



Joint Institute Recommendations to Expand Wood and Biomass Utilization in California

Innovative wood products can support carbon-beneficial, sustainable forest management in California. Their development and deployment can help the state increase the pace and scale of forest management and restoration efforts needed to address the problems of overstocked forests and climate change.

SB 901 (Dodd, 2018) requires California to double forest fuel removal to reduce the risks of catastrophic wildfires. More recently, California entered an agreement with the United States Forest Service (USFS) to reduce forest fuels on 1 million acres per year. While some of that will be accomplished with prescribed fire, much of it will require mechanical thinning that will generate as much as 10 million bone dry tons of forest waste per year. These recommendations are intended to put this material to its highest value use rather than it ending up pile burned or converted.

There are numerous innovative products with sufficient commercial and technical readiness, and potential market share, to justify increased public and private investments in their development. California stands to benefit significantly from support for innovation in the sector through increased local capacity, strengthened regional collaborations, increased carbon storage in long-lived wood products, and more healthy, resilient forests.

The California Forest Carbon Plan provided recommendations about forest management activities that will achieve resilient forests able to withstand and adapt to wildfire, drought, and a changing climate; safeguard the state's water supply; and ensure the state's forests operate as carbon sinks. Central to the carbon benefits of forests are innovative wood and biomass products.

Moving forward, we recommend that California continue the following activities to expand innovative wood and biomass products markets:

- *Facilitate information flow* between state, federal, tribal, and local governments; utilities; and other non-governmental organizations.
- *Provide financial incentives*, leveraging scarce public dollars to attract private capital to support demand for innovative wood and biomass products markets.
- *Identify priority wood products manufacturing centers*, based on the New Markets Tax Credit (NMTC), Opportunity Zones, location, proximity to solid infrastructure (roads, highways, ports, etc.), brownfields incentives, etc.
- *Provide grants to train workforce*.
- *Develop regional strategies*, informed by the best available science and technology, that prioritize achievable solutions.
- *Encourage coordination* among agencies delivering funding or conducting procurement or relevant regulatory activities to enhance overall outcomes of state investments.
- *Identify and harmonize cross-jurisdictional regulatory and permitting requirements* for wood and biomass infrastructure.

- *Leverage agency expertise* in forest management, funding, or regulation.
- *Provide consistent and coordinated messaging* between relevant stakeholders and the public.
- *Measure progress* and monitor outcomes to inform future activities.

The following initial actions are recommended to spur wood and biomass products innovation in California.

1. All Wood and Forest Biomass Products

- 1.1. **Supportive policy:** Demonstrate California’s commitment to expanding wood products markets through state energy, climate, and procurement policies that address supply, distribution, and demand.

- 1.1.1. *Implement a short-term supply incentive at the point of harvest or at the point of delivery to a processing site.*

Problem Statement: It is typically not economically feasible for landowners or Licensed Timber Operators to extract, haul, and load low-value biomass at the same time forest management activities occur. This means landowners cannot require removal of material that has historically been non-commercial because there is a risk of a “no-bid” timber sale. Consequently, biomass is often piled within the project area at the time of timber harvest, increasing fire risk and increasing the price of future removal. Existing programs providing incentives for biomass transportation, like the My Sierra Woods Forest Biomass Transportation Incentive, provide a model or learning opportunities for a statewide program. This incentive is funded using California Climate Investments.

Action: Explore the most effective models that will support costs while enabling markets to set necessary prices. For instance, a variable-price ‘tipping-fee’ (the fee paid to dispose of waste, usually in landfills) could be implemented at the delivery site. This tipping fee could be administered in such a way that it (1) enables the implementing agency to place premium value on priority landscapes, (2) provides insight into market conditions (e.g. a reverse-auction model), and (3) allows the maturing market to assume costs over time. By providing incentive to harvesters to remove biomass, this has the added benefit of improving rural economic security and workforce development.

Action: Implement a statewide program in partnership with conservation groups, Registered Professional Foresters, Licensed Timber Operators, forest market leaders, and state and federal agencies.

