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**BEFORE THE PUBLIC UTILITIES COMMISSION**
**OF THE STATE OF CALIFORNIA**

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| Order Instituting Rulemaking to Continue Implementation and Administration of California Renewables Portfolio Standard Program. | Rulemaking 11-05-005<br>(Filed May 5, 2011) |

# PETITION OF THE CENTER FOR BIOLOGICAL DIVERSITY, CENTRAL CALIFORNIA ENVIRONMENTAL JUSTICE NETWORK, CENTRAL VALLEY AIR QUALITY COALITION, THE JOHN MUIR PROJECT, AND THE CALIFORNIA CHAPARRAL INSTITUTE TO MODIFY DECISION 14-12-081 AND THE BIOMAT TARIFF.


Lauren Packard, Staff Attorney
Haley de Genova, Law Clerk
Center for Biological Diversity
1212 Broadway, Ste. 800
Oakland, CA 94612
(510) 844-7100 ext. 303
lpackard@biologicaldiversity.org

Nayamin Martinez, MPH, Director
Central California Environmental Justice Network
4991 McKinley Ave, Ste. 109
Fresno, CA 93727
(559) 272-4874 ext. 15
Nayamin.martinez@ccejn.org

Catherine Garoupa White, PhD,
Executive Director
Central Valley Air Quality Coalition
4991 E McKinley Ave, Ste. 109
Fresno, CA 93727
(559) 960-0361
catherine@calcleanair.org

Chad Hanson, PhD, Ecologist & Director
John Muir Project of Earth Island Institute
P.O. Box 897
Big Bear City, CA 92314
(530) 273-9290
Cthanson1@gmail.com

Richard Halsey, Director
California Chaparral Institute
P.O. Box 545
Escondido, CA 92033
(760) 419-5760
rwh@californiachapparal.org

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## I. EXECUTIVE SUMMARY

Biomass energy, particularly woody biomass energy—energy derived from burning plant matter from the forest—is dirty. Incinerating whole trees and parts of trees releases incredibly large quantities of carbon pollution at the smokestack, in addition to huge quantities of health-harming air pollution such as soot, smog, and toxins. Smaller power plants that are not subject to the stringent emissions controls applicable to larger facilities are especially polluting. Acquisition of feedstock for power plants that burn woody biomass harms forest ecosystems that have evolved to rely on a diverse array of plant matter at all life stages and reduces forests' crucial ability to sequester carbon.

Yet, woody biomass energy is not only encouraged but heavily subsidized. Ratepayers foot the ever-growing bill for this incredibly harmful energy. The science is clear that burning trees is not a climate solution. In fact, this practice is incredibly climate-damaging. This petition calls on the California Public Utilities Commission to stop allowing climate damaging projects to benefit from ratepayer subsidies by updating the eligibility requirements for woody biomass feed-in-tariffs to require a showing of net greenhouse gas emissions reductions *before* woody biomass power plants can receive ratepayer money. This change is necessary to ensure California can meet its climate goals on a time frame relevant to averting the worst of the climate crisis.

## II. GLOSSARY OF TERMS

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| **BIOMAT** | Bioenergy Market Adjusting Tariff |
| **BIORAM** | Bioenergy Renewable Action Mechanism |
| **CALFIRE** | California Department of Forestry and Fire Protection |
| **CARB** | California Air Resources Board |
| **CATEGORY 1 FEEDSTOCK** | Wastewater, municipal organic waste, food processing, codigestion |
| **CATEGORY 2 FEEDSTOCK** | Byproducts of dairy and agriculture |
| **CATEGORY 3 FEEDSTOCK** | Byproducts of "sustainable forest management" |
| **CEC** | California Energy Commission |
| **COMMISSION** | California Public Utilities Commission |
| **GHGs** | Greenhouse Gases |
| **RPS** | Renewable Portfolio Standard |

## III. SUMMARY OF POSITION AND INTRODUCTION

Pursuant to Rule 16.4 of the California Public Utilities Commission's Rules of Practice and Procedure, the Center for Biological Diversity, Central California Environmental Justice Network, Central Valley Air Quality Coalition, the John Muir Project, and the California Chaparral Institute (collectively, Petitioners) submit this petition to address the need to ensure generation facilities benefiting from the Bioenergy Market Adjusting Tariff (BioMAT) or the Bioenergy Renewable Action Mechanism (BioRAM) demonstrate net greenhouse gas emissions reductions.

The BioMAT and the BioRAM—two vehicles designed to facilitate the purchase of bioenergy from small- to mid-scale producers, respectively—are part of the Renewable Portfolio Standard (RPS). Although the California Energy Commission sets the floor for eligibility in the RPS, the California Public Utilities Commission (Commission) can set additional eligibility criteria for the BioMAT and BioRAM, and did so in Decision 14-12-081[1] and Decision 16-10-025.[2]

Petitioners request that Decision 14-12-081 and the BioMAT Tariff be modified such that sellers participating in the BioMAT must demonstrate not only that their Category 3 feedstock derives from the five processes outlined in Decisions 14-12-081 and 16-10-025, but also that the energy they produce is carbon neutral or better.

These changes are necessary because:

- The BioMAT is not operating as intended: instead of accruing environmental and climate benefits at competitive prices, energy generation facilities emit

1 D. 14-12-081, Decision Implementing Senate Bill 1122 (Dec. 26, 2014), https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M143/K960/143960061.pdf (creating BioMAT).
2 D. 16-10-025, Decision Implementing Provisions of Governor's Proclamation of a State of Emergency Related to Tree Mortality and Senate Bill 840 Related to the Bioenergy Feed-in Tariff in the Renewables Portfolio Standard Program (Oct. 28, 2016), https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M169/K115/169115610.PDF (identifying High Hazard Zones).

greenhouse gases, criteria pollutants, and hazardous air pollutants (especially in disadvantaged communities) at exorbitant prices;
- Energy derived from woody biomass is consistently more climate-damaging than energy derived from fossil fuels per megawatt-hour produced, even when tree regrowth is accounted for;
- Harvest of woody biomass feedstock harms forest ecosystems and wildlife; and
- Ratepayers should not have to subsidize expensive energy, environmentally damaging that has not demonstrated climate benefits.

Petitioners submit this petition more than a year after the effective dates of D.14-12-081 because implementation of the BioMAT and BioRAM has revealed their environmental, public health, and climate consequences as well as the exorbitant prices sellers have charged per megawatt-hour—costs that are unjustly passed onto ratepayers. A BioMAT program review initiated on November 28, 2017—more than a year after the effective date of D.14-12-081—revealed that several BioMAT facilities may harm air quality in disadvantaged communities and BioMAT facilities, especially those using Category 3 feedstock, and may not result in net greenhouse gas (GHG) emissions reductions.[3] Meanwhile, California has adopted even more stringent climate goals that underscore the importance and urgency of transitioning to truly clean energy.[4] Thus, it is an opportune moment for the Commission to reconsider the issue of eligibility in the BioMAT and BioRAM.

This Petition proceeds in four parts. First, it outlines the interests of the petitioners. Second, it describes current legislative and regulatory treatment of biomass energy. Third, it outlines the factual bases for Petitioners' proposed modifications. Lastly, it outlines the relief

3 California Public Utilities Commission Energy Division, Bioenergy Market Adjusting Tariff (BioMAT) Program Review and Staff Proposal (Oct. 30, 2018) (Draft Staff Proposal) at 7, 11, *available at* https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy/Energy_Programs/Electric_Power_Procurement_and_Generation/Renewable_Energy/BioMAT%20Program%20Review%20and%20Staff%20Proposal.pdf.
4 *See* Section III.

requested. Pursuant to Rule 16.4(b), specific wording to carry out this requested relief is provided in Appendices A and B.

## IV. INTERESTS OF THE PETITIONERS

The Center for Biological Diversity (Center) was a party to Rulemaking 11-05-005.[5] The Center is a non-profit advocacy organization with more than 1.7 million members and supporters nationwide and over 200,000 members and supporters in California. The Center is committed to protecting endangered species, public health, biodiversity, and to promoting clean, and renewable energy across the nation through legal action, scientific advocacy, creative media, and grassroots activism. The Center has worked extensively to further a speedy and just transition to clean, renewable energy and has also advocated and litigated on behalf of communities impacted by fossil fuel extraction, processing, and infrastructure.

Central California Environmental Justice Network (CCEJN) is a coalition of grassroots environmental justice groups serving small, isolated, poor rural communities that hold little political clout but suffer multiple environmental harms throughout the San Joaquin Valley. CCEJN has years of experience coordinating community air monitoring across the San Joaquin Valley, including near bioenergy facilities such as Rio Brava in Fresno, and advocating for cleaner air. As such, regulation of biomass energy generation facilities intimately affects CCEJN and its members. CCEJN obtained its first paid staff in 2013—over a decade after its founding—and did not participate in the proceeding until now due to resource constraints.

