

THE BASICS OF AGENDA 2020

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AF&PA LOOKS TO THE NEXT MILLENNIUM WITH CONCISE, ATTAINABLE GOALS.

The forest products industry has a long history of conducting research to address urgent concerns, especially in the environmental or safety arena. In 1996, the industry launched a new program to address the greater pressures before us as the next century draws near.

"Agenda 2020" is the long-range research program designed to promote industrial growth, energy efficiency, and international competitiveness while protecting the environment. To accomplish this, Agenda 2020 articulates where the industry stands today, where it wants to be in 25 years, and the technology-related issues that bridge the gap.

The Board of the American Forest & Paper Association (AF&PA) approved the Agenda 2020 document in October 1994. The following month, the association entered into a compact with the U.S. Department of Energy to develop an implementation plan for Agenda 2020. That compact required AF&PA to assume leadership for identifying the long-term research and technology needs and for providing oversight for the research effort to be undertaken.

The implementation process for Agenda 2020 has just begun and, as an initial step, involves identification of top research priorities—those major research items that will provide broad, significant benefits to the entire industry. A consortium of research institutions, industry, and national laboratories will undertake these research projects. Their goal is developing new technologies, processes, or measurements that will allow companies to manufacture products more efficiently and cost-effectively while reducing environmental impacts of operations and maximizing the efficient use and reuse of resources.

THE 2020 VISION

As its name implies, Agenda 2020 helps us to see our future more clearly. Our vision of the future is both ambitious and inspiring. Here is what we see:

- The U.S. forest, wood, and paper industries will continue to be the global leaders in providing safe and

essential products based on forest resources.

- The industry must be financially healthy and attractive not only to the investment community but also to the communities where it operates and to the nation as a whole.
- The industry will be an example of sustainability, with its renewable raw material growing in productive, well-managed forests at considerably greater rates than today. Material recovery and recycling will increasingly leverage the virgin raw material base.
- Manufacturing plants will operate in harmony with the environment and their host communities. Water use will be low, and discharges to the air and water will be closely controlled to minimize effects on the environment. Regulations will consider environmental effects as well as energy use and economics.
- More energy-efficient processes will evolve, and an even larger amount of the industry's energy will be self-generated based on biomass and waste materials. Excess energy will be marketed as electricity and liquid fuels.
- Productivity will be substantially higher than today, and less costly processes will be developed, improving capital efficiency and leading to enhanced financial performance.
- Highly skilled, motivated employees will operate the industry's automated manufacturing facilities. Worldwide technological leadership will be regained as the best scientists and engineers are attracted to the industry and cooperative precompetitive efforts between the industry, universities, and government flourish.

BRIDGING THE GAPS

To bridge the gap between the present and the future, we must focus on those needs that will advance the entire industry while also providing suitable cooperative research efforts. High-priority efforts will center on six research areas relevant to all three industry segments—forestry, wood products, and pulp and paper products:

- Sustainable forest management
- Environmental performance
- Energy performance
- Improved capital effectiveness
- Recycling
- Sensors and controls.

As a starting point, our research agenda outlines likely research needs in each area. Our goal is to address a spectrum of program maturities, from basic research to development and demonstration projects. To move forward, AF&PA asked its standing committees of industry experts to assume an added responsibility, thus one committee "adopted" each research area.

We were fortunate to be able to link these committees and the research community. The universities connect with the Pulp & Paper Research Alliance, the National Association of Professional Forestry Schools and Colleges, and similar regional and national bodies. The Department of Energy National Laboratories are linked through a National Coordinating Council with a mandate to facilitate the reapplication of their expertise to support industry. These relationships allow AF&PA to involve a broad spectrum of potential investigators in committee discussions. The result is a practical communications system that provides very valuable input to the deliberations.

