Domestic Burning in Scotland

Asthma + Lung UK Scotland domestic burning position

ASTHMA+ LUNG UK
SCOTLAND

Contents

Summary

The Scottish Government aims to have the cleanest air in Europe. Asthma + Lung UK Scotland supports that ambition, and we need to see bold actions to make that ambition a reality. In this report, Asthma + Lung UK Scotland looks at how domestic burning policies and interventions can really make the air in Scotland the cleanest it possibly can be.

Air pollution from wood burning has steadily increased over the last thirty years, to the point where it is now the second largest source of fine particulate matter ($PM_{2.5}$) pollution in Scotland after $PM_{2.5}$ emissions created by construction and manufacturing industries. Across the UK, $PM_{2.5}$ emissions from burning wood as a fuel have increased by 89% since 2010.[1]

Particulate matter is one of the most dangerous pollutants for human health. It exacerbates lung conditions like asthma and chronic obstructive pulmonary disease (COPD). It has also been linked to the increased likelihood of developing heart conditions, strokes, mental health issues and dementia. Air pollution has been shown to cause cancers, with research showing that for every 10 $\mu g/m^3$ of increased exposure to $PM_{2.5,}$ the risk of dying from any cancer rose by 22%.[2]

Almost 9 out of 10 (88%) people with a lung condition who responded to a 2022 Asthma + Lung UK survey on air quality across the UK said that air pollution affects their health and wellbeing, whilst over half (60%) have said that they have been discouraged from leaving their home due to toxic air. We hear about the impact of domestic burning on lung conditions almost every day, whether that's smoke from bonfires or fumes from neighbours' chimneys.

This position paper looks to set out key policy proposals which will address the issue of wood burning in Scotland, with reference to key developments across the UK. It has a specific focus on indoor burning of wood, with some reference to burning coal and other forms of fuel.

While this paper sets out the urgent need for more evidence, policy makers know enough to be taking a precautionary approach by setting a public health framework for action to reduce wood burning now, before it's too late.

The Scottish Government's main clean air strategy, Cleaner Air for Scotland 2 (CAFS2)[3], sets out 7 key actions around domestic combustion such as encouraging uptake of Ecodesign stoves, educational schemes, measures to control the supply of fuels and revision of the Clean Air Act 1993. The strategy was published in 2021 and the next version of CAFS is expected to be released in 2026.

We would like to see the Scottish Government support the following recommendations to be taken forward during the implementation of CAFS2 and into the next iteration of the strategy:

1. The Scottish Government, alongside it's public health and environmental agencies, should deliver a national awareness raising campaign to set out clear health advice.
2. A ban on the sale of the most polluting fuels.
3. Deliver a nationwide scrappage scheme for the most inefficient wood burners.
4. Set up $PM_{2.5}$ monitoring stations in every community.
5. Use data from increased monitoring to communicate health alerts to people living with lung conditions.
6. Revise all legislation covering Smoke Control Areas (SCA's) to better support local authorities to implement and enforce SCA's.

Background

Health impacts of domestic burning

As the weather gets colder, there is often an increase in domestic burning across Scotland, with people lighting fires and stoves to keep their homes warm in winter. We repeatedly hear from people living with lung conditions that this has a significant impact on their lung health and how they perceive how safe it is to walk around their area or leave windows open while a neighbour burns wood, coal, and other solid fuels.

The two most dangerous pollutants for human health are Nitrogen Dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$). Air pollution has a major impact on public health, and it is linked to up to 2,700 premature deaths each year in Scotland[4], and around 43,000 deaths across the UK. A single fireplace operating for one hour and burning 10lbsof wood, is estimated to emit 4,300 times more carcinogenic polyaromatic hydrocarbons than 30 cigarettes.[5]

Poor air quality worsens asthma and COPD symptoms resulting in people feeling more anxious about their lung health and increases the likelihood of a hospital admission if symptoms worsen. It has also been linked to the increased likelihood of developing lung cancer, heart conditions, strokes, mental health issues and dementia.

