ReVeAL

The Big ReVeAL

Insights from the implementation of Vehicle Access Regulations in six cities

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 815008.

CIVITAS
Sustainable and smart mobility for all

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List of Abbreviations

BSD	Brainport Smart District
ISA	Intelligent Speed Assistance
LEZ	Low Emission Zone
LTZ	Limited Traffic Zone
ReVeAL	Regulating Vehicle Access for Improved Liveability
SUMP	Sustainable Urban Mobility Plans
ULEZ	Ultra-Low Emission Zone
UVARs	Urban Vehicle Access Regulations
ZEZ	Zero Emission Zone

A cyclist commuting in Vitoria-Gasteiz, using segregated bicycle lanes side by side with the tram tracks. *Credits: Centro de Estudios Ambientales, Vitoria-Gasteiz*

Vitoria-Gasteiz welcomes a new form of public transport: an electric and intelligent BRT (BEI). *Credits : Tuvisa*

Section 1:

ReVeAL and its approach

Context

Since the 20th century, motorised traffic has framed how cities are shaped, where people live and how they experience urban life. With the influx of internal combustion cars, buses, vans and trucks came a spectrum of challenges including harming air and noise pollution, greenhouse gas emissions, heavy congestion, high safety risks, exacerbated inequalities, disconnection of neighbourhoods and urban sprawl.

Across Europe, local authorities are now putting a stop to the dominance of motorized vehicles, especially private cars, in cities and towns. One of the most efficient and successful tools available are Urban Vehicle Access Regulations (UVARs). These regulations determine the conditions for vehicle access in parts of urban areas, prioritising sustainable mobility, limiting access to certain types of vehicles and creating liveable cities made for people, not cars. UVARs can take many forms including Low Emission Zones (LEZs), congestion charges, Limited Traffic Zones (LTZs), and changes to the road layout, amongst others.

In this context, the Horizon 2020 project ReVeAL (2019-2022) - *Regulating Vehicle Access for Improved Liveability* - was initiated to add UVARs to the standard range of urban mobility approaches across European cities. ReVeAL combined case study research with hands-on UVAR implementation in six pilot cities, and it produced a toolkit to support other towns and cities.

The ReVeAL Approach

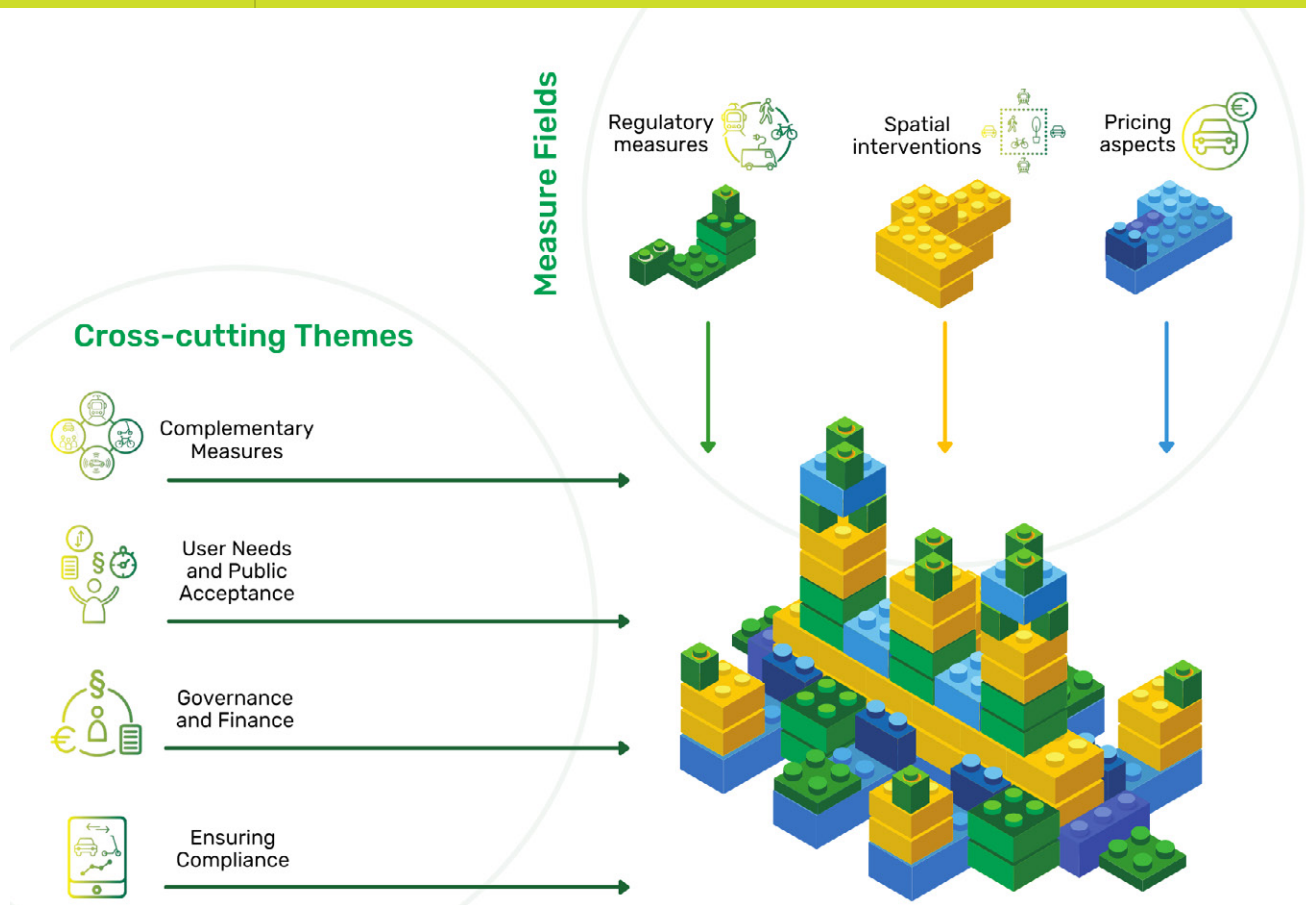
To implement these regulations, the ReVeAL approach and toolkit break down UVARs into different features that are then combined by local authorities through a 'pick-and-mix' assortment appropriate to their urban context. These include:

