THE STATUS OF AND OPPORTUNITIES FOR BUSINESS CLUSTERING WITHIN THE FOREST PRODUCTS SECTOR IN THE U.S.

Appendix A
Opportunities for Increased Competitiveness of Forest Business Clusters

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CONTENTS

FULL CIRCLE (SELF-SUSTAINING) FOREST BUSINESS CLUSTERS

Another strategy for cluster development is to think in terms of full circle or self-sustaining clusters. This strategy focuses on building a self-sustaining cluster that includes more than just a manufacturing component but service (repair), education, research, recreation, and other components as well. (*See Port Townsend Wooden Boat case study in Appendix B.*) In theory, full circle clusters are not inclined to be as negatively impacted as clusters that depend on one component such as paper, lumber or furniture manufacturing. With full circle clusters, the "cluster risk" is spread out over different types of businesses and organizations.

Full circle clusters provide opportunities for, as an example, end-users (consumers) of products to return again and again to cluster businesses. As noted in the Port Townsend case study, the cluster not only builds wooden boats but repairs them as well, creating additional demand for businesses in the cluster. In Port Townsend's case, a sub-cluster of educational and vocational entities attracts outsiders (visitors) to the area and provides training opportunities for cluster and local community members. The cluster also promotes recreational activities related to its "flagship product" (wooden boats) that draws visitors to the area. This reinforces the idea that Port Townsend is the place to be for anything related to wooden boats.

Most existing forest business clusters have elements of full circle clustering but very few have a complete program in place. Also, the full circle approach might be more applicable to smaller clusters (community or county-based for example) since all aspects of the businesses (manufacturing, repairing, educating, recreating, etc.) might be easier to develop and coordinate at a local level. A small cluster of woodcraft manufacturers that operate sales galleries, provide repair service for wood items such as furniture, sponsor "how-to-build-it" wood product seminars, and engage in festivals and other promotions to attract customers would be another example of incorporating elements of a full-circle cluster.

PRODUCT BRANDING

Branding is one method of accomplishing product differentiation and reinforcement. When combined with high quality products and good service, branding offers a means of responding to external competitive challenges such as lost or dwindling market share, product complexity, and global competitive forces. "Place of origin" branding for wood and wood products has been growing in the United States. Many forest sector business clusters are using branding to create a positive image and raise consumer awareness for raw and value-added products[1].

One example of a state branding effort is the Minnesota Wood Campaign (MWC), an industry sponsored initiative based in northern Minnesota. The mission of MWC is to "...bring to the world's attention the natural qualities and sustainability of northern Minnesota wood- and forest-based products and the abilities of the people who make them." Members of the Minnesota Wood Campaign are eligible to use a "True North Woods" brand symbol on products and sales materials (www.truenorthwoods.com). Membership fees are based on levels of annual sales.

Another example of local and regional branding is the Maine Made program. This branding effort attempts to capitalize on the notion that Maine produces high quality products steeped in tradition. Although the Maine Made program is not strictly limited to forest-based products, many wood producers in the Maine Forest Sector Cluster have joined the program and use the brand as a tool in marketing their products. Producers must show adequate production capabilities, sound customer service practices, and high quality products to be admitted to the program. The Maine Made program is a service of the Maine Products Marketing Program, a division of Maine's Department of Economic and Community Development (http://www.mainemade.com/default.asp).

Examples of Other "Place-of-Origin" Branding Efforts Include:

- Brand Oregon (www.oregon.gov/BRANDOREGON/)
- California Grown (www.californiagrown.org)
- Vermont Quality Wood Products (www.vermontwood.org).

While the Oregon branding program applies to all Oregon products and the California effort is focused on agricultural products, the Vermont initiative targets specifically the wood products industry.

Occasionally, quality workmanship over a period of many years gives a product or line of products a "brand" without a strong branding effort. The Holmes County, Ohio Amish Furniture Cluster is a case in point. Although the furniture manufacturers in this cluster do not actively promote their products as "Amish made", their long standing reputation as excellent craftsmen have given their products a positive image which has benefited producers in their marketing efforts.

