



LOW EMISSION (CLEAN AIR) ZONE TOOLKIT

September 2023

www.transition-air.org.uk

Introduction

Air pollution represents the largest environmental risk to public health in the UK.¹ It is responsible for an estimated 29,000 – 43,000 deaths each year² and many harmful health effects.³ Between 2017 and 2025, the total estimated NHS and social care cost will be at least £1.6 billion in England.⁴ As outlined in the 2022 Chief Medical Officer's Annual Report which focussed specifically on air pollution, “we can and should go further to reduce air pollution”.⁵

A Low Emission Zone (LEZ) (or Clean Air Zone, CAZ) represents a defined zone which discourages the use of the most polluting vehicles through charging or other restrictions, and is one way in which local authorities can look to improve air quality and public health. Introducing a LEZ can be challenging, both practically and politically. Here, we provide support for local authorities on how best to navigate all stages involved in the LEZ process – by providing detailed, evidence-based guidance, sharing lessons learned, and highlighting available resources.



Clean Air Zones improve the urban environment to support public health and the local economy, making cities more attractive places to live, work, do business and spend leisure time. They support cities to grow and transition to a low emission economy thus ensuring these benefits are sustainable for the long term.

— Government vision for Clean Air Zones (2020)

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UK100 is a network of ambitious local leaders who have pledged to lead a rapid transition to Net Zero with Clean Air in their communities ahead of the government's legal target.

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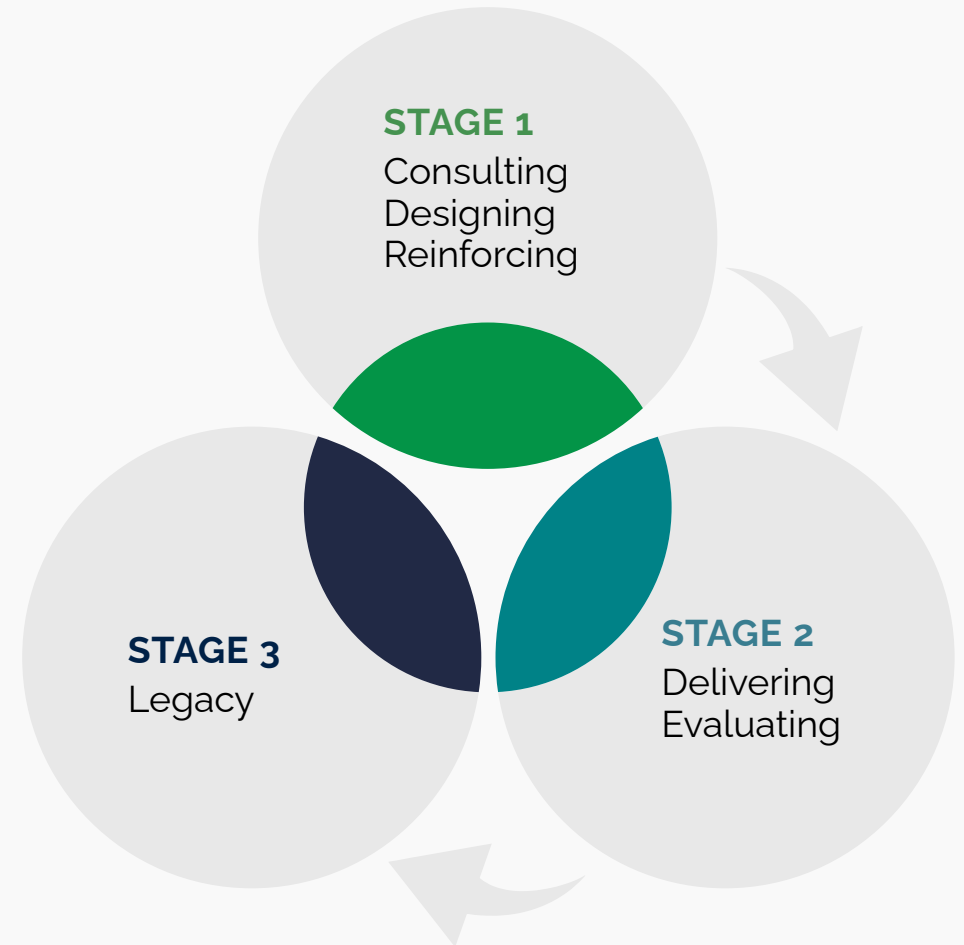
Williams, H., Landeg-Cox, C., Ropkins, K., Pope, F. D., Liu, B., Shi, Z., Bartington, S. E. (2023) Low Emission (Clean Air) Zone Toolkit. TRANSITION Clean Air Network, September 2023. Available online at: <https://transition-air.org.uk/toolkits>

About this toolkit

This toolkit provides comprehensive guidance for local authorities planning to introduce a Low Emission Zone (LEZ).

It is meant as a resource for local authority officers involved in the LEZ process, comprising consultation and planning processes from the scheme's inception (**Stage 1**), implementation and evaluation process during the scheme's lifetime (**Stage 2**) and final considerations designed to help you reflect on your scheme and its legacy (Stage 3).

We supplement this document by signposting to existing guidance and relevant resources, and sharing lessons learned across policy and academic landscapes.



What is a Low Emission Zone (LEZ)?

For the purpose of this toolkit we primarily use the term LEZ, however when appropriate, the term CAZ may also be used (e.g., in quotes, or when referring to already published resources such as the Government's "Clean air zone framework for England").

A Low Emission Zone defines an area where access is restricted for vehicles that fail to meet required environmental standards (currently based on its Euro emissions standard) via charge-based measures.

A Clean Air Zone (CAZ) defines an area where targeted action is taken to improve air quality. Typically a CAZ refers specifically to a charging clean air zone – although 'non-charging' clean air zones do exist. A charging-CAZ is synonymous with a LEZ, and these terms are often used interchangeably.

Definitions

Low Emission Zone (LEZ)/Charging CAZ – A defined area where access to some polluting vehicles is restricted or deterred to improve air quality.

Clean Air Zone (CAZ) – a defined area where targeted action is taken to improve air quality.

Ultra Low Emission Zone (ULEZ) – The London ULEZ affects all vehicles that do not meet Euro 4 (petrol) and Euro 6 (diesel) standards. It operates 24 hours a day, every day of the year except Christmas Day.

Zero Emission Zone (ZEZ) – An area where zero (tailpipe) emission vehicles (e.g., fully electric cars) can be used without occurring a charge but where other motor vehicles may be charged.



Context

The UK Government identified clean air zones as the fastest and most cost-effective way of achieving statutory Nitrogen Dioxide (NO₂) limit values in towns and cities⁶. They are being increasingly utilised by local authorities across the UK, to achieve compliance with legally binding air quality objectives.

