Health professionals oppose biomass energy

There is strong evidence-based scientific consensus that biomass plant pollution is harmful to public health. For this reason many health organizations, including the American Academy of Pediatrics, American Lung Association, American Public Health Association, Asthma and Allergy Foundation of America, National Association of County & City Health Officials, National Environmental Health Association, Trust for America's Health, and Children's Environmental Health Network are opposed to burning biomass for electricity.

Pollution from biomass plants includes particulates, nitrogen oxides, carbon monoxide, and volatile organic compounds such as benzene and dioxin. Exposure to these pollutants causes and/or exacerbates common conditions like cancer, heart disease and asthma; increasing emergency room visits, hospitalizations, and premature deaths. This is true even when air quality meets state and federal standards, and even when other sources are bigger causes of pollution, because there there is no safe threshold below which health harms don't occur.

Vulnerable populations

Not all people are equally sensitive to biomass pollution. Fetuses, infants, children, and teenagers are more vulnerable to permanent damage from air pollution because their lungs and brains are still developing. The elderly are more sensitive, as are people with diabetes, and chronic heart and lung disease because the inflammation caused by inhaling pollutants triggers constriction of airways and arteries already affected by age and disease. People of color and low income people are more vulnerable because they suffer disproportionate exposure and have worse health outcomes.

Vulnerable age groups

Roughly 30% of the Humboldt County population is in the vulnerable age ranges of under 18 or over 65. In some of the towns closest to biomass plants, the proportions are higher. 40% of Scotia residents and 75% of the population of Blue Lake Rancheria are in these vulnerable age groups. All together this vulnerable group includes 44,000 people.

Vulnerable conditions

Asthma is one of the fastest growing chronic diseases in California. Humboldt County has a higher percentage of asthmatics (1 in 10 children and 1 in 5 adults) and more ER visits for asthma than the state average. 24,000 Humboldt residents have asthma. We also have more smokers and more deaths from chronic obstructive pulmonary disease. People with cardiovascular disease (1 in 10 Humboldt adults) are also more vulnerable to pollution. 10,000 Humboldt residents are living with heart disease.

Vulnerable socioeconomic groups

Twenty one percent of Humboldt residents are below poverty level. Poverty rates are higher for children, women of childbearing age, Latinos and Native Americans, who are also vulnerable for other reasons.

Taken together, these high risk groups make up a large slice of Humboldt County's population. These numbers can't be added since there is overlap between categories, but it is clear that a substantial portion of our population is at risk.

Sources:

US Census
Humboldt County Community Health Assessment
California Health Information Survey
Humboldt County Asthma Profile
http://www.californiabreathing.org/asthma-data/county-asthma-profiles/humboldt-county-asthma-profile

Location

Residential proximity to fuel fired power plants is known to increase health impacts such as adverse birth outcomes, hospitalizations for asthma, COPD, and pneumonia and school days missed due to asthma. These health effects are most severe for those who live closest but extend from the plants to a radius of 30-50 miles.

Topography, weather, and wind direction are important factors. Temperature inversions in the Mad River and Eel River valleys trap polluted air increasing the intensity and duration of exposure. pollutants can persist for days and travel thousands of miles downwind. In the winter and fall prevailing winds from the southeast transport pollution from Scotia to Rio Dell and Fortuna, and from Blue Lake to Arcata. In the summer prevailing winds from the northwest carry pollution from Fairhaven to Cutten, Humboldt Hill, Loleta, and Fortuna.

Sources:
Estimated public health impacts of criteria pollutant air emissions from nine fossil-fueled power plants in Illinois. Levy, J. et al (2000) Harvard School of Public Health Paper
Coal power plant emission exposure and its effect on education access JPublicHealth 22(4):313-321 · January 2014
Associations Between Residential Proximity to Power Plants and Adverse Birth Outcomes. Ha, S. et al (2015) 182 (3):215-224.doi: 10.1093/aje/kwv042

Economic cost of health harm from pollution

The medical costs of pollution induced or exacerbated illness are substantial. A typical emergency room visit for asthma costs $1,500 and an asthma hospitalization costs $6,000. An increase in asthma severity from mild to moderate requires the addition of maintenance medication costing $200-300 per month. A hospital admission for an exacerbation of chronic obstructive pulmonary disease costs $9,700 and an increase in COPD severity from mild to moderate adds $800 per month of medications. The lifetime cost of a heart attack, including care and lost productivity is $760,000. Most of these expensese are shared by all of us in the form of taxes and insurance premiums.

