

Workplan Outline: Bioenergy Program
Climate Pollution Reduction Grants – Implementation Grants
Applicant: California Department of Conservation

1. OVERALL PROJECT SUMMARY AND APPROACH

California has been a leader in cleaning the air and the fight against climate change for decades. Most recently, California passed Assembly Bill 1279 (AB 1279) (Muratsuchi, Chapter 337, Statutes of 2022)¹. This bill establishes the State’s science-based policy to achieve carbon neutrality no later than 2045 and reduce anthropogenic greenhouse gas (GHG) emissions 85 percent below 1990 levels by 2045. This transition will require a historic rate of clean technology production, deployment, rapid consumer adoption, and coordination across all levels of government, while ensuring affordability and maximizing myriad co-benefits. California’s 2022 Scoping Plan Update² lays out the sector-by-sector, technologically feasible, and cost-effective path for California to achieve the mandates in AB 1279. The 2022 Scoping Plan Update also highlights how increased climate ambition can address persistent air pollution and opportunity gaps faced by low-income communities and communities of color. To be successful, California must drastically reduce its dependence on fossil fuel energy and remove carbon from the atmosphere.

This proposal would scale and expand two pioneering programs underway in California, turning woody biomass and agricultural wastes into low-carbon fuels such as renewable hydrogen, displacing fossil fuels and resulting in net-negative emissions through carbon capture and geologic sequestration (a process often referred to as bioenergy with carbon capture and storage, or BECCS) and other carbon negative pathways. The proposal would not support combustion of biomass in existing biomass electricity generating plants. At the same time, this proposal would help address a large unmitigated wildfire risk across the vast forests of California, provide alternatives to agricultural burning, reduce pollution in areas of severe non-attainment of federal air quality standards, and bring health, economic, and job benefits to a wide range of low-income and disadvantaged communities. This proposal is highlighted in the State’s Priority Climate Action Plan (PCAP)³ developed under the Climate Pollution Reduction Grants (CPRG) Program and is well aligned with CPRG goals to drastically reduce greenhouse gas emissions and air pollution. It is also strongly aligned with State climate goals to reach carbon neutrality by 2045 set in AB 1279 and the State’s latest Scoping Plan. This proposal was also chosen because the need to safely remove biomass waste from forests and farms was elevated repeatedly through the CPRG PCAP processes by diverse groups across the State.

It is easy to see why this measure was so widely elevated by Californians. Climate change has brought hotter summers and strong dry winds, which have fueled catastrophic megafires. Of the twenty largest wildfires ever recorded in California, nine occurred in 2020 and 2021. The worst wildfire season in California’s recorded history was in 2018, with over 24,226 structures damaged or destroyed and over 100 lives lost. The largest wildfire season ever recorded in State history was in 2020, where more than 4.3 million acres burned, albeit at different intensity and with varying ecological impacts, and over 112 million metric tons of carbon dioxide (CO₂) emitted into the atmosphere. The economic damage of these fires was estimated to be over \$10 billion in property damage and over \$2 billion in fire suppression costs. The Camp Fire, which destroyed much of Paradise, California, was the world’s costliest natural

¹ Available online at: https://leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=202120220AB1279

² CARB. 2022. 2022 Scoping Plan for Achieving Carbon Neutrality. https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp_1.pdf.

³ 2024. The State of California’s Priority Climate Action Plan. Energy Measure 4. https://ww2.arb.ca.gov/sites/default/files/2024-03/California%20CPRG%20Priority%20Climate%20Action%20Plan%202024%20March%201_0.pdf

disaster in 2018, with overall damages of \$16.5 billion. It was also the deadliest fire in California history, with 85 civilian fatalities. A typical California county experiences an average increase of 3.6 days per year with heavy smoke density due to wildfires,⁴ and studies in California show a clear link between wildfire smoke and a rise in hospital admissions for respiratory problems, particularly asthma and chronic obstructive pulmonary disease exacerbations. Fine particles (PM_{2.5}) from wildfire-specific smoke has been shown to be ten times more harmful to children's respiratory health compared to ambient PM_{2.5}.⁵

Wildfires have always been part of California's natural ecology and will continue to be. However, changes to the State's climate and precipitation expand the footprint of wildfire threat, as well as wildfire severity, and intensity. One quarter of California—more than 25 million acres— is now classified as under very high or extreme fire threat.

It is important to add that forest biomass removal is one piece of a multipronged strategy to address forest health and to reach statewide carbon neutrality, as discussed in the State's Forest Carbon Plan⁶, Wildfire and Forest Resilience Action Plan,⁷ and 2022 Scoping Plan Update.⁸ The State's forest health activities must adhere to the State's Forest Practice Rules,⁹ one of the most stringently protective forest management regulations in the nation. The actions of forest management will result in biomass waste, and it is beneficial to remove that waste when it is close to a road (generally within ½ mile) to lessen wildfire risk. The Department of Energy recently released its 2023 billion Ton Report,¹⁰ which provides substantially similar protections and perspectives in its chapter on forest biomass. Further, no California forests are managed for biomass production, and the California Air Resources Board (CARB) Low Carbon Fuel Standard (LCFS) specifically prohibits purpose-grown crops to avoid deforestation and removal of healthy forests.

Additionally, California's natural and working lands are identified as a carbon source for at least the next twenty years. While California has been identifying and implementing policy and investment actions for over a decade to address forest and agricultural carbon sequestration potential, it is inadequate to the task and unsustainable over the long term. We must increase the value of these waste products and incentivize private market development for long-term sustainability of our natural and working lands.

a. Description of GHG Reduction Measures

This proposal would help achieve long-term financial and management stability for forest and agricultural landscapes and achieve community health benefits by demonstrating the value of biomass and agricultural wastes to private sector actors. This proposal would focus on the highest value pathway for organic waste management: bioenergy production.

Operationally, this proposal includes the following three features.

⁴ CDPH, 2022: Wildfire Smoke: Considerations for California's Public Health Officials. https://www.cdph.ca.gov/Programs/EPO/CDPH%20Document%20Library/EOM%20Documents/Wildfire-Smoke-Considerations-CA-PHO_08-2022.pdf

⁵ California Hospital Association. 2020: Respiratory hospitalizations and wildfire smoke: a spatiotemporal analysis of an extreme firestorm in San Diego County, California. October 4. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7941788/>

⁶ Forest Climate Action Team. 2018. California Forest Carbon Plan: Managing Our Forest Landscapes in a Changing Climate. Sacramento, CA. 178p. <https://ww2.arb.ca.gov/sites/default/files/2019-01/California-Forest-Carbon-Plan-Final-Draft-for-Public-Release-May-2018.pdf>

⁷ The California Wildfire and Forest Action Plan (2021) is available here: <https://wildfiretaskforce.org/wp-content/uploads/2022/04/californiawildfireandforestresilienceactionplan.pdf>

⁸ CARB. 2022. 2022 Scoping Plan for Achieving Carbon Neutrality. https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp_1.pdf

⁹ California Forest Practice Rules (2022) are available here: https://bof.fire.ca.gov/media/y5rfw50b/2022-fpr-and-fpa_ada.pdf They are updated regularly with statutory and regulatory processes; this is the current version.

¹⁰ Information on the DOE's 2023 Billion Ton Report, as well as links to chapters and summaries, is available here: <https://www.energy.gov/eere/bioenergy/2023-billion-ton-report-assessment-us-renewable-carbon-resources>.

1. Significantly expanded scope and success of two existing interlocking grant programs. This proposal would build on the combined human and government infrastructure and success of:
 - a. *California's Biomass Aggregation Pilot Program* which invests in local governmental partnerships to collect hard to reach biomass across forest landscapes and creates a reliable woody biomass feedstock supply for a variety of markets, including energy production. The award of CPRG grant funding will allow the State to expand this program in scope, including agricultural biomass waste, and to cover the entire State.
 - b. *The Department of Conservation's Biofuels Program* which invests in carbon-negative biomass derived fuels, such as renewable hydrogen, and incentivizes production companies to enter and expand markets in California, offsetting fossil fuel use and increasing forest health activities in the State that would not otherwise be funded. The award of CPRG grant funding will allow the State to expand this program in scope, including agricultural biomass waste, and to cover the entire State.
2. Competitive grant solicitations to develop bioenergy products addressing critical supply chain "nodes:"
 - a. Supply: aggregating and transporting waste from where it is produced to where it is needed;
 - b. Processing Capacity: increasing industrial capacity to process biomass waste into valuable products; and
 - c. Market Development: making sure there are product offtakers/consumers.