There are four increasingly stringent classes of CAZ, from Class A to D:

A – Buses, coaches, taxis, private hire vehicles

B – Buses, coaches, taxis, private hire vehicles, heavy goods vehicles (HGVs)

C – Buses, coaches, taxis, private hire vehicles, HGVs, vans, minibuses

D – Buses, coaches, taxis, private hire vehicles, HGVs, vans, minibuses, cars (the local authority has the option to include motorcycles)

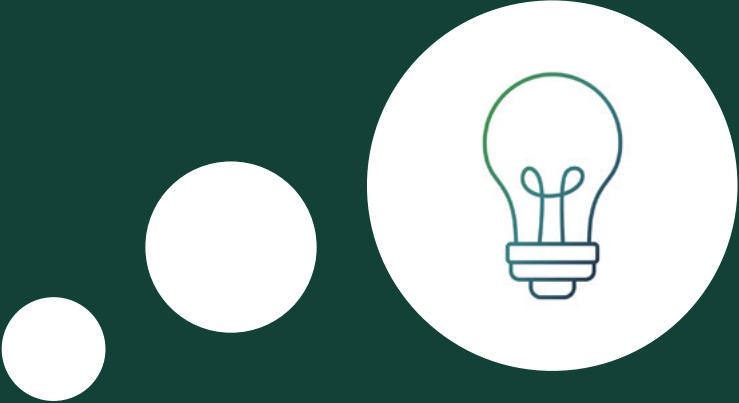
Further information on the minimum classes and standards for clean air zones is provided in Annex A of the Government's Clean air zone framework policy paper.⁷

Before you start

The UK Government identified CAZs as the fastest way to achieve statutory NO₂ limit values in towns and cities, as outlined in the [2017 UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations](#). A local authority must consider the establishment of a CAZ, however it is for local authorities to determine what the appropriate solution is to tackling NO₂ concentrations. This toolkit is targeted at local authorities and officers planning to introduce a CAZ or LEZ, whether under direction from the Government or otherwise (for example City of York Council voluntarily introduced a [bus-only CAZ](#)).

As outlined in the [Clean Air Zone Framework](#) “if a local authority can identify measures other than charging zones that are at least as effective as reducing NO₂, those measures should be preferred as long as the local authority can demonstrate that this will deliver compliance as quickly as a charging clean air zone.”

Whilst beyond the scope of this toolkit, there are a number of resources available that can help Local Authorities seek alternative measures that may be better suited than a CAZ/LEZ.

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- Public Health England (now replaced by the UK Health Security Agency and the Office for Health Improvement and Disparities) published a [Review of interventions to improve outdoor air quality and public health](#) which provides local practitioners and policy makers with an indication of the broad range of available interventions.
 - The [Air Quality Hub](#) is a free online information and knowledge sharing resource for Local Authority air quality professionals, which includes a number of potential air quality improvement measures.
 - This [Systematic Evidence Map](#) characterises peer-reviewed international evidence on urban-level policy interventions aimed at reducing traffic emissions and traffic-related air pollution (linked to this [academic publication](#)).



STAGE 1

Consulting
Designing
Reinforcing

Consulting

Stakeholder mapping

- **Have you identified all relevant public sector stakeholders?** This could include relevant internal teams and departments (e.g., Planning, Environmental Health, Public Health, Licensing, IT, Finance, Energy, Waste, Parking, Enforcement, Help Desk teams), neighbouring authorities, central government (e.g., the Joint Air Quality Unit, Highways Agency, the DVLA, NHS), and local and regional politicians.
- **Have you identified all relevant private sector stakeholders?** This could include local businesses, local chambers of commerce, business improvement districts, transport services (e.g., bus service operators and taxi fleet operators) and technical consultants.
- **Have you identified all relevant civic society stakeholders?** This could include local residents, community groups, faith groups, and non-governmental organisations.
- **Do you have appropriate representation of all socio-economic and demographic groups?** This should include those of different age, sex and sexual orientation, religion or belief, disability, race including colour, nationality, ethnic or national origin as well as other protected characteristics (gender reassignment, being married or in a civil partnership, being pregnant or on maternity leave).

To ensure they are engaging with a representative sample of the population many Local Authorities have utilised 'sortition' processes, recognised internationally as the gold standard method for recruiting citizens' assemblies. This has been employed by, for example, Wandsworth Borough Council for the Wandsworth Air Quality Citizens' Assembly (<https://www.wandsworth.gov.uk/news/campaigns/climate-change/wandsworth-air-quality-citizens-assembly/>) and Climate Assembly UK (<https://www.climateassembly.uk/detail/recruitment/>).

Stakeholder consultation

- **Have you reviewed the Government's Consultation principles to inform your consultation process?** (<https://www.gov.uk/government/publications/consultation-principles-guidance>).
- **Have you assessed whether a separate group will need to be set up to manage consultation?** This can become labour intensive.
- **Have you considered what consultation activities and tools will be employed?** This could include workshops and public consultation (both face-to-face and online), existing forums or meetings, interviews and newsletters or briefing documents (both web, email and paper based) and should also consider accessibility (i.e., include e-reading and publish in different languages).

The Community Planning Toolkit, for example, outlines a broad range of community engagement activities, as well as their strengths and weaknesses (<https://www.communityplanningtoolkit.org/community-engagement>).
- **Have you considered how these consultation activities and tools may potentially impact representation?** For example, considering factors such as internet literacy/accessibility, or the time and place of any in-person activities.
- **Have you considered how you can both monitor and manage the risk of bias?** Stakeholder consultation may suffer from some degree of self-selection bias, where individuals or organisations more interested in or aware of air quality issues, may have agreed to attend.

Ongoing engagement

- **Have you clearly conveyed the aims of introducing a clean air zone to your stakeholders, including its expected environmental, social, economic, and health benefits?**

- **Have you considered how you will develop the framing/messaging/narrative for your zone?**

The Workplace Parking Levy Toolkit developed by UK100 provides insightful commentary and guidance on establishing a clear narrative, with many parallels applicable to LEZs (<https://www.uk100.org/publications/uk100-political-toolkit-workplace-parking-levy>).

- **Have you discussed strategies to deal with potential misinformation or disinformation that may emerge around your zone?**

The Local Government Association (LGA) provides useful guidance on countering misinformation (with regard to COVID-19 vaccines, but outlining many principles applicable to misinformation generally): (<https://www.local.gov.uk/our-support/coronavirus-information-councils/covid-19-service-information/covid-19-vaccinations/behavioural-insights/resources/countering-misinformation>). This includes strategies for protecting people from future misinformation, and correcting misinformation once it is already circulating.

- **Have you considered how you will maintain communication and engagement with your stakeholders throughout all stages of this process?** Ensuring openness and transparency can help build and maintain trust with your stakeholders.

- **Have you identified any potential pressure groups, and considered how you will engage with them?** You may not change their minds, but inaccurate information may undermine the development of the zone.

- **Have you considered how you can work with politicians throughout the consultation and engagement process?**

The LGA produced '[A councillor's workbook on neighbourhood and community engagement](#)', designed to help councillors think about the issues surround the development of neighbourhood and community engagement, outlining some of the key skills, approaches and tactics they may consider when involved.

- **Have you identified any potential barriers that may hinder internal collaboration and joined up working?**

- **Have you identified key community catalyst members?** These are vocal and influential members who can influence others, both positively and negatively, and engaging with them may help build support for your scheme.

