



MARKETS MATTER CONVENING PROCEEDINGS

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Prepared by Keystone Policy Center for the U.S. Endowment for Forestry and Communities



EXECUTIVE SUMMARY

PURPOSE OF THE CONVENING

The Markets Matter Convening was designed as a working session to move a multi-year conversation about forest markets from diagnosis toward coordinated implementation. Its purpose was not to revisit familiar concerns, promote a single technology, or produce a general statement of support for forest products. Instead, the convening brought together leaders from industry, public agencies, philanthropy, investment, research, conservation, tribal forestry, and rural community development to identify practical actions that can strengthen markets for small-diameter timber, low-value wood fiber, logging slash, forest residuals, and industry residuals.

The underlying premise was that forests, forest-dependent communities, and the broader forestry supply chain are increasingly threatened by the loss or weakening of markets for low-value material, the effects of which extend beyond individual companies. Landowners lose revenue, loggers and truckers lose work, mills lose economic balance, forest management slows, and rural communities lose jobs, tax base, and stability. When markets function well, they help keep working forests working, make active forest management more economically feasible, support wildfire risk reduction and watershed protection, and create pathways for innovation and rural prosperity. The convening therefore focused on the practical alignment of supply, demand, capital, policy, technology, infrastructure, workforce, applied research, and public understanding.

THE BROADER CONVERSATION

The Markets Matter Convening grew from a multi-year conversation about the relationship between forest health, wildfire risk reduction, rural prosperity, and the future of forest-based markets.

In 2023, regional industry roundtables and a National Forest Industry Roundtable helped identify recurring barriers to low-value wood utilization, including road infrastructure, workforce capacity, supply certainty, trust, policy constraints, and the need for new markets for underutilized biomass. These conversations established that the challenge was not limited to any single region, product, or agency action, but reflected broader misalignment among forest conditions, market capacity, public policy, infrastructure, and investment.

In October 2025, the Richard King Mellon Foundation and the U.S. Endowment for Forestry and Communities convened a National Leadership Forum on Economic Development Through Working Forests. That meeting added an explicit investment frame to the conversation, bringing together forest product organizations, investors, philanthropies, architects, builders, researchers, conservationists, and other sector leaders. The resulting roadmap emphasized that strong forest-product markets are essential to working forest conservation, rural economic vitality, and forest health outcomes, and that philanthropy and impact capital can play a catalytic role in de-risking investment and supporting market formation.

Following that work, the Endowment, the Society of American Foresters, and the USDA Forest Service formalized the Markets Matter initiative. A diverse steering committee was formed at the end of 2025 to provide strategic oversight, clarify project outcomes, and guide development of a national convening and action framework. To ensure the Convening was grounded in existing knowledge and responsive to ongoing conversations, the Endowment also

commissioned The Beck Group to complete a national and regional market and investment analysis, and Keystone Policy Center to conduct regional focus groups and review existing strategies and resources.

Together, these efforts confirmed several cross-cutting themes. Low-value wood and residual markets are under stress across the country, but the nature of the challenge varies by region. No single technology, product, or policy intervention is likely to solve the problem on its own. Durable progress will require a portfolio of market pathways, stronger alignment among policy and investment tools, attention to regional conditions, and coordinated action across the full supply chain.

The Convening should therefore be understood as both a continuation and a transition point. It continued conversations that had been building since at least 2023, while also moving the work from diagnosis toward coordination and implementation. Its purpose was not to restart the conversation, but to gather prior learning, test emerging strategies with a broader set of participants, and help identify the actions, partnerships, and investment pathways needed to support healthier forests, stronger markets, and more resilient rural communities.

CONVENING STRUCTURE

The convening was structured to move from building a foundation of shared understanding from presentations and panels to generating ideas for action in small discussion groups.

Day 1 established the market, policy, and systems frame through plenary presentations and case examples. Speakers described an industry experiencing structural change: aging pulp and paper assets, declining or shifting demand, underutilized residual fiber, changing housing and construction markets, and growing pressure to address wildfire, watershed, and rural economic challenges. The Salt River Project case study demonstrated how a utility can help support forest restoration by valuing biomass for watershed protection and wildfire risk reduction, rather than only as electricity. The South Carolina panel showed how one state responded to mill closures and pulpwood market decline by organizing a Forest Recovery Task Force, engaging economic development agencies, and pursuing a portfolio of new bioeconomy opportunities. A panel on cohesive market strategy highlighted the importance of coordinated demand development, code work, technical education, and value-chain alignment, drawing lessons from the softwood lumber and mass timber experience.

Day 2 shifted into working sessions. Participants first discussed four market pathways: existing infrastructure, biomass power and combined heat and power, biofuels and biochemicals, and emerging markets. They then tested ideas through regional breakouts focused on the South, Midwest, Northeast/Appalachia, and Inland West/Pacific Northwest. This structure allowed participants to explore both national themes and regional differences.

Day 3 focused on implementation levers: applied research and innovation, investment, and policy. The convening closed with reflections from leaders who emphasized that implementation will require sustained ownership, cross-sector partnership, catalytic funding, policy alignment, and continued coordination beyond the meeting itself.

KEY THEMES

At the end of the three days of progressive breakout conversations, several strong themes emerged on how to positively influence markets for low-value wood and fiber. These themes, as well as the weighty balance of additional ideas, considerations, and perspectives generated in conversation, will inform the Action Plan coming out of the convening.

- Retain and modernize existing infrastructure before it is lost. Participants repeatedly emphasized that mills, woodyards, biomass facilities, CHP assets, loggers, truckers, and regional supply chains are difficult or impossible to rebuild once they disappear.
- Treat markets for low-value wood as a systems challenge. Feedstock, technology, scale, logistics, demand, capital, policy, and social license all need to align for durable utilization.
- Build demand and offtake, not just supply or technology. Emerging markets need real buyers, public procurement, corporate champions, long-term contracts, and early adopters.
- Monetize public benefits and avoided costs. Fire risk reduction, watershed protection, avoided smoke, carbon, biodiversity, rural jobs, and community resilience came up repeatedly as benefits that current markets often fail to pay for.
- Use policy and finance to de-risk investment. Ideas included loan guarantees, working capital, state forest product banks, tariff revenue reinvestment, procurement, tax credits, RFS/biomass eligibility reforms, and state renewable-energy tools.
- Connect research to commercialization. Participants called for feasibility studies, techno-economic analysis, adoption-readiness work, codes and standards, accelerators, and clearer pathways from research to market.
- Build a unified coalition and trusted narrative. Public trust, cross-sector messaging, regional communications, and a coordinated policy voice were seen as essential enabling conditions.

TOWARDS ACTION

The closing roundtable on Day 3 framed the convening as the beginning of implementation, not the conclusion of a conversation. Speakers emphasized that the scale of the challenge is too large for government, industry, philanthropy, or any individual organization to solve alone. The path forward will require public-private partnership, coalition-building, sustained coordination, and practical ownership of next steps. The U.S. Endowment indicated its intention to continue investing in this work and to help bring additional capital to the table, while other speakers highlighted collaboration, crisis-driven opportunity, and the need to build from the foundation created in Madison.

The next step is to consolidate the convening's breakout outputs into a Markets Matter Action Plan that identifies priority actions, enabling conditions, potential owners, and timelines. This plan will distinguish near-term opportunities that can be launched quickly from longer-term implementation needs. It will also clarify which actions are best led by the U.S. Endowment, public agencies, industry associations, investors, universities, utilities, conservation organizations, or regional coalitions. Ideally, this Action Plan will be a rallying force for all the entities that influence the marketplace for low value wood.

Ultimately, the convening underscored that markets for low-value wood are not peripheral to forest health and rural prosperity. They are central to whether active management can occur at meaningful scale, whether communities can retain forest-based employment, and whether emerging forest products can become durable parts of the economy. The challenge now is to convert the shared understanding developed at the convening into coordinated action.

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INTRODUCTION AND WHY MARKETS MATTER

The Markets Matter Convening came at a moment of significant structural change for the forest products sector. Participants heard repeatedly that the challenge is not simply a lack of wood, a lack of technology, or a lack of interest. Rather, the core challenge is that markets cannot economically absorb the volumes of low-value fiber, small-diameter timber, logging slash, and residual material that are available or necessary to support active forest management.

The convening framed forest markets as essential infrastructure for forest health, rural economies, wildfire risk reduction, water quality, and resilient domestic supply chains. When markets for low-value material disappear, landowners lose revenue, loggers lose work, mills lose economic balance, forest management slows, and communities lose jobs and tax bases. Conversely, durable markets can help keep working forests working while enabling restoration, innovation, and rural economic vitality.

Across the plenary sessions and breakouts, participants described a sector facing both immediate risk and significant opportunity. Pulp and paper markets are declining or shifting; existing facilities are aging; biomass power has lost ground to other energy sources; and global competition has changed the economics of some legacy markets. At the same time, opportunities are emerging in mass timber, molded fiber, packaging, biochar, biofuels, biochemicals, biocarbon, nanocellulose, lignin, biomass thermal applications, and other wood-based substitutes for more carbon-intensive or non-renewable materials.

BACKGROUND

The Markets Matter Convening did not emerge as a standalone event. It represented a logical next step, and in some ways a culmination, of conversations that had been building for several years among forest products companies, land managers, investors, researchers, conservation organizations, public agencies, and communities working to understand the future of forest-based markets. Those conversations began with a shared recognition that the health of forests, the resilience of rural economies, and the ability to reduce wildfire risk are increasingly tied to whether low-value wood, small-diameter timber, biomass, and mill residuals can move into durable and economically viable markets.

INDUSTRY ROUNDTABLES

In 2023, the U.S. Endowment for Forestry and Communities, the USDA Forest Service, and Resources for the Future helped organize a series of regional industry roundtables associated with the Forest Service's Wildfire Crisis Strategy. These conversations were designed to understand the market and infrastructure conditions needed to support the removal and utilization of biomass from high-priority forest landscapes. The regional roundtables surfaced a consistent set of issues across geographies: road infrastructure, certainty and trust, workforce development, new uses and market development for underutilized biomass, and national policy barriers. They also made clear that regional conditions vary significantly. Some regions had relatively robust infrastructure but needed supply certainty and workforce support. Others described industries on the edge of collapse, with limited processing capacity and few viable markets for low-value material.

The National Forest Industry Roundtable, convened in September 2023, built on these regional conversations. It brought together public and private sector participants to consider how the Forest Service, USDA, industry, and other partners

might work together to grow markets and market potential. The national discussion reinforced the regional findings while elevating several broader themes. Participants emphasized that the challenge was not simply one of forest management, technology, or public funding alone. It was a systems challenge involving federal procedures, infrastructure, procurement, market development, private investment, workforce, and public trust. The roundtable also pointed toward the need for policy analysis and continued discussion, especially where existing authorities, financing tools, and procurement systems were not well matched to the scale or urgency of the wildfire and forest health challenge.

These early conversations helped establish the foundation for what would later become Markets Matter. They showed that many people across the sector were asking similar questions, but often from different vantage points. Land managers were focused on treatment needs, wildfire risk, and the costs of removing material. Industry was focused on supply certainty, delivered cost, infrastructure, and whether markets could support capital investment. Investors and foundations were focused on where catalytic funding could reduce risk and unlock private capital. Communities were focused on whether new or retained forest products infrastructure could support local jobs, reduce fire risk, and strengthen rural economies. The ongoing challenge was how to connect these perspectives into a more coordinated and actionable strategy.

NATIONAL LEADERSHIP FORUM

In October 2025, the Richard King Mellon Foundation and the U.S. Endowment for Forestry and Communities convened the National Leadership Forum on Economic Development Through Working Forests in Pittsburgh. This meeting brought together more than 150 leaders from 22 states and more than 80 forest product organizations, alongside philanthropies, investors, architects, builders, researchers, and conservationists. The Forum was intended to identify solutions and investment opportunities that could address fundamental challenges in the forest products sector. It also provided a more explicit investment frame for the conversation. Participants discussed the role of philanthropy and impact capital in de-risking investments, the need for market-ready and scalable opportunities, and the importance of aligning investment with forest health, climate, community, and rural economic outcomes.

