalent to removing 540 million tons of CO_2 from the atmosphere per year.

Source: NCASI. "The greenhouse gas and carbon profile of the global forest products industry". Special Report 07-02.

Carbon benefits from forest products

Forest products are made from renewable raw materials. They require lower fossil fuel energy inputs during their life cycle than most alternative non-wood products, are highly recyclable, and store carbon.

When measured against common alternative building materials, wood-based structures of comparable thermal performance use less energy and have fewer CO_2 emissions. This is because wood building materials require less energy to manufacture and because much of the energy required to produce them comes from biomass – a carbon-neutral source of energy. Virtually all goods leave an environmental and carbon footprint throughout their life cycle: from resource extraction through manufacturing, to distribution, use and end-of-life disposal. Too often climate change policies focus on greenhouse gas mitigation at only one stage in a product's life cycle. When viewed on a life cycle basis, wood-based building materials are substantially less carbon intensive than substitute materials.

At a global level, the greenhouse gas emissions from the forest industry value chain are largely offset by sequestration in forests and forest products. Value chain emissions are expected to decline as manufacturing becomes less greenhouse gas intensive and as public policies become increasingly effective in keeping recyclable materials out of landfills and reducing methane emissions from landfills. This positive trend could be adversely impacted if fiber supplies are not sustainably managed and if increasing demand for electricity and ethanol production make fiber scarce.

The forests supporting the Sustainable Forest Products Industry (SFPI) are managed primarily to supply fiber. Therefore, the amount of carbon they store is not likely to increase or decrease significantly. Additional carbon storage can be found in the industry's products. This form of sequestration will continue to increase due to the growing global population and increasing standards of living. The production and export of bio-based electricity and recycling help reduce methane releases from landfills, and are two additional benefits of the forest industry's value chain. Non-recyclable products can also be a source of biofuel, displacing fossil fuels.

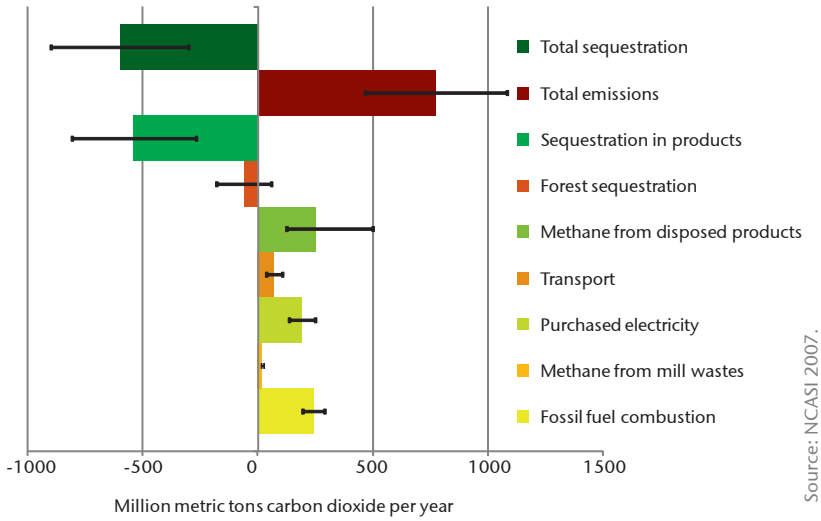


Figure 1: Emissions from the forest products value chain are largely offset by sequestration in forests and forest products.

Sustainably managed forests are a renewable natural resource

Optimum forest management practices:

- Ensure continued carbon sequestration in the forest,
- Provide wood fiber for biomass-based products and carbon-neutral biomass energy, and
- Protect the ecological values of the forest in a balanced way.

When landowners receive income for products grown on their land they are encouraged to maintain, renew and manage this valuable resource sustainably. This is an especially important consideration in places facing economic pressures to convert forestland to non-forest uses.

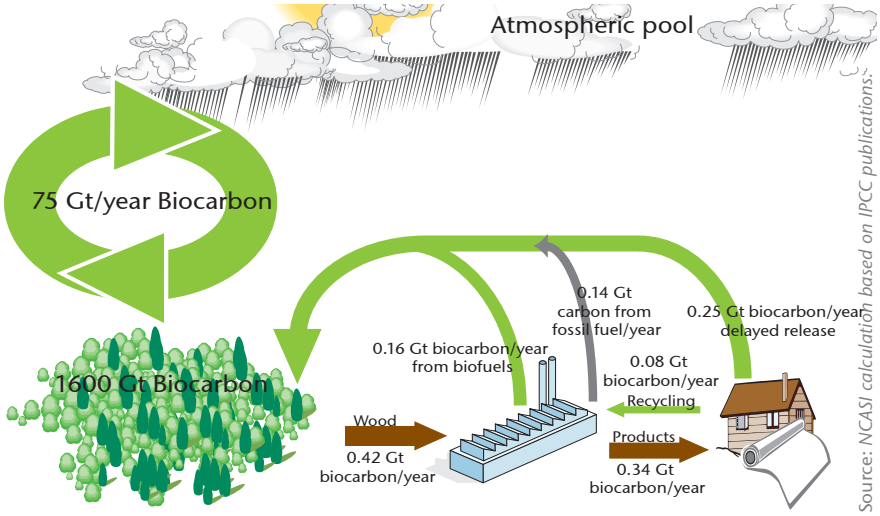


Figure 2: The carbon removed from the forest by the forest products industry represents only about 0.5% of the carbon that is recycled between the forest and the atmosphere annually, and less than 0.03% of the carbon stored in the world's forests.

Sustainably managed forests provide wood fiber and carbon benefits

Options for using forests in the battle to control greenhouse gases in the atmosphere range from forest preservation to intensive forest management. At one end of the spectrum trees are used only to sequester carbon. At the other end, the objective is to maximize the production of products that displace fossil fuels and fossil fuel-intensive products. Many factors affect the carbon benefits of different forest management practices. The optimum approach will vary from one situation to another. Studies have found that: "In the long term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fiber or energy from the forest, will generate the largest sustained mitigation benefit." (Source: IPCC. 2007. *Mitigation, Fourth Assessment Report.*)

By providing a market for wood, the forest products industry also gives forest owners an incentive to keep land in forest, as opposed to converting it to other uses that provide few or no carbon benefits.

