

Episode 56AA thru 56AE

Ep 56AA Japan, Arizona thru Connecticut Ep 56AB Indiana thru Pennsylvania Ep 56AC Vermont thru Wisconsin 1 of 2 Ep 56AD Wisconsin 2 of 2, U K, Asia, Small Wind Turbines 1 of 2 Ep 56AE Small Wind Turbines 2 of 2

Episode 56AA March 20, 2023, The Scientific Method in Service of Public Health Issue

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).

Japan's Disclosure of PM2.5 emissions at the stacks of Biomass (Wood) Burning Plants.

RAWSEP View: Japan is unique among the nations of the United Kingdom and the European Union: Japan now discloses counts of Particulate Matter of 2.5 micrometer size (PM2.5) emissions at the stacks of Japan's Biomass (Wood) Burning Plants. Wood burning is 90% PM2.5 Not counting, or hiding the count, of emissions from wood burning can continue to be practiced in the United Kingdom and the nations of the European Union. Transparency and dealing with real facts of PM2.5 pollution is the first step toward real, not paper, attainment of each nation's Climate Goals. That transparent step has not yet been taken by the United Kingdom and the European Union. The downside to this is that Japan has to count and disclose PM2.5 emission levels at Japan's Biomass (wood) burning plants, but Japan does NOT have to incorporate those wood smoke PM2.5 emission counts into Japan's count of total PM2.5 levels from other (including Fossil Fuel) sources for use in attaining Japan's Climate Goals. The basis of Japan's Climate Goals continues to be unrealistic, since wood burning produces more PM2.5 particulates than the most particulate polluting Fossil Fuel, Coal and produces 450 times the particulate pollution of the cleanest Fossil Fuel, natural gas. Coincidentally, according to The Week (March 24, 2023 issue, page 17), a news aggregator publication, "(In studies about viral transmission by the Cochrane Organization, two studies about mask use during the Covid era, in Indonesia and Bangladesh) "Both (studies) found that masks helped (prevent transmission of Covid)". "Aerosol studies showed that well-fitted N95s and KN95s block 90 percent of airborne viral particles. Real world proof of (the efficacy of N95 and KN95 masks) comes from Japan, which emphasized wearing masks and had one sixth of the Covid death rate of the U S . The science is clear that masks work". Congratulations to Japan for following the science in responding to these two public health challenges, Covid and Particulate Pollution, although only a small step has been taken by Japan in the case of PM2.5 pollution. Reference:

[Japan, EU, UK biomass emissions standards fall short, full of loopholes: Critics - Mongabay](#)

Mongabay

Imported wood pellets in the U.K. waiting to be burned at Drax, a former coal burning power plant converted to forest biomass. Image by DECCgovuk via ...Mongabay Series: [Covering Climate Now](#), [Covering the Commons](#), [Planetary Boundaries](#)

Japan, EU & UK biomass emissions standards fall short and are full of loopholes, critics say

United States

RAWSEP View: Not using the most current term, PM2.5, confuses the general reader. Don't use the terms dust, soot, etc. when you mean PM2.5, the recognized and most descriptive term for this size of particulate matter. Residential wood smoke is 90% PM2.5, Particulate Matter of 2.5 micrometer size, the perfect size to infiltrate the human lung, causing a cascade of human health problems.

[How Dust Affects the World's Health - NASA Earth Observatory](#)

NASA Earth Observatory

Doctors and public health experts agree that breathing fine particulate matter (PM2.5) can be harmful to human health. [Air pollution below safe levels in 99% of planet's land surface, new study shows](#)

Travel Tomorrow

About 99.82% of the world's land surface is exposed to levels of particulate matter 2.5 (PM2.5), which are particles that scientists have linked ...

[CGTN on Twitter: "The 24-hour concentration of PM 2.5 is considered unhealthy when it ... - twitter.com](#)

[Full Coverage](#)

[Healthy Planet, Healthy You: March 2023 Climate News To Know | mindbodygreen](#)

MindBodyGreen

... to common pollutants like nitrogen dioxide and particulate matter in ... found that only 0.18% of the global land area has levels of PM 2.5, ...