Central Valley Air Quality Coalition (CVAQ) leads a partnership of more than 70 organizations representing thousands of Californians in the fight for clean air for the San Joaquin

5 *See* Comments of the Center for Biological Diversity Re: Staff Proposal on Implementation of SB 1122 (Dec. 20, 2013); Reply Comments of the Center for Biological Diversity Re: Staff Proposal on Implementation of SB 1122 (Jan. 16, 2014).

Valley, the nation's most polluted air basin. Its mission is to raise awareness of air quality issues, act as a watchdog, advocate for policies that advance clean air, and mobilize communities. As such, issues that affect air quality—such as regulation of biomass energy generation—are of great importance to CVAQ and its member groups. CVAQ did not participate in the initial proceeding because of resource constraints—it has only one full-time and one part-time staff member.

The John Muir Project (JMP) is a non-profit organization dedicated to the ecological management of our federal public forestlands to support and restore the full complement of native biodiversity in these forest ecosystems. JMP's focus is primarily on the damage that government timber sales—including post-fire timber sales—do to forest ecology, and therefore it has a strong interest in policies that impact forest management, such as the BioMAT and BioRAM. JMP did not participate in the proceeding because the extent to which state woody biomass energy feed-in-tariffs would incentivize ecologically damaging forest activities was initially unclear.

The California Chaparral Institute is the only non-profit organization dedicated to protecting and preserving the imperiled chaparral ecosystem. It advocates for and promotes fire risk reduction based on science and community protection. Because biomass energy is touted as a fire management tool, its regulation is of great importance to the California Chaparral Institute. The California Chaparral Institute did not participate in the proceeding initially due to resource constraints—it is primarily a volunteer organization with only one full-time staffer.

## V. CURRENT REGULATORY AND LEGISLATIVE TREATMENT OF WOODY BIOMASS ENERGY

Established in 2002, California's RPS program requires retail sellers of electricity to procure increasing amounts of renewable energy over time. Since then, the state Legislature has

modified, increased, and accelerated the RPS program several times. Most recently, in 2018, Governor Brown issued Executive Order B-55-18, setting a statewide goal of carbon neutrality by or before 2045 and net negative GHG emissions thereafter[6] in order to address the threat of climate change by building "a sustainable future without reliance on fossil fuels." [7] To support this goal, Senate Bill (SB) 100 mandates that 100 percent of total retail sales of electricity come from renewable energy resources and zero-carbon resources by 2045[8] to ensure the state's energy grid is "100% clean before the middle of the century."[9] The Commission "shall incorporate this policy into all relevant planning."[10] SB 100 was passed so that "California remains the world's clean energy superpower" and "lead[s] the nation in addressing the threat of climate change."[11] Woody biomass is currently categorized as a source of renewable energy that is eligible for the RPS program despite the GHG emissions that are produced through its generation.[12]

An energy generation facility that uses an RPS-eligible resource—such as woody biomass—can apply to the California Energy Commission (CEC) for RPS certification.[13] Once the CEC certifies the facility, the facility is eligible for the RPS.[14] Then, a load-serving entity

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6 Governor Edmund G. Brown Jr., Executive Order B-55-18 (Sept. 9, 2018), https://www.ca.gov/archive/gov39/wp-content/uploads/2018/09/9.10.18-Executive-Order.pdf.
7 The Office of the Governor Edmund G. Brown Jr., Letter to the Honorable Ryan Zinke, Secretary, U.S. Department of the Interior re: Comments on the BLM Notice of Intent to Prepare for Potential Amendment to the Resource Management Plan for the Bakersfield Office, California and to Prepare an Associated Supplemental Environmental Impact Statement; 83 Federal Register 39116 (August 8, 2018) (Sept. 7, 2018).
8 Sen. Bill No. 100, Ch. 312, Reg. Sess. 2017-2018 (Cal. 2018), https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB100.
9 Sen. Bill No. 100, Assem. Floor Analysis (Aug. 8, 2018), *available at* https://leginfo.legislature.ca.gov/faces/billAnalysisClient.xhtml?bill_id=201720180SB100.
10 *Id.*
11 Sen. Bill No. 100, Sen. Floor Analysis (Aug. 28, 2018), *available at* https://leginfo.legislature.ca.gov/faces/billAnalysisClient.xhtml?bill_id=201720180SB100.
12 *See* Section VI.a *supra*.
13 California Energy Commission, RPS Eligibility Guidebook, Ninth Edition (April 27, 2017) (RPS Eligibility Guidebook) at 45-50, *available at* https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=16-RPS-01.
14 RPS Eligibility Guidebook.

(LSE) may procure from the facility to meet the LSE's RPS obligations. In some circumstances, an energy generation facility must report its annual generation to the CEC.[15] In all cases, LSEs must submit annual compliance reports to the Commission to demonstrate their procurement meets RPS guidelines.[16] The Commission is responsible for establishing compliance targets for the amount of eligible renewable energy resources retail sellers of electricity must procure and implements and administers RPS compliance rules for California's retail sellers of electricity. Pub. Utilities Code § 399.15(b).

There are multiple programs within the RPS to encourage procurement from renewable and distributed generation. Two are relevant here: the BioMAT and the BioRAM.

**a) BioMAT**

SB 1122 established a procurement program for small bioenergy resources through the BioMAT.[17] The BioMAT is a feed-in tariff program for bioenergy renewable generators less than 3 megawatts (MW) in size.[18] The BioMAT established a 250 MW procurement program for small-scale bioenergy projects.[19] BioMAT allocates procurement to the distinct bioenergy areas of Biogas, Agriculture, and Sustainable Forest Management.[20] The BioMAT offers long-term contracts and price certainty in order to accelerate investment in small-scale bioenergy and achieve market transformation.[21]

The goal of the BioMAT is to provide "benefits to ratepayers and the environment from reducing air pollution and global warming emissions."[22] While eligibility for BioMAT is

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15 *Id.* at 56-57.
16 D.12-06-038, Decision Setting Compliance Rules for the Renewables Portfolio Standard Program (June 27, 2012), https://docs.cpuc.ca.gov/WORD_PDF/FINAL_DECISION/169704.pdf.
17 Sen. Bill No. 1122, Ch. 612, Reg. Sess. 2011-2012 (Cal. 2012); *see also* D.14-12-081 (Dec. 26, 2014), implementing SB 1122.
18 Cal. Pub. Util. Code § 399.20(b).
19 *Id.* § 399.20(f)(2).
20 *Id.* § 399.20(f)(2)(A)(i-iii).
21 *Id.* § 399.20(f)(2).
22 SB 1122, Assem. Floor Analysis (Aug. 24 2012), *available at* http://leginfo.legislature.ca.gov/faces/billAnalysisClient.xhtml?bill_id=201120120SB1122.

consistent with the RPS program as defined in the RPS Eligibility Guidebook, RPS eligibility is not sufficient for BioMAT eligibility.[23] The BioMAT tariff contains "separate and additional rules and requirements that apply to BioMAT projects" to provide air pollution and climate benefits.[24]

In Decision 14-12-081, the Commission clarified eligibility requirements for the BioMAT, including by defining the term "sustainable forest management," which is unique to Section 399.20 in the California Public Resources Code and has no regulatory definition in the California Code of Regulations.[25] The Commission recognized that the term "sustainable forest management" could be construed in a variety of ways and is "embedded in…controversies."[26] Fire threat reduction activities, fire safe clearance activities of government agencies and utilities, infrastructure clearance projects of government agencies and utilities, and other sustainable forest management were all designated as elements of "sustainable forest management."[27] For the sake of clarity and transparency, the Commission adopted an "operational characterization" of "other sustainable forest management" via a publicly available, detailed eligibility checklist of qualifying management activities compiled by California Department of Forestry and Fire Protection (CAL FIRE) staff and prepared by BioMAT participants.[28] At the same time, the Commission acknowledged the shortcomings of this definition, which is a product of CAL FIRE's unique interpretation of what constitutes sustainable forest management and is therefore susceptible to bias.[29] CALFIRE's mission is firefighting and fire prevention—not ecological or

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23 D. 20-08-04, Decision Revising the Bioenergy Market Adjusting Tariff Program (Sept. 1, 2020) at 40, https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M346/K112/346112503.PDF.
24 D. 20-08-043 at 40.
25 D. 14-12-081 (Dec. 26, 2014) at 22; Conclusion of Fact 7 ("The term 'sustainable forest management' is not defined in SB 1122.").
26 *Id.* at 23; 31; Conclusion of Fact 8 ("The term 'sustainable forest management' does not have a single, widely accepted definition.").
27 *Id.*; Conclusions of Law 15-20.
28 *Id.* at 31-32; Conclusion of Law 21-22.
29 *Id.* at 31-32. In Decision 16-10-025 (Oct. 28, 2016) the Commission clarified that this category also includes fuel obtained from high hazard zones designated by CALFIRE in accordance with *infra* 30.

climate sustainability—and therefore any definition of "sustainable forest management" will reflect a bias towards activities the agency presumes will fight or minimize fire. [30]