Unfortunately, the carbon benefits that forests could provide are often constrained by public policy. In the words of the IPCC, "Forestry can make a very significant contribution to a low-cost global mitigation portfolio that provides synergies with adaptation and sustainable development.... However, this opportunity is being lost in the current institutional context and lack of political will to implement and has resulted in only a small portion of this potential being realized at present." (Source: IPCC. 2007. "Working Group III contribution to the Fourth Assessment Report", pre-copy edit version.) The lessons of the past decade illustrate that carbon policies and trading programs should recognize the full range of opportunities for using forest to mitigate atmospheric greenhouse gases.

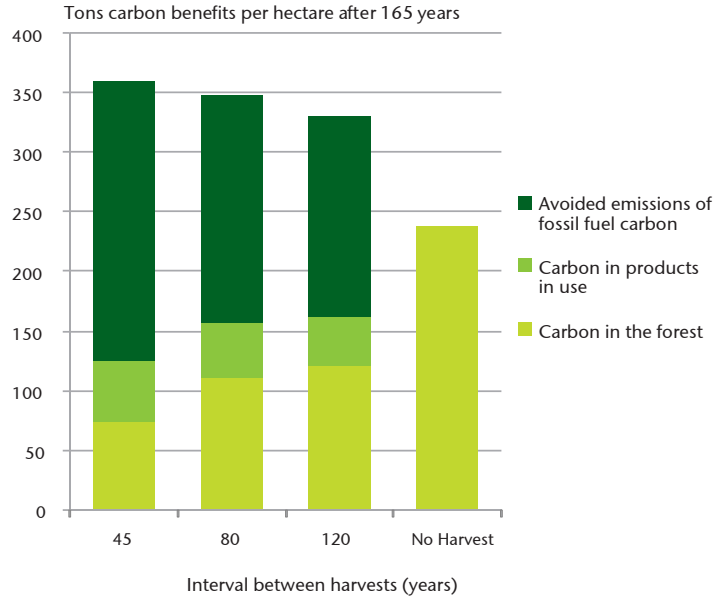


Figure 3: Forests in the Pacific Northwest of the United States are an example of where greater carbon benefits are obtained when harvesting intervals are reduced to increase the amounts of building products that are manufactured.

The forest industry is highly resource efficient

The industry has created and supports an extensive infrastructure necessary for collecting biomass from forests and essentially all of the material removed from the forest is used either in products or as a source of biomass energy in the manufacturing process.

The industry's eco-efficiency improvements are demonstrated by FAO data which indicate that in 2005, the industry obtained 30% more product from every cubic meter of harvested wood than it did in 1990. This progress has been made possible by more efficient manufacturing, improved products that use less wood and paper (e.g., reduced grammage), and increased recycling.

1. Paper recovery rate is generally defined as the percentage of paper and paperboard consumed domestically that is recovered for recycling or other uses. Data are from national trade associations for 2005, or the most recent year for which data are available. Because the data sources and definitions vary somewhat among national associations, comparisons between countries must be made with caution.)

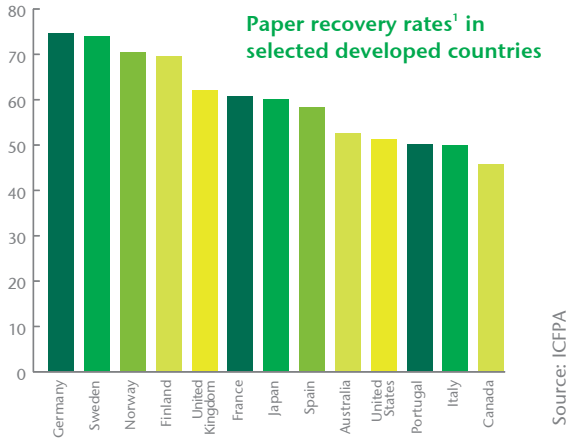


Figure 4: In many industrialized countries over one-half of the paper is recovered for recycling, allowing forest fiber to serve repeated uses.

The forest industry is energy intensive, but meets much of its needs with carbon-neutral biomass

According to the Intergovernmental Panel on Climate Change (IPCC), it is new carbon from fossil fuels that is primarily responsible for increases in atmospheric CO_2 over the last 100 years.

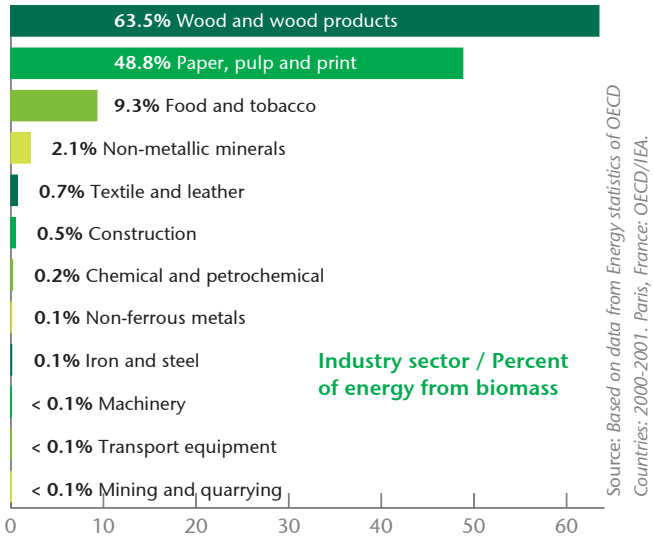


Figure 5: The forest products industry derives a greater fraction of its energy requirements from biomass than any other industry. In developed countries the forest products sector typically obtains more than half its energy from biomass.

