BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Petition to Adopt, Amend, or Repeal a Regulation Pursuant to Pub. Util. Code § 1708.5	Petition _____ (Filed June 20, 2023)

PETITION OF THE CENTER FOR BIOLOGICAL DIVERSITY FOR A RULEMAKING TO REQUIRE GENERATING FACILITIES USING BIOMASS THAT WOULD OTHERWISE BE DISPOSED OF TO ACCOUNT FOR THEIR GREENHOUSE GAS EMISSIONS IN ORDER TO SHOW COMPLIANCE WITH THE EMISSION PERFORMANCE STANDARD

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I. INTRODUCTION

Pursuant to Rule 6.3 of the California Public Utility Commission's (the Commission) Rules of Practice and Procedure and Public Utilities Code (Pub. Util. Code) section 1708.5, the Center for Biological Diversity petitions the Commission to open a rulemaking to reconsider a provision in the Emission Performance Standard (EPS) regulations exempting certain categories of woody and agricultural biomass powerplants from demonstrating EPS compliance.[1]

This rulemaking is an urgent matter because California requires 90% of the state's electricity to be from renewable and zero-carbon resources by 2035 and 100% by 2045. The state's carbon emissions, however, are one number on paper and another—higher number—in reality. This discrepancy arises from the Commission's choice to give a free pass under the EPS

[1] CPUC, *Order Instituting Rulemaking to Implement the Commission's Procurement Incentive Framework and to Examine the Integration of Greenhouse Gas Emissions Standards into Procurement Policies -- Interim Opinion on Phase 1 Issues: Greenhouse Gas Emissions Performance Standard*, Decision 07-01-039 (Jan. 25, 2007), under Rulemaking 06-04-009 (Filed April 13, 2006) [hereinafter Interim Opinion on Phase 1 Issues]; *see also id.* Attachment 7, "Adopted Interim Rules for Greenhouse Gas Emissions Performance Standard" [hereinafter, Interim EPS Rules].

to most woody and agricultural biomass based on its erroneous assumption that biomass energy's greenhouse gas (GHG) emissions are net negative. In fact, biomass power is more climate-damaging than other sources of electricity in California, and even more GHG-intensive at the smokestack than coal.[2] It is time for the Commission to revise its EPS rules on this issue—which the Commission itself characterized as "interim" in 2007—in order to align with current science, and for California to take an honest accounting of the climate-harming emissions of its power sector and make all polluting sources of electricity generation play by the same rules in the EPS.

In 2006, California sought to address the GHG emissions of powerplants by enacting SB 1368, the world's first GHG emission standard for powerplant investments and certain procurements.[3] Specifically, SB 1368 prohibits any "load-serving entity or local publicly owned electric utility . . . [from entering] into a long-term financial commitment unless any baseload generation supplied under the long-term financial commitment complies with the greenhouse gases [EPS]."[4]

In a 2007 rulemaking, the Commission set the EPS for all Load Serving Entities (LSEs) at 1,100 pounds (lbs) of carbon dioxide (CO_2) per megawatt hour (MWh).[5] As a result, the state has made progress on powerplant GHG emissions. The 2019 GHG emission rate of the

[2] John Sterman et al., *Does replacing coal with wood lower CO2 emissions? Dynamic lifecycle analysis of wood bioenergy*, 13 Env't Rsch. Letters 015007 (2018), DOI: 10.1088/1748-9326/aaa512; John Sterman et al., *Does wood bioenergy help or harm the climate?*, 78 Bulletin of the Atomic Scientists 128 (2022), DOI: 10.1080/00963402.2022.2062933.

[3] S.B. 1368, 2005-2006 Leg., Reg. Sess. (Cal. 2006), codified at Division 4.1 Cal. Pub. Util. Code § 8341(a) [hereinafter SB 1368].

[4] Cal. Pub. Util. Code § 8340(f); *see also* Cal. Code Regs. tit. 20, § 2902(b).

[5] Cal. Code Regs. tit. 20, § 2902(a); *see also* Interim EPS Rules § 4; Interim Opinion on Phase 1 Issues, Conclusions of Law 16. Though this petition is focused on eliminating the exemption for woody and agricultural biomass, we encourage the CPUC to revisit and reconsider the 1,100 lbs CO_2 per MWh threshold that is now 16 years old and out of date in the context of the climate crisis and California's goals to ratchet down emissions.

electricity portfolio was 463 lbs of carbon dioxide equivalent (CO_2e) per MWh for in-state and imported electricity combined, and 375 lbs CO_2e per MWh for in-state electricity alone.[6]

Biomass power, however, bucks this hopeful trend. In 2018, non-cogeneration woody and agricultural biomass power plants in California emitted more than *seven times* the average California rate, or three times the EPS, averaging 3,500 lbs of CO2e per net MWh.[7]

But rather than have to prove that they comply with the EPS, biomass power plants operate under what the Commission called an "automatic pass"[8] when enacting the EPS regulations in 2007.[9] Specifically, the Commission's EPS regulations shield most, if not all, of the state's woody and agricultural biomass energy from having to demonstrate EPS compliance

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[6] Cal. Air Res. Bd., *California Greenhouse Gas Emissions for 2000 to 2019, Trends of Emissions and Other Indicators* (July 28, 2021), https://ww2.arb.ca.gov/sites/default/files/classic/cc/ca_ghg_inventory_trends_2000-2019.pdf at Figure 9 (GHG Intensity of Electricity Generation); *see also* Cal. Air Res. Bd., 2000-2019 Emissions Trends Report Data (Updated on April 21, 2022), https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/2000_2019_ghg_inventory_trends_figures_20220516.xlsx at Figure 9, showing the overall GHG Intensity of Electricity Generation in 2019 of 0.21 tonnes CO2e per MWh, which is equal to 463 pounds CO2e per MWh, and in-state electricity generation at 0.17 tonnes CO2e per MWh which is equal to 375 pounds CO2e per MWh.

[7] Total CO2e emissions for each facility in 2018 come from California Air Resources Board Mandatory GHG Reporting Emissions data, available at *Mandatory GHG Reporting – Reported Emissions,* Cal. Air Res. Bd., https://ww2.arb.ca.gov/mrr-data (last visited Nov. 10, 2022). Data on net MWh produced by each facility in 2018 come from *California Biomass and Waste-To-Energy Statistics and Data*, Cal. Energy Comm'n, https://ww2.energy.ca.gov/almanac/renewables_data/biomass/index_cms.php (last visited Nov. 10, 2022) (select 2018 in the "Go to a Different Year" dropdown menu). Total CO2e produced by the 9 electricity only, non-cogeneration active woody biomass facilities with available data totaled 2,127,693 metric tons, and net MWh in 2018 from these 9 facilities totaled 1,334,346 MWh, for an average of 1.59 metric tons CO2e per net MWh, equal to 3,515 pounds CO2e per net MWh. The average of 3,515 pounds CO2e per MWh includes electricity-only plants; cogeneration plants are excluded because some of their CO2 emissions are from heat-related fuel consumption.

[8] Interim Opinion on Phase 1 Issues at § 1.6 (p. 18); § 4.10 (p. 120).

