Episode 56BM through Episode 56BR, April 4, 2023. The PurpleAir, IQAir, and Zephyr PM2.5 monitors issue.
Ep 56BM Alaska Ep 56BN Michigan, Montana PurpleAir, Ohio IQAir 1 of 3 Ep 56BO Ohio IQAir 2 of 3 Ep 56BP Ohio IQAir 3 of 3, Pennsylvania, U K Southampton Zephyr, Sweden 1 of 2 Ep 56BQ Sweden 2 of 2, Bangladesh, Thailand IQAir 1 of 2 Ep 56BR Thailand IQAir 2 of 2

Episode 56BM,

Residents Against Wood Smoke Emission Particulates (see RAWSEPresidents.wordpress.com and Scroll Down for PDFs of articles with U R L's to search on, and on the website are links to 10 minute Tiktok and Youtube videos and 30 minute podcasts on Spotify and Podbean).

United States

Alaska

RAWSEP View: Electric heat pumps that work at temperatures well below zero will work in Fairbanks, Alaska and are clean alternatives to residential wood burning in Alaska. What does the Alaska Legislature mean by requesting PM2.5 regulations from the federal Environmental Protection Agency (E P A) "unique to Fairbanks"? The Alaska Legislature is requesting that certification of residential wood stoves in Fairbanks have MORE pollution loopholes for Wood Stove Manufacturers. Wood stove industry lobbyists in synchronicity with the Alaska legislature are requesting the federal E P A make wood burning stove manufacturing certification less strict. Federal E P A regulations do not require banning of wood stoves. The Alaska's Department of Environmental Conservation (D E C's) plan does not require banning of residential wood stoves. RAWSEP believes that residential wood stoves should be banned. Wood burning produces more particulates of 2.5 micrometer size, PM2.5 than burning of the fossil fuel Coal. Wood burning produces 450 times more particulates of 2.5 micrometer size, PM2.5, than burning of the cleanest fossil fuel Natural Gas. PM2.5 is the perfect size to infiltrate the human lung, producing a cascade of human health problems and early deaths. PM2.5 also contributes to climate change. PM2.5 from residential wood burning also affects the health and lives of near neighbors. The residential wood smoke enters the yards and infiltrates the homes of near neighbors. PM2.5 monitors should be handed out to any near neighbor who complains of smoke from a residential wood burner's stack. The measurements at the stack or the fence line of a residential wood burner should be evidence of pollution from residential wood burning. The E P A limits of "safe" PM2.5 levels, expected by 2024 to be 8 micrograms per meter cubed annually and 25 micrograms per meter cubed daily, should be enforced by shutting down residential wood stoves that exceed these limits, as measured by fence line readings from the yards of near neighbors. PurpleAir PM2.5 monitors have historic data (gathered every 10 minutes) online available for download by the general public 24 hours a day, 7 days a week. PurpleAir data for a specific monitor can be downloaded by government officials during normal government working hours. Evidence of pollution can be gathered without having to enter the homes of residential wood burners, nor certification of wood stoves checked. The Office of the Inspector General (O I G), in a February 2023 report stated that the certification process of wood stoves was flawed and allowed polluting wood stoves to be manufactured and sold. That certification process continues to be flawed, because of wood stove industry lobbying that allows giant loopholes to compliance with E P A "safe" limits of PM2.5 emissions from wood stoves. What the Alaskan Legislature is urging the E P A to do, is ignore even the most lax standards that E P A knows it should enforce. The E P A changed and strengthened regulations they had previously set to better control PM2.5 pollution which affects the health of near neighbors of residential wood burners. The changed, stricter, E P A nation-wide regulations for PM2.5 also seek to curb further climate change. Fairbanks, Alaska, the area of the U S most polluted by PM2.5 from residential wood burning, should not have laxer standards than the rest of the nation. Wood Stove Industry economics and the Wood Stove Industry's superficially legal and loophole-filled compliance with previous laws which are now outdated, should not override the need to protect the health of U S citizens.
RAWSEP View: It is hypocritical for the Alaskan Legislature to seek to shift the blame of wood stove pollution to the E P A, since the aim of the Alaska Legislature is to allow production of more wood stove pollution to allow continued economic gain for the Wood Stove Industry. The blame for wood stove pollution in Fairbanks Alaska lies squarely on the Wood Stove Industry and the Alaska Legislature that does the industry's bidding. Describing the Alaskan Department of Environmental Conservation (D E C's) control of wood stove PM2.5 as "moderate" is another way of saying it is ineffective. Describing the D E C's **control** of wood stove PM2.5 as "serious" is inaccurate, because the harm of PM2.5

pollution **continuing** is serious. If PM2.5 from wood burning continues it will continue to cause human health problems to near neighbors of residential wood stove users.
RAWSEP View: Using a photo of a fishing shack where wood is burned in a stove, for this article, implies that wood burning is done far from neighbors, when in reality wood burning in Fairbanks, Alaska is mostly done close to neighbors. Alternate forms of residential heating are available and affordable through numerous subsidies such as the national Low Income Home Energy Assistance Program (L I H E A P), for the new electric Heat Pumps that can work at temperatures well below zero. If such heat pumps are powered by solar, geothermal or wind energy, also subsidized, the particulates emitted from home heating in Fairbanks, Alaska, will be close to zero.

