

# SMART SOLUTIONS SUPPORTING LOW-CARBON MOBILITY POLICIES IN EUROPEAN CITIES



## WHO WE ARE

10 partners from 7 different countries share the will to protect key city areas from traffic through the use of Low Emissions Zones and similar measures.

Each partner represents a Functional Urban Area (FUA) which is comprised of one core city and municipalities in its hinterlands.

The project consortium includes both experienced cities in low carbon mobility, technical experts and cities that have some unique experience in low-carbon mobility or policy of Low Emission Zones.

**7**  
COUNTRIES

**10**  
PROJECT  
PARTNERS

**8**  
FUNCTIONAL  
URBAN AREAS

**1.93**  
MILLION EURO  
PROJECT BUDGET

**1.6**  
MILLION EURO  
ERDF

TAKING  
**COOPERATION**  
FORWARD

### Austria

- City of Graz

### Croatia

- University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture.
- City of Dubrovnik

### Czech Republic

- Transport Research Centre
- KORDIS JMK

### Hungary

- Pannon Business Network Association

### Italy

- Municipality of Vicenza - Lead Partner
- City of Turin

### Poland

- City of Gdansk

### Slovakia

- City of Žilina



## GENERAL DESCRIPTION

The majority of European cities have grown around an identifiable centre, where commerce, entertainment, shopping and political power are concentrated. As a result, city centres are responsible for a relevant part of urban traffic, from/to other urban areas and the hinterlands, where the urbanisation phenomenon is spreading year by year causing an increasing transport demand.

Various instruments can be used to tackle this phenomena, such as access restriction policies, the location and pricing of parking, improvement of public transport services. Nevertheless, each of these approaches has proved to present pros and cons that need to be carefully evaluated to identify the most effective mix of solutions for each functional urban area (FUA).

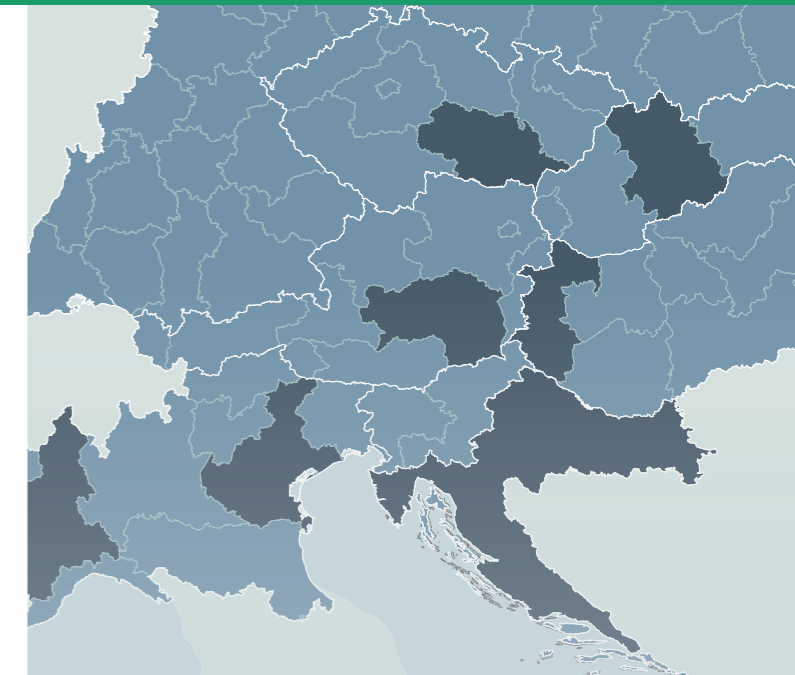


## APPROACH IN THE PROJECT

SOLEZ brings together 8 cities which are working on low carbon mobility solutions at different extents, so to enhance their strategies and develop smart services and products around the concept of low emission zones (LEZ) in functional urban areas. Project activities taken into account local administrators', residents', tourists' and private operators' need aims to:

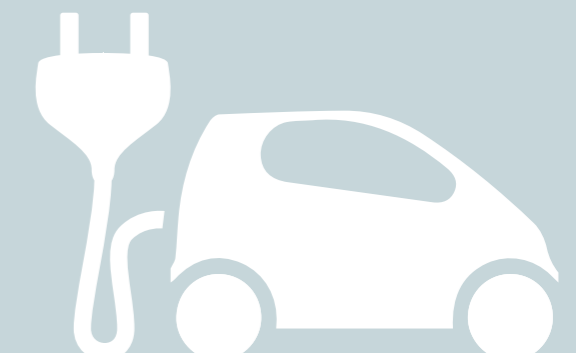
- Enhanced dialogue with key stakeholders about access restriction policies through the definition and implementation of proper participatory strategies and stakeholder involvement initiatives;
- Design, development and pilot application of innovative ICT-based services and solutions supporting low emission zones and other access restriction policies, by contributing to reducing the negative side effect of these interventions.

The innovative ICT-based services and solutions supporting low emission zones and other access restriction policies, developed by project partners have been customized and tailored to the need, requirements and local frameworks of each SOLEZ pilot site and have been implemented, tested and evaluated in order to demonstrate and validate feasibility and effectiveness of proposed solutions.



## In total 12 Pilot Actions been implemented:

- **Smart Parking solutions:**  
Brno, Gdansk, Žilina, Vicenza, Dubrovnik
- **Value-Added Services:**  
Turin, Graz, Gdansk, Vicenza, Sárvár
- **City bus transport electrification:**  
Dubrovnik, Žilina





## SOLEZ PROJECT IN VICENZA

With the activities linked to SOLEZ project, Vicenza in 2016 lays the foundations to start a concrete path that is now guiding the city from the Urban Mobility Plan (UMP), which was adapted in 2012, to the Sustainable Urban Mobility Plan (SUMP). And it's just that one character, the "S" that makes all the difference, implying a new concept of planning urban mobility by integrating and harmonizing all the strategic urban, territorial and social instruments, aiming at improving the efficiency and the effectiveness of the mobility system.

It represents an actual challenge to be faced in a wider and participatory perspective.

This is the new approach that characterizes the SUMP, which simply put requires involvement of citizens and local key stakeholders, and coordination between different territories of the Functional Urban Area (FUA)

In 2017, thanks to project activities, the city of Vicenza, created the first stakeholder group of representatives of the most relevant FUA municipalities. And then, for the very first time these representatives discussed the issues of common urban mobility problems affecting their territories. With the streamlined approach of the SOLEZ guidelines, they have jointly elaborated the Action Plans for the integration of low-carbon mobility policies in the local mobility planning of Vicenza FUA.

On a parallel peer-to-peer and capacity building project activity, the same stakeholders participated in 2 study visits in partner cities Graz and Turin.