[9] *Id.* § 1.6 (p. 19). As noted below, the regulation exempts generating facilities "using biomass *that would otherwise be disposed of*" from EPS compliance. *Id.* In contrast, facilities generating electricity from "biomass that is grown (or disposed of using methods other than those that are pre-approved as EPS compliant)" must demonstrate EPS compliance. *Id.* § 1.6 (p. 19); Interim EPS Rules § 6(A). As demonstrated in this letter, however, our research indicates that most—if not all—of California biomass-fueled generating facilities use biomass that would otherwise be disposed of, meaning that the EPS exempts all of the state's biomass powerplants.

based on the erroneous assumption that biomass electric generation, even from "waste" feedstocks, results in a net reduction of GHG emissions.[10]

The Commission's exemption for woody and agricultural biomass is not supported by accurate or current scientific knowledge. In its 2007 rulemaking, the Commission relied on only two studies, one from 1989, and another from 2000. *See* Attachment A. These studies—now 34 and 23 years old, respectively—should not have justified the exemption for woody and agricultural biomass then and are outpaced by significant amounts of scientific evidence now. The CPUC cannot ignore that current science shows that electricity generated from woody and agricultural biomass, including biomass considered to be residue or waste that would otherwise be disposed of, *does not result in net negative emissions,* but instead emits significant net GHG emissions that worsen the climate crisis. The Commission must take action to align with the current science on this issue.

Further, when adopting the biomass exemption, the Commission reasoned that biomass power would be beneficial economically and to health and the environment.[11] These justifications are no longer supportable. Biomass power is California's most expensive power source, and biomass powerplants are some of the state's largest emitters of criteria and hazardous air pollutants.

Notably, the Commission itself characterized the 2007 EPS regulations as "interim" and a "near-term bridge" until an enforceable GHG limit passed, which SB 1368 envisioned would be in the rulemaking timeframe.[12] The time for an "interim" rule has long passed, and the

[10] *Id.* § 1.6 (p. 18); *see also* Conclusions of Law 35.
[11] *Id.* § 4.10 (p. 117).
[12] Cal. Pub. Util. Code § 8341(g); *see also* Interim Opinion on Phase 1 Issues at § 1 (p. 2).

Commission should recognize this fact and "reevaluate, modify, or replace" the interim standard, as it pledged once to do.[13]

For these reasons, we urge the Commission to commence a rulemaking to do the following:

1. Repeal the **bolded** language below from the Interim EPS Rules at section 5:

   Baseload powerplants generating electricity using the following renewable resources and technologies are pre-approved as EPS compliant, and therefore the LSE does not need to calculate the net emissions from powerplants utilizing these generation sources to demonstrate compliance with the EPS:
   - Solar Thermal Electric (with up to 25% gas heat input)
   - Wind
   - Geothermal, with or without Reinjection
   - **Generating facilities (e.g., agricultural and wood waste,** landfill gas**) *using biomass that would otherwise be disposed of* utilizing open burning, forest accumulation, landfill (uncontrolled, gas collection with flare, gas collection with engine), spreading or composting.**[14]

2. Add clarifying language in the EPS regulation explaining that "generating facilities using biomass that would otherwise be disposed of are *no longer* pre-approved as EPS compliant, and therefore LSEs must calculate their net lifecycle emissions in order to demonstrate compliance with the EPS."

3. Require *all* biomass facilities to calculate their net lifecycle GHG emissions "from the process of growing, processing and generating the electricity from the fuel source. This

[13] Interim Opinion on Phase 1 Issues at § 1 (p. 2); *see also id.* at § 3 (p. 35) ("Therefore, today's decision focuses on the most appropriate design parameters for an interim EPS, rather than a permanent one.").
[14] In this petition we take no position on the exemption for landfill gas but encourage the Commission to examine this issue by considering the latest science on landfill gas emissions and soliciting public comment asking whether this exemption should end.

calculation of net emissions shall also include the CO_2 equivalent of methane gas emissions associated with these processes."[15]

4. Require that when calculating their net lifecycle GHG emissions, net emissions calculations "must include upstream, downstream, and indirect emissions associated with electricity generation and use counterfactual modeling of alternatives for the biomass materials that offer the greatest potential climate and justice benefits."[16]
5. Further, we request that the public be given notice and the ability to offer comment on requests for pre-approval to use carbon capture and storage as a means to comply with the EPS.

To our knowledge, the biomass exemption has never been litigated before the Commission, nor has the Commission acted on (or decided not to act on) this issue within the preceding 12 months. Rule 6.3(b), (f).

Pursuant to Pub. Util. Code section 1708.5(b)(1), we request a response from the Commission within six months from the date of this petition's receipt.

We have attached the two studies upon which the Commission relied on in 2007 as Attachment A. In addition, over 50 groups in California have indicated their support of this petition and are listed in Attachment B. We have also attached more recent scientific studies cited herein for the Commission's convenience as part of this filing.

[15] Interim EPS Rule, § 6(A); *see also id.* § 1(f) ("For facilities generating electricity from biomass, biogas, or landfill gas energy, net emissions represent the net change in emissions from the process of growing, processing and generating the electricity from the fuel source.").
[16] We urge the Commission to consider requiring all sources to calculate their net lifecycle GHG emissions.

II. INTERESTS OF PETITIONERS

The Center for Biological Diversity (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, 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. The Center also works to protect the climate, forests and ecosystems, and communities from harmful pollution and destructive logging.

III. LEGAL FRAMEWORK FOR THE CURRENT TREATMENT OF BIOMASS UNDER THE EPS

A. SB 1368

SB 1368 prohibits any "load-serving entity or local publicly owned electric utility . . . [from entering] into a long-term financial commitment unless any baseload generation supplied under the long-term financial commitment complies with the greenhouse gases emission performance standard."[17] The statute defines "long-term financial commitment" to mean "either a new ownership investment in baseload generation or a new or renewed contract with a term of five or more years, which includes procurement of baseload generation."[18] The statute defines "baseload generation" as "electricity generation from a powerplant that is designed and intended to provide electricity at an annualized plant capacity factor of at least 60%."[19]

[17] SB 1368.
[18] Cal. Pub. Util. Code § 8340(f).
[19] *Id.* § 8340(a).

As directed by SB 1368, the Commission and the California Energy Commission (CEC) share EPS oversight and enforcement duties, depending on the type of electricity-procuring entity.[20] The Commission oversees proposed energy procurements of LSEs,[21] whereas the CEC oversees procurements of municipal utilities.[22]

The statute directs both the Commission and CEC to establish an EPS threshold and enforcement regulations.[23] Per the statute, the Commission sets its EPS threshold first, and the CEC's subsequent EPS threshold must be consistent with the Commission's standards.[24] For each set of rules, the EPS can be no higher than the rate of GHG emissions for combined-cycle natural gas baseload generation.[25] Determining the GHG emissions for baseload generation "include[s] the net emissions resulting from the production of electricity."[26]

The statute also carves out several requirements for the Commission and CEC when setting the EPS. Specific to biomass, biogas, and landfill gas energy, the statute requires both the Commission and CEC to "consider net emissions from the process of growing, processing, and generating electricity from the fuel source."[27] The statute also requires the Commission to consider the effects of the EPS on system reliability and overall costs to electricity customers.[28]

Anticipating that a separate GHG emissions limit was on its way, the statute requires the

[20] *Id.* § 8341.
[21] *Id.* § 8341(b)(1)-(2).
[22] *Id.* § 8341(c)(1)-(2).
[23] *Id.* §§ 8341(d)(1), (e)(1).
[24] *Id.* § 8341(e)(1) ("The greenhouse gases emission performance standard established by the Energy Commission for local publicly owned electric utilities shall be consistent with the standard adopted by the [CPUC] for load-serving entities.").
[25] *Id.* §§ 8341(d)(1), (e)(1). All combined-cycle natural gas (CCGT) powerplants in operation, or with an Energy Commission final permit decision to operate as of June 30, 2007, were deemed to be in compliance with EPS. *Id.*
[26] *Id.* §§ 8341(d)(2), (e)(3).
[27] *Id.* § 8341(d)(4), (e)(5).
[28] *Id.* § 8341(d)(6).