Cost: \$40 - 60 million dollars/year

Supporting Agencies: CAL FIRE

- 1.1.2. *Adopt climate policy protocols to help increase climate finance for forest restoration activities.*

Problem Statement: There has been considerable effort given to developing carbon offset protocols that can quantify the emissions benefits of wood products, including reducing wildfire intensity, removing and utilizing excess biomass instead of open burning, and biochar production. For instance, CAL FIRE recently funded the Climate Action Reserve to develop a Biochar Protocol. Integration into California's compliance carbon market, via offset protocols or California's low-carbon fuels standard, can help drive climate finance to forest restoration. Voluntary markets and/or emerging federal climate policies are additional sources of demand for offsets.

Action: The Air Resources Board (ARB) to work with CAL FIRE and relevant Air Districts to identify, develop, and integrate protocols for California's compliance markets.

Action: The California Natural Resources Agency (CNRA) to work with USFS to expand use of climate finance, including state and federal grants and carbon offset programs, to fund restoration activities on federal lands. For instance, matching and expanding the \$1.8 million Innovative Finance for National Forests (IFNF Grant) program of the USDA to ensure it is deployed in California.

Action: CAL FIRE, UC Cooperative Extension, and environmental NGOs (e.g. TNC, CAR) to work with Nonindustrial Private Forest (NIPF) landowners to continue accessing carbon markets. For instance, the California Forest Improvement Program could include cost-sharing for preparation of forest offset projects.

Action: Review emerging protocols to ensure they are sending consistent signals for sustainable forest management.

Cost: \$3 million in one-time grant funding to support protocol development by external organizations

Timeline: Grants awarded in 2021. Draft protocols developed in 2023. Protocols finalized in 2024.

Supporting Agencies: ARB, CAL FIRE, CNRA, UCCE, BOF/Joint Institute for Wood Products Innovation

1.1.3 *Expand and clarify Sales Tax Exemption for wood products manufacturing, equipment, and products under the California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA).*

Problem Statement: California Revenue and Taxation Code section 6010.8 provides an exemption (CAEATFA) from sales and use tax for the purchase of tangible personal property by a "participating party" or by a construction contractor (including subcontractors) for use in the performance of a construction contract for a "participating party" for eligible projects involving (1) Alternative energy sources, (2) Advanced transportation technologies, (3) Advanced manufacturing, and (4) Recycled Feedstock. New bioenergy projects qualify for the sales tax exemption, but it is not clear whether biochar or other wood product infrastructure could qualify. Clarifying or expanding the definition of eligible wood products would be helpful to

secure the sales tax exemption. In addition, the program is always oversubscribed, so the overall funding should be increased.

Action: Determine if biochar (made from forest biomass or other organic waste feedstocks) can qualify for the CAEATFA sales and use tax exemption either under “recycled feedstock” or “advanced manufacturing.”

Action: Determine if certain wood products, such as pre-fabricated wood construction components and systems, qualify as “advanced manufacturing” under CAEATFA or if additional legislation is necessary.

Action: Work with the Legislature to increase the cap on the sales tax exemption, with focus on utilizing forest biomass from restoration and wildfire mitigation projects.

Supporting Agencies: Treasury

1.1.4. *Develop Subordinated Debt Fund to (1) encourage development of businesses which reduce the cost of extracting biomass from the forests and increase the value of biomass that is extracted; (2) encourage private sector innovations to existing business models, infrastructure, and supply chains in the woody biomass markets; and (3) provide subordinated debt financing for the upfront capital expenditure of at least one multi-product wood innovation campus as it's 'anchor project'. Several such campuses will be needed to address California's forest health challenge.*

Problem Statement: Financing is needed to develop economically viable wood fiber and biomass markets. This will require new approaches, including private sector innovation in business models and technologies, which will require investment and entail risk. Today's market does not effectively reflect the private and public benefit of taking that risk. Reliable or sustainable financing mechanisms which effectively encourage private investment in innovation are needed. Tools like loan loss reserves or guarantees will be depleted over time, while a subordinated debt fund would reduce the financial risk of investment for investors and offer the potential for the public sector to recoup investments and continually put that capital to work

Action: Establish a subordinated debt fund focused on business model innovation, technology innovation, and development of integrated campus models for the most efficient use of wood fiber and biomass. Develop criteria for this fund which specifically target the challenges in wood product supply chains for which capital is the primary barrier. Empower the fund administrator to use a range of credit enhancement tools based on specific risk criteria where appropriate.