The Community development handbook (<https://www.gov.uk/government/publications/community-development-handbook/community-development-handbook>) outlines how to engage with community catalyst members and community leaders

- **Have you identified potential unintended consequences and how these could be mitigated at the design stage?**

Lessons learned



Above all, it's important to provide context about why the scheme is needed – how it will help meet ambitious air quality standards and drive health and environmental benefits – along with the way fees and fines will be reinvested back into the community. Understanding the tangible benefits of the scheme will help residents better engage with it.^A



It is important to fully explore the potential adverse consequences from implementing policy interventions such as charging clean air zones prior to implementation to ensure that they do not inadvertently disadvantage certain groups, or widen existing inequalities.^B



Tailored approaches to communicate about the proposed benefits of policies such as CAZ prior to implementation may be an important way to increase acceptability amongst vulnerable groups.^C



This need also demands that the council (1) engages in clear engagement and consultation that has openness and honesty at its heart and (2) is willing to give frank answers to tough questions and the inevitable challenges that come with such an initiative.^D



In Bath 59% of residents supported the CAZ; these high levels of support can be attributed to a greater awareness of the health benefits of cleaner air, thanks to messaging from local authority.^E



Image: Ross Sneddon/unsplash.com

^A 'What are the key considerations when rolling out a successful Clean Air Zone scheme?' Available online at: <https://www.localgov.co.uk/What-are-the-key-considerations-when-rolling-out-a-successful-Clean-Air-Zone-scheme/53885>.

^B Rashid, R., Chong, F., Islam, S., Bryant, M. and McEachan, R.R., 2021. Taking a deep breath: a qualitative study exploring acceptability and perceived unintended consequences of charging clean air zones and air quality improvement initiatives amongst low-income, multi-ethnic communities in Bradford, UK. *BMC public health*, 21(1), pp.1-16.

^C Mebrahtu, T.F., McEachan, R.R.C., Yang, T.C., Crossley, K., Rashid, R., Hossain, R., Vaja, I. and Bryant, M., 2023. Differences in public's perception of air quality and acceptability of a clean air zone: A mixed-methods cross sectional study. *Journal of Transport & Health*, 31, p.101654.

^D UK100 (2022) Birmingham Clean Air Zone: UK100 Case study. Available online at: <https://www.uk100.org/projects/knowledgehub/birminghams-clean-air-zone>

^E Taking Joint Air Quality Unit (2022). Local NO2 Plans: Annual Report 2021 Ipsos and Institute for Transport Studies. Available online at: <https://www.ipsos.com/en-uk/2021-annual-report-evaluation-local-no2-plans>

Links to additional decision-support resources

Read Chapter 6 'Consultation and Community Engagement' from the Local Air Quality Management Policy Guidance (PG22), which includes advice and relevant case studies: <https://laqm.defra.gov.uk/air-quality/featured/england-exc-london-policy-guidance/>.

Read the Local Government Association's (LGA) consultation check list, which offers a quick overview of the typical stages of a consultation and the things you should keep in mind when conducting a consultation: <https://www.local.gov.uk/consultation-check-list>.

Read the Local Government Association's (LGA) guide to engagement, which offers a guide for councillors and officers working to build a stronger dialogue between council and community: <https://www.local.gov.uk/publications/new-conversations-lga-guide-engagement>.

Read about Transport for Scotland's experiences with consultation and engagement for developing Low Emission Zones: <https://www.lowemissionzones.scot/about/consultation>.

Read the following report based on the analysis of responses to the Building Scotland's Low Emission Zones Consultation which sought feedback on the Scottish Government's proposals to introduce Low Emission Zones (LEZs) in Scotland: <https://www.transport.gov.scot/publication/analysis-report-consultation-on-building-scotland-s-low-emission-zones/>.

Browse the Government's SHARE checklist which aims to build audience resilience to mis- and dis-information online: (<https://sharechecklist.gov.uk/>). The checklist provides the public with five easy steps to identify false content, encouraging users to stop and think before they share content online.

See Table 4 from the following scoping review 'Engaging communities in addressing air quality' (<https://ehjournal.biomedcentral.com/articles/10.1186/s12940-022-00896-2>) which outlines 'Community engagement approaches and associated outcomes, facilitators and challenges'.

Designing

Preparing and planning

- **Have you defined clear and smart objectives, in terms of required emission/concentration reductions?**
 - See the Government's latest Air quality strategy: framework for local authority delivery (<https://www.gov.uk/government/publications/the-air-quality-strategy-for-england/air-quality-strategy-framework-for-local-authority-delivery>) which provides a framework to enable Local Authorities to deliver for their communities and contribute to long-term air quality goals, including information on current legal air pollutant limits.
- **Have you defined the type of emission sources that need to be addressed?**
- **Have you defined the type of vehicles that need to be addressed?** (Further information on typical vehicle types, Euro category and Euro standard for each CAZ class is provided in Annex A of the Clean air zone framework: <https://www.gov.uk/government/publications/air-quality-clean-air-zone-framework-for-england/annex-a-clean-air-zone-minimum-classes-and-standards>).
- **Have you considered additional objectives, for other pollutants? Congestion or traffic? Noise? Greenhouse gases?**
- **Have you defined the scope and boundary of the zone?**
- **Have you defined a precise, feasible timeline to meet these objectives?**
- **Have you considered the potential implications from any traffic displaced to surrounding areas?**
- **Have you considered how information about the zone will be effectively displayed?** As a minimum requirement there must be traffic signing strategies in place along major access routes and at entry points to clearly delineate the zone, and alternative routes for those who wish to divert around it. Urban boundaries such as ring roads also offer a clear and recognisable boundary.
- **Have you considered the number and distribution of fixed and/or mobile cameras required in order to deliver the objectives of your CAZ?** CAZs are required to operate Automatic Number Plate Recognition (ANPR) for vehicle detection. (For further guidance on ANPR performance assessment and optimisation see: <https://www.gov.uk/government/publications/guidance-on-anpr-performance-assessment-and-optimisation>).
- **Have you also considered how you will effectively and securely store the sensitive Automatic Number Plate Recognition (ANPR) data?**
 - See section 4.5 'Data Handling' from The Magenta Handbook (<https://www.gov.uk/government/publications/the-magenta-book>) which covers how to appropriately collect, handle and access data.
- **Have you considered how document management systems can help capture decisions involved in the design process?** This should be regularly updated when information is available, and can provide confidence for the public.
- **Have you considered how the zone could be framed alongside existing wider initiatives such as Air Quality Management Areas (AGMAs) and Air Quality Action Plans (AQAPs)?**
- **Are you communicating with other local authorities who have created zones to share learning and experiences?**



Baseline monitoring

- **Do you have the sufficient capability and resources to collect minimum baseline data to monitor and evaluate the zone?** (Further details provided in 'Evaluating your LEZ' section).
- **Are you allowing enough time to correctly establish a baseline?** An air quality baseline should be established with at least 6 months before implementation (preferably one year) to account for seasonal variability in measurements.
- **Are you carrying out work to identify the extent to which different key sources contribute to air quality in the zone?** i.e., baseline 'source apportionment', which will assist authorities to correctly target the most important sources, and to focus principal measures.

Charging, enforcement and exemption

- **Have you established what charges will be imposed?** This should consider the behaviour change needed to deliver the ambitions for the zone; the local economic and social factors of the zone and surrounding areas; and the operational costs of running a scheme.