The roadmap that followed from the RK Mellon and Endowment process described the need for coordinated action around working forests and forest product markets. It identified several priority investment areas, including education and outreach, mass timber and advanced wood construction, bioenergy and bioproducts, forest management and conservation, manufacturing and processing facilities, finance, workforce, research, and infrastructure. Importantly, the roadmap reinforced that strong forest-product markets are not separate from conservation outcomes. They are one of the conditions that allow working forests, forest-dependent communities, and restoration efforts to persist over time.

MARKETS MATTER STEERING COMMITTEE

At the end of 2025, the Endowment, in partnership with the Society of American Foresters and the USDA Forest Service, formalized the Markets Matter initiative. A steering committee was formed to provide strategic oversight and help define project outcomes. The committee included representation from biomass power, pulp and paper, forestry associations, the U.S. Forest Service, utilities, conservation organizations, sustainable forestry organizations, tribal forestry, wildlife organizations, private landowners, and forest products associations. The composition of the committee reflected the convening's intent to bridge sectors rather than produce a single-industry strategy. The objectives outlined in the charter included developing an actionable framework, aligning stakeholders across sectors, accelerating investment in

geographically specific solutions, identifying policy needs and near-term actions, and developing research strategies to support long-term industry health and stability. Early on, the Steering Committee identified the priority market pathways that would structure the Convening, including retention of existing infrastructure, biomass power and combined heat and power, biofuels and biochemicals, and emerging markets.

PRE-CONVENING ASSESSMENTS

The Endowment commissioned work ahead of the convening to ensure that it would be responsive to the broader conversation already underway. The Beck Group was hired to complete a regional needs assessment and market and investment opportunities analysis. That work provided a national and regional assessment of small-diameter roundwood and mill residual utilization, identifying where underutilized wood fiber exists, how regional infrastructure and ownership patterns shape utilization, and which market pathways may be better aligned with different feedstocks and regional conditions. The Beck Group analysis emphasized that the central challenge is not simply the amount of wood available, but whether markets, technologies, institutions, and investment conditions are aligned well enough to use that wood economically and at scale.

Keystone Policy Center was also engaged to support pre-Convening learning. Keystone facilitated six regional focus groups in April 2026 with more than 60 participants representing sawmills, pulp and paper companies, state and federal agencies, universities, conservation organizations, investment funds, tribal resource managers, community nonprofits, and logging and trucking contractors. These conversations were designed to test and deepen the national analysis with regional knowledge. Participants were asked to describe the state of low-value wood markets in their region, what is holding back the pace and scale of forest restoration, which market priorities make sense regionally, and what actions might lower hurdles across policy, investment, and innovation.

The focus groups confirmed that the problem is shared nationally but experienced differently by region. Participants described structural decline in pulp and paper markets, weakening residual outlets, logging and trucking constraints, regulatory and policy barriers, insufficient demand for low-value material, and a lack of investment tools suited to the sector. They also emphasized that no single product, technology, or policy change would be sufficient. Biochar, mass timber, advanced biocarbon, wood fiber for packaging and textiles, biomass power, combined heat and power, and biofuels may all have a role, but none can replace the scale and employment once provided by traditional markets on their own. A portfolio approach would be needed.

Keystone also reviewed existing resources and strategies developed over the past five to ten years. That review was intended to acknowledge and build from the substantial body of prior work rather than duplicate it. The review organized existing strategies around cross-cutting needs and priority market pathways. It emphasized that durable outcomes require alignment among customers, forest conditions, technology readiness, policy incentives, investment time horizons, supply chain logistics, workforce capacity, and public understanding. This synthesis helped to position the Convening within a broader implementation frame.

BUILDING ON THE LARGER CONVERSATION

Together, these steps were intended to ensure that the Markets Matter Convening responded to the greater ongoing conversation. The Convening was not designed to restart the discussion or to produce a simple declaration of shared concern. It was designed to gather the threads of prior work, test them with people operating in different parts of the

system, and move toward a more actionable framework. The 2023 roundtables identified core barriers and themes. The 2025 RK Mellon and Endowment forum elevated the role of coordinated investment. The steering committee provided governance and strategic direction. The Beck Group analysis offered a national and regional market foundation. Keystone's focus groups and resource review added practitioner insight and connected the Convening to prior strategies.

In this sense, the Convening represented both continuity and transition. It continued a multi-year conversation about the future of forest markets, wildfire risk reduction, working forests, and rural prosperity. It also marked a transition from diagnosis toward coordination. The challenge before participants was not whether low-value wood utilization matters; that had already been established. The challenge was how to align policy, investment, innovation, infrastructure, and regional action in a way that could support durable markets, healthier forests, and stronger communities.

The proceedings that follow should be read in that context. They capture one important moment in a longer arc of work. The value of the Convening lies not only in what was said during the meeting, but in how the meeting built from prior conversations and helped focus the next stage of collective action.

OVERVIEW OF THE CONVENING

Markets Matter was initiated at the request of Chief Schultz and U.S. Forest Service leadership, who recognized the urgency of declining markets for low-value wood and the need for coordinated public, private, and nonprofit leadership. The U.S. Endowment for Forestry and Communities hosted the convening in partnership with the Society of American Foresters, with support and guidance from a cross-sector steering committee. The convening was facilitated by Keystone Policy Center.

The intended outcome was a Markets Matter Action Plan that would serve as a call to action and alignment for organizations throughout the wood products industry. To inform this plan, the convening was designed to produce priority actions, enabling conditions, ownership categories, pathways for applied research, opportunities for capital alignment, and a framework for continued coordination. Participants were asked to envision how the plan could help them and how they could help forward the plan by identifying realistic levers for action and considering commitments or partnerships their organizations could advance.

GUIDING PRINCIPLES

In pursuit of the convening's goals, participants were asked to find solutions that were feasible, scalable, durable, and aligned with deployment realities. They were asked to distinguish near-term needs from longer-term opportunities, test market hypotheses with people who could influence implementation, and connect policy, research, investment, infrastructure, and fiber supply.

In conversation, participants were encouraged to be candid, actively participate, listen across differences, remain solution-oriented, focus on the purpose of the meeting, and respect confidentiality in breakout discussions. Plenary speakers could be cited, but breakout comments were not to be attributed to individual participants without permission.

AGENDA

Day 1: Framing and Context. The day included optional tours of the Forest Products Laboratory, welcome remarks, a series of market status presentations, a wildfire/water/energy presentation, a South Carolina state-level success panel, a cohesive market strategy panel, and a closing setup for the working sessions.

Day 2: Developing Actionable Strategies. The day began with introductory remarks from the Society of American Foresters (SAF), the U.S. Endowment, and U.S. Forest Service Chief Tom Schultz, followed by facilitated breakout sessions by market pathway and by region, structured networking, report-outs, and polling.

Day 3: Refinement and Next Steps. The final day focused on applied research, investment, and policy breakouts, followed by a Forest Products Laboratory overview, a closing panel, and final reflections on action planning and continued coordination.

PARTICIPATION

The convening invited leaders whose work and institutions could help bring feasible, scalable, and durable market solutions benefiting sustainably managed forests in the United States. The organizations represented connected to forest products, forest management, market development, investment, research, policy, and rural economic development. They made it to Madison from the South, Pacific Northwest, Inland West, Midwest, Northeast, Appalachia, and other forested regions.

Participants represented entities across the professional sectors, such as:

- **Wood products and related industry:** Forest products companies, sawmills, lumber producers, pulp and paper interests, biomass energy providers, biochar and emerging-product companies, timberland managers, logging and trucking representatives, wood-products trade associations, and utilities
- **Public sector:** Federal and state agencies, including forestry, research, energy, economic development, and natural resource programs
- **Research and technology development:** Universities, national laboratories, research centers, and extension programs focused on forest products, wood utilization, biomass, bioproducts, and market innovation
- **Civil society:** Conservation organizations, forest collaboratives, landowner organizations, and rural community development groups
- **Investment and philanthropy:** Investors, philanthropic organizations, finance professionals, and entities working on blended capital, project de-risking, and market formation
- **Tribal and Indigenous organizations**

Attendees' roles ranged from CEOs, presidents, founders, owners, directors, and senior executives to researchers, foresters, policy leads, program managers, utilization specialists, investment professionals, sustainability staff, and market-development practitioners. This breadth was important because the Convening was not focused on a single product, technology, or policy solution. It was designed to bring together the people who understand fiber supply, processing infrastructure, market demand, investment risk, public policy, workforce, research, and community impacts from different positions in the system.

Survey responses ahead of the convening showed that attendees were interested in an “all of the above” conversation rather than a narrow pathway discussion. They came prepared to engage not only as representatives of their own sector or region, but as contributors to a broader conversation about how markets, capital, policy, technology, and regional implementation could better align to support forest health, wood utilization, and rural prosperity.

SESSION PROCEEDINGS

NOTES FROM DAY 1 PLENARY

Day 1 was designed to ground participants in market realities and provide examples of cross-sector approaches before the facilitated working sessions. The day opened with remarks from Alicia Cramer, who framed the convening around structural change rather than a temporary market cycle. Her remarks emphasized that the sector is losing infrastructure historically relied upon to absorb low-value wood, while global competition, aging facilities, declining markets, and changing demand patterns are reshaping the system.

SECTOR STATUS AND MARKET REALITIES

The market status panel included perspectives on the housing and building products economy, the U.S. pulp sector, and residual wood fiber utilization.

Nate Catuara of John Burns Research and Consulting focused on factors influencing the U.S. housing market. He described an uncertain and uneven economic backdrop, high mortgage rates, affordability pressures, demographic headwinds, and soft new construction conditions alongside expected remodeling activity. These conditions affect demand for building products and related forest product markets.

Vincent Leon of AFRY described U.S. pulp assets at a crossroads. The notes highlighted 89 operating wood-consuming pulp mills in the United States, with roughly 70 percent clustered in the South. Aging infrastructure was a major concern, including a substantial number of recovery boilers over 50 years old and potential replacement costs in the hundreds of millions to billions of dollars. The pulp sector faces demand decline, global competition, and major capital decisions, but also opportunities in existing positions, packaging, paperization, and bioeconomy diversification.

Roy Anderson of The Beck Group presented key messages from a residual wood fiber assessment. The notes framed two linked systems: the forest system and the rural economy system. The key takeaway was that sawtimber is roughly balanced, but large volumes of pulpwood, logging slash, mill residuals, and other low-value material remain underutilized. He cited approximately 270 million bone-dry tons of annual supply, 214 million bone-dry tons of annual demand, leaving 56 million bone-dry tons unused. He emphasized that markets do not create equal economic pull and that system anchors such as lumber and pulp/paper remain essential.

WILDFIRE, WATER, AND ENERGY

Elvy Barton of Salt River Project presented a case study linking biomass utilization to wildfire risk reduction and watershed protection. SRP serves a large customer base in the Phoenix metropolitan area and sees catastrophic wildfire as a direct threat to water supply. The cost of action can be far lower than post-fire recovery, and biomass power should be valued as a risk-reduction and watershed-restoration tool, rather than just as an energy source.

The SRP example demonstrated how a utility can help support forest restoration by paying for biomass power and biochar in ways that recognize avoided wildfire, water quality, carbon, infrastructure protection, and other co-benefits. The discussion also raised unresolved questions about public versus investor-owned utilities, bioenergy subsidies, insurance, biochar market development, and long-term offtake for biochar.

CASE STUDY: SALT RIVER PROJECT



Photo Credit: Salt River Project

Salt River Project (Arizona): Utilities as Catalysts for Forest Restoration in the West

The Salt River Project (SRP), which provides power and water to more than 2.5 million customers in the Phoenix metropolitan area, is pioneering a utility-driven approach to forest restoration that directly addresses the West's escalating wildfire and watershed challenges.

The Challenge + Opportunity:

Solutions: Recognizing that biomass removal is often the largest cost barrier to restoration, SRP has invested in biomass utilization as a risk-reduction strategy rather than solely an energy strategy. Through long-term support for biomass power and biochar markets, including innovative offtake agreements and regional cost-sharing partnerships, SRP is helping maintain critical forest-products infrastructure while creating economic pathways for low-value woody biomass.

