

A Path Forward

A bold new “roadmap” released by the Agenda 2020 Technology Alliance outlines measures to make the forest products industry more competitive, sustainable, and efficient.

A new Forest Products Industry Technology Roadmap released in early May by the Agenda 2020 Technology Alliance invites the global research community to engage in collaborative, pre-competitive research, development, and demonstration programs that will provide the foundation for deployment of new breakthrough technologies for the forest products industry.

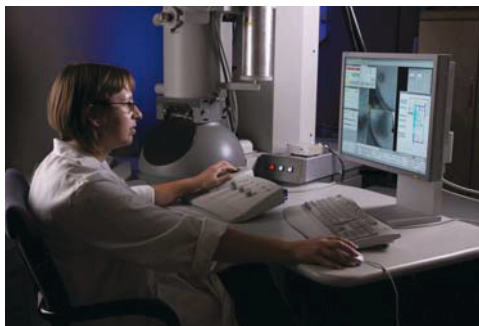
The *2010 Forest Products Industry Technology Roadmap* provides both the industry and the research community with guidance on the research and development (R&D) priorities necessary to transform the industry’s products and manufacturing processes and position the industry for sustainable, long-term growth. Breakthrough technologies are needed to facilitate the industry’s continuing progress as a producer of goods made from a renewable, carbon-neutral resource, while increasing its leadership position in bioenergy and recycling of waste products.

The research community — including both those who actively conduct research and those who fund it — plays a vital role in ensuring the industry’s continued success. In collaboration with industrial partners, the research community produces the scientific breakthroughs that support the development of new technology solutions, which in turn enable industry to become more efficient and to develop new products and serve new markets. The partnership with the research community is particularly important for the forest products industry because the manufacture of new types of paper, pulp, and wood-based products requires a broad range of technology solutions.

Industry Importance

The global forest-based industry is an important component of society in many nations. Its total economic value was US\$468 billion in 2006, employing 13.7 million people, according to the United Nations. The world’s pulp and paper industry covers six continents, with North America, Europe, and Asia having the largest portions.

The United States forest products industry accounts for approximately 6 percent of the total U.S. manufacturing gross domestic product (GDP), placing it on par with the automotive and plastics industries. The industry generates more than \$200 billion a year in sales and employs approximately 900,000 people earning \$50 billion in annual payroll. The industry is among the top 10 manu-



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facturing employers in 42 states. This geographic diversity results in a widespread employment base that is concentrated in the nation’s rural communities.

Innovation

The forest, wood, and paper industry can significantly improve by encouraging innovation as an essential element of long-term sustainability; recognizing that investment in technology can dramatically reduce manufacturing costs and enable individual companies to pursue progress in new and advanced products. A robust industry-driven R&D program is an important building block in changing the image of the industry to investors and the public. Breakthrough R&D is the best path for achieving the

product innovations and reductions in manufacturing costs that are necessary for a sustainable economic future long-term.

In recent years, many companies in the industry and related supplier companies have embraced the concepts of “open innovation.” In this approach, companies look externally for technologies that can advance their objectives and collaborate meaningfully with partners in industry and the research community, bringing the best available talent to bear on priority R&D targets. Open innovation is a basis for the collaborative programs that will be undertaken to advance technology objectives in this roadmap.

Trends and Drivers

A comprehensive technology roadmap for the forest products industry was published in 2006, and much of its content is still relevant. In the last four years, however, the need to address significant issues such as climate change, water availability, energy security, and sustainability has become more urgent and more complex. The 2010 roadmap effort was undertaken to rethink priorities and goals, particularly in response to several key trends and drivers:

Societal Concerns: While covered in the 2006 roadmap, concerns over climate change, water availability, energy security, and sustainability have grown exponentially, especially in light of recent efforts to regulate the emission of greenhouse gases. Further concerns, such as global population growth, have also influenced the forest products industry’s priorities.

Manufacturing Considerations: Input costs have risen dramatically in recent years, often punctuated by significant short-term fluctuations, driving a desire for next-generation approaches. In addition, improving the industry’s currently high energy intensity will require

advanced technologies and processes.

Economic Pressure: The recent economic recession directly impacted the forest products industry globally, with large declines in demand for many of its products. Sharp drops in housing starts and construction reduced sales of wood-based building products. Steep drops in advertising led to large declines in demand for printing papers. Lower overall economic activity resulted in reduced need for packaging. While the industry is now recovering from the impacts of the severe recession, it is positioned to build on its strengths and embrace new technologies and market opportunities.

