FOREST BIOMASS ENERGY IS A FALSE SOLUTION

Wheelabrator Shasta Energy biomass plant, photo by Trip Jennings

UNDERSTANDING WHY INCINERATING FORESTS TO GENERATE ELECTRICITY IS A BAD IDEA IS AS EASY AS P-I-E

Forest biomass power is:

- **Polluting,** emitting greenhouse gases, worsening the climate crisis, and harming vulnerable communities
- **Ineffective** for protecting communities during wildfires
- **Expensive** and dependent on subsidies that take resources away from truly clean energy alternatives

Instead of promoting biomass energy that harms our climate, communities, and forests, legislators and policy-makers should:

- Stop mandating, subsidizing, or otherwise incentivizing biomass power production, and instead direct investments toward truly clean energy production such as solar and wind.
- Fully account for the smokestack emissions from biomass power plants and stop incorrectly treating biomass power as "carbon neutral."
- Create climate-smart wildfire and forest policy that invests in proven home and community-focused approaches to wildfire safety rather than forest-cutting, while increasing forest protections that keep carbon stored in forest ecosystems as an essential climate solution.

Polluting for the Climate — Biomass is currently categorized as a "renewable" energy source along with solar and wind, but the reality is that biomass energy has more in common with fossil fuels. Like coal and oil, biomass is a carbon-burning form of energy production that emits carbon dioxide and contributes to the climate crisis. In fact, biomass power plants are California's dirtiest electricity source—releasing more carbon at the smokestack than coal. Adding to these harms, cutting trees for biomass energy reduces the forest's ability to sequester and store carbon. All in all, biomass power is a double whammy for the climate: it emits more carbon at the smokestack and leaves less carbon stored in the forest.

Polluting for Communities— Biomass power plants are also a significant source of air pollutants, harming the vulnerable communities where biomass facilities are located and worsening environmental injustice.

Ineffective — Biomass energy is often promoted as a tool to incentivize large-scale tree-cutting ("thinning") under the claim that this will protect communities and forests during wildfires. However, this approach is ineffective at protecting houses and communities, which is best achieved through a home-focused fire-safety strategy that helps communities safely coexist with inevitable wildfires. Although biomass energy is promoted as a means for disposing of debris piles from forest thinning projects, it is mostly lumber mill residues from commercial logging that end up being subsidized. Meanwhile, biomass extraction does significant ecological damage to forests.

Expensive —The inefficiency of using forest biomass to generate electricity makes it particularly costly. In fact, biomass power is California's most expensive energy source. Biomass power plants rely heavily on regulatory incentives and subsidies paid for by taxpayers and ratepayers. These biomass subsidies consume resources that would be better spent on cheaper and truly clean solar and wind energy alternatives and the jobs they create.

Each of these points is explained and supported in the factsheets accompanying this overview.

On close inspection, it's clear that biomass energy is not the solution – and would in fact impede California's ability to build a truly clean energy economy, all while endangering Californians along the way. The resources the state could pour into biomass would be put to better use pursuing truly clean solar and wind energy that will protect Californians, our health, our forests, and our climate well into the future.

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Wheelabrator Shasta Energy biomass plant, photo by Trip Jennings

BIOMASS ENERGY IS POLLUTING:
A FALSE CLIMATE SOLUTION THAT WORSENS THE CLIMATE CRISIS

Biomass is currently categorized as a "renewable" energy source along with solar and wind, but the reality is that biomass energy has more in common with fossil fuels. Like coal and oil, biomass is a carbon-burning form of energy production that emits carbon dioxide and contributes to the climate crisis. In fact, biomass power plants are California's dirtiest electricity source—releasing more carbon at the smokestack than coal. Adding to these harms, cutting trees for biomass energy reduces the forest's ability to sequester and store carbon. All in all, biomass power is a double whammy for the climate: it emits more carbon at the smokestack and leaves less carbon stored in the forest.

