

User-friendly Information Tool on Urban and Regional Access Regulations Schemes

Contract: MOVE/B4/SER/2019-498/SI2.832125

Deliverable 1.1 – 'UVAR State of Play – Report'

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Administrative section

1 Document bios

Document file name	Work package	Tasks
UVARBox_WP1_Deliverable1.1_02-2021_3.0.docx	WP1	1

2 Version history

Version	Date	Description of changes	Author	Partner
1.0	02.2021	First Draft	Manon Coyne, Lucy Sadler	POLIS Network, Sadler Consultant
2.0	04.2021	Final draft	Viktoria Kaltwasser, Nuno Rodrigues, Dennis Hofman, Alexander Gstundner, Martin Böhm, Julia Dueh, Tito Stefanelli, Cosimo Chiffi, Claudio Disperati, Antonio Liberato	AlbrechtConsult, MAPtm, ATech, TRT, MEMEx
3.0	07.2021	Quality Review	Sonia Soares, Jon Harrod Booth, Manon Coyne	Armis, Harrod Booth Consulting, POLIS Network

3 Disclaimer

The views and opinions expressed in this document are the sole responsibility of the author(s) and do not necessarily reflect the views of the European Commission.

General section

4 Executive Summary

The 'UVAR State of the Play' – Report of the UVAR Box project provides knowledge on the current and planned UVAR (Urban Vehicle Access Regulation) policies at the local, regional, and national level. The report is structured in a short introduction to the project and methods, a mapping of UVAR policies, creation and publication processes in our five focus countries (Austria, Belgium, Germany, Italy, and the Netherlands) and beyond, a summary of barriers and drivers for the UVAR toolbox uptake, and conclusions for future work within and beyond the UVAR Box project. Based on existing databases and outreach to UVAR-responsible authorities, we have investigated the digitisation level of existing UVAR interfaces. We have also reviewed procedures that are used to activate or deactivate UVARs, especially the dynamic ones, to define where the UVAR Box could support the processes.

Overall, most European cities adopting UVARs inform their citizens through conventional information dissemination (newspaper, letters, website, etc.) in their local language, and through physical road signage. Some authorities are in the process of digitising information on their UVARs, but we have only found one that has put the information into DATEX II (as part of an EU project, Socrates 2.0), and they reported several issues linked to a lack of standardisation. An increasing number of authorities have the boundaries spatially digitised, using various encoding formats – but data relating to the restrictions and conditions for entry have not been digitised. The Netherlands has some semi-structured digitally encoded LEZ data available nationally, and the German Environment Agency is working on collating LEZ maps. None currently shares them with their National Access Point (NAP).

There are examples of systems used to manage UVAR data, some specific-purpose commercial products, others which are configurations and extensions of more general-purpose software tools, such as Geographic Information Systems (GIS), e.g., configurations of ArcGIS. This is a driver for the uptake of the toolbox developed within the project: future work in the UVAR Box must ensure interoperability with these systems. The knowledge gathered in this report shows that the codification and structuring of UVAR types, data and processes, and exchange between the UVAR-responsible authorities, will enable the harmonisation of the UVAR data and their communication to road users. Besides, the availability of a common machine-readable encoding format for these data is a key condition for a common approach to digitising it.

Following this report and the classifications established in it, this common machine-readable format will be developed, as well as a methodology to implement its use. Further research could be conducted on a standardised enforcement of UVARs in the EU. This report is not exhaustive and knowledge from the emerging UVAR-community is welcome to enrich future work both within the UVAR Box project and beyond.

5 Detailed Work

5.1 Introduction

5.1.1 About the UVAR Box

The UVAR Box is a preparatory action including development and piloting, focusing on enabling road users, in particular motorists (i.e., both professional and non-professional drivers) to be fully informed about urban and regional access schemes by working on the needed enablers, i.e., standardisation and data provision for the integration of the information in tools such as apps or navigation devices. It also includes the simplification of the generation of the necessary information to comply with the single digital gateway regulation.

Urban and regional access schemes are 'measures to regulate vehicular access to urban infrastructure'¹ and they are generally designated under the term "UVAR". They include Low Emission Zones (LEZ), Limited Traffic Zones (LTZ), and other examples detailed further in this report.

The project investigates existing and planned UVARs, and processes to create, define and communicate these UVARs, to structure the data used to describe and set them up (conditions of vehicles allowed to access, time validity of the measure, etc.). Based on this structure, a machine-readable format of this data is developed in Work Package 1: UVAR data definition, structuration, and exchange. This format uses DATEX II, the European standard for the coding and exchange of traffic management and traffic-related data. Then, tools are developed to support cities when digitizing their UVARs with this machine-readable format. Finally, dissemination and communication must support a sustainability strategy of these tools, so it supports UVARs digitization after the end of the project.

UVARs are adopted at a local level, by different types of authorities across European cities and regions: various administrative and governmental departments can be responsible for their setup (environment, mobility, urbanism, etc.) and different authority levels can be involved (local, regional, national...). Their communication to road users also varies from one locality to another: some publish the regulation in local journals, others integrate them in software which differs from one city to another. Considering the diversity of the measures and processes – though all are adopted with the same general overarching goals, including urban mobility sustainability, traffic reduction, air quality improvement, improvement to the urban living realm, etc., establishing an overview of UVARs in Europe is necessary to provide a common data encoding a standard for them all. It is however challenging, due to the diversity of channels and languages in which the UVAR information is distributed. Therefore, the UVAR Box relies on several partners with thorough expertise on UVARs from different EU countries.

5.1.2 About this Document

¹ European Commission Staff Working Document on Access Regulations "A call for smarter urban vehicle access regulations" SWM (2013).

Deliverable 1.1: 'UVAR State of Play' - Report is the result of the UVAR Box partners' investigations on existing and planned UVARs, and the processes to create, define and communicate. It provides an overview of UVARs and their processes in the EU. This overview is meant to support the structure of the UVAR data and the development of related machine-readable formats. The final objective is to enable UVAR-responsible authorities to use the developed format to digitise their measures and make them understandable for applications and navigation software that will enhance the information of road users to ensure better respect of the UVARs.

The present report intends to give a thorough definition of the categories of measures and the geographical scope covered in the project, and the data attributes used to define and characterise UVARs. It then establishes an overview per country of the measures in force or soon to be implemented in our 5 focus countries, but also beyond in a more summarised description. In each country's overview, examples of practices in different localisations are quoted.

5.1.3 Methodology

Several methods have been used to collect data for this report. They are detailed below:

- Definition of UVAR and UVAR processes: before collecting concrete examples of UVARs, a first definition and typology has been set up based on the expertise of partners, available research and other EU-projects' outcomes.
 - Five types of UVARs have been defined as part of the project's scope, for digitisation support: low emission zones, limited traffic zones, congestion charging schemes, parking regulations and pedestrian zones. These UVAR types are further defined and developed. The geographical scope of the project has also been limited for the task to be manageable in its timeframe (also further developed).
 - The UVARs and processes included in this report have been determined in alignment with the functions of the European framework of traffic information: the ITS Directive has established a process of transport data harmonisation and communication through National Access Points, which is the basis for the UVAR Box tools, and should be considered when analysing current UVAR processes and their potential digitisation; the Single Digital Gateway regulation, defining data categories and metadata, provides a framework for UVAR data to be collected and digitised.
- Outreach to external stakeholders (cities, NAPs, road users): to gather examples of UVARs and processes for their communication, stakeholders currently and potentially involved in their set up, communication, and implementation have been engaged in the project.

- Building our contact base: Outreach to UVAR authorities has been facilitated through various methods and contacts, including identifying the right contacts from the CLARS service database, other consortium members, and dissemination via multipliers such as national ministry policy colleagues, city or regional groupings, various working group meetings, and both formal and informal networks. City stakeholder networks such as Eurocities, Polis, ICLEI were also able to disseminate information to get contacts to cities to seek involvement. Stakeholder categories have been identified, then consortium partners' contacts have reached out to their networks, and a project's database has supported the coordination of outreach and data collection. Specific partners have been defined as "Country Coaches", responsible for the engagement of stakeholders in their respective countries: AustriaTech for Austria, PRISMA Solutions for Germany, TRT and MemEX for Italy, and MAPtm for the Netherlands and Belgium.
- Create exchange opportunities: Stakeholders had the opportunity to share information on their policies and processes through online workshops and discussions, interviews with country coaches, and an extended questionnaire, which remains open during the whole project lifetime.
- Desktop research: besides framework setting and outreach to stakeholders, desktop research has also provided many insights for this report. The CLARS database has confirmed or encouraged information from stakeholders, to strengthen the results for the report. Local websites have supported the report on existing processes as well.

5.2 Definition of UVARs in the framework of the UVAR Box

UVARs, Urban Vehicle Access Regulations, are urban and regional access schemes – that is, measures regulating the access of motorised vehicles to urban infrastructure and areas. As explained above, there is a large diversity of UVARs. The UVAR Box project focuses on the most frequent examples of UVARs in the EU: **Low Emissions Zones (LEZ)**, **Congestion Charges (CS)**, **Limited Traffic Zones (LTZ)**. It also includes **Parking Regulations (PARK)** and **Pedestrian Zones (PED)**, though their scope is much broader than the regulation of access to urban infrastructure.

There are other Access Regulations which will not be specifically included in the structure and digitisation tools – for example lorry through traffic bans (where only destination lorries are allowed) and lorry bans (where areas or road sections are not permitted for vehicles above a certain weight, width or length). These are not included under LTZs (and therefore under the proactive digitisation process within the UVAR Box project), as are not implemented with permits and not aimed at limiting general traffic. It is,

however, likely that these “restricted zones” would be able to be placed in the DATEX II structure if cities wish, as they are less complex than the LTZs or other schemes included, and usually have requirements that would be included in the DATEX II structure.

At a more conceptual level, a UVAR regulates under what conditions certain vehicles are allowed to access the regulated location, which is typically certain parts of a city. Many conditions can be applied, which can include aspects such as:

- vehicle weight or size (e.g., maximum permitted height, width, length dimensions; maximum gross / unladen or axle weights)
- time periods (time of day, day of the week, etc.)
- emission levels (either per vehicle or within a certain area)
- resident status
- payment of a certain fee
- occupancy level

The “R” in UVAR stands for regulation and not for restriction. This is to denote the important quality of a UVAR, which can also choose not to restrict access to vehicles altogether but to specify and regulate the conditions under which vehicles can access a certain area².

The UVAR Box tool will support the digitisation of all types of UVARs, by developing DATEX II data models and data encoding formats applicable for all. UVAR Box partners will work mainly on the collection of data about LEZs, CSs and LTZs, in defined focus areas.

5.2.1 *Typology of UVARs to be included in the UVAR Box*

The UVAR Box tools will support the digitisation of five types of UVARs, which are defined below and illustrated with examples.

For the three UVAR types *Low Emission Zones*, *Congestion charging schemes*, and *Limited traffic zones*, the UVAR Box will undertake outreach work to facilitate data provision/conversion by the UVAR-responsible authorities, in addition to their inclusion in the developed DATEX II specifications. The tools developed will enable cities to transmit the digitised data to their NAPs (or interim solution if, after consultation with each NAP, individual NAPs cannot yet do this). From the NAPs, UVAR data will be accessible for service providers and app developers. It is also possible, though not an output of the UVAR Box project, that UVAR Box tools could support cities self-publishing UVAR data.

Low Emission Zones (LEZ) and diesel bans

² ReVeAL glossary: <https://civitas-reveal.eu/resources-overview/glossary/>

LEZs, diesel bans, and pollution schemes areas are delimited zones where the access of vehicles below a specific emission level is restricted to improve air quality. In some LEZs, vehicles that do not meet the required emission standard are still allowed to enter, either by paying a fee or under specific conditions (e.g., emergency vehicles). Some LEZs are Zero Emission Zones (ZEZs). There are a few in operation, and more are planned.

The German so-called 'diesel bans' are actually Euro 5/V or 6/VI LEZs. There is currently no UVAR in operation that bans diesel vehicles without banning petrol; and most LEZs have a tighter numerical standard for diesels, as diesel vehicles may emit higher emissions for each Euro standard for most pollutants than petrol/spark ignition vehicles. LEZs have however been scheduled in a number of cities that prohibit diesel vehicles (e.g., Paris from 2024, using the French Crit'Air sticker system, level 5). Therefore, we will in the future include diesel bans under LEZs.

One example of an LEZ is that of Antwerp. Vehicles need to meet the emissions standard. Certain vehicles (e.g., for disabled transport) can gain exemptions, others such as certain plug-in hybrid or emergency service vehicles are automatically exempted. Those not meeting the emissions standard can gain entry up to 8 times a year through payment – the rate of which depends on several factors. As the city only has access to Belgian and Dutch vehicles' data, all vehicles from other countries need to be registered – independent of their emissions or vehicle category.

Another example is the Low Emission Zone in Aachen. There, only vehicles with a green sticker can enter, which can only be received if the emission standards are met. All diesel vehicles and petrol vehicles without a closed loop catalytic converter are affected. There are several exemptions like emergency vehicles, craftsmen, etc.

Some cities and regions implement emergency pollution schemes (EMERG), where UVARs are triggered depending on the pollution levels (either actual, over the previous days, or predicted). These schemes are similar to LEZs but are temporary and not automatic. They will not be covered as LEZs by the UVAR Box project.

There is often a scaled response: at certain concentrations of particulate matter and/or NO₂, advice might be given; then, after 2 days, speed limits would be reduced on certain streets; finally, after further days or higher pollution levels, certain Euro standard vehicles might be banned. Usually, the measures are defined in advance, but sometimes they are not.

An example is the emergency pollution schemes in the region of Emilia Romagna in Italy. The winter emergency schemes are valid between the first of October and the 31st of March in cities with more than 30,000 inhabitants. If the PM₁₀ limit is exceeded for four consecutive days during this period, only vehicles above a certain Euro standard can enter the zone the next day. Again, electric vehicles are always excluded. If the PM₁₀ limit is exceeded for more than ten days, further restrictions apply.

Emergency pollution schemes can be considered as a subcategory of low emission zones because they can set up temporary low emission zones, but they are diverse and can also be quite different. They can ban vehicles according to emission standards, but also consist in speed reduction measures and

additional incentives towards more environment-friendly behaviours. In the framework of the UVAR Box, they will be considered as separate from LEZs, though considered when brought forward by cities.

Congestion charging schemes & urban road charging schemes (CS)

In zones where congestion charging schemes apply, you must pay to access the zone. This is aimed at reducing traffic congestion or traffic jams, and at improving air quality and noise impact reduction. The charge is enforced mostly by cameras and electronic transponders, or by paying the charge when entering the zone.

An example is Milan: to enter into the zone, it is necessary to buy a ticket and activate it. All vehicles except electric vehicles, motorcycles and mopeds are affected. The zone is active on weekdays between 07:30 to 19:30 (Thursdays only until 18:00), except for bank holidays. Cameras are used to enforce this congestion charging scheme. In addition, vehicles not meeting the set emissions standard are not allowed to enter, even on payment – this is combined charging and low emission zone.

Limited traffic zones (LTZ)

Limited Traffic Zones (LTZs) are areas where permits are required to access the zone. Permits' conditions can include type of trip, type of vehicle, and can in addition include payment or emissions requirements. In most cases, the access restriction is limited to a certain period (e.g., between 21:00 and 06:00). Vehicles of residents, delivery vehicles, etc. may be exempted. An example is the LTZ of Celano in Italy³. The LTZ is active between 21:00 and 06:00, during which no vehicles can enter the zone, except for vehicles that are exempted from the restriction. Another example is Gent Restricted Traffic Area⁴, where a permit is required for vehicles to enter a central zone, according to different criteria.

For the two UVAR types *Parking Regulations* and *Pedestrian Zones*, UVAR Box will encourage and support digitisation, and develop DATEX II specifications, but not undertake outreach work. The tools will enable the transmission of converted data to the NAP, from where it will be accessible to service providers and app developers.

Parking regulations (PARK)

Restricted parking zones are areas where only residents or other permit holders are allowed to park at certain times of the day. The aim is to reduce parking congestion in residential areas or cities. Examples are the so called "Parkraumbewirtschaftungszonen" in Germany, where residents can pay for a permit that allows permanent parking in the zone where they live. For non-residents, there are ticket

³ https://celano.etrasparenza.it/archivio16_procedimenti_0_15991_25_1.html

⁴ <https://stad.gent/en/mobility-ghent/restricted-traffic-area>

machines where a temporary parking permit can be purchased. These zones usually have time limits e.g., Monday to Friday between 09:00 and 19:00 and Saturday between 10:00 and 16:00.

In Austria, there are also some shops allowing purchase of such tickets, or purchase is possible with an app or SMS. In Vienna, the maximum is up to 3 hours stay for vehicles parked.

Pedestrian zones (PED)

A pedestrian zone is an area for pedestrian-only use in which most or all vehicular traffic is prohibited. Those vehicles given exemptions are mostly emergency vehicles, delivery vehicles, etc. Almost every city has pedestrian zones to make mobility easier for pedestrians. It is worth making note that some pedestrian zones permit bicycles, pedal cycles and other light or active "road" users.

For example (see Picture 1), Graz in Austria has:

- About 5.3 km pedestrian zone (approx. 70,000 m²) around the city centre
- Sidewalks mainly in the inner districts, partly missing in the peripheral districts
- Good circulation in the inner districts, partly missing in the outskirts
- Several parks and natural areas on the outskirts
- Squares with mostly low quality of stay due to traffic noise and pollution
- No designed network of footpaths⁵

Fußverkehr 2020

— Fußgänger-
zonen, breite
Fußwege und
autofreie
Plätze rund um
die Grazer
Innenstadt

..... temporär
begehbar

Quelle: Eigene Darstellung.
Grundlage: OpenStreetMap (2019).



Picture 1 – Pedestrian Traffic in Graz 2020⁶

Translation: Pedestrian traffic 2020, Pedestrian zones, large pedestrian routes and car-free squares around the Graz inner city, Temporarily walkable, Source: own representation. Basis: OpenStreetMap (2019).

⁵ From <https://move-it-graz.at/move-it-mobilitaetsplan-2030/fussverkehr-2030/> viewed 23.3.2021

⁶ From <https://move-it-graz.at/move-it-mobilitaetsplan-2030/fussverkehr-2030/> viewed 23.3.2021 picture copyright: Move it Graz

Combined schemes

There are increasingly schemes that are a combination of different scheme types. For example, LTZs that have emissions requirements and payment for permits, or LEZs that are implemented by a charging mechanism. These schemes will be included under the category that best suits them, and the other aspects will be mentioned.

5.2.2 Geographical scope of UVARs covered by UVAR Box

All five types of UVARs described above (LEZs, CSs, LTZs, PARKs, PEDs), in all EU member states, where details are known, will form the shaping content of the DATEX II data model and attended to in the UVAR Box software tools development.

The effort to organise the use of the UVAR Box tools and propose a stepwise approach for cities to begin the generation of their digital UVAR schemes will firstly focus on LEZs in 5 selected pilot Member States: Austria, Belgium, The Netherlands, Germany, and Italy. The joint efforts of cities and the Consortium to generate this data will end up resulting in full coverage (100%) of these two types of UVAR schemes (LEZs, and therefore also Diesel Bans) for the 5 Pilot Member States. Only where and when the direct involvement of UVAR-responsible authorities deems unfruitful for the LEZ data, the Consortium will take up the conversion of CLARS data, as a last resort. The remaining types will be converted following a best effort approach.

The UVAR Box does not exclusively cover the defined focus countries, and outreach has also targeted France, Spain, Portugal, Hungary, the Baltic countries, etc. These countries will not be actively involved and trained on the use of the UVAR Box tools, but are also targeted in the dissemination of the project outcomes and covered in the report to ensure that the UVAR Box tools are also usable for them.

5.2.3 UVAR data attributes to be collected and translated into a machine-readable format

Due to the diversity of types and formats of UVARs in the EU, the UVAR Box has conducted a detailed analysis of all elements potentially composing the regulations. These are the UVARs' attributes, which the project aims to collect and then provide a means for translating into the machine-readable format DATEX II. The analysis and categorization of these attributes are necessary to identify a structure for the data to define UVARs, which supports the development of appropriate DATEX II data specifications. Below we outline the types of data that this will cover:

- Administrative data

The administrative data consolidates the information on the competent authority(ies) issuing the regulatory document of the UVAR and the date when it was issued, as well as the date when it enters into force. Also, all other competent authorities involved with the issue or update of the regulation. In

case of a dynamic UVARs also information on the activation conditions. And information on references to the legal regulations that establish the UVARs. The model attempts to support definition of this data (i.e., a UVAR that reference some national level legislation/regulation).

- Type of regulation

The type(s) of regulation specifies what the regulation restricts, e.g. an access restriction or a parking restriction. Schemes are increasingly crossing the boundaries of specific types and being specified in combination, so several types of regulation may be needed for the same scheme. For example, the zone in Milan combines an LEZ with a charging scheme, Bologna has converted the LTZ into a combined LTZ and LEZ, etc. The current model supports a set of regulations (a Traffic Regulation Order - TRO) having the ability to contain many regulations.

- Time validity

The time validity of a UVAR is the period in which the regulation(s) applies. It can be any period, including a specific period of a day, certain days a week, or 24 hours a day, or more flexible period definitions such as specified times on market days or days of specific events (such as large sporting fixtures), or activated under specific conditions (see activation processes below).

- Activation processes of triggered dynamic UVARs

Triggered dynamic UVARs, for example, emergency pollution schemes, are often activated by a different authority (such as the regional Environment Agency) to that which issues the regulatory document (city). It depends on the criteria causing the activation decision (for example, the number of days that the pollution is above a set level). There are different triggering mechanisms; in the case of Northern Italy, the emergency pollution schemes are activated automatically by the regional air quality levels, for example, while in France it is a combined decision from city and region. The schemes (and their progressive tightening) are often announced in the evening and activated the next day, depending on the pollution levels in the previous days.

Many UVARs are activated on a dynamic or temporary basis, with the activation being triggered by a defined set of triggering conditions (or sometimes on the decision-making by the "competent" authority). The processes for activation differ as does the time between the activation conditions being met and the activated start of the temporary restriction. The term dynamic is often associated with instantaneous, whereas many pollution schemes are being activated with a delay.

