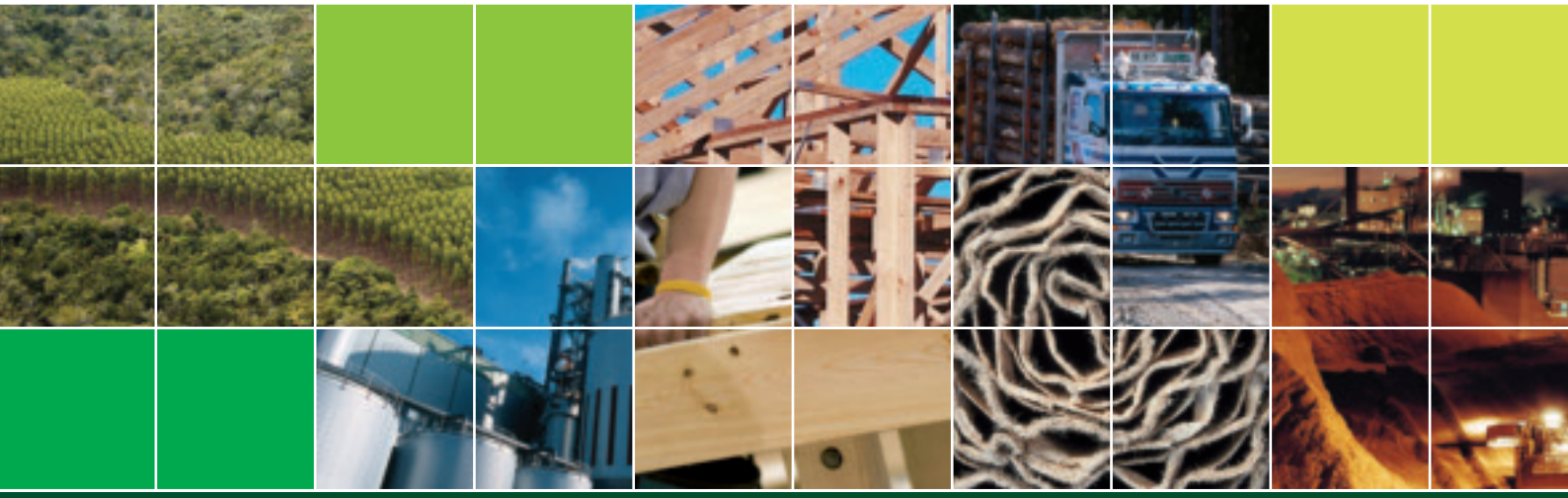
DEDICATED TO MAKING A DIFFERENCE



The Sustainable Forest Products Industry,

Carbon and Climate Change

Key messages for policy-makers

Third Edition

wbcsd forests

Technical content developed by

ncasi

Contents

> 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, fibre or energy from the forest, will generate the largest sustained mitigation

Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007.

> To support action on climate mitigation and adaptation, business must lead in expanding sustainable forest based solutions to produce more wood and use it more wisely.

José Luciano Penido, Chairman, Fibria, Co-Chair WBCSD's 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.

These companies are committed to maximizing their contribution to climate change mitigation and adaptation by proactively managing their carbon profile. Under the SFPI Membership Principles and Responsibilities participating member 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 and adaptation strategies.

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 given available logistics, and store carbon.**

> **Working with private and public landowners, we use forest resources sustainably, maintaining the efficient infrastructure needed to ensure healthy growing forests, and the provision of valuable ecosystem services.**

> **We are energy intensive, but meet much of our energy needs with biomass, a fuel that adds no CO_2 to the atmosphere, when produced sustainably.**

> **We provide markets for wood, and thus encourage landowners to retain or expand their forests.**

> **We are committed to working with other stakeholders to maximize the contribution of the sector to climate mitigation and adaptation.**

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, especially by increasing the use of combined heat and power (CHP) systems and waste heat recovery;
- Increase its use of biomass in energy production;
- Provide wood-based products, chemicals and fuel that can replace fossil fuel based alternatives;
- Supply society and industry with increasing amounts of sustainably produced wood and fiber for use as a raw material and for bioenergy;
- Provide wood products to society that mitigate the growth in atmospheric greenhouse gases by storing carbon and substituting for more greenhouse gas-intensive products;
- Increase the recovery and use of recycled fiber;
- Plan and provide for increased sustainably 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.**

> **Government incentives and mandates for using wood, and other types of biomass, for fuels and bio-based products without commensurate increases in virgin and recovered fiber supply will create increased competition for our primary raw material and the land where it grows.**

Our policy recommendations

Sustainable forest management – the key strategy

> **Expand efforts to further bring the world's forests under sustainable management, accommodating the multiple and varied economic, social and ecological values and benefits of forests.**

> **Develop local management capacity and support policy reform to reduce deforestation in developing countries as proposed by the REDD+ mechanism.**

Produce and use more wood on a sustainable basis – the key outcome

> **The many benefits of sustainable forest-based products and bio-energy can only be realized if public policies:**
- Promote development of adequate supplies of wood from sustainably managed forests;
- Support the mitigation and adaptation roles of forest owners by helping them keep forested land in forest, improve forest productivity, and increase the recovery of forest residuals;
- Help minimize competition for the land used to produce food, energy and industrial raw materials;
- Recognize the GHG mitigation and adaptation benefits of carbon stored in harvested wood products, and when substituted for more GHG-intensive alternatives;
- Optimize fiber recovery and its use and re-use – as products first, and finally as a source of energy.

