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Regional Mobility Plan for the designated region based on the regional needs' analysis and SWOT analysis
&
RECOMMENDATIONS regarding sustainable transport to update the document: "Development Strategy of Małopolska Province"

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REGIO-MOB
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SPIS TREŚCI

1 INTRODUCTION – SUMMARY OF THE CURRENT STATE DIAGNOSIS – WITH REGARD TO REGIONAL NEEDS ANALYSIS AND SWOT ANALYSIS

Regio-Mob project covers the area of Niepołomice Commune, areas, within which there are located travel destinations related to work and education of the commune's residents and travel origins of people employed in the Niepołomice Investment Zone [Polish: Niepołomicka Strefa Inwestycyjna; acronym: NSI]. In addition, it concerns areas where transport accessibility increase may encourage their inhabitants to take up work in the Niepołomice Investment Zone. This zone is the largest of all subzones of the Krakow Special Economic Zone, concentrating in its area workplaces, oriented on servicing the Krakow's and Małopolska Province's markets, as well as national, and for some plants – also international. The number of people employed in the zone is 6328 (data as at the end of 2017), and according to surveys, as many as 80% of them live outside Niepołomice Commune, commuting daily to the zone from the area under analysis.

The analyzed area is affected by a number of problems. It is characterized by a relatively dense network of national and provincial roads, but the area of Krakow and the Krakow Functional Area [Polish acronym: KrOF, from Krakowski Obszar Funkcjonalny] requires investments to improve road accessibility, which is currently ensured mainly by local municipal and district (in Polish: powiat) roads. The KrOF's road network often does not ensure sufficient capacity, and thus accessibility in the connections of communes with Krakow. In addition, vehicle traffic volumes in Niepołomice Commune are critically high in the Niepołomice Investment Zone area. Increased traffic on roads is accompanied by negative effects in the form of harmful contamination and noise emissions.

Increased traffic is a consequence of excessive and ineffective use of cars in the travels of the residents of this area. The motorization rate determined on the basis of declarations of the Krakow Metropolitan Area [Polish: Krakowski Obszar Metropolitalny] residents is 323 passenger cars per 1000 residents in Krakow, and 354 cars per 1000 residents in neighboring communes (data for 2014[1]). The percentage of travels made with this means ranges from 34% to 36%, and is higher in travels of neighboring communes' residents. The percentage of journeys made by public transport ranges from 34% (in journeys of neighboring communes' residents) to 36% (in journeys of Krakow residents), while the percentage of journeys made on foot oscillates around the average value of 31% and is higher in the case of movement of neighboring communes' residents. The share of other forms of transport is marginal. In journeys by car undertaken in the metropolitan area, usually just one person travels in the vehicle. The car filling rate is 1.5 for the residents of Krakow and 1.6 for the residents of the neighboring communes. The car is chosen mainly for convenience and the shortest travel time as well as the lack of a suitable public transport offer. What is worrying with regard to commuting to the Niepołomice Investment Zone, is 85% of car share in travels, resulting from a very high percentage of employees living outside Niepołomice Commune and the lack of an attractive alternative to individual transport.

The results of transportation preferences survey in the communes located in the analyzed area, that have mobility plans, clearly indicate that there is a need to change the existing commuting patterns to places of work or study, because current commuting is too expensive, too long and tiring. The most important factors encouraging the residents of the communes to give up their car in everyday obligatory travels and traveling by public transport are: a higher frequency of public transport services, reducing the travel time by public transport and lower costs. In turn, the most important incentives to travel by bike are: providing a safe bicycle route to the place of work / study and financial incentives offered by

[1] EKKOM Sp. z o.o., International Management Services Sp. z o.o., "Badania zachowań komunikacyjnych mieszkańców Krakowskiego Obszaru Metropolitalnego" ["Research on communication behavior of the inhabitants of the Krakow Metropolitan Area."] Final report from the survey with the synthesis of results and detailed conclusions, Krakow 2014.

the employer. In addition, respondents the comprehensive traffic research in Małopolska Province point also to the following factors improving the functioning of public transport: Park & Ride parkings, central timetable, modern transfer hubs.

Presented below, the most important results of the existing state analysis show that the currently functioning system of collective and bicycle transport is not a real alternative to car in the travels of the area's residents.

In terms of the public transport, the area of Niepołomice Commune, which is the focus Regio-Mob area, is served by public agglomeration bus transport, private carriers and rail transport. The three agglomeration lines operated under the agreement with Krakow Commune provide access to Niepołomice town center from the western and north-eastern areas of Niepołomice Commune, eastern areas of Krakow Commune as well as the northern areas of Wieliczka Commune and from Wieliczka town. Two of them serve also stops located in the NSI area. However, public transport connections with the south-eastern neighborhoods of Krakow, including Nowa Huta, are insufficient. In addition, public and private bus transport vehicles move in the general traffic of other cars and are exposed to the impact of traffic congestion. This intensifies the perception of potential users of the lack of time efficiency of these means.

In terms of the quality of public bus transport services, residents of the communes adjacent to Krakow, including Niepołomice residents, rate the best personal safety, punctuality and regularity of services, as well as information for passengers, and the worst – fares, service frequency, duration of the trip and the immutability of travel time. On the other hand, microbus transport is a means with a distinctive negative image and a "necessary evil" to the insufficient offer of the other transport means, though with a high rating of suitability. In terms of the quality of its services, the highest rated features are: the minimum number of required transfers and travel time, and the lowest: comfort at stops and stations and accompanying parking infrastructure. In addition, the standard of rolling stock of private carriers is unsatisfactory in terms of transporting disabled people and prams. Generally, in the case of infrastructure quality of the bus public transport, residents' assessments are negative – stops are often devastated, without timetables, unlit, filthy, without seats. In addition, a significant problem, especially in the suburban area, is the lack of pedestrian and bicycle routes allowing safe access to bus stops.

On the other hand, in Krakow agglomeration one can observe a tendency to expand the microbus and bus network, which in the context of the need to develop future connections serving the area is a positive aspect, as well as the presence of infrastructure for CNG vehicles in Niepołomice Commune – vehicle treatment and refueling stations with the biogas coming from a municipal waste landfill. In addition, the launch of the Podłęże junction on the A4 motorway enables to introduce accelerated microbus lines serving Niepołomice and the NSI, and in Krakow – areas with poor access to the Fast Agglomeration Railway (Polish: Szybka Kolej Aglomeracyjna; acronym: SKA).

Rail transport, on the other hand, is perceived as the most dynamically changing transport mode – currently characterized by many shortcomings, but also considered one of the most passenger-friendly, with very high potential. The railway offer is still poorly known and used at the moment. Similarly to the other collective transport modes, the most perceptible barrier to rail travel is the lack of guarantee of timely arrival at the destination resulting from the conviction about possible delays of trains, timetable poorly adapted to passengers' expectations and conviction about insufficient comfort of travel. The highest rated features of the railway are, however, the timeliness and availability of timetables as well as the sense of security. The assessment of railway infrastructure is diverse – many stations and stops still need renovation. The essential factors leading to the improvement of railway operation include the coordination of railways with the public transport network, the increase in the number of P+R facilities at railway stations, and the development of the SKA.

The launch of the SKA route towards Tarnów has improved the transport links of

Niepołomice with Krakow, Bochnia and Brzesko as the travel destinations of many residents of the commune, but also the place of residence of many NSI employees. Currently connections between Krakow and Bochnia have the highest available frequency, and the model for co-organizing feed transport to the SKA developed in Wieliczka district is a model to follow in the process of transport systems integration. The potential of the railways is enforced by the relatively short distance of Niepołomice Investment Zone from Podłęże railway station. However, due to the fact that this stop is located outside the area of compact settlement, increasing its availability requires organizing feed transport (also in the case of Staniątki stop). Similarly problematic is the large distance of the inhabitants of the eastern part of the commune from the railway line, causing extended the access time to the railway. Improvement of the accessibility of Podłęże and Staniątki stops, especially from areas poorly served by bus transport, will be achieved through P+R parkings at these stops and at the station in Niepołomice. Another opportunity for increasing the railways role in the transports lies in the expansion of the mid-diameter line in Krakow and long-term plans for constructing the SKA line through Nowa Huta and Batowice.

It should be emphasized that the key issue is to ensure efficient connections by public transport of the Niepołomice Investment Zone with towns and villages where a large number of employees live, and without measures to improve these connections the car role in commuting will increase, causing increasing parking problems and difficulties in recruiting employees.

The landform in the Regio-Mob area, as well as location of the travel destinations of the commune's residents are conducive to pedestrian and bicycle traffic. The advantage is also the proximity of Niepołomice Forest and its good connection with the center of Niepołomice and the Vistula embankments (along which the Vistula Bicycle Route is planned) favoring the promotion of this area as a bicycle recreation place among the residents of Niepołomice Commune, Krakow and neighboring communes. Niepołomice Commune is also gradually implementing solutions favoring the calming of car traffic and improving cycling conditions. In addition, the planned P+R parking lot in Podłęże will be equipped with parking spaces for bicycles, which will increase the convenient access to the railways by pro-ecological transport. It is important to strive for other solutions to improve cycling and walking.

Yet it should be remembered that the ecological awareness of the society and awareness about the health effects of one's lifestyle are growing. This potential can be used in shaping the desired transport behavior, through information activities and campaigns promoting transport means alternative to car. What is also very important – transport systems serving the analyzed area are managed and coordinated by various urban, regional and supra-regional centers. The implementation of solutions to improve their operations will require the development of mechanisms that increase the cooperation of administrators and ensure the implementation of solutions in an integrated manner.

2 THE ESSENCE AND GOALS OF THE MOBILITY PLAN

This mobility plan is a document that responds in a balanced and integrated manner to challenges and transport problems of the Regio-Mob project area. The area of impact of the mobility plan covers 37 communes and has a regional character with a focus on Niepołomice Commune and the Niepołomice Investment Zone.

The purpose of the mobility plan is to indicate activities to develop sustainable transport system and to shape sustainable mobility, thus:

1. providing all the residents of Niepołomice Commune with access to travel destinations related primarily to work and study places, as well as to basic services;
2. ensuring high transport accessibility of the Niepołomice Investment Zone, especially with transport means alternative to car;
3. increasing transport accessibility of the areas of potential travel origins to work in the Niepołomice Investment Zone, especially with transport means alternative to car;
4. improvement of comfort and safety of travels carried out in the area covered by the plan;
5. increase in transport awareness of the area residents and formation of desired transport behavior;

and indirectly:

6. reducing negative effects of mobility, in particular when using passenger cars (reduction of environmental pollution, noise emissions, number of accidents, level of energy consumption);
7. increasing the efficiency of public transport in the area covered by the plan;
8. improvement of the economic vitality of the area covered by the, in particular, the Niepołomice Investment Zone;
9. improvement of attractiveness of the analyzed area and increasing the quality of life of its inhabitants.

It is important that the mobility plan, according to the concept of sustainable mobility planning, in contrast to the existing planning processes, focuses on people and their needs, not only on ensuring smooth traffic and increasing the speed of travel by car.

The mobility action plan has been defined on the basis of a diagnosis of the existing conditions of transport infrastructure and quality of transport services, analysis of regional needs, SWOT analysis and based on the principles of sustainable mobility policy. In addition, the existing – both at the local level of Niepołomice Commune and the regional level – concepts and plans for the transport systems development and projects accepted for implementation, were taken into account. In this context, the plan arranges the actions already taken, stresses the legitimacy of their application and provides a framework for their effective implementation.

The mobility plan measures cover comprehensively public and private transport means, motorized and non-motorized means, on the move and during parking. They take into account the balanced development of all significant forms of mobility, however, in such a way as to encourage travel carried out by means other than car, especially by public transport means, as those with the highest transport capacity, but also as being a viable alternative to commuting by car, especially in traveling to work. The plan stresses the role of the so-called active forms of mobility, especially bicycle (and in Niepołomice Commune, also pedestrian travels), as those bringing the greatest benefits for the health of residents and the environment. It also indicates ways to promote more efficient use of cars and to provide convenient conditions for multimodal travel.

The integrated action package proposed for implementation includes a wide range of solutions, measures and instruments, including "hard" measures related to investment plans, implementation of physical changes, financial instruments as well as organizational and "soft" measures regarding information, promotion and education.

Due to the fact that the plan focuses on meeting the needs and expectations of residents in the field of mobility, it also recommends using a participative approach, involving not only citizens, but also other stakeholders, both at the planning and implementation stages. This will allow for increasing public acceptance of the proposed activities (sometimes perceived initially as controversial) and will minimize the risk of social objections and conflicts between various interest groups. The process of detailed planning of implementation of actions and their implementation should be characterized by a wide range of cooperation between various sectors (public, private, non-governmental), levels of government (authorities at regional, urban, local level) and various stakeholders of the transport system (managers, carriers, etc.). Therefore, for each of the activities, a lead unit responsible for its implementation and involved stakeholders were identified, whose participation and support are necessary for the success of activities. In addition, a schedule was prepared for each measure, implementation and operation costs were estimated and possible sources of funding identified. To ensure the quality of the implementation process, a system for monitoring the implementation was created, and for a future assessment of their effects – a set of assessment indicators.

It should be emphasized that the mobility plan includes an integrated action plan and to ensure that its implementation will bring the maximum achievable results, an integrated action package should be implemented in its entirety. Actions should be mutually penetrated, complemented, and all stakeholders should be involved. Only then it will be possible to expect a synergy effect, i.e. "2+2=5 effect", in which the effect occurring in the interaction of various factors and simultaneous implementation of many activities is greater than the sum of the effects resulting from the separate application of individual actions.

It is assumed that this mobility plan is a model solution (the so-called good practice) and the planning of sustainable mobility in relation to other regions can be done based on activities defined here, and their scope should be adjusted and adapted to specific local conditions.

3 SOLUTIONS PROPOSED FOR IMPLEMENTATION

3.1 Measures related to individual road transport

In the analyzed area, a significant increase in traffic flows has recently been observed what is an immediate consequence of the dynamical development of individual motorization but also the further development of industrial areas located within the Niepołomice Investment Zone. Because only about ¼ of its employees come from Niepołomice Commune, therefore most of them have to commute to work by their cars even from farther distances. This causes an overload of the road network, and due to the fact that it very often passes through areas of compact settlement – also environmental nuisance and deterioration of safety conditions.

Another problem is a heavy traffic of trucks that serve production plants located in the commune, mainly in the Niepołomice Investment Zone. Their large streams also lead to accelerated degradation of the existing road network. Therefore, it is reasonable to take actions aimed at transferring traffic flows to routes specially designed for this purpose, i.e. construction of Podłęże junction on the A4 motorway and Podłęże bypass along the provincial road No. 964.

3.1.1 Construction of Podłęże junction on the A4 motorway

Introduction

Intensive development of the Niepołomice Investment Zone generates more and more freight traffic flows burdening the roads of lower classes, which are not adapted to carry such high traffic volumes. In addition, they often pass through small towns and villages, which causes adverse impact of traffic on residents (air pollution, noise, cutting ties), and also increases the risk of accidents. Therefore, the implementation of the junction along the A4 Krakow - Tarnów motorway will enable the transfer of a significant part of freight traffic to routes which, due to their technical properties, are designed to carry heavy traffic.

Another problem related to the further development of the Niepołomice Investment Zone is the lack of staff. Only a small part of the employees come from Niepołomice Commune, while most of them commute from other communes, sometimes distant. If they are not served by rail transport then it is necessary to offer efficient bus transport. An overloaded road network often does not guarantee punctuality of such journeys. The construction of the motorway junction will not only reduce the travel time, but will also significantly relieve the existing roads from bus traffic. It will also enable the organization of attractive bus transport providing efficient access even from larger distances via motorway.

Action description

Construction of a junction along the A4 motorway in Podłęże, aimed at improving transport accessibility to the Niepołomice Investment Zone and villages in the western part of Niepołomice Commune, as well as reducing the heavy traffic on the lower-grade road network passing through smaller villages causing significant environmental nuisance and increasing the accident risk. Its construction will also contribute to further increasing of the attractiveness of the Niepołomice Investment Zone and will be a factor encouraging other companies to invest in Niepołomice and create new jobs.

