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# Forest Sector Systems Analysis: Executive Summary

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The authors hope this report will contribute to a more informed discussion of the forest sector in Vermont and contribute to strategic investments that will foster a strong and sustainable forest economy.

## Objectives of the Forest Sector Systems Analysis

The Forest Sector Systems Analysis was initiated to foster a shared vision for a sustainable forest economy among a variety of stakeholders in Vermont's forest sector through extensive participatory engagement combined with targeted research on market-driven opportunities.

The desired outcomes as presented in the request for proposals were to:

1. Identify gaps in infrastructure in the supply chain that will guide future public and private investment in the industry.
2. Facilitate connectivity across the forest sector.
3. Provide an understanding of market trends and frame market opportunities.
4. Develop an industry-wide strategy to enhance the public understanding of the economic, cultural, environmental, and social importance of the industry within Vermont.

Yellow Wood was engaged to work with the WLEB Forestry Subcommittee to:

- Provide a systems analysis of the forest and wood products industry in Vermont (now referred to as the “forest sector”).
- Engage a variety of stakeholders across forest and wood products value chains.
- Provide a comprehensive analysis of value chains to better understand the sector and the opportunities for strategic investments to support and grow the sector.

This report summarizes the results of this year-long endeavor. This is a beginning, not an end. More opportunities will come to light and opportunities already identified will be better understood as the work continues. This has been and will continue to be a learning process.

## Context

As Vermont’s Commissioner of Forests, Parks and Recreation, Michael Snyder, reminded us at the Statewide Summit, Vermont is “forest strong.” Forests cover 75 percent of the state of Vermont or nearly 4.5 million acres. Since 2007, the state has lost about 75,000 acres of forest, or about 1.6 percent, according to the U.S. Forest Service; however, the volume of available wood has not changed substantially and the growth to removal ratio is 1.7 to 1.<sup>1</sup>

Vermont’s forestry and wood products sector as defined here encompasses a variety of subsectors, including landowners, forestry services, sawlogs, pulpwood, fuelwood and biomass, lumber, millwork and solid wood parts, engineered wood products, solid wood furniture and furniture parts, paper, wood pellets, woodchips, firewood, Christmas trees, maple syrup and carbon credits. The majority of businesses in Vermont’s forestry and wood products sector are very small (one FTE or fewer); the sector also contains small firms with 10-50 employees and several firms with more than 50 employees. The forest products sector in Vermont generates \$1.5 billion in revenue and employs 10,555 people.<sup>2</sup>

A critical issue for the forest sector in Vermont is access and reliability of wood supply, which is highly influenced by ownership as well as competing demands for raw materials in different subsectors, both regionally and globally. Almost one-fifth (19%) of Vermont’s forestland, or about 900,000 acres, is publicly owned by a combination of federal (11%), state (7%) and local (1%) governments. Eighty percent of Vermont’s forests are privately owned. The number of landowners is increasing, the size of the parcels is decreasing and the age of owners is increasing. Between 2003 and 2009, the amount of land in parcels of 50 acres or more decreased by 4 percent, or about 34,000 acres.<sup>3</sup> The cost to own an acre of forest increased 73 percent between 2003 and 2006.<sup>4</sup>

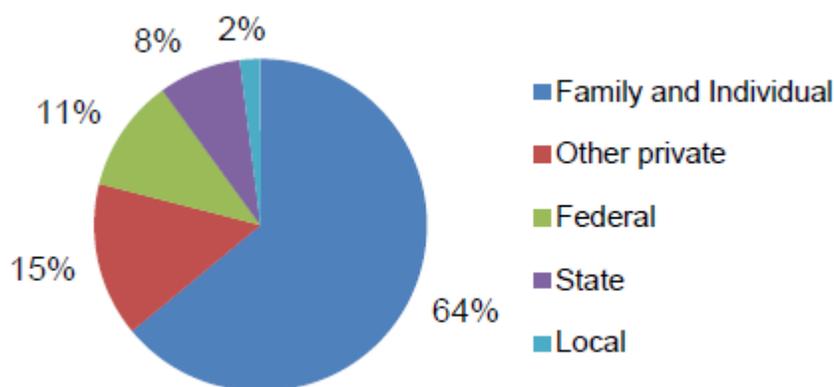
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<sup>1</sup> Northern Forest Futures Project. Current Conditions for Vermont. USDA Forest Service. [http://www.nrs.fs.fed.us/futures/current\\_conditions/states/?state=VT](http://www.nrs.fs.fed.us/futures/current_conditions/states/?state=VT)

<sup>2</sup> North East State Foresters Association. 2013. The Economic Importance of Vermont’s Forest-Based Economy 2013. [http://fpr.vermont.gov/sites/fpr/files/Forest\\_and\\_Forestry/Vermont\\_Forests/Library/NEFA13\\_Econ\\_Importance\\_VT\\_final\\_web\\_Jan29.pdf](http://fpr.vermont.gov/sites/fpr/files/Forest_and_Forestry/Vermont_Forests/Library/NEFA13_Econ_Importance_VT_final_web_Jan29.pdf)

<sup>3</sup> Vermont Department of Forests, Parks and Recreation. Agency of Natural Resources. 2015. 2015 Vermont Forest Fragmentation Report. [http://vnrc.org/wp-content/uploads/2015/04/FOREST-FRAGMENTATION\\_FINAL-11.pdf](http://vnrc.org/wp-content/uploads/2015/04/FOREST-FRAGMENTATION_FINAL-11.pdf)

<sup>4</sup> Brighton, D., Fidel, J., and Shupe, B. 2010. Informing Land Use Planning and Forestland Conservation Through Subdivision and Parcelization Trends Information. <http://vnrc.org/wp-content/uploads/2012/08/Full-Subdivision-Report-with-Appendices-optimized.pdf>



**Figure 1. Ownership of Forests in Vermont<sup>5</sup> (Morin et al. 2014)<sup>6</sup>**

This research has confirmed the complexity of Vermont’s forest sector. There are few, if any, generalizations that can be accurately made about the forest sector as a whole. One reason for this is the diversity of markets served by the array of businesses in the sector. Two-thirds of the survey respondents producing wood products (as opposed to providing services) serve retail markets (i.e. sell directly to end-users) and a quarter serve primarily wholesale markets (i.e. sell inputs and/or products to those who re-sell to others). Many do some mix of both: usually, though not always, these are businesses that sell primarily to wholesale buyers and make a limited amount of retail sales as well.