[Most polluted cities and countries in the world, according to IQAir - CNBC](#)

CNBC

IQAir measured air quality levels based on the concentration of lung-damaging airborne particles known as PM 2.5. The report found that the top ...

[Most polluted cities and countries in the world, according to IQAir - Vigour Times](#)

Vigour Times

IQAir measured air quality levels based on the concentration of lung-damaging airborne particles known as PM 2.5. Research shows that exposure to ...

[10 US cities with the worst air quality revealed by study | Washington Examiner](#)

Washington Examiner

The company measured the concentration of PM 2.5 — lung-damaging airborne particles — in the air. The WHO recommends anything below five.

Arizona, Phoenix homeless wood burning around a small business.

<https://www.nytimes.com/2023/03/19/us/phoenix-businesses-homelessness.html>

New York Times

Phoenix Businesses, Homelessness

Excerpts

offering them food and firewood. he could see a half-dozen men pressed around a roaring fire. lit fires for warmth that burned down palm trees and scared away customers. "It's a fire the size of my house. My customers are trying to eat, and they can't even breathe.". at least 1,097 calls for emergency medical help, 185 fires. That would mean sending the Fire Department, and lately firefighters had been harassed or assaulted so often within the encampment that they typically responded with a police escort. The remains of a 20-to-24-week-old fetus were burned and left next to a dumpster in November. returned to recover on a molding mattress in a partly burned tent.

Connecticut, Wallingford

[Wallingford Wood-n-Tap closed after kitchen fire - Record-Journal](#)

Record-Journal

The blaze was extinguished relatively quickly, causing minor smoke damage to the kitchen. No injuries were reported at the scene. "It was nothing too ...

WALLINGFORD — The fire department responded early Saturday morning to a fire at Wood-n-Tap bar & grill, 970 N. Colony Rd.

Responding to a fire alarm on the premises at around 3 a.m, firefighters forced entry into the kitchen area which had caught fire. The blaze was extinguished relatively quickly, causing minor smoke damage to the kitchen. No injuries were reported at the scene.

"It was nothing too extensive," Battalion Chief Kris Sundwall said. "It was isolated to that area of the kitchen."

The cause of the fire is under investigation by the Fire Marshal's office.

Wood-n-Tap is a chain restaurant with multiple locations around the local area. The manager could not be immediately reached Saturday. An outgoing phone message states that the Wallingford location will be closed this weekend due to the fire.

Episode 56AB

Indiana, Gary

[Region's industrial core listed as air pollution hotspot; Gary revives Air Pollution Committee](#)

The Times of Northwest Indiana

PM 2.5 accounts for most air pollution-related health impacts in the U.S.. The Guardian report found that a central section of Indianapolis had the ...

GARY — Brenda Scott-Henry told the audience to "drive down 94, not as a driver but as a passenger, close your eyes and you'll know when you get to certain exits because you can smell the diesel."

Interstates 94, 65 and 90; U.S. 12 and 20 — every day, hundreds of thousands of cars and trucks travel the many highways that crisscross the Crossroads of America. While most vehicles simply pass through, the pollutants they leave behind have long-lasting environmental impacts.

According to a recent [Guardian analysis of research from the University of Washington and Virginia Tech](#), the Northwest corner of Indiana and the South and West sides of Chicago have some of the worst air pollution in the country. The study looked at fine particles of air pollution called PM 2.5. Emitted by industrial operations, vehicles and wildfires, [PM 2.5 particles are small enough](#) to make it into the deepest part of the lungs and into the bloodstream.

Kentucky, Caldwell County

[Workshop Damaged in Caldwell County Fire | WPKY 103.3 FM - 1580 AM](#)

WPKY 103.3 FM

Chief Francis said he suspects that a woodburning stove inside the building was the source of the fire. According to Chief Francis, the home near ...

Michigan, Escanaba

[1 firefighter injured in garage fire in Escanaba - Upper Michigan's Source](#)

Upper Michigan's Source

Officers say they observed heavy smoke coming from the garage when they ... and cardboard along the wood stove near the motor home's exhaust pipe.