The BioMAT has been modified in response to legislative mandates. In 2016, eligibility requirements for participation in the BioMAT were updated in response to the 2015 Emergency Proclamation and Senate Bill 840.[31] In 2017, the nameplate capacity for bioenergy facilities eligible for the BioMAT program was increased to 5 MW.[32]

In 2018, in response to a program review that revealed BioMAT facilities—especially those using Category 3 feedstock—may not result in net GHG emissions reductions,[33] Energy Division staff asked stakeholders whether the Commission should "establish a requirement that facilities reduce [pollution and GHG] emissions as a condition for BioMAT eligibility." After gauging considerable interest in this provision, which would align the BioMAT with the intent of the legislature, Energy Staff developed a draft BioMAT Emissions Lifecycle Assessment Calculator, which it released in July 2019.[34] At a public workshop on July 19, 2019 and in comments, stakeholders pointed out that, while the draft calculator represented a good start, it needed further development before it could be applied in practice.[35] On March 10, 2020, the final staff proposal recommended, *inter alia*, that the Commission establish a technical working group

30 *See e.g.* CALFIRE, About us, https://www.fire.ca.gov/about-us/ (accessed September 7, 2020).
31 D. 16-10-025 (Oct. 28, 2016) (implementing Sen. Bill 840, Ch. 341, 2015 – 2016, Reg. Sess. (Cal. 2016) and Governor Edmund G. Brown, Proclamation of a State of Emergency (Oct. 30, 2015), https://www.ca.gov/archive/gov39/wp-content/uploads/2017/09/10.30.15_Tree_Mortality_State_of_Emergency.pdf (2015 Emergency Proclamation).
32 D. 17-08-021, Decision Revising Eligibility Requirements for the Renewables Portfolio Standard Feed-In Tariff in Accordance with Assembly Bill 1979 and Assembly Bill 1923 (Aug. 28, 2017), https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M194/K763/194763138.PDF (implementing Assem. Bill 1923, Ch. 663, 2015-2016, Reg. Sess. (Cal. 2016) and Assem. Bill 1979, Ch. 665, 2015-2016, Reg. Sess. (Cal. 2016).
33 Draft Staff Proposal.
34 The draft lifecycle assessment calculator is available at https://www.cpuc.ca.gov/SB_1122/.
35 Comments of Center for Biological Diversity, Sierra Club, and the Partnership for Policy Integrity on Order Instituting Rulemaking to Continue Implementation and Administration, and Consider Further Development, of California Renewables Portfolio Standard Program (Apr. 1, 2020) at 9-11.

to develop a project-specific lifecycle GHG calculator to quantify program emissions impacts.[36] Most recently, the Commission adopted this proposal but declined to address the issue of eligibility.[37]

**b) BioRAM**

In 2015, Governor Brown issued an Emergency Proclamation on Tree Mortality in response to prolonged drought and a bark-beetle infestation that resulted in a large scale tree die-off that increased the risk of devastating wildfires and concomitant air pollution and greenhouse gas emissions.[38] The Emergency Proclamation ordered the Commission to extend contracts to existing bioenergy facilities that received feedstock from areas designated as "high hazard zones"—areas with a large number of dead and dying trees identified by the California Energy Commission and other state agencies as representing heightened risks from wildfires and falling trees due to proximity to roads, homes, utility lines.[39] The Commission implemented this directive in Decision 16-10-025, which identified a method for defining high hazard zones (HHZ) and expanded the definition of BioMAT eligibility to include feedstock from HHZ, among other actions.[40] Therefore, HHZ fuels as identified pursuant to Decision 16-10-025 may qualify as Category 3 feedstock for the purposes of the BioMAT.

The Commission also modified the Renewable Auction Mechanism (RAM)—a simplified market-based procurement mechanism for RPS-eligible energy generation facilities that generate between 3 MW and 20 MW annually.[41] Resolution E-4770[42] created the Bioenergy

36 *See* D. 20-08-043 (Sept. 1, 2020) at 4; 38.
37 *Id*.
38 2015 Emergency Proclamation.
39 *Id.*
40 D. 16-10-025 (Oct. 27, 2016).
41 Resolution E-4770 (March 17, 2016).
42 Resolution E-4770, Commission Motion Authorizing Procurement from Forest Fuelstock Bioenergy Facilities supplied from High Hazard Zones for wildfires and falling trees pursuant to the Governor's Emergency Proclamation (Mar. 17, 2016), https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M159/K652/159652363.PDF (creating BioRAM).

Renewable Auction Mechanism (BioRAM), which is an extension of the RAM process that applies to woody biomass derived from these high hazard zone and, among other modifications, does not place a cap on the quantity of megawatts procured.[43] Subsequently, the Legislature passed SB 859, which mandates that Investor Owned Utilities (IOUs) collectively procure 125 MW, divided pro rata, of bioenergy derived from feedstock collected in these high hazard zones.[44]

## VI. JUSTIFICATION FOR THE PROPOSED MODIFICATIONS

The BioMAT is one tool whereby the Commission attempts to reduce greenhouse gas and air pollution emissions to effectuate California's ambitious climate goals and further public health.[45] Similarly, one impetus behind the BioRAM is to avert the "release of thousands of tons of greenhouse gas emissions and other harmful air pollutants."[46] However, as discussed below, these programs as currently implemented are actually doing the opposite. The modifications requested by Petitioners would address this issue by requiring that sellers demonstrate net greenhouse gas emissions reductions. Modifications to Decision 14-12-081 and the BioMAT Tariff (See Appendix A and B) would apply to HHZ fuels used in the context of the BioMAT. That is, generation facilities would be required to demonstrate net greenhouse gas emissions reductions before benefiting from the BioMAT tariff.

Energy derived from woody biomass is not carbon neutral, and results in substantial net GHG emissions.[47] Depending on the source of biomass, the methods of converting it into energy,

43 *Id.* at 5.
44 Sen. Bill No. 859, Ch. 368, Reg. Sess. 2015-2016, (Cal. 2016), implemented by Resolution E-4805 (Oct. 13, 2016).
45 The goal of the BioMAT is to provide "benefits to ratepayers and the environment from reducing air pollution and global warming emissions." Sen. Bill No. 1122, Assem. Floor Analysis (Aug. 24 2012).
46 2015 Emergency Proclamation.
47 *See e.g.* House Select Committee on the Climate Crisis, Solving the Climate Crisis: The Congressional Action Plan for a Clean Energy Economy and a Healthy, Resilient, and Just America (June 2020) at 460, https://climatecrisis.house.gov/sites/climatecrisis.house.gov/files/Climate%20Crisis%20Action%20Plan.pdf.

and the time horizon considered, the climate impacts of biomass can vary, and burning woody biomass generally results in substantial net GHG emissions.[48] As currently implemented the BioMAT is not operating as intended with respect to GHG and air pollutants. Both the BioMAT and BioRAM, as currently implemented, seriously undermine California's ability to meet its climate goals. Additionally, incinerating woody biomass energy releases massive quantities of criteria pollutants such as particulate matter and nitrogen oxides, as well as hazardous air pollutants such as hydrochloric acid, dioxins, benzine, formaldehyde, arsenic, chromium, cadmium, lead, and mercury.[49] Harvesting woody biomass feedstock also harms forest ecosystems. Because energy derived from woody biomass is inordinately expensive, without the BioMAT and BioRAM it would be uneconomical.[50] As a result, ratepayers subsidize energy that is harmful to the environment, public health, and the climate, contravening the letter and intent of SB 1122 and SB 100. Petitioners' proposed modifications seek to ensure that these programs operate as intended and do not undermine California's climate goals.

**a) The BioMAT is Not Operating as Intended.**

On November 28, 2017, Energy Division staff initiated a BioMAT program review because the contract price passed a Commission-set threshold of $197/MWh.[51] On October 31, 2018, Energy Division staff issued its draft BioMAT Review and Staff Proposal (draft Staff

48 Bracmort, Kelsi, Is Biopower Carbon Neutral?, R41603, Congressional Research Service (Feb. 4, 2016) at 10, https://fas.org/sgp/crs/misc/R41603.pdf.

49 For example, Roseburg Forest Products ranked as the 21st biggest stationary source of fine particulate matter out of 591 sources state-wide in 2017, according to facility-level emissions data from the California Air Resources Board, Pollution Mapping Tool, https://ww3.arb.ca.gov/ei/tools/pollution_map/pollution_map.htm (accessed Sept. 8, 2020); Partnership for Policy Integrity, Air pollution from biomass energy (updated April 2011), https://www.pfpi.net/wp-content/uploads/2011/04/PFPI-air-pollution-and-biomass-April-2011.pdf.

50 *See* Section IV.d., *supra.*

51 D.14-12-081 (Dec. 26, 2014) at 62 (requiring the Energy Division to initiate a review process "at any time after the price for any technology category reaches $197/MWh and remains at that price or increases, over two program periods.").

