Public Comment

July 27, 2023
RCEA Board of Directors
Regular Meeting

7.2 Humboldt Sawmill Company Memorandum of Understanding

From: Martha Walden
To: Public Comment
Subject: CAC meeting item 6
Date: Tuesday, July 11, 2023 4:55:29 PM

As others have pointed out, we need more time and more information before decisions are made about the IRP because more information is on the way about the biomass element and the sawmill's violations of air quality standards. I know that RCEA's job is complicated. The Electric Future workshop gave a little taste of how complicated it is—the different priorities, sometimes conflicting, the regulatory mandates about resource adequacy and other criteria. So looking at the big picture you can say biomass electricity is a fairly small part of it, but it's the most contentious because of its outsized carbon emissions and air pollution.

However, the reason it's so important to me goes beyond our local situation. Incinerating biomass to make electricity is becoming more and more common —ironically, as a greener substitute for fossil fuels. And of course that's a big step in the wrong direction for the climate. So we're talking about more than one sawmill burning, primarily, its own waste and getting some baseload electricity out of it, which is helpful for balancing the grid even though it's a small amount of electricity, considering all those emissions. The larger issue is a situation that is getting worse and worse as word gets around that you can burn wood as an energy source and not even count the carbon emissions, plus you can get a ticket from the CPUC that allows you more air pollution than other electricity producers get. More and more people are getting into that business.

Another factor is the proliferation of fuel load reduction projects and the drastic need to do something with huge amounts of forest residues. We're in a lot of trouble if burning it is the main way to deal with all that stuff. CO2 emissions are going up, not down. We have to reverse that. There are other things to do with biomass that are much better for the environment, and we must prioritize those. I don't know how to get through to Humboldt Sawmill Company. It's a private corporation that is mainly concerned with its bottom line, but I'm hoping that if RCEA can hear these concerns from the public and stop supporting biomass incineration, HSC will get the message.

Thank you,

Martha Walden

From: Sheri L Woo
To: Lori Taketa; Matthew Marshall; Eileen Verbeck
Subject: Fwd: [(warning) -] Biomass in RCEA power mix
Date: Friday, July 21, 2023 6:12:24 AM
Attachments: Copy of Biomass Fact Sheet 7-13.pdf
cidA0C0F160-CCAA-4A97-9893-CFB7D6FC04C4.pdf

Hello all, I told Mr. Dedini that I would forward these documents on as public comment. Although he didn't indicate an agenda item number (and maybe he sent it before the agenda was published), we can assume its in relation to the biomass item rather than general comment.

---------- Forwarded message ---------
From: **Lee Dedini** [redacted]
Date: Wed, Jul 19, 2023 at 12:06 PM
Subject: [(warning) -] Biomass in RCEA power mix
To: [redacted]

Hi Sheri,
How are you? It is hard to believe that I have been retired from the water district for almost 4 years. In my retirement I have become a member of 350 Humboldt.
Because you are on the Board of Directors for RCEA, I wanted to email you information on why biomass is not clean energy. I hope you find time to read and see burning biomass is as worse as burning coal.
A group of concerned groups have a petition to drop biomass from RCEA's power mix. (see below).
Hopefully, you may help to bring this to the attention of the rest of the RCEA Board.
Thank you for your time and work.
Lee Dedini, retired electrical/electronics

Stop burning fossil fuels well before mid-century and absolutely, positively do not fail.
Tom Bowman (2020) *What if Solving the Climate Crisis Is Simple?*

BIOMASS IS NOT CLEAN ENERGY

Humboldt County's largest stationary source of air pollution

Humboldt County has 2 federally designated Major Sources of air pollution: PGE's Humboldt Bay Generating Station and Humboldt Sawmill Company's biomass plant. [1] Compared with the natural gas fired power plant, the biomass plant emits 10 times more fine particulates, 7 times more NOx, and 15 times more benzene, despite producing only one third as much electricity. [2]

$3-7 million a year in health damage

An EPA modeling tool calculates that the biomass plant's soot costs $3-7 million a year in premature deaths, infant mortality, heart attacks, lung disease, hospitalizations, emergency room visits and lost work days. [2,3] This figure does not include additional health harm from toxic emissions of carcinogens, endocrine disruptors, and developmental neurotoxins. The Humboldt Del Norte Medical Society has called on RCEA to drop biomass from its energy mix. The American Public Health Association, American Academy of Pediatrics, American Lung Association, and the National Association of City and County Health Officers all oppose biomass combustion.

