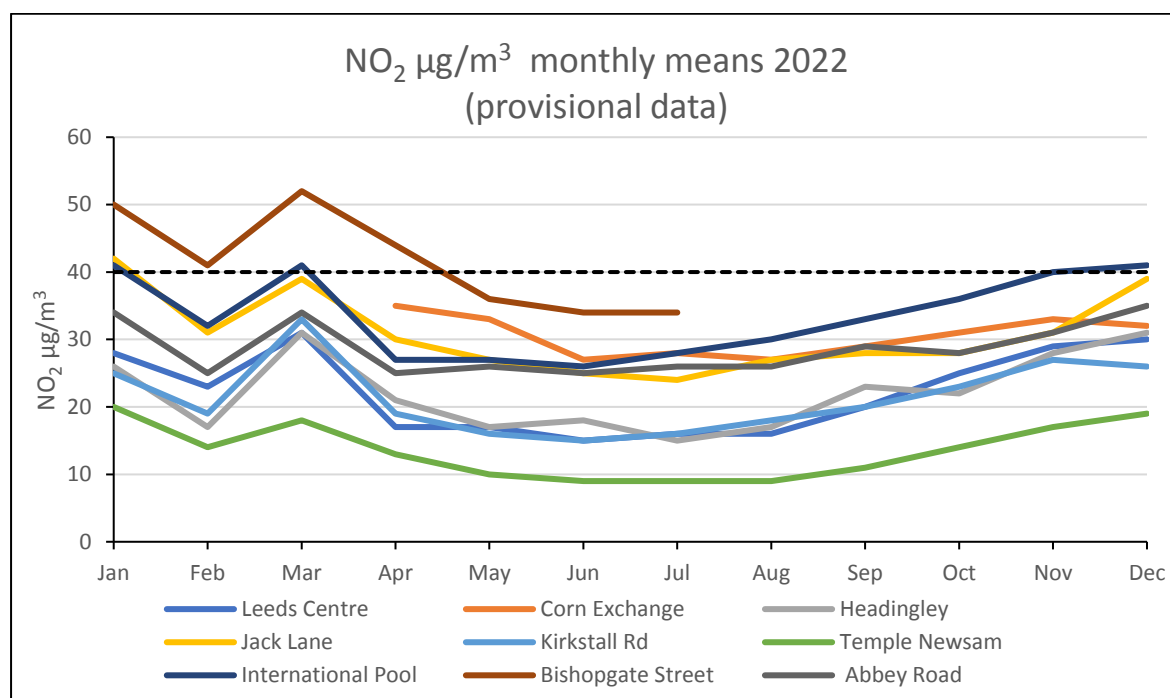


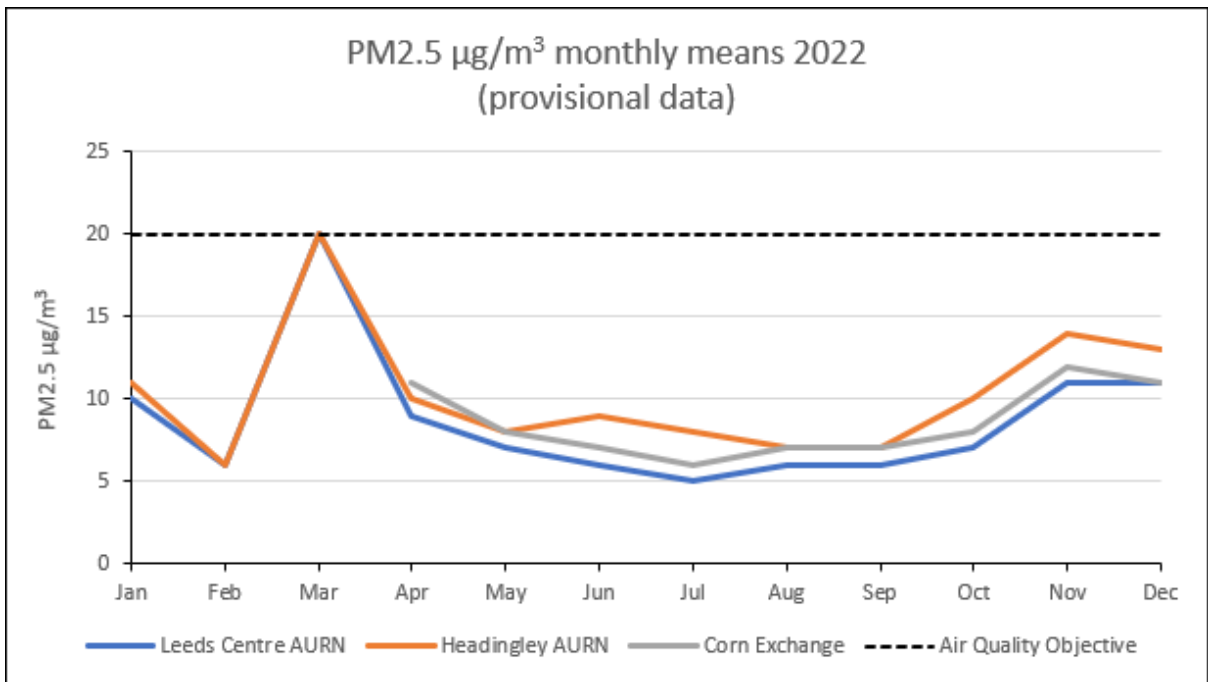
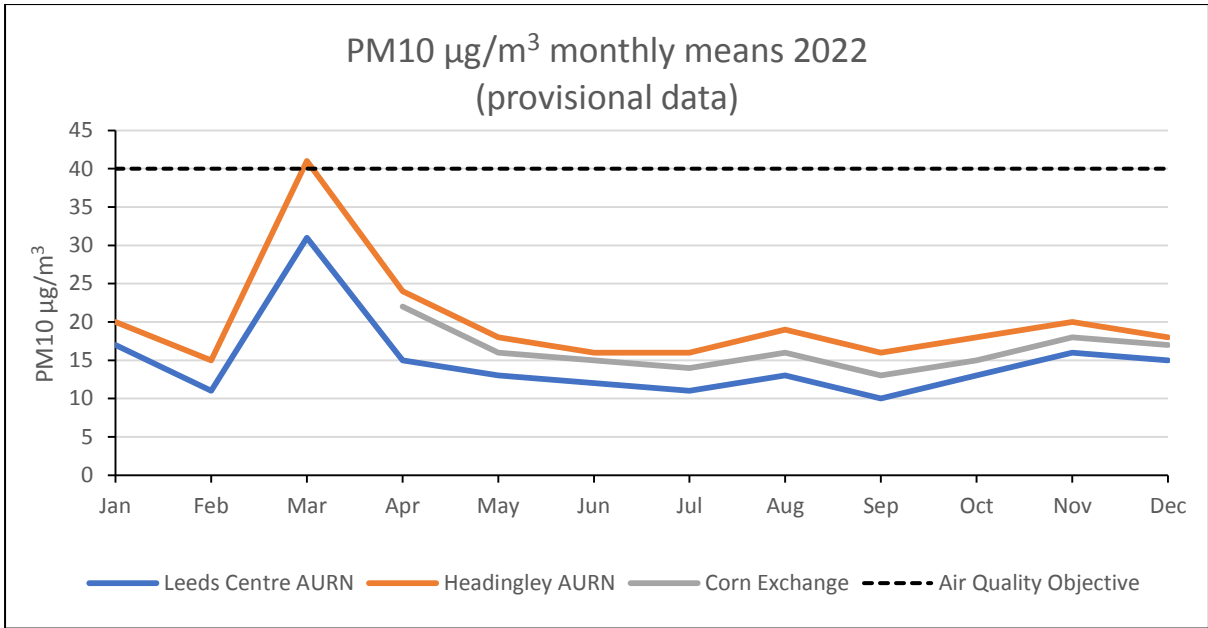
## Appendix –