- **The range and type of UVAR measures a city wants to carry through.**
  ReVeAL identified 33 UVAR interventions (**building blocks**) which include parklets, cycling lanes and bans for high-emitting vehicles. They can be implemented in isolation (1 building block) or more often in combination (multiple building blocks). These building blocks are categorised into three **Measure Fields** according to their nature:

1. **Spatial interventions:** measures that change the physical design and allocation of road space in the city, creating spaces where vehicles cannot access. These can include roadblocks, parklets, reallocation of road or parking space to walking, cycling or various types of mobility hubs.

2. **Pricing aspects:** measures that involve payments related to vehicle users' access to a given area. Pricing can apply to all vehicles in an area (e.g., a congestion charge), certain categories of vehicles (e.g., a charge based on emissions standards or vehicle size), parked vehicles (various forms of parking charges), and can include permit fees and fines for non-compliance. Pricing can be flat or variable rates.

3. **Regulatory measures:** measures that apply restrictions, regulations and bans to vehicles according to their characteristics. Restrictions may be by emissions (low- or zero-emission), to the vehicle or trip type. Non-complying vehicles are not allowed into the regulated area and their owner/users face a fine if they do enter.



The ReVeAL Approach

- **The way the UVAR measures are implemented in a local setting.**
  Within ReVeAL, four **cross-cutting themes** were taken into consideration including Governance and Financing, Complementary Measures, Ensuring Compliance, and User Needs and Acceptance. These topics are largely relevant to all types of UVARs and can help ensure that they are feasible, have the desired impact and minimise any potential negative impacts.

- **UVAR strategies** must be implemented according to the goals, ambitions and capacity of each city and local government. A range of parameters must be included such as future-proofing, timescales, stakeholder engagement, communication, equity and more. These are detailed in the ReVeAL guidance document.

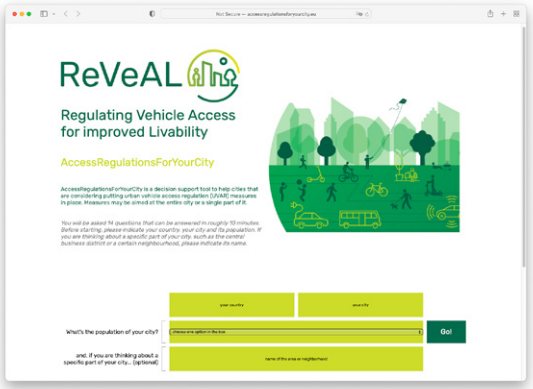
A ReVeAL Tool: AccessRegulationsForYourCity

A key output of ReVeAL is the creation of an open-source online UVAR tool made for local governments: AccessRegulationsForYourCity.

The tool was developed based on the lessons learned throughout the project and aims to help cities that are considering implementing UVARs in the entire city or a single area, such as the central business district or a residential neighbourhood.

AccessRegulationsForYourCity consists of 14 questions that can be answered in 5-10 minutes by a city representative who knows the local mobility context and goals well. The tool uses the responses to filter the 33 UVAR building blocks identified in the ReVeAL project to suggest the ones that are likely to suit the local context.

The output of the tool is a short list of suggested UVAR building blocks that may be worth considering for the town or city. For each suggested UVAR building block, the respondent will be redirected to a fact sheet that includes enforcement options; considerations on timing, phasing and scaling; gender and equity issues to keep in mind; and a selection of other building blocks that may combine well with it and a case example. The fact sheets also link to different aspects of the project's guidance document which lay down wider issues that cover several building blocks.