This proposal addresses Nodes 1 and 2; since the market (Node 3) for fuels – currently mostly fossil fuels – is extremely well-established worldwide.

To address Node 1, supply, this proposal would capitalize the biomass aggregation sites piloted throughout the State. These are structured to take advantage of the core local membership and the innovative legal organizations of JPAs, interagency MOUs, co-ops, and other structures. Biomass aggregation is essential to generating raw material supply and removes one of the most persistent barriers to private investment in biomass processing infrastructure. It will help de-risk both agriculture and forest woody biomass utilization businesses and attract private sector investment.

To address Node 2, processing capacity, this proposal will continue the State's role as a first mover in commercializing new technologies and fuels needed to meet climate goals. To accelerate markets for bioenergy, and aligned with State goals, this proposal would further the State's first mover efforts in project finance, creating incentives through CARB's LCFS, leverage federal tax and funding incentives such as through ARCHEs, and addressing policy and legislative barriers to full market development.

Project developers report that a public investment as small as 10% of the expected project cost is enough to attract private capital. Such support provides operational cashflow and certainty to attract outside funding. There is significant private-sector interest in California's emerging bioenergy market: the last solicitation issued by the Department of Conservation (DOC) was specific to just the Sierra Nevada and still brought in 19 applicants.¹¹

3. Ensured benefits. Modeled off past program success, this proposal will ensure benefits and their documentation through community outreach during grant solicitation, requirements for community benefits and job creation plans as part of project development, rigorous tracking of outputs and

¹¹ It is important to note that the DOC realizes that making subaward to for-profit companies using EPA funding is rare. However, the State's multiple planning documents suggest that the transition - certainly on a state level but also on a national level - to a carbon-neutral, fossil-free economy will not be sustainable over the long-term without private sector participation. Thus, similar to DOC's existing Biofuels Program, for-profit companies are expected to be eligible to apply for and be competitive to receive CPRG funding via this expanded State program.

outcomes (see Section 3 below), the creation of a biomass tracking system, and leveraging existing platforms to share lessons learned from these practices.

The major milestones of this proposal include:

1. Aggregation solicitation finalized and publicly available (within six months of final CPRG award).
2. Bioenergy solicitation finalized and publicly available (within six months of final CPRG award).
3. Aggregation awards made to biomass aggregation recipients (within nine months of CPRG award).
4. Bioenergy awards made (within nine months of CPRG award).
5. First long-term feedstock contracts available via aggregation projects (within two years of CPRG award).
6. First bioenergy facility built and making carbon-negative fuel (2026 at the earliest, and likely by 2028/29 for other Bioenergy Program funding recipients).

The major risks of this proposal include:

1. Publicly sponsored biomass feedstock aggregation is a new concept. Still, California has been piloting this work since 2021. Five of the existing biomass aggregation grantees have met their milestones to date, two new regions were recruited in 2024, and all have demonstrated continued commitment to program and continue to be on track – socially, financially, and logistically – for implementation.
2. Gasification and pyrolysis technology has existed for years, but their application in California to woody biomass and agriculture waste is new: while slim, there is risk that some investments do not resulting in carbon-negative fuel by 2030. The DOC and supporting interagency team have structured the existing program to avoid risk to the extent possible, but if there was no risk, it would public investment would not be needed to move the market.
3. Most fuel developers expect to depend on geologic carbon sequestration (CCS), to make their fuel carbon negative. Fuel producers may be among the first movers to contract with CCS companies in this space, which carries risk. However, a robust CCS market is essential for carbon negativity. DOC has hired new staff to identify and characterize sequestration opportunities throughout California and is investing in data purchases to ensure the State has the information necessary for a robust CCS analysis. It is expected that California's work to build this industry will be successful by the time it is needed for the bioenergy sector, if not sooner.

b. Demonstration of Funding Need

While the existing Biofuels Program was established with State funds in 2021, the program uptake has been so significant that existing funding was inadequate to meet demonstrated need. The State has spent approximately \$4.2 million on the existing Biofuels Program to date, with more invested in the industry through similar and complementary State and federal programs (including through the existing Biomass Aggregation Pilots, as well as funding from sibling State agencies and the U.S. Forest Service).

While other State funds may become available, they are not guaranteed. Further, the Biofuels Program is the only program in the State designed to make grant investments in carbon-negative bioenergy where private or public loans are challenging. The State expects substantial private investment following the public seed funding that would be provided by CPRG for selected bioenergy projects. De-risking projects with 10% of total project costs, private sector investment would cover the remaining 90% of projects that range from a total of \$60 million to \$500 million. The use of public funding establishes a strong signal of the durability of the bioenergy industry in California and, can make it easier for developers to attract and retain private investments in bioenergy projects.

Similarly, the future success of California's Biomass Aggregation work depends on additional one-time funding for project capitalization and deployment. As debt capital for aggregation projects is an unproven investment in the private sector, public funding is essential.

Project developers also intend to pursue and stack other applicable funding. These include incentives for fuel produced through the State's LCFS program and federal RIN credits; 45V and 45Q tax credits through the IRA that incentivize hydrogen production and carbon sequestration; minimum procurement mandates for biomethane from the California Public Utilities Commission; and the momentum and market-moving conversations initiated by ARCHES, California's hydrogen hub, that have helped to increase interest and some capital investment in bioenergy production. While these present excellent opportunities, they are limited in scope and/or amount of funding available, or they support long-term operations and not initial facility capitalization. Further, California needs diverse fuels to power a transition to a climate resilient and community-centered economy: beyond hydrogen, the State needs biomethane, methanol, ethanol, and other fuels to ensure that all sectors of the economy are served with fossil fuel alternatives. This proposal would serve an important role in the ecosystem of State and federal climate resilience programs, activities, and investments to create carbon-negative fuels.

c. Transformative Impact

The use of woody biomass and agricultural waste in California's bioenergy industry is pioneering and promising. Foremost, developing a market for bioenergy feedstocks helps meet demand set by the State's ambitious and durable climate policies. For example, the 2022 Scoping Plan Update, which charts a path to achieving carbon neutrality by 2045 as mandated by AB 1279 (Muratsuchi, Chapter 337, Statutes of 2022),¹² calls for producing at least 90% of the State's aviation fuel from low carbon sources, and generating 1,700 times more hydrogen to help achieve AB 1279 targets, among other actions. This proposal also leverages successful bioenergy deployment from established feedstocks through the LCFS program, which has successfully been in operation statewide since 2011 and helped the State replace over 60% of diesel use with clean fuels.¹³ California's LCFS program has been influential in the development of similar programs in Oregon, Washington, British Columbia, and in other jurisdictions around the world. Through California's existing partnerships with other jurisdictions,¹⁴ this proposal would carry similarly transformative impacts to commercialize woody biomass and agricultural waste fuel pathways across California, other U.S. states, and beyond.

More specifically, the transformative opportunities of this proposal include:

Biomass supply chain stability: Biomass aggregation is essential to secure the supply chain for energy offtakers: the reliability and long-term availability of biomass has been one of the challenges of attracting private-sector funding to biomass utilization businesses. The State's Biomass Aggregation Expansion would allow local governments to design and implement a fee-for-service business to bridge gaps between seasonal and geographically diverse biomass availability and financiers' expectation of long-term supply guarantees. Operating capital grant from the State will help grantees generate revenue streams, sustainably finance long-term operations, and facilitate market development in each project region. This investment can bridge the gap from planning to full-scale implementation and anchor the biomass aggregation sites to their communities long-term, supporting feedstock supply for biomass

¹² 2022. https://leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=202120220AB1279

¹³ CARB. 2023. <https://ww2.arb.ca.gov/news/first-time-50-california-diesel-fuel-replaced-clean-fuels>.

¹⁴ In addition to government-to-government relationships with U.S. states, California has agreements with jurisdictions around the world as directed by under the California Global Warming Solutions Act of 2006 (AB 32, Nunez, Chapter 448, Statutes of 2006). For a summary of formal international agreements, see here: <https://business.ca.gov/advantages/international-trade-and-investment/international-collaboration/international-diplomacy/>.

energy production. The State will use the data from the existing biomass aggregation investments to refine, grow, and replicate the program if awarded.