- Location

The location of a UVAR describes the area, in which the regulation(s) applies. There might be one location for each UVAR or several locations for different types or phases of regulations e.g., a restriction of the height of vehicles in parts of the city and a restriction of the width of vehicles in different parts of the city; or one zone for Euro 5 LEZ and a smaller concentric zone with Euro 6 LEZ (such as Stuttgart), which can be either both valid at the same time, or in different timed phases. There may also be roads exempted from the area, or the area may be defined as a series of road sections. How the location of a zone is

described varies between schemes, some are based on textual (named) descriptions (e.g., inside the ring road), other on map images, others may have digitised spatial coordinate definitions, others can be collections of named streets, etc.

- Applicability conditions

The conditions under which the regulation applies – or a permit/sticker, etc., can be issued. These are the requirements that need to be met for access. They are many and varied, and can include most conceivable vehicle, driver or trip attributes, from vehicles physical attributes such as weight, class, emissions, or that the vehicle is owned by the city authority; the driver's status as resident, disabled; or the trip purpose such as delivery or a doctor on an emergency call-out; or specific load types (e.g., dangerous goods). For charging schemes, applicability is the payment of a fee.

These variables are often required in several aspects of the UVAR, for example in exemptions or registration. Some permits have costs associated with them, or (a limited number of) exemptions or permits can be purchased per day (or per some other specified period).

- Exemptions

Exemptions, as in applicability conditions, can use many different variables, and often include certain vehicle categories like electric vehicles or certain trips like delivery services, permissions for registered tradesperson, vehicles performing a specific function or roles (such as postal service vehicles), or certain drivers (such as residents or disabled), etc. It should be noted that LEZs and LTZs use the phrase exemptions differently, which can cause confusion⁷. For LEZ, the general rule is permitted if emission standards are met, there are however often exemptions (retrofitting, military vehicles...). For LTZs, the general rule is that no vehicles are allowed entry. Necessary vehicles (usually clearly identifiable) are exempted (e.g., emergency, city vehicles...), all others require a permit.

- Registration

In some UVARs it is necessary to register the vehicle's number plate before entering. An example of this is the LEZ in Antwerp. Here, people with a Belgian or Dutch number plate are automatically registered and all others must register online to be allowed to drive into the LEZ. In other UVARs it is a requirement to display a windscreen sticker, or to have been issued with a permit for use (e.g., by use of a transponder, windscreen sticker, paper-based documentation, or database entry).

- Enforcement method

UVARs may currently be enforced with cameras (using e.g., ANPR), transponders, by physical barriers, or manually by police for moving vehicles and/or enforcement officers for stationary traffic. Vehicle identification may be by vehicle's number plate, stickers, permits (paper, windscreen or via a 'white list' of number plates), proof of trip type, or vehicle papers.

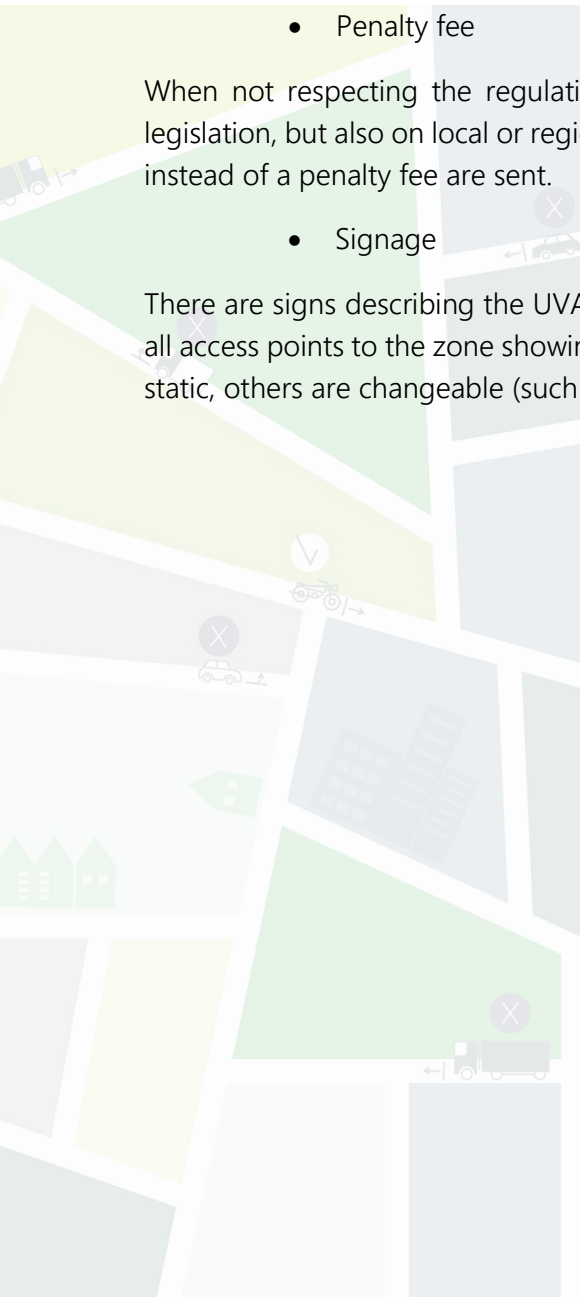
⁷ See the ReVeAL guidance note: https://civitas-reveal.eu/wp-content/uploads/2021/03/ReVeAL-LEZ_LTZ_Exemptions_Permits-guidance-15-final.pdf

- Penalty fee

When not respecting the regulations of a UVAR, a fee is charged. This is often based on national legislation, but also on local or regional legislation. An interim period may be used where warning letters instead of a penalty fee are sent.

- Signage

There are signs describing the UVAR regulations. In the German LEZ ("Umweltzone"), there are signs at all access points to the zone showing the stickers with which one can drive into the zone. Many signs are static, others are changeable (such as Variable Message Signs).



5.3 Main outcomes: Overview of UVAR schemes and processes

Based on the UVAR types and the UVAR attributes described above, the UVAR Box partners have investigated the different UVAR measures previously, currently and soon in place in our 5 focus countries, and also to some extent in other EU countries. This main part of the report gives an overview of the results of these investigations.

It is structured per country – with a last part on all “other” EU countries. For each country (and for the “other” EU countries at the end), an introduction gives a quick impression of the current state on UVARs. Then the overview is structured in 3 parts: current and planned UVAR measures in the country, processes to create UVARs, and processes to publish and disseminate UVARs. In each part, the information is divided per type of UVAR, as the attributes used to define them vary from one type of UVAR to the other, as well as the processes and actors involved to create or publish them. For example, LEZ can be defined by a limit emission level, from a ministry of environment, while CS would require the definition of a charging amount and involve budget and mobility departments of a local authority.

Where information is not divided per type of UVAR, the information provided is valid for all existing UVARs in the country.

To support the analysis, examples are provided for cities in particular. Sometimes generalisation was not possible and only cities’ cases are presented. At the end of the overview for each country, a summarising table is displayed to give a quick view of the content of the part. For countries outside our focus countries, a quick summary is provided, without a global overview and less detailed than other parts.

To facilitate data collection and overview of the state of play, the CLARS database has been used as one of the main sources, as well as the outcome of the UVAR Box questionnaire and knowledge of the Country Coaches.

The UVAR Box project uses an Excel database, with the names and links to further information of all the UVARs on the CLARS database. This allows us to identify the authorities that need to be contacted, who has contacts with which authorities, and to allocate our resource contacts to follow up and approach these authorities. The project also monitors each interaction with UVAR-responsible authorities and assesses whether interaction needs to be further encouraged.

All photos for Italy are Sadler property, except Milan. All other pictures/signs in this section are from the relevant authorities.

5.3.1 AUSTRIA

The research has shown that the following UVAR types are implemented in Austria: LEZ, LTZ, PED, and different parking regulations. PARK and PED are the most frequent UVAR types, with different characteristics concerning time limits, costs and possible permit holders. Responsible authorities for these regulations are mainly cities/municipalities. The most common types at a regional level are LEZ, regulated by regional authorities. In Austria, no CS have been established so far.

Austria puts much effort into the digital transformation of transport-related data. Nevertheless, the digitalisation process varies widely: some cities and regions have already defined legal regulations on providing digitised data and have implemented machine-readable formats, while others, especially the small ones, are just starting the digitisation process of their data.

5.3.1.1 *Current and planned UVAR measures in Austria*

LEZ: In the CLARS⁸ database, there are five LEZs for heavy vehicles at regional level, and one lorry LEZ on a motorway in Tyrol.

The LEZs cover Burgenland, Styria, Lower Austria, Upper Austria, and Vienna. They affect the cities within those regions. There is a national LEZ framework with official Austrian exhaust emission stickers, the IG-L, since 1st January 2015. Stickers are valid for all vehicles, but there are currently only lorry schemes in Austria. In all five LEZs for heavy vehicles, the minimum standard is Euro 3. An official Austrian sticker must be purchased and put on the windshield of the vehicle.

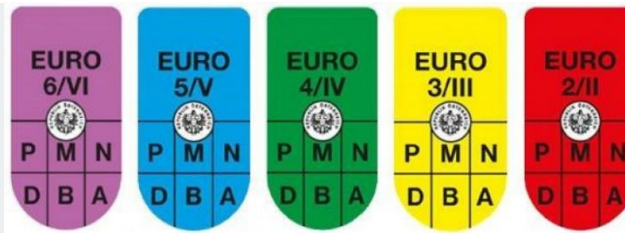
Stickers are delivered according to Euro emission classes of vehicles. A vehicle's euro emission class is defined with the following documents:

- ✓ Registration certificate
- ✓ Approval certificate
- ✓ Data extracted from the approval database
- ✓ CEMT certificate
- ✓ Consultation with the dealer, manufacturer or general importer
- ✓ Determination of exhaust gas class by COC (Certificates of Conformity)
- ✓ Date of first approval (using AKKP⁹ homepage)

Picture 2 shows the existent stickers in Austria.

⁸ From <https://urbanaccessregulations.eu/countries-mainmenu-147/austria-mainmenu-78> viewed 23.3.2021

⁹ <https://www.akkp.at/>



Picture 2 - Stickers in Austria¹⁰

Tyrol: There is a low emission zone on the Austrian motorway A12 (see Picture 3). From 1st May 2017 the official Austrian sticker, that shows the Euro standard of the vehicle, has to be put on the windshield of the vehicle. The minimum standard that has to be met by lorries over 7.5t, on the A12 between km 6,35 and 90,00, depends on whether they are involved in transit or non-transit traffic. For transit traffic, the minimum standard is gradually increasing from Diesel Euro 4 to Diesel Euro 6 between 2017 and 2021. For non-transit traffic, the same requirements are raising from 2020 to 2023¹¹.

When air pollution is high, the speed limit for passenger cars is reduced from 130km/h to 100km/h. This has been in operation since the 1st November 2007.¹²



Quelle Basiskarte: <http://www.oeamtc.at/verkehrsprognose/>

Picture 3 - LEZ on the Austrian motorway A12

Translation: Source of the original map: <http://www.oeamtc.at/verkehrsprognose/>

Emergency pollution schemes: there are five emergency pollution schemes for all vehicles at a regional level. More pollution schemes are expected after the recent change of government. There is an online calculator, which shows what environmental badge needs to be bought.^{13 14}

¹⁰ <https://www.wko.at/service/verkehr-betriebsstandort/Abgasklassenzuordnung.html>

¹¹ <https://urbanaccessregulations.eu/countries-mainmenu-147/austria-mainmenu-78/a12-motorway-tirol>

¹² <https://urbanaccessregulations.eu/countries-mainmenu-147/austria-mainmenu-78/26-key-access-regulations/austria-access-regulations/68-a12-air-quality-based-speed-limit>

¹³ <https://www.akkp.at/label/class>

¹⁴ <https://www.akkp.at/provinces/stm>

1. The A2 South motorway in Carinthia is affected in the area between the Klagenfurt Ost junction and the Klagenfurt Airport junction¹⁵. The emergency scheme ordinance aims to reduce the emission pollution caused by traffic through the air pollutants PM10 (fine dust) and NO2 (nitrogen dioxide) and to improve the air quality by reducing the maximum speed.¹⁶
2. In Upper Austria, the maximum speed is reduced along the A1 West motorway in the area of the cities of Ansfelden, Linz, Enns, Asten, and St. Florian¹⁷.
3. In Salzburg, the maximum speed is reduced on the A10 Tauern motorway and A1 West motorway¹⁸.
4. In Styria, the maximum speed is decreased on sections of the A2 Süd motorway and the A9 Pyhrn motorway¹⁹.
5. In Vienna, an emergency scheme is in place for high pollution events. It is activated if the PM10 levels exceed 50 µg/m3 for more than 25 days a year²⁰.

There are two levels of the emergency scheme (Smog alarm):

- 1. Information / recommendation level:
 - Use public transport if possible
 - Reduce room temperature to 20°C
- 2. Alert level:
 - Vehicles with internal combustion engines can be banned from driving.

For all of those emergency schemes, there are exemptions for electric vehicles and fuel cell-powered vehicles, who are not affected by the speed reduction but are required to have a green licence plate. This is only valid where the road sign indicates this. There is a penalty fee of up to Euro 2.180.^{21 22}

CS: For now, no congestion charges are planned in Austria.

LTZ: Austria has one limited traffic zone established in the City of Salzburg.

Traffic bollards: Automatic, rising bollards are installed at various locations in Salzburg's Old City to manage the vehicular flow and calm the traffic. Roads secured by bollards are not open to public traffic. See Picture 4 and 5 for LTZ bollards in Austria.

¹⁵ https://www.ris.bka.gv.at/Dokumente/Lgbl/LGBL_KA_20120118_2/LGBL_KA_20120118_2.pdf

¹⁶ <https://urbanaccessregulations.eu/countries-mainmenu-147/austria-mainmenu-78/kaernten-emergency-scheme>

¹⁷ <https://urbanaccessregulations.eu/countries-mainmenu-147/austria-mainmenu-78/oberosterreich-emergency-scheme>

¹⁸ <https://urbanaccessregulations.eu/countries-mainmenu-147/austria-mainmenu-78/salzburg-emergency-scheme>

¹⁹ <https://urbanaccessregulations.eu/countries-mainmenu-147/austria-mainmenu-78/steiermark-emergency-scheme>

²⁰ <https://urbanaccessregulations.eu/countries-mainmenu-147/austria-mainmenu-78/wien-vienna-emergency-scheme>

²¹ <https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20007781>

²² <https://www.akkp.at/provinces/vbg>

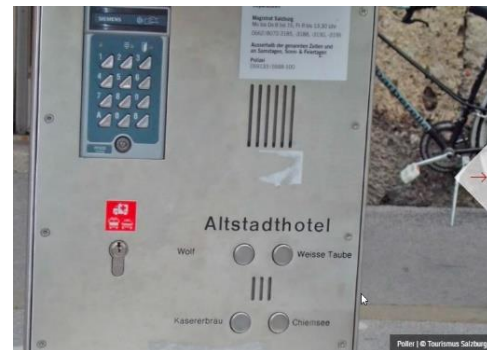
Parking in Salzburg's Old City – traffic bollards: The bollards rise at 11:00 and drivers who enter the restricted zone before that hour will be unable to exit the inner city after that. For these cases, the driver must contact the police department on Rathausplatz, where an exit code should be provided upon payment of a fine.

Hotel access: Guests holding a hotel reservation are authorized to enter the restricted zone. The bollards at the access points in "Rathausplatz", "Mozartplatz", "Kaigasse" and "Linzer Gasse" are equipped with an intercom system to allow the driver to contact the hotel. The hotel will give the guest an entry code for once-only, limited entry and exit. Each hotel can only be accessed via a specific access point. Hotel users must require this information from their hotel.

Barrier-free: Disabled parking spaces secured by bollards in the Old City can be accessed with the Euro-Key. Guests that do not have the Euro-Key are requested to use the disabled parking spaces on Makartplatz, Franz Josef Strasse, and Münzgasse.



Picture 4 - LTZ bollards in Austria



Picture 5 - Intercom system to access LTZs in Austria²³

PARK: In Austria, there are many parking regulations at a municipality level, with different characteristics concerning time limits, costs and possible permit holders.

In specific zones, parking is prohibited within defined hours, with an exception for people with disabilities. In others, short-term parking is allowed, with a maximum duration specified (for example 2 hours).

Vienna: The capital of Austria, the city of Vienna with its 23 districts, has a variety of different parking zones, for each different district.²⁴ While Table 1 shows the parking timetable in Vienna, Pictures 6 and 7 show the Short parking²⁵ and Park and Ride²⁶, respectively.

²³ From <https://www.salzburg.info/en/travel-info/arrival-traffic/car/traffic-bollards> viewed 26.3.2021, picture copyright: Tourismus Salzburg

²⁴ From: <https://parkenwien.at/ratgeber/kurzparkzonen> viewed 24.3.2021

²⁵ https://www.data.gv.at/katalog/dataset/stadt-wien_kurzparkzonenwien/resource/3472c93b-c690-4994-b99e-a7a289e1fd22

²⁶ <https://www.data.gv.at/katalog/dataset/627a9226-a907-4018-89e3-878002a9d22b>

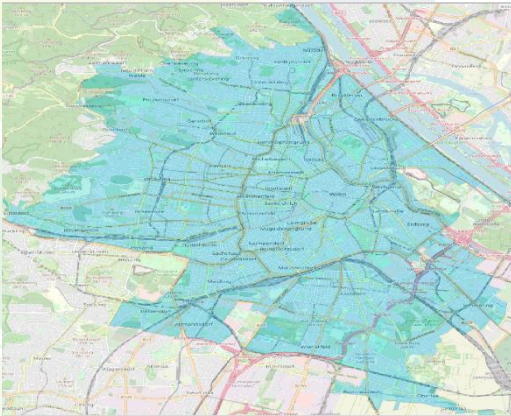
Table 1 - Parking timetable in Vienna

District	from - to	Hours legal to park at one spot
1. – Innere Stadt	9:00 – 22:00	2
2. – Leopoldstadt	9:00 – 22:00	2
3. – Landstraße	9:00 – 22:00	2
4. – Wieden	9:00 – 22:00	2
5. – Margareten	9:00 – 22:00	2
6. – Mariahilf	9:00 – 22:00	2
7. – Neubau	9:00 – 22:00	2
8. – Josefstadt	9:00 – 22:00	2
9. – Alsergrund	9:00 – 22:00	2
10. – Favoriten	9:00 – 19:00	3
11. – Simmering	9:00 – 19:00	3
12. – Meidling	9:00 – 19:00	3
14. – Penzing	9:00 – 19:00	3
15. – Rudolfsheim-Fünfhaus*	9:00 – 19:00*	3*
16. – Ottakring	9:00 – 19:00	3
17. – Hernals	9:00 – 19:00	3
18. – Währing	9:00 – 19:00	3
19. – Döbling	9:00 – 19:00	3
20. – Brigittenau	9:00 – 22:00	2
21, 22 and the 23 district has no parking schemes		

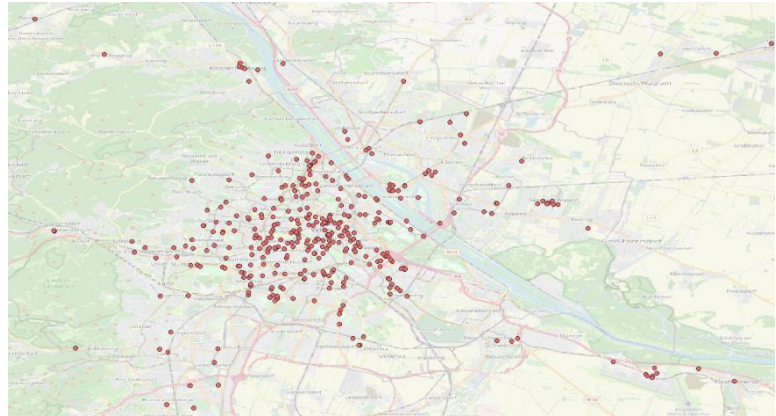
The fee structure in Vienna is:

- 15 minutes: for free
- 30 minutes: 1,10 Euro
- 1 hour: 2,20 Euro
- 1,5 hour: 3,30 Euro
- 2 hour: 4,40 Euro²⁷

²⁷ Numbers from: <https://www.wien.gv.at/verkehr/parken/> viewed 24.3.2021



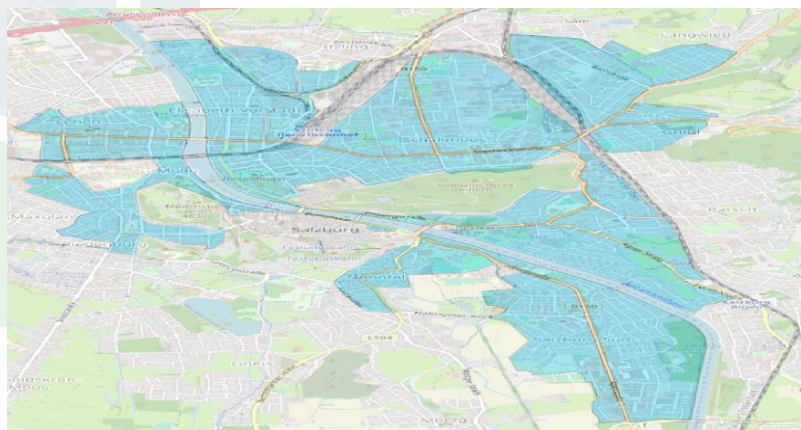
Picture 6 - Vienna Short parking map



Picture 7 - Vienna Park and Ride map

Salzburg: Due to its geographical location and the constantly increasing traffic volume, the city of Salzburg has limited parking space. All parking areas in the city centre are short-term parking zones.²⁸²⁹

Picture 8 shows the short-term parking zone in Salzburg³⁰.



Picture 8 - Salzburg short-term parking map

P+R parking in Salzburg: In the city of Salzburg there are four Park & Ride parking lots with over 4,000 parking spaces available all year round. The combination ticket for 15€ includes the parking fee as well as the day network ticket for public transport for up to five people. For more Park and ride information, the city website can be consulted³¹.