Multiple violations and failed enforcement of environmental laws

When the biomass plant bid for its original contract with RCEA in 2016, it reported only 1 air quality violation while withholding pollution monitoring reports from the North Coast Unified Air Quality Management District which subsequently showed over 700 violations. While under contract with RCEA, the plant has received 12 notices of violation of the Clean Air Act [4] and a settlement order for multi-year violations of the Clean Water Act [5]. A recent review of public documents obtained from the North Coast Unified Air Quality Management District found multiple longstanding failures to enforce state and federal pollution laws at the biomass plant. [7]

Warming the planet

Biomass emits 3 times more carbon dioxide per kilowatt hour than natural gas power. The Scotia plant emits nearly 300,000 tons of CO2 annually, as much as 75% of Humboldt's passenger vehicles. This carbon warms the planet for 40-50 years before it is reabsorbed [9] so, even if biomass is carbon neutral over the long term (which many scientists debate), it is not climate neutral. RCEA spending on biomass diverts millions of ratepayer dollars away from supporting real clean energy.

Injustice

The consequences of biomass pollution and global warming fall most heavily on BIPOC and low income people, children, elders, and people with heart and lung disease. Students at the Stanwood Murphy Elementary School, 3 blocks from the plant, are 30% nonwhite and >70% economically disadvantaged. 1 in 4 of Humboldt's school aged kids has been diagnosed with asthma.

REFERENCES

1 North Coast Unified Air Quality Management District https://www.ncuaqmd.org/major-source-title v-permits

2 California Air Resource Board Pollution Mapping Tool https://ww2.arb.ca.gov/capp-resource center/data-portal/carb-pollution-mapping-tool

3 Co Benefits Risk Assessment Health Screening and Mapping Tool https://cobra.epa.gov/

4 NCUAQMD multiple Notices of Violation obtained via public record request

5 North Coast Regional Water Board Settlement Agreement with Humboldt Sawmill Company https://www.waterboards.ca.gov/northcoast/board_decisions/tentative_orders/pdf/2022/220712%20Final%20Stipulated%20Agreement%20HSC.pdf November 2022

6 US Department of Labor https://www.osha.gov/ords/imis/establishment.inspection_detail? id=1520807.015

7 multiple documents obtained by public record request and absence of requested documents (because they didn't exist) from the NCUAQMD.

8 Synthsis Report of the IPCC Sixth Assessment Report (AR6) Summary for Policymakers https://report.ipcc.ch/ar6syr/pdf/IPCC_AR6_SYR_SPM.pdf

9 Law, BE et al Land use strategies to mitigate climate change in carbon dense temperate forestsPNAS April 3, 2018 115 (14) 3663-3668; first published March 19, 2018; https://doi.org/10.1073/pnas.1720064115 https://www.pnas.org/content/115/14/3663

10 CDPH, California Asthma Dashboard https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHIB/CPE/Pages/CaliforniaBreathingCountyAsthmaProfiles.aspx

11 California Department of Education https://www.caschooldashboard.org/reports/12630246008155/2022

Petition to Drop Biomass from RCEA's Power Mix

BIOMASS INCINERATION IS DIRTY ENERGY. 15% of our electricity comes from burning mill waste in a biomass plant which emits more carbon dioxide and as much air pollution as coal. Humboldt Sawmill's plant has repeatedly violated the Clean Air Act.

We the undersigned call on RCEA to stop funding biomass incineration.

Name	Town	Zip code	Email

Sponsored by: 350 Humboldt, Humboldt Unitarian Universalist Fellowship Climate Action Campaign, Women's International League for Peace and Freedom, Health Care for All, Buddhist Peace Fellowship, HOPE Coalition

Materials Submitted

At Meeting

July 27, 2023
RCEA
Board of Directors
Regular Meeting

Submitted by Yana Valachovic, Biomass Technical Advisory Group Member
NOTE: Submitter stated this document has not been updated since 2019.

FAQs about Forest Biomass Energy in Humboldt

What are the benefits of energy made from forest biomass?