Locally produced end-user products that are unique and effectively marketed can be a strategy to enhance cluster growth. As noted earlier in the report, the wooden boat industry in Port Townsend, Washington, is an example of a cluster focused on one unique value-added product with numerous supporting businesses and their unique (often one-in-kind) products. Unique products also offer branding opportunities that further distinguish the product.

Products that "tell a story" through unique utilization techniques (lumber recovered from Emerald Ash Borer-killed trees in the Detroit or Chicago area) or commemorate a special event or place (Civil War battleground for example) can serve as the nucleus for an industry cluster. Sales programs need to capture the "story" behind the product and marketing a suite of attributes and benefits to consumers beyond just the functional purpose of the product.

Products from certified forests with a chain-of-custody paper trail from forest to final consumer also can be marketed as "locally produced" in as much as the origin of the wood fiber can be determined. This is important to consumers who want assurance that the product they are purchasing was produced in a sustainable manner.

Forest business clusters considering a branding initiative should recognize a couple of key points. First, building strong brand awareness is typically a long-term process that requires time, energy, and financial resources. Second, branding can backfire and leave negative impressions in the minds of customers if the branded products do not perform as advertised (consider the Louisiana Pacific home siding crisis during the 1990s). Third, a group (locale) branding effort requires communication between manufacturers, distributors, and others in the marketing chain. These interactions between firms are the lifeblood of successful clusters, demonstrating that branding can be used to enhance a cluster.

[1] For an overview of branding see "Branding: Creating intangible competitive advantages in the forests products industry" by John Tokarczyk and Eric Hansen, Forest Products Journal, 56(7/8): 4-13, July/August 2006.

THINK VALUE-ADDED

A key strategy in getting more bang for the buck is to focus on value-added processing and value-added markets. The American Forest and Paper Association publishes an annual "Economic Impact" report that provides state-by-state forest products industry data in various categories. The impact of value-added industries is striking when comparing states such as Iowa for example (with meager timberland acreage) with Idaho and Montana (significantly larger timberland resources). In forest product economic categories such as number of employees, annual payroll, and value of industry shipments, Iowa's value-added impact is greater than both Idaho and Montana[2].

The conclusion is obvious: it is not the amount of timberland that generates the greatest economic impact but rather the activities that occur after timber is harvested, processed, and shipped to a value-added producer.

Whenever possible, clusters should encourage local value-added processing. This strategy not only generates the greatest economic impact but also helps decrease adverse economic impacts on the cluster resulting from fluctuations in availability of raw materials (such as logs).

Table 1. The impact of value-added industries in Iowa, Idaho, and Montana.

State	Timberland	Number of Employees	Annual Payroll	Annual Shipments
Iowa	1,900,000 acres	17,319	$ 814,000,000	$ 3,053,248,000
Idaho	16,800,000 acres	12,393	$ 593,000,000	$ 2,588,420,000
Montana	19,200,000 acres	7,830	$ 359,000,000	$ 960,445,000

[2] See American Forest and Paper Association's "Economic Impact" report at http://www.afandpa.org/Content/NavigationMenu/About_AFandPA/State_Economic_Brochures1/Economic_Impact.htm.

BIOENERGY

Renewable energy accounted for about 7% of the total energy consumed in the U.S. in 2007. The Energy Information Administration reported that wood and derived fuels (black liquor, and wood/wood waste solids and liquids) satisfied about 2% of national energy demands. The current market for woody biomass for energy that includes wood manufacturing residuals, wood chips, cordwood, and wood pellets has an estimated annual value of about $6.5 billion according to a report by Summit Ridge Investments.

Biomass can be used for energy at three scales: large-scale electrical power generation at stand-alone facilities (including co-firing with coal); cogeneration to produce process steam and electrical power; and small-scale thermal heating projects. Barriers exist, however, for making biomass harvests economical. These include long transportation distances, inaccessible terrain, inefficient harvesting and trucking systems, dispersed labor force, and poor markets. The uncertainty of a regular flow of raw materials from federal lands could also make investments in biomass and bioenergy systems problematic. However, there are opportunities for adding value to woody materials removed from fire-prone densely stocked stands.