Avoid counterproductive policy impacts and technology barriers – the key requirement

> **Mitigation or adaptation strategies involving the supply and use of forest biomass should be market-driven, rather than relying on subsidies, incentives or mandates.**

> **Policies should support the mitigation role of forest products manufacturers by helping them expand the use of CHP (Combined Heat and Power), invest in low-GHG emitting technologies, and facilitate the early adoption of these technologies.**

> **A level global playing field in terms of carbon policy impacts will avoid carbon leakage.**

Our full recommendations are outlined on pages 12-13.

Responsible managers of carbon

While carbon is stored in forest products – known as Harvested Wood Products (HWP) within the context of the UNFCCC – it remains out of the atmosphere. Studies indicate that the amount of carbon stored in forest products is increasing by about 115 million tons per year. This is equivalent to removing 424 million tons of CO_2 from the atmosphere per year.

Source: FAO Forestry Working Paper 159, Impact of the global forest industry on atmospheric greenhouse gases

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 given available logistics, and store carbon.

When measured against common alternative building materials, the life cycle of wood-based structures requires less energy and releases 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 fuel that adds no CO_2 to the atmosphere, if sustainably produced. Based on average displacement figures, the use of wood-based building products avoids emissions of an estimated 483 million tons of CO_2 per year (FAO, 2010a).

In addition, our packaging products help to reduce waste (and thus carbon emissions), by protecting products during handling, shipment and storage, and our wood-based chemical products are often a low carbon substitute for petroleum-based chemicals.

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 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 subsidies and mandates for biomass-based electricity and ethanol production make fiber scarce.

The forests supporting the Sustainable Forest Products Industry are managed primarily to supply fiber. Therefore, the amount of carbon they store is not likely to increase or decrease significantly. Although the data does not allow a quantitative estimate of the impact of the global forest products industry on the world's forest carbon stocks, the effectiveness of sustainable forest management practices in maintaining carbon stocks in production forests is clear from experiences in North America and the EU. These regions, which account for more than 55 percent of global industrial roundwood production, contain most of the world's certified forests, and have generally stable or increasing forest carbon stocks (FAO 2010a). 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 sale 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 wood and paper products can also be a source of biofuel, displacing fossil fuels.

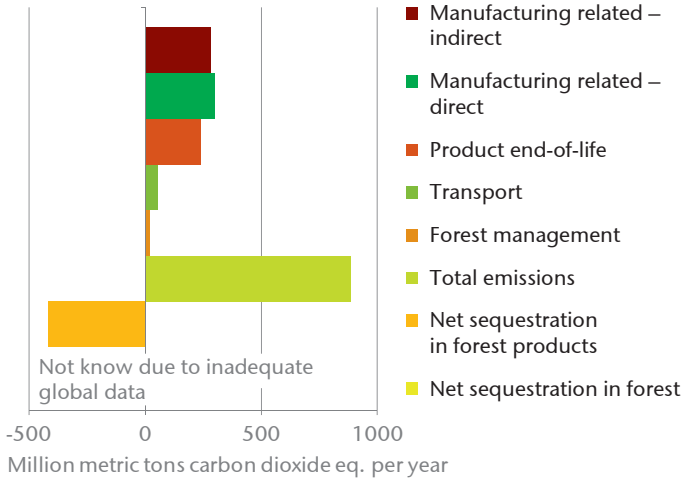


Figure 1: Emissions from the forest products value chain are largely offset by sequestration in forest products.

Sustainably managed forests are a renewable natural resource

Sustainable forest management practices:

- Ensure continued carbon sequestration in the forest;
- Provide wood fiber for biomass-based products and biomass energy;
- Protect the ecological values of the forest in a balanced way;
- Maintain healthy and vigorously growing forests.

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.

Landscape environmental values, including biodiversity, can be enhanced by sustainable forest management and, as such, sustainably managed forests complement and extend land areas managed for environmental values and biodiversity. Likewise, local communities are sustained and may benefit from employment and downstream activities.