Proposal) in Rulemaking 18-07-003.[52] The draft Staff Proposal found that the BioMAT program is not delivering intended environmental benefits. The draft Staff Proposal found, among other things, that several BioMAT facilities may harm air quality in disadvantaged communities; and BioMAT facilities—especially those using Category 3 feedstock—may not result in net GHG emissions reductions.[53] Similarly, in the context of the Integrated Resource Proceeding, Energy Division staff recently found that "[b]iomass, combined cycle, and cogeneration power plants are the *top three emitters* of criteria pollutants in California.[54]

**c) Biomass Energy Is More Climate Damaging Than Fossil Fuel Energy Per Unit of Energy Generated.**

Unlike other renewables such as wind and solar, biomass generation emits GHGs. Emissions data gathered after initial implementation of the BioMAT and BioRAM shows the remarkable extent to which carbon pollution from woody biomass exceeds that of the rest of the grid. The average GHG emission rate for California's current electricity portfolio is about 485 pounds $CO_2e$ per MWh.[55] Woody biomass power plants in California emit more than eight times that amount, averaging nearly 4,000 pounds per MWh in 2017.[56] Combustion of woody biomass

52 Draft Staff Proposal.
53 *Id.* at 7, 11.
54 CPUC Energy Division, R.16-02-007 Integrated Resources Proceeding's ALJ Ruling Seeking Comment on the Proposed Reference System Plan, Attachment B (Nov. 6, 2019) (IRP Presentation) at slide 38, https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M319/K132/319132054.PDF (emphasis added).
55 California Air Resources Board, California Greenhouse Gas Emissions for 2000 to 2017, Trends of Emissions and Other Indicators (2019) at Figure 9, https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2017/ghg_inventory_trends_00-17.pdf (GHG Intensity of Electricity Generation). *See also* California Air Resources Board, 2000-2017 Trends Figure Data (2019) at Figure 9, https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2017/2000_2017_ghg_inventory_trends_figures.xlsx showing the overall GHG intensity of Electricity Generation in 2017 of 0.22 tonnes $CO_2e$ per MWh, which is equal to 485 pounds per MWh.
56 $CO_2e$ emissions for each facility in 2017 come from California Air Resources Board, Mandatory GHG Reporting – Reported Emissions, *available at* https://ww2.arb.ca.gov/mrr-data. Data on MWh produced by each facility in 2017 come from California Energy Commission, California Biomass and Waste-To-Energy Statistics and Data, *available at* https://ww2.energy.ca.gov/almanac/renewables_data/biomass/index_cms.php. Total CO2e produced by

emits even more GHGs than of fossil fuels at the smokestack: in California, woody biomass energy generation emits about double the carbon pollution per unit of electricity of coal-fired power, and four and a half times the carbon pollution of gas-generated power.[57] In contrast, solar and wind energy provide truly carbon-free sources of power. As one scientific article noted, "[t]he fact that combustion of biomass generally generates more $CO_2$ emissions to produce a unit of energy than the combustion of fossil fuels increases the difficulty of achieving the goal of reducing [greenhouse gas] emissions by using woody biomass in the short term."[58]

Despite these emissions, proponents of biomass energy claim that incinerating trees for energy is carbon neutral. To do this, they take credit for carbon absorbed by future tree growth. However, there is no requirement that forests cut down for biomass energy be allowed to regrow instead of being cut again and again, or that forests won't be developed into other land uses. Even if trees are allowed to regrow, numerous studies show that it takes many decades to more than a century, if ever, for new trees to grow large enough to capture the carbon that was released.[59]

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the 21 active woody biomass facilities with available data totaled 5,093,628 metric tons, while total net MWh in 2017 from these 21 facilities totaled 2,858,996 MWh, for an average of 1.78 metric tonnes $CO_2e$ per MWh, equal to 3,928 pounds $CO_2e$ per MWh.

57 Searchinger, Timothy D. et al., Europe's renewable energy directive poised to harm global forests, 9 Nature Communications 3741 (2018), *available at* https://www.nature.com/articles/s41467-018-06175-4; Total System Electric Generation in California (GWh) in 2017 from natural gas and coal come from the California Energy Commission at https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2019-total-system-electric-generation/2017. Total CO2e produced by natural gas and coal electricity generation in California in 2017 come from the California Air Resources Board GHG Emission Inventory Summary (2000-2017), at https://www.arb.ca.gov/app/ghg/2000_2017/ghg_sector.php.

58 Bird, David N. et al., Zero, one, or in between: evaluation of alternative national and entity-level accounting for bioenergy, Vol. 4 GCB - Bioenergy 576, 584 (2012), https://onlinelibrary.wiley.com/doi/full/10.1111/j.1757-1707.2011.01137.x (cited in Informal Comments of Center for Biological Diversity, Sierra Club, and Partnership for Policy Integrity on the BioMAT Program Review and Staff Proposal (Dec. 7, 2018) in R.18-07-003 (Dec. 7, 2018 Comments), FN 8).

59 Searchinger, Timothy D. et al., Fixing a critical climate accounting error, 326 Science, 527 (2009), https://www.pfpi.net/wp-content/uploads/2011/03/Searchinger-et-al-2009.pdf (cited in Comments of Center for Biological Diversity, Sierra Club, and Partnership for Policy Integrity on Order Instituting Rulemaking to Continue Implementation and Administration, and Consider Further Development, of

Cutting trees for biomass energy reduces the forest's ability to sequester and store carbon, because when trees are cut to fuel a power plant, it ends their carbon sequestration. Intact forests are a vital part of the climate solution because they pull carbon out of the air and provide long-term, natural storage.[60] If these trees had instead been allowed to continue growing, they would have continued to pull carbon out of the atmosphere and increased the total amount of carbon stored in the forest. Even dead trees left in the forest will continue storing much of their carbon for decades or even centuries, while also providing important wildlife habitat, and eventually

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California Renewables Portfolio Standard Program (Apr. 1, 2020) in R.18-07-003 (Apr. 1, 2020 Comments), FN 31); Gunn, John, et al., Massachusetts Biomass Sustainability and Carbon Policy Study: Report to the Commonwealth of Massachusetts Department of Energy Resources, Manomet Center for Conservation Sciences (2010), http://gfmc.online/vfe/Manomet-Biomass-Report-June-2010.pdf (cited in Comments of the Center for Biological Diversity Re: Staff Proposal on Implementation of SB 1122 (Dec. 20, 2013) in R.11-05-005 (Dec. 20, 2013 Comments), FN 38); McKechnie, Jon et al., Forest Bioenergy or Forest Carbon? Assessing Trade-Offs in Greenhouse Gas Mitigation with Wood-Based Fuels, 45 Environ. Sc. Technol. 2, 789 (2011*), available at* https://pubs.acs.org/doi/10.1021/es1024004 (cited in Dec. 20, 2013 Comments, FN 38); Hudiburg, Tara W. et al., Regional carbon dioxide implications of forest bioenergy production, 1 Nature Climate Change, 419 (2011), *available at* doi: 10.1038/NCLIMATE1264 (cited in Dec. 20, 2013 Comments, FN 42); Law, Beverly E. & Mark E. Harmon, Forest sector carbon management, measurement and verification, and discussion of policy related to climate change, 2 Carbon Management 1, 73 (2011), http://terraweb.forestry.oregonstate.edu/sites/terraweb/files/lawharmon2011.pdf (cited in Apr. 1, 2020 Comments, FN 31); Campbell, John L. et al., Can fuel-reduction treatments really increase forest carbon storage in the western US by reducing future fire emissions?, 10 Frontiers in Ecology and Environment 2, 83 (2012) ("Campbell 2012"), *available at* https://esajournals.onlinelibrary.wiley.com/doi/abs/10.1890/110057 (cited in Dec. 20, 2013 Comments, FN 42); Holtsmark, Bjart, The outcome is in the assumptions: Analyzing the effects on atmospheric $CO_2$ levels of increased use of bioenergy from forest biomass, 5 GCB Bioenergy 4, 467 (2012), https://onlinelibrary.wiley.com/doi/full/10.1111/gcbb.12015 (cited in Dec. 20, 2013 Comments, FN 39); Mitchell, Stephen R. et al., Carbon debt and carbon sequestration parity in forest bioenergy production, 4 Global Change Biology Bioenergy 6, 818 (2012), https://onlinelibrary.wiley.com/doi/full/10.1111/j.1757-1707.2012.01173.x (cited in Dec. 20, 2013 Comments, FN 38); Schulze, Ernst-Detlef et al., Large-scale bioenergy from additional harvest of forest biomass is neither sustainable nor greenhouse gas neutral, 4 Global Change Biology Bioenergy 6, 611 (2012), https://onlinelibrary.wiley.com/doi/full/10.1111/j.1757-1707.2012.01169.x (cited in Dec. 20, 2013 Comments, FN 38); Booth, Mary S., Not carbon neutral: Assessing the net emissions impact of residues burned for bioenergy, 13 Environmental Research Letters 035001 (2018) ("Booth 2018"), https://doi.org/10.1088/1748-9326/aaac88 (cited in Apr. 1, 2020 Comments, FN 23); Sterman, John D. et al., Does replacing coal with wood lower CO2 emissions? Dynamic lifecycle analysis of wood bioenergy, 13 Environmental Research Letters 015007 (2018), *available at* https://iopscience.iop.org/article/10.1088/1748-9326/aaa512/meta.