Vermont’s forestry and wood products sector is driven by entrepreneurs at every level from foresters to loggers, to sawmills, craftsmen, and other secondary producers, including those in the energy sector. There are both new business entrants and aging business owners in the forest sector, which, like so many others, is being presented with both opportunities and challenges related to inter-generational transfer, particularly in logging, milling, and secondary manufacturing.

While there have been many previous efforts to identify opportunities for development in the forest sector, this is the first effort to employ a systems analysis based on demand-driven value chains. The emphasis throughout has been to build new relationships between and among participants in the sector from different places in the value chains as well as different parts of the state. As many at the Statewide Summit commented, this is the first time that landowners, loggers, foresters, primary manufacturers, secondary manufacturers, technical assistance providers, funders, and supporters have all come together in one place to discuss the future of the forest sector.

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<sup>5</sup> Vermont Department of Forests, Parks and Recreation. Agency of Natural Resources. 2015. 2015 Vermont Forest Fragmentation Report. [http://vnrc.org/wp-content/uploads/2015/04/FOREST-FRAGMENTATION\\_FINAL-11.pdf](http://vnrc.org/wp-content/uploads/2015/04/FOREST-FRAGMENTATION_FINAL-11.pdf)

<sup>6</sup> (Morin et al 2014) New Hampshire and Vermont NRS-51 s 2012. Randall S. Morin, Chuck J. Barnett, Gary J. Brand, Brett J. Butler, Susan J. Crocker, Grant M. Domke, Mark H. Hansen, Mark A. Hatfield, Jonathan Horton, Cassandra M. Kurtz, Ron Piva, Sandy Wilmot, Richard H. Widmann, and Chris Woodall).

## Methods

A combination of primary and secondary data collection methods and participatory research were used in the Forest Sector Systems Analysis. The project began in July 2014 with a Market Sector Analysis, which involved secondary research on market opportunities in the forest sector, as well as over 30 key informant interviews with contacts relevant to a variety of Vermont's subsectors. A Forestry and Wood Products Sector Survey of producers was conducted in Fall of 2014 to gain insight into the production and market relationships that exist among and between Vermont firms, as well as gaps and opportunities related to production and market penetration as perceived by producers. The survey received 175 responses, for a 31% response rate. An assessment of "Local Wood, Local Good," certification systems, and Vermont sourced wood was also completed. Reports on each of these activities are included in the Appendix.

Four focus groups were held in four regions of the state (Northeast Kingdom, Central Vermont, Northwest Vermont and Southern Vermont) in November and December of 2014. Each brought together a variety of perspectives on the forest sector and engaged participants in conversations about positive developments in the forestry and wood products sector, challenges to strengthening the sector, and opportunities for the future of the sector in Vermont. In total, 50 participants engaged in the focus groups.

Market research, interview and survey results, combined with participation by the WLEB Forestry Subcommittee, led to a focus on three sub-sectors for the value chain workshops: furniture and solid wood products, construction, and wood energy. A fourth value chain workshop focused on enhancing the value of Vermont's woodlands and brought landowners, loggers, foresters, truckers, primary processors and other together to address the challenges to getting the wood out of the woods in response to market opportunities identified in the three sub-sectors. Value chain workshops were held in March and April 2015 to map out value chains around furniture and solid wood products, construction, wood energy and enhancing the economic value of Vermont's woodlands. Value chain workshops engaged a total of 74 people representing a variety of value chain roles, from landowners through loggers, foresters and truckers to sawmills and wholesalers, retailers and end users. Supporting players engaged included government agencies, nonprofit organizations, educational institutions, financiers and investors, technical assistance providers, certifiers and others.

Yellow Wood worked with the WLEB Forestry Subcommittee to develop goals and indicators with respect to those market-driven opportunities that emerged from the value chain workshops as priorities. Summaries of focus groups and value chain workshops are included in the Appendix.

A Statewide Summit, attended by 107 people, was held June 16<sup>th</sup> at Sugarbush Resort to identify the most impactful changes that can drive progress toward goals in three subsectors - furniture and solid wood products, construction, and wood energy—and toward two public awareness goals. Participants used the indicator analysis process that is part of Yellow Wood's You Get What You Measure® approach to strategic planning. A complete list of indicators used in the analyses is available in the Statewide Summit Summary. At the Statewide Summit, the asset maps created by WLEB with assistance from the Agency of Agriculture and the Department of Forests and Recreation were on display. The asset maps are drawn from a database that is still under development and designed to provide a comprehensive list of forest sector-related firms and their locations around the state.

This work has brought together participants in the forest sector from all parts of the value chain, often for the very first time. Participants have commented on the value of coming together and being recognized by

the State. Participants have also expressed appreciation for the background research to which they have had access. The WLEB Forestry Subcommittee was extremely engaged throughout this process, taking primary responsibility for outreach to participants in focus groups, value chain workshops, and the statewide summit, and providing direction, feedback and guidance at every step. Their commitment to this process has been a key ingredient in its success.

## General Findings

### **Demand exists in a variety of subsectors.**

It has been clear, throughout this process, that demand for forest products and services exists in a variety of subsectors. Vermont companies can be working together more effectively to take greater advantage of these market opportunities. Three subsectors that offer opportunities for Vermont firms to distinguish themselves in the marketplace and that are highlighted in this report are furniture and solid wood products, construction and wood energy. Demand-driven opportunities identified in other subsectors, as well as additional opportunities identified in furniture and solid wood products, construction, and wood energy that were not investigated in greater depth because they were not prioritized at the value chain workshops, are highlighted in the Summary of Market Sector Analysis included in the Appendix.