### A - Air Quality Data

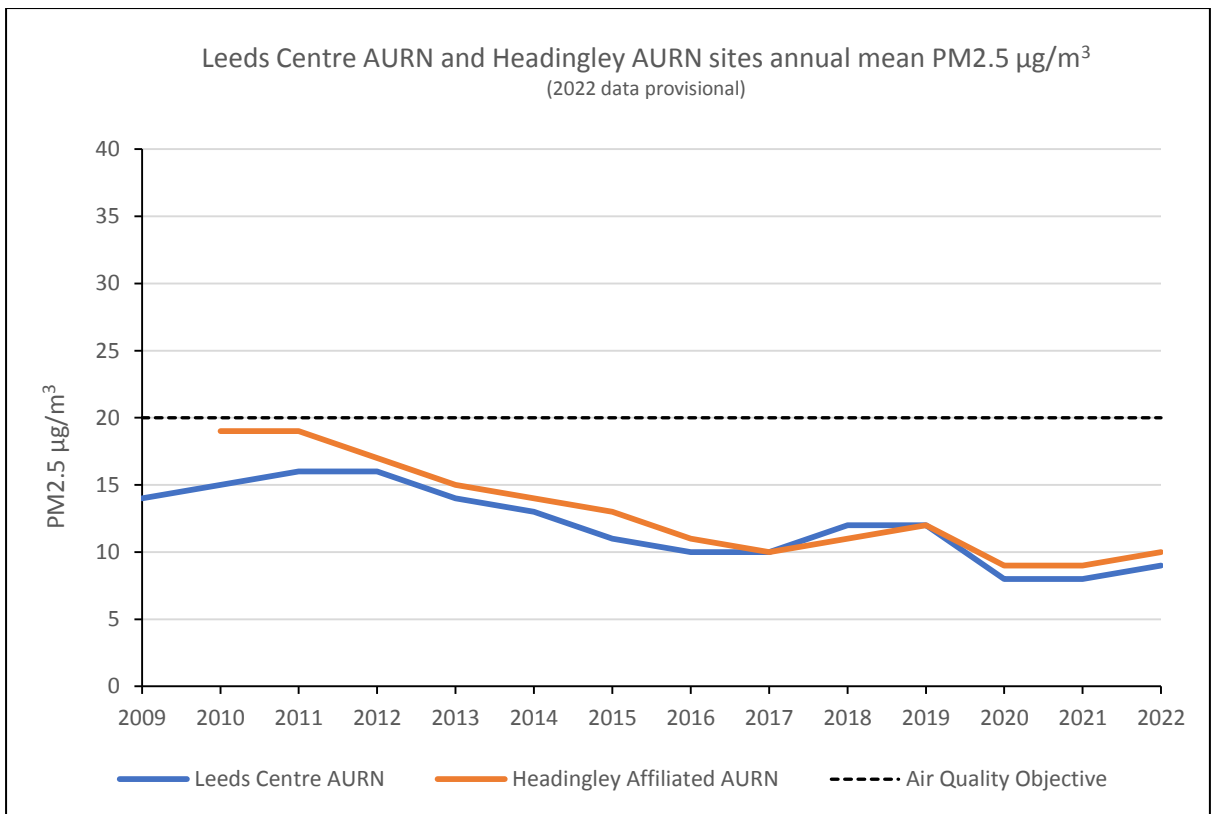
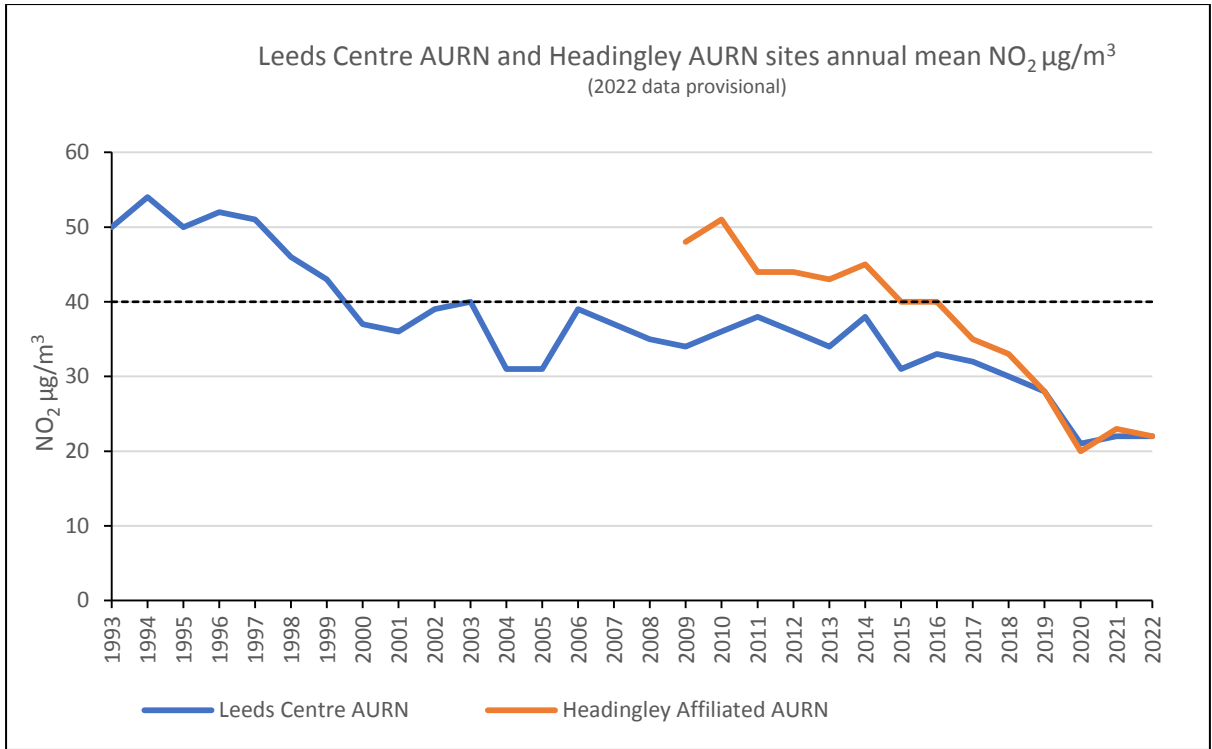
1. The graph below shows measurements from our key monitoring sites. The full data and detail of Leeds air quality can be reviewed through the 2023 Annual Status Report submitted to DEFRA – link in appendices.



2. PM10 and 2.5 monitoring data (below) also shows ongoing compliance with air quality objectives in the UK. A pollution episode that occurred in March 2022 was due to calm weather conditions, stagnant air and low wind speeds, plus air being drawn in from Europe carrying Saharan dust which reached the UK – leading to the peaks in March that can be seen across the 2022 data.
3. Annual averages – which is what national and WHO targets are based on, however show that Leeds remains compliant with UK targets for air quality.



- Historical analysis best demonstrates the annual improvements in air quality across both NO<sub>2</sub> and PM across the 2 key DEFRA affiliated monitoring stations in the city, also showing compliance on both NO<sub>2</sub> and PM 2.5.



## **B - Air Quality Improvement Actions**

Actions that have been taken to improve air quality in line with the Leeds Air Quality Action Plan are detailed below. Traditionally the focus has been on delivery of work to improve the quality of the air outdoors, through management of transport-based pollution. We are now developing work focused across the broader sources and locations of air pollution.