The joint travelling experience brought the working group together creating a good team-building atmosphere and making them feel involved in the project since its very beginning.



The Communication events organized on FUA territories, to raise awareness on sustainable mobility topics, have further consolidated this team and create a favorable ground that has facilitated the hard task of elaborating a common low-carbon mobility strategy at FUA level.

As a matter of fact, the SOLEZ Action Plan improved the capacities of local public administrators to implement integrated sustainable mobility plans in their territories.

In March 2019, the City of Vicenza, capitalizing on these results, officially created the inter-institutional group that has started the SUMP elaboration: the long way ahead has been already tracked by SOLEZ!

## Pilot Actions

*"A shopping shift: no more bags to lift!"* the real-life testing of the SOLEZ Value Added Pilot Action, launched in January 2019 with a wide promotional campaign, which involved all of the FUA municipalities, TV and local media.

*"An innovative B2C delivery service",* says Vicenza's mobility councillor Claudio Cicero, *"promoting shopping in the city centre and at the same time encouraging a more sustainable behaviour that leads to CO<sub>2</sub> reduction. I leave my car in the P&R and get to the city centre easily with shuttle bus. I do my shopping and my bags are delivered directly to the parking place where I collect them on my way home putting them directly into my car. I can enjoy the city centre without having to carry around heavy bags".*

The service has been designed in cooperation with Veloce Ecologists Center, the consolidation hub that has been since 2004 delivering more than 80% of the goods in and out Vicenza's LTZ, only with fully electric vehicles and which represents a renown and well established best practice at international level for last mile freight delivery.

The second Pilot Action has been implemented in cooperation with AIM Mobility, the in-house company that manages the parking system in Vicenza. The elaboration of the SOLEZ Action Plan has highlighted the necessity to reduce congestion around the Local Health Unit of San Bortolo Hospital, which has a wide territorial relevance including all FUA citizens.

Action Plan has highlighted the necessity to reduce congestion around the Local Health Unit of San Bortolo Hospital which has a wide territorial relevance including all FUA citizens. By customizing the smart parking tool developed at the project level, we have made a prediction model on parking occupancy in scheduled days and times in the future. By using the Chatbot on Telegram it allows citizens visiting the hospital to forecast parking availability and plan the best and most sustainable way to reach the destination avoiding parasite traffic of vehicles searching for parking lots.





## SOLEZ PROJECT IN DUBROVNIK

The global problem of CO<sub>2</sub> emissions is present in many cities and urban centers. One of these cities is the City of Dubrovnik and it's a functional urban area, a densely populated tourist center with approximately 40,000 inhabitants.

Moreover Dubrovnik is a cultural and historical location included in the UNESCO List of Protected World Heritage Sites. And that is why it is not only necessary to preserve the values of the Functional Urban Area (FUA), but also to improve living conditions for the citizens.

Dubrovnik is a city on the hilly terrain, which makes it unfavourable for construction.

Besides its residential buildings are built very close to each other and the streets surrounding them are really narrow.

Given this spatial construction, it is impossible to do any large scale construction work within the urban centre and so the city needs to rely on quality organizational and management measures and the implementation of modern technologies.

The SOLEZ project, with its guidelines, contributes to the preservation of the local heritage and helps to reduce the CO<sub>2</sub> emissions.

Two pilot actions, which have been implemented within the project, will serve as adequate basis for assessing the feasibility of future individual projects.

These pilot actions have been carried out through telemetry monitoring of public transport buses and defining new smart parking regulation by collecting, processing and



**Grad Dubrovnik**

analysing the data on vehicles entering and leaving from the Dubrovnik's FUA. Furthermore, **SOLEZ Action Plan** for the development of low-carbon solutions in the transport system contributes to solving one of the key problems of the Dubrovnik's FUA, which is the negative impact of the transport system on the environment.

### Pilot Actions

In the pilot action dealing with telemetry, Dubrovnik equipped 10 city buses with tracking devices.

These devices were on 24/7 and during six months recorded the bus speed, absolute position (longitude, latitude and altitude), mileage, fuel consumption, engine speed and torque, transmission ratio etc. The consequent analysis pointed out that the future Dubrovnik electric city bus transport seems to be a good answer to a fast charging through pantograph system that bottoms from the charging station to the e-bus roof.

The elaboration of the SOLEZ Action Plan has highlighted the necessity to reduce congestion around the historic city center and improve the system of parking regulation. By customizing the smart parking tool, we have defined new parking regulation strategy for Dubrovnik, based on data about traffic flow and real demand in its city centre.

By the end of June 2019 SANITAT (Dubrovnik's in house parking company) in cooperation with the Municipality, will have installed more than 1900 smart sensors (currently, 890 detectors have already been installed on parking spots within the city, including taxi spots and disabled parking spots). The pilot action will then contribute to designing a more effective parking regulation strategy for new smart parking system in the future.





## SOLEZ PROJECT IN BRNO

One of the specific goals of the Action plan developed for Brno Functional Urban Area (FUA) is development of new P+R (Park & Ride) facilities in the Brno FUA in connection with high-capacity mass public and multimodal terminals. The action plan prefers people to leave their cars outside Brno at key towns' railway stops and continue their journey by train.

Commuters driving to Brno often park their cars at many railway stations close to Brno. The reason why they use cars for part of their journey is that the frequency of the feeder bus lines is insufficient. Some of the municipalities in Brno FUA have already built car parks that are in line with the technical standards and traffic regulation, however a systematic approach and standardization of P+R car parks in the whole FUA is missing.

That is why the Coordinator of South Moravian Integrated Public Transport System (KORDIS JMK) decided to implement a pilot project of a smart parking solution and use it for spreading the experience to other municipalities in the FUA.

It is foreseen that KORDIS JMK role as the coordinator of the public transport services in the South Moravian Region is to extend to a provision of technical standards recommendations to the municipalities to create a single monitoring system with standard and open data.

Smart parking system for the pilot action in Blansko has been customized in with cooperation with Transport research centre (CDV), responsible for provision of technical assistance to all the project partners involved in pilot implementation of Smart parking



“The key input for the design was free flow solution and future scalability, i.e. minimum price and the requirements on installation and maintenance”, says Zuzana Švédová, CDV project manager.

### Pilot Actions

With regard to the gradual development of the P+R system at the FUA Brno, the most suitable seems to be using the combination of the traffic flow detectors and calibration parking occupancy detectors. This will ensure maximum synergy and investment efficiency. The system consists of 6 traffic flow detectors, 7 calibration parking occupancy detectors and the relevant communication infrastructure (1 control unit and at least 2 repeaters).