Forest-based biomass for this set of FAQs is defined as organic matter (materials from fuels reduction projects or the chips and bark from sawmill operations) that can be utilized to produce heat and power in emissions-controlled power plants that can provide clean energy, improved forest health, ambitious climate change mitigation, and rural job creation. **No energy source is perfect, but on the balance, locally produced and utilized biomass energy provides numerous public trust, environmental, and economic benefits** such as:

- ✓ Delivers distributed, flexible baseload generation. Biomass energy production provides a continuous 24-hour and reliable power source, unlike solar or wind that have a variation in daily and seasonal power production. Additionally, biomass power plants can be ramped up and down to meet the needs of the grid.
- ✓ An essential tool in the promotion of healthy forests and defensible communities through fuel reduction strategies for diseased and over-crowded forests that contribute to large and high intensity wildfires.
- ✓ Reduces emissions from wildfires or burn piles. Biomass power plants include effective air quality emissions technologies. Biomass emissions are substantially lower than wood stoves, wildfires, or burn piles[1].
- ✓ Reduces greenhouse gas emissions. Bioenergy production using materials from sustainably managed forests reduces long-term climate impacts by replacing fossil fuel energy sources.
- ✓ Utilizes a local product. The ability for forest landowners to sell logs to local sawmills provides an economic incentive to steward and sustainably manage local forests. Furthermore, farmers use the ash produced as an organic soil amendment.
- ✓ It's renewable. Unlike coal, oil and natural gas, which are fossil fuels that bring "new" carbon into the earth's atmosphere, biomass is an abundant and renewable source of fuel. The burning of biomass and the growth of trees creates a closed-loop system and does not contribute additional long-term atmospheric carbon. In Humboldt County biomass operations turn wood waste into electricity without compromising the essential cultural and habitat values that forests provide.

Is biomass clean energy?

There is no universally accepted definition of clean energy. Definitions can incorporate life cycle analysis, social justice, and other externalities. Nevertheless, the vast majority of scientists and governments classify biomass as both a clean energy and renewable (i.e. non-fossil fuel) source. The State of California defines biomass as a renewable energy resource along with solar, wind, geothermal, small hydro, renewable methane, ocean wave, ocean thermal, or fuel cells[2].

When bioenergy is made from locally grown small diameter trees and shrubs or the byproducts of sawmill operations it is a clean energy source. Not only do trees convert solar energy into fixed carbon, they store energy organically with far lower environmental impact than fossil fuels or batteries. This naturally fixed carbon and energy may then be managed as habitat in the forest, harvested for use as a building material, or

[1] Springsteen B, Christofk T, York R, Mason T, Baker S, Lincoln E, Hartsough B, Yoshioka T. 2015. Forest biomass diversion in the Sierra Nevada: Energy, economics and emissions. Calif Agr 69(3):142-149. https://doi.org/10.3733/ca.v069n03p142.
[2] https://focus.senate.ca.gov/sb100/faqs

utilized as energy in a biomass power plant. Burning biomass for bioenergy production is importantly distinguished from burning fossil fuels in that *biomass is part of the actively cycled carbon in the atmosphere and was sequestered within the past 40-100 years, while fossil fuels reintroduce carbon into the atmosphere that were sequestered 60-200 million years ago and now are being reintroduced into the atmospheric carbon cycle*.

All clean energy sources have an important role to play in fighting climate change and producing renewable energy. In this regard, biomass energy provides many advantages beyond its renewable electrons, especially when fuel is sourced from the local area. From producing long-lived building materials that sequester carbon, to generating renewable heating, cooling, and power in local communities, strategic biomass utilization can support the interrelated goals of forest health, forest carbon sequestration, water and air quality, creating and maintaining local jobs, as well as keeping forests healthy for everyone's enjoyment and recreation.

How does biomass support forest health?

The fire seasons of 2017 and 2018 in California[3] have been a reality check for many, forcing a collective understanding that forest management plays a key role in wildfire risk reduction. In California alone, at least 129 million trees have died since 2010, due to a combination of fire suppression leading to overstocked and dense forests[4], drought, and pests. Managing the large number of dead trees is a difficult challenge, particularly within the context of protecting rural California residents. In January 2019 the Governor charged CAL FIRE and the Natural Resources Agency with the task of reducing fuels to protect our most vulnerable communities. CAL FIRE estimates that 15 million acres need forest restoration[5] and recognizes that "while it is not possible to eliminate wildfire risks in California; focused and deliberate action can protect communities and improve forest and fuels conditions to enable a more moderate and healthier wildfire cycle that can coexist with Californians". These challenges are not limited to the Sierra Nevada and are common throughout California including the North Coast.