Supporting Agencies: Treasury, IBank, GoBiz, BOF/Joint Institute for Wood Products Innovation, CAL FIRE, State Revolving Funds, USDA Rural Development programs

1.1.5. *Allocate private activity bonds and other relevant tax-exempt finance structures for large-scale wood utilization infrastructure finance.*

Problem Statement: Private activity bonds (PABs) and nonprofit bonds are tax-exempt bonds issued by, or on behalf of, a local or state government to provide special financing benefits for qualified projects. A wide array of infrastructure projects is included. PABs have proven to be

critical to the construction of first-of-a-kind wood to biofuels facilities. However, in California, PABs are typically used for housing, with 84% reserved for multifamily affordable rental housing in 2020.

Action: Work with California Debt Limit Allocation Committee (CDLAC) to prioritize tax-exempt finance structures for large-scale wood utilization infrastructure projects.

Action: Identify other tax-advantaged finance to support large-scale wood utilization infrastructure projects, including equity investments.

Cost: No direct budgetary impact expected

Supporting Agencies: Treasury, IBank

1.2. **Permitting:** Achieve efficient and effective permitting for wood products facilities.

1.2.1. *Promote brownfield redevelopment for wood product and bioenergy facilities.*

Problem Statement: There are many properties scattered throughout rural California that were once home to industrial activities. Some properties, such as sawmills, may need minimal clean up to be used for that purpose again. The locations are generally still properly zoned for industrial activity and are sometimes good locations to site wood products facilities, but the regulatory framework does not facilitate their reuse in any appreciable time frame. There are complicated regulations that could be streamlined and the local agencies that are meant to guide local businesses on these issues often do not have the capacity to provide adequate support. The redevelopment of these sites can happen without compromising public health.

Action: Department of Toxic Substances Control (DTSC) should consider reviewing and amending regulations to identify any statutes that unnecessarily restrict the conversion of brownfield sites to forest product and/or bioenergy facilities. If legislative needs are identified, DTSC should collaborate with OPR, the Joint Institute for Wood Products Innovation, and Go Biz to develop alternative language.

Action: OPR should gather a small team of regional ombudsmen who could be deployed to improve local government awareness and support local businesses to redevelop these sites. These brownfield development coordinators should be well versed in issues relating to DTSC regulations and other relevant regulations. OPR could also coordinate strategy to compete for federal EPA Brownfield site assessment, clean up, and revolving loan fund grants.

Action: Develop a program managed by OPR to offer 5 grants valued at \$2.5 million each for qualifying development of brownfield sites.

Cost: Estimated at \$13 million, which includes \$500,000 for OPR/external review and \$12.5 million for grants. *Costs for new employee positions at OPR not included.

Supporting Agencies: DTSC, OPR

1.2.2. *Develop a detailed handbook for local governments to serve as lead permitting agencies.*

Problem Statement: The construction of greenfield or brownfield industrial development projects can be difficult, especially for wood products businesses that may need unique permit conditions. In rural communities, which tend to have small municipal or county planning departments, the burden to process these permits can be difficult. This often means that permit applications include the cost of environmental review, including third party consultants to work with the local agencies.

Action: Develop and promote a resource guide for cities and counties (similar to OPR's 2016 solar handbook) who are the lead agencies for the development of wood products businesses to lower costs and permit processing time. Commit to continuous updating.

Cost: Estimated at \$250,000 for the initial guide

Supporting Agencies: OPR, BOF/Joint Institute for Wood Products Innovation, GoBiz, ARB, CEC, CAL FIRE, DGS

1.2.3 *Support permitting of large-scale projects on lands managed by federal agencies, such as the USFS.*

Problem Statement: Project permitting on federal forests is a significant hurdle in removing flammable surface and ladder fuels from overstocked forests. Interviews with business leaders indicate that lack of certainty as to timelines and volumes of biomass and wood fiber removal is an important factor inhibiting private investment in processing infrastructure and wood technologies. Advances in technology and collaborative decision-making forums, have made large-scale planning efforts more efficient, without sacrificing the quality of environmental analysis and protection. Larger projects, once approved, can facilitate development longer-term implementation plans and greater project certainty. Examples include the 28,000-acre French Meadows Partnership and the 275,000-acre North Yuba Forest Partnership Project (in development). Adequate staffing and large scale permitting of hazardous fuels removal (i.e. small diameter surface and ladder fuels) on federally owned forest land also has the potential to enable greater supply certainty, increase competitiveness for biomass and wood fiber harvesting, and increase private investment in end-markets that create demand for forest materials. Such large-scale projects require collaboration and will be successful if clear and effective environmental sidebars accompany the thinning activities.