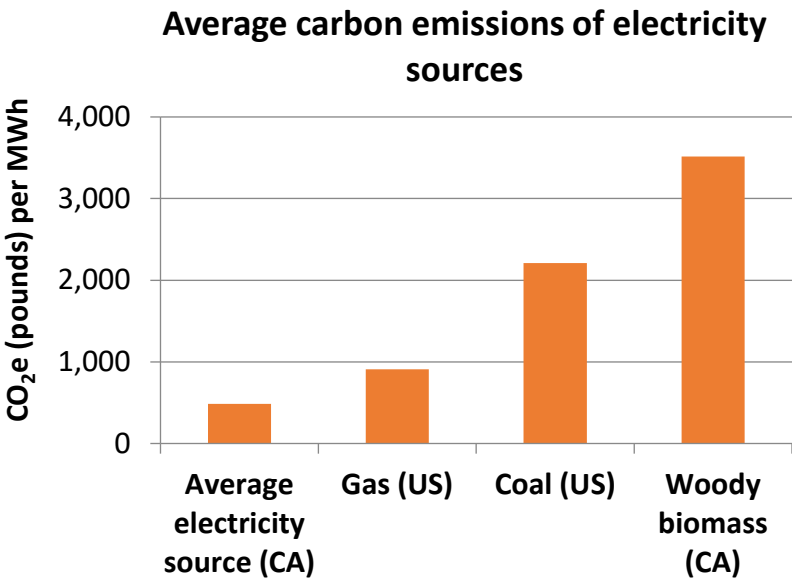
Biomass power plants are California's dirtiest electricity source.

Biomass power plants are ***much more*** climate-polluting than other electricity sources in California. The average greenhouse gas emission rate for California's current electricity portfolio is about 485 pounds carbon dioxide equivalent (CO_2e) per megawatt hour (MWh).[1] In 2018 woody biomass power plants in California emitted more than seven times that amount, averaging 3,500 pounds CO_2e per net MWh for the non-cogeneration facilities.[2] Smaller-scale biomass power plants using gasification technology are similarly carbon-intensive.[3]

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**

Biomass energy is more climate-polluting than coal.

At the smokestack, biomass power plants release more carbon pollution than coal for the same amount of electricity produced.[4] Woody biomass energy generation in California emits more than one-and-a-half times the carbon pollution of coal-fired power per unit of electricity—and almost four times the carbon pollution of gas-generated power.[5] This is because incinerating trees is a remarkably inefficient way to generate electricity, resulting in high carbon emissions and high costs of production. In contrast, solar and wind energy provide truly carbon-free sources of power.



Biomass energy is not carbon neutral.

Despite the substantial carbon pollution from biomass power, biomass proponents claim that cutting and incinerating forests is inherently "carbon neutral"—that it does not cause net greenhouse gas emissions. The reality is biomass energy worsens carbon pollution, at a time when global emissions must be cut in half in the next decade to limit the worst damages of the climate crisis.

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 absorbed by future tree growth. But there is no requirement that forests cut down for biomass energy be allowed to regrow instead of being cut again and again, and or that forests won't be developed into other land uses. In short, there is no guarantee that new forests will be allowed to grow large enough to sequester as much carbon as the older, complex, carbon-rich forests that were cut.