Commission and CEC to "reevaluate and continue, modify, or replace" the EPS "when an enforceable greenhouse gases emissions limit is established and in operation."[29]

B. The Commission's EPS Regulations

In January 2007 the Commission finalized its EPS rulemaking, setting the EPS threshold as 1,100 lbs of CO_2 per MWh.[30] All covered procurements must "be with specified resources that can demonstrate compliance (or demonstrate that compliance is not required) with" the EPS.[31]

In its EPS regulation, the Commission gave what it called an "automatic pass"[32] to certain types of biomass power by deeming them compliant with the standard:

> Baseload powerplants generating electricity using the following renewable resources and technologies are *pre-approved as EPS compliant*, and therefore the LSE does not need to calculate the net emissions from powerplants utilizing these generation sources to demonstrate compliance with the EPS:
>
> - Solar Thermal Electric (with up to 25% gas heat input)
> - Wind
> - Geothermal, with or without Reinjection
> - Generating facilities (e.g., agricultural and wood waste, landfill gas) *using biomass that would otherwise be disposed of* utilizing open burning, forest accumulation, landfill (uncontrolled, gas collection with flare, gas collection with engine), spreading or composting.[33]

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[29] *Id.* § 8341(g). SB 1368's findings state that "federal regulation of emissions of greenhouse gases is likely during this decisionmaking timeframe." SB 1368, Section 1(f).

[30] Interim EPS Rules, § 4; *see also* Interim Opinion on Phase 1 Issues, Conclusion of Law 16. The Rule explains, though, that it initially proposed a rate of 1,000lbs/MWh, and only changed after being "persuaded that allowing a small amount of leeway above this threshold would more appropriately take into account smaller-sized CCGTs utilizing newer technologies." Interim Opinion on Phase 1 Issues at § 4.3 (pp. 69-70).

[31] Interim EPS Rules § 8 ("Specified" means that the covered procurement identifies the individual powerplant(s) that will be delivering power.).

[32] Interim Opinion on Phase 1 Issues at § 1.6 (p. 18); § 4.10 (p. 120).

[33] Interim EPS Rules § 5 (emphasis added). The CPUC explained in its rule that it does not believe if a facility uses "distinct and separate" fuelstocks, such as renewables at one unit and fossil fuels at another, then that facility should not comprise a "single powerplant." Interim Opinion on Phase 1 Issues at § 4.2.4 (p. 54). Treating different high-emitting with low-emitting resources due to a shared physical location could, the CPUC argued, create "an absurd result" where power stations expand in order to co-locate high-emitting units in with low-emitting ones in order to circumvent the EPS. *Id.*

In contrast, biomass facilities generating electricity "from biomass that is *grown* (or disposed of using methods other than those that are pre-approved as EPS compliant")[34] must demonstrate EPS compliance. This latter category of biomass facilities must calculate their net emissions "from the process of growing, processing and generating the electricity from the fuel source. This calculation of net emissions shall also include the CO_2 equivalent of methane gas emissions associated with these processes."[35]

The Commission explained that its decision to give certain biomass powerplants a pass from the EPS arose from SB 1368's directive that the EPS consider "net emissions" of biomass power.[36] In considering these net emissions, the Commission asserted that the record showed that "electric generation using biomass . . . results in a substantial *net reduction* in GHG emissions . . . because the usual disposal options for biomass wastes emit large quantities of methane gas, whereas the energy alternatives either burn the wastes that would become methane or burn the methane itself, generating CO_2."[37] The Commission based its conclusions on two studies from 1989 and 2000. *See* Attachment A.

[34] Interim EPS Rules § 6(A) (emphasis added).
[35] *Id.*; *see also id.* § 1(f) ("For facilities generating electricity from biomass, biogas, or landfill gas energy, net emissions represent the net change in emissions from the process of growing, processing and generating the electricity from the fuel source.").
[36] Interim Opinion on Phase 1 Issues at § 1.6 (p. 18), § 4.10 (p. 116).
[37] *Id.* at § 1.6 (p. 18); *see also* CPUC, *Final Workshop Report: Interim Emissions Performance Standard Program Framework*, R.06-04-009 (Oct. 2, 2006), https://docs.cpuc.ca.gov/word_pdf/REPORT/60350.pdf ("although biogenic renewables (biomass and biogas generators) have higher GHG emissions from the stack than CCGT, when net emissions are properly accounted for, these resources reduce the net emissions associated with the alternative disposal of these same materials and eventually have lower emissions than CCGT plants."). CPUC noted that no parties submitting comments disputed the claim that biomass power reduces net GHG emissions; some of those parties included NRDC, TURN, and Union of Concerned Scientists. Interim Opinion on Phase 1 Issues at § 4.10 (p. 116). One commenter, IEP, suggested instead that the CPUC adopt a pre-established calculation of net GHG emissions that LSEs could then use when seeking approval. *Id.* at 116-117.

In the rulemaking record, the Commission stated that the biomass exemption would support SB 1368's recognition "that renewable resources are . . . both environmentally and economically sound in the context of addressing the adverse consequences of climate change on the economy, health, and environment of California."[38] The Commission also justified the biomass exemption on the basis that doing so would reduce costs to LSEs and "to electricity customers."[39] And while the Commission acknowledged concerns from staff in their final report that SB 1368 "may not permit" it to make "an upfront one-time determination" that biomass power is EPS compliant, the Commission nonetheless concluded that it found "nothing in the statute would preclude us from doing so."[40]

IV. REASONS SUPPORTING AN END TO THE BIOMASS EXEMPTION IN THE EPS AND CREATION OF A REQUIREMENT THAT BIOMASS FACILITIES MUST DEMONSTRATE EPS COMPLIANCE

A. The Studies that the Commission Relied on in 2007 Are Not the Best Science, and Current Evidence Shows that Biomass Power Is Not Carbon Negative

SB 1368 required the Commission, when issuing regulations for the EPS, to "consider net emissions from the process of growing, processing, and generating electricity" from fuel sources such as biomass.[41] To abide by this directive, the Commission looked at two studies supposedly showing that biomass power, when generated from biomass materials that would "otherwise be disposed of," results in a substantial net negative amount of GHG emissions.[42] See Attachment

[38] *Id.* § 4.10 (p. 117), citing SB 1368, section 1(a)-(c).
[39] *Id.*
[40] *Id.* at § 4.10 (p. 118).
[41] Cal. Pub. Util. Code §§ § 8341(d)(4), (e)(5).
[42] Those studies were Peter Gleick, Gregory Morris & Nicki Norman, *Greenhouse-Gas Emissions From the Operation of Energy Facilities*, Pacific Institute Report (1989); Gregory Morris, *Biomass Energy Production in California: The Case for a Biomass Policy Initiative*, Nat'l Renewable Energy Lab'y Rep. No. NREL/SR-570-28805 38-50 (2000); Interim Opinion on Phase 1 Issues, Attachment 6, "Summary of Net Emissions Data for Renewables" (Jan. 25, 2007). *See also* Interim Opinion on Phase 1 Issues at § 1.6 (p. 18); CPUC, *Final Workshop Report: Interim Emissions Performance Standard Program Framework*, R.06-04-009 (Oct. 2, 2006).

A. Those studies were not credible then and have been rendered obsolete by current evidence now. Accordingly, the Commission must adhere to current science and eliminate the biomass exemption.

The two studies the Commission relied on are problematic for two reasons: first, the studies reached invalid conclusions and should not have supported the exemption in the first place; and second, the studies, Morris (2000) at over 23 years old, and its predecessor (Gleick, Morris, and Norman 1989) at 34 years old, are outdated. Current evidence and scientific research, as well as changes in the regulatory landscape, demonstrate that it is not credible to assert that biomass power generated from "waste" materials is carbon neutral, much less to assert that it results in net negative GHG emissions, as these outdated studies claim.