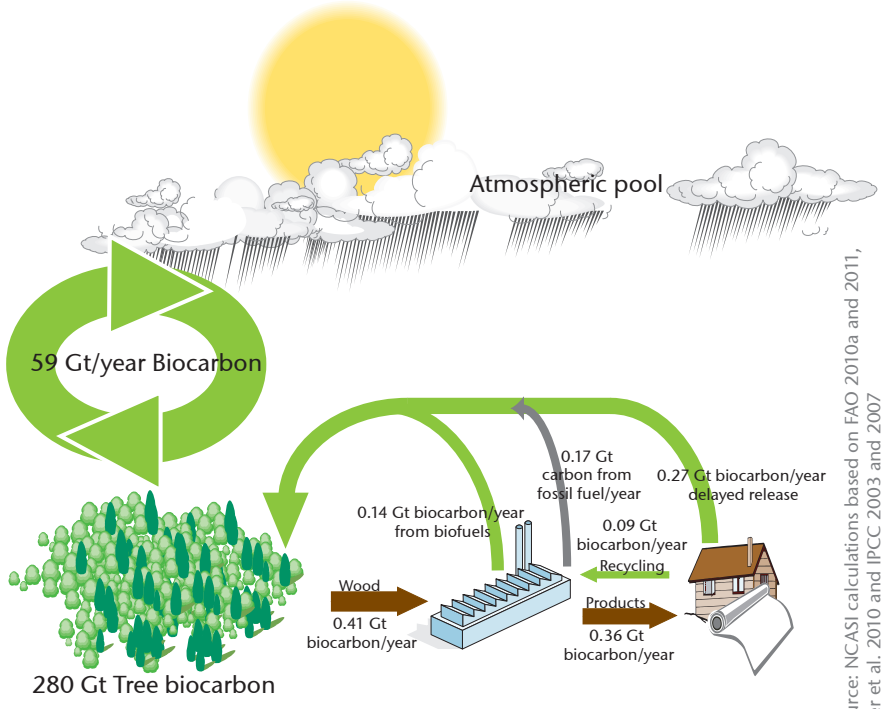


Figure 2: The carbon removed from the forest by the forest products industry represents only about 0.7% of the carbon that is recycled between the forest and the atmosphere annually, and less than 0.14% of the carbon stored in trees in the world's forests.

Sustainably managed forests provide wood fiber and carbon benefits

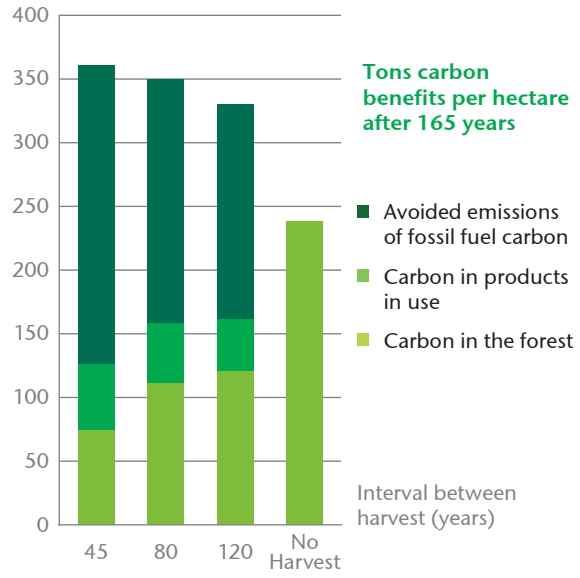
The global carbon cycle has a long feedback and stabilization period, in which carbon stocks must be kept out of the atmosphere to effect climate mitigation. The life cycle benefits of sustainably managed forests represent an appropriate mitigation mechanism that is already in place, and does not require a start-up mechanism, innovation, or public funds. The mitigation and adaptation benefits of sustainably managed forests include carbon storage in forests and forest products, as well as reductions in emissions of greenhouse gases, when forest products are used in place of products that are more greenhouse gas-intensive. Long-duration concession licenses and ownership titles help ensure that these life cycle benefits will be maintained.

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, allowing them to eventually become more susceptible to natural disturbances (fire, insects, disease). 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.

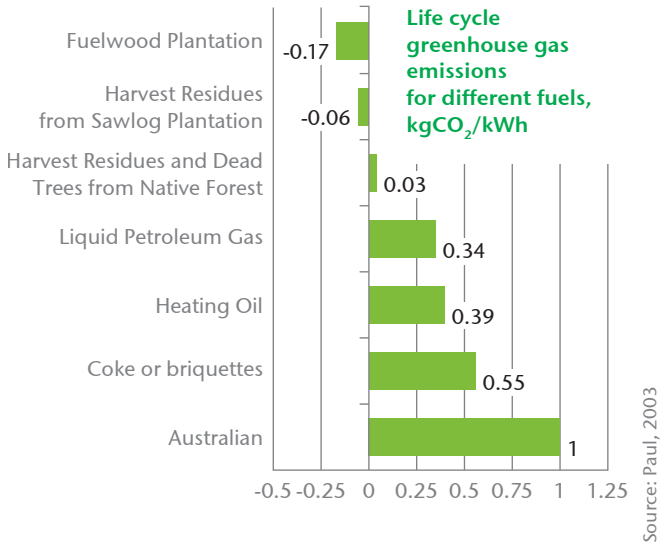
Unfortunately, the carbon benefits that forests could provide are often constrained by public policy. In the words of the IPCC, "Forestry can make a very significant contribution to a low-cost global mitigation portfolio that provides synergies with adaptation and sustainable development... However, 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"). The lessons of the past decade illustrate that carbon policies should recognize the full range of opportunities for using forests to mitigate atmospheric greenhouse gases.

Currently, there is a contradiction between the physical reality and the accounting rules of the Kyoto Protocol, which creates a significant risk of unintended outcomes. Within the Kyoto Protocol, the carbon stored with HWPs is not fully recognized as an expanding carbon stock or sink and, under existing accounting rules, forest harvesting is accounted for as an immediate emission, which is not technically or scientifically accurate. Furthermore, in the current framework the forest sector does not receive credit for emission savings that occur in society as a result of using HWP in place of more greenhouse gas-intensive alternatives. In combination, these factors make HWP an under-utilized mitigation option, and an under-leveraged adaptation strategy (WBCSD 2011a).



Source: Perez-Garcia et.al.2005.

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.



Source: Paul, 2003

Figure 4: Wood obtained from sustainably managed forests produces energy with low greenhouse gas intensity. New plantations established on non-forested lands, for instance, can produce wood for heating having net greenhouse gas emissions that are less than zero, due to the carbon sequestration associated with afforestation.