The pulp and paper industry is energy-intensive. Its energy efficiency has however steadily increased because of improved manufacturing processes and practices. A large proportion of mills use residue from the production process for the manufacture of energy. Manufacturing paper from recycled fiber uses less energy than processing virgin fiber, further improving the industry's energy efficiency. The use of biomass energy in virgin pulp manufacturing and the recycling of used products make the forest products value chain very resource efficient. Wood products manufacturing is typically less energy intensive than paper and paperboard manufacturing, largely because energy is not required to separate the wood into individual fibers and because little or no water is added to the process that would later need to be extracted.

Direct greenhouse gas emissions from fossil fuel combustion in the forest-based industries are approximately 240 million tons of CO_2 per year, which is about 0.9% of global CO_2 emissions. Indirect emissions from purchased power are approximately 190 million tons of CO_2 per year. Combined, these total approximately 430 million tons of CO_2, or about 1.6% of global CO_2 emissions. (Source: NCASI and IPCC. Fourth Assessment Report.)

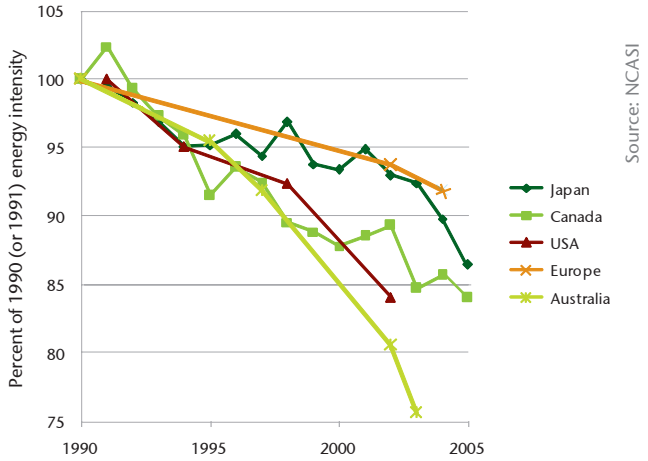


Figure 6: The major paper and paperboard producing regions of the world have reduced energy intensity by 8-15% percent or more since 1990. Regions with more energy efficient industries in 1990, Japan and Europe for instance, have tended to show slower rates of improvement since then.

Although the pulp and paper industry is already a leader in using combined heat and power (CHP) technology, more can be done. A study by the US government indicated that "CHP presents a significant opportunity for improving energy efficiency and reducing carbon emissions in the pulp/paper and the chemicals industries. [...] There are about 17.8 GW remaining technical potential for CHP in the pulp/paper industry... ."

Source: Khrushch, M., et. al. 1999. "Carbon Emissions Reduction Potential in the US Chemicals and Pulp and Paper Industries by Applying CHP Technologies". Report LBNL-43739. Berkeley, CA: Lawrence Berkeley National Laboratory.

Wood-based construction reduces greenhouse gas emissions

Compared to alternative construction systems, using wood in home construction in the United States is estimated to reduce greenhouse gas emissions by 9.6 million tons of CO_2 equivalents per year. The corresponding energy benefit is approximately 132 million gigajoules per year. These figures represent approximately 22% of the energy and 27% of the greenhouse gas emissions associated with the pre-occupancy stages of the life cycle of residential structures in the US.

Source: Upton, et.al. 2006. Energy and greenhouse gas impacts of substituting wood products for non-wood alternatives in residential construction in the United States. NCASI.

Research

Because the forest products industry is energy intensive and biomass based, there are significant opportunities to leverage breakthrough technologies.

For example:

- Development of forest-based bio-refineries to convert forest biomass into gaseous and liquid fuels and other commercial products.
- Significant breakthroughs in the most energy-intensive areas of forest product manufacturing – i.e., mechanical and chemical pulping, pulp and paper drying and chemical recovery.

Gasification technology converts biomass into a gaseous form that can be used to produce electricity more efficiently than conventional biomass-based generation techniques. If successful, it could transform the forest products industry from a net consumer of power into a net exporter of "green" biomass-based electricity for use by society. Gasification also has the potential to produce bio-based transportation fuels and chemicals needed to make the bio-based products of the future.

The WBCSD's Sustainable Forest Products Industry working group encourages public-private partnerships such as the European Forest-Based Technology Platform and the US Agenda 2020 Technology Alliance to help accelerate the deployment of breakthrough technologies needed to accomplish dramatic reductions in energy use and greenhouse gas emissions.

The industry can help supply society by increasing amounts of sustainably produced fiber for use as a raw material and for bioenergy.

The forest-based industry is finding ways to increase forest productivity while protecting forests' environmental values. New and improved management techniques will further increase the amount of biomass that can be produced on a given area.

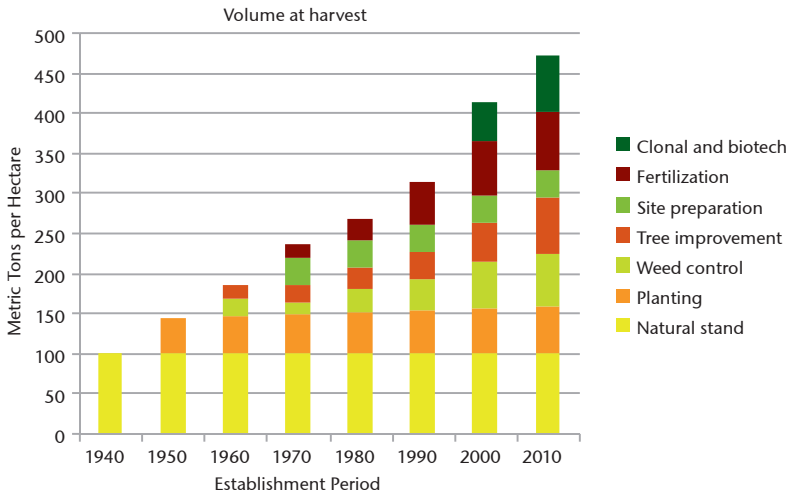


Figure 7: A variety of intensive management practices have resulted in dramatic increases in the productivity of pine plantations in the Southern United States.