Below, we focus on the flaws of the Morris study because it amended and replaced Gleick et al. and was the primary study used by CPUC as the basis for assuming that biomass energy emissions from burning residues are net negative.

1) The Studies Reached Invalid Conclusions Based on Flawed Methodologies

To the first issue, the Morris and Gleick et al. studies are rife with methodological problems. These include, among others: (i) the core calculation of net GHG emissions for biomass erroneously subtracts "avoided emissions"; (ii) the use of invalid emissions factors; (iii) the incorrect assumption that all biomass burned for energy is "residues" and "waste"; and (iv) analysis over long time frames that fail to align with California's climate targets.

a) The studies' core calculation of net GHG emissions is flawed

Morris incorrectly calculates the net emissions for biomass energy. That study calculates net biomass energy emissions as the difference between the emissions from biomass power production and the emissions from alternative disposal methods for biomass residues. However,

Morris further incorrectly subtracts "avoided emissions" from fossil fuel-based power production—which Morris defines as additional emissions that would have been produced had the power been generated instead from fossil fuels including coal and fossil gas.[43] Subtracting out avoided fossil fuel emissions when calculating net emissions from biomass energy is no more valid than it would be to calculate net emissions for gas-fired power production by subtracting out the extra emissions that would have been produced had the power been generated instead from coal. This error contributes to a significant underestimate of the actual net emissions of biomass energy. Morris estimated that ~25% of "the total greenhouse gas benefits of biomass energy production are due to fossil fuel avoidance." [44] Particularly now, over two decades later, assuming that California would rely on fossil fuels for energy is untenable and cannot serve as the basis for giving biomass energy a free pass under the EPS.

b) The studies rely on illogical and incomplete emissions factors that fail to include upstream emissions

Morris's calculations are further corrupted using illogical and incomplete emissions factors for biomass energy and alternate biomass disposal fates. These illogical factors are as follows:

[43] Morris at 34-35 ("The production of electricity in biomass power plants helps reduce air pollution by displacing the production of power using conventional sources. The marginal generating source displaced by biomass energy generation in most cases is natural gas fired power generation, using steam-turbine technology, and/or gas-turbine technology. The full net emissions reductions associated with biomass energy generation can be calculated as the difference between the net emissions associated with the biomass power cycle alone, and the sum of the emissions that would have been produced by the avoided fossil fuel based generation, and the emissions associated with the displaced alternative disposal of the biomass residues.")

[44] Morris at 44 estimated that "avoided emissions" amounted to 2 million tons of CO2-eq in 1999 alone. Although subtracting "avoided emissions" is clearly incorrect, the study further errs in assuming that avoided emissions are solely from fossil fuel-based power generation, rather than using grid-average emissions or emissions from solar or wind energy which are more likely to be displaced by biomass energy.

- Morris vaguely states that the emissions factors that form the basis of his calculations are from the EPA's AP-42 documentation and unspecified "other relevant sources."[45] However, we were unable to trace the emissions factors to EPA's AP-42.
- Morris provides a single emissions factor for "biomass energy" in California across a wide range of biomass feedstocks, facilities, combustion types, and combustion controls,[46] despite the fact that emissions vary substantially across feedstocks, facility types, and processes.
- Morris's emissions factor fails to include the significant upstream emissions from cutting, extracting, transporting in diesel trucks, processing, and drying the biomass materials prior to electricity production.[47]
- Morris fails to include the substantial methane emissions from decay in wood chip storage piles prior to incineration.[48]

As a result of these errors and omissions, the study's emission factor for biomass energy generation—a process that immediately releases all the stored carbon to the atmosphere—is much smaller than for all other biomass fates, including fates that keep much of the biomass intact such as composting, spreading, and forest accumulation (i.e., leaving the forest uncut).[49]

[45] *Id.* at 36.
[46] Morris bases criteria pollutant emissions from "information supplied by 34 California biomass facilities" but does not document this information.
[47] *See, e.g.*, upstream emissions estimates in Mirjam Roder 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 (2015), DOI: 10.1016/j.biombioe.2015.03.030.
[48] *Id.*
[49] Morris at Table 3 and 6.

Based on his erroneous emission factor calculations, Morris asserts that biomass energy results in half the emissions of leaving the forest uncut.[50] It defies common sense—and is unsupported by science—to claim that an in-tact forest produces more GHG emissions than cutting trees, extracting cut materials, trucking biomass often long distances, drying and chipping, storage which releases significant methane emissions, and incineration which releases all the stored carbon to the atmosphere, all while reducing the capacity of the cut forest to sequester carbon.

c) The studies use irrelevant time frames

Morris uses time frames of 50 and 100 years for calculating net biomass emissions.[51] A more logical approach would be to use near-term (such as within the next decade) timeframes, as these as more relevant to addressing the climate emergency and meeting California's climate goals.

California's climate law and policies require increasingly steep reductions in GHG emissions during this decade and the next.[52] The IPCC reports make clear that global GHG emissions must be cut in half by 2030 to limit global heating to 1.5°C, with much larger reductions required by the U.S. due to our dominant role in driving climate change and greater

[50] Biomass energy has an emissions factor of 1.76 tons CO2e/bone dry tons of biomass, whereas leaving forests uncut has an emissions factor of 3.35. *See* Morris (2000) at Table 3 and 6.
[51] *Id.* at 40-41, 47.
[52] Executive Order B-30-15 and Senate Bill 32 established the climate target of cutting greenhouse gas emissions 40 percent below 1990 levels by 2030. Exec. Order B-30-15 (2015), https://www.library.ca.gov/wp-content/uploads/GovernmentPublications/executive-order-proclamation/39-B-30-15.pdf; S.B. 32, 2015-2016 Leg., Reg. Sess. (Cal. 2016). Executive Order B-55-18 established the statewide goal to "to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter." Exec. Order B-55-18 (2018), https://www.ca.gov/archive/gov39/wp-content/uploads/2018/09/9.10.18-Executive-Order.pdf. Senate Bill 100 requires at least 60% of California's electricity to be renewable by 2030, and 100% of electric retail sales to be supplied by renewable energy and zero-carbon resources by 2045. S.B. 100, 2017-2018 Leg., Reg. Sess. (Cal. 2018). Senate Bill 1020 requires 90% of the state's electricity to be from renewable and zero-carbon resources by 2035 and 95% by 2040. S.B. 1020, 2021-2022 Leg., Reg. Sess. (Cal. 2022).

financial and technical resources to implement emissions cuts.[53] At a time when emissions must be urgently reduced, it is imperative that the EPS account for the GHG pollution from biomass energy over the next five to ten years and other near-term time frames.

d) The studies fail to account for the full scope of biomass feedstocks being burned for energy

Describing biomass feedstocks is important because the definition affects the modeling inputs, parameters, and emissions results for biomass energy, as well as whether biomass energy can be categorized as coming from material that "would otherwise be disposed of," as assumed under the EPS. But the Morris study relies on the erroneous assumption that only forest residues—defined therein as treetops, limbs, bark, and cull logs[54]—are used as feedstocks for biomass power plants. That is not the case in California, where regulations do not restrict woody biomass feedstocks to residue categories. For example, the definition of "sustainable forest management" under the BioMAT program is extremely broad, permitting the cutting and collection of any forest material as feedstock.[55] In practice, California's woody biomass power plants routinely burn more than "residues," including whole trees cut for "fire threat reduction" and large dead trees cut post-fire.

Log piles are common at California biomass plants, showing that whole trees are being chipped, not just "residues." Woody biomass material is often transported to biomass plants as wood chips, where chipping is done near the logging site or at wood processing facilities.