Case Study: Liz Mason,

Living with bronchiectasis in Blairgowrie

“Luckily, I live in an area that isn’t reliant on burning as a main source of heat and we all are connected to the gas network. However, there are three wood burners in houses either side of me.”

Every time they are on, which is usually in the autumn and winter months, and the smoke pollutants start to fill the air, my bronchiectasis flares up and I begin to wheeze and cough. I find it’s usually worse when there’s a down draught caused by wind, but it doesn’t matter which direction the wind comes from, I still get the fumes. I can’t go into my garden; I have to stay inside and close my windows.

I approached a neighbour, and was told - well, we have it because we get a lot of free wood, so it’s cheap heating. Because wood burners are in people’s homes, there’s a feeling that it’s a personal choice, so you can’t object. Interestingly, none of my neighbours’ smoke. They’re unaware however, as are most people, that burning 10 lbs of wood for an hour generates 140 times more carcinogenic hydrocarbons than one cigarette.

> **“The smoke pollutants start to fill the air, my bronchiectasis flares up and I begin to wheeze and cough.”**

I would like the authorities to enforce the use of the right type of fuel or dried wood and if possible, ensure older stoves have special chimneys fitted to remove toxic substances before releasing into the air. And lastly, test the smoke coming from the chimneys to check for harmful toxic substances."

Fine particulate matter - $PM_{2.5}$

What is it?
Tiny solid and liquid particles in the air, such as dirt or dust. Referred to by their diameter in size, $PM_{2.5}$ has a diameter smaller than 2.5μm (microns) - 30 times smaller than the average human hair.

How bad is it?
Particulate matter can trigger asthma attacks and symptoms flare ups for people living with a lung condition such as COPD. It can enter deep into the lungs and into the blood stream. It is incredible damaging to human health.

An estimated 97% of people in the UK are breathing levels of $PM_{2.5}$ above the levels recommended by the World Health Organisation (WHO). In Scotland, the annual average legal limit for $PM_{2.5}$ is 10μm/m^3, which is double the WHO guidelines.

Where does it come from?
Concentrations of $PM_{2.5}$ are particularly bad in Scotland's cities and large towns, but hotspots are not limited to urban areas. The main sources of $PM_{2.5}$ pollution are industrial combustion, domestic combustion, and road transport.

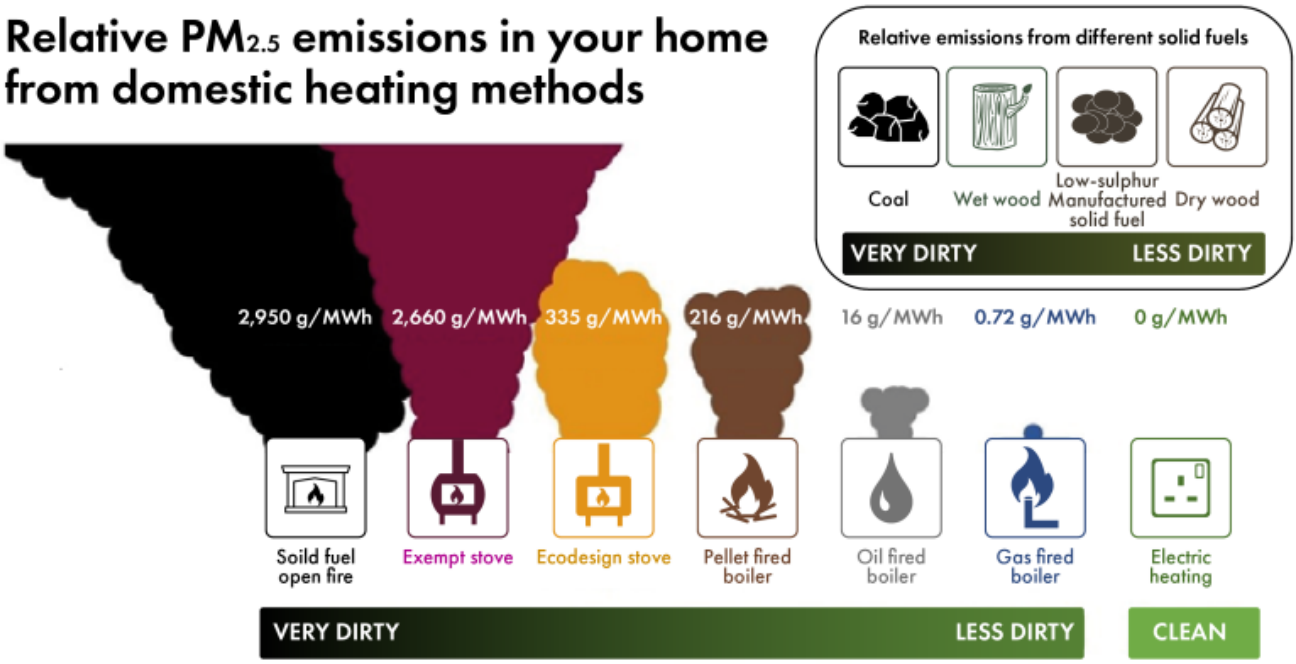
Contribution to air quality in Scotland and UK