AccessRegulationsForYourCity

AccessRegulationsForYourCity offers guidance on the *process* of developing packages of UVAR measures to support cities' critical thinking around effective and equitable UVARs. The tool can be used multiple times, allowing one to change parameters to explore different results. The tool can also be used by different people as part of a city's stakeholder involvement processes.

Section 2:

The Six ReVeAL Cities

As part of ReVeAL, the measure fields and cross-cutting themes were developed and tested between 2019-2022 in six cities: Bielefeld, Helmond, Jerusalem, City of London, Padova and Vitoria-Gasteiz. Through the ReVeAL process, they selected a combination of UVAR building blocks that were either completely new to the city or building on existing access regulations and successes.

The next section presents an overview of the six pilot cities' achievements within ReVeAL.

Overview of the six pilot cities.

In Bielefeld, municipality officials distributed goodies to cyclists using a new bicycle road at the Waldhof to create awareness and share information.
Credits: Stadt Bielefeld

Bielefeld

In the scope of ReVeAL, Bielefeld combined a range of UVAR measures to test the feasibility and acceptance of a car-reduced old town. Significant stakeholder involvement and well-planned measures ensured that the schemes were well accepted and work is underway to implement them permanently.

Meet the city

Bielefeld is a medium-sized city of 340,000 inhabitants in North Rhine-Westphalia, Germany. The fast-growing city, with a population expected to grow by a further 6% by 2025, has over 80,000 daily commuters, with many traveling by car.

The city centre has retained many of its traditional features, including Gothic and Renaissance architecture. However, like many municipalities with narrow road networks, Bielefeld has been trying to reduce congestion and traffic levels, while unlocking opportunities for more liveable urban spaces and better streets for pedestrians and cyclists.

Achievements: Reshaping the inner city

Through data collection, coordinated planning and extensive stakeholder engagement, a thorough pilot project was implemented in Bielefeld's horseshoe-shaped old town. This area is strategically located: it is adjacent to Jahnplatz, the main mobility hub in the city centre which was in the process of being rebuilt when ReVeAL started.

Between June 2021 and February 2022, several UVAR building blocks were tested in the old town including the extension of a pedestrian zone, redesigned public spaces, reallocation of car lanes to cycling lanes, a transformation of parking spaces for other uses (seating, bicycle parking, sports, restaurant terraces, etc.), and the introduction of moveable bollards to prevent through traffic in some streets. The goal of the pilot was to evaluate the impacts and acceptability of these interventions by the public, with the hope to make them permanent in 2023 and potentially scale them up.

Before determining the measures to test in the pilot, the city of Bielefeld considered a range of approaches, examining how each would affect residents and businesses while keeping the city on track to achieve its SUMP goals.

One UVAR action led to another

Before the ReVeAL pilot in the city's historical town, Bielefeld had already begun a project to reduce car use in its urban areas: the transformation of Jahnplatz. The square is located at the northern edge of the historic city centre, connecting the centre to the main commercial areas and hosting a major transport hub. It was being transitioned into a space for active mobility and slower – and less–motorised traffic through the reallocation of car lanes to bus and cycle lanes, the reduction of the speed limit from 50km/h to 30km/h, and the creation of new attractive public spaces.

The transformation of Jahnplatz kick-started the transformation of Bielefeld's historic old town through a package of spatial intervention UVAR building blocks. Both the Jahnplatz and old town projects are in line with the city's mobility strategy which defines a sustainable model for the development of mobility in the city and aims to reduce individual car trips from the current 51% to 25% by 2030. The lessons learned in ReVeAL have given the city of Bielefeld a strong foundation to reach this goal.

What is next?

Today, the city is using the results of the old town pilots to turn towards permanent changes and expand its UVAR measures. There is overall strong support from all stakeholders, including restaurant and shop owners, and road users, driven by the stakeholder-focused process. Bielefeld has now begun testing a new last-mile city logistics concept with a spatial focus on the city centre including a distribution centre/city logistics hub and a cargo bike rental system. This should further reduce the number of journeys done by motorised vehicle into the city centre. A pilot is starting in autumn 2022 which will make use of existing bike rental infrastructure in the city to put in place cargo bike sharing for commercial use and at a later stage for private use. These new services may enable the final scheme to be even more ambitious.

Young residents of Bielefeld spend time together in a new form of public space: a parklet.
Credits: Stadt Bielefeld

Residents of Bielefeld playing ping pong in a parklet.
Credits: Stadt Bielefeld

The development of the Brainport Smart District.
Credits: Gemeente Helmond

Helmond

Through its innovative 'living lab' approach, Helmond demonstrated how a new neighbourhood can be planned to be a zero-emission zone (ZEZ) from the start. It also tested innovative road safety technology that can propel sustainable transport ambitions and support UVAR implementation.

Meet the city

Helmond is a medium-sized city with approximately 95,000 inhabitants, located in the south of The Netherlands. The city has been at the forefront of new sustainable mobility solutions and was selected to be part of the European Union's Climate Neutral and Smart Cities Mission.

