



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 millions of tons of forest waste per year. These recommendations are intended to put this material to its highest value use rather than pile burning or leaving it to decompose.

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 help 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.

The California Public Utilities Commission (CPUC) has deemed the following activities as “byproducts of sustainable forest management,” consistent with the term as used in Public Utilities Code Section 399.20 (f)(2)(A)(iii).

- Fire threat reduction
- Fire safe clearance activities
- Infrastructure clearance projects
- Feedstock derived from sustainable forest management activities

To meet California's forest health and carbon neutrality goals, the state should continue to expand innovative wood and biomass products markets through the following activities:

- *Provide financial incentives*, leveraging public dollars to attract private capital to support demand for innovative wood and biomass products markets.
- *Identify priority wood products manufacturing centers in or near forested communities throughout the state*, based on the New Markets Tax Credit (NMTC), Opportunity Zones, locations that reduce hauling costs, proximity to solid infrastructure (roads, highways, ports, etc.), and brownfields incentives.

- *Provide grants to support workforce development.*
- *Develop science and technology-based regional strategies that prioritize achievable solutions.*
- *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.*
- *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 to 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 pilot 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: Estimate \$60 million dollars/year

Timeline: Design begins 2021. Program implemented as soon as possible

Primary Agency: CAL FIRE

1.1.2. *Adopt climate policy tools 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 and forest health and fuel reduction projects, including reducing wildfire intensity, removing and utilizing excess biomass instead of open burning, and biochar production. For instance, CAL FIRE is exploring funding 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) or guidance on GHG compliance for land development projects and other voluntary carbon market mechanics, can help drive climate finance to forest restoration.

Action: The California Air Resources Board (CARB) should work with CAL FIRE and relevant Air Districts to identify, develop, and integrate protocols and procedures for California's compliance markets that account for long-term climate benefits and drive forest restoration and fire prevention.

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

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

Primary Agency: CARB

Supporting Agencies: California Air Pollution Control Officers Association (CAPCOA) CAL FIRE

Action: Work with Nonindustrial Private Forest (NIPF) landowners to create access to voluntary and compliance carbon markets. For instance, the California Forest Improvement Program could include cost sharing for preparation of forest offset projects. The Governor's Office of Planning and Research (OPR) should explore and coordinate this and expand carbon finance for NIPF landowners

Cost: 1 person year (PY)

Timeline: Begin in 2021, ongoing program

Primary Agency: OPR

Supporting Agencies: Joint Institute, CAL FIRE, CARB, Conservancies, CAPCOA

Action: OPR should adopt an amendment to Guidelines Section 15126.4(c)(3) that reflects and clarifies the holding in Golden Door Properties, LLC v. County of San Diego (2020) 50 Cal.App.5th 467 and to ensure that forest health and fuel reduction projects that provide long-term GHG benefits over time are explicitly supported. The amendment (new text is underlined and italicized) should read:

Off-site measures, including offsets, that are not otherwise required to mitigate a project's emissions, *which demonstrate quantifiable benefit, including but not limited to those that may initially be carbon positive, but over time provide carbon reduction benefit. Any offsets used should be consistent with the goals of AB 32, but do not necessarily need to be the same as compliance grade credits under the Cap and Trade program.*

Cost: 1 PY

Timeline: Complete rulemaking by July 1, 2022.

Primary Agency: OPR

Supporting Agencies: CARB, CAPCOA, California State Association of Counties (CSAC)

Action: OPR should adopt a GHG mitigation handbook for lead agencies under CEQA that includes potential methodologies to mitigate CEQA projects with forest health or fire prevention projects, including the development of offsite mitigation credit program guidance for local agencies should they choose to develop such a program.

Cost: \$1 million

Timeline: Begin process in January 2021. Complete process by July 1, 2022.

Primary Agency: OPR

Supporting Agencies: CARB, CAPCOA, CAL FIRE

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 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.

Cost: Funds appropriated annually by Legislature

Timeline: Begin and complete in 2021.

Primary Agency: Treasury

1.1.4. *Develop a dedicated Forest Resilience Fund, a flexible fund to (1) encourage development of businesses which utilize wood and forest biomass; (2) encourage private sector innovations to existing business models, infrastructure, and supply chains in the woody biomass markets; and (3) provide subordinated debt financing to encourage private investors to take on the senior debt position 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. Reliable or sustainable financing mechanisms which effectively encourage private investment in innovation are needed. Further, there is a need for financial technical assistance and investor relations for project proponents. An effective fund will utilize a variety of credit-enhancement and guarantees to maximize the flow of private investment into projects which speed and scale restoration of forest land. 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 the Forest Resilience Fund, a flexible debt fund. In order to ensure this fund is performance-based rather than prescriptive, the fund administrator should be empowered to employ a variety of credit-enhancement tools and guarantees. Develop criteria for this fund which specifically target the challenges in wood product supply chains for which capital is the primary barrier. The success of the fund should be measured on defined performance-based outcomes. Recommended tools, priority outcomes, and investment decisions should be vetted and developed in partnership with private investors and financial analysts with expertise in forest restoration through an appropriate governance structure such as an investment committee. The implementing agency should ensure the fund administrator has the expertise needed to employ a diverse array of creative financial tools and to work in partnership with

existing private finance entities. Partners will include Community Development Financial Institutions (CDFIs), foundations, and impact investment funds. This close alignment of capital will enable investors to adapt to gaps in financing, which will vary from project to project.