²⁸ <https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=LrSbg&Gesetzesnummer=10000656>

²⁹ <https://www.salzburg.info/de/reiseinfos/anreise-verkehr/auto/parken>

³⁰ <https://www.data.gv.at/katalog/dataset/200e7304-f01d-4acd-91ff-1becafe98641>

³¹ https://www.salzburg.info/06-reiseinfos/0601-anreise-und-verkehr/P%2BR_Folder.pdf

Linz: Short-term parking zone³²

As of October 1, 2001, the individual metered short-stay parking zones in downtown Linz were combined into one area-wide zone. 32 marked access roads lead to the new short-stay parking zone. The maximum parking time is 90 minutes. A fee must be paid for parking from Monday to Friday from 8:00 to 18:30, and on Saturday from 8:00 to noon. Single-lane vehicles (bikes, mopeds) can be parked free of charge and without time restrictions. The amount of the parking fee in the metered short-term parking zones is a uniform 1€ for each half hour or part thereof.

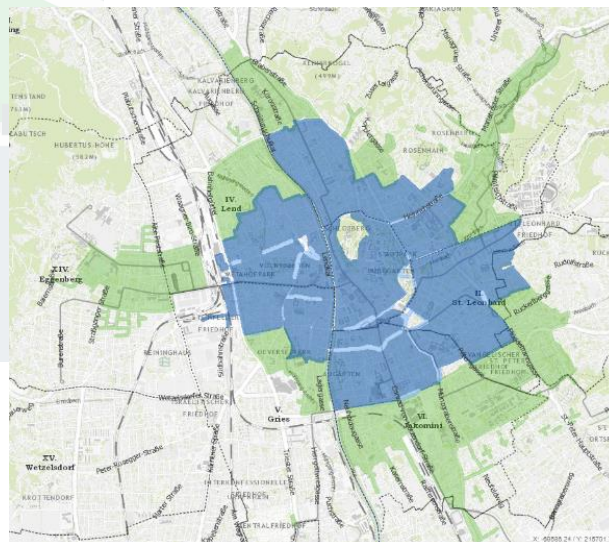
Graz: Short Term parking zones³³ (see Figure 9).

There are parking zones for short stays in the city centre of Graz. Parking is subject to charges throughout the city.

In defined Blue Zones, parking is limited to a maximum of 3 hours. Free parking is allowed for a maximum of 10 minutes. Parking tickets can be purchased at machines in the zones or via cell phone. Fees are fixed for 30 minutes and then calculated per additional minute. The fee applies on weekdays from 09:00 to 20:00, on Saturdays from 09:00 to 13:00. At Graz Central Station, it applies daily from 08.00 to 22.00. The tariff is 1€ per half hour.

In defined green zones, parking is possible for several days at a time with the appropriate parking ticket. Saturday is free of charge and the zone tariff is 0,80€ per half hour.

With the walking disabled pass, according to the §29b StVO law, you can park in Graz in the blue and green zone free of charge and without a time limit.



Picture 9 - Graz short-term parking map

³² https://www.linz.at/serviceguide/viewchapter.php?chapter_id=122157#infomaterial

³³ <https://www.graz.at/cms/beitrag/10072106/7922687>

PED: In Austria, there are a lot of pedestrian zones, for which the municipal authority in the given region is in charge. They are in place in different areas, and active at different periods, with specific exceptions. Information on these areas can be consulted on a national open data website³⁴.

5.3.1.2 Processes to create UVARs

Most of the UVARs in Austria are issued on a regional agency level. Coordination comes from the national agencies as well.

Based on the StVO³⁵, KFZ³⁶ and VStG³⁷ laws, the regional law can be different in some ways³⁸, when it comes to a penalty notice or other fee structures like a short-term parking violation ticket.³⁹ When Vienna is issuing a UVAR the MA 46⁴⁰ (Municipal Department: Traffic organization and technical traffic matters) is in charge to implement the urban vehicle access regulation⁴¹.

PED: The legislation for pedestrian zones is most often in an MS Word or PDF document.

5.3.1.3 Processes to publish and disseminate UVARs

Most UVARs in Austria are published via newspaper and the cities homepage, like the homepage of Vienna showcasing relevant UVAR information⁴². Most UVARs are imported in the national Graph Integration Platform – GIP⁴³, where it is digitised and updated when needed. Moreover, in some cities, the given information about the UVARs is also captured in a DATEX II format (in the city of Vienna for example).

The awareness level for the Single Digital Gateway is very low at the moment and needs to be explained further in detail to the stakeholders.

UVARs are communicated to road users via traffic signs and floor markings. A few examples of these are provided below.

³⁴ data.gv.at

³⁵ <https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10011336>

³⁶ <https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10011384>

³⁷ <https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10005770>

³⁸ <https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=LrW&Gesetzesnummer=20000136>

³⁹ <https://www.wien.gv.at/english/transportation/parking/shortterm.htm>

⁴⁰ <https://www.wien.gv.at/kontakte/ma46/index.html>

⁴¹ <https://www.stadt-wien.at/wien/parken-in-wien.html>

⁴² <https://www.wien.gv.at/english/transportation/cars/>

⁴³ <https://www.gip.gv.at>

LEZ: For emergency pollution schemes, if there is a smog alarm, it is disseminated via radio, TV, teletext and on-air quality display panel saying SMOG.

In Vienna for example, information on emergency scheme is disseminated at the city government website⁴⁴.

Picture 10 shows the road signs for the regional LEZs in Vienna, while Picture 11 shows the Road signs for the motorway A12 Tyrol LEZs.



Picture 10 - Vienna regional LEZ road sign



Picture 11 - Tyrol motorway LEZs road signs

PARK: For parking regulations, the following attributes are available in JSON/XML files:

- Validity times
- Maximum parking duration
- Prices
- Payment options

Short-term parking zones on individual streets are marked by traffic signs at the beginning, and the end of each zone. There are no additional traffic signs within each zone to indicate that you are in a short-term parking zone. Short-term parking zones are chargeable and marked by the traffic signs shown in Picture 12^{45,46}.



Picture 12 - Vienna short-term parking road signs

Translation: Tax obligation, parking duration: 2 hours

Traffic signs: short-term parking beginning traffic sign; short-term parking end traffic sign; additional sign. Maximum admissible parking duration (for example: two hours)

⁴⁴ <https://www.wien.gv.at/ma22-lgb/luftgi.htm>

⁴⁵ From <https://www.wien.gv.at/english/transportation/parking/shortterm.htm> picture copyright MA 67, viewed: 26.3.2021

⁴⁶ Paragraphe 52 a/13a StVO

Times of short-term parking validity (for example, Monday to Friday, weekdays, from 09:00 to 22:00). There may be additional blue markings to indicate short-term parking zones, these are for user orientation only.^{47 48}

In Linz, parking regulations are communicated as follows: large road signs on the left and right of the street announce the beginning of the zone subject to tolls; they show the period during which a fee must be paid for parking. In addition to these regulatory signs, a 1-meter-wide blue bar running across the roadway will signal the beginning of the new parking zone.

PED: For pedestrian zones in Vienna, a QGIS tool is used to show the different areas, the time where the zone is active, and what exceptions are in place⁴⁹.



Picture 13: Vienna PED Road signs

⁴⁷ For more information about the trafficsigns:

<https://www.wien.gv.at/verkehr/verkehrszeichen/vorschrift.html#:~:text=%C2%A7%2052%20a%2F13b%3A%20%22,der%20sich%20dieses%20Zeichen%20befindet>. Picture copyright MA 46 viewed: 26.3.2021

⁴⁸ From: <https://mobilitydata.gv.at/daten/kurzparkzonen-parkraumbewirtschaftete-zonen-%C3%B6sterreich-json> viewed 23.3.2021

⁴⁹ Datasample: https://www.data.gv.at/katalog/dataset/stadt-wien_fugngerzonenwien

Table 2 - Austrian UVARs Summary

Current and planned UVAR measures in Austria								
	Cities		Regions					
	Vienna	Salzburg	Burgenland	Styria	Lower Austria	Upper Austria	Tyrol	Carinthia
Most common UVARs	LEZ PARK PED	LEZ (EMERG) LTZ PARK PED	LEZ PED	LEZ PARK (Graz) PED	LEZ PED	LEZ PARK (Linz) PED	LEZ PED	LEZ (EMERG) PED
Responsible entity	Regional and National Agency levels, MA 46	Regional and National Agency levels	Regional and National Agency levels	Regional and National Agency levels	Regional and National Agency levels	Regional and National Agency levels	Regional and National Agency levels	Regional and National Agency levels
Time Validity	LEZ: Permanent PARK: 9:00-19:00 or 22:00	LTZ: Daily from 11:00 PARK: 9:00-16:00 or 19:00	LEZ: Permanent	LEZ: Permanent PARK: 8:00 or 9:00-13:00, 20:00 or 22:00	LEZ: Permanent	LEZ: Permanent PARK: 8:00-12:00 or 18:30	LEZ: Permanent	LEZ: Permanent
Activation Processes (only for dynamic schemes)	LEZ (EMERG): if PM ₁₀ > 50 µg/m ³ for >25 days/year	LEZ (EMERG): based on air quality measurement	/	LEZ (EMERG): based on air quality measurement	/	LEZ (EMERG): based on air quality measurement	LEZ (EMERG): based on air quality measurement	LEZ (EMERG): based on air quality measurement
Location	LEZ: whole city PARK: districts 1 to 20	LEZ (EMERG): on the A10 Tauern motorway and A1 West motorway LTZ: Old city PARK: all parking areas in the city centre	LEZ: all cities in the region	LEZ: all cities in the region PARK: throughout the city of Graz	LEZ: all cities in the region	LEZ: all cities in the region PARK: downtown Linz	LEZ: on the A12 between km 6,35 and 90,00	LEZ (EMERG): A2 South motorway in the area between the Klagenfurt Ost junction and the Klagenfurt Airport junction
Applicability conditions	LEZ: IG-L sticker Euro 3 for heavy vehicles LEZ (EMERG): maximum speed reduced for	LEZ (EMERG): maximum speed reduced for internal combustion vehicles	LEZ: IG-L sticker Euro 3 for heavy vehicles	LEZ: IG-L sticker Euro 3 for heavy vehicles LEZ (EMERG): maximum speed reduced for	LEZ: IG-L sticker Euro 3 for heavy vehicles	LEZ: IG-L sticker Euro 3 for heavy vehicles LEZ (EMERG): maximum speed reduced for	LEZ: IG-L sticker Diesel Euro 4 for lorries	LEZ (EMERG): maximum speed reduced for internal combustion vehicles

	internal combustion vehicles PARK: short-term parking for all vehicles	LTZ: ban for all vehicles PARK: short-term parking for all vehicles		internal combustion vehicles PARK: short-term parking for all vehicles		internal combustion vehicles PARK: short-term parking for all vehicles		
Exemptions	LEZ (EMERG): electric vehicles and fuel cell-powered vehicles	LEZ (EMERG): electric vehicles and fuel cell-powered vehicles LTZ: Hotel guests, Disabled parking drivers	/	LEZ (EMERG): electric vehicles and fuel cell-powered vehicles PARK: Disabled drivers	/	LEZ (EMERG): electric vehicles and fuel cell-powered vehicles PARK: Single-lane vehicles (bikes, mopeds)	/	LEZ (EMERG): electric vehicles and fuel cell-powered vehicles
Registration	LEZ: IG-L Stickers LEZ (EMERG): green licence plate PARK: Short-term parking ticket	LEZ (EMERG): green licence plate LTZ: Hotel reservation, Euro-Key PARK: Short-term parking ticket	LEZ: IG-L Stickers	LEZ: IG-L Stickers LEZ (EMERG): green licence plate PARK: Short-term parking ticket	LEZ: IG-L Stickers	LEZ: IG-L Stickers LEZ (EMERG): green licence plate PARK: Short-term parking ticket	LEZ: IG-L Stickers	LEZ: IG-L Stickers LEZ (EMERG): green licence plate
Enforcement method	LEZ: many actors sell the sticker LEZ (EMERG): the police controls speed limits	LEZ (EMERG): the police controls speed limits LTZ: the police charges a fine	LEZ: many actors sell the sticker	LEZ: many actors sell the sticker LEZ (EMERG): the police controls speed limits	LEZ: many actors sell the sticker	LEZ: many actors sell the sticker LEZ (EMERG): the police controls speed limits	LEZ: many actors sell the sticker	LEZ: many actors sell the sticker LEZ (EMERG): the police controls speed limits
Penalty fee	LEZ (EMERG): Euro 2.180	LEZ (EMERG): Euro 2.180		LEZ (EMERG): Euro 2.180		LEZ (EMERG): Euro 2.180		LEZ (EMERG): Euro 2.180
Signage	Road signs	Road signs	Road signs	Road signs	Road signs	Road signs	Road signs	Road signs
Processes to create UVARs								

	Issuance at regional level, based on national laws StVO ⁵⁰ , KFZ ⁵¹ and VStG ⁵² , and coordination at national level. Implementation at municipal level.							
	Processes when publishing and disseminating UVARs							
<i>Where</i>	Newspapers, Vienna city homepage, GIP LEZ (EMERG): radio, TV, teletext and on-air quality display panel saying SMOG	Newspapers, cities' homepage, GIP LEZ (EMERG): radio, TV, teletext and on-air quality display panel saying SMOG	Newspapers, cities' homepage, GIP	Newspapers, cities' homepage, GIP LEZ (EMERG): radio, TV, teletext and on-air quality display panel saying SMOG	Newspapers, cities' homepage, GIP	Newspapers, cities' homepage, GIP LEZ (EMERG): radio, TV, teletext and on-air quality display panel saying SMOG	Newspapers, cities' homepage, GIP	Newspapers, cities' homepage, GIP LEZ (EMERG): radio, TV, teletext and on-air quality display panel saying SMOG
<i>In which formats</i>	DATEX II PARK: JSON/XML files PED: QGIS tool for location, time validity and exemptions	DATEX II PARK: JSON/XML files	DATEX II	DATEX II PARK: JSON/XML files	DATEX II	DATEX II PARK: JSON/XML files	DATEX II	DATEX II
<i>Links</i>	https://www.wien.gv.at/kontakte/ma46/index.html ; https://www.gip.gv.at	https://www.salzburg.info/en/travel-info/arrival-traffic/car/traffic-bollards ; https://www.gip.gv.at	https://www.gip.gv.at	https://www.graz.at/cms/beitrag/10072106/7922687 ; https://www.gip.gv.at	https://www.gip.gv.at	https://www.linz.at/serviceguide/viewchapter.php?chapter_id=122157#infomaterial ; https://www.gip.gv.at	https://www.gip.gv.at	https://www.gip.gv.at
<i>Update process</i>	When needed	When needed	When needed	When needed	When needed	When needed	When needed	When needed
<i>SDG awareness</i>	Very low	Very low	Very low	Very low	Very low	Very low	Very low	Very low

⁵⁰ <https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10011336>

⁵¹ <https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10011384>

⁵² <https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10005770>

5.3.2 BELGIUM

The subject UVAR in Belgium has mostly a federal regulatory framework, which is then complemented with regional and/or city-level policies and regulations. Each of the 3 regions has its own policies and regulations, but in most cases, the cities complement the regulations with local policies and their own implementation activities.

The regions and the federal government work together on the implementation of EU Directive 2010/40/EU, including setting up National Access Points. Current NAP implementation in Belgium is related with Multimodal Traffic Information, implemented by the Flanders regional government⁵³. The Real Time Traffic Information (RTTI) implementation is or will be done by Wallonia regional government for the whole country.

Each region has a strategic mobility plan where the main policies and multi-year development plans are depicted including specific references to UVARs.

- Flanders: <https://www.mobienvlaanderen.be/mobiliteitsplan/>
- Wallonia: <http://mobilite.wallonie.be/home/politiques-de-mobilite/politique-de-mobilite-regionale-wallonne/strategie-regionale-de-mobilite.html>
- Brussels: <https://mobilite-mobiliteit.brussels/nl/good-move>

Furthermore, Flanders is currently implementing the “MobiliData program” including innovative technology solutions for provision of traffic regulation via digital services and services providers. Mobility policy plans of Antwerp and Brussels include already the adoption of new technologies (digitalisation) and market trends (service providers) for provision and monitoring of UVAR regulation and information provision.

At all governance levels, there are separate thematic departments involved in the development and implementation of UVAR policies and regulations. In particular, for LEZ UVARs, there is commonly a cooperation between the Environmental, the Mobility, the Logistics infrastructure, and even the Fiscal departments. There are also different levels of participation and roles for private stakeholders for each type of UVAR, with parking having the highest level of participation.

5.3.2.1 Current and planned UVAR measures in Belgium

LEZ: In the CLARS database, for Belgium⁵⁴, there are 3 LEZs at the city level. A regional LEZ for Wallonia will start in 2023 and there is a framework for Walloon cities with LEZs.

⁵³ <https://www.transportdata.be/en/pages/about>

⁵⁴ <https://urbanaccessregulations.eu/countries-mainmenu-147/belgium/>

Schemes are adopted either at the city or regional level. Authorities for all schemes are signed up to cooperate with the project. Regional authorities have set frameworks to enable harmonisation. Cities are responsible for enforcement and communication for city schemes.

The schemes have similarities but also differences:

All vehicles (except motorcycles) are affected for all schemes. Up to 8-day passes can be purchased from the city authority website to enter a LEZ with a vehicle that does not meet the requirements. In Flanders, the fee is dependent on the vehicle type and its emissions, in Brussels it is a flat fee. Most foreign vehicles need to be registered before entering the different LEZs. Since the cities have access to the Belgian, as well as the Dutch, vehicle databases, vehicles from these countries do not have to be registered.

The Flanders LEZs are scheduled to be tightened in stages, in 2025, 2027 and petrol & gas/spark ignition vehicles Euro 4 and diesel Euro IV/6d in 2027/28; in Brussels, spark ignition Euro 3, diesel Euro 5 in 2022, spark ignition Euro 3, diesel Euro 6 in 2025. In Wallonia there are two standards, one for the regional and one for city schemes, and the details of the exemptions are not yet announced.

The penalty system for vehicles that enter a LEZ while not conforming to the Euro standards differs throughout Belgium. In Antwerp there are 3 levels, with a lower fine for the first and second offence. In Brussels there is a system in place where you can receive 1 fine every three months if breaching rules, in order to provide time for the owner of the vehicle to make changes to his vehicle or change his or her travel habits. This rule is also in place for the pollution emergency scheme.

The city LEZs are camera ANPR enforced. The Wallonia regional LEZ has not yet announced enforcement method.

Emergency pollution schemes: There are 3 emergency pollution schemes at regional level (where one of the regions is Brussels city/region). The emergency schemes are manually enforced by police. The Federal Road Police perform targeted speed checks during the period of the regional smog alarms in Flanders, Brussels, and Wallonia (where the first level of the regulation is a speed reduction). The emergency schemes are triggered by air pollution levels. The duration of the interventions from the emergency scheme are based on the daily concentrations of $PM_{2.5}$, PM_{10} , and NO_2 .

All vehicles (except motorcycles) are affected for all schemes.

CS: Brussels region is investigating/planning kilometre charging/tax for 2022 implementation based on location and time of day. With this project, called SmartMove, the kilometre tax amount will be calculated by three factors: (1) time of travel (peak hours / non-peak hours); (2) number of kilometres travelled; and (3) cubic capacity of the vehicle engine. There will be an additional daily fee for non-residents travelling through Brussels. During the weekends, and between 19:00 and 07:00, there will be no kilometre tax.

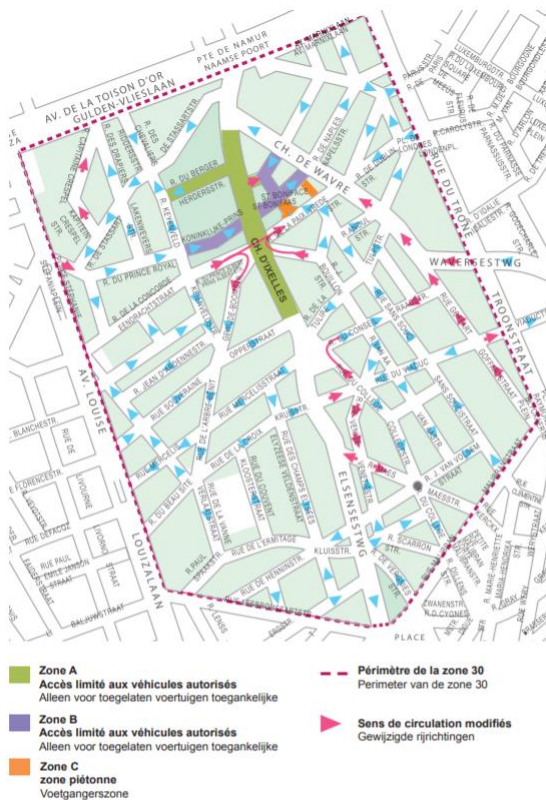
With the exception of class A and B two-wheeled scooters and mopeds, all vehicles will be affected by the kilometre charge. Foreign vehicles will also be charged. The enforcement will be done using cameras.

This kilometre tax in the region of Brussels is the only one of its kind in Belgium, the Walloon and Flanders region are not planning to implement something similar. For leased vehicles, of which the fiscal system is regulated nationally, the tax will have to be paid for by the users.

LTZ: In Belgium, there are 3 cities with large limited traffic zones (that are combined with pedestrian zones): Brussels, Antwerp, and Gent.

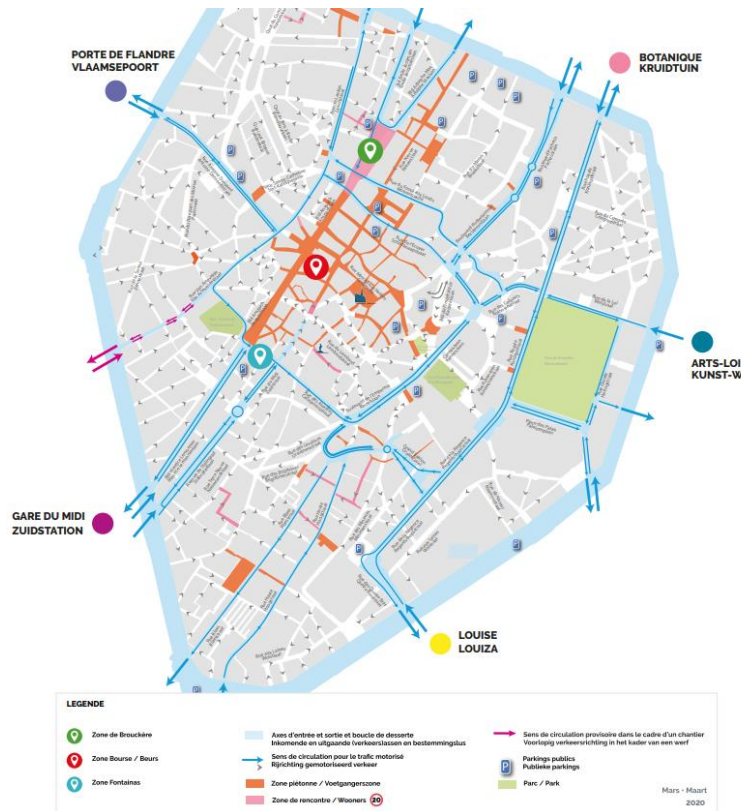
Brussels: The LTZ in Brussels are spread through the city at the Elsenesteenweg, Vijfhoek and centrum area with access conditions divided in zones and regulated via permits. Zone A + B - no access from Monday - Sunday 07:00 - 19:00; Zone C - permanently no access (pedestrian zone).