The Sustainable Forest Product Industry's role

The Sustainable Forest Products Industry can do a number of things to help reduce society's energy use and greenhouse gas emissions.

Its commitment to energy efficiency and increased use of biomass for energy are reflected in the following:

- The European pulp and paper industry has a goal of increasing biomass use from 40% of total on-site primary energy consumption to 56% by 2010.
- The American Forest and Paper Association has taken on a goal of reducing the greenhouse gas intensity (i.e., a reduction in greenhouse gas emissions per ton of production) of its membership by 12% by 2012. It is on target to meet or exceed that goal.
- Canada's pulp and paper sector cut greenhouse gas emissions by 44% during the 1990-2005 period while reducing emissions intensity by 54%.
- The Japan Paper Association has a goal to reduce energy intensity by 13% and reduce CO_2 emissions intensity 10% by 2010, compared to 1990 levels.

The increased use of biomass is a central element of all of these commitments.

WBCSD SFPI member companies are reducing emissions intensity via energy efficiency improvements and increased use of biomass energy, typically reducing direct emissions intensity by 1 to 4% per year.

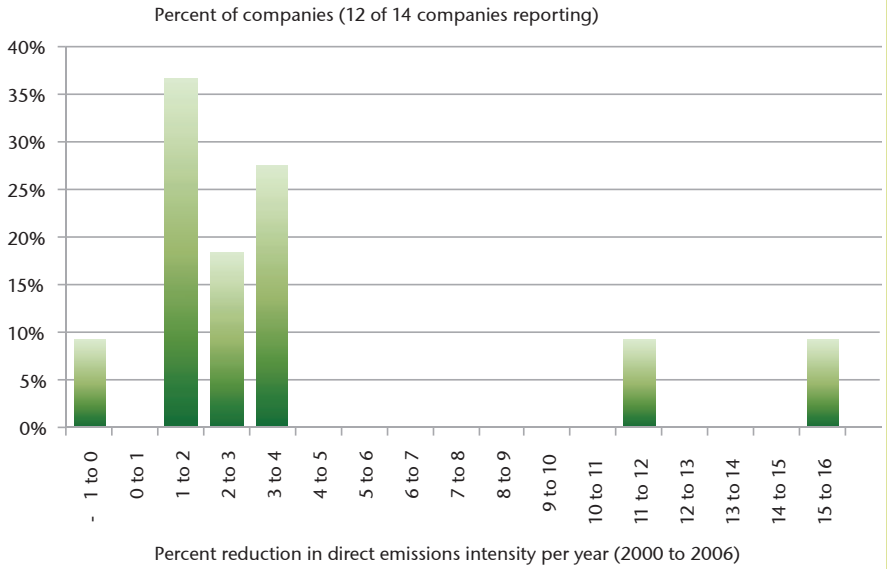


Figure 8: Reductions in direct emissions intensity among WBCSD SFPI working group companies

The Alholmens Kraft biofuelled power plant in Pietarsaari, Finland is one of the largest in the world. The plant is a CHP facility producing electricity for the owners as well as steam that is used by a nearby UPM mill and by the local municipality for district heating. The plant is designed to use 150,000 to 200,000 cubic meters of loose or bundled logging residue annually. Photo: TEKES brochure 2002.

The industry is committed to increasing recovery rates and the increased use of recycled fiber.

The industry has committed to a range of recycling goals. These vary in timing and scope, reflecting conditions in different parts of the world. Some of the commitments are for recovery rates, (the percentage of paper consumed that is recovered for recycling). Other commitments are based on utilization rates (the percentage of recovered fiber used in new product).

Some of the different recycling goals are:

- The Japan Paper Association has committed to achieve a recovered fiber utilization rate of 62% by 2010.
- The American Forest and Paper Association has a goal to recover 55% of all paper consumed in the US by 2012.
- The European Recovered Paper Council (ERPC) has set a goal of increasing the European recycling rate for paper and paperboard to 66% by 2010.
- In 2003, the Forest Products Association of Canada announced that it would support efforts to achieve a 25% increase in recovery rates by 2010. That would increase the recovery rate to 55%.

The rapidly growing interest in biomass energy demands efficient and sustainable methods to produce and use biomass. Inefficient use of wood and other types of biomass will increase the competition for land needed to produce food, energy and industrial raw materials. The sustainable forest-based industry uses highly productive and efficient practices resulting in products that often are more energy efficient than alternatives.

The connection between atmospheric carbon and deforestation

In recent years, about 20% of CO_2 emissions have been caused by land use change, primarily deforestation. Between 2000 and 2005, the size of the world's forests decreased at a rate of 7 million hectares per year – an improvement compared to the 9 million hectares per year lost in the 1990s, but still a substantial loss. Forest area is stable or growing in North America and Europe but deforestation in the tropics is causing global forest area to decline at a rate of 0.18%/yr. The amount of forest loss would have been almost twice as large, were it not for afforestation (establishing new forests), forest restoration and natural forest expansion (FAO, 2006).

Deforestation has complex causes that differ from one region to another. Wood extraction can be one of the factors contributing to deforestation, but state-run activities and illegal logging are far more often to blame than the legal activities of private companies (Geist, 2001). The global forest products industry is committed to eliminating the unsustainable, and often illegal, activities that contribute to deforestation. These efforts include urging governments, industry, environmental non-governmental organizations (ENGOs) and other stakeholders to proactively collaborate in bringing more of the world's forests under sustainable management and expanding the adoption of credible forest certification (ICFPA, 2005).