Takeaway: The SRP model demonstrates how western utilities can leverage investments in wildfire mitigation, water security, and forest health to support market development and landscape-scale restoration simultaneously.

Learn more at: [Salt River Project](#)

STATE-LEVEL SUCCESS: SOUTH CAROLINA

The South Carolina panel described how one state responded to significant market disruption, including mill closures, declining pulpwood markets, and reduced utilization. Panelists included Scott Phillips, South Carolina State Forester; Guy Sabin, South Carolina Forestry Association; and Dr. Soledad Peresin, Clemson University. The notes report that

South Carolina created a Forest Recovery Task Force following a recent paper mill closure and sought to stabilize existing industry while pursuing new bioeconomy markets.

Key lessons included the importance of cross-agency coordination, state economic development engagement, communication with policymakers and communities, and a portfolio approach that does not depend on one silver bullet. The panel also emphasized the Clemson Wood Design and Utilization Institute and the need to connect innovation to market development across the Southeast.

CASE STUDY: SOUTH CAROLINA



Photo Credit: South Carolina Forest Recovery Task Force

South Carolina: Building a Bioeconomy Around Existing Forest Infrastructure

South Carolina offers a compelling example of how southeastern states can respond to market disruption by leveraging existing forest industry infrastructure and abundant fiber resources.

The Challenge + Opportunity: Following the closure of 14 mills and significant declines in pulpwood demand, state leaders established a Forest Recovery Task Force to stabilize the sector while identifying new pathways for growth. Rather than replacing traditional industries, South Carolina is pursuing a complementary strategy that builds on its existing mill network, workforce, and forest products supply chain.

Solutions: Efforts are focused on attracting emerging bioeconomy industries—including renewable fuels, biochar, and biobased chemicals—that can utilize mill byproducts, sawmill residues, and underutilized fiber streams. Through partnerships with Clemson University and the Wood Design and Utilization Institute, the state is also fostering innovation in wood products, construction, and manufacturing.

Takeaway: By combining industry retention, strategic investment, and market diversification, South Carolina is positioning itself as a southeastern hub for next-generation forest products while improving utilization of its substantial standing timber inventory and existing industrial assets.

Learn more at: [South Carolina's Forest Recovery Task Force Report](#)

BUILDING A COHESIVE MARKET STRATEGY

The cohesive market strategy panel focused on lessons from coordinated market-building efforts in the wood products sector. The run of show identifies the panel as a facilitated discussion with Brian Luoma and Ryan Flom, Softwood Lumber Board; Jackson Morrill, American Wood Council; and Jennifer Cover, Woodworks. Source notes indicate that the session was intended to explore coordinated demand development, education, and market strategy, particularly through the lens of building and construction markets.

Key lessons included the importance of aligning the entire forest products value chain around a shared market development strategy, as demonstrated by the softwood lumber industry's successful expansion into nonresidential and mass timber construction. Panelists emphasized the need for coordinated investment in code development, technical education, market adoption, and stakeholder partnerships, while highlighting the role of trusted third-party support, local engagement, and relationship-building. Discussions also underscored the urgency of addressing the loss of pulpwood markets, expanding demand across forest products sectors, and creating unified industry action to support long-term forest management and economic sustainability.

LOOKING AHEAD TO THE WORKING SESSIONS

The final Day 1 session reminded participants that the plenary content was intended to create a shared starting point for the working sessions. Participants were also asked to carry forward insights from prior convenings, regional engagement, and market analysis into the Day 2 and Day 3 breakout discussions.

NOTES FROM CHIEF SCHULTZ SPEECH

U.S. Forest Service Chief Tom Schultz framed forest products and market capacity as a national security, rural community, and forest resilience issue. He described hearing from landowners, industry, tribes, and communities across the country that lack of markets for low-value materials is a primary threat to the forest sector. He emphasized that market conditions have changed rapidly and structurally, especially over the last several years.

The remarks connected mill and facility closures to rural community impacts, including jobs, education, healthcare, and broader economic stability. Chief Schultz emphasized that when facilities close, residuals and chips that once generated revenue can become a cost to haul away. He also stressed that active management, thinning, and treatment are essential, but that the economics of implementation are challenging.

Chief Schultz also addressed Forest Service reform, administrative burden, and efforts to streamline decision-making and push decisions closer to the ground. He discussed continued investment in the Wood Innovations Grant Program, the need to think of biomass power and mills as critical infrastructure, and the importance of recognizing loggers, trucks, and staff as part of the infrastructure system.

His remarks challenged participants to think beyond familiar circles, engage people from finance and other sectors, explore innovative funding mechanisms, and produce a practical blueprint for action. He also emphasized that leadership and ownership of the work would be necessary after the convening.

NOTES FROM EACH OF THE BREAKOUTS

The following summaries synthesize the breakout session documents provided for Session 1 market pathways, Session 2 regions, and Session 3 action categories. Each breakout included multiple discussion tables, report-outs, and supporting notes. The summaries below emphasize themes that were both well developed and actionable.

SESSION 1: MARKET PATHWAY BREAKOUTS

Existing Infrastructure. Participants emphasized the urgency of retaining and modernizing sawmills, pulp mills, paper mills, woodyards, CHP (Combined heat and power) assets, transportation links, and processing capacity. The central message was that existing infrastructure is the foundation for future market development and should not be displaced by attention only to new technologies. Specific ideas included mill-retention incentives, modernization grants, low-interest loans, black-liquor-style credits, woodyard investment, domestic procurement, transportation support, co-generation, and monetizing non-market benefits.

Biomass Power and CHP (Combined Heat and Power). Participants argued that biomass power should be valued for wildfire risk reduction, forest health, watershed protection, avoided smoke impacts, and community resilience rather than only for electricity. CHP and thermal uses were seen as more viable than electricity-only models when reliable heat loads exist. Participants discussed PPAs (Power Purchase Agreements), renewable and thermal credits, modernization of existing assets, data center demand, state energy policy, permitting, carbon accounting, public education, and the Salt River Project model.

Biofuels and Biochemicals. Participants focused heavily on Renewable Fuel Standard reform, woody biomass definitions, feedstock eligibility, life-cycle analysis, investment certainty, supply-chain scale, offtake, technology transfer, and whole-cost accounting. They highlighted the need to clarify the status of federal wood, hazardous fuels, tree residues, slash, logging residuals, and pre-commercial thinning materials. They also identified the need to educate investors about wood procurement and supply realities.

Emerging Markets. Participants emphasized demand creation, early adopters, buyer-defined specifications, and a focused portfolio rather than a broad scatter of product ideas. High-potential areas included molded fiber and packaging, mass timber and other building products, biochar/biocarbon, bio-based plastics, lignin, nanocellulose, and substitutes for non-renewable materials. Participants also called for applied research, commercialization support, regional clusters, co-located facilities, public messaging, and policies that help wood compete with agriculture and incumbent materials.

SESSION 2: REGIONAL BREAKOUTS

South. The South breakout focused on retaining pulp, paper, mill, woodyard, and supply-chain infrastructure while building new demand streams. Practical ideas included woodyard PPPs, state economic development task forces, data centers as demand drivers for biomass power and mass timber, military/federal energy resilience uses, co-location at existing or closed mills, SAF (Sustainable aviation fuel), marine methanol, biocarbon, procurement of wood/paper products, and mass timber using southern species and small-diameter logs.

Inland West and Pacific Northwest. These groups framed biomass energy as forest health, wildfire mitigation, water, insurance, and resilience rather than for its value as energy alone. The PNW emphasized public-private coordination, federal planning reform, storytelling, data centers, mass timber, and treating infrastructure as a public good. The Inland

West emphasized fragile mills, transportation costs, federal supply certainty, biochar, biomass power, case studies that quantify benefits beyond electricity, and loan guarantees.

Midwest. The Midwest breakout described the region as well suited to solve low-value timber utilization because of abundant low-value material, lower controversy around forestry, strong university-government partnerships, and the agriculture-forestry interface. Priorities included a regional forest products consortium, state economic development engagement, expanded Wood Innovation Grants, infrastructure retention, transportation reciprocity, biomass as clean energy, RFS (Renewable Fuels Standard) reform for residuals, structural standards for small-diameter and diverse species, mass timber/housing, and new markets for pulp fiber and diverse species.

Northeast and Appalachia. Participants framed the core issue as demand, not simply supply or technology. Shared priorities included retaining existing infrastructure, creating regional investment structures with patient capital, stacking ecological/economic/social benefits, building a unified policy voice, expanding biomass heat and district heating, developing region-specific mass timber and modular housing, and creating research-to-launch pipelines. Northeast themes included proximity to population, district heating, and infrastructure retention; Appalachia themes included biodiversity, intact forests, rural economic transition, local manufacturing, and hardwood markets.

SESSION 3: ACTION CATEGORY BREAKOUTS

Applied Research and Innovation. Participants called for stronger bridges between research and commercialization, including a clearinghouse, cooperative funding models, feasibility studies, techno-economic analysis, adoption-readiness metrics, building-code pathways, fast-track pilots, regional accelerators, regional advisory committees, third-party validation, and better communication between researchers and industry. The group emphasized that research is abundant but fragmented, while commercialization requires coordination, customer demand, applied funding, and practical deployment pathways.

Investment. Participants focused on making forest resilience and low-value wood markets legible to capital. Ideas included finance frameworks, simple resilience metrics, benefit-accounting tools, state-by-state opportunity mapping, sovereign funds or state forest product banks, working capital for mills, an industry-funded investment research hub, trusted market data and indexes, curated deal pipelines, management-team matching, accelerators, and engagement with mainstream investors, utilities, insurers, water providers, healthcare organizations, and foundations.

Policy. Participants emphasized a dedicated forest-market infrastructure and commercialization fund, possibly with separate demand/infrastructure and wildfire-utilization tracks. They discussed tariff revenue, softwood settlement funds, Farm Bill funds, public/private co-investment, loan guarantees, adapting existing federal tools, RFS reform, a simple statutory definition of woody biomass, coordinated advocacy, community-centered political messaging, market-failure analysis, and a coalition with a single lead and clear roles for lobbying and non-lobbying organizations.

SUMMARY OF KEY THEMES

Across the sessions, the ideas evolved from pathway-specific concerns to regionally tailored strategies and then to implementation architecture. The most durable ideas were not single products. They were systems for retaining infrastructure, creating demand, aligning policy, de-risking investment, valuing public benefits, coordinating applied research, and building trusted coalitions.

- Infrastructure retention is the immediate priority because future markets require existing mills, woodyards, logistics, workforce, and processing assets.
- Demand creation is essential. Markets need buyers, procurement, offtake, power purchase agreements, public purchasing, and corporate demand signals.
- Biomass and low-value wood need to be valued for resilience benefits, not only commodity or energy value.
- Finance tools must be designed to de-risk early investment, support working capital, and translate public benefits into bankable structures.
- Policy reform is needed to remove bias against wood, clarify biomass eligibility, support procurement, and adapt existing federal and state tools.
- Applied research must move toward commercialization, codes and standards, pilots, techno-economic analysis, and adoption readiness.
- Regional strategies must differ because the South, West, Midwest, Northeast, and Appalachia face different infrastructure, species, ownership, fire, energy, and demand conditions.
- Communications and social license are enabling conditions, especially for biomass, active management, and public investment.

CLOSING ROUNDTABLE DISCUSSION

The closing discussion emphasized that the convening should be understood as the beginning of implementation rather than the end of a discussion. Speakers described the problems as too large for government, industry, philanthropy, or any single organization to solve alone. Public-private partnership, coalition-building, and sustained coordination were repeatedly identified as the only viable paths forward.

Pete Madden of the U.S. Endowment thanked the team and emphasized the role of philanthropy in organizing cross-sector response where problems are too large for government or industry alone. The notes report that the Endowment intends to put another \$10 million over the next 10 years toward addressing this problem, while working to bring additional capital to the table.

Carrie Annand reflected that crisis can create opportunity and that large accomplishments in the sector are likely to come through collaboration. Terry Baker described the convening as opening a door to new possibilities and offering a foundation to build from. Dave Tenny emphasized that existing infrastructure remains the anchor of the system, even as the sector evolves and needs capital, innovation, and federal policy. Chief Schultz closed by challenging participants to exercise leadership, own the work coming out of the convening, pursue short-term wins while keeping sight of the long-term game, and share the message with people who were not in the room.

