

Wood-burning stoves

SEPARATING FACT FROM FICTION

There is currently a frenzy of misinformation surrounding wood-burning stoves, most of what you hear is incorrect or is confusing stoves with open fires. All the information below can easily be verified.

■ Myth – ‘17% of the ultra fine particles in London air come from wood-burning stoves’

This figure includes all types of combustion, open fires, barbecues, bonfires, biomass power stations, wildfires etc. Even if you could possibly attribute all 17% to open fires and stoves, an open fire can produce 40 grams of particulates every hour, the maximum a stove is allowed to produce is 3 grams. Of houses burning wood, 40% have an open fire, 60% have a stove, therefore less than 2% of the pollution could be coming from stoves.

At Burley we manufacture the world’s cleanest and most efficient stoves, the particulates from our stoves are as low as 0.1 grams per hour, just 1/30th of what is allowed. Putting it another way, replacing an open fire with a Burley stove could reduce any pollution by 99.7%. The remaining 0.3% is unmeasurable.

■ Myth – ‘Wood is not carbon neutral’

As a tree grows it takes in carbon dioxide, when that tree dies, if it is burned or if it lies on the floor and rots, exactly the same amount of CO₂ is released back into the environment. People are confusing carbon neutral with carbon capture. If in some way you could preserve the wood for eternity you could lock the CO₂ up in the wood. Man has not found an efficient way to do this but ironically nature did, by making gas, coal and oil, which we are burning like there’s no tomorrow.

■ Myth – ‘Harvesting firewood damages forests’

Unlike pine forests, rain forests and teak forests which are levelled to produce our cardboard, cheap hamburgers and garden furniture, firewood comes largely from forest management and natural tree loss. It is essential for deciduous forests that trees are thinned out, it allows the stronger trees to grow, promotes health and creates biodiversity. If the thinned out trees are not logged for stoves they will have to be chipped and burned anyway, which makes the banning of stoves utterly pointless. Where forests are grown commercially, thinking you will still have the forests without firewood is as silly as thinking there will still be sheep in the fields if we don’t eat lamb.



burley

The World’s cleanest and most efficient wood burning stoves



Burning **300** of Burley’s ultra clean Fireball™ stoves produces less air pollution than **one** open fire!



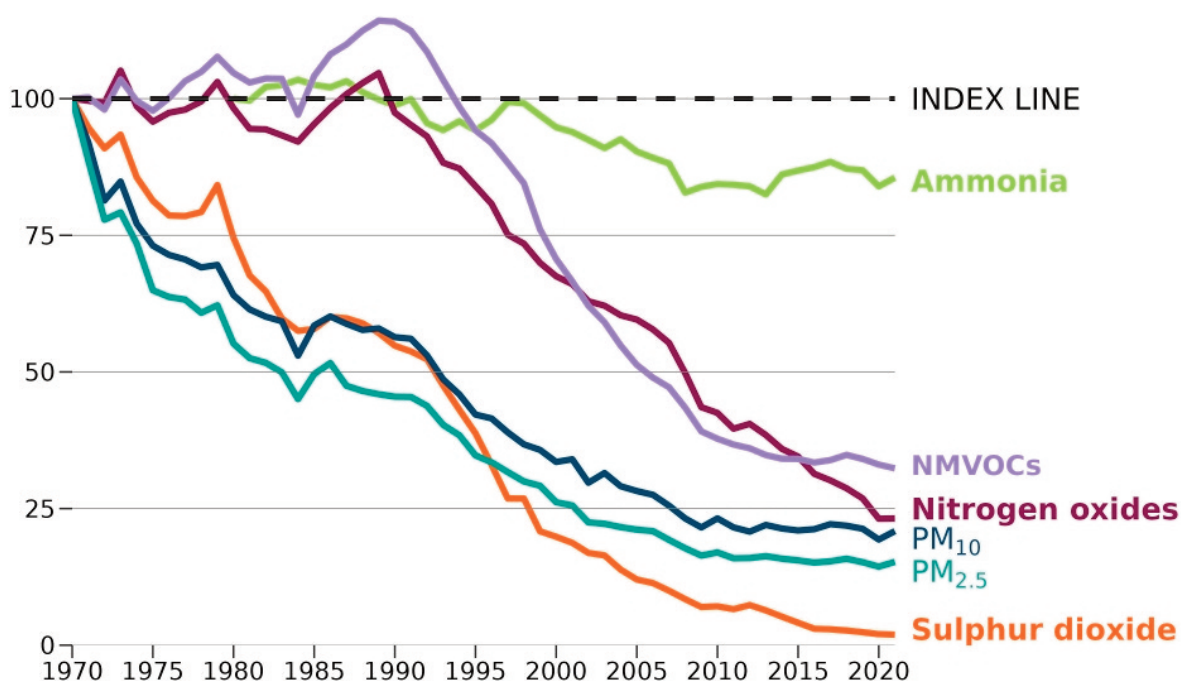
■ Myth – ‘Burning wood produces more CO₂ than gas or oil’