Minnesota, St. Louis County

RAWSEP View: The article below is about a Minnesota residential wood stove manufacturer who wants to sell polluting wood stoves, even though the Environmental Protection Agency (E P A) has revoked certification of those polluting wood stoves. Even though the Office of the Inspector General (O I G), "watchdog" of the E P A, pointed out in the O I G February 2023 report that the wood stove testing methods of the E P A were so defective that they did not catch polluting wood stoves, and instead certified them, the E P A determined that this particular wood stove manufacturer's stoves were so polluting that they were NOT certified by the E P A. The O I G did not think more polluting wood stoves should be certified, the O I G thought that polluting wood stoves should NOT be certified, whether their pollution was caught (in this instance, the pollution was caught) or not. The manufacturer below is like a drunk driver who failed the sobriety test, but because other drunk drivers were not given the test, this drunk driver wants to continue driving. Acting as its own lobbyist, the residential wood manufacturer is concerned about its own profits declining from being prevented from selling polluting wood stoves, rather than concern for the health of near neighbors of residential wood stove users.

[Investigation raps EPA's wood burner testing - The Timberjay](#)

The Timberjay

REGIONAL— The Environmental Protection Agency's testing program for wood stoves and other wood-burning devices is ineffective and is putting the ...

Excerpts edited by RAWSEP for brevity and clarity.

Investigation raps EPA's wood burner testing. Federal watchdog confirms many complaints aired by Wood Stover Manufacturer. REGIONAL— The Environmental Protection Agency's testing program for wood stoves and other wood-burning devices is ineffective and is putting the public's health at risk. That's according to the EPA's Office of Inspector General, which issued a scathing indictment of the EPA's missteps as it attempted to implement strict new emission controls beginning back in 2017.

The public health wasn't the only thing to suffer from flaws in the program. Tower-based (Minnesota wood stove manufacturer) had flirted with bankruptcy late last year after the EPA rescinded its certification to sell its Kuuma wood furnaces, despite test results that repeatedly demonstrated it was the cleanest-burning wood furnace on the market. The company, which was the first to meet the strict new emissions standards that took effect in 2020, had seen its sales

grow steadily in the wake of their certification. By the summer of 2022, with the upcoming heating season and a new federal grant program for the purchase of certified wood furnaces, the company was poised for sales like they'd never experienced before. In anticipation, the company ramped up its workforce and spent hundreds of thousands of dollars on materials.

In June of 2022, with their five-year certification period coming due, the company sent the EPA a letter indicating its wish to renew. That's when the EPA delivered their bombshell. **Due to two minor issues**, neither of which was the fault of (the Minnesota wood stove manufacturer), the company would need to repeat the entire testing program before the EPA would renew its certification. What's more, the company's certification would expire on Sept. 1, preventing them from either selling or advertising their wood furnaces. Those companies, which were initially certified two years after (the Minnesota wood stove manufacturer's) Kuuma wood furnaces, will need to re-test before they can be recertified in 2024. And that could provide (the Minnesota wood stove manufacturer) with the window for dramatic growth down the road... provided they can avoid the vagaries of the federal E P A.

New Jersey, Orange County, Greenwood Lake, and West Milford

[Firefighters Injured, Homes Damaged By Brush Blaze Overlooking Greenwood Lake](#)

Daily Voice

UPDATE: A resident conducting an illegal burn on a hill overlooking ... The resident was burning wood and debris in a fire pit when the brush ...

Excerpts

A resident conducting an illegal burn on a hill overlooking Greenwood Lake ignited a rapidly spreading brush fire. (That fire) engulfed one home, damaged two others and sent two firefighters to the hospital. The resident was burning wood and debris in a fire pit when the brush caught fire and flames spread up the hill West Milford, a little over a half-mile from the New York State border. Two firefighters were transported from the scene to a Medical Center, one with a knee injury, the other with chest pains. A third was treated at the scene for a head injury and refused further attention. The first house involved caught fire and was gutted as EMS was requested and tanker trucks were called out. The second home had exterior damage and the third sustained deck and shed damage. Firefighters from Orange County rushed to provide mutual aid. Investigators from the New Jersey State Forest Fire Service and borough detectives also quickly joined at the scene. Official action against the resident was expected.

