



Zero-emission vehicles

This ReVeAL building block fact sheet is one of a series of 33, each describing one Urban Vehicle Access Regulation (UVAR) building block and providing an example of its use in a city. The ReVeAL building blocks can be combined with one another to create a structured UVAR package for a city. Try out the ReVeAL online tool, www.AccessRegulationsForYourCity.eu, to receive suggestions of appropriate UVAR building blocks for your city as well as guidance in their implementation.

The EU-funded research and innovation project, CIVITAS ReVeAL, aims to add Urban Vehicle Access Regulations and associated policies and technologies to the standard range of urban mobility measures in cities across Europe. The project mission is to enable cities to optimise urban space and transport networks use to improve urban accessibility, sustainability, and liveability.

For more information, please visit: www.civitas-reveal.eu.

Spatial Interventions

Spatial interventions are where the road layout has been altered to favor more sustainable mobility and prevent vehicles entering. Examples of these are removing road and parking space taken for vehicles and using the space for sustainable mobility or amenities (bus lanes, logistics hubs, parklets, restaurants and more)

Speed reduction

Traffic filter:

- Recirculation of traffic
- Road block
- Capacity restraint

Reallocating parking space:

- Parklet
- Drop-off zone shared mobility
- Logistics bay (mini-hub)
- Kiss & Ride (K&R)

Reallocating road space for pedestrians:

- Widen pavement
- Pedestrian priority street or zone

Reallocating road space for cycling:

- Cycle lane
- Cycling street

Reallocating road space for public transport:

- Bus or tram priority lane

Pricing Aspects

Pricing aspects are when the entry to an area or to the entirety of the city is given a price tag to encourage more sustainable transport. Pricing aspects also include the (differential) levels of penalty fees to encourage (and enforce) compliance.

Road charges / tolls:

- Charge applied to a perimeter or an area (congestion charge)
- Charge applied to specific points
- Distance-based charge
- Time-based charge
- Permit charge
- Charge based on emission standards (pollution charge)

Parking charge:

- Dynamic price (real time)
- Fixed price
- Charge based on emission standards (pollution charge)
- Workplace levy
- From on-street to off-street parking

Regulatory Measures

Regulatory measures are those where there is a legal instrument that states who can and cannot enter an area. They could often also be called "bans" and include Zero Emission Zones, Low Emission Zones, and Limited Traffic Zones.

Regulation by emissions:

- Euro standard
- Zero-emission vehicles

Regulation by vehicle type and dimensions:

- Vehicle type
- Dimensions

Regulation by trip purpose:

- Delivery and logistics
- Through traffic ban

Regulation by permit:

- Permit to travel
- Parking permit
- Planning permit conditions



Zero-emission vehicles

Definition of the building block

Vehicle access is only allowed (or advantages are given) to zero-emission vehicles (as opposed to segmenting vehicles into different emission categories). Such a scheme is generally implemented for climate reasons; another aim is often to improve air quality.

Timing, phasing, scaling and replication

A ZEZ can be considered in places that already have a reasonable number of ZEVs. Its introduction can be phased in by building upon existing UVAR measures. For example, a ZEZ can be phased in by tightening standards in an existing LEZ or by changing permit conditions in an LTZ. Conditions can be added on deliveries within a pedestrian zone to make it zero emission, or a delivery scheme can limit access to EVs only or add time windows for ZEV access.

If no existing measures are in place, a ZEZ can be started directly in a small central area. It can be upscaled by increasing the area affected, by affecting additional vehicle types, by adapting access time windows or by reducing the number of exemptions. All planned phases of the measure should be announced at the beginning to allow those affected to make long-term plans. Having complementary measures in place at the outset enables best acceptance and compliance.

Time windows

- Allowing vehicle access at particular times of day
- Allowing vehicle access on given days of the week (e.g., weekends)
- Having no time differentiated vehicle access

Enforcement options

- Cameras with automated number plate recognition (ANPR)
- Manual enforcement through visual inspection
- Physical barriers
- Radio frequency identification (RFID)
- Theoretically, geofencing could be used with PHEV, however ZEVs are advancing so fast to make investment in geofencing technology ineffective (with the small possibility of its use for public transport).

Gender and equity

There may be concerns about the ability of people with low incomes to afford zero-emission vehicles. Complementary measures of additional sustainable mobility options or grants for new, retrofitted or adapted vehicles may help address this. Exemptions can also be considered in individual cases.



Zero-emission vehicles

Complementary measures

Exemptions

The types of exemptions will be different depending on the scheme type, but some examples are:

- Key exemptions for police, fire department, waste collection, etc.
- User needs exemptions, e.g. for people with disabilities with forced car dependency, taxis, classic car owners, residents, deliveries
- Exemptions for adapted vehicles (e.g., retrofitted or converted electric or hybrid vehicles)
- Limited numbers of purchased exemptions for entry (e.g., per day/month/year) to a specific zone
- Specified maximum amount of kilometre “credits” allocated to individuals or businesses

Increased mobility options

The types of increased mobility options will be different depending on the scheme type, but some examples are:

- Creation of mobility hubs
- Increasing/improving walking or cycling facilities
- Increasing/improving public transport
- Facilitating vehicle hire and/or car sharing
- Providing parking spaces in alternative locations (e.g., Park & Ride)

Financial incentives

These will differ depending on the planned UVAR measures, but some options include:

- Financial incentives for fleet renewal, e.g., for the purchase, renting or leasing of greener vehicles (including tax exemption)
- Membership or vouchers for sustainable mobility options (e.g., public transport and shared mobility services) such as discount cards, free rides or annual passes for public transport or consolidation centres
- Monetary incentives for cycling trips (e.g., for bike-to-work) or for (e-)cycle or (e-)cargobike purchases
- Grants towards retrofits (e.g., diesel particulate filters, new engine or fuel conversion)
- Compensation for scrapping an old vehicle (either financial or through a voucher), often differentiated by emission standards, vehicle type or owner income.