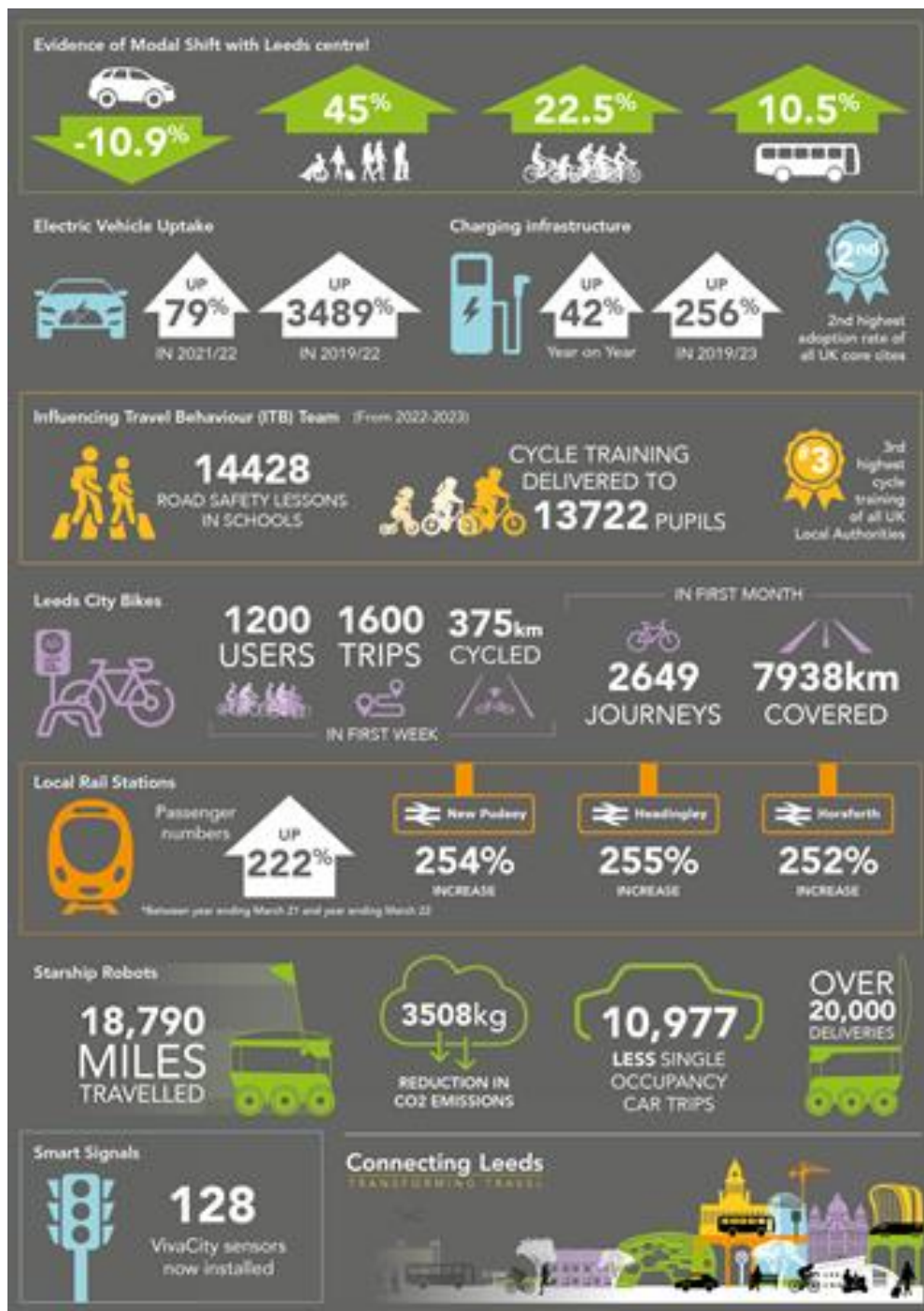
### **Transport**

1. Further work to develop the **electric vehicle charge infrastructure** across the city is continuing at pace. In line with the council's strategy for this the work is based upon the council working with central government, charge point operators, the combined authority and other key stakeholders.
2. There are now over 510 public charge points in Leeds, with the number increasing consistently, with over 100 added in the last 12 months alone. This is in addition to the thousands of private chargepoints installed at homes, businesses and in other private locations in support of the transition towards electric vehicles.
3. Work with the Highways and Transport service to establish **on street charging** design guidance is to be tested through a pilot project that will establish on street charging in 2024 in partnership with private investment.
4. Significant **government funding** is also being secured to deliver infrastructure locally and regionally, with current and projected projects due to add hundred's more charging points around the city over the next three years, in addition to the charging infrastructure that will be installed due to planning and as commercial operations increase.
5. Over £16million of funding has now been allocated to West Yorkshire through the **Local Electric Vehicle Infrastructure (LEVI)** scheme following work by Leeds, West Yorkshire Combined Authority and the other four districts to demonstrate our ability to deliver infrastructure and uptake of electric vehicles in the region. This grant funding will be added to with commercial investment in delivery, with successful market testing and engagement with the charge point sector identifying significant appetite to invest in the region, therefore increasing the value of the investment in vehicle charging and the number of charge points that will be delivered. This work to combine government grants with **private investment** is in line with the LCC Electric Charge Point Infrastructure [Strategy](#) that was approved in 2022 by Executive Board.
6. To support regional delivery of the LEVI programme, a **West Yorkshire Electric Vehicle Strategy** is being developed that will align with the LCC strategy. This will also be supported with of a procurement framework that will streamline the ability of the 5 districts to delivery of projects with Charge Point Operators who have been assessed on quality, best value, ability to invest and delivery experience to ensure that infrastructure is resilient, accessible, and competitive across the region.

7. LEVI funding is aimed at supporting the delivery of charge infrastructure to those who cannot charge at home, with near to home public charging for areas characterised with housing that lacks off street parking, such as terraces and high-rise housing. LEVI funding doesn't provide domestic charging for individual households, but in line with government policy aims to support the growth of the commercial charging network to facilitate the rapid transition of vehicles towards zero-tailpipe emission electric vehicles.
8. In addition to LEVI funding Leeds has continued to seek to utilise other funding sources, such as the **Residential Charging Scheme (ORCS)** that provides a proportion of capital funding for installation of near to home public charging in areas as described above. To date we have successfully secured over £300,000 in this funding to deliver 84 charge points and are undertaking an application for a third round of funding to deliver further infrastructure in early 2024 in addition to the LEVI programme that aims to deliver at least 500 connectors in Leeds by 2026.
9. As noted in the report, there are over **50,000 registered plug-in vehicles in Leeds** all contributing to improved air quality through their zero tailpipe emissions. It should also be noted that charge points that are installed in partnership with Leeds City Council should be supplied with renewable energy as part of our Net Zero strategy.
10. There has been utilisation of ANPR data to identify and monitor fleet change across the city as well as to support development of EV infrastructure, assess trends in fleet transition to zero emission and support development of targeted communications. ANPR data has shown that there has been a consistent growth in the number of plug-in-vehicles on Leeds roads, providing verification of the data from the DVLA on plug-in vehicle registrations in the city.
11. Our own **fleet improvement** is ongoing with further electric vehicles being sought to add to the existing zero emission fleet of almost 400 vehicles. The first fully electric refuse collection vehicles are due to be received in Spring 2024, with work to identify opportunities in other vehicle categories for EV transition in progress. A wide ranging and in-depth fleet review process that includes an implementation plan for decarbonisation is due to be undertaken and completed in the first 6 months of 2024 through work with an external fleet consultancy with expertise in this area. This will deliver a roadmap for the transition of our fleet to the lowest possible emission vehicle categories that will support both ongoing air quality improvement, but also out net zero targets.
12. [Novembers' Executive Board meeting](#) heard how a record amount of work has been completed under the banner of the **Connecting Leeds transport strategy** and plan.
13. The vision for Connecting Leeds is to deliver transformational change in the transport network and connectivity across Leeds and the wider region, helping to bring people, places, jobs, learning and leisure closer together. This is to be achieved through improvements to road, rail, bus, park, and ride, cycling and

walking services and infrastructure, reducing congestion, and improving air quality and accessibility.

14. A key part of the transport strategy is to increase the use of walking, cycling and public transport, which contributes to carbon reduction by encouraging modal shift away from the private car and supporting inclusive growth by making it easier to access education, employment, and public services.
15. Since 2018 through Connecting Leeds, there has been an unprecedented £750 million of investment into the transport network across the city, in partnership with the West Yorkshire Combined Authority, bus operators and other transport stakeholders. This includes the Leeds Public Transport Investment Programme, East Leeds Orbital Route, City Square and associated works, Armley Gyratory, Regent Street flyover and recent launch of Leeds City Bikes.
16. The closure of City Square to general traffic marks an important move towards transforming the city centre, improving the main gateway to the city from the railway station, prioritising public transport and creating places for the people of Leeds to enjoy. Monitoring of city centre travel habits between 2022 and 2023 has shown a 10 per cent reduction in use of private cars, with bus, rail, walking and cycling all increasing, for example walking by as much as 45 per cent.
17. The successful launch of the **Leeds City e-Bikes** scheme in September 2023, which is the largest of its kind in the UK, will help more people make the switch to cycling for some of their journeys taking advantage of the high-quality infrastructure delivered by the council. In the first week of operation 1,200 users covered 375km and made over 1,600 trips, rising to 2,649 journeys, and covered 7,938km in the first month of operation. People were invited to join a series of free led rides on Leeds' growing cycling network, with more than 10km of segregated lanes in the city centre alone. Leeds City Bikes is a fully electric public bike hire service delivered by Beryl in partnership with Leeds City Council and the West Yorkshire Combined Authority.
18. Covered in the graphic below are examples of performance indicators including electric vehicle uptake, Stars hip delivery robots, SMART traffic signals, uptake at local rail stations and road safety education with Bikeability cycle training.