New York

[Brush burning ban starts in New York - WCAX](#)

WCAX

Only charcoal or dry, clean, untreated, or unpainted wood can be burned. The ban runs through May 14th.

Oregon

[Weekday Wrap: Portland and regional air quality declining, report shows - OPB](#)

Oregon Public Broadcasting

... at a type of particulate pollution that hangs in the air from wood smoke. While particulate readings spike during wildfire season, ...

[Portland-area air quality getting worse, annual report card shows](#)

The Lund Report

New data released from IQAir shows smoke from wood stoves and ... the type of particulate pollution that hangs in the air from wood smoke.

Pennsylvania, Berks County (BC)

[ATSPA Raising Awareness for National Poison Prevention Week - BCTV.org](#)

BCTV.org

Keep appliances, furnaces, fireplaces, and wood-burning stoves in working order. Store Medicines and Products Properly

Episode 56AC

Vermont

[Letter to the editor: Don't burn wood to heat - VTDigger](#)

VTDigger

This measures the PM2.5 particles that go deep in our lungs and don't come out easily. When we smell the nice odor from burning wood in a fireplace or ...

Excerpts

Letter to the editor: Don't burn wood to heat

Burning wood to heat buildings is a terrible idea.

The pollution given off by wood-burning is something Vermonters don't want to talk about. We have a long tradition of cutting trees to provide heat without realizing the impacts. The air quality emitted from a wood furnace is not realized. There is no network of air quality meters around the state to measure local areas' particulate on a minute-by-minute basis, so the practice is not recognized as harmful. After all, our grandparents did it.

So, watch a website — purpleair.com — to see the days when wood burning is active. This measures the PM2.5 particles that go deep in our lungs and don't come out easily.

When we smell the nice odor from burning wood in a fireplace or stove, think of what it is we are smelling.

Virginia, Prince William County

[Safe and Effective Ways When Using Alternative Home Heating Systems](#)

Prince William County

Wood stoves, the most popular category of wood-burning heaters, causes thousands of residential fires each year. Be sure to: Install wood burning ...

Washington, Yakima

[Letter: Air quality solutions take hard data, cooperation | Opinion | yakimaherald.com](#)

Yakima Herald

The greatest emitters are vehicle traffic along I-82 and wood smoke. ... switch to hybrid or e-vehicles and reduce/eliminate wood burning devices. Letter: Air quality solutions take hard data, cooperation

Excerpts

County has marginalized air quality year-round. The greatest emitters are vehicle traffic along I-82 and wood smoke. The solutions — drive less, use cleaner diesel, switch to hybrid or e-vehicles and reduce/eliminate wood burning devices. As far as emissions from agriculture, it is the Legislature that must help define actions and regulations. To show harm and excesses, there must be data and the will to proceed by entities that regulate. Cooperation with the Yakama Nation and EPA will be essential as much of Yakima County is under that jurisdiction.

Answers are not easy. Still, knowing what's in the air matters. Local concerns matter. Let's hope this study provides impetus to achieve clean air for everyone.

Wisconsin, Madison

RAWSEP View: Benjamin Franklin did not make a comprehensive study of the adverse effects of residential wood smoke pollution PM2.5, particulate matter of 2.5 micrometer size, on human health. If Franklin had conducted such a study using PurpleAir PM2.5 monitor data, and using public health records, as many researchers do today, I have no doubt that Franklin's scientific views would have changed about any value of residential wood burning for heat rather than using clean energy sources such as solar panels. But Franklin did not make such a study. I admire Benjamin Franklin and believe, as he believed, that he was ahead of his time, the 1700's, in his use of the scientific method. Harriet Beecher Stowe was ahead of her time, the 1800's, in many admirable ways, but was not apparently ahead of her time in knowledge of the adverse effects of wood smoke pollution on human health. Looking to Franklin and Stowe to bolster arguments against solar clean energy in 2023 is like using an 1849 law to bolster arguments against abortion in 2023. We know now that residential wood burning has adverse health effects on human health because of the particulates that

wood burning produces. We know now that lack of access to abortion takes away the rights of women to make their own decisions about their own healthcare.