Stakeholders involved

- Generalna Dyrekcja Dróg Krajowych i Autostrad w Krakowie [General Directorate for National Roads and Motorway Branch in Krakow] – motorway manager,
- Zarząd Dróg Wojewódzkich w Krakowie [Province Road Authority in Krakow] – provincial road manager (the planned junction is located at the intersection with the provincial road No. 964),
- Starostwo Powiatowe w Wieliczce [District Governor's Office in Wieliczka],
- Urząd Miasta i Gminy w Niepołomicach [Municipal Office in Niepołomice].

Timeframe

2018-2019 (investment coordinated with the construction of a junction on the provincial road No. 964)

Costs

Estimated costs (signed agreement among stakeholders): PLN 29 million

Sources of funding:

- General Directorate for National Roads and Motorway Branch in Krakow – PLN 14.5 million (50%),
- Province Road Authority in Krakow – PLN 7 million (24%),
- Municipal Office in Niepołomice – PLN 4.5 million (16%),
- District Governor's Office in Wieliczka – PLN 3 million (10%).

3.1.2 Construction of the Podłęże bypass along the provincial road No. 964

Introduction

The dynamic development of the Niepołomice Investment Zone, as well as the increased individual motorization among the commune's residents, contribute to the excessive growth of traffic on lower-grade road network, which is not adapted to carry large traffic flows, especially heavy vehicles. The most important road in this area has the status of a provincial road (No. 964), nevertheless it runs through a number of villages: Podłęże, Zakrzów, Ochmanów and Zabawa. This causes deterioration of environmental conditions (exhaust and noise emission), but also of traffic safety conditions.

In addition, the often occurring congestion may be a factor hampering further development of the Niepołomice Investment Zone and a deterrent for new potential investors. Therefore, it is necessary to undertake modernization activities of the main roads in this area in order to improve the traffic flows, especially heavy traffic. One of the options is the construction of bypasses of individual villages.

Action description

The construction of the Podłęże bypass along the provincial road No. 964 – reduction of car traffic, especially heavy traffic, and transfer of transit traffic out from the area of Podłęże, which will enable the implementation of speed limiting solutions on the current road crossing (Wielicka Street), and consequently increasing pedestrian safety, enabling the implementation of bicycle traffic solutions, reducing the effect of a barrier cutting the village and reducing the noise emission level.

Stakeholders involved

- Province Road Authority in Krakow – provincial road manager,
- Municipal Office in Niepołomice – administrator of the street in the village of Podłęże, and after the completion of the bypass and changing it into a provincial road –

administrator of the current passage through the village,

- Podłęże residents (mainly of Wielicka Street) – reduction of the car traffic (especially heavy traffic) and the reduction of vehicles speed. Following effects can be expected: reduction of noise emissions, improvement of conditions and safety for non-motorized traffic, as well as reduction of the barrier effect and cutting ties among neighbors.

Timeframe

From 2018, design work, completion of investment in 2020 – investment coordinated with the construction of Podłęże junction along the A4 motorway)

Costs

PLN 70 million

Sources of funding:

- Regional Operational Program for Małopolska Province for the years 2014-2020 – PLN 59.5 million (85%)
- State Treasury – PLN 7 million (10%)
- Municipal Office in Niepołomice – PLN 3.5 million (5%)

3.2 Measures aimed at increasing the share of trips made by public transport means – bus and microbus transport

At the moment, due to the dynamically developing individual motorization, the importance of public transport in transport services in Niepołomice Commune is quite limited. This is also due to the dispersed nature of the investment, which makes it difficult to run a bus and a microbus line in the immediate vicinity of all destinations. Recently, there has been a growing interest in the Fast Agglomeration Railway in commuting to Krakow, especially its downtown. The factors that favor this are: on the one hand, high standard of rail transport, but also growing transport difficulties when commuting to the city and growing problems with parking in the city center (deficit of space, extensive paid parking zone). Therefore, it is necessary to aim at improving the accessibility of Podłęże railway station, including launch of appropriate feed transport ensuring efficient access not only from Niepołomice, but also the Niepołomice Investment Zone, which is a very large traffic generator. Another action favoring the increase of the public transport role in regional transport services is a reconstruction of Kolejowa Street in Podłęże into a "woonerf" zone, ensuring the improvement of the access to the railway station from the existing bus stop located within Wielicka Street (action described in detail in section 3.3.7).

3.2.1 Launch of the feeder bus line to the stop in Podłęże

Introduction

In 2016, the Fast Agglomeration Railway line no. 3 was launched on Kraków Główny – Tarnów route. It has two stops in Niepołomice Commune: in Podłęże and Staniątki. The former provides accessibility from the western part of the commune, including Niepołomice, but it can also be used for commuting to the Niepołomice Investment Zone. The latter is less important for transport services in the commune, because it is located in the eastern part, which is much less populated. For this reason, first of all, feeder transport to Podłęże station should be launched.

The analyzes conducted so far have shown little interest in traveling by rail by employees of industrial plants located in the Niepołomice Investment Zone, as most of the production plants are located in a considerable distance from Podłęże station that exceeds the distance of an acceptable pedestrian catchment. Therefore, bus transport of a feeder character between the railway station and industrial plants located in the NSI and Niepołomice town center should be launched. Such a route could be used both by the NSI employees who commute from Niepołomice by train, but also by other transport means. The residents of Niepołomice could also use it when accessing the train stop. Although such a solution would extend the time of commuting to the railway station in Podłęże, such a route would increase the profitability of such a line through increased ticket revenues.

Action description

Launch of a feeder bus line to the station in Podłęże, coordinated with the timetable of the Fast Agglomeration Railway trains – improvement of the access for Niepołomice Commune residents (especially of the western part which is more intensively invested) to the railway line and improvement of transport service of the Niepołomice Investment Zone, especially with regard to satisfying the needs of employees.

Options of feeding lines layout:

Option 1

This option is in line with the route proposed in the "Mobility plan for the Municipality of Niepołomice"[2] where two lines were proposed in Niepołomice Commune: U-A-SKA31 and

[2] Resolution No. XXVII/377/17 of the Municipal Council in Niepołomice of 26 January 2017 on adoption of the "Mobility plan for the Municipality of Niepołomice".

U-A-SKA32, and one U-A-SKA15 line, whose launch was proposed in the Transport Plan for Wieliczka Commune. This line is supposed to connect the center of Wieliczka and the center of Niepołomice, simultaneously serving passengers using Wieliczka Rynek-Kopalnia railway stop and the Podłęże railway station.
The first line marked as U-A-SKA31 would run from Chobot to Podłęże and Staniątki stops through the town center of Niepołomice. It is assumed that the courses will be performed alternately to both stations with a frequency of 1 hour. Thanks to this, on Chobot – Niepołomice Centrum route, the tact will be maintained for 30 minutes. This line will enable the residents of Chobot to use the SKA system, and additionally, it will provide passenger services on Chobot – Staniątki route. The timetable will be coordinated with train departures from Podłęże station and Staniątki stop.

- U-A-SKA31 Podłęże – Niepołomice Investment Zone – Niepołomice Center – Wola Zabierzowska – Chobot
- U-A-SKA31 (Option) Staniątki – Niepołomice Center – Wola Zabierzowska – Chobot
- Route: Podłęże Railway Station – Ogrodowa – Kwiatkowskiego – Wimmera – Płaszowska – Kościuszki (provincial road No. 964) – Niepołomice Rynek - 3 Maja – Batorego – Zabierzowska – provincial road No. 964 – Chobot.
- Route of an optional line: Staniątki Railway Stop – Staniątecka – Aleja Dębowa – Piękna – Niepołomice Rynek – 3 Maja – Batorego – Zabierzowska – provincial road No. 964 – Chobot.

Buses serving the U-A-SKA31 line will start and end their operation at the bus terminal located on the northern side of the railway station in Podłęże. In Staniątki buses will start and end their operation in the bus bay at the P+R parking lot.

The line marked as U-A-SKA32 will provide transport of passengers from the following villages: Suchoraba, Zagórze, Słomiróg, Bodzanów and Zakrzowiec to the railway stop in Staniątki. In addition, it will be locally serving passengers living in the southern part of Niepołomice Commune. The timetable will be coordinated with the departure of trains from Staniątki stop.

- U-A-SKA32 Suchoraba – Zagórze – Słomiróg – Bodzanów – Zakrzowiec – Staniątki
- Route: Suchoraba – national road No. 94 – Zagórze – Słomiróg – Bodzanów – Zakrzowiec – Droga Królewska – Jana Pawła II – Kolejowa – Staniątki stop.

Buses serving U-A-SKA32 line will start and end their operations at Kolejowa Street in Staniątki.

U-A-SKA15 feeder line will replace 301 agglomeration line from the railway station in Płaszów, to Niepołomice through Wieliczka. It will connect the center of Niepołomice with the center of Wieliczka, and provide services for passengers using Podłęże station. Ultimately, it is planned to extend the line to Świątniki Górne Commune.

- U-A-SKA15 Niepołomice – Wieliczka Rynek-Kopalnia (the whole route of the former 301 agglomeration line, ultimately extended to Świątniki Górne Commune)

The routes of particular lines enumerated above should be treated as guidelines for creating a network of connections. It is assumed that observations of bus fillings will be periodically carried out. In order to adapt the transport offer to the actual needs of passengers, it is possible to modify the route of particular lines.

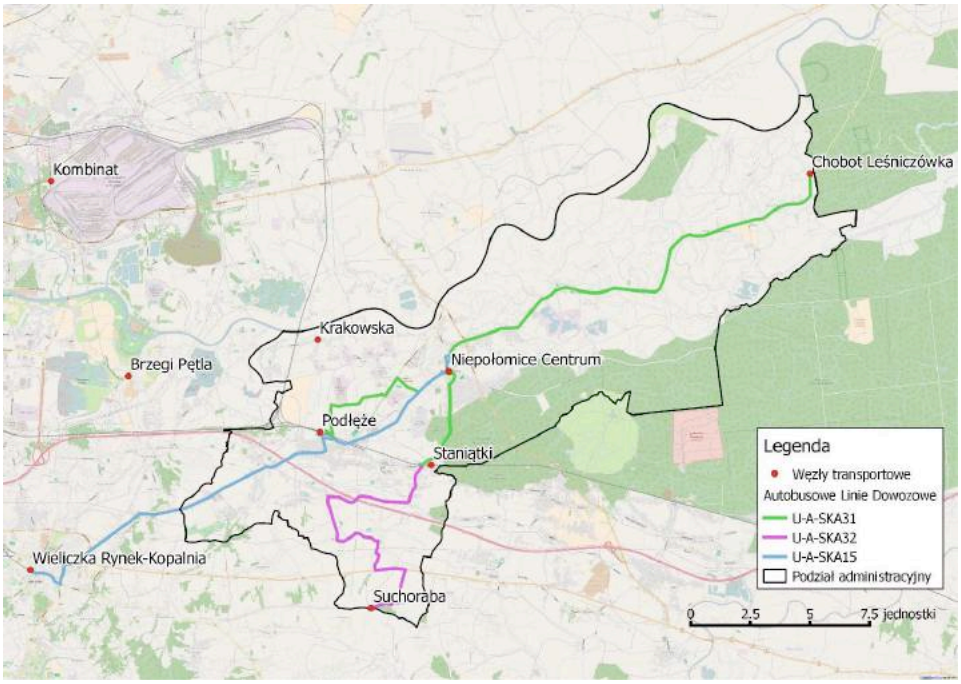

Fig. 3.1. Proposed feeder lines layout according to the „Mobility plan for the Municipality of Niepołomice"
Source: „Mobility plan for the Municipality of Niepołomice", Resolution No. XXVII/377/17 of the Municipal Council in Niepołomice of 26 January 2017

Option 2

In all subsequent options[3], the transformation of the current 301 line was assumed in the feeder line to Wieliczka Rynek-Kopalnia stop which is in line with the proposal of the mobility plan for Niepołomice Commune. Due to its course in the vicinity of the station in Podłęże (the existing bus stop is located at the intersection with Kolejowa Street in Podłęże, which is to be transformed into a pedestrian friendly woonerf zone), it will also serve as a feeder line for the inhabitants of Niepołomice to the railway station. Analyzing the zone of a convenient access to a bus stop within 10 minutes walk, it can be stated that the majority of the town's residents are within its reach.

In option 2 (symbol SKA31A), the route runs from Podłęże station, passes MAN plant, along Diesla Street to the intersection with Grabska Street, then Płaszowska and Wielicka Streets through the center of Niepołomice to the planned bus station at Kolejowa Street. The number of bus stops is 10, while the length of the route is 6.1 km. In the area of accessibility up to 10 minutes there is a large number of different companies in investment zone and most of the buildings in the town of Niepołomice. Its detailed course is shown in Figure 3.2.

[3] Jelito M.: "Opracowanie linii komunikacji dowozowej do przystanków Szybkiej Kolei Aglomeracyjnej na terenie gminy Niepołomice" ["Layout of feeder lines to the stops of the Fast Agglomeration Railway in Niepołomice commune"]; master's thesis, thesis supervisor M. Dudek, Politechnika Krakowska 2017

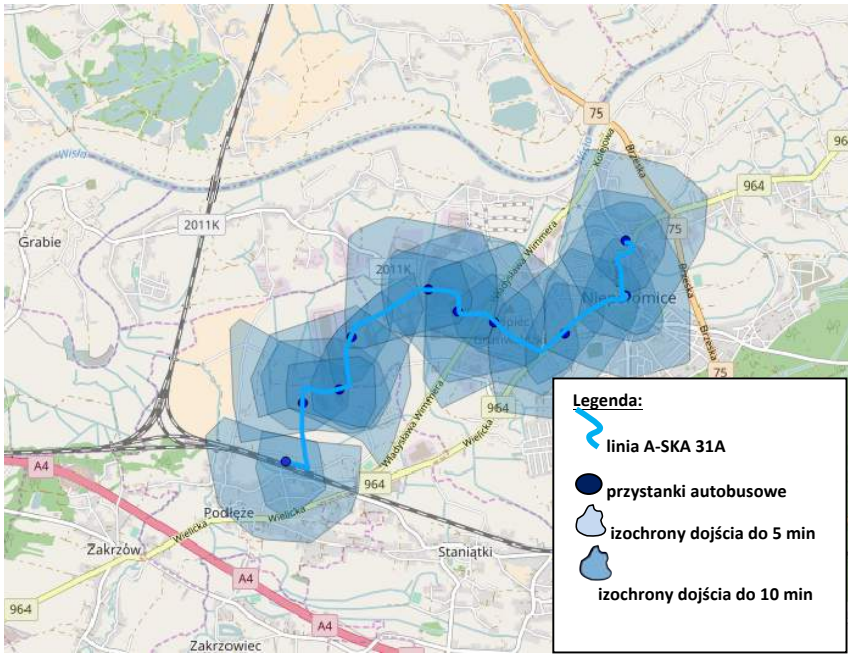

Fig. 3.2. SKA 31A line layout and walk accessibility of its stops
Source: Jelito M.: "Opracowanie linii komunikacji dowozowej do przystanków Szybkiej Kolei Aglomeracyjnej na terenie gminy Niepołomice" ["Layout of feeder line to the stops of the Fast Agglomeration Railway in Niepołomice commune"]; master's thesis, thesis supervisor M. Dudek, Politechnika Krakowska 2017.

The main advantages of the line:

- service for a large part of the NSI,
- great significance for the residents of the town of Niepołomice, around 9,000 inhabitants of the city in the walking accessibility up to 10 minutes,
- providing access to the NSI also for residents of the town of Niepołomice,
- the shortest feeder lines connecting: Podłęże station – NSI – Niepołomice center.

The disadvantages of the SKA 31A feeder line:

- no service for plants at Wodna Street or Mokra Street,
- no service for a large number of companies located at Grabska Street in the direction of Krakow,
- prolonged travel time to the station at Kolejowa Street, the line runs through the town center.