After analysing the availability of the communication technologies in the pilot area, it has been recommended to use IQRF communication technology for communication between each detector and its master unit. This master unit gathers all necessary data and sends them to the cloud for evaluation via LTE network in selected periodical intervals.

All occupancy data is aggregated into a software tool (SOLEZ parking software platform), which was designed by the SOLEZ project as Outputs O.T2.1. “The data management system has shown that there are about 2500 cars coming to the place per day for various reasons, so traffic flow detection was the right choice.”

The SOLEZ software tool allows you to provide output for third party needs through the application interface. The software is operated in a cloud solution and is scalable according to the requirements of the system operator.

“We have learnt from long-term data that the system has 98,5 % reliability and it is the best value for money option which is a very important result for CEE market potential where public investments still consider the cost as the prime requirement”. “The pilot action within the SOLEZ project was very useful as now we can provide the municipalities and the region with proper guidance”, says Květoslav Havlík, deputy director of KORDIS and adds: “We would like to provide people not only with the parking occupancy information but also with the travel time comparison between car and train to help them decide wisely what transport mode they will use for travelling to the city.”

With the Air Quality Plan of the Brno city and planned introduction of Low Emission Zones the importance of the regional P+R network and the parking occupancy information system will continue to grow significantly .





## SOLEZ PROJECT IN GRAZ

Anna, 37, lives in Graz with her husband and daughter Lisa. She works as a chemist at a company for laboratory instruments. Anna bikes to work or takes a commuter train. Anna and her husband sold their car years ago, because one day, they had realized that they do not need one for their daily life. No more expensive maintenance costs, no more searching for parking spot and no more waiting in congestion. Living in Graz without owning a car works fine for Anna and her family and could be even more convenient in the future.

### Why?

Imagine: Anna has an urgent appointment somewhere outside of Graz. She needs to transport heavy things. She wants to organize all her trips via one app. She would be even interested in using this app for purchasing her concert tickets. You and Anna might want to get deeper insights regarding the EU-INTERREG project

SOLEZ, Mobility as a Service (MaaS) and how it provides a convenient and clear answer to a lot of questions.

### Pilot Actions

In order to make a step towards MaaS in the functional urban area of Graz, within the SOLEZ project, a feasibility study as a SOLEZ pilot action was carried out by the Institute for Futures Studies and Technology Assessment from Berlin. The feasibility study was commissioned by the City of Graz (Unit for EU Programmes and International Cooperation and the Department of Transport Planning) in cooperation with the Regional Management Metropolitan Area of Styria.

The study covered the future mobility trends, challenges and opportunities for the FUA of Graz. It also



focused on how the MaaS could be further developed following the current trends.

The study built upon the existing public driven initiatives and services, especially “TIM” (German for “*T*äglich *I*ntelligent *M*obil” English translation “*D*aily *I*ntelligent *M*obile”, a TIM station is a multi-modal-mobility hub; “TIM” was established with the help of national funding) and GUSTmobil (a call bus system in the FUA of Graz). Existing MaaS initiatives in Aachen, Aarhus and Helsinki with similar framework conditions as Graz were examined as pilot case studies. These cases provided indications of success factors and obstacles to the development and implementation of the MaaS approach.

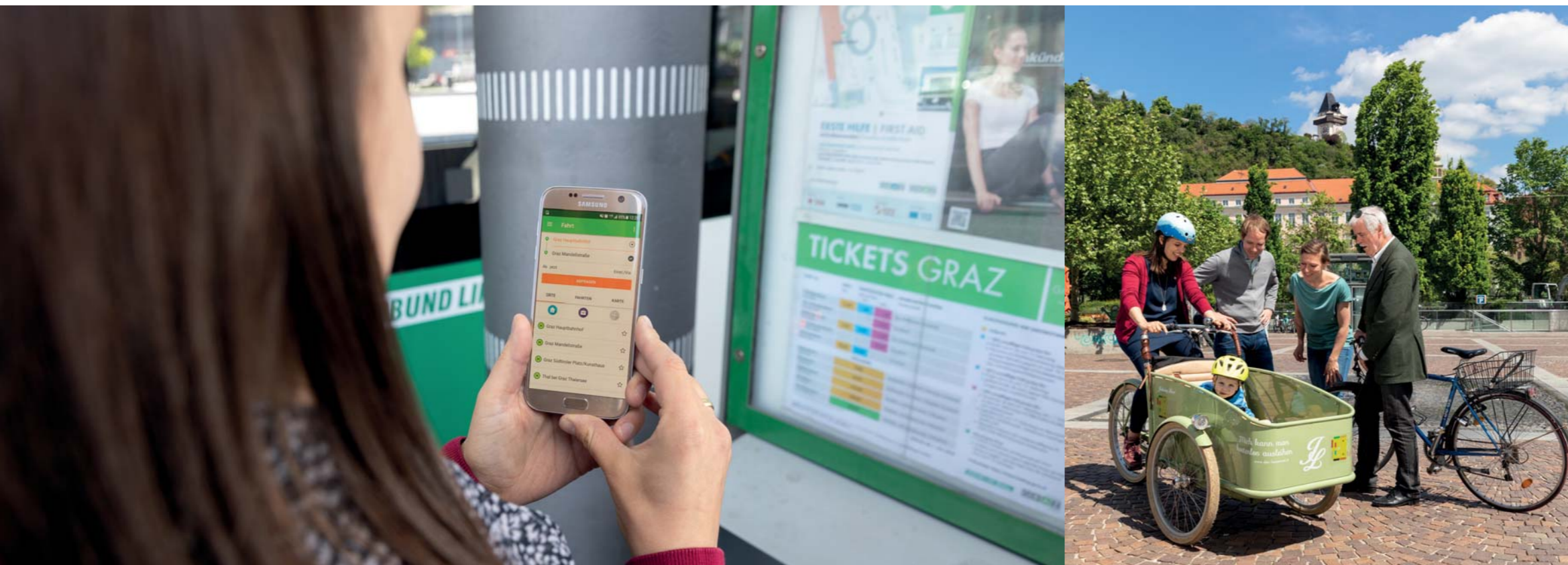
The results of the study demonstrate that the integrated MaaS approach provides a great opportunity to

foster a sustainable low-emission urban mobility. In this sense, the MaaS would have the potential to decrease individual car trips and to increase social inclusion and accessibility while providing attractive mobility offers for the entire urban region.