60 Moomaw, William R. et al., Intact forests in the United States: proforestation mitigates climate change and serves the greatest good, Frontiers in Forests and Global Change (2019), https://www.frontiersin.org/articles/10.3389/ffgc.2019.00027/full.

becoming soil that nourishes more forest growth.[61] All these benefits are lost when a tree is hauled away to a biomass facility.

Meanwhile, biomass power plant pollution can exceed that of coal-fired power plants even when the best available control technology is used.[62] Criteria pollutants, such as nitrogen oxides, particulate matter, and sulfur dioxide, are linked to a variety of health problems including respiratory diseases such as asthma, emphysema and bronchitis, heart disease, and premature death.[63] Many of California's biomass power plants are concentrated in communities already suffering from high pollution burdens, worsening environmental injustice. In the San Joaquin Valley—one of the nation's most polluted air basins[64]—4 of 5 active biomass plants and 4 of 5 idle biomass plants are located in disadvantaged communities;[65] most of these communities are

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61 Swanson, Mark E. et al., The forgotten stage of forest succession: early-successional ecosystems on forested sites, Frontiers in Ecology and Environment (2011) ("Swanson 2011"), *available at* https://www.fs.usda.gov/treesearch/pubs/36205 (cited in Dec. 20, 2013 Comments, FN 17); DellaSala, Dominick A. et al., Complex early seral forests of the Sierra Nevada: what are they and how can they be managed for ecological integrity?, 34 Natural Areas Journal 3, 310 (2014) ("DellaSala 2014"), *available at* https://doi.org/10.3375/043.034.0317 (cited in Dec. 7, 2018 Comments, FN 19); The Ecological Importance of Mixed-severity Fires: Nature's Phoenix (DellaSala, Dominick A. & Chad T. Hanson eds., Elsevier, 2015) (cited in Dec. 7, 2018 Comments, FN 20).

62 Partnership for Policy Integrity, Air pollution from biomass energy (updated April 2011), https://www.pfpi.net/wp-content/uploads/2011/04/PFPI-air-pollution-and-biomass-April-2011.pdf (cited in Apr. 1, 2020 Comments, FN 37); *see also* Booth, Mary S., Trees, Trash and Toxics: How biomass energy has become the new coal, Partnership for Policy Integrity (Apr. 2, 2014), https://www.pfpi.net/wp-content/uploads/2014/04/PFPI-Biomass-is-the-New-Coal-April-2-2014.pdf (cited in Dec. 7, 2018 Comments, FN 10); *See also* IRP Presentation, slide 38.

63 U.S. Environmental Protection Agency, Nitrogen Dioxide Pollution, https://www.epa.gov/no2-pollution/basic-information-about-no2#Effects (accessed Aug. 26, 2020); U.S. Environmental Protection Agency, Particulate Matter Pollution, https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm (accessed Aug. 26, 2020); U.S. Environmental Protection Agency, Sulfur Dioxide Pollution, https://www.epa.gov/so2-pollution/sulfur-dioxide-basics#effects (accessed Aug. 26, 2020).

64 California Air Resources Board, Press Release: Clean-air plan for San Joaquin Valley first to meet all federal standards for fine particle pollution (Jan. 24, 2019), https://ww2.arb.ca.gov/news/clean-air-plan-san-joaquin-valley-first-meet-all-federal-standards-fine-particle-pollution.

65 Four active biomass plants (Rio Bravo Fresno, DTE Stockton, Merced Power, and Ampersand Chowchilla) and four idle biomass plants (Community Recycling Madera Power, Covanta Mendota, Dinuba Energy, and Covanta Delano) are in census tracts designated as disadvantaged under SB 535, California Office of Environmental Health Hazard Assessment, SB 535 Disadvantaed Communities (June 2017), https://oehha.ca.gov/calenviroscreen/sb535.

within the ninetieth percentile for air pollution burden, and some are in the top percentile.[66] Bakersfield, Fresno-Madera-Hanford, and Visalia are the top three most polluted cities for year-round particulate pollution levels in the country.[67]

As Energy Staff determined in the context of the Integrated Resource Proceeding, "[t]he most efficient way to reduce criteria pollutants is likely by installing emissions control technologies on biogas and biomass resources. The CPUC should prioritize reducing emissions from these resources, especially in [disadvantaged communities.]"[68] "[S]mall biomass facilities less than 30 MW" are especially problematic because they are not subject to Clean Air Act Title V permitting and concomitant Best Available Control Technology requirements.[69]

Because biomass energy does not result in a reduction in GHG emissions, and results in heavy pollution of other air pollutants known to harm human health, it has consistently been rejected as a mechanism for mitigating climate change in other fora. For example, in the Integrated Resource Proceeding, the Commission rejected biomass in its RESOLVE model for even the highest emissions Scenario (46 MMT $CO_2e$).[70] Requiring BioMAT generation facilities to demonstrate they deliver actual climate benefits is also a step in the right direction to ensure these projects do not harm communities already overburdened with air pollution–which the Commission recognized when it requested the lifecycle assessment calculator also quantify criteria pollutants.[71]

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66 Data from California Office of Environmental Health Hazard Assessment, CalEnviroScreen 3.0 (June 2018), https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30.
67 American Lung Association, State of the Air 2020: Most Polluted Cities, http://www.stateoftheair.org/city-rankings/most-polluted-cities.html (accessed Sept. 8, 2020).
68 IRP Presentation at slide 39.
69 *Id.* at slide 40.
70 *Id.* at slide 17.
71 D. 20-08-043 at 39.

**d) Harvest of Woody Biomass Feedstock Harms Ecosystems and Is Ineffective at Protecting Communities in High Risk Fire Areas.**

Biomass energy is often promoted as a tool to incentivize large-scale tree-cutting ("thinning") under the claim that this will reduce the extent and/or severity of wildfires, thereby protecting communities and reducing the release of GHGs. Neither claim has borne out.

First, forest thinning is ineffective at protecting houses and communities. Communities near forested areas can best be protected through a home-focused fire-safety measures that reduce the ignitability of the structure itself (e.g. fireproof roofing, leaf gutter guards, external sprinklers) and the immediate surroundings within about 100 feet from the home (e.g. through thinning of brush and small trees adjacent to the homes).[72]

That feedstock originates from HHZs provides absolutely no assurance that the forest projects that produce that feedstock provide any benefits related to fire or communtiy protection. Only about a third of the forest-sourced biomass being consumed in biomass plants is forest thinning residues, while the majority—more than two-thirds, on average—is residues from commercial lumber mills.[73] For the seven biomass plants that utilize the BioRAM program subsidy, in 2017, only 30% of their feedstock came from forest thinning residues.[74] When these

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72 Cohen, Jack D., Preventing disaster: home ignitability in the Wildland-Urban Interface, 98 J. of Forestry 3, 15 (2000), *available at* https://www.fs.usda.gov/treesearch/pubs/4688; Cohen, Jack D. & Richard D. Stratton, Home destruction examination: Grass Valley Fire, Lake Arrowhead, California, U.S. Forest Service Technical Paper R5-TP-026b, U.S. Forest Service, Region 5 (2008), *available at* https://www.srs.fs.usda.gov/pubs/31544; Philp Gibbons et al., Land management practices associated with house loss in wildfires, 7 PLoS ONE 1: e29212 (2012), *available at* https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0029212 (cited in Dec. 7, 2018 Comments, FN 26).

73 CalRecycle, SB 498 Reporting, 2018 Biomass Conversion (2018), https://www2.calrecycle.ca.gov/Docs/Web/116706. (According to CalRecycle (2018), the 25 biopower facilities operating in 2018 incinerated approximately 4.1 million bone-dry tons (BDT) of biomass annually. On average, forest residues accounted for 15% of this total, mill residues for about 35%, and the remainder derived from agricultural and urban waste streams.)