### **There is an overall willingness to engage.**

Although this sector has long been characterized as fragmented and lacking a shared vision from landowners to loggers to primary and secondary processors, the extent of participation throughout the forest sector enabled by this process has evidenced an appetite for connection. Throughout this process, we have engaged over 300 people; many have chosen to engage more than once. The participation throughout the process, in the survey, interviews, focus groups, value chain workshops and the statewide summit, shows that firms in the sector and support players are interested in connecting with each other to pursue greater success for themselves and the sector as a whole.

### **Evidence of innovative thinking in the private sector with respect to demand.**

There are companies in Vermont's forest sector that are being responsive to demand, adopting new technologies and manufacturing approaches, developing new products, and experimenting with new ways of connecting with buyers. There seems to be a growing interest in re-positioning Vermont's forest sector for the next century by connecting differently to markets and to each other.

### **There is an opportunity to reframe perceptions of the forest sector through new messaging.**

The opportunity to connect differently with buyers is driven, in part, by available technologies and in part by the opportunities for new messaging that captures the multiple contributions of the forest sector to concerns shared by the consuming public including a healthy environment, strong communities, working lands, cultural heritage, and climate security. Younger generations may be particularly responsive to a broader message. The connections, both with the forest sector and between the sector and consumers, will need to be intentionally fostered to overcome a legacy of disconnection that has led to public misconceptions about the sector and different (and sometimes limiting) perspectives within the sector on what is possible.

### **Receptivity to government recognition of the economic significance of the sector.**

Forest sector businesses and supporters are excited that WLEB and the State are taking an interest in and recognizing the significant contribution of their sector to Vermont's economy and working lands. They value the fact that WLEB and the State are actively engaging them in determining the best next steps for the sector.

For the most part, there is an emerging sense of the potential for partnership in which the private sector takes primary responsibility with strategic support from the public sector.

**Desire to increase public awareness.**

Participants in Vermont's forest sector have expressed a strong desire to see an increase in public awareness among landowners, Vermonters, and visitors to Vermont regarding the significant contributions the forest sector makes to Vermont's economy, landscape, environment, and culture. They recognize that public awareness is more than messaging; its purpose is to change behaviors and actively engage more people in supporting the forest sector.

This may be a point in time when real change is possible and a foundation capable of attracting ongoing investment can be laid for a strong and sustainable future for Vermont's forest sector. Market-driven opportunities are aligned; sector participants are willing to engage by partnering with, but not relying entirely on, the public sector; innovative thinking and action are taking place on the ground. There is more interest in actively engaging landowners, Vermonters, and visitors to Vermont in understanding and supporting the forest sector as well. There is also an opportunity to reframe perceptions of the forest sector through a change in messaging tied to broader societal concerns.

## What is a value chain?

A **value chain** is a set of relationships among the people and businesses whose skills and contributions are essential to produce a good or service valued by buyers in the market. The glue that holds value chains together is the self-interest and shared interest of the participating businesses.

Value chains are **demand-driven**. This means they begin with an understanding of the specific attributes of goods and services that are of greatest value to wholesale buyers in the market. These might include design features of the product itself, transparency with respect to the origin of the product, specific performance attributes, or specific services that make buyers' lives easier. There are three types of demand:

- The first is meeting demand that already exists. For example, some demand already exists for timber frame construction, cabinets, and millwork.
- The second is making ineffective demand into effective demand. Many people want nice furniture, but often can't afford it. Their demand is ineffective. Building high quality entry-level furniture at entry-level prices is a good example of making ineffective demand into effective demand.
- The third is creating demand through innovation based on what consumers would want if they knew they could have it. Innovative products such as ultra-high quality wood pellets are an example of that.

Value chains are comprised of three types of partners:

1. **Demand partners** are the wholesale buyers or demand aggregators that purchase goods or services for resale. While there is demand throughout the value chain since each business has a demand for something, whether it is logs, lumber, finished product, etc., **demand partners** are those buyers closest to the final consumers who have their fingers on the pulse of what those consumers desire.
2. **Transactional partners** are the people, businesses, or organizations that play a direct role in producing the product or service. **Transactional partners** may include but are not limited to:
  - a. Suppliers—Provide specific inputs to other value chain partners
  - b. Producers—Create goods or services
  - c. Aggregators—Bundle products to meet demand
  - d. Distributors—Market and transport goods or services to wholesaler buyers
3. **Support partners** are those people, businesses, or organizations that support the transactional partners and help make the value chain responsive, effective and efficient. Support partners may include but are not limited to: business and technical assistance providers, investors and financiers, policy-makers and regulators, media, researchers, trainers, and insurers.

Each partner in a value chain performs specific **functions** based on their core competencies, without which the chain could not operate effectively. Often, when a new value chain is being developed, there are functional gaps that must be filled either by existing businesses or, in some cases, by entrepreneurs starting new businesses.

A fourth role in value chains may exist—that is the role of the **value chain coordinator**. Value chain coordinators are individuals or organizations that hold the vision for the entire value chain while building the relationships among the partners that are required to make the value chain work. Value chain coordinators understand the self-interests and shared interests of the value chain partners. Shared interests are the areas where two or more value chain partners see benefit for themselves in working together. Value chain coordinators must be trusted by all partners in the value chain.

## Opportunities for Investment & Policy Considerations

Broadly speaking, two types of investments—1) in improving, creating, and strengthening sub-sector value chains and 2) in increasing public awareness of the forest sector and ways in which landowners, Vermonters, and visitors to Vermont can both contribute to and benefit from it—are needed to support and grow Vermont’s forest sector. Value chain investments must be multi-faceted to address all the gaps and bottlenecks that need to be addressed for the value chain to succeed. Single focus investment (e.g. a new mill) or investment that is restricted to a particular set of activities (e.g. workforce development) without regard to outcomes and overall value chain performance is unlikely to be beneficial to the sector overall. Public awareness is not a value chain per se, but investments in public awareness can be tied to value chain development. For example, landowners can be encouraged to contribute raw materials to specific value chains, and Vermonters and visitors to Vermont can be encouraged to help emerging value chains connect with new buyers, by, for example, recommending Vermont products to the architects and retailers with which they do business or introducing Vermont firms directly to potential buyers. Vermonters can also be encouraged to support policies that enable value chains to succeed.