Legislature urges EPA to develop new woodstove certification program | Local News
Fairbanks Daily News-Miner
Wood smoke rises from an ice fishing hut on Chena Lake. The borough's nonattainment area, which includes Fairbanks and North Pole, has had some of ...
Excerpts edited by RAWSEP for brevity and clarity.
Wood smoke rises from an ice fishing hut on Chena Lake. The Fairbanks, Alaska, borough's nonattainment area, which includes Fairbanks and North Pole, has had some of the nation's worst air quality dating as far back as 2009, due in large part to smoke from wood stoves. The Alaska Legislature is encouraging the federal Environmental Protection Agency (E P A) to create a woodstove certification program unique to Fairbanks. House Joint Resolution 11, which the Legislature passed Wednesday, also calls for the state Department of Environmental Conservation (DEC) to create "an economically and legally defensible implementation plan" for the Fairbanks North Star Borough nonattainment area.

Legislature passes resolution supporting wood burning certification program for Fairbanks ...
Must Read Alaska
Studies identified wood burning as the greatest contributor of PM2.5 pollution, and efforts taken under the state DEC's moderate and serious state ...
Excerpts edited by RAWSEP for brevity and clarity.
Legislature passes resolution supporting wood burning certification program for Fairbanks North Star Borough
March 29, 2023. The Alaska Legislature has passed House Joint Resolution 11, urging the United States Environmental Protection Agency to develop a woodstove certification program in Fairbanks, and for the state Department of Environmental Conservation to develop an economically and legally defensible state implementation plan for the Fairbanks North Star Borough nonattainment area. Studies identified wood burning as the greatest contributor of PM2.5 pollution, and efforts taken under the state DEC's moderate and serious state implementation plans resulted in a significant reduction in PM2.5 emissions.
However, the resolution notes that the United States EPA's national wood heater certification program is deeply flawed. Rep. Will Stapp (R-Fairbanks), the prime sponsor of HJR 11 said "This resolution recognizes the tremendous efforts of the people of the North Star Borough to come into compliance, only to have the EPA change the regulations they previously set." The resolution also expresses concern that the United States EPA seems intent on turning attention toward so-called greener sources of heat, including electric heat pumps that will not work as solutions in the Fairbanks North Star Borough. The resolution highlights the need for adequate and affordable sources of heat in harsh subarctic winter conditions. The resolution urges the United States EPA to develop a woodstove certification program that the state DEC and residents of the Fairbanks North Star Borough nonattainment area can rely on to address the core threat to clean and healthy winter air in Fairbanks and urges the state DEC to develop an economically and legally defensible state implementation plan.

Episode 56B N

Michigan, East Lansing

RAWSEP View: Those who are "breathing compromised" are any humans who inhale wood smoke. Humans with common sense are those who are trying to avoid the risk to human health of wood burning PM2.5 emissions. In Michigan, it will be a popular policy to offer smokeless campgrounds by 2024. Since air moves and wood smoke travels in the air, RAWSEP thinks that all existing opportunities to pollute with wood smoke should end in Michigan campgrounds.

DNR to offer smokeless campgrounds in future - Upper Michigan's Source
Upper Michigan's Source
Wood burning fires release lingering fine particles into the air. ... people who have health risks and those who are trying to avoid smoke risks.
Edited by RAWSEP for brevity and clarity.
EAST LANSING, Mich. (WLUC) The Michigan DNR is considering making new 'smokeless' campgrounds to accommodate those who are breathing compromised. Wood burning fires release lingering fine particles into the air. To combat that, the new areas will have no fire pits at all. Rather than converting existing sites to smokeless, the DNR says they are looking to create campgrounds that are specifically made to be smokeless. "We know that there are people in existing locations that already have campfires," said the DNR Parks and Recreation resources section chief. "we're probably looking at adding to the inventory, as opposed to removing existing opportunities (to burn wood)." Though they are still in the planning stage, the DNR is working on getting these sites ready for the 2024 camping season.

Montana, Seely Lake.