The Sustainable Forest Products Industry affects carbon in the forest primarily by helping maintain land in forest and by developing new managed forests. Land managed for wood production normally maintains relatively constant carbon stocks over time. Establishing new managed forests can have complex effects on carbon. Conversion of "natural" forest to managed forest can reduce carbon stocks, while establishing managed forest on previously unforested land can increase carbon stocks.

Land use changes involving forests owned or controlled by WBCSD SFPI companies – 2000 to 2006

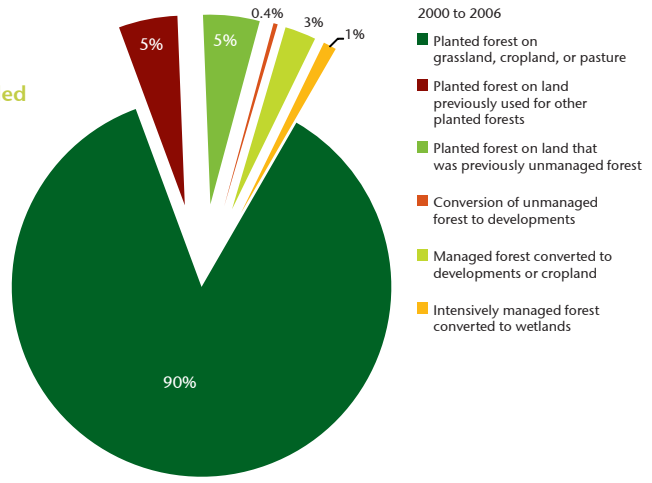


Figure 9: 90% of the land planted in intensively managed forest by WBCSD SFPI members between 2000 and 2006 was formerly non-forest – a change in land use that increases carbon stocks. Another 5% of new intensively managed forest was on land that was previously covered by managed forests of a different type (based on data from 10 companies).

Our carbon challenges

A study of the pulp and paper industry by researchers at the University of Maryland and Boston University concluded that:

"...regardless of [the industry's] location, resource availability and production structure, an increase in the rate of capital turnover is the most important factor in permanently changing carbon emission profiles and energy efficiency in the pulp and paper industry."

Source: Davidsdottir, B. and M. Ruth. 2004. "Capital vintage and climate change policies: the case of US pulp and paper". Environmental Science & Policy, issue 7, pp. 221-233.

The connections between the forest products industry and the global carbon cycle are complex – hastily enacted climate change policies can have unintended consequences on the forest products industry.

Attempts to increase carbon storage in forests via prohibitions on harvesting can:

- Reduce the availability of wood fiber for forest products and for biomass energy;
- Increase the costs of forest products, causing them to lose market share to competing products that do not store carbon and are more energy and carbon intensive;
- Increase the risk of stored carbon being lost via fire or infestation.

Attempts to expand the use of wood-derived biomass energy without ensuring commensurate increases in virgin and recovered fiber supplies would:

- Reduce the availability and increase the cost of wood fiber for manufacturers of forest products;
- Result in the loss of market share to non-wood based products that may be more energy and carbon intensive;
- Threaten the viability of forest product manufacturing facilities that provide more economic and social benefits than operations that merely burn fiber for energy.

Active forest management practices, such as competition control, fertilization, thinning and prescribed fire, can enhance forest carbon sequestration. However, other important functions of forests must also be considered – especially their role in supplying wood for biomass-based products and wood-derived biomass energy that displaces fossil fuel.

Forestry is challenged with very long investment horizons and uncertain economic returns on investments in improved productivity. Where these challenges can be met, forest management for wood fiber provides a critical economic incentive for keeping land in forests. The alternative is conversion of forestland to other uses that provide no climate and energy benefits. On the other side is the need for appropriate land use choices and long-term planning to ensure balance between supply and demand for forest resources.

Forest products industry is capital intensive

The forest products industry is capital intensive, making it difficult and expensive to change technology to accommodate near-term policy actions.

Technological innovation and accelerated capital stock depreciation are the best ways the forest products industry can reduce emissions. However, the industry is capital intensive, with very long-lived capital equipment. For example, the typical predicted lifetime for a power plant, chemical pulp mill or paper production line is typically over 25 years. Decisions concerning fuels, energy procurement options, production processes and their efficiencies, as well as main raw materials and product categories, are set years in advance. Long planning horizons are one of the most difficult challenges facing this industry. Using policy tools like taxation, licensing, and emissions pricing and trading to impact climate change can affect our competitiveness. Although these policies are intended to steer our industry towards a less carbon-intensive position, they may not provide our industry with sufficient ability to reduce our emissions because of the high capital costs involved. Meeting climate change goals may require the early retirement of much of society's capital stock. Capital intensive industries, like the forest products industry, need consistent, dependable, long-term policy directions to navigate in this environment.

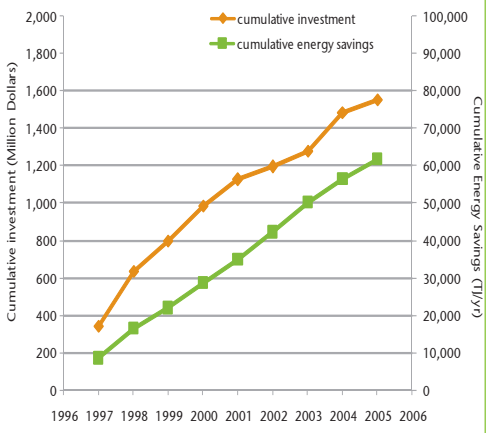


Figure 10: Since 1996, the Japanese paper industry has spent over 1.5 billion dollars on projects and equipment to accomplish cumulative energy savings of over 60,000 TJ per year, equivalent to almost 10 million barrels of oil per year. Source: JPA.

Long value chain and high recycling rates

When tailoring policies for the forest products industry, it is important to consider the industry's manufacturing facilities, long value chain and high recycling rates. The development of appropriate policies for the forest products industry is further complicated by the industry's unique carbon profile, and the long timescale for carbon and climate impacts.

