

Action Plan of Low Carbon Mobility in the City of Zilina and its Urban Area

This document describes the various steps for the proposal and implementation of the low-carbon mobility measures in Zilina town. The document was developed as case study within SOLEZ project, while recommendations of the European Union ("The Joint Instrument (Manual) for the elaboration of the SOLEZ Action Plans") are processed within the document. The Action Plan represents the short- and long-term goals of introducing low carbon mobility in line with the SOLEZ project. The Action Plan outlines general recommendations for stakeholders and proposes specific solutions for problems that are related to the region of Zilina. The plan addresses not only quick short-term measures to reduce the carbon trails of the city of Zilina but also describes solutions which are relevant in short and long term horizon.

1. Strategic goal

Supporting low carbon mobility through the use of P + R within the transport infrastructure of the city of Zilina

1.1. The strategic objective for the functional city area of Zilina (FUA) can be divided into the following parts:

- Technical sustainability of proposed measures within transport
- Environmental sustainability both from local and global point of view
- Economic sustainability
- Raising public awareness

The above-mentioned strategic objectives can be achieved by implementing the following strategic measures in FUA:

- Satisfaction with FUA mobility needs
- Reducing environmental encumbrance
- Increasing the security
- Minimizing the use of private cars in urban areas
- Introduction of LEZ (low emission zones) and LTZ (low transport zones)
- Improving the quality of services that ensure mobility within the FUA
- Increasing the integration of public transport
- Increasing the competitiveness and efficiency of public transport
- Increasing the percentage of integrated transport users
- Increase the share of the shared transport system within the FUA

2. Defining a Functional Urban Area – FUA

On the basis of the document "Zilina City Zones of Transport" (hereinafter UGD), the city of Zilina holds the function of administrative, economic and cultural center of the north-western part of the Slovak Republic. Within the proposal of the Zilina town plan, the treated area is divided into 11 urban areas, further divided into transport districts.

From the above data it is clear that FUA consists of several units of the city of Zilina and based on the methodology for determining the functional urban area FUA (Source: OECD Definition of Urban Areas (FUA) for the OECD metropolitan database), FUA Zilina can be defined as a polycentric FUA where more than 15% of the population are transporting to the work from one core (Zilina town) to another core (Martin town) and vice versa. Based on the number of inhabitants, the FUA is defined as small urban area, i.e. urban area with a population of up to 200,000, with more than 50% of the FUA population living in a high

density area. Based on the mentioned methodology, the city of Zilina and the city of Martin belong to the FUA core. It is a FUA with two or more urban centers.

The area of interest and thus of the functional urban area is formed by municipalities immediately bordering with the agglomeration, which usually is exposed to the high percentage of transportation to Zilina town. The catchment area consists of municipalities situated in the area of interest in the Zilina district, with a significant portion of transportation to the town. The wider external area reacts to the interconnection between the Zilina agglomeration and the other territories of the Slovak Republic, but also to the border with the Czech Republic and Poland.

The constraint factor of these territories to the communication infrastructure (highways, high-speed roads, roads, railways) is included in the traffic model of the transportation model. In relation to the Zilina urban agglomeration, 37 districts of interest are developed, 6 catchment areas and 5 entry and exit communication routes in relation to the territory of the Slovak Republic and abroad.

[Source: Urban Areas of the City of Žilina, Definition of Functional Urban Areas (FUA) for the OECD metropolitan database].

2.1 Defining a framework for low carbon mobility in a functional urban area

As part of the any action plan for the development of low carbon mobility, the area of Zilina and its suburban areas will be included in the overall framework. A more detailed division of the city in terms of mobility and transportation is carried out in the so-called "traffic districts". These transport districts correspond to the localities based on analysis of the transport and population mobility. Their boundaries, location and size are given by the shape of the territory, by its functional links, by transport links, and by the division of the city's communications network. The city of Zilina is divided into 4 urban districts. Under the proposed measures for low carbon mobility, these urban areas will be taken into account.