Unlocking private investment: As has been reported above, the availability of grant funds to either element of this program – bioenergy and feedstock aggregation – will allow them significantly greater access to private financing and will help prove the market in California and beyond. This proposal is designed to ensure public investment of around 10% of the total facility cost, which is often seen as market-moving by industry.

Technology development and scaling: California’s permitting environment and the high cost of these technologies have meant that the significant potential benefits of this proposal have been difficult to realize by the private sector alone. The DOC’s Biofuels Program is the first State program to invest in the biomass to biofuels industry and has already resulted in attracting many new actors to the State. Further CPRG investment could have ramifications for a national biomass to biofuels/bioenergy market.

Hard-to-decarbonize Industries: Non-fossil fuels, and especially hydrogen and Sustainable Aviation Fuel (SAF), are essential to supporting California and U.S. industries that are difficult to decarbonize, including cement manufacturing, fertilizer production, long-haul freight operations, and aviation. This proposal will help grow and diversify the low-carbon fuels needed for California’s science-based climate targets across many hard-to-decarbonize sectors, which will have implications for low-carbon fuel markets beyond California.

Agricultural applications: In 2017, approximately 6 tons per day of PM_{2.5} were produced by open agricultural burning statewide, affecting PM_{2.5} and ozone levels and exposing residents to harmful air. Prohibitions on burning agricultural waste are now in place in the State’s large San Joaquin Valley, but in other parts of the State, this proposal could help avoid burning and reduce air pollution. This will be helpful as landfilling and composting of agricultural waste is not always an option. The development of a strong bioenergy industry will support long-term, sustainable agricultural waste management strategies, and more options for energy sufficiency in communities.

Forest health: As has been mentioned, this proposal will have a direct impact on the health of California’s forest lands, offsetting the cost of forest health treatments through creating a viable market for woody biomass waste. The State and U.S. Forest Service have each committed to treating at least 500,000 acres per year of forest land by 2025, and the largest impediment to meeting this goal – important from a climate, habitat, public cost, and community safety perspective – is the cost of these management activities. An established, reliable feedstock offtakers – in the form of the biomass aggregation work – will result in more forest health work and return more forest acres to a healthy, carbon-sequestering state. Biomass aggregation will also support the collection of agricultural waste supply, quality control, and a sustainable pathway for agricultural waste management.

The success of this proposal could provide an example and lessons learned for better management of hundreds of millions of acres forest and agricultural lands across the U.S., as well as help develop nationally relevant feedstocks for low-carbon fuels, high-road jobs, GHG reductions, and criteria pollutant co-benefits.

2. IMPACT OF GHG REDUCTION MEASURES

a. Magnitude of GHG Reductions from 2025 through 2030

This proposal is expected to reduce greenhouse gas emissions by 5,627,960 MTCO₂e cumulatively between 2025 and 2030. This magnitude of emissions is expected to be durable long into the future.

More specifically, emissions reductions from this measure are expected from two main types of activities. The Biofuels Program Expansion will remove and store emissions through carbon capture and sequestration (CCS) or through biological charcoal (biochar) and will yield 3,672,000 MTCO₂e in reductions cumulatively between 2025 and 2030. As hydrogen from this measure displaces natural gas in high-heat industrial processes and diesel in heavy-duty transportation applications, an additional 1,955,960 MTCO₂e would be cumulatively reduced between 2025 and 2030.

Cumulative emissions reductions from this proposal (2025 – 2030)

Reduction Type	Cumulative Emissions Reduction in MTCO ₂ e
Direct emissions reduction using carbon capture and sequestration or biochar	3,672,000
Indirect downstream emissions reduction of using hydrogen to replace fossil gas	1,955,960
Total GHG Reductions	5,627,960

It is reasonable to assume that direct emissions reductions from CCS would be permanently durable, and aligned with the State’s existing protocol on CCS, established under the Low Carbon Fuel Standard, where applicable.¹⁵ While the persistence of carbon sequestration through biochar is continually being studied,¹⁶ it is reasonable to assume durability of emissions reductions from biochar as well. It is also expected that investments in hydrogen fuel cell technologies are large and mature enough to be permanently durable. California policies such as the Advanced Clean Fleets rule (ACF)¹⁷ that require large truck fleet operators to purchase and operate zero-emissions technologies further support the retirement of fossil fuel technologies and the durability of the indirect emissions reductions of this proposal. Lastly, while the ACF rule is binding on technology, it does not guarantee emissions reductions without investment in hydrogen fuel production and support from proposals such as this.

b. Magnitude of GHG Reductions from 2025 through 2050

Emissions reductions from this proposal are expected from the same two types of activities as described in 2.a above. Cumulative emissions reductions from this proposal between 2025 and 2050 are estimated at 40,544,342 MTCO₂e. The table below further summarizes these estimates. Durability and permanence are expected as in 2.a above.

¹⁵ CARB. 2018. Carbon Capture and Sequestration Protocol under the Low Carbon Fuel Standard. https://ww2.arb.ca.gov/sites/default/files/2020-03/CCS_Protocol_Under_LCFS_8-13-18_ada.pdf.

¹⁶ Azzi, E., Li, H., Cederlund, H., Karlton, K., and Sundberg, C. 2024. *Modelling biochar long-term carbon storage in soil with harmonized analysis of decomposition data*. Geoderma. Volume 441. January. <https://www.sciencedirect.com/science/article/pii/S001670612300438X>

¹⁷ CARB. Advanced Clean Fleets. <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets>.

Cumulative emissions reductions from this proposal (2025 – 2050)

Reduction Type	Cumulative Emissions Reduction in MTCO₂e
Direct emissions reduction using carbon capture and sequestration and biochar	26,712,000
Indirect downstream emissions reduction of using hydrogen to replace fossil gas	13,832,342
Total Potential GHG Reductions	40,544,342

c. Cost Effectiveness of GHG Reductions

Per EPA's guidance in its Notice of Funding Opportunity under the CPRG general competition, the cost effectiveness of this proposal accounts for the overall request of \$499,602,081 in CPRG funding (per budget detail) and the total expected cumulative emissions reductions from 2025 to 2030 (5,627,960 MTCO₂e). Overall, this proposal yields a competitive cost effectiveness of \$88.77 per MTCO₂e.

d. Documentation of GHG Reduction Assumptions

As detailed in the technical appendix included in this application package, the calculations for the above emissions reductions rely on project level data provided to DOC through their Phase 1 Solicitation under their Biofuels Program. While confidential, these data were anonymized to yield representative facility development costs, biomass processing potential, amount of hydrogen fuel produced, and carbon sequestered for each community scale and large-scale projects. Using the budget detail and an assumed \$325 million of CPRG funding for seed funding, and the attraction of ten times the private capital, a total of six to 12 new facilities are assumed based on this proposal. A representative mix of community and large-scale facilities expected online by 2029 or 2030 was created for annual emissions reductions potential.

Direct emissions reductions for each community and large-scale facilities are calculated annually by multiplying the number of projects that are online in a given year by the representative emissions reductions factors. Estimated over an expected 25-year lifetime of facilities, annual emissions reductions were summed to create cumulative estimates for the 2025-2030 and 2025-2050 time periods.

Indirect emissions reductions were estimated based on the energy content of the expected hydrogen fuel produced by all facilities, as well as emissions factors for the displacement of natural gas for industrial processes and diesel in heavy-duty transportation applications. Because there is uncertainty in how the new hydrogen would be used, the methodology conservatively assumes that two-thirds of hydrogen fuel would be used as a drop-in replacement for natural gas in existing industrial appliances, and that one-third would displace diesel fuel in heavy-duty trucks. These emissions factors are detailed in the technical appendix. The annual direct and indirect emissions reductions are summed to create total annual emissions reductions. Annual emissions reductions are then summed over time periods 2025-2030 and 2025-2050 to create cumulative estimates.

3. ENVIRONMENTAL RESULTS – OUTPUTS, OUTCOMES, AND PERFORMANCE MEASURES

a. Expected Outputs and Outcomes

By 2030, this proposal will result in the following outputs:

1. Three staff will be hired to administer programs and track GHG and criteria pollutant abatement;
2. At least five biomass aggregation sites will be secured, with operational logistics in place;

3. At least nine bioenergy facilities will be developed;
4. At least two education opportunities offered on industry development and/or public involvement;
5. Bio-based hydrogen sources will be highlighted in the State's hydrogen strategy and implemented in collaboration/coordination with ARCHES Hydrogen Hub.