Particulate pollution of 2.5 micrometer size (PM2.5) is the perfect size to infiltrate the human lung, causing a cascade of human health problems and early deaths. Wood smoke is 90% PM2.5, and particulate pollution from residential wood burning affects the health and lives of near neighbors of residential wood burners. That is why PM2.5 monitors should be handed out to any Madison, Wisconsin resident who complains of wood smoke from a neighboring wood burner infiltrating their yards and into their homes. The neighbor of a wood burner could put the PM2.5 monitor in the neighbor's own yard, and the data showing exceedance of the Environmental Protection Agency (EPA) limits for PM2.5 could be evidence to enable the indoor wood stove to be shut down. After EPA's February 2023 public hearings, the EPA safe limits for PM2.5 in 2023 are expected to change to 8 micrograms per meter cubed annually and 25 micrograms per meter cubed daily. On 2/28/2023 the Office of the Inspector General (OIG), the "watchdog" for the EPA, issued a report saying that the current EPA residential wood stove certification process is so flawed that wood stoves now certified safe are not safe to operate and do not even meet the standards of certification. Resident-owned PurpleAir PM2.5 monitors can measure the PM2.5 "at the stack" or "at the fenceline" in real time in real world conditions, which is the most honest and reliable, and public health protective measurement of PM2.5 emissions. PurpleAir data for every working monitor is also available online on US Government AirNow Maps of Smoke and Fire alongside official EPA PM2.5 monitors which cost over \$100,000 but which the inexpensive resident-owned PurpleAir monitors are correlated to with a simple mathematical formula. There are approximately 15 Official EPA PM2.5 monitors in the State of Wisconsin and approximately 55 resident owned PurpleAir PM2.5 monitors in the State of Wisconsin, on AirNow Maps of Smoke and Fire at this time. Historical weekend and overnight online data collected every 10 minutes from PurpleAir can be downloaded by government officials and the general public during normal government working hours, so there is no need to enter residences of wood burners nor check if their wood stove is certified if measures "at the stack" or at "the fenceline" (in the yards of neighbors of wood burners) can be made with PM2.5 monitors.

The fact that Ben Franklin, Harriet Beecher Stowe, and Nathaniel Hawthorne felt sentimental about wood burning is not surprising, since the alternative of coal was cleaner, but not much cleaner, so in both instances these illustrious persons were living with air pollution on a grand scale, in order to heat their homes. The adverse health effects from the particulates of wood burning and coal burning were not scientifically proven in the 1700s and 1800s, but the shorter lifespan in those eras could persuasively be argued to have been caused by use of solid fuels like wood and coal for home heating. Sentimentality about a method of heating that shortens one's lifespan is pathetic to contemplate. It is even more pathetic to know about the health effects of particulate pollution and not be able to solve the problem of that air pollution, because of irrational objections to the use of say, solar panels instead of coal and wood burning for residential home heating. Coal was not introduced in order to deal with air pollution. However, wood burning produces more particulates than coal burning. Solar panels do not produce air pollution particulates, which is the selling point of solar panels. The selling point of solar panels is that they solve one problem of air pollution, particulates from wood burning or coal burning. Wood burning produces more particulates than coal burning, but coal was introduced not primarily because it produced less particulates (PM2.5) but because coal was more convenient to use, and in some areas, coal was more plentiful than wood.

Aesthetically, solar panels could not be described as ugly or unsightly. Criticizing the look of solar panels seems like an indirect way to object to a clean method of providing electricity for particulate-free home heating. Solar panels look like mirrors pointing toward the sun, which is what they are. We have had mirrors for centuries, so this is not a new idea or look. This article says there will be kicking and screaming if solar panels replace wood burning, but why that would happen is not explained in this article.

Episode 56AD

[Opinion | The fueling of America has long been controversial | Plain Talk by Dave Zweifel](#)

Cap Times

Not only that, but most houses had wood-burning fireplaces, ... of the problem was that homeowners had to purchase metal ovens to burn the coal, ...