The health impacts of air pollution exact an indirect cost on the economy due to lost productivity from missed days of work and school. Children who live near pollution emitting power plants have double the number of school absences due to asthma. Nationally, asthma causes 10.5 million missed school days and 14.2 million days of missed work at an estimated annual cost of 3.8 billion dollars.

Because Humboldt County has a chronic physician shortage, another cost we all pay is decreased access to health care. With practices closing, doctors not taking new patients, and appointment schedules full, and every office or emergency room visit for care of a pollution related illness means someone else has to wait for medical attention.

Sources:
Humboldt County Asthma Profile
http://www.californiabreathing.org/asthma-data/county-asthma-profiles/humboldt-county-asthma-profile
CDC. Asthma Facts— U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2013.

Barnett, S Costs of asthma in the United States: 2002-2007. Ann. Allergy Asthma Immon. 127:(1) 145-152. 2011

How much pollution?

Humboldt County's biomass plants are among the county's top stationary sources of air pollution. In 2014, they collectively emitted 2,900 tons of carbon monoxide, 470 tons of nitrogen oxides, and over 100 tons of fine particulates. These amounts of criteria pollutants are seventy to seven hundred times more (varies by pollutant) than those emitted by the Humboldt Bay Generating Station, which burns natural gas and produces more electricity than all 3 biomass plants combined. In 2013 (the most recent data available) Blue Lake and Fairhaven also each emitted nearly six tons of benzene and formaldehyde.

Table 1. REPORTED ANNUAL EMISSIONS

		2014 (tons/year)					2013 (lb/year)	
Facility	**MW**	**CO**	**NOx**	**SO2**	**pm10**	**pm2.5**	**Benzene**	**Formaldehyde**
Blue Lake	11	659	99	16	26	24	2006	2106
Fair Haven	18	1466	171	30	34	31	9469	9923
Eel River*	28	683	202	30	43	40	11947	17367
PG&E (gas)	163	8	15	0.1	1.2	1.2	770	2198

*now called Humboldt Redwood
Source: California Air Resource Board Emissions Inventory Facility Information

Table 2. Emissions per MWh (in pounds)

Facility	**CO**	**NOx**	**SO2**	**pm2.5**
Blue Lake	19.7	2.96	0.48	0.72
Fairhaven	23.8	2.78	0.49	0.50
Eel River	14.1	4.18	0.62	0.83

Sources: California Air Resource Board Emissions Inventory, Redwood Coast Energy Authority (Mwh compilation from California Energy Almanac)

Sources:
September 13 2016 letter to Congress from health organizations (attached)
EPA. Integrated Science Assessment for Particulate Matter. 2009.
WHO International Agency for Research on Cancer. IARC Monograph on the Evaluation of Carcinogenic Risks to Humans. 2016 Volume 109, Outdoor Air Pollution
EPA. Integrated Science Assessment for Oxides of Nitrogen-Health Criteria. 2016.
EPA. Integrated Science Assessment of Ozone and Related Photochemical Oxidants. 2013.
EPA. Integrated Science Assessment for Carbon Monoxide, 2010.
Beauchemin, P. Emissions from Wood-Fired Combustion Equipment. British Columbia Ministry of the Environment. 2008

Context

While Humboldt's biomass plants are among the largest major stationary sources of air pollution in the

county, they are far from the only culprits. Vehicle exhaust, road dust, and residential woodstoves all add pollution to our air. In comparison to some of these sources, biomass's contribution is small. But compared to other sources of electricity, biomass is a big polluter. Even new biomass plants with the best pollution controls emit ten times more particulates than a coal fired power plant. As a point source of pollution with clean alternatives, biomass pollution is a problem we can solve faster than the time it will take to switch out all our cars for electric vehicles and all our woodstoves to heat pumps.

Table 3. EPA Allowable emission rates lb/ MMBtu

	Blue Lake*	**Fairhaven**	**Scotia**	**Coal**
NOx	0.15 -.175	0.16 - 0.23	0.2 - 0.26	.088
CO	0.50 – 0.69	2.5 - 4.0	1.2 - 3.0	.144
PM10	0.02 - 0.03	0.04	0.04	.017

* after installing mandated new pollution controls

Sources:

Allowable emissions rates in 2016 EPA consent decree with Blue Lake Power
http://www.ncuaqmd.org/files/permits/BLP/Exhibit%201%20-%209.pdf
Average EPA emission limits for COAL POWERED plants permitted 2002-2006
https://www.dep.state.fl.us/air/emission/construction/taylor/BACT.pdf
NCUAQMD Title V Operating permits for Fairhaven Power and Humboldt Redwood

Doesn't the government protect us?