RAWSEP View: PurpleAir PM2.5 monitors are being used in a rural setting, with backup SD cards if rural internet proves unreliable. Old wood stove replacement by other wood stoves does not solve the problem of particulate pollution. Wood burning in any stove produces more pollution than coal burning and 450 times the pollution of natural gas burning for home heat. Wood stove use should be banned, since there are alternatives now, with generous subsidies, for heat pumps that can work at temperatures well below zero, which can be powered by wind, geothermal or solar, which are now cost-effective sources of electricity, perfect for a modern electric grid. The article following describes how a graduate student plans to collect PM2.5 data using PurpleAir PM2.5 monitors, in rural Seely Lake, Montana. This evidence of PM2.5 pollution could best be used to pinpoint the source of the PM2.5 pollution and shut down residential wood stove use in rural Seely Lake. The PM2.5 sensors need to be close enough to the wood stove pollution, hyper-localized, to detect PM2.5 levels that affect the health of near neighbors.
Until there is reliable rural internet, backup of data with SD cards in PurpleAir PM2.5 monitors is needed. This is an example of how PurpleAir PM2.5 monitors can work, even in a rural setting with an unreliable internet connection. PurpleAir PM2.5 monitors are being used in Seely Lake, Montana to monitor air quality in the resort community. The data appears on PurpleAir online maps, and can be downloaded everywhere, including in Missoula, Montana, 52 miles away, at times when the internet is reliable in Seely Lake. The Missoula City-County Health Department is going to use the data. The graduate student found "five to 15 homeowners or businesses willing to have the innocuous PurpleAir monitors, which are actually white, installed on their property. Then (the graduate student created) a study protocol, or design framework, that can be passed along for others involved in this two-year study." A good Wi-Fi connection, the graduate student said, is valuable for data collection in real time. But, she added, the sensors do have SD cards, so they are still collecting data even if the internet connection goes down. "I'll just have to go up to Seeley and manually download the data if they stop working," she said. "We have a lot of possibilities to make this work." Seeley Lake sits in a narrow valley, making it prone to air inversions made worse from particulate matter PM2.5 in the smoke from older wood-burning stoves. In a largely ineffective effort to reduce particulate matter, particulate matter was only reduced 50%, when the county embarked on an ambitious stove replacement program in 2012, changing out 164, or nearly 90%, of existing stoves in the community with cleaner burning devices. A permanent monitoring station, located at the Seeley Lake Elementary School, continues to show a 50% improvement in particulate matter at that location. The new study aims to see if this improvement is community-wide." We think most neighborhoods will meet particulate standards now," a Health Department official said. "But we want to find out if it's distributed more evenly or if one neighborhood is having trouble. This is important because particulate pollution does impact people's health."

UM Student Wrangles Wi-Fi to Study Air Quality in Popular Resort Town - University of Montana
University of Montana
Seeley Lake sits in a narrow valley, making it prone to air inversions made worse from particulate matter in the smoke from older wood-burning ...
Edited by RAWSEP for brevity and clarity.

SEELEY LAKE– A University of Montana graduate student spent several weeks this spring semester diligently hunting for strong internet connections in Seeley Lake, Montana. Her search for a robust link had nothing to do with taking an online class or watching a favored social media channel, but was needed for a capstone project she is conducting, which will help the Missoula City-County Health Department study air quality in the resort community 52 miles northeast of Missoula. The Wi-Fi she explains is needed to transmit data from small air quality monitors, called PurpleAir, from Seeley Lake homes and businesses to Missoula. After several attempts she and her supervisor, an air quality specialist for the Missoula City-County Health Department, finally found success. “Last week we were able to get a sensor up and running at a location we tried several times before,” Cram reported. “We can’t figure out why it worked this time, but we are happy it did! This gave us a green light to reach out to the other volunteers who are letting us install the sensors on their property.” Such trial-and-error is one of many valuable lessons learned by UM students through capstone research projects. Seeley Lake sits in a narrow valley, making it prone to air inversions involving particulate matter in the smoke from older wood-burning stoves. To reduce particulate matter, the county embarked on an ambitious stove replacement program in 2012, changing out 164, or nearly 90%, of existing stoves in the community with cleaner burning devices. A permanent monitoring station, located at the Seeley Lake Elementary School, continues to show a 50% improvement in particulate matter at that location. The new study aims to see if this improvement is communitywide. “We think most neighborhoods will meet particulate standards now,” Schmidt said. “But we want to find out if it’s distributed more evenly or if one neighborhood is having trouble. This is important because particulate pollution does impact people’s health.” Contact: Dave Kuntz, UM director of strategic communications, 406-243-5659, dave.kuntz@umontana.edu.