Option 3

Option no. 3 (marked as SKA 31B) of the line starts at the bus loop at Podłęże station and passes the streets: Półłanki, then Diesla all the way to Grabska Street. Then from Grabska Street the route passes to Wodna Street, next in Wimmera Street and finally in Kolejowa Street, directly to the planned transfer nod. The length of the route is 6.6 km, and the number of bus stops is 9. This line serves mainly the Niepołomice Investment Zone and especially the companies located at Diesla and Wodna Streets. Taking into account the walking catchment, presented with isochrones of 5 and 10 minutes, a large number of work places can be determined, located in walking catchment up to 10 minutes. Among them ares: MAN, Brembo, Pratt & Witney Tubes and the plants located at Wodna Street, i.e.: Polbruk SA, Nidec Motors and FoodCare Sp. z o.o. Moreover, it is worth to mention such companies as: Staco Polska Sp. z o.o. or Elektrotermia Sp. z o.o. Line layout with a walking catchment is shown in Fig. 3.3.

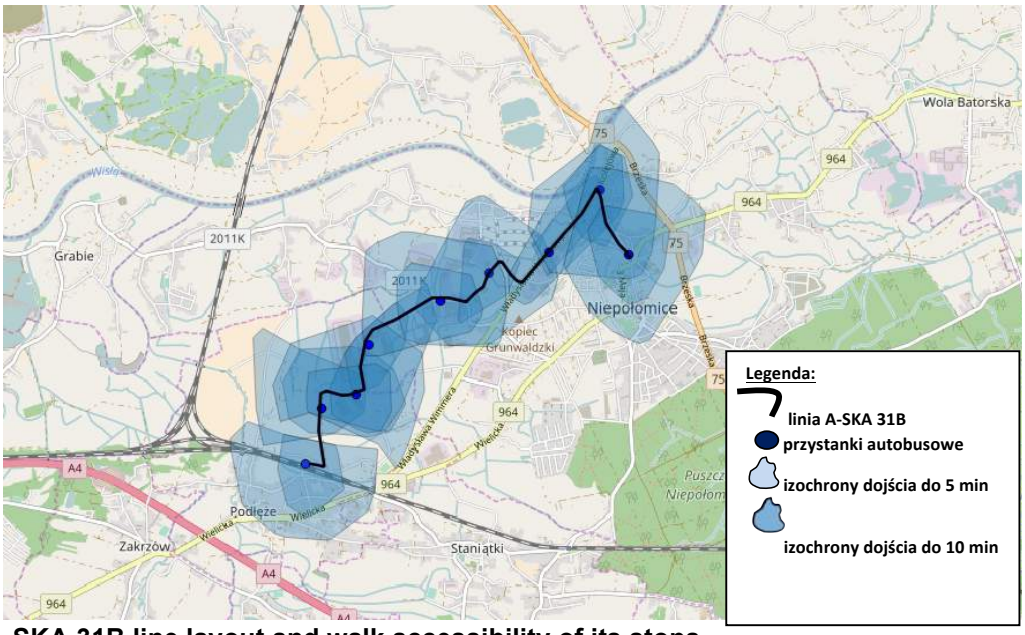

Fig. 3.3. SKA 31B line layout and walk accessibility of its stops
Source: Jelito M.: "Opracowanie linii komunikacji dowozowej do przystanków Szybkiej Kolei Aglomeracyjnej na terenie gminy Niepołomice" ["Layout of feeder line to the stops of the Fast Agglomeration Railway in Niepołomice commune"]; master's thesis, thesis supervisor M. Dudek, Politechnika Krakowska 2017.

The advantages of the above presented options include:

- very good service for the Niepołomice Investment Zone, around 3,000 employees of various companies within 5 minutes walk accessibility to the stops,
- the route runs exclusively on the available infrastructure (this statement applies to all options of the feeder line),
- service for industrial plants at Wodna Street,
- very fast access to the NSI from the station at Kolejowa Street (bypassing the town center),
- smooth travel, lack of intersections with traffic lights, traffic laid out on the bypass.

The disadvantages of the presented option are:

- service mainly for the NSI,
- access to the zone from Niepołomice only from the station at Kolejowa Street (little importance for the town's residents),
- lack of service for plants located at Mokra and Grabska Street.

Option 4

Option no. 4 (marked as SKA 31C) starts its route at the bus loop at Podłęże station, the route has been laid out along Diesla Street, Grabska Street, next Wimmera Street in the direction of Podłęże, and farther along Mokra Street, up to the intersection with Wielicka Street. Next, along the provincial road through Niepołomice town center directly to the planned bus station at Kolejowa Street. The length of the line is 7.2 km, and the number of stops is 10. Figure 3.4 presents, apart from this option, also an additional sub-option marked with a dashed line, laying out the line along Kwiatkowski Street, what is justified in the situation of a more intense investment of the areas located there. Such being the case, the length of the route would be 5.8 km, and the number of stops would decrease from 10 to 8. However, this solution is worse and should be rejected after initial analysis.

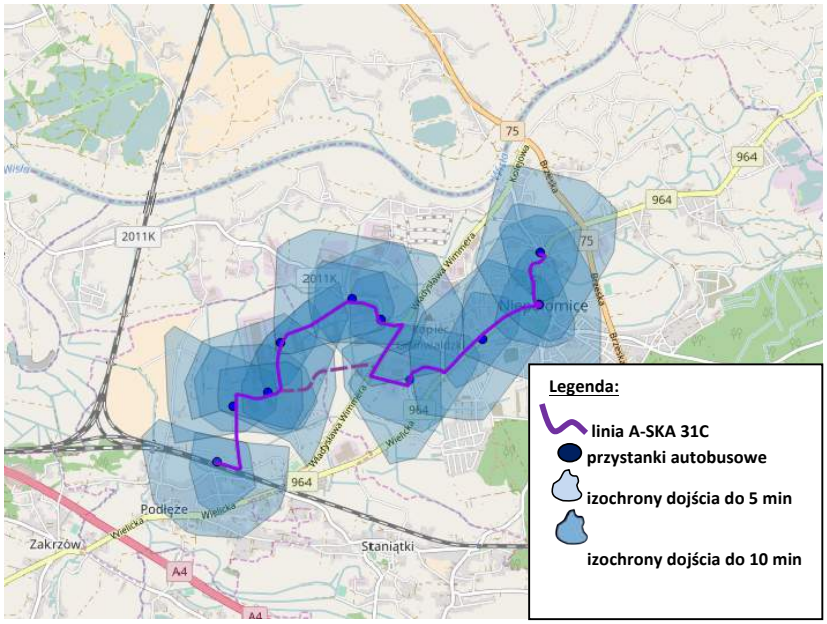

Fig. 3.4. SKA 31C line layout and walk accessibility of its stops
Source: Jelito M.: "Opracowanie linii komunikacji dowozowej do przystanków Szybkiej Kolei Aglomeracyjnej na terenie gminy Niepołomice" ["Layout of feeder line to the stops of the Fast Agglomeration Railway in Niepołomice commune"]; master's thesis, thesis supervisor M. Dudek, Politechnika Krakowska 2017.

Advantages of this option:

- service for the main plants in the NSI, approx. 2.5 thousand employees within 5 minutes walk accessibility,
- service for the town of Niepołomice – approx. 8 thousand residents within up to 10 minutes accessibility to the stops,
- route passes exclusively along the available road infrastructure,
- service for plants located at Mokra Street.

Disadvantages of this option:

- significant elongation of the line due to its meandering layout,
- possible difficulties with going into Wimmera Street and Wielicka Street (road without right of way),
- prolonged travel time – the line runs through the town center,
- no service for areas at Wodna Street.

Option 5

The feeder line route according to option no. 5 (marked as SKA 31D) runs from the bus loop located at the railway station in Podłęże, along Diesla Street to the intersection with Grabska Street. Next along Grabska Street in the direction of Krakow – Mały Płaszów to Chwalców Street, then along Chwalców Street to Marseplast Sp. z o.o. The length of the line is 5.8 km; the number of stops is 9. This line is reinforcement for the NSI service on its north-west side. An important aspect here is to provide a suitable place, an area that can be used as a bus terminus. One of the options is the possibility of reversing at parking space at the Marseplast plant, provided consent to such maneuvers has been obtained. In the second option, if reversing at the parking space is not possible, a bus loop in the vicinity of the plant mentioned should be designed. The line route is shown in Figure 3.5.

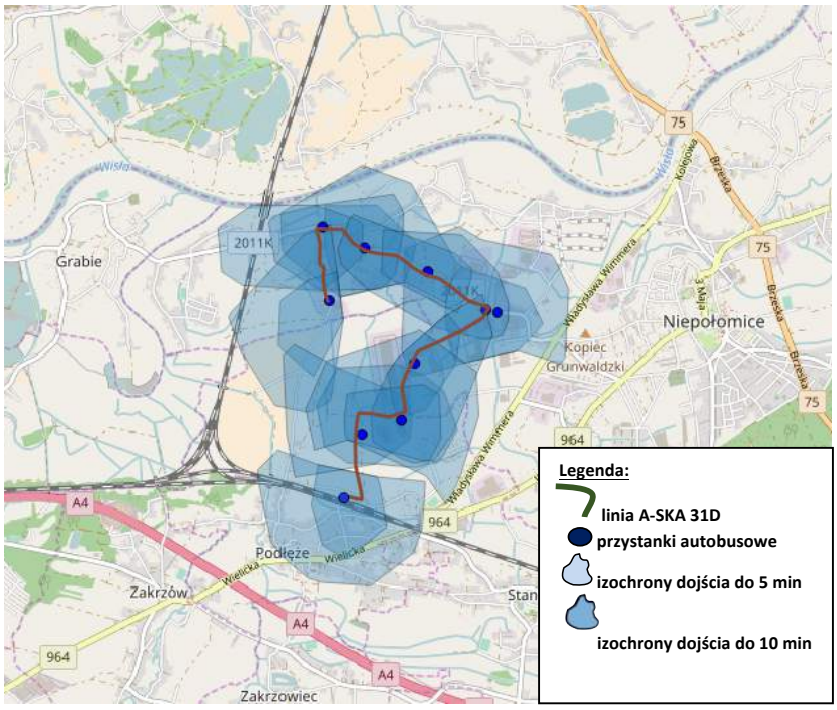

Fig. 3.5. SKA 31D line layout and walk accessibility of its stops
Source: Jelito M.: "Opracowanie linii komunikacji dowozowej do przystanków Szybkiej Kolei Aglomeracyjnej na terenie gminy Niepołomice" ["Layout of feeder line to the stops of the Fast Agglomeration Railway in Niepołomice commune"]; master's thesis, thesis supervisor M. Dudek, Politechnika Krakowska 2017.

Advantages of the option no. 5:

- service for a significant NSI area, approx. 3,000 employees in the area within up to 10 minutes access to bus stops,
- in addition, the line serves residential housing located along Krakowska Street,
- service for a large number of companies located at Grabska Street, in the direction of Krakow and at Podłęska Street,
- line length of only 5.8 km, fast travel time, no intersections, line bypasses the town center.

Disadvantages of the SKA 31D feeder line:

- finding a place for the construction of a bus loop, additional costs resulting from the construction of a loop,
- lack of service for the town of Niepołomice,
- lack of service for plants located at Wodna Street, Mokra Street or Wimmera Street,

From among the presented options of the feeder line, the line according to option no. 2 marked with the symbol SKA 31A is recommended. It provides access to the Niepołomice Investment Zone, both from the town of Niepołomice and the station in Podłęże. The SKA 31D line should be considered as a complementary solution, but planned for implementation in a further time horizon.

Stakeholders involved

- Niepołomice Commune – as an organizer of public transport within the commune,
- District Governor's Office in Wieliczka – in the case of bus lines operating beyond the boundaries of Niepołomice Commune – as an organizer of inter-communal transport within the district,
- Małopolska Province Marshal's Office – as an organizer of public transport within the province (travel from Niepołomice to Krakow by SKA train can be treated as a travel on the scale of the province),
- Companies located in Niepołomice (including the Niepołomice Investment Zone) – improvement of transport accessibility, meeting the needs of non-motorized employees, reduction of parking demand in the vicinity of facilities and possible obtaining of land reserves for the future expansion of the plant.

Timeframe

From 2019 (deadline for completion of Park & Ride junction in Podłęże), or later, after the completion of renovation of the mid-diameter line in Krakow and the re-launch of full train operations.

Costs

According to estimates, approx. PLN 350.000 on an annual basis (the final amount depends on the frequency of connections and readiness of co-financing by individual companies).

Sources of funding:

- Niepołomice Commune – primary role,
- District Governor's Office in Wieliczka – in the case of bus lines operating beyond the boundaries of Niepołomice Commune – such being the case, supporting role,
- Małopolska Province Marshal's Office – supporting role,
- Companies located in Niepołomice (including the Niepołomice Investment Zone) – supporting role,
- Regional Operational Program for Małopolska Province for the years 2014-2020 – co-financing of the purchase of rolling stock in case of independent servicing of feeder transport by Niepołomice Commune.

3.2.2 Construction of an integrated transfer hub at Kolejowa Street in Niepołomice

Introduction

For many years, the most important public transport hub has been located at Mickiewicza Street in Niepołomice, in the very center of the town, in the immediate vicinity of the Market Square and the Castle. On the one hand, it allows direct access to the most important traffic generators in the town, but on the other hand the buses waiting here for a long time significantly degrade this historical area, which should be a public space with high aesthetic values. Therefore, it is necessary to take measures to transfer the terminus function to another place, and leaving in the current place only a stop-over stop. Such a solution will still allow for reaching the most important travel destinations located in the center, and at the same time will reduce the nuisance related to the bus parked here.

Action description

The construction of an interchange hub at Kolejowa Street in Niepołomice is planned, located in the northern part of the city, approx. 750 m from the existing bus station. It is located in the immediate vicinity of the most important streets of the basic layout in the town: Brzeska (national road No. 75) and Wimmera (acting as a north-western bypass). It will be

implemented as part of the Integrated Territorial Investments (Polish: Zintegrowane Inwestycje Terytorialne; acronym: ZIT): "Integration of collective transport with individual transport in Niepołomice commune in relation to KrOF", under which construction of the following facilities has been planned:

- new interchange station in a new location with 4 places: 2 for buses, 2 for microbuses,
- new parking lot: 136 parking places for cars (including 4 for disabled people + 4 for parents with children) as well as 8 places for motorcycles,
- roofed bicycle sheds (38 parking places),
- Kiss & Ride places,
- 1 charging point for electric cars.

Stakeholders involved

- Niepołomice Commune – leading stakeholders, who will take the following actions:
  - providing the land for the construction of the above-mentioned interchange hubs, including Park & Ride parkings,
  - preparation of the interchange parking project,
  - provision of execution and supervision of the investment.
- Małopolska Province Marshal's Office – supporting stakeholder – maintaining the Park & Ride system in a regional context, including tariff integration for the entire system (joint IMKA ticket),
- Metropolia Krakowska – supporting stakeholder – support for Niepołomice Commune in applying for co-financing of the investment,
- Regio-Mob project partners – supporting stakeholder – support for Niepołomice Commune in creating the Park & Ride system.

Timeframe

Execution of the investment is planned for the years: 2018-2019.

Costs

Estimated total costs of the investment, including construction of 4 parking lots in the Park & Ride system (including 3 at railway stops) with accompanying infrastructure: PLN 28 190 684.

Sources of funding

- Investment is co-financed in the frame of the Regional Operational Program for Małopolska Province for the period 2014-2020. Sub-action 4.5.1 Low emission urban transport – the amount of co-financing: PLN 15.3 millions
- Niepołomice Commune – PLN 12.9 millions

3.3 Measures aimed at increasing the share of trips made by public transport means – rail

One of the ways to improve transport conditions (including road transport) in Małopolska is a significant increase in the share of rail in the structure of passenger and goods transport. Therefore, rail transport will face two major challenges in the coming years. The first is taking over a leading role in commuting to work and schools within the analyzed area. The second challenge is to create a viable alternative to car use in travels between main centers of the region and the country. Currently, the role of rail in inner-city transport in the analyzed area is marginal, which is mainly due to deficiencies in the railway infrastructure ensuring efficient functioning of connections. It is planned that railway transport in the analyzed area should operate on the basis of the Fast Agglomeration Railway, using existing stops/stations in communes and successively built stops in the analyzed area. Stations/stops must be integrated with individual transport subsystems (car, bicycle) and collective transport (bus, microbus). In order to increase the share of trips made by railway transport means, the following actions are proposed:

- Modernization of the railway (line E30) on the section Krakow (Podłęże) – Rzeszów,
- Modernization of the railway line E30 on the section Kraków Główny Towarowy – Rudzice with the extension of tracks of the agglomeration line,
- Improvement of accessibility of railway stops, in particular: Podłęże, Staniątki, Szarów and improved development of the surroundings of these stops in terms of land development functions.
- Joint ticket SKA + Niepołomice areas,
- Increased frequency of trains of the Fast Agglomeration Railway,
- Construction of a new section of the railway line Podłęże – Piekiełko,
- Adaptation of railway line no. 95 to passenger transport.