- 19.
20. To meet these 2030 carbon targets and ambitions outlined in the transport strategy, there remains a significant funding gap. Funding is needed for both ongoing maintenance and to deliver new key infrastructure programmes to encourage a significant mode shift to active travel and public transport, however the council continues to work hard to identify and secure funding opportunities to deliver sustainable transport options.
21. Leeds City Council has successfully been awarded funding for five schemes that will enable residents to choose more active and sustainable modes of travel and improve air quality and road safety for everyone. A part of a £200million funding pot, which Active Travel England expects to generate up to 16 million extra

walking and cycling trips every year from, the Leeds-based schemes will go out to public consultation this financial year. Stakeholders, businesses, residents, and the public will be able to have their say on the proposals and shape the designs. The five areas that make up the Leeds programme are:

- Armley Town Street – plans aim to enhance and uplift Armley Town Street whilst providing bus priority improvements (£2.9million)
- Bentley Residential Streets, Meanwood – traffic management measures in the area (£0.35million).
- Eastern Gateway, Leeds City Centre – safer, segregated, two-way cycle tracks on Templar Street and Bridge Street to link together existing cycle tracks on Vicar Lane and Eastgate. Improvements to pavements and pedestrian crossings are also included in the plans (£0.4million).
- Holbeck Connector, Whitehall Road – extend segregated cycle tracks on Whitehall Road, near the Wellington Place offices, to link to the existing cycle track adjacent to A643 Ingram Distributor, near Dunelm. (£2.3million).
- Westgate Connector – extend segregated cycle tracks on Westgate and create a safer, segregated, two-way cycle track on Park Lane and Burley Street providing a safe link from the western end of Burley Road to the western edge of the city centre. Improvements to pavements and pedestrian crossings are also included in the plans (£1.8million).

22. Depending on public consultation, the schemes are scheduled to be delivered by March 2025.

- Works to improve walking and cycling connections over the River Aire have completed, marking a significant milestone for cycling improvements in Leeds city centre.
- The Crown Point Bridge Gateway scheme adds over 1km of protected cycle track over the bridge, Crown Point Road and Black Bull Street and aims to boost connectivity to the south-east of the city by encouraging more people to walk, wheel or cycle shorter journeys.
- The scheme creates links to local education and new developments in the south bank, helping to give more people the opportunity to give cycling a go when getting around the city. The project also provided valuable work experience to local students.
- Continuing improvements to the public transport fleet has been supported with projects such as the transformation of the Bramley First Bus depot to support EV charging for buses getting underway in autumn 2023. The work will deliver the capacity to operate a fully electric fleet from the depot, with a £29m scheme combining commercial investment with £12.6m government funding secured by the West Yorkshire Combined Authority via the Department for Transport Zebra scheme. When the project is completed, 57 buses – a third of the fleet at Bramley – will be fully electric



by March 2024, with each bus saving around 60 tonnes of carbon emissions a year and being effectively zero emission at the tailpipe – crucial for air quality improvement. This follows on from already existing electric bus routes operated in the city, such as the Number 5 route in the city centre and the services to and from Stourton Park & Ride.

- **27 E-Cargo bikes** have been secured with funding from the Department for Transport, with these being utilised across the region with loans of the bikes to small businesses and other organisations to demonstrate the benefits of zero emission last mile delivery. This work compliments broader Transport strategy work to both make zero emission modes accessible, and also reduce the number of journeys taken by combustion engine vehicles. We also continue to engage with local fleets to support the transition of vehicles to zero emission models, with significant commitments being made, such as the entire Leeds fleet of last mile delivery vehicles operated by DPD being 100% electric by the end of 2023.

### **West Yorkshire Strategy**

23. Work on the update to the **West Yorkshire Low Emission Strategy** is also ongoing with working groups, third sector organisations and evaluation of new policy and developments and work to share data and best practice across the region.
24. This work incorporates air quality impacts from modal shift, providing guidance on planning and enhancing data through work such as utilisation of Zephyr monitors funded through the combined authority.

### **Public Health**

25. Delivery of the UK's first air quality event for Health professionals – the '**Every Breath You Treat**' event hosted by LCC in late 2022. With 150 health professionals and key stakeholders attending the event, it was a very positive was to demonstrate the impacts of air pollution to those treating its effects. Feedback on the event was excellent, one delegate stating it was the "*best example I've seen at running a virtual conference, very impressive*" and another commended Leeds for "*their real commitment to tackle air pollution*". This work delivered in partnership between Public Health and the Climate and Energy team has proved to have a lasting impact with unique work linking the sources of air pollution with its impacts and raising awareness of air quality amongst clinicians having a transformational impact on the way the health sector has been engaging on air quality in the city.
26. The **Air Quality Alert system** went live in 2022 providing live information on days with very high air pollution so action can be taken by those most vulnerable to its impacts. <https://www.leeds.gov.uk/clean-air>

27. As part of this alert, public health messaging for the public and for those most at risk of the impact of poor air quality (including those with respiratory or cardiovascular conditions) is provided.
28. Nearly 2000 individuals and local organisations are currently subscribed to receive these alerts including all education establishments, care homes, third sector organisations, home care providers and GP practice managers.
29. We have also updated our online information - [www.leeds.gov.uk/cleanair](http://www.leeds.gov.uk/cleanair) We've added much more information about the health impacts of air pollution, protecting yourself, and reducing your own emissions.
30. The above actions are in line with actions that activist organisations such as Asthma + Lung UK (A+LUK) are calling for local authorities to deliver. The fact that Leeds has already implemented these in advance of the A+LUK demands has been seen as welcome and innovative in pro-actively tackling both the mitigation of air pollution, but also the awareness of varied stakeholders regarding exposure and actions that can be taken to reduce impacts.
31. The Air Pollution and Health Group has been continually active in addressing the need for cross-agency and service work on air quality. This group is a citywide multi-agency partnership (involving partners from Environmental Health; NHS; Housing; Highways and Transport; University of Leeds; Climate, Energy and Green Spaces) and is accountable to the Leeds Health Protection Board and Leeds Health and Wellbeing Board.
32. The partnership is chaired by Dawn Bailey (Chief Officer for Health Protection and Sexual Health) and ensures a collaborative approach for action, planning and prevention to address the impact of air pollution on health across Leeds. The Health Protection team works in partnership to drive forward actions and priorities.
33. The continued work with Public Health Leeds includes the development of the **Health Needs Assessment Report** which is critical to the understanding of Air Quality in the Health care sector in the city. The aim of the HNA is to define a targeted approach to addressing the health inequalities exacerbated by air pollution in Leeds.
34. Key objectives of the needs assessment include understanding the evidence-base and local data picture with regards to health outcomes and presenting perspectives from residents.
35. A key findings workshop was led by the Health Protection team and held in March 2023; this allowed collaboration with local and national stakeholders to develop key recommendations for local activity and interventions that mitigate the risk of poor health because of air pollution. These actions are part of the ongoing work of the Air Pollution and Health Group and detailed across this report.
36. The Health Protection Board Report contains a significant section on air quality and health in recognition of the significance of Public Health's work in this area, bit in terms of raising awareness, but also mitigation.

# Air quality and health

54 of every 1000 deaths that occur in Leeds can be attributed to air pollution.

– (Fingertips, 2021).

## Current position

Air pollution remains the largest environmental health risk in the UK and there are no safe levels of the main pollutants of concern (NO<sub>2</sub> and PM). Last year's Chief Medical Officer (CMO) annual report (2022) focused on air pollution and the need for public health action to reduce exposure and contributions to indoor and outdoor pollution.

There are two primary pollutants of concern for Leeds:

- Nitrogen dioxide (NO<sub>2</sub>) of which the main source is vehicle emissions and the burning of other fossil fuels.
- Particulate matter (PM10 and PM2.5) There are a number of sources of Particulate Matter. A small proportion of the concentrations of PM that people are exposed to come from naturally occurring sources such as pollen, sea salt and airborne dust. A third of all PM in the UK is from sources outside of the UK. However, around half of UK concentrations comes from domestic wood burning and transport emissions.

Source: Clean Air Strategy, 2019

In 2022, outdoor air quality in most of Leeds met the UK's air quality objectives and has remained at similar levels since 2021.

Leeds City Council plans to revoke five out of six current Air Quality Management Areas in the city. These are areas where the pollution levels have previously exceeded the UK standards.

### Partnership approach to mitigate the impact of Air Pollution

The Leeds Air Pollution and Health Group is a citywide multi-agency partnership, involving partners from Environmental Health; NHS; Housing; Highways and Transportation; University of Leeds; Climate, Energy and Green Spaces, and is accountable to the Leeds Health Protection Board and Leeds Health and Wellbeing Board. The partnership ensures a collaborative approach for action, planning and prevention to address the health impact of air pollution on health across Leeds.