Achievements: testing Intelligent Speed Assistance (ISA) and pioneering in creating a striving ZEZ district

Through ReVeAL, Helmond led two main actions.

The first is the **creation of a new largely traffic-free mixed-used neighbourhood** - Brainport Smart District (BSD). The plan was to have a ZEZ with no fossil-fuelled car access, car parking spots located on the edge of the district,

a standard of 0.2 car parking spaces per household, streets designed for people, access to active mobility and high involvement of citizens. The district is a test bed for the development, deployment and transferability potential of ZEZs. BSD is expected to accommodate around 2,500 houses and 4 hectares of business park by 2030, in addition to being a living lab for innovation and a space for deep cooperation between local authorities, academics, businesses and citizens. The first residents moved in early 2022.

The second action was **testing the use of ISA technologies on 10 vehicles** in cooperation with V-tron to assess the impact on traffic speeds and collect information on drivers' perceptions. Driver feedback offered insight into public acceptance of these new technologies: while not all feedback was positive, many drivers found ISA useful particularly to improve safety in 30km zones. Data was also collected on the impact of the introduction of vehicles equipped with ISA on peak speeds.

What is ISA?

Intelligent Speed Assistance (ISA) is an in-vehicle system that supports driver compliance with speed limits, using the information on the position of the vehicle and/or road signs, and the speed limit in force at a particular location. ISA is a collective term for various systems; an open ISA warns the driver (visibly and/or audibly) that the speed limit is being exceeded, a half-open ISA increases the pressure on the accelerator pedal when the speed limit is exceeded, and a closed ISA limits the speed automatically if the speed limit is exceeded.

Does ISA help achieve UVAR goals?

Speeding and aggressive driving styles increase emissions and pose risks to road safety. A TU Delft study has demonstrated that up to 8% CO2 could be saved if ISA were generalised, notably thanks to fewer braking actions. ISA may thus provide support to the development of UVARs - for example forming part of access permit conditions, either to reduce emissions or improve road user safety which are essential components of sustainable urban mobility plans. With studies showing ISA could prevent 20% of fatal accidents, these technologies are proving to be key tools for accelerating focus on citizen safety.

What is next?

Helmond's ultimate ambition is to make BSD not only a ZEZ but also a safe district, (nearly) traffic-free and people-friendly environment. Regarding ISA, Helmond and V-Tron will continue to cooperate to make sure that both the physical and digital infrastructure is adapted and updated for optimal use of ISA in an urban environment.

The municipality of Helmond and V-tron tested Intelligent Speed Adaptation (ISA) technologies in the Brainport Smart District to assess their impact on safety and emissions.
Credits: Gemeente Helmond

A consultation with the "pioneer group" of future residents at the Brainport Smart District in Helmond.
Credits: Gemeente Helmond

Urban Vehicle Access Regulation Signage in Jerusalem.
Credits: Jerusalem Municipality

Jerusalem

Jerusalem's experience implementing an LEZ reveals that an incremental approach supported by a multi-level partnership can produce success.

Meet the city

The City of Jerusalem is located between the Mediterranean and the Dead Sea. It is one of the oldest cities in the world and plays an important role in three major Abrahamic religions: Judaism, Christianity, and Islam, meaning it has a very diverse population.

The city is served by highly developed communication infrastructure, making it a leading logistics hub for Israel, with a high-speed rail line from Tel Aviv to Jerusalem and several major roads connecting the centre, suburbs and surrounding municipalities. However, Jerusalem's centre faces considerable challenges: it sees over 1,000,000 car trips per day, creating acute congestion and air quality problems.

Achievements: a city-wide LEZ and tackling pollution from non-road mobile machinery

In 2018, before it participated in ReVeAL, Jerusalem established a small (0.75 km^2) LEZ in its city centre. Vehicles over 3.5 tonnes built before 2005 and built for the transportation of goods were banned from entry unless they installed a particulate filter. Within ReVeAL, the Municipality of Jerusalem expanded its LEZ in 2020 to the entire city area (125 km^2) and added light diesel vehicles (less than 3.5 tonnes) to the banned list. The restrictions will continue to become stricter over time, with enforcement carried out manually and through mobile cameras. The registered owner of every affected vehicle received notification of the new regulations and an extensive multi-lingual communications campaign was carried out in the city to make citizens aware of the issue of air quality and how the new regulations will help to improve it.

Within ReVeAL, Jerusalem also added a focus on regulating non-road mobile machinery (construction vehicles) when it became clear that a comparatively small number of vehicles was having a disproportionate effect on air quality in the city. Getting the regulation in place has involved extensive discussions with construction companies across Israel as well as with the Ministry of Environmental Protection, the Ministry of Transport and the Ministry of Justice. Filters will be required on all non-road mobile machinery with engine power between 19kW - 560kW. Filter installation must be done by a registered workshop.