Outcomes and recommended tools include:

- (1) Increasing the ability of higher risk projects to access initial financing and funding - projects in this category will include business model innovation, technology innovation, and development of integrated campuses.
- (2) Creating longer-term and lower-risk financing for larger scale infrastructure projects.
- (3) Increasing in the total amount of private investment for the efficient use of wood fiber and biomass.

Cost: \$100 million, plus 1 PY in perpetuity. If structured well, this fund could leverage a far greater amount of private capital (~\$500 million).

Timeline: Begin 2021, with initial funds deployed that year.

Primary Agency: California Infrastructure and Economic Development Bank (iBank)

Supporting Agencies: Treasury, California Governor's Office of Business and Economic Development (GoBiz), BOF/Joint Institute for Wood Products Innovation, CAL FIRE, State Revolving Funds, USDA Rural Development programs, Sierra Nevada Conservancy (SNC)

1.1.5. *Encourage private activity bonds, green 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: Consider prioritizing tax-exempt finance structures for affordable housing that uses mass timber technology.

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

Cost: No direct budgetary impact expected.

Timeline: Design and implement in 2021.

Primary Agency: Treasury

Supporting Agencies: IBank, CA Pollution Control Finance Authority

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 zoned for industrial activity and are good locations to site wood products facilities, but the regulatory framework does not facilitate their reuse quickly. 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: The 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 and CSAC to develop alternative language.

Cost: 1 PY in 2021

Timeline: Completed in 2021.

Primary Agency: DTSC

Supporting Agencies: CSAC, OPR

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 a 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.

Action: Support and fund technical assistance programs that help interested communities undertake and complete brownfield remediation processes along with other early-stage requirements to attract developers and financing for biomass value-added project development.

Cost: Estimated at \$15 million, which includes \$500,000 for OPR/external review, 2 million in technical assistance grants, and \$12.5 million for site development grants. One additional PY.

Timeline: 2022-2026

Primary Agency: OPR

Supporting Agencies: DTSC, GoBiz, CAL FIRE, EPA Region 9 Brownfields Program, SNC, Watershed Research and Training Center, other Regional support entities

1.2.2. *Develop a handbook to assist local governments serving as lead permitting agencies.*

Problem Statement: The development of greenfield, brownfield, or idled industrial development projects can be difficult, especially for wood products businesses that have unique permitting 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) to serve lead agencies in the development of wood products businesses. This would lower costs and permitting time.

Cost: \$500,000 for the initial guide.

Timeline: Begin 2021, complete by mid-year 2022.

Primary Agency: OPR

Supporting Agencies: BOF/Joint Institute for Wood Products Innovation, GoBiz, ARB, CEC, CAL FIRE, Department of General Services (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: Facilitate 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.

Cost: No cost expected.

Timeline: Begin as soon as possible; ongoing

Primary Agency: Governor's Office

Supporting Agencies: CNRA, CAL FIRE, BOF, State Conservancies

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 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. (Note: The California Council on Science and Technology [CCST] is releasing a study on this soon.)

Action: Fund a comprehensive analysis taking into consideration the Catastrophic Event Memorandum Accounts at the CPUC (and other related wildfire accounts), CAL FIRE costs, public health, and ecosystem services losses, including tourism and business impacts of wildfire. Implement a permanent system to track data over time.

Cost: \$2 million

Timeline: Begin January of 2021. Complete by end of 2022.

Primary Agency: California Natural Resources Agency (CNRA)

Supporting Agencies: CPUC, CCST

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 in the 2019 Prescribed Fire Reporting and Monitoring Program, which gathers information 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 actual open pile burning statewide. Determine the greenhouse gas emissions from wood decomposition and/or incomplete combustion, particularly in larger piles.

Cost: \$2 million (Two \$1 million, 1-2 year studies, focused on: 1) burn permits and 2) methane emissions from burn piles.)

Timeline: 2021-2022

Primary Agency: CAPCOA

Supporting Agencies: 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 stage feasibility assessments, such as pre-Front-End Engineering Design Studies, and other information regarding market opportunities to develop innovative wood products are generally not available. California's current academic research capacity to support the wood sector is limited, and this capacity needs to be augmented to support assessment and feasibility studies.