Recommendations for the next step, which would be suitable to successively roll out and scale up the MaaS scheme in the region of Graz in order to contribute to an improvement of the overall traffic situation are:

- Integrate a holistic MaaS approach into mobility strategies
- Expand public transport as it is the backbone system of every MaaS
- Expand the already existing ticketing service app “GrazMobil” to a convenient MaaS one-stop-shop
- Integrate other public services (e.g. library card) in MaaS the platform in order to reach new target groups
- Add new services (e.g. parcel lockers, cycle boxes etc.) to multi-modal-mobility hubs “tim”
- Pay special attention to commuters with the integration of a ridesharing function
- Build strategic alliances with interest groups (e.g. driver associations) to address more relevant target groups
- Test and pilot with a MaaS in the functional urban area of Graz as a lighthouse region
- Develop a MaaS campaign with incentives to attract new target groups

The Graz activities, within the SOLEZ project with the thematic focus on the MaaS, build up on local and regional needs. On the other hand, the SOLEZ project results, and especially the results of the SOLEZ pilot action provided a valuable contribution to stimulate a regional stakeholder process with the aim to establish the MaaS working process. Last but not least, Graz is currently part of a national working group, which has been developing the MaaS standards for Austria.





## SOLEZ PROJECT IN SÁRVÁR

The functional urban area (FUA) of Sárvár, located in the Vas county, in the Western part of Hungary with about other 40 villages and a total of 39 thousand inhabitants, is the smallest FUA represented in the SOLEZ project.

However, Sárvár is one of the most visited Hungarian spa cities with half million guest staying overnight and the total of 700.000 visitors per year.

In 2012 Sárvár gained the *Health Resort* status and one of the main aims of the municipality is to keep high standard of air quality in the area. In order to maintain this status, the advocacy of sustainable mobility is inevitable.

As a result, SOLEZ project was an excellent opportunity for Sárvár, as well as for the neighbouring municipalities, to cooperate and learn from more experienced FUAs in the Central Europe, which could share their knowledge and experience on effective low carbon mobility solutions.

Given the importance of the topic, municipalities and key stakeholders of Sárvár FUA were very keen in supporting project activities since the very beginning, guaranteeing an achievement of successful project results.

In the first project phase, the SOLEZ Action Plan was elaborated with the direct involvement of local mobility stakeholders. The aim was to draw a concrete roadmap for the implementation and management of traffic restriction schemes not only for Sárvár, but also for other FUA municipalities. The Action Plan increased the effectiveness and the acceptability of traffic restriction policies in the context of FUA mobility planning.

One of the tangible achievements of the SOLEZ project in Sárvár FUA was, that since the autumn of

2017, the main tourist office in Sárvár, implemented six e-bikes in their office available for rent by local residents or tourists.

During the SOLEZ project, key stakeholders have visited Graz and Turin, where they could witness the successful implementation of sustainable mobility best practises. Within the project, several communication events were organised to introduce the results to citizens and local stakeholders. Moreover, all project activities were presented at various International Transport Conferences.



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## Pilot Actions

As a pilot action, Sárvár FUA has developed a smart phone application called SÁRVÁR MOBILITY providing multimodal traveller information to its users. The application has been developed on the basis of stakeholder's meetings inputs and results of the preliminary self-assessment following the Mobility as a Service (MaaS) conception. To promote this application and introduce it to general public several local and regional media platforms have been used (online articles, newspapers, YouTube, etc.). The overall objective of the application is to encourage people to use public or active transport instead of their cars.

The application integrates all information about the available transport modes of Sárvár FUA such as train, bus, car rentals, bike rentals, e-car charging stations and car-pooling services. Moreover, sustainable leisure time information, such as Nordic walking and cycling paths are provided in the app as well as upcoming events, restaurants and much more.



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## SOLEZ PROJECT IN TURIN

The City of Turin has committed to achieving the main objective of the Sustainable Urban Mobility Plan adopted in 2010, which aims at reducing the use of private cars. In the past five years, the Administration has promoted the expansion of the most popular mobility services in sharing (BIKE, CAR, SCOOTER, TAXI).

These services combined with public transport serve as an alternative intermodal solution to the use of cars in the city.

However, it is necessary to build IT systems facilitating the use and improving citizen's experience with these services. Moreover, it aims at helping the administration to control the future mobility.

The City of Turin together with the SOLEZ project have

accepted this challenge and implemented the concept of the Mobility as a Service (MaaS).

The MaaS represents a new model of mobility, expecting citizens to understand that shared means of transportation bring about more benefits than personal transportation. The success of this model mostly depends on the ability of the mobility operators to offer the highest possible level of integration between the available public and private mobility services. If so, the users will be able to use this service in a simple, accessible and flexible way.

The realization of the MaaS passes through the implementation of a single technological platform that enables the integration between different mobility options, both in terms of *travel planning* (intermodal



CITTA' DI TORINO

route planner and real-time information on travel times and distances), as well as use (booking and payment of services through subscription or electronic wallet).

This way, through the MaaS digital platforms, users can plan their end-to-end journeys (literally „from one point to another“) by combining all public and private means of transport available in the city and paying for the service through a monthly subscription or according to their actual travels.

### Pilot Actios

A public tender involving citizens, have been organized within the SOLEZ project, aiming at selecting a company that would take on the role of a Mobility Manager. The tender was won by the General MOTORS Powertrains. By involving their employees in testing of the MaaS platform a „pay per use“ offer of public transport services, Taxi, Bike Sharing and Scooter Sharing, has been created.

Employees took part in the new mobility process via gamification. Consequently generated data served as groundwork for further reviewing of this system.

Like the mobility of people, the supply of goods is also of a fundamental importance for the socio-economic development of a community, especially in cities

New models of economic development such as JIT (just-in-time) or e-commerce have increased the travel of couriers that traditionally use fossil fuel vehicles and they do not always operate in a SMART way.

Within the SOLEZ project, the city of Turin has implemented a measure on the territory in order to act on two levels of improvement of the supply chain concerning the last mile logistic: *the use of zero-emission vehicles and the concentration of loads.*

Therefore, after a participatory process that has seen the involvement of the main logistics players (DHL, FEDEX, TNT, UPS), the city has introduced PULL policies that have allowed a limited number of vehicles in the city to take advantage of territorial benefits such as the use of preferential lanes and the freedom of access within the Limit Traffic Zone (LTZ) of the city.

In return, the involved operators invested economically with the replacement of traditional diesel-powered vehicles with zero-emission or CNG (Compress Natural Gas) vehicles.

In addition, it was requested to further invest in the purchase of on-board vehicle tracking devices in order to build a database available to the city for the construction of future road planning and loading and unloading car parks within the city LTZ.

The project turned out to be a good winning practice for all the operators in the supply chain who requested final commissioning.

This course was the subject of study by the Italian Ministry of Transport and in 2016 it was mentioned in the annual programming document prepared by the Italian Ministry of Economic Development.





## SOLEZ PROJECT IN ŽILINA

Thanks to the SOLEZ project, the city of Žilina was able to continue its low-emission mobility planning. The main focus was placed on smart parking and electromobility.