Harvesting higher value timber along with biomass removals is perhaps the best way to create favorable economic conditions for woody biomass harvesting treatments. Different approaches exemplify opportunities for additional income to landowners and the wood products sector. Creating a network of schools (as was done in Darby, Montana[3]) and other community buildings that use biomass for heating is a way of utilizing small diameter stems that are typical of hazardous fuel reduction projects. Enterprises manufacturing wood pellets and other densified fuels are examples of start-up businesses that are taking opportunities generated from harvesting of woody biomass removed as part of fuel-reduction silvicultural treatments. Stewardship contracts on federal lands are a method of generating a reliable flow of raw materials for bioenergy and other value-added industries (e.g. in the U.S., approximately 200 stewardship contracts are currently in different stages of implementation).

Policy Incentives for the Development of Wood for Energy Initiatives

Forest business clusters interested in adopting wood-for-energy technologies can benefit from incentives from federal and state governments through partnerships and investments. At the federal level, two major pieces of legislation intend to boost the use of wood as an energy feedstock. In the 2008 Farm Bill, a specific provision stresses the role of forests as a source of energy feedstock. Title IX, Energy, of the Food, Conservation, and Energy Act of 2008 includes a Forest Biomass for Energy Provision that authorizes new competitive research and development programs. The program is centered on the following priority areas: development of technology and techniques to use low-value forest biomass for energy production, development of processes to integrate energy production from forest biomass into biorefineries, development of new transportation fuels from forest biomass, and improvement of growth and yield of trees intended for renewable energy. The 2007 Energy Independence and Security Act has launched several programs including the University-based research and development grant program. The same Act has authorized the appropriation of $500 million for the period of fiscal years 2008 through 2015 to support grants for production of advanced biofuels. Recently, the Department of Energy (DOE) approved several grants to support specific research in cellulosic ethanol development including cellulosic ethanol projects in Colorado, Maine, Kentucky, Louisiana, Missouri, Tennessee, Oregon, and Wisconsin.

State policies complement federal actions. A review of policies promoting wood for energy uses carried by the Department of Forestry at the University of Missouri suggests that the most commonly used policy instruments include renewable energy portfolios (a mandate requiring the incremental use of renewable energy), financial instruments (such as tax and subsidy incentives to promote generation of renewable energy from wood), and public services (including public education and research programs). The most commonly adopted policy instruments applied at the state level are renewable energy portfolios and financial incentives. Examples from different states including specific types of energy and the use of wood as an energy feedstock in general include:

Pennsylvania: the State of Pennsylvania has adopted legislation requiring the use of biofuels. Pennsylvania's House Bill No. 1202 "Biofuel Development and in-State Production Incentive Act", among several requirements, mandates that all gasoline sold in the state must contain at least 10% of cellulosic ethanol after the in-state production volume of 350,000,000 gallons of cellulosic ethanol has been reached and sustained for three months.

Georgia: Georgia's biomass sales and use tax exemption promotes the increased use of biomass as a renewable energy feedstock. The state legislature enacted legislation to exempt biomass materials from the state's sales and use taxes. The term "biomass

[3] See Bergman, R. and T. Maker. 2006. "Fuels for Schools: Case Study in Darby, Montana," USDA Forest Service, Gen. Tech. Report FPL-GTR-173, 21 pp. Available at www.fpl.fs.fed.us/documnts/fplgtr/fpl_gtr173.pdf.

material" is defined as organic matter, excluding fossil fuels, but including agricultural crops, plants, trees, wood, wood wastes and residues, sawmill waste, sawdust, wood chips, bark chips, and forest thinning, harvesting, or clearing residues; wood waste from pallets or other wood demolition debris; peanut shells; pecan shells; cotton plants; corn stalks; and plant matter, including aquatic plants, grasses, stalks, vegetation, and residues, including hulls, shells, or cellulose containing fibers. Pellets and fuels derived from biomass are generally eligible. To qualify for the exemption, biomass material must be utilized in the production of energy, including the production of electricity, steam, or both.