3.3.1 Construction of a new section of the railway line Podłęże – Piekiełko

Introduction

In order to improve railway accessibility of the area analyzed within the Regio-Mob project through a significant reduction of travel time between Krakow and Podhale, Sądecczyzna and Limanowszczyzna, it is proposed to build a new section of Podłęże – Piekiełko railway line (task included in the basic list of the National Rail Program). Currently, it takes about 3.5 hours to travel by train from Krakow to Zakopane (approx. 150 km), while the bus takes about 2 hours. Trains on this route cannot reach higher speed than 100 km/h (and this only on short sections), and usually they move at an average speed of 60 km/h. These parameters result from the technical limitations of the lines, resulting from the course of the current route (sharp turns and steep inclines). In turn, in the direction of Nowy Sącz there will be a significant shortening of the travel distance, which currently reaches 166 km (in road transport – 112 km). The implementation of this investment will not only contribute to the shortening of the route, but also due to the implementation of the investment with increased parameters, the travel speed will be increased.

Action description

The planned section of Podłęże – Piekiełko line[4] runs, among others, through the communes of Wieliczka, Niepołomice, Biskupice and Gdów, which are part of the analyzed area defined in the Regio-Mob project. The planned section of the railway line is part of the project concerning the implementation of the fast connection of Krakow to Podhale, Sądecczyzna and Limanowszczyzna. According to the plans (as of 2017), Podłęże –

[4] http://www.rynek-kolejowy.pl/wiadomosci/nadzorca-i-etapu-projektu-podlezepiekielko-wybrany-81833.html

Piekiełko line will start in the area of the branching post in Rudzice, located on the line no. 91 Kraków Główny Osobowy – Medyka, and then head southwards through Gdów to Szczyrzyc. There it will branch out in the direction of Tymbark and Kasina Wielka. In these places, it will connect to the existing (planned for modernization) railway line no. 104 Chabówka – Nowy Sącz. Line no. 622 and no. 623 [5].

On the new section of the line, in the analyzed Regio-Mob area, the following stops and stations will be located: Węgrzce Wielkie (shared with line no. 91), Balachówka, Zagórze (Balachówka and Zagórze – stops in Niepołomice commune) and further Wiatowice and Gdów. In addition, other options of stops are considered in the analyzed area, instead of the stop Zagórze, a stop is proposed in the so-called center of the village, or on the national road no. 94. It is worth noting that there may be a problem with line efficiency due to its nature (on the analyzed section of the route located in the area under the Regio-Mob project).

The analyzed line will be an interregional line on which trains will develop the highest possible speeds due to high technical parameters of the route and rail fleet, and thus not servicing the major part of settlements of minor importance. Its purpose is to allow quick access from Krakow to Zakopane in the assumed time of 90 minutes, and to Nowy Sącz in 60 minutes[6]. Therefore, at the planning and design stages, special attention should be paid to the location of railway stops/stations on the analyzed section. The location of the railway stop at the national road no. 94 may result in a greater demand for the services of this line, which is why changing the planned location of the stops should be considered. People traveling toward Niepołomice and Krakow are more likely to leave their vehicles closer to the road with higher parameters in order to change the mode of transport to rail. In this case the need to go down the road of a lower class, and thus of less capacity, is eliminated.

It should be noted that the destination of the line – according to previous assumptions – is primarily for servicing high-speed trains, and for the time being its possible use for the needs of a regional line is omitted. Therefore, at the current stage of planning work, there is doubt about the possibility of including this line in the service of regional traffic in the context of access to Niepołomice Commune and the Niepołomice Investment Zone from communes located south of them.

The full route of the newly proposed railway line is shown in figures 3.6 and 3.7 below.

[5] http://pociagautobusgory.pl/podleze-piekielko

[6] Bochniarz Ł., Manowiecki P., Orzeł B.: Podstawowe informacje o linii Podłęże-Piekiełko (pol.). Kampania Pociąg-autobus-góry 2014. [accessed 2017-02-25]

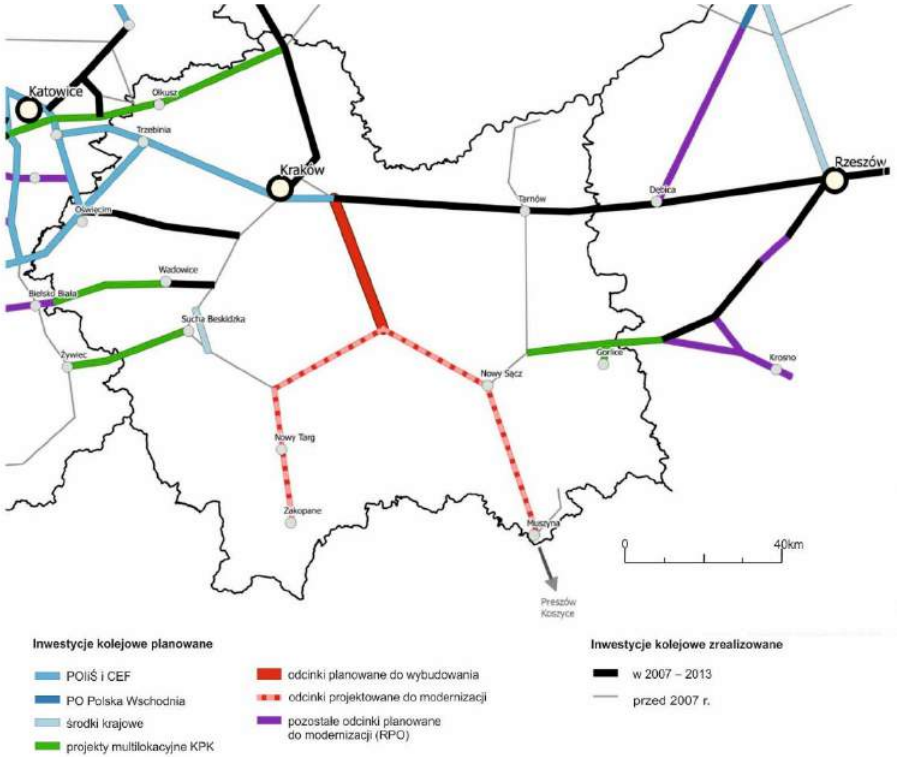

Fig. 3.6. Railway investments in Małopolska
Source: A draft of the change of the spatial development plan for Małopolska Province. Volume 2. Annex to Resolution No. 143/17 of the Board of Małopolska Province of 7 February 2017.

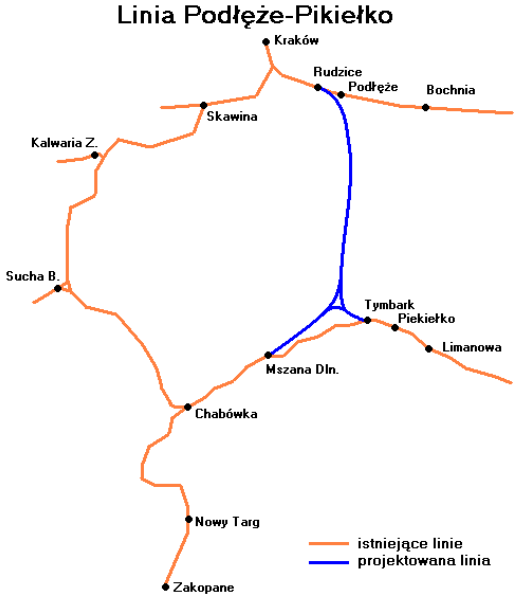

Fig. 3.7. Podłęże – Piekiełko line layout
Source: https://commons.wikimedia.org/wiki/File:Pod%C5%82%C4%99%C5%BCe-Piekie%C5%82ko.png

The expected result of the investment for the analyzed Regio-Mob area is primarily:

- increase of the investment attractiveness of the region,
- increase of the competitiveness of rail transport,
- improvement of the transport accessibility of the area,

- shortening of the travel time,
- usefulness of the line as a basic connection for the residents of Niepołomice Commune with Krakow.

Stakeholders involved

- Ministry of Infrastructure – development and implementation of national railway programs,
- PKP Polskie Linie Kolejowe S.A. [national rail operator] – investor,
- Małopolska Province Marshal's Office – organizer of rail transport in the province, financing, subsidizing passenger transport, purchase of rail fleet,
- District Governor's Office in Wieliczka – organizer of feeder transport,
- Municipal offices in communes where stops of the railway line Podłęże – Piekiełko are located, including Municipal Office in Niepołomice (communes: Wieliczka, Biskupice and Gdów) – improvement of travel conditions for residents of these communes and improvement of the access to Krakow and investment zones located in their respective areas,
- Koleje Małopolskie Sp z o.o. [regional rail operator] – organization of transport, providing public services in the field of public transport,
- Metropolia Krakowska – Krakow Functional Area (Polish: Krakowski Obszar Funkcjonalny, acronym: KrOF) – improvement of connections between the communes of the KrOF and Krakow.

Timeframe

Implementation of planning and design works: 2018-2023.

Costs

Costs are difficult to estimate due to the fact that the planned investment is in the initial phase of the project documentation. (Project Podłęże – Szczyrzyc – Tymbark / Mszana Dolna together with modernization of railway line no. 104 Chabówka – Nowy Sącz is analyzed comprehensively, as a comprehensive task. The total value of the project is currently estimated at PLN 7.18 billion [7]).

Sources of funding

- EU funds and national funds[8,9], company bonds and European Investment Bank loans. Tasks related to the construction of the new railway line Podłęże – Szczyrzyc – Tymbark / Mszana Dolna were submitted as recommended for support from the European Fund for Strategic Investments (EFSI). Action is included in the basic list of the National Railway Program. The costs of the preparatory work will be primarily financed from PKP PLK SA bonds. Ultimately, it is expected that the preparatory work will be financed from the Cohesion Fund[10],
- Budget of Małopolska Province,
- Local government units – the accompanying infrastructure.

3.3.2 Modernization of the railway line (E30) on the section Kraków (Podłęże) –

[7] Resolution no. 144/2016 of the Council of Ministers of 23 November 2016, changing the resolution on the establishment of the National Railway Program until 2023

[8] http://pociagautobusgory.pl/podleze-piekielko

[9] http://media.wix.com/ugd/0a3577_df5288f744dd48488ba46b0c3669ffbb.pdf

[10] Resolution no. 144/2016 of the Council of Ministers of 23 November 2016, changing the resolution on the establishment of the National Railway Program until 2023

Rzeszów

Introduction

The current railway infrastructure on the route Krakow (Podłęże) – Rzeszów, part of which is located in the analyzed Regio-Mob area is undergoing modernization, in order to adapt it to the AGC/AGTC standards for international transport corridors. Adaptation of the railway infrastructure to the above-mentioned standards will contribute primarily to increasing the maximum speed of trains, and thus will improve the quality of the transport offer, especially for the places located east of the station in Podłęże.

Action description

Infrastructure of the E30 railway line on the Kraków (Podłęże) – Rzeszów section is undergoing modernization to adapt it to the AGC/AGTC standards applicable to international transport corridors. The project is implemented within the task POIiŚ [Operational Program Infrastructure and Environment] 5.1-7 "Modernization of the E30/C-E30 railway line, section Kraków – Rzeszów, stage III" – PHASE II[11]. As a result, the line will be adjusted to the pressure of 221 kN per axis and the maximum speed for passenger trains V = 160 km/h and freight V = 120 km/h.

As part of the modernization in PHASE II, it is planned to execute, among others, the following construction works: reconstruction of the railway line at the length of 15.368 km, continuation and completion of works related to the modernization of 11 stations, changing of 3 stations for a passenger station – branch post, changing of 1 station for a passenger stop and liquidation of 1 station, continuation and completion of the reconstruction of 4 passenger stops, reconstruction/construction of engineering structures, including: bridges, railway and road viaducts and overpasses, execution of works related to the liquidation of 20 railroad crossings at the level of rails, continuation and completion of works related to liquidation of rail level crossing, total modernization of railway crossing, continuation and completion of modernization of railway crossings, construction of a class B railway crossing, modernization of railway traffic control and telecommunications devices, replacement of the existing traction network on tracks within stations and tracks between stations including reconstruction of traction power supply and non-tractive loads, construction of acoustic screens, development and launch of the Local Control Center devices at the Tarnów and Rzeszów Główny stations[12].

The main objective of the action:

- improvement of the conditions of passenger transport,
- reducing the travel time,
- elimination of traffic problems,
- improvement of the punctuality rate of transport,
- increase of the efficiency of railway lines,
- higher services comfort at stations (e.g. Bochnia),
- elimination of barriers for people with limited mobility.

Stakeholders involved

- PKP Polskie Linie Kolejowe S.A. – investor,
- Małopolska Province Marshal's Office – investments accompanying rail transport infrastructure,
- Municipal offices in communes where railway stops are located, improvement of the

[11] http://www.plk-inwestycje.pl/inwestycje/program-operacyjny-infrastruktura-i-srodowisko/poiis-51-7/
[12] http://www.plk-inwestycje.pl/inwestycje/program-operacyjny-infrastruktura-i-srodowisko/poiis-51-7/

travel conditions for residents of these communes as well as improvement of access to Krakow city center and to investment zones located in their respective areas,
- Koleje Małopolskie Sp z o.o. – organization of transport, providing public services in the field of public transport,
- Metropolia Krakowska - Krakow Functional Area [Polish: Krakowski Obszar Funkcjonalny, acronym: KrOF] – improvement of connections between the communes of KrOF and Krakow.

Timeframe
Project in progress, completion of investment planned by 2020 [13]

Costs
Total costs of the project: PLN 665 143 049,36
EU funds: PLN 465 192 697,00

Sources of funding

- PKP Polskie Linie Kolejowe S.A. – investor,
- UE funds – Connecting Europe Facilty – Project co-financed within POIiŚ [Operational Program Infrastructure and Environment] 5.1-7 „Modernization of the E30/C-E 30 railway line, section Kraków – Rzeszów, stage III" – PHASE II.

3.3.3 Modernization of the E30 railway line on the section Kraków Główny Towarowy – Rudzice with the extension of the agglomeration line tracks

Introduction

One of the main elements contributing to increasing the attractiveness of rail travel (Krakow, Niepołomice area) is the improvement of travel comfort, increased safety and availability of railways. In order for achieve this objective, it is necessary to fill gaps in the existing railway infrastructure, including construction of tracks, construction of new interchanges, and thus increasing the integration of railways with urban transport in the area of Krakow. The improvement of the current infrastructure will enable the launch of more rail connections in a given area and the increase of the maximum speed of trains, and consequently the reduction of travel time. Due to the improvement of current conditions of the railway transport, the modernization of the E30 railway line on the Kraków Główny Towarowy – Rudzice section is currently underway, with the extension of the agglomeration line tracks (Fig. 3.8) in accordance with the action carried out under the project "Works on the E30 railway line on the Kraków Główny Towarowy – Rudzice section with the extension of the agglomeration line tracks" – within CEF (Connecting Europe Facility) 2014-2020[14].