CASE STUDY: USFS FOREST PRODUCTS LAB



Photo Credit: USDA Forest Service photo by Joshua Limbaugh.

U.S. Forest Service Forest Products Laboratory: Driving Forest Product Innovation in the Midwest

Located in Madison, Wisconsin, the U.S. Forest Service's Forest Products Laboratory (FPL) serves as the nation's premier forest products research institution and a cornerstone of forest-sector innovation in the Midwest.

Challenge + Opportunity: For more than a century, FPL has helped translate scientific discoveries into commercially viable technologies that expand markets for wood and forest biomass. Its work is particularly relevant as the industry seeks new markets to replace declining pulp demand, improve utilization of low-value materials, and strengthen domestic manufacturing.

Solutions: By bridging fundamental research with applied product development, FPL plays a critical role in creating higher value uses for forest resources that support both forest management and rural economies. Today, the laboratory's research portfolio spans advanced wood structures, mass timber, advanced composites, nanocellulose, biofuels, biochemicals, energy storage materials, and utilization pathways for small-diameter trees and mill residuals.

Takeaway: As a Midwest-based innovation engine with national reach, FPL demonstrates how research institutions can accelerate commercialization and help shape the future bioeconomy while supporting healthy forests and resilient supply chains.

Learn more at: [Forest Products Laboratory | US Forest Service Research and Development](https://research.fs.usda.gov/fpl)
(<https://research.fs.usda.gov/fpl>)

APPENDICES

FULL CONVENING AGENDA

[Agenda](#)

ORGANIZATION AND PLANNING

The convening was organized by a Core Team with oversight and strategic direction given by a Steering Committee.

STEERING COMMITTEE

The steering committee helped shape the convening focus, direction, and attendance. Steering committee members included:

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- Carrie Annand, American Biomass Power Association
 - Terry Baker, Society of American Foresters
 - Elvy Barton, Salt River Project
 - Brian Boland, Billerud
 - Brian Brashaw, U.S. Forest Service
 - Whitney Calvert, The Nature Conservancy
 - Lauren Cooper, Sustainable Forestry Initiative
 - Alicia Cramer, US Endowment for Forestry and Communities
 - Justin Dawe, Earth Force
 - Jaelith Hall-Rivera, U.S. Forest Service
 - Jonathan Lowery, Westervelt
 - Andy Martin, US Forest Service
 - Jackson Morrill, American Wood Council
 - Cal Mukumoto, Intertribal Timber Council
 - Molly Pitts, National Wild Turkey Federation
 - Marcus Selig, National Forest Foundation
 - Dave Tenny, National Alliance of Forest Owners

CORE TEAM

The Core Team consisted of the convening partners and the Keystone facilitation team. Together they organized the convening in coordination with the Steering Committee.

- Brianna Brumbaugh, Keystone Policy Center
- Morgan Franklin, U.S. Endowment for Forestry and Communities
- Jonathan Geurts, Keystone Policy Center
- Natasha James, Society of American Foresters
- George Jutras, Keystone Policy Center
- Matt Krumenauer, U.S. Endowment for Forestry and Communities
- Julie Shapiro, Keystone Policy Center

CONVENING GROUND-SETTING DOCUMENTS

In preparation for the convening, the Endowment commissioned a study of the state of markets for low-value wood and residuals conducted by The Beck Group. Keystone also conducted and summarized learnings from a series of regional listening sessions and performed a synthesis of strategies outlined in existing reports, plans, and whitepapers. These materials served as context-setting read-ahead materials for convening participants.

BECK STUDY

In early 2026, the Endowment hired The Beck Group to complete a national economic assessment, resulting in their “Residual Wood Fiber Regional Needs Assessment, Market & Investment Opportunities Analysis.” This assessment was one of the central analytic anchors for the convening. On Day 1 of the convening, Roy Anderson of The Beck Group summarized the assessment’s main points. He described a system in which sawtimber is largely in balance while low-value materials remain economically stranded. He quoted approximately 270 million bone-dry tons of annual supply, 214 million bone-dry tons of annual demand, and 56 million bone-dry tons going unused. The analysis emphasizes that system anchors such as lumber and pulp/paper provide stronger economic pull than volume absorbers or policy-dependent pathways, and that utilization depends on alignment across feedstock, technology, scale, logistics, and demand.

[Residual Wood Fiber Regional Needs Assessment, Market and Investment Opportunity Analysis](#)

REGIONAL LISTENING SESSION SUMMARIES

In April 2026, Keystone Policy Center facilitated six regional focus groups, totaling over 60 participants. The groups represented multi-sector points of view in the Northeast, the South, Appalachia, the Midwest, the Intermountain West, and the Pacific Northwest. These conversations were designed to test and deepen the conclusions of the Beck Group’s assessment with on-the-ground perspectives. Keystone summarized the findings from these conversations for use as preparatory reading for the Convening.

[Regional Listening Summary](#)

PRIOR WORK SYNTHESIS

In preparation for the Convening, Keystone reviewed existing strategy documents and other resources developed over the past 5-10 years. The resulting synthesis document was provided to participants as a read-ahead, to ensure that the Convening built upon rather than duplicated earlier conversations. It emphasized that durable outcomes require alignment among customers, forest conditions, technology readiness, policy incentives, investment time horizons, supply chain logistics, workforce capacity, and public understanding.

FRAMING DOCUMENT

As a welcome to Convening registrants, the U.S. Endowment for Forestry and Communities sent a framing document. The document clarified objectives, issued a call to action, and announced the structure and ultimate purpose of the Convening. The document emphasized the conveners' intent to have a new kind of conversation that would result in action rather than a more typical meeting that just continues to clarify the problem or pitches solutions without substantial follow-up.

[Convening Framing Document](#)

PRESENTATIONS

Day 1 presentations and panels covered market status, global pulp and paper dynamics, domestic residual fiber markets, wildfire/water/energy, state-level response in South Carolina, and cohesive market strategy.

Day 3 included remarks from John Rothlisberger on the Forest Products Laboratory, including its role as the Forest Service's national forest products research laboratory and its focus areas in advanced structures, composites, bioeconomy, nanotechnology, wood utilization, small-diameter trees, and mill residuals.

[Convening Presentations](#)

CONVENING IDEA INVENTORY

The following inventory represents the ideas raised in the full convening process, from the pre-work conducted by The Beck Group and Keystone through to each of the breakout sessions in Madison. It contains approximately 180 distinct ideas and actions drawn from all source materials without filtering or prioritization. They have been organized by functional area for ease of reference.

Sources:

- Beck Group Regional Needs Assessment & Utilization Analysis
- Pre-Convening Regional Focus Group Summary
- Existing Resources Overview & Priority Market Pathway Strategies
- 11 Breakout Session Summaries (4 pathway, 4 regional, 3 action area)

1. POLICY

Policy ideas focused on changing the rules that determine whether forest-derived materials can become investable markets. Participants repeatedly returned to federal definitions, state procurement, biomass eligibility, clean fuel credits, and dedicated funding mechanisms as the places where modest language changes could unlock larger market activity. The central tension is that policy must be broad enough to remove bias against wood, but specific enough to maintain sustainability safeguards and avoid reallocating fiber away from existing productive uses.

1.1 RENEWABLE FUEL STANDARD AND BIOFUEL ELIGIBILITY

The conversation in this area focused on whether existing federal and state fuel policies unintentionally exclude or disadvantage forest feedstocks. Participants saw definitions and eligibility rules as decisive because they determine whether developers can claim credits, secure offtake, and finance facilities. Feasibility will depend on coordinated advocacy, clear sustainability guardrails, and agency interpretation; the major tension is concern that expanded eligibility could increase competition for fiber or be perceived as weakening environmental protections.

- Reclassify sawmill residuals as waste products, irrespective of upstream harvest intent, so they qualify as eligible biofuel feedstocks regardless of the harvest origin of the parent log. This would reduce uncertainty for residual streams that are generated after logs enter existing manufacturing systems.
- Create a statutory definition of 'woody biomass = biomass that comes from wood' through Farm Bill amendment or omnibus legislation, written specifically enough that Environmental Protection Agency (EPA) cannot reinterpret it. A clear definition would create a common baseline for agencies, developers, advocates, and investors.
- Ensure forest-derived fuels qualify under state-level Low Carbon Fuel Standards (California, Oregon, Washington). This would help forest feedstocks compete in state clean-fuel markets where carbon intensity drives value.
- Align the Greenhouse gases, Regulated Emissions, and Energy use in Technologies (GREET) model treatment of wood-derived fuels to reflect actual carbon accounting. More accurate treatment in the model would affect credit values and investor assumptions for wood-derived fuels.
- Align Section 45Y clean electricity and Section 45Z clean fuel production credits to treat wood consistently with other feedstocks. Consistent tax-credit treatment would reduce policy risk for developers considering wood-based fuel or power projects.
- Make lignin eligible under the Renewable Fuel Standard — it is currently excluded despite being a waste product. Eligibility could turn a pulp-sector byproduct into a higher-value fuel or chemical feedstock.
- Align sustainable aviation fuel (SAF) eligibility frameworks to explicitly include forest feedstocks. Explicit inclusion would help sustainable aviation fuel developers evaluate forest feedstocks early in project design.
- Separate biomass from timber in the National Forest Management Act (NFMA) so residual material can be removed from federal lands without triggering the full timber appraisal process. This could lower transaction barriers for removing low-value residuals from federal lands.
- Reform the U.S. Forest Service (USFS) appraisal process so biomass removal is treated as a liability that yields public benefit, not a valuable product requiring appraisal. Reframing biomass as a cost-reduction and public-benefit material would better match its market reality.
- Establish state-level biomass energy tax credits (Arizona model cited as immediately replicable). A targeted credit would improve project economics during the early market-building period.

1.2 GOVERNMENT PROCUREMENT

Procurement was discussed as a near-term demand-creation tool. Participants saw public purchasing as a way to create anchor markets for wood products before private demand fully matures. Enabling conditions include clear specifications, model procurement language, environmental product documentation, and agencies willing to act as early buyers; tensions include cost premiums, uneven code acceptance, and the risk that preferences are too weak to move markets.

- Create federal and state procurement preferences for locally sourced wood products, especially for construction, infrastructure, and institutional facilities. This would convert public purchasing into a demand signal that private investors and manufacturers can underwrite.
- Mandate or create strong incentives for mass timber in all public buildings. This would convert public purchasing into a demand signal that private investors and manufacturers can underwrite.

- Develop procurement specifications for biochar in federal and state transportation and infrastructure projects — replicate the Minnesota Department of Transportation (DOT) stormwater/road salt model. This would convert public purchasing into a demand signal that private investors and manufacturers can underwrite.
- Assess and target procurement policies at federal and state levels for packaging, energy, and biochar. This would convert public purchasing into a demand signal that private investors and manufacturers can underwrite.
- Require data centers to meet 5–15% of power from biomass or renewable energy (South session proposal). This would connect fast-growing power demand with forest-health, rural-development, and resilience objectives.
- Use Environmental Product Declarations or similar tools to create a procurement advantage for wood-based materials. This would convert public purchasing into a demand signal that private investors and manufacturers can underwrite.

1.3 BIOMASS ENERGY POLICY

Biomass energy policy discussions emphasized that electricity markets often undervalue biomass because they do not pay for avoided wildfire, forest health, disposal, or resilience benefits. Participants explored rate design, renewable portfolio treatment, avoided-cost analysis, and utility engagement as ways to create stable revenue. The feasibility tension is that biomass power can be expensive compared with other energy sources unless policy recognizes its broader public benefits.