The North Coast is blessed and burdened with highly productive forest and plant growth. However, all living vegetation is part of the natural carbon cycle and its fate is eventual carbon release either through decomposition or wildfire. The question is when and how? Management of this growth in the form of forest fuels reduction and the reduction of stand densities are important steps to creating more fire resilient forests and reducing uncontrolled emissions of greenhouse gasses and Short-Lived Climate Pollutants, including black carbon, during wildfires. Over the coming decade California will see an enhanced level of fuel reduction through mechanical and prescribed fire techniques and a broader level of incentives to manage fuel backlogs and improve forest health. Bioenergy utilization with emission-control technologies is an important part of the solution and provides an alternative to open-pile burning[6] of forest fuels and prescribed fire.

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[3] Governor's Executive Order N-05-19 https://www.gov.ca.gov/wp-content/uploads/2019/01/1.8.19-EO-N-05-19.pdf and the state emergency declaration http://www.fire.ca.gov/general/downloads/45-DayReportPlans/3.22.19-Wildfire-State-of-Emergency.pdf

[4] Parsons and DeBenittie (1979) Impact of fire suppression on a mixed-conifer forest. Forest Ecology and Management 21: 21–33.

[5] CAL FIRE 45 Day Report. http://www.fire.ca.gov/downloads/45-Day%20Report-FINAL.pdf

[6] Springsteen B, Christofk T, York R, Mason T, Baker S, Lincoln E, Hartsough B, Yoshioka T. 2015. Forest biomass diversion in the Sierra Nevada: Energy, economics and emissions. Calif Agr 69(3):142-149. https://doi.org/10.3733/ca.v069n03p142. http://calag.ucanr.edu/Archive/?article=ca.v069n03p142

How does forest biomass utilization support climate change mitigation?

Biomass utilization produces important climate change mitigation benefits, both by sequestering carbon and displacing carbon-intensive products. Executive Order B-55-18 'To Achieve Carbon Neutrality', issued by Governor Brown on September 10, 2018, places California on a path to net-neutral economywide emissions by 2045[7]. Carbon sequestration from forest biomass will be essential to achieving this goal, as carbon stored in living trees or wood-based lumber products can help with long-term sequestration and to offset emissions from hard-to-decarbonize sectors such as aviation, long-distance trucking, and agriculture. Further, biomass power plants support removal of hazardous forest fuels that are otherwise placing these carbon stores at risk.

Furthermore, forest biomass has an important role to play in carbon sequestration. In the near-term, maintenance of bioenergy markets will help to make reducing forest fuels economically feasible thereby helping California's forests become more resilient to wildfire or other disturbances. In the future, RCEA and other energy consumers may be able to procure net carbon-negative electricity from biomass, which permanently removes CO_2 from the atmosphere. For instance, numerous scientists and policymakers recognize that biomass utilization combined with carbon sequestration (commonly referred to as BECCS—Bio-Energy with Carbon Capture and Storage) will be necessary if we are to keep global warming significantly below 2 degrees Celsius. Supporting biomass energy through power purchase agreements and other procurement mechanisms can help drive the deployment of BECCS technologies in California as they become commercially viable.

Finally, many recognize that a "portfolio" approach to fighting climate change produces large economic benefits in comparison to those that rely solely on a limited number of energy sources[8,9]. Biomass, alongside other complimentary renewable energy sources, can play an important role in achieving cost-effective climate change mitigation.

How does the State of California view biomass and forest carbon?

California's Forest Carbon Plan, released in 2018, embraces biomass utilization as a key driver of sustainable forest management[10]. Key findings include:

- Reducing carbon losses from forests, particularly the extensive carbon losses that occur during and after extreme wildfires in forests and through uncharacteristic tree mortality, is essential to meeting the state's long-term climate goals. Fuel reduction in forests can increase the stability of the remaining and future stored carbon.
- The limited infrastructure capacity for forest management, wood processing, and biomass utilization, and the limited appropriately trained or licensed supporting workforce, are major impediments to forest restoration and ongoing forest management.

Near-term actions proposed by the State include:

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[7] https://www.gov.ca.gov/wp-content/uploads/2018/09/9.10.18-Executive-Order.pdf

[8] D.L. Sanchez, J.H. Nelson, J. Johnston, A. Mileva, D. Kammen. "Biomass enables the transition to a carbon-negative power system across western North America." *Nature Climate Change*, 5, 230–234 (2015).

[9] S.J. Davis *et al.* (with over 30 authors) "Net-zero emissions energy systems" *Science* (2018). http://science.sciencemag.org/node/711939.full

[10] Forest Climate Action Team. 2018. California Forest Carbon Plan: Managing Our Forest Landscapes in a Changing Climate. Sacramento, CA.