Action: Support large-scale USFS planning and permitting efforts that focus on the strategic removal of surface and ladder fuels, which in turn support the reintroduction of beneficial controlled fire in overstocked forests that are susceptible to fuel-driven wildfires. Simultaneously, identify gaps in wood products supply chains, including small diameter tree processing capacity in the planning area(s) and coordinate infrastructure (re)development efforts to address those gaps.

Supporting Agencies: Governor's Office, CNRA, BOF

1.3. **Tools:** Research to explore value added wood products.

1.3.1. *Study the total cost of wildfire, connecting wildfire costs to beneficial use of wood products.*

Problem Statement: While it is generally recognized that wildfire is expensive, robust estimates of the total costs of wildfire do not exist. Costs associated with wildfire prevention and impacts are siloed within different agencies; thus, public focus tends to be only on the suppression costs. Understanding the costs of forest restoration and removal of excess biomass compared to the costs of wildfire, including the costs of climate and air pollution emissions and other impacts, has been undertaken at limited scale (e.g. the 2014 Mokelumne Watershed Avoided Cost Analysis), yet a statewide vision has not been developed.

Action: Fund a comprehensive analysis taking into consideration the Catastrophic Event Memorandum Accounts at the CPUC (and other related wildfire accounts), CAL FIRE costs, and ecosystem services losses, including tourism and business impacts of wildfire.

Cost: \$1-3 million

Supporting Agencies: CNRA, CPUC

1.3.2. *Develop information collection and analysis around pile burning and pile decay of biomass.*

Problem Statement: Open pile burning is regulated and permitted by air districts (and CAL FIRE in some parts of the state). There is little consolidated information about the volume of burn permits that are approved statewide, and even less data about how many of them are then realized. Currently the only information collected is 2019 Prescribed Fire Reporting and Monitoring Program, which gathers information only about burns associated with Smoke Management Plans through the Prescribed Fire Incident Reporting System (PFIRS), and funding for that data collection is limited.

Additionally, the carbon emissions from the alternative fate of wood left or burned in large piles in the forest is not well understood.

Action: Determine the volume of burn permits approved over the past 5 years and what statistically relevant amount of those permits should be followed up on to determine the amount of real open pile burning statewide. Determine the carbon emissions from wood decomposition and/or incomplete combustion, particularly when piled in large amounts.

Cost: \$1-2 million for 2, 1 to 2 year studies, focused on burn permits and methane emissions from burn piles

Supporting Agencies: California Air Pollution Control Officers Association (CAPCOA) to manage in consultation with CAL FIRE, Air Pollution Control Districts

1.3.3. *Engage University research and private entities to develop publicly available tools to improve feasibility analysis for proposed projects.*

Problem Statement: Early state feasibility assessments and other information regarding market opportunities to develop innovative wood products are generally not available. Wood sector academic research is currently poorly represented in California; significant resources and expertise are required to make it competitive.

Action: Fund the development of publicly available tools to evaluate the feasibility of proposed projects, including pre-Front-End Engineering Design studies.

Action: Integrate and communicate information to investors and research entities outside of the state, including project feasibility tool development.

Cost: \$2.6 million (\$1M/yr for 2 years, then \$300K/yr in grants)

Supporting Agencies: BOF/Joint Institute for Wood Products Innovation, CAL FIRE, CEC, UCCE

1.4. Convening and Information Sharing: Support development of a collaboration network between wood sector organizations to ensure access to available information.

1.4.1. Develop a public campaign to market the value of wood and woody biomass products at large scale.

Problem Statement: The social and political license to operate remains a significant barrier to forest restoration activities. Wood products have a negative reputation among the public due to forestry policies of the past. If a “California First” or “Wood First” initiative is adopted (action 2.2 below) it will need significant public support to be effective.