Pictures 14 and 15 show the Brussels map with the LTZ⁵⁵ and traffic directions and parking⁵⁶.



Picture 14 - Brussels LTZ map

Translation: Zone A, access limited to authorized vehicles / Zone B, access limited to authorised vehicles / Zone C, pedestrian zone / Limit of the zone 30 / Modified traffic direction



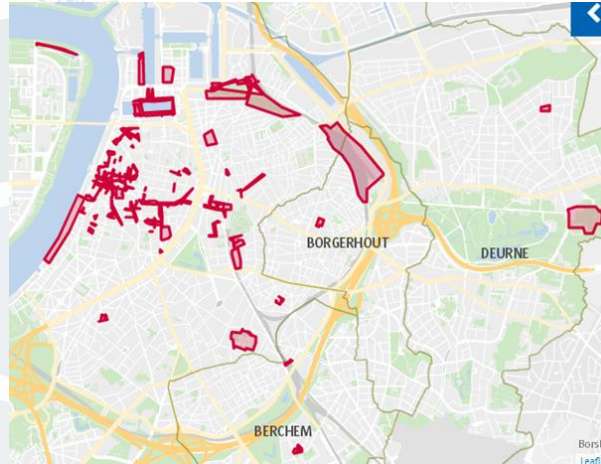
Picture 15 - Brussels traffic directions and parking

Translation: Entry and exit axes and service loop / Motorised traffic direction / Pedestrian zone / Meeting zone / Temporary traffic direction due to works / Public parking / Park / March 2020

⁵⁵ https://parking.brussels/sites/default/files/upload/plan_elsene_ixelles_zone_v2.0_0.pdf

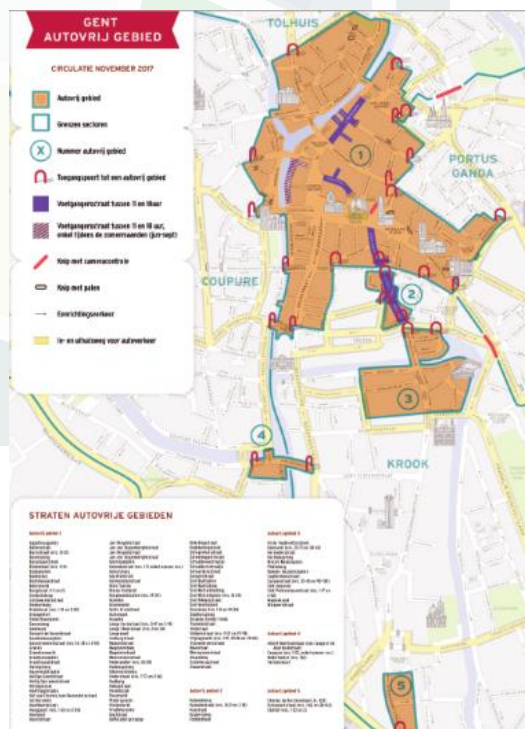
⁵⁶ https://www.brussel.be/sites/default/files/bxl/CEN20_004_v02.pdf

Antwerp: In Antwerp⁵⁷ there are 60 Limited traffic zones (or Pedestrian zones) – see Picture 16 - where motorised vehicles are not allowed to circulate except during indicated hours, the so-called "window times", where business owners and residents can enter the zones to load and unload. If no "window times" are indicated, there is always need for an authorization / permit that needs to be obtained at a specific city service. These areas are each indicated with a specific road sign and controlled either via ANPR cameras or rising bollards.



Picture 16 - Antwerp LTZs map

Gent: In the city Gent there are 5 LTZ regulated by a permit system and controlled by ANPR cameras – see Picture 17⁵⁸.



Picture 17 - Gent LTZs map

Translation: Car-free zone / Sectors' limits / Number of the car free zone / Access point to a car free zone / Pedestrian street between 11:00 and 18:00 / Pedestrian street between 11:00 a.d 18:00 and permanently during summer months (june-sept) /

Camera control point / Post control / One direction traffic / Car traffic roads // Streets of the car free zones / Car free zone 1, car free zone 2, car free zone 3, car free zone 4, car free zone 5.

⁵⁷ <https://www.antwerpen.be/info/58a310c2a6779391a5118fe0/autoluwe-zones-en-voetgangerszones-in-de-stad>

⁵⁸ https://stad.gent/sites/default/files/page/documents/20171113_DO_Circulatieplan3.0_Autovrij%20gebied_intern_A1.pdf

PARK: Parking regulations in Belgium are originally established at a federal level⁵⁹, but each region and city can have complementary, stricter and/or additional regulations related to:

- Paid parking tariffs schemes divided by geographical zones (“colours”), types of vehicles and days or time of day.
- Parking limited time conditions, for example in the “blue zone”.
- Parking locations reserved for holders of municipal parking card or resident’s card.
 - The municipal parking card is usually valid for a specific period.
 - The card is valid for the vehicle number plate registered in the name of the holder.
 - Each municipality is free to determine the conditions for obtaining a municipal parking card.
- Parking locations reserved for specific types of vehicles like shared mobility services.

Brussels region has a “Parking policy plan” describing the current parking policies and expected developments for the whole region, including a harmonised framework regulation as well for the 19 municipalities⁶⁰.

Flanders region has also a “Sustainable Parking Plan” presenting guidelines for cities in the region while developing and managing parking policies and regulations⁶¹.

PED: There is a large pedestrian scheme in Brussels (see LTZ) and Gent (see LTZ).

5.3.2.2 Processes when creating UVARs

The process of development and adoption of UVARs is very similar for each of the regions, as well as the involved local authorities and stakeholders. The following steps are taken for the creation of UVARs:

1. Identification of needs for regulation of space and its usage: The start of this step derives from the regional and local policies and plans from local authorities and in particular its mobility, infrastructure, and environmental departments. This step should provide answers to the following questions: Which problems and bottlenecks are encountered to achieve mobility and environmental goals and objectives? Which organizations, governmental bodies and departments should be in the lead (or involved) in solving these challenges?

⁵⁹ <https://wegcode.be/>

⁶⁰ <https://mobilite-mobiliteit.brussels/nl/parkeerbeleidsplan>

⁶¹ <https://www.mobienvlaanderen.be/vademecums/parkeerbeleid/index.php#gsc.tab=0>

2. Solutions development and Plan of approach: Analysis and evaluation of problem(s); Development of scenarios and evaluation of potential solutions and approaches (Impact assessment studies) combining several governmental departments: mobility, environment, planning and infrastructure. Sometimes already including a first consultation with involved stakeholders. At the end of this step, a solution choice has been done and detailed in a policy implementation plan. This will usually be with the EU-wide SUMP (Sustainable Urban Mobility Plan⁶²) process.
3. Legislation and regulation approval procedure: The chosen solution is detailed and translated into a legislation and regulation proposal which is set for internal (different governmental bodies) and external consultation with relevant stakeholders (lobby organizations, local groups of users, etc.) before approval at the regional or city level.

LEZ: As part of a LEZ definition process several regional and city departments are involved. The LEZ aims at reducing vehicle emissions and impacts on air quality. It is then the Environmental department that usually takes the lead on defining the policies and regulations for access of vehicles. The mobility department supports in defining the right auxiliary measures and services for re-routing and informing vehicles (drivers). The IT department can also be involved in the implementation of the necessary systems for user information and enforcement depending on the system used. Finally, and related with enforcement, the Fiscal department for identification of vehicles and drivers follow with eventual fines.

Brussels, Antwerp, and Gent have their own technical resources supporting the implementation, maintenance, and monitoring of their LEZ.

CS: The Brussels congestion charging measure is part of the “Smart move” initiative⁶³, led by the Brussels region government, and in particular the environmental and fiscal departments. It has been developed and is now in the public consultation phase.

LTZ and **PED:** The LTZ regulations in Brussel and Gent are developed, implemented, and managed by the cities’ mobility departments. Some of LTZ in Brussels are managed in combination with parking services.

PARK: City parking regulations are defined and managed by the mobility department of the cities. In Brussels there is a parking entity that implements and manages parking services. Major cities have their own IT facilities and tools to define and manage the different zones and their regulation schemes.

⁶² <https://www.eltis.org/mobility-plans/sump-guidelines>

⁶³ <https://smartmove.brussels/en>

5.3.2.3 Processes when publishing and disseminating UVARs

Traffic regulations are officially published at the different governmental levels starting with parking legal framework at the Federal government website⁶⁴.

The 3 regions of Flanders⁶⁵, Wallonia and Brussels⁶⁶ have also published their official regulations at public sites, and their "open data portals" with digital maps for different UVAR types⁶⁷.

In general, the bigger Belgian cities have their own open data portals where regulations are published in different locations and digital platforms.

LEZ: The city LEZs have a good web presence. The information on the emergency schemes activation is disseminated through websites, for example, of the air quality authority in Brussels and in Flanders⁶⁸.

Gent: Regulation documents are published via a city website⁶⁹, or as well in other human-readable formats like newspapers. Information is published in a Word or PDF format. The city open data portal provides information on the LEZ geographical areas⁷⁰, but machine-to-machine formats are not in use. Road users are notified of existing UVARs in the area by electronic billboards, response teams on site, traffic signs, floor markings, the internet, and newspapers/letters/trade bodies/other paper forms. There is no relation to a NAP between the regional authorities, nor is there awareness of the Single Digital Gateway regulation. Information on UVARs in the different systems is updated once a year.

Antwerp: Regulation documents are published via a city website⁷¹. Information is published in a PDF or XML/JSON format at the city open data portal. These formats only contain textual information. Road users are notified with electronic billboards, traffic signs, floor markings, the internet, and newspapers/letters/trade bodies/other paper forms. The Flemish government also publishes the regional formal legal regulatory mechanism on the behalf of Antwerp if the UVARs are also applicable on the higher-level road network. The UVARs are at this moment not yet linked to the NAP, but they are planning to do so in the future. Single Digital Gateway regulations are not yet implemented either. The information on UVARs in the different systems is only updated when a legal change occurs in the regulation.

⁶⁴ <https://wegcode.be/>

⁶⁵ <https://ebesluit.antwerpen.be/>

⁶⁶ <https://be.brussels/over-het-gewest/de-gewestregering/besluiten-van-de-ministerraad>

⁶⁷ <https://data.mobility.brussels>; <https://data.vlaanderen.be/>

⁶⁸ <https://qualitedelair.brussels/>, <http://www.awac.be/>, <https://www.vmm.be/lucht/luchtkwaliteit>

⁶⁹ lez.stad.gent - stad.gent/autovrijgebied

⁷⁰ <https://data.stad.gent/explore/dataset/lage-emissie-zone-gent>

⁷¹ <https://www.slimnaarantwerpen.be/nl/home>

Brussels: In Brussels the LEZ information is officially published on the city government website⁷². Furthermore, the Brussels region open data portal⁷³ provides geographical information in GIS format. It is also disseminated on several city information websites for the general public. The Single Digital Gateway regulations are not yet implemented either. The information on UVARs in the different systems is only updated when a legal change occurs in the regulation. The road sign for LEZs in Brussels is shown in Picture 18.



Picture 18 - Brussels LEZ road signs

CS: Brussels congestion charging scheme is already developed and currently (end 2020) in a public consultation phase. More information at Smart Move kilometre tax⁷⁴.

LTZ: In Brussels the LTZ information is also published at the city government website⁷⁵ and open data portal⁷⁶.

In the city of Gent the LTZ information is also published at the city government website⁷⁷ and city open data portal⁷⁸.

The LTZ information in Antwerp ("Autoluwe zones en voetgangerszones") is officially published at the city website⁷⁹, including the regulation, zone identification and access conditions. The open data portal provides in GIS format data on the location of the zones.

PARK: Official information about parking regulations is available at the region and cities governmental and websites (for example Region Brussels⁸⁰) and open data portals (for example Gent⁸¹). The information is also largely disseminated in several public city websites including tariffs, payment methods, geographical zones, and exceptions. For larger cities, besides static information, there is also off and on-

⁷² <https://www.brussel.be/gemeentelijke-reglementen>

⁷³ <https://data.mobility.brussels/nl/>

⁷⁴ <https://smartmove.brussels/en>

⁷⁵ <https://www.brussel.be/gemeentelijke-reglementen>

⁷⁶ <https://data.mobility.brussels/nl/>

⁷⁷ <https://stad.gent/nl>

⁷⁸ <https://data.stad.gent/explore/dataset/sectoren-circulatieplan-gent/table/>

⁷⁹ <https://www.antwerpen.be/info/58a310c2a6779391a5118fe0/autoluwe-zones-en-voetgangerszones-in-de-stad>

⁸⁰ <https://www.brussel.be/gemeentelijke-reglementen>

⁸¹ <https://data.stad.gent/explore/dataset/parkeertariefzones-gent/table/>

street parking space availability information. Based on this, multiple service providers deliver further personalized information and payment services for off and on-street parking in almost all cities of Belgium.

Examples of Road Signs for parking and loading restrictions are shown in Picture 19.



Translation: From Monday to Friday



Translation: From Monday to Saturday from 07:00 to 18:00

Picture 19 - Brussels parking road signs

PED: Same as LTZ.

Table 3 - Belgian UVARs Summary

Current and planned UVAR measures in Belgium						
	Regions			Cities		
	Brussels	Flanders	Wallonia	Brussels	Gent	Antwerp
Most common UVARs	LEZ CS PARK	LEZ PARK	LEZ	LEZ LTZ PED	LEZ LTZ PED	LEZ LTZ PED
Responsible entity	LEZ: Region and city CS: Region PARK: Federal, Region, City	LEZ: Region and city PARK: Federal, Region, City	LEZ: Region and city	LEZ: Region and city LTZ & PED: City	LEZ: Region and city LTZ & PED: City	LEZ: Region and city LTZ & PED: City
Time Validity	LEZ: Permanent (based on the daily concentrations of PM _{2.5} , PM ₁₀ , and NO ₂ for EMERG) CS: Mo-Fri 07:00-19:00	LEZ: Permanent (based on the daily concentrations of PM _{2.5} , PM ₁₀ , and NO ₂ for EMERG)		LEZ: Permanent (based on the daily concentrations of PM _{2.5} , PM ₁₀ , and NO ₂ for EMERG) LTZ: 07:00-19:00 PED: Permanent	LEZ: Permanent (based on the daily concentrations of PM _{2.5} , PM ₁₀ , and NO ₂ for EMERG) LTZ & PED: Permanent except Window times	LEZ: Permanent (based on the daily concentrations of PM _{2.5} , PM ₁₀ , and NO ₂ for EMERG)
Activation Processes (only for dynamic schemes)	LEZ (EMERG): Based on the daily concentrations of PM _{2.5} , PM ₁₀ , and NO ₂ for EMERG					
Location	LEZ: city level PARK: districts 1 to 20	LEZ: city level LTZ: Old city PARK: all parking areas in the city centre	LEZ: city level	LEZ: city level LTZ (Zones A+B) & PED (Zone C): Elsensesteenweg, Vijfhoek and centrum area PARK: throughout the city of Graz	LEZ: city level LTZ & PED: 60 zones in the city	LEZ: city level LTZ & PED: 5 zones in the city
Applicability conditions	LEZ: spark ignition Euro 3, diesel Euro 5 in 2022, spark ignition Euro 3, diesel Euro 6 in 2025	LEZ: spark ignition vehicles Euro 4 and diesel Euro IV/6d in 2027/28	LEZ: not yet announced	LEZ: spark ignition Euro 3, diesel Euro 5 in 2022, spark ignition Euro 3, diesel Euro 6 in 2025	LEZ: spark ignition Euro 3, diesel Euro 5 in 2022, spark ignition Euro 3, diesel Euro 6 in 2025	LEZ: spark ignition Euro 3, diesel Euro 5 in 2022, spark ignition Euro 3, diesel Euro 6 in 2025

	CS: depending on time & distance of travel + vehicle cubic capacity + residence place			LTZ: All motorised vehicles PED: All vehicles	LTZ: All motorised vehicles PED: All vehicles	LTZ: All motorised vehicles PED: All vehicles
Exemptions	LEZ: Motorcycles CS: class A and B two-wheeled scooters and mopeds PARK: Municipal parking, residents, shared mobility services	LEZ: Motorcycles PARK: Municipal parking & residents	LEZ: Motorcycles	LEZ: Motorcycles LTZ: authorised vehicles	LEZ: Motorcycles LTZ: business owners and residents to load and unload in window times	LEZ: Motorcycles
Registration	LEZ: Up to 8-day passes + Foreign vehicles registration PARK: Municipal & residents' card	LEZ: Up to 8-day passes + Foreign vehicles registration PARK: Municipal & residents' card	LEZ: Up to 8-day passes + Foreign vehicles registration	LEZ: Up to 8-day passes + Foreign vehicles registration LTZ: Permit system at specific city service	LEZ: Up to 8-day passes + Foreign vehicles registration LTZ: Permit system at specific city service	LEZ: Up to 8-day passes + Foreign vehicles registration LTZ: Permit system at specific city service
Enforcement method	ANPR enforced with cameras	ANPR enforced with cameras	ANPR enforced with cameras	ANPR enforced with cameras	ANPR enforced with cameras	ANPR enforced with cameras & rising bollards
Penalty fee	/	/	/	LEZ: 1 fine every three months if breaching rules	/	LEZ: 3 levels, with a lower fine for the first and second offence
Signage	Road signs	Road signs	Road signs	Road signs	Electronic billboards, response teams on site, traffic signs, floor markings	Electronic billboards, response teams on site, traffic signs, floor markings
Processes to create UVARs						

	LEZ: Regional & City departments – Definition; Environmental department – policies; Mobility department – support; IT & Fiscal department – implementation CS: Public consultation & Regional environment and fiscal departments LTZ, PED & PARK: Cities’ Mobility department					
Processes when publishing and disseminating UVARs						
Where	Regional public website & Open data portal			City website, newspapers, city open data portal		
In which formats	Digital maps			LEZ: GIS format	LEZ: Human readable format	LEZ: PDF or XML/JSON format LTZ: GIS format
Links	https://data.mobility.brussels	https://data.vlaanderen.be/	https://www.odwb.be/pages/home/	https://www.brussel.be/gemeentelijke-reglementen	https://stad.gent/nl https://data.stad.gent/	https://www.antwerpen.be/info/58a310c2a6779391a5118fe0/autoluwe-zones-en-voetgangerszones-in-de-stad
Update process	When regulations change					
SDG awareness	Not yet implemented					

5.3.3 THE NETHERLANDS

The Ministry of Infrastructure and Water Management sets national policies for mobility, transport sector and environment aspects. In 2018 the Ministry presented a Smart Mobility policy plan as a start of several supporting programs and initiatives aiming to scale up nationally the digitalization of mobility and also cooperation with private transport and mobility sector⁸².

Several initiatives on mobility digitalization are being implemented under an overall Smart mobility governance structure where support national, provincial and city governments cooperate in a national roll-out of smart mobility services including the UVARs in scope:

- “Digitaliseren overheden” (Digitalization of governmental organizations)⁸³ is a joint initiative of the Ministry of Infrastructure and Water Management with provincial and city governments, aiming at ensuring together that all governments are digitally capable towards mobility services by 2023. This means that governments use data for their own processes in policy, management and supervision, and have set up their organizations to do so. Producing, protecting and managing data and digital work processes is one of the core tasks of governments. They work together in Regional Data Teams on the collection, digitalization, and keeping data in the mobility domain in order. A Regional Data Team acts on behalf of its “own” authorities and is part of regional partnerships with structural staffing and financing.
- “Data voor Logistiek” (Data for logistics)⁸⁴ is an initiative of the Ministry of Infrastructure and Water Management tackling the need to make city data related to logistics, such as “window times”, LEZs and loading and unloading locations, digitally public and accessible to third parties. A private party was chosen as a partner to collect, enrich and centrally access the data. The assignment included the collection of the data from the source holders: the road authorities in the region. A large part of the data is currently available via an open data platform and is made available to the sector free of charge.
- “VM-IVRA” (Traffic management information for route advice)⁸⁵ is a joint initiative of the Ministry of Infrastructure and Water Management, the Dutch Traffic management council and NDW (National Data Portal Wegverkeer) to digitalise and share data with navigation service providers.

⁸² <https://www.rijksoverheid.nl/onderwerpen/mobiliteit-nu-en-in-de-toekomst/nederland-als-testland-voor-mobiliteit>

⁸³ <https://dutchmobilityinnovations.com/organisatie-smart-mobility>

⁸⁴ <https://dutchmobilityinnovations.com/spaces/1145/data-voor-logistiek/about>

⁸⁵ <https://dutchmobilityinnovations.com/spaces/1175/vm-ivra-drs/about>

- “Milieuzones in Nederland”⁸⁶ a national information service providing the characteristics of all Low Emission Zones in The Netherlands, including an online vehicle permit check.
- “Parkeerdata catalogus”⁸⁷ is an initiative of the Ministry I&E providing (real-time) parking information based on open data service.

5.3.3.1 Current and planned UVAR measures in The Netherlands

LEZ: For the Netherlands⁸⁸, there are 13 cities that have implemented LEZs. These cities are Amsterdam, Arnhem, Breda, Delft, The Hague, Eindhoven, Leiden, Maastricht, Rijswijk, Rotterdam, Den Bosch, Tilburg, and Utrecht. All of these cities have LEZs for diesel heavy duty vehicles, and 4 (Amsterdam, Utrecht, Arnhem, and The Hague) have LEZs for diesel light duty vehicles. Amsterdam has also zones excluding Taxis and mopeds. The Hague has a zone excluding mopeds as well.