Action description

The measure assumes preparation of the technical infrastructure of the line to forecast passenger and freight volumes, its adaptation at least to the minimum operational parameters specified in AGC/AGTC international agreements, i.e. to speed V=100÷160 km/h for passenger trains combined with classic train fleet and V=80÷120 km/h for freight trains and a maximum load of 221 kN/axis, adaptation of rebuilt and modernized engineering facilities to the load of 245 kN/axis and increasing the capacity of the E30 railway line on the

[13] http://www.plk-inwestycje.pl/inwestycje/program-operacyjny-infrastruktura-i-srodowisko/poiis-51-7/
[14] http://krakow-rudzice.pl/o-inwestycji/wartosc-projektu/

Kraków Główny – Kraków Płaszów – Kraków Bieżanów section[15]. The planned works will be performed on the following lines: railway line no. 133 – Dąbrowa Górnicza Ząbkowice – Kraków Główny (3.59 km) and railway line no. 91 – Kraków Główny – Medyka (16 km). Project includes: new passenger stops and engineering facilities, a flyover on the section Kopernika Street – Miodowa Street in Krakow, construction of additional tracks on the Kraków Główny – Kraków Plaszów section, extension of the track on the Kraków Płaszów – Kraków Bieżanów section, modernization of the stations: Kraków Główny Towarowy, Kraków Główny Osobowy, Kraków Bieżanów and Kraków Płaszów, reconstruction of the traction network, rebuilding of the railway traffic control equipment[16] – Fig. 3.8.

Fig. 3.8. E30 line layout on the section Kraków Główny Towarowy – Rudzice
Source: https://www.plk-sa.pl/

The main objective of the action:

- improvement of travel comfort,
- raising the maximum speed for passenger trains,
- improvement of the parameters of agglomeration connections,
- elimination of traffic obstructions, liquidation of a bottleneck at the Kraków Główny – Kraków Płaszów section,
- creation of "railway interchange junctions" with other public transport means in the area of Krakow and improvement of accessibility for travel destinations located along the railway line, as well as with other SKA lines,
- integration of sections covered by previous investment projects (Katowice – Kraków Towarowy and Rudzice – Medyka),
- accessibility of railway to people with reduced mobility.

Stakeholders involved

[15] http://www.plk-inwestycje.pl/inwestycje/fundusz-laczac-europe-connecting-europe-facility-cef/prace-na-linii-kolejowej-e30-na-odcinku-krakow-glowny-towarowy-rudzice/
[16] http://www.plk-inwestycje.pl/inwestycje/fundusz-laczac-europe-connecting-europe-facility-cef/prace-na-linii-kolejowej-e30-na-odcinku-krakow-glowny-towarowy-rudzice/

- PKP Polskie Linie Kolejowe S.A. – investor,
- Małopolska Province Marshal's Office – investment accompanying railway transport infrastructure,
- Municipal offices in communes where railway stops are located – improvement of travel conditions for residents and accessibility of Krakow city center as well as to investment zones located in the vicinity of the railway line, improvement of the accessibility of investment zones in the respective communes.
- Koleje Małopolskie Sp. z o.o. – organization of transport, providing public services in the field of public transport,
- Metropolia Krakowska – Krakow Functional Area (Polish: Krakowski Obszar Funkcjonalny, acronym: KrOF) – improvement of connections between the communes of KrOF and Krakow.

Timeframe

Project in progress, by 2020 [17]

Costs

Construction works: PLN 966 254 611,44 (net value)
Total project cost: PLN 1 678 500 000 (net value)
Co-funding: PLN 1 518 000 000 (net value)

Sources of funding

- PKP Polskie Linie Kolejowe S.A. – investor,
- CEF – works on the E30 railway line on the Kraków Główny Towarowy – Rudzice section with the extension of the agglomeration line tracks.

3.3.4 Increasing train frequency of the Fast Agglomeration Railway

Introduction

It is necessary to provide residents of the analyzed area with the best possible conditions for rail travel, so that it becomes a transport mode competitive for individual vehicles. One of the activities aimed at encouraging residents of the analyzed area to travel by rail is to increase the frequency of train operations. Analyzes show that in the analyzed area house related travels prevail: getting from home to work or school, or returning from work or school home. The percentage of non-walking trips made by public transport in districts included in the analysis area is 35-50%. This means that the remaining trips are carried out primarily by car – 50-65% of the trips[18]. Of particular worry is the car share at the level of 85% in commuting to the NSI. Just over 7% of journeys to the zone are made by a private carrier microbus, while the share of other transport modes is minor. The research show also that over 80% of people employed in the zone live outside Niepołomice Commune. In addition, there is no attractive alternative to individual transport. The most important factors that would encourage residents of Skawina, Wieliczka and Niepołomice communes as well as people employed in the NSI to resign from driving a car in everyday trips to work and study places, and to use public transport are, among others, increasing the frequency of public transport operations and shortening of travel time.

[17] http://www.plk-inwestycje.pl/inwestycje/fundusz-laczac-europe-connecting-europe-facility-cef/prace-na-linii-kolejowej-e30-na-odcinku-krakow-glowny-towarowy-rudzice/

[18] Politechnika Krakowska, PBS Sp. z o.o., Jan Friedberg – Projektowanie dróg i doradztwo w zarządzaniu, EKKOM Sp. z o.o., International Management Services Sp. z o.o., Kompleksowe Badania Ruchu w województwie małopolskim – wybrane wyniki i wnioski, Kraków 2014.

Therefore, it is necessary to provide the best possible passenger service by rail in order to encourage them to travel with this transport means. Thus, it is proposed to increase the frequency of train operations on the SKA3 route.

Action description

It is proposed to organize the SKA operations so that they run every 30 minutes on Krakow – Podłęże – Bochnia route and to increase their frequency in peak hours to 15 minutes. It can be achieved by introducing additional trains running on the entire Krakow – Tarnów route or only on the most-loaded section Kraków Główny – Bochnia. In addition, it is suggested that trains to Podłęże station should arrive approximately 25-30 minutes before the start of work shift in the NSI (time needed to reach the place of work from the railway station and time for changing clothes and preparation of workplace).

Increasing the frequency of the SKA trains on the analyzed section is aimed at, among others:

- increasing the share of rail in the structure of passenger transport, especially those traveling to the NSI. Based on research carried out as part of the Via Regia Plus project[19], the change in the frequency of the SKA trains (e.g. frequency x2) will increase the share of rail travel from 11% to 35%. Introduction of additional elements such as the ban on buses entering the center and introduction of a joint ticket may increase the share from 11% to 49%;
- increasing the investment attractiveness of the region,
- increasing the competitiveness of rail transport,
- improving the transport accessibility of the area (including accessibility to the NSI);

Stakeholders involved

- Małopolska Province Marshal's Office – organizer of rail transport in the province – lead role,
- Koleje Małopolskie sp. z o.o. – carrier serving connections of the Fast Agglomeration Railway,
- District Governor's Offices in Wieliczka and Bochnia – organizers of transport within respective districts – complementary role,
- Municipal offices in communes where Krakow – Tarnow SKA3 line stops are located, including the Municipal Office in Niepołomice – improvement of the travel conditions for residents of these communes and the accessibility of Krakow which is the main place of work in the region, and also improvement of accessibility of investment zones located in this area – complementary role,
- Authorities of investment zones located in the vicinity of the railway line – complementary role

Timeframe

2018 – start of negotiations, arrangements,
2021 – launch of services.

Costs

Detailed analysis is required to determine the costs.

Sources of funding

- Budget of Małopolska Province

[19] Friedberg J.: Projektowanie dróg i doradztwo w zarządzaniu, Adam Manikowski, Przeprowadzenie badań i analiz popytu na transport kolejowy w kontekście uruchomienia systemu Szybkiej Kolei Aglomeracyjnej projektu Via Regia Plus, Wyniki badania – raport 2, Wieliczka, 2010.

3.3.5 Adaptation of railway line no. 95 to passenger transport

Introduction

Currently there is neither railway connection to the center of Niepołomice nor convenient rail connections to the NSI. The nearest railway station to the NSI is Podłęże station located approx. 2.7 km from the central point of the NSI. The walking time is about 30 minutes and is definitely higher than the acceptable value. Due to the long walking access time to the zone, an additional means of transport connecting Podłęże station and the NSI must be used. Therefore, to ensure better accessibility of Niepołomice area, including the NSI, the adaptation of railway line no. 95 Krakow Mydlniki – Podłęże to passenger transport (action carried out under the "Repair program of the Kraków-Nowa Huta station"[20]) should be considered. The implementation of this investment would contribute to a substantial shortening of travel time from Niepołomice along with the NSI towards Nowa Huta (traditional direction of transport links) and northern neighborhoods of Krakow.

Action description

As part of the measure, it is planned to ensure efficient passage of freight and passenger trains on railway line no. 95. Due to the maintenance of efficient freight transport, PKP Polskie Linie Kolejowe will also provide repair and maintenance of 22 engineering structures, including 8 overpasses (at least in Kościelniki and Podgrabie) and 5 bridges (at least on the Vistula and Dłubnia rivers). The new signaling room in Dłubnia, additional traffic control devices and renovation of bridges, viaducts and tracks on Kraków Mydlniki – Podłęże line will ensure efficient passage of passenger and freight trains. It is planned that this railway line will be used by companies operating in its vicinity, including the NSI.

As part of the investment, the existing stops should be modernized: Kraków Nowa Huta-Północ, Kraków Lubocza, Podgrabie-Wisła. In addition, it is worth considering new bus stops Kościelniki, Wyciąż or Przylasek Rusiecki. The route of railway line no. 95 Kraków Mydlniki – Podłęże is shown in Fig. 3.9.

The operation based on preliminary analyzes can be considered ineffective and therefore it is proposed to conduct more thorough research on its legitimacy.

Fig. 3.9. Route of railway line no. 95
Source: https://semaforek.kolej.org.pl/wiki/index.php/Plik:95.png

[20] http://www.rynek-kolejowy.pl/mobile/pnuik-naprawi-stacje-krakow-nowa-huta-81842.html

The main objective of the action:

- improvement of passenger transport conditions,
- increasing the rail share in the structure of passenger transport in the direction of Niepołomice, including the NSI,
- increasing the investment attractiveness of the region,
- improving transport accessibility of the area.
-

Stakeholders involved

- PKP Polskie Linie Kolejowe S.A. – investor, construction of the railway infrastructure – lead role,
- Małopolska Province Marshal's Office – organizer of rail transport in the province – complementary role,
- Koleje Małopolskie sp. z o.o. – carrier serving connections of the Fast Agglomeration Railway – complementary role,
- Municipal Office in Niepołomice – construction of the accompanying railway infrastructure, improvement of travel conditions for residents and improvement of their accessibility to Krakow as well as to investment zones located in the analyzed area – complementary role,
- Krakow City Hall – construction of the accompanying railway infrastructure – complementary role.

Timeframe
After the year 2025.

Costs
Detailed analysis is required to determine the costs.

Sources of funding

- PKP Polskie Linie Kolejowe S.A.,
- Małopolska Province Marshal's Office,
- Krakow City Hall,
- Municipal Office in Niepołomice,
- UE funds.

3.3.6 Joint ticket: SKA + urban transport in Niepołomice area

Introduction

In order to increase the competitiveness of the analyzed area, to increase the number of people traveling by rail it should be aimed at providing offers that will be affordable for various groups of users. An attractive tariff offer can be an effective tool in acquiring potential customers. An important element is the integration of the analyzed Regio-Mob area, which can be achieved primarily by a common tariff (rail + urban public transport in communes). Introduction of solutions that allow passengers to travel on one ticket using various transport modes is of great importance, especially if there is a will to integrate a given area (e.g. KrOF), where railway transport can fulfill a role of urban transport.

Aside from the financial benefits of selling an integrated ticket (such a ticket is usually cheaper than a separate ticket for urban transport and a separate train ticket), it is substantial that a passenger does not have to buy a separate ticket every time, what saves time, and also facilitates the use of the entire system. A passenger using offers integrating various

transport modes does not have to be aware of the exact structure of the passenger transport market, what simplifies the use of services[21].

It is proposed to implement the action in accordance with the program "Małopolska Agglomeration Card – construction of a collective transport management system in Małopolska Province part II" implemented as part of the Regional Operational Program for Małopolska Province for the period 2014-2020 (Measure 7.2. Railway transport, Sub-measure 7.2.3 Regional rail transport)[22].

Action description

As part of the measure, it is proposed to introduce a joint ticket for the SKA and collective transport in Niepołomice Commune. This service can be implemented as extension of the Małopolska Agglomeration Card (Polish acronym: MKA) already in use in the selected areas of Małopolska Province. The Małopolska Agglomeration Card is a modern solution that integrates services of public transport in the region into one coherent and friendly system. It is a system in which the existing systems of the Krakow City Card and the Tarnow City Card have been integrated with the services provided by Koleje Małopolskie and Przewozy Regionalne companies. Moreover, due to the integration of the Krakow City Card (KKM) and Tarnow City Card (MK) systems with the MKA, now using a single card, a user traveling within Małopolska Province has access to services provided by Koleje Małopolskie and Przewozy Regionalne companies on the routes of the Agglomeration Fast Railway and urban transport in Krakow and Tarnów. The entitlements of the users of the KKM and TKM system are available in the MKA system. The MKA currently offers tickets and services of the following organizers[23]:

- Małopolska Province – on Fast Agglomeration Railway lines,
- Zarząd Infrastruktury Komunalnej i Transportu w Krakowie [Municipal Infrastructure and Transport Authority in Krakow],
- Zarząd Dróg i Transportu w Tarnowie [Road and Transport Authority in Tarnów],
- Park & Ride in Tarnów.

Each of the organizers has made a number of tickets and services available as part of the MKA: season tickets, kilometer/section tickets and zonal tickets (SKA zones are shown in Fig. 3.10), section and zone paper tickets, integrated tickets, single-ride and time-limited tickets of Komunikacja Miejska w Krakowie [Urban Transport in Krakow], ELS [electronic student ID] in the MKA system, parking and event entries. Using the MKA card in Krakow as a carrier of transport services, one can use Krakow's Park & Ride system for free and have access to the city bike rental system. In Tarnów, the MKA card is the carrier of the so-called t-wallet. Thanks to the integration with the ELS system, the MKA card also stores information about the entitlement to discounts.

During the inspection in the urban transport in Krakow there is no need to show a document entitling to a discount.

The MKA card has its own infrastructure in the form of the MKA vending machines. The machines are located in the vicinity of railway stops on the SKA routes, at the Customer Service Point in Krakow and in the center of Tarnów. In addition, the card is accepted in over

[21] Departament Regulacji Rynku Kolejowego, Urząd Transportu Kolejowego: Oferty taryfowe w transporcie kolejowym – analiza wybranych rozwiązań. 2016, Warszawa.

[22] Annex no. 1 to the Resolution of the Małopolska Province Board No. 1882/16 of 15 December 2016: Identification of the project Małopolska Agglomeration Card – construction of collective transport management system in Małopolska Province, part II, ftp://ftp.zdw.home.pl/wzp5/1_35_17/zalaczniki%20OPZ/zalacznik_nr_2_1882_16%20zalacznik%20dot%20%20identyfikacji%20MKA.pdf

[23] https://mka.malopolska.pl/bilety-i-uslugi

100 machines of the Krakow City Card in Krakow and in interactive kiosks in Tarnów. It should be noted that the Małopolska Agglomeration Card program – construction of collective transport management system in Małopolska Province, part II (Measure 7.2. Railway transport, Sub-measure 7.2.3 Regional rail transport) includes, among others[24]:

- Construction of a dynamic passenger information and travel planning system – 1 system,
- Construction of the CICO system (checkINcheckOUT) in the SKA vehicles – delivery of train devices, implementation of solutions for the MKA IT system – 1 system,
- Delivery and assembly of MKA machines on the SKA platforms and on the trains – 70 machines,
- Expansion of the MKA IT system to the extent necessary to obtain the coverage of the MKA system of the entire Małopolska Province, with the inclusion of wheeled carriers in the MKA system – development of the IT system – 1 system (extension),
- Delivery and assembly of parking management devices in the Park & Ride system,
- Expansion of the MKA acceptance network by including into the system the existing transport and communication infrastructure located in cities and communes – bodies involved in the implementation of the MKA project (e.g. a network of devices operating paid parking zones),
- Integration of the MKA system with other public transport systems operating in Małopolska Province.