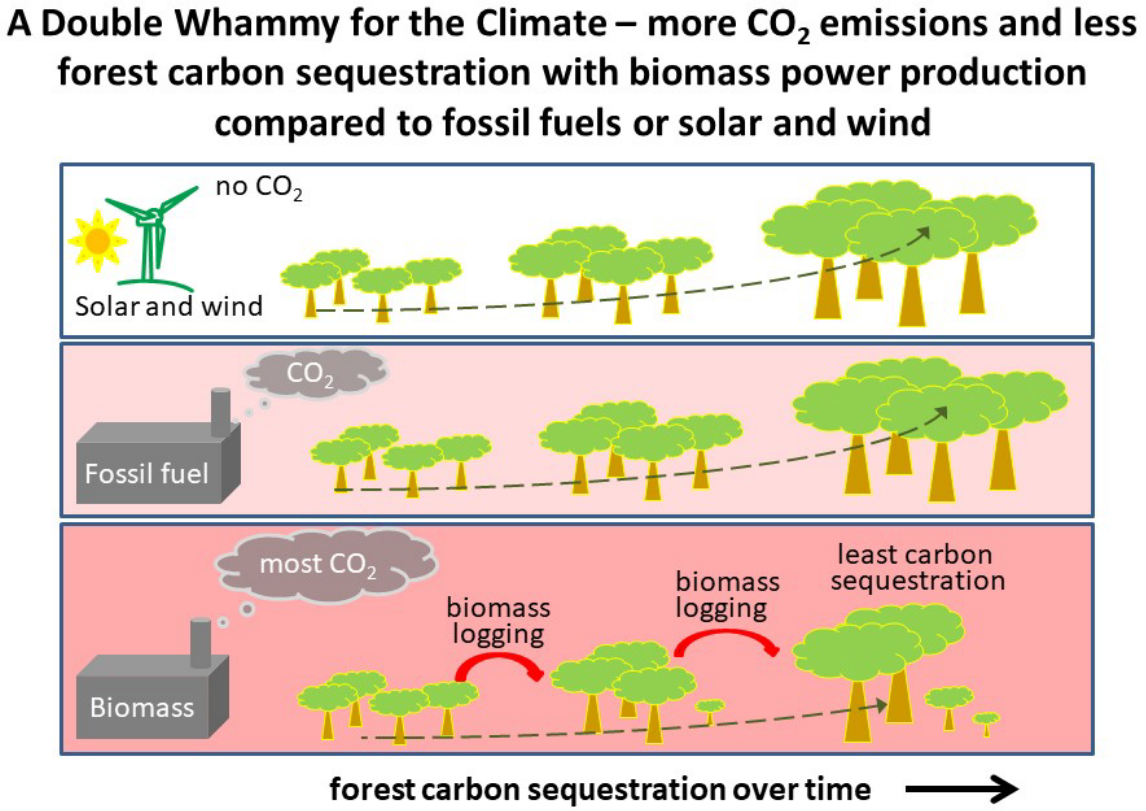
Even if trees are allowed to regrow, numerous studies show that it takes many decades to more than a century, if ever, for new trees to grow large enough to capture the carbon that was released. [6] One study concluded that the increase in atmospheric greenhouse gases may be permanent.[7] In the meantime, that carbon pollution worsens the climate crisis and contributes to the probability of surpassing climate tipping points, causing irreversible harms.

Biomass energy reduces carbon stored in forests.

Cutting trees for biomass energy reduces the forest's ability to sequester and store carbon. When trees are cut to fuel a power plant, it ends their carbon sequestration. 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 becoming soil that

nourishes more forest growth. All these benefits are lost when a tree is hauled away to a biomass facility. Thus, biomass power is a double-whammy for the climate—it emits more carbon at the smokestack and it leaves less carbon stored in the forest than if the trees had not been cut.

Intact forests are a vital part of the climate solution because they pull carbon out of the air and provide long-term, natural storage.[8] Instead of cutting our natural carbon stores, we should support genuine forest protection, allowing trees to keep growing and sequestering carbon, in addition to the many other benefits that intact forests provide such as wildlife habitat, recreation, flood control, clean air and water.



Adapted from figure by Partnership for Policy Integrity

Promoting biomass energy to avoid wildfire emissions is damaging to the climate.

The bioenergy industry promotes cutting forests and incinerating forest materials for bioenergy as a way to avoid carbon emissions from forest fire. However, this claim is contradicted by scientific research and practical realities. Studies show that thinning forests to control fire actually reduces forest carbon stocks and increases overall carbon emissions.[9] Because the probability of a fire occurring on any given acre of forest is relatively low, many more acres must be thinned than will actually burn during the timeframe in which the thinning has an effect, so thinning ends up removing more carbon than would be released in a fire. 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.[10] Furthermore, field studies of large fires find only about 11% of forest carbon is

consumed in a fire, and only 3% of the carbon in trees,[11] and vigorous post-fire regrowth returns forests to carbon sinks within several years.[12] In contrast, when forest biomass is extracted for bioenergy production, 100% of that carbon is immediately emitted to the atmosphere.