Forests

- Recycle CO_2 between the atmosphere and the terrestrial environment;
- Provide biomass-based raw material for forest products;
- Provide biomass for carbon-neutral energy from sustainably managed forests.

Wood product manufacture

- Uses little or no fossil fuel, so there are only limited opportunities to make major reductions in GHG emissions although opportunities exist to use biomass more efficiently;
- Often consumes purchased electricity, however, making it vulnerable to increased electricity costs;
- Has the potential for playing an important role in an expanded biomass infrastructure aimed at supplying increased amounts of biomass to industry and society;
- Relies on fossil fuel-based transportation of raw materials and products.

Pulp and paper manufacturing

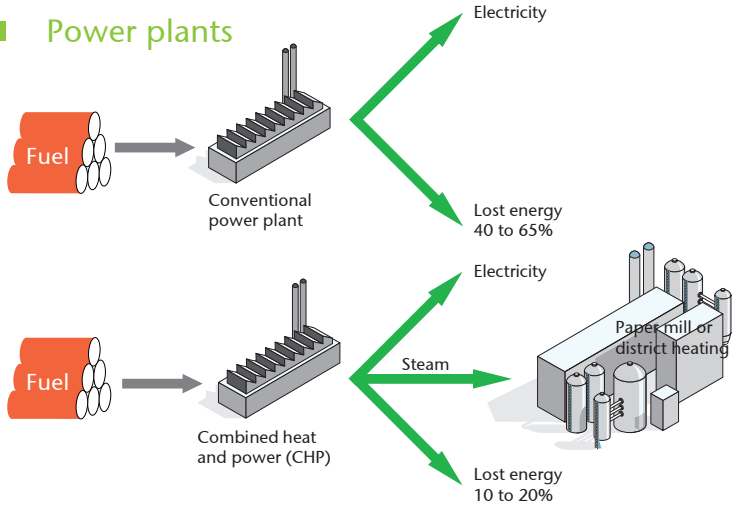
- Is energy intensive, but energy efficiency has steadily improved over time, and continued incremental improvements are likely;
- Is seeking ways to reduce energy use due to increasing fossil fuel and electricity costs. GHG emissions reductions usually occur as a result;
- Uses large amounts of steam, making pulp and paper mills ideal hosts for combined heat and power (CHP); the sequential use of steam for several purposes within the production process allows these systems to be highly energy efficient;
- Is already a leader in the use of CHP in many countries, but significant untapped potential remains; in some locations, the challenges to utilizing this potential include regulatory and market limitations;
- Using virgin fiber typically obtains a significant amount of its energy from biomass – i.e., wood waste, bark or spent pulping liquors containing the lignin removed during pulping;
- Has opportunities to increase the use of biomass energy, and in some cases replace a portion of fossil fuels with biomass derived energy;
- Faces challenges to making these improvements, including required capital costs and insufficient quantities of affordable biomass;
- Like wood product facilities, supports a biomass procurement and distribution system that could be expanded to produce additional amounts of biomass for society.

The industry continues to research breakthrough technologies having the potential to dramatically reduce its energy use. Key focus areas include mechanical pulping processes, pulping liquor recovery systems and paper dewatering and drying technologies.

Forest products

- Store carbon during use that slowly returns to the atmosphere;
- Often compete against products that are more energy and carbon intensive;
- Can usually be recycled, providing eco-efficient use of forest resources;
- Can be used as a source of biomass energy at the end of their life cycle, thereby displacing fossil fuels.

Power plants

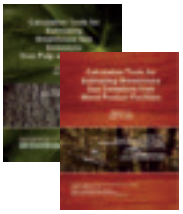


Source: NCASI, 2007.

Figure 11: Compared to conventional electrical power generation systems, combined heat and power systems produce twice as much usable energy from the same amount of fuel. Without these efficiencies, the emissions required to generate the steam and electricity needed by the industry would be much higher. If the industry had to purchase this electricity from the grid, emissions from the electricity sector might increase by as much as 95 million tons CO_2 per year.

Managing GHG emissions

The industry has developed tools for calculating greenhouse gas emissions from pulp and paper and from wood product manufacturing. These tools, which have been accepted for use under the WRI/WBCSD GHG Protocol, are available on the GHG Protocol website *www.ghgprotocol.org.*



Calculation tools developed by the International Council of Forest and Paper Associations, working with the WBCSD and the World Resources Institute.

Public policy alert

Public policy needs to consider not only the climate-change implications of biomass use, but also the economic and employment benefits to society. These could be threatened by policies that diminish the vitality of the forest products sector. Using wood in the forest products value chain creates more than ten times the value added and one hundred times the employment of using the same biomass only for energy.

The renewable energy target for the European Union could result in demand for wood that exceeds the current use by the entire European pulp and paper industry.

Source: CEPI. 2003. Renewable Raw Materials vs. Renewable Energy: Two Competing Goals.

Recommendations

The forest products industry supports the ongoing recognition of biomass from sustainably managed forests as a low-impact, renewable and CO_2 neutral energy source. The most efficient and effective long-term greenhouse gas mitigation policies are those that consider the emissions profile of a product over its entire life cycle. The industry can make significant contributions toward meeting the world's climate goals if certain policy recommendations are effectively implemented:

1. The many benefits of biomass-based products and fuels can only be realized if public policies promote the development of adequate supplies of wood and recovered fiber.
2. The use of wood biomass as a carbon neutral energy source must be balanced against the economic, social and environmental benefits of using this resource within the forest products value chain.
3. Incentives for the development and deployment of biomass-based technologies (such as biomass gasification) are needed to make our industry energy self-sufficient and potentially a net supplier of bio-based energy.
4. Government policies that help reduce the cost of capital through lower interest rates, tax incentives and accelerated depreciation.
5. The many benefits of combined heat and power production are well known throughout the forest products industry. Regulatory barriers that discourage facilities from maximizing combined heat and power potential should be removed.
6. Forest-based carbon sequestration should be carefully considered to avoid unintended consequences, such as the withdrawal of productive forests from the forest products value chain, artificial pricing of forest resources, or limiting virgin fiber availability for processing.
7. The carbon removed from the atmosphere and sequestered in forest products throughout their useful lives should be more fully recognized, as should the carbon and energy attributes of forest products compared to competing products.
8. Public policies should encourage sustainable and highly efficient practices for producing and using all types of biomass so as to minimize competition for the land needed to produce food, energy and industrial raw materials.
9. Policies that reduce deforestation in developing countries and encourage active reforestation are needed to bring more of the world's forests under sustainable management. These efforts should be based on the use of market incentives such as carbon sequestration credits, additional public funding mechanisms and development aid to build local management capacity.
10. Public policies should allow market forces to determine the highest and best use of biomass fiber.