Each research committee developed detailed pathways for future research that formed the basis for Requests for Research Proposals. The response in our first year has been exciting. We received almost 200 submissions. A range of industry members assessed submissions for relevance and importance to the entire industry, for scientific and engineering merit, for the likelihood of delivering promised goals, and for overall merit. The result was a consensus program recommendation funded in August 1996. Funding sources include approximately US\$ 2 million of industry contributions in kind and more than US\$ 5 million from the Department of Energy.

RESEARCH COMMITTEE REPORTS

Summarizing the careful deliberations and actions conducted in 1996 is not possible here, but I will outline the highlights of the various research committees in our first year.

Sustainable forest management

The overall objective is to accelerate the development and deployment of genetically superior lines of trees and to realize important gains in sustained forest productivity. There are four focus areas: (a) biotechnology, (b) basic physiology of forest productivity, (c) sustainable soil productivity, and (d) remote sensing technologies to

improve forest inventory and stand management. The research group also seeks more scientific understanding of the ecological consequences of genetic engineering in forestry, even though the ecological risks appear to be minimal at this time.

Projects funded in 1996 begin addressing these focus areas. Specifically, we will:

- Look for molecular markers for wood properties to improve the accuracy of superior tree selection and reduce the time and costs involved.
- Look for molecular markers for improved photosynthetic efficiency and carbohydrate utilization.
- Study the basics of biochemical and molecular regulation on crown architecture as a basis for future breeding strategies to increase productivity.
- Study the effects of high-intensity forest management on water quality and site nutrient reserves.
- Study ways to engineer step-change improvements in soil productivity.

Environmental performance

In the environmental arena, 14 clearly defined focus areas underscore the proliferation of issues and the importance of maintaining our continuous environmental improvements. The research group seeks to address all vectors affecting the environment from all industry sectors.

Four broad areas provide focus for pulp and paper production: (a) cost-effective recovery and reuse of process streams far beyond what is possible today, (b) reducing volatile emissions, (c) minimizing the need for pulp bleaching and making the chemicals more efficient and effective, and (d) characterizing and communicating the uncertainty in life-cycle analyses.

For wood products, the issues are fourfold: (a) volatile organics, (b) product durability alternatives, (c) extending the useful life of wood products, and (d) recycling what is left.

The 1996 research program builds on a history of successfully addressing major environmental concerns in a collaborative way. We have committed to working to:

- Understand the value of wood-based products compared with their competitors (this is a successor project to the CORRIM study of the 1970s).
- Study reduced production and control of volatile organics from wood drying or pulp production.
- Further clean up and reuse air and water streams in pulp production.
- Improve efficiency of producing and using bleaching chemicals.

Energy performance

Energy research must advance the industry's outstanding record of energy self-sufficiency despite various pressures that can increase energy use, such as improved environmental control and increased recycling. There is a history of collaborative research to build on, and collaborative efforts have already produced dramatic benefits in improved recovery boiler safety.

Drying efficiency improvements and economical low-level heat recovery are pervasive needs for all industry products. In pulpmaking and papermaking, we need to: (a) accelerate our understanding of the fundamentals of the recovery boiler, (b) open the way to further reuse of recycled waste streams to the boilers, and (c) develop options for replacing older Tomlinsons. The 1996 program will concentrate on resolving the core issues of black liquor and biomass gasification.

Improved capital effectiveness

Improved capital effectiveness represents a new research planning area for AF&PA as well as an opportunity to improve global competitiveness and cost effectiveness. The 1997 target areas are: (a) reducing corrosion, (b) simplifying existing process technologies, (c) improving fabrication methods, (d) improving skill capabilities through education, and (e) developing intelligent manufacturing techniques. Collaborative work on corrosion issues in recovery boilers is under way and partly funded by the Department of Energy.

Recycling

The industry is actively pursuing its commitment to reach a 50% recovery goal by 2000, and already fiber recovery rates surpass 40%. However, the challenge of continuous improvements only grows with each recovery goal we successfully reach. Many emerging technical questions need answers so we can continue our progress. How do we collect efficiently and retain quality? How do we separate the desirable from the undesirable? How do we improve the bonding of used fibers? How do we dispose of waste? How do we increase wood recycling? We will be looking at all these questions further.

