

CALIFORNIA ENERGY COMMISSION

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January 17, 2017

Pedro Nava
Chair, Little Hoover Commission
925 L Street, Suite 805
Sacramento, CA 95814

RE: Response Letter to Little Hoover Commission January 26, 2017 Public Hearing on Forest Management in California in Response to the Tree Mortality Crisis

Dear Chair Nava:

Thank you for notifying the California Energy Commission of the Little Hoover Commission's review of the state's coordination and collaboration among its own agencies and with federal, local, private and nonprofit organizations in response to unprecedented tree die-offs.

Energy Commission staff participates in the Tree Mortality Task Force, which includes state and federal agencies, local governments, utilities, and various stakeholders. The Tree Mortality Task Force is tasked with coordinating emergency protective actions, and monitoring ongoing conditions to address the vast tree mortality resulting from four years of unprecedented drought and the resulting bark beetle infestations across large regions of the State.

The Energy Commission's research and development on biomass in general, and forest biomass and forest management activities in particular, is primarily supported under the Electric Program Investment Charge (EPIC) Program and the Alternative and Renewable Fuel and Vehicle Technology Program's Sustainability Research.

The EPIC Program's 2012-2014 Triennial Investment Plan allocated 20 percent of funding, or about \$26 million, for bioenergy technology development and demonstration (TD&D). The EPIC Program's 2015-17 Triennial Investment Plan allocated \$23 million for bioenergy, with \$15 million for forestry bioenergy TD&D and applied R&D.

Additionally, in the transportation sector, the Energy Commission's development of forest biomass technology and deployment of commercial forest biofuel is supported under the Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP). The ARFVTP provides up to \$100 million per year for projects that will "transform California's fuel and vehicle types to help attain the state's climate change policies."

Specifically in forest biomass and forest management activities, the ARFVTP funds projects that produce biofuels from waste-based and renewable feedstocks to support California's petroleum displacement, GHG emission reduction, and air quality improvement goals. To date, the ARFVTP has provided \$5.3 million, specifically to forest biofuel projects. The Energy Commission is considering a targeted ARFVTP solicitation for forest biofuels projects in the near future. Since many forest communities are among the most disadvantaged in the state, and lie within or in near proximity to impacted air districts, such a solicitation would complement emerging State policy goals.

Research and development on forest biomass and forest management activities address the broad challenges to the widespread commercialization of bioenergy systems. For the applied R&D of the first EPIC investment plan, in 2012-2014, the emphasis was on modular bioenergy systems for forest/urban interface which will support sustainable collection, management, and power generation from forest residue thinning, as well as community-scale forestry-biomass demonstration projects and low emission or zero emission distributed generation technologies, including combined heat and power.

The R&D Division manages several active research and development projects funded under the 2012-2014 EPIC plan and the Natural Gas Research and Development Program (Table 1).

As part of the second EPIC investment plan and in response to the Governor's Proclamation of a State of Emergency¹ to protect communities against unprecedented tree die-off, the Energy Commission released an EPIC solicitation to address fire-hazard reduction focused on forestry biomass to energy. The Energy Commission accelerated the release of the bioenergy solicitation by a year and dedicated \$15 million of the \$23 million available for bioenergy research to support technologies that can help mitigate drought-related tree mortality.

The solicitation, developed in coordination with the California Public Utilities Commission, seeks solutions for biomass from high hazard zones. The Applied Research and Development (AR&D) funding in this solicitation supports early stage development on technologies and strategies for the sustainable use of forest residue and thinning to generate renewable electricity, while reducing catastrophic fire hazards. The TD&D component supports the demonstration of innovative technologies, techniques, and deployment strategies to expand the sustainable use of California's woody biomass from high hazard zones (per the Governor's Proclamation of a State of Emergency) for electricity generation and, where possible, thermal energy. Additionally, the woody biomass must be a byproduct of sustainable forest management activities as defined by the CPUC's BioMAT program.

Furthermore, several critical barriers exist that must be overcome for effective utilization of forest biomass for transportation fuels. These include: high costs of aggregating feedstocks and delivering finished biofuels from remote and inaccessible locations, and high capital costs of mature technologies that inhibit investment. Additionally, emerging technologies for woody biomass conversion show significant promise, but require public financial support to help mitigate perceived risks and overcome early technology development costs. The solution to addressing these critical barriers may require targeted government funding in the near term.