In Scotland, the health impact of burning wood is two-fold: it increases the levels of dangerous pollutants inside the home; and increases the levels of ambient $PM_{2.5}$ in the air outside, impacting both those choosing to burn wood, coal, and other solid fuels and those who happen to live, work, and play nearby.

A systematic review of the science of indoor air quality and its impact on children across the UK, undertaken by the Royal College of Paediatricians and Child Health with a report published in January 2020[6], found that children spend on average just 68 minutes outdoors each day. This means that that the levels of pollution inside are incredibly important for the health of children and young people.

One study found that wood burners can triple the level of harmful pollutants in the home[7]. Despite being marketed on the premise that they significantly reduce harmful emissions, a study has found that Eco-design stoves emit 750 times more pollution than an HGV[8]. While the exact impacts of wood burning stoves are contested by the Stove Industry Alliance, it is clear that they emit a significant amount of PM2.5, which we know can enter the lungs and then the blood stream which can severely damage human health.

In January 2022, European regulations came into force to ensure that all new wood burning stoves, multi-fuel stoves and fireplaces must meet strict new guidelines known as Eco-design. However, if someone purchased and installed a stove prior to January 2022 that does not meet these new standards, then they can continue to burn as long as they are burning approved fuels.



Smoke plumes are not to scale. Emission factors show emissions in the home - emissions during production of fuel or electricity are not included here. Emission factors taken from EMEP 2016 Guidebook (1A4 - small combustion tables). The following definitions were used: **Solid fuel open fire**: wood burned in an open fire; **Non-Defra approved stove**: wood in a conventional stove; **Defra-approved / Ecodesign stove**: wood in an advanced / ecolabelled stove; **Pellet fired boiler**: wood in pellet stoves and boilers; **Oil fired boiler**: fuel oil in a medium (>50kWh <1MWh) boiler; **Gas fired boiler**: natural gas in a small (<50 kWh) boiler

Source: Defra

Even kiln-dried wood and smokeless coal, which are still legal to burn in the UK, emit high levels of $PM_{2.5}$. These levels can be extremely dangerous for vulnerable groups such as young children, the elderly and those living with lung conditions. There is also some concern about other chemicals which can be released through the burning of kiln-dried wood because of the treatments it has undergone to dry out. While the academic research is still looking into this to understand it's full effect, this remains a major cause for concern for public health. Therefore, anyone with a lung condition should avoid burning anything on an open fire or in a wood burning stove, regardless if it is an Eco-design stove or not.

The UK Government's Department for Environment, Food and Rural Affairs research found Ecodesign stoves produce 450 times more $PM_{2.5}$ emissions than gas boilers[9] (graphic overleaf). For older stoves, now banned from sale, emissions are 3,700 time greater than a gas boiler.

