



IHI POWER SERVICES CORP.

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Rajinder Sahota
Division Chief, Industrial Strategies Division
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Comments on the E3 Presentation Discussing Carbon Neutrality

Dear Ms. Sahota:

Thank you for the opportunity to comment on E3's presentation on achieving carbon neutrality in California. As the state looks to achieve carbon neutrality, leveraging utility-scale biomass power is going to be a key strategy to making that goal a reality. IHI Power Services, which owns and operates three plants in California, including the Rio Bravo plants and Chinese Station, is one of the largest biomass power provider in the state and has been contributing to the state's environmental goals for over 30 years.

With much of the state on fire and the electrical grid under extraordinary pressure, now is the time to make a renewed effort to take advantage of biomass power's ability to address multiple state goals including the tree mortality crisis, wildfire mitigation, organic waste management and renewable power goals. Proper management of the state's biomass resources could result in 142 million metric tons of negative and/or reduced emissions, which would be more significant than taking every passenger vehicle in the state off the road. The Air Resources Board (CARB) should accordingly pay significant attention to biomass in its Scoping Plan efforts, especially since so much progress has been made in other sectors, such as mobile sources through zero-emission vehicle programs. With that context in mind, IHI would like to present the following comments on the role that biomass can play in the state's carbon neutrality strategy, as well as feedback on E3's presentation.

Overview

As California continues to strive toward achieving its climate goals, including achieving climate neutrality and ultimately net-negative greenhouse gas emissions, the state must develop a comprehensive approach to dealing with waste biomass. While the E3 report was helpful, we believe that the Lawrence Livermore National Laboratory study, "Getting to Neutral," provides greater insight into leveraging biomass to achieve the state's goals. "Getting to Neutral"

highlights bioenergy with carbon capture and sequestration (often referred to as BECCS) as one of the most promising, significant and cost-effective strategies to help California achieve its carbon neutrality and negative emissions goals. Importantly, the report identifies the same scale of opportunity and the same costs for BECCS in California in both 2025 and 2045, suggesting the state should not wait to quickly scale its vision and approach towards biomass to capture these opportunities.

The report specifically identifies biomass gasification with CCS to produce hydrogen for use in the transportation sector as a promising technology, but also suggests that biomass combustion with CCS to produce electricity could offer largely similar emissions benefits and cost effectiveness. Since it is unlikely that a one-size fits all approach will ultimately be best to address the state's entire biomass feedstock, and since tremendous uncertainty remains about the ultimate scope and timing for hydrogen markets in the transportation sector, biomass combustion could remain an important strategy for cost effectively handling waste biomass in the state for decades to come. Irrespective of the ultimate technology used, or markets targeted, existing or shuttered biomass facilities are well situated to help quickly capture this opportunity and evolve to utilize emerging technologies and reach new markets.

Currently, none of the preferred technologies (gasification, CCS) or markets (hydrogen for transportation) exist at commercial scale in California. Accordingly, and to help address the ongoing tree mortality crisis and poor air quality in the Central Valley, which is exacerbated by open burning of agricultural wastes that could otherwise be used to create energy, the state should continue to operate the few remaining biomass energy plants while it transitions to newer technologies, emerging markets, and greater scale as identified in the report. In addition to supporting the state's air quality and climate neutrality objectives, existing utility-scale biomass plants also support California's SB 100 renewable energy goals, organic waste diversion and black carbon reduction targets mandated by SB 1383, and can serve as important opportunities to support just transitions for fossil-fuel workforces and provide economic opportunities in hard-hit rural and low income communities.

Ultimately achieving the necessary climate benefits identified in the report will require a coordinated plan to match waste biomass supplies with offtakers, energy facilities, and markets, as well as developing a statewide plan for CCS at scale. The state should develop such a plan, which should be flexible to accommodate market conditions that could affect either the supply of biomass, or end use markets. In the meantime, the state should preserve the existing biomass fleet in order to deal with the ongoing organic waste streams, and support them acting as platforms that can scale the next generation of technologies. With existing footprints and interconnections, utility scale biomass plants are unique opportunities to install and showcase new technologies without having to break new ground. The state should view existing biomass plants as an asset that can be used to continue to address organic waste diversion, air quality and renewable energy goals, while providing a footprint which can support new technologies to

transition away from the combustion-to-energy model. As CARB develops a significant biomass strategy in the Scoping Plan, it should also immediately take steps to support existing plants, including potential expansions and modernizations, to capture the opportunity today and support the investments needed for the future.

Benefits of Biomass

Currently, there are 21 biomass plants in California, providing just under 600 MW of renewable energy to the state. By diverting organic waste from agricultural, municipal and forest sources and using it to generate renewable electricity, these plants ensure that environmentally detrimental practices such as open burning are avoided. While biomass plants are generally evaluated on the cost of the price of the electrons they generate, these valuations do not capture the numerous societal benefits that they bring beyond renewable energy. These include:

- **Health Benefits:** Biomass plants are integral in achieving state goals for pollutants under the 1990 Clean Air Act Amendments. A retroactive study of this law estimates the average California health benefits to equal nearly \$8 billion per year.
- **Wildfire Prevention:** Biomass plants have been called upon to aid in the management of the vast amount of beetle-killed trees throughout the state, which represent a significant wildfire threat. Increased utilization of biomass for forest fire prevention will help reduce forest fires, and their costs – in lives and in dollars.
- **State Landfill Diversion Goals:** Under SB 1383, California has set a statewide goal of obtaining a 75% reduction in organic waste landfilled. Removing organics such as biomass materials from the landfill is a critical component to achieving this goal.
- **Black Carbon Reductions:** Wildfires and biomass burning are the largest source of black carbon emissions in California, which as a component of particulate matter is the ultimate super pollutant - claiming millions of lives globally per year and exerting a profound impact on climate change in the short term. Getting excess biomass out of the forest and off farms where it would otherwise open burn is the most important step the state can take to reduce black carbon emissions.
- **Water and Watershed Benefits:** California's forests are overgrown and utilize water that was historically available for other uses. Biomass is a key component of preventing forest overgrowth. Proper forest density management is estimated to increase water availability by 4.8 million acre-feet annually or an approximate tripling of the current water supply to the California Water Project.
- **Local Economic Benefits:** Biomass generation facilities provide more jobs per unit of generation than any other renewable technology. Additionally, the vast majority of biomass facility expenditures are within a 60 to 100 mile radius of the facility, providing further economic benefit.