Missouri: The Missouri Qualified Fuel Ethanol Producer Incentive Fund is an example of a subsidy to energy output. This fund is targeted to any producer of fuel ethanol whose principal place of business and facility for the fermentation and distillation of fuel ethanol is located in the state of Missouri and is at least 51 percent owned by agricultural producers. Ethanol can be made from cereal grains, cereal grain by-products, and qualified biomass. Qualified biomass is defined as any wood derived organic material harvested in accordance with a site specific forest management plan developed by a professional forester. Each Missouri qualified fuel ethanol producer is eligible for a total grant in any fiscal year equal to 20 cents per gallon for the first 12.5 million gallons and five cents per gallon for the next 12.5 million gallons of qualified fuel ethanol produced from Missouri agricultural products and qualified biomass.

Opportunities and Challenges for Forest-based Communities and Clusters

The use of woody biomass as an energy feedstock is faced with significant opportunities and challenges. Some of the greatest opportunities are the capacity to generate locally produced energy, generate additional work opportunities for logging operators, provide more opportunities for commercial thinning, improve the health of forestlands, and create jobs in the energy industry. Major challenges include high costs of harvesting and transporting biomass material from the harvest site to an energy facility, sufficient woody biomass supply, and capital costs of energy facilities.

The case of Old Town, Maine, illustrates some of the opportunities for forest-based communities to be active participants in the generation of renewable energy from woody materials. This is an example of university research and private and public investment in the development of an integrated biorefinery. The proposed biorefinery will take use of a former paper-manufacturing mill that was closed down because of fierce price competition from international pulp producers. RSE Pulp & Chemical partnered with the University of Maine and American Processes Inc. to research, develop, demonstrate, and commercialize a technology to produce 2.2 million gallons a year of fuel ethanol using 80 dry tons a day of hemicellulose extract. The processes can be integrated into existing pulp facility structures to minimize capital investments. The objective is to turn mills from simple pulp factories into complete forest biorefineries that convert wood residues into cellulosic ethanol. The proposed model would create revenues by maximizing pulp production, manufacturing ethanol, chemicals, polymers, and transportation fuel, and using biomass as fuel for the pulp mill. The biorefinery model aims to improve efficiency by utilizing different inputs for their most profitable uses instead of producing a single product (e.g. pulp) and improve revenue streams to pulp mills around the nation.

Forest-based communities that are highly dependent on large pulp and paper mills can benefit from the experiences learned in Old Town, Maine. Communities can create synergies with universities as well as public and private organizations to bring bioenergy projects to reality. Certain policies can promote professionally managed operations as they are linked to the adoption of a forest management plans (e.g. the Missouri Qualified Fuel Ethanol Producer Incentive Fund is only available to landowners with a forest management plan developed by a professional forester). Commercial thinnings can be motivated for the sales of material that previously had little or no commercial value but that is now an input to an emerging energy sector. Expanding markets for fiber in energy production can further silvicultural opportunities as they can balance sawtimber and woody biomass production to supply material for small-diameter and low-grade markets. The use of locally available sources can help reduce imports that currently account for in excess of 60 percent of all domestic oil consumption. There is particular potential in the electric power sector that despite being dominated by low-cost and locally available fuel (e.g. coal), can be supplied by forest biomass too. Wood can compete and replace coal as a cleaner source of fuel due to its co-firing potential. Incentives such as renewable energy credits or renewable portfolio standards have improved the economics of wood for energy production.