Emissions from domestic burning in Scotland and the UK

"The continuing uncertainty over emissions levels from domestic burning means that setting precise reduction targets is difficult. Further research into the proportion of emissions attributable to domestic burning, as well as assessment of type and source of emissions, is required." - Cleaner Air for Scotland 2, Scottish Government

Across the UK, domestic burning is a major source of particulate matter emissions, accounting for 16% of PM_{10} and 27% of $PM_{2.5}$ in 2021[10]. For comparison, in the same year, road transport accounted for just 13% of $PM_{2.5}$ emissions. It is estimated that around 50% of local ambient $PM_{2.5}$ concentrations can be attributed to long-range transboundary transport emanating from outside Scotland. The Scottish Government regards this as a "complicating factor".

The use of wood stoves and open fires has been increasing year on year. As a result, levels of $PM_{2.5}$ from domestic wood burning have increased by 35% between 2010 and 2020[11]. This has been attributed to a growing trend towards wood burning as a luxury household appliance, rather than due to any reduction in traditional heating methods. There has, however, been reports of a 20% increase in wood burning stove sales because of increased gas prices across the UK[12].

The monitoring of $PM_{2.5}$ in Scotland is recorded primarily at roadside. As such it is difficult to pinpoint how what proportion of the emissions come from domestic burning. However, we can see that in a period between September 2022 and December 2023 there was a recorded rise of 32% in $PM_{2.5}$ emissions. Contributions to $PM_{2.5}$ emissions from domestic burning are higher in winter months and the cost of living and soaring energy costs have made more people turn to domestic burning as a source of heat. The cost of living crisis may also have resulted in people burning things they shouldn't, such as woods with paints or varnishes.

Burning trends in Scotland

Despite its major contributions to levels of air pollution in the UK, just 8% of homes are burning combustible fuel - including wood, coal and biomass[13]. In Scotland that figure stands at just 6.8%, compared to 12% in Wales and 27.1% in Northern Ireland. It should be noted that for many rural areas in Scotland, households are not connected to the gas grid.

Generally, wood burning is more prevalent across towns and cities, with 68% of those burning solid fuels living in urban areas of the UK[14]. This is surprising given that rural areas are less likely to be connected to gas and assumed to be burning more than urban areas. But those living in towns and cities who are burning are doing so for an additional source of heat. However, in Scotland, CAFS2 shows that around 4 in 5 of households using solid fuels in Scotland as their main source of fuel are in rural areas[15].

Domestic burning is a social issue

Only a small number of households use wood burning stoves and open fires as their primary source of heat. For the vast majority using such heating methods, it is for aesthetic purposes. Wood burners have become appealing for the more well-off, especially in urban areas.

In light of soaring gas and electric prices, less affluent households in Scotland are less likely to have the means to retrofit fireplaces or purchase newer and more efficient wood burners. These households are more likely to have greater exposure to poor air quality. We know that it is the most densely populated areas across our towns and cities that have much higher levels of $PM_{2.5}$. These are also areas where we find the most deprived communities. The CAFS2 strategy also states that nearly half of households (46%) using solid fuels are living in fuel poverty, far above the national average of 25%[16].

Burning wood is not environmentally friendly

Wood burning stoves are being increasingly marketed as clean, green forms of domestic heating, particularly when compared to gas or oil burning heaters. This is because wood burning stoves do not rely on fossil fuels to operate and can be classed as carbon neutral forms of heating.

Carbon neutral means that the carbon dioxide (CO_2) released from the wood when burnt is balanced out by the CO_2 that the wood absorbed during its life. Wood burning is also seen as renewable because new trees can be planted after they have been cut down. However, despite these things both being true, it is not the case that wood burning is an environmentally friendly form of heating. There are several considerations that are often overlooked when making the case for wood being a renewable, carbon neutral fuel.

Firstly, suggesting wood burning is carbon neutral does not account for the timeframe needed for trees to grow back when cut down for heating - wood burning only achieves carbon neutrality as a source of heating in the long term. It can take several decades and even centuries for forests to regrow[17].

Secondly, replanted trees do not have the same carbon capturing capability as forests that are native to Scotland. Research has shown that native forests store more carbon dioxide than planted forests, one study concluded that it would take 40 to 100 years for a managed forest to capture the same amount of carbon as a natural forest[18]. Trees planted for wood pellets are often cut down within 20 years which is not enough time to absorb the same quantity of carbon than they emit.