Fig. 3.10. MKA area
Source: https://mka.malopolska.pl/informacje-o-ska

The primary purpose of introducing a joint ticket for the SKA and public transport in Niepołomice is:

- increase of rail travel share of people traveling to Niepołomice, including the NSI.

[24] Annex no. 1 to the Resolution of the Małopolska Province Board No. 1882/16 of 15 December 2016 ftp://ftp.zdw.home.pl/wzp5/1_35_17/zalaczniki%20OPZ/zalacznik_nr_2_1882_16%20zalacznik%20dot%20%20identyfikacji%20MKA.pdf

According to research on the SKA carried out as part of the Via Regia Plus project[25], the introduction of a joint ticket together with an increase in frequency may increase rail travel share from 11% to 49% in the analyzed area,
- improvement of travel conditions in the analyzed area,
- transport integration of the area,
- increasing the attractiveness and competitiveness of the area,
- stress-free travel.

Stakeholders involved

- Municipal Office in Niepołomice – leading role, in the case of expanding the MKA services to the whole province – municipal and communal offices interested in the MKA service in Małopolska Province,
- Public transport organizers in Krakow, Tarnów, Niepołomice (in the case of expanding the MKA services to the whole province – public transport organizers in Małopolska Province) – complementary role,
- Public transport carriers operating in the analyzed area, under a common tariff – complementary role,
- Małopolska Province Marshal's Office – rail transport organizer in the province – complementary role.

Timeframe
2018-2020

Costs
Detailed analysis is required to determine the costs.

Sources of funding:

- Małopolska Province Marshal's Office,
- UE funds within the Regional Operational Program for Małopolska Province for the period 2014-2020,
- Municipal Office in Niepołomice.

3.3.7 Improvement of accessibility of railway stops, in particular: Podłęże, Staniątki and Szarów and improvement of management of the railway stops surroundings in terms of land development functions.

Introduction

Current railway stations lying in the area or near Niepołomice Commune, of great importance for the Niepołomice area itself, require improving their transport accessibility and improving the development of these areas. Currently functioning railway stops are not fully integrated with other public and individual transport modes, and the space around the stops is not sufficiently passenger-friendly. Therefore, it is proposed to improve the accessibility of Podłęże, Staniątki and Szarów railway stops as well as to improve the management of the railway stops surroundings in terms of land development.

Action description

As part of the action, a brief description of the railway stops important for the

[25] Friedberg J., Projektowanie dróg i doradztwo w zarządzaniu, Adam Manikowski, Przeprowadzenie badań i analiz popytu na transport kolejowy w kontekście uruchomienia systemu Szybkiej Kolei Aglomeracyjnej projektu Via Regia Plus, Wyniki badania - raport 2, Wieliczka, 2010.

Niepołomice area was presented, as well as proposed changes in management of the railway stops surroundings in terms of land development functions. Partially the changes are recommended in accordance with the document of the Integrated Territorial Investments (ZIT): "Integration of collective transport with individual transport in Niepołomice Commune in relation to KrOF"[26,27]. The experiences of the Regio-Mob project partners – Ljubljana[28] and Edinburgh[29] cities – were also taken into account in the creation of a transfer parking system. Good practices from partners helped in the process of creating an application for co-financing of planned investments from the Regional Operational Program for Małopolska Province for the period 2014-2020 – Low-Emission Urban Transport.
The location of the railway stops Podłęże, Staniątki and Szarów is presented in the below Fig. 3.11.

Fig. 3.11. Railway stops location
Source: Politechnika Krakowska with the use of www.googlemaps

As part of the action the following works are planned in Podłęże railway stop area:

- construction of Park & Ride, Bike & Ride parkings,
- woonerf,
- construction of a pedestrian-bicycle route to the station,
- renovation of the railway station,
- development of unattractive parking lot with greenery,
- bicycle station designed for employees of this area,
- creating of feeder bus line, express bus line, linking Niepołomice town center with Podłęże railway stop; the line would be coordinated with trains timetable,
- ticket machines and passenger information points,
- small architecture elements, such as benches or litter bins.

[26] http://metropoliakrakowska.pl/wp-content/uploads/2014/10/Za%C5%82.-5_Koncepcja-systemu-transportu.pdf
[27] http://wiadomosci.niepolomice.eu/gospodarka/powstana-nowe-parkingi/
[28] Best Practices Exchange Slovenia, Ljubljana – Main conclusions and Lessons Learnt, Regio-Mob project
[29] Lowrie S., Edinburgh Park & Ride, presentation during a Regio-Mob project meeting

As part of the action the following works are planned in Staniątki railway stop area:

- facilities of pedestrian and bicycle infrastructure,
- sheds for bicycle stands, as well as a bike rental station,
- Park & Ride parkings,
- installation of an openwork shed,
- ticket machines and passenger information points,
- small architecture elements, such as benches or litter bins.

As part of the action the following works are planned in Szarów railway stop area:

- bicycle stands for individual bicycles,
- bike rental station,
- parking lot,
- tourist information boards, providing information about tourist paths and Niepołomice Primeval Forest area,
- small architecture elements, such as benches or litter bins.

Below a detailed description of the three railway stops in Podłęże, Staniątki and Szarów is presented in terms of accessibility of the railway stops and development of their surroundings:

Podłęże station

Podłęże railway station is the westernmost stop, located near the provincial road no. 964. The areas south of the stop are areas with quite intensive single-family housing, while the Niepołomice Investment Zone is located on the northern side. The companies located within it offer a total of over 6,000 workplaces for the residents of Niepołomice, but also for commuters from nearby communes, including Krakow. Podłęże stop has a relatively good transport links both with Podłęże and the town of Niepołomice, due to the possibility of direct access to the platforms. The newly built road and roundabout allow for shortening the access time. Moreover, an accelerated bus line no. 301 runs along the provincial road. It allows passengers from the center of Niepołomice to access the bus stop. However, due to the location of the bus stop, it also requires walking of around 500 m. There is no developed bicycle infrastructure in the area. The area of platforms is very well organized. It is pedestrian friendly, including for people with disabilities, due to the good condition of the surface, adequate lighting and the necessary small architecture.

Using the experiences of Ljubljana[30] and Edinburgh[31], as part of improving the accessibility of Podłęże railway stop, a better individual transport connection has been proposed, by creating two Park & Ride parkings (parking lots located on both sides of the Podłęże stop). In addition, it is assumed that unattractive parking lot will be arranged with greenery to become user-friendly. Next to the Park & Ride parking, the location of a Bike & Ride parking has also been proposed.

On the southern side, the Park & Ride parking is located right next to the platform, which will be isolated from the access road by a green belt. On one of the streets (Kolejowa St.), located on the southern side of the tracks, connecting Podłęże railway stop area with the provincial road no. 964, it has been proposed to create a woonerf-type solution. In addition, an attractive pedestrian-bicycle route leading directly to the stop will be created. A lookout of this street will be a renovated railway station building, which will house a cultural center and other services catering for passengers basic needs.

[30] Best Practices Exchange Slovenia, Ljubljana – Main conclusions and Lessons Learnt, Regio-Mob project
[31] Lowrie S., Edinburgh Park & Ride, presentation during Regio-Mob project meeting

On the northern side, a bike station for the employees of this zone has been located. There will also be a connection to individual transport in the form of Park & Ride parking, around which the bus line will pass. Stops are located directly at the entrances to the platforms. Moreover, an option of an express bus line connecting the town center of Niepołomice to Podłęże railway station has been considered. This line would be coordinated with the train timetable. On its route, there would be only one intermediate stop (center of Niepołomice – NSI zone – Podłęże railway station). Figures 3.12 and 3.13 show the current state of the stop and the concept of its development.

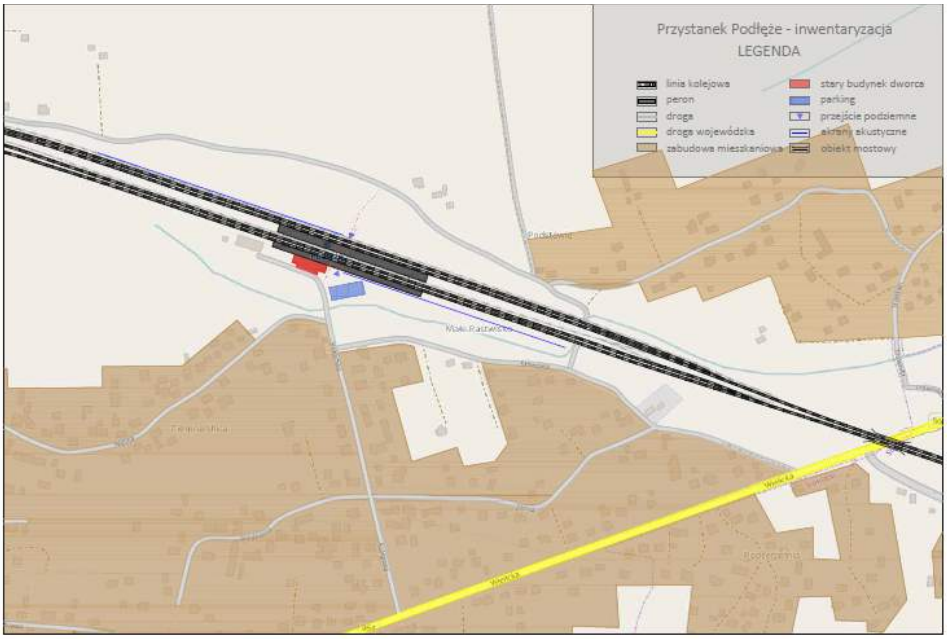

Fig. 3.12. Podłęże stop development – current state
Source: Szarata A., Duda-Wiertel U., Nosal K., Solecka K.: Przygotowanie oraz wdrożenie metodologii zajęć warsztatowych dla min. 15 osób oraz przygotowanie zajęć warsztatowych ze studentami kierunku transport lub pokrewnym, poświęconych wypracowaniu nowych rozwiązań transportowych w regionie w ramach spotkań projektowych regionalne grupy interesariuszy. Opracowanie na zlecenie Gminy Niepołomice. Politechnika Krakowska, 2017.

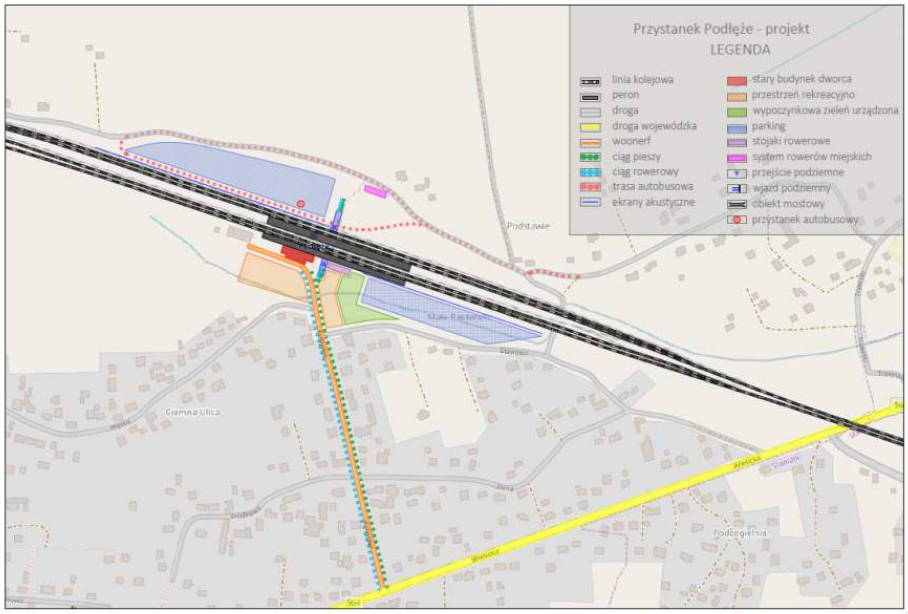

Fig. 3.13. Podłęże stop development concept
Source: Szarata A., Duda-Wiertel U., Nosal K., Solecka K.: Przygotowanie oraz wdrożenie metodologii zajęć warsztatowych dla min. 15 osób oraz przygotowanie zajęć warsztatowych ze studentami kierunku transport lub pokrewnym, poświęconych wypracowaniu nowych rozwiązań transportowych w regionie w ramach spotkań projektowych regionalne grupy interesariuszy. Opracowanie na zlecenie Gminy Niepołomice. Politechnika Krakowska, 2017.

Staniątki stop

Staniątki stop is located south of the center of Niepołomice. A characteristic feature of this bus stop is the overpass that ensures collision-free passage of vehicles. The platforms are diagonally opposite each other and are elevated slightly above the ground. Stairs provide pedestrian access from both sides. Access for disabled people is provided by ramps. The passage between the platforms is provided by a tunnel located in the middle, which is adapted to the movement of all users. There is also a possibility of accessing the train stop by individual transport, because it is possible to park vehicles in the vicinity of the stop and directly under the overpass, parallel along the road. However, this solution has disadvantages – there is not enough number of parking spaces, and some of them are located along the street thus occupying the spaces designed for pedestrians.

The advantage of the stop is location of bicycle stands next to it. Since the largest percentage of people using the stop are local residents, in this case a special attention has been paid to walking and cycling infrastructure facilities. An important element is improvement of the quality of pedestrian connections in a radius reflecting the maximum of 10 minute walking. It is also worth creating a secure connection between the railway station and the planned pedestrian and bicycle path so as to ensure a cycling connection with the town center of Niepołomice. Shelters for bicycle stands, as well as a bike rental station have been planned. Access to the stop for people living in further areas will be provided by individual transport.

Construction of a Park & Ride parking on the northern side of the platforms has been planned, while on the southern side, it is suggested to maintain a reserve area for the construction of the second parking (Park & Ride type). There is also space left for a potential bay for the bus. Facilities for people waiting for the arrival of the train will be provided – it has been proposed to install an openwork shelter in which small catering services, such as food vending machines or a kiosk would be located. In addition, ticket machines and passenger information points will be located at the shed. The interior will be complemented by small architecture elements such as benches or litter bins. Figures 3.14 and 3.15 show the current

state of the stop and its development concept.

Fig. 3.14. Staniątki stop development – current state
Source: Szarata A., Duda-Wiertel U., Nosal K., Solecka K.: Przygotowanie oraz wdrożenie metodologii zajęć warsztatowych dla min. 15 osób oraz przygotowanie zajęć warsztatowych ze studentami kierunku transport lub pokrewnym, poświęconych wypracowaniu nowych rozwiązań transportowych w regionie w ramach spotkań projektowych regionalne grupy interesariuszy. Opracowanie na zlecenie Gminy Niepołomice. Politechnika Krakowska, 2017

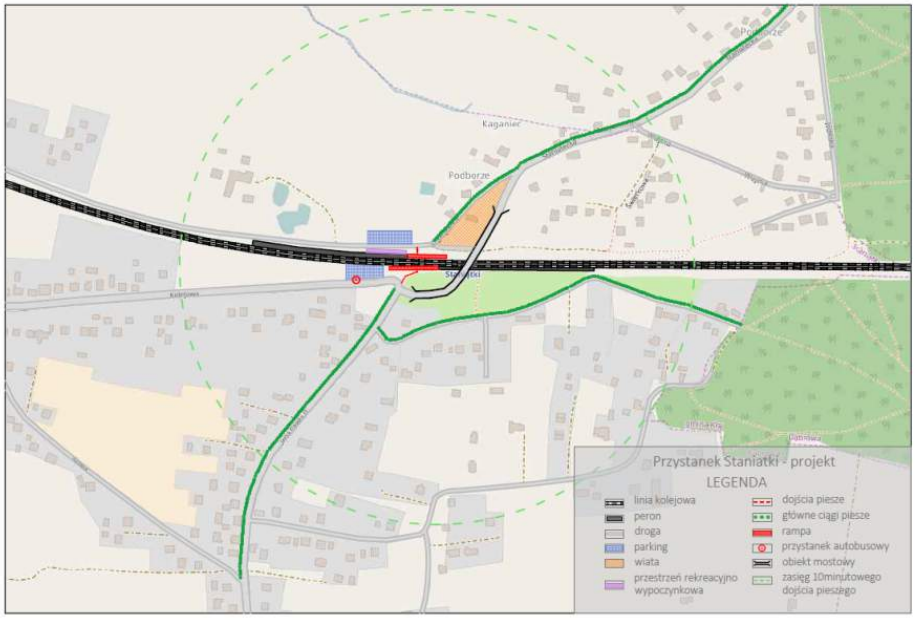

Fig. 3.15. Staniątki stop development concept
Source: Szarata A., Duda-Wiertel U., Nosal K., Solecka K.: Przygotowanie oraz wdrożenie metodologii zajęć warsztatowych dla min. 15 osób oraz przygotowanie zajęć warsztatowych ze studentami kierunku transport lub pokrewnym, poświęconych wypracowaniu nowych rozwiązań transportowych w regionie w ramach spotkań projektowych regionalne grupy interesariuszy. Opracowanie na zlecenie Gminy Niepołomice. Politechnika Krakowska, 2017

Szarów stop

Szarów stop is located in Niepołomice Primeval Forest, near the national road no. 75. It is located outside Niepołomice Commune, however, it is extremely important for proper services in its eastern part. From the south the stop borders with dispersed single-family housing. A sports field used by the local football club is located near the railway tracks (also from the southern side).