Type of fuel	CO ₂ produced heating a typical house
Coal	7,260kg
Oil	5,200kg
Natural gas	4,040kg
Wood boiler	300kg

www.forestresearch.gov.uk/tools-and-resources/fthr/biomass-energy-resources/reference-biomass/factsfigures/carbon-emissions-of-different-fuels/

■ **Myth** – ‘Air quality is getting worse due to the rise in the popularity of stoves’

Open fires are gradually being replaced by stoves which is improving air quality dramatically. Unfortunately, due to the misinformation now being circulated about stoves, consumers are sometimes thinking it is better to keep their smoky open fires instead.



Source: Ricardo Energy & Environment

■ **Myth** – ‘Air quality is worse in winter due to stoves and open fires’

The type of pollution most commonly associated with air quality is ultrafine particles known as PM_{2.5}. Below is data taken at random sites across London showing the average levels of PM_{2.5} by month. This is available to see at:

www.londonair.org.uk

Measurement of pm2.5, hourly average of µg/m3 (micrograms per cubic meter of air)

2021	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Westminster	19.5	19.2	22.2	19.5	13.1	19.7	17.9	16.7	21.7	17.5	21.6	15.2
Aldgate	19.8	18.8	23.3	20.3	14.3	18	19.7	16	24.8	18.9	22.4	17.9
Richmond	17.2	17.8	22.9	21	11.1	13.4	13.4	8.1	17.5	10.3	20	14.5
Southwark	26.8	25.7	31	31.1	16	17.9	17.8	13.1	26.8	24.1	25.5	23
Lewisham	16.3	19.2	23.2	20.2	11.6	13.2	15.6	8.9	19.9	11.9	16.2	14.2
Average	19.92	20.14	24.52	22.42	13.22	16.44	16.88	12.56	22.14	16.54	21.14	16.96

Air quality was worse in April and September than in October, November, December, January and February. The level of particulates in July is the same as in December. Simple mathematics show that if only 17% of particulates come from combustion, 83% is coming from elsewhere, mostly vehicles.

www.unearthed.greenpeace.org/2016/11/03/causes-londons-air-pollution/

■ **Myth** – ‘Burning wood in a stove is the same as an open fire’

Open fires have uncontrolled combustion, they draw an unregulated amount of air which chills the flames, making them smoky; it is really just an indoor bonfire. With a modern stove the air is introduced in a controlled ratio which means the fuel is burned cleanly and efficiently. It also means that the combustion chamber is far hotter, burning particulates and tarry chemicals which are released by open fires.

The difference in the types of combustion is similar to an old car that has not been tuned and puffers out clouds of black smoke, and a well-maintained modern car that runs cleanly. Also, an open fire is less than 20% efficient, a stove is up to 90% so needs 4 times less wood per kilowatt of heat.

■ Myth – ‘Indoor air quality is three times worse in homes with stoves’

Even if this rumour was true, so what? Background particulates in the home are 2-3µg/m, three times this would be only 6-9, the WHO recommended limit is 25. Plumping a pillow will give a level of over 100.

This rumour isn't true however, it is a result of flawed research which failed to understand air movement in the home and didn't take into account other sources such as cooking. When a stove is lit air is drawn towards it, if you were to drill a hole in the side air goes in, smoke doesn't come out. The researchers only put 1 analyser in each house, this was in the room with the stove. When the stove was lit it drew contaminated air in from the kitchen, when it wasn't lit it didn't draw the contaminated air from the kitchen. The researchers erroneously concluded that the contamination must be coming from the stove.

www.mdpi.com/2073-4433/11/12/1326?s=09

To challenge this we repeated the tests when no other activity was taking place. For comparison, we also took air quality readings while making toast, when lighting ten candles on a birthday cake and then blowing them out and when using an air fryer to make a sausage sandwich.

See results at www.burley.co.uk/blog

Running the stove showed no noticeable deterioration in air quality, even when the stove was refuelled.

When making toast the level rose to 120 and after two hours was still 4 times ambient. If the toast was burned even a little the analyser exceeded its limit of 1000 and the test had to be repeated.

When the air fryer was used for 10 minutes the level of pollution exceeded the analyser's limit of 1000. After 2 hours the room still showed an increase of 100 fold. Remember that the public is being panicked over an alleged 3 fold increase with stoves.