A multi-level effort

The first step was establishing a multidisciplinary and multi-level work team, led by the Municipal Department of Environment, alongside the Strategic Planning Unit, the Urban Planning /Engineering Department at the local level, the Ministry of Transport, the Ministry of Environmental Protection, the National Roads Authority at the national level as well as local consultants providing expertise in transport pollution mitigation. The Ministry of Environmental Protection played a key role by providing professional and public support as well as additional funding to subsidise the installation of filters in high-polluting vehicles. This subsidy was crucial to the success of the LEZ.

How does this fit with Jerusalem's wider mobility strategy?

The city's transportation plan is based upon a policy which gives priority to cyclists and pedestrians, followed by public transport and then private cars. At the same, the city's environmental plan aims to further reduce air pollution levels throughout the city. None of this would be possible without a functioning LEZ!

What is next?

The city council's approval of the new 2021 – 2026 plan to reduce air pollution from traffic was the kickstart to add ultra-low emission zones (ULEZ) in some parts of the city. The first area earmarked is the old town of Jerusalem, where further options for emission limitation will apply to operational vehicles such as freight, communal services, and bus transportation as well.

Jerusalem undertook a comprehensive media campaign to create awareness on the city's high air pollution levels and on the creation of a new LEZ to help solve the problem.
Credits: Jerusalem Municipality

Collection of air pollution data in Jerusalem to monitor the impacts of the implemented UVARs, including the LEZ.
Credits: Jerusalem Municipality

During the Covid-19 lockdown, the City of London created temporary cycling lanes to allocate more space to active mobility.
Credits: City of London

City of London

By trialling a ZEZ, the City of London provided a blueprint for how the entire city can accelerate its current UVAR framework. In the process, the local government learnt key lessons on dealing with disruption.

Meet the city

The City of London - also known as the Square Mile - is one of the 33 local authorities within Greater London. It should be noted that the City of London, managed by the City of London Corporation, is composed of the historic centre and the central business district, and should not be mistaken with the territory of the full capital city.

The City has a unique set of mobility challenges. With a resident population of 8,000, it has 513,000 daily commuters and 10 million annual visitors, most of whom arrive by public transport.

In the City of London, road transport is responsible for 26% of NOx emissions and 60% of $PM_{2.5}$ emissions, with levels reaching often twice the safe limit in the busiest streets. At the same time, 90% of on-street journeys that start or finish in the City are entirely or partially walked. Allocating more space for last-mile journeys by foot was revealed as a key priority together with reducing air pollution and greenhouse gas emissions.

Achievements: testing multiple small-scale ZEZs

Through ReVeAL, in March 2020, the City of London launched a ZEZ pilot covering multiple roads including Bishopsgate, Leadenhall and Beech Street. The tested measures include vehicle bans from 7 am to 7 pm, improved cycling infrastructure, installation of pedestrian priority signs, and one-way streets with contraflow cycling lanes.

As one example, in Beech Street, the pilot applied restrictions to all categories of vehicles. Only vehicles emitting up to 75 g CO_2/km, with a zero-emission range of at least 20 miles (32 km) and which are compliant with Euro 6-equivalent emission standards for nitrogen oxides (NOx) were allowed to pass through the 360-meter-long Beech Street, a street partly in a tunnel and with high levels of air pollution. Exemptions were applied, for example, to access private underground car parks and loading depot areas on the street.

Dealing with disruption

The onset of the COVID-19 pandemic and its overwhelming impact on the number of people moving and the mode of transport they used, undoubtedly affected the deployment and scaling-up of this pilot. However, it also proved to be a unique opportunity to embark on innovative street respacing activities.

Active travel and public transport use were encouraged through restrictions to all traffic apart from buses, pedestrians and cyclists – thus boosting safe and sustainable travel.

Complementary to the UVARs and in line with the City of London's plans to maintain low traffic flows post-lockdown, the City of London Corporation worked to improve active mobility routes between Old Street and Bank, and between Cannon Street and Holborn to Bank.

How does this fit into London's wider strategy?

The Mayor of London's London Environment Strategy aims for London to become a zero-carbon city by 2030, with the best air quality of any major world city - going beyond the legal requirements - to protect human health and minimise inequalities. London aims to achieve this notably with comprehensive changes in traffic flows, and UVARs play a key part in this.

London's congestion charge covers its 21 central square kilometres, including nearly all of the City of London, and charges £15 per day for entry.

London holds one of the boldest UVAR strategies in Europe. London's LEZ covers most of Greater London with its 2,644km² and is in operation 24 hours a day, every day of the year, and allows only the cleaner large diesel vehicles such as buses, lorries and coaches - with fines for non-compliant entry. In 2019, the ULEZ was introduced, covering the congestion charge area. In 2021, it was extended and consultations are ongoing for a further expansion of the ULEZ to cover the current the LEZ area.