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 2007, the industry obtained 34% more product from every cubic meter of harvested wood than it did in 1990 (FAO 2011). 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. The use of recovered paper as a source of fiber to make new paper or paperboard varies by type of paper, but mills making certain packaging grades commonly use 100% recovered paper to supply their fiber needs.

The pulp and paper industry makes widespread use of combined heat and power (CHP) systems, which extract far more usable energy from fuels than systems that produce only steam or electricity. Almost 95% of the electricity produced at pulp and paper mills in Europe is produced by CHP (CEPI 2011). In the United States, 37% of all industrial CHP capacity is in the forest products industry, a larger contribution than any other industry sector (AF&PA, 2010).

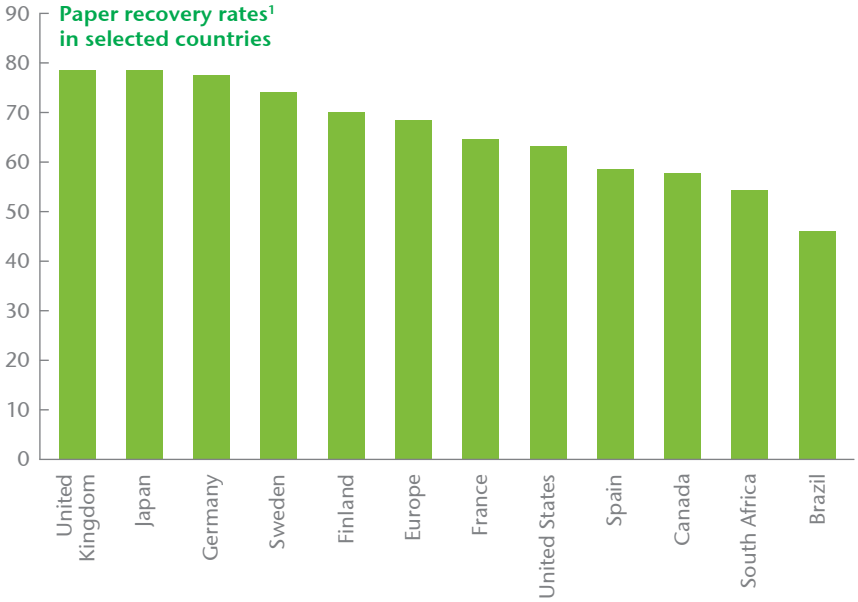


Figure 5: In many countries over one-half of the paper is recovered for recycling, allowing forest fiber to serve repeated uses.

[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 is from national trade associations for the most recent year for which data is available. Because the data sources and definitions vary somewhat among national associations, comparisons between countries must be made with caution.

The forest industry energy consumption

The forest industry is energy-intensive, but meets much of its needs with biomass, a fuel that adds no CO_2 to the atmosphere if produced sustainably

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.

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 often 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 270 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 460 million tons of CO_2 or about 1.6% of global CO_2 emissions.

Source: FAO 2010a and IEA 2010

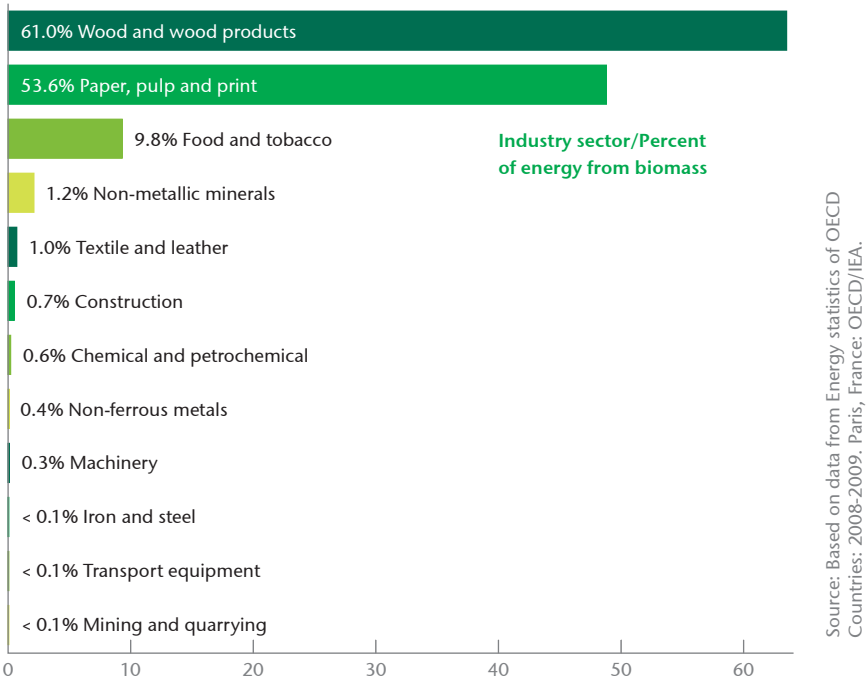


Figure 6: The forest products industry derives a greater fraction of its energy requirements from biomass than any other industry. In developed countries, the forest products sector typically obtains more than half its energy from biomass.

