



## **The silent killer in our homes: Wood-burning stoves emit six times as much pollution as a diesel truck... and they're ruining your health even if you don't own one**

- Wood-burning stove may be doing the British atmosphere more harm than good
- Smoke they produce is almost invisible, particularly when compared with smogs
- Scientists measuring air have proven that wood-burning is not a thing of the past

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By [DR GARY FULLER, LEADING POLLUTION SCIENTIST, FOR THE MAIL ON SUNDAY](#)  
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Their march has been unstoppable, from traditional farmhouses and cosy country cottages all the way to the front rooms of suburban semis. No family home, it seems, is complete without a stylish wood-burning stove.

And why not? Anyone who has ever watched the gently dancing flames will know that real fires are relaxing and reassuring, a nostalgic link to an age when life was simpler.

Featuring in endless glossy photoshoots, wood-burning stoves have even acquired something of a 'green' image, viewed as a clean, efficient and renewable source of heat.

Yet this cosy reputation conceals an altogether dirtier reality.



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**Scientists have found that wood burning stoves are choking the British atmosphere, adding to the smoke particles from traffic, industry and farming that cause thousands of preventable deaths**

Because, whether in open hearths or specialist burners, wood fires are choking the British atmosphere, adding to the smoke particles from traffic, industry and farming that cause thousands of preventable deaths.

Although barely discussed, the evidence is shocking: just one of the latest 'eco-friendly' wood-burning stoves – those meeting all European tests – can produce about six times more particle pollution than a modern diesel lorry, or 18 times more than a modern diesel car.

Worse, still, they release their fumes into residential areas and at times when people are likely to be at home.

Few of us need to heat our homes with wood, rather than gas or electricity. In other words, the stoves and hearths we spark up for that extra cosy glow on a winter evening are little more than a lifestyle accessory.

One reason there's so little discussion of this silent threat is that **the smoke they produce is almost invisible**, particularly when compared with the killer smogs of the 20th Century. Those filthy, sometimes deadly combinations of fog and smoke caused by burning coal, led directly to the widely acclaimed Clean Air legislation of the 1950s.

It wasn't until a chance discovery in Paris in 2005 that the modern menace of urban wood-burning was even identified. Oliver Favez, a young PhD student, was measuring air pollution in a city park when he noticed a pattern that could not be linked to diesel fumes.

Instead, his instruments recorded a chemical signature previously seen in Alpine valleys, where wood-burning has a serious impact on air pollution. If the readings were correct, it was a serious problem in Paris, too.



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Favez continued his measurements for five weeks, concluding that each night – especially at weekends – the air was polluted by wood-burning and that wood smoke was adding between ten and 20 per cent to the city's particle pollution.

Stranger still, this new pollution was not drifting in from the countryside as you might expect, but was instead coming from within the city itself.

Fellow scientists leapt on the findings and, gradually, traces of wood-burning pollution were found in other major European cities. Public authorities had long since assumed that wood-burning was a thing of the past, but scientists measuring the air that people breathed were now proving them wrong.

Today in Britain there are more than 1.5 million wood-burning stoves, and about 200,000 are added to that total every year. Yet nobody bothered to measure the effects until the winter of 2010, when my research team at King's College London placed sampling devices in a 20-mile line across London.

As we suspected, a great deal of wood was being burned and it was making up ten per cent of the particle pollution that Londoners were breathing during winter.



Two years earlier, London had introduced a low emission zone, banning the most polluting diesel vehicles from the city. (Stock image)

There was other information, too. Wood-burning happened mainly at weekends, for example. It seemed that, to Londoners at least, the stoves were largely decorative or used as an extra heating source.

How bad was the problem? Two years earlier, London had introduced a low emission zone, banning the most polluting diesel vehicles from the city.

Now we had established that the extra particle pollution from wood-burning was six times greater than the particle pollution that the low emission zone had saved.

If wood-burning were to continue unabated, the money invested in cleaning up transport and industry could be negated.



It has been calculated that particle pollution caused 29,500 premature deaths in Britain in 2010 and that a short period of high air pollution in March and April 2014 caused about 1,650 'excess' or additional deaths. (Stock image)

In fact, wood-burning could halt the progress on air pollution that has been made since the middle of the 20th Century.

If we introduce still more wood burning, particle pollution in the air of British cities is expected to be similar in 2030 to what it was in 2015, despite improvements in vehicle emissions.

Along with other scientists, we presented our data to the environment ministries here and in Europe, but the politicians were so focused on traffic pollution that they didn't want to hear.

It was only in 2015, when a Government survey revealed that about one home in 12 in the United Kingdom was burning wood, that it was finally recognised as a problem. Wood-burning was producing 2.6 times more dangerous polluting particles than traffic exhaust.

A lot of these fires are actually illegal. Major British cities still have the smoke control laws put in place following the terrible four-day London smog of 1952 which killed at least 12,000.

These ban the burning of non-smokeless coal in open fires and prohibit the burning of wood, too, but the law is rarely enforced and widely ignored.