In the area of parking a strategy for regulation of parking in the city centre has been developed. Before the project implementation, the city of Žilina had no actual information on the state of parking in the city centre, which has a Limit Traffic Zone (LTZ).

The SOLEZ project helped the city of Žilina to obtain the necessary data on the basis of which it will be possible to adjust the strategy and parking regulation not only in the city centre, but also in its surrounding areas.

Each passing vehicle data is obtained using smart sensors installed in the road surface

Continuously the fleet in the transport company of Žilina is being renewed. This renewal also includes the purchase of green electric buses. As part of the SOLEZ pilot activity, the city of Žilina had the opportunity to obtain the necessary information to plan a replacement of the fleet. For example, information is needed to determine which routes are suitable for electric buses.

In parallel with this issue, the project was able to obtain information to assess the effectiveness of the electric buses introduction.



### Pilot Actions

The first pilot activity in the city of Žilina consists of characterisation of current city bus transport based on continuous GPS/GPRS telemetry tracking of buses and a pilot study of city bus transport electrification based on virtual simulation of electric bus fleet over recorded driving cycles.

Project partner of Žilina equipped 15 city buses with telemetry tracking devices for continuous 12 month, 24 hour/day recording of bus velocity, absolute position (longitude, latitude and altitude), mileage, fuel consumption, engine speed and torque, etc.

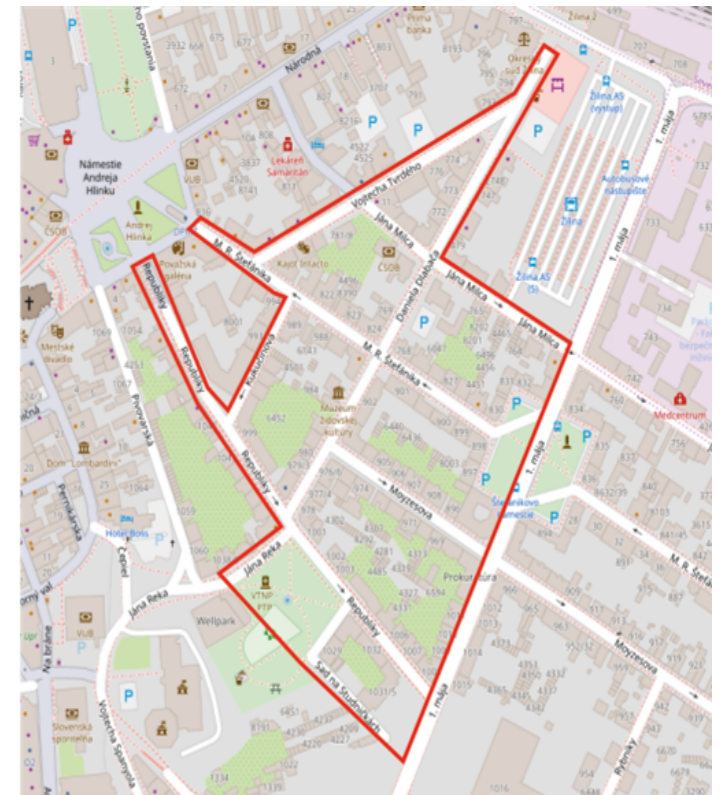
The acquired raw data have been inserted into the Data Post-Processing Module (DPPM) of the overall software tool developed by the University of Zagreb to extract the set of driving cycles for virtual simulation of the city bus fleet, as well as to provide statistical analysis/characterisation of city bus transport.

The analysis has pointed out that the Žilina city buses are placed in the depot during a long period over night (around 8 hours) and also in late morning and early afternoon hours, so that the total depot dwelling time ratio exceeds 50%. On the other hand, the buses are dwelling at the end station for a relatively short time (3 minutes in average for all stations, and around 10 minutes for selected end stations).

Based on these results and the fact that Žilina has a trolleybus electric grid in the city centre, it has been found that Žilina electric city bus transport should be based on charging in depot and also in selected stations in the city centre (not end stations) where the trolleybus grid is available and where buses are dwelling for a considerable amount of time (e.g. railway station stops).

The fast chargers should be installed on the bus, together with a pantograph that can be lifted to the trolleybus grid line when the bus is resting in the selected station to be charged.

The second pilot action helps understand installation needs for smart parking system, offers test data available from installed traffic flow monitoring system for setting new regulation strategy for parking zone.





## SOLEZ PROJECT IN GDANSK

Taking part in the SOLEZ project has begun a change in the city centre of Gdansk and put a focus on the city centre in regard to expand the Limit Traffic Zone (LTZ).

### Pilot Actions

The first pilot solution implemented within the SOLEZ project was limiting the heavy trucks traffic in the Gdansk city centre. To find a suitable solution a discussion has been started with local businesses. At first there were some issues to be overcome, but a year later the right solution has been agreed on and fully adopted.

The changes, inspired by the SOLEZ project, which have since been implemented in the public space of Gdansk, often raised doubts and were a subject to heated public discussions. However, in aftermath,

it made the city of Gdansk seem as an innovative city. What is worth mentioning, are new pedestrian zones - totally car free - in the area of Stągiewna, Grobla IV and Św. Ducha streets and new urban arrangement in Szafarnia developed together with local businesses and district council.

The city of Gdansk have also prepared a so-called Gdansk Action Plan for expanding and improving Limited Traffic Zones in the city centre. Various city entities together with metropolitan association set a broad range of measures and started to be successfully implement them. New local law regulation was introduced to expand the Limited Traffic Zone and set a narrow timeframe 6 - 11 a.m. for B2B deliveries in the historical city centre.



GDANSK

Additionally, in line with Gdansk Action Plan, a new scheme of Paid Parking Zone was adopted by Gdansk City Council in April 2019. The new scheme is characterized by integrated approach and covers the whole area of the Gdansk city centre.

What's more, within smart parking pilot action a system for counting free parking spaces was launched at Długie Ogrody Street providing essential data for city decision maker together with a user friendly mobile app for citizens.

Great emphasis was put on public communication and meetings with various stakeholders. In September 2018, The Congress of Active Mobility in Gdansk attracted and gathered almost 300 participants.

There had also been several events aiming at children covering the topic of air quality in Gdansk, Gdynia, Tczew and Wejherowo.





# PROJECT MAIN OUTPUTS: ENHANCED SERVICES FOR SMART PARKING

This tool has been designed mainly in order to improve planning of low carbon mobility and to show that it is possible to reduce impacts of traffic regulation by means of well-adjusted smart parking service and to utilize data for better traffic organization in an operative area.