Market Forces: Customers increasingly want products from renewable materials. The desire is growing also for fuels and chemicals from renewable sources. A significant advantage for wood-based products, as well as fuels and chemicals derived from wood, is the “green” and sustainable aspect of the primary raw material. In addition, competition from alternative products and materials, particularly electronic media and plastic substitutes, continues to complicate market needs and erode industry margins.

Impact of Government Policies on Wood Supply: Governments at all levels are imposing mandates or providing incentives for renewable energy. In the United States, government agencies project that biomass use will grow more rapidly than other renewable energy sources to meet these mandates or in response to governmental incentives. This projection has heightened concerns over competition for wood between traditional uses for the production of forest products and newer uses for bioenergy.

The 2010 roadmap effort was necessary to realign research and technology development with industry needs that respond to the trends and drivers facing the industry. Taking full consideration of these recent developments and their impacts upon forest products, the updated roadmap reframes and clarifies the industry’s technology strategy and messages to its key audiences: federal agencies, universities, and researchers. It provides an updated framework for understanding the technological innovation that industry needs to improve manufacturing performance, develop new value streams from forest resources, and enable greater profitability.

Roadmap Content and Structure

The 2010 Forest Products Industry Technology Roadmap was developed with the help of more than one hundred knowledgeable representatives from industry, universities, and government agencies. A multi-step process was used to first identify the important strategic issues facing the industry, and then translate those issues into specific R&D needs and pathways that provide researchers with clear points of entry for designing relevant research initiatives.

Strategic Issues

The roadmap identifies six strategic issues that establish critical imperatives for the forest products industry. The six issues represent a broad consensus of leaders from the forest products industry, government, and universities, and comprise an integrated set of priorities for meeting the new challenges posed by the trends and drivers.

- Reduce substantially carbon emissions and energy consumption in mills and plants.
- Reduce fresh water intake in manufacturing at least 50%.

- Increase the supply of high-quality fiber and low-cost biomass.
- Increase the value from high-quality fiber and low-cost biomass.
- Enable new products and product features.
- Improve recovery and recycling of waste wood and fiber products.

Technology Strategy

The technology strategy is (1) to define priorities in research and development that would provide breakthrough solutions for the forest products industry to use in transforming its processes and products, and (2) to advance collaborative programs that address the industry technology priorities.

The roadmap presents an updated technology strategy that maps the strategic issues onto the industry value chain. The strategic issues cover the entire forest products value chain, from forestry and manufacturing operations to consumer products and recycling. This technology strategy provides the basis for a planned approach to strengthening the industry’s competitiveness and ensuring its continuing contributions to the overall economy and to societal goals of resource independence and environmental sustainability.

Implementation Strategy

The technology strategy focuses on innovative, breakthrough solutions that no single company can accomplish on its own. As such, collaborative, cost-shared R&D is the cornerstone of the implementation strategy. Collaborative efforts are essential because the technical challenges and solutions are multidisciplinary and because diverse teams with breadth of knowledge and experience are necessary to move technologies from concept to commercialization. Meaningful industry-government partnerships will help to ensure that adequate resources — including funding, scientific know-how, demonstration facilities, etc. — are applied to achieving shared industry and national goals.

Path Forward

The development, demonstration and deployment of multiple new transformational technologies that will make the industry more competitive, sustainable, and efficient, is beyond the resources and capabilities of forest products companies acting alone or even in concert. This task will require sustained involvement and collaboration among industrial organizations, government agencies, and research institutions. The roadmap is offered both as an invitation to and as guidance for these ongoing efforts.

Agenda 2020 will pursue an active role in the implementation of the roadmap. It will work with industry to monitor priority needs and with government and academia to reinforce the strategic line of sight. It will track progress and keep the roadmap up-to-date. It will maintain lines of communication and facilitate research partnerships. The Agenda 2020 Technology Alliance intends to lead the path forward on key programs outlined in the 2010 roadmap. ■

The 2010 Roadmap was developed by the Agenda 2020 Technology Alliance, in partnership with The Institute of Paper Science and Technology at Georgia Tech, and with financial support from the U.S. Department of Energy’s Industrial Technologies Program. An electronic copy of the 2010 Roadmap is available at: www.agenda2020.org.