[53] Because California represents the largest share of the U.S. economy, it too has an outsized responsibility to reduce its emissions.
[54] Morris at 18.
[55] CPUC, *Decision Implementing Senate Bill 1122*, Decision 14-12-081 (Dec. 26, 2014), https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M143/K960/143960061.pdf. Section 2.23 allows the harvest of forest materials related to "fire threat reduction," "fire safe clearance activities," "infrastructure clearance projects," and "other sustainable forest management" activities, which are so broad and non-specific as to allow any forest material to qualify as feedstock.

Evidence from wood processing facilities in California shows that whole trees are being chipped, not just "residues."

2) Advances in Biomass Science and State Laws Render the Studies the Commission Relied on Outdated

Advances in scientific research and changes to California law further invalidate the Morris study's conclusion that biomass energy has net negative emissions. These advances include: (1) the scientific consensus that biomass power is not carbon neutral, and certainly not net negative (as detailed above); (2) updated emissions factors for biomass energy and alternative fates (for example, the EPS combustion emissions factors in AP-42 have been updated several times); (3) new state laws that dramatically change the disposal fates of biomass residues, rendering Morris's emissions calculations invalid; and (4) outdated assumptions about methane emissions from biomass disposal fates and the failure to account for the high methane production associated with biomass energy generation.

In sum, current evidence and research make clear that biomass power generated from woody and agricultural residues results in significant GHG emissions, in contrast to the outdated conclusion of Morris on which the biomass EPS exemption is based.

a) New science informs updated emissions factors

Morris states that the emissions factors that form the basis of his calculations are from the EPA's AP-42 documentation and unspecified "other relevant sources."[56] The EPS combustion emissions factors in AP-42 have been updated[57] since Morris's 2000 study, and many other

[56] Morris at 36.
[57] *See e.g.*, New and Revised Emissions Factors for Wood Residue Combustion in Boilers, posted March 2022, Final Revisions to AP-42, Chapter 1, Section 6 – Wood Residue Combustion in Boilers, U.S. EPA, https://www.epa.gov/air-emissions-factors-and-quantification/final-revisions-ap-42-chapter-1-section-6-wood-residue (last updated Mar. 22, 2022).

studies have been published updating the emissions factors for biomass energy and alternative fates, as detailed throughout this petition.

b) New state laws changed what happens to biomass waste

The Morris study's assumptions about what is likely to happen to biomass waste are no longer valid because of changes in state laws. These changes in law further render the Morris study irrelevant and unable to support the EPS exemption for certain biomass.

For example, Morris models alternate "disposal fates" for biomass residues. He does this across four categories—wood processing, in-forest, agricultural, and urban wood. The dominant alternate fate that he models for wood processing and urban wood residues is landfill disposal, whereas the dominant alternate fate for agricultural residues is open burning.[58] Yet SB 1383 (2016) requires most organic waste, including wood biomass, to be *diverted from* landfills, mandating a 50% reduction by 2014 and a 75% reduction by 2025.[59] Further, while Morris assumes that a large portion of biomass residue goes to "uncontrolled landfills" where methane is not captured, California's 2010 *Methane Emissions from Municipal Solid Waste Landfills* regulation requires methane capture.[60]

For agricultural biomass, the California Air Resources Board and state law require an end to open burning in the Central Valley by 2025.[61] For agricultural residues, chipping, composting, and mulching help increase soil carbon and revitalize soil health.[62] For wood processing and

[58] Morris at Table 2.
[59] S.B. 1383, 2015-2016 Leg., Reg. Sess. (Cal. 2016) at 39730.6.
[60] Cal. Air Res. Bd., Final Regulation Order: Methane Emissions from Municipal Solid Waste Landfills (2010), https://ww2.arb.ca.gov/sites/default/files/2020-06/landfillfinalfro.pdf.
[61] Press Release, Cal. Air Res. Bd., CARB partners with local air quality officials, farmers and communities to nearly eliminate agricultural burning in San Joaquin Valley by 2025 (Feb. 25, 2021), https://ww2.arb.ca.gov/news/carb-partners-local-air-quality-officials-farmers-and-communities-nearly-eliminate.
[62] Central Valley Air Quality Coal., *Sustainable Alternatives to Biomass Incineration in the San Joaquin Valley* (2019), http://www.calcleanair.org/wp-content/uploads/2019/03/biomass-handout-legislators.pdf.

forest residues, mastication and "lop and scatter" of materials in the forest do not appear to increase wildfire intensity[63] and would lead to lower emissions than biomass energy.[64] Correctly accounting for the current fates of biomass materials is critical for getting the emissions calculations right.[65] The Morris study simply does not do that, and its approach has been outpaced by California laws.

c) New science shows that biomass power wood chip piles release more methane than previously known

Finally, scientific research has documented substantial methane emissions from the wood chip piles used for biomass power generation which significantly increases its net emissions.[66] This source of methane emissions was not factored in by Morris and must be accounted for in a revised EPS that eliminates the free pass to certain types of biomass energy.

The Commission's EPS regulations assert that biomass energy generation is net negative because it is associated with no- or low-methane emissions while alternate biomass disposal methods produce high methane emissions.[67] But Morris's methane emissions estimates are poorly documented with no clear reference sources and largely relate to methane production from landfill disposal (which, as noted above, is no longer the dominant alternate fate for

[63] Jesse K. Kreye et. al., *Fire behavior in masticated fuels: a review*, 314 Forest Ecology and Mgmt. 193 (2014), http://dx.doi.org/10.1016/j.foreco.2013.11.035.
[64] Beverly E. Law at al., *Creating strategic reserves to protect forest carbon and reduce biodiversity losses in the United States*, 11 Land 721 (2022), https://doi.org/10.3390/land11050721.
[65] This is because Morris (2000) discounts biomass energy emissions with the emissions that would result from alternate uses of the biomass residues. Morris (2000)'s use of alternate fates with high emissions factors, such as landfill disposal and open burning, drives the calculation of biomass energy as net negative.
[66] Mirjam Roder 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 residue*, 79 Biomass and Bioenergy 50 (2015), DOI: 10.1016/j.biombioe.2015.03.030.
[67] Interim Opinion on Phase 1 Issues at § 1.6 (p. 18) ("the usual disposal options for biomass wastes emit large quantities of methane gas, whereas the energy alternatives either burn the wastes that would become methane or burn the methane itself, generating CO_2.").

biomass residues). Plus, as noted above, science has advanced and now shows that methane emissions from biomass production activities are far higher than were previously assumed.

B. Current Science Shows that Biomass Power Generation Is Not Net Negative, Making the "Automatic Pass" in the EPS Inappropriate

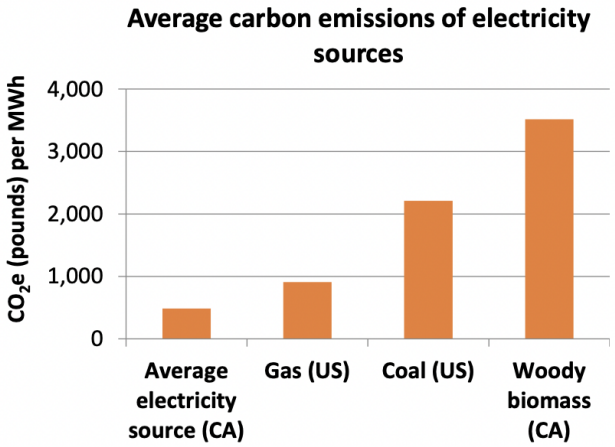
Incinerating wood to generate electricity emits more CO_2 per kilowatt-hour than what is generated from fossil fuels, including coal.[68] As a result, biomass power plants are much more climate polluting than other electricity sources in California. According to 2018 data pulled from the Air Resources Board, all of California's biomass facilities far exceed the EPS, with GHG emissions ranging from around 2,500 to over 19,000 lbs CO_2e per MWh, and averaging 3,500 pounds CO_2e per MWh for non-cogeneration facilities (see chart below).[69]

[68] John Sterman et al., Does wood bioenergy help or harm the climate?, 78 Bulletin of the Atomic Scientists 128 (2022), DOI: 10.1080/00963402.2022.2062933.