Certain commonalities that have implications for investment priorities have emerged across all the sub-sector value chains. First and foremost for the success of the value chain approach: **firms need to understand more about demand and consumer preferences.** All three subsectors, furniture and solid wood products, construction, and wood energy, identified more understanding of consumer demand and consumer preferences as among the most impactful changes that would help the sector progress. Targeted investment in training and supporting businesses in direct buyer engagement will allow firms not only to develop products and services in response to demand, but to cultivate relationships with buyers that support ongoing new product development and increase resilience to changing market conditions over time. Establishing systems for information sharing between firms in the same and different subsectors regarding market demand and buyer preferences will also be critical.

All value chain participants recognize that **Vermont’s forest sector is small in relation to the global market.** As such, it is not well positioned to compete on a commodity basis. Fortunately, the ingenuity of Vermont’s entrepreneurs, combined with individual craftsmanship, technology that supports mass customization, innovative design and use of uncommon materials, all offer opportunities to not only respond to existing demand but also to create new demand. The first step must be a better and more widely shared understanding of consumer demand and preferences. Value chain participants recognize the power of story and the appeal of “Vermont” in the minds of some buyers, but story without outstanding products, superior communications and customer service will not keep companies afloat.

**One of the bottlenecks common to all the value chains is inadequate information about the availability of raw materials,** whether standing timber slated for harvest, logs, low-grade wood, lumber or other materials. Without better information on materials availability at all stages in the value chain, it will be difficult for Vermont companies that are all relatively small to compete with larger companies for access to raw materials over time. Better information would document the sustainability of supply, attract investment, and increase efficiencies and profitability throughout the value chains. One aspect of information some believe would be useful includes the ability to distinguish forest products and raw materials that originate in Vermont from imported products and materials. Once logs have entered the value chain for further processing, there is currently no way for partners further down the value chain to identify the origin of the wood. If firms had the ability to distinguish the origin of their inputs, it would enable them to choose to support the regional forest sector economy as well as contribute to the stories they can tell.

Lack of information on the availability and origin of inputs is only one type of information gap affecting efficiency in the sector. For furniture and solid wood products manufacturers in particular, reduced lead times are required to meet market demand, which will require better information on materials availability on the one hand and longer lead times for harvesting and primary processing on the other. All value chains could benefit from increased efficiencies by adopting lean manufacturing, integrating new technologies, and/or improving transportation efficiencies where appropriate. **Greater efficiency in the value chain** and in its products increases profitability and can provide returns to Vermont businesses and landowners throughout the value chain. Greater efficiencies can also lower price points and make ineffective demand into effective demand, thus expanding the consumer base.

Value chains that align multiple independent businesses to serve a variety of markets do best when there is a **clearly defined set of standards associated with the good or service being produced**. That standard can apply to the good or service itself, the way it is produced and who produces it, its cultural significance, origins, and environmental impacts. Each of these can be an element of the story that helps capture consumer interest and make the sale. In today's world, only verified and verifiable claims hold up to consumer scrutiny. Vermont has an opportunity to invest in the capacity of value chains to set and meet standards that serve the sector and the state while also appealing to consumers. The wood energy subsector seems particularly ready to discuss shared standards. Standards can be a powerful tool for increasing the relevance of the forest sector by making the connection with consumer values such as local economy, climate security, environmental health and culture. For example, standards might stipulate the proportion of wood derived from forests in Vermont (local economy), the management regime used in those forests (environmental health), and the proportion of forests managed for carbon credits (climate security) as well as moisture content, species mix, and pest control features of the products. Each stipulation, to be credible, would have to be incorporated into the way the value chains operate.

The six opportunities (two in each subsector) highlighted here are those that emerged through a participatory process as priorities within each of the three targeted sub-sectors of furniture and solid wood products, construction, and wood energy. **These six opportunities do not represent the full range of potential opportunities for value chain development or investment in the forest sector**. Other opportunities identified throughout the year are listed in Appendix B and are described more fully in the appended Market Sector Analysis Summary and Recommendations. **Even these six opportunities are at an early stage of exploration**. Significantly more work is needed to: 1) define each opportunity more precisely; 2) engage demand, transactional and support players in assessing their self-interests and shared interests in working together and building relationships among them; 3) fill the functional gaps in the value chains and reduce the barriers to value chain success; and 4) prove the efficacy of each value chain through market engagement. It is entirely possible that the focus of one or more value chains will shift as a result of further exploration. It is also likely that additional value chain opportunities will emerge.

**Value chain development takes time.** It is reasonable to allow approximately a year to identify the right demand, transactional and support partners for each value chain, identify a coordinator, and build relationships and trust among them, determine the feasibility of the value chain, and identify the gaps and barriers, including policies that could prevent success. It generally takes another year or two to actually fill the gaps, address the barriers, and test the performance of the value chain by actually moving products and services to buyers at a relatively small scale. During this time, new gaps and barriers emerge and will need to be addressed and new opportunities may also become evident. Once the value chain is operating effectively, it can begin to scale up by increasing the number and diversity of buyers and the volume of products moved.

Eventually, value chains become institutionalized as the “new normal” way of doing business. This may involve changes in public and/or private policies such as procurement policies or sector financing, adoption of standards, designated staffing, new protocols for business partnering, and more. If Vermont invests in multiple value chains at the same time, the synergies, information sharing, and peer learning among these chains could be considerable if resources and coordination are available to keep them connected with one another.

## Investments with Potential to Significantly Strengthen the Forest Sector

Here we describe areas with high potential for impact on the forest sector through investments in public awareness, developing a supply of carbon credits, and the three subsectors of furniture and solid wood products, construction, and wood energy. These are not the only investments that could be made in strengthening the sector, but they are among those likely to be most impactful. More work will be needed that is beyond the scope of this first year of effort to determine the most appropriate investors, level of investments, and participants in each area.

### Public Awareness

Ongoing availability and accurate information about availability of raw materials is critical for strengthening Vermont’s forest sector. Trends in landownership include decreasing average parcel size, relatively short tenures of ownership, and an increasing number of private owners. While this may seem like a challenge, in fact it provides an opportunity to reframe the relationship between Vermont’s forestland owners and the forest sector into one in which forestland owners recognize and act on their ability to contribute materials to the forest sector economy while meeting other landowner goals.