This proposal will also result in the following outcomes:

1. Reduction in roughly 5.6 million MTCO₂e cumulatively between 2025 and 2030;
2. Reduction in roughly 40.5 million MTCO₂e cumulatively between 2025 and 2050;
3. Between 500,000 and 55 million kilograms of hydrogen fuel produced annually;
4. Approximately 100,000 to 1 million bone-dry tons of woody biomass from forests and/or agricultural operations are utilized annually and diverted from the landfill/avoided burning;
5. Reductions in PM_{2.5} and NO_x from the replacement of diesel combustion with zero-emissions alternatives, as well as reductions in any associated formation of ground-level ozone;
6. Potential reduction in PM_{2.5} and any associated ground-level ozone from decreased wildfire risk;
7. Reductions of the above criteria air pollutants are expected to be particularly meaningful for low-income and disadvantaged communities (LIDACs) identified in maps one through four in section 4a below (those in non-attainment of U.S. EPA's 2015 PM_{2.5} and ozone standards, intersected by the National Freight Highway Network, or containing forested areas);
8. With the above reductions in criteria air pollutants, associated decreases in hospitalizations from asthma and other acute respiratory and related health issues;
9. 600-1,600 permanent high-road jobs created, many in LIDACs;
10. At least 50,000 acres of forest returned to health annually, tracked as climate-resilient forest acres and measured via the State's developing forest health tracking system;
11. The home insurance market becomes more accessible for communities living in/near affected forests, measured via conversations and analyses from the California Department of Insurance;
12. Private financing becomes more available and predictable for bioenergy projects, measured via conversations with developer and the occurrence and timing of new projects coming online;
13. Increased State staff capacity to implement GHG reduction measures; and
14. Increased community engagement, as measured by grantees' tracking and reporting out outreach activities and events, with sectoral engagement highlighted, including Tribal engagement, disadvantaged community engagement, and general engagement.

b. Performance Measures and Plan

The performance measures of this proposal will include:

1. Staff hiring and onboarding, including command of the program subject matter;
2. Public meetings, including those informing solicitation development;
3. Completion of grant solicitation documents with input from sibling agencies (State and federal), LIDAC community members, and the public;
4. Grant award contracts in place (at least five for Biomass Aggregation, nine for Bioenergy Program);
5. Participation in developing the State's hydrogen strategy, ensuring the inclusion and central role of biomass waste to hydrogen pathways;
6. Quarterly reporting from all grantees, including progress to date, expenditure plans, contracting progress, and challenges experienced and overcome, as well as annual reporting of:
 - a. Annual reporting on avoided/sequestered GHG emissions;
 - b. Annual reporting on fuel output and fossil fuel replacement estimates;
 - c. Annual reporting on community plans, benefits, and job-related activities;

- d. Annual reporting on woody and agricultural biomass utilization – including estimates if the facility is not yet complete – and projected forest vs. agricultural acres impacted;
 - e. Staffing levels and classification;
- 7. Overall quantification of GHGs reduced using standardized templates developed for quarterly reports above, and using the methodologies used in this proposal to estimate total GHG reductions;
- 8. Quantification where possible of reduced criteria pollutants from the creation of low-carbon fuels and the displacement of fossil fuels;
- 9. Groundbreaking commensurate with expected dates as outlined in the grant applications and subsequent contracts, with parties addressing emerging issues as they arise;
- 10. Documentation of responses to grantee inquiries and support given to grantees with technical and other support, as needed and requested;
- 11. The number of feedstock supply agreements in place for Biomass Aggregation by 2026, and tracked annually through 2030 with actions taken to address any emerging challenges;
- 12. Community benefit agreements in place for all grantees, with benefits specific to low-income and disadvantaged communities, including avoided emissions, high-road jobs, and workforce transitions;
- 13. Documentation of communication with the California Department of Insurance regarding insurers' approach to forested communities, ascertaining the impact of the projects on perceived forest wildfire risk and insurability (toward the end of the grant period);
- 14. Biannual reporting to the EPA as required in the grant contract, providing documentation and background information as needed and ensuring that the grant managers understand progress being made, potential exportable successes, and lessons learned;
- 15. Assurance from grantees of their understanding of their responsibilities – including post-grant – for land and equipment purchased with federal funding, as well as with construction, Davis-Bacon, and BABA requirements, including compliance with CFR 200.311 for land acquisition.
- 16. Final reports, from grantees, compiled by program staff for EPA review and approval (no later than five years following the final grant award contract).

c. Authorities, Implementation Timeline, and Milestones

The DOC has received numerous federal grant awards and contracts, and also advertises, reviews, awards, and manages hundreds of millions of dollars in State funding annually. The DOC is fully capable and ready to receive and administer the CPRG funding to implement this proposal and certifies that it has systems in place to comply with the requirements described in the EPA's Subaward Agreement Template and General Term and Conditions. All of the tasks outlined in the table below are the responsibility of the DOC, and while work will be completed by subawardees/grantees of the programs, they will be monitored and reported to the U.S. EPA by the DOC.

The DOC is a State agency within the California Natural Resources Agency. The DOC's authorizing statutes are located at Chapter 2 of Division 1 of the California Public Resources Code,¹⁸ with authority for execution and administration of laws as is detailed in Government Code section 11150 et seq.¹⁹ (incorporated by reference). The DOC has powers and responsibilities over several natural resource subject areas, such as forestry, mines and geology, oil and gas, and soil conservation.

¹⁸ Pub. Resources Code, §§ 600 et seq.:

https://leginfo.ca.gov/faces/codes_displayexpandedbranch.xhtml?tocCode=PRC&division=1.&title=&part=&chapter=2.&article=

¹⁹ Available at:

https://leginfo.ca.gov/faces/codes_displayText.xhtml?lawCode=GOV&division=3.&title=2.&part=1.&chapter=2.&article=1

The DOC's general statutory authorization to award grants derives from Public Resources Code (PRC) section 604²⁰ and PRC section 614²¹ authorizing the DOC to administer local assistance programs, including grants. Similarly, PRC section 608²² authorizes the DOC to accept federal grants for the purposes for which the DOC is established, and to expend those funds under such terms and conditions as may be required by the federal government.

Implementation timeline, activities, and milestones

Note: Early on, there are different tasks and timelines for each the Biomass Aggregation and Bioenergy Program Expansions. Unless otherwise listed, tasks and milestones apply across both.

Q4 2024	Q4 2024
	Tasks
	<p><u>For both Biomass Aggregation and Bioenergy Program Expansions</u></p> <ol style="list-style-type: none"> 1. Begin hiring process for all staff under each program expansion. 2. Develop and make public draft solicitations/guidelines (based on existing program guidelines as applicable) 3. Hold public review meetings of each draft solicitation, taking input and suggestions. The Bioenergy Program would leverage significant public outreach done to date. 4. For the Bioenergy Program Expansion, incorporate existing/previous learnings and policies into the State's hydrogen strategy, as appropriate.
Q1 2025	Milestones
	<ol style="list-style-type: none"> 1. Finalize the solicitation/guidelines for publication for each project component.
	Q1 2025
	Tasks
	<p><u>For both program expansions</u></p> <ol style="list-style-type: none"> 1. Finalize and issue the solicitation/guidelines for each program expansion (30-day window for biomass aggregation program expansion, and 60-day window for bioenergy program expansion). 2. Develop subaward contract templates in partnership with the EPA to ensure compliance with 2 CFR Part 200, 2 CFR Part 1500, and 40 CFR Part 33, as well as with EPA's National Term and Condition for Subawards, Build America, Buy America (BABA), and other federal regulations and requirements. 3. Compile first semi-annual report to submit to EPA. 4. Compile and submit to EPA a Quality Assurance Project Plan (QAPP) as needed. <p><u>For Biomass Aggregation Expansion</u></p> <ol style="list-style-type: none"> 5. Receive and review Biomass Aggregation applications. 6. Consult with and ensure EPA approval for subawards, especially for real property purchases (e.g., ensure compliance with CFR 200.439(b)(1)) prior to final contract. 7. Identify and announce plans to award, begin contracting with proposed awardees. <p><u>For Bioenergy Program Expansion</u></p> <ol style="list-style-type: none"> 8. Begin the RFP process to recruit a contractor to support environmental permitting review for awardees, on behalf of the DOC; NOTE: this contractor may also support environmental work needed by Biomass Aggregation Expansion awardees.
	Milestones

²⁰ https://leginfo.ca.gov/faces/codes_displaySection.xhtml?lawCode=PRC§ionNum=604.