Sensors and controls

In this area, we seek to improve our ability to "communicate" with the processes we run as the basis for further continuous improvements. One fundamental issue is controlling the variability that is inherent in large-scale processes using natural or recycled raw material. Another issue is the lack of satisfactory measurement sensors on the process, the products, or the effluents. We have identified the need for enhanced diagnostic tools and for development of associated models and control systems. Importantly, we need to improve our ability to assimilate all available data and reduce it to the practical knowledge

valued by process managers. Mill employees will play a very key role as developments call for improved skills around startups and transitions. Training in general will be essential to bringing real benefits to our mills.

The projects funded in 1996 cover "100%" measurement of web priorities, rapid assessment of wood chips, and automated sorting of recycled materials.

FURTHER DISCUSSION

Through Agenda 2020, the fundamentals of planning pre-competitive, collaborative research guide us as we fund priority projects and begin. It continues to be a learning process as we proceed; yet, this adaptive and fluid approach serves to unite us in our efforts.

Two serious questions continue to stimulate extensive discussions. First, what makes a quality research portfolio? The essence of the answer is to define the "big hits" that can make a real difference to a broad spectrum of the industry. We must address major issues with work that is likely to advance practical solutions from precompetitive work.

The second question we consider is how we can work together to find the right research portfolio. We call this our "pathways" approach. We established a model pathway in each research area to ensure that we follow some simple but key steps. First, we must define issues critical to the future success of a broad spectrum of this great industry. Then, we must present these needs to all potential investigators to benefit from their experience and expertise. Finally, we must prioritize proposals to establish a consensus program that moves the industry forward.

Significant benefits arise from the extra work involved in this proactive approach. Planning and research are essential to fit the necessary technical changes into the rhythm of capital upgrades, replacement, and repair. This requires recognition by all stakeholders that single-purpose technical changes consume disproportionate levels of all key resources (people, money, and equipment). This also requires trust that the long-range improvement vectors will be maintained.

THE 1997 AGENDA FOR AGENDA 2020

The year 1996 was one for building the foundation and infrastructure for Agenda 2020. In this effort some principles have emerged.

Focus is critical. Through clear identification of six research areas, we keep our eye on the target, which we define as "big hits" or research that will yield dramatic, important results.

We continue to witness the positive results of collaborative work. In this case, Agenda 2020 has been structured fundamentally differently than past industrywide

efforts. The Department of Energy has played a valuable role, both in supporting our development of Agenda 2020 and in partially funding projects consistent with their primary mandate to reduce energy consumption and environmental impact. The Forest Service—particularly the Forest Products Laboratory in Madison, WI—has a long history of addressing broad technical problems of wide industrial value and provides important contributions.

Through AF&PA, the industry has come together and committed itself to provide the leadership for the process. AF&PA will not manage the research itself in the future. Rather, the association will provide perspective, feedback, and influence to enable this research program to improve the long-term competitiveness for the industry as whole. Hopefully, AF&PA will serve as a nexus, with the best and brightest ideas flowing into the association and circulating out again to the broader industry and research community.

In line with this goal, in 1997 we want to further open our decision-making to comment and critique. In particular, we want to involve suppliers in more meaningful ways in our research planning, since these professionals can significantly augment our progress.

Through Agenda 2020, AF&PA is developing new pathways and partners that will help take us forward confidently into the 21st century. We hope you will join in this effort.

REQUEST FOR SUPPORT

We seek support, comment, and critique on work conducted so far, and we welcome additional ideas on addressing industry's needs and developing measurements of progress. Mail or fax (+1 202 463-2423) your comments on this report to David Cooper at the American Forest & Paper Association, 1111 19th St., NW, Suite 800, Washington, DC 20036. **TJ**

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