Section 2.3 'Typical daily CAZ charges', from the research briefing 'Clean Air Zones, Low Emission Zones and the London ULEZ' (<https://commonslibrary.parliament.uk/research-briefings/cbp-9816/>), provides examples of current daily charges for non-compliant vehicles entering existing CAZ cities.
- **Have you established the manner in which charges which will made, collected, recorded, and paid?**

For example, Local authorities can administer CAZ payments and enforcement procedures independently, or opt into the Government's Clean Air Zones Central Services ("CAZ Central Services"). This national service can be used to administer CAZ charging schemes and includes a digital service, including the ability to make payments online using the gov.uk webpage (<https://www.gov.uk/clean-air-zones>), and technical and customer contact support. Local authorities that use this are charged £2 for each transaction processed through the service.
- **Have you established enforcement regimes, and penalties for non-payment of charges?**

For example, considering CAZs penalty charges for non-payment are capped under legislation (regulation five of the [Road User Charging Schemes \(Penalty Charges, Adjudication and Enforcement\) \(England\) Regulations 2013](#)). This sets the maximum penalty for entering a CAZ without prior payment in a non-compliant vehicle at £120, reduced to £60 if paid within 14 days.
- **Have you considered where exemptions, or reduced charge-rates may be appropriate?**

There are some national exemptions from the charge (see 'Exemptions' within the Government's guidance on Clean air zones: <https://www.gov.uk/guidance/driving-in-a-clean-air-zone>) and local authorities may also apply local exemptions. These could be for emergency service vehicles, community transport vehicles, Blue Badge holders and vehicles used by a disabled person exempt from Vehicles Excise duty, historic and specialist vehicles, military vehicles, or residents who live within the zone (see the 'Exemptions and discounts', section 37-55, of the *Clean Air Zone Framework* linked below for specific guidance).
- **Have you considered options for temporary suspensions?** This could be for emergency scenarios or repairs, large and/or local sporting and music events, or for an event of local significance – and should be conducted in liaison with licensing and emergency services.

- **Have you considered the hours of operation?** If the local authority chooses to implement a clean air zone, the government has assumed in its modelling that the zone would operate 24 hours a day, every day of the year. However, if a local authority can demonstrate that, by operating on a reduced hours basis, it will still achieve compliance with air quality limit values in the shortest possible time, it could bring forward such a scheme.
- **Have you considered how you will effectively advertise information on charging, enforcement and exemption to the public, to minimise misunderstanding around the zone?**

Ongoing engagement

- **Are you actively and consistently referring to issues and concerns raised during the consultation process so as to design an effective and acceptable zone?**
- **Are you continually engaging with your stakeholders to hear their concerns throughout the process, not just the start?**
- **Have you considered how you will engage with politicians throughout the development of your zone?** The political difficulty of putting such schemes in place can cause progress on implementing a LEZ to fall down, therefore involving politicians from the start of the scheme can help ensure its success.

Read Chapter 3 'Engaging local decision-makers' of the Briefing for Directors of Public Health (Air Pollution) Toolkit (<https://laqm.defra.gov.uk/air-quality/guidance/public-health/#resources>).

- **Are you working with communication teams and local media, to ensure the message is being spread and to help you identify issues, concerns, and inaccurate information?**

Further guidance on engaging the media and working with your in-house communications teams can be found on page 95 and 96 (respectively) of the Briefing for Directors of Public Health (Air Pollution) Toolkit.

Lessons learned



Designing an equitable LEZ requires cities to understand how and where people travel and consider how the program design – namely, introducing pricing or banning high-polluting vehicles from the zone – will impact people across socio-demographic groups.^A



We listened and talked to people about what mattered to them - air quality is personal because everyone knows someone who has asthma, knows people whose lives have been affected by conditions such as diabetes and cancer which are linked to air pollution - and so we have been able to have more meaningful conversations with communities about delivering the Clean Air Zone. This enabled us to design mitigations into the scheme to address concerns of residents on low incomes and city centre businesses and achieve a more acceptable scheme.^B



Ensure dedicated professional communications support: This will be vital to ensure you succeed in winning public opinion and tackling misinformation. This could include rapid rebuttal, building relationships with local journalists, encouraging comments from campaigners for change especially outside the council and challenging and responding on social media with specifically designed graphics.^C



Image: Graham Durham/unsplash.com

^A Institute for Transportation & Development Policy (2023) The Opportunity of Low Emission Zones: A Taming Traffic Deep Dive Report. February, 2023. Available online at: <https://www.itdp.org/publication/the-opportunity-of-low-emission-zones-a-taming-traffic-deep-dive-report/>.

^B UK100 (2023) What CANZ be done? Local Authorities leading the way on integrating Clean Air and Net Zero. January 2023. Available online at: <https://www.uk100.org/publications/what-can-z-be-done-local-authorities-leading-way-integrating-clean-air-and-net-zero>.

^C UK100 (2023) UK100 Political Toolkit: Workplace Parking Levy. May, 2023.. Available online at: <https://www.uk100.org/publications/uk100-political-toolkit-workplace-parking-levy>



Links to additional decision-support resources

Read the Government's 'Clean air zone framework for England' policy paper which outlines the principles local authorities should follow when setting up clean air zones in England: <https://www.gov.uk/government/publications/air-quality-clean-air-zone-framework-for-england/clean-air-zone-framework>.

Read this briefing from the Clean Cities Campaign that outlines the main elements that determine the success of a low-emission zones across Europe: <https://cleancitiescampaign.org/research-list/the-7-steps-to-create-effective-low-emission-zones/>.

Reinforcing

Enabling healthy and active travel

- **Are you developing healthy and active travel alternatives?** The Government provides technical guidance and outlines tools to help Local Authorities plan cycling and walking infrastructure (<https://www.gov.uk/government/publications/local-cycling-and-walking-infrastructure-plans-technical-guidance-and-tools>). Potential actions outlined in Annex B of the Clean air zone framework (<https://www.gov.uk/government/publications/air-quality-clean-air-zone-framework-for-england/annex-b-general-approach-to-clean-air-zones>) include:
 - Creating safe, continuous and convenient cycling and walking networks
 - Public realm improvements to create town centre environments that are attractive to cyclists and walkers
 - Identifying and addressing existing barriers to active travel
 - Support for purchasing or hiring a bike/scooter and safety equipment
 - Supporting maintenance courses and cycling proficiency schemes
- **Have you considered how to raise awareness for active travel options?** Potential actions outlined in Annex B of the Clean air zone framework include:
 - Developing school travel planning to tackle emissions from the 'school run' via walk to school initiatives
 - Working with business, local communities, schools, further education colleges and universities to encourage the provision of attractive and secure facilities such as cycle racks and changing facilities
 - Communications activity around the potential health benefits of active travel and air quality
 - Improving traffic signing, with walking and cycling distances or journey times to encourage take-up

Better, cleaner, public transport

- **Are you developing better, cleaner public transport alternatives?** Potential actions outlined in Annex B of the Clean air zone framework include:
 - Introducing cleaner fleet alternatives, such as hydrogen and electric buses
 - Bus priority schemes to improve reliability and journey times, making buses more attractive as an alternative mode
 - Developing safe, convenient and continuous active travel networks that link public transport hubs such as bus and rail stations within clean air zones to employment and education.
 - Understanding public perception of public transport and whether it is a viable alternative
 - Pricing schemes and affordability