California's current policies do not account for greenhouse gas pollution from biomass energy, undermining the state's climate goals.

Despite the high carbon emissions from biomass power, California policies avoid accounting for this greenhouse gas pollution, implicitly treating the cutting and incinerating of forests as carbon neutral. For example, California's greenhouse gas cap-and-trade program does not count bioenergy emissions when calculating the amount of carbon pollution that electricity companies are allowed to emit. California's renewable portfolio standard treats biomass energy as an eligible energy source indistinguishable from non-carbon-burning energy like solar and wind,[13] completely ignoring the fact that biomass energy is extremely carbon intensive. California's Forest Carbon Action Plan and Vegetation Treatment Program both promote biomass energy as an economic driver for forest thinning projects that remove trees from the forest. Each of these policies includes a de facto assumption that biomass energy is carbon neutral, without explicitly stating that assumption or providing any analysis of the actual carbon impacts of forest bioenergy. The reality is that incinerating trees to make electricity increases carbon pollution in the atmosphere and undermines California's ability to meet its climate goals.

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[1] California Air Resources Board, California Greenhouse Gas Emissions for 2000 to 2018, Trends of Emissions and Other Indicators (2020 Edition) at Figure 9 (GHG Intensity of Electricity Generation); *See also* California Air Resources Board, 2000-2018 Emissions Trends Repot Data (2020 Edition) at Figure 9, showing the overall GHG Intensity of Electricity Generation in 2018 of 0.22 tonnes CO_2e per MWh, which is equal to 485 pounds per MWh.

[2] Total CO_2e emissions for each facility in 2018 come from California Air Resources Board Mandatory GHG Reporting Emissions data, available at https://ww2.arb.ca.gov/mrr-data. Data on net MWh produced by each facility in 2018 come from the 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 CO_2e 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 CO_2e per net MWh, equal to 3,515 pounds CO_2e per net MWh. The average of 3,515 pounds CO_2e per MWh includes electricity-only plants; cogeneration plants are excluded because some of their CO_2 emissions are from heat-related fuel consumption.

[3] For example, the Cabin Creek bioenergy project approved by Placer County would have an emissions rate of more than 3,300 lbs CO_2/MWh. *See* Ascent Environmental, Cabin Creek Biomass Facility Project Draft Environmental Impact Report, App. D (July 27, 2012) (describing 2 MW gasification plant with estimated combustion emissions of 26,526 tonnes CO_2e per year and generating 17,520 MWh per year of electricity, resulting in emissions of 3,338 lbs CO_2e per MWh).
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[5] Overall average GHG Intensity of electricity generation in California comes from California Air Resources Board, 2000-2018 Emissions Trends Repot Data (2020 Edition); Average CO_2 emissions per MWh for gas and coal in the United States in 2019 are from U.S. Energy Information Administration, How much carbon dioxide is produced per kilowatt hour of U.S. electricity generation?
[6] Searchinger, T.D. et al., Fixing a critical climate accounting error, 326 Science 527 (2009); Gunn, J., et al., Manomet Center for Conservation Sciences, Massachusetts Biomass Sustainability and Carbon Policy Study: Report to the Commonwealth of Massachusetts Department of Energy Resources (2010); Hudiburg, T.W. et al., Regional carbon dioxide implications of forest bioenergy production, 1 Nature Climate Change 419 (2011); Law, B.E. and M.E. Harmon, Forest sector carbon management, measurement and verification, and discussion of policy related to climate change, 2 Carbon Management 73 (2011); Campbell, J.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 83 (2012); 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 467 (2012); Mitchell, S.R. et al., Carbon debt and carbon sequestration parity in forest bioenergy production, 4 Global Change Biology Bioenergy 818 (2012); Schulze, E.-D. 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); Booth, Mary S., Not carbon neutral: Assessing the net emissions impact of residues burned for bioenergy, 13 Environmental Research Letters 035001 (2018); Sterman, John D. et al., Does replacing coal with wood lower CO_2 emissions? Dynamic lifecycle analysis of wood bioenergy, 13 Environmental Research Letters 015007 (2018)
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BIOMASS ENERGY IS POLLUTING: BIOMASS POWER PLANT POLLUTION HARMS VULNERABLE COMMUNITIES, WORSENING ENVIRONMENTAL INJUSTICE

Biomass power plants are a significant source of air pollutants, harming the vulnerable communities where biomass facilities are located and worsening environmental injustice.