There is a national framework for lorry LEZs, implemented as a covenant, and an agreement as to the earliest date and standard for which light duty LEZs could be implemented. Light duty LEZs were implemented first at the city level, then harmonised at the national level by the national government (with an interim phase to avoid additional changes of city schemes) to enable a single framework. The different emissions standards of light duty LEZs are colour coded to facilitate communication.

For Amsterdam, since the 1st of November 2020, diesel passenger cars need to have the Euro 4 rating. In Utrecht this is the case since the 1st of April 2021, and for Arnhem this was the case since October 29 2020. Since the 1st of July 2021, diesel passenger cars with a Euro rating of 4 or higher are allowed in the LEZ of The Hague. The LEZ for Utrecht is set to become stricter from 2025, when passenger cars with the Euro 4 rating are not allowed to enter the zone anymore. From 2030 onwards, all petrol and diesel vehicles will be banned from entering the LEZ in Amsterdam.

The LEZs are camera enforced, and the fine for entering a LEZ with an unsuited passenger car is 100€. There is a national exemption from the LEZs for old timers (vehicles at least 40 years old). Also, day passes can be bought for passenger cars for the LEZ of Utrecht and Arnhem.

The LEZs for the heavy duty vehicles all have the same characteristics. The heavy duty vehicles are required to have a Euro 4 rating to enter the zone, this will increase to a Euro 6 rating from 2022.

⁸⁶ <https://www.milieuzones.nl/>

⁸⁷ <https://www.parkeerdatacatalogus.nl/>

⁸⁸ <https://urbanaccessregulations.eu/countries-mainmenu-147/netherlands-mainmenu-88>

The Ministry has set a national framework to support cities in the implementation of Zero Emission Zones for logistics vehicles which are being prepared and will be implemented from 2025. 20 cities have recently announced (9th February 2021) that they are initiating the process for implementing Zero Emission Zones.

There are no triggered pollution schemes in the Netherlands.

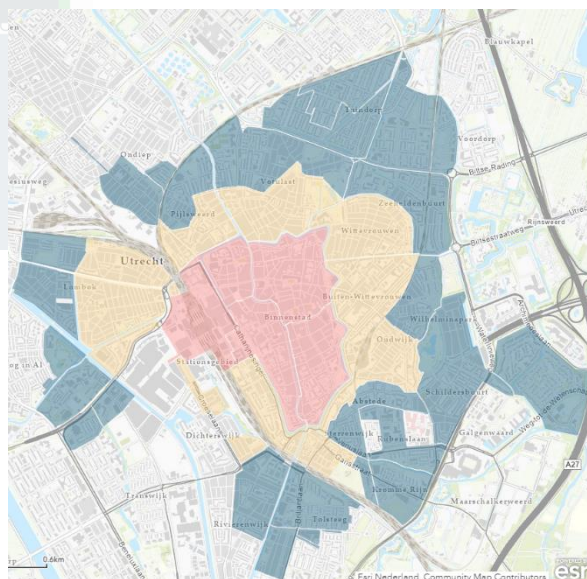
CS: There are currently no congestion charging schemes in the Netherlands.

LTZ: There are seven cities with LTZs implemented: Amersfoort, Amsterdam, Delft, Groningen, Haarlem, Utrecht and Rotterdam. The type of restrictions ranges from the limitation of specific vehicles/users to access only during pre-defined “window times” (“venstertijden”). They are mostly enforced with cameras. Several Dutch cities are in the process of planning or approval of the new LTZ.

Several Dutch cities are in the process of approving or implementing the so-called “Autoluwe gebieden” (Low motorised traffic zones). Some of these zones can also be seen as Pedestrian zones depending on the policy objectives and measures.

PARK: Parking regulations in the Netherlands are established at the national level. Parking regulations can be related to:

- Paid parking tariffs schemes. The paid parking area is often divided into different categories where the costs for the parking permits are higher in the city center. For example, Utrecht has 3 different parking area categories (see Picture 20).



Picture 20 - Utrecht parking zones map

- Parking permits for residents that live in a paid parking area. A permit is only valid for one license plate number that needs to be registered to the same name as the permit holder. The costs of these permits are related to the parking tariffs for that area. Cities can determine the specific conditions for parking permits. In Amsterdam for example, requesting a permit for an electric car can give you preference on the waiting list.
- Parking limited time conditions also called the “blue zone”
- Parking places for people with a physical disability
- Parking places reserved for electric vehicles. Usually this comes with the condition that the vehicle needs to be charging during the time it is parked.

The Ministry of Infrastructure and Water Management and “Servicehuis Parkeer- en Verblijfsrechten (SHPV)” are implementing “Parkeedata catalogus” programme aiming to make parking data more accessible to users via a digital portal as open data. This is done in collaboration with a large number of stakeholders such as municipalities.

The open parking data is collected centrally and published uniformly for the benefit of users such as travel and navigation apps and MaaS service providers.

This includes the location of the car park, the GPS coordinates of the entrance and the number of places. Collected data is available at the National Parking Register (NPR) managed by the RDW.

To speed up the process, SHPV collects the static data and checks it with the source holders and municipalities. Various sources are used to collect data, including the website of municipalities. The progress until 2020 is listed below:

- 105 from 125 cities with on-street parking is already available
- 100% carpool places and P + R locations
- 75% parking garages and parking areas with a barrier on going

In order to ensure the quality of parking data, machine-to-machine interfaces are being applied as much as possible. On-street by the cities. Parking garages also via the PMSs.

Part of the collaboration with lenW is that SHPV actively supports municipalities in collecting, managing and making parking data accessible as open data. Currently, 101 of the approximately 120 municipalities that facilitate mobile payments already use the services of the SHPV. Municipalities are also approached via the Regional Data Teams that are now being set up, in which different national regions work together on one Digital Agenda for the Netherlands.

PED: See LTZ description and the plans for “Autoluwe gebieden” (low motorised traffic zones).

5.3.3.2 Processes when creating UVARs

The process of development and adoption of UVARs in the Netherlands follows a standard procedure initiated either by national or and with local authorities, usually with the EU-wide SUMP (Sustainable Urban Mobility Plan⁸⁹) process:

- Policy development for mobility and city urban development: this step includes identification of needs for regulation of space and its usage, deriving from regional and policies and plans from national and local authorities. This step should provide answers to the following questions:
 - Which problems and bottlenecks are encountered in order to achieve mobility and environmental goals and objectives?
 - Which organizations, governmental bodies and departments should be in the lead (or involved) in solving these challenges?

The results are strategic plans usually with a set of measures including new or updated infrastructure and services, complemented with a regulatory framework supporting or enforcing the measures.

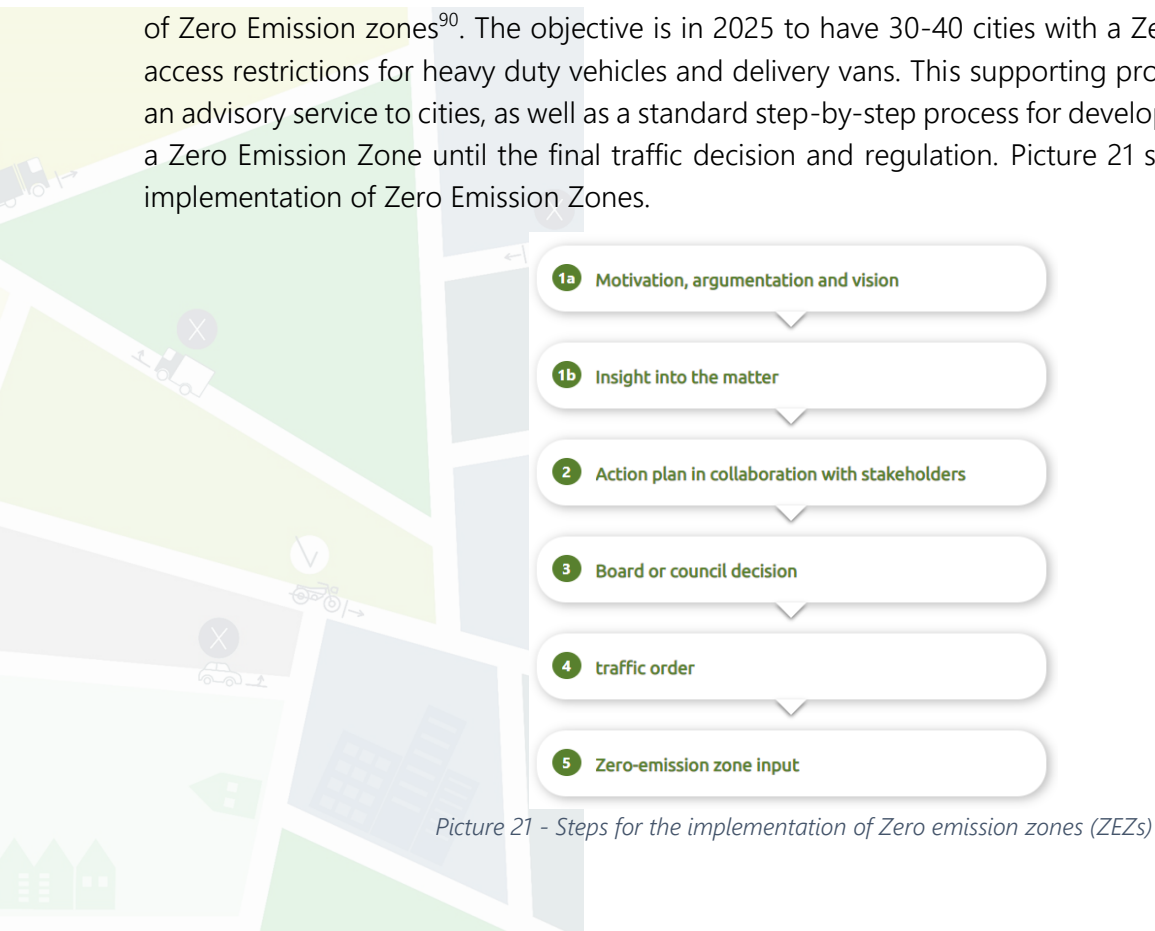
- Solutions development and plan of approach: analysis and evaluation of problem(s); Development of scenarios and evaluation of potential solutions and approaches (Impact assessment studies) combining several governmental departments: mobility, environment, planning and infrastructure. It usually already includes a first consultation with involved stakeholders. At the end of this step, a solution choice has been done and detailed in an implementation plan.
- Legislation and regulation approval procedure: the chosen solution is detailed and translated into a legislation and regulation proposal which is set for internal (different governmental bodies) and external consultation with relevant stakeholders (lobby organizations, local groups of users, etc.) before approval at the regional or city level.

LEZ: The Mobility and/or Environment departments of the cities are usually the leading groups for initiating and implementing a LEZ regulation.

Recently the Dutch Ministry of Infrastructure and Water Management, driven by the “Paris Climate agreement” has launched a national initiative to support Dutch cities in the process of implementation

⁸⁹ <https://www.eltis.org/mobility-plans/sump-guidelines>

of Zero Emission zones⁹⁰. The objective is in 2025 to have 30-40 cities with a Zero Emission Zone with access restrictions for heavy duty vehicles and delivery vans. This supporting programme includes both an advisory service to cities, as well as a standard step-by-step process for developing and implementing a Zero Emission Zone until the final traffic decision and regulation. Picture 21 shows the steps for the implementation of Zero Emission Zones.



Picture 21 - Steps for the implementation of Zero emission zones (ZEZs)

5.3.3.3 Processes when publishing and disseminating UVARs

UVAR official decisions and documentation are published either at local and/or at the national register⁹¹.

For Amsterdam, data is already available and published using the DATEX II format, as well as a digital shape. So, both text and pictures are published⁹². Amsterdam's LEZs are also accessible via the NAP. Many other entities publish UVARs, on their own initiative, for example, the Dutch Automobile Club, ANWB, publishes and disseminates LEZ data. They are only one of many, and hopefully in the future many more "service providers" will do so.

For Rotterdam, data is published using PDF and XML/JSON format to a central access point to all information about government organisations⁹³.

The information on UVARs is only updated when regulation on a UVAR changes.

⁹⁰ <https://opwegnaarzes.nl/gemeenten>

⁹¹ <https://www.overheid.nl/> or <https://www.officielebekendmakingen.nl/staatscourant>

⁹² <https://www.amsterdam.nl/parkeren-verkeer/milieuzone-amsterdam/>

⁹³ <https://www.officielebekendmakingen.nl/staatscourant>

LEZ: There is a national LEZ website and coordinated collation of semi-structured data and digitised maps (whether the digitisation is sufficient quality for DATEX II remains to be investigated). UVARs are enforced through cameras. Picture 22 shows the road signs for the different LEZs in Amsterdam.



Picture 22 - Amsterdam LEZs road signs

LTZ: Public information is available on cities' public websites. Digital geographical information, if existing, is also available on cities' open data portals.

PARK: Public information is available on cities' public websites or private parking service providers. From the 125 cities with city parking regulations (on-street and off-street), 105 have their regulations and real-time parking capacity or availability digitally available as open data at the Parkeer data catalogus service⁹⁴ also in DATEX II compatible format.

Examples of different road signs for parking are shown in Picture 23.



Picture 23 - Dutch parking road signs

PED: Same as LTZ.

⁹⁴ <https://www.parkeeredatacatalogus.nl/>

Table 4 - Dutch UVARs Summary

Current and planned UVAR measures in the Netherlands						
	Amsterdam	Utrecht	Arnhem	The Hague	Heavy Duty Vehicles LEZ	Groningen
Most common UVARs	LEZ LTZ/PED PARK	LEZ LTZ/PED PARK	LEZ PARK	LEZ PARK	Lorry LEZ	LTZ/PED PARK
Responsible entity	LEZ: National and city level LTZ/PED: City PARK: National level				Lorry LEZ: National level	LTZ/PED: City PARK: National level
Time Validity	LEZ: Permanent LTZ/PED: Permanent or outside window times					
Activation Processes (only for dynamic schemes)	N/A					
Location	LEZ: City center					
Applicability conditions	LEZ: Diesel Euro 4 rating. All petrol and diesel cars banned from 2030 LTZ/PED: From specific vehicles/users to all motorised vehicles	LEZ: Diesel Euro 4 rating. Diesel Euro 5 rating from 2025 LTZ/PED: From specific vehicles/users to all motorised vehicles	LEZ: Diesel Euro 4 rating LTZ/PED: From specific vehicles/users to all motorised vehicles	LEZ: Diesel Euro 4 rating LTZ/PED: From specific vehicles/users to all motorised vehicles	Diesel Euro 4 rating. Diesel Euro 6 rating from 2022	LTZ/PED: From specific vehicles/users to all motorised vehicles
Exemptions	LEZ: Oldtimer PARK: Municipal parking and residents, electric vehicles, blue zones	LEZ: Oldtimer + daypass PARK: Municipal parking and residents, electric vehicles, blue zones	LEZ: Oldtimer + daypass PARK: Municipal parking and residents, electric vehicles, blue zones	LEZ: Oldtimer PARK: Municipal parking and residents, electric vehicles, blue zones	Up to 12 day passes for Euro 3 rating or lower	PARK: Municipal parking and residents, electric vehicles, blue zones
Registration	LEZ no need to register vehicle					
Enforcement method	LEZ/LTZ/PED: Enforced with cameras					
Penalty fee	LEZ 100€, mopeds 70€	LEZ 100€	LEZ 100€	LEZ 100€, mopeds 70€	250€	
Signage	Road signs					

Processes to create UVARs			
	1 – Policy development (issue analysis and adequate authority to act); 2 – Solution development and plan of approach; 3 – Legislation and Regulation approval procedure LEZ: City Mobility and/or Environment departments initiative and implement; National support initiative for Zero Emission Zones		
Processes when publishing and disseminating UVARs			
Where	On the city website, via the NAP, and on private organisations' websites	Local and/or national register LEZ: National LEZ website LTZ/PED: Cities' public websites and open data portals PARK: Cities' public websites, Private parking service providers, Parkeer data catalogus service	Central access point to all information about government organisations
In which formats	DATEX II	LEZ: Semi-structured data and digitised maps LTZ/PED: Digital geographical information, if existing PARK: DATEX II compatible format	PDF and XML/JSON
Links	https://www.amsterdam.nl/parkeren-verkeer/milieuzone-amsterdam/	https://www.overheid.nl/ or https://www.officielebekendmakingen.nl/staatscourant PARK: https://www.parkeerdatalogus.nl/	https://www.officielebekendmakingen.nl/staatscourant
Update process	When regulations change		
SDG awareness	No information		

5.3.4 GERMANY

The findings so far have shown that the most common UVARs in Germany are pedestrian zones, LEZs, parking regulations and zones with limited traffic. Other restrictions and combined schemes also exist. Germany has currently no urban road or city charging schemes. But the creation and publication processes of these schemes are heterogeneous across cities, especially between larger and smaller cities.

5.3.4.1 Current and planned UVAR measures in Germany

LEZ: In the CLARS⁹⁵ database, there are 80 LEZs at city level affecting all vehicles except motorcycles. UVARs are coordinated at the regional level (by the Länder), which can facilitate contact with the cities. The first LEZ has been discontinued, as the required pollution concentration levels have been reached.

There are two types of LEZ for air quality purposes:

1. Those called LEZs (Umweltzonen) set out in national law that are up to Euro 4 diesel and Euro 1 petrol standards for all vehicles except motorcycles. There are stickers to facilitate enforcement. They have national, city, and sometimes also regional exemptions.
2. There are also several tighter Euro 5 or Euro 6 diesel standard schemes, that are known (incorrectly) as "Diesel Fahrverbote" or "diesel bans". These have often been triggered by legal action due to not meeting the EU air quality limit values. They are not harmonised, and are often individual streets. The emission standards are usually diesel Euro 6, in Stuttgart areas with both Euro 5 and 6, and the petrol standard varies. There are no stickers post Euro 4 diesel Euro 1 petrol.

Schemes are manually enforced by the police, as camera enforcement is politically sensitive in Germany. However, there is draft legislation that could enable some camera enforcement in the future.

The legal basis of the LEZs (Umweltzonen) in Germany is the Ordinance for the labelling of motor vehicles with a contribution to pollution (Verordnung zur Kennzeichnung der Kraftfahrzeuge mit geringem Beitrag zur Schadstoffbelastung⁹⁶). The labelling is set below.

Table 5 - German stickers criteria

Emissions class	1	2	3	4
Sticker	No Sticker exists	 Schadstoffgruppe 2	 Schadstoffgruppe 3	 Schadstoffgruppe 4
Requirement for diesel vehicles	Euro 1 or worse	Euro 2 or	Euro 3 or Euro 2 with	Euro 4, Euro 5, Euro 6 or

⁹⁵ <https://urbanaccessregulations.eu/countries-mainmenu-147/germany-mainmenu-61/>

⁹⁶ <https://www.bmu.de/gesetz/35-verordnung-zur-durchfuehrung-des-bundes-immissionsschutzgesetzes/>

		Euro 1 with a particulate filter	particulate filter	Euro 3 with a particulate filter
Requirement for petrol vehicles	Without a catalytic converter			Euro 1 or better pre-Euro 1 with a catalytic converter fitted

The legal basis of the LEZs that are tighter than Euro 4/1 (diesel/petrol respectively), the so-called “Diesel Fahrverbote”, is the Road code (StVO), with a specific addendum as to the restriction to diesel vehicles, together with the Act on the protection against harmful effects on the environment caused by air pollution, noise, vibrations and similar processes (BImSchG). This legal basis was disputed in court, but confirmed by two legal cases, and statements from the Bundestag⁹⁷. Until and unless there is an update of the 35. BImSchV to include tighter standards, there is no national harmonised basis for these schemes.

Emergency pollution schemes: Stuttgart has had a voluntary pollution emergency scheme during the winters of 2018 and 2019. Due to improved pollution and stricter LEZs it is no longer in place. It was triggered by pollution levels.

CS: There is currently no urban road tolling or congestion charging scheme indexed for Germany. The so-called “City Maut” is a fee upon entrance of vehicles that do not respect defined criteria. Berlin has, for example, recently considered this option as an answer to the climate emergency declared by the city in 2019: anyone driving into the city centre would have to pay a charge. The toll has long been discussed, with talk of between 5€ and 8€ per vehicle⁹⁸. It is estimated that if this were to be implemented, which is far from certain, it would certainly be after the timescale of the UVAR Box project.

LTZ: There are 17 lorry transit bans in cities, for air quality reasons, which account for access regulations. These are not exactly LTZs, as no permit is needed, but still have the effect of limiting traffic on specific roads and in determined areas.

PARK: Many “Kurzpakzonen” are in place in German cities. These are short parking zones where cars can park for a limited amount of time. “Anrainerzonen”, which are resident zones where only persons living in the defined area can park, are also a type of parking regulation adopted in many German cities. These parking regulations can be static, always applicable, or dynamic, applicable only when a defined parameter reaches a defined level.

PED: Pedestrian zones exist in many different towns and cities in Germany that are off limits to motor vehicles, either as streets or zones.

⁹⁷ <https://www.bundestag.de/resource/blob/553358/b4297053c67c8f2018ab0c9802011111/WD-7-055-18-pdf-data.pdf>

⁹⁸ <https://www.berliner-zeitung.de/en/would-a-congestion-charge-save-berlin-li.103623>

5.3.4.2 Processes when creating UVARs

The processes for creating UVARs are rarely entirely digitised. Additionally, the availability of tools varies across cities of different sizes. While big cities are often using different software systems for different types of UVARs, specific software addressing UVARs can hardly be found in small cities.

LEZ: For “Umweltzonen”, cities implement the LEZs within their air quality action plan, which is undertaken with the Land, that includes assessment of the pollution situation and measures to reach the air quality limit values. The city, in cooperation with the Land, defines the area and theoretically the standard, however Baden-Württemberg and NRW harmonised standards, and all but one LEZs in Germany now have the highest standard. Where there is a dispute, the Land can require a city to implement an LEZ.

For UVARs overall, based on stakeholders’ consultation, the creation process differs from one local authority to another. But they globally follow the process of formulation of needs, planning, application, formal examination and investigation, approval and documentation. Environmental protection departments of the local authorities are usually involved in the creation of LEZs and lorry transit bans.

The tool used most often is MS Word, though Excel and GIS-based planning systems are used as well, depending on the cities.

The UVARs are mostly defined as entire areas or zones, i.e., polygons defining geographic coverage of measures, sometimes with motorways exempted from the area. Names of streets and house numbers are used, as well as administrative units. Several cities have a digital road network with nodes and edges.