The London Mayor's plans include ZEZs starting with small borough schemes, then Central London and then London-wide by 2050 at the latest.

What is next?

As London seeks to expand its ZEZs, the lessons learned in this pilot will be critical for developing the targeted, responsive and citizen-focused frameworks which are required.

Success is critical. Despite recent improvements in air quality, toxic air pollution remains the biggest environmental risk to the health of all Londoners, with around 4,000 premature deaths in 2019 because of long-term exposure to air pollution. A climate-neutral London is not possible without decarbonising the transport sector, and the lessons revealed in making ZEZs prioritising active mobility will provide useful input into further local ZEZs and the guidance Transport for London gives for London's local authorities.

A ZEZ was tested in Beech Street in the City of London. Exemptions were made for vehicles accessing premises in that street, including off-street parking.
Credits: City of London

Pupils of the Ricci Curbastro Institute taking part of in a public event in the SuperGuizza superblock in 2021. *Credits: Comune di Padova*

Padova

To tackle poor air quality and congestion, Padova introduced a superblock model to improve the area around a school and added new requirements such as emissions to their existing LTZ, a potential model for other Italian cities.

Meet the city

Padova lies in the North-Eastern corner of the Po Valley in northern Italy; an area encountering air quality challenges. The municipality, which is home to around 210,000 inhabitants, attracts large numbers of tourists and university students, presenting a range of challenges for achieving sustainable transport.

However, through its Mobility Department, Padova is taking a rigorous approach to innovative transport solutions. With one of Italy's largest train stations, a tram line, around 40 bus lines and expanding cycling infrastructure, it is fast becoming a more sustainably mobile city.

Achievements: bringing an LTZ a step further and the first superblocks in Italy

Through ReVeAL, Padova has tested two actions.

The first action was Padova's **historical centre's transformation from an LTZ to a LEZ**. To do so, an online survey was developed and sent to a wide range of stakeholders (Padova's municipality, transport operators, trade associations, residents, etc.) to gather feedback on the proposed interventions and evaluate the extent of potential impacts.

The city centre is popular amongst tourists and home to many residents, attracted by its remarkable collection of architectural and cultural landmarks, connected by cobbled streets and broad piazzas. While beautiful, this urban design also means the district is prone to traffic congestion - an impetus for the development of the LTZ in the past – and pollution – the reason Padova is planning to add LEZ components to decrease the number of vehicles that can enter the zone.

The municipality of Padova created a new vehicle access regulation in the historic centre to progressively allow only low-emitting vehicles in, with limitations being applied to both passenger and goods vehicles. In addition, a number of automatic gates were installed around the existing LTZ to monitor vehicles at the entrance and exit of the area. Within ReVeAL, the impact of the different scenarios has been evaluated, to estimate the variations of local pollutants and greenhouse gas emissions, changes in the number of vehicles entering the area and changes in car use.

The second action in Padova is a **superblock** in Guizza, one of the southernmost districts of the city. The city identified several streets around Piazzale Cuoco and the "Ricci Curbastro" primary school, which were deemed apt for such redevelopment. The city implemented a new local circulation plan and created a network of one-way streets, with the speed limit reduced to 30 km/h, accompanied by street furniture close to the school to reduce traffic to near zero while reallocating space for active travel.

To implement the superblock, data was collected on levels of traffic (both destination and through-traffic), congestion, and active mobility, as well as public space use. In addition, a survey was undertaken to collect information on awareness, acceptance and equity of the measures, accessibility and noise pollution levels. These data helped inform the design to enable the most effective combination of building blocks.

What is a superblock?
A superblock is a spatial unit or set of basic roads forming a polygon, typically around 400 metres wide, that contains within it several roads. This new urban cell has both an interior and exterior component. The interior is primarily closed to through traffic and open to residents, through mainly spatial intervention building blocks like one-way streets, roadblocks, cycle streets as well as access-only roads. The exterior forms the basic road network on the periphery for use by motorised vehicles.

How does this fit into Padova's wider mobility strategy?

Padova has taken a comprehensive and integrated approach to sustainable mobility. In 2020 the municipality approved its first Sustainable Urban Mobility Plan (SUMP), which emphasises the involvement of city residents and the coordination of planning policies and instruments between different areas of competence of the public authority.

Through this participatory process, the city is embarking on the transition towards low-carbon mobility by encouraging alternative modes of transport (i.e. sustainable and active modes) and low-emission vehicles. The low emissions zone and the superblock are critical to supporting these ambitions.

In addition to its UVAR measures, the City Council of Padova has adopted a Bicycle Master Plan 2018 – 2022. It contains an analysis of the current state of urban cycle paths and a road map to enhance, complete and make more safe cycling routes in Padova – to achieve 25% of all trips by bike by 2030. The Guizza superblock in particular will help support these cycling goals.

What is next?

