



**Testimony for DOER Hearing on Alternate Energy Portfolio Standard (APS)**

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Partners for a Healthier Community is the Public Health Institute of Western Massachusetts, providing research assessment, program evaluation and coalition building services. We convene the Pioneer Valley Asthma Coalition, a community partnership of healthcare organizations, local public health agencies, housing organizations, community agencies, academic institutions, community members, and other community based organizations that work to improve the quality of life for individuals, families and communities affected by asthma.

It has been proven time and time again that air pollutant emissions from biomass facilities contribute to the extremely high rates of asthma and respiratory illness in nearby communities. The high concentration of particulate matter released from these facilities are gravely concerning for the health of children, seniors and people with asthma in Springfield and the Pioneer Valley. The increased air pollution from the proposed APS regulations around biomass energy has the potential to impact MA residents and in particular Springfield and Holyoke residents who are already experiencing significant health disparities. We oppose any incentives for biomass energy and urge the DOER to consider alternative energy that does not have the negative health impacts found with biomass.

**Air Pollution Impact on Health**

Air pollution is a major health danger for children and adults. Ozone, PM<sub>2.5</sub> and outdoor air pollution have been shown to lead to morbidity for several chronic diseases including asthma, chronic obstructive pulmonary disease (COPD), cardiovascular disease, with recent studies also suggesting an association with diabetes (Anderson 2012, Brook 2004, Ko 2009, Rajagopalan 2012). In addition, air pollution affects the development of lungs and is linked to low birth weight and pre-term birth and susceptibility to infections. Air pollution is linked to neuroinflammation including stroke, Alzheimers and Parkinson's diseases (Block 2009).

According to the EPA, fine particle pollution causes early death (both short-term and long-term exposure) and may cause reproductive and developmental harm (U.S. Environmental Protection Agency, *Integrated Science Assessment for Particulate Matter*, December 2009 EPA 600/R-08/139F). In 2013 the World Health Organization concluded that outdoor air pollution is carcinogenic to humans (<http://www.euro.who.int/en/health-topics/environment-and-health/urban-health/news/news/2013/10/outdoor-air-pollution-a-leading-environmental-cause-of-cancer-deaths>).

## Health Effects Specifically Related to Biomass

Even though burning wood for fuel is a time-honored tradition, increasingly there is a consensus around the negative health impacts of incineration. The key pollutants from biomass or wood incineration systems are: particulate matter, carbon monoxide, polycyclic aromatic hydrocarbons (PAHs), and heavy metal from contamination or treatment of wood. Fine particulate (pm 2.5) have the greatest risk though all particulates can have a systemic impact. (Hoppins & Jacobs, Emissions and Health Effects of Wood Biomass Combustion, 2013). Both ultrafine and PM 2.5 particles tend to deposit in the deep lung (alveolar regions), where they penetrate the blood stream and can have systemic biological effects. (Hoppins & Jacobs).

- Woodsmoke may be more harmful than other sources of air pollution. Woodsmoke results in a greater risk for respiratory problems than other kinds of emissions (ie traffic). There is also some evidence that woodsmoke leads to increased cardiovascular problems and there is already a demonstrated link between particulate pollution and cardiovascular outcomes. (Hoppin & Jacobs) As noted above, cancer risk is also a concern since woodsmoke can contain a number of carcinogens naturally occurring in wood as well as the risk of contamination or use of treated wood.
- Woodsmoke in specific has been shown to have harmful health impacts including “increased health care utilization to address respiratory illnesses, aggravation of asthma, aggravation of chronic obstructive pulmonary disease, bronchitis, and decreased lung function (Naeher et al. 2007; Boman et al. 2003)” (Hoppins & Jacobs,187).
- Supporting biomass incineration could have both outdoor and indoor air quality impacts since fine particulate pollution can easily enter homes, schools and other buildings. PM 2.5 from wood biomass combustion can remain suspended in ambient air for longer periods of time, can be transported over long distances, and can penetrate more readily into indoor environments as compared to larger, coarser particles (Wilson and Suh 1997).Consequently, fine particulate emissions into the outdoor ambient air from institutional, commercial, industrial, and electricity-generating wood biomass facilities can potentially pose an indoor as well as outdoor air quality hazard (Allen et al. 2003 ;Larson et al. 2004). (Hoppins & Jacobs)

## Cancer Risk

Cancer is also a health outcome of concern, given the known carcinogens in woodsmoke. There is a risk of contamination from heavy metals that occur naturally in wood: Trace levels of heavy metals such as arsenic, cadmium, and nickel are generally found in the air emissions of wood-fi red combustion units because the metals occur naturally in many types of wood (Washington State Department of Ecology 2003 ; Demirbas 2008). Metal emissions can be highly variable depending on the type of wood or biomass being burned, whether the fuel includes bark, whether the fuel is contaminated with other debris, and whether other fuel sources are used in combination with wood (Demirbas 2008 ; Chandrasekaran et al. 2012 ). While metals are not a significant fraction of particulate pollution, one recent study of emissions from institutional and commercial wood biomass combustion units (2.8–16.4

MW) found that heavy metals and trace elements, which occur naturally in wood fuel, showed a tendency to concentrate in fine particles (Sippula et al. 2009 ). (Hoppins & Jacobs)