- Implement biomass-specific standard offer contracts or other rate structures providing long-term contracts and set market prices for electricity from biomass. Long-term pricing would make biomass revenue more predictable and easier to finance.
- Develop policy mechanisms that formally recognize the value biomass provides to utility customers, providers, and the public through grid reliability, reduced system costs, and wildfire risk reduction. This would create clearer policy signals and reduce uncertainty for agencies, developers, and investors.
- Clarify and expand biomass eligibility under state renewable portfolio standards — several states currently exclude biomass. Eligibility would determine whether biomass can participate in state clean-energy compliance markets.
- Redirect softwood tariff revenue (~\$700–800M annually) from Treasury to a dedicated fund for forest infrastructure and loan facilities. Redirecting existing revenue could create a dedicated source of capital for domestic forest infrastructure.
- Re-establish Statewide Wood Energy Teams (SWET). These teams could provide a practical forum for matching energy users, forest managers, and project developers.
- Engage state utility commissions in Integrated Resource Planning and avoided-cost determinations for biomass. Long-term pricing would make biomass revenue more predictable and easier to finance.

1.4 FUNDING, FINANCE, AND PROGRAM POLICY

This heading gathered ideas for public programs and finance policy that could move beyond episodic grants. Participants wanted tools that support infrastructure, commercialization, reporting, and predictable supply over time. Enabling conditions include federal and state program alignment, flexible capital, clear eligibility, and administrative fixes; tensions include the complexity of blending programs and the possibility that funds could be too broad to guide investment effectively.

- Create a dedicated Forest Markets Infrastructure and Commercialization Fund combining technical assistance, loan guarantees, low-interest loans, capital investment, and commercialization support. A flexible fund could support the gap between research, infrastructure, and financeable projects.
- Enhance the Timber Products Expansion Program; develop state forest products infrastructure banks. Program expansion could create state-level tools tailored to forest-sector assets and repayment cycles.
- Extend the Section 45Q carbon sequestration tax credit to permanent biochar applications. A targeted credit would improve project economics during the early market-building period.
- Include biochar provisions in the Farm Bill. Clear specifications and offtake would help move biochar from one-off pilots into repeatable public and private markets.

- Leverage wildfire mitigation and disaster/emergency funding to co-finance biomass infrastructure with long-term resilience value. Using these funds could connect emergency spending to long-term capacity and avoided future costs.
- Align state tax credits with multi-year capital timelines. A targeted credit would improve project economics during the early market-building period.
- Simplify permitting processes for manufacturing modernization projects. Simpler permitting could reduce the time and uncertainty that discourage modernization and first-of-kind projects.
- Fix 508-compliance issues that prevent Wood Innovation Grant findings from being published on federal websites. Better publication and reporting would improve knowledge transfer from publicly funded projects.
- Require compliance with Wood Innovation Grant final reporting requirements to enable knowledge transfer. Better publication and reporting would improve knowledge transfer from publicly funded projects.
- Improve contracting mechanisms to increase predictability of public timber supply. More predictable contracts would help investors and operators plan around reliable feedstock.
- Establish coordinated state or multi-state implementation teams for sustainable aviation fuel (SAF). This would create clearer policy signals and reduce uncertainty for agencies, developers, and investors.
- Advance model state legislation supporting long-term demand for wood products and biomass energy. This would create clearer policy signals and reduce uncertainty for agencies, developers, and investors.

1.5 COST OF INACTION ANALYSIS

Cost-of-inaction analysis was discussed as a way to make the stakes legible to policymakers and investors. Participants wanted concrete estimates of what is lost when mills close, wildfire risk grows, or rural tax bases shrink. The enabling condition is credible, region-specific economic analysis that can be updated and communicated simply; the tension is that broad avoided-cost claims may not be persuasive unless tied to specific places, facilities, and decisions.

- Produce region-specific analyses of infrastructure loss, wildfire costs, manufacturing capacity loss, lost investment value in real assets, and tax revenue implications for rural communities. Quantifying losses would strengthen policy advocacy and make risks visible to investors and local leaders.
- Publish findings in accessible formats designed to support both policy advocacy and investor conversations. This would create clearer policy signals and reduce uncertainty for agencies, developers, and investors.
- Update analyses annually as conditions evolve and as initiative actions begin to show results. This would create clearer policy signals and reduce uncertainty for agencies, developers, and investors.

2. INVESTMENT AND CAPITAL

Investment ideas centered on de-risking a sector that has clear public benefits but weak conventional revenue models. Participants saw capital as available, but not yet organized around the needs of mills, woodyards, biomass facilities, emerging products, and restoration supply chains. Enabling conditions include credible project pipelines, blended capital, working capital tools, better data, and investors who understand forest supply; the main tensions are long payback periods, uncertain feedstock, lack of offtake, and limited management capacity in early-stage ventures.

2.1 FUND AND CAPITAL VEHICLE DEVELOPMENT

Participants explored multiple capital vehicles to fill gaps that conventional lenders do not address. The emphasis was on existing infrastructure, first-of-a-kind facilities, and public-benefit projects that need patient or blended capital. Feasibility depends on governance, underwriting criteria, deal flow, and public/private participation; the tension is that a fund without investable projects or clear mandates could become symbolic rather than catalytic.

- Create a blended capital fund with working capital gap financing, loan guarantees, low-interest loans, and technical assistance — designed for existing mills, not startups. Blended capital can absorb risks that conventional lenders are unlikely to take alone.
- Develop forest-sector revolving loan funds at the state level. A revolving structure would recycle repayments into future projects and create a durable state tool.
- Establish state forest product banks supported by sovereign funds or federal policy. A revolving structure would recycle repayments into future projects and create a durable state tool.
- Establish public-private investment attraction and coordination teams by region. This would improve financeability by matching capital tools to the sector's risk, timing, and public-benefit profile.
- Develop a mission-driven 501(c)(3) — company- and product-agnostic — to accelerate intellectual property (IP), seed businesses, and attract venture capital based on a transparent, repeatable scorecard. A mission-driven nonprofit could provide neutral support without favoring one company or product pathway.
- Capitalize and deploy 3–5 coordinated state-level infrastructure investment platforms. This would improve financeability by matching capital tools to the sector's risk, timing, and public-benefit profile.
- Deploy \$250 million in coordinated investment by 2030. This would improve financeability by matching capital tools to the sector's risk, timing, and public-benefit profile.
- Create a dedicated investment fund to keep interconnected supply chain companies operational during market downturns (Pacific Northwest (PNW) model). This would improve financeability by matching capital tools to the sector's risk, timing, and public-benefit profile.
- Use blended finance to share early-stage risk for first-of-a-kind facilities. Risk sharing is especially important where technology works technically but has not yet been commercially proven.
- Structure capital deployment according to project maturity stage: pilot, demonstration, first commercial, scale-up. Stage-appropriate finance would prevent projects from being pushed into debt or equity before they are ready.

2.2 CAPITAL INSTRUMENTS

Capital instrument ideas focused on matching finance tools to the irregular revenue and risk profiles of forest markets. Participants suggested revenue-based lending, offtake guarantees, catalytic grants, bonds, and concessionary capital. These tools could reduce early-stage risk, but their feasibility depends on credible benefit metrics, reliable counterparties, and enough projects ready to use them.

- Develop revenue-based lending — payments indexed to actual revenue rather than fixed debt service — as a better-fit instrument for this sector. This could fit variable project revenues better than fixed debt service.
- Use philanthropic offtake guarantees for early-stage producers. Offtake support would give producers and lenders confidence that demand exists before large capital is committed.
- Use smaller matched grants as complements to larger capital programs. Smaller grants can unlock larger capital by paying for early diligence, engineering, or market validation.
- Use catalytic grants to scale lab-stage innovations toward commercial application. Smaller grants can unlock larger capital by paying for early diligence, engineering, or market validation.
- Use utility bonding capability, municipal bonds, and state revolving loan funds for biomass development and construction capital. A revolving structure would recycle repayments into future projects and create a durable state tool.
- Develop co-investment models tied to resilience and ecosystem benefits. Benefit accounting can help stack revenue and justify investment beyond product sales alone.
- Offer concessionary capital (-3% to 3% returns) for projects delivering clear public benefits including forest health, wildfire mitigation, and rural employment. Using these funds could connect emergency spending to long-term capacity and avoided future costs.
- Use forest-resilience bonds or similar structures for development and construction capital. Bond financing could match long-lived infrastructure benefits with longer repayment horizons.

2.3 NONTRADITIONAL INVESTORS AND BENEFICIARIES

This discussion broadened the universe of potential payers beyond forest products companies. Utilities, insurers, water providers, data centers, healthcare systems, and corporate actors may benefit from avoided wildfire, cleaner water, better air quality, and resilient supply chains. The opportunity is to convert those benefits into co-investment; the tension is that these actors need verified, defensible links between their payments and measurable outcomes.

- Engage investor-owned utilities as co-investors based on avoided grid costs, wildfire suppression costs, and resilience benefits. These beneficiaries may be willing to co-invest if avoided costs and benefits can be verified.
- Engage insurers — link insurance premium reductions to wildfire risk reduction; explore legislative mechanisms connecting insurance markets to forest treatment funding. These beneficiaries may be willing to co-invest if avoided costs and benefits can be verified.
- Engage water utilities — structure payment for watershed protection services delivered by forest management. These beneficiaries may be willing to co-invest if avoided costs and benefits can be verified.
- Engage data centers and hyperscalers — negotiate wood-to-energy supply agreements, workforce development commitments, and community benefits. This would connect fast-growing power demand with forest-health, rural-development, and resilience objectives.
- Engage healthcare systems — link community health outcomes and air quality to forest management investment. These beneficiaries may be willing to co-invest if avoided costs and benefits can be verified.
- Develop formal investment models and value propositions for each nontraditional beneficiary class. This would improve financeability by matching capital tools to the sector's risk, timing, and public-benefit profile.
- Pilot at least one formal co-investment agreement with a nontraditional beneficiary by end of 2026. Stage-appropriate finance would prevent projects from being pushed into debt or equity before they are ready.

2.4 INVESTMENT INFRASTRUCTURE AND MARKET DATA

Participants saw market data and investment infrastructure as prerequisites for attracting capital. Investors need information about residual supply, specifications, logistics, market size, and project maturity. Enabling conditions include trusted data hubs, market indexes, concierge services, and investor education; tensions include proprietary data, regional variability, and uncertainty about what supply is truly accessible.

- Expand the Forest Markets Investment Advisory Group (formed by RK Mellon Foundation and U.S. Endowment for Forestry and Communities (USE)) into a coordinated investment strategy with shared priorities. This would improve financeability by matching capital tools to the sector's risk, timing, and public-benefit profile.
- Establish an industry-funded Investment Research Hub modeled on Electric Power Research Institute (EPRI), Semiconductor Manufacturing Technology Consortium (SEMATECH), or U.S. Department of Agriculture (USDA) Cooperative Extension to produce credible market data for lenders and investors. A trusted hub could produce lender-grade data and market intelligence for an unfamiliar sector.
- Create a market index or gauge for residual wood fiber — covering volume, location, specifications, operability, logistics, and long-term reliability — similar to agricultural commodity benchmarks. A benchmark would help price residual fiber and reduce uncertainty in underwriting.
- Develop a concierge service connecting project developers with investors and buyers. A matchmaking function would reduce transaction costs for developers, investors, and buyers.
- Build coordinated deal flow and investor convenings to bring nontraditional capital to the sector. Curated deal flow would help capital find credible projects rather than broad concepts.
- Develop clear communication materials on market structure, growth pathways, and capital cycles for investors unfamiliar with the sector. This would improve financeability by matching capital tools to the sector's risk, timing, and public-benefit profile.

- Evaluate tools that reduce feedstock supply risk and improve the investment case for facilities dependent on low-value material. This would improve financeability by matching capital tools to the sector's risk, timing, and public-benefit profile.

2.5 PROJECT PIPELINE DEVELOPMENT

Project pipeline ideas responded to the concern that capital may exist but projects are not ready to absorb it. Participants emphasized technical assistance, business planning, investor matchmaking, and pairing innovators with experienced operators. The tension is that early-stage support is labor-intensive and may not produce quick wins, but without it many promising ideas will remain unfinanceable.

- Identify and support 50 investment-ready projects across all market pathways. This would improve financeability by matching capital tools to the sector's risk, timing, and public-benefit profile.
- Provide technical assistance, business planning, chief financial officer (CFO) support, and investor matchmaking through regional programs. Business support would help promising ideas become financeable companies or projects.
- Focus on projects capable of attracting private capital within 24 months of initial support. This would improve financeability by matching capital tools to the sector's risk, timing, and public-benefit profile.
- Pair ideators — scientists, practitioners, technology developers with promising approaches — with experienced operators and commercial partners. Pairing innovators with operators would strengthen execution capacity and investor confidence.
- Launch at least four regional business development and technical assistance programs. Business support would help promising ideas become financeable companies or projects.
- Assess additional regional needs and develop a strategy to expand programs. This would improve financeability by matching capital tools to the sector's risk, timing, and public-benefit profile.