[69] Total CO2e emissions for each facility in 2018 come from California Air Resources Board Mandatory GHG Reporting Emissions data, available at *Mandatory GHG Reporting – Reported Emissions,* Cal. Air Res. Bd., https://ww2.arb.ca.gov/mrr-data (last visited Nov. 10, 2022). Data on net MWh produced by each facility in 2018 come from *California Biomass and Waste-To-Energy Statistics and Data*, Cal. Energy Comm'n, https://ww2.energy.ca.gov/almanac/renewables_data/biomass/index_cms.php (last visited Nov. 10, 2022) (select 2018 in the "Go to a Different Year" dropdown menu). Total CO2e produced by the 9 electricity only, non-cogeneration active woody and agricultural biomass facilities with available data totaled 2,127,693 metric tons, and net MWh in 2018 from these 9 facilities totaled 1,334,346 MWh, for an average of 1.59 metric tons CO2e per net MWh, equal to 3,515 pounds CO2e per net MWh. The average of 3,515 pounds CO2e per MWh includes electricity-only plants; cogeneration plants are excluded because some of their CO2 emissions are from heat-related fuel consumption. The high CO2e rate-per-MWh is similar for biomass facilities without cogeneration.

Biomass energy generation in California emits more than 1.5 times the carbon pollution of coal-fired power per unit of electricity—and almost four times the carbon pollution of gas-generated power (see chart below).[70] Other studies have similarly found that biomass energy produces emissions at the smokestack in the range of 3,220 pounds CO_2 per MWh, which significantly exceeds emissions from coal and fossil gas for the same amount of electricity produced.[71] This is because incinerating trees is a remarkably inefficient way to generate electricity, resulting in high carbon emissions and high costs of production.[72] In contrast, solar

Biomass power plant emissions in 2018	Capacity (MW)	Total CO_2e (pounds) per net MWh
Ampersand Chowchilla Biomass Power	12.5	2,996
Burney Forest Products (BioRAM) (cogen)	31	3,768
Collins Pine Biomass Power (cogen)	12	19,120
DG Fairhaven	15	3,877
DTE Stockton Biomass Power (cogen)	50	3,298
HL Power (BioRAM)	35.5	2,980
Humboldt Sawmill Company (cogen)	32.5	5,016
Merced Power	12.5	3,220
Mt. Poso Cogeneration (cogen)	63.6	2,507
Pacific Ultrapower Chinese Station (BioRAM)	25.7	4,418
Rio Bravo Fresno Biomass Power (BioRAM)	27.8	3,150
Rio Bravo Rocklin Biomass Power (BioRAM)	27.8	3,435
Roseburg Forest Products (cogen)	13.4	4,967
SPI Anderson Biomass Power II (cogen)	30.1	4,480
SPI Burney Biomass Power (cogen)	20	4,736
SPI Lincoln Biomass Power (cogen)	19.2	5,314
SPI Quincy Biomass Power (cogen)	35.3	6,215
SPI Sonora Standard Biomass Power (cogen)	7.5	11,540
Wheelabrator Shasta Energy (BioRAM)	62.8	3,900
Woodland Biomass Power	28	3,464
Average for non-cogeneration plants		**3,515**



[70] Overall average GHG Intensity of electricity generation in California comes from Cal. Air Res. Bd., 2000- 2018 Emissions Trends Report Data (2020 Edition), https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2018/2000_2018_ghg_inventory_trends_figures.xlsx; average CO2 emissions per MWh for gas and coal in the United States in 2019 are from, *FAQS: How much carbon dioxide is produced per kilowatt hour of U.S. electricity generation?*, U.S. Energy Info. Admin., https://www.eia.gov/tools/faqs/faq.php?id=74&t=11 (last updated Nov. 4, 2021).

[71] Manomet Ctr. for Conservation Scis., *Massachusetts Biomass Sustainability and Carbon Policy Study: Report to the Commonwealth of Massachusetts Department of Energy Resources* (2010) at 103, https://www.mass.gov/doc/manometbiomassreportfullhirezpdf/download.

[72] John Sterman et al., *Does wood bioenergy help or harm the climate?*, 78 Bulletin of the Atomic Scientists 128 (2022), DOI: 10.1080/00963402.2022.2062933.

and wind energy (also predetermined by the Commission to be EPS-compliant) provide virtually carbon-free sources of power.

Despite the substantial carbon pollution from biomass power, proponents erroneously claim that cutting and incinerating trees is inherently "carbon neutral"—that it does not cause net GHG emissions.[73] Published scientific research has thoroughly debunked this false claim. As a result, the Intergovernmental Panel on Climate Change (IPCC), federal Environmental Protection Agency's Science Advisory Board, and numerous other scientific bodies have established that woody biomass energy should not be assumed carbon neutral.[74] Cutting and burning trees for bioenergy releases their stored carbon to the atmosphere, immediately increasing CO_2 emissions and ending trees' future carbon sequestration, creating a "carbon debt."[75] To claim biomass energy is carbon neutral, biomass proponents try to discount the carbon released by biomass power plants by taking credit for the carbon that will be absorbed by future tree growth—claiming the carbon debt will eventually be repaid. This is misleading because forest regrowth takes time and is highly uncertain—there is no guarantee that cut forests will be allowed to grow back or that forests won't be converted to other land uses. Once trees are cut, numerous studies

[73] *Id.*

[74] IPCC, *Frequently Asked Questions*, *Intergovernmental Panel on Climate Change (IPCC) Task Force on National Greenhouse Gas Inventories*, http://www.ipcc-nggip.iges.or.jp/faq/faq.html (last visited Nov. 10, 2022) at Q2-10 ("The IPCC Guidelines do not automatically consider biomass used for energy as 'carbon neutral,' even if the biomass is thought to be produced sustainably); Letter from Michael Honeycutt, U.S. EPA Sci. Advisory Bd., to Andrew Wheeler, U.S. EPA Administrator, *SAB Review of Framework for Assessing Biogenic CO2 Emissions from Stationary Sources* (Mar. 5, 2019), https://cfpub.epa.gov/si/si_public_file_download.cfm?p_download_id=539269&Lab=OAP at 2 ("not all biogenic emissions are carbon neutral nor net additional to the atmosphere, and assuming so is inconsistent with the underlying science"); Letter from John Beddington, et al. to EU Parliament regarding forest biomass (Jan. 9, 2018), http://empowerplants.files.wordpress.com/2018/01/scientist-letter-on-eu-forest-biomass-796-signatories-as-of-january-16-2018.pdf.

[75] John Sterman et al., *Does wood bioenergy help or harm the climate?*, 78 Bulletin of the Atomic Scientists 128 (2022), DOI: 10.1080/00963402.2022.2062933.

show it may take many decades to more than a century, if ever, to pay back the carbon that was lost from cutting and incinerating them.[76]

Importantly for the EPS exemption, research also shows that using forest "residue" or "waste" for bioenergy—referring to biomass that would otherwise be disposed of—is not carbon neutral and leads instead to a *net increase* of carbon emissions in the atmosphere for decades.[77] One recent study found that burning all wood types, including forest residues (defined as branches, tree tops and bark) and fire-killed trees, to generate electricity increases carbon emissions in the atmosphere for more than a century compared to generating that electricity with fossil gas.[78] In short, biomass energy is not only harmful to the climate when feedstocks are grown explicitly for energy production: science shows that wood "waste," as exempted under the EPS, also increases GHG emissions.