Ohio, Columbus

RAWSEP View 1: The maker of one type of PM2.5 monitor, IQAir’s report on the state of Columbus, Ohio’s air is being attacked by both the Ohio EPA and Mid-Ohio Regional Planning Commission. However, in response to the IQAir report, more government owned regulatory PM2.5 monitors have been installed in Ohio.
RAWSEP View 2: Residential wood burning as a source of PM2.5 pollution is not mentioned in this article, unless wood burning is glancingly referred to as “energy creation”. Columbus, Ohio needs more PM2.5 monitors, because Columbus, Ohio needs to become less polluted, and needs real data to come up with real solutions to Columbus’ pollution problem. If the IQAir conclusions are true about Columbus pollution, the Ohio EPA and Mid-Ohio should face reality and deal with the problem. But it is true more monitors are needed, to scientifically pinpoint the sources of pollution in Columbus. From the article below, the messenger, IQAir, is being blamed for publicizing the (true) message that PM2.5 pollution in Columbus, Ohio is high. “The Ohio EPA and the Mid-Ohio Regional Planning Commission are pushing back on the IQAir conclusions about Columbus, but the IQAir company is defending its methodology.

Episode 56B O

An IQAir representative said government regulatory monitors in Columbus haven’t been painting an accurate picture of the amount of PM 2.5 in the air because there aren’t enough in operation. “What gets measured gets done,” she said.”
RAWSEP View: Accurate, low-cost resident-owned PM2.5 monitors such as PurpleAir, which are put on U S AirNow maps of Smoke and Fire alongside $100,000 standard E P A monitors, are correlated to standard monitors with a simple mathematical formula. Fog or mist does not affect PM2.5 readings, since fog is water droplets not particulate matter, so this M O R P C argument is absurd. But a Mid-Ohio Regional Planning Commission (M O R P C) sustainability officer said lower-cost monitors have problems. “We've seen more than once where there's been foggy or misty conditions, and that did cause all of those purple air sensors to read a lot higher levels of pollution, which didn't compare to what our regulatory monitors were reading,” the MORPC representative said. IQAir pushes back on that. “We validate and calibrate data… So, we throw out what's called anomalies. And we calibrate based on different factors, meteorology factors like relative humidity and also dew point, which can affect optical sensors that we have, which are low-cost sensors,” the IQAir representative said.
RAWSEP View: Hyper-localized areas, such as yards of near neighbors of residential wood burners, need to be monitored hyper-locally, with sensors close to the source of PM2.5 pollution in order to accurately detect unsafe levels of PM2.5
The IQAir representative said the Ohio EPA network may be collecting enough data to be compliant with the Clean Air Act, but it still leaves big portions of town unmonitored. She said IQAir’s data goes a step further and provides a

“complete set of validated air quality data,” which allows “private citizens and community organizations to fill the data gaps in their communities.”
RAWSEP View: Although IQAIR has a financial interest in monitoring air quality, as all manufacturers of PM2.5 monitors do, IQAir’s assertions about the accuracy and usefulness of IQAir PM2.5 monitors are correct.
RAWSEP View: Monitoring with more PM2.5 monitors, alone, will not solve the problem of air pollution, but will pinpoint the sources of air pollution and make solutions possible. RAWSEP believes one of these solutions is banning residential wood stoves. RAWSEP believes this additional monitoring could be done well with more, and more hyper-localized, PurpleAir PM2.5 monitors or more, and more hyper-localized, IQAir PM2.5 monitors.