An Air Quality management area is: "geographical areas where air pollution levels are, or are likely to, exceed national air quality objectives at relevant locations"

#### Air Pollution & You



## Protect yourself when high air pollution is forecast

Everyone can be harmed by dirty air but those most at risk are

- People with heart or lung conditions
- Pregnant women
- Older people
- Children

Air pollution warning for Leeds: **Very high** pollution forecast

Making simple changes on days when poor air quality is forecast can reduce your risk of becoming ill or worsening existing health conditions.



Sign up here to receive email alerts and official public health advice when high levels of air pollution are forecast in Leeds. This free service is provided by Leeds City Council.

To find out more about air quality in Leeds visit [www.leeds.gov.uk/cleanair](http://www.leeds.gov.uk/cleanair)



37. The Health Protection team have led on the following initiatives to support with this agenda alongside partners:

- Co-developing the air pollution alerts system with Council partners (Environmental Health; Resilience and Emergencies; Climate, Energy and Green Spaces)
- Working with the University of Leeds on their Sensing Leeds network of expanding the number of particulate matter sensors across the city; this will increase our understanding of pollution trends across both urban and rural areas.
- 'Want to Know More About...' training webinars and the development of a training video resource aimed at the wider public health workforce to increase understanding about air pollution and health
- Delivery of a workshop on air quality and health at the 2022 Leeds Public Health conference
- Co-organised an accredited national conference 'Every Breath You Treat' aimed at health professionals and clinicians to help encourage meaningful conversations about air pollution and health as part of routine appointments and clinical assessments
- Distributed 7000 patient-friendly leaflets to all GP surgeries in Leeds for those with respiratory health conditions

- Created and distributed posters to support clinicians and encourage sign-up to the air quality alerts system
- Ensuring public health messages are kept up to date and shared via the Clean Air Leeds website
- Hosting and facilitating a workshop for local partners to collectively develop actions from the HNA and CMO report recommendations (see below)

38. The **Health Protection** team further intend to work with local partners to develop a refreshed action plan for the Air Pollution and Health Group that will use the recommendations from the HNA, CMO report and the Health Protection Board report. This will include:

- Strengthening the workforce development offer for the wider public health workforce and health professionals
- A greater focus on communication and engagement with populations at higher risk of the short- and long-term effects of air pollution
- Prioritising key activity and guidance on indoor air pollution, which is an area of emerging public health practice and recognition
- Projects with local schools, including supporting Bracken Edge Primary School to access air quality monitors and sensors, lesson plans, and resources.
- A bid with Leeds Older People Forum to develop workshops on air pollution for staff and volunteers attending Neighbourhood Networks and tailored resources for the older population.
- Championing air quality as a key health issue across Leeds, including within settings, communities, and alongside councillors. Everybody has a role to play to reduce their contribution and exposure to air pollution.

39. As referenced above the **Health Protection Board's Air Pollution and Health Group (APHG)** was established as part of the Health and Wellbeing Strategy Action Plan and meets quarterly with an over-arching aim to develop and implement an Action Plan.

40. The Health Needs Assessment (HNA) work will support the development of their air quality action plan and will outline a summary of the evidence-based interventions and recommendations which will be used to inform key actions

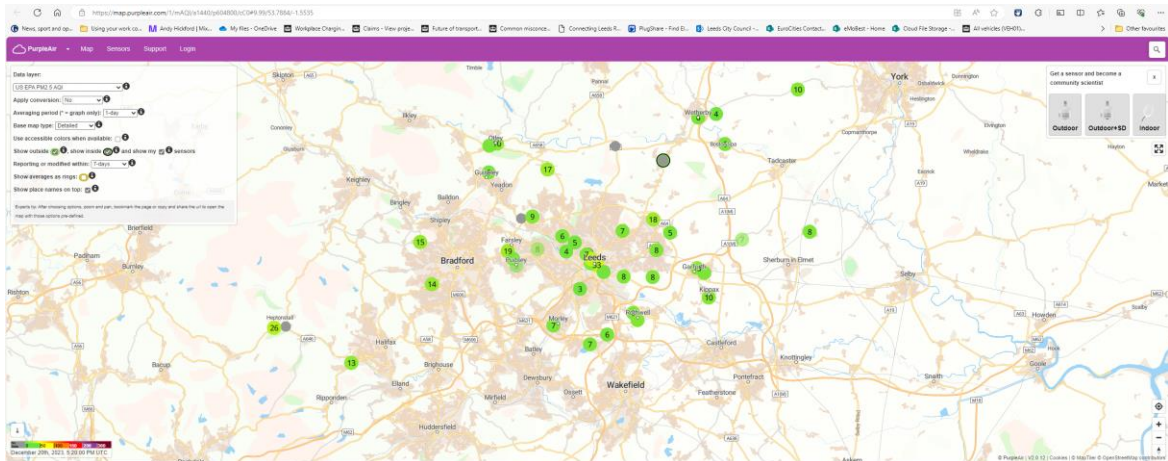
41. The APHG Action Plan aims to raise awareness and promotion to key health organisations the impact of air pollution on health. How these key stakeholders can contribute was evidenced with the successful Every Breath You Treat conference in October 2022 and the development of the air quality alert system.

42. The APHG identified the need for a rapid, desk-based needs assessment providing wide-ranging, high-level data on the impact of poor air quality on the health of the population in Leeds. The Public Health Intelligence team have worked to include a range of quantitative (looking at disease burden, secondary care, and the prevention of premature deaths, alongside levels of air pollutants

and high pollution episodes) data as well as qualitative (focus groups to gain insight about views on health and air pollution, a citywide survey) data as part of the HNA development.