Overall, few UVAR-responsible authorities are using tools for UVAR creation and monitoring, which enable the set-up of transferable and machine-readable data.

5.3.4.3 Processes when publishing and disseminating UVARs

Digitalisation is progressing steadily but slowly in Germany. More and more cities are providing some of their UVAR data digitally, many on the website of the German Environment Agency, some even through the German National Access Point. Thus, the majority of UVAR data in Germany is still not available in a machine-readable form. This highlights the need for digital interfaces and tools for German cities.

However, information is generally well known, thanks to online presence. The German Environment Agency’s national website is <http://gis.uba.de/website/umweltzonen/index.php>, and city web presence is usual (though patchy for smaller cities). Many cities use their own website, and local newspaper, letters, professional associations and other paper formats to publish their UVARs. The cities publishing UVAR information through the German National Access Point are currently not so many, but a few more plan to do so.

Cities use mostly human-readable formats for their UVAR communication, but some also use XML/JSON formats, and the city of Kassel already uses DATEX II.

UVARs are indicated through traffic signs.

LEZ: The Euro 4 German LEZ road signs are harmonised throughout the country, there is some variation with the Euro 5 and 6 LEZs. Pictures 24 to 26 show, respectively:

- The national road sign for LEZs
- The road sign for Euro 5 LEZ in Stuttgart
- The road sign for Euro 5 LEZ in Hamburg



Picture 24 - German LEZ road sign



Picture 25 - Stuttgart LEZ road sign

Translation: Diesel (except delivery) only from Euro 5 allowed
Only Diesel passenger cars until Euro 5 (incl.) / Residents free



Picture 26 - Hamburg LEZ road sign

Translation: Diesel until Euro 5 / Residents free

Emergency pollution schemes: Information on the Stuttgart emergency pollution scheme was disseminated through radio, website, VMS, WhatsApp/messenger alert, widgets available for third party websites.

Picture 27 shows the road sign for the Stuttgart emergency scheme.



Picture 27 - Stuttgart Emergency scheme road sign

Translation: Fine dust alarm / From Friday / Environmental zone Stuttgart / Use buses and trains

PED: German Road sign for pedestrian zone (left) and 'Spielstrasse' (right) (Sadler) can be seen in Picture 28.



Picture 28 - German PED road signs

Translation: Delivery traffic 06:00-10:00, 13:00-14:30, and bike free / Park with ticket in designed areas / Working days Mo-Fri 09:00-18:00, Sa 09:00-12:00 / Free delivery traffic

Picture 29 shows the German road sign for transit ban (Sadler).



Picture 29 - German transit ban road sign

Table 6 - German UVARs Summary

Current and planned UVAR measures in Germany	
Most common UVARs	<p>LEZ (Environmental zones and diesel bans)</p> <p>LTZ</p> <p>PARK</p> <p>PED</p>
Responsible entity	<p>LEZ: Land for planification, City for implementation (environmental department involved)</p> <p>LTZ: Cities' environmental department</p>
Time Validity	Permanent
Activation Processes (only for dynamic schemes)	/
Location	<p>LEZ (Environmental zones): whole cities</p> <p>LEZ (Diesel bans): often individual streets</p> <p>LTZ: Specific roads and determined areas</p> <p>PARK: defined areas</p> <p>PED: streets or zones</p>
Applicability conditions	<p>LEZ (Environmental zones): up to Euro 4 diesel and Euro 1 petrol</p> <p>LEZ (Diesel bans): Euro 5 or Euro 6 diesel</p> <p>LTZ: lorry transit bans</p> <p>PARK: short parking or resident zones</p> <p>PED: off limits zones to motor vehicles</p>
Exemptions	LEZ (Environmental zones): motorcycles + national, city, and sometimes also regional exemptions
Registration	<p>LEZ (Environmental zones): stickers</p> <p>PARK: resident's registration</p>
Enforcement method	Manually enforced by the police, maybe camera-enforced in the future
Penalty fee	No information
Signage	Road signs
Processes to create UVARs	
	<p>Regional level: Formulation of needs, planning,</p> <p>Cities (environmental departments): Application, formal examination and investigation, approval and documentation</p> <p>Tools: MS Word, sometimes Excel and GIS-based planning systems > few enabling transferable and machine-readable data</p>

Processes when publishing and disseminating UVARs	
Where	National website of the German Environment Agency, sometimes through the NAP Cities' own websites, local newspapers, letters, professional associations
In which formats	Human-readable formats, some XML/JSON, DATEX II in the city of Kassel
Links	German Environment Agency website: http://gis.uba.de/website/umweltzonen/index.php
Update process	No information
SDG awareness	No information

5.3.5 ITALY

Italy has the highest number of UVARs in Europe, with several hundreds of them. LTZs are the most frequent UVARs, but there are also many different Low Emission Zones with differing standards and time periods, mainly in northern Italy, but also in mid Italy and Sicily – Milan and Palermo both have combined LEZ and urban road tolling schemes. UVAR-responsible authorities are municipalities, and enforcement is based on dispositions from the national Road Code. The digitisation process of publication is gradually starting, with an active NAP using DATEX II, and some cities already implementing machine-readable formats, and aware of DATEX II.

5.3.5.1 Current and planned UVAR measures in Italy

LEZ: In the CLARS⁹⁹ database, there are 86 LEZs at the city level and 90 winter LEZs. LEZs are predominantly, but not only, in force in the 4 northern Italian regions of Emilia Romagna, Lombardia, Piemonte and Veneto which in June of 2017 co-signed with the Minister of Environment an Agreement for the improvement of the air quality in the Po valley, by far an area with the worse air pollution levels in Europe (being trapped by the high walls of the Alps and Apennines mountains) and currently the largest LEZ in Europe. The Agreement sets out the minimum permanent LEZ restrictions that should be undertaken from 1st October to 31st March, Monday to Friday from 8:30 to 18:30 in all municipalities over 30,000 inhabitants and with sufficient public transport provision. The regions, and then the cities can however set different, tighter LEZs. In Lombardia (see Picture 30), the time window is now extended from 07:30 to 19:30 and municipalities are also those below 30,000 inhabitants. Most LEZs are now permanent, but some are still in part-time operation.

LIMITAZIONI PERMANENTI

(dall'11 gennaio 2021)

In vigore nei periodi indicati a prescindere dai livelli di inquinamento dell'aria

 STOP AI VEICOLI	Comuni Fascia 1	Comuni Fascia 2 più di 30 mila abitanti	Comuni Fascia 2 meno di 30 mila abitanti	Altri Comuni
Benzina Euro 0 - 1 Diesel Euro 0 - 1 - 2 - 3 (senza FAP*)	tutto l'anno lun-ven 7.30-19.30			nessun blocco
Diesel Euro 4 (senza FAP*)	dal 1° ottobre al 31 marzo lun-ven 7.30-19.30 <div>SOSPESO</div>		nessun blocco	nessun blocco
Motocicli e ciclomotori Due Tempi Euro 0	tutto l'anno 24 ore su 24			
Motocicli e ciclomotori Due Tempi Euro 1	dal 1° ottobre al 31 marzo lun-ven 7.30-19.30		nessun blocco	

* Filtro Anti Particolato (FAP) che garantisce emissioni di particolato pari o inferiori a 0,0045 g/km (campo V.5 carta circolazione)

Info e aggiornamenti su www.aria.regione.lombardia.it


 Regione Lombardia

Picture 30 - Lombardian LEZ infographic

Translation: Permanent restrictions (from January 11, 2021) / in force during the periods indicated regardless of air pollution levels // Stopping vehicles / City type 1 / City type 2 >30k inhabitants / City type 2 <30k inhabitants / Other cities // Essence Euro 0-1, Diesel Euro 0-1-2-3 (without anti-particles filter, APF) / All year Mo-Fri 07:30-19:30 / No blockage // Diesel Euro 4 (without APF) / Suspended / No blockage / No blockage // Motorbikes & mopeds two-strokes Euro 0 / All year 24/24 // Motorbikes & mopeds two-strokes Euro 1 / From October 1st until March 31st Mo-Fri 7:30-19:30 / No blockage // Info and updates on www.aria.regione.lombardia.it

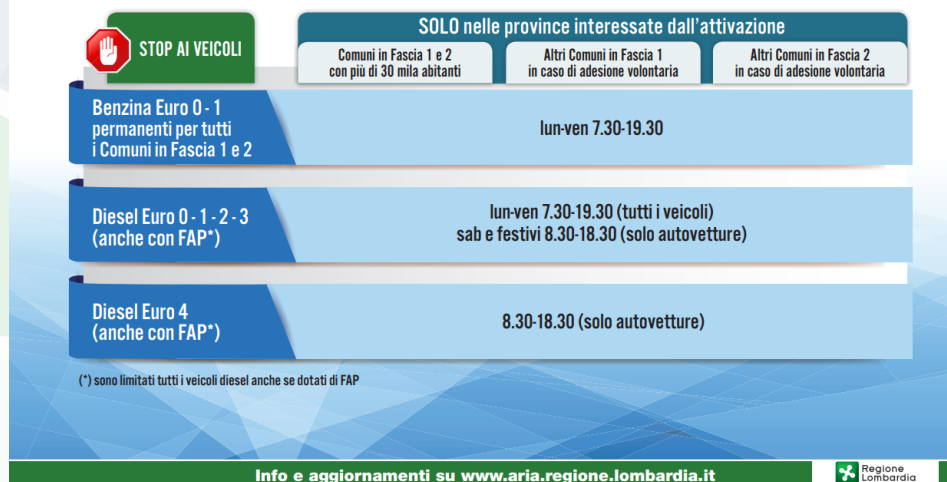
⁹⁹ <https://urbanaccessregulations.eu/countries-mainmenu-147/italy-mainmenu-81/>

Most LEZs are manually enforced by police checking vehicle papers. Some bigger cities (Bologna, Milan) are starting to combine their current LTZs with LEZs and enforcing them with cameras. The boundary of schemes of LEZs is often based, but not always, on the communal boundaries (e.g., Area B in Milan), sometimes with exemptions such as car parking or particular access roads. The LEZs use the LTZ Road Code articles as their legal basis.

Emergency pollution schemes: In the CLARS¹⁰⁰ database, there are 97 emergency schemes. The same as for LEZs, the emergency schemes are in force in the 4 northern Italian regions of Emilia Romagna, Lombardia, Piemonte and Veneto according to the Agreement discussed above. The further temporary emergency pollution schemes are applied according to air pollution levels and forecasts¹⁰¹, particularly when PM₁₀ levels exceed pollution limits for 3, 4, or 10 consecutive days. The emergency pollution schemes are implemented on a regional basis, specifying the cities involved (through an inhabitant population definition). Picture 31 shows the Lombardian emergency scheme infographic.

LIMITAZIONI TEMPORANEE DI 1° LIVELLO (dall'11 gennaio 2021)

Scattano dopo 4 giorni consecutivi di PM10 elevato e si aggiungono alle limitazioni già vigenti



Picture 31 - Lombardian emergency scheme infographic

Translation: Temporary restrictions level 1 (from January 11, 2021) / Triggered after 4 consecutive days of high PM10 and in addition to the restrictions already in place // Stopping vehicles / Only in provinces affected by the activation / City types 1 & 2 >30k inhabitants / Other cities of type 1 in case of voluntary membership / Other cities of type 2 in case of voluntary membership // Essence Euro 0-1 permanent for all cities of types 1 & 2 / Mo-Fri 07:30-19:30 // Diesel Euro 0-1-2-3 (also with anti-particles filter, APF) / Mo-Fri 07:30-19:30 (all vehicles), Sa & Holidays 08:30-18:30 (only passenger cars) // Diesel Euro 4 (also with APF) / 08:30-18:30 (only passenger cars) // Info and updates on www.aria.regione.lombardia.it

¹⁰⁰ <https://urbanaccessregulations.eu/countries-mainmenu-147/italy-mainmenu-81/>

¹⁰¹ <https://www.arpae.it/it/temi-ambientali/aria/liberiamo-laria/bollettino-misure-emergenziali/bollettino-misure-emergenziali>

CS: There are two charging schemes currently active in Italy, in Milan and Palermo, both combined with LEZ schemes. Other cities may charge for entry into their LTZ, particularly for occasional trips, so having significant CS aspects embedded. These are also transposed into annual fees for obtaining permits from admitted user categories (sometimes differentiating charges if on-street parking is allowed or for residents' second or third vehicle).

LTZ: The 330 camera-enforced (non-LEZ) LTZs are reported in the CLARS database, however, the total number of non-LEZ LTZ schemes, including the street level, temporary and non-camera enforced ones, is over 5,200. LTZs are by far the most relevant and longest established UVAR implemented by city authorities to protect their historical city centres or coastal marinas during summer.

The Italian Ministry of Transport (DG Road Safety) released in June 2019 the *"Guidelines for regulating road traffic and signage in Limited Traffic Zones"*¹⁰². The document has introduced and specified some common rules on how to properly plan and implement an LTZ (as well as Pedestrian Areas (PED)), distinguishing between temporary and permanent schemes and limiting the presence of contiguous LTZs with different rules (thus avoiding confusion for the users). The Guidelines contain prescriptions on the terminology to be used at LTZ/PED entry or exit gates (including VMS that should be in both the Italian and English languages) and the exact layout and positioning of the road signage.

The LTZ Guidelines are a first attempt to create a common and correct application of UVARs, but large differences still exist from city to city in terms of user categories eligible for permit, permit duration, number of vehicles allowed per permit holder, etc. Despite the absence of a proper harmonisation, LTZs schemes are somehow similar regarding the authorised/permitted user categories. The following list gives the main user categories generally allowed to hold a permanent or temporary permit for a limited traffic zone (source: ReVeAL note on exemptions and permits, which also has further details¹⁰³):

- Residents permanently living in the LTZ (as stated by the municipal registry office as owners/tenants of a property)
- Owners/tenants of a garage in the LTZ
- Freight carriers* – professional third-party operators (e.g., express couriers, parcel delivery services, logistics companies) or companies delivering goods on an own-account basis (e.g., retailers located in the LTZ, food and beverage producers/distributors, companies transporting heavy or voluminous goods, street/public market vendors, pharmacies, catering services, florists, etc.)
- Maintenance and tradespeople providing regular and ongoing services in the LTZ* – e.g., providers of technical assistance on IT systems, elevators, bar equipment, cleaning companies, electricians, plumbers, and other tradespeople

¹⁰² <https://www.mit.gov.it/comunicazione/news/ztl-sicurezza-stradale-tpl/ztl-ecco-le-linee-guida-mit-per-la-regolamentazione>

¹⁰³ https://civitas-reveal.eu/wp-content/uploads/2021/03/ReVeAL-LEZ_LTZ_Exemptions_Permits-guidance-15-final.pdf

- People with disabilities with e.g., an EU parking card or disabled vehicle tax class
- Caregivers – either professionals or relatives who provide assistance to someone living in the LTZ, who is dependent on their help (e.g., elderly or disabled persons, children)
- Doctors of the local health service and/or with a clinic in the LTZ
- Public institutions – for their official fleet only

* allowed in specific time windows.

Following is a list of those who are usually issued occasional or temporary permits:

- Tradespeople
- Construction companies
- Event organisers
- Wedding cars
- Removal companies performing house moving operations
- Visitors of an LTZ resident (with the resident applying on behalf of visitors, contractors or suppliers)
- Clients of hotels in the LTZ – usually only for check-in and check-out with hotels applying on behalf of their guests
- Justified urgent and/or occasional needs (normally with a maximum number of accesses per month)

Less restrictive LTZs might also include the following categories as holders of a permanent permit (instead of an occasional one):

- Dwellers not residing in the city – individual citizens or families who live for certain months/ weeks of the year in the LTZ, e.g., university students or owners/tenants of a vacation apartment)
- Retailers and tradespeople located in the LTZ
- Professionals located in the LTZ
- Owners of private properties in the LTZ but not living in the LTZ
- Minors not living in the LTZ who need to be accompanied to school or to relatives in the LTZ
- Private vehicles of people acting in an institutional role or working for a public entity, e.g., police officers, city council officers, city council members
- Journalists and media companies

The Ministry is still responsible for the prior approval and certification of all UVAR enforcement systems that can be installed by municipalities, however, cities are no longer obliged to receive the approval of their digitally enforced LTZ/PED (ANPR cameras or RFID-controlled moving bollards) following a recent normative revision.

The Veneto Region has recently introduced a system called Zetatielle Network that aims at allowing the automatic inclusion of people with reduced mobility owning a Blue Badge in the white list of all municipal LTZs (without having the holder to request multiple permits).

PARK: On-street resident parking zones and paid parking schemes are widely present in Italian cities. These have progressively substituted time-limited parking disc. Residents have usually access to discounted fares or free parking permits for their first car but only in the cases where no private parking area or garage is owned.

PED: Pedestrian areas are present in almost all Italian cities. PED have common rules in terms of their functioning as in the Road Code: the only admitted motorised vehicle categories are the ones used for emergency/public security purposes (police, ambulances, firefighters), for freight loading/unloading operations (only allowed at certain time windows) and those of residents who need to reach their garage plus blue badge holders. In case also police vehicles are excluded from entering a PED, those of disabled people cannot enter the PED either. On the contrary, bicycles are always allowed.

Some cities have several schemes, and there are over 370-460 UVAR cities to be contacted from the schemes on the CLARS database.

5.3.5.2 Processes when creating UVARs

As reported above, Municipalities are the competent authorities for UVARs, except for those air pollution emergency schemes where also Regions can have a role.

According to the Road Code, cities are free to adopt an LTZ/LEZ scheme by simply issuing a Mayoral Ordinance (it happened in Siena in 1965 for the first LTZ established in Europe, but the practice is now limited to temporary measures or street only closures). Council Resolutions and/or LTZ/PED Regulations (discussed in Traffic Committee and adopted by the whole Municipal Assembly) – which sets all the different aspects related to permitted categories or time validity - are the most common foundational administrative legislative acts. These are always followed by traffic orders (issued by the competent city department) that practically implement the scheme through signage and other minor elements (e.g., instructions and templates on how to request and obtain permits).

All applicability conditions (exemptions, time windows, tariffs, user categories and UVAR boundaries) are in any case included in resolutions issued by the elected body (the Assembly, the Council or the Mayor).

The possibility to implement parking schemes but also LTZs and other UVARs is often included in the SUMP and/or the General Urban Traffic Plan.

UVARs are mostly created in human-readable formats, using MS Word or Excel for descriptions, though several cities have a digital road network representation – but do not use it for UVARs at the moment.

Penalty fees are applied according to the Road Code and neither cities or regions can alter the rates.

5.3.5.3 Processes when publishing and disseminating UVARs

In Italy, the National Access Point has the main task to find and disseminate information on traffic and road conditions throughout the country. The "CCISS - Centro di coordinamento informazioni sulla sicurezza stradale" coordinated by "MIMS - Ministero delle Infrastrutture e della Mobilità Sostenibili" was established in the late eighties. It assumes the role of "TIC - Traffic Information Centre" for Italy, disseminating information on the entire national territory via "RDS-TMC (Radio Data System - Traffic Message Channel)" service of RAI (National Radio and TV broadcasting) using FM radio channel. "TMC - Traffic Message Channel" is a worldwide standard (ISO) for dissemination of information related to traffic and road conditions. The Italian Public Authorities send to CCISS the required information to describe current traffic condition on the road network using the DATEX II protocol. Since the early 2000, CCISS sets a direct channel for information exchange with the TICs of France and Germany based on DATEX II protocol.

In order to satisfy the European Commission requirements, indicated through various Directives and Delegated Regulations issued over the last decade (Delegated Regulations: 885/2013, 886/2013, 962/2015, and 1926/2017, and integration of Directive 2010/40) the CCISS, as the NAP, is implementing the needed tools for dissemination of information related to traffic, road conditions and mobility in general, to third parties through the standard DATEX II (evolution of the previous DATEX protocol) and, in the near future, NeTex and SIRI for multimodal mobility. This protocol also includes information related to UVAR that, as envisaged by the UVAR Box Project itself, will be managed through the development of further specific "objects/classes" in DATEX II standard in the future.

Information about UVARs is currently published via cities' websites, notice boards, and also some software interfaces. Formats used for communication are human-readable MS Word, PDF and MS Excel, but also machine-readable formats in some cities (XML/JSON).

This latter consideration is confirmed by the information collected from several Italian cities: the use of specific GIS or non-GIS based tools that support the UVAR administrative process support output machine-readable data. As highlighted in the following table a significant percentage of cities are still using MS Word / MS Excel tools whereas an increasing number of cities are implementing more advanced support systems.

Table 7 - Answers collected through question 8 of "UVAR Box questionnaire"

Tools used for UVAR creation and publication	%
MS Word/something similar	73,17%

MS Excel/something similar	41,46%
GIS-based planning and/or approval system that supports UVAR-related administrative processes.	12,20%
Non-GIS-based planning and/or approval system that supports UVAR-related administrative processes.	4,88%
Other tools (3rd party software)	9,76%
Unfortunately, I cannot answer that question.	17,07%

UVARs are notified to road users via road signs.

LEZ: All LEZ road signs are based on the UNECE no entry sign, with the requirement stated in Italian below (see Picture 32). Other types of road signs are also used, as are also e.g., VMS road signs (see LTZ below).



Picture 32 - Italian LEZ road signs

Translation: Vehicles euro 0, 1, 2, 3 from Monday to Friday (except holidays and authorised vehicles)

Dynamic additional LEZ restrictions are automatically applied in the Po Valley after 4 consecutive days of surpassed PM₁₀ levels. Air quality reports are issued by the competent regional environmental agencies (called ARPAs).

CS: Milan combined congestion charge and LEZ road signs.

Supplementary LTZ/LEZ warning signs for Milan (out of the typologies prescribed by the Road Code) are shown in Picture 33.



Picture 33 - Milan LEZ/LTZ road signs

Milan also has adverts at relevant places for drivers, e.g., the poster at surrounding motorway service stations (see Picture 34). The road sign for Palermo's charging scheme (Sadler) is shown in Picture 35.



Picture 34 - Milan LTZ promotional poster



Picture 35 - Palermo's LTZ/CS road sign

Road sign for Palermo's charging scheme (Sadler)

LTZ: All LTZ road signs are based on the UNECE no entry sign, with the requirement stated in Italian below. Other types of road signs are also used, as are also e.g., VMS road signs.