Does Columbus really have the most polluted air among all major U.S. cities? | WOSU News
WOSU News - WOSU Public Media
PM 2.5, or particulate matter 2.5, is small bits of matter created during combustion, through the burning of fossil fuels in vehicles, ...
Excerpts edited by RAWSEP for brevity and clarity.
A new international air quality monitoring report is making some big claims about pollutants in Columbus. It claims that out of the United States’ most major cities, Columbus has the highest concentration of the “worst” type of air pollution, known as PM 2.5.
PM 2.5, or particulate matter 2.5, matter of 2.5 micrometer size created during combustion, through the burning of fossil fuels in vehicles, manufacturing and energy creation. PM 2.5 accounts for about 95% of the total pollutants typically detected. PM2.5 can enter the bloodstream and lead to numerous health problems, and worsen existing health issues like asthma. “PM 2.5 kills people on the planet more than any other pollutant. So it is the most important pollutant that we look at, because it is the most impactful health wise,” said the CEO of IQAir’s North American division in California. The Ohio EPA and the Mid-Ohio Regional Planning Commission (M O R P C) are pushing back on the IQAir conclusions about Columbus, but IQAir is defending its methodology. The IQAir representative said regulatory monitors in Columbus haven’t been painting an accurate picture of the amount of PM 2.5 in the air because there aren’t enough in operation. “What gets measured gets done,” she said. A map the Ohio EPA provided shows two regulatory monitors in the Columbus region, both on the outskirts. One is near Dublin at Smoky Row Road and Interstate 270, the other is in New Albany, at New Albany High School. A 2021 Ohio Air Quality Report issued by the Ohio EPA shows data from a total of four locations. IQAir admits there are plenty of other cities more polluted with PM 2.5 than Columbus, in and out of Ohio. But, out of the country’s major cities, the IQAir representative said, Columbus has the most. “Usually, Los Angeles is up there. But Columbus beat Los Angeles,” she said.
The IQAir representative said 10 of the 15 worst off cities in the U.S. are in California, and the state is considered the most polluted.
The IQAir report shows the number for PM 2.5 coming in at 13.1 micrograms per cubic meter of air, just above the 12 micrograms per cubic meter the U.S. deems safe, while state reports show averages coming in between 7 and 10 micrograms per cubic meter. The figures are all above the 5 micrograms per cubic meter limit the World Health Organization recommends. The Ohio EPA representative points out IQAir sells air quality sensors. At M O R P C, the sustainability officer has her doubts about the report, too. “We have some concerns about the methodology that characterizes Columbus's air pollution. For one, the report collects access data from both the regulatory grade monitors and the low-cost sensors, which can operate very differently. Combining the data from both of these can be challenging and misleading,” she said. The Ohio EPA representative said the placement of the sensors is also very important, and it’s unclear if IQAir followed U.S. EPA guidelines for the placement of their sensors. A representative of IQAIR said IQAir has a network of 30 sensors to track the particulate, using sensors and monitors of different grades, including low-cost sensors known and high-grade ones like the ones used by governments. The company argues they can get a better picture of PM 2.5 because they have many more monitors in place than the Ohio EPA. She said their sensors have been tested and found to be accurate. But the M O R P C representative said lower-cost monitors do have problems. “We've seen more than once where there's been foggy or misty conditions, and that did cause all of those purple air sensors to read a lot higher levels of pollution, which didn't compare to what our regulatory monitors were reading,” a MORPC representative said. IQAir pushes back on that, though. “We validate and calibrate data… So, we throw out what's called anomalies. And we calibrate based on different factors, meteorologist factors like relative humidity and also dew point, which can affect optical sensors that we have, which are low-cost sensors,” an IQAir representative said. An IQAir representative said the Ohio EPA network may be enough to be compliant with the Clean Air Act, but it still leaves big portions of town unmonitored. She said IQAir’s data goes a step further and provides a “complete set of validated air

quality data," which allows "private citizens and community organizations to fill the data gaps in their communities." An associate professor in Ohio State University's Department of Civil, Environmental and Geodetic Engineering, said regulatory monitors do provide more accurate data than low-cost sensors, but said more data would lead to a more comprehensive view of air pollution in Columbus. "I think a lot of other larger US cities have more EPA monitors that are actually tracking what's in the air," the professor said. "Columbus is somewhat underrepresented in terms of regulatory measurements which influence the results to some extent." The Columbus Climate Adaptation Plan, created by Ohio State University's Byrd Polar and Climate Research Center, the city and M O R P C, appears to back the idea that the area could use more air quality monitoring. The IQAir report called for monitoring and states "traditional estimates of citywide air pollution based on a few select measurements are inaccurate." Following that report, MORPC and Franklin County Public Health created a new, 20-sensor network using both low-cost sensors and regulatory sensors. The first report from that effort is expected to be released sometime in June. The MORPC representative said people who are concerned about air quality can check their air quality forecasts so they can avoid strenuous, outdoor activity when conditions are bad.

Episode 56B P

Continuation of a Columbus, Ohio article.
RAWSEP View: Mid-Ohio Regional Planning Commission, which is critical of IQAir low-cost sensors in comparison with standard $100,000 Environmental Protection Agency (E P A) sensors, has an acronym of M O R P C. However the low-cost sensors are correlated with EPA standard sensors with a simple mathematical formula. The E P A is a federal organization, and E P A operates online Airnow Maps of Smoke and Fire where low-cost PurpleAir PM2.5 sensor data, often resident-owned sensor data, and $100,000 standard E P A PM2.5 sensor data is placed side-by-side on the Smoke and Fire Map to inform the public of PM2.5 pollution levels in their areas, across the nation.

"M O R P C offers air quality forecasts in the region, for ozone and particulate matter pollution. IQAir and the EPA also have monitoring services.