Encouraging uptake of cleaner vehicles, improving existing vehicles and adapting driver behaviour

- **Are you actively supporting and facilitating the use of Ultra Low Emission Vehicles (ULEVs)?** Potential actions outlined in Annex B of the Clean air zone framework include:
 - Providing incentives and benefits for their use, such as preferential parking bays or access, lower parking fees, allowing access to bus lanes, and exemptions from other restrictions.
 - Ensuring the provision of suitable infrastructure to support ULEV use, such as plug-in vehicle charging networks, residential on-street vehicle charging, and charging at 'destination' points such as bus depots, transport hubs, shopping centres, car parks, and leisure facilities.
- **Are you providing opportunity and incentive for existing vehicles to improve?** This could include:
 - Retrofitting emission abatement technologies
 - Highlighting services such as the Government's Clean Vehicle Retrofit Accreditation Scheme (CVRAS) (<https://energysavingtrust.org.uk/service/clean-vehicle-retrofit-accreditation-scheme/>) that can provide independent evidence that a vehicle retrofit technology will deliver the expected pollutant emission reductions and air quality benefits.
- **Are you supporting anti-idling enforcement?** (See section 67-68 'Engine idling' from Annex B of the Clean Air Zone Framework for further information).
- **Are you supporting scrappage schemes?**

Whilst the Government currently has no plans to support a national scrappage scheme they have stated: "We continue to welcome manufacturer led scrappage schemes as a way to help some owners of older vehicles to purchase a cleaner vehicle and will continue to work with manufacturers to encourage these schemes to be available to support people to upgrade their vehicle." (From: <https://www.gov.uk/government/consultations/air-quality-additional-measures-to-support-individuals-and-businesses-affected-by-local-no2-plans>).

Ongoing engagement

- **Are you regularly liaising with Director of Public Health and Public Health teams?**

This Briefing for Directors of Public Health (<https://www.local.gov.uk/publications/air-quality-briefing-directors-public-health>) outlines the crucial role Public Health officials have as leaders and influencers, and how they can shape local approaches to improve air quality.
- **Are you regularly liaising with transport providers?**

Lessons learned



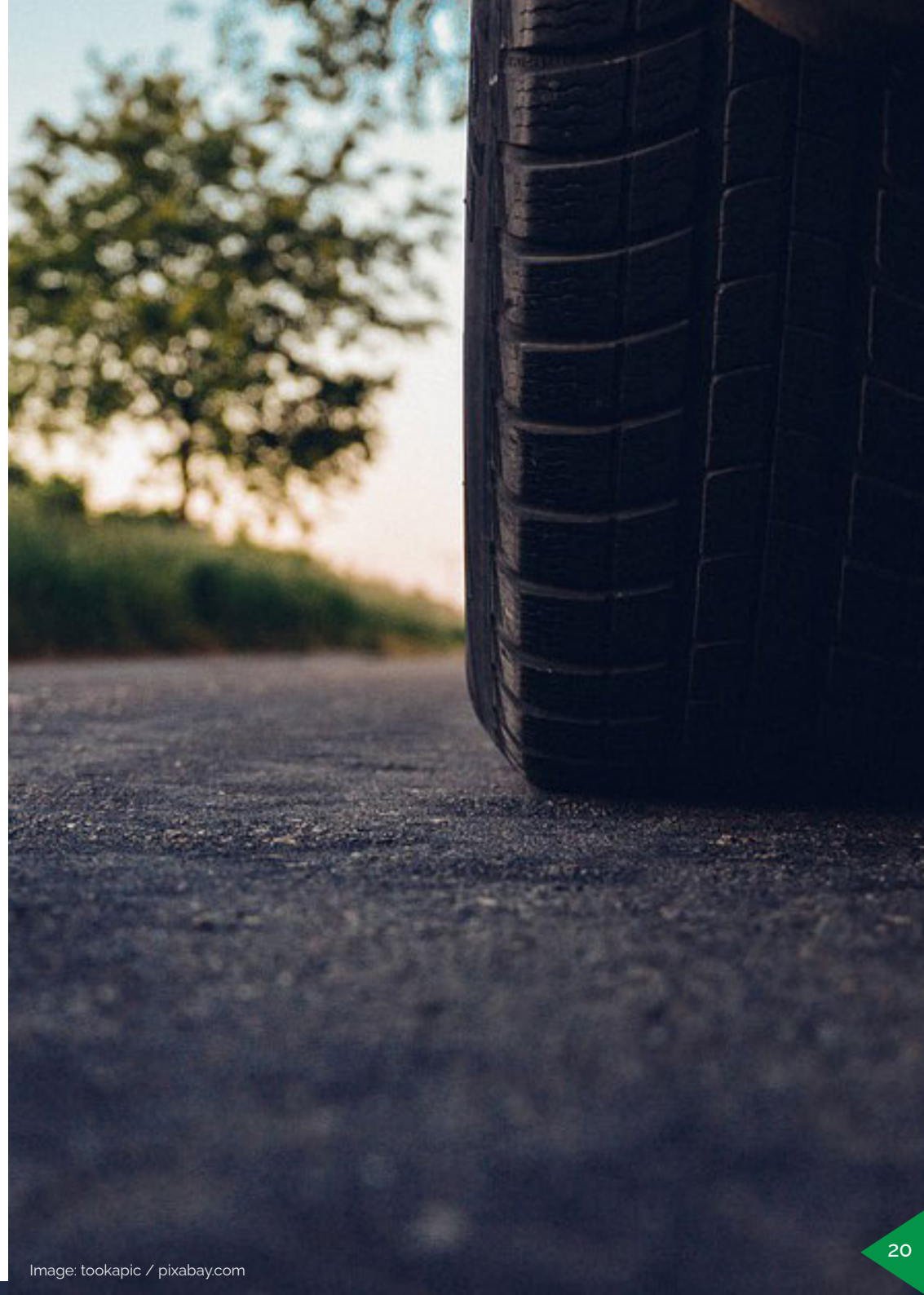
Increasing cycling and walking can help tackle some of the most challenging issues we face as a society – improving air quality, combatting climate change, improving health and wellbeing, addressing inequalities and tackling congestion on our roads.^A



It is crucial that charging measures are implemented alongside measures like improving public transport and active travel infrastructure to ensure the impact on local residents and small businesses is minimised. Evidence from Public Health England suggests the best way of reducing emissions from road transport is through a package of transport and non-transport related policy measures designed according to the local area's requirements.^B

^A Department for Transport (2020) Gear change: a bold vision for cycling and walking. Available online at: <https://www.gov.uk/government/publications/cycling-and-walking-plan-for-england>.

^B Asthma + Lung UK (2023) Zoning in on clean air: The need for clean air zones in polluted towns and cities across the UK. February 2023. Available online at: <https://www.asthmaandlung.org.uk/Zoning-in-on-Clean-Air-Report>.