Opinion | The fueling of America has long been controversial.

Excerpts edited by RAWSEP for brevity and clarity.

Some see solar panels as unsightly, and in some communities they're actually banned. "[When Coal First Arrived, Americans Said 'No Thanks'](#)" By 1744, Benjamin Franklin wrote 'Wood, our common Fewel, which within these 100

Years might be had at every Man's Door, must now be fetch'd near 100 Miles to some towns, and makes a very considerable Article in the Expence of Families,' . "In an 1864 essay, Harriet Beecher Stowe fulminated: 'Would our Revolutionary fathers have gone barefooted and bleeding over snows to defend (coal-burning) air-tight stoves and cooking-ranges? I trow (believe) not.' In his 1843 short story Fire Worship, Nathaniel Hawthorne argued that gathering before a flickering hearth was crucial to bringing families and citizens together." Now it's coal and other fossil fuels' turn to be replaced. But history shows us it won't happen without a lot of kicking and screaming.

United Kingdom

U K, Bedford

[Reducing pollution from wood burners and open fires in Bedford Borough homes](#)

Bedford Borough Council

Open fires and wood-burning or multi-fuel stoves have risen in popularity over recent years. There are many benefits for users but burning at home ...

Excerpts edited by RAWSEP for brevity and clarity.

People who are already using an open fire or wood-burning stove at home, or anyone considering installing one, will need to understand which fuels and stoves can be used. This information, along with other relevant regulations, can be found at <https://uk-air.defra.gov.uk/library/burnbetter/>.

Find a practical guide to Open Fires and Wood-burning stoves at <https://tinyurl.com/5ejfyk8a>.

[Concerns over health as use of wood burners in Bedford increases](#)

Bedford Independent

Bedford Council has warned about the dangers of open fires and wood burners and multi-fuel stoves due to the rise in popularity of these types of ...

Excerpts edited by RAWSEP for brevity and clarity.

Concerns include a pollutant called Fine Particulate Matter (FPM) (PM2.5, Particulate Matter of 2.5 micrometer size) or Particulate Matter (PM) that is present in the smoke from wood which can be dangerous to those who breathe it in.

Government data shows wood burners and multi-fuel stoves were a major source of dangerous particles in the air we breathe in 2021, accounting for 16% of PM10 emissions and 27% of PM2.5 emissions. Further reports show that emissions of PM2.5 from domestic wood burning increased by 124% between 2011 and 2021, representing 21% of total PM2.5. emissions in 2021. Use solid fuels that have been approved solid fuels by [DEFRA](#) Do not burn waste wood such as pallets or fence panels etc.

Asia

Bahrain

[IQAir ranks Bahrain among most polluted for air quality in 2022 | THE DAILY TRIBUNE](#)

News of Bahrain

Research shows that exposure to such particulate matter can lead to heart ... Studies have also linked longterm exposure to PM 2.5 with a higher ...

China

[A Potential Health Threat: China's "Dark" Side of Air Pollution - SciTechDaily](#)

SciTechDaily

Increased O3 and PM2.5 pollution due to nighttime oxidation poses an important challenge in further improving air quality in China, ...

[Effects of short-term PM 2.5 exposure on blood lipids among 197957 people in eastern China](#)

Nature

PM2.5 was positively correlated with low-density lipoprotein cholesterol and total cholesterol, and negatively correlated with triglyceride, ...

India, Bengaluru

[Bengaluru's annual PM2.5 levels exceed WHO guidelines by 6 times - NEWS TRAIL](#)

NEWS TRAIL

Coimbatore, Bengaluru, Mangaluru and Amravati all saw annual PM2.5 (atmospheric particulate matter that has a diameter of less than 2.5 ...

[Bengaluru's air quality dipped 8% in 2022, says survey - Times of India](#)

Times of India

With an annual average of 31.5 g/m³ (micrograms per cubic metre of air) of particulate matter 2.5 for 2022, the city exceeded WHO's standard of ...

India, Delhi

[Norms not implemented, India has 65 of 100 world's most polluted cities - Sunday Guardian](#)

Sunday Guardian

The PM 2.5 levels were equally bad in these cities. The Delhi NCR region, which includes the satellite cities of Noida, Ghaziabad and Faridabad, ...