- Expand wood products manufacturing in California and take actions to support market growth scaled to the longer-term projections of forest productivity and resource management needs.
- Continue public investment to build out the 50 megawatt (MW) of small scale (5MW or less sized facilities), wood-fired bioenergy facilities mandated through SB 1122 (Rubio, 2012).
- Maintain existing bioenergy capacity at a level necessary to utilize materials removed as part of forest restoration and to support long-lived storage of carbon in building materials.

What role does biomass have in rural job creation?

Biomass utilization creates economic opportunities locally[11]. Forest management and restoration activities cannot be outsourced and produce many living wage jobs in our local communities. These jobs include forest management, forest operations, trucking, processing, and other value-added operations. The many steps involved in bioenergy production require that workers be employed to operate each link of the supply chain. By having an integrated infrastructure rural development persists providing both near- and long-term economic benefits.

Does biomass utilization emit greenhouse gasses?

Yes, combustion of woody materials emits CO_2, however, these gases are already in the atmospheric carbon pool as opposed to releasing stored carbon from the fossil fuel pool (e.g. utilizing coal or natural gas for energy production). In short, utilization of organic sources of carbon for building materials or sources of energy is a part of a closed loop carbon cycle. When trees emit carbon from decomposition or through combustion in a wildfire, carbon is made available as CO_2 and can be sequestered from the atmosphere through photosynthesis into new organic forms.

Is biomass power the best means of handling the waste stream generated by our local forest products industry?

Yes, at present, power produced from the utilization of feedstocks from sawmill operations is the best means to utilize this material because:

- The utilization of chips, bark, sawdust, and other smaller pieces of wood to produce heat and power in emission-controlled power plants allows for utilization of a diversely-sized feedstock with a range of moisture contents. Other utilization options are not as flexible in their size or moisture variation.
- This material is abundant in our local region and does not require the importation of other feedstocks.
- Biomass energy complements other higher value markets, including using chips to produce pulp and paper, using bark and chips for landscape mulch, using sawdust for compost manufacturing, and using shavings for animal bedding. Bioenergy is part of a broad solution for the sustainable and renewable use of locally available woody materials. When no other higher value markets exist, the remaining residuals are used for energy production.

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[11] Henderson, James E.; Standiford, Richard B.; Evans, Samuel G. 2017. Economic contribution of timber harvesting and manufacturing to north coast redwood region counties. In: Standiford, Richard B.; Valachovic, Yana, tech cords. Coast redwood science symposium—2016: Past successes and future direction. Proceedings of a workshop. Gen. Tech. Rep. PSW-GTR-258. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station: 371-381.

- Looking for new and creative technologies and markets is encouraged and over time, these markets may include composting, gasification, or other uses (see discussion below). However, at present these markets do not exist at scale in Humboldt or within reasonable transportation distances.

In the medium- to long-term, new, innovative wood products could provide enhanced climate benefits and enhanced revenues from forest products. To this end, California has founded the Joint Institute on Wood Products Innovation[12] to serve as a center for analysis, testing, and outreach to support industry retention and development in California for new wood products. The work of the Institute will support long-term ecological and economic sustainability, increase forest resilience, long-term carbon storage, and local economies.

Should we be looking to emerging technologies such as gasification to keep using biomass as a power source?

Gasification is a process that converts organic materials into carbon monoxide, hydrogen and carbon dioxide. This is achieved by reacting the material at high temperatures (typically >700 °C), without combustion, with a controlled amount of oxygen and/or steam. Wood gas is a syngas fuel which can be used as a fuel for furnaces, stoves and vehicles in place of gasoline, diesel or other fuels. Biochar is a coproduct.

It is always valuable to look for higher value options and to test emerging technologies. However, gasification technology has not been deployed at scale yet to process the amount of available sawmill residues and requires a uniform feedstock free of soil and rocks. Moisture management of the feedstock is also critical. Some of the sawmill residue could be diverted to a gasification plant, but it would require a significant capital investment and tight controls on the feedstock quality.

An additional question is what is the lifespan of a biomass power plant and what modifications and improvements can be reasonably expected or are feasible? Furthermore, do these plants really age out or can they be upgraded when new emission control technologies become available? At present both DG Fairhaven and Scotia have invested significant capital into emission control technology upgrades and are operating within their existing air quality permits requirements.

Should we be continuing with the existing centralized power plant approach or looking to more decentralized emerging technologies?