Links to additional decision-support resources

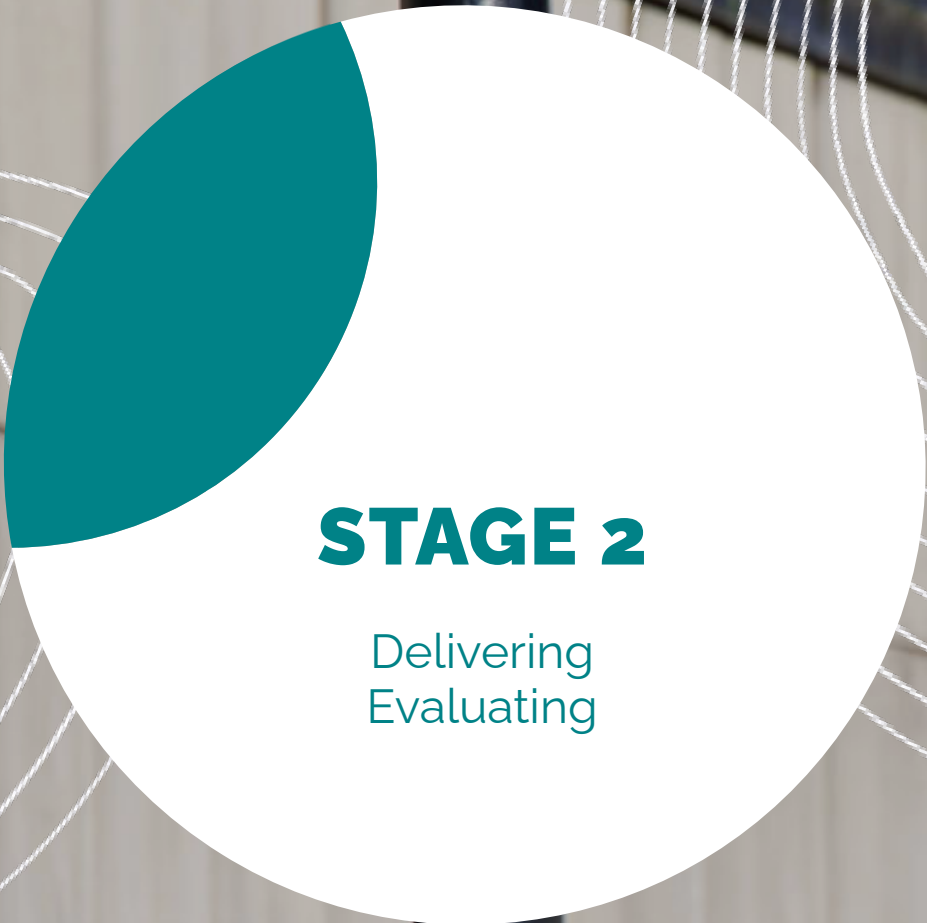
Browse the Active Travel Portal which brings together information for local authorities, including case studies, links to documents, policies and research, and funding opportunities: <https://www.activetravel.org.uk/>.

Read the final evaluation report of the Cycle City Ambition programme which makes suggestions for local policymakers and practitioners on the most effective ways to increase active travel: <https://www.gov.uk/government/publications/cycle-city-ambition-programme-2013-to-2018-review>.

Read the Government's guidance for local authorities on designing high-quality, safe cycle infrastructure: <https://www.gov.uk/government/publications/cycle-infrastructure-design-ltn-120>.

See the Sustrans Active Travel Toolbox that provides guides, tools and case studies to help local authorities and their partners make the case for walking and cycling schemes including the economic case, housing growth and planning and health resources: <https://www.sustrans.org.uk/our-blog/research/all-themes/all/active-travel-toolbox>.

Read 'A Guide to Inclusive Cycling' by Wheels for Wellbeing which promotes best practice in designing inclusive cycling infrastructure. Available online at: https://wheelsforwellbeing.org.uk/wp-content/uploads/2020/12/FC_WfW-Inclusive-Guide_FINAL_V03.pdf.



Implementing

Launching

- Have you considered a pilot scheme?
- Have you considered what launch strategy you will employ (e.g., soft vs. hard launch)? A soft launch can provide drivers with a little extra time to get ready, review the support available, and consider the alternatives to driving in the zone.
- Have you considered how those who will be potentially impacted by charges can be pre-warned? This could include issuing early notice letters to drivers of vehicles that could be subject to the daily fee, running radio campaigns across the regions prior to the launch, sending postcards to residents of the clean air zone, billboard displays etc.
- Have you considered the need for a 'grace period' that will allow those who should be fined a chance to pay the daily charge, or a 'sunset period' that would allow residents additional time to comply? And the length of time these may be necessary for?

As outlined in paragraph 53 of the clean air zone framework, "in assessing the need for a grace period, and the length of time one may be necessary for, local authorities should take account of the change needed in vehicle mix to meet a zone's air quality aims, as well as the social, economic and health impacts of a zone's introduction."
- Have you liaised with those who will inherit responsibility in the operation phase (e.g., helpdesk teams that will assist the public, or parking teams who will manage exemptions and enforce against non-payment) to ensure a seamless transition after launch?

Monitoring

- Have you considered all available options for undertaking appropriate monitoring and assessment of air quality in your zone, for each target pollutant, and the impacts this choice may have?

Local Air Quality Management Technical Guidance (TG22) provides a detailed guidance on air quality monitoring, including what the monitoring aims to achieve, the considerations to bear in mind to obtain value for money, and the available instruments and reporting requirements for each pollutant (<https://laqm.defra.gov.uk/air-quality/featured/uk-regions-exc-london-technical-guidance/>).

For example, for NO₂ two technologies have been approved - the reference method (chemiluminescence) and diffusion tubes. Significant variation in performance quality has been found between these technologies and local authorities should use measurement techniques with sufficient accuracy and precision for the intended purpose.

The Local Air Quality Management (LAQM) website provides a summary of all available tools for air quality assessment, including monitoring tools (<https://laqm.defra.gov.uk/air-quality/air-quality-assessment/list-of-available-tools/>).



- **Have you considered installation of additional monitoring, the benefits this could have for evaluating your zone, and where this could be optimally installed to best capture the impacts of the zone?**

For further information on monitor installation see Local Air Quality Management Technical Guidance (TG22) paragraph 7.146 through paragraph 7.152

For further information on Air Quality Monitoring Equipment Suppliers see 'FAQ 8 - Air Quality Monitoring Equipment Suppliers' (<https://laqm.defra.gov.uk/faqs/faq8/>).

- **Have you also considered how you will collect traffic data (e.g., changes in traffic levels, changes in vehicle mode, changes in driver behaviour)?** Common methods include manual classified counts (MTC), automated traffic counts (ATC) and ANPR cameras.

For further information on potential sources of traffic data, or methods to get this data see, for example, the Transport analysis guidance (TAG) unit M1-2 data sources and surveys (<https://www.gov.uk/government/publications/webtag-tag-unit-m1-2-data-sources-and-surveys>).

- **Have you considered how the data will be verified to ensure accuracy and consistency with requirements (considering, for example, who the most appropriate individuals to verify the data are, and what resources will be required to undertake this task)?**

Operation

- **Have you defined and communicated how excess revenue can be used to support local transport policy, improve air quality and support the delivery of the ambitions of the zone?** Ring-fencing funds to for environmental and socially beneficial activities may also help garner public engagement and support.