[Extreme Winter Nighttime Pollution In New Delhi Air Explained - Outlook India](#)

Outlook India

The study, published in the journal Nature Geoscience, found that the trigger for the high levels of particulate matter is the fumes emitted when wood ...

[Strange chemical process behind Delhi's unique extreme night-time smog discovered](#)

Yahoo News UK

In winter, observations have shown particulate matter levels in the ... high levels of particulate matter is the fumes emitted when wood is burnt.

[Researchers Solve Mystery of Extreme Nighttime Pollution in New Delhi](#)

Laboratory Equipment

In the study, the team found that the trigger for the high levels of particulate matter is the fumes emitted when wood is burnt. For more than 400 ...

[Why thick sheet of dust and smoke rises in Delhi, Kanpur's study revealed shocking](#)

News Day Express

We saw in Delhi that 30 nanometer particles are being emitted every hour, ... particulate matter is emitted from uncontrolled burning of wood and ...

India, Kochi

[Kochi: Pm Pollutants Remain Above Normal Limits - Times of India](#)

Times of India

Kochi: Though many parts of Ernakulam, including Kakkanad, received thundershowers, the maximum PM 2.5 (particulate matter the size of 2.5 microns ...

[Kochi can breathe easy as PM emissions drop to desired levels - The Hindu](#)

The Hindu

Particulate Matter 10 and 2.5 drop below permissible levels on March 15; PM 10 recorded 80 micrograms per cubic metre and PM 2.5 as 49 units on ...

Thailand, Bangkok

[Mixed appeal - Bangkok Post](#)

Bangkok Post

... annual PM 2.5 toxicity after coughing up (sorry) the required funds. ... When Prime Minister Gen Prayut Chan-o-cha and allies insist that they ...

Technology Alternatives to Wood Burning (PM2.5. Is 90% of wood smoke)

<https://www.energy.gov/energysaver/installing-and-maintaining-small-wind-electric-system>

Installing and Maintaining a Small Wind Electric System

Energy Saver

[Energy Saver](#)

[Renewables & Electricity](#)

[Residential Renewable Energy](#)

[Small Wind Systems](#)

Installing and Maintaining a Small Wind Electric System

If you went through the [planning steps](#) to evaluate whether a [small wind electric system](#) will work at your location, you will already have a general idea about:

The amount of wind at your site

The zoning requirements and covenants in your area

The economics, payback, and incentives of installing a wind system at your site.

Now, it is time to look at the issues associated with installing the wind system:

Siting -- or finding the best location -- for your system

Estimating the system's annual energy output and choosing the correct size turbine and tower

Deciding whether to connect the system to the electric grid or not.

Installation and Maintenance

You should have your system installed by a professional installer. A credible installer may provide additional services such as permitting. Find out if the installer is a licensed electrician, and ask for references and check them. You may also want to check with the Better Business Bureau.

With proper installation and maintenance, a small wind electric system should last up to 20 years or longer. Annual maintenance can include:

Checking and tightening bolts and electrical connections as necessary

Episode 56AE

Checking machines for corrosion and the guy wires for proper tension

Checking for and replace any worn leading edge tape on the turbine blades, if appropriate

Replacing components such as turbine blades and/or bearings as needed.

Your installer may provide a service and maintenance program or can recommend someone who can.

Siting a Small Electric Wind System

Your professional installer should help you finding the best location for your wind system. Some general considerations they will discuss with you include:

Wind Resource Considerations -- If you live in complex terrain, take care in selecting the installation site. If you site your wind turbine on the top of or on the windy side of a hill, for example, you will have more access to prevailing winds than in a gully or on the leeward (sheltered) side of a hill on the same property. You can have varied wind resources within the same property. In addition to measuring or finding out about the annual wind speeds, you need to know about the prevailing directions of the wind at your site. In addition to geological formations, you need to consider existing obstacles, such as trees, houses, and sheds. You also need to plan for future obstructions, such as new buildings or trees that have not reached their full height. Your turbine needs to be sited upwind of any buildings and trees, and it needs to be 30 feet above anything within 300 feet.