However, the use of wood as a feedstock for the generation of energy also faces significant challenges. The cost of harvesting and transporting biomass material from the harvest site to an energy facility was identified as the most challenging factor to the sustainable use of woody biomass as an energy feedstock in a survey of forest sector stakeholders completed at the University of Missouri. Specialized equipment for more cost-effective fuel treatment operations that can accommodate small-diameter trees must be developed. Research opportunities open the door for public support and collaboration with the private sector and communities interested in attracting wood-for-energy

initiatives. Locating new energy facilities should be done with caution to consider the availability of the biomass resource, forest ownership patterns, material already used by the wood products industry, and potential price changes as consequence of new market interactions derived from new energy uses. The Pinchot Institute for Conservation highlights the benefits of decentralized, small-scale wood-based bioenergy production. Such arrangement disperses the pressure on the forest resource across larger areas and has the opportunity to enhance the resiliency of the system to potential disruptions in the supply of woody biomass. In addition, small-scale production units reduce potential impacts on the forest resource and the environment from resource exploitation.

The availability of cost-competitive woody biomass partly depends on the existence of local logging and milling infrastructure to collect and process forest materials. Milling infrastructure is necessary for a steady demand for wood materials that can support simultaneous harvesting for higher-value material and biomass treatments. Logging firms are instrumental to harvesting woody biomass. Woody biomass treatments that solely aim at harvesting low-diameter trees and other woody fibers are not currently financially feasible and will need to be integrated with the collection of higher-priced materials.

Conclusions

With increasing prices of fossil fuels and concerns over dependence on foreign sources for energy, wood is becoming an attractive energy feedstock. Forest business clusters and local communities could benefit from federal and state level incentives promoting wood-for-energy initiatives. Synergies between the private and public sectors present opportunities for the development of integrated biorefineries to maximize the use of woody materials. Pulp and paper mills that face intense pulp price competition may explore new business models that rely on multiple outputs to create additional revenues. Forest-based communities seeking to attract new energy projects might rely on smaller-scale operations that do not create excessive harvesting pressure on the forest resource. Policies, prices and resource availability can create opportunities for adoption of forest management plans, improve forest health conditions, create new work opportunities for forest professionals, and generate income for landowners.

Forest business clusters can include integrated biorefineries into their structures. Clusters that can provide harvesting services and sufficient demand for wood can make transportation of woody materials (high quality for the wood products industry and lower quality for energy uses) cost-effective and ensure the availability of residues for conversion to energy.

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TYPES OF FOREST CERTIFICATION

Since the early 1990s, forest certification has been evolving as a marketing strategy. Certification offers the opportunity to promote wood products that are environmentally preferable because of verified compliance with standards for responsible forest management. Certification also aligns with forest sector clustering efforts. There are a number of forest sector clusters already utilizing certification as a promotion strategy and as awareness and participation in certification develops, additional opportunities may emerge.

Types of Forest Certification

Forest certification has two major components: forest management certification and chain-of-custody certification. Forest management certification applies to the field operations and land management practices of landowners and managers. Chain-of-custody certification is a system of tracking raw materials harvested from certified forests through the production process. This tracking system allows for verification and labeling of final products that have been derived from certified sources. In combination, these two components provide a system for assuring customers that products are from forests that are responsibly managed. Certification is also intended to serve as a system for identifying and rewarding responsible forest management through market differentiation.

Background

Since the early 1990s, an increasing number of forest managers and forest product companies have adopted forest certification. The area of certified forests worldwide now totals 700 million acres, approximately 8% of the world's forests. The reasons for deciding to participate in forest certification vary and include considerations related to meeting forest management mandates, serving stakeholder interests, meeting customer demands, pursuing a market niche, and other factors that cross the spectrum between social, environmental, and economic concerns.

At the same time that certified forest area has increased, customer demand for certification has also grown. Two significant areas of market growth for certified products in North America have been in the paper and publishing sectors and in the green building movement. The recent growth in the market for certified paper products is perhaps best illustrated by the fact that of the 130 companies with chain-of-custody certificates for paper and paper products in the United States at the end of 2007, only eighteen (14%) of these certificates were first issued before 2005 and at least 70 (54%) of them were issued in the first three quarters of 2007.