The Energy Commission's ARFVTP has funded a comprehensive investigation of sustainable forest biomass utilization, including four forest biomass pilot-scale demonstration projects. These projects are described in Table 2 and show that pilot-scale technologies are being developed for the commercial production of multiple fuels, including biomethane, ethanol, and renewable gasoline.

¹ The Proclamation is at: https://www.gov.ca.gov/docs/10.30.15_Tree_Mortality_State_of_Emergency.pdf Order 11 reads: "The California Energy Commission shall prioritize grant funding from the Electric Program Investment Charge for woody biomass-to-energy technology development and deployment, consistent with direction from the California Public Utility Commission."

Chair Pedro Nava

January 9, 2017

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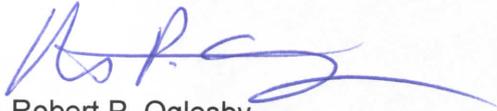
Additionally the ARFVTP has funded research conducted by the U.S. Forest Service. The US Forest Service, supported by university and private subcontractors, recently completed an applied research project, which provides tools to evaluate and prescribe sustainable harvest and utilization of forest biomass in California. Tasks include:

- Developing a revised version of BioSum model, which provides an analysis and planning tool for modeling the impacts of alternative forest treatment prescriptions under site-specific conditions in California forest lands.
- Quantifying carbon storage and mass balances following wildfires, by measuring carbon losses from fire compared to adjacent unburned lands, to quantify benefits from treatments to reduce the intensity of high severity fires.
- Measuring forest ecological impacts from recent fires, to measure rates of forest recovery from high severity wildfires; modeling impacts of biofuel demand, to develop scenarios measuring the economic viability and potential locations of forest biofuel facilities, based on alternative technology, cost and price assumptions.
- Quantifying the efficacy of fuel reduction treatments, looking at their impacts on reducing wildfire severity and lowering carbon emission from wildfire.

Energy Commission subject matter experts for various topics related to tree mortality include: Laurie ten Hope, Aleecia Gutierrez, John Kato, and Rizaldo Aldas.

I hope this information is useful. Please feel free to contact Laurie ten Hope, Energy Research and Development Division at (916) 327-1551 if you have further questions.

Sincerely,



Robert P. Oglesby
Executive Director

Enclosures:

Table 1: Electric Program Investment Charge (EPIC) and Natural Gas Research and Development Programs – Forestry /Woody Biomass Funded Projects

Table 2: Alternative and Renewable Fuel and Vehicle Technology Program – Forestry/Woody Biomass Funded Projects

cc: Robert B. Weisenmiller, Chair
Laurie ten Hope, Deputy Director, Energy Research and Development Division
Carole D'Elia, Executive Director, Little Hoover Commission
John Kato, Deputy Director, Fuels and Transportation Division

Table 1: Electric Program Investment Charge (EPIC) and Natural Gas Research and Development Programs – Forestry/Woody Biomass Funded Projects

Demonstrating Bioenergy Solutions that Support California's Industries, the Environment, and the Grid (PON 14-305)						
Project Title	Researcher	Project Description	Amount	Match	End Date	Feedstock Info volume/year MW & MWh
North Fork Community Power Forest Bioenergy Facility (EPC-14-033)	The Watershed Research and Training Center	Install and demonstrate a commercial-scale gasification-to-electricity facility that converts wood waste from forest management activities to renewable electricity while providing reduced fire risk, watershed protection, improved air quality, other environmental benefits, and local jobs. The project is located in North Fork, CA.	\$4,965,420	\$1,169,216	9/30/2018	Forest Biomass 8000 BDT/year *1MW (85% capacity factor) 7446 MWh/year
Advancing Cleaner, Less Costly, More Reliable Distributed Generation to Enable Customer Solutions and Zero-Net Energy Communities (PON 14-303)						
Project Title	Researcher	Project Description	Amount	Match	End Date	Feedstock Info volume/year MW & MWh
Modular Biomass Power Systems to Facilitate Forest Fuel Reduction Treatments (EPC-14-024)	West Biofuels, LLC	Develop a pilot-scale modular biomass gasification system integrated with a high-efficiency lean-burn engine in order to convert forest residues into renewable grid power. This project will reduce the cost and increase the benefits of forest fuel reduction projects in California's high fire risk regions.	\$2,000,000	\$539,914	3/31/2018	Forest Biomass 500 BDT/year 500MWh/year Capacity of the system: 2 MWe
Cleaner Air, Cleaner Energy: Converting Forest Fire Management Waste to On Demand Renewable Energy (EPC-14-051)	All Power Labs Inc.	Design, deploy and test 150kW modular biomass gasifier technology that can convert forest slash into renewable energy. The gasifier will meet applicable air quality standards. The results of the demonstration will be analyzed to determine (1) optimal siting to enhance grid stability, and (2) impact of monetizing current forest waste as fuel on ability to increase forest thinning and lower wildfire risk.	\$1,990,071	\$476,250	3/31/2019	Forest Biomass Feedstock rate: 1kg/kWh 780 MWh/year Capacity of the system: 150KW (numbers represent pilot scale testing stage)