Participatory analysis suggests that the most impactful changes with the potential to engage Vermont landowners in being intentional about contributing to the forest economy are:

- More **advertising to landowners** including more demonstration sites for landowners to visit that show how harvesting is good for the forest and compatible with other landowner goals.
- More **advertising to landowners** that emphasizes the contribution they can make to local businesses and communities through sustainable forest management.
- **More loggers and consulting foresters use improved customer service skills to actively share information and new messaging with landowners.**

Vermonters and visitors to Vermont are important potential constituencies for the forest sector as consumers, investors, voters, and ambassadors, but currently there seems to be little widespread recognition of the economic significance of the sector to the state and the host of corollary benefits it delivers. Support for the forest sector in the public mind lags far behind support for agriculture.

The most impactful changes with the potential to result in Vermonters and visitors to Vermont being able to articulate the economic significance of Vermont’s forest sector and the ways in which they can support it are:

- **More effective marketing to the public about the positive contributions of the forest/wood products sector.**
- **More focus on connecting the forest products sector to other emerging concerns** (for example, climate change, energy security, viability of small family businesses and local economies, water

quality, etc.) that broaden what people think of when they think about forestry and forest/wood products.

Taken together, these lists suggest the opportunity for several types of investments in public awareness. These will need to be refined and others will emerge over time.

### Craft the Messages

Two different types of messages need to be crafted and field-tested.

1. **Messaging for landowners** about the relationship between landowner goals, forest stewardship, and the forest sector economy including specific calls to action, connections to local and state resources (e.g. foresters, educational opportunities, etc.), connections to primary and secondary processors or aggregators seeking inputs, and landowner incentives (e.g. becoming part of a group of landowners that aggregates material for sale into a value chain, opportunities to meet other landowners, meet local processors, etc.), connections to energy security and state energy goals, and climate change.
2. **Messaging for Vermonters and visitors to Vermont** that reframes the importance of the forest sector by making the connection between other emerging concerns such as climate change, energy security, small family businesses, local economies, and cultural heritage and broadens what people think of when they think about the forest sector. Messaging would emphasize the connection between wood products and forests and the benefits of sustainable management, including harvesting, to the forest.

### Identify and Consolidate Resources

Identify and make information available about **demonstration forests** on public and private land around the state that illustrate the impacts over time of various management regimes that meet a variety of landowner objectives (e.g. wildlife habitat, recreation, timber harvest, firewood, non-timber forest products, carbon sequestration, maple syrup production, enhanced property value, etc.). Encourage loggers and foresters (among others) to offer their clients the opportunity to experience these forests.

The role of **aggregator of raw materials** from landowners of smaller forested parcels may be one that needs to be supported by firms in the industry as an entrepreneurial opportunity. The economic model for the aggregation process needs to be developed and tested in conjunction with identifying the locations for aggregation yards around the state that would generate the greatest benefits to landowners and processors.

### Engage the Media

**The media can be a powerful ally in engaging both landowners and other Vermonters and visitors to the state.** Radio, print, television, YouTube, social media, and specialized media such as magazines, school publications, trade presses, and more can all be effective platforms for telling stories highlighting Vermont's forest sector including participants throughout the value chain and other beneficiaries. Vermonters and visitors would be surprised to learn how far Vermont forest products travel and why and what makes them special. There are many stories of innovation in the sector including innovations in manufacturing and marketing, multi-generational businesses, public private partnerships, innovative forest stewardship and value chains, and more. A concerted effort to encourage consistent language about the forest sector and emphasize the wide range of contributions it makes to the state would help raise its visibility and foster a broader appreciation of its benefits. Linking the forested landscape to the agricultural landscape as part of the working landscape is another angle to consider, as is making the connection between the forest sector and other sectors with their own constituencies such as food/restaurants, farms, craft beverages, schools and

universities, architecture and design, and more. Investing in a strategy for media engagement including messaging, story development, placement and evaluation is worthy of consideration.

### **Work Toward Consistent and Stable State Policies**

Many forest sector participants made the point that the legislature's continual review of Use Value Appraisal (Current Use) raises the specter of change on a regular basis and has contributed to the public perception that the program may not be stable or reliable. Given the importance of Use Value Appraisal to maintaining the working landscape, care should be taken to extend its key provisions over a longer time period.

### **Other Methods of Engaging Landowners**

Landowners already enrolled in Use Value Appraisal (Current Use) are readily identifiable and could be reached by county and private foresters with **new messaging**. Many landowners are not enrolled in Use Value Appraisal and landownership turns over frequently. Outreach to these landowners could be accomplished through a system that identifies forestland transactions and ties forest landowner messaging into mortgage and/or real estate transfer processes, deed registration, etc.<sup>7</sup> Loggers and foresters can be supported and trained as needed in the new messaging and encouraged to be proactive in reaching out to clients and prospective clients through incentives provided by the public and/or private sectors.

### **Developing a Supply of Carbon Credits**

Carbon markets are maturing and becoming more accepted and more stable. There is more demand for credits than there is supply. Carbon credits are another possible market opportunity that could benefit landowners. The infrastructure to supply carbon credits is still being developed in response to demand which is created through a combination of regulations (in the compliance market) and the public relations benefits to firms of carbon offsets (in the voluntary market). New EPA regulations on utility carbon dioxide emissions are in the works and will shape the carbon market in New England. Even though Vermont does not have coal-based utilities, it could still feed credits into the system. Carbon credits help other companies establish environmentally friendly credentials (on the voluntary market) and meet regulatory requirements (on the compliance market); this may appeal to Vermont companies in other sectors who may be interested in purchasing Vermont carbon credits if they were available in sufficient quantity. In Vermont, the average yield is 1 to 3 tons of marketable carbon per acre per year. Carbon credits are totally compatible with sugaring. Both pay landowners for not harvesting. Carbon credits can also be earned for some durable products that use solid wood.