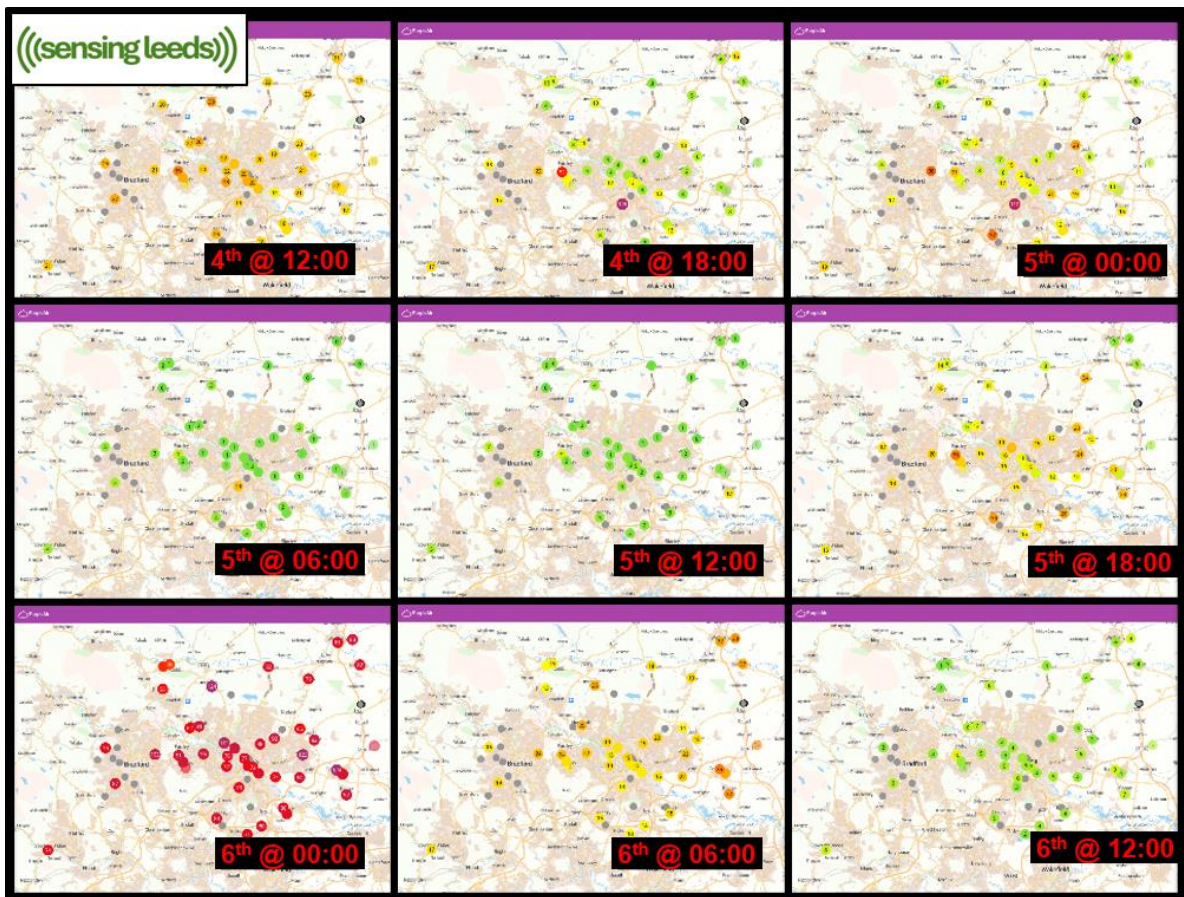
### **Monitoring Technology**

43. We have continued work with academics across the city, including Leeds Beckett University and University of Leeds, such as through the **Purple Air** project that is enhancing coverage of air quality monitoring and therefore providing richer data sets that better inform our understanding of pollutant concentrations, movements, sources and baselining data to track improvements. The Purple Air project includes installation of air quality monitoring at locations such as schools, which will assist with understanding of impacts on vulnerable groups as well as help identify links to air pollution and other inequalities.
44. Purple air sensors measuring PM2.5 and PM10, temp and % humidity have been distributed across Leeds by the University of Leeds with a few just outside the LCC boundary.
45. The units are significantly cheaper than traditional air quality sensors (around £250) allowing for greater distribution and granular data capture. These have been purchased and installed as part of a University of Leeds project assisted by LCC in terms of help/advice with location and installation.
46. There is an acceptance that the cheaper cost of the units means that the data in and of itself may not be “wholly accurate”, however University Quality Assurance has ensured that the sensors should at least be comparative with trends and that co-location with higher cost and more accurate sensors means that we can establish data assumptions that will make the data from purple air monitors valuable and instructive in understanding and evaluating wider air quality trends, patterns and sources.
47. The data from this project is available freely to public via the purple air [website](#), but it should be noted that based on the above caveats regarding accuracy that the raw data on the website should be treated as part of the picture of air quality in the city, and should be considered alongside detailed LCC reporting, such as through the Annual Status Report to Defra.
48. The aim of the project is to see how we can identify “events” or variations in concentrations across a wider area through a network of cheaper sensors rather than a few expensive but accurate ones, so that we can enhance understanding and therefore identify opportunities to tackle such events with mitigating measures to improve overall air quality.
49. Some initial work has shown how we can identify localised peaks from regional events and whether they may be related to domestic heating or other sources.



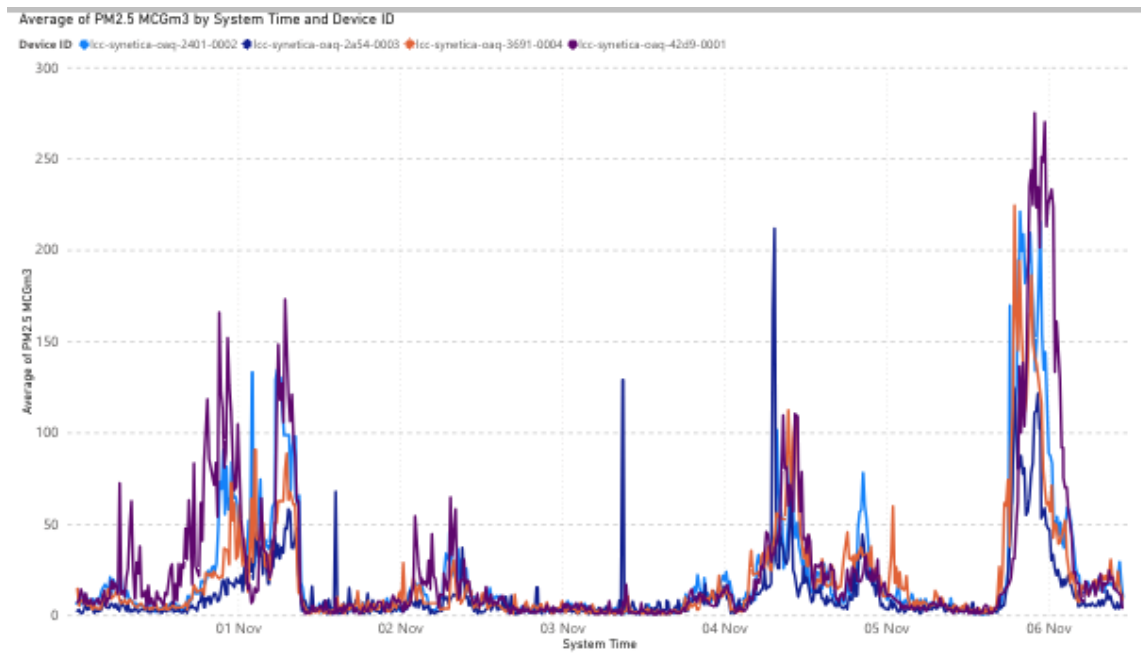
50. Above – A typical image taken showing PM levels in Leeds as monitored by Purple Air sensors across the city. This image shows average readings over an hour at 5pm on 20<sup>th</sup> December 2023.

51. Below – images showing the potential impact of Bonfire night with a sequence of images taken from the Purple Air website with readings across a 48-hour period including midnight on 5<sup>th</sup> November.



52. Below captures data from the 4 real time Air Quality sensors we have that demonstrates spikes in line with bonfire & firework night. On November the 4<sup>th</sup> there was relentless rain all day, so that likely accounts for the lower spikes on

that day. There also appears to be a spike too on Halloween, with firework use a possible additional source of particulate matter on that evening.



53. A regional group with Leeds City Council working with academics and the Combined Authority secured a £220,000 DEFRA Air Quality Grant in February 2023 that will deliver further improvements to the monitoring of particulate matter across the region. This will also enable the establishment of a PM data dashboard that will collate all data sets and assist in understanding of sources of PM in the city and region that will inform and develop improvement public health messaging, communications campaigns and help target actions to reduce emissions in key locations.

54. This project is the '**The West Yorkshire Public Particulate Information Improvement Project (PIIP)**'.

- WYCA funding will pay for a network of "low Cost" iMCERT particulate monitors across West Yorkshire (approx. £2000 per sensor / per year for 2 years). There will be between 3 and 6 sensors per district.
- They will be owned by WYCA and passed on to LCC (and other districts) after project if they wish to keep them operating.
- The project includes match funded input by University of Leeds, Leeds Beckett University and Slingshot Simulations to provide detailed Quality Assurance and data analysis with the creation of a data dashboard for public (and private) access via WYCA Webpages.
- This project will also look at creating processes to automatically flag potential events or sensors going off-line to increase data collection etc.
- The dashboard will also take data from other Sensors such as Purple Air, our own LoRaWAN sensors and Leeds Beckett University's iMCERT and oniMCERT monitors (including 6x Zephyr monitors which also analyse NO<sub>2</sub> as well as PM<sub>10</sub> and PM<sub>2.5</sub> and % humidity located within Leeds)

into the same data pool for analysis and incorporation into the dashboard so all sensors in Leeds can be viewed and accessed via one common platform.

- This work includes source apportionment work for West Yorkshire to help identify areas of greatest emissions and highest risk of population exposure to inform projects or policy development to mitigate those sources.
- The PIIP Project will also include development of public health messages as well as data visualisation on dashboard and website to support awareness as well as understanding of the air pollution picture in the city.

**55. Transport / IDS Trial project** - Leeds IDS has purchased 4 “low cost” iMCERT monitors (approx. £1500 each) which work on our own LoRaWAN system for data transfer and will monitor NO<sub>2</sub>, %humidity, PM<sub>2.5</sub> and PM<sub>10</sub>. We will be working with IDS and the University to collect data and process this in a way that is comparable with the more expensive commercial models which require annual subscription to see and collect the data. The Environmental health team are looking at the potential for these to be better and easier to provide for evaluation of ‘before and after’ monitoring for highway scheme air quality assessment and evaluation requirements.

56. Leeds Beckett University have installed some of their indoor ‘SensorBee’ monitors that can detect particulate matter ranging from PM<sub>10</sub> right down to PM<sub>0.01</sub> in different buildings in the city to research and identify possible links with outdoor air quality. These units are being upgraded to work outside as well as potentially being mobile, so there is a chance these could also be included in the PIIP project or located on buses for example to help create a more granular and geographically and environmentally spread set of data.

