

# EVIDENCE BASED APPROACH TO SETTING CLEAN AIR ZONE CHARGES

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## 1 Context

The Joint Air Quality Unit (JAQU) is clear that charging Clean Air Zones (CAZs) should only be implemented if non-charging alternatives have been found to be insufficient to bring about compliance with air quality limits in the shortest possible time.

It is the responsibility of the local authority to determine any charge levels. This guidance is to enable local authorities to bring together relevant evidence and use this to underpin and explain their chosen charge levels. **Local authorities who are implementing a charging CAZ will need to use evidence in their Outline Business Case (OBC) and Full Business Case (FBC) to justify any CAZ charges they choose to set and demonstrate that they will be adequate to achieve compliance.**

Because local authorities are required to implement their plans in the shortest possible time, it is important that the assessment of the suitability of charge levels is proportionate to the available time, evidence base and resources. The most robust way to assess these responses would be through a full quantitative study but due to the need to achieve compliance in the shortest possible time we recognise this is unlikely to be feasible. We have therefore provided this guidance to help inform such decisions. JAQU will also work with local authorities to ensure that any charges they develop are evidence-based so that the business case demonstrates a local plan that is fair, effective and good value.

**A charging CAZ should only be implemented if non-charging alternatives have been found to be insufficient to bring about compliance with air quality limits in the shortest possible time.** Nonetheless some CAZs may require a charging element whereby older, more polluting vehicles will be charged to enter the zone.

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The purpose of these charges is to encourage behavioural responses by vehicle owners which will lead to improvements in air quality and ultimately in public health. Vehicle owners facing a CAZ charge may respond in a variety of ways including:

- Choosing to continue their normal travel behaviour and **pay the charge**.
- Avoiding the charge by **diverting their journeys** around the CAZ area.
- **Reducing journeys** into the CAZ.
- Through **changing mode** such as from a car to walking or cycling.
- **Upgrading their vehicles** to newer, less-polluting models which are exempt from a CAZ charge.

These responses will vary depending on personal needs and preferences, local conditions and the size of the charge levied. There is also a risk that charges will have significant adverse distribution impacts for those affected.

In line with the [CAZ framework](#), **local authorities should not set the level of charge as a revenue raising measure**. The Transport Act 2000 requires any excess revenue that may arise from charges above the costs of operation to be re-invested to facilitate the achievement of local transport policies and these should aim to improve air quality and support the delivery of the ambitions of the zone, while ensuring this does not displace existing funding. Such charges may not be used as a form of taxation to raise revenue generally.

There are a number of areas that local authorities would be expected to consider when justifying their CAZ charges:

- The existing evidence base
- Local conditions
- The expected behavioural responses to the charges
- The potential distributional impacts of the charges
- Alternative charge structures

## 2 The evidence base on charging CAZ levels and other related policies

An important first step when thinking about what charge levels might be appropriate for a CAZ is to look at the existing evidence base on charging CAZs and other relevant sources. This will make sure that the charges are calibrated to real world values which have been proven to be able to drive behavioural change. **When using these evidence sources local authorities will need to consider the limitations of these sources** given the circumstances and requirements of the local authority.

For instance, for the evidence on charging CAZs, a local authority should consider how their local conditions might be different to that set out in the evidence. Likewise, for evidence on related policies, a local authority should evidence how these policies differ from a charging

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CAZ (e.g. in geographical scope/coverage, objectives etc.) and to what extent their responses and charges would be relevant to those for a charging CAZ.

### Useful sources:

#### *Evidence base on charging CAZs*

- *London:* [Low Emission Zone Impact Assessment](#), and on huddle - [Initial Ultra Low Emission Zone \(ULEZ\) research](#), [ULEZ expansion behavioural response research](#)
- *Other:* On huddle - analysis from other local authorities (e.g. [anonymised summary of analysis conducted by a local authority](#))

#### *Other related policies*

- *Congestion Charges:* [TfL Congestion Charge Zone evaluation](#)
- *Toll roads:* M6 Toll Post Opening Project Evaluation ([1 year after study](#), [5 years after study](#)), evidence from other countries ([Norway](#), [the Netherlands](#), [Taiwan](#))<sup>1</sup>
- *Parking charges:* local data, [Parkopedia](#)

## 2.1 The local conditions of the local authority and how these compare to other areas

The effects of the same CAZ charge would differ around the UK because of the unique circumstances of each area. Local authorities should therefore think about factors which might cause behavioural responses in their area to diverge from those elsewhere.

For example, when considering the charge levels proposed by London, a local authority might look at differences in income (which might affect people's willingness to pay a charge) and the public transport infrastructure (which might affect people's propensity to change mode) in order to estimate the difference in impacts that they might expect from the same charge levels in their own area. **Local factors will be important to help explain the charge levels which local authorities decide to set.**

### Useful sources:

- *Public Transport data:* [DfT Journey Time Statistics](#)<sup>2</sup>, [NAPTAN](#), [PTAL](#) (London only), locally held bus routes and public transport data
- *Income statistics:* [ONS Annual Survey of Hours and Earnings](#)
- *Size of CAZ:* dependent on boundaries chosen in business cases
- *Data on businesses:* [BEIS Business Population Estimates](#)

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<sup>1</sup> It is important to bear in mind that many of the international examples/studies are very project-specific and so the extent to which their findings will be applicable to this are may be limited.