Almost all of London is designated as a smoke control area, for example, but in 2015, 68 per cent of wood-burning homes in London were using an open fire, even though most UK homes have gas or electric heating.

Why the lack of action?

In part, there's political resistance to the idea of telling people what to do in their own homes, particularly when it comes to banning something pleasurable.

What happened in France is instructive. In 2015, the city of Paris got within a hair's-breadth of banning wood-burning in open fires, but with just days to go, the French Ecology Minister, Ségolène Royal, attacked the proposal as 'ridiculous'.

In a series of extraordinary statements, she seemed to suggest that banning a romantic evening with a glass of wine in front of the fire was an attack on the French way of life.

Another obstacle is the clean image that wood-burning stoves present. Stoves have been promoted as 'green', renewable and carbon-neutral compared to the environmental evil of burning fossil fuels.

It is certainly true that the most modern stoves and wood-pellet burners produce less than a fifth of the particle pollution that comes from an open fire.

So, upgrading from fireplaces to modern wood-burners should reduce air pollution at a stroke – but those upgrades are unlikely to happen any time soon because fireplaces and stoves go on for ever.

The people who burn wood in open hearths in Britain probably use the fireplace that was built with their house a century or more ago. Inefficient old stoves can pump out heat and fumes for generations to come.

In other words, it is not enough to set pollution standards for new wood-burners – we need action on existing fireplaces and stoves.

The testing regime itself is another obstacle to real improvement. Yes, stoves are getting better, and by 2022 those sold in Europe will have to meet Ecodesign standards that set limits on how much smoke they can produce.

However, as with diesel vehicles, there is a very large disparity between test performance and the smoke that comes from stoves in the real world.

Stoves are tested in idealised conditions using dry wood burnt for just an hour or so rather than the variety of wood that people use at home with frequent refuelling and adjustment to keep a fire going all evening.

So the results from laboratory tests have been nothing like results from those same wood-burners when they were tested in normal houses – and produced ten times as much pollution.

Some days the emissions were close to those of the laboratory test and at other times they would be as much as 16 times higher.

There has been huge variability in results even from the same stove, and it was a puzzle to find out why. Using wet wood appears to be one factor that increases the pollution; closing the air vents on the stove is another.

The biggest factor, though, is the person who lights the fire and the skill with which he or she does so. (Some countries have introduced videos and classes aimed at encouraging the best wood-burning techniques, such as lighting their fires from the top of the stacked wood and using plenty of kindling.

A lack of kindling is one of the reasons why wood-burners sometimes produce smoke when they are first lit.)

What you burn matters, too.

There is worrying evidence from air- quality testing carried out at a bowling club in the small New Zealand town of Wainuiomata, near Wellington.

As expected, the town's air was full of wood smoke throughout the winter, but the smoke contained arsenic at a level 50 per cent greater than the legal limit in Europe.

The only possible explanation was that people were burning construction timber, treated with a preservative known as chromated copper arsenate (CCA).

New Zealand scientists rapidly found that it was not just a local problem. Treated wood was being burnt everywhere. Arsenic and lead were found in the air of suburbs of the Greek capital Athens, suggesting that people were burning construction waste and old painted wood. This is inevitably happening in Britain, too.

It is difficult to measure the direct effect on public health in detail, but wherever wood is burnt, we find air-pollution problems.

And air pollution, we know, endangers health. It has been calculated, for example, that particle pollution caused 29,500 premature deaths in Britain in 2010 and that a short

period of high air pollution in March and April 2014 caused about 1,650 'excess' or additional deaths.

The latest research suggests that the damaging effects of wood smoke are worse than we thought. In particular, it does not dissipate harmlessly.

On the contrary, scientists have discovered that wood smoke changes over time as the gases and particles in the smoke react and then make yet more pollution particles.

In some experiments, the concentration of particle pollution in the smoke increased by about 60 per cent as the hours passed. In others it tripled.

Because the problem is invisible, the health implications often become clear only when the wood-burning is removed or reduced.

In areas where this has happened as part of government-sponsored anti-pollution initiatives, the number of older people admitted to hospital has dropped by as much as 11 per cent, and winter death rates have dropped by a similar amount.

And there's the great injustice. The smoke from a small numbers of homes that are burning wood – often as a lifestyle choice – can pollute a whole neighbourhood or even an entire city.

Changing centuries-old attitudes and habits will not be easy – who doesn't love a crackling fire?

However warm, cosy and no-doubt stylish they make us feel, we have to question the place of wood fires in towns and cities.

We need to take action and urgently – lives are at risk.

**Adapted from *The Invisible Killer: The Rising Global Threat Of Air Pollution – And How We Can Fight Back*, by Gary Fuller, published by Melville House UK on November 28, priced £12.99. Offer price £10.39 (20 per cent discount) until December 3. Pre-order at [mailshop.co.uk/books](http://mailshop.co.uk/books) or call 0844 571 0640; p&p is free on orders over £15. Spend £30 on books and get free premium delivery.**

<https://www.dailymail.co.uk/sciencetech/article-6402031/Wood-burning-stoves-emit-six-times-pollution-diesel-truck.html>