### **57. Domestic Energy & Insulation Impacts**

58. Decarbonising homes through better insulation and the adoption of heat pumps, solar, and direct electric heating/cooking, removes significant combustion sources of air pollution from the home. Alternatives being considered, such as combustion of hydrogen or biogas methane in place of fossil methane, retains emissions of NO<sub>x</sub> and particulates due to the presence of combustion.

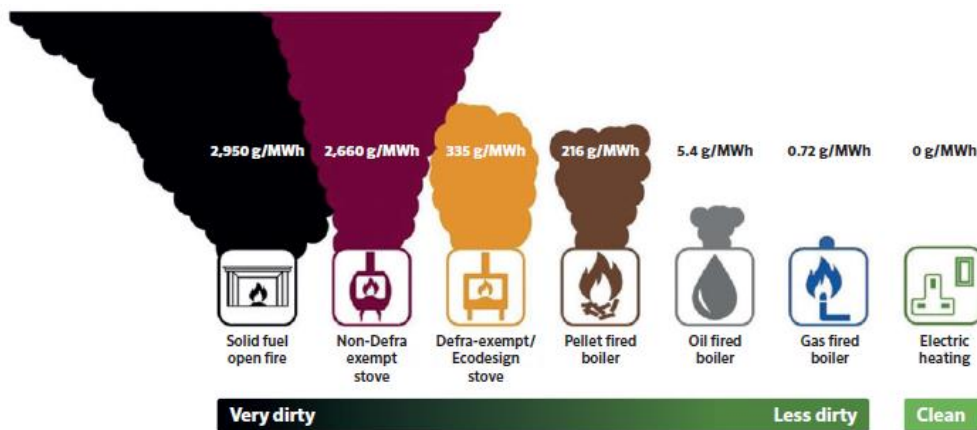
59. In the UK, over 22 million households are connected to the Methane gas grid, and in 2020, 38% of the UK’s gas demand was used for domestic heating. The combustion process in gas boilers is a source of NO<sub>x</sub> emissions, which is released into the ambient air through domestic boiler flues. In addition, when gas boilers are not working properly and there is incomplete combustion of the gas, they can emit harmful carbon monoxide.

60. Although gas boilers are very common, 16% of homes in Great Britain are not connected to mains gas. These homes use either electricity or alternative heating methods, such as liquid petroleum gas, heating oil or solid fuel of coal, coke or wood. Households without mains gas are more likely to be in fuel poverty and



tend to be in rural areas and may find changing to an alternative heating method logistically and financially challenging.

61. Through the **Home Upgrade Grant (HUG)** we are working to deliver upgrades to up to 750 homes that are not connected to the gas grid with improvements to insulation and heating that will both lower bills and lower the carbon emissions from the homes. Work is underway identifying and assessing homes for eligibility and the funded works that can be delivered.
62. Heating that relies on electricity, using electric heaters or heat pumps, is not a source of air pollution at the point of use – however, it can be seen as an expensive method of heating if the cost of install is considered prohibitive initially.



Note: The air pollution emissions will also depend on the age of the appliance, how it is maintained and used and the fuel burned (for example, dry or wet wood).

The following definitions were used: *Solid fuel open fire*: wood burned in an open fire. *Non-Defra-exempt stove*: wood in a conventional stove. *Defra-exempt/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 (>50KWth <1MWth) boiler. *Gas fired boiler*: natural gas in a small (<50kWth) boiler.

Source: Emission factors taken from EMEP 2019 Guidebook<sup>32</sup> (1A4 small combustion tables). Adapted from the Clean Air Strategy<sup>33</sup> with updated data

63. We know that domestic burning accounted for 25% of the UK’s primary PM2.5 emissions in 2020, with around 1.5 million households burning wood and 400,000 using coal and other solid fuels. Nationally, the use of wood stoves is increasing and can impact air quality significantly in urban areas. Air pollution emissions can be reduced, but not fully eliminated, by using modern, less polluting stoves and burning wood that is dry.
64. The growing challenge in controlling emissions from burning of fuel is that the rising utility costs have encourage alternative sources of heating in homes. In smoke control areas, these rules should be adhered to. PM2.5 emissions from burning different types of fuel can be noted below.

Fuel	PM <sub>2.5</sub> emissions when burned
Wet wood	28.87 grams per tonne
Dry (seasoned) wood	7.21 grams per tonne
Manufactured solid fuels	1.6 grams per tonne
Smokeless coal	1.76 grams per tonne

Source: The Air Quality (Domestic Solid Fuels Standards) (England) Regulations 2020<sup>35</sup>

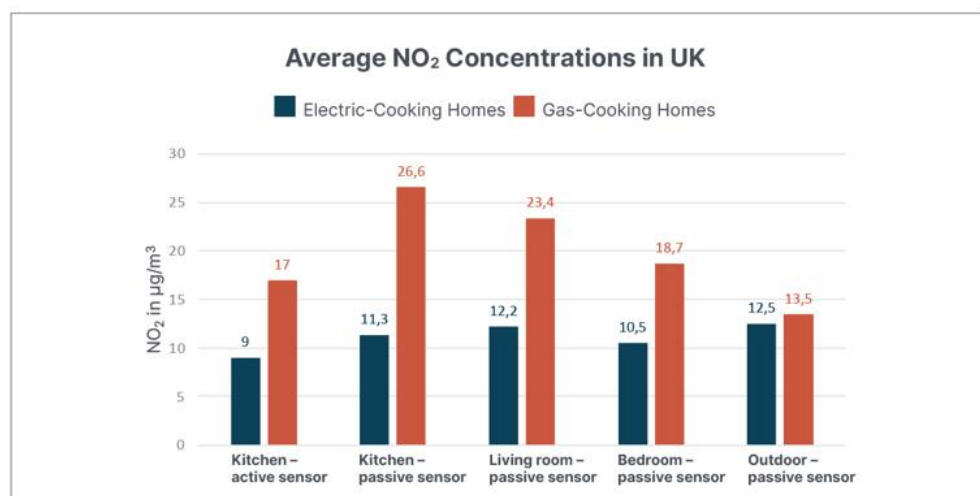
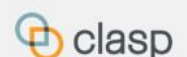
65. When wood and other solid fuels are burned indoors, air pollution travels to the outside through the chimney or flue and pollution is also released indoors, particularly when an open fire is used, or the stove door is open, creating health harms for both the resident burning and their neighbours.
66. Studies have been undertaken on the impact of wood burning – Global Action Plan have published a report '[Relight my Fire – Investigating The True Cost Of Wood Burning](#)'. This established that counter to popular belief, wood burning is not only harmful, but also is more expensive than using central heating unless self-sourced at zero cost, with Air Source heat Pumps offering both a cleaner heat source, but over whole life cost analysis a cheaper heat source too. Whilst Gas central heating is also cheaper than wood-burning, it retains the harmful impacts.
67. In addition to domestic space heating, effective insulation of people's homes reduces the demand for heating and helps to maintain adequate building temperatures for people's thermal comfort and health. Even if there is a shift to hydrogen-based heating, if the demand for heating can be reduced, the amount of NOx released is likely to be lower. As such it is important to draw the clear links between decarbonisation and air quality, especially regarding domestic heating and health.
68. Hundreds more households will benefit from more affordable, reliable, and lower carbon heating with three tower blocks set to become the latest to connect to the city's **Leeds PIPES district heating network**. Two hundred and fifty-nine council properties in Lovell Park Heights, Lovell Park Grange, and Lovell Park Towers will be set up to receive heat from the network within the next six months. Private leaseholders of properties in the Little London tower blocks will also be able to benefit from the network if they opt to connect their homes to the system.
69. Meanwhile, Leeds Conservatoire (formerly Leeds College of Music) has become the thirteenth non-residential customer to have signed a contract to connect. The new connections are expected to reduce the city's annual carbon footprint by 279 tonnes, supporting efforts to end the city's contribution to climate change by transitioning to 'net zero' emissions.
70. By using heat and energy recovered from non-recyclable waste at the Recycling and Energy Recovery Facility (RERF) to provide warmth and hot water to buildings in the city, the Leeds PIPES district heating project is helping businesses and residents to move away from costly fossil-fuel powered heating systems. Removal of combustion-based heating in homes, such as gas boilers will have a positive impact on local air quality as the impact of gas heating on indoor air pollution is becoming increasingly known (as detailed earlier in this report), this is a significant additional benefit from the district heat programme as well as providing more affordable and lower carbon heating.
71. Leeds City Council estimates that the network, delivered in partnership with Vital Energi, is helping existing customers to collectively save nearly half a million

pounds (£490,000) in reduced energy costs this year alone, with health benefits from the improved air quality providing further value to the city as well as individuals. The £62million network continues to expand and is regularly connecting to new buildings. Leonardo & Thoresby student accommodation buildings and St James’s Hospital are the latest buildings to have begun taking heat from the scheme. Last year, the network of insulated underground pipes supplied 22,029 megawatt-hours of heating in total and helped reduce the city’s carbon footprint by 3,975 tonnes.