Pennsylvania, Westmoreland County, East Huntington Township

Wood-burning stove sparks fire at Westmoreland County home, no injuries reported
CBS News
Firefighters determined a wood-burning stove caused the flames. ... and at one point, there was smoke everywhere as six different units fought to ...
Excerpts edited by RAWSEP for brevity and clarity.
April 1, 2023. CBS Pittsburgh.
Fire crews from several municipalities battled a house fire. It was a difficult morning for residents in East Huntingdon Township as fire ripped through this house around 8 a.m. Crews responded to the house, which was fully engulfed in flames. Neighbors said the fire woke them up, and at one point, there was smoke everywhere as six different units fought to put out the blaze. The East Huntingdon Fire Chief said that the fire was started by a wood-burning stove in the living room and that no one was in the home at the time of the fire. No first responders were injured in the fight. West Penn Power was on the scene, and they said that no power was running to the house when the fire started. While the cause of the fire is known, Chief Kite said that they have not been able to contact the homeowner and are not entirely sure who was living in the home at the time.

United Kingdom

U K, Southampton

RAWSEP View: 18 Zephyr PM2.5 monitors from Earthsense are being used in Southampton. The data feeds into EarthSense's MappAir air quality model, which also includes datasets from the Department for Environment, Food and Rural Affairs' (Defra's) Automatic Rural Networks. This provides visualizations of emissions and PM2.5 dispersion via a public-facing website. A statement from EarthSense said the system will "pinpoint the various sources of particulate

pollution through source apportionment of wood-burning, transport and background emissions." In Southampton more "sustainable" alternatives to residential wood burning are encouraged.

UK city uses data to raise awareness of wood burner pollution - Cities Today
Cities Today
Southampton City Council is using data from air quality monitors to show the pollution from wood-burning stoves and fires and encourage people to ...
U K city uses data to raise awareness of wood burner pollution.
March 29, 2023.
Excerpts edited by RAWSEP for brevity and clarity.
Southampton City Council is using data from air quality monitors to show the pollution from wood-burning stoves and fires and encourage people to choose more sustainable ways to heat their homes. Photo of Zephyr monitor from EarthSense. Home wood-burning causes 21 percent of PM2.5 emissions in the UK, despite the fact only around eight percent of UK households burn wood at home. PM2.5 has been linked to heart and lung disease and other health conditions. Sales of wood burners have increased as energy prices have soared. According to a report last year from the European Public Health Alliance, air pollution from wood-burning in homes is responsible for £0.9 billion (US$1.1 billion) a year in health-related damages in the UK and €9 billion (US$9.7 billion) across the EU. Southampton is installing 18 Zephyr monitors from EarthSense in residential areas and neighboring local authority areas, to gather near real-time measurements of PM2.5. The project has been set up over four focus areas, some of which have smoke control in place, where there is a high prevalence of domestic burning. The data feeds into EarthSense's MappAir air quality model, which also includes datasets from the Department for Environment, Food and Rural Affairs' (Defra's) Automatic Rural Networks. This provides visualizations of emissions and PM2.5 dispersion via a public-facing website. EarthSense said the system will "pinpoint the various sources of particulate pollution through source apportionment of wood-burning, transport and background emissions." The initiative is part of a campaign on wood-burning with local charity the Environment Centre with Southampton, The New Forest, Eastleigh and Winchester and follows an air quality grant that Southampton received from DEFRA. Air Quality Projects Lead at Southampton City Council, commented: "We recognized that the wood-burning engagement project with a network of monitors would capture PM fractions in more residential areas." "The EarthSense Zephyr monitors plug this gap in our monitoring and give us local data to use when engaging with residents to highlight how wood-burning is affecting their health and the health of their community. The MappAir model has helped residents know what air quality is like in any area of the city." Via the website, council staff and residents can download air quality data, set alerts, and view 72-hour air pollution forecasts. EarthSense said: "The evidence is clear that wood-burning smoke emissions are harming human health. Fine particulate matter from domestic burning is a transboundary issue, meaning once we light a fire to heat our homes it goes further than our own exposure. It affects people living nearby and those living with health challenges, such as asthma and COPD, as it travels through the air and infiltrates their environment too. "We can bring a joined-up approach to educate members of the public about why moving away from wood-burning stoves is crucial for cleaner air quality." New rules recently implemented by London Mayor Sadiq Khan mean that wood-burners will effectively no longer be allowed in new and refurbished homes in London.

Europe

Sweden

RAWSEP View: The modifiable risk factor for long COVID, is air pollution. PM2.5 air pollution can be reduced by banning residential wood burning, since wood burning smoke is 90% PM2.5

PM2.5 and Health Effects
Risk of Long COVID Increases with Air Pollution - HCPLive
HCPLive
New data demonstrate a concerning link between particulate matter ≤2.5 µm exposure and the risk of prolonged symptoms of COVID-19 in young ...
Excerpts edited by RAWSEP for brevity and clarity.