2.6 WOODYARDS AND SUPPLY CHAIN INFRASTRUCTURE

Woodyards and supply-chain infrastructure were repeatedly identified as unglamorous but decisive bottlenecks. Participants discussed cooperative ownership, public-private partnerships, depots, preprocessing, road access, and critical-infrastructure framing. The enabling condition is practical capital and governance for shared assets; the tension is that these investments reduce costs and risk but may not generate obvious standalone returns.

- Identify woodyards as a critical and underappreciated supply chain bottleneck. Woodyards can reduce handling bottlenecks and improve supply reliability for multiple downstream users.
- Explore cooperative, public entity, or community ownership models for woodyards. Woodyards can reduce handling bottlenecks and improve supply reliability for multiple downstream users.
- Explore woodyard cooperative or public-private partnership (PPP) structures serving multiple facilities to reduce per-facility capital burden. Woodyards can reduce handling bottlenecks and improve supply reliability for multiple downstream users.
- Explore reframing mills as community infrastructure to qualify them for public financing. This would improve financeability by matching capital tools to the sector's risk, timing, and public-benefit profile.
- Pursue a 'critical infrastructure' designation for forest products assets, analogous to national security infrastructure. This framing could open public-finance tools for assets needed to manage forests and support rural economies.
- Protect and upgrade road infrastructure critical for hauling low-value material. Road access affects delivered cost and determines whether low-value material can reach markets.
- Develop regional aggregation and preprocessing hubs near high-priority feedstock areas. Aggregation and preprocessing can standardize material and reduce delivered costs for buyers.
- Develop biomass depots to preprocess feedstock to uniform specifications and reduce delivered costs. Aggregation and preprocessing can standardize material and reduce delivered costs for buyers.
- Improve road access specifically for biomass removal in restoration areas. Road access affects delivered cost and determines whether low-value material can reach markets.

3. MARKETS AND MARKET DEVELOPMENT

Market development discussions moved beyond naming promising products to asking how those products would actually find customers, specifications, procurement pathways, and long-term demand. Ideas clustered around retaining existing infrastructure, building regional demand for biomass power and combined heat and power, advancing biofuels, biochar, mass timber, lignin, packaging, and other emerging products, and creating full-value accounting for ecosystem services. The key feasibility question is whether buyers and public policy can create enough demand quickly enough to keep the current supply chain intact.

3.1 INFRASTRUCTURE RETENTION

Infrastructure retention was one of the strongest cross-cutting themes of the convening. Participants emphasized that mills, woodyards, biomass facilities, transportation assets, and primary processors are prerequisites for emerging markets. Enabling conditions include vulnerability assessments, working capital, modernization support, feedstock confidence, and state economic development alignment; tensions include thin margins, market downturns, and the difficulty of rebuilding capacity once it closes.

- Identify the 50–100 most critical mills, woodyards, biomass facilities, transportation assets, and supply-chain bottlenecks at risk of closure. Woodyards can reduce handling bottlenecks and improve supply reliability for multiple downstream users.
- Complete a formal infrastructure vulnerability assessment — Q1 2026 target. A triage approach would identify which assets are most urgent and most strategic to retain.
- Develop region-specific retention and investment strategies for priority assets. This would help convert restoration material into repeatable demand rather than one-off project opportunities.
- Distinguish between facilities needing immediate financial intervention (working capital, bridge financing) and those needing market transition support. Blended capital can absorb risks that conventional lenders are unlikely to take alone.
- Target at least five projects invested through the infrastructure initiative; document and publish learnings. This would help convert restoration material into repeatable demand rather than one-off project opportunities.
- Maintain and expand primary processing capacity (sawmills, pulp mills) to preserve residual markets and anchor employment. Primary processors anchor residual markets, employment, and the ability to use lower-value material.
- Support modernization investments across the supply chain — automation, efficiency upgrades, equipment. Modernization can reduce costs and improve competitiveness without waiting for new markets to mature.
- Strengthen export diversification to reduce exposure to single-market volatility. Diversification would reduce dependence on a single buyer, geography, or policy-driven market.
- Incorporate long-term infrastructure support strategies into state economic development plans. This would help convert restoration material into repeatable demand rather than one-off project opportunities.
- Explore mechanisms to increase confidence in long-term feedstock availability, including contract structures or risk-sharing tools. This would help convert restoration material into repeatable demand rather than one-off project opportunities.

3.2 BIOMASS POWER AND COMBINED HEAT AND POWER

Biomass power and combined heat and power were discussed as more feasible when linked to thermal loads, resilience, restoration cost reduction, and community benefit rather than standalone electricity sales. Participants emphasized smaller distributed systems, data centers, military bases, microgrids, and long-term offtake. The tension is that project economics depend on policy, heat customers, feedstock logistics, and social license around combustion.

- Prioritize small-scale (<3 MW) combined heat and power (CHP) co-located with thermal hosts: greenhouses, hospitals, sawmills. Combined heat and power improves economics by selling useful heat as well as electricity.

- Develop distributed energy systems that improve community resilience rather than utility-scale standalone power. Benefit accounting can help stack revenue and justify investment beyond product sales alone.
- Build data center co-location pilot projects: biomass power co-located with data centers on tribal or community lands, structured around community benefit agreements and microgrids. This would connect fast-growing power demand with forest-health, rural-development, and resilience objectives.
- Document, case-study, and disseminate the Salt River Project model as the most replicable existing proof of connecting restoration, utility needs, and public benefits. The model offers a concrete example of connecting restoration material, utility needs, and public benefits.
- Pursue military bases as partners for on-site biomass power as cyber-resilient backup generation, framed as a national security asset. Defense facilities can value resilience and backup power in ways ordinary power markets may not.
- Integrate urban wood waste and mill residues into biomass supply systems. Integrating urban wood can diversify supply and connect waste systems with forest markets.
- Develop long-term offtake structures insulated from short-term energy price swings. This would help convert restoration material into repeatable demand rather than one-off project opportunities.
- Build regional biomass market dashboards. Data systems can reduce uncertainty about supply, logistics, and market opportunities.
- Coordinate forestry, waste, and energy agencies to leverage overlapping expertise and resources. This would help convert restoration material into repeatable demand rather than one-off project opportunities.
- Maximize thermal efficiency and dual revenue streams in combined heat and power (CHP) systems. Combined heat and power improves economics by selling useful heat as well as electricity.
- Prioritize projects that reduce the cost burden of residual disposal in forest restoration. This would help convert restoration material into repeatable demand rather than one-off project opportunities.

3.3 BIOFUELS AND BIOCHEMICALS

Biofuels and biochemicals were viewed as promising but capital-intensive pathways that require clear policy, supply chains, and offtake before construction. Participants emphasized sustainable aviation fuel, renewable diesel, biointermediates, lignin, and carbon removal. The main tension is timing: facilities need certainty before investment, while policy, supply aggregation, and technology readiness are still evolving.

- Advance Sustainable Aviation Fuel production from forest feedstocks — prioritize Minnesota/Midwest where lignin extraction is a near-term opportunity. This would help convert restoration material into repeatable demand rather than one-off project opportunities.
- Model and deploy Biomass Carbon Removal and Storage (Biomass Carbon Removal and Storage (BiCRS)) pathways. Carbon removal pathways could add a climate-driven revenue stream if accounting and storage are verified.
- Secure long-term offtake agreements before facility construction — not after. Offtake support would give producers and lenders confidence that demand exists before large capital is committed.
- Emphasize near-term renewable diesel and co-processing pathways as near-term bridges while longer-term sustainable aviation fuel (SAF) pathways mature. Near-term drop-in pathways may build demand while more complex fuel pathways mature.
- Develop drop-in biointermediates compatible with existing refineries to reduce capital requirements. Intermediates can use existing refinery infrastructure and lower the capital burden of new facilities.
- Invest in water-tolerant catalysts for lignocellulosic conversion. Catalyst improvements could lower conversion costs for wet or variable lignocellulosic feedstocks.
- Advance cost modeling for Biomass Carbon Removal and Storage (BiCRS) deployment scenarios. Carbon removal pathways could add a climate-driven revenue stream if accounting and storage are verified.

- Establish shared data platforms for biofuels modeling, verification, and carbon removal accounting. Carbon removal pathways could add a climate-driven revenue stream if accounting and storage are verified.
- Form regional coalitions to demonstrate supply chain viability for biofuels investment. A coordinated coalition would reduce fragmented messaging and make policy asks easier to understand.

3.4 BIOCHAR AND BIOCARBON

Biochar and biocarbon drew significant interest because they can connect restoration material to carbon, water, soil, industrial decarbonization, and public procurement. Participants emphasized standards, specifications, offtake contracts, PFAS remediation, stormwater, and steelmaking applications. Feasibility depends on buyer-defined specifications, reliable feedstock, and validated performance; tensions include inconsistent standards and uncertain long-term prices.

- Harmonize biochar standards and laboratory methods nationally to enable public procurement. This would convert public purchasing into a demand signal that private investors and manufacturers can underwrite.
- Replicate the Minnesota Department of Transportation (DOT) model in at least three additional states — work with state transportation engineers to develop specifications for roadside biochar applications. Clear specifications and offtake would help move biochar from one-off pilots into repeatable public and private markets.
- Focus biochar research investment on the 5–10 most commercially viable applications: per- and polyfluoroalkyl substances (PFAS) remediation, soil health, stormwater management, built-environment uses. Clear specifications and offtake would help move biochar from one-off pilots into repeatable public and private markets.
- Pursue 10-year public offtake contracts for biochar produced from wildfire thinning material. Clear specifications and offtake would help move biochar from one-off pilots into repeatable public and private markets.
- Develop advanced biocarbon products: graphene and graphite for electric vehicle (EV) battery anodes. These higher-value materials could connect forest carbon to industrial decarbonization and battery supply chains.
- Develop biocarbon as feedstock for electric arc furnaces in steelmaking and other industrial decarbonization applications. Industrial biocarbon could substitute for fossil carbon in hard-to-decarbonize manufacturing.
- Launch large-scale biochar demonstration projects in defined priority applications; monitor effectiveness in driving additional demand. Clear specifications and offtake would help move biochar from one-off pilots into repeatable public and private markets.
- Incentivize secure raw material supply agreements from wildfire thinning for biochar production. Clear specifications and offtake would help move biochar from one-off pilots into repeatable public and private markets.
- Coordinate biochar producers and end-use industries around product specifications. Clear specifications and offtake would help move biochar from one-off pilots into repeatable public and private markets.
- Develop biochar for per- and polyfluoroalkyl substances (PFAS) remediation as a near-term premium market. Clear specifications and offtake would help move biochar from one-off pilots into repeatable public and private markets.

3.5 MASS TIMBER AND ENGINEERED WOOD PRODUCTS

Mass timber and engineered wood products were discussed as visible, demand-building pathways that can link construction, housing, carbon, and local manufacturing. Participants emphasized species certification, demonstration buildings, affordable housing, schools, and data centers. The main tension is that mass timber alone will not use all low-value material and requires standards, code acceptance, and residual outlets.

- Develop structural standards for hardwood species not currently code-accepted: white pine spruce-pine-fir (SPF), hardwood cross-laminated timber (CLT) components, red cedar, and regional Midwest and Appalachian hardwoods. Species-specific testing is needed so local material can enter structural and higher-value markets.
- Build hardwood mass timber demonstration buildings in the Midwest to prove viability to architects and developers. This would support product acceptance while linking forest markets to construction, housing, and embodied-carbon goals.