Padova's achievements with ReVeAL increased awareness and levels of concern for air quality in the city – across all stakeholder groups. Citizens, politicians and technical advisors all agreed on the need to reduce air pollution from transportation, driving a considerable improvement in capacities within the municipal environmental department in terms of staff and influence on air quality agendas.

A box to drop off questionnaires on the superblock in the Guizza district, in Padova ("SuperGuizza")
Credits: Comune di Padova

A cyclist commuting in Vitoria-Gasteiz, using segregated bicycle lanes side by side with the tram tracks.
Credits: Centro de Estudios Ambientales, Vitoria-Gasteiz

Vitoria-Gasteiz

By implementing and enhancing superblocks, while adding complementary traffic calming measures, Vitoria-Gasteiz showcased how comprehensive urban vehicle access regulations work.

Meet the city

Vitoria-Gasteiz is the capital of the Basque country, an autonomous community in northern Spain. Over the last several years, the city has emerged as a frontrunner in active mobility, decarbonisation and climate action. It was the first Spanish municipality to be awarded the title of European Green Capital (in 2012) and be recognised by the UN with the Global Green City Award (in 2019).

Transport has been key to this journey. Its most recent plans – the City's Agenda (2019-2023) and the new Sustainable Mobility and Public Space Plan (2021-2025) provide ambitious sustainable mobility targets, with clear timelines and milestones, to gradually give public space back to pedestrians, bicycles and public transport.

Achievements: pushing the boundaries of superblocks

Within ReVeAL, Vitoria-Gasteiz has worked on improving both mobility and public spaces in line with its SUMP. To do so, they implemented two superblock projects (*please see page 23 for the definition of a superblock*). The first superblock is in

Arquillos, which is an important part of the central superblock in the area of the Memorial Centre for the Victims of Terrorism. The second is the consolidation of the superblock in Médico Tornay Street and surrounding areas with measures operative since 2020.

The superblocks give priority to pedestrians over vehicles while creating public plazas and recreational areas in spaces once used for car parking. This occurs through, for example, lane reduction, parking removal, street direction changes and contraflow bicycle lanes. To give an example, in the city centre superblock, a new square was created with an open, renovated, pedestrian-friendly space with a green area, and a covered bicycle parking area with more than 500 hundred spaces was established. The superblocks had a strong positive impact on people's behaviour. To give an example, in Médico Tornay, pedestrian traffic increased by 15% and bicycle traffic by 60%, car traffic in adjacent streets decreased by 50% and speed by 13% when comparing data before (2018) and after (2020) the UVAR interventions. An important success factor was the involvement of relevant neighbourhood associations in the creation and implementation of the superblocks.

Finally, Vitoria-Gasteiz has developed complementary actions focused on delivering gains to stakeholders and people through spatial interventions and other measures. These create new opportunities to move within the city that complement the UVARs. Beyond ReVeAL, Vitoria-Gasteiz also delivered new public transport networks, high-capacity public transport corridors, and improved walking and cycling infrastructure alongside its measures connected to removing parking spaces and restricting vehicular access to superblocks.

No sustainability without accessibility

The project placed accessibility at the forefront of street space rearrangement. Indeed, to create the comprehensive modal shift urgently required, changes must be as accessible and inclusive as possible to the wide range of mobility needs.

In parallel with ReVeAL, the municipality of Vitoria-Gasteiz installed, in the Central Superblock, escalators and a lift which improved pedestrian and bicycle access to the medieval quarter of the city. Furthermore, additional cycle lanes provided extra capacity for young or less physically mobile cyclists to feel more confident riding around the city.

What is next?

Following the success of these superblocks, and given new requirements in Spanish national legislation, the municipality of Vitoria-Gasteiz has kick-started the preparation for an LEZ. In a first phase, an LTZ corresponding to the Central Superblock will be implemented, as well as additional measures favouring active mobility and associated emission reductions. In later phases, further measures – including parking regulation according to the environmental label of vehicles - will be implemented to improve air quality and reduce noise pollution in the LEZ.

In early 2022, the Spanish Government announced that the city of Vitoria-Gasteiz will receive 11 million euros from the EU recovery package "Next Generation EU". These funds will be used to further develop the city's LEZ and develop other sustainable mobility projects.

Between 2022 and 2023, residents of Vitoria-Gasteiz will witness the extension of the city's cycling network and an increase in bicycle parking spaces, improvements in pedestrians' accessibility to the Central Superblock, modernised and digitised parking regulations, the creation of last-mile micro-logistics hubs for sustainable deliveries and the development of the Electric Mobility Centre, amongst others.

Residents of Vitoria-Gasteiz waiting for the electric bus.
Credits: Quintas

Cyclists in Vitoria-Gasteiz on a segregated cycling path.
Credits: Quintas

Section 3:

Five Lessons Learnt: Evidence from the Six Cities

1. Collect and use data to make your case

In all six cities, gathering data before and after the implementation of UVARs was essential to measure their impacts and foster acceptance by all stakeholders (the public, political figures, national governments, the private sector, etc.).