A new study published in the Lancet Regional Health found a positive association between ambient air pollution and long COVID among young adults in Sweden suggesting ambient long-term particulate matter of 2.5 micrometer size (PM2.5) exposure may pose a risk to this population. These findings support the need for continuous improvement of air quality, investigators wrote. Persistent COVID-19 and PM2.5 Air Pollution.
To examine the ambient air pollution level, particulate matter less than 10 micrometer in size (PM10), black carbon (BC), and nitrogen oxides (NOx) were assessed along with PM2.5. Estimations were made with individual-level addresses and dispersion modeling conducted by the team of investigators led by a researcher at the Institute of Environmental Medicine, Karolinska Institute. A total of 116 (15.4%) of the 753 participants with SARS-CoV-2 infection included in the study, reported having long COVID. The most common symptoms were altered smell or taste (10.6%), dyspnea (labored breathing) (4.8%), and fatigue (4.5%). Following infection, individuals typically continue to experience fatigue, chronic cough, and altered smell and taste, which can affect them for several months. Investigators emphasized the necessity of ongoing initiatives to improve air quality and reduce air pollution, in order to reduce the burden of long COVID risk, particularly for this population. “These findings shed light on the complex pathogenesis of long-term post-COVID-19 symptoms and ubiquitous adverse health effects of air pollutants,” the team wrote.

Episode 56B Q

Continuation of article about Swedish study linking PM2.5 and long COVID.

“Since ambient air pollution is a modifiable risk factor through national or regional public health regulations as well as individual interventions, our results support the broad public health benefits of continuous efforts to reduce ambient air pollution levels.”

Asia

Bangladesh, Dhaka

RAWSEP View: Dhaka's brick kilns use coal and wood to fire bricks from clay. The second highest concentration of PM 2.5 levels is found near brick kilns, fueled by wood burning, in Greater Dhaka, which is 136% above the WHO Air Quality Guidelines (AQG). In Dhaka, Bangladesh, a child is born underweight, as are thousands of babies, because of air pollution. A World Bank March 2023 study said Bangladesh air pollution accounts for 20% of all premature deaths.

Air pollution adversely affects expectant women in Bangladesh
Anadolu Agency
The fine particulate matter (PM 2.5) at these sites is on average 150% higher than the WHO Air Quality Guidelines (AQG). Air pollution adversely affects expectant women in Bangladesh. Air pollution causes multiple health problems for women in Dhaka, most serious of which are underweight birth, premature birth, and high newborn mortality.
March 30,2023.
https://phys.org/news/2019-12-bangladesh-brick-kilns-toxic-smog.html
Bangladesh brick kiln’s toxic smog, December 2019

Edited by RAWSEP for brevity and clarity.
Her son was born underweight, as were thousands of other babies in Dhaka, Bangladesh's capital, due to one reason – air pollution. "My doctor was always concerned about my healthy breathing during the pregnancy because Dhaka air is unhealthy," the mother said. Bangladesh air pollution accounts for 20% of all premature deaths in the country, according to the World Bank's latest report released on Tuesday. The World Bank stated in its previous report published in December last year that the second highest concentration of PM 2.5 levels is found near brick kilns in Greater Dhaka, which is 136% above the WHO Air Quality Guidelines (AQG), it added. Air pollution causes multiple health problems for city residents, the most serious of which are underweight birth, premature birth, and high newborn mortality.
Polluted air or the presence of particles in the air reduces the human capacity to inhale oxygen. If pregnant mothers do not get enough oxygen, it directly affects the babies. According to a gynecologist, breathing unhealthy air or getting less oxygen causes metabolic disorders, hypertension, and reduces the woman's fertility and ability to give birth to healthy babies.

Thailand

RAWSEP View: Burning of farmlands, also known as agricultural burning, is the cause of most forest fires in Thailand. This is human caused, anthropogenic air pollution, as is residential wood burning in other parts of the world. Raging forest fires in northern Thailand are threatening to worsen the country's air pollution, which has sent nearly 2 million people to hospitals with respiratory illnesses since the beginning of the year. The Thai Prime Minister has directed lawmakers to go after perpetrators of forest fires and there are laws in place curtailing agricultural burning. But the problem is most of these restrictions are ignored. For farmers, burning their plot is often the easiest and cheapest method to clear land. The forest fires affect air quality in Thailand, Myanmar and Laos, in what is called trans-boundary haze. IQAir monitors the situation. Thais are urged to wear respirators when outside.

Thai forest fires worsen pollution that's left 2 million ill | The Japan Times
The Japan Times
Prime Minister Prayuth Chan-ocha has ordered urgent steps to put out forest ... as PM 2.5 in some areas past the threshold into a hazardous zone.