Yes, we should explore emerging technologies and yes, we should recognize the value that the existing power plants provide as a backbone to accommodate the diversity of feedstocks that are available. There are challenges to financing and permitting new facilities that also need to be evaluated and it is important to recognize that innovation takes time. A recent example was the proposed development of a BioRAM eligible 5 MW biomass plant in Arcata that was derailed when PG&E required the developer to fund an additional $6 million upgrade of the PG&E substation. It could be viewed from a “bird in the hand is worth two in the bush” perspective where we are certain in what we have and there is no guarantee that future technologies will perform adequately or at scale. Permitting and capital investments for building new

[12] https://bof.fire.ca.gov/board-committees/joint-institute-for-wood-products-innovation/

infrastructure will likely continue to be a large barrier to deployment of emerging bioenergy technologies across the State and in the North Coast.

What can be expected if the existing power plants close?

- An immediate logistical challenge to divert the ~100-120 truckloads a day to Wheelabrator Shasta (in Anderson, CA), the closest biomass facility, and assuming they would take the material. This is a 300+ mile round trip haul. There are not enough trucks available to move this material.
- In the longer term, forest landowners, managers, and product manufacturers would be affected as these sectors shrink. Specific Humboldt groups include:
    - Manufacturing: Humboldt Redwood Company, Green Diamond, Mad River Lumber, North Fork Lumber, Schmidbauer Eureka, Pacific Clears, CW Wood, Arcata Lumber Products
    - Landowners of all sizes, including all small forested landowners, Bureau of Land Management, State and National Parks, USDA Forest Service, conservation organizations, etc.
    - Municipal compost facilities such as Arcata, Humboldt Waste Management Authority, Recology, etc.
    - Many licensed timber operators and trucking companies
    - And any further development of the forest products manufacturing sector. It is reasonable to assume there would be a contraction of this sector if the biomass power plants closed.

Could the sawmill residues be utilized for compost?

While compost is a promising option for wood waste, the industry faces a number of barriers to reaching scale. As a result, only smaller amounts of biomass can be utilized for compost. With the county's daily production of ~100-120 truckloads of biomass a day, there is no existing option available at scale. HRC alone produces 70-100 chip vans per day (5 days/week) of this material. It would take 2.65 days to fill a football field (120 x 53 x 5 yards) to a height of 15 feet with the volume of material that HRC generates. Storing large amount of chips present fire hazards because the decomposition process releases heat and fires are common. An additional challenge is that the local compost industry is currently experiencing a contraction. Finally, some portion of the compost will decompose and emit CO_2 and methane over time and the carbon will not be permanently sequestered.

Is biomass energy more expensive than other renewables?

Community-scale biomass facilities in California are currently receiving 12.7 to 19.7 cents per kilowatt (kWh) hour of power; RCEA is currently paying 6.5 cents per kWh for power from DG Fairhaven and Scotia. In contrast, distributed solar is typically 6 to 7 cents and large scale solar is 3-4 cents per kWh[13]. Biomass provides 24-hour base-load generation unlike wind and solar. If power needs were calculated on a 24-hour framework, wind and solar need other complementary sources to meet daily power demands. This is why biomass is an important Resource Adequacy tool for load serving entities. Right now, half of California's electricity comes from natural gas - so storage is not a problem because the gas provides both storage (gas can be stored) and generation- but as we phase out fossil fuels, solar and wind will increasingly require energy storage to meet demand.

[13] Julia Levin Per. Comm., Bioenergy Association of California

The energy storage needed to fill in around solar costs 25 to 50 cents per kWh. When the cost of battery storage is added to the costs of solar, then biomass has a competitive advantage. Furthermore, battery technology is still in development and their longevity and life cycle needs to be included in our analyses. As California fully decarbonizes its economy and phases out fossil fuels, bioenergy will become increasingly cost competitive. This is due to both its flexibility, and its ability to sequester carbon from the atmosphere.

Is RCEA providing a "subsidy" to the timber industry by purchasing power from biomass from the two power plants?

It could be viewed from that perspective; however, biomass produces numerous local benefits to offset its perceived higher cost. Biomass is the primary locally available and renewable power source, a key consideration for RCEA and meets Resource Adequacy standards. Minimal trucking and processing is required to utilize this source and new infrastructure does not need to be built. Biomass utilization is providing many community benefits including: an ability to steward and improve the resiliency of our forestlands, job creation; tightly controlled emissions of low-value forest residues; disposal of urban organic wastes; and a reliable source of 24-hour power that meets local energy demands.