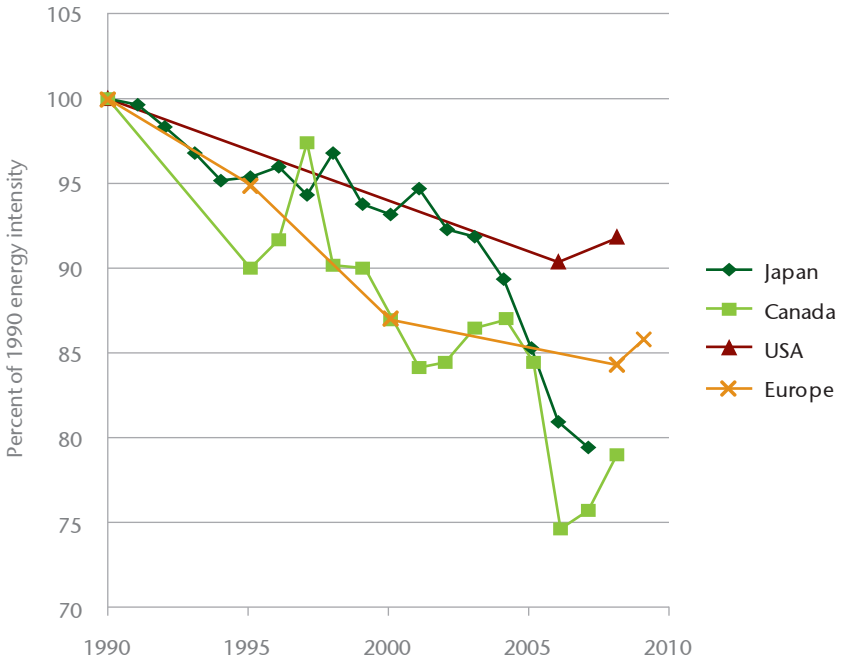


Figure 7: The major paper and paperboard producing regions of the world have reduced energy intensity by approximately 10 to 20 percent since 1990. Recent upturns in energy intensity are probably due to lower operating rates, attributable to the global economic slowdown. Comparisons between regions must be carried out with caution, because the 1990 energy intensity varied between countries, and different countries may use different calculation methods to determine energy intensity.

Although the pulp and paper industry is already a leader in using combined heat and power (CHP) technology, more can be done. COGEN Europe, for instance, indicates that although the European pulp and paper industry already has over 7 GWe of CHP capacity, this capacity could be increased to more than 18 GW.

Source: Minett and Mensink, "Pulp and paper industry combined heat and power in Europe", presented to the International Seminar on Energy and the Forest Products Industry, Rome, October 2006.

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 GJ per year. These figures represent approximately 22% of the energy and 27% of the greenhouse gas emissions associated with the preoccupancy stages of the life cycle of residential structures in the US (Upton, 2006).

Policies that allow the benefits of low greenhouse gas products to be recognized in the marketplace can reduce societal emissions by promoting the selection of less greenhouse gas intensive products and materials. (WBCSD 2011b)

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 biorefineries 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.

An example of collaborative research into breakthrough technologies is the Value Prior to Pulping (VPP) research program. This collaborative effort is managed by Agenda 2020, and involves industry, including MeadWestvaco Corporation and Weyerhaeuser, 5 other pulp companies, and 13 research organizations. The objective of the program is to find a commercially viable process to extract hemicelluloses from wood chips before pulping, and to convert the extract to ethanol, butanol, and other value-added and biomass-based chemicals that can reduce societal greenhouse gas emissions by substituting for more greenhouse gas-intensive alternatives. (WBCSD 2010a).

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.

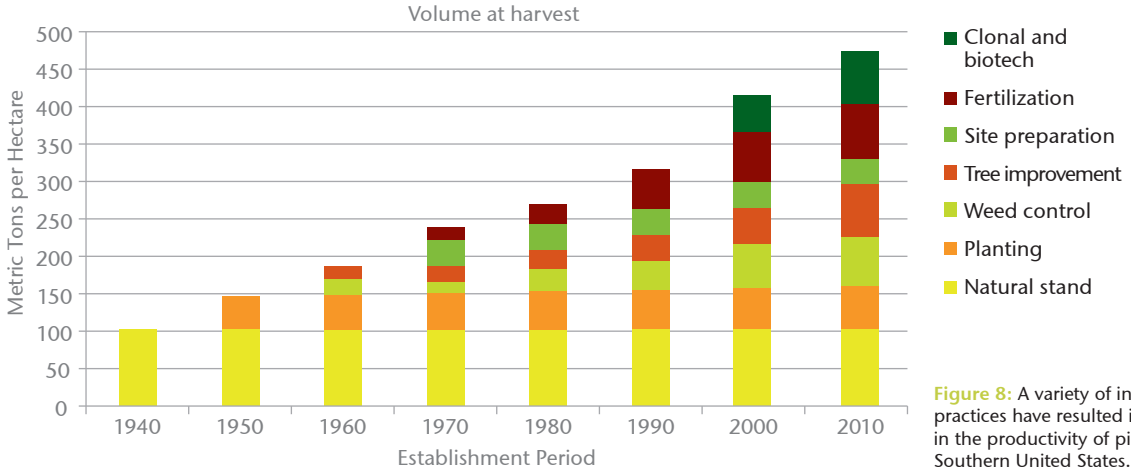


Figure 8: A variety of intensive management practices have resulted in dramatic increases in the productivity of pine plantations in the Southern United States.