The tool is composed of 3 successive parts that provide benefit (service) to all stakeholders (policy-makers, traffic experts) during any phase of the smart parking implementation process (project preparation, tender, ITS development action plan for FUA).



## Part 1

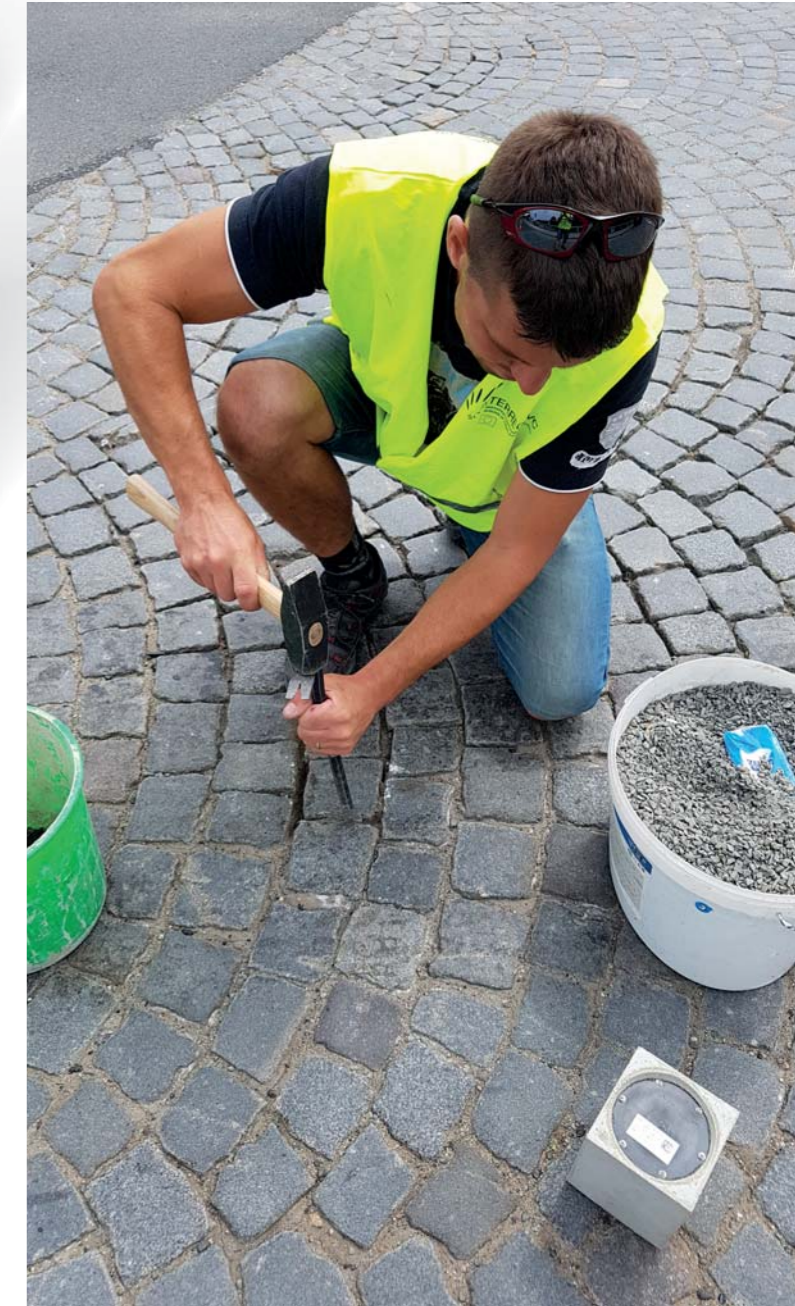
Provides basic information for raising awareness of ITS technologies used for smart parking. It describes advantages and disadvantages of specific technologies as well as what purposes they are suitable for. This part is suitable for the phase of planning and designing of a new parking system implementation.

## Part 2

Proposes possible parking regulation schemes. The regulation schemes are described and assigned with detection technologies and related intelligent networks suitable for implementation so that the expectations for using smart parking are met. DSS is created which gathers specified information and assists in selection of the most suitable detection technology. The methodology for identification of problematic spots for standing traffic is formulated; this manual allows to compile requests for assigning feasibility study of a smart parking system. It includes description of data management allowing data collection by detection technologies and its evaluation to comply with the interoperability requirements of ITS system according to the ITS directive.

## Part 3

The SOLEZ software tool has been created to merge the data from detection technologies implemented within SOLEZ pilot action, but also to be used in any other possible way. The SOLEZ software is cloud-based and its implementation is described step by step at report available as output on project website.



## Expected impact and benefits of the tool for the concerned territories and target groups

The tool is composed in a modular way, it is therefore possible to use only its certain part during any stage of the smart parking project planning. Even only developed software for merging the data from implemented detection technologies can be used to support smart parking.

In more detail, the proposed Tool can help Mobility Planners and Public Administrators from Central Euro-pean cities

to define more effective parking regulation strategy for their territories by:

- Providing comprehensive and validated information and advice on how to access the new ITS technologies and assess their suitability, how to choose between different technologies with regard to the overall transport concept of cities and their urban areas;
- Using Software that collects data about parking availability, provides real time data, dialogs with existing apps for info-mobility, supports intermodality towards drivers to the public transport.

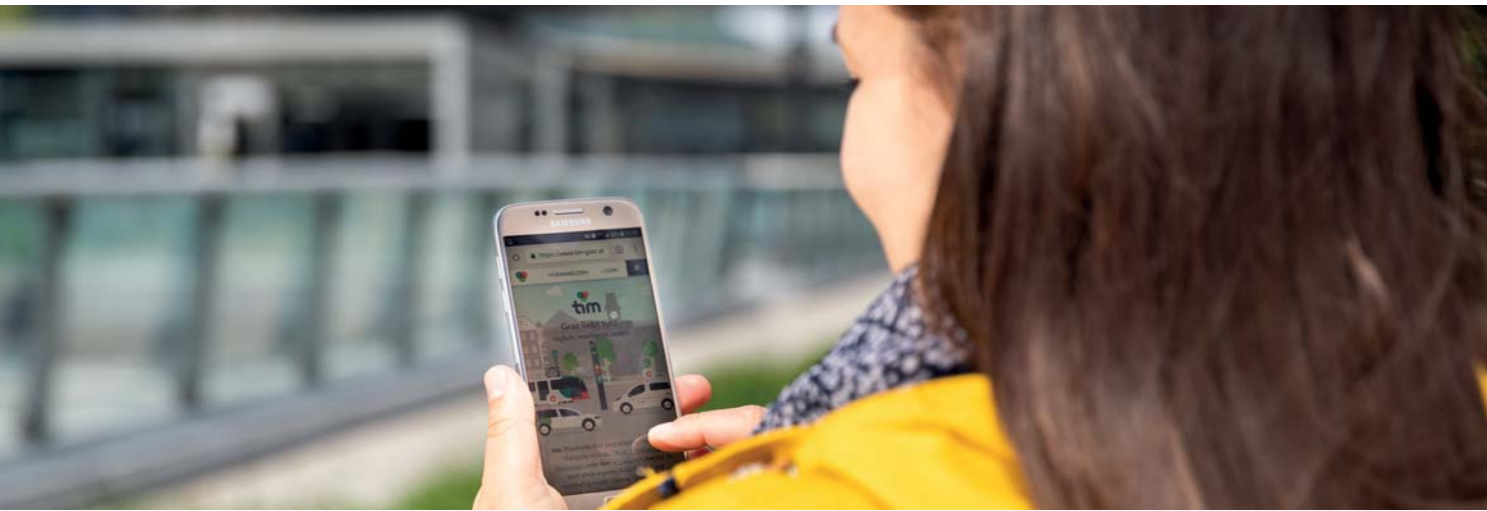
## Sustainability of the tool and its transferability to other territories and stakeholders