74 The Beck Group, High Hazard Fuels Availability Study, The High Hazard Fuel Study Committee and PG&E (June 13, 2019). (This analysis reported that the cost of qualifying fuel is more than 2.5 times the cost of non-qualifying fuel, and that even with the subsidized power price provided by BioRAM contracts, some BioRAM plants are struggling to obtain enough qualifying fuel.)

programs act as a subsidy to the timber industry, they incentivize forest destruction and concomitant ecosystem and climate harms. Feedstock derived from timber industry residues can also lead to additional environmental hazards as wood chip piles and even dried wood pellets have been shown in some cases to be large sources of methane.[75]

Second, thinning does not reduce GHG emissions: studies show that thinning forests to control fire actually reduces forest carbon stocks and increases overall carbon emissions.[76] One study estimated that thinning operations typically tend to remove about three times as much carbon from the forest as would be avoided in wildfire emissions.[77] A 2019 study found that the combustion coefficients used in models relied on by policymakers do not reflect observed conditions—the models assume that, in a fire, mature trees combust totally and instantaneously, even though only 5% of mature tree biomass is actually consumed.[78] In addition, models fail to consider snags—dead trees that remain standing for decades, and provide important habitat and carbon sequestration functions.[79] As a result, "regional emissions estimates [in the western United States] using widely-implemented combustion coefficients are 59-83% higher than emissions based on field observations."[80] Field studies of large fires find only about 11% of

75 Röder, Mirjam et al., How certain are greenhouse gas reductions from bioenergy? Life cycle assessment and uncertainty analysis of wood pellet-to-electricity supply chains from forest residues, 79 Biomass and Bioenergy, 50 (Aug. 2015), *available at* https://www.sciencedirect.com/science/article/pii/S0961953415001166.
76 Mitchell, Stephen R. et al., Forest fuel reduction alters fire severity and long-term carbon storage in three Pacific Northwest ecosystems, 19 Ecological Applications 3, 643 (2009), *available at* https://esajournals.onlinelibrary.wiley.com/doi/abs/10.1890/08-0501.1;
Campbell, John L. & Alan A. Ager, Forest wildfire, fuel reduction treatment, and landscape carbon stocks: a sensitivity analysis, 121 Journal of Environmental Management, 124 (2013), https://www.fs.fed.us/pnw/pubs/journals/pnw_2013_campbell001.pdf;
DellaSala, D.A. & M. Koopman, Thinning Combined with Biomass Energy Production Impacts Fire-Adapted Forests in Western United States and May Increase Greenhouse Gas Emissions, 1 Reference Module in Earth Systems and Environmental Sciences 491 (2018), *available at* https://www.sciencedirect.com/science/article/pii/B9780128096659095872.
77 Campbell 2012, *supra* FN 54.
78 Stenzel, Jeffrey E. et al., Fixing a snag in carbon emissions estimates from wildfires, 25 Global Change Biology 11 (2019) at 3985, *available at* https://onlinelibrary.wiley.com/doi/abs/10.1111/gcb.14716.
79 *Id.* at 3987.
80 *Id.*

forest carbon is consumed in a fire, and only 3% of the carbon in trees,[81] and vigorous post-fire regrowth returns forests to carbon sinks within several years.[82] In contrast, when forest biomass is extracted for bioenergy production, 100% of that carbon is immediately emitted to the atmosphere.

The resulting loss of forest carbon stocks and transfer of carbon to the atmosphere can last decades to more than a century—a timeline starkly at odds with California's clean energy goals. A report from Oregon found that thinning operations resulted in a net loss of forest carbon stocks for up to 50 years.[83] Another study found that even light-touch thinning operations in several Oregon and California forest ecosystems incurred carbon debts lasting longer than 20 years.[84]

Finally, to the extent that biomass energy is touted as a means whereby to dispose of woody debris to improve forest ecosystems, the BioMAT and BioRAM fail as well. Harvesting and removing limbs, leaves and plant parts from forests, which would normally recycle nutrients back into the soil as they decay, can diminish soil fertility and hasten erosion.[85] Removing

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81 Campbell, John, et al., Pyrogenic carbon emission from a large wildfire in Oregon, United States, 112 J. of Geophysical Research G04014 (2007), https://www.fs.fed.us/pnw/pubs/journals/pnw_2008_campbell001.pdf.

82 Meigs, Garrett M. et al., Forest fire impacts on carbon uptake, storage, and emission: The role of burn severity in the Eastern Cascades, Oregon, 12 Ecosystems 8 (2009), *available at* https://www.researchgate.net/publication/226576573_Forest_Fire_Impacts_on_Carbon_Uptake_Storage_and_Emission_The_Role_of_Burn_Severity_in_the_Eastern_Cascades_Oregon.

83 Clark, Joshua et al., Impacts of Thinning on Carbon Stores in the PNW: A Plot Level Analysis, Final Report, C. of Forestry, Or. St. U. (May 25, 2011), https://www.nrdc.org/sites/default/files/ene_13041704a.pdf (cited in Dec. 7, 2018 Comments, FN 16).

84 Tara Hudiburg et al., Regional carbon dioxide implications of forest bioenergy production, 1 Nature Climate Change, 419 (2011), *available at* doi:10.1038/NCLIMATE1264. (cited in Dec. 7, 2018 Comments, FN 17).

85 Achat, David L. et al., Forest soil carbon is threatened by intensive biomass harvesting, 5 Sci. Reports 15991 (2015), https://www.nature.com/articles/srep15991.pdf (cited in Dec. 7, 2018 Comments, FN 18); Achat, D. L. et al., Quantifying consequences of removing harvesting residues on forest soils and tree growth – A meta-analysis, 348 Forest Ecology & Mgmt., 124 (2015), *available at* https://www.sciencedirect.com/science/article/abs/pii/S0378112715001814 (cited in Dec. 7, 2018 Comments, FN 18).

vegetation from the ground also impacts wildlife habitats on the forest floor.[86] Scientific research has established that mechanical thinning (including the removal of dead trees through post-fire salvage logging) causes numerous ecological harms, such as the loss of wildlife habitat, loss of carbon storage, spread of weeds, sedimentation into streams, soil compaction, disruption of nutrient flows, and disturbance to sensitive wildlife.[87] And dead trees—standing or fallen—provide numerous ecological benefits such as wildlife habitat, soil stabilization, water quality, and carbon storage.[88] As one scientist put it, "[t]he ecological cost of salvage logging speaks for itself, and the message is powerful. I am hard pressed to find any other example in wildlife biology where the effect of a particular land-use activity is as close to 100% negative as the typical postfire salvage logging operation tends to be."[89]

Woody biomass projects should be scrutinized and evaluated on their ability to produce tangible benefits in comparison to their negative impacts, and at a minimum show net greenhouse gas emissions reduction before they are eligible for the BioMAT.

**e) Benefits Should be Demonstrated to Justify the High Costs of the BioMAT and BioRAM.**

Because incinerating trees is a highly inefficient method of producing energy, biomass power is the most expensive of California's common electricity sources.[90] The average wholesale

86 Cho, Renee, *Is Biomass Really Renewable?*, Earth Institute, Columbia University: State of the Planet Blog (Aug. 18, 2011), https://blogs.ei.columbia.edu/2011/08/18/is-biomass-really-renewable/.
87 Lindenmayerand, D.B, & R. F. Noss, Salvage logging, ecosystem processes, and Biodiversity Conservation, 20 Conservation Biology 4, 949 (2006), *available at* https://doi.org/10.1111/j.1523-1739.2006.00497.x (cited in Dec. 7, 2018 Comments, FN 21).
88 Swanson 2011; DellaSala 2014; Hutto, Richard L. et al., Toward a more ecologically informed view of severe forest fires, 7 Ecosphere 2:e01255 (2016), https://www.fs.fed.us/rm/pubs_journals/2016/rmrs_2016_hutto_r001.pdf.
89Hutto, Richard L., Toward Meaningful Snag-Management Guidelines for Postfire Salvage Logging in North American Conifer Forests, 20 Conservation Biology 4, 984 (2006), https://www.firescience.gov/projects/04-2-1-106/project/04-2-1-106_02ConBiopaper.pdf (cited in the Dec. 20, 2013 Comments, FN 17).
90 California Energy Commission, Staff Report, Estimated Cost of New Utility-Scale Generation in California: 2018 Update (May 2019) ("CEC Staff Report") at 40, https://ww2.energy.ca.gov/2019publications/CEC-200-2019-005/CEC-200-2019-005.pdf.

price of power on the California grid in 2018 was $50 per megawatt hour (MWh).[91] But the price for forest biomass energy through the BioMAT program is four times as much—$199.72 per MWh based on the price cap set by the Public Utilities Commission[92]—and more than twice as much through the BioRAM program at $115 per MWh.[93] In practice, California residents and electric utility ratepayers are subsidizing forest biomass facilities at a rate of $150 per MWh above market price through the BioMAT program, and $65 per MWh above market price through the BioRAM program. Furthermore, BioMAT power is four times as expensive as photovoltaic solar power and 3.5 times as expensive as wind power.[94] BioRAM power is more than twice as expensive as solar or wind power.[95] As discussed above, the purported co-benefits from these programs, which ostensibly justify their exorbitant rates,[96] do not actually eventuate.