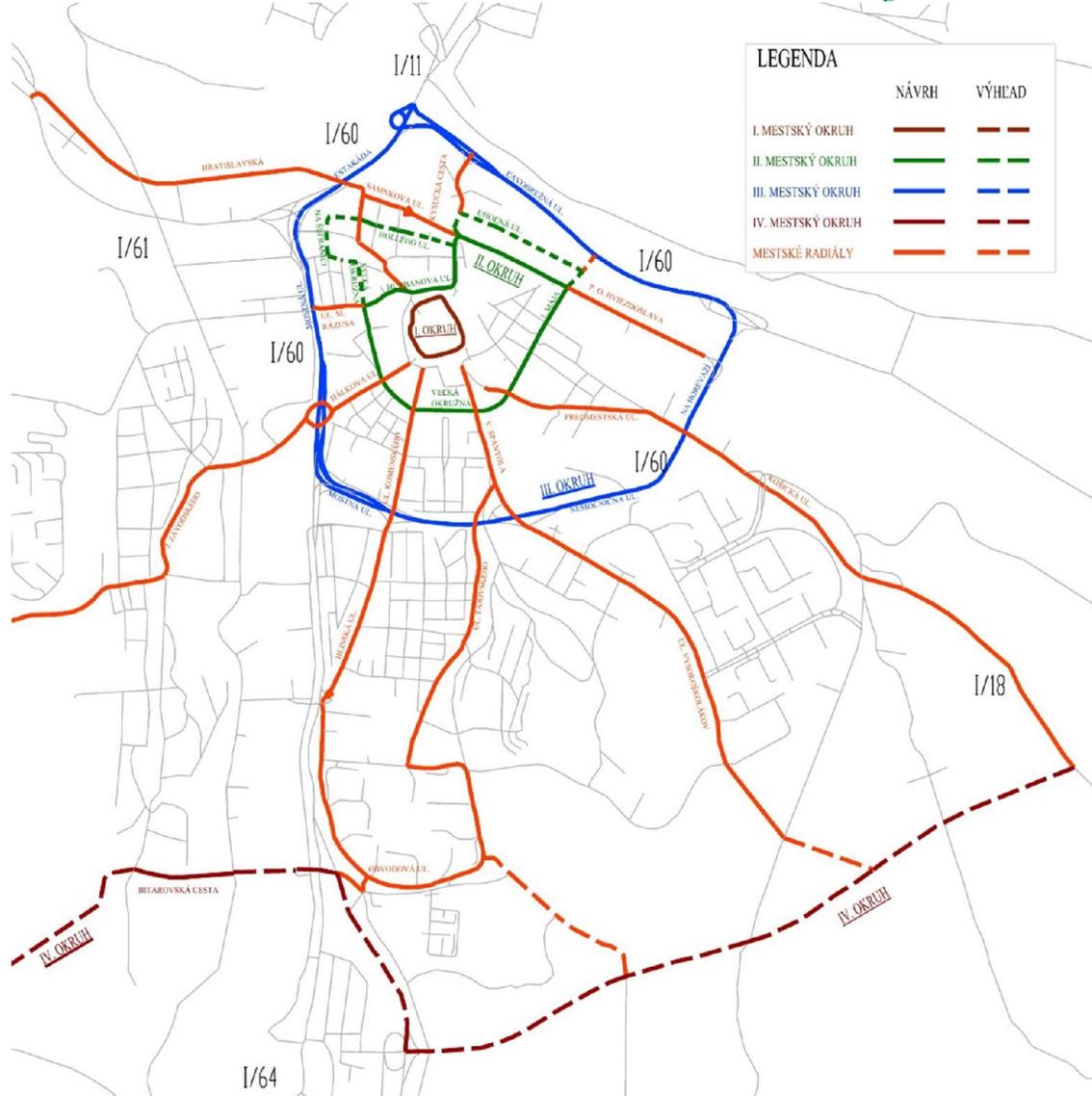


Fig. 1: Main transport districts of Zilina city

3. Identification of key actors within a functional urban area

The City of Zilina as a public official is the main actor of mobility within the FUA. Together with the city, individual urban areas, private companies and residents of individual regions are part of mobility in Zilina. All proposals to reduce carbon mobility of the city needs to be discussed not only within the policy of the council, but especially within the requirements of other stakeholders. It must be given that the proposed measures will affect their activities. It will also be necessary for stakeholders to take part

in the process of consulting the proposals for individual measures. The other actors are energy supply companies and scientific institutions that are able to provide the necessary infrastructure for the development of low-carbon or non-emission-free transportation and also to provide know-how and methodology to achieve the objectives and measures.