Thirdly, most people in the UK are not able to source their wood from local, renewable sources. The UK is the third largest importer of wood products in the world[19], with imports of wood pellets, primarily used for burning, increasing year on year since 2019[20]. Imported wood cannot be carbon neutral, as it creates additional carbon emissions from transportation.

Cutting down wood for fuel has broader environmental impacts beyond CO_2 emitted into the atmosphere and should, as a result, be reduced as much as possible. Forest ecosystems are vital for our planet and health. Deforestation and cutting down trees have disastrous consequences for biodiversity. An increase in the demand of wood or wood pellets will drive the harvest of biologically diverse old-forest growth, often in countries that have low environmental regulation. Evidence has also shown a host of negative consequences for public and environmental health linked with deforestation.

Furthermore, carbon neutrality should not be seen as the goal in and of itself. The Scottish Government has set the goal of reaching net zero emissions by 2045 - within one generation it claims. Whilst under certain circumstances wood burners could be seen as carbon neutral, they are not "net zero" as this refers to not emitting CO_2 emissions from the start. Therefore, an increase in wood burning will undermine our attempts to reach net zero by 2045.

Finally, particulate matter pollution (both $PM_{2.5}$and PM_{10}) is itself helping to speed up climate breakdown. Particulate matter can circulate around the globe, ending up in the most remote places, including the polar regions. When PM lands on ice and snow it darkens them slightly, leading to less sunlight being reflected back into space, and contributing to global warming[21].

Policy context

Domestic burning is a health, social and environmental issue, resulting in increasing levels of ambient $PM_{2.5}$. There is a duty to reduce levels of wood burning not just to protect those in their homes, but their neighbours and wider communities as well. We must therefore take a precautionary approach for public health based on all available evidence, in line with World Health Organisation's advice for protection from environmental hazards.

To do this, there needs to be a policy framework that protects public health first. In Scotland, CAFS2 is the Scottish Government's key clean air strategy, running from July 2021 until 2026.

Asthma + Lung UK Scotland are members of the CAFS2 Ministerial and Delivery groups, as well as sub-groups on Health and Public Engagement and Behaviour Change. We have supported the Scottish Government in the implementation of CAFS2 along with civil servants, academics, environmental organisations, and other key stakeholders.

House coal and wet wood

In CAFS2, the Scottish Government has committed to "take forward...potential measures to control the supply of the most polluting domestic fuels - including a ban on house coal, restricting sulphur content of smokeless fuels to 2%, prohibiting the sale of certain types of wet wood and introduction of a minimum renewable content for manufactured smokeless fuels." Similar commitments have already been set in place by the UK Government.

The Scottish Government commissioned Ricardo Energy and Environment to assess the likely costs, benefits, and risks of proposed legislation on a potential ban on the sale of house coal. The published report, 'Impacts on the sale of house coal and the most polluting manufactured solid fuels in Scotland'[22], sets out three options for the Scottish Government to adopt: Option 1 would be to take no action; Option 2 would be a voluntary approach with an information campaign on the public health impacts of solid fuel use; and Option 3 would be for regulation on the sale, distribution and marketing of fuels such as house coal and high sulphur (>2%) smokeless fuels for domestic use.

While these measures are likely to reduce levels of $PM_{2.5}$, they risk being ineffective without efficient enforcement. House coal releases just under 5 times more $PM_{2.5}$ than smokeless coal and wet wood releases 4 times more $PM_{2.5}$ than dried wood. Regardless of any interventions to limit emissions, it must be remembered that domestic combustion in all forms is incredibly dangerous to human health, as there is no safe level of air pollution to breathe. It is clear that exposure to any level of $PM_{2.5}$ from wood burning is likely to cause damage to people's health, whether that wood has been kiln-dried or not.

All new stoves for sale in Scotland and the UK must meet Ecodesign standards, as set out in European regulations in January 2022, however these only account for less than 10% of all wood burning stoves currently in use in the UK and there are no plans to retrofit existing stoves[23]. Improvements in wood burners and technological change is not enough. There must be behavioural change across the country.