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:

- In 2003, the European pulp and paper industry set a goal of increasing biomass use to 56% of total onsite primary energy consumption by 2010. The most recent data indicate that the industry is on track to meet this goal;
- In 2011, AF&PA expanded an earlier greenhouse gas reduction goal, committing to reducing greenhouse gas intensity by 15% by 2020 compared to 2005 levels. In addition, AF&PA committed to reducing purchased energy intensity by 10% over the same period;
- Canada's pulp and paper sector cut greenhouse gas emissions by 57% during the 1990-2009 period, while reducing emissions intensity by 60%;
- In 2008, the Japan Paper Association committed to reducing the five-year average fossil energy consumption per ton by 20% and related CO_2 emissions by 16% from 1990 levels by 2012.

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

In 2010, Stora Enso commissioned a new 140 million Euro multifuel boiler at its Langerbrugge pulp and paper mill in Belgium. With an annual input capacity of 250000 – 300000 ton biomass and Refuse Derived Fuel, it generates 125MWh of power. Photo: Stora Enso

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 products).

Some of the different recycling goals are:

- The Japan Paper Association has committed to achieve a recovered fiber utilization rate of 64% by 2015;
- In March 2011, AF&PA announced a goal to increase the paper recovery for recycling rate to exceed 70% by 2020;
- The 2010 European paper recycling rate of 68.9% was higher than the 66% target set by the European paper industry for 2006-2010. The European Recovered Paper Council is preparing a new, ambitious commitment for 2011-2015, to further increase paper recycling;
- In 2003, the Forest Products Association of Canada a 25% increase in recovery rates by 2012. 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 are often 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 2010, the size of the world's forests decreased at a rate of 5 million hectares per year – an improvement compared to the 8 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 0.13%/yr. The amount of forest loss would have been more than twice as large, were it not for afforestation (establishing new forests), forest restoration, and natural forest expansion (FAO, 2010b).

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). At the global level, commercial agriculture and subsistence farming have been identified as being the primary drivers for deforestation and forest degradation (Blaser and Robledo, 2007). 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.

Studies of the relationship between deforestation and industrial harvesting have found that the regions with the highest levels of industrial timber harvest and forest product output are also the regions with the lowest rates of deforestation. One recent study notes that "forest products and industrial roundwood demands provide revenue and policy incentives to support sustainable forest management, and, in turn, industrial timber revenues and economical forest management have helped avoid large-scale systematic deforestation in those regions with the highest levels of industrial timber harvest" (Ince, 2010).

The UNFCCC Cancun COP 16 declaration confirmed the importance of early action in reducing emissions from deforestation and forest degradation in developing countries, including the role of conservation, sustainable management of

forests and enhancement of forest carbon stocks – known as REDD+. WBCSD supports the design and implementation of REDD+ policies and funding mechanisms that leverage carbon markets and incentivize improved management capacity and practices in developing countries, based on payments for the carbon sequestration and storage services provided by forests when they are sustainably managed. The WBCSD believes REDD+ incentives must be:

- Designed to catalyze and support a full range of forest management options, including intensification and restoration over the long-term, and not just provide short-term avoided deforestation "fixes";
- Flexible enough to address specific and significant causes of deforestation in individual countries e.g. agriculture, poverty, poor governance;
- Based on phases to allow for sufficient initial investment in capacity building, training, and policy reform along a pathway leading to performance based payments;
- Include social, environmental and financial safeguards that ensure effective stakeholder participation, equitable benefit sharing, and clear and secure property and tenure rights;
- Implemented by the proactive involvement of indigenous peoples, forest communities and private sector stakeholders, who are actually responsible for sustainable forest management practices;
- Informed by the experiences from the voluntary carbon markets, in particular private sector expertise on:
  - Mobilization of finance.
  - Standard setting.
  - Measurement, reporting and verification.

More information on the opportunities and challenges related to forestry activities and REDD+ is available in a number of documents published by The Forests Dialogue (TFD 2008, 2009, 2010).

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 fire and infestation with the result being losses in stored carbon.

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.

Limiting the types of biomass acceptable for energy production could shift producers of biomass energy towards using fossil fuel.

Active forest management practices, such as planting (density/species/genetics control), 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.

In addition, the ability of plantations, and other types of active forest management, to produce more wood on a smaller area of land, makes land available for other purposes, including food production, recreation, and conservation.

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 little or 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 important enablers in the industry's efforts to 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 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, 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, gradual and measured long-term policy directions to navigate in this environment.