As of late 2007, there were 1,227 chain-of-custody (CoC) certificates in the United States and 399 in Canada. As of June 2008, these numbers grew to 1,938 companies with CoC certificates in the United States and 489 in Canada. The overall growth rate for the first two quarters of 2008 has been nearly 60% in the U.S. and 23% in Canada.

Recent information indicates that there is currently a high level of CoC certification activity and continued growth. For example, about half of all current CoC certificates in the U.S. were issued in 2008. Of the nearly 2,400 Forest Stewardship Council (FSC) CoCs in the U.S as of November 2008, about 1,200 were issued in the first 10 months of 2008, about 700 were issued in 2007, 200 in 2006, and 300 active certificates were first issued before 2006.

Certification Benefits

After more than ten years of certification experience in the United States, participants and stakeholders are increasingly interested in evaluating the benefits of certification. Just as the drivers for certification are highly variable, so are the potential benefits. Research of certification benefits for state forest certification has found that the benefits include the development of improved public communication, increased investment in forest administration and state forest practices (e.g., continuous improvement), improved departmental coordination, improved access to state funds, improved staff morale, increased market access and chain-of-custody participation, and improved state forest management leadership.

It appears that forestland owners and managers in the Great Lakes Region have realized sufficient benefits from forest certification to warrant continued and expanded participation in certification programs. As participation expands, the search for suppliers of diverse certified raw materials and finished products is increasingly efficient. As the track record on forest certification continues to develop there will be additional opportunities to evaluate the trade-offs of participation.

Although the continued growth of certification is admirable, there are significant challenges to future growth. The region has benefited from the leadership of large public land managers in pursuing certification. However, the remaining non-certified lands are primarily federal forests and private, non-industrial lands that present unique obstacles to certification.

For certification to continue to grow it is increasingly important that the diverse stakeholders who are interested in this growth work together to engage the remaining non-certified landowners and managers. The full potential of certification as a market-based system and as a tool to support forest sector clustering is increased each time new certificates are issued.

Forest Certification Case Study: The Great Lakes Region

Over the past decade the Great Lakes Region, including the states of Minnesota, Wisconsin, Michigan and the

Province of Ontario, has become a hub for forest certification leadership and innovation. The major certification systems used in the region include the standards of the Sustainable Forestry Initiative (SFI), Forest Stewardship Council (FSC) and the American Forest Foundation's American Tree Farm System (AFTS). In many ways, in order for forest certification to deliver its full potential, a critical mass needs to be reached in the available supply of certified raw materials, participating manufacturers, and customers who preferentially purchase a range of certified products. In measurable ways, this critical mass is being reached in the Great Lakes Region. As of the end of 2007, the three states included in this region, Minnesota, Michigan and Wisconsin, represented 29% of all of the certified forestland in the United States, including 50% of the FSC-certified and 19% of the SFI-certified lands. Similarly, in Canada, the Province of Ontario alone represented 49% of the FSC-Certified lands and 19% of the SFI-Certified lands in Canada. Taken together, these three states and one province encompass 30% of the certified forestlands in North America.

Several significant activities are underway to continue to increase the amount of certified forestland in the Great Lakes Region. If the certification efforts initiated in 2008 in the region are successful, the U.S. will see the first state with more than 50% of its forestland certified. One of the most highly anticipated new certification efforts in the region is the more than 2.2 million acres of non-industrial private lands in Wisconsin that are being reviewed for FSC certification. These lands are enrolled in the state's Managed Forest Law (MFL) and are currently certified through the American Tree Farm System (ATFS). If successful, this will be the largest known group of FSC-certified family forestlands.

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GREEN BUILDING

Since 2006, the market for green building has officially exploded into the mainstream. In 2006, 2% of newly constructed homes were considered "green." According to a survey of the National Association of Home Builders (NAHB) conducted by McGraw-Hill Construction, "by the end of 2010 more than half of NAHB's members, who build more than 80 percent of the homes in the U.S., will be incorporating green practices into the development, design and construction of new homes." A subsequent report concluded that the value of green building construction would increase to $60 billion by 2010.