There is a risk that allowing some types of fuels to be burnt in specific Ecodesign stoves will promote the idea that these are safe ways to burn fuel in the home. This is not the case. We know that there is no safe level of air pollution, and such policies could undermine attempts by governments to communicate the importance of reducing air pollution for public health and environmental reasons.

Smoke Control Areas

First introduced as part of the Clean Air Act of 1956 and further strengthened in 1993, Smoke Control Areas make it illegal to emit smoke from chimneys unless exempt or using authorised fuels. In Scotland, 18 of the 32 local authorities have at least one Smoke Control Area, with the majority covering the central belt, the south-west and as far north as Dundee[24].

The Scottish Government has committed to work with local government to revise the Clean Air Act 1993, which is out of date and no longer fit for purpose. However there has been no plan or timeline for doing so. We encourage the Scottish Government to start this action as soon as possible.

Through Freedom of Information and Environmental Information Regulations requests, Asthma + Lung UK Scotland has found that between 2018 and 2022 a total of 1712 investigations were carried out by local authorities after receiving complaints within Smoke Control Areas. Of these investigations the only outcome was advice issued to the household. According to the FOI responses, no council has formally taken action such as issuing fines.

Smoke control areas are not fit for purpose. They are not effectively communicated to residents nor properly enforced by local authorities. We estimate that there are roughly 100 people across Scotland who are responsible within local authorities to investigate complaints and possible breaches of Smoke Control Areas. The problem of enforcement appears not to be workforce related but the powers and resources available to local authorities to investigate and take appropriate action. A further problem is that burning tends to happen in the evening and then investigated another day, usually when there is no burning.

Public awareness of the dangers is very low

Many of those who burn wood do not do so purely to heat their homes. Instead, the main reasons why people in the UK use a wood burning stove are: to create a homely feel, so they could heat just one room, to save money and/or because they like look of a fire[25].

When it comes to domestic burning, there is simply not enough knowledge of the potential dangers both to the individuals burning wood inside and also to others nearby. The *'Public Engagement with Air Quality in Scotland Report 2022'*[26] by the Scottish Government found that when asked to select one option, only 3% of respondents view the burning of wood and coal in homes as a main source of poor air quality, compared to 56% viewing transport as a main source. When able to select 3 options, the number of respondents who view domestic burning as a source of poor air quality increased to 23%, again compared to 81% for transport.

The same survey shows that 53% are not concerned about air quality in their local area, with 44% concerned. These figures correlate with Asthma + Lung UK Scotland polling showing that 53% are not concerned with air quality in their local area. Our polling also found that only 35% are concerned with the increased use of wood burning stoves.

Global Action Plan and other experts in behaviour change campaigns have produced a stakeholder toolkit to better understand and address wood burning[27]. The toolkit looks at the behaviours of wood burning with key messaging around reduction strategies, communication principles and awareness raising, providing a detailed insight in how to communicate the effects of wood burners to households across Scotland.

Asthma + Lung UK Scotland has been calling for greater education around the dangers associated with air pollution, as well as the specific dangers that domestic burning can cause to people with asthma and other lung conditions.

Policy recommendations

1. The Scottish Government, alongside it's public health and environmental agencies, should deliver a national awareness raising campaign to set out clear health advice, including specific guidance to all homes with a wood burning stove or open fire, alongside general messaging on the health impacts of air pollution. As well as targeting the people who are burning, messaging should also consider: those who don't burn and how they can communicate the effects of burning with those who do; and also, those who are considering burning at some point in the future.

2. A ban on the sale of the most polluting fuels such as house coal and wet wood.

3. Deliver a nationwide scrappage scheme for the most inefficient wood burners.

4. Set up $PM_{2.5}$ monitoring stations in every community for local authorities to accurately analyse the levels of $PM_{2.5}$ across different neighbourhoods, identify hotspots and implement more targeted interventions designed to reduce pollution levels. The Scottish Government must fund local authorities to monitor 24 hours a day, investigate and control sources of air pollution.