This year, Pacific Gas and Electric Company (PG&E) estimated the BioMAT program cost "$3 billion for PG&E customers alone, of which $2 billion is above-market costs relative to renewable portfolio standard procurement costs.[97] PG&E, Southern California Edison Company and San Diego Gas & Electric Company collectively, Joint IOUs) pointed out that the Commission's Proposed Decision revising the BioMAT failed to adequately address program

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91 California ISO, 2018 Annual Report on Market Issues & Performance (May 2019), http://www.caiso.com/Documents/2018AnnualReportonMarketIssuesandPerformance.pdf.
92 PG&E reported executed BioMAT contracts with three biomass facilities at a price of $199.72 per MWh: North Fork Community Power (2 MW), Blue Mountain Electricity Company (3 MW), and Hat Creek Bioenergy (2.88 MW), See BioMAT Executed PPAs Awarded, 10 Day Report, https://pgebiomat.accionpower.com/biomat/doccheck.asp?doc_link=biomat/docs/FIT/2015/documents/d.%20PPAs%20 Awarded/2.%20PPAs%20Awarded-10-Day%20Report/BioMAT_ExecutedPPAs_10DayReport.xlsx.
93 Sierra Club California, Moving Beyond Incineration, (Nov. 2019) at 10, https://www.sierraclub.org/sites/www.sierraclub.org/files/sce/sierra-club-california/PDFs/SCC_MovingBeyondIncineration.pdf.
94 In 2018, the levelized cost per megawatt hour was $49 for photovoltaic solar and $57 for wind. CEC Staff Report at 40.
95 *Id.*
96 *See e.g.* D. 20-08-043 at 57. ("Because the benefits of BioMAT program are shared by all Californians, it is only equitable that the costs of the program are shared by all Californians.")
97 PG&E Comments on the Bioenergy Market Adjusting Tariff Staff Proposal (Apr. 1, 2020) at 9.

costs.[98] To address program costs, PG&E, SCE, and SDG&E suggested, among other measures, that the greenhouse gas calculator be used as an input for evaluation of the costs and benefits in the Integrated Resource Plan proceeding.[99] Petitioners' proposed modifications would not only ensure reasonable rates but also consistency with the Integrated Resource Plan proceeding if Joint IOUs' proposal is adopted.

**f) Calculating Net GHG Emissions Would Not Overly Burden Either Commission Staff or Energy Generation Facilities.**

The development of a bioenergy net emissions impacts calculator is critical to ensure the BioMAT and BioRAM are operating as intended. The calculator should:

(1) Rely on feedstock-specific calculations;

(2) Compare the emissions of bioenergy generation to the emissions of the possible alternative fates of the biogenic feedstock material if not used for energy generation, e.g. if used as a woody product or simply left to decompose in the forest;

(3) Use a timeframe meaningful for climate change mitigation, i.e. use timeframes for evaluating cumulative net emissions consistent with California's short-term and long-term emissions goals (e.g., 2020, 2025, 2030, 2035, 2040, 2045, 2050);

(4) Analyze emissions from both the smokestack *and* the processing, transport, and storage of the feedstock;

(5) Utilize a stand-level modeling approach aggregated to the fuelshed level that uses regionally appropriate, feedstock-specific calculations, i.e., sequential analysis that accumulates the effect of harvesting and regrowth of individual plots through time and makes clear that each plot is "responsible" for re-sequestering equivalent carbon that was released when that plot was cut;

(6) Consider leakage, i.e. carbon emissions or sequestrations that occur outside of the feedstock production boundary but can be attributed to the biogenic feedstock production activities;

98 Joint IOUs Comments on the Proposed Decision Revising the Bioenergy Market Adjusting Tariff Program (Aug. 13, 2020) at 2-3.
99 *Id.* at 10-11.

The development of such a calculator is eminently feasible. Some such calculators already exist and could be readily adapted for this purpose.[100] For example, Dr. Mary S. Booth, an expert on forest biomass energy has outlined a model that calculates sector-wide net emissions from biomass generation:

> Built in Excel, the model calculates cumulative net emissions as cumulative direct emissions ($CO_2$ from combustion for energy plus $CO_2$ from harvesting, producing, and transporting biomass, or 'HPT emissions'), minus cumulative counterfactual emissions (what emissions would be if the biomass were left in the field to decompose or were burned without energy recovery). The net emissions impact (NEI) is the ratio of cumulative net emissions to cumulative direct emissions.[101]

$CO_2$ from combustion is measured at the stack. Based on a review of the scientific literature, HPT emissions for forest residues is equivalent to 4% of the carbon content of green chips.[102] Counterfactual emissions—the emissions from the alternative fate of the woody biomass (e.g. decomposition, utilization in a salable product such as mulch or furniture) are calculated as:

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100 Booth 2018, *supra* FN 54; *see also* Laganière, Jérôme et. al., Range and uncertainties in estimating delays in greenhouse gas mitigation potential of forest bioenergy sourced from Canadian forests, 9 GCB-Bioenergy 2, 358 (2017), https://onlinelibrary.wiley.com/doi/full/10.1111/gcbb.12327(Apr. 1, 2020 Comments, FN 19); Walker, T., P. et. al., Carbon Accounting for Woody Biomass from Massachusetts (USA) Managed Forests: A Framework for Determining the Temporal Impacts of Wood Biomass Energy on Atmospheric Greenhouse Gas Levels. 32 J. of Sustainable Forestry 1-2, 130 (2013), DOI: 10.1080/10549811.2011.652019 (Apr. 1, 2020 Comments, FN 19); Gunn, John S. & Thomas Buchholz, Forest sector greenhouse gas emissions sensitivity to changes in forest management in Maine (USA), 91 Forestry: An International J. of Forest Res. 4, 526 (2018), *available at* https://academic.oup.com/forestry/article/91/4/526/4969361(cited in Apr. 1, 2020 Comments, FN 19).

101 Booth 2018, *supra* FN 54, at 2.

102 *Id.* at 3.

$$PE'(t) = 1 - (e^{-k't}) \quad (1)$$

$$cE'(t) = BC' * PE'(t) \quad (2)$$

$$CE(t) = \sum_{1}^{t} cE'(t) \quad (3)$$

where
$PE'(t)$ = proportion of carbon from biomass collected in a given year that has been emitted by year $t$
$k'$ = rate-constant for decomposition of biomass collected in a given year
$cE'(t)$ = carbon from biomass collected in a given year that has been emitted by year $t$
$BC'$ = carbon content of biomass collected in a given year
$CE(t)$ = carbon emitted by year $t$ from biomass collected in all years

Then this figure is converted to $CO_2$.[103] This calculator is valid for use when fuel is sourced from residues but would require some adjustments for when fuel is sourced from whole trees removed in thinning operations or specifically for use as bioenergy.

Once a calculator is adopted, a net GHG emissions reductions requirement would not burden BioMAT and BioRAM facilities with prohibitively expensive and complicated compliance obligations. The input that a calculator would require, such as pounds of feedstock burned per day, what type of feedstock is burned, and where the feedstock was harvested, is already known to BioMAT facility operators. Entering this data into a model represents a few extra minutes of work per compliance period.

The Commission could retain an independent consultant to efficiently and cost-effectively create a customized calculator that relies on accurate, feedstock-specific calculations that reflect both the quantity and timescale of relevant emissions.

## VII. RELIEF REQUESTED

For the reasons above, Petitioners respectfully urge the Commission to modify Decision 14-12-081 and the BioMAT tariff such that eligibility criteria includes a requirement that

103 *Id.* at 2.

generation facilities demonstrate net greenhouse gas emissions reductions. Pursuant to Rule 16.4(b), specific wording for the requested modifications is provided in Appendices A and B.

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Respectfully submitted,

/s/ Lauren Packard
Lauren Packard, Staff Attorney
Haley de Genova, Law Clerk
Center for Biological Diversity
1212 Broadway, Ste. 800
Oakland, CA 94612
(510) 844-7100 ext. 303
lpackard@biologicaldiversity.org

/s/ Nayamin Martinez
Nayamin Martinez, MPH, Director
Central California Environmental Justice Network
4991 McKinley Ave, Ste. 109
Fresno, CA 93727
(559) 272-4874 ext. 15
Nayamin.martinez@ccejn.org

/s/ Catherine Garoupa White
Catherine Garoupa White, PhD,
Executive Director
Central Valley Air Quality Coalition
4991 E McKinley Ave, Ste. 109
Fresno, CA 93727
(559) 960-0361
catherine@calcleanair.org

/s/ Chad Hanson
Chad Hanson, PhD, Ecologist & Director
John Muir Project of Earth Island Institute
P.O. Box 897
Big Bear City, CA 92314
(530) 273-9290
Cthanson1@gmail.com

/s/ Richard Halsey
Richard Halsey, Director
California Chaparral Institute
P.O. Box 545
Escondido, CA 92033
(760) 419-5760
rwh@californiachapparal.org

## APPENDIX A
## [PROPOSED] MODIFICATIONS TO DECISION 14-12-081

Decision 14-12-081, section 2.2.3 should be modifies as follows:[104]