Action: Hire an external firm to design and run campaigns and workshops specifically encouraging collective and individual action to support wood product markets. Potentially engage UC and CSU systems in a competition for storytelling, assets, and campaign concepts.

Action: Consider adopting a program to promote production of products from California wood. For instance, the Colorado Forest Products Program educates consumers about the benefits of working with Colorado’s wood products growers, manufacturers, and retailers.

Cost: Minimum \$1 million (firm, ad buys, and media purchases; prize/competition management and capital); Cost could be up to \$10 million

Supporting Agencies: BOF/Joint Institute for Wood Products Innovation, CAL FIRE

1.5. Forest Biomass Supply Chain Development

1.5.1. Develop CAL FRAME: Forest Residuals Aggregation Market Enhancement entities, which will establish institutional arrangements that provide contracting services that improve forest biomass feedstock supply chains. New entities would enter into contracts with landowners (including in some cases NIFPs) and, in turn, enter into contracts with wood products businesses. The entities would manage contract administration through project completion. Additionally, the entity would provide cost-effective consultants who provide

environmental review under NEPA/CEQA and house a wood products business support center supported by the Joint Institute for Wood Products Innovation.

Problem Statement: Wood products businesses are unable to obtain reliable, long-term supplies of woody biomass from forested lands in California due to limited USFS contracting approaches and undeveloped state and other landholder processes. This impedes the removal of biomass from forest restoration projects and is a barrier to wood products business development.

Action: Establish new, regional arrangements by geographical area based on the presence of viable business models, local expertise, existing forest health projects, and forest management plans. The arrangements would be either (1) an expansion of state conservancy or agency, (2) a Joint Powers Authority (JPA), or (3) a Special District. This action recognizes that all 3 mechanisms could be in place in the state working in parallel within distinct regions.

Action: Fund grants for exploration by local groups to determine which operating model is right for their region and outline the specific steps needed to build out the desired entity.

Cost: 10 grants at \$100,000; total cost: \$1 million

Action: Fund regional efforts to establish 5 JPA or Special District entities. Funding to include (but not limited to) initial scoping, development of Forest Health Advisors (outside regional collaboratives and other entities who would support these agencies with workload) or in-house professional forester concept, contracting process development, and long-term financial models to be self-sustaining entities.

Cost: 5 pilot JPA/Special Districts: \$500,000 seed money for phase 1; \$500,000 for phase 2 if entities meet objective milestones for successful implementation; total cost: \$5 million

Action: Fund effort to explore the expansion of state entities to perform CAL FRAME function: within Conservancy Framework, CAL FIRE, or Wildfire Safety Division. Additionally, explore an “all wood” management approach through CNRA, CAL EPA, or OPR. Forest only option: \$500,000; “all wood” management approach: \$1 million; total cost: \$1.5 million

Total cost: \$7 million

Timeframe for implementation: Grants issued in 2021. Grant period 2021-2023. Several unique institutional arrangements in place by 2025.

Supporting agencies: OPR

2. Forest Bioenergy

2.1. **Permitting:** Achieve efficient and effective permitting for bioenergy projects.

2.1.1. *Consider consolidated permitting for forest biomass to energy projects.*

Problem Statement: Bioenergy projects require multiple permits from different agencies, which can operate on different timelines with different requirements. The result has been long delays in permitting. One potential solution is consolidated permitting, which has been developed for dairy digesters in California.

Action: Explore whether the consolidated permitting process authorized by Government Code section 71020 et seq. would be applicable and beneficial to new, distributed scale bioenergy projects.

Supporting Agencies: CalEPA, CNRA, CAPCOA

2.2 Develop Recommendations for State Procurement of Bioenergy

2.2.1. *Recommend options for state procurement of bioenergy (including electricity, heating, combined heat and power, and vehicle fuels) generated from forest waste, mill residues, and wood processing wastes as well as other vegetation removed for wildfire mitigation.*

Problem statement: Public procurement of forest bioenergy can play a valuable role in mobilizing forest restoration, demonstrating new technologies and applications, and providing greater energy security and resilience for forested communities. Procurement goals should ensure that they are based on meaningful, yet achievable, volumes of feedstock from forest restoration and wildfire mitigation. Procurement targets should also prioritize carbon-negative sources of bioenergy (on a lifecycle basis), maximize benefits for air quality, provide local energy supplies, and economic development.