Special attention has been paid to tourist functions in the stop area. Due to the vicinity of Niepołomice Primeval Forest, the stop can be used by tourists. Because they can move around in the forest by bike, a place was reserved for both bike racks for individual bikes and a bike rental station. Laying out new walking and cycling routes from the stop has been recommended.

The previous function of the sports field has been preserved, and a small parking lot has been created next to it. On the southern side, a recreation area with small architecture elements, such as benches or litter bins, has been proposed. It is also worth paying attention to appropriate lighting. The project will be complemented with the installation of tourist information boards, informing about tourist routes and Niepołomice Forest area. Figures 3.16 and 3.17 show the current state of the bus stop and its development concept.

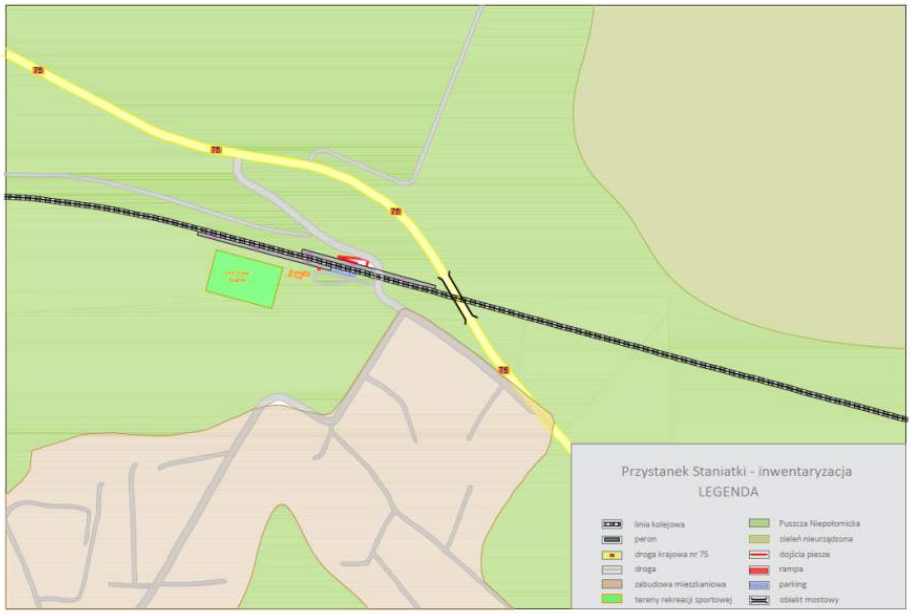

Fig. 3.16. Szarów stop development – current state
Source: Szarata A., Duda-Wiertel U., Nosal K., Solecka K.: Przygotowanie oraz wdrożenie metodologii zajęć warsztatowych dla min. 15 osób oraz przygotowanie zajęć warsztatowych ze studentami kierunku transport lub pokrewnym, poświęconych wypracowaniu nowych rozwiązań transportowych w regionie w ramach spotkań projektowych regionalne grupy interesariuszy. Opracowanie na zlecenie Gminy Niepołomice. Politechnika Krakowska, 2017

Fig. 3.17. Szarów stop development concept
Source: Szarata A., Duda-Wiertel U., Nosal K., Solecka K.: Przygotowanie oraz wdrożenie metodologii zajęć warsztatowych dla min. 15 osób oraz przygotowanie zajęć warsztatowych ze studentami kierunku transport lub pokrewnym, poświęconych wypracowaniu nowych rozwiązań transportowych w regionie w ramach spotkań projektowych regionalne grupy interesariuszy. Opracowanie na zlecenie Gminy Niepołomice. Politechnika Krakowska, 2017

The primary purpose of the action:

- improvement of comfort of travelers at railway stations,
- transport integration: Park & Ride parkings, Bike & Ride, bike rental,
- increasing the attractiveness of the area, railway stops,
- improvement of traffic conditions for pedestrians, cyclists in the railway stops area,

Stakeholders involved

- Niepołomice Commune, Kłaj Commune – leading role, construction and maintenance of the stops infrastructure, providing execution and supervision of the investment,
- Małopolska Province Marshal's Office – maintaining Park & Ride system at a regional scale (tariff integration – IMKA joint ticket),
- Metropolia Krakowska association – support Niepołomice Commune in efforts to obtain co-financing of the investment.

Timeframe
2020

Costs
Approx. PLN 28 190 684 (Staniątki, Podłęże, Wola Batorska, Niepołomice),
Approx. PLN 5 799 497 (Szarów).

Sources of funding

- EU funds (Sub-measure 4.5.1 Low emission urban transport – Integrated Territorial Investments) – Staniątki, Podłęże, Wola Batorska, Niepołomice),
- Municipal Office in Niepołomice,
- Kłaj Commune.

3.4 Measures related to parking facilities

The location of Niepołomice Commune in the immediate vicinity of Krakow (as part of the Krakow Functional Area; Polish acronym: KrOF), the developing Niepołomice Investment Zone and the resulting displacement directions of residents and employees of the commune provide a strong foundation for carrying out activities aimed at strengthening transport links in a regional context.

Due to the great popularity of railway transport within the Fast Agglomeration Railway (SKA3 line on the Tarnów – Kraków route), access to railway stops in the region should be improved and the system integrating public transport with individual transport should be extended (supplemented). In this context, the best potential solution would be to create a system of interchange parking lots, which contribute to the implementation of the basic assumption – in relation to mobility policy – striving to reduce the share of journeys made by individual transport means, including by improving travel conditions (shortening travel time).

3.4.1 Construction of Park & Ride parking system

Introduction

The success of activities aimed at limiting car traffic by encouraging combined travel – in the Park & Ride system, has been proved by numerous examples from foreign cities (including Regio-Mob partners)[32,33] that have successfully implemented the Park & Ride subsystem into the urban transport system. Thus, it is considered reasonable to take measures to build parking lots in the Park & Ride system in locations with potential for regional traffic – in the context of Niepołomice Commune:

- at Staniątki and Podłęże railway stops,
- at places where passengers potentially transfer from individual transport to collective road transport: in Niepołomice and Wola Batorska,
- as well as other locations (stops served by public transport), where a high share of journeys made in the interchange system has been observed (first, carried out by an individual car and continued from a given stop using public transport,
- It is also recommended to support the development of interchange parking lots network at remaining railway stops along the SKA3 route, and at other places where interchanges have been made so far, as part of regional trips, that are beyond the Niepołomice Commune.

As part of the planning of an interchange junction, what consists – as one of the elements – of a parking lot in the Park & Ride system, it is recommended to carry out detailed analyzes to confirm predictions about the effectiveness of the planned parking lot, in particular:

- on-site visit of the surroundings of a given stop to determine potential problems with cars parked by the travelers in the informal Park & Ride system,
- if observed – research on vehicles parking in the vicinity of a given stop,
- survey of travelers traveling from a given stop – identifying basic data about these trips: origin, destination, transport means used, readiness to travel in the Park & Ride system, etc.,
- potential analysis of the so-called travel diaries of residents of the area lying within good accessibility by car to a given bus stop, in terms of their mobility, travel objectives and transport means used.

Experiences of Edinburgh[34] (among others) indicate that the main factor that decides

[32] Lowrie S., Edinburgh Park & Ride, presentation during Regio-Mob project meeting
[33] Best Practices Exchange Slovenia, Ljubljana – Main conclusions and Lessons Learnt, Regio-Mob project
[34] Lowrie S., Edinburgh Park & Ride, presentation during Regio-Mob INTERREG Europe project meeting

about the use (or not) by a traveler of an interchange parking is its optimal location, in connection with access to an efficient means of transport (they determine travel time by public transport means from the parking lot to the destination). Therefore, particular attention should be paid to the issue of optimal location of the planned interchange parking network.

Action description

Construction of Park & Ride parking lots, planned as part of the Integrated Territorial Investments: "Integration of collective transport with individual transport in Niepołomice commune in relation to KrOF "(Sub-measure 4.5.1. Low-emission Urban Transport).

As part of the investment, the construction of interchange car parkings has been planned in the following locations:

- Park & Ride parking at Staniątki bus stop,
- Park & Ride parking at Podłęże railway station,
- Park & Ride parking in Niepołomice,
- Park & Ride parking in Wola Batorska.

The implementation of this measure includes the construction of parking lots, but also the construction, reconstruction or revitalization of complementary infrastructure for the entire interchange. In order to better adapt the planned interchanges to the users' needs and thus achieve – following the example of foreign cities, project partners, including Ljubljana[35] and Edinburgh[36] – its better use by travelers, it is planned to revitalize access roads with infrastructure for pedestrians and cyclists and direct parking environment, as well as equipping the hub with supporting infrastructure (additional stations for charging electric vehicles, Kiss & Ride places, as well as bus shelters, covered bicycle stands, etc.).

Locations of railway stops with planned Park & Ride parkings are shown in Figure 3.18.

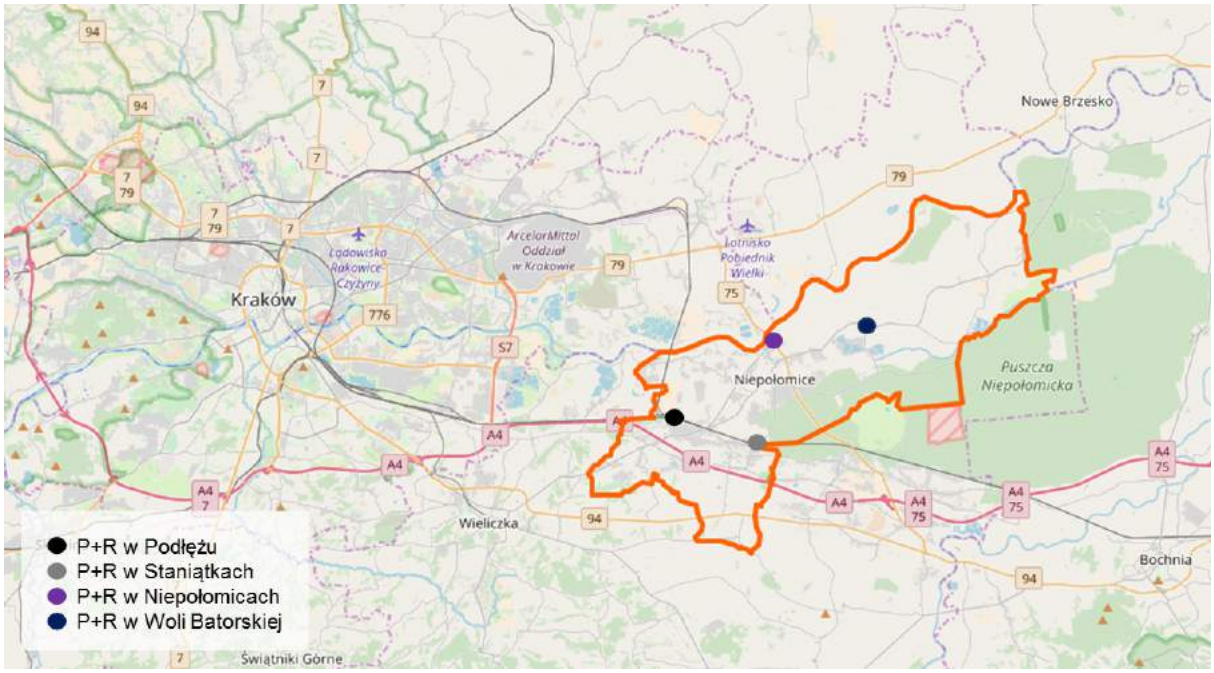

Fig. 3.18. Location of planned interchange parkings in P+R system
Source: Own elaboration.

[35] Best Practices Exchange Slovenia, Ljubljana – Main conclusions and Lessons Learnt, Regio-Mob project
[36] Lowrie S., Edinburgh Park & Ride, presentation during Regio-Mob project meeting

Park & Ride parking in Staniątki

The interchange hub design at Staniątki railway stop, implemented as part of the Integrated Territorial Investments: "Integration of collective transport with individual transport in Niepołomice Commune in relation to KrOF" assumes the construction of a Park & Ride parking, located on the northern side of the platforms. It is recommended to implement the planned activities, with the possible complement of additional elements integrating travel in the local and regional context. The parking infrastructure will include:

- 120 parking spaces for passenger cars (including 4 for people with disabilities),
- 6 parking spaces for motorcycles,
- Kiss & Ride places.

In addition, it has been proposed:

- 1 charging point for electric cars,
- 6 roofed bicycle sheds (60 parking spaces),
- Małopolska Agglomeration Card system (MKA).

Within the interchange, a space for a potential bay for the bus should be reserved and also facilities for passengers waiting for a train should be provided: it is recommended to provide a shed to wait for an oncoming train. The location of the parking lot together with the spatial development concept in the interchange area is presented in a figure in section 3.3.7 of this study.

Park & Ride parking in Podłęże

The interchange hub design at Podłęże railway station, implemented as part of the Integrated Territorial Investments: "Integration of collective transport with individual transport in Niepołomice Commune in relation to KrOF" assumes the construction of two Park & Ride parking lots (located on the northern and southern sides of the stop), providing 182 parking places in total. It is recommended to implement the planned measure, taking into account the following:

The parking infrastructure for the site from the north should include:

- 119 parking places (including 3 for people with disabilities + 2 for families),
- 7 places for motorcycles,
- 2 Kiss & Ride places,
- 10 roofed bicycle sheds (100 parking places),
- bus bay (3 places),
- 1 charging point for electric cars,
- MKA system.

Plan for the parking lot from the north includes:

- 63 parking places (including 3 for people with disabilities + 2 for taxis)
- 8 places for motorcycles,
- 2 roofed bicycle sheds (20 parking places),
- 2 Kiss & Ride places,
- 1 charging point for electric cars.

Plan of rearranging of the space around the P+R facilities of the existing stop in Podłęże is presented in section 3.3.7 of this study.

Park & Ride parking in Niepołomice

The interchange hub design at Kolejowa Street in Niepołomice, implemented as part of the Integrated Territorial Investments: "Integration of collective transport with individual transport in Niepołomice Commune in relation to KrOF" assumes:

- construction of a new interchange station in a new location (4 places: 2 for buses, 2 for microbuses),
- construction of a new parking lot: 136 parking places (including 4 for people with disabilities + 4 for parents with children).

Additionally:

- 8 places for motorcycles,
- roofed bicycle sheds (38 parking places),
- Kiss & Ride places,
- 1 charging point for electric cars.

It is recommended to implement the investment and all the planned and designed objects of a new interchange.

Park & Ride parking in Wola Batorska

The interchange hub design in Wola Batorska, implemented as part of the Integrated Territorial Investments: "Integration of collective transport with individual transport in Niepołomice Commune in relation to KrOF" assumes construction of one small parking lot of Park & Ride type with accompanying infrastructure.
It is recommended to build the interchange and all the accompanying objects. The parking infrastructure of the site should include:

- 34 parking places (including 3 for people with disabilities),
- places for motorcycles,
- roofed bicycle sheds (40 parking places),
- Kiss & Ride places.