Given the threatened rollbacks in air quality standards, the lack of air quality monitoring in communities where plants are located, the infrequency of required emissions monitoring, and the plants' history of fines and violations, it would be a mistake to assume that regulatory agencies are protecting the public from the health harms of biomass pollution.

Old and ready to retire

The amount of pollution produced by a biomass plant depends mostly on the method used to extract energy. In general the older the biomass technology, the more pollution it produces. Our biomass plants were built in the 1980's. The normal useful life of a biomass plant is 20-30 years. These plants use one of the oldest methods, burning wood on grates in boilers to create steam. According to the EPA, adding the best available pollution controls to this type of biomass boiler only cuts pollution around 7%.

On a statewide level, the California Air Resource Board modeled different biomass energy scenarios and concluded that closing biomass plants in the state would improve air quality and expanding biomass energy with current technology would worsen air pollution. Advanced technologies such as gasification and pyrolysis are likely to pollute less but there is not enough data yet to generalize.

Our current biomass plants are old and out of date. They can't make clean energy. They need to be retired, not rescuscitated.

Would the alternative be worse?

Local biomass energy proponents point out that burning wood in power plants pollutes less than open burning of slash and dead trees or dumping waste in landfills. Humboldt biomass plants burn mill

waste, not slash and dead trees. Burning mill waste is illegal and California's Mandatory Organic Recycling law requires all businesses which produce more than 4 cubic yards of clean wood waste per week to recycle it instead of putting it in a landfill. Humboldt County businesses and timber companies not exempt. If our community decides not to buy biomass energy and it can't be sold elsewhere at a competitive price, then timber companies would have to dispose of their waste without burning or dumping.

There are healthy alternatives. Mallard Creek in Rocklin, CA accepts mill waste free of charge and produces animal bedding, landscaping materials, playground chips, and industrial fiber. Mill waste is composted with municipal biosolids in Washington State and British Columbia, and with fish waste in Washington, Alaska, and Argentina. Expanding local compost production could create jobs, decrease flooding, raise local agricultural productivity, increase access to fruits and vegetables, and lower waste management costs for the whole community.

Equity and a Just Transition

Equity and justice are health concerns because their absence takes a physical and emotional toll. The economic benefits of biomass energy accrue to a relatively small number of people: the plant owners and the timber sector, which currently comprises 12% of the county's economy. The costs are borne by the entire community, not only in the form of health impacts but also in the form of lost opportunities to invest in a clean energy future. The above market cost of biomass energy diverts public money from investment in local clean energy and slows our transition to a low carbon future.
Ending this public subsidy of old biomass plants would result in the loss of some jobs and the creation of others in new local clean energy and efficiency programs and mill waste recycling. Government and affected industries should sit down and develop ways to retrain and prioritize hiring of displaced workers into these newly created jobs and assist them financially during the transition.

Source: Humboldt Economic Index, HSU Department of Economics
2016.http://www2.humboldt.edu/econindex/current.pdf

Sources: CARB Emissions Inventory, Title V plant operating permits issued by NCUAQMD.

CONCLUSION

Air pollution from Humboldt's aging biomass power plants adversely affects the health of a large proportion of Humboldt County's population and imposes health costs on the entire community. Updating pollution controls cannot bring these plants up to modern standards. Subsidizing the continued operation of these businesses by buying their electricity at above market rates is not in the community's best interest.

It is recommended that local government work with the timber industry to plan for the retirement of aging biomass plants and their replacement by clean local energy and less polluting methods of woody waste disposal. Meanwhile, a short term option for mitigation would be for mill and power plant owners to fund the replacement of residential woodstoves by heat pumps to quantitatively offset plant emissions.

September 13, 2016

Dear Senator/Representative:

The undersigned public health, medical and nursing organizations urge you to oppose policies that would encourage or expand the use of biomass for electricity production. Biomass is far from "clean" – burning biomass creates air pollution that causes a sweeping array of health harms, from asthma attacks to cancer to heart attacks, resulting in emergency room visits, hospitalizations, and premature deaths.