Existing Plants Can Contribute to the Future of Biomass

As noted in “Getting to Neutral,” there are a variety of promising technologies on the horizon that will convert waste biomass into fuels and store carbon dioxide. These include conversion of waste biomass to liquid fuels through pyrolysis and to gaseous fuels through gasification. However, our experts believe it will take five to ten years for these technologies to be consistently reliable and affordable enough to reach the scale envisioned in the report. In order to get to implementation of these technologies while still dealing with the active waste streams of organic material, the state should move to preserve the existing biomass fleet. Therefore, to fully support the potential of the new biomass technologies, the state should enact policies that support the existing biomass facilities through runway contracts that span five to ten years. This will provide the off-ramp needed for new technologies to scale up and for existing plants to transition to the new technologies.

Runway contracts will also provide the biomass industry with the certainty needed to make capital improvement investments in next-generation biomass technologies that are more immediately available. Such technologies include biomass combustion with carbon capture and storage and hybridizing plants with energy storage technologies. These types of investments will present opportunities for job creation, making them ideal targets for any stimulus initiatives that may result from federal allocations or other funding streams.

Preserving the existing fleet will allow those plants to provide support for the cultivation of newer technologies. Because these sites have an existing footprint, they do not require the permitting, acquisition of new land or new connections to the grid, thereby sparing potential new technologies from many of the challenges that would be required to bring a new project online. Additionally, utility-scale biomass plants have established networks for the collection and transportation of fuel, which generally take a long time to create from scratch. These dynamics create a unique opportunity for the state to leverage existing footprints to not only preserve existing jobs but foster the development of new technology projects on sites that already have the infrastructure needed to make those projects successful.

Other Supportive Implementation Opportunities

While contracts are key to facilitating the transition of traditional biomass plants to newer technologies, there are a variety of existing and potential state programs that can also facilitate and accelerate this evolution. These programs include:

- **Low Carbon Fuel Standard-** With numerous pathways that can generate revenue for biomass plants, the LCFS program can play a critical role in the evolution of the biomass industry. The electrification of fleets, especially heavy-duty bus and truck fleets, and the creation of biomass-to-fleet pathways would be an important development for the

industry. A pathway for biomass with direct air carbon capture and storage can also be a crucial new tool for the biomass industry.

- **Short Lived Climate Pollutant Goals-** The air quality and organic waste diversion goals laid out in SB 1383 dovetail nicely with the natural activities of biomass plants and any successor technologies. By providing an alternative fate for biomass waste that would otherwise be open burned, biomass plants have long contributed to air quality improvements in their communities, especially in the Central Valley. The creation of a biomass-focused policy framework, nested within the larger SB 1383 framework, that leverages the strengths of biomass plants will help the state achieve its organic waste diversion goals even faster.
- **Renewable Gas Standard-** The creation of a renewable gas standard will be critical for the commercial success of gasification technologies. Such a standard should set ambitious goals for renewable gas procurements and would support numerous goals including biomass waste management, control of short-lived climate pollutant and greenhouse gas emissions, air quality and economic growth.
- **Direct Incentives-** The use of direct incentives can catalyze the transition to next-generation technologies. Federal stimulus dollars, should they materialize, would be an ideal source for incentives. While the COVID-19-induced recession has resulted in significant declines in the state's various revenue streams, the economy will eventually rebound. Once it does, potential sources of direct incentives include utility programs, Cap-and-Trade and tipping fees.

Agency Processes

All of these different strands can be tied together by state agencies, led by the California Natural Resources Agency and the California Environmental Protection Agency, through the development of a comprehensive plan for utilizing biomass in California. This plan will effectively be a successor to previous versions of the Bioenergy Action Plan, but with new focus on achieving carbon neutrality while supporting the state's priorities around equity, air quality and carbon removal. The plan should be completed by 2021, so that it can feed into the next draft of the California Air Resources Board's Scoping Plan.

Amount of Biomass Assumptions

In determining the amount of woody biomass waste in California, E3 used estimates at the national level and then allocated California its pro rata share. This assumption is based on a dated model that was underpinned by a policy goal to use biomass for liquid fuels and the interplay with imported ethanol and diesel. Achieving the carbon neutrality goal will require thinking differently about how to best manage in-state biomass resources for maximum benefits. Between California's municipal solid waste, agricultural economy and the tree mortality crisis, there is far more woody biomass waste than in E3's assumption of 40 million bone dry tons. The

Lawrence Berkeley National Lab figure of more than 50 million bone dry tons is more accurate and should be used for CARB's planning processes.

Conclusion

As the state pursues multiple goals in parallel to the effort to achieve carbon neutrality, it is important that CARB leverage every tool available. Utility-scale biomass plants can play a critical role in this effort and we strongly urge CARB to place a strategic focus on leveraging these existing assets for the benefit of the state. Thank you for the opportunity to provide comments on this effort.

Sincerely,

Steve Gross
President and CEO
IHI Power Services Corp.