Demonstrating Clean Energy Solutions That Support California's Industries, the Environment, and the Electrical Grid (PON 14-307)

Project Title	Researcher	Project Description	Amount	Match	End Date	Feedstock Info volume/year MW & MWh
Advancing Biomass Combined Heat and Power Technology to Support Rural California, the Environment, and the Electrical Grid (EPC-14-082)	Sierra Institute for Community and Environment	Deploy a biomass-fired CHP system to provide heat and power to Plumas County health facilities and to dormitories at Feather River College. Biomass from local forest clearing operations will be used by a new biomass boiler to supply heat to an Organic Rankine Cycle (ORC) power unit. Waste heat from the ORC will be piped all buildings to provide source heat for heat pumps, improving their performance for the winter heating season. New heat pumps will be deployed in dormitories to replace existing propane/electric resistance heaters.	\$2,603,228	\$652,400	7/31/2018	Forest Biomass Replaces > 17,000 gallons of propane/yr Replaces electric boiler with renewable biomass heat 1,100 tons forest biomass /year 65kW CHP net 59kW facility use

Advancing Clean Energy from Biogas, Biomethane and Natural Gas (PON 14-505)

Project Title	Researcher	Project Description	Amount	Match	End Date	Feedstock Info volume/year MW & MWh
Renewable Natural Gas Production from Woody Biomass via Gasification and Fluidized-Bed (PIR-14-023)	University of California, San Diego	Develop and demonstrate a novel bioenergy pathway which converts woody biomass into renewable natural gas via fluidized-bed methanation.	\$1,000,000	\$237,000	12/29/2017	Woody Biomass Biomethane bench-scale study – proving the methanation concept

Table 2: Alternative and Renewable Fuel and Vehicle Technology Program - Forestry /Woody Biomass Funded Projects

Funded Projects						
Company	Project Description	Amount	Match	Fuel Type Produced	End Date	
G4 Insights	Test and refine a thermo-chemical process technology for converting forest biomass to pipeline quality biomethane for transportation use. Next steps would be a demonstration-scale plant.	\$1,229,966	\$1,232,257	Biomethane	5/15/2015	
United States Forest Service	Investigate the sustainability of forest biomass for renewable biofuel production. This included collecting field data from forest management activities, analysis of field data, case studies of biomass utilization activities, and decision tools for future projects.	\$2,088,716	N/A	N/A	3/31/2016	
West Biofuels	Combine a commercially-proven thermochemical process for converting woody biomass residues to syngas with a commercial catalyst to develop and validate, at pilot-scale, a synthesis process to convert the syngas to mixed alcohols, with an end product of ethanol for transportation use.	\$1,000,000	\$1,000,000	Ethanol	8/31/2018	
Altex Technologies Corporation	Develop a 1 barrel per day Biomass Conversion to Synthetic Gasoline System (BCSGS) and demonstrate that the process produces gasoline at less than \$2/gallon, with less than a 30 gCO ₂ e/MJ carbon intensity when scaled up. Under the project, California waste-based biomass and energy crops will be converted to a renewable gasoline that will meet the gasoline ASTM standards.	\$999,993	\$1,814,820	Renewable Gasoline	9/1/2018	