### **Particulate Pollution at Any Level Results in Health Problems**

The EPA strengthened its standards for pm 2.5 in 2013. In part the improvement in outdoor particulate pollution is due to these new standards which have lowered particulate pollution as well as the closing of the Mt Tom power plant and the switch of some local power plants from coal to natural gas fuel. Even though these decreases are significant, they are not enough. Studies have not found a “no-risk” level for particulates: the US EPA lowered the annual PM2.5 standard to in 2013, but studies have observed premature mortality at much lower levels (Crouse et al. 2012 ;Krewski et al. 2009). Numerous epidemiological studies examining the relationship between increase in PM 2.5 pollution and the most serious adverse health outcomes such as premature death or hospitalizations associated with heart or pulmonary conditions have not been able to identify a level of “no risk” (i.e., a no-threshold model) (Pope and Dockery 2006 ; Brook et al. 2010 ). **This implies that health protection is expected to improve with reductions in air pollution at any level.** (Hoppins & Jacobs, emphasis added).

### **Potential Exacerbation of Existing Health Disparities**

Springfield is already burdened with a high level of health disparities. Biomass incineration has the potential to negatively impact residents who already suffer poor health outcomes. Chronic illness, such as preexisting respiratory disease, puts people at greater risk of adverse outcomes associated with exposure to fine particulate exposure. In addition, some populations are more susceptible to health effects because of their age or condition. For example, pregnant women, infants, children, the elderly, and individuals already burdened by significant environmental, social and economic stressors are more likely to be adversely affected by exposure to air pollution (Hoppin & Jacobs).

The following data show how Springfield residents already experience large health disparities when compared to the state. Residents are disproportionately impacted by high rates of asthma, stroke, chronic obstructive pulmonary disease (COPD), obesity, hypertension, childhood lead poisoning, and diabetes.

- **Respiratory Disease**

- **Asthma** – An estimated 18% of Springfield residents have asthma, which is 60% higher than the state prevalence (MDPH, Behavioral Risk Factor Surveillance Survey [BRFSS] 2012). Residents experience high morbidity due to asthma with ER visit rates 3 times higher than that of the state and more than double the national rate (Table 1). Schoolchildren have an asthma prevalence of close to 18.6%, compared to 12.4% statewide and 8.6% nationwide (MDPH 2013-2014).
- **COPD** – Springfield residents experience this disease that typically affects older adults at an ER visit rate double that of the state (Table 1).

- **Stroke and Hypertension** – Springfield residents experience over double the rate of hypertension emergency room visits than the state. Springfield hospitalization rates for stroke are 15% higher than the state (Table 1).

When examining through a lens of race and ethnicity, Springfield Black and Latino residents experience disproportionately poorer health outcomes. Latinos are more than 3 times as likely to end up in the ER for asthma and Blacks are twice as likely than Whites in Springfield. Similarly, Hispanics and Blacks are twice as likely to be hospitalized for cardiovascular diseases. Communities of color face even greater risk from the addition of pollution from the incentives for biomass energy.

### **Biomass and Climate Change Health Impacts**

In addition to the direct results of air pollution, the pollution from biomass will drive climate change. The likely impacts of climate change are expected to increase the health disparities in Springfield and across the commonwealth. Increases in temperature, increased precipitation and flooding may create even greater disparities and negatively impact individuals with pre-existing conditions and other vulnerable populations as follows:

- Increases in temperature and heat waves– Individuals with diabetes, obese individuals, children, elderly, hypertension, stroke, and depression are all at risk for negative effects of increases in temperature (Kovatz 2008). In some cases, such as children and older adults, bodies have a difficult time adjusting to the increased temperature, particularly in the absence of air conditioning. Elderly adults in assisted living institutions have been found to be at particular risk. Heat stress can also increase strain on the cardiovascular system which would negatively impact those with existing cardiac disease (e.g. stroke). Also, some common medications may prevent the body from adjusting to increased heat (e.g. diuretics used to treat hypertension). The increase in temperature may also increase ozone pollution levels which would potentially adversely affect all residents but particularly vulnerable populations which include the elderly, children, and individuals with asthma, COPD, stroke, and diabetes (Eze 2014)(Anderson 2012; Brooke 2004).
- Flooding or extreme weather conditions would have the potential to destroy or cause damage to houses – Damage sustained from these conditions would lead to exposure to hazards in the home, including lead, asbestos and mold. Disrepair could also create opportunity for pest infestation, which is a trigger for asthma morbidity, in addition to mold exposure. It is estimated that 21% of asthma cases can be attributable to mold and moisture exposure in housing and buildings (Mudarri & Fisk 2007).
- Extreme weather events Such events may negatively impact mental health due to the stress and strain of homelessness, loss of property, etc.
- Rising temperatures, increased precipitation and flooding, and extreme weather events that will likely occur as a result of climate change may negatively affect the health of a large number of at-risk Springfield residents, including those with asthma, COPD, stroke, hypertension, diabetes, obesity, depression.

We urge the DOER to save the incentives for truly clean energy like solar and wind power, rather than biomass which must be monitored extensively to prevent public health impacts.