

October 7, 2022. Episode 43b Courtenay, British Columbia, Canada, City Council Engineer presents PM 2.5 solutions in July, including use of PurpleAir PM2.5 monitors. Decision on purchasing PurpleAir monitors takes a step back in October 2022.

Courtenay council has adopted a nuisance bylaw amendment intended to better regulate excessive wood smoke. The amendment says nuisance smoke visibly drifts onto a neighboring property, and interferes with the use and enjoyment of private or public property.

Analysis by RAWSEP: Strengths of the Bylaw passed on Oct. 3, 2022

This bylaw would regulate excessive wood smoke from a chimney, instead of regulating components of the fire. This bylaw acknowledges that certified appliances may not be able to achieve their rated emission limits. This bylaw acknowledges that even with compliance with wood storage requirements and with regulations that wood moisture content be 20% or less, these components of the fire may not prevent excessive wood smoke.

Analysis by RAWSEP: Weaknesses of the Bylaw passed on Oct. 3, 2022

Instead of using PM2.5 monitors to measure wood smoke pollution in yards of near neighbors of residential wood burners, visible smoke is the criteria for measurement of wood smoke pollution. How this is considered observed or measured was not discussed. It might be done with a near neighbor's security camera fixed on the roof and stack of the wood burning house so as not to invade the privacy of human activity.

Instead of buying PurpleAir PM2.5 monitors, the council members decided to wait and see. In answer to Councilor Hillian's question, an engineer said there would not be a long wait for PM2.5 monitors if the council decided to purchase them in 2023.

On July 25, 2022, in Courtenay, British Columbia, Canada, Engineers made a presentation to the City Council, suggesting ways to solve the problem of PM 2.5 emissions from residential wood burning.

July 25, 2022

Engineers presented a slideshow including Storage of Wood and Operation of Wood Burning Appliances. Many factors influence the amount of smoke produced. Provincial regulations require the moisture content of wood to be 20% or less. Already a high rate of compliance with wood storage regulations. Certified appliances may not be able to achieve their rated emission limits. The engineers concluded in their slide the Recommendation: Review and revise existing bylaws to regulate excessive wood smoke from a chimney, instead of regulating components of the fire.

October 3, 2022

British Columbia Provincial Air Quality Stations show PM2.5 exceedances happen multiple times a year. PM2.5 Concentrations are highest from 6 PM to 8 AM in the winter, and are low almost all other times, showing that PM2.5 is caused by residential wood burning, not the wildfires that are prevalent in warm weather. Inversions are challenging because emissions become trapped in the Comox Valley. It was observed that air quality was better in areas where wood burning was not used as a primary source of heat. Three Nuisance bylaws are a way to address public concerns. 1. Prevention of Public Nuisances Bylaw No. 2804, 2. Municipal Public Information Bylaw No. 2435, and 3. Nuisances Abatement and Public Cost Recovery Bylaw No. 2985.

October 3, 2022

Discussion by Council Members.

Only one member of the six member council opposed the amendment at the Oct. 3 meeting. Like noise complaints, he feels bylaw infractions concerning smoke would be difficult to enforce and would take up too many resources. He would prefer to see efforts invested on education. Courtenay's Chief Administrative Officer (C A O) said the bylaw is based on research and good practice. Councilor Doug Hillian said adverse effects on low income earners, were raised at the previous council meeting. In addition, staff said enforcement would be a last resort after other measures had been taken. The director of corporate services said there has to be a persistent state of non-compliance to be a cause of nuisance. "It's the existence of that persistent state that would give us time to work with the resident on identifying alternative burning sources that may be more appropriate," she said. The director of corporate services said an egregious continuation of non-compliance with the bylaw is when a ticket would be issued.

Mary noted that Wood burning emits more CO2 than Coal burning. Mary calculated the CO2 emissions of Natural Gas burning are, at most, around half of the CO2 that Coal emits. Mary also did a calculation from the chart from Families for Clean Air, which compared the weight of PM 2.5 emitted annually. The weights were one sixth of a pound for Natural Gas, 27 pounds for a wood pellet stove, 97 pounds for a certified wood stove and 244 pounds for an uncertified wood stove. Also, the Natural Gas weights would not increase over time, but wood burning emissions might very well increase over time, as wood stoves aged or were not maintained under laboratory conditions. Given the weights from the Families for Clean Air chart, a wood pellet stove emits 16,200 times more PM 2.5 than a natural gas furnace, a certified

wood stove emits 58,200 times more PM 2.5 than a natural gas furnace, and an uncertified wood stove emits 146,400 times more PM 2.5 than a natural gas furnace. Mary noted that the focus of Residents Against Wood Smoke Emission Particulates (RAWSEP) is on the health effects to near neighbors of living next to residential wood burning, in those hyper-localized areas where the source of particulate pollution, PM 2.5, is concentrated. PM 2.5, particulate matter of 2.5 micrometer size, is the perfect size to infiltrate the human lung, causing a cascade of human health problems. Wood smoke consists of 90% PM 2.5. Residential PM 2.5 monitors can be purchased by neighbors from PurpleAir for less than \$300, and their locations are put on the online PurpleAir Map, along with data uploaded every 10 minutes, available to the general public, and of course to governmental authorities. Neighbors of Residential Wood Burners would like their PurpleAir PM 2.5 monitor data to be used to regulate and shut down Residential Wood Burning detected at neighbors' fence lines that exceeds the World Health Organization (W H O) standards of 5 micrograms per meter cubed or future US standards of 8 micrograms per meter cubed. There could even be court-ordered monitoring using a neighbor-owned PurpleAir PM 2.5 monitor as a "breathalyzer" (similar to car breathalyzers court ordered for repeat drunk drivers) to turn off the ignition of a neighboring indoor wood stove when levels of PM 2.5 in a near neighbor's yard is exceeded. In this way governmental authorities would not have to check the make and model of an appliance and would not have to rely on unreliable certification and other worthless assurances of levels of wood stove particulate emissions by the company that manufactured the wood stove. PurpleAir monitors also provide data every 10 minutes 24 hours a day, and data can be downloaded from the map by governmental authorities the day after the PM 2.5 levels are exceeded, during normal government working hours. PurpleAir PM 2.5 monitors are so reliable and accurate they are put on U S AirNow Smoke and Fire maps alongside \$100,000 Environmental Protection Agency (E P A) monitors, correlated to the EPA monitors with a simple mathematical formula. But to publicize this, it is necessary to point out that living hyper-localized next to a residential wood burner is essentially the same as living hyper-localized next to any kind of PM 2.5 emitting wood burning appliance, next to a PM 2.5 emitting wood burning wildfire or next to a PM 2.5 emitting industrial biomass (wood) burning facility.