**Section 2.2.3. Bioenergy Using Byproducts of Sustainable Forest Management**

It is not necessary for this Commission to resolve the issues raised by the CAL FIRE staff white paper definition and the comments on it. The Commission does not need to wade into what is revealed by the record in this proceeding to be a longstanding, complex, and highly technical discussion about how to define the concept of "sustainable forest management." **However, clearly feedstock is not a byproduct of "sustainable forest management" if its use results in net greenhouse gas emissions.** For purposes of implementing SB 1122, **therefore, the Commission will first** ~~it is sufficient to be able to~~ identify, clearly enough to allow compliance with the criteria and meaningful verification of compliance, those activities whose byproducts meet the SB 1122 criterion of "byproducts of sustainable forest management." **After meeting this initial threshold, generation facilities must also demonstrate net greenhouse gas emissions reductions using a lifecycle assessment model certified by Energy Division staff.[105]**

**[Section 2.2.3.6. Net Greenhouse Gas Emissions]**

**Unlike other sources of renewable energy that comprise the RPS—such as solar and wind energy—bioenergy derived from Category 3 feedstock emits greenhouse gases. Because the goal of the RPS is to address the climate crisis by replacing fossil fuel generation with zero carbon energy[106] and because the Commission has been directed to "incorporate this policy into all relevant planning,"[107] it is reasonable to require projects demonstrate net greenhouse gas emissions reductions to be eligible for the BioMAT. The lifecycle assessment calculator used by the Energy Division for this purpose should:**

- **Rely on feedstock-specific calculations;**
- **Compare the emissions of bioenergy generation to the emissions of the possible alternative fates of the biogenic feedstock material if not used for energy generation, e.g. if used as a woody product or simply left to decompose in the forest;**

104 Additions are in bold; deletions are crossed out text.
105 Energy generation facilities cannot use Air Resources Board or Air District offsets to demonstrate greenhouse gas emissions reductions and/or net greenhouse gas emissions reductions.
106 Sen. Bill No. 100, Assem. Floor Analysis (Aug. 8, 2018). Sen. Bill No. 100, Ch. 312, Reg. Sess. 2017-2018 (Cal. 2018). (The RPS will ensure the state' energy grid is "100% clean by the middle of the century.")
107 Sen. Bill No. 100, Ch. 312, Reg. Sess. 2017-2018 (Cal. 2018).

- **Use a timeframe meaningful for climate change mitigation, i.e. use timeframes for evaluating cumulative net emissions consistent with California's short-term and long-term emissions goals (e.g., 2020, 2025, 2030, 2035, 2040, 2045, 2050);**

- **Analyze emissions from both the smokestack *and* the processing, transport, and storage of the feedstock;**

- **Utilize a stand-level modeling approach aggregated to the fuelshed level that uses regionally appropriate, feedstock-specific calculations, i.e., sequential analysis that accumulates the effect of harvesting and regrowth of individual plots through time and makes clear that each plot is "responsible" for re-sequestering equivalent carbon that was released when that plot was cut;**

- **Consider leakage, i.e. carbon emissions or sequestrations that occur outside of the feedstock production boundary but can be attributed to the biogenic feedstock production activities.**

**Conclusions of Law**:

15. For purposes only of implementing SB 1122, fire threat reduction activities should be included as an element of sustainable forest management.

16. For purposes only of implementing SB 1122, byproducts of fire threat reduction activities should be defined as:

> Biomass feedstock which originates from fuel reduction activities identified in a fire plan approved by CAL FIRE or other appropriate state, local or federal agency.

17. For purposes only of implementing SB 1122, fire safe clearance activities of government agencies and utilities should be included as an element of sustainable forest management.

18. For purposes only of implementing SB 1122, byproducts of fire safe clearance activities should be defined as:

> Biomass feedstock originating from fuel reduction activities conducted to comply with Pub. Res. Code Sections 4290 and 4291. This would include biomass feedstocks from timber operations conducted in conformance with 14 CCR 1038(c) (150' Fuel Reduction Exemption) as well as projects that fall under 14 CCR 1052.4 (Emergency for Fuel Hazard Reduction), 14 CCR 1051.3-1051.7 (Modified THP [timber harvest plan] for Fuel Hazard Reduction), and 14 CCR

1038(i) (Forest Fire Prevention Exemption), and categorical exclusions on federal lands approved under 36 CFR 220.6(e)(6)ii and (12}-{14).

19. For purposes only of implementing SB 1122, infrastructure clearance projects of government agencies and utilities should be included as an element of sustainable forest management.

20. For purposes only of implementing SB 1122, byproducts of infrastructure clearance projects should be defined as:

> Biomass feedstock derived from 1) fuel reduction activities undertaken by or on behalf of a utility or local, state or federal agency for the purposes of protecting infrastructure, including but not limited to: power lines, poles, towers, substations, switch yards, material storage areas, construction camps, roads, railways; and 2) all utility right-of-way fuel reduction activities undertaken for the purpose of protecting infrastructure, including water conveyance systems (canals, penstocks, flumes, tunnels etc.), gas lines, and telecommunication lines.

21. For purposes only of implementing SB 1122, various additional activities identified in the checklist prepared by staff of CAL FIRE, as revised by this decision and reproduced as Appendix B, as "other sustainable forest management" activities should be included as an element of sustainable forest management.

22. For purposes only of implementing SB 1122, "other sustainable forest management activities" should be identified by the presence of 12 complying answers to the 16 questions on the checklist prepared by staff of CAL FIRE, as revised by this decision, reproduced in Appendix B to this decision.

**22a. For the purposes only of implementing SB 1122, to qualify as sustainable forest management generation facilities must demonstrate net greenhouse gas emissions reductions using a lifecycle assessment developed and certified by Energy Staff.**

**22b. For the purposes only of implementing SB 1122, the lifecycle assessment calculator should:**

- **Rely on feedstock-specific calculations;**
- **Compare the emissions of bioenergy generation to the emissions of the possible alternative fates of the biogenic feedstock material if not used for energy generation, e.g. if used as a woody product or simply left to decompose in the forest;**
- **Use a timeframe meaningful for climate change mitigation, i.e. use timeframes for evaluating cumulative net emissions consistent with California's short-term and long-term emissions goals (e.g., 2020, 2025, 2030, 2035, 2040, 2045, 2050);**

- **Analyze emissions from both the smokestack *and* the processing, transport, and storage of the feedstock;**

- **Utilize a stand-level modeling approach aggregated to the fuelshed level that uses regionally appropriate, feedstock-specific calculations, i.e., sequential analysis that accumulates the effect of harvesting and regrowth of individual plots through time and makes clear that each plot is "responsible" for re-sequestering equivalent carbon that was released when that plot was cut;**

- **Consider leakage, i.e. carbon emissions or sequestrations that occur outside of the feedstock production boundary but can be attributed to the biogenic feedstock production activities.**

## APPENDIX B
## [PROPOSED] MODIFICATION TO BIOMAT TARIFF

Section 14 of the BioMAT tariff should be modified as follows:

c. Category 3: Biogas or biomass that is derived from one or more of the following processes:

(1) Biomass feedstock from fuel reduction activities identified in a fire plan approved by the California Department of Forestry Protection (CAL FIRE) or other appropriate state, local, or federal agency and categorical exclusions on federal lands approved under 36 C.F.R. 220.6€(6)(ii) and (12) thru (14) ("fire threat reduction")

(2) Biomass feedstock from fuel reduction activities conducted to comply with Public Resources Code Sections 4290 and 4291. This would include biomass feedstocks from timber operations conducted in conformance with 14 CCR 1038(c) (150' Fuel Reduction Exemption) as well as projects that fall under 14 CCR 1052.4 (Emergency for Fuel Hazard Reduction), 14 CCR 1051.3-1051.7 (Modified THP [timber harvest plan] for Fuel Hazard Reduction), and 14 CCR 1038(i) (Forest Fire Prevention Exemption), and categorical exclusions on federal lands approved under 36 CFR 220.6(e)(6)ii and (12}-{14) ("fire safe clearance activities").

(3) Biomass feedstock from (1) fuel reduction activities undertaken by or on behalf of a utility or local, state or federal agency for the purposes of protecting infrastructure, including but not limited to: power lines, poles, towers, substations, switch yards, material storage areas, construction camps, roads, railways; or (2) all utility right-of-way fuel reduction activities undertaken for the purpose of protecting infrastructure, including water conveyance systems (canals, penstocks, flumes, tunnels etc.), gas lines, and telecommunication lines ("infrastructure clearance projects").

(4) Biogas or biomass that is the byproduct of other sustainable forest management practices not covered in any of Section 14.3.c(1), (2), (3) or (5) of this Schedule, but which are considered "other sustainable forest management" fuel resources as indicated in a fully completed, executed and certified "Category 3 Other Sustainable Forest Management Eligibility Form" in the form of Appendix A to the PPR Fuel Resource Attestation Form (Form 79-1187), which must be submitted with the PPR ("other sustainable forest management").

(5) High Hazard Fuel.

(6) **In addition to procuring feedstock from one of the above processes, generation facilities must demonstrate, using a lifecycle assessment calculator certified by Energy Division staff, that bioenergy they produce results in net greenhouse gas emissions reductions.**