Action: Develop recommendations for a state procurement program that secures an appropriate amount of forest feedstock across potential end uses, including electricity, CHP, and vehicle fuels.

Supporting Agencies: DGS, Joint Institute for Wood Products Innovation, CEC

2.3. Regulatory Revisions

2.3.1. *Ensure microgrid tariffs and diesel alternatives include forest waste-based energy and forested communities.*

Problem Statement: SB 1339 (Stern, 2018) requires the CPUC to adopt a tariff to commercialize microgrids. The first phase of the CPUC's microgrid proceeding focused on short-term solutions and deployment of solar, batteries, and diesel backup generators. Several stakeholders are pushing to limit the second phase of the proceeding to pilot projects in a limited number of communities and some parties are pushing to focus solely on Disadvantaged Communities under CalEnviroScreen, which would exclude most or all forested communities that are most vulnerable to wildfire, Public Safety Power Shutoffs, and other grid disruptions. This risks missing a meaningful opportunity to engage forested communities in developing forest biomass-powered microgrids.

Action: The CPUC should: 1) include forested and other rural communities in the microgrid tariff; 2) provide incentives to encourage microgrids to include bioenergy generated from forest

waste and other vegetation removed to mitigate wildfire; and 3) consider requirements for utilities to upgrade rural substations and other power infrastructure to increase resilience and more easily accommodate additional forest biomass to energy generation.

Action: Consider adopting CAL FIRE-FRAP Priority Landscape Maps to supplement CalEnviroScreen. CAL FIRE-FRAP Landscape maps include both fire risk and disadvantaged communities.

Supporting Agencies: CPUC, CEC, CAL FIRE, BOF/Joint Institute for Wood Products Innovation

2.3.2. Allocate at least 20% of EPIC and Natural Gas PIER funding to new forest biomass projects, including carbon-negative systems.

Problem Statement: When the CPUC created the Electricity Program Investment Charge (EPIC), it required that 20% be allocated to new, small-scale bioenergy projects required by SB 1122 (Rubio, 2012), now known as the BioMAT program. Governor Brown's Emergency Order on Tree Mortality also required the California Energy Commission (CEC) to prioritize EPIC funding for forest BioMAT projects. EPIC funding was instrumental in getting the first round of forest BioMAT projects established. More recently, EPIC funding has not been allocated to forest biomass projects or issues, despite the importance of these projects to reduce open burning, wildfire hazards, benefits to local energy supplies, grid resilience, and economic development in forested communities. Additional funding is needed to demonstrate the next generation of technologies, including biomass gasification combined with fuel cells, biomass energy with carbon capture and storage, biogas for energy storage, and carbon capture and storage (CCS), generation of hydrogen from forest biomass, and assessment of lifecycle carbon benefits of biomass gasification or pyrolysis with biochar production and use. Similarly, the Natural Gas PIER could support gaseous fuels research, such as hydrogen and renewable natural gas.

Action: Allocate 20% of EPIC and Natural Gas PIER funding to new forest biomass to energy projects to demonstrate the feasibility of CCS, gasification to fuel cell applications, gasification to pipeline biogas for offsite generation, and gasification to CHP. Allocate 20% of the Natural Gas PIER for production of gas from biomass (hydrogen, RNG) that replaces fossil natural gas.

Supporting Agencies: CPUC, CEC

2.3.3. Adopt pipeline injection standards for biomethane generated from the non-combustion thermal conversion of forest biomass.

Problem Statement: Health and Safety Code section 25421 requires the CPUC to adopt pipeline biogas standards to protect public safety and pipeline integrity. The CPUC has adopted standards for the biogas from landfills, dairies, and wastewater treatment facilities, but not for pipeline injection of biogas generated from forest waste. This is despite recent legislation (AB 3163) classifying thermal gasification of biomass as a source of biomethane in California.

Action: The CPUC should adopt pipeline injection standards for biomethane generated from the non-combustion, thermal conversion of forest biomass.

Supporting Agencies: CPUC, OEHHA, ARB

2.3.4. Consider adopting incentives or rate basing a portion of the costs to interconnect forest biomass projects to the electricity grid and to common carrier pipelines.