The main actors in the framework for low carbon mobility in the FUA:

- Žilina (City)
- Urban areas
- Private companies (the main players within the selected area)
- Transport companies
- Energy companies
- Scientific Research Institutions

The role of the city of Zilina within the solution of low carbon and sustainable motilities lie in facilitating the movement of people and loads. This process shall be smooth, efficient, environmentally and economically free and socially beneficial. Within the functional urban area, it is important to identify coordination requirements and potential across all relevant policy areas, particularly in those areas and urban areas most relevant to the mobility.

4. Diagnostics of Mobility and Goal Setting for FUA

The analysis of the current state of the traffic situation in individual zones and districts of the city of Zilina was taken from the document "Territorial analysis of the city of Zilina 2015", which accurately capture and describe the current situation in the field of traffic and mobility.

4.1 Analysis of the current state of transport infrastructure

The current state of the transport infrastructure is a basic starting point for the proposal of the Low Carbon Action Plan in the city of Zilina and its functional urban area. In the following chapters, the different types of transport infrastructure are described and their current status is assessed.

4.1.1 Road – car transport

The length of the road network of the Žilina Region is a total of 2 025 km (valid for 1st January 2015), which represents approximately 11.7% of the total length of the roads in Slovakia. The density of the network is indicated by two data:

- the number of km of roads per area: 0,297 km / km²,
- the number of kilometers per 1000 inhabitants: 2,039 km / 1000 inhabitants.

The current state of road infrastructure in Zilina is characterized by a relatively dense network of roads, but with a low proportion of higher class roads (highways and high-speed roads). The total length of the roads in Zilina was 321,689 km (valid for 1st January 2015), which is increase of only 11 km within the last 10 years. From total amount, first class roads are 77,739 km, II. class 53,776 km and III. class 182,438 km. The motorways make up only 9,736 km. The density of the road network characterized by the length of the road to the area is 0,397 km / km², which is above the Slovak average (0,366 km / km²). However, this does not apply to the calculation of the density of the road network to a population that is only 2,039 km / 1000 inhabitants, which means Zilina city belongs to the regions with the lowest density (in Slovakia it is 3,305 km / 1000 inhabitants).

5. Individual scenarios and measures for low-carbon mobility within selected framework of the FUA

In order to achieve the stated goals and strategic objectives in accordance with the Low Carbon Action Plan in the City of Zilina, some scenarios and solutions were proposed for short term vision as well as for long term vision. The division of the different scenarios for the implementation individual measures for reduction of the carbon trails is as follows:

Stage Nr.1 – short and medium term solutions (1 – 5 years)

- Bike sharing (in cooperation with the private sector)
- Modification of public transport links (in accordance with point 1)
- Introducing e-bike sharing
- Introduction of the low-carbon zone within the 1st city circuit and the adaptation of the parking policy (low-carbon sites)
- Introduction of e-bus in urban transport
- Installing the charging stations Step 1 (in accordance with point 3)
- Installing charging stations on pillars of public lightning infrastructure

Stage Nr.2 – long term solutions (10 – 20 years)

- Expansion of bike / e-bike sharing
- Introducing e-car sharing
- Enlargement of low carbon zones
- Implementation of e-bus charging stations at public transport stops (accessibility of other areas)
- Introducing WET charging at parking places
- Realization of accumulation points (energy hub)

The steps in the action plan are focused on the development of sustainable urban low carbon mobility. It defines a series of related concrete actions designed to meet the needs of mobility of individuals and businesses in the future. The main principles of design of the city's transport system are based on developments of conditions for sustainable mobility. These measures are time-consuming and cost-intensive and can be divided into 'fast-paced' solutions for short- to medium-term intervals. Mobility strategies within functional urban areas focus on a long-term vision covering all modes of transport, passenger and freight transport, walking and cycling, parking, etc. The distribution of individual measures in terms of time and financial is shown in Fig. 4.