There are now organizations like The Climate Trust<sup>8</sup> that can manage projects for states and/or utility companies. There are innovative state programs in Oregon and elsewhere and programs that invest dollars generated through carbon credit sales for improved forest management and other activities that strengthen the forest sector. Carbon credits will likely have to be aggregated by type of ownership (e.g. private, municipal, non-profit, state) to meet market demand. Aggregation adds a layer of complexity and would require management.

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<sup>7</sup> Many thanks to Tabitha Bowling for a related suggestion.

<sup>8</sup> Find The Climate Trust at <https://www.climatetrust.org/>

**Vermont has not yet established the guidance, models, and templates or the relationships between aggregators, forest managers and landowners that would be required to succeed in aggregating carbon credits at scale.** Investments in establishing the public and private infrastructure required to meet market demand for carbon credits would support the re-positioning of Vermont’s forest sector as a producer of multiple benefits and could strengthen the ties between sectors in Vermont.

## **Furniture and Solid Wood Products**

Two opportunities emerged as priorities for value chain development in Vermont’s furniture and solid wood products industry. The first would allow the forest sector to **add greater value to the full range of local species that grow in the northern forest region**, and the second would **provide a variety of affordable well-crafted entry-level furniture products from native species** that help build loyalty to Vermont furniture companies.

Three changes were identified as likely to be the most impactful on both value chains given current conditions:

1. **Coordination of companies, non-profit organizations, and government agencies with each other and with the demand side of the market.**

Value chain coordination could apply to every aspect of the value chain. For example, coordination is needed to identify existing and potential buyers based on buyers’ self-interests, and determine the best path to relationship building. Who should maintain relationships with which buyers on behalf of the value chain? How will communications flow from the demand side of the market throughout the chain? Once target buyers are engaged and there is a shared vision for the value chain, coordination is required among all the companies in the value chain to determine what they need to do differently to meet market demand and how the changes made by one partner will impact the others. For example, if one company commits to developing a new function (e.g. custom kiln-drying), how does that affect everyone else in the chain? Does it free up resources for others to invest differently? If several companies require training to become more efficient, coordination is required to identify the most appropriate training providers and work with providers to ensure the relevance of the training. A thorough and deep understanding of each company can lead to coordination of options for shared equipment or services. The coordination of investment and finance can help financiers and investors recognize opportunities to engage with the value chain and ensure that the order of investment makes sense. Coordination can also help companies articulate the impact of existing policies, regulations, and enforcement and help identify opportunities for policy changes that would positively impact the value chain. Most importantly, coordination is essential in keeping value chain partners connected with one another, bringing in new partners as needed, and ensuring solid communication among all partners including mediation where necessary.

Value chain coordination could be provided by an existing entity or a group of organizations that share the job. Effective value chain coordination requires many different skills including practical visioning, systems thinking, trust and relationship building, business savvy, access to technical skills, and management capabilities. An effective value chain coordinator may work for an organization that is also a transactional player in a value chain, but the coordinating staff must be focused on the entire value chain to succeed. A value chain coordinating entity most likely to succeed has: 1) the trust and respect of transactional players; 2) the right set of skills (or access to them) and 3) the staying power to effectively explore and build out a value chain over years. Although there has been interest expressed in “virtual” coordination through a database or social networking platform, experience

from similar efforts in other states suggests that, without the networking and other skills provided by a value chain coordinator, value chains do not progress. A “virtual” coordination mechanism may be a complement to dedicated coordinating staff, but it is definitely not a substitute. A value chain coordinator is needed to forge and expand relationships throughout the chain and with demand partners that would not naturally occur, as well as to work with value chain partners to fill gaps, address bottlenecks, troubleshoot unanticipated events, and maintain trustworthy communications.

2. A **better understanding of consumer preferences** including increased understanding of what is attractive to customers about each species.

There are a variety of ways to invest in firms’ capacities to understand consumer preferences. The most impactful of these are to provide training and support to business owners and their staffs to engage directly with the wholesale buyers or demand aggregators that purchase goods or services for resale. They have direct knowledge of end consumers. This could be through attending trade shows and/or conferences and targeted direct outreach to selected buyers. The key to engaging wholesale buyers or aggregators of demand in value chain work is understanding the pressures they need to respond to in order to serve the end consumers and then structuring the entire value chain to address their concerns (assuming doing so represents a profitable opportunity for all value chain partners). Secondary research on consumer preferences, while helpful in understanding overarching market trends and suggesting avenues to pursue in conversation with wholesale buyers and aggregators, does not advance the relationship building critical to keeping in touch with changes in consumer preferences over time. Another way of understanding consumer preferences is through direct feedback from end consumers, but it runs the risk of not being representative of a larger market. Investments in understanding consumer preferences should be structured to engage multiple firms and supporting partners in research and sharing of information learned.

3. A **statewide lumber inventory system** for Vermont (or northern forest region) lumber held at the mills (or closer up the chain to the value-added producers) in which the origin of the wood is identified is needed to ensure timely supply and keep the whole value chain working smoothly. A statewide inventory would also help firms locate underutilized species. An investment is needed to determine how best to design and implement a statewide or perhaps northern forest region-wide lumber/solid wood inventory system that distinguishes native species.<sup>9</sup> Ideally, the creation and ownership of this system should reside in the private sector but may be established through matching public investment.

## Construction

Two opportunities emerged as priorities for value chain development in the construction subsector of Vermont’s forest sector. The first is to **expand the use of solid sawn lumber from Vermont in residential and commercial construction, ski lodges, rest areas, universities, bridges, and landscaping**. Solid sawn lumber refers to large timbers that could be more than 16 feet long and 4 inches thick. The second is to **produce innovative, engineered wood products that are used in residential and commercial**

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<sup>9</sup> WLEB recognizes that Vermont is part of a larger woodshed that extends beyond state boundaries. They view the woodshed as including but not limited to the Northern Forest that includes parts of New York, Vermont, New Hampshire and Maine. The term used to designate the larger region and distinguish it from the Northern Forest is northern forest region. They view the northern forest region as a source of inputs, partners, and expertise for Vermont’s forest sector.