Problem Statement: Interconnection to either the electricity grid or pipeline network can be a significant barrier to new bioenergy development. The CPUC adopted a \$40 million incentive program for interconnection of pipeline biogas, pursuant to Public Utilities Code section 399.24(a), but that funding has been used up by existing (non-forest) projects and were only applicable to pipeline (not electricity) interconnections.

Action: CPUC should renew and expand the incentive program for pipeline biogas interconnection and reserve a portion for forest biomass projects. The CPUC should also consider adopting a similar incentive program to incentivize interconnection for forest BioMAT projects.

Supporting Agencies: CPUC, CAL FIRE, Joint Institute for Wood Products Innovation

2.3.5. Promote low-carbon and carbon-negative transportation fuels (gaseous and liquid) through administration of the Low Carbon Fuels Standard (LCFS).

Problem Statement: ARB has not adopted an LCFS pathway for forest biomass to vehicle fuel, which makes it hard for projects to obtain financing and move forward with biomass conversion to vehicle fuels. Further, the LCFS needs mechanisms to ensure the commercialization of very low-C fuels, including biofuels produced from forest biomass with carbon capture and sequestration.

Action: ARB should consider adopting pathways for forest biomass to biofuel (lifecycle carbon intensity determinations), including pathways for forest biomass to hydrogen, electricity, liquid and gaseous vehicle fuels.

Action: ARB should consider providing durable support for the LCFS credit value of biofuels from forest biomass. To commercialize low-carbon and carbon-negative fuel, including those derived from forest residue feedstocks, we recommend ARB: 1) Embrace the most up-to-date science regarding lifecycle assessment, 2) Create additional, targeted incentives for very low-C fuels through a volumetric technology carve-out or credit multiplier, and 3) ensure that the LCFS stimulates the best-performing fuels across a variety of environmental parameters, such as the co-benefits of forest residue mobilization.

Supporting Agencies: ARB, BOF/Joint Institute for Wood Products Innovation

2.3.6. Offer incentives for heavy duty vehicles that use biofuels generated from California forest waste.

Problem Statement: Both ARB and CEC no longer provide clean vehicle incentives to natural gas trucks that use biogas. This means that there are not sufficient natural gas vehicles to use biomethane generated from forest waste. However, heavy-duty transportation is a “hard to decarbonize” sector, for which very few alternatives exist to replace diesel trucks. Biomass remains one of the few sources that can provide fuels for heavy-duty vehicles, including biogas

and renewable natural gas where there is not yet a commercially available electric or fuel cell option.

Action: ARB and CEC should continue to provide heavy duty vehicle incentives for truck and bus fleets that enter long-term contracts for in-state biogas, hydrogen, or electricity that is generated from forest biomass. Develop a chain-of-custody certification for forest biomass.

Supporting Agencies: ARB, CEC

2.4. **Legislation:** Require a percentage of Renewable Portfolio Standard (RPS) generation to come from non-intermittent, flexible, or carbon-negative renewable resources and increase the requirement for new, small-scale forest BioMAT projects.

2.4.1. *Consider legislation to require a percentage of RPS power to come from non-intermittent, flexible, or carbon-negative renewable resources including new, small-scale forest biomass projects. Preference should be given to power sources that can provide carbon negative emissions on a lifecycle basis.*

Problem Statement: The CPUC and utilities purchase RPS power based on the cost per kilowatt-hour of output, without regard to the costs of backup generation or energy storage, the lifecycle carbon intensity of different renewable power types, which varies by orders of magnitude, or the upstream benefits that biomass energy can provide. This distorts the RPS market so that virtually all new procurement is solar and wind power, even though these sources of power are not necessarily less expensive when including the costs of storage or backup generation and grid integration. To maintain reliability, the utilities must procure more baseload and flexible generation power, which forest biomass to energy can provide.

Action: Legislation should consider requiring the CPUC to make alterations to the RPS to ensure that California's generation portfolio remains diverse, reliable, and capable of meeting statewide carbon-neutrality goals, including a preference for carbon-negative renewables.

Action: Support legislation to increase the requirement for new, small-scale bioenergy projects that use the byproducts of sustainable forestry (BioMAT Category 3) to a total of 500 megawatts over the next 10 years.