Biomass uses fuel sources, or feedstocks, whose combustion harms human health, including wood products, agricultural residues or forest wastes, and highly toxic construction and demolition waste. Burning biomass from any source generates immediate dangerous air pollution that puts health at risk.

Among the most dangerous of these emissions is particulate matter, also known as soot. These particles are so small that they can enter and lodge deep in the lungs, triggering asthma attacks, cardiovascular disease, and even death.[i] Particulate matter can also cause lung cancer.[ii]

Biomass combustion also creates nitrogen oxide emissions, which are harmful in their own right and also contribute to the formation of ozone smog and particulate matter downwind.[iii] Ground-level ozone pollution can trigger asthma attacks and cause premature death, and newer research shows possible links to reproductive and central nervous system harm.[iv]

Burning biomass also creates carbon monoxide, which leads to headaches, nausea, dizziness, and in high concentrations, premature death;[v] and carcinogens, including benzene and formaldehyde.[vi]

The dangerous air pollution from burning biomass endangers some people more than others. Millions of infants and children, older adults, individuals with respiratory or cardiovascular disease or diabetes, and individuals with lower incomes face a higher risk of suffering serious health effects from these pollutants.[vii]

In addition to emitting harmful conventional pollutants, some biomass processes also increase carbon emissions that contribute to climate change. The U.S. Environmental Protection Agency's Science Advisory Board is currently evaluating available research to answer questions about the net carbon emissions that result from burning biomass. In their 2012 letter to EPA from an earlier review, the Science Advisory Board noted that "[c]arbon neutrality cannot be assumed for all biomass energy a priori" and described the processes that can make biomass increase carbon emissions.[viii]

Scientists must be allowed to continue to review these impacts. The United States is already experiencing health harms as a result of climate change. Increased temperatures lead to heat-related illnesses and deaths and help make the formation of ground-level ozone more likely. More droughts lead to elevated particulate matter levels. More frequent and severe extreme weather events harm both physical and mental health. These trends are projected to continue, along with increased health threats from vector-borne diseases; food insecurity; food- and water-borne diseases; worsened allergy seasons; and many more.[ix]

Burning biomass creates proven harm to human health through direct air pollution impacts, as well as the potential for increasing climate change. Because of those threats, the undersigned public health, medical and nursing organizations ask that you oppose policies that would encourage or expand the use of biomass for electricity production. We urge you to protect human health by supporting the development of truly clean, carbon-free sources of energy such as solar energy and wind power.

Sincerely,

Allergy & Asthma Network

American Academy of Pediatrics

American Lung Association

American Public Health Association

Asthma and Allergy Foundation of America

National Association of County & City Health Officials

National Environmental Health Association

Physicians for Social Responsibility

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[i] U.S. Environmental Protection Agency. Integrated Science Assessment for Particulate Matter. 2009.
[ii] World Health Organization International Agency for Research on Cancer. IARC Monograph on the Evaluation of Carcinogenic Risks to Humans. Volume 109, Outdoor Air Pollution. Lyon: IARC (in Press).
[iii] U.S. Environmental Protection Agency. Integrated Science Assessment for Oxides of Nitrogen-Health Criteria. 2016.
[iv] U.S. Environmental Protection Agency. Integrated Science Assessment of Ozone and Related Photochemical Oxidants. 2013.
[v] U.S. Environmental Protection Agency, Integrated Science Assessment for Carbon Monoxide, 2010.
[vi] Naeher LP, Brauer M, Lipsett M, Zelikoff JT, Simpson CD, Koenig JQ, Smith KR. 2007. Wood smoke Health Effects: A Review. Inhalation Toxicology. 19:67-106.
[vii] U.S. Environmental Protection Agency, Integrated Science Assessment for Particulate Matter. 2009.
[viii] Swackhammer, Deborah L. and Madhu Khanna, letter to Lisa P Jackson, Administrator, U.S. Environmental Protection Agency on SAB Review of EPA's *Accounting Framework for Biogenic CO_2 Emissions from Stationary Sources*. September 28, 2012.
[ix] USGCRP, 2016: The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment. Crimmins, A., J. Balbus, J.L. Gamble, C.B. Beard, J.E. Bell, D. Dodgen, R.J. Eisen, N. Fann, M.D. Hawkins, S.C. Herring, L. Jantarasami, D.M. Mills, S. Saha, M.C. Sarofim, J. Trtanj, and L. Ziska, Eds. U.S. Global Change Research Program, Washington, DC, 312 pp. http://dx.doi.org/10.7930/J0R49NQX