²¹ https://leginfo.ca.gov/faces/codes_displaySection.xhtml?lawCode=PRC§ionNum=614.

²² https://leginfo.ca.gov/faces/codes_displaySection.xhtml?lawCode=PRC§ionNum=608.

	1. Staff hired.
Q2 2025	Q2 2025
	Tasks
	<u>Biomass Aggregation Expansion</u> <ol style="list-style-type: none"> 1. If not complete, finalize all awardee contracts. 2. Ensure awardees are aware of land acquisition and rules and create a long-term plan for compliance with CFR 200.311 on real property acquisition. <u>Bioenergy Program Expansion</u> <ol style="list-style-type: none"> 1. Receive, review, score, and rank applications. 2. Consult with the EPA prior to announcing preliminary awards, including consultation and approval on real property acquisition proposals (e.g., CFR 200.439(b)(1)). 3. Gain approval from EPA on any competitive awards to for-profit entities. 4. Begin contracting with proposed awardees.
	Milestones
	<ol style="list-style-type: none"> 1. Publish an RFP for recruiting a contractor to support environmental permitting review for awardees.
Q3 2025	Q3 2025
	Tasks
	<u>Biomass Aggregation Expansion</u> <ol style="list-style-type: none"> 1. Track project progress and support awardees' technical and logistical challenges. 2. Administer the DOC's quarterly financial, performance, and environmental progress reporting, alongside any external audit or other findings. <u>Bioenergy Program Expansion</u> <ol style="list-style-type: none"> 1. Finalize all contracts with awardees and begin quarterly reporting and check-ins. 2. Share information on and create a long-term plan for compliance with CFR 200.311 on real property acquisition. 3. Review proposals and select a contractor for environmental permitting support; contract with the selected provider (also relevant to Biomass Aggregation Expansion awardees) <u>Both program expansions</u> <ol style="list-style-type: none"> 1. Compile second semi-annual report to EPA, including benefits to LIDACs, estimated GHG and co-pollutant reductions from funded projects, as applicable to and in accordance with any approved QAPP.
	Milestones
	<ol style="list-style-type: none"> 1. Select a contractor to support environmental permitting review for awardees.
Q4 2025	Q4 2025
	Tasks
	<ol style="list-style-type: none"> 1. Quantify impact based on first programmatic year, including new feedstock supply and offtake contracts. 2. Ensure site control and groundbreaking plans are on track, based on grant application and contract timelines. 3. Administer the DOC's quarterly reporting, including financial, programmatic, performance, environmental progress and impacts, and any external findings.
	Milestones
	<ol style="list-style-type: none"> 1. Control documents are substantially written and being implemented across both program expansions, including community benefits plans; quality assurance project plans; Workforce development/recruitment plans; feedstock supply plans.

Q1 2026	Q1 2026
	Tasks
	<ol style="list-style-type: none"> 1. Compile third semi-annual report to EPA. 2. Administer the DOC's quarterly reporting, including financial, programmatic, performance, environmental progress and impacts, and any external findings. <p><u>For Biomass Aggregation Expansion</u></p> <ol style="list-style-type: none"> 3. Begin an RFP process to hire a contractor to build on the State's existing Biomass Tracking System for the State and include a refined implementation pathway, recommended partner(s) for implementation, and inclusion of agricultural biomass waste.
Q2 2026	Q2 2026
	Tasks
	<ol style="list-style-type: none"> 1. Administer the DOC's quarterly reporting, including financial, programmatic, performance, environmental progress and impacts, and any external findings.
Q3 2026	Milestones
	<ol style="list-style-type: none"> 1. Publish the RFP recruiting a Biomass Tracking System contractor.
	Q3 2026
Q4 2026	Tasks
	<ol style="list-style-type: none"> 1. Administer the DOC's quarterly reporting, including financial, programmatic, performance, environmental progress and impacts, and any external findings. 2. Compile fourth semi-annual report to EPA. 3. Hold the first educational webinar or other stakeholder engagement opportunity. 4. Review proposals and select a contractor for Biomass Tracking System refinement and expansion; get into contract with the selected provider.
	Milestones
Q1 2027	<ol style="list-style-type: none"> 1. Select a contractor to refine the State's Biomass Tracking System.
	Q4 2026
	Tasks
Q2 2027	<ol style="list-style-type: none"> 1. Quantify impact of combined program expansions based on two years of implementation, including new feedstock supply and offtake contracts, acres treated (if yet applicable), avoided emissions, and jobs. 2. California interagency programmatic meeting to review progress, including the Department of Insurance and other "unconventional" climate partners required to meet performance metrics. 3. Administer the DOC's quarterly reporting, including financial, programmatic, performance, environmental progress and impacts, and any external findings.
	Q1 2027
	Tasks
Q3 2027	<ol style="list-style-type: none"> 1. Administer the DOC's quarterly reporting, including financial, programmatic, performance, environmental progress and impacts, and any external findings. 2. Compile fifth semi-annual report to EPA.
	Q2 2027
	Tasks
Q4 2027	<ol style="list-style-type: none"> 1. Schedule site visits with each awardee to see project progress firsthand and to develop a first-person report for inclusion in the sixth semi-annual report to the EPA. 2. Administer the DOC's quarterly reporting, including financial, programmatic, performance, environmental progress and impacts, and any external findings.

Q3 2027	Q3 2027
	Tasks
	<ol style="list-style-type: none"> 1. Administer the DOC's quarterly reporting, including financial, programmatic, performance, environmental progress and impacts, and any external findings. 2. Compile sixth semi-annual report to EPA. 3. Hold the second educational webinar or other stakeholder engagement opportunity.
	Tasks <ol style="list-style-type: none"> 1. Quantify CPRG award impact based on three programmatic years, including feedstock supply and offtake contracts, acres treated (if yet applicable), avoided emissions, and jobs. 2. Administer the DOC's quarterly reporting, including financial and programmatic reports, performance, environmental progress and impacts, and any external findings, such as by an audit or other report, and compliance with deficiency corrections.
Q1 2028	Q1 2028
	Tasks <ol style="list-style-type: none"> 1. Administer the DOC's quarterly reporting, including financial, programmatic, performance, environmental progress and impacts, and any external findings. 2. Compile seventh semi-annual report to EPA.
Q2 2028	Q2 2028
	Tasks <ol style="list-style-type: none"> 1. Ensure that Biomass Aggregation Expansion sites are fully operational, or close to being so. Ensure that Bioenergy Program Expansion grantees are on track to producing carbon-negative fuel by 2030, and address issues if they exist. 2. Administer the DOC's quarterly reporting, including financial, programmatic, performance, environmental progress and impacts, and any external findings.
Q3 2028	Q3 2028
	Tasks <ol style="list-style-type: none"> 1. Administer the DOC's quarterly reporting, including financial, programmatic, performance, environmental progress and impacts, and any external findings. 2. Compile eighth semi-annual report to EPA.
Q4 2028	Q4 2028
	Tasks <ol style="list-style-type: none"> 1. Quantify CPRG award impact based on four programmatic years, including feedstock supply and offtake contracts, acres treated (if yet applicable), avoided emissions, and jobs. 2. Administer the DOC's quarterly reporting, including financial, programmatic, performance, environmental progress and impacts, and any external findings.
Q1 2029	Q1 2029
	Tasks <ol style="list-style-type: none"> 1. Administer the DOC's quarterly reporting, including financial, programmatic, performance, environmental progress and impacts, and any external findings. 2. Compile ninth semi-annual report to EPA.
Q2 2029	Q2 2029
	Tasks

	<ol style="list-style-type: none"> 1. Ensure that grantees continue to be aware of land acquisition, BABA, and construction rules and adhere to plans for compliance with CFR 200.311 on real property acquisition, Buy American requirements, and construction regulations. 2. Administer the DOC's quarterly reporting, including financial, programmatic, performance, environmental progress and impacts, and any external findings.
Q3 2029	Q3 2029
	Tasks <ol style="list-style-type: none"> 1. Administer the DOC's quarterly reporting, including financial, programmatic, performance, environmental progress and impacts, and any external findings. 2. Compile final report to EPA, including assessment of total GHG and criteria pollutants mitigated/reduced/avoided, community engagement and benefits seen, and lessons learned for program application elsewhere.
Q4 2029	Q4 2029
	Tasks <ol style="list-style-type: none"> 1. Continue to provide long-term monitoring of grant investments, including those of real property and GHG/criteria pollutant goals.
	Milestones
	<ol style="list-style-type: none"> 1. Submit final report to EPA.