In **Helmond**, testing the ISA technology in comprehensive urban and road settings allowed the city to draw key findings on requirements needed for its scale-up. It found out that physical speed signs are not sufficient for an ISA system to work well, and digital maps of speed regulations are needed. In addition, easily accessible communication channels to the public, like a video which was widely circulated, proved useful to share what the municipality was doing and the data they were collecting.

In the **City of London**, traffic data on and around Beech Street was collected and presented on a publicly accessible portal with different pages showing traffic data before and during the pilot, as well as dashboards comparing air quality, a noise survey and taxi journey data.

Finally, **Vitoria-Gasteiz** collected extensive data on pedestrian, cyclist and private vehicle traffic, noise and citizen perceptions of the UVARs they were implementing as part of ReVeAL. They found that more than 70% of space was reserved for the exclusive use of private cars - despite nearly 70% of journeys carried out on foot.

2. Awareness, consultations and involvement: bring the public on board!

UVAR success relies strongly on the acceptance of the public and the alignment of the regulations and urban space reallocation with their needs.

In **Bielefeld**, public consultations were undertaken through several channels: in-person roundtables, the creation of an interactive website to gather input on the planned UVAR measures, a survey answered by over 50% of the residents of the old town, and workshops before, during and after the implementation of the pilot (around 8 workshops in person and online).

A similar approach was used in **Padova** where residents were invited to online meetings and received questionnaires to co-discuss and give feedback on the street redesigns and space reallocation. In addition, securing input from representatives of the local tourist industry was found to be critical.

In **Vitoria-Gasteiz**, cooperating with the two superblock area neighbourhood associations through several meetings got residents on board with the UVAR project - particularly over the issue of parking.

The city of **Jerusalem** used a comprehensive communications campaign to alert citizens to the changes in traffic circulation restrictions. The awareness strategy, which was part of the "Clean the City of Air Pollution" project included the production of videos for the television, as well as announcements on radio channels and billboards across the city. A survey before and after the campaign evaluated its success- revealing awareness grew from 15% to 64% of the measures.

3. Cultivate political will and build robust partnerships

The ReVeAL project showcased that UVARs require strong political backing and partnerships at both horizontal - within the city and local or regional public authority - and vertical - across layers of governance, from local to international – levels.

In **Bielefeld**, the continual support of the City Council, albeit an election in the middle of the project, was paramount to ensure the UVARs go from a temporary to a more permanent configuration.

In **Helmond**, the BSD depends on multi-layered decision-making processes. Universities, the municipality and the province, private companies and future residents all have the power to make decisions on certain questions, including exemptions of vehicles to the regulations in certain areas of the district. Similarly, in **Jerusalem,** the close cooperation between municipal authorities and the Ministry of Environmental Protection facilitated the funding and legal structure required to allow the LEZ to take effect.

In **Vitoria-Gasteiz,** the support from other levels of governance was crucial, specifically the financial contribution from the Spanish Government during the COVID-19 crisis to maintain and extend UVAR actions. Simultaneously, other sources like local, state and EU funds as well as alternatives like participatory budgets proved useful.

Finally, in **Padova**, cross-sector engagement was key, with workshops organised with municipal departments, the local police and Padova University. In addition, the interregional authority *Bacino Padano* supported the municipality with advice on legal options for how and when to implement air quality-related measures. The municipality also ensured the measures were aligned with existing urban planning strategies, including the SUMP.

4. Mixing high- and low-tech solution proves valuable

Combining advanced technologies, like ISA or cameras to detect number plates, with simpler solutions, like tactical urbanism, can help reach the most beneficial results.

To reduce traffic and provide additional space for sustainable modes, physical incursions in the landscape such as moveable bollards and greenery provided traffic calming and inhibited access in **Vitoria-Gasteiz**, while technical enforcement approaches including traffic cameras and license plate recognition ensured regulations were respected. The same was found in **Jerusalem**. To enforce its LEZ, the city used both inspectors and cameras to use license plate recognition technology.

5. Be ready to adapt to change

Uncertainty and changes in circumstances will undoubtedly occur along the way. It is important to be able to react and even capitalise on these. Amongst others, COVID-19 was a big challenge for the six ReVeAL cities.

The **City of London** used the pandemic as an opportunity to enhance alternative mobility options, with actions such as markings, signage and campaigns to encourage safe and considerate behaviour by all street users. The local government also set an advisory 15mph speed limit, and temporarily reallocated some on-street parking bays to cycle parking and dockless cycle hire.

Vitoria-Gasteiz had to alter works around the area of the Memorial Centre for the Victims of Terrorism when archaeological remains of an 18th-century convent were discovered. This discovery led to slight modifications to the original project, but it is expected that the changes will not result in delays to the completion date. As many cities with historic pasts know, digging can often expose the unexpected!

To find out more about the project's lessons learnt, read the project's recommendations.

ReVeAL