**construction.** An engineered wood product is anything that processes wood beyond a commodity, e.g. plywood, laminated veneer lumber, truss joists, composite materials, new technology, new processes.

One highly impactful change needed to strengthen both construction value chains is:

**More understanding of consumer demand and preferences.** In the construction sub-sector, demand partners include architects, landscape architects, builders, and residential and commercial developers, as well as transportation planners, municipal and state officials.

In addition, if demand justifies it, investment will be needed in the solid sawn timber value chain to:

1. **Increase the capacity of existing mills to handle large timbers.**
2. **A change in state institutional procurement policy that intentionally seeks to incorporate Vermont timbers.** Members of the forest sector believe that a solid sawn timber value chain would benefit from such a change. Public investment in understanding the implications of this type of policy change would help clarify market potential.

For the engineered wood product value chain, changes identified as impactful, if justified by demand, also included:

1. **Develop partnerships with research institutions** to gain access to existing research and possibly sponsor new research related to innovative engineered wood products relevant to raw materials in Vermont.
2. **Develop testing and verification services** for engineered wood products to insure quality and consistency.
3. **Develop wood trusses manufactured in Vermont.** One specific gap in engineered wood products mentioned with some frequency is the lack of availability of wood trusses engineered in Vermont. This could provide the focus for additional value chain exploration.

## Wood Energy

Two opportunities emerged as priorities for value chain development in the wood energy subsector. The first is the opportunity to **reach out to consumers with a unified message about wood energy based on understanding what is important to consumers.** The goal of having a unified message is to increase market demand and utilization of wood energy. The second opportunity is to **produce and consistently supply ultra-high quality wood chips, wood pellets and firewood,** so that Vermont becomes known for superior products that offer the advantages of reduced maintenance costs, superior burns, and greater ease of use.

The three most impactful changes identified for this subsector include:

1. Effective **value chain coordination** is needed to improve communication throughout the chain and catalyze action. Throughout this process, the tenor of participation by diverse firms and support partners in the wood energy subsector suggests a readiness to collaborate exists to take advantage of each of these opportunities. An investment in value chain coordination by one or more organizations familiar with and trusted by the subsector could provide the “glue” needed to make progress.
2. The unified message would be greatly enhanced by a **detailed roadmap showing the options for using wood to help meet Vermont’s goal of 90% reliance on renewable energy.** A detailed roadmap would identify the complementary mix of wood chips, wood pellets, and firewood required,

including benchmarks and goals that would enable Vermont to manage its forest resources sustainable for its own long-term benefit. Ideally, it would also investigate the implications of increased use of low grade wood for wood energy or other opportunities for the use of low grade wood such as engineered wood products and paper-making. As a complement to the roadmap, the wood energy subsector would benefit from investment in developing a system to collect information on longer term intentions to harvest that would identify inventory kept on the stump. This information could be used to help address consumer concerns, inform policy, and attract investment.

3. Finally, more applied research is needed to **determine what consumers value** (and what concerns them) about wood energy in all its forms and across a variety of markets including industrial, commercial, residential and institutional. A more nuanced and complete understanding of wood energy consumers is the foundation for a compelling unified message. Once that message is crafted and tested, an investment will be needed in developing a messaging strategy including materials and training for salespeople.

Ideally, the development of ultra-high quality products supported by industry standards will become part of the unified message, and marketing outreach to all types of consumers in Vermont and New England markets will further stimulate demand.

## Recommended Next Steps and Potential Pathways to Progress

Based on the findings of this year of exploration, we offer the following general recommendations to WLEB and the State:

- ✓ **Think about the development of the forest sector as a long-term process** and create specific benchmarks that denote progress over the next ten years. The results of this study can be used as a baseline where appropriate.
- ✓ **Invest to continue the relationship building** that has started here by sponsoring a forest sector-wide convening at least once a year to provide opportunities for sector-wide relationship building and peer learning and engage the sector in reporting on progress and concerns. Consider inviting speakers from other sectors to share new perspectives on what is possible. Make sure these convenings are participatory and not simply talking heads. The interaction that has taken place over the past year has been invaluable in building relationships and initiating partnerships that are critical to moving the sector forward. In many instances, businesses had never met each other before. Overwhelmingly, participants in all the interactive components of the project were excited to connect with others in the sector.
- ✓ **Expand public sector understanding** of this complex sector by intentionally including legislators, selectboard members, mayors, planners and others in convenings and conducting outreach directly to them. Work with the Vermont League of Cities and Towns, Association of Vermont Conservation Commissions, County Foresters, and others to help spread the word about how the sector is being reframed and draw attention to new developments in the sector.
- ✓ **Develop a media strategy** for the forest sector that includes messaging for different audiences (e.g. landowners, Vermonters, visitors), story opportunities, alliances with a variety of media outlets, and

suggested language to use in story development related to the forest sector. Make sure the messaging emphasizes the multiple benefits of a healthy forest sector.

- ✓ **Look for areas in which policy and/or regulatory changes could open up new opportunities.** For example, what difference could it make if state procurement favored the use of Vermont forest products? Are there changes to Act 250, with respect to operating restrictions and/or siting of mills and kilns in particular, that would be worth considering?
- ✓ **Consider the role municipal, state and national forest lands can play** in supporting the forest sector economy. This could include modified harvesting plans, forest stewardship demonstration sites, carbon credit supply and more.
- ✓ **Invest in information systems that are integrated into the work of value chain partners and/or the State.** There are many different public, private, and nonprofit information systems already in place that contain some information relevant to the forest sector; however the information is fragmented and not readily accessible or well known. In addition, existing information systems often do not provide information needed to improve value chain decision-making in real time. There are many different types of information important to the future of this sector, including, but not limited to, information about consumer preferences, buyer demand, lumber availability, manufacturing capabilities, raw materials availability and product traceability.