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[76] Manomet Ctr. for Conservation Scis., *Massachusetts Biomass Sustainability and Carbon Policy Study: Report to the Commonwealth of Massachusetts Department of Energy Resources* (2010), https://www.mass.gov/doc/manometbiomassreportfullhirezpdf/download; Tara W. Hudiburg et al., *Regional carbon dioxide implications of forest bioenergy production*, 1 Nature Climate Change 419 (2011), https://doi.org/10.1038/nclimate1264; B.E. Law & M.E. Harmon, *Forest sector carbon management, measurement and verification, and discussion of policy related to climate change*, 2 Carbon Mgmt. 73 (2011), https://doi.org/10.4155/cmt.10.40; S.R. Mitchell et al., *Carbon debt and carbon sequestration parity in forest bioenergy production*, 4 Global Change Biology Bioenergy 818 (2012), https://doi.org/10.1111/j.1757-1707.2012.01173.x; E.D. Schulze et al., *Large-scale bioenergy from additional harvest of forest biomass is neither sustainable nor greenhouse gas neutral*, 4 Global Change Biology Bioenergy 611 (2012), DOI:10.1111/j.1757-1707.2012.01169.x; Bjart Holtsmark, *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 467 (2013), https://doi.org/10.1111/gcbb.12015; John Sterman et al., *Does replacing coal with wood lower CO_2 emissions? Dynamic lifecycle analysis of wood bioenergy*, 13 Env't Rsch. Letters 015007 (2018), https://doi.org/10.1088/1748-9326/aaa512.

[77] Mary S. Booth, *Not carbon neutral: Assessing the net emissions impact of residues burned for bioenergy*, 13 Env't Rsch. Letters 035001 (2018), https://doi.org/10.1088/1748-9326/aaac88; John Sterman et al., *Does wood bioenergy help or harm the climate?*, 78 Bulletin of the Atomic Scientists 128 (2022), https://doi.org/10.1080/00963402.2022.2062933.

[78] Jerome Laganiere et al., *Range and uncertainties in estimating delays in greenhouse gas mitigation potential of forest bioenergy sourced from Canadian forests*, 9 *GCB Bioenergy* 358 (2017), https://doi.org/10.1111/gcbb.12327.

Biomass proponents also falsely claim that cutting trees ("thinning") for biomass energy will reduce wildfire severity and lead to an overall net carbon benefit. Yet published scientific research on this issue has debunked this blanket claim. Broad-scale thinning to reduce fire risk or severity leads to more carbon emissions than it prevents from being released in a wildfire and creates a long-term carbon deficit that worsens the climate crisis.[79] Similarly, biomass proponents often claim that cutting dead trees after fire—frequently done as clear-cutting—is needed to reduce fire risk and leads to an overall carbon benefit. However, published research shows that dead trees do not increase wildfire risk (including no increase in fire severity, rate of spread, or extent).[80] Moreover, dead trees left standing in a forest provide critical carbon storage post-fire by retaining the vast majority of their carbon even after large, intense burns.[81] The

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[79] J.L. Campbell 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 Env't 83 (2012), https://doi.org/10.1890/110057; Tara W. Hudiburg, et al., *Meeting GHG reduction targets requires accounting for all forest sector emissions*, 14 Env't Rsch. Letters 095005 (2019), https://doi.org/10.1088/1748-9326/ab28bb; Kristina J. Bartowitz et al., *Forest carbon emission sources are not equal: putting fire, harvest, and fossil fuel emissions in context*, 5 Frontiers in Forests and Global Change 867112 (2022), https://doi.org/10.3389/ffgc.2022.867112; Chad Hanson, *Cumulative severity of thinned and unthinned forests in a large California wildfire*, 11 Land 373 (2022), https://doi.org/10.3390/land11030373; Beverly E. Law at al., *Creating strategic reserves to protect forest carbon and reduce biodiversity losses in the United States*, 11 Land 721 (2022), https://doi.org/10.3390/land11050721.

[80] Monica L. Bond et al., *Influence of pre-fire tree mortality on fire severity in conifer forests of the San Bernardino Mountains, California,* 2 The Open Forest Science J. 41 (2009), http://dx.doi.org/10.2174/1874398600902010041; Sarah J. Hart et al., *Area burned in the western United States is unaffected by recent mountain pine beetle outbreaks*, 112 PNAS 4375 (2015), https://doi.org/10.1073/pnas.1424037112; Garrett W. Meigs et al., *Do insect outbreaks reduce the severity of subsequent forest fires?,* 11 Env't Rsch. Letters 045008 (2016), DOI: 10.1088/1748-9326/11/4/045008; S.J. Hart & D.L. Preston, *Fire weather drives daily area burned and observations of fire behavior in mountain pine beetle affected landscapes*, 15 Env't Rsch. Letters 054007 (2020), DOI 10.1088/1748-9326/ab7953.

[81] Most combustion during wildfire comes from needles and small branches less than 2 centimeters in diameter. John Campbell et al., *Pyrogenic carbon emission from a large wildfire in Oregon, United States*, 112 J. of Geophysical Rsch. Biogeosciences G04014 (2007), https://doi.org/10.1029/2007JG000451; Garrett W. Meigs et al., *Forest fire impacts on carbon uptake, storage, and emission: The role of burn severity in the Eastern Cascades, Oregon*, 12 Ecosystems 1246 (2009), https://doi.org/10.1007/s10021-009-9285-x; Jeffrey E. Stenzel et al., *Fixing a snag in carbon*

carbon storage and ecological benefits of dead trees are lost when they are removed and incinerated for biomass energy.

In short, scientific research has established that biomass energy is highly climate-polluting, including when it is produced from "residues" that otherwise would be disposed of.

C. Biomass Is California's Most Expensive Energy Source and Harms Communities

In its 2007 rulemaking, the Commission claimed that the biomass exemption would benefit communities by reducing costs to electricity customers[82] and by being both "environmentally and economically sound in the context of addressing the adverse consequences of climate change on the economy, health, and environment of California."[83] Neither of these claims are true, as biomass power is expensive and harmful to public health and the environment. For these reasons, the Commission must open a rulemaking to hear from ratepayers and communities about this justification for the biomass exemption from the EPS.

Biomass power is California's most expensive energy source.[84] In 2018, the levelized cost of biomass power averaged $166 per MWh/hr—more than three times the cost for photovoltaic solar ($49 per MWh/hr) and almost three times the cost for wind ($57 per MWh/hr).[85] Perhaps because of these exorbitant costs, biomass energy is heavily subsidized

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emissions estimates from wildfires, 25 Glob. Change Biology 3985 (2019), https://doi.org/10.1111/gcb.14716 at Table 1; M.E. Harmon et al., *Combustion of Aboveground Wood from Live Trees in Mega-fires, CA, USA*, 13 Forests 391 (2022), https://doi.org/10.3390/f13030391.

[82] Interim Opinion on Phase 1 Issues at § 4.10 (p. 117).

[83] *Id.*, citing SB 1368, section 1(a)-(c).

[84] Cal. Energy Comm'n, *Staff Report, Estimated Cost of New Utility-Scale Generation in California: 2018 Update*, CEC-200-2019-500 (2019), https://www.energy.ca.gov/sites/default/files/2021-06/CEC-200-2019-005.pdf at 40.