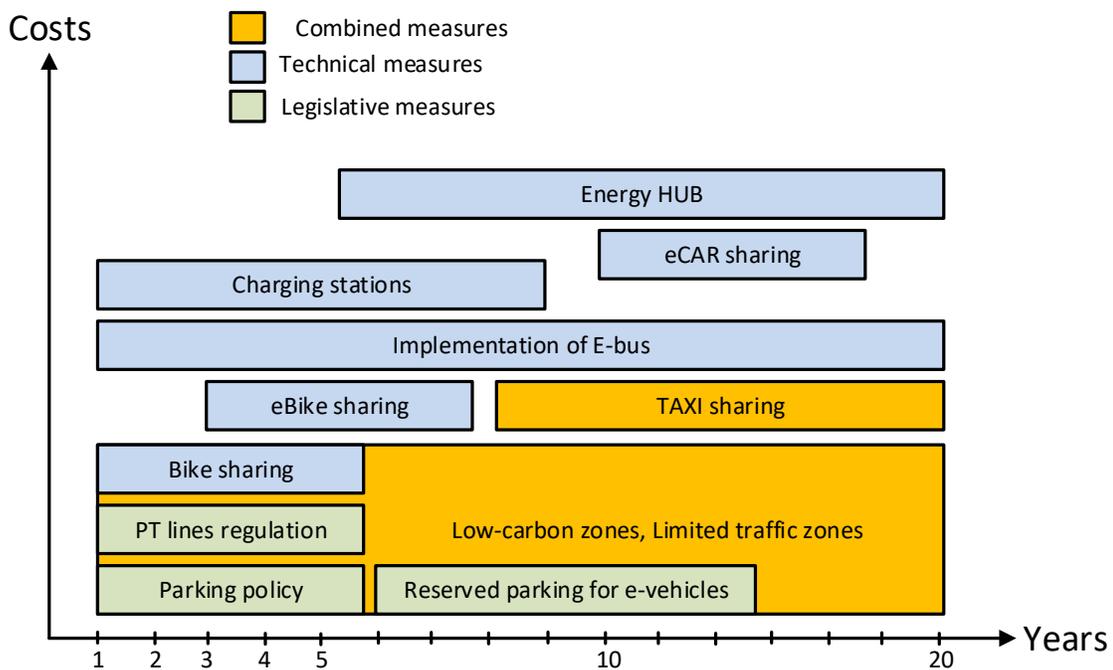


Fig. 4: Time and cost requirements of individual actions under the Action Plan

During the implementation of individual low-carbon mobility measures within the FUA selected framework, the co-ordination of individual actors and the definition of their competencies are necessary. The role of the City of Zilina as the main actor of mobility will be to set precise requirements for addressing individual steps within the action plan. These requirements must be in line with EU documents concerning the deployment of intelligent transport systems, renewable energy sources in the FUA frameworks as well as measures to improve energy efficiency within the FUA.

The basis for implementation of individual measures in the FUA is the good availability of the so- strategic points in cities and functional urban areas. Within FUA central points (core points) the strategic points include state and municipal institutions, business zones,

transport hubs, and educational institutions. Within the FUA, strategic points include industrial zones, transport hubs and larger agglomerations. Based on the definition of the framework for FUA Zilina, the following strategic points have been defined in the FUA (in Zilina city):

Strategic Points in Zilina:

- Center (Hlinka Square)
- Bus station
- Train station
- Town Hall
- VÚC
- ÚPSVaR
- HOSPITAL
- Žilpo (polyclinic)
- University of Žilina (University)
- Courts
- KC PZ
- Aupark Shopping Center
- Mirage Shopping Center
- Shopping Center Max
- Stadium (football and winter)
- Industrial zone - Kamenná street
- Shopping center Dubeň

The following chapters describe specific procedures for addressing short-term measures to achieve the objectives of the Action Plan.

5.1 Bike sharing

Bike sharing is a short-term measure that can reduce carbon mobility in the city through the passage of cyclists. Within the bike sharing system, stations are used where residents can borrow bicycles and use them as an alternative way of transport. This bicycle rental system is especially suited for locations with close proximity to strategic points from the individual site. This measure has positive emission feedback, i.e., the more participants of the bike sharing within transport exist; the more reduction of carbon emission is presented.

5.2 Modification of city transport lines

As part of the implementation of the measures mentioned in the Low Carbon Action Plan, it is necessary within the first stage of the implementation to adapt the public

transport lines in the way that distribution of the bike - sharing stations are considered according to Fig. 5. In connection with the modification of the city transport lines, it is necessary to take into account also the cost of individual connections according to the city of Zilina, in order to make the most efficient use of bicycles.