Continued engagement

- **Do you have systems in place to ensure that concerns are being heard?** Furthermore, do you have an open communication strategy that highlights what concerns have been raised, how/if they have been dealt with, or an explanation as to why they are unable to be dealt with? This ensures open communication between the community and the council.
- **Are you holding ongoing conversations with organisations like the chambers of commerce on issues surrounding the zone?**
- **Are you holding ongoing conversations with partners such as the NHS on shared priorities regarding public health?**

Lessons learned



Extensive work was done particularly with those parts of the Council who have inherited the CAZ in its operation phase – the Helpdesk teams assisting the public and the Parking team who will manage exemptions and enforce against non-payment, so that they were fully trained in how the CAZ operated and were able to seamlessly take over when the CAZ launched.^A



In developing a zone, it is important to recognise that the longer businesses and individuals have to make these changes, the easier it will be for them to do so, and therefore the more likely they will. However, this needs to be balanced by the ongoing health impacts of pollution. Time will need to be allowed between formally announcing the details of a zone and the beginning of its operation to allow businesses and individuals to adjust.^B



As the project moved into the delivery stage, a broader engagement plan saw consultation directly with people who live and work in the zone, and faith centres and businesses in its boundary. This ensured that the voices of those impacted most by the introduction of the zone could be heard.^B

^A UK100 (2022) Portsmouth Clean Air Zone: UK100 Case study. Available online at: <https://www.uk100.org/projects/knowledgehub/portsmouth-clean-air-zone>

^B Department for Environment, Food & Rural Affairs and Department for Transport (2022) Clean air zone framework. Policy paper. Available online at: <https://www.gov.uk/government/publications/air-quality-clean-air-zone-framework-for-england/clean-air-zone-framework>.

^C UK100 (2022) Birmingham Clean Air Zone: UK100 Case study. Available online at: <https://www.uk100.org/projects/knowledgehub/birminghams-clean-air-zone>.



Evaluating

Evaluation

- **Are you evaluating the impact of your zone using a range of primary metrics?** This should include:
 - Air quality monitoring data
 - Vehicular fleet information
 - ◇ Traffic flow data (typically in 24-hour Annual Average Daily Traffic (AADT) format). Traffic flows both in and around the LEZ area should be collected to understand the changes in traffic flow as a result of the scheme
 - ◇ Number of compliant/non-compliant vehicles
 - ◇ Fleet composition (For example, for traffic modelling the proportion of HDV/LDV split is required as a minimum, but further breakdown of vehicle classes is preferable, e.g. percentage of Cars, LGVs, HGVs, Buses and Coaches and Motorcycles.)
 - ◇ Vehicle emissions data
- **Are you also considering other metrics, that can help gauge primary and secondary benefits of your zone?** This could include:
 - Active travel data (e.g., pedestrian and cycle counts on key arterial routes)
 - Uptake of ULEVs
 - Public transport usage and fare data
 - Vehicle speeds
 - Traffic displacement
 - An example of investigating possible traffic displacement can be seen in "Appendix 2: Investigating traffic displacement concerns (Q3)" from 'Bath's Clean Air Zone Quarterly Monitoring Report, July to September 2022 (<https://beta.bathnes.gov.uk/policy-and-documents-library/baths-clean-air-zone-monitoring-reports>).
 - Greenhouse gas emissions
 - Noise levels
 - Health impacts
 - Economic impacts
 - Public awareness and perception of the zone



Methods

- **Have you made observations before and during the implementation phase to ensure a proper evaluation?**
- **When evaluating your zone, are you taking into account other factors that are known to influence air quality?** These factors include weather conditions, natural seasonal or year-by-year trends in air quality, socio-economic factors, general vehicle fleet turnover, or specific events such as the COVID-19 lockdown.
 - As noted by AQEG, even if there are statistically significant differences between a set of measurements before and after the intervention, it does not necessarily prove that the change was caused by the intervention. Understanding these other factors is critical in understanding the true impact of your zone.
 - Read the following briefing document 'Quantifying the impact of Clean Air Policy Interventions For Air Quality Management': (<https://doi.org/10.25500/epapers.bham.00004040>) which outlines a methodological approach that can be used to provide evidence of the success or otherwise of different clean air policies for different geographical areas and time periods.
- **Have you considered which methods will be used to quantify changes in measured concentrations, and the impact this choice may have on your results?** These approaches can range from various data filtering methods, to sophisticated statistical analysis, to air quality modelling.
 - The Air Quality Expert Group (AQEG) produced the following report 'Assessing the Effectiveness of Interventions on Air Quality' (https://uk-air.defra.gov.uk/library/reports.php?report_id=1004). See Chapter 2 'Principles and approaches used for quantifying the effects of interventions' which outlines many different methods and their challenges.
 - The LAQM website provides a summary of all available tools for air quality assessment (<https://laqm.defra.gov.uk/air-quality/air-quality-assessment/list-of-available-tools/>).
 - For analysis, characterisation, and evaluation of air quality data consider tools such as:
 - openair (<https://CRAN.R-project.org/package=openair>), an R package developed for the purpose of analysing air quality data.
 - AQEval (<https://cran.r-project.org/package=AQEval>) that was developed for use by those tasked with the routine detection, characterisation and quantification of discrete changes in air quality time-series, such as identifying the impacts of air quality policy interventions.
- **Have you considered how the efficacy of these methods can vary greatly depending on the air pollutant being considered?**
- **Have you considered how the efficacy of these methods can vary greatly depending on the location of the measurement site(s)?**

Results

- **Are you carefully assessing your data for quality and validity?** This should account for anomalous/erroneous results and data completeness.
 - Further information on dealing with erroneous data can be found in Local Air Quality Management Technical Guidance (TG22) paragraph 7.153 '*Identifying Erroneous Data*'.
- **Are confounding factors being considered in the evaluating process?**
- **Have you quantified any uncertainties, to provide more confidence in your results and the decisions based on your results?**
 - For more information and approaches for dealing with uncertainty, see section 2.4.1 '*Dealing with uncertainty in measurement*' of the AQEG '*Assessing the Effectiveness of Interventions on Air Quality*' report.

Reporting

- **Are you committed to regularly reporting on the impact of your zone, to monitor and display its progress?**
 - For example, Bath and North East Somerset Council regularly report on the impact of the Bath CAZ through quarterly and annual reports (<https://beta.bathnes.gov.uk/policy-and-documents-library/baths-clean-air-zone-monitoring-reports>).