Key information and data sources

Forest and Wood Products Research and Development Corporation. 2006. *"Forests, Wood and Australia's Carbon Balance"*, at www.fwprdc.org.au

CEI-Bois. 2006 *"Tackling Climate Change: Use Wood"*, February 2006, at www.cei-bois.org

United Nations Food and Agriculture Organization (FAO). 2006. *Global Forest Resource Assessment 2005.* Rome: FAO.

United Nations Food and Agriculture Organization (FAO). FAOSTAT Database. Rome, at http://faostat.fao.org

Forest Products Industry Associations in major producing countries and regions including:

Australia – www.a3p.asn.au
Brazil – www.bracelpa.org.br
Canada – www.fpac.ca
Chile – www.corma.cl
Europe – www.cepi.org
Europe – www.cei_bois.org
Finland – www.metsateollisuus.fi
France – www.copacel.fr
Germany – www.vdp-online.de
Global – www.icfpa.org
Italy – www.assocarta.it
Japan – www.jpa.gr.jp
New Zealand – www.nzfoa.org.nz
Norway – www.pulp-and-paper.no
Portugal – www.celpa.pt
South Africa – www.pamsa.co.za
Spain – www.aspapel.es
Sweden – www.skogsindustrierna.org
United Kingdom – www.paper.org.uk
United States – www.afandpa.org

Field and Raupach (ed). 2004. Scope 62 – *The Global Carbon Cycle: a project of The Scientific Committee on Problems of the Environment (SCOPE).* Washington, DC: Island Press.

Geist, H. and E. Lambin. 2001. "What drives tropical deforestation? A meta-analysis of proximate and underlying causes of deforestation based on subnational case study evidence". *LUCC Report Series*; 4. LUCC International Project Office, University of Louvain, Department of Geography, Belgium at www.geo.ucl.ac.be/LUCC

Intergovernmental Panel on Climate Change (IPCC). 2000. *Land Use, Land Use Change, and Forestry – A Special Report of the IPCC.* Cambridge: Cambridge University Press.

Intergovernmental Panel on Climate Change (IPCC). 2007. *Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.*

Intergovernmental Panel on Climate Change (IPCC). 2006. *2006 IPCC guidelines for national greenhouse gas inventories.*

International Council of Forest and Paper Associations (ICFPA). 2005. *Statements on Illegal Logging, April and May* 2005 at www.icfpa.org

International Energy Agency Bioenergy Task 38. "Answers to ten frequently asked questions about bioenergy, carbon sinks and their role in global climate change", at www.joanneum.ac.at/iea-bioenergy-task38

Miner, R. and A. Lucier. 2004. *A Value Chain Assessment of Climate Change and Energy Issues Affecting the Global Forest-Based Industry – A Report to the WBCSD Sustainable Forest Products Industry Working Group.* Geneva: WBCSD.

NCASI. 2006. "Energy and Greenhouse Gas Impacts of Substituting Wood Products for Non-Wood Alternatives in Residential Construction in the United States". *NCASI Technical Bulletin No. 925, November 2006.* NCASI, Research Triangle Park, NC.

NCASI. 2007. "The greenhouse gas and carbon profile of the global forest products industry." *NCASI Special Report 07-02, February 2007.* NCASI, Research Triangle Park, NC.

OECD/IEA. *Energy Statistics for OECD Countries.* Paris: OECD.

Perez-Garcia et.al. 2005. "An assessment of carbon pools, storage, and wood products market substitution using lifecycle analysis results". *Wood and Fibre Science, 37 Corrim Special Issue, 2005, pp. 140 - 148* © 2006 by the Society of Wood Science and Technology.

USDA. 2004. *Forest Service, Southern Research Station General Technical Report 75, October 2004.*

World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD). 2004. *The Greenhouse Gas Protocol Initiative.* USA: WBCSD/WRI at www.ghgprotocol.org

WBCSD. 2007. *Sustainable Forest Products Industry Working Group Membership Principles and Responsibilities*, at www.wbcsd.org

WBCSD. 2007. *Policy Directions to 2050: A business contribution to the dialogues on cooperative action*, at www.wbcsd.org

WBCSD. 2006. *Biomass Issue Brief: Energy and Climate*, at www.wbcsd.org

Membership Principles and Responsibilities

As evidence of our ongoing commitment to sustainable development and balancing our efforts between economic growth, ecological balance and social progress, members of the Sustainable Forest Products Industry Working Group will, in accordance with the following principles:

1 Management and Governance

1. Apply corporate policies and procedures to meet all applicable legal requirements and other company commitments, including these membership principles and responsibilities.
2. Seek cost-effective opportunities to continuously improve and be industry leaders in sustainable development.
3. Work against corruption and illegal practices in all their forms.

2 Resource Management

1. Use sustainable forest management in forests we own, lease or manage to provide fiber, timber and other forest products and valuable ecosystems services.
2. Seek to conserve important biodiversity and cultural values and to optimize the social, environmental and economic benefits of managed forests.
3. Respect the lawful access and tenure rights of indigenous peoples and other community members directly affected by our forestry operations. Proactively seek to resolve any potential land disputes through dialogue, independent arbitration or the legal system.
4. Recognize as credible forest certification systems that are based on third party verification, independent accreditation, good governance and transparency,and support efforts to expand their use.
5. Progressively and systematically introduce credible forest certification in the forests we own, lease or manage.