- Extend cross-laminated timber (CLT) specification work to regional hardwood species in the Northeast. Species-specific testing is needed so local material can enter structural and higher-value markets.
- Pursue mass timber for affordable housing, schools, and institutional construction. This would support product acceptance while linking forest markets to construction, housing, and embodied-carbon goals.
- Develop mass timber for data center construction as a near-term demand signal, pairing it with biomass energy at the same facility. This would support product acceptance while linking forest markets to construction, housing, and embodied-carbon goals.
- Extend the mass timber institutional support model — research, code work, demonstration buildings, procurement — to other emerging building products. This would convert public purchasing into a demand signal that private investors and manufacturers can underwrite.
- Develop wood wool wall systems as a complementary building product. This would help convert restoration material into repeatable demand rather than one-off project opportunities.
- Develop wood fiber insulation products and pathways to code acceptance. Insulation links low-value fiber to housing, energy efficiency, and local manufacturing.
- Develop modular housing components using small-diameter structural material. Modular components can connect forest markets with housing affordability and workforce housing needs.
- Build a mass timber market presence in the South — currently only one manufacturer in the entire Southeast despite large hardwood supply. This would support product acceptance while linking forest markets to construction, housing, and embodied-carbon goals.
- Certify local species for structural applications across all regions. Species-specific testing is needed so local material can enter structural and higher-value markets.

3.6 LIGNIN

Lignin was identified as a market-coordination problem as much as a technology opportunity. Participants noted that producers may lack offtake while manufacturers report interest in supply. Enabling conditions include cross-sector matchmaking, Renewable Fuel Standard eligibility, extraction and processing R&D, and application demonstrations; tensions include inconsistent supply, uncertain economics, and lack of buyer-producer coordination.

- Resolve the market coordination failure between lignin producers and manufacturers — multiple producers have ceased operations while manufacturers report they would take all available supply. This would help convert restoration material into repeatable demand rather than one-off project opportunities.
- Develop lignin as an asphalt additive to extend pavement life — this use is already deployed commercially in Canada. Asphalt applications could provide a large infrastructure market if performance and supply are consistent.
- Develop lignin as a replacement for petroleum-based adhesives in cross-laminated timber (CLT) and other engineered wood products. Bio-based adhesives and resins could reduce petroleum inputs in engineered wood and packaging.
- Develop lignin as a feedstock for fine chemicals and sustainable aviation fuel. This would help convert restoration material into repeatable demand rather than one-off project opportunities.
- Make lignin eligible under the Renewable Fuel Standard. Eligibility could turn a pulp-sector byproduct into a higher-value fuel or chemical feedstock.
- Invest in further research and development (R&D) on lignin extraction, processing, and product development. This would help convert restoration material into repeatable demand rather than one-off project opportunities.
- Facilitate cross-sector exchanges between forest products producers and chemical manufacturers around lignin bioprocessing. Facilitated exchange can match forest-derived molecules with manufacturers that know end markets.

3.7 MOLDED FIBER PACKAGING AND WOOD-BASED MATERIAL SUBSTITUTION

Wood-based packaging and material substitution were discussed as ways to replace plastics and petroleum-based inputs with forest-derived materials. Participants saw procurement, plastic bans, and public concern about microplastics as potential demand drivers. The tension is that plastic remains cheap and incumbent supply chains are mature, so policy and anchor buyers may be necessary to create early scale.

- Develop wood-based molded fiber packaging as a direct substitute for plastic packaging. Packaging offers a visible substitution market where procurement and plastic-reduction policies can drive demand.
- Pursue bio-based packaging facilities in the Northeast as a near-term regional opportunity. Packaging offers a visible substitution market where procurement and plastic-reduction policies can drive demand.
- Use public procurement and plastic bans as demand anchors for molded fiber packaging. This would convert public purchasing into a demand signal that private investors and manufacturers can underwrite.
- Develop wood-based resins and bio-based adhesives to replace petroleum-based products. Bio-based adhesives and resins could reduce petroleum inputs in engineered wood and packaging.

3.8 OTHER EMERGING PRODUCTS AND MATERIALS

This heading captures the breadth of product innovation discussed across the convening. Participants raised nanocellulose, carbon fiber, battery materials, biochar-concrete blends, thermally modified wood, woodstoves, infrastructure products, and specialty lumber. The opportunity is diversification; the tension is that spreading effort too broadly can dilute capital, research, and buyer engagement.

- Develop nanocellulose and cellulose nanofibers for high-performance materials, coatings, and packaging. Packaging offers a visible substitution market where procurement and plastic-reduction policies can drive demand.
- Develop wood-based carbon fiber and resins for composites, automotive, and aerospace applications. Bio-based adhesives and resins could reduce petroleum inputs in engineered wood and packaging.
- Develop wood-derived battery materials: bio-graphite and carbon anodes for electric vehicle (EV) batteries. These higher-value materials could connect forest carbon to industrial decarbonization and battery supply chains.
- Develop carbon-sequestering concrete additives using biochar-cement blends. Clear specifications and offtake would help move biochar from one-off pilots into repeatable public and private markets.
- Develop acetylated and thermally modified wood for durable exterior applications: decking, cladding, joinery. Durable wood treatments can create higher-value markets for species that might otherwise be underused.
- Explore woodstove markets aligned with growing public interest in energy independence (Pacific Northwest (PNW)). This would help convert restoration material into repeatable demand rather than one-off project opportunities.
- Develop infrastructure applications: utility poles, railway ties, treated structural wood — stable demand driven by long-term investment cycles. Infrastructure uses provide steady demand because replacement cycles are long and predictable.
- Develop appearance products and specialty lumber from underutilized Appalachian hardwood species. Species-specific testing is needed so local material can enter structural and higher-value markets.

3.9 ECOSYSTEM SERVICES AND FULL-VALUE ACCOUNTING

Full-value accounting was discussed as a way to make public benefits financially usable. Participants wanted revenue stacks that combine product sales with carbon, water, habitat, resilience, energy, and avoided-cost benefits. Enabling conditions include credible measurement, verification, beneficiary participation, and pilot landscapes; tensions include methodological complexity and investor skepticism if benefits are not bankable.

- Develop a Forest Resilience Investment Framework across 3–5 pilot landscapes — include at least one investor-owned utility, one water utility, and one corporate entity. Stage-appropriate finance would prevent projects from being pushed into debt or equity before they are ready.

- Launch full-value demonstration projects that stack revenue from products, carbon, water, habitat, resilience, and energy simultaneously. Stage-appropriate finance would prevent projects from being pushed into debt or equity before they are ready.
- Develop and publish monitoring and case studies showing how benefit accounting converts public benefits into investable revenue streams. Place-based examples can make abstract benefits tangible for communities, agencies, and investors.
- Quantify avoided fire suppression cost, water yield protection, insurance premium reduction, and community resilience value per bone-dry ton or per acre treated. Benefit accounting can help stack revenue and justify investment beyond product sales alone.
- Advance carbon, water, biodiversity, and resilience markets that can anchor long-term project finance. Benefit accounting can help stack revenue and justify investment beyond product sales alone.
- Develop verification systems for ecosystem service revenue to support investor confidence. Benefit accounting can help stack revenue and justify investment beyond product sales alone.
- Engage U.S. Forest Service (USFS), Natural Resources Conservation Service (NRCS), and state agencies on conservation program alignment with private ecosystem-service market development. This would help convert restoration material into repeatable demand rather than one-off project opportunities.

4. RESEARCH, INNOVATION, AND COMMERCIALIZATION

Research and innovation ideas emphasized commercialization rather than research for its own sake. Participants called for a stronger bridge among universities, national laboratories, industry, investors, specifiers, and end users. Enabling conditions include applied research, techno-economic analysis, adoption-readiness work, standards, demonstration projects, and shared data systems; the primary tension is that technical proof does not automatically translate into buyer acceptance, code approval, financeability, or scale.

4.1 COMMERCIALIZATION INFRASTRUCTURE

Commercialization infrastructure ideas focused on the missing connective tissue between research and markets. Participants called for clearinghouses, accelerators, advisory committees, fast-track pipelines, and operator partnerships. The main enabling condition is a trusted backbone institution; the tension is avoiding another information hub that does not directly help companies reach buyers and capital.

- Establish a national clearinghouse connecting researchers, companies, investors, and end users. A shared platform could connect fragmented research, capital, and market opportunities.
- Create a forest products commercialization network with a biennial industry investment priorities report. A shared platform could connect fragmented research, capital, and market opportunities.
- Launch a forest business accelerator in every region with regional advisory committees. A shared platform could connect fragmented research, capital, and market opportunities.
- Establish a mission-driven entity to accelerate intellectual property (IP) and seed forest-products businesses, with a transparent scoring framework. This would improve the path from technical idea to market adoption and investment readiness.
- Pair researchers and technology developers with experienced operators and commercial partners — Kodama, BurnBot, Cambium, and Convective cited as investable models. Operational partners can test whether a promising idea can actually be produced, sold, and scaled.
- Create a fast-track pipeline from research to commercial launch, with loan instruments for novel products that are ready to deploy but lack commercial infrastructure. This would improve the path from technical idea to market adoption and investment readiness.
- Create interagency 'problem-buster' teams to streamline innovation deployment. A cross-agency team could resolve permitting, funding, and deployment barriers that no single agency owns.

4.2 APPLIED RESEARCH PRIORITIES

Applied research priorities emphasized practical market readiness: techno-economic analysis, adoption readiness, industry participation, standards, species performance, logistics, and conversion technologies. Participants wanted research questions shaped by industry and investor needs. The tension is that academic incentives may not align with deployment timelines or commercial constraints.

- Prioritize techno-economic analysis, market analysis, adoption-readiness assessment, and commercialization planning — not just technical proof-of-concept. These analyses translate technical promise into business, buyer, and finance requirements.
- Require industry participation in funded research projects as a condition of support. Industry participation increases the odds that research addresses real market and operational needs.
- Fund applied research in advanced wood materials, bio-based additives, and carbon-storing products. Benefit accounting can help stack revenue and justify investment beyond product sales alone.
- Expand fire-safety and structural research for mass timber with new species. This would support product acceptance while linking forest markets to construction, housing, and embodied-carbon goals.
- Fund nanocellulose and advanced material commercialization. Advanced cellulose materials may offer high-value outlets, but require commercialization support and buyer development.
- Investigate small-scale data centers compatible with biomass supply and community scale. This would connect fast-growing power demand with forest-health, rural-development, and resilience objectives.
- Evaluate species-specific performance for emerging product pathways across regions. Species-specific testing is needed so local material can enter structural and higher-value markets.
- Invest in preprocessing systems to reduce transportation costs and improve feedstock reliability. Aggregation and preprocessing can standardize material and reduce delivered costs for buyers.
- Develop improved grading standards for underutilized species. Species-specific testing is needed so local material can enter structural and higher-value markets.
- Expand optical scanning and automated grading technologies. This would improve the path from technical idea to market adoption and investment readiness.
- Invest in water-tolerant catalysts for biofuel conversion processes. Catalyst improvements could lower conversion costs for wet or variable lignocellulosic feedstocks.
- Advance cost modeling for Biomass Carbon Removal and Storage (BiCRS) deployment scenarios. Carbon removal pathways could add a climate-driven revenue stream if accounting and storage are verified.

4.3 STANDARDS, CODES, AND PRODUCT ACCEPTANCE

Standards and codes were discussed as decisive adoption barriers. Participants emphasized buyer-driven biochar specifications, structural testing, code official education, mass timber fire safety, and Environmental Product Declarations. Feasibility depends on credible testing and specifier engagement; the tension is that standards development is slow but markets cannot scale without it.

- Develop engineering specifications for roadside biochar through state Department of Transportation (DOT) partnerships — buyer-driven model, not producer-driven. Clear specifications and offtake would help move biochar from one-off pilots into repeatable public and private markets.
- Support testing, certification, and code adoption for hardwood cross-laminated timber (CLT), white pine spruce-pine-fir (SPF), and red cedar structural applications. Species-specific testing is needed so local material can enter structural and higher-value markets.
- Educate code officials and product specifiers on wood-based building products — adoption readiness, not just technical readiness. Specifier education is essential because product acceptance often depends on confidence, not only technical data.