Organisational support

This can include logistical, administrative, promotional or other support provided by the city. This might include supporting alternative business models (e.g., for car parks that have no/fewer customers), facilitating changes and working on individual solutions to resolve issues.

Zero-emission vehicles

Consider combining with:

Pricing Aspects

Road charges/tolls:

- Permit charge
- Charge based on emission standards (pollution charge)

Parking charge: Charge based on emission standards (pollution charge)

Road charges/tolls can be an alternative method of implementing regulation by emissions; instead of regulating (banning) 'undesirable' vehicles, these vehicles are charged a fee at the level of a fine, and 'compliant' vehicles are charged no fee. A parking charge can be one of the phases of this measure or a linked measure.

Future considerations

Regulating by emission is a tool to push the change towards zero-emission vehicles. As there are currently relatively few zero-emission vehicles in most cities, this type of regulation may also help to reduce the overall number of vehicles in a given area. As the number of zero-emission vehicles grows, ZEZs will become easier to implement, but additional measures may be needed to maintain this traffic-reducing effect.

Regulatory Measures

Regulation by vehicle type and dimensions:

- Vehicle type
- Dimensions

Regulation by trip purpose:

- Delivery and logistics
- Through traffic ban

Regulation by permit:

- Permit to travel
- Parking permit
- Planning permit conditions

Further guidance

- Communicating the aim of the scheme
- Exemptions
- Financial or in-kind incentives
- Enforcement options
- Legal framework
- Managing permits (and exemptions)

Zero-emission vehicles

*Example: Amsterdam, the Netherlands*Description

The city of Amsterdam will have a zero-emission zone by 2030. The strategy for a low-emission zone started in 2008, targeting just lorries. In 2020, a national regulation was introduced in the Netherlands to harmonise all the local LEZs. There are currently six low-emission zones in Amsterdam, which will be expanded and more strictly regulated. The city's approach is defined in its Clear Air Action Plan to meet the European standards for climate. However, Amsterdam is striving to reach the standards delineated by the World Health Organisation, which are twice as strict. The emission strategy runs parallel to the policy goal of climate neutrality and circularity in all sectors.

Enforcement methods

Automated number plate recognition (ANPR)

Time windows

No time differentiation for access
Phasing and upscaling

- 2006. Agreement to implement LEZ
- 2008. City-wide strategy for lorries
- 2020. National regulation to harmonise all the local Dutch LEZs
- 2020. Ban diesel cars with emissions standard Euro 0, 1, 2 or 3
- From 2022. Goods traffic will only be allowed within the A10 ring road with a zero-emission or emissions standard 6 diesel or petrol engine;
- From 2025. Only electric scooters and mopeds will be allowed in the built-up area of Amsterdam. Goods and delivery vehicles, taxis, public transport buses and private coaches will only be allowed inside the A10 ring road if they have zero-emission engines. The same goes for passenger and pleasure vessels and public transport ferries
- From 2030. the entire built-up area of Amsterdam will be emission-free for all forms of transport, including cars and motorbikes



in blue,
emission-free
centre (2022)
in orange,
emission-free
zone within the
A10 ring road
(2025)
in green,
emission-free
Amsterdam
(2030)

On the left, the extent of the current LEZ and the future ZEZ (Gemeente Amsterdam, 2019b)

Zero-emission vehicles

Amsterdam, the Netherlands

Other building blocks put in place

Pricing Aspects

Parking charge:
From on-street to off-street parking

Regulatory Measures

Regulation by emission: EURO standard

Regulation by vehicle type and dimensions:

- Vehicle type
- Dimensions

Regulation by permit: Permit to travel

Complementary measures

Exemptions

- Petrol fuel vehicles
- Campers
- Vehicles of more than 7.5 tons (with a permit)

Increased mobility options

- Park & Ride
- Electric car sharing

References

- Gemeente Amsterdam. (n.d.). *Low emission zone for diesel vehicles only*. Retrieved June 2, 2022, from <https://www.amsterdam.nl/en/traffic-transport/low-emission-zone/>
- Gemeente Amsterdam.(n.d.). *Parking + Travel (P+R)*. Retrieved June 2, 2022, from <https://www.amsterdam.nl/parkeren-verkeer/parke-ren-reizen/>
- Gemeente Amsterdam. (2019a). *Policy: Clean air*. Retrieved June 2, 2022, from <https://www.amsterdam.nl/en/policy/sustainability/clean-air/>
- Gemeente Amsterdam. (2019b). *Clean Air Action Plan*. https://assets.amsterdam.nl/publish/pages/867636/clean_air_action_plan_1.pdf



An example of Zero-Emission logistics vehicles in the city centre of Amsterdam (Gemeente Amsterdam, 2019b)