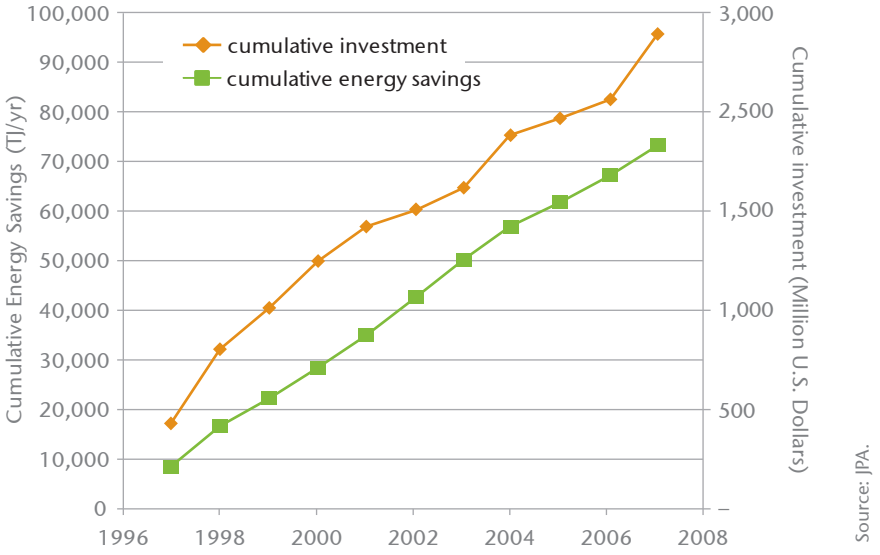


Figure 9: Since 1996, the Japanese paper industry has spent over 2.5 billion dollars on projects and equipment to accomplish cumulative energy savings of over 70,000 TJ per year, equivalent to approximately 12 million barrels of oil per year.

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.

Business requires clear signals towards a low carbon economy, and a level playing field across international markets. Without these, industry faces uncertainty, which can delay investments in low carbon alternatives.

Business has experienced that several cross-sector elements are necessary to enhance investments and sales of low-carbon technologies (WBCSD 2010b):

1. Strong signals from governments towards low-carbon growth nationally and internationally, either through targets or regulatory measures.
2. Adequate institutional frameworks that provide stable policies, transparent investment regulation, and conducive local conditions.
3. Appropriate absorptive capacity in institutions, business and society, including a functioning education system, a receptive environment, and targeted capacity building programs.
4. Economic and financial incentives to bridge the gap between low-carbon solutions and their commercial viability.
5. Energy efficiency drivers through removing barriers such as perverse subsidies, introducing economic incentives, and consumer outreach.
6. Business engagement with governments would allow business expertise and know-how to be incorporated into the design of new instruments that aim to enhance technology diffusion to developing countries. WBCSD member companies believe that the private sector should have an active role in the international and national climate change process to increase the likelihood of success in reaching common objectives.

There are also a number of enabling factors that apply more specifically to the forest products sector (WBCSD 2010b):

- Encouraging the practice of sustainable forest management;
- Recognizing and rewarding forest-based ecological services in addition to carbon sequestration;
- Eliminating perverse subsidies;
- Developing and deploying biomass based breakthrough technologies;
- Removing existing regulatory barriers that discourage maximization of combined heat and power technology;
- Including public and private sector procurement policies for wood, paper-based products, and bio-mass energy;
- Promoting faster turnover of capital stock depreciation so that improvements in energy and carbon intensity can be accelerated with the sustainable forest products industry.

Forests

- Recycle CO_2 between the atmosphere and the terrestrial environment;
- Provide biomass-based raw material for forest products;
- Provide biomass for 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

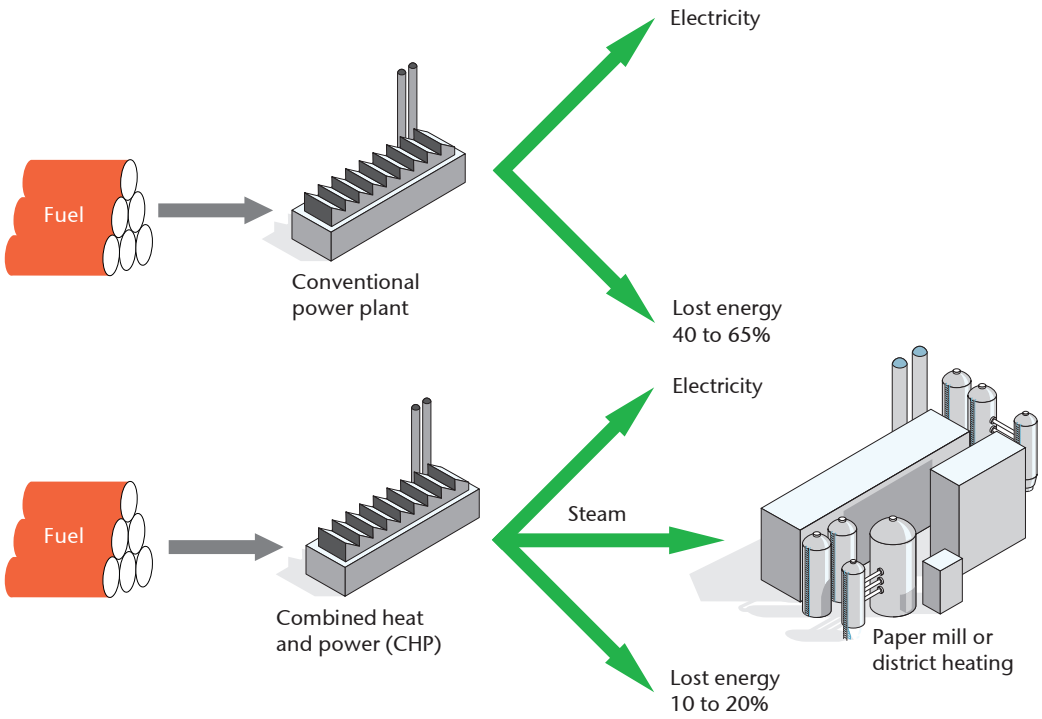
- Is energy intensive, but energy efficiency has steadily improved over time, and continued incremental improvements are likely;
- Is seeking ways to reduce energy use, due to increasing fossil fuel and electricity costs. GHG emission reductions usually occur as a result;
- Uses large amounts of steam, 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 readily 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 petroleum-, concrete- or steel-based products that are more energy and carbon intensive;
- Can usually be recycled, providing ecoefficient 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: Miner and Perez-Garcia, 2007

Figure 10: 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.