Particularly for the LTZs there are clear prescriptions on how to properly design and locate both signs at entry/exit gates and those anticipating the LTZ while users are approaching gates (e.g., with exact minimum distances and visibility to be guaranteed).

Also, the exact wording and layout have been included in the national LTZ Guidelines for the additional explanatory signs to be put below the main ones with symbols. This is also referred to VMSs and the use of further explanatory signage is used also for LEZs and Pedestrian Areas.

Picture 36 shows the basic LTZ warning sign at city entry.



Picture 36 - Italian LTZ road sign

Municipalities inform drivers of new UVARs or modified rules mostly through dedicated sections and news items on their websites plus media campaigns on local newspapers and street advertisements.

PARK: Prescribed Italian parking vertical road signs are shown in Pictures 37 and 38.



Picture 37 - Italian road parking instruction

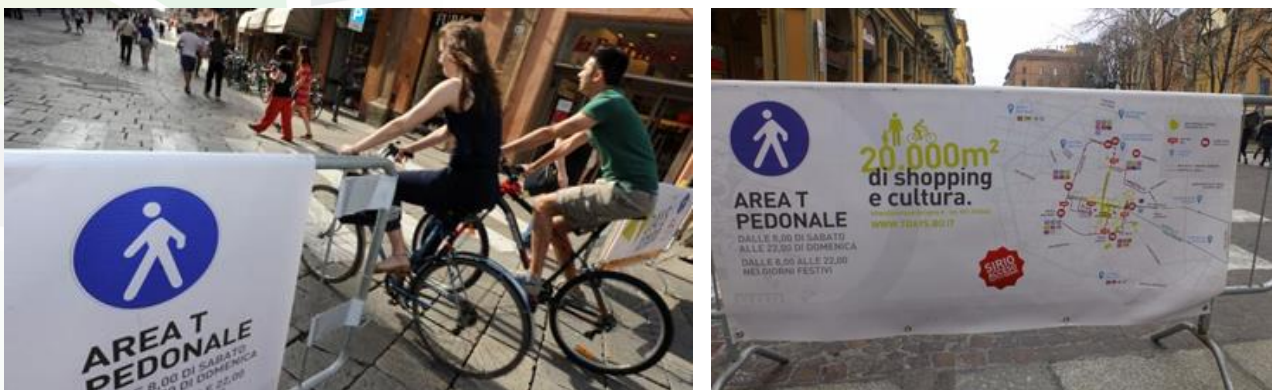


Picture 38 - Italian PARK road sign (Sadler)

PED: Temporary street closures are also communicated by using either basic street furniture or, in the case of more structured calendars of initiatives, again through tailored campaigns. The T-Days in Bologna (see Picture 40) and ViaLibera in Roma (see Picture 41) are examples of temporary pedestrianisations activated during the weekends. Picture 39 shows a generic Italian PED road sign.



Picture 39 - Italian PED road sign



Picture 40 - Temporary pedestrian zone in Italy



Picture 41 - Map of temporary pedestrianisation in Rome

Table 8 - Italian UVARs Summary

Current and planned UVAR measures in Italy							
	Cities			Regions			
	Milan	Palermo	Bologna	Emilia-Romagna	Veneto	Piemonte	Lombardia
Most common UVARs	LEZ CS LTZ PARK PED		LEZ LTZ PARK PED	LEZ LTZ PARK PED	LEZ LTZ PARK PED	LEZ LTZ PARK PED	LEZ LTZ PARK PED
Responsible entity	LEZ & LTZ: Cities and Regions, National coordination support from the Ministry of Environment CS: Cities		LEZ: Cities and Regions, National coordination support from the Ministry of Environment				
Time Validity	LEZ/CS/LTZ: Monday to Friday 07:30-19:30	LEZ/CS/LTZ: Monday to Friday 08:00-20:00	LEZ/LTZ: Everyday 07:00-20:00 or Permanent	LEZ/LTZ: Permanent or Monday to Friday 8:30-18:30		LEZ/LTZ: Permanent or Monday to Friday 07:30-19:30	
Activation Processes (only for dynamic schemes)	LEZ (EMERG): According to air pollution levels and forecasts, at regional level, announcing cities concerned						
Location	LEZ/LTZ: Area B – whole city LEZ/CS: Area C – city centre	LEZ/CS/LTZ: Centre of Palermo	LEZ/LTZ: In the historic centre	LEZ/LTZ: In all municipalities over 30,000 inhabitants and with sufficient public transport provision		LEZ/LTZ: In all municipalities with sufficient public transport provision	
Applicability conditions	LEZ/LTZ: HGV and most polluting vehicles based on Euro standards LEZ/CS/PARK/PED: All vehicles	LEZ/LTZ/CS/PARK/PED: All vehicles	LEZ/LTZ/PARK/PED: Most polluting vehicles based on Euro standards				

Exemptions	LEZ/LTZ: Electric vehicles, LPG, methane, bifuel and hybrid LEZ/CS/PARK/PED: mopeds and motorcycles	LEZ/CS/LTZ: Motorcycles and electric vehicles	LEZ/LTZ/PARK/PED: motorbikes and mopeds	LTZ: Residents, Freight, People with disabilities, Professional moves, wedding cars PARK: Residents if no private parking area nor garage owned PED: Emergency purposes, freight, residents, people with disabilities, bicycles
Registration	LEZ/LTZ: Permits LEZ/CS: Tickets	LEZ/CS/LTZ: Permits	LEZ/LTZ/PARK/PED: Stickers and residents' permits	LTZ PARK/PED: Permanent or temporary permit, blue badge for people with reduced mobility
Enforcement method	Camera-enforced	Camera-enforced	ANPR Cameras or RFID-controlled moving bollards	Manually enforced by police checking vehicle papers (except in larger cities launching camera enforcement)
Penalty fee	LEZ/LTZ: 80€ LEZ/CS: Depending on vehicle's emissions	LEZ/CS: Depending on vehicle's emissions	No information	
Signage	LEZ/CS/LTZ: Road signs, posters, VMSs PARK: Road signs PED: Basic street furniture			
Processes to create UVARs				
	Municipalities adopt mayoral ordinance, council resolutions or assembly regulations. Competent city departments implement road signs, enforcement, etc., with a traffic order. They use human-readable formats, not their digital road network. Regions can have a role in air pollution emergency schemes. Penalty fees are defined by the national Road Code.			
Processes when publishing and disseminating UVARs				
Where	Currently on city websites, notice boards, and some software interfaces. In the future, also via the NAP.			
In which formats	Currently in human-readable MS Word, PDF and MS Excel, but also machine-readable formats in some cities (XML/JSON). In the future, in machine-readable formats DATEX II, NeTeX and SIRI.			
Links	No link			
Update process	No information			
SDG awareness	No information			

5.3.6 OTHER EU MEMBER STATES

Based on the CLARS database, and replies to the questionnaire, the UVAR Box partners could provide some elements of information on UVAR measures and processes in other countries than our five focus areas. This overview is limited to countries in which stakeholders have expressed interest in further involvement in the project (example: Paris, Gothenburg, etc.), or for which we already had information.

5.3.6.1 Current and planned UVAR measures in other EU member states

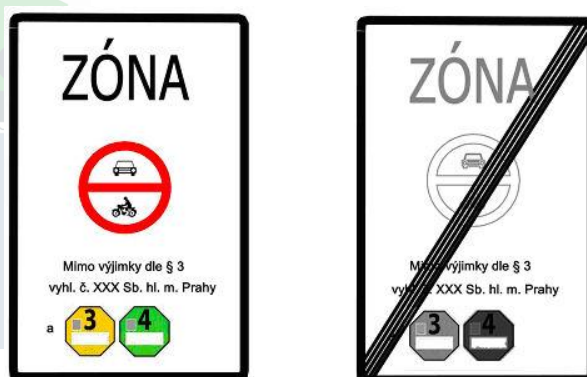
Bulgaria

LTZ: There is time-related ban for lorries over 4T and 12T in Sofia¹⁰⁴, although this is a simple restriction without permits, so not an LTZ.

Czech Republic

LEZ: There is a national LEZ framework, based and harmonised on the German stickers, with a hexagonal sticker to differentiate it from the German sticker. However, there are no traditional LEZs in the Czech Republic yet confirmed.

Picture 42 shows a Czech Republic LEZ road sign.



Picture 42 - Czech LEZ road signs

LTZ: There is a permit-based lorry access regulation in Prague¹⁰⁵, where vehicles over 3.5T must get a (free) permit to enter; Euro 4 is required to receive a permit; including a ban for tourist coaches in the historical centre. There is a time regulated LTZ for all vehicles in Brno¹⁰⁶, the number of passes, location

¹⁰⁴ <https://urbanaccessregulations.eu/countries-mainmenu-147/bulgaria/sofia-ar>

¹⁰⁵ <https://urbanaccessregulations.eu/countries-mainmenu-147/czech-republic-mainmenu-448/praha-prague-coaches>

¹⁰⁶ <https://urbanaccessregulations.eu/countries-mainmenu-147/czech-republic-mainmenu-448/brno-ar>

and reason for entry need to be given, and there is a variable fee (if over/under 3.5T and the length of time the permit is valid).

Prague LTZ and coach parking road signs are shown in Picture 43.



Picture 43 - Prague LTZ road signs

PARK: There is a regulation of coach parking in Prague¹⁰⁷. The parking permits (short or long term) need to be registered in advance, stating the reason for entering.

Denmark

LEZ: There is a national framework for LEZs, affecting light and heavy vehicles in 5 city authorities¹⁰⁸, that are camera enforced. The standards are based on the age of first registration, with retrofitting allowed. Foreign users of vehicles that are first registered before the date limit are required to register their vehicle.

Danish LEZ road signs are shown in Picture 44.



Picture 44 - Danish LEZ road signs

¹⁰⁷ <https://urbanaccessregulations.eu/countries-mainmenu-147/czech-republic-mainmenu-448/praha-prague-coaches>

¹⁰⁸ <https://urbanaccessregulations.eu/countries-mainmenu-147/denmark-mainmenu-221>

Finland

LEZ: In Helsinki¹⁰⁹ there is an LEZ Euro V standard for buses and dustbin lorries.

LTZ: Vehicles over 12m in length require a permit to enter a zone in the city. The road sign is shown in Picture 45.



Picture 45 - Helsinki LTZ road sign

France

LEZ: France has a national framework for LEZs in place, with 11 LEZs in force. Vehicles are classified into 6 sticker categories, depending on their date of registration (= Euro standard), fuel, and type of vehicle. The 6 stickers (Crit'Air) require different Euro standards for lorries than for cars and vans or motorcycle-based vehicles. They allow a diesel-free (and tight petrol standard) sticker and an emissions-free sticker. National legislation requires cities to implement an LEZ if they do not meet the EU air quality limit values through other methods. Some LEZs are aimed at delivery vehicles, others at all vehicles. France also has Emergency Schemes in place in many regions and cities. In times of high pollution, there may be differential speed limits, or vehicles with certain Crit'Air stickers¹¹⁰ can be banned from circulating in the region/city. This decision is made jointly by the city and region. There is no national website for information and little coordination from the national ministry.







There are also delivery restriction schemes, some of which grant additional flexibility for electric, gas and plug-in-hybrid vehicles.

Table 9 - French Stickers criteria

Vehicle Classification according to article L. 318-1 and R. 318-2 French road traffic act			
Class	Motorcycles, trikes and quads	Cars and vans	Lorries

¹⁰⁹ <https://urbanaccessregulations.eu/countries-mainmenu-147/finland/helsinki>

¹¹⁰ See under national scheme on <https://urbanaccessregulations.eu/countries-mainmenu-147/france/paris>

		Diesel	Petrol	Diesel	Petrol
non classified	Without norm until 31.05.2000	Pre-Euro, Euro 1 until 31.12.96 (vans: 30.09.97)	Pre-Euro, Euro 1 until 31.12.96 (vans: 30.09.97)	Pre-Euro, Euro 1, 2 until 30.09.01	Pre-Euro, Euro 1, 2 until 30.09.01
	-	Euro 2 1.1.97 to 31.12.00	-	Euro 3 1.10.01 to 30.09.06	-
	Without norm 1.6.2000 to 30.6.04	Euro 3 1.1.01 to 31.12.05	-	Euro 4 From 1.10.06 to 31.12.09	-
	Euro 2 1.7.04 to 31.12.06	Euro 4 1.1.06 to 31.12.10	Euro 2 and 3 1.1.97 to 31.12.05	Euro 5 From 1.10.09 to 31.12.13	Euro 3 & 4 From 1.10.01 to 30.09.09
	Euro 3 1.1.07 to 31.12.16 for motorcycles; to 31.12.17 for mopeds	Euro 5 and 6 From 1.1.11	Euro 4 1.1.06 to 31.12.10	Euro 6 From 1.1.14	Euro 5 From 1.10.09 to 31.12.13
	Gas vehicles and PHEV (plug in hybrid)				
	Euro 4 1.1.17 for motorcycles; 1.1.18 for mopeds	-	Euro 5 and 6 From 1.1.11	-	Euro 6 From 1.1.14
	Electric vehicles and hydrogen fuel cell vehicles				

The French LEZ road sign is shown in Picture 46.



Picture 46 - French LEZ road sign

Greece

LEZ: In Athens¹¹¹ for vehicle over 2.2T, based on age and odd/even numberplates.

The Athens LEZ road sign is shown in Picture 47.



Picture 47 - Athens LEZ road sign

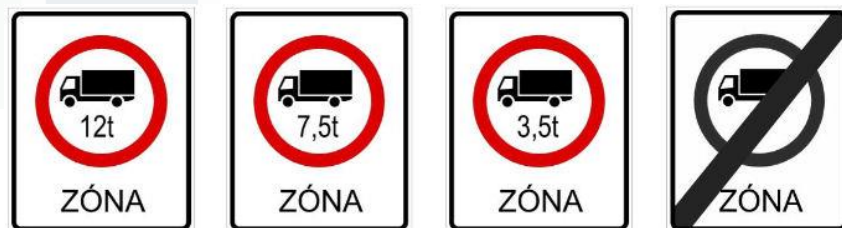
LTZ: in a number of Greek towns/cities.

Hungary

LEZ: In Budapest, there is an emergency pollution scheme affecting vehicles under Euro 5/V between 06:00 and 22:00, that is manually enforced.

LTZ: in Budapest¹¹² a system of zones that are either not accessible for traffic, or where a permit is required for heavy duty vehicles; the permit cost depends on the vehicle's total weight and emissions.

The Budapest LEZ road signs are shown in Picture 48.



Picture 48 - Budapest LEZ road signs

¹¹¹ <https://urbanaccessregulations.eu/countries-mainmenu-147/greece/athens>

¹¹² <https://urbanaccessregulations.eu/countries-mainmenu-147/hungary/budapest>

Ireland

LTZ: Dublin¹¹³ has an access restriction for heavy goods vehicles with over 5 axles from 07:00 to 19:00 (called HGV Management Strategy HGV 5+ axle Cordon). A permit is possible for loading/unloading or for wide-load or restricted goods that may not use the tunnel.

Dublin HGV Management Strategy HGV 5+ axle Cordon road sign is shown in Picture 49.



Picture 49 - Dublin LTZ road sign

Latvia

CS: In operation from April to September in Jurmala¹¹⁴. Day passes and longer passes are available, price is different for under or over 3.5T vehicles, camera enforced.

LTZ: For vehicles over 5T in Riga¹¹⁵, that are only allowed during specified time intervals, although this is a simple restriction without permits, so not an LTZ.

PED: Riga¹¹⁶ has a large pedestrian area in its city centre, with certain trips allowed only at certain times.

Malta



CS: There is a charging scheme in Valletta¹¹⁷ (see Picture 50); cost is dependent on the length of time in the zone during weekdays, the first 30 minutes are free.

Picture 50 - Valletta CS road sign

¹¹³ <https://urbanaccessregulations.eu/countries-mainmenu-147/ireland/dublin-ar>

¹¹⁴ <https://urbanaccessregulations.eu/countries-mainmenu-147/latvia/jurmala-cs>

¹¹⁵ <https://urbanaccessregulations.eu/countries-mainmenu-147/latvia/riga-wr>

¹¹⁶ <https://urbanaccessregulations.eu/countries-mainmenu-147/latvia/riga>

¹¹⁷ <https://urbanaccessregulations.eu/countries-mainmenu-147/malta/valletta-charging-scheme>

Poland

LEZ: There is a national Zero Emission Zone framework in Poland. Cracow¹¹⁸ has implemented such a zone, which allows only electric, hydrogen, and gas vehicles (see Picture 51); however, there are many exemptions, partly due to the low numbers of zero emission vehicles currently in Poland.



Picture 51 - Cracow ZEZ road sign

LTZ: There are restrictions for heavy vehicles in some Polish cities¹¹⁹, at certain times. Where access is essential during the restricted times, permits may be gained. Different cities use different weight criteria. The Polish weight restriction road sign is shown in Picture 52.



Picture 52 - Polish LTZ road sign

PARK: There are parking zones in Cracow, with differentially priced costs. Cracow parking scheme road signs are shown in Picture 53.



Picture 53 - Cracow PARK road signs

¹¹⁸ <https://urbanaccessregulations.eu/countries-mainmenu-147/poland/krakow-cracow>

¹¹⁹ <https://urbanaccessregulations.eu/countries-mainmenu-147/poland>

Portugal

LEZ: In Lisbon¹²⁰, manually enforced, with a Euro 4 emissions standard. Certain vehicles and driver/vehicle types may get exemption stickers to be permitted to enter or park in the LEZ.

The Lisbon LEZ stickers are shown in Picture 54.

To get an exemption sticker you have to be part of one of the following groups:

Red sticker allows free parking in the streets for:

- resident
- emergency vehicles
- national health service
- residents' caregivers



Green sticker allows parking in specific locations for:

- taxis
- school drop off
- loading and unloading (traders)
- vehicles with private parking spaces
- motorcycles and mopeds (Euro 3)
- regular tourists
- disabled



Blue sticker allows parking in specific locations for:

- garage space owners
- electric vehicles
- residents' guests (with monthly limit of 10)
- access to health equipment



Picture 54 - Lisbon Stickers

¹²⁰ <https://urbanaccessregulations.eu/countries-mainmenu-147/portugal/lisbon>

Romania

LTZ: in Bucharest for vehicles over 5T for certain times of day, depending on the months of the year, exemption permits can be applied for.

Slovenia

PED: A pedestrian zone in the historic centre of Ljubljana¹²¹, with access for delivery and residents at certain times. The road sign and entry to the Ljubljana pedestrian zone is shown in Picture 55.



Picture 55 - Ljubljana PED road signs

Spain

LEZ: There is a national LEZ Sticker framework with four categories. Vehicles are categorised by fuel type and Euro standard; the tightest category is for battery electric vehicle fuel cell and plug in hybrid vehicles with a range requirement. Most UVARs are camera-enforced.

There is a 'traditional' LEZ in Barcelona¹²². There are two emissions-related schemes in Madrid¹²³; one is an emissions-related parking pricing scheme, the other a combined LTZ and zero/low emission zone (Madrid Central).

The Madrid Central road sign is shown in Picture 56 and the Barcelona LEZ road sign in Picture 57.

¹²¹ <https://urbanaccessregulations.eu/countries-mainmenu-147/slovenia/ljubljana-ar>

¹²² <https://urbanaccessregulations.eu/countries-mainmenu-147/spain/barcelona>

¹²³ <https://urbanaccessregulations.eu/countries-mainmenu-147/spain/madrid>



Picture 56 - Madrid LEZ road signs




Picture 57 - Barcelona LEZ road sign

Table 10 details the Spanish Sticker system.

Table 10 - Spanish Sticker system

Name of the sticker	colour	Date of registration	Euro standard	Vehicles
Null Emission 	blue			EV, plug-in-hybrid (minimum range 40 km), fuel cell
ECO 	blue and green	petrol: from 2006 diesel: from 2014	petrol: Euro 4, 5 and 6 diesel: Euro 6	Plug-in-hybrid (minimum range < 40 km), hybrid: gas: CNG, LNG, LPG. These vehicles have to fulfil standards for green sticker C.
C 	green	petrol: from 2006 diesel: from 2014	petrol: Euro 4, 5 and 6 diesel: Euro 6	

	yellow	petrol: from January 2000 diesel: from January 2006	petrol: Euro 3 diesel: Euro 4 and 5	
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Emergency pollution schemes: schemes in four cities¹²⁴, each with different restrictions for different categories of alerts.

LTZ: In some cities, they are camera-enforced, along the lines of the Italian LTZs¹²⁵. There are also Superblocks in Vitoria-Gasteiz and Barcelona; these are a combination of changed traffic priority often combined with a permit requirement.

Sweden

LEZ: a national framework for LEZs, implemented in 8 cities, based on Euro standard and date of first registration. Retrofit is only allowed if all pollutants are met (for most countries only the PM, or sometimes NOx, standard is required). The Swedish LEZ road signs are shown in Picture 58.



Picture 58 - Swedish LEZ road sign

CS: Schemes in two cities, Stockholm¹²⁶ and Gothenburg¹²⁷. The cost charged by the time of day and time of year, and a single charge rule in Gothenburg where several passes of the payment stations within 60 minutes is only taxed once; the amount that must be paid is the highest one. The CS is a tax implemented by national law in these two cities, rather than a charge (this enables the payment to be more easily collected). The Swedish CS road signs are shown in Picture 59.

¹²⁴ <https://urbanaccessregulations.eu/countries-mainmenu-147/spain>

¹²⁵ <https://urbanaccessregulations.eu/countries-mainmenu-147/spain>

¹²⁶ <https://urbanaccessregulations.eu/countries-mainmenu-147/sweden-mainmenu-248/stockholm-charging-scheme>

¹²⁷ <https://urbanaccessregulations.eu/countries-mainmenu-147/sweden-mainmenu-248/goeteborg-charging-scheme>



Picture 59 - Swedish CS road sign

LTZ: There are different types of LTZ. These include a ban for vehicles with studded road tyres in three cities and seasonal coach ban in Stockholm (both without permit requirement), night-time lorry ban in Stockholm and regulations for vehicles of a certain weight, width and lengths, also in Stockholm where exemptions can be applied for. The Swedish studded tyre road sign is shown in Picture 60.



Picture 60 - Swedish LTZ road sign

PED: Stockholm¹²⁸ has an access regulation in place that covers the 'Old Town' (Gamla stan). All motor traffic is prohibited daily from 11:00 to 18:00.