In light of the rapid growth, all of the major green building programs continue to evolve. These continued changes create both opportunities and challenges for the forest sector. To date, many of the green building programs have been criticized for their treatment of wood products, including incentives for the use of non-forest based products that can be demonstrated to have greater negative environmental impacts. The green building programs have also been challenged for their stance on forest certification and failure to recognize competing forestry standards.

Many of the conflicts between the forest sector's interests and the position of some green building programs relates directly to the lack of the use of life cycle analysis (LCA) in the program design and selection of preferred materials. Environmental LCA has become the tool of choice for leading organizations in both the public and private sectors. Sometimes referred to as "cradle to grave" analysis, LCA provides a mechanism for systematically evaluating the environmental impacts linked to products and process and in guiding process or product improvement efforts. LCA-based information also provides insights into the environmental impacts of raw material and product choices, and maintenance and end-of-product-life strategies. Due of the systematic nature of LCA and its power as an evaluative tool, the use of LCA is increasing as environmental performance becomes increasingly important to society. It is likely that LCA will soon become widely used within American industry and by those involved in crafting national and regional environmental policies.

Life cycle assessment is recognized in some building programs, but not all, and even those that do give recognition only do so for framing materials. This means that the principal green building programs are not holding non-structural materials to the same standards as structural materials. This is partly due to greater availability of LCA information for framing materials than for other materials. As more data becomes available this discrepancy needs to be addressed. Despite the strong adoption rate for green building programs, there is much room for improvement and work needs to be done to reach the goal of ensuring that the programs truly result in improved environmental performance and provide appropriate opportunities for the forest sector.

Leadership in Energy and Environmental Design

The U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) program is perhaps the most widely recognized national green building standard. First released in 2000, there are now many different LEED rating systems, including systems focused on new construction, homes, schools, hospitals, and commercial interiors. Most recently, the USGBC has joined with the American Society of Interior Designers (ASID) to develop ReGreen, a home remodeling program standard. In June 2007, intentions were announced for streamlining the LEED rating system into one main standard with additional requirements and guidelines for different types of projects, new regionally-based credits, and consideration of the incorporation of life cycle assessment in all systems. The USGBC is planning to release LEED version 3.0 in 2009, which may address these intentions. The two most widely referenced LEED programs are LEED-New Construction (LEED-NC) and LEED for Homes (LEED-H). LEED-NC applies to newly constructed commercial, retail, and some high-density residential buildings. LEED-NC was the first program developed by the USGBC and has largely set the precedent for subsequent LEED standards. The latest version, LEED-NC 2.2, was released in October 2005 and LEED-NC 2009 was available for public comment in 2008. To date, at least 6,800 projects have been registered to the LEED-NC standard and over 1,000 projects have been certified.

National Association of Home Builders Green Building Standard

The National Association of Home Builders (NAHB) Model Green Homebuilding Guidelines were released in 2005 for use by individual homebuilders or Home Builder Associations (HBAs) interested in green building practices. The program is voluntary and does not incorporate a certification process. Instead, builders can perform self-assessments by following the guidelines or HBAs can use the guidelines as a model to create their own regional green building standards. The guidelines apply to residential buildings only. The NAHB standard is unique in several ways, including its established recognition of LCA as a tool for evaluating materials.

