



Charge applied to a perimeter or an area (congestion charge)

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



Charge applied to a perimeter or an area (congestion charge)

Definition of the building block

Road charges for a perimeter or an area are a daily charge to be paid for driving through a designated boundary and/or within the restricted area.

Timing, phasing, scaling and replication

Consider how you will deal with foreign-registered vehicles, if there will be a flat rate payment or a sliding scale according to the size of the vehicle, and how this could increase in subsequent phases.

Time windows

- Allowing vehicle access at particular times of day
- Allowing vehicle access on given days of the week (e.g., weekends)
- Allowing seasonal vehicle access
- Triggered access restrictions (e.g., by pollution levels)

Enforcement options

- Cameras with automated number plate recognition (ANPR)
- Radio frequency identification (RFID)
- Dedicated short-range communication (DSRC)

Gender and equity

The selection of payment method(s) should be carefully considered to avoid excluding people with a low income or those without a smart phone or easy Internet access.

Future considerations

No specific effects are foreseen for this building block from future technologies.

Further guidance

- Communicating the aim of the scheme
- Signage to communicate UVARs
- Financing
- Complementary sustainable mobility measures
- Legal framework
- Enforcement options
- Camera enforcement and privacy issues

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.



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Consider combining with:

Spatial Interventions

Speed reduction

Traffic filter:

- Recirculation of traffic
- Road block

Reallocating parking space:

- Drop-off zone
- Logistics bay (mini-hub)

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

Parking charge:

From on-street to off-street parking

Regulatory Measures

Regulation by vehicle type and dimensions:

- Vehicle type
- Dimensions

Regulation by trip purpose:

Delivery and logistics

Road charges applied to a perimeter or an area are commonly combined with various spatial interventions.



Singapore is an example of a charge applied to a perimeter, and vehicle access is checked through a system of gantries (MOT, 2022)

Charge applied to a perimeter or an area (congestion charge)

Example: Electronic Road Pricing (ERP). Singapore

Description

All Singapore-registered vehicles, including goods vehicles, taxis, and buses, must install an in-vehicle unit (IU) to drive through the city. Access is checked via the system of electronic road pricing (ERP) and a network of gantries.

The electronic road pricing allows automatic payments for entering specific urban areas based on distance travelled, time of day, and vehicle type. Gantries are placed on expressways and arterial roads linking to the Singapore Central Area.

Payment methods

Automatic payment. The in-vehicle unit deducts the charges, which increase based on the number of gantries passed. Drivers pay either via a stored value card or via credit/debit card. The charges are based on time of the travel (in peak hours, charges can change every half hour) and size of the engine (larger vehicle types pay more).

Enforcement methods

Smart card and Radio Frequency Identification (RFID)

Time windows

In effect daily, except Sundays and public holidays.

Phasing and upscaling

- 1975. Singapore's government implements road pricing scheme in the form of Area Licensing System, with a flat charge on all vehicles entering the Central Business District
- 1998. Electronic road pricing system is introduced with 33 gantries
- 2013. Expansion of the charging zone to a total of 71 gantries

Other building blocks put in place

Spatial Interventions

Speed reduction

Pricing Aspects

Road charges / tolls:

- Charge applied to specific points
- Distance-based charge
- Time-based charge
- Permit charge

Regulatory Measures

Regulation by permit: Parking permit



Complementary measures

Increased mobility options

Options for foreign-registered cars without an IU:

- Renting a temporary detachable IU
- Paying a flat fee of \$5 each day to drive through operating ERP gantries

Options for motorcycles without an IU:
Renting a temporary detachable IU

Digital Parking Guidance System to check parking lot availability

Car sharing

Financial Incentives

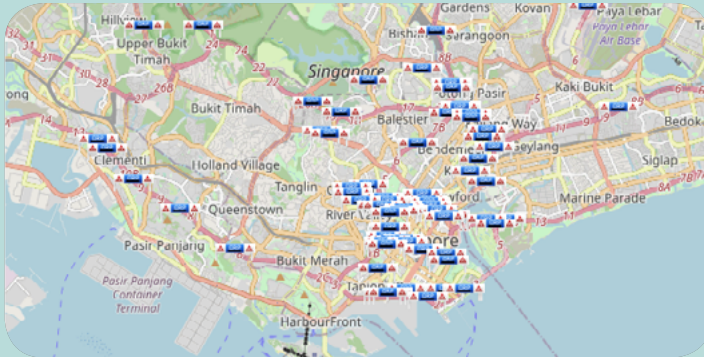
Off-peak car scheme introduced to reduce peak hour traffic. Three types available: Weekend Car (WEC), Off-Peak Car (OPC) and Revised Off-Peak Car (ROPC). Car owners can save on car registration related fees and road taxes, in return for using their cars during restricted hours – mostly on weekends, public holidays and at night longer be driven in the region.



Every registered vehicle in Singapore must be equipped with a device called an in-vehicle unit (IU) to drive through the city. (LTA, 2022).

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Electronic Road Pricing, Singapore



The map shows the position of the ERP gantries in Singapore. (Sgcarmart, 2022)

Additional information

ERP rates are determined based on traffic conditions. The optimal traffic speed range is 45 – 65 km/h on expressways and 20 – 30 km/h on arterial roads. If traffic speeds rise above the maximum thresholds, charges at that gantry will be reduced, conversely, it will be increased if traffic moves slower than the minimum threshold.

The Vehicle Quota System (VQS) fixes the number of new cars that can be bought every year. Prospective buyers must obtain a quota licence, that is a certificate allowing their vehicle purchase.

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