¹²⁸ <https://urbanaccessregulations.eu/countries-mainmenu-147/sweden-mainmenu-248/stockholm-ar>

5.3.6.2 Processes when creating UVARs

France

LEZ: The French “Loi d’orientation des mobilités” adopted in 2018 has created the low emission zones in France (“zones à faibles émissions mobilité” - ZFE-m), enabling local authorities to limit the traffic of most polluting vehicles on their territory¹²⁹. Following this national law, all cities, metropolitan areas and local entities of over 100 000 inhabitants or with an air pollution control plan must have established permanent or temporary LEZs on their territory by the end of 2020.

Local authorities adopt ZFE-m through an order from the mayor, after public consultation and adoption in the council of the metropolitan area (in the case of metropolitan areas). In some metropolitan areas, it is the president of the area who signs the order, in consultation with the local mayors. In some cases, the Police prefect also signs the order. Regional and national agencies, especially those responsible for environment protection (ADEME, national environment protection agency), are involved in the set-up of the LEZs and may provide funding to implement local actions aiming at air quality improvement.

Local authorities use MS word documents for the mayor’s order and for public consultations, MS Excel documents for databases and management of beneficiaries, and GIS for the localisation of their LEZ. Their LEZ has the form of polygons including defined streets and urban areas.

The metropolitan area of Lyon gives an example of a LEZ delimitation on their open data portal¹³⁰.

Ireland

UVARs are regulated by Traffic Regulation Orders in Dublin. The TRO is adopted by a regional agency and a state agency, under an MS Word format. Reports are compiled for councillors. MS Excel is used to keep track of all existing UVARs. The GIS department is used to map the zone and it provides a list of streets and addresses. Dublin does not use a digital road network. Updates are done only when legal changes occur and less frequently than once a year.

Spain

In Spain, UVARs are adopted via several ordinances, using Word documents for the legal texts and administrative approval processes, and Excel to manage uses and infractions. UVARs are designed as urban areas and street names with house numbers. The city of Vitoria Gasteiz has a digital road network but does not use it for UVARs.

Sweden

In Gothenburg, UVARs are issued with traffic regulation orders for which regional and national agencies are responsible. They use a standard program from a company called Sokigo to create the regulation

¹²⁹ <https://www.ecologie.gouv.fr/10-zones-faibles-emissions-en-2021-lutter-contre-pollution-lair>

¹³⁰ <https://data.grandlyon.com/jeux-de-donnees/zone-a-faibles-emissions-metropole-lyon-zfe/donnees>

and the system provides a simple GIS tool. The UVARs defined are geographically represented as polygons covering urban units and streets.

5.3.6.3 Processes when publishing and disseminating UVARs

France

Enforcement is manual with stickers. There are national investigations and plans to have camera enforcement of the stickers, with cities like Paris leading.

The publication is done through scoreboards, local and official journals, and city websites, mostly in PDF format but also in some cases in machine-readable formats such as XML/JSON or Shapefile. Very few cities have heard about DATEX II and there is little connection with the National Access Point.

There are examples of UVAR communication on the websites of the cities of Toulouse¹³¹, Lyon¹³², and Strasbourg¹³³.

Communication to road users is currently done with on-site teams ensuring enforcement, road signs and road markings on the ground.

Ireland

The UVARs in Dublin are published via notice boards and city websites¹³⁴. They do not publish under a machine-readable format yet and do not use DATEX II. Communication of UVARs to road users is done via electronic billboards, traffic signs, the internet, and newspapers.

Spain

In the city of Vitoria Gasteiz, UVARs are published via notice boards and the city website, as well as other human-readable channels (newspapers). They are not aware of DATEX II and communicate UVARs to road users with traffic signs, road markings on the ground, newspapers, and the internet, at www.vitoria-gasteiz.org.

Sweden

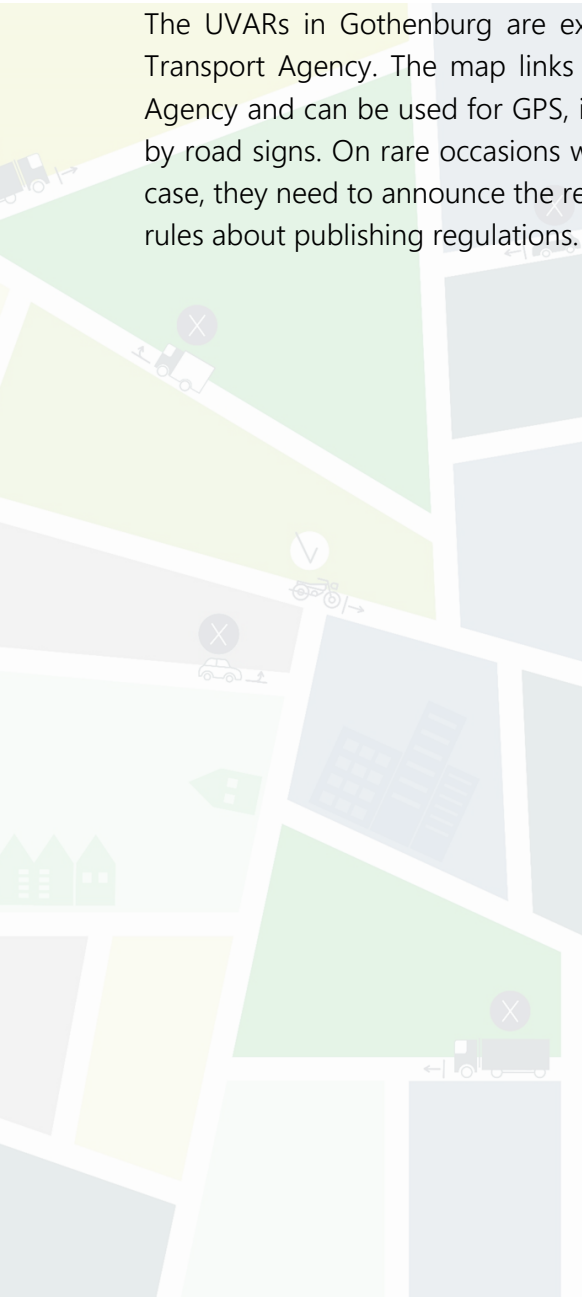
¹³¹ <https://toulouse-metropole.fr/>

¹³² <https://www.grandlyon.com/services/zfe-mode-demploi.html>, www.onlymoov.com

¹³³ <https://www.strasbourg.eu/nouvelles-regles-de-livraison-au-centre-ville>

¹³⁴ www.dublincity.ie and www.hgv.ie

The UVARs in Gothenburg are exported to the national registry, STFS¹³⁵, provided by the Swedish Transport Agency. The map links are imported to NVDB¹³⁶ also provided by the Swedish Transport Agency and can be used for GPS, interactive maps, and so on. Most often their UVARs are announced by road signs. On rare occasions when national regulations allow, there are no road signs and, in that case, they need to announce the regulation in local newspapers. The Swedish Transport Agency defines rules about publishing regulations.



¹³⁵ <https://rdt.transportstyrelsen.se/rdt/defaultstfs.aspx>

¹³⁶ <https://www.nvdb.se/sv>

Table 11 - UVARs in other countries Summary

Current and planned UVAR measures in Germany								
	France	Portugal	Ireland	Spain	Czech Rep	Poland	Latvia	Sweden
Most common UVARs	LEZ		LTZ	LEZ LTZ	LEZ LTZ PARK		CS LTZ PED	LEZ CS LTZ PED
Responsible entity	LEZ: National authority LEZ (EMERG): City/Region	City	City	LEZ: National & City authority LTZ: City	LEZ: National authority LTZ/PARK: City	LEZ (ZEZ): National & City authority LTZ/PARK: City	City	LEZ: National & City authority CS: National law LTZ/PED: City
Time Validity	Permanent or time windows at city level	Daily 06:30-00:00	Daily 07:00-19:00	LEZ: time windows at city level LTZ: Permanent	Permanent	LEZ (ZEZ): Permanent LTZ/PARK: Permanent or time windows at city level	CS: April-Sept LTZ: Permanent or 07:00-10:00 and/or 16:00-19:00 PED: Permanent	LEZ: Permanent CS: Working days 06:30-18:30 LTZ: Depending on purpose, permanent or time windows PED: Daily 11:00-06:00
Activation Processes (only for dynamic schemes)	City & region based on air quality	/	/	Based on air quality	/	/	/	/
Location	Defined zones in cities	Defined zone in Lisbon	Defined zones in cities	Defined zones in cities	City Centre	Defined zones in cities	Whole cities or defined zones in cities	Defined zones in cities
Applicability conditions	Based on emissions	Based on emissions and weight of vehicles	Based on vehicles' weight and size	LEZ: Based on emissions LTZ: Based on weight and emissions	LEZ: Emissions level LTZ/PARK: Weight & emissions level	LEZ: Emissions level LTZ: Weight level PARK: All vehicles	CS/ PED: All LTZ: Based on weight	LEZ: Emissions CS: Time based LTZ: Characteristics based (tires, weight...) PED: All vehicles
Exemptions	People with disabilities,	Security and emergency	Deliveries and vehicles not	Bikes, Residents,	Optional: Residents,	LEZ: Electric, hydrogen, gas, and many others	CS: Residents, people with disabilities,	People with disabilities,

	professional vehicles, special convoys, bikes, buses, electric and sometimes hybrid vehicles	services, funeral services, motorcycle and mopeds (other exemptions with stickers)	allowed to use the Dublin tunnel	People with reduced mobility, public service, professional services	Businesses, People with disabilities	(businesses, public service, slow moving, etc.) LTZ: Residents, public service, emergency, delivery PARK: Electric vehicles, hybrids, public service, motorcycles	electric vehicles, professional vehicles LTZ: Emergency and public vehicles PED: Public vehicles	emergency vehicles, professional vehicles, motorcycles
Registration	National Crit' air stickers	Stickers	Transit permit	LEZ: Stickers LTZ: Sometimes permits	LEZ: Stickers (not yet in force) LTZ/PARK: Permits	LTZ: Permit PARK: Ticket	CS: Short & long-term entry passes	LEZ/LTZ: Stickers for exemptions
Enforcement method	Manual by the police	Manual	Electronic registration checked by the police	Camera enforced	Manual	LTZ/PARK: Manual	CS: Camera LTZ/ PED: Manual	Manual and/or camera enforced
Penalty fee	Fine	Fine	Fine, increasing for reiterations	Fine	Fine	LTZ/PARK: Fine	Fine	Fine or surcharge tax
Signage	Road signs	/	Road signs	Road signs	Road signs	Road signs	LTZ/ PED: Road sign	Road signs
Processes when creating UVARs								
	France		Ireland		Spain		Sweden	
	National law and local implementation through a mayor's ordinance, with support from regional and national environment protection agencies, in human-readable format, with UVAR localisation on GIS tools		Regional and national agencies issue a traffic regulation order in human-readable format, with UVAR localisation on GIS tools		Several ordinances in human-readable format		Regional and national agencies issue a traffic regulation order in human-readable format, with UVAR localisation on GIS tools	
Processes when publishing and disseminating UVARs								

	France	Ireland	Spain	Sweden
Where	On scoreboards, in local and official journals, on city websites	On notice boards, on city websites and newspapers		On the national registry STFS provided by the Swedish Transport Agency, which produces map links usable for GPS & interactive maps, and in local newspapers
In which formats	Human-readable formats mainly, some in XML/JSON or Shapefile formats	Human-readable formats		Machine-readable formats
Links	https://toulouse-metropole.fr/ , https://www.grandlyon.com/services/zfe-mode-demploi.html , www.onlymoov.com , https://www.strasbourg.eu/nouvelles-regles-de-livraison-au-centre-ville	www.dublincity.ie and www.hgv.ie	www.vitoria-gasteiz.org	https://rdt.transportstyrelsen.se/rdt/default-stfs.aspx https://www.nvdb.se/sv
Update process	When changes occur	No information		
SDG awareness	Little awareness	No information		

5.4 Conclusions and future work

5.4.1 Lessons learned on the digital communication about UVARs

There are many ways that cities, regions and countries communicate about their UVARs. These have, up until now been mainly 'analogue'. Some cities are starting to digitise some UVAR data – starting with the boundaries, but often without the entry 'metadata' to explain the requirements that need to be met within the zone. Some cities and countries are coordinating this and producing the 'metadata' in 'semi-structured digital formats', such as in the Netherlands. Here the data tends to be collated by a nationally coordinated body on behalf of the national authority, not necessarily provided in this format by the cities. The country coaches are working with these collators, to see how both sides can help each other, and that the data comes directly (as well as accurately and updated) from the UVAR authority.

5.4.2 Barriers and Drivers for the UVAR Toolbox uptake

The clearest barrier is that there has so far not been an accepted standardised digital format for UVARs. The only city that has produced UVAR data in DATEX II format did so as part of an EU project. Other barriers to cities using the UVAR toolbox would include resources, skills, difficulty in digitising data (e.g., 3-D maps when fly-overs are on the boundaries), knowing that they should do so, not seeing the benefit, and DATEX II not being understood or easily accessible. For the last barrier, the UVAR toolbox should help improve understanding and use. If navigation tool service providers do not start using the data provided, this will reduce the incentive for cities to provide further data; service providers will not use it until there is significant data – this chicken and egg issue is one that the UVAR Box project is looking to resolve.

Drivers could include when it is required regionally or nationally, getting information onto navigation tools, when it helps support enforcement (particularly for foreign vehicles), the general trend towards digitisation in authorities to reduce the effort needed for administration.

5.4.3 Future work in UVAR Box and beyond

To conclude on future work to undertake, the mapping of UVARs established in this document shows how difficult it is to obtain a complete European overview of existing UVARs, for several reasons: there is no common structure enabling an easy categorisation of measures, information on the measures themselves; the processes to adopt and communicate them are extremely diverse; there is not a European structure for UVARs, be it a standard format or a unique place where to communicate information on them. The CLARS database is the most comprehensive tool openly accessible to collect information on UVARs in the EU and is not used by drivers and the wider public targeted by the measures.

Therefore, future work should support the completion of the European UVARs' overview, a task that is not included in the UVAR Box's coming activity.

The project will contribute to define a standard for UVAR communication, which can also support their definition, but is most importantly designed to support an easier perception and comprehension of UVARs by their targeted public, i.e., road users. The project also supports the communication of UVARs from local authorities to National Access Points, facilitating the localisation of information on UVARs. This coordination between local and national levels must be further encouraged through other initiatives.

5.4.4 *Interconnections with other work packages*

This deliverable relies on works undertaken in other work packages, and provides insights for further tasks.

The overview has been established thanks to outreach activities to external stakeholders, managed by the stakeholders' engagement work package 5. It is also based on information collected within the sustainability strategy responsible work package 4. Many inputs also come from the UVAR data definition worked on within work package 1. And the main outcomes in this deliverable have been drafted by Country Coaches, monitoring their national stakeholders' engagement and gathering inputs from them for this, for also other deliverables in work package 2 focused on UVAR processes.

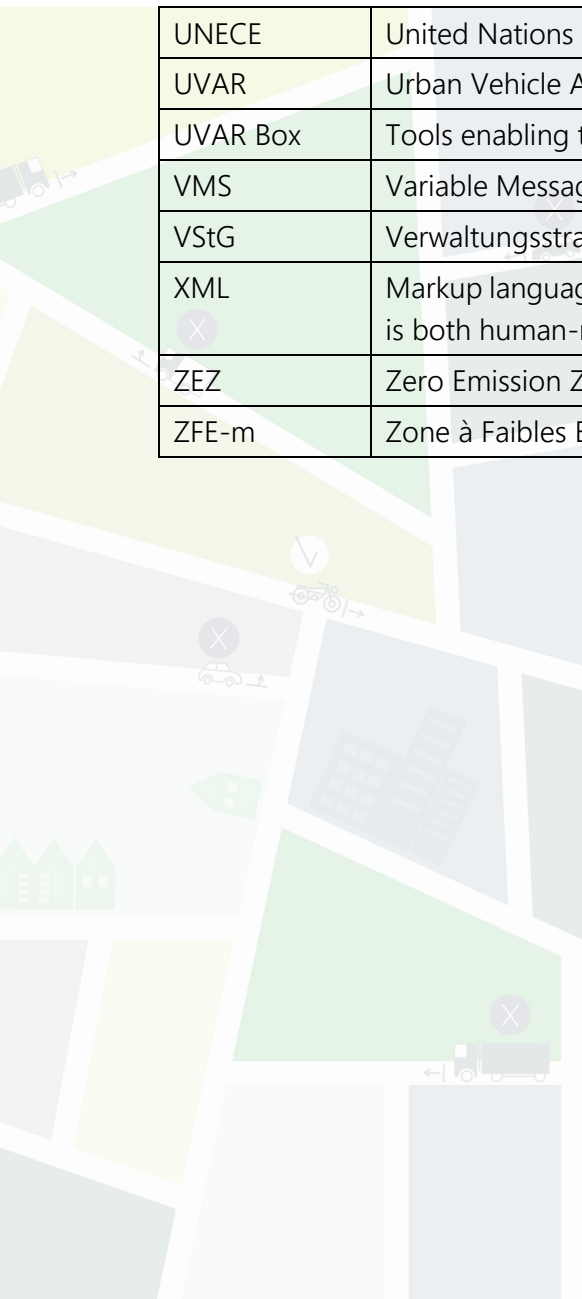
The 'UVAR State of Play' Report contains relevant information for the definition of processes used by UVAR-responsible authorities, and to be supported with the developed UVAR Box tools within work package 2. It can also facilitate the development of more adapted DATEX II specifications, based on real-life examples. It is finally a tool for communication and dissemination of the project's results, and will therefore support work package 5 as well.

6 Glossary

Term	Definition
ADEME	French Agency for ecological transition
AKKP	Informationsportal Abgasklassen-Kennzeichnung – Portal to access information on emission stickers in Austria
ANPR	Automatic Number Plate Recognition
ANWB	Dutch Royal Touring Club
ArcGIS	Cloud-based GIS mapping software
ARPA	Italian regional environmental agency
BImSchG	Bundes-Immissionsschutzgesetz – Federal Emission Control Act
BImSchV	Bundes-Immissionsschutzverordnung – Federal Emission Control Ordinance
CCISS	Centro di coordinamento informazioni sulla sicurezza stradale – Italian Road Safety Information Coordination Centre
CLARS	Charging, Low emission zones, Access Regulation Schemes – most complete platform currently identifying UVARs in Europe
Crit'Air	French stickers indicating vehicle's level of emission
CS	Congestion charging Scheme
DATEX II	Electronic language used in Europe for the exchange of traffic information and traffic data
Diesel/Petrol Euro 1/2/3/4/5/6/...	European vehicle's emission standards
EMERG	Emergency scheme
EV	Electric Vehicle
GIP	Graph Integration Platform
GIS	Geographic Information System
HGV	Heavy Goods Vehicle
ICLEI	International Council for Local Ecological Initiatives
IenW	Ministry of Infrastructure and Water Management
IG-L	Austrian Emission Class Ordinance
ITS	Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport
JSON	Open standard file format and data interchange format that uses human-readable text to store and transmit data objects consisting of attribute–value pairs and arrays

	(or other serializable values). It is a very common data format, with a diverse range of applications, one example being web applications that communicate with a server
KFZ	Kraftfahrzeuggesetz – Austrian Motor vehicles act
LEZ	Low Emission Zone
LTZ	Limited Traffic Zone (ZTLA in Italy)
MA46	Vienna Municipal Department: Traffic organization and technical traffic matters
MIMS	Ministero delle Infrastrutture e della Mobilità Sostenibili – Italian Ministry of infrastructure and sustainable mobility
NAP	National Access Point
NeTEx	General purpose XML format designed for the efficient, updateable exchange of complex transport data among distributed systems
NPR	National Parking Register in the Netherlands
NRW	Nordrhein Westfalen region in Germany
PARK	Parking Regulation
PED	Pedestrian Zone
PHEV	Plug-in Hybrid Electric Vehicle
PMS	Parking Management System
P+R	Park and Ride
QGIS	Free and Open Source Geographic Information System
RDS-TMC	Radio Data System - Traffic Message Channel
RDW	Netherlands Vehicle Authority in the mobility chain
RFID	Radio-Frequency Identification
RTTI	Real time traffic information
SDG	Single Digital Gateway: European unique portal to access information, procedures and assistance on EU and national rules and rights related the Single Market
SHPV	Servicehuis Parkeer- en Verblijfsrechten - Service house for parking and residence rights
SIRI	Standard Interface for Real-time Information - XML protocol to allow distributed computers to exchange real-time information about public transport services and vehicles.
StVO	Strassenverkehrsordnung – German translation of traffic regulation
SUMP	Sustainable Urban Mobility Plan
TIC	Traffic Information Centre
TRO	Traffic Regulation Order

UNECE	United Nations Economic Commission for Europe
UVAR	Urban Vehicle Access Regulation
UVAR Box	Tools enabling the digitisation of UVARs
VMS	Variable Message Sign(s)
VStG	Verwaltungsstrafgesetz – Austrian Administrative Penal Code
XML	Markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable
ZEZ	Zero Emission Zone
ZFE-m	Zone à Faibles Emission mobilité – French translation for LEZ



7 References

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ReVeAL guidance note: [https://civitas-reveal.eu/wp-content/uploads/2021/03/ReVeAL-LEZ LTZ Exemptions Permits-guidance-15-final.pdf](https://civitas-reveal.eu/wp-content/uploads/2021/03/ReVeAL-LEZ_LTZ_Exemptions_Permits-guidance-15-final.pdf)

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Salzburg tourism: <https://www.salzburg.info/en/travel-info/arrival-traffic/car/traffic-bollards>

Vienna parking: <https://parkenwien.at/ratgeber/kurzparkzonen>

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Brussels mobility : <https://smartmove.brussels/en>

Antwerp: <https://www.antwerpen.be/info/58a310c2a6779391a5118fe0/autoluwe-zones-en-voetgangerszones-in-de-stad>

Amsterdam: <https://www.amsterdam.nl/parkeren-verkeer/milieuzone-amsterdam/>

Regional websites

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Austrian graphs integration platform: <https://www.gip.gv.at/>

Belgian Transport data portal: <https://www.transportdata.be/en/pages/about>

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Template version and print date

Template version used	1.0 01-09-2020
Print date	15-12-2021 20:19