Our policy recommendations

Public policy alerts

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. Studies have indicated that using wood in the forest products value chain creates much greater value added and employment, than using the same biomass only for energy (CEPI, 2003 and RISI, 2010).

Studies of systems wherein wood fiber is "cascaded" from wood and paper products, through recycling and reuse opportunities and then used as a source of biomass energy have found greenhouse gas emission reductions can sometimes be twice or more the reductions accomplished by burning the wood fiber as a first use (Dornburg, 2005).

The uncertainties regarding the balance between future wood supplies and demand have been highlighted in several studies. A review of European studies, for instance, found that estimates of the quantities of forest-derived biomass available for energy in 2020 varied by a factor of five (Rettenmeier, 2010). Such uncertainties present challenges to companies and policy makers interested in sustainable forest management, and the products made from sustainably produced wood. In the face of these uncertainties, policy makers need to strive to avoid incentives and mandates that will distort wood markets, and pursue policies that help keep forested land in forest, and ensure adequate wood supplies for the future (e.g. see NAFO, 2011, AF&PA, 2011, CEPI, 2008).

Recommendations

The forest products industry supports the ongoing recognition of biomass from sustainably managed forests as a low-impact, renewable raw material and biomass 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 mitigation and adaptation goals, if certain policy recommendations are effectively implemented.

Under the UNFCCC process, national level responses to climate mitigation and adaptation are now being developed more actively, including plans for Nationally Appropriate Mitigation Actions (NAMA) and National Adaptation Programmes of Action (NAPA) in addition to national inventories and communications. Regardless of jurisdiction, we urge governments to take up the following public policy recommendations:

Sustainable forest management – the key strategy

1. Efforts to extend sustainable forest management practices to more of the world's forests should be continued and intensified. Governments must pursue forest policies that provide the needed flexibility to account for the multiple environmental, economic and societal values of forests, and the variation in these values from forest to forest.

2. Policies are needed to reduce deforestation in developing countries, and encourage afforestation and active, sustainable forest management. These efforts should be based on the facilitation of markets for forest products, and the use of market incentives such as carbon sequestration credits, as well as better management systems, including adequate forest inventory systems. Development aid to build local management capacity and support policy reform will be necessary in many countries, as proposed under the REDD+ mechanism.

Produce and use more wood on a sustainable basis – the key outcome

3. The many benefits of sustainable forest-based products and bio-energy can only be realized if public policies promote the development of adequate supplies of wood and recovered fiber. These policies should enable forest owners to assist in meeting the demand for forest biomass by keeping forested land in forest, improving forest productivity, and increasing the recovery of biomass co-products from forestry operations. Forest products manufacturers can also assist in meeting the demand for biomass by expanding efforts to generate additional wood-derived co-products, and better use of residual materials.

4. Within a market-driven framework, policies should recognize the societal, eco-efficiency and greenhouse gas mitigation benefits that occur when forest biomass is used to make useful products first – and then recycled as appropriate, before being used as a source of energy.

5. 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 that are more greenhouse gas intensive.

Avoid counterproductive policy impacts and technology barriers – the key requirement

6. Public policies should allow market forces, rather than subsidies, incentives or mandates, to determine the highest and best use of biomass. These policies should encourage sustainable and 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.

7. 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, and declining forest health, leading to decreased sequestration and increased vulnerability to natural disturbances.

8. Regulatory and non-regulatory barriers that discourage facilities from maximizing combined heat and power potential should be removed, so that the well-known greenhouse gas and energy benefits of this technology can be realized.

9. Policies should enable the development and deployment of biomass-based technologies (such as biomass gasification) needed to make our industry energy self-sufficient, and potentially a net supplier of bio-based energy.

10. Government policies that help reduce the cost of capital through lower interest rates, tax incentives and accelerated depreciation, will facilitate the early adoption of technologies that reduce greenhouse gas emissions.

11. A level global playing field, with respect to the impacts of carbon policies, is necessary in order to avoid carbon leakage attributable to the relocation of industries and increasing transportation-related emissions.

Key information and data sources

Key information and data sources

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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

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Membership Principles and Responsibilities (agreed March 2007)

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 woodtracing 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 | WBCSD

The WBCSD is a CEO-led, global coalition of some 200 companies advocating for progress on sustainable development. Its mission is to be a catalyst for innovation and sustainable growth in a world where resources are limited. The Council provides a platform for companies to share experiences and best practices on sustainable development issues and advocate for their implementation, working with governments, non-governmental and intergovernmental organizations. The membership has annual revenues of USD 7 trillion, spans more than 35 countries and represents 20 major industrial sectors. The Council also benefits from a network of 60 national and regional business councils and partner organizations, a majority of which are based in developing countries.

For more information visit www.wbcsd.org

National Council for Air and Stream Improvement | 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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Printer:	Atar Roto Presse SA, Switzerland. Printed on paper containing 85.9% PEFC certified fiber and 3.2% FSC certified fiber. 100% chlorine free. ISO 14001 certified mill.
Photo credits:	Provided courtesy of member companies
Copyright:	© WBCSD, October 2011. Third Edition.
ISBN:	978-3-940388-78-0

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