5.3 Introduction of low carbon zones

The introduction of low-carbon zones aims to reduce the carbon trails in those parts of the city where high concentration of pedestrian traffic and a high concentration of residential buildings (city center) are presented. In the context of the introduction of a low-carbon zone, it is also necessary to consider the introduction of restricted transport zones and the extension of zones with the limited entry of trucks.

Zoning of the city of Zilina, as part of the implementation of low-carbon mobility, must take into account the above-mentioned solutions as well as the requirements from interested parties. In the case of these measures, there may be conflict requirements from individual stakeholders within the city mobility. It deals about the private sector as the infrastructure user and the town hall as city manager. For this reason, it is recommended to deal about restricted transport zones in sensitive and precise way.

5.4 Installing charging stations on existing infrastructure of public lightning

One of the critical aspects of integration of the electric vehicles and other vehicles powered by onboard batteries is the availability of charging stations and their power capacity. From a global perspective, chargers can be divided into three power classes - charging stations with low, medium and high installed power.

As part of the implementation of individual measures to support low-carbon mobility in the city of Zilina, it is envisaged to install low and medium power level charging stations on the selected pillars of public lightning infrastructure (PLI). Due to the fact that the town of Žilina is addressing the reduction of its energy intensity by replacing old light sources with modern LED lamps, the saved power capacity can be used for building of the charging stations. This measure is addressed by the city of Zilina through the coordination of its activities with the energy company (determination of the location of individual stations) and the scientific-research institution (processing of technical aspects).

5.5 E-bike sharing

The e-bike sharing system is relatively widespread in the metropolitan areas of the European Union. This is a low-carbon mobility solution similar to bike sharing, but with the elimination of the overrun problem of individual routes. The issue of height differences

between individual strategic points is quite pronounced in the city of Zilina, therefore this measure is particularly advantageous.

5.5 E-busses implementation within public transportation

This measure is one of the short- to medium-term solutions. However, this solution requires not only technological support (charging stations implementation), but also a critical verification of the route within which electric bus shall operate. The reason is to make the solution as efficient as possible.

6. Review of the impacts of individual solutions within Low Carbon Action Action Plan of Zilina city

In order to address the strategic objectives and propose action plans for the Low Carbon Action Plan, it is necessary to carry out a critical factor assessment. For FUA Zilina, the following factors are critical:

- Long time intervals in decision-making by competent institutions
- Traffic jams - overloading individual communications
- Pollution
- Advanced bus age
- Limited funding opportunities for innovative technologies
- Low public awareness of low carbon mobility innovations

It is also necessary to eliminate the critical factors related to the introduction of low-carbon mobility within the FUA:

- Long responses to NFP requests
- Difficulties in accepting measures which restrict access to low carbon zones
- High cost for electrical means of transport
- Poor awareness of the people about the benefits of introducing low carbon mobility
- Discreet efficiency of electric vehicles in terms of CO₂ production on a global scale

7. Review of the impacts of individual solutions within Low Carbon Action Action Plan of Zilina city

The Low Carbon Action Plan of Zilina defines the following strategic objectives:

- Technical sustainability of proposed transport measures
- Environmental sustainability both locally and globally
- Economic sustainability
- Raising public awareness

The above-mentioned strategic objectives can be achieved by implementing the following strategic measures within FUA Zilina:

- Satisfaction with FUA mobility needs
- Reducing environmental pollution
- Increasing security
- Minimizing the use of private cars in urban areas
- Improving the quality of services that ensure mobility within the FUA
- Increasing the integration of public transport
- Increasing the competitiveness of public transport
- Improving the economic efficiency of public transport
- Increasing the percentage of integrated transport users
- Increase the share of the shared transport system within the FUA

The solution of the measures to achieve the objectives can be divided into two stages:

Stage 1 - short and medium term solutions (1 to 5 years)

- Bike sharing (in cooperation with the private sector)
- Modification of public transport links (in accordance with point 1)
- Introducing e-bike sharing
- Introduction of the low-carbon zone within the 1st ring road and the adaptation of the parking policy (low-carbon sites)
- Introduction of e-bus in urban transport
- Installing the charging stations Step 1 (in accordance with point 3)

Stage 2 - long-term solutions (10 - 20 years)

- Expansion of bike / e-bike sharing
- Introducing e-car sharing
- Enlargement of low carbon zones
- Implementation of charging stations at public transport stops (accessibility of other areas)
- Introduction of WET charging at parking places
- Realization of accumulation points (energy hub)