4. LOW-INCOME AND DISADVANTAGED COMMUNITIES (35 POINTS)

a. Community Benefits (25 points)

This proposal would be administered statewide, and benefits to low-income and disadvantaged communities (LIDACs) will be similarly broad in scope. This subsection describes expected direct and indirect benefits, as well as concerns that communities have raised about potential disbenefits and how these would be addressed. It is based on both California's past programmatic experience as well as geospatial analysis of how expected benefits overlap with LIDACs. In line with U.S. EPA guidance, LIDACs have been identified using both the Climate and Economic Justice Screening Tool (CEJST) and the supplemental data from U.S. EPA's Environmental Justice Screening and Mapping Tool (EJScreen).²³

California has one of the highest poverty rates in the nation, and thus the existing programs leveraged in this proposal were structured to bring benefits to disadvantaged and lower-income regions in the State. To date, 100% of the current Biofuels Program grant awards have been made to project developers serving rural disadvantaged communities underserved by existing infrastructure and with higher rates of unemployment. If awarded, at least 80% of CPRG funds would be used within communities identified as LIDACs under the U.S. EPA's definition.

Significantly, there is strong interest in forest management and bioenergy development from federally recognized Tribes, all of which are identified as LIDACs under U.S. EPA's definition. At least 25% of the existing Biofuels Program grants were made directly to Tribes or to a project in which a Tribe had a material financial interest. In one project, a facility will be sited on reservation land, streamlining permitting processes and facilitating a reliable feedstock strategy through collaboration with the U.S. Forest Service and use of the Tribal Forest Protection Act.

This proposal would be structured to emphasize community benefits, allocating points specifically to community partnerships, and projects creating synergies with other public investments, including

²³ Data and EPA guidance can be found here: <https://www.epa.gov/inflation-reduction-act/cprg-tools-and-technical-assistance-low-income-and-disadvantaged>

federal workforce investments. As such, California bioenergy producers are implementing significant and meaningful efforts to ensure that projects, as they are implemented on the ground, are beneficial to the communities they serve and reflective of the diversity and expertise of all Californians, ensuring opportunities are available to all. This practice would continue under any CPRG award.

With similar outcomes, the Biomass Aggregation Pilot Program administered by OPR has done significant community outreach and partnered with community colleges to address workforce and transportation needs. Implementing regions would continue this work under this proposal, ramping it with a physical site location.

It is important to note that biomass electricity, produced via combustion technology, has been contentious for environmental justice communities in the San Joaquin Valley for the last few years.

There are two considerations that make this proposal very different:

1. Rural communities in the northern Sacramento Valley, Sierra-Cascade Ranges, and Coastal Range broadly welcome biomass energy facilities for reasons of forest health, wildfire safety, and economic development. In these rural areas, this proposal could also help in meeting EPA's new federal PM_{2.5} standards of 9 ug/m³.²⁴
2. Importantly, new technology has been developed supporting bioenergy – gasification, pyrolysis, and fermentation – that is very different from the conventional combustion technology associated with biomass electricity facilities. This technology also generally has a purer stream of CO₂ as a byproduct. These new bioenergy facilities will result in net negative climate and criteria pollutant emissions, directly benefitting their host communities.

With all of that true, negotiations directly with the host communities regarding development of community benefits packages, including considerations of geographical placement, transportation considerations, workforce training, public outreach, community investment, and other considerations, will be an essential part of this proposal.

As an example, the San Joaquin Valley is a “traditional energy community,” where residents have lived with oil and gas operations in their backyards, proximal to their school yards, grocery stores, and other community landmarks nearly since California became a state. This, combined with significant agricultural activity and presence of two major transportation corridors, has resulted in the San Joaquin Valley having some of the worst air quality in the nation. In part because of this, but in combination with a number of other political and funding conditions coalescing, local leaders were convened by the Clean Air Task Force in 2023 to begin the process of a grassroots energy planning effort. California State agencies have been participating at the invitation of local leaders to contribute thoughts on State priorities, but the effort has been driven by Valley residents. The interest in renewable energy, and bioenergy in particular, is strong within this community when 1) they learn about the new gasification, pyrolysis, and fermentation technology resulting in bioenergy outputs with decreased pollution, and 2) that the product of the investment could further offset criteria and climate pollutants from fossil fuels-based transportation. Combined with the potential for a workforce transition from traditional oil and gas operations to bioenergy, as well as the opportunity to define a community benefits plan ahead of any investments, communities become generally supportive of bioenergy efforts.

Benefits identified in community benefits planning have included:

1. Increased resilience to climate change due to direct investments such as mitigating heat island effects through tree planting and parks, and commensurate increases in property values and recreation opportunities;

²⁴ CARB. PM_{2.5}. <https://ww2.arb.ca.gov/our-work/programs/state-and-federal-area-designations/federal-area-designations/pm2-5>.

2. Improved community health through reducing the risk of catastrophic wildfire;
3. Improved public health through reduction in criteria pollutant emissions specific to energy production, including NO_x and PM_{2.5}, and any resulting ground level ozone as reflected in hospital visits for asthma;
4. Creation of high-road, family supporting jobs and new workforce training and/or transition opportunities, with an emphasis on expanding opportunities for individuals facing barriers to employment;
 - a. Note that we expect this benefit to build on workforce development investments currently made by the State and federal governments into these pathways; see the response to Question 5, below, for more detail; and
5. Performance stipulations for production objectives and criteria and GHG pollutant reduction and avoidance.

Expected community benefits will be part of the new Biomass Aggregation and the Bioenergy Program grant application package requests under this proposal, with a requirement for community outreach and engagement to ensure community voices and needs are reflected in each proposed project's community benefits package.

As reported in the performance measures table above (response to Question 3c), we expect to request annual reviews by the grantees of their community benefits performance and will provide that information to the EPA regularly.

If funded, the State expects that many LIDACs would experience direct and indirect benefits. While some benefits would be identified and ensured through community engagement, some can be spatially analyzed, including four of the five benefits previously identified in community planning exercises (listed above). To map how these benefits could align with federally recognized LIDACs, the California Air Resources Board assessed the overlap of various geospatial data, as outlined below and as mapped on the following page.

1. **Addressing PM_{2.5}.** The first map shows where this proposed measure could lead to a decreased risk in catastrophic wildfires, further alternatives to the burning of agricultural waste, and a reduction in diesel fuel combustion in trucks could benefit LIDACs in non-attainment of the U.S. EPA's 2015 PM_{2.5} standard.²⁵ Smoke from the burning of forests and agricultural waste contains PM_{2.5} and the combustion of diesel leads to PM_{2.5} and ground-level ozone formation.²⁶
2. **Addressing ground-level ozone.** The second map shows the LIDACs in non-attainment of the EPA's 2015 ozone standard²⁷ that could similarly benefit from this measure.
3. **Bioenergy for freight.** The third map shows the LIDACs intersected by the Federal Highway Administration's National Highway Freight Network²⁸ that could benefit from improved air quality from the wider availability of bioenergy to replace diesel combustion.

²⁵ *ibid*

²⁶ CARB. <https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health#:~:text=Diesel%20exhaust%20also%20contains%20gaseous%20pollutants%2C%20including%20volatile,atmosphere%20leading%20to%20formation%20of%20PM2.5%20and%20ozone.>

²⁷ U.S. EPA. <https://www.epa.gov/green-book/green-book-gis-download>

²⁸ Federal Highway Administration. National Highway Freight Network. <https://usdot.maps.arcgis.com/apps/webappviewer/index.html?id=c4c0fdef029a4093b169e493e1883988>.

4. **Communities with forests.** The fourth map shows communities with any amount of forested land that could be treated by this measure and see resulting reduction of wildfire risk and the creation of high-road jobs.²⁹
5. **Communities with cropland.** The fifth map similarly shows communities with any amount of cropland that could be treated by this measure and benefit from further alternatives to agricultural burning and the creation of high-road jobs.³⁰
6. **Areas likely to bear higher costs from climate change.** The sixth map shows the LIDACs in California where this measure could lessen expected economic losses associated with climate change. Developed under the 2022 Scoping Plan Update, the Climate Vulnerability Metric (CVM),³¹ includes the projected impacts of climate change on human welfare across four impact categories through midcentury (2050) under a moderate emissions scenario. These include human mortality, hours worked in high-risk sectors (e.g., with high heat exposure), household energy costs, and flood-related property damage.