Supporting Agencies: ARB, California Council on Science and Technology, CEC

3. Innovative Wood Products

3.1. **Technical assistance:** Develop marketing, financial analysis, analytics, and tools that encourage investment in innovative wood products.

3.1.1. *Assess small-diameter feedstock suitability for wood products sourced from common California conifer species.*

Problem Statement: Small-diameter biomass (non-saw log size) is often left to decay in the forest, in part because few options are available to use small-diameter biomass for structural

wood products. Nevertheless, there are several promising candidates, including oriented strand board (OSB), laminated veneer lumber (LVL), parallel strand lumber (PSL), wood wool cement board, and mass plywood.

Action: Identify scalable structural wood products from small-diameter and non-merchantable biomass. Prioritize promising technologies for future wood infrastructure deployment.

Cost: \$1-2 million in research grants

Supporting Agencies: BOF/Joint Institute for Wood Products Innovation, CAL FIRE, Building Standards Commission

3.2. **Supportive policy:** Signal California's interest in expanding wood products markets through state energy, climate, and procurement policies.

3.2.1. *Implement a biochar practice under CDFA's Healthy Soils Program (HSP).*

Problem Statement: The US Biochar Initiative, in collaboration with UC Davis biochar researchers, developed and formally proposed a biochar practice for the Healthy Soils Program in August 2020. That proposal is currently under review. If accepted, biochar would be an eligible practice for CCI funds allocated to HSP and farmers could apply for grants from CDFA to finance biochar projects on their lands. This practice would essentially provide an incentive payment to growers who sequester carbon on their lands using biochar. This has the potential to reduce acquisition costs of biochar products for end users and incentivize its use in agricultural operations throughout California.

Action: Implement biochar practice proposal.

Supporting Agencies: CDFA

3.2.2 *Adopt state purchasing requirements for mass timber and other innovative wood products for state facilities and operations.*

Problem Statement: Mass timber, with recent code approvals, holds promise to replace more carbon-intensive and polluting materials, such as steel and concrete. The implementation process of new construction material is lengthy and would benefit significantly from public policies that encourage its use, expediting its incorporation into standard construction material uses.

Action: To encourage use of mass timber in public projects: 1) Adopt feedstock-neutral policies that will ensure that wood from California forest restoration projects is considered for public buildings and 2) Promote development of standards that will help evaluate wood use as part of Whole Building LCA studies, for potential incorporation into the Buy Clean California Act.

Action: Consider creating or appointing a temporary approval agency, like the OSHPD hospital and school approval process, for all mass timber buildings in the state. This entity should coordinate and collaborate with local jurisdictions. This will ensure a uniform approval process and reduce developer risk.

Cost: Uncertain initially, lower as the market grows. Mass-timber buildings are often competitive in cost with steel and concrete alternatives. Hybrid construction (mix of materials) is a likely outcome and most likely will reduce building cost, construction time, safety and quality, and environmental impact.

Supporting Agencies: DGS, Building Standards Commission

4. Oversight and Coordination

Problem Statement: A successful long-term wood utilization program that supports sustainable forest restoration requires communication and coordination among all stakeholders and a centralized hub for information sharing,

The BOF/Joint Institute for Wood Products Innovation will:

4.1 Track progress.

- Track progress of Institute recommendations and action plan, providing accountability and central hub of information for work underway.
- Develop regional strategies, informed by the best available science and technology, that prioritize achievable solutions.
- Leverage agency expertise in forest management, funding, and regulation.

4.2. Drive coordination.

- Encourage coordination among agencies delivering funding or conducting procurement or relevant regulatory activities to enhance overall outcomes of state investments.
- Facilitate information flow between state, federal, tribal and local governments, utilities, and other non-governmental organizations, targeting the wood and biomass industries, insurance and re-insurance organizations, entrepreneurs, small businesses and investors.
- Develop a website to support this network.

4.3. Education and Outreach

- Engage stakeholders to take advantage of the legislative, funding, regulatory, and research changes proposed in this plan.
- Identify and harmonize cross-jurisdictional regulatory and permitting requirements for wood and biomass infrastructure.
- Provide consistent and coordinated messaging between stakeholder and the public. Measure progress and monitor outcomes to inform future activities.

Supporting Agencies: BOF/Joint Institute for Wood Products Innovation