Action: Fund the development of publicly available early stage feasibility assessments, such as pre-Front-End Engineering Design Studies, to evaluate the feasibility of proposed projects.

Action: Integrate, work with, and communicate information to investors and research entities outside of the state, including project feasibility tool development. Work with the investment and business community to identify the most-needed tools for future development.

Cost: \$2.6 million (\$1 million per year for 2 years, then \$300,000 per year in grants)

Timeline: 2021-2025

Primary Agency: BOF/Joint Institute for Wood Products Innovation

Supporting Agencies: CAL FIRE, California Energy Commission (CEC), University of California Cooperative Extension (UCCE), SNC

1.3.4. *Research chain-of-custody certification solutions.*

Problem Statement: As markets grow, chain-of-custody solutions for forest biomass will become increasingly valuable. A secure, scalable, open-source, and low-cost chain-of-custody solution to digitally trace and authenticate forest biomass content based on defined attributes could improve data visibility, transparency, and trust among all stakeholders, lower regulatory compliance costs compared to current practices, extend to multiple uses of woody biomass, and enable a range of policy levers currently not practicable (e.g., rebates, product content standards, eco-labels).

Action: Conduct research on chain of custody authentication and certification tools, methods, software, and practices used in other industries. Identify features and functionality, including those attributes that could address a range of use cases. The report findings should determine whether existing solutions can be adapted or new tools and approaches should be developed.

Cost: Outside consultant \$50,000

Timeline: 6 months

Primary Agency: BOF/Joint Institute for Wood Products Innovation

Supporting Agencies: CAL FIRE, CNRA, BOF

1.4. **Convening and Information Sharing:** Support development of a collaboration network among 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 – and in California, bond measures and major legislation require supermajorities in the Legislature and/or public votes. Both the State Senate and the general electorate need to be informed about the critical value of wood fiber and biomass use – including the potential to store carbon in wood products, to avoid carbon emissions through a reduction in open pile burns, and to restore our forests to historical carbon sequestration capacities. Further, if a “Wood First” initiative is adopted (action 2.2 below) it will need significant support from the general public 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.

Timeline: Spend majority of funds in 2021-2022

Primary Agency: BOF/Joint Institute for Wood Products Innovation

Supporting Agency: 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 regional efforts to establish 5 pilot JPA or Special District entities. Funding to include (but not limited to) initial scoping, development of Forest Health Advisors (outside regional organizations 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.

Action: Fund State 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, the California Environmental Protection Agency (CalEPA), or OPR.

Action: Fund grants for exploration by local groups to determine whether their region could be right for future entity development, and outline the specific steps needed to begin the pilot phase of development for the entity.

Action: Consider implementing 10-year floating term contracts to increase feedstock certainty. At the end of each year, participants have an option to extend the contract for an additional year, for an ongoing 10-year term.

Cost:

- (1) Pilots: 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
- (2) Statewide effort: Forest only option: \$500,000; “all wood” management approach: \$1 million; total cost: \$1.5 million
- (3) Local groups: Four grants at \$250,000; Cost: \$1 million

Total cost: \$7.5 million

Timeline: Grants issued in 2021 for all three action items simultaneously. Grant period 2021-2023. Several unique institutional arrangements in place by 2025.

Primary Agency: BOF/Joint Institute for Wood Products Innovation

Supporting Agencies: OPR, CAL FIRE, State Conservancies

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.

Cost: ½ PY for 1 year

Timeline: 2021-2022

Primary Agency: CNRA

Supporting Agencies: CalEPA, CAPCOA

2.2 Develop Recommendations for State Procurement of Bioenergy

2.2.1. *Explore and recommend options for state procurement of bioenergy (including electricity, heating, combined heat and power, and low-carbon transportation fuels) generated from forest waste, mill residues, and wood processing waste 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: Identify barriers and develop recommendations for a state procurement program that secures an appropriate amount of forest feedstock across potential end uses, including electricity, Combined Heat and Power (CHP), and transportation fuels.

Cost: ½ PY for 1 year; Program cost depends on the recommendations

Timeline: 1 year to develop recommendations

Primary Agency: DGS

Supporting Agencies: BOF/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 want to limit the second phase of the proceeding to pilot projects in a limited number of communities and some parties want 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) Prioritize inclusion of 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.

Cost: No additional staff time. Additional ratepayer costs will depend on specific requirements of microgrid tariff and type/location of projects.

Timeline: 2021

Primary Agency: CPUC

Supporting Agencies: 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: The Electric Program Investment Charge (EPIC) program invests in scientific and technological research to accelerate the transformation of the electricity sector. 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, 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 hydrogen fuel cell applications, gasification to pipeline biogas for offsite generation, and gasification to CHP. Allocate 20% of the Natural Gas PIER funding for conversion of forest biomass to biogas, biomethane, and hydrogen and other renewable fuels to replace fossil fuels, especially in industrial, manufacturing, and other hard-to-electrify end uses.