Biomass power plants emit large amounts of air pollutants that harm public health.

Biomass power plants emit toxic air pollutants, including particulate matter (PM), nitrogen oxides (NOx), carbon monoxide (CO), sulfur dioxide (SO_2), lead, mercury, and other hazardous air pollutants that harm public health.[1] Biomass power plant pollution can exceed that of coal-fired power plants even when the best available control technology is used.[2]

In California, biomass power plants are among the worst emitters of particulate matter and NOx.[3] Fine particulate matter (PM 2.5)—which can get deep into the lungs and even enter the bloodstream—is linked to serious health problems including heart disease, premature death, stroke, and aggravated asthma.[4] In the San Joaquin Valley air district, two biomass plants—Mount Poso Cogeneration Company 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. In the Sacramento Valley air district, 7 out of the 10 worst PM 2.5 polluters were biomass plants.[5]

Biomass power plants also emit hazardous air pollutants, including hydrochloric acid, dioxins, benzene, formaldehyde, arsenic, chromium, cadmium, lead, and mercury.[6] 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.[7]

California's biomass plants are often located in vulnerable communities already overburdened with pollution, worsening environmental injustice.

Many of California's biomass power plants are concentrated in vulnerable communities already suffering from high pollution burdens, worsening environmental injustice. The San Joaquin Valley is one of the nation's most polluted air basins. Currently, Bakersfield, Fresno-Madera-Hanford, and Visalia are the top three most polluted cities for year-round particulate pollution levels *in the country*.[8] In the San Joaquin Valley, 4 of 5 active biomass plants and 4 of 5 idle biomass plants are located in disadvantaged communities.[9] Most of these communities are within the ninetieth percentile for air pollution burden, and some are in the top percentile. For example, the 25 MW Rio Bravo biomass plant in Fresno is located less than a half-mile from the Malaga Elementary School, Malaga Community Park, and surrounding homes, in a majority Hispanic neighborhood with a pollution burden score of 100.[10]

California's biomass plants have repeated air pollution violations.

California's biomass power plants are guilty of repeated air quality violations.[11] In 2016 the now idle Blue Lake Power plant, located near Blue Lake Rancheria Indian Tribal lands, was cited and fined for multiple air pollution violations.[12] Tribal members, especially children and the elderly, reported severe health harms from the air pollution from the plant.[13] Merced Power and Ampersand Chowchilla Biomass in the San Joaquin Valley have been levied large fines for the excess emission of nitrogen oxides and fine particulate matter.[14]

Biomass power plants produce continuous air pollution.

The air pollution from biomass power plants can be continuous, heavily impacting nearby communities and degrading the entire air basin around the clock and throughout the year with the incineration of woody biomass from throughout the region. In comparison, leaving woody materials in the forest to decompose naturally cycles carbon and nutrients and helps increase forest growth, aiding in future carbon sequestration. Even when cut materials are pile-burned in the forest, the burning occurs for a limited period of time and dispersed through the forest, in contrast to biomass plants which emit pollution continuously in or near particular communities.

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[2] 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

[3] 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

[4] U.S. Environmental Protection Agency, Health and Environmental Effects of Particulate Matter, https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm

[5] Based on facility-level emissions data in each air district from the California Air Resources Board Pollution Mapping Tool, https://ww3.arb.ca.gov/ei/tools/pollution_map/pollution_map.htm

[6] 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

[7] Based on 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

[8] American Lung Association, State of the Air 2020: Most Polluted Cities, http://www.stateoftheair.org/city-rankings/most-polluted-cities.html

[9] 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, https://oehha.ca.gov/calenviroscreen/sb535

[10] Data from CalEnviroScreen 3.0. https://oehha.ca.gov/calenviroscreen.