Excerpts edited by RAWSEP for brevity and clarity.
Thai forest fires worsen pollution that's left 2 million ill. A forest fire northeast of Bangkok, on March 31, 2023. Raging forest fires in northern Thailand are threatening to worsen the country's air pollution, which has sent nearly 2 million people to hospitals with respiratory illnesses since the beginning of the year. The Thai Prime Minister on Thursday ordered urgent steps to put out forest fires in Nakhon Nayok province to the east of Bangkok and those in the country's northern region including popular tourist destination Chiang Mai and Chiang Rai, according to a Thai government spokesman. Firefighters and other officials have been deployed to monitor the affected areas, as burning of farmlands and illegal foraging occur during this time of the year. Several wildfires are also reported from protected forests in Thailand's north, with several hotspots across the borders in neighboring Myanmar and Laos, a satellite heat map by a Thai space agency showed. The wildfires are the latest cause for the worsening air quality in Thailand that's pushed levels of particulate dust particles known as PM 2.5 in some areas past the threshold into a hazardous zone. Bangkok and other Thai cities have grappled with poor air quality in recent years, with pollution tending to get worse in the dry season around December to February due largely to agricultural burning in Thailand and neighboring countries, and vehicular emission. The Association of Southeast Asian Nations was urged on to take steps to tackle the trans-boundary haze situation that stems mainly from hotspots across the region. Chiang Mai was ranked as the world's most polluted city by air quality monitor IQAir, with a "very unhealthy" PM2.5 concentration reading. Its neighboring province Chiang Rai had a "hazardous" reading for most of the last seven days, IQAir data showed. Eight provinces in Thailand's north were being monitored for dangerous levels of air pollution, which is expected to last until early April and normalize in May. Patients with air pollution-related diseases in Thai hospitals have spiked to more than 1.73 million between Jan. 1 and March 19 this year. Thais are urged to stay indoors as much as possible or wear respirators when outside, he said.

Thailand's extreme air pollution: 'I feel sorry for my daughter' - BBC News
BBC
Exposure to PM 2.5 dust can cause burning and itching in the eyes and skin, as well as coughing and chest tightness. These symptoms can be amplified ...

Thailand's extreme air pollution: 'I feel sorry for my daughter'.
March 30, 2023.
For the past few weeks, a Thai father has painstakingly explained to his four year-old daughter that the yellow cloud they see outside their window - which has tickled her imagination - is actually a danger to her health. It's a scare that has gripped northern Thailand where millions of people are currently finding it harder to breathe.
Widespread farm burning and forest fires have created a smog that's even thicker than usual, which is choking communities and exposing them to respiratory disease. In the tourist-favored Chiang Rai province, and even the capital Bangkok, people have been on edge checking the air quality levels every day. "I feel very sorry for my daughter," "As a child she doesn't know. She thinks that it's natural fog. But the truth is a poisonous mist." The girl is under strict orders to stay at home, but even indoors and with an air purifier whirring away, the air quality is compromised. Drone footage

captures thick smog choking Chiang Rai. At a Thailand hospital, a pediatrician fears for newborns who are exposed to the air pollution. Babies can't wear face masks, and even with a purifier machine, the air in the nursery can be hazardous. "[It's sad] newborn children have to encounter pollution like this. Their lungs are just starting to work,". Thailand's air pollution is an issue each year in the dry season - which typically runs from November to March - mainly due to seasonal burning from farmers clearing their sugarcane and rice fields. But the smog has been particularly bad this year. In the first nine weeks of the year, more than 1.3 million people had already suffered air pollution-related diseases. Nearly 200,000 of these cases were reported in the first week of March - when the haze had started to worsen. The levels of the hazardous PM 2.5 particles have also soared. PM1.5 are particulates small enough to be breathed into lungs and to even enter bloodstreams. Exposure to PM 2.5 dust can cause burning and itching in the eyes and skin, as well as coughing and chest tightness. These symptoms can be amplified for those who have pre-existing heart or lung conditions. Fire trucks were deployed to blast water into the air to clear the dust.

Episode 56B R

Continuation of article about Thai PM2.5 pollution from agricultural burning, crossing boundaries between nations.

On Monday, about 200 people in the Chiang Rai district of Mae Sai protested outside a local government office demanding that authorities take action. "Nowadays, people live in misery. Both young and old, living in hardship," said one of the demonstrators, Local protesters this week wearing masks. The day of the protest, the air quality in parts of Chiang Rai was nearly 125 times over the limit deemed safe by the World Health Organization. Protesters said Thailand should negotiate with Myanmar and other neighboring countries where agricultural burning has contributed to the smog. Satellite data showed that many of fire hot spots were located in Myanmar, followed by Laos. Fires were also spotted in Cambodia and Vietnam. However a majority of the pollution still comes from closer sources. The Thai Prime Minister has directed lawmakers to go after perpetrators of forest fires and there are laws in place curtailing agricultural burning. But the problem is most of these restrictions are ignored. For farmers, burning their plot is often the easiest and cheapest method to clear land.