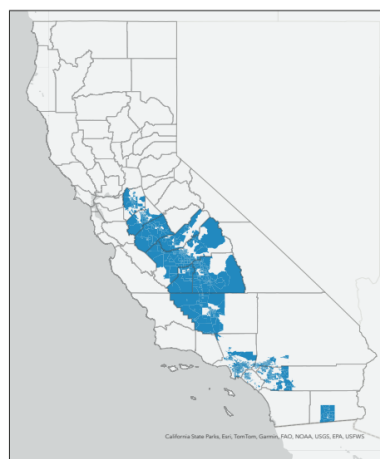
Together, these areas highlighted across all maps above are home to over 17 million residents and roughly 95% of the total LIDAC population identified in California under the federal definition.³² The potential range of LIDACs benefiting from this application shows its strength in helping U.S. EPA ensure Justice40 goals are met through CPRG awards.

The LIDAC census tracts and block groups associated with these maps total 10,824 and are too numerous to list here. Instead, they can be found as an Excel file in this application package.

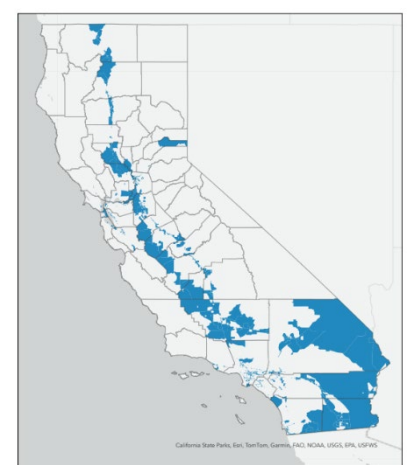
Map 1: LIDACs in nonattainment of U.S. EPA's 2015 standard for ozone



Map 2: LIDACs in nonattainment of U.S. EPA's 2015 standard for PM_{2.5}



Map 3: LIDACs intersected by the National Freight Highway Network



²⁹ Census Tracts and block groups that contained any amount of forested area or agricultural or croplands were included in this analysis and the associated map. Land use types were taken from existing vegetation type data developed through the LANDFIRE initiative:

https://www.landfire.gov/lf_230.php.

³⁰ *ibid*

³¹ CARB. 2022. 2022 Scoping Plan Update Appendix K: Climate Vulnerability Metric. November.

https://ww2.arb.ca.gov/sites/default/files/2022-11/2022-sp-appendix-k-climate-vulnerability-metric_0.pdf. Note that these data were created under the 2010 U.S. Census boundaries. A crosswalk from the Census Bureau relating 2010 Census Boundaries to 2020 Census boundaries was used to relate the CVM to U.S. EPA's low income and disadvantaged communities definition. Available:

<https://www.census.gov/geographies/reference-files/2020/geo/relationship-files.html#trac>.

³² This analysis is based on U.S. Census American Community Survey 5-year estimates for total population (table ACS001_001E). Available for download at: <https://data.census.gov/>.

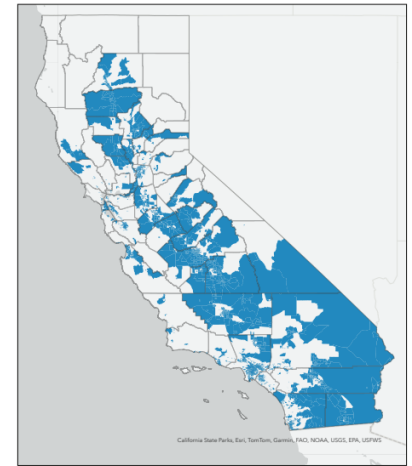
Map 4: LIDACs with forested areas



Map 5: LIDACs with cropland



Map 6: LIDACs vulnerable to the costs of climate change under CVM



b. Community Engagement

Leveraging Existing Engagement: This proposal will build on robust and existing community engagement. For example, the existing Biofuels Program interagency team has welcomed community members from all organizations, perspectives, and geographies to provide input on solicitation development and operationalizing feedstock planning, attracting private finance, and more. Specific and targeted outreach to environmental justice, Tribal, and other interested communities was completed in early 2022 to ensure awareness and provide a meaningful chance to help design the Biofuels Program. These efforts have largely been virtual, to accommodate large audiences from far reaches of the State and to accommodate simultaneous translation. Public input has directly informed the Biofuel Program's solicitation and guidelines which include preferential points for serving low-income and disadvantaged communities and incentivizing Tribal leadership in project implementation.

This measure was identified out of the PCAP measures to apply for the CPRG funds because the application was elevated repeatedly by diverse groups throughout the State during the CPRG PCAP process. The need to manage biomass waste from forests and farms is a priority for public health, public safety, and climate resilience, having an effect on all Californians due to air quality impacts.

In addition, existing program grantees are developing community benefits plans (as described above). These are living documents that evolve to ensure that outreach and engagement strategies continue and improve over time, and that outcomes are achievable and address community needs and concerns. The community and labor engagement component of these plans include actions to engage diverse stakeholders and historically underrepresented groups; offer career-focused, participatory educational outreach; enable sustained community input for accountability; and facilitate social buy-in and minimize project risks.

Project developers are taking advantage of existing forums to access community leaders without adding work to these leaders' plates: they are presenting at City Council and County Supervisor meetings, as well as existing community forums and planning commission meetings. Interactive and hosted open-house public workshops are held with trusted community groups, including local governments and non-governmental entities. Printed materials are developed to distribute via local fairs and retail sites, as well as via social media, e-mail lists, and partner websites. This proposal would also leverage existing outreach through related State efforts such as the Community Wildfire and Capacity Building Webinars

led by UC Irvine and in partnership with Communities for a New California Education Fund to maximize community engagement if awarded.

Ongoing and Future Engagement: Additional engagement under this proposal will begin with a presentation of the programs this proposal would expand, offering opportunities for public input. These conversations will provide the public with an opportunity to learn more about the programs and offer input on program roll out, requirements for grantees, and to raise any concerns before implementation.

Grant solicitation and guidelines documents implementing expanded programs will continue to require public and community engagement, and the development of outreach and engagement strategies. The list of possible engagement activities provided by the EPA in the CPRG Notice of Funding Opportunity will be provided in the State's program guidelines.

As reflected in the performance measures timeline above, we expect to receive regular reports about the grantees' community engagement activities, implementation of agreed-to public benefits, and other agreements established through community engagement. These reports will show a variety of engagement activities and applications, specific to the geography and community they're serving, and reflective of the diversity of the State of California.

5. JOB QUALITY

As reported by the Department of Energy³³ and the U.S. Bureau of Labor Statistics,³⁴ the jobs in bioenergy are generally high quality, providing family-supporting wages; per the EPA's CPRG requirements, all projects funded with CPRG money will require adherence to prevailing wages. Further, this proposal will incentivize the location of funded projects in low-income and disadvantaged rural communities where high-quality employment options may be harder to find.

This proposal would build on workforce development and job creation efforts implemented by grantees through existing programs. These prioritize the creation and retention of quality jobs and the development of a skilled, diverse, clean energy workforce with opportunities for advancement. Strategic partnerships with workforce development boards, community-based organizations, labor groups, and community colleges will continue to allow project developers to co-develop customized workforce training, promote equity in training and employment, and ensure job opportunities extend to underserved, overburdened, and/or traditionally excluded groups.

In particular, one existing grantee created two new job training and curriculum programs, and by the end of 2024 contracts will be negotiated with labor unions, labor councils, community-based organizations, and others. Workforce development plans under existing programs include goals for creating numbers of jobs in specific fields (e.g., construction, or clean energy), the creation of labor and workforce agreements, targets for a minimum percentage of contractual agreements with women or minority-owned businesses, career-track training and internship opportunities with community-based partners, and more. The DOC expects these successes to be reflected in the work described in this application.

Per the Bureau of Labor Statistics (cited above), the bioenergy industry employs a diversity of high-quality jobs including scientists, chemists, and lab technicians; chemical, civil, and electrical engineers; construction managers, laborers, and equipment operators; foresters, licensed timber operators, geologists, agricultural economists, and truck drivers; plant and facility managers, operators, and industrial hygienists; and sales agents to purchase raw material and output products. These roles are all

³³ Available here: <https://www.energy.gov/energysaver/explore-bioenergy-careers>.