After two hours the room with the candles saw nearly a 20 fold increase.

This is in line with research on scented candles which records levels of up to 379µg/m³h.

www.sciencedirect.com/science/article/pii/S0160412021002154

It is ironic that *Wood Burning Project London* place adverts on the London Underground calling for the banning of stoves. Stations on the Victoria line have an average level of between 361 and 880µg/h, 35 times higher than the WHO safe limit. This pollution is being vented directly onto London streets.

www.sciencedirect.com/science/article/pii/S0160412019313649

If you want to improve air quality it would be far more productive to campaign to ban candles and air fryers, banning stoves will make little if any difference, you will just be contributing more to global warming and you won't have a lovely fire to sit in front of and enjoy.

PM2.5 particulates measured during activity

Time	Wood stove	Toast	Ten candles	Air fryer
00:00	5	5	3	3
01:00	6	5	730	4
02:00	8	5	62	3
04:00	6	120	48	2
06:00	2	65	105	4
08:00	2	60	223	11
10:00	3	50	232	432 (off)
14:00	2	53	215	1000+
18:00	5	53	196	1000+
30:00	3	43	166	1000+
60:00	6 (refuel)	35	105	671
90:00	4 (refuel)	28	82	280
120:00	4	21	52	247

■ Partly true – ‘Wood is more expensive than other fuels’

At the time of writing, energy costs per kWh are as below:

Fuel type	Cost per kWh
Natural gas	7p
Heating oil	7p
Wood	16p
Electricity	29p

When burning wood the flue needs sweeping once a year which costs around £50, but apart from that overheads are very low. Gas and oil heating have far higher servicing costs, boilers need changing more often than stoves, they also use electricity which adds significantly to their running costs.

In reality, unless you live in a large town or city, wood is very often free. A blowdown barely touches the ground before it is being swarmed over by locals. This is a free service for councils who would otherwise have to pay to have it cleared and burned, making the banning of stoves a futile waste of energy.

There are of course additional unquantifiable moral costs, such as being in the grip of Russia for your energy and having to fund countries with appalling human rights records and oppression of women. Another priceless benefit of wood is that it is the only heating to still work in a power cut.

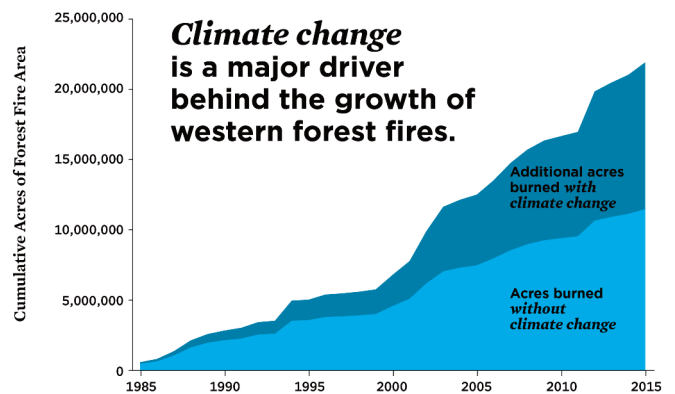


Myth – ‘Burning gas is cleaner than burning wood’

‘No snowflake thinks it is responsible for the avalanche.’

Even if you have a smoky open fire rather than a clean burning stove, any pollution you are producing will be gone in a few minutes. If you are heating your house with gas, oil or electricity YOU are creating pollution which everyone will have to live with every year for the rest of time. Particulates released by the devastating increase in wildfires caused by global warming are more detrimental to health than particulates from ALL other sources.

www.nature.com/articles/s41467-021-21708-0

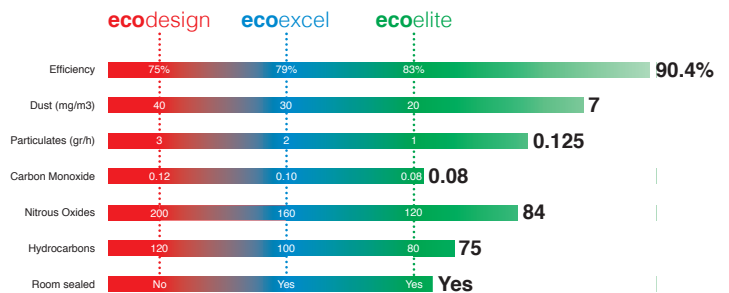


Wood is the ONLY zero-carbon heating we have. Putting 10kg of logs on a Burley stove during an evening creates as much warmth in your home as burning over 100kWh of gas in a power station, saving 25kg of carbon dioxide (enough to offset a 600 mile train journey).



The Burley Hardwick

The World's cleanest and most efficient wood-burning stove



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