An important consideration emerged during the elaboration of parking regulation scheme, thanks to the transnational dimension of the Consortium, is that within Central Europe great differences exist from country to country and from city to city in experience and approaches concerning smart parking implementation.

In this context, the Parking Regulation scheme and Software platform has been developed with inputs and contributions from 5 partners FUAs, but with a clear leading role of the Transport research centre and the support of a ITS mobility experts, able to summarize and harmonize the different needs and requirements. I



## PROJECT MAIN OUTPUTS: HOW TO EFFECTIVELY DESIGN VALUE-ADDED SERVICES SUPPORTING LOW-CARBON MOBILITY



The Value Added-services toolbox is a transferable support tool aimed at designing and assess low-carbon Value-Added services for passenger and freight in EU functional urban areas.

Value-Added services are organizational measures enabling to boost and promote low-carbon mobility services as an effective and alternative solution to conventional fossil-fuelled transport modes reducing, at the same time, the disadvantages produced by traffic restriction policies to people living, working or visiting Functional Urban Areas.

Furthermore, they can increase business opportunities of mobility services suppliers (including sustainable passenger and freight mobility services such as carpooling integrated with public transport, green last-mile delivery, etc.). The toolbox provides an overall description of most promising and innovative solutions implemented in European cities, enabling competent Public Authorities and professionals to assess and evaluate the technical, organisational and financial applicability

of these innovative services in their own territories, taking into consideration the specific local conditions.

The Value-Added services considered in the toolbox are based on relevant technical knowledge and experience resulting from previous and ongoing European research and development projects, CIVITAS, Intelligent Energy Europe, Horizon 2020, etc.) dealing with innovative and low-carbon mobility services and ICT-based solutions. The covered Value-Added services are:

- carpooling integrated with public transport (innovative apps);
- innovative services in passenger transport interchanges;
- Mobility as a Service (MaaS) schemes;
- Multi-users lanes (priority bus lanes sharing with freight vehicles);
- Green last-mile logistics services (Business to business - Version 2 B2B - and Business to Consumer -B2C- last-mile).

### Expected impact and benefits of the tool for the concerned territories and target groups

City centers are responsible for a relevant part of traffic from and to other urban areas in their hinterlands. Access restriction policies (such as Low Emission Zones - LEZ - or Limited Traffic Zones - LTZ and pedestrian areas) can be used to tackle this phenomena which is spreading year by year causing an increasing transport demand.

However, this interventions can have a negative impact on the relevant target groups involved (i.e. commuters, tourists, students, shop owners, etc) that can jeopardise their good effect.

The developed Toolbox enables Public Authorities, transport providers as well as business operators to design and set-up tailored services and measures that can counterbalance the negative effects of traffic restriction regulations for city users.

### Sustainability of the tool and its transferability to other territories and stakeholders

In the medium term, the toolbox and the implementation of proposed Value-Added services will thus contribute to increase attractiveness and accessibility of urban areas, favouring the shift towards low-carbon mobility and transport habits, without limiting individual mobility capability.

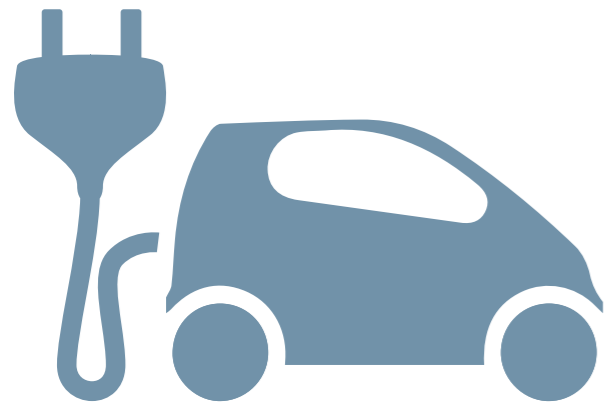
The SOLEZ toolbox has been elaborated combining top-down and bottom-up approaches in order to provide an effective and transferable technical supporting tool for relevant stakeholders including both public and private sector) to design and implement low-carbon mobility service in Functional Urban Areas.



City of Graz / Harry Schiffer.



## PROJECT MAIN OUTPUTS: TOOL FOR PLANNING THE CITY BUS TRANSPORT ELECTRIFICATION



Main aim of this ICT tool is to support local administration in planning city bus electrification

The tool consists of four modules:

- Driving cycle data post-processing module (DPPM)
- E-bus simulation module (EBSM)
- Charging optimization module (COM)
- Techno-economic analysis module (TEAM)



### Expected impact and benefits of the tool for the concerned territories and target groups

The developed software tool can be exploited by different users to deliver a number of benefits for the concerned territories and various target groups.

First, the city bus transport companies can use the tool for planning of future introduction of different types of electric buses and related charging infrastructure.

The tool is designed to use real/recorded driving cycles and techno-economic data, which the transport companies are at disposal of, to calculate the optimal type and number of e-buses and chargers, as well as prediction of total cost of ownership including investment and exploitation cost.

The calculation also includes savings in energy consumption, and equally important reduction of pollutant gases and CO<sub>2</sub> emissions in the concerned cities/territories.

The public administrators can use the tool to analyse the benefits of city bus transport electrification for different techno economic scenarios, and shape the incentives for end users to proliferate such green technologies for the benefits of citizen.

The tool can also be used by research and development institutions (e.g. universities) for various projects aimed at greening the city transport of future, as well as for education purposes.

### Sustainability of the tool and its transferability to other territories and stakeholders

The main lessons learned through a direct cooperation with the two cities involved and interactions with other cities participating in the project were related to realizing that different cities have rather specific characteristics of city bus transport systems, internal processes and requirements/preferences.