Green Globes

Green Globes is a program of the Green Building Initiative (GBI). The Green Globes standard was initially developed based on the UK Building Research Establishment's Environmental Assessment Method (BREEAM). It was adapted for use in Canada in 1996 and in the United States in 2004. In 2000, Green Globes Canada became an online rating tool that uses point

allocation to determine qualification for certification; this feature characterizes the current U.S. Green Globes program. Builders can audit themselves using the online program and then achieve certification through third-party verification. Green Globes was developed initially for use with construction of commercial buildings. GBI has specifically addressed residential structures by indicating that Green Globes is intended as a template for development of regional and local housing standards, and GBI collaborated with the National Association of Home Builders in developing the previously-described National Green Building Standard. The GBI offers assessment tools related to the Management and Operation of Existing Buildings, Building Emergency Management, Building Intelligence, and Fit-Up (for commercial interiors). In 2005, GBI became the first green building organization to be accredited as a standards developer by the American National Standards Institute (ANSI). The GBI proposed American National Standard 01-2008P for Commercial Buildings that is currently in development and undergoing public review for ANSI recognition. The proposed standard is meant to be used for commercial buildings; the GBI recommends that single-family residential building utilize the NAHB National Green Building Standard that is also in the process of achieving ANSI recognition. The GBI is the only entity to date to focuses on life cycle assessment as a foundation for green building design and materials selection, and the new national commercial standard reflects this as well.

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GREEN JOBS

In 2007, the Green Jobs Act and the Energy Efficiency and Conservation Block Grant program were approved as par of federal energy legislation. Both new initiatives could support green-collar job creation and provide opportunities for the forest sector.

The Green Jobs Act is a pilot program designed to identify needed skills, develop training programs, and educate workers with the skills needed to succeed in jobs related to renewable energy and energy efficiency industries. The Act is authorized at $125 million and targets a broad range of eligible individuals. A total of 20% of the funds are targeted for "green pathways out of poverty" – interpreted as programs that create employment opportunities for individuals in households that earn up to 200% of the poverty level.

The Energy Efficiency and Conservation Block Grant program is authorized at $2 billion per year and provides support for communities to retrofit buildings and take other actions that combat global warming and increase energy efficiency.

The remaining challenge for both programs is the outcome of the 2009 Appropriation Bill and whether or not the programs receive at least partial funding.

Recent green job research has focused on the potential for growth in a few key areas: green building (including remodeling and building retrofitting), public mass transit, energy-efficient vehicles, wind and solar energy, and cellulosic biomass fuels. At least 45 occupations have been identified whose skills are required in these industries. Currently at least 14 million Americans, 9% of the labor force, work in these fields. If growth occurs in these areas of the economy, including growth resulting from new policy initiatives, demand for workers with these skills and the appropriate training will also rise.

The forest sector and forestry occupations are related to several areas of the green economy, and most closely related to the potential for green jobs in cellulosic biomass fuels development. Growth of the green economy and related green jobs can result in opportunities for private and public sector forestry organizations, including land management organizations that can contribute to raw material supplies as well as research and educational institutions engaged in training new employees and developing technologies.

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NATURAL DISASTERS

The discovery of the Emerald Ash Borer (EAB) in 2002 in Detroit, Michigan presented an unlikely opportunity for wood–based businesses and entrepreneurs. Soon after the EAB discovery, quarantine was imposed on ash logs and other ash products, making it difficult to transport materials between infected and non-infected geographic areas. A small cluster of urban and suburban wood processors soon developed to capitalize on the value-added processing opportunities in the quarantined counties. Small lumber manufacturers, lumber dryers, and other businesses began producing products from ash and other "community" tree species. Recycling groups, environmental organizations, and "buy local" networks soon embraced the idea of using trees felled due to EAB or other natural disasters (wind storms for example). Today, a small but active cluster exists of businesses, educational and non-profit organizations, government agencies, and community leaders.

A similar wood-based value-added cluster emerged in the Chicago, Illinois area soon after EAB was discovered in 2006 and quarantine was imposed restricting movement of ash products. Both Detroit and Chicago relied heavily on government programs and funds to organize and shepherd the two wood-based clusters.

Hurricanes, tornadoes, floods, fires, ice storms, and disease outbreaks occur somewhere every year in the U.S. Although devastating at first, especially when human lives are lost, natural disasters often (out of necessity) provide the impetus, and create opportunities, for value-added technologies to be adopted in a rapid manner. Leaders of industry, government and other institutions should consider long-term strategies (such as clustering) when evaluating the short-term impacts of disaster recovery.