5. Use data from increased monitoring to communicate health alerts to people living with lung conditions during periods of higher air pollution. This would better support hospitals and general practices to reduce emergency respiratory admissions, reduce hospitalisations and reduce waiting times thus protecting the vital resources of the NHS.

6. Revise all legislation covering Smoke Control Areas to better support local authorities to implement and enforce SCAs. Along with more efficient monitoring, local authorities would be able to better monitor and investigate and control air pollution caused by domestic burning as well as enabling stronger enforcement for repeat offenders. Local authorities need better availability of resources and increased powers to act.

References

1. https://www.gov.uk/government/statistics/emissions-of-air-pollutants
2. https://aacrjournals.org/cebp/article/25/5/839/71066/Cancer-Mortality-Risks-from-Long-term-Exposure-to
3. https://www.gov.scot/publications/cleaner-air-scotland-2-towards-better-place-everyone/
4. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1083447/CHaPR_AQ_Special_Edition_2206116.pdf
5. https://www.familiesforcleanair.org/health/health4/#:~:text=Other%20EPA%20estimates%20suggest%20that,polyaromatic%20hydrocarbons%20than%2030%20cigarettes.
6. https://www.rcpch.ac.uk/sites/default/files/2020-01/the-inside-story-report_january-2020.pdf
7. https://www.theguardian.com/environment/2020/dec/18/wood-burners-triple-harmful-indoor-air-pollution-study-finds
8. https://airqualitynews.com/news/fuels-news/feature-why-we-need-transparency-in-the-wood-burning-industry/
9. https://www.theguardian.com/environment/2022/dec/08/eco-wood-burners-produce-450-times-more-pollution-than-gas-heating-report
10. https://www.gov.uk/government/statistics/emissions-of-air-pollutants/emissions-of-air-pollutants-in-the-uk-particulate-matter-pm10-and-pm25
11. IBID
12. https://www.dailymail.co.uk/news/article-10509439/Stove-sales-soar-gas-bills-rocket-experts-fear-increase-add-pollution-levels.html
13. https://randd.defra.gov.uk/ProjectDetails?ProjectID=20159&FromSe
14. IBID
15. IBID
16. IBID
17. https://www.sciencedaily.com/releases/2018/03/180322140915.htm
18. IBID
19. https://www.forestresearch.gov.uk/tools-and-resources/statistics/forestry-statistics/
20. https://cdn.forestresearch.gov.uk/2022/02/ch3_trade_fs2021.pdf
21. https://www.unep.org/news-and-stories/story/air-pollution-and-climate-change-two-sides-same-coin
22. https://www.gov.scot/binaries/content/documents/govscot/publications/research-and-analysis/2023/08/impacts-sale-house-coal-polluting-manufactured-solid-fuels-scotland-final-report-report-commissioned-scottish-government/documents/impacts-sale-house-coal-polluting-manufactured-solid-fuels-scotland-final-report/impacts-sale-house-coal-polluting-manufactured-solid-fuels-scotland-final-report/govscot%3Adocument/impacts-sale-house-coal-polluting-manufactured-solid-fuels-scotland-final-report.pdf
23. https://randd.defra.gov.uk/ProjectDetails?ProjectID=20159&FromSe
24. https://data.spatialhub.scot/dataset/smoke_control_areas-is/resource/1137b71c-9fe9-4588-ba4a-4a5160e9ee55
25. https://randd.defra.gov.uk/ProjectDetails?ProjectID=20159&FromSe
26. https://www.gov.scot/binaries/content/documents/govscot/publications/research-and-analysis/2023/06/public-engagement-air-quality-scotland-report-2022/documents/public-engagement-air-quality-scotland-report-2022/public-engagement-air-quality-scotland-report-2022/govscot%3Adocument/public-engagement-air-quality-scotland-report-2022.pdf
27. https://urbanhealth.org.uk/wp-content/uploads/2023/09/Toolkit-Behavioural-approach-to-Wood-Burning_FINAL.pdf

Asthma + Lung UK

18 Mansell Street
London E1 8AA

0300 222 5800
scotland@asthmaandlung.org.uk
AsthmaAndLung.org.uk/Scotland

ASTHMA+
LUNG UK
SCOTLAND