Ongoing engagement

- **Are you supporting transparency, and open access to your data?**
- **Are you ensuring subsequent reports are being made easily accessible, and actively communicating your findings?**
- **Are you engaging with those in academia or industry with expertise in air quality, to ensure robust evaluation and analysis and improve confidence in results?**

Lessons learned



Evaluating clean air policies is a challenge because of the complex physical and chemical processes in the atmosphere and other socioeconomic factors that may also be impacting pollution levels.^A



There are two principal targets to assess, first the question of whether the desired outcome (e.g. air quality, health outcomes) has actually changed, and second the question of whether any observed change was causally related to the intervention.^B



The design of the assessment of an intervention should be considered at the planning stage, with the practitioners receiving pragmatic advice on the process.^B

^A Shi, Z., Liu, B., Cheng, K., Elliott, R.J.R., Cole, M.A., Bryson, J.R., 2022. Quantifying the impact of Clean Air Policy: For air quality management. Working paper, Available online at: <https://doi.org/10.25500/epapers.bham.00004040>

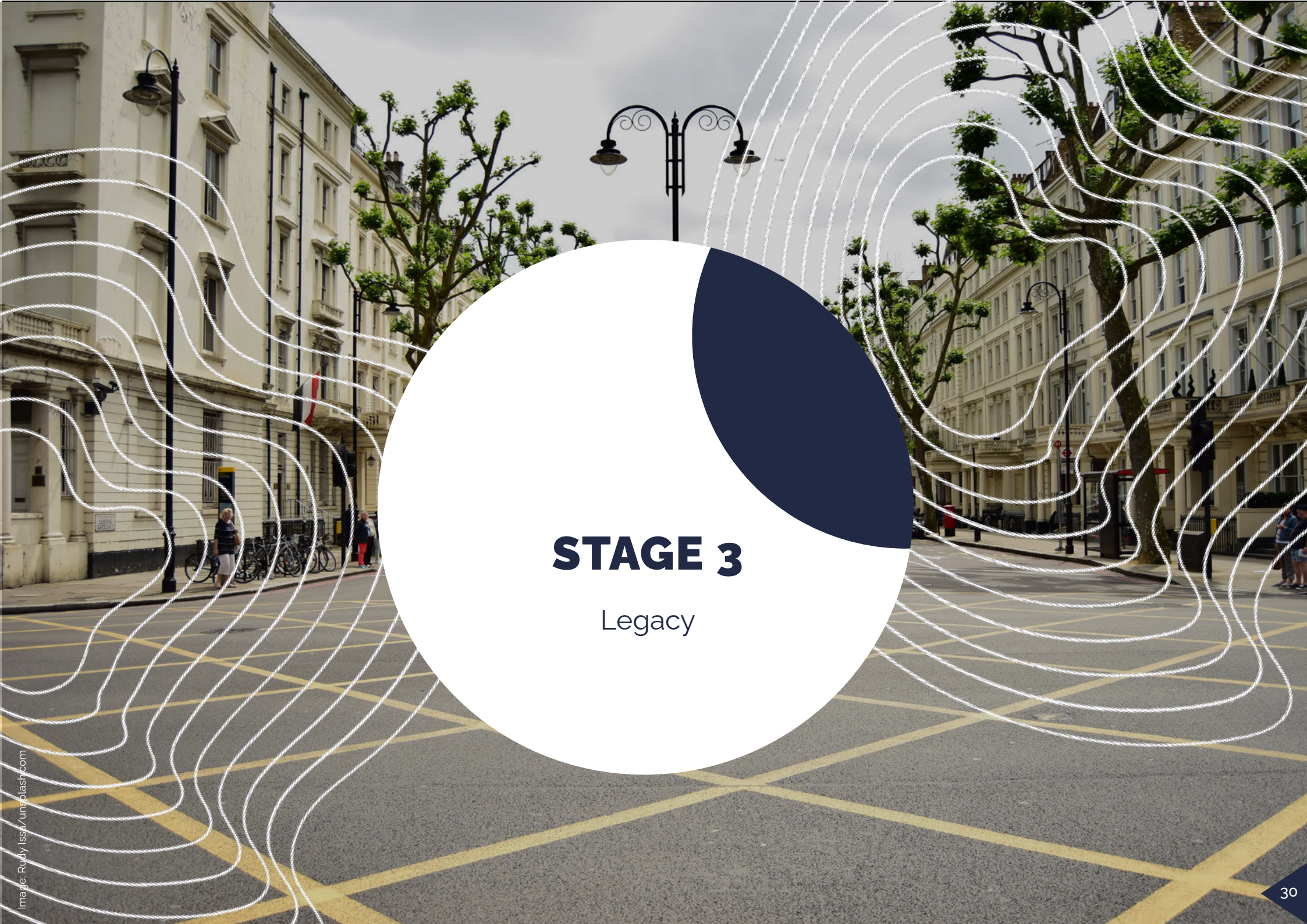
^B AQEG (2020) Assessing the Effectiveness of Interventions on Air Quality. Available online at: https://uk-air.defra.gov.uk/library/reports?report_id=1004



Image: Jack Lucas Smith/unsplash.com

Link to additional decision-support resource

Read the C40 Cities 'Ambient Air Quality Data Processing and Reporting Guide'. Available online at: https://www.c40knowledgehub.org/s/article/Ambient-air-quality-data-processing-and-reporting-guide?language=en_US



STAGE 3

Legacy

Legacy

Reflection

- **Has your zone achieved its designed purpose (i.e., have air quality objectives been met)?** Before you consider the decommissioning of a zone you must first assess whether the desired outcome has changed (e.g., have you achieved statutory NO₂ limit values), and understand whether any observed change is causally related to the implementation of the zone.
- **Has your zone been successful in achieving 'secondary' objectives (e.g., reduced traffic flow, greater uptake of active travel modes, or electric vehicles)?** Understanding the successes and failures of your zone on these metrics can help better inform future interventions.

Decommissioning

- **Have you considered the potential benefits of continuing to operate your zone?** Even if legal objectives are met, these limits still remain above the World Health Organisation 2021 Air Quality Guidelines – extending the lifetime of the zone may therefore continue to provide substantial public health and economic benefits.
- **Have you considered the role of future vehicle fleets, and how future zones will need to accommodate these?** Current LEZs are based on Euro classes that are expected to be redundant once sufficient fleet turnover has occurred, and careful consideration of how to introduce more stringent options, such as moving towards a ZEZ, is required.
- **Have you considered how future place-based air quality solutions could be redesigned to maximise public health benefits, and how this may differ based on your own LEZ experience?**

Ongoing engagement

- Are you sharing knowledge and lessons learned with other local authorities?
- Are you still engaging with your stakeholders, and opening discussion to the future of your zone?

Lessons learned



Looking ahead, it is time to shift up a gear given that the improvements in air quality are real but often limited. LEZ should be gradually turned into zero emission mobility zones (ZEZ) and complement policies promoting a switch to clean alternatives, such as walking and cycling, the electrification of all modes including public transport, taxis, shared and private vehicles as well as delivery vans. This transition is also required by climate targets that imply a complete phase-out of internal combustion engines by the mid-2030's, starting earlier in cities.^A

^A Transport & Environment (2019) Low-Emission Zones are a success – but they must now move to zero-emission mobility. Briefing, September 2019. Available online at: <https://www.transportenvironment.org/discover/low-emission-zones-are-success-they-must-now-move-zero-emission-mobility/>.



Additional resources

- Read our briefing note on Low Emission Zones: <https://transition-air.org.uk/briefing-notes/>.
- Browse the UK100 Knowledge Hub (<https://www.uk100.org/knowledgehub>) where you can find case studies and read different City Council's experiences with clean air zones in:
 - Birmingham (<https://www.uk100.org/projects/knowledgehub/birminghams-clean-air-zone>)
 - Portsmouth (<https://www.uk100.org/projects/knowledgehub/portsmouth-clean-air-zone>)
 - York (<https://www.uk100.org/projects/knowledgehub/yorks-clean-air-zone>)
- Read the Government's clean air zone framework: <https://www.gov.uk/government/publications/air-quality-clean-air-zone-framework-for-england>.

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