[11] Based on the EPA Enforcement and Compliance History Online Database, https://echo.epa.gov/, and other public records.

[12] EPA Enforcement and Compliance History Online Database, https://echo.epa.gov/enforcement-case-report?id=09-2014-0502

[13] Blue Lake Rancheria, Environmental Programs, https://bluelakerancheria-nsn.gov/about/departments/environmental-programs-2/; Blue Lake Power Under Fire From Residents, Tribe Over Alleged Pollution Violations, Clean Power Exchange (Nov. 29, 2016), https://cleanpowerexchange.org/blue-lake-power-under-fire-from-residents-tribe-over-alleged-pollution-violations/

[14] Green, Ronnie, "Green" Biomass Isn't Always So Clean, Center for Public Integrity (April 26, 2011, updated May 19, 2014), https://publicintegrity.org/environment/green-biomass-isnt-always-so-clean/

Biomass logging, Stanislaus National Forest, 2019, photo by Chad Hanson

LOGGING FOR BIOMASS ENERGY IS INEFFECTIVE FOR PROTECTING COMMUNITIES DURING WILDFIRES

Biomass energy is often promoted as a tool to incentivize large-scale tree-cutting ("thinning") under the claim that this will protect communities and forests during wildfires. However, this approach is ineffective at protecting houses and communities, which is best achieved through a home-focused fire-safety strategy that helps communities safely coexist with inevitable wildfires. Although biomass energy is promoted as a means for disposing of debris piles from forest thinning projects, it is mostly lumber mill residues from commercial logging that end up being subsidized. Meanwhile, biomass extraction does significant ecological damage to forests.

Effectively protecting communities from wildfire requires preparing houses and the area immediately surrounding them—not large-scale forest thinning.

Research and experience show that the most effective way to prevent homes from igniting during wildfires is to make the homes themselves more fire safe. Home safety retrofits and vegetation pruning in the "home-ignition zone" within 60 to 100 feet of a house provide the most direct and effective way to prevent wildfire from going from the forest to the home.[1] In communities in fire-prone areas, California should invest in helping communities implement proven home fire-safety measures: retrofitting homes and other structures with fire-resistant roofing, rain gutter guards, ember-proof vent screens, and pruning vegetation in the defensible space immediately surrounding them. To avoid putting communities in harm's way, California should also stop allowing new developments in highly fire-prone wildlands.

In contrast to the "from the home outward" approach, biomass proponents promote large-scale forest-cutting—"thinning" or "fuels reduction"—as a way to alter wildfire behavior and reduce community fire risk. Yet the best-available science indicates that thinning forests far from communities is not a good way to protect people and property from wildfire. The probability that thinned forest areas will overlap with a wildfire is very small.[2] Thinning is ineffective in altering fire behavior under the hot, windy, extreme fire weather conditions that have caused largest losses of homes and lives in recent years.[3] And thinning more than 100 feet from homes is largely

irrelevant to home fire safety. A properly prepared home—with home fire-safety retrofits and defensible space pruning—will generally not ignite even if high-intensity fire occurs nearby. By the same token, an improperly prepared house can burn from contact with wind-blown embers from distant fires.[4] Furthermore, the majority of California communities most vulnerable to wildfire are not in forests but in chaparral and grasslands, making forest thinning irrelevant for their safety. All in all, the ineffective forest-cutting approach of biomass proponents takes resources away from proven home-focused fire-safety strategies that protect our communities.

Bioenergy facilities primarily consume commercial lumber mill refuse, not forest thinning residues.

Biomass energy is often promoted as a means to incentivize the removal of residual forest material cut during thinning projects, but the reality is that biomass facilities select to get their material mainly from other sources, even when receiving state subsidies intended to promote thinning. Commercial lumber mill refuse is more reliable, easier to obtain, and cheaper to transport than material taken from the forest. 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.[5] For the seven biomass plants that utilize the BioRAM program subsidy, in 2017, only 30% of their feedstock came from forest thinning residues.[6]

Dead trees do not increase wildfire and should not be sent to bioenergy facilities.