³⁴ Available here: <https://www.bls.gov/green/biofuels/biofuels.htm>.

covered by OSHA standards, and especially activities on an industrial job site. In combination with their location in more rural parts of the State, the jobs will likely be of higher quality than what is otherwise regionally available.

In order to meet these labor needs and recruit a workforce representing the diversity of California, the California Workforce Development Board implements the [High Road Training Partnership](#) initiative to simultaneously addresses income inequality, economic competitiveness, and climate change through regional skills strategies to support economically and environmentally disadvantaged communities across the State and generate family-supporting jobs. In addition, this proposal would leverage significant and relevant workforce development efforts, including the Foundation for Community Colleges \$21.5 million grant to support its “California Resilient Careers in Forestry” proposal, funded by President Biden’s American Rescue Plan.³⁵

Finally, the tertiary impacts of these projects will be significant given applicable domestic content sourcing requirements under the Build America, Buy America (BABA) provisions of the Infrastructure Investment and Jobs Act, as well as via compliance with the Davis Bacon and Related Acts (DBRA): bioenergy facilities will include significant iron and steel components as well as other construction materials, and so will have a positive impact on America’s unionized workforces in these sectors.

6. PROGRAMMATIC CAPABILITY AND PAST PERFORMANCE

a. Past Performance

The DOC has experience in administering several assistance agreements with the federal government, which lay a foundation for success under this award. These include:

1. Project Title: Historical Mine Production Records – Phase Two – Transcribing previously scanned documents, displaying, displaying data on an interactive web map, and providing downloadable PDF versions of the scanned records. National Geological and Geophysical Data Preservation Program
 - a. Assistance Agreement Number: G23AP00279-00
 - b. Agency and Listing Number: USGS, 15.814 – National Geological and Geophysical Data Preservation
 - c. Description of agreement: This project will enable the California Geologic Survey (CGS) to digitally convert a portion of its unique record holdings for easier access by users, as well as preserving them long-term for the future.
 - d. Funder contact: Federal Project Officer, Dr. Lindsay Powers 303-202-4828
 - e. Successful completion: This project is still in progress, but will be successfully achieved via the staffing expertise and time set aside for this work within the CGS and DOC.
2. Project Title: Geologic Mapping and Geochemical Reconnaissance of Tertiary nonmarine sedimentary formations for lithium potential in southeastern California
 - a. Assistance Agreement Number: G23AC00509-00
 - b. Agency and Listing Number: USGS, 15.073 Earth Mapping Resources Initiative
 - c. Description of agreement: This project will enable the CGS to obtain new detailed geologic mapping and geochemical reconnaissance help support Earth Mapping Resources Initiative and National Cooperative Geologic Mapping Program objectives.
 - d. Funder contact: Federal Project Officer: Michael Marketti 703-648-6976
 - e. Successful completion: This project is still in progress but will be successfully achieved via the staffing expertise and time set aside for this work within the CGS and DOC, as well as close partnerships with stakeholders and the community present in the areas of interest.

³⁵ <https://www.eda.gov/arpa/>

3. Project Title: New Geologic Mapping and Digital Compilation in California
 - a. Assistant Agreement Number: G23AC00402-00
 - b. Agency and Listing Number: USGS, 15.810 – National Cooperative Geologic Mapping
 - c. Description of Agreement: This project provides funding from USGS to support CGS State Component of the National Cooperative Geologic Mapping Program.
 - d. Funder contact: Federal Project Officer: Michael Marketti 703-648-6976
 - e. Successful completion: This project is still in progress, but will be successfully achieved via the staffing expertise and strong USGS partnerships within/with the CGS and DOC.
4. Project Title: FEMA Approved Community Outreach and Mitigation Strategies
 - a. Assistant Agreement Number: EMF-2022-CA-00019-S01
 - b. Agency and Listing Number: FEMA, no listing number
 - c. Description of Agreement: CGS is working with world-renowned experts in the tsunami and coastal hazard mitigation and engineering fields, developing new and detailed products for improving community resilience. This is the second phase of a three-phase process for completing models and products for the entire coast.
 - d. Funder contact: FEMA Regional Project Officer: Kate Kilduff 866-927-5646
 - e. Successful completion: This project is still in progress but will be successfully achieved via the staffing expertise within the CGS and DOC, and the high levels of interest in the project from our Governor’s Office and affected communities.
5. Project Title: Plugging and abandonment of orphan wells and associated facilities and pipelines
 - a. Assistant Agreement Number: D22AP00167-00
 - b. Agency and Listing Number: DOI, 15.018 Energy Community Revitalization Program
 - c. Description of Agreement: This project provides funding for Plugging and abandonment services.
 - d. Funder contact: FEMA Regional Project Officer: Matthew Reichert 703-914-3710
 - e. Successful completion: This project is still in progress but will be successfully achieved via the staffing expertise within the Geologic Energy Management Division at the DOC, complemented by strong public and statewide administration support.

b. Reporting Requirements

For the first four assistance agreements listed in 6.a. above, DOC has met all reporting requirements in this agreement to date. DOC has also routinely met with, and kept the grantor apprised of, its progress and work products. For the fifth agreement (Plugging and abandonment of orphan wells and associated facilities and pipelines), DOC is tracking progress through milestones for each abandonment. Field work is documented weekly. Invoices are submitted and paid only to the matching progress milestone. The DOC submits quarterly performance, financial reporting, and eventually final reporting. All reporting has been done timely and DOC regularly meets with the grantor as needed.

c. Staff Expertise

The DOC fosters the wise use and conservation of energy, land and mineral resources and administers nearly a dozen competitive grant programs, in areas as diverse as carbon negative bioenergy, landscape management planning and capacity building, and climate-smart land management block grants for agricultural conservation easements.³⁶ DOC has successfully administered many of these programs for many decades. While the biofuels program is only a few years old, it has benefitted from DOC’s depth of experience and lessons learned.

³⁶ DOC. <https://www.conservation.ca.gov/about-us>.

The current Biomass Aggregation Pilot Program is administered at the Governor's Office of Planning and Research (OPR), who developed the concept with a work group in 2018 and has since funded, developed, and administered the program to its maturity point today. The program location is in flux, however, given the role of the OPR in leading planning and research: the exceptional job they've done in implementing this program means that it is past the research stage, and has moved into the central body of work the State does in forest management and community economic development. This program may continue to be housed at OPR through 2030, or it may move to the DOC for long-term implementation. This decision will not affect the implementation of this proposal, funding needs, or program effectiveness. It is solely an administration decision.

The staff administering the Biomass Aggregation Program, Michael Maguire, is currently at OPR and was part of the program's entire lifecycle: from concept development to implementation and oversight over the last six years. The Program has matured under Michael's leadership, and he has expanded it as funding allows, to include consideration of logistical variables such as supply insurance, tools for biomass source identification, and online market strategy supports, as well as building administration understanding of forest health and greenhouse gas sequestration/avoided emissions impacts. We expect Michael to continue to help lead this proposal no matter whether it's housed at the OPR or DOC.

The current Bioenergy Program Manager, Jenny DiStefano, has done grant program development, management, administration, and evaluative work at DOC for more than 20 years and has seen a broad variety of projects, applicants, fiscal issues, and successes. Her expertise has helped this new program to be implemented smoothly, and to great success as reported by agency partners, grantees, and others invested in its success. While we expect to hire additional staff to support program expansion, she will continue to be available to offer her support and experience.

The Bioenergy Program Executive Sponsor, Elizabeth Betancourt, has worked in rural development, climate sustainability, and forest and watershed management for 20 years, including with extremely diverse parties such as: private companies, non-profit groups, environmental justice advocates, local government staff, elected officials, Tribes and Tribal representatives, and many others. This experience helped place public outreach to Tribes and environmental justice communities at the core of the existing Biofuels Program, as well as engagement with potential applicants and project developers to ensure a well-rounded understanding of emerging technologies and their setting in the State's diverse communities. Elizabeth's experience with climate emissions reporting, including scopes 1, 2, and 3, allows her to work effectively with project developers on addressing reporting gaps and strategic project design to ensure emissions reductions. Elizabeth will continue to provide program consultation and oversight as the executive sponsor of the Bioenergy Program and will provide a coordinating or oversight role on the Biomass Aggregation Pilots, pending a final decision on program location.