- Harmonize biochar standards and laboratory methods nationally. Clear specifications and offtake would help move biochar from one-off pilots into repeatable public and private markets.
- Develop mass timber fire-safety and structural standards for new species and configurations. This would support product acceptance while linking forest markets to construction, housing, and embodied-carbon goals.
- Evaluate species-specific performance for emerging product pathways. Species-specific testing is needed so local material can enter structural and higher-value markets.
- Use Environmental Product Declarations and similar tools to support wood-based materials in procurement. This would convert public purchasing into a demand signal that private investors and manufacturers can underwrite.

4.4 DEMONSTRATION PROJECTS

Demonstration projects were viewed as both technical proof and narrative tools. Participants wanted visible pilots for mass timber, biochar, packaging, CHP, carbon removal, lignin, and stacked-revenue models. The enabling condition is choosing demonstrations that answer real buyer and investor questions; the tension is that demonstrations can become isolated one-offs unless linked to procurement and replication.

- Hardwood mass timber demonstration buildings in the Midwest. This would support product acceptance while linking forest markets to construction, housing, and embodied-carbon goals.
- Biochar roadside installations — replicate the Minnesota Department of Transportation (DOT) model in multiple states. Clear specifications and offtake would help move biochar from one-off pilots into repeatable public and private markets.
- New wood-based building products demonstrations in the Pacific Northwest and Southwest. Stage-appropriate finance would prevent projects from being pushed into debt or equity before they are ready.
- Bio-based packaging facilities in the Northeast. Packaging offers a visible substitution market where procurement and plastic-reduction policies can drive demand.
- Biomass combined heat and power (CHP) co-located with data centers. Combined heat and power improves economics by selling useful heat as well as electricity.
- Biomass Carbon Removal and Storage (BiCRS) pathway demonstrations in each region. Stage-appropriate finance would prevent projects from being pushed into debt or equity before they are ready.
- Biochar for per- and polyfluoroalkyl substances (PFAS) remediation pilot projects. Clear specifications and offtake would help move biochar from one-off pilots into repeatable public and private markets.
- Lignin extraction and utilization demonstrations. Stage-appropriate finance would prevent projects from being pushed into debt or equity before they are ready.
- Full-value stacked-revenue demonstration projects combining products, carbon, water, and resilience. Stage-appropriate finance would prevent projects from being pushed into debt or equity before they are ready.

4.5 DATA AND INFORMATION SYSTEMS

Data systems were seen as a foundation for market development, investment, and policy. Participants wanted tools that track feedstock, infrastructure, transportation constraints, biofuels modeling, fiber flows, and underwriting information. The tension is balancing transparency with proprietary concerns and ensuring the data are current enough to support decisions.

- Build shared data tools tracking feedstock availability, infrastructure, and transportation constraints by region. Data systems can reduce uncertainty about supply, logistics, and market opportunities.
- Develop regional biomass market dashboards. Data systems can reduce uncertainty about supply, logistics, and market opportunities.
- Establish shared data platforms for biofuels modeling, verification, and carbon accounting. Benefit accounting can help stack revenue and justify investment beyond product sales alone.

- Build market development tools that connect producers with end users. This would improve the path from technical idea to market adoption and investment readiness.
- Develop integrated fiber platforms that track material from timber supply through processing to end products. Data systems can reduce uncertainty about supply, logistics, and market opportunities.
- Build the investment data infrastructure that lenders and investors need for underwriting — not just industry reporting metrics. This would improve the path from technical idea to market adoption and investment readiness.

5. COALITION, NARRATIVE, AND COORDINATION

Coalition and narrative ideas reflected the need for the forest sector to act with more coordination and clearer public messaging. Participants saw fragmentation across industry, agencies, NGOs, communities, and investors as a barrier to policy success and market formation. The conversation emphasized a shared voice, credible messengers, regional storytelling, and active management framed around wildfire, water, jobs, climate-smart products, and community resilience; the tension is that different constituencies may support different parts of the agenda and may disagree on biomass, fiber competition, exports, or sustainability claims.

5.1 COALITION BUILDING

Coalition-building ideas reflected a need for a sustained, coordinated voice for forest markets. Participants compared the desired structure to Farm Bureau-style commodity advocacy while recognizing the need to manage internal tensions around fiber access, exports, pellets, and NGO participation. Feasibility depends on common language, clear roles, and a trusted lead organization.

- Establish a coordinated coalition with common language, clear roles for lobbying and non-lobbying organizations, and a single lead speaker to legislators and agency heads. A coordinated coalition would reduce fragmented messaging and make policy asks easier to understand.
- Model coalition structure on the Farm Bureau: a singular, sustained advocacy voice for the forest sector comparable to commodity agriculture — covering trade policies, tax credits, domestic production support, and global competitiveness. A targeted credit would improve project economics during the early market-building period.
- Conduct CEO-to-CEO conversations with U.S. Forest Service (USFS), U.S. Department of Agriculture (USDA), and congressional committee leadership alongside formal advocacy. This would strengthen alignment among stakeholders and make the market-development case easier to communicate.
- Treat wood as a national strategic commodity with a policy architecture comparable to agriculture. This would give forestry a more durable policy architecture comparable to agriculture.
- Manage American Forest & Paper Association (AF&PA) concerns about fiber access competition explicitly within coalition structure — distinguish between expanding markets for stranded material versus redirecting fiber with existing productive uses. A coordinated coalition would reduce fragmented messaging and make policy asks easier to understand.
- Manage export vs. domestic pellet tension within the coalition without fracturing it. A coordinated coalition would reduce fragmented messaging and make policy asks easier to understand.
- Coordinate messaging around forest products as climate-smart infrastructure. Clear messaging can build social license and political support for active forest management and markets.
- Build and align coalition messaging across industry, nongovernmental organizations (NGOs), states, communities, and investors. A coordinated coalition would reduce fragmented messaging and make policy asks easier to understand.

5.2 PUBLIC NARRATIVE AND COMMUNICATIONS

Public narrative ideas emphasized that markets cannot scale without social license. Participants wanted biomass framed around wildfire mitigation and forest health, not only energy, with location-specific case studies and community toolkits. The enabling condition is credible messengers; the tension is that communications can be dismissed if they appear to be industry promotion rather than public-benefit explanation.

- Invest in public narrative and communications as urgently as technical market development — especially in the Pacific Northwest (PNW) and Northeast where public opposition constrains social license to operate. Clear messaging can build social license and political support for active forest management and markets.
- Frame biomass as wildfire mitigation and forest health infrastructure, not primarily as energy. Using these funds could connect emergency spending to long-term capacity and avoided future costs.
- Frame the core political message as 'protect from wildfire and protect jobs' — wildfire as the entry point in the West, infrastructure and jobs as anchor in the East. This framing connects public safety with rural economic resilience in a politically accessible way.
- Develop location-specific case studies quantifying full public benefits per bone-dry ton or per acre treated — not just electricity revenue. Place-based examples can make abstract benefits tangible for communities, agencies, and investors.
- Develop a toolkit for communities and project developers to communicate the stacked benefits of biomass-powered data centers. This would connect fast-growing power demand with forest-health, rural-development, and resilience objectives.
- Build regional branding and storytelling strategies. Clear messaging can build social license and political support for active forest management and markets.
- Use visible demonstration projects that serve both technical proof and public narrative functions. Stage-appropriate finance would prevent projects from being pushed into debt or equity before they are ready.
- Educate regulators and communities on sustainability safeguards and forest health benefits. This would strengthen alignment among stakeholders and make the market-development case easier to communicate.
- Engage state governors' offices for political leadership explicitly championing wood in climate and energy agendas — Maine cited as a partial existing model. Governor-level leadership can align agencies and elevate wood markets as an economic development priority.

5.3 SECTOR COORDINATION

Sector coordination ideas focused on matching needs and capacity across regions, agencies, universities, investors, and industries. Participants called for recruitment teams, economic development alignment, facilitated exchanges, Statewide Wood Energy Teams, and interagency task forces. The tension is that coordination requires time and leadership, but without it promising ideas remain isolated.

- Form regional market recruitment teams. Workforce investment is necessary because capacity will not rebuild from market signals alone.
- Align economic development agencies with forestry departments at state and federal levels. Economic development agencies can bring business recruitment, incentives, and workforce tools to forestry problems.
- Coordinate Midwest chemical manufacturers and forest products producers around lignin bioprocessing — the facilitated exchange model. Facilitated exchange can match forest-derived molecules with manufacturers that know end markets.
- Extend research and development (R&D) infrastructure, university partnerships, and commercialization support to emerging forest products markets that lack the institutional backing mass timber has benefited from. This would support product acceptance while linking forest markets to construction, housing, and embodied-carbon goals.
- Convene mass timber ecosystems across designers, manufacturers, and investors. This would support product acceptance while linking forest markets to construction, housing, and embodied-carbon goals.
- Coordinate biochar producers and end-use industries around product specifications and procurement. This would convert public purchasing into a demand signal that private investors and manufacturers can underwrite.

- Re-establish Statewide Wood Energy Teams (SWET). These teams could provide a practical forum for matching energy users, forest managers, and project developers.
- Form regional coalitions to demonstrate supply chain viability for biofuels investment. A coordinated coalition would reduce fragmented messaging and make policy asks easier to understand.
- Coordinate universities, national labs, and industry around specific research priorities driven by industry and investor needs — not academic agendas. Research institutions can provide technical depth when priorities are driven by industry and market needs.
- Create interagency task forces to simplify permitting for emerging products. Simpler permitting could reduce the time and uncertainty that discourage modernization and first-of-kind projects.

6. WORKFORCE AND SUPPLY CHAIN

Workforce and supply-chain ideas focused on the practical capacity needed to move material from the woods to markets. Participants emphasized that labor, trucking, logging businesses, succession planning, depots, preprocessing, roads, and small-landowner access are not secondary issues; they determine whether any market pathway can operate. Enabling conditions include training, business assistance, aggregation hubs, preprocessing infrastructure, road access, and better data, while tensions include aging operators, high equipment costs, low margins, and the risk that capacity disappears before demand develops.

- Expand workforce recruitment targeting younger generations for logging, trucking, and manufacturing roles. Workforce investment is necessary because capacity will not rebuild from market signals alone.
- Invest in training and business succession planning for small logging and trucking businesses. Workforce investment is necessary because capacity will not rebuild from market signals alone.
- Develop training programs for digital fabrication, programming, robotics, and advanced manufacturing roles in forest products. Workforce investment is necessary because capacity will not rebuild from market signals alone.
- Train operators in advanced combustion and combined heat and power (CHP) technologies. Combined heat and power improves economics by selling useful heat as well as electricity.
- Train specialized operators for advanced biorefinery systems. Operational partners can test whether a promising idea can actually be produced, sold, and scaled.
- Train next-generation entrepreneurs in forest products business development. This would strengthen the practical capacity needed to move material and sustain market activity.
- Address the 40% decline in logging and trucking capacity in the Northeast and similar trends nationally — workforce rebuild requires deliberate investment, not market signals alone. Workforce investment is necessary because capacity will not rebuild from market signals alone.
- Invest in logging contractor business succession planning — once equipment is sold and crews disband, they do not reassemble easily. Succession planning can prevent permanent loss of equipment, knowledge, and contractor capacity.
- Expand residual collection and preprocessing systems. Aggregation and preprocessing can standardize material and reduce delivered costs for buyers.
- Develop biomass depots for feedstock aggregation and preprocessing. Aggregation and preprocessing can standardize material and reduce delivered costs for buyers.
- Improve preprocessing to reduce transportation costs and ensure supply reliability for investors. Aggregation and preprocessing can standardize material and reduce delivered costs for buyers.
- Protect and upgrade road infrastructure critical for hauling. Road access affects delivered cost and determines whether low-value material can reach markets.
- Develop shared data tools tracking feedstock availability, infrastructure, and transportation constraints. Data systems can reduce uncertainty about supply, logistics, and market opportunities.

- Build regional aggregation hubs near high-priority feedstock areas. Aggregation and preprocessing can standardize material and reduce delivered costs for buyers.
- Address minimum tract size barriers that prevent small landowners (typically <50 acres in the South) from accessing logging markets. Better aggregation and outreach can bring small parcels into markets that usually require larger tract sizes.
- Improve outreach to new and post-COVID landowners of small woodlots who lack knowledge of active forest management. Better aggregation and outreach can bring small parcels into markets that usually require larger tract sizes.