This posed the requirement on making the tool transferable to different users/territories, which at the end yielded a multilayer modular tool architecture (in its core and in specific input modules) to satisfy that requirement.





## PROJECT MAIN OUTPUTS: COMMON TOOL FOR ACTION PLAN ELABORATION

Within the project, partners defined shared procedure and methods for the elaboration of the “SOLEZ Action Plans”, identifying local based priorities and demand-oriented measures for increasing the effectiveness and acceptability of traffic regulation policies in urban areas.

The final purpose of this Tool is to support competent Local Administrations from Central Europe cities in the elaboration and drawing up of a strategic and implementation-driven transport planning document for defining effective and shared low-carbon mobility actions targeted to short-medium timeframes as well as longterm visions at Functional Urban Areas level (FUAs). It provides a common and smart step-by-step process that Public Administrators can follow to draw their Action Plans, congruent and compatible with the most relevant and well recognized European sustainable mobility planning Guidelines, and able to take into account other relevant transport sectors plans, policies and strategies already adopted in the FUA.

The developed methodology foresees 6 steps that goes from an assessment of the existing low-carbon mobility framework at FUA level, to a mobility diagnosis and goals setting which finally leads to the identification of effective low-carbon mobility actions, that will be either “quick win” solution targeted to short-medium term and strategies to long-term vision, covering all transport modes, passengers and freight mobility aiming to improving quality of life for all FUA citizens.

The developed guidelines are available in English and are now being applied and tested in 8 FUAs directly involved in the SOLEZ project.

### Expected impact and benefits of the tool for the concerned territories and target groups

The proposed Tool can help Public Administrators from Central Europe cities to define:

- More effective and sustainable low-carbon mobility strategies for their territories, by shifting the focus from the city to the FUA dimension, supporting co-planning and coordination of interventions between central city and hinterland municipalities;
- Promoting the identification and adoption of a coherent mix of both “push” measures (ex. tools, LEZ, etc.) and “pull” interventions (ex. info-mobility services, improved public transport offer, etc.), to increase acceptability and effectiveness of proposed interventions;
- Offering a simplified and accessible instrument for low-carbon mobility planning, that can represent the first step for the subsequent adoption of other and complete instruments for sustainable and integrative planning processes in transport and mobility sector, like the Sustainable Urban Mobility Plans (SUMP) and other.

### Sustainability of the tool and its transferability to other territories and stakeholders

The Guidelines have been designed ensuring overall compatibility and compliance with the most relevant and well-recognized European sustainable mobility planning guidelines and other existing supporting instruments for planning, designing and implementation of sustainable transport measures, in order to maximize sustainability and transferability beyond project territories.

The proposed process has been kept as simple and straight forward as possible, to be easily implementable also in smaller municipalities and with no or minimum need for external support.



7

EU countries

10

Project partners

1.933.734

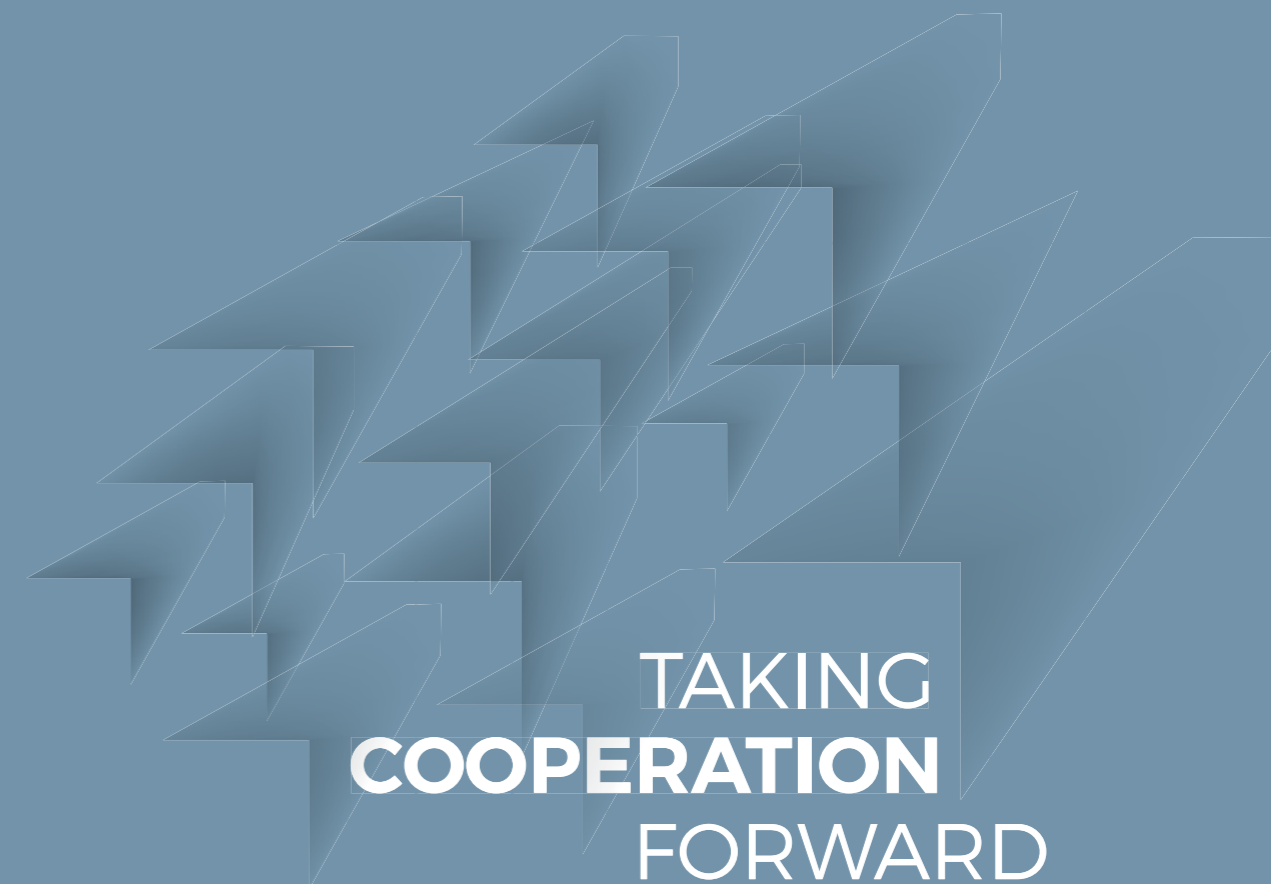
Project budget

€ 1.604.562

ERDF Founding in EUR

06.2016-07.2019

Project duration



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COOPERATION  
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