3 Fiber Sourcing

1. Manage supply chains to obtain purchased fiber from acceptable sources, using contract requirements and education and outreach programs, as appropriate to the nature and scale of the fiber supply activities.
2. Ensure legal ownership of all fiber and wood utilized and comply with all applicable laws in forestry operations.
3. Introduce credible, independently certified wood-tracing systems where needed to address significant risks.

4 Eco-efficiency and Emissions Reduction

1. Promote efficiency and innovation in the use of key resources (raw materials, water, energy and chemicals) and foster continuous improvement based on setting and reporting on appropriate reduction targets.
2. Promote the use of new and innovative technologies whenever economically and environmentally feasible.
3. Promote the recyclability and recovery of forest products and the appropriate reuse of materials.

5 Climate Change Mitigation

1. Improve energy efficiency and the use of renewable energy whenever economically and environmentally feasible.
2. Track and report on carbon dioxide (CO_2) emissions and progress on managing the reduction of greenhouse gas (GHG) emissions.
3. Promote sustainable forest management, including afforestation and reforestation, and the use of forest products as important climate mitigation strategies.

6 Health and Safety

1. Strive for continuous improvement in occupational health and safety and report accidents and injuries in the workplace.

7 Community Well-being & Stakeholder Engagement

1. Contribute to economic health, employment and community service in the communities in which we operate.
2. Engage in, listen to and respond to local sustainability expectations and concerns related to our operations.
3. Cooperate with other organizations, governments and stakeholders to promote and develop sustainability in the forest products industry, including sharing best practices and lessons learned.

8 Human Rights and Labor Standards

1. Respect all national laws for human rights and labor standards and, where these are lacking, use internationally agreed standards.

9 Reporting

1. Publish a periodic report reflecting progress on these principles and responsibilities according to international reporting standards.

World Business Council for Sustainable Development I WBCSD

The World Business Council for Sustainable Development (WBCSD) brings together some 200 international companies in a shared commitment to sustainable development through economic growth, ecological balance and social progress. Our members are drawn from more than 30 countries and 20 major industrial sectors. We also benefit from a global network of about 60 national and regional business councils and partner organizations.

Our mission is to provide business leadership as a catalyst for change toward sustainable development, and to support the business license to operate, innovate and grow in a world increasingly shaped by sustainable development issues.

Our objectives include:

Business Leadership – to be a leading business advocate on sustainable development; *Policy Development* – to help develop policies that create framework conditions for the business contribution to sustainable development; *The Business Case* – to develop and promote the business case for sustainable development; *Best Practice* – to demonstrate the business contribution to sustainable development and share best practices among members; *Global Outreach* – to contribute to a sustainable future for developing nations and nations in transition. For more information visit www.wbcsd.org.

National Council for Air and Stream Improvement I NCASI

The National Council for Air and Stream Improvement (NCASI) is an independent, non-profit research institute that focuses on environmental topics of interest to the forest products industry. Established in 1943, NCASI is recognized as a leading source of technical and scientific information on environmental issues affecting this industry. Although NCASI receives most of its funding from forest products companies, it also receives funding from government agencies, associations and other organizations interested in better understanding the connections between the forest products industry and the environment. For more information visit www.ncasi.org

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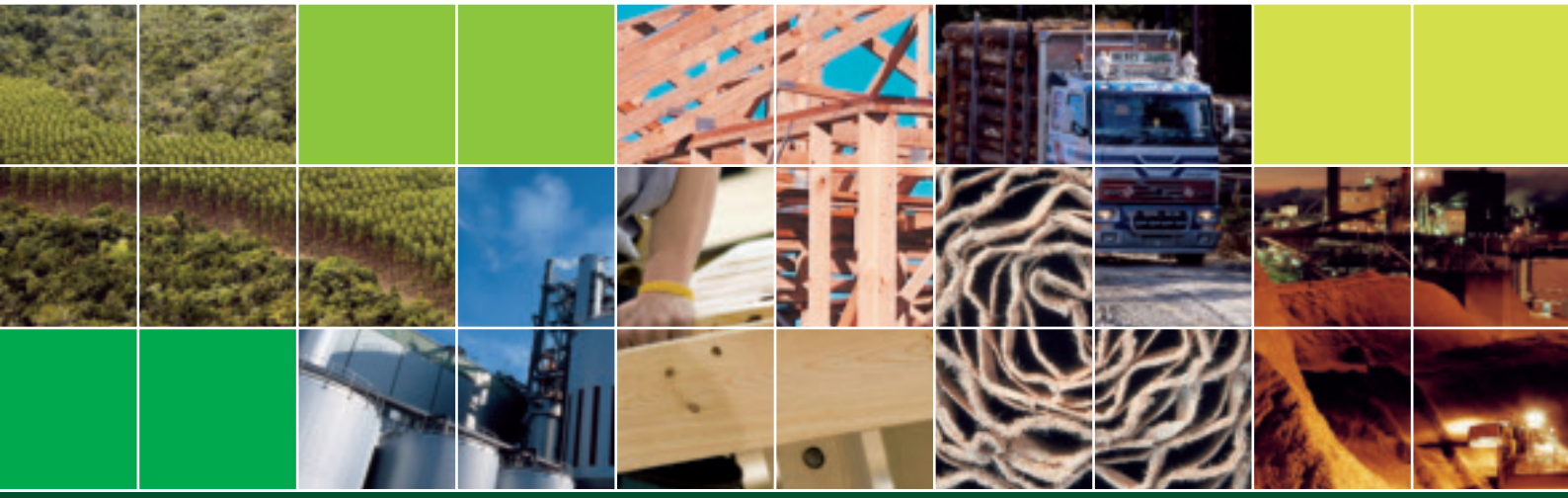

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