[85] *Id.* at B-18 (levelized mid-level cost of Wind 80 m Hub Height 100 MW is $57), and B-21 (levelized mid-level cost of Biomass fluidized bed boiler 20 MW is $166). The levelized cost estimates reflect the average cost per megawatt-hour for an independent developer to build and operate a power plant over the lifetime of the facility.

through mechanisms such as the BioMAT, a feed-in tariff for bioenergy renewable generators that encourages long-term contracts and offers price certainty in order to accelerate investment in bioenergy.[86] Notably, in 2018, Energy Division staff at the Commission concluded in a program review that BioMAT facilities—particularly those utilizing woody biomass—may not produce net GHG reductions.[87]

Biomass power plants are also damaging to community health and the environment.[88] Biomass power plants are significant sources of harmful air pollutants, degrading the health of vulnerable communities where biomass facilities are located throughout the State and adding to environmental injustice.[89] This problem is especially pressing in the Central Valley, which is home to several biomass power plants and some of the worst air quality in the country.[90] In the San Joaquin Valley, eight of the 10 biomass plants are located in communities already severely overburdened by pollution.[91] Fresno's Rio Bravo biomass plant is located less than a half-mile

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[86] Cal. Pub. Util. Code §§ 399.20(b), (f)(2).

[87] CPUC, Energy Division, *Bioenergy Market Adjusting Tariff (BioMAT) Program Review and Staff Proposal* (Oct. 30, 2018) at 7, 11, https://www.cpuc.ca.gov/-/media/cpuc-website/industries-and-topics/documents/rps/biomat-program-review-and-staff-proposal.pdf ("Draft Staff Proposal"). In 2020, the final staff proposal recommended that the Commission establish a technical working group to create a project-specific lifecycle GHG analysis model to quantify biomass emissions. *See* CPUC, *Decision Revising the Bioenergy Market Adjusting Tariff Program*, D. 20-08-043 (Sept. 1, 2020), https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M346/K112/346112503.PDF at 4, 38. The working group's efforts are ongoing as of the date of this petition.

[88] Jonathan J Buonocore, A decade of the U.S. energy mix transitioning away from coal: historical reconstruction of the reductions in the public health burden of energy, 16 Env't Rsch. Letters 054030 (2021), https://doi.org/10.1088/1748-9326/abe74c.

[89] The air pollution from biomass powerplants isn't just antithetical to the goals of SB 1368. The air pollution of biomass facilities also contradicts the RPS, which is meant to achieve a "reduc[tion in] air pollution, particularly criteria pollutant emissions and toxic air contaminants, in the state." Cal. Pub. Util. Code § 399.11.

[90] *See State of the Air: Most Polluted Cities*, Am. Lung. Ass'n., http://www.stateoftheair.org/city-rankings/most-polluted-cities.html (listing Bakersfield, Visalia, and Fresno-Madera-Hanford in the top 10 most polluted cities in the U.S.) (last visited Nov. 10, 2022).

[91] 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, *SB*

from the Malaga Elementary School, Malaga Community Park, and surrounding homes, all in a majority Hispanic neighborhood with a pollution burden score of 100.[92]

Biomass power plants are also among the largest emitters of the criteria pollutants particulate matter (PM) and nitrogen oxide (NOx) in the state.[93] In the San Joaquin Valley Air District, two biomass plants—Mount Poso and Rio Bravo Fresno—were the 11th and 13th biggest stationary source of fine particulate matter (PM 2.5) in 2017 out of 153 sources.[94] In the Sacramento Valley Air District, 7 out of the 10 worst PM 2.5 polluters were biomass plants.[95] PM2.5 can penetrate deep into lung tissue and even enter the bloodstream and is linked to serious health problems including heart disease, premature death, stroke, and aggravated asthma.[96]

In addition to criteria air pollutants, biomass power plants emit large amounts of hazardous air pollutants, such as hydrochloric acid, dioxins, benzene, formaldehyde, arsenic, chromium, cadmium, lead, and mercury.[97] For example, in 2017, Humboldt Redwood Company's Scotia biomass cogeneration facility reported emitting a whopping 11,574 pounds of the carcinogen benzene and 12,364 pounds of the toxin formaldehyde.[98]

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535 Disadvantaged Communities, Cal. Off. of Env't Health Hazard Assessment, https://oehha.ca.gov/calenviroscreen/sb535 (last visited Nov. 10, 2022); *see also CalEnviroScreen*, Cal. Off. of Env't Health Hazard Assessment (June 2018), https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30 (showing that communities in the San Joaquin Valley near biomass facilities are at or above the 90th percentile in air pollution burden).

[92] *CalEnviroScreen*, Cal. Off. of Env't Health Hazard Assessment (June 2018), https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30.

[93] 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 *CARB Pollution Mapping Tool*, Cal. Air Res. Bd., https://ww3.arb.ca.gov/ei/tools/pollution_map/pollution_map.htm (last updated Feb. 9, 2022).

[94] *Id.*

[95] *Id.*

[96] *Health and Environmental Effects of Particulate Matter (PM)*, U.S. EPA, https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm (last updated Aug. 30, 2022).

[97] Partnership for Pol'y 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.

[98] Based on facility-level emissions data from *CARB Pollution Mapping Tool*, Cal. Air Res. Bd., https://ww3.arb.ca.gov/ei/tools/pollution_map/pollution_map.htm (last updated Feb. 9, 2022).

All of this is relevant because by no means is giving "an automatic pass" to biomass economically sound, beneficial to electricity customers, or in line with the goal of addressing the adverse consequences of climate change on the economy, health, and environment of California, as was assumed in 2007.[99]

D. The Commission Is Overdue to Revisit and Revise the EPS Regulations

The Commission is overdue to revisit and revise the EPS regulations—and especially the biomass exemption—based on its decision in 2007 to characterize the regulations as "interim" standards. The "interim" rules have been in place for 16 years, meaning the time is now to open a rulemaking to update the EPS rules to be more in line with current science, California's climate goals, and new regulatory frameworks.[100]

In 2007, the Commission explained that its EPS regulations focused "on the most appropriate design parameters for an interim EPS, rather than a permanent one."[101] The 2007 EPS regulations would therefore "serve as a near-term bridge" until that federal limit passed, after which the Commission pledged it would "reevaluate and continue, modify, or replace."[102] The time is ripe for the Commission to transform its "near-term bridge" of EPS regulations into something matching today's reality that we are in a "code red" for the climate,[103] recognizing that allowing facilities like biomass powerplants to operate without having to account for their GHG emissions only hastens and worsens the climate crisis.

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[99] Interim Opinion on Phase 1 Issues at § 4.10 (p. 117), citing SB 1368, section 1(a)-(c).
[100] As noted in a footnote earlier, we also urge the Commission to revisit the EPS standard itself of 1,100 lbs of CO_{2e} per MWh in light of California's updated climate goals since enactment of the EPS over a decade ago.
[101] Interim Opinion on Phase 1 Issues at § 3 (p.35).
[102] Interim EPS Rules at § 11 (further explaining that "These rules will remain in effect unless modified by subsequent Commission order."); *see also* Cal. Pub. Util. Code §§ 8341(d)(2).
[103] *IPCC report: 'Code red' for human driven global heating, warns UN chief*, United Nations News, Aug. 9, 2021, https://news.un.org/en/story/2021/08/1097362.

V. CONCLUSION

Achieving greenhouse gas emissions on paper does not help avert the climate crisis and is not true climate leadership. The facts are clear: woody and agricultural biomass power plants emit far beyond the EPS threshold, yet the EPS fails to take these emissions into account because of the "automatic pass" given to these sources by the Commission in 2007. The "automatic pass" is not supported by science and has become untethered from state laws passed since that time. Now, 16 years after their issuance, it is time to update the so-called "interim" EPS rules to reflect the latest science and policy goals.

In order for the EPS to function as intended, we urge the Commission to open a rulemaking and adopt the suggested changes articulated in this petition.

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