## 72. Cooking

73. International studies have also been undertaken on the impact of gas cooking in homes, with significant findings. The NGO, ‘Clasp’ have identified that cooking with gas releases toxic pollutants, including nitrogen dioxide (NO<sup>2</sup>), carbon monoxide (CO) and ultrafine particulate matter into the air directly impacting the health of those in the household. Essentially, similar to the emissions from a car exhaust pipe, breathing the pollution from burning fossil fuels in your kitchen will have a negative health impact. Forty years of research is showing that gas cooking appliances can cause respiratory diseases like asthma, with children and low-income communities facing the greatest risk of negative health effects.
74. In the UK the Clasp study has found that 53.9% of homes have gas cooking appliances, with 557,326 paediatric asthma cases being linked to gas cooking. The below graphic illustrates the difference in NO<sup>2</sup> concentrations in monitored UK homes that have electric cooking rather than gas cooking. Significantly lower NO<sup>2</sup> monitoring is found when cooking is undertaken with electric appliances than gas, due to the elimination of combustion from the process. Induction cooking is also cheaper to use than gas.

### Findings in the UK



- The report found that the indoor monitoring undertaken for the study demonstrated that gas cooking households exceeded EU, UK and WHO

guidelines and limits indoors regularly, whereas electric-cooking homes did not. This information will be critical in terms of providing guidance to households who can make decisions on cooking methods when purchasing cooking appliances and as such will form part of the information that we can disseminate as a local authority, as well as considering our ability to shape the change required where we have determination over cooking appliances in homes or civic buildings.

### UK Findings

NO <sub>2</sub> Standards	Exceedances for Gas-Cooking Homes	Exceedances for Electric-Cooking Homes
WHO daily guidelines	55%	0%
WHO hourly guidelines	25%	0%
UK hourly limits	25%*	0%

*\*Extrapolation of 13 days of measurement data to yearly exceedance*

75. To reduce the impact of gas cooking within the Leeds City Council Housing estate several changes are being made to transition our housing stock to electric based cooking.

- Our new build specification is for electric cooking only to be facilitated.
- We're reviewing void specifications with a proposal to remove gas cooker points during the void process. Consultation with tenant representatives is scheduled in 2024 as part of this review.
- This phased approach to encourage electric cooking through the new build and void processes is identified as the most feasible approach.
- There is work under way with the communications team in Housing around how to develop meaningful and appropriate messaging for tenants to encourage them to consider electric cookers when replacing existing appliances. The preference of Housing property maintenance would be to offer to disconnect tenant's gas cookers (for safety reasons) but maintain that the tenant would be responsible for the new appliance purchase, delivery, and maintenance. The messaging for tenants will be designed to make clear the health benefits and potential financial benefits of making this change.

### 76. Air Quality Communication and Engagement

77. Work is ongoing to raise awareness of air quality and how to reduce individual exposure to air pollution as well as reducing emissions through behaviour change. Events such as **Car Free Day** in September and **Clean Air Day** in June

2023 have continued to ensure that the issue of healthy air remains in the public eye, with collaborative work with Influencing Travel Behaviour, Global Action Plan, Voluntary groups, and Connecting Leeds evidencing the joined-up approach to this work. Leeds also signed up to support the first ever **Clean Air Night** with Global Action Plan in January 2024, with our social media posts about the day having over 8,000 impressions.

78. Enhancement of the information carried on the LCC website also includes information on indoor air quality, its sources, and impacts. This has also been aligned with work to promote grants and schemes that support improvements to home heating, insulation and reducing energy costs with the associated benefit of reducing the volume of gas burning to heat homes and therefore lower NOx emissions.
79. There has been targeted engagement with relevant professionals (those involved in planning, designing, building, renovating, and maintaining homes) to encourage building design that improves indoor air quality. The Local Plan Update has been out for consultation with key stakeholders ensuring that air quality is a key aspect of this work. To reflect the growing understanding of the importance of indoor air quality it should be noted that building standards have changed to increase ventilation at a national level now too. Planning policy requiring increased energy efficiency and airtightness. Building regs to direct new build homes to include whole house ventilation systems (positive pressure combined with heat recovery and extractions).
80. Issuing of banners to schools to encourage drivers to switch off their engines when waiting for students was completed by September 2022. Anti-idling banners have encouraged this switch-off, to reduce the numbers of vehicles idling and to raise awareness of air quality. These banners can still be purchased by local schools.
81. This message has also been circulated to school buses that are operated by the combined authority across the region. As the transition to electric vehicles continues the issue of idling will be less prevalent, as these vehicles both automatically switch off and have zero emissions at the tailpipe.
82. As part of clean air activity in the city three more schools in Leeds will benefit from having a School Street from this September, joining 12 other schools who have had them since 2020. Blenheim Primary School, Birchfield Primary School and Bramhope Primary School have introduced School Streets as part of the new phase of the Leeds School Streets programme.
83. **School Streets** make roads outside schools into pedestrian and cycle only zones at the times displayed on the signs. This helps to make the space outside school more pleasant for those choosing to walk, cycle and wheel to school. They can also help to reduce children's exposure to air pollution and keep them safe from traffic. Leeds City Council Road Safety trainers deliver a range of interactive lessons in schools throughout the year and new School Street schools will receive pedestrian and scooter training during the initial weeks. Last year 14,400 children received road safety and sustainable travel education.

#### **84. Environmental Health & Planning**

85. The service continues to carry out all statutory obligations to monitor and ensure compliance with national standards across industrial, manufacturing and other commercial settings. This also includes assessment of relevant planning applications to identify any air quality impacts, providing and maintaining the air quality monitoring network, liaison with internal and external agencies to require the implementation of the best available techniques for the management of air quality impacts during the construction of major infrastructure (e.g. HS2, Trans Pennine Rail Upgrade).
86. This also covers ensuring wide reaching dissemination of good practice in Local Authority Air Quality Management by involvement in the Yorkshire and Lincolnshire Pollution Advisory Group (Air Quality). This is in line with the planning requirement for all major planning applications to carry an air quality assessment, including requirements such as including EV charge point provision in all cases.
87. The Planning service proposed a sustainable development assessment checklist for new Planning applications. A Climate Change Officer has been appointed to give consultation comments on how well planning applications are achieving policies and is also preparing a sustainable development checklist.
88. In line with the proposed 20-minute neighbourhoods (place making around service centres and hubs within a 20 min walk from where people live) a new policy on 20-minute neighbourhoods is being progressed through the Local Plan Update. The Local Plan Update also includes proposals around enhanced protection, improvement, and extension of green and blue infrastructure particularly along cycle and walking routes.

#### **89. Government Asks**

90. As detailed above there is significant work being delivered locally and regionally in line with the Leeds Air Quality Strategy and we are seeing improvement in the air we breathe because of that. However, support is required from Central Government to enable the Council to continue to meet its obligations in respect of managing air quality in the city in terms of funding and powers. Additionally, and as the CMO report made clear, significant sources of air pollution are transboundary and not locally sourced and as such require national and international actions to mitigate them, particularly if the WHO guidelines are to be reached. The asks to Central Government are set out below:
91. Requirement for better information regarding emissions from industrial point sources to establish clear baselines from which to determine and measure improvements. Government to obligate industry to publish its actual emissions as opposed to its allowance.
92. An immediate need exists to tighten building regulations on energy efficiency and carbon reduction at a national level to support local planning guidance and implementation of clearer and more stringent requirements of developers both domestic and industrial.

93. Increased funding to deliver:

- Active travel initiatives, including school streets and other similar initiatives
- Alternative fuel infrastructure, including hydrogen and support for electric uptake, particularly amongst lower income groups.
- Additional national campaigns, legislation, and associated fines for activities such as engine idling and solid fuel burning.
- Updating and amending national guidance and training programmes (including refresher training) to physicians and medical professional through national representative bodies (GMC etc.) and all training institutions highlighting the risks and how to communicate to patients with specific conditions ways to manage and reduce their exposure to poor air quality in general and response to specific events.
- The Council will use its existing officer and political networks in its work to engage with national policy makers to increase support for the asks outlined above.