There is no “one size fits all” solution to aggregating, managing, and sharing this information. New systems that take advantage of new technologies will need to be crafted to move the forest sector forward. However, information “mandates” that require some people to supply information to others that has no direct benefit to the supplier, however well meaning, tend to be costly, inaccurate, and alienating. Far more effective are those information systems in which parties see it in their self-interest to contribute information and the information they contribute is already something they track. For example, some sawmills may already track their inventory of lumber by size, species and grade while others may not. As connections to markets demand more and better information, it may become in the self-interest of more mills to adopt better techniques for inventory tracking. Once they have those processes in place, it is relatively easy to share that information, particularly if they are rewarded by increased business. Instead of investing in top down information systems, WLEB and the State should invest in the capacity of firms and supporting partners in the forest sector to collect and use the information that will contribute to their own success and then work closely with the private sector to determine the least cost and most effective way to aggregate information to meet specific needs.

- ✓ **Carefully consider any investment in a virtual platform for forest sector interaction.** While “virtual” platforms can be effective in promoting information sharing within a sector, they rarely serve this purpose well unless the people using them already have some connection with each other. Do not expect a “virtual” platform to substitute for the critical and hard work of relationship building within the sector. Once specific groups have come together to work on particular value chains and they see it in their self-interest to share information, there are many options, some quite simple (e.g. a listserv) that can be used. It is easy to invest lots of money in developing sophisticated platforms that are too broad to engage any specific group and are, as a result, significantly underused. In particular, the success rate for platforms that require participants to update their information is quite low unless participants recognize a direct benefit.

We also offer the following recommendations specific to continued support for value chain development:

- ✓ **Provide support for developing relationships with buyers on the demand side of value chains.** Developing relationships with the demand side is critical to successful value chains. Many businesses have made these connections, but many more have not. The idea is to learn more about the needs of potential buyers in an effort to be responsive to them. One effective way to help value chain partners learn about demand together is through participatory action research into consumer preferences that engages demand partners in the value chain in collecting and sharing information from buyers that interact with targeted consumer groups.
- ✓ **Offer support to groups of private sector firms that want to continue to work on promising value chains.** This could include matching support for coordination of value chains. Successful value chains require ongoing coordination to make sure that information and networking are happening throughout the chain and to more effectively fill gaps. Encourage ongoing communication between value chains if more than one is being developed at the same time.
- ✓ **Provide a flexible pool of funds** that can be tapped to support emerging issues in value chains through sector research including market research, learning journeys, best practices research and more. A great deal of value chain development work requires different kinds of research, such as market research, feasibility research, learning journeys (to get an idea of what's possible), and best practices research to move individual businesses forward. It would be helpful to have a pool of funds that businesses could tap into for these types of research that will propel individual businesses forward.
- ✓ **Encourage investment in increased efficiencies, design capabilities, technological innovations, and intergenerational transfer as well as market relationships.** These are all areas in which investment will be required to strengthen the forest sector economy.

**Roles and responsibilities are context dependent.** There are many organizations in Vermont and throughout the northern forest region that could play constructive roles in value chain development and in raising public awareness and increasing the engagement of landowners, Vermonters, and visitors to Vermont in the forest sector. It will make sense for different businesses and organizations to take the lead for different value chains and for raising different aspects of public awareness. One next step for WLEB and the State will be to circle back to participants and determine who is ready to move ahead and in what capacity. Participants in the wood energy conversation, for example, have suggested creating a Vermont Wood Energy Council to organize and lead this subsector.

The key to forward progress for the sector as a whole will be coordination and communication. Just as the Vermont Sustainable Jobs Fund has provided the “glue” to move Farm to Plate forward while allowing others to take charge of many separate initiatives under one large umbrella, ideally there will be an organization that provides the “glue” for an overall forest sector initiative that engages a wide diversity of partners but is driven primarily by initiatives led by the private sector. Without a coordinating organization, it will be very easy for all actors in the sector to revert to business as usual and miss opportunities to connect and grow.

The Northern Forest Center plays an important role in unifying the forest sector across four states as well as providing technical assistance and other services. Their ongoing engagement would continue to bring the multi-state perspective to Vermont forest sector development efforts.

## Conclusion

The Forest Sector Systems Analysis has been a model of successful public/private partnership both within the WLEB Forestry Subcommittee and for the analysis overall. It is clear that this work will be most successful if it moves forward in the same spirit, with the private sector leading and the state offering support.

As the work progresses, there is an opportunity to continue to widen the circle to include more firms in the forest sector and connect more strongly with other sectors such as travel and tourism, health care, insurance, finance, agriculture, electronics and more that have the potential to benefit from a strong forest sector. This can happen as needed and as roles for additional sectors become better defined. There are also opportunities to engage key support partners within and outside Vermont that are already active in the forest sector. While it is important that support partners not drive the conversation, they often have much to contribute from their own experience. It is important that they be informed as developments occur so that that can align their own resources to be most impactful.

Many buyers of Vermont forest products are located out of state or, for example, in the case of the paper companies operating in Vermont, are owned by out of state corporations that have ties to much larger markets. Firms in Vermont's forest sector have the opportunity to develop and use these ties to understand, access, and serve markets larger than those that can be satisfied by any single Vermont firm. That has been the premise of this work from the start. A year later, we see that there is an appetite within the sector to work together toward shared goals. The specific roles most appropriate to different firms and organizations will depend on the task at hand and will vary by area of focus. One indicator of success will be if the circle of engagement continues to grow wider and deeper over time.

## List of Appendices

*Appendices are available under separate cover.*

Appendix A: Market-Driven Opportunities, Impactful Changes and Most Likely Results by Sub-Sector

Appendix B: List of Additional Market Opportunities to be Explored

Appendix C: Forest Sector Systems Analysis Deliverables:

- Market Sector Analysis Summary and Recommendations
- Forestry and Wood Products Sector Survey: Summary of Findings
- Forestry and Wood Products Sector Survey: Appendices
- Focus Group Summary
- Summaries of Value Chain Workshops
  - Value Chain Workshop Summary: Furniture and Solid Wood Products
  - Value Chain Workshop Summary: Construction
  - Value Chain Workshop Summary: Wood Energy
  - Value Chain Workshop Summary: Enhancing the Economic Value of Vermont's Woodlands
- Assessment of Local Wood, Local Good, Certification Systems & Vermont Sourced Wood
- Statewide Summit Summary



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