System Considerations -- It is encouraged that you only consider small wind turbines that have been tested and certified to national performance and safety standards. When siting be sure to leave enough room to raise and lower the tower for maintenance. If your tower is guyed, you must allow room for the guy wires. Whether the system is stand-alone or grid-connected, you also will need to take the length of the wire run between the turbine and the load (house, batteries, water pumps, etc.) into consideration. A substantial amount of electricity can be lost as a result of the wire resistance—the longer the wire run, the more electricity is lost. Using more or larger wire will also increase your installation cost. Your wire run losses are greater when you have direct current (DC) instead of alternating current (AC). If you have a long wire run, it is advisable to invert DC to AC.

Sizing Small Wind Turbines

Small wind turbines used in residential applications typically range in size from 400 watts to 20 kilowatts, depending on the amount of electricity you want to generate.

A typical home uses approximately 10,649 kilowatt-hours of electricity per year (about 877 kilowatt-hours per month). Depending on the average wind speed in the area, a wind turbine rated in the range of 5–15 kilowatts would be required to make a significant contribution to this demand. A 1.5-kilowatt wind turbine will meet the needs of a home requiring 300 kilowatt-hours per month in a location with a 14 mile-per-hour (6.26 meters-per-second) annual average wind speed.

A professional installer will help you determine what size turbine you'll need. First establish an energy budget. Because energy efficiency is usually less expensive than energy production, [reducing your home's electricity use](#) will probably be more cost effective and will reduce the size of the wind turbine you need.

The height of a wind turbine's tower also affects how much electricity the turbine will generate. A professional installer should help you determine the tower height you will need.

Estimating Annual Energy Output

An estimate of the annual energy output from a wind turbine (in kilowatt-hours per year) is the best way to determine whether it and the tower will produce enough electricity to meet your needs.

A professional installer can help you estimate the energy production you can expect. The manufacturer will use a calculation based on these factors:

Particular wind turbine power curve

Average annual wind speed at your site

Height of the tower that you plan to use

Frequency distribution of the wind -- that is, an estimate of the number of hours that the wind will blow at each speed during an average year.

The installer should also adjust this calculation for the elevation of your site.

Grid-Connected Small Wind Electric Systems

Small wind energy systems can be connected to the electricity distribution system. These are called grid-connected systems. A grid-connected wind turbine can reduce your consumption of utility-supplied electricity for lighting, appliances, electric heating and cooling, and vehicle charging. If the turbine cannot deliver the amount of energy you need, the utility makes up the difference. When the wind system produces more electricity than your household requires, the excess is credited and used to offset future use of utility-supplied power.

Modern grid-connected wind turbines will operate only when the utility grid is available. They can also operate during power outages when configured to work in tandem with storage to form a home microgrid to provide back-up power.

Grid-connected systems can be practical if the following conditions exist:

You live in an area with average annual wind speed of at least 9 miles per hour (4 meters per second).

Utility-supplied electricity is expensive in your area (about 10 cents per kilowatt-hour).

The utility's requirements for connecting your system to its grid are not prohibitively expensive, and there is sufficient capacity to integrate your system.

Your utility can provide you with a list of requirements for connecting your system to the grid. For more information, see [grid-connected home energy systems](#).

Wind Power in Isolated Grid Systems

Wind power can be used in isolated off-grid systems, or microgrid systems, not connected to an electric distribution grid. In these applications, small wind electric systems can be used in combination with other components -- including a [small solar electric system](#) -- to create [hybrid power systems](#). Hybrid power systems can provide reliable off-grid power for homes, farms, or even entire communities (a co-housing project, for example) that are far from the nearest utility lines.

An off-grid, hybrid electric system may be practical for you if the items below describe your situation:

You live in an area with average annual wind speed of at least 9 miles per hour (4.0 meters per second).

A grid connection is not available or can only be made through an expensive extension. The cost of running a power line to a remote site to connect with the utility grid can be prohibitive.

You would like to gain energy independence from the utility.

You would like to generate clean power.

For more information, see [operating your system off the grid](#).