<sup>2</sup> Gives information on the ease of access to various services using public transport which could be used to estimate the quality of public transport in the area.

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### 2.2 The behavioural responses needed to bring about compliance

As the purpose of the CAZ charge is to drive improvements in air quality through behavioural responses, the relationship between charge levels and the responses of vehicle owners is of central importance. **Local authorities should therefore consider the behavioural response that they need to get in order to achieve compliance and set their charge levels accordingly.**

One way to estimate this link between charges and responses would be to consider the various costs of different behavioural responses. For paying a charge and upgrading to a compliant vehicle, these costs are likely to be primarily financial. However, the costs associated with other responses are likely to be in terms of generalised cost of travel<sup>3</sup>. It is also important not to overlook potential transitional costs from changing behaviour such as the costs of searching for a vehicle and transaction costs. Another approach would be to use existing behavioural response data and consider how similar the responses would be expected to be given the local authority's own situation.

Because there are a number of sources of NO<sub>2</sub> in any given area, there may be multiple combinations of charge levels that could achieve compliance. For example, a local authority might be able to achieve the same overall response by imposing a higher charge on LGVs and a lower one on HGVs (or vice versa). The balance between which vehicles should be charged will depend on local circumstances and should be justified with reference to the potential distributional impacts.

#### Useful sources:

##### *The behavioural responses needed*

- *Source apportionment data*<sup>4</sup>: From [national modelling](#) and local modelling
- *Air quality modelling*: From [national modelling](#) and local modelling

##### *The relationship between behavioural responses and charge levels*

- *Overview of factors which affect travel behaviour*: [Victoria Transport Policy Institute paper](#)
- *London: Low Emission Zone Impact Assessment*, and on huddle - [Initial Ultra Low Emission Zone \(ULEZ\) research](#), [ULEZ expansion behavioural response research](#)
- *Congestion Charges*: [TfL Congestion Charge Zone evaluation](#)
- *Fleet data* (e.g. from ANPR studies and Trafficmaster data)
- [Vehicle values and depreciation rates](#) (data inputs table on huddle)
- *Transport Appraisal Guidance*: [WebTAG](#) and [WebTAG data book](#)

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<sup>3</sup> For more information on this please see the Department for Transport's [Transport Appraisal Guidance](#).

<sup>4</sup> Source apportionment data sets out which activities are contributing to NO<sub>2</sub> concentrations and hence show what the major sources of local pollution are,

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### 2.3 The expected distributional impacts

A charging CAZ is unlikely to impact all groups equally. As such **it is important to examine the potential effects of CAZ charges on different groups** including:

- Deprived groups
- Children
- The elderly
- Disabled people
- Gender
- Ethnic minority groups
- Small businesses

In looking at the impacts on these groups it will be necessary to also think about potential measures to reduce the adverse effects of any charge levels. This should link with the general distributional impacts analysis as discussed in the [options appraisal guidance](#) on huddle.

For instance, if a local authority believes that a charge on buses is likely to have a significant impact on smaller businesses because there are a number of small operators within the CAZ boundaries, it may be decided to reduce the charge on buses and increase the charge on another form of transport to maintain the overall air quality improvements. In another example, a local authority may have a number of supporting measures (such as retrofit funding) to help HGVs. This could be used as a justification to increase the charge levels on HGVs so as to reduce the charge burden on other vehicle types while still achieving the necessary level of behavioural response.

#### Useful sources:

- *Fleet data* (e.g. from ANPR studies and Trafficmaster data)
- *Geography of deprived groups*: [DCLG Index of multiple deprivation](#) and [map explorer](#)
- *Link between transport and distributional impacts*: [DfT National Travel Survey](#)
- *Transport spending as a proportion of total household spending*: [ONS family spending survey](#)
- *Information about local bus operators*: [DfT bus statistics](#)
- *Distributional impacts*: Defra/DfT – Annex D of [NO<sub>2</sub> plan technical document](#) and Section 7 of [NO<sub>2</sub> plan consultation technical document](#)

### 2.4 Alternative charge structures

While JAQU's national modelling assumes a fixed daily charge, local authorities have the flexibility to set charges in different ways. Therefore it is worth thinking about what the best charge structure might be for the local area.

For example, if the distributional analysis suggests that a CAZ boundary covers areas of multiple deprivation, it could be preferable to have different charge levels for those living in

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the zone and for those coming in from outside. Alternatively, if a major source of pollution is as a result of congested roads during peak hours, a charge during rush hours might deliver the necessary change in behavioural responses. Such a policy could be especially effective for vehicle types which may be more flexible in the hours that they enter the zone such as HGVs.

However if charge structures other than a fixed daily charge are chosen, **it will be essential to demonstrate that these charge structures are feasible to implement through available powers and that they still deliver the required level of behavioural response to ensure compliance is achieved in the shortest possible time**