In response to California's widespread tree mortality during drought, Governor Brown in 2015 issued an Emergency Declaration calling for the removal of dead trees along with incentives to bioenergy facilities to burn them.[7] The justification was that dead trees were feared to increase wildlife risk. However, numerous scientific studies show that dead trees do not increase wildfire—including no increase in fire severity, rate of spread, or extent.[8] Meanwhile, dead trees—standing or fallen—provide numerous ecological benefits such as wildlife habitat, soil stabilization, water quality, and carbon storage.[9] These ecological benefits are lost when dead trees are removed and incinerated in biomass power plants.

Biomass extraction harms forests.

Cutting forests for biomass energy is often promoted as helping protect forests from "catastrophic" wildfire, but this misrepresents the important role of wildfire—including high-intensity fire—in California's forest ecosystems. Fire of all intensities, called "mixed-severity" fire, is a natural and necessary part of California's forests.[10] Forests are adapted to mixed-severity fire and need fire to rejuvenate. In fact, patches of high-severity fire create some of the most diverse wildlife habitat of any forest type.[11] And numerous studies show that there is currently less fire of all severities now than there was prior to modern fire suppression,[12] depriving forests of the ecological benefits produced by intense fires, such as habitat creation and nutrient cycling. California's focus on logging and fire suppression degrades wildlife habitat, results in a net loss of carbon storage, and takes resources away from proven fire-safety solutions focused on homes and communities.

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BIOMASS POWER IS EXPENSIVE AND DEPENDS ON TAXPAYER SUBSIDIES THAT TAKE RESOURCES AWAY FROM TRULY CLEAN ENERGY

The inefficiency of using forest biomass to generate electricity makes it particularly costly. In fact, biomass power is California's most expensive energy source. Biomass power plants rely heavily on regulatory incentives and subsidies paid for by taxpayers and ratepayers. These biomass subsidies consume resources that would be better spent on cheaper and truly clean solar and wind energy alternatives and the jobs they create.

Biomass power is California's most expensive energy source.

Incinerating trees is a highly inefficient way to make electricity, which makes it very expensive. In fact, biomass power is the most expensive of California's common electricity sources.[1] In 2018, the levelized cost of biomass power averaged $166 per megawatt hour compared to $49 per megawatt hour for photovoltaic solar and $57 for wind.[2]

Biomass power plants in California are not competitive with other electricity sources and depend on being propped up by state policies.

As of 2019, there were 23 bioenergy power plants operating in California fueled by wood and other biomass[3] which contribute less than 2% of the state's total electric power.[4] Many California bioenergy power plants have been closed or idled since the peak of more than 60 plants in the 1980s because bioenergy is not competitive with other energy sources.[5] Because biomass energy is expensive and inefficient, bioenergy power plants depend heavily on regulatory incentives and subsidies in order to be economically viable.

Recent legislation has required electric utilities to purchase electricity from bioenergy power plants at high costs that are passed on to customers. In 2012 under SB 1122 (Rubio), California required public utilities to collectively purchase 250 MW (megawatts) of electricity from bioenergy plants, including 50 MW from forest-sourced woody biomass.[6] As a result, in 2014, the Public Utilities Commission established the BioMAT program (Bioenergy Market Adjusting Tariff), a feed-in-tariff that effectively requires California's three investor-owned utilities—PG&E, SCE, and SDG&E—to purchase bioenergy at a price set by the CPUC. In other words, it provides a guaranteed above-market price to bioenergy facilities less than 5 MW in size. This is effectively a subsidy to bioenergy plants, the cost of which is passed through to ratepayers.