Cost: No additional staff time, no new state costs, no new ratepayer costs – this would allocate a portion of the \$143 million annual EPIC program, which the CPUC just reauthorized for 10 years.

Timeline: 2021-2030

Primary Agencies: CPUC, CEC

2.3.3. *Adopt pipeline injection standards for biomethane and hydrogen 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 pipeline standards for biogas from landfills, dairies, and wastewater treatment facilities, but not for biogas or hydrogen generated from forest or agricultural waste. California just enacted AB 3163 (Salas, 2020) which expands the definition of biomethane to include the gas from non-combustion thermal conversion of biomass feedstocks. The expanded definition will allow utility procurement of biomethane or hydrogen from biomass conversion. To facilitate that procurement, the CPUC should adopt pipeline standards for biomethane and hydrogen from biomass conversion.

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

Cost: No new costs

Timeline: 1-2 years

Primary Agency: CPUC

Supporting Agencies: California Office of Environmental Health Hazard Assessment (OEHHA), CARB

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 to pay up to 50% of the interconnection costs for pipeline biogas projects, pursuant to Public Utilities Code section 399.24(a), but that funding has been used up by existing (non-forest) projects and was only applicable to pipeline (not electricity) interconnections. Interconnection to the electricity grid is also very expensive, sometimes as much as the cost of the bioenergy facility itself, and is very hard for project developers to accurately predict costs at the beginning of project planning and financing. Developing a similar incentive program to help cover a portion of electricity interconnection costs would help address the single biggest hurdle for new forest BioMAT projects.

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 adopt a similar program to incentivize interconnection for forest BioMAT projects to the electricity grid.

Cost: No net cost to ratepayers since interconnection costs are already passed on to ratepayers through contract prices; could provide small savings for pipeline interconnection since having utilities pay costs upfront avoids federal transfer tax.

Timeline: 1 year

Primary Agencies: CPUC, CEC

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

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

Problem Statement: CARB has not prioritized adoption of design-based LCFS pathways for forest biomass to renewable transportation fuel, including biomethane, hydrogen, and electricity from forest biomass. This 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: CARB should prioritize adopting additional pathways for forest biomass to biofuel (lifecycle carbon intensity determinations), including pathways for forest biomass to hydrogen, electricity, liquid, and gaseous transportation fuels. CARB should consider holding workshops to understand and quantify the emissions benefits of forest biomass to biofuels, based in part on emerging evidence around pile burning and decomposition.

Action: CARB should consider providing durable support for the LCFS credit value of biofuels derived from forest biomass.

Cost: \$50,000 for workshop costs

Timeline: 1-2 years

Primary Agency: CARB

Supporting Agency: CAL FIRE

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, and 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 expand the BioMAT program for new, small-scale bioenergy projects that use the byproducts of sustainable forestry 1) by increasing the total megawatts that must be procured from forest biomass to 250 MW and 2) allowing Community Choice Aggregators, publicly owned utilities, and other Electric Service Providers to participate in BioMAT procurement.

Cost: The marginal cost of new BioMAT projects will depend on whether EPIC funding is used to help defray interconnection costs, whether the feedstock will be subsidized, what the market for biochar will be, whether the CPUC or ARB will incentivize carbon negative power, and whether pricing will be based of flexible generation, baseload power and/or energy storage.

Timeline: Enact legislation in 2021 and require all 250 MW to be procured by 2030.

Primary Agency: CPUC

Supporting Agencies: ARB, CCST, CEC, CAL FIRE

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 million a year in research grants for 5 years

Timeline: 2021-2025

Primary Agency: BOF/Joint Institute for Wood Products Innovation

Supporting Agencies: 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.

Cost: no cost

Timeline: 2021

Primary Agency: CDFA

3.2.2. *Adopt state purchasing requirements for mass timber, cellulosic nanocrystal, biochar, 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. Similar markets are emerging for cellulosic nanofibers and biochar in state facilities and operations.

Action: Encourage the 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 Office of Statewide Health Planning and Development (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.

Action: Pilot installation of pavement, concrete, gutters, and curbs made from cellulosic nanocrystals. Recent pilots of concrete containing cellulosic nanocrystals include the Moffett Creek Bridge located in Siskiyou County.

Action: Pilot and evaluate industrial uses for biochar, such as a substitute for imported granulated activated carbon in water and waste-water treatment.

Cost: ½ PY for one year at each agency

Timeline: Develop recommendations in 2021.

Primary Agencies: DGS, Building Standards Commission, CalRecycle, Caltrans

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 stakeholders and the public. Measure progress and monitor outcomes to inform future activities.

Primary Agency: BOF/Joint Institute for Wood Products Innovation

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