In 2016, SB 859 required that all utilities serving more than 100,000 customers must collectively procure 125 MW of power from existing bioenergy plants for which 80% of the biomass feedstock must be a byproduct of "sustainable" forestry management—defined as any logging other than clearcutting—60% of which must derive from Tier 1 and Tier 2 high hazard zones.[7]

Also in 2016, the CPUC initiated the BioRAM program (Bioenergy Renewable Auction Mechanism), which requires California's three investor-owned utilities to collectively procure at least 50 MW of biomass energy and to pay above-market rates for that electricity, provided that at least 50% of a biomass facility's feedstock derives from wildfire high-hazard zones (HHZs). This proportion was raised to 60% in 2018, and 80% for 2019 and beyond. However, because this program does not distinguish between forest thinning projects and commercial logging, so long as the wood comes from hazard zone areas, the majority of the material comes from commercial timber operations and lumber mills.

Californians bear the costs of propping up the biomass industry.

California lawmakers provide subsidies to the biomass industry without directly using state funds in two ways: by including biomass energy under the Renewable Portfolio Standard and through legislation requiring electric utilities to purchase forest-sourced biomass power. Californians wind up shouldering the cost of these subsidies when they pay for the high cost of biomass power through their electricity bills. Meanwhile, lawmakers claim that they are addressing forest fire without allocating any actual funds for community wildfire protection.

For comparison, the average wholesale price of power on the California grid is $50 per megawatt hour (Mwh).[8] 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[9]—and more than twice as much through the BioRAM program at $115 per Mwh.[10] 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. BioRAM power is more than twice as expensive as solar or wind power.

California policies that incentivize forest bioenergy divert resources away from truly clean energy solar and wind energy and the jobs they create.

State policies that mandate that electric utilities purchase electricity from forest-sourced woody biomass divert investment away from zero-carbon sources like solar and wind, impeding the urgently needed transition to truly clean energy. Because the Renewable Portfolio Standard is used as the means for providing subsidies to biomass, every increase in biomass energy means a direct reduction in the amount that utilities companies invest in solar or wind power.

In addition, costly forest thinning projects to fuel biomass power plants are heavily dependent on taxpayer subsidies. On national forests, the federal timber sale program operates at a net loss to taxpayers of nearly $2 billion each year.[11] In California, the state government subsidizes tree-cutting in various ways, including a billion dollars over five years allocated by SB 901. These resources were intended to increase public safety during wildfires. Instead of first paying for the forest projects and then paying a second time to burn the residues in biomass facilities, these resources would be much more effectively used to directly help communities implement wildfire-safety actions right around houses, with vastly greater public safety benefits.

Redirecting resources to home fire safety work and solar and wind energy would also be better for job creation, bolstering rural communities. While bioenergy proponents tout biomass power plants as a source of jobs, the reality is that these facilities are highly automated, so they produce few jobs for the massive subsidies necessary to prop them up. In contrast, fire-safety work directed at homes and the zone right around them requires much more intensive involvement by well-trained workers, and thus generates far more jobs per dollar spent. One study found that an equal amount of government investment could produce two to three times as many jobs—and better paying jobs—if those funds were used to support fire-safety work right around homes rather than subsidizing forest-cutting projects to fuel biomass power plants.[12] In addition, solar and wind energy are driving massive job creation with relatively high, family-sustaining wages.[13]

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[4] California Energy Commission, California Biomass and Waste-To-Energy Statistics and Data, https://ww2.energy.ca.gov/almanac/renewables_data/biomass/index_cms.php. In 2017, 22 operational bioenergy plants produced 3,205 GW, which was 1.6% of the state total 206,387 GW produced.

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[7] Cal. Pub. Utilities Code § 3.99.20.3(a). (In addition to the requirements of subdivision (f) of Section 399.20, by December 1, 2016, electrical corporations shall collectively procure, through financial commitments of five years, their proportionate share of 125 megawatts of cumulative rated generating capacity from existing bioenergy projects that commenced operations prior to June 1, 2013. At least 80 percent of the feedstock of an eligible facility, on an annual basis, shall be a byproduct of sustainable forestry management, which includes removal of dead and dying trees from Tier 1 and Tier 2 high hazard zones and is not that from lands that have been clear cut. At least 60 percent of this feedstock shall be from Tier 1 and Tier 2 high hazard zones.)

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