Kiss & Ride zone, planned as part of the site in Wola Batorska should additionally serve the primary school located in the vicinity of the interchange.

Stakeholders involved

- Niepołomice Commune – leading role, responsible for the following measures:
  - providing land for the construction of interchanges mentioned above, including Park & Ride parking lots,
  - preparation of the interchange parking design,
  - providing execution and supervision of the investment.
- Małopolska Province Marshal's Office – maintaining Park & Ride system at a regional scale, including a tariff integration for the whole system (IMKA joint ticket),
- Metropolia Krakowska association – support for Niepołomice Commune in efforts to create a Park & Ride system.
- Regio-Mob project partners – complementary role – support for Niepołomice Commune in creating a Park & Ride system.

Timeframe

Investment execution planned for the period: 2018-2019.

Costs

Estimated total investment costs (including construction of 4 parking lots in a Park & Ride system along with accompanying infrastructure, and works on pedestrian and bicycle paths, and access roads, planned for reconstruction): PLN 28 190 684.

Sources of funding

- Investment co-financed within the Regional Operational Program for Małopolska Province for the period 2014-2020. Sub-measure 4.5.1 Low-emission urban transport – amount of funding: PLN 15,3 millions
- Niepołomice Commune – PLN 12,9 millions

3.4.2 Construction of additional Park & Ride parkings in locations with great potential for regional travel

Introduction

It is proposed to create a Park & Ride parking lot at existing Szarów railway stop, aimed at serving people commuting to the Krakow agglomeration from the east, which would additionally serve recreational trips on non-working days.

Action description

Park & Ride parking in Szarów

Due to the location of Szarów railway stop (Fig. 3.19) in the immediate vicinity of Niepołomice Primeval Forest, the parking proposal also highlights the facilities for tourist trips. For this reason, a transfer parking is recommended with a relatively small number of parking spaces for cars (20), located next to the existing sports field.

The development of the interchange area, with particular emphasis on bicycle infrastructure and elements of small architecture, has been described in detail in section 3.3.7 of this study.

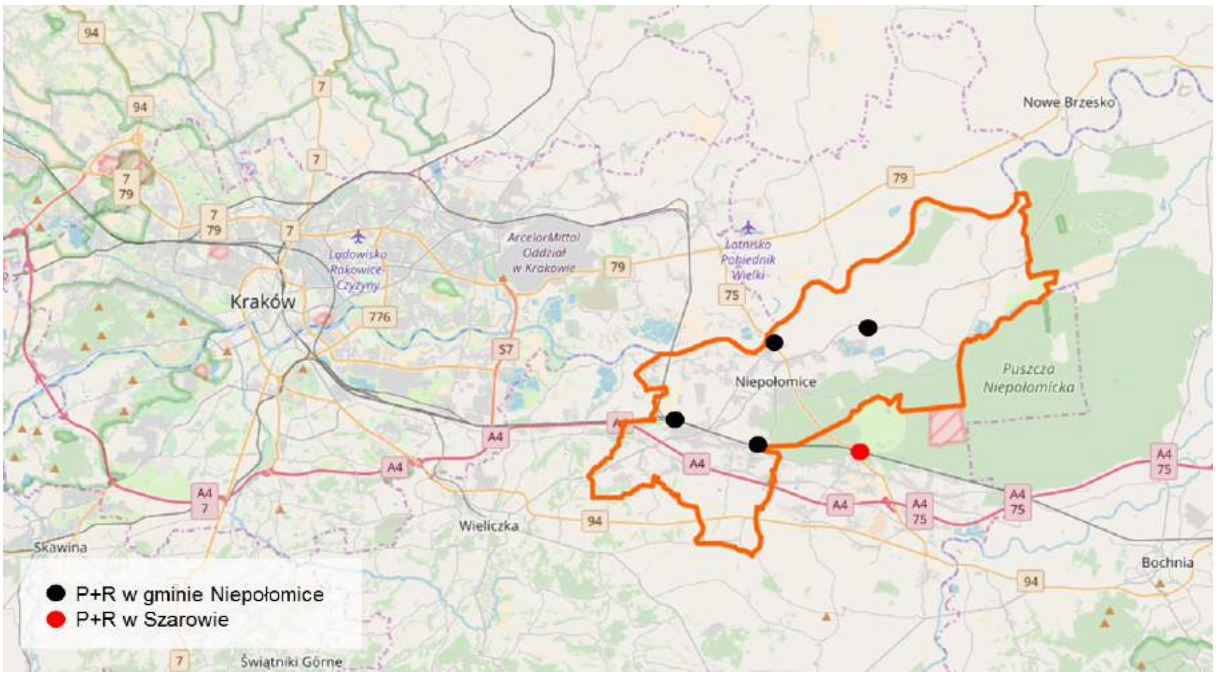

Fig. 3.19. Location of the planned interchange P+R parking lot in Szarów
Source: own elaboration

Stakeholders involved

- Kłaj Commune – leading role, responsible for the following actions:
  - providing land for the construction of the above-mentioned interchange hubs, including Park & Ride parking lots,
  - preparation of the interchange parking design,
  - providing execution and supervision of the investment.
- Niepołomice Commune – complementary role – initiator of the investment, and after the agreement with Kłaj Commune, possible co-financing of investment in the scope of design and implementation.
- Małopolska Province Marshal's Office – complementary role – maintaining Park & Ride system at a regional scale, including a tariff integration (IMKA joint ticket),
- Regio-Mob project partners – complementary role – support for Niepołomice Commune in creating a Park & Ride system.

Timeframe

Investment execution planned for the period: 2020-2022

Costs

Estimated total investment costs (including construction of Park & Ride parking lot along with the accompanying infrastructure, and works on pedestrian and bicycle paths, and access roads, planned for reconstruction): PLN 5 799 497.

Sources of funding

- Kłaj Commune's own funds,
- Niepołomice Commune's own funds – after singing an appropriate agreement with Kłaj Commune,
- Regional Operational Program for Małopolska Province for the period 2014-2020 – after the project has been submitted and qualified for execution and co-financing.

3.5 Actions aimed at increasing bicycle trips share

The bicycle is the fastest means of transport in crowded areas, with a great potential in meeting transportation needs, especially on short and medium distances (5-7 km). Cycling is one of the most pleasant ways of traveling; it has a positive effect on health, condition and well-being. In addition, two-wheeled vehicle is relatively cheap to buy and maintain compared to, for example, a car. City authorities should also consider its advantages from the point of view of economic efficiency – this form of transport does not require construction of huge infrastructural objects, such as flyovers, road junctions or large-surface parking lots for motorized traffic and does not pollute the environment. The bike is one of the most sustainable forms of mobility and a complement to public transport in the city. Supported by appropriate solutions, especially infrastructure – it can also become an alternative to individual transport.

In the context of traveling with this transport means, research carried out as part of the mobility plan for Niepołomice Commune revealed that over 80% of its residents have access to a bicycle, however only approx. 7% of residents in the summer and over 4% in winter cycle to work and school. In the case of the NSI employees, these indicators are even lower (by approx. 2 percentage points)[37]. The results of the research also revealed that currently the potential of changing the transport mode for a bicycle in the case of the residents of the commune is small, which probably results from the lack of a comprehensive bicycle road system, but nearly 70% of the NSI employees declare bicycle riding provided solutions to facilitate such trips have been introduced. Bearing in mind the above information and due to the advantages of cycling, Niepołomice Commune authorities, in cooperation with other stakeholders, should carry out various measures aimed at improving the comfort and safety of cyclists' travels, thus encouraging the commune residents and people employed in the NSI to use this transport means.

3.5.1 Development of a bicycle road system

One of the most important factors encouraging bike travels is to provide a consistent road system for bicycles, guaranteeing fast, comfortable and safe travel by this transport mode. Currently, the bicycle network in Niepołomice Commune is not developed enough to ensure the desired quality of cycling, which is reflected in the low share of bicycles in the travels of both commune residents and the NSI employees. Moreover, there are no bicycle paths leading to neighboring communes, from which a high percentage of employees commute to the NSI every day. The results of survey conducted among the NSI imply the need to provide adequate line infrastructure – for 30% of respondents the presence of a safe bicycle route to the workplace is a factor that would encourage them to change transport means to a bicycle[38]. The successive development of bicycle routes can also stimulate the number of journeys made by commune residents, both in obligatory and optional travel motivations.

Action description

Therefore, it is recommended to strive for a successive development of a bicycle road system, both in the area of Niepołomice Commune and in the adjacent communes. The area where the road network for bicycles must be complemented is shown in Fig. 3.20 – it was designated in relation to the focal point of the Niepołomice Investment Zone (as an area generating a very large number of trips) and limited by a 7 km radius, which indicates the maximum distance traveled to work by bike. The area includes the southern and central areas of Niepołomice Commune, the northern areas of Wieliczka Commune and Biskupice

[37] Mobility plan for the Municipality of Niepołomice, Via Vistula, Krakow, 2016.
[38] Mobility plan for the Municipality of Niepołomice, Via Vistula, Krakow, 2016.

Commune, a small part of the southern area of Gdów Commune, western areas of Kłaj Commune, the south-eastern areas of Krakow Commune and the southern areas of Igołomia-Wawrzeńczyce Commune.

It is recommended that the road network for bicycles be developed based on existing concepts developed in the study entitled "Mobility plan for the Municipality of Niepołomice"[39], study entitled "Concept of development of the bicycle transport system in the Krakow Functional Area"[40] (including plans for the development of a bicycle network in the communes: Niepołomice, Wieliczka, Biskupice, Krakow and Igołomia-Wawrzeńczyce) and the "Study of conditions and directions of spatial development of the City of Krakow"[41] (in the scope of main and complementary routes, planned for implementation in the south-eastern areas of Krakow Commune).

Providing bicycle connections to the communes of Kłaj and Gdów requires from Niepołomice Commune to start talks with their authorities in order to convince them that it is necessary to develop a bicycle infrastructure that would enable commuting to workplaces in the NSI.

[39] Mobility plan for the Municipality of Niepołomice, Via Vistula, Krakow, 2016.

[40] Via Vistula, Koncepcja rozwoju systemu transportu rowerowego na terenie Krakowskiego Obszaru Funkcjonalnego [Concept of development of the bicycle transport system in the Krakow Functional Area], http://metropoliakrakowska.pl/wp-content/uploads/2016/09/Koncepcja-rozwoju-systemu-rowerowego-na-terenie-KrOF.pdf.

[41] Studium Uwarunkowań i Kierunków Zagospodarowania Przestrzennego Miasta Krakowa, załącznik do Uchwały Nr XII/87/03 z dnia 16 kwietnia 2003 r. zmienionej uchwałą Nr XCIII/1256/10 z dnia 3 marca 2010 r. zmienionej uchwałą Nr CXII/1700/14 z 9 lipca 2014 r.

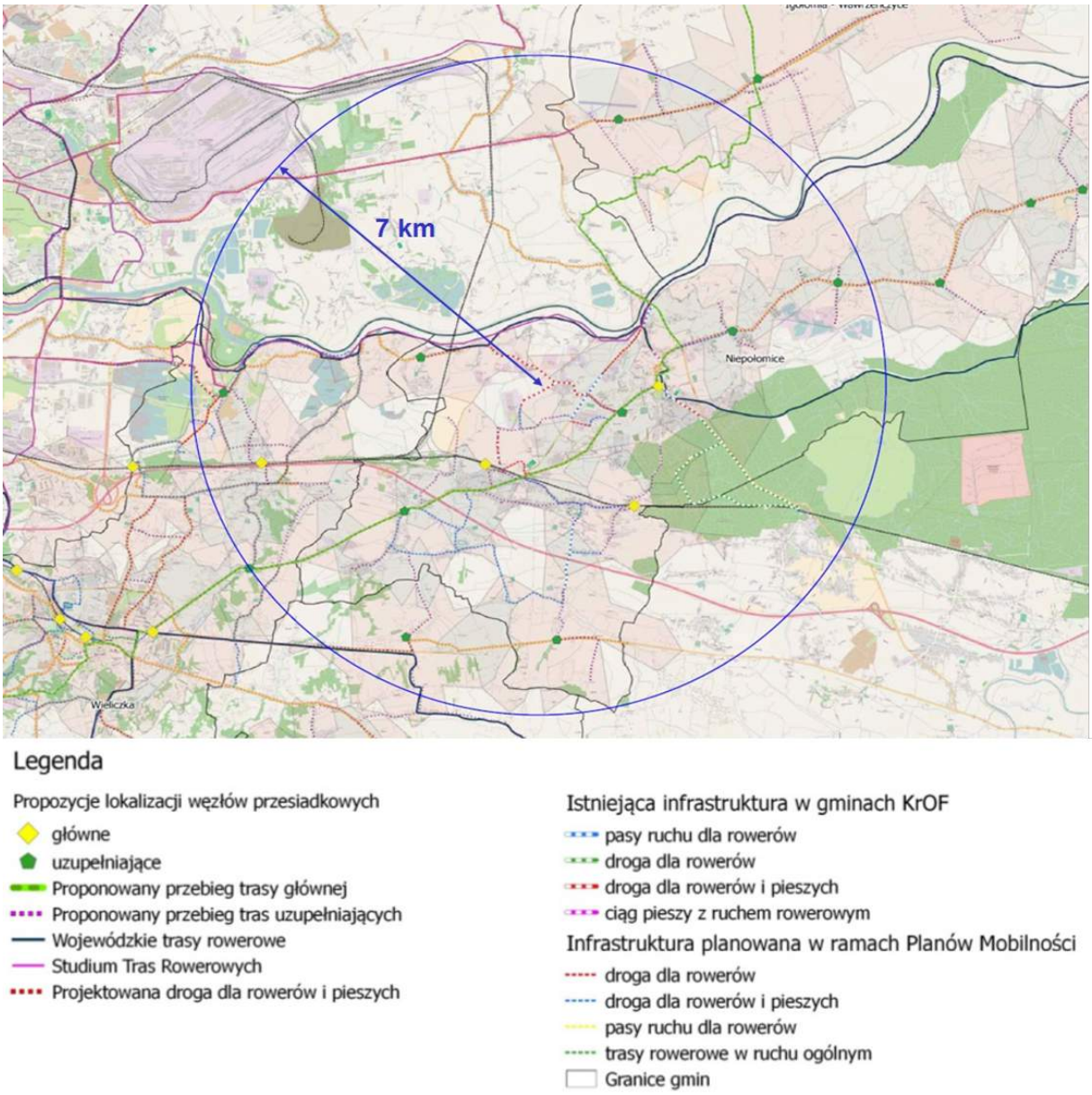

Fig. 3.20. Bicycle paths planned for implementation in the area where people commute by bicycle to the NSI
Source: Via Vistula, Koncepcja rozwoju systemu transportu rowerowego na terenie Krakowskiego Obszaru Funkcjonalnego [Concept of development of the bicycle transport system in the Krakow Functional Area].

It should be emphasized that a bicycle road network in the area indicated in Fig. 3.20 should be completed in the nearest future, which is of key importance for increasing the number of trips made by bicycle to the NSI. In addition, it will ensure safe access by bicycle to railway stops.

Based on the concepts developed as part of the "Mobility plan for the Municipality of Niepołomice", it is necessary to shape a bicycle road network in the remaining parts of the commune, not covered by the above-mentioned area of commuting by bicycle to work in the NSI – so as to ensure residents safe and comfortable cycling also in remaining area.

Working on a development of the bicycle network, the principles of designing this type of infrastructure should be taken into consideration (including safety, convenience and attractiveness) described, among others, in the "Concept of the development of the bicycle

transport system in the Krakow Functional Area"[42].

Stakeholders involved

- Niepołomice Commune – development of a road network in the commune, encouraging the authorities of the communes Kłaj and Gdów to develop a bicycle infrastructure in order to enable the residents of these communes to commute by bike to workplaces in the NSI,
- Communes: Krakow, Wieliczka, Kłaj, Gdów, Biskupice, Igołomia-Wawrzeńczyce – development of the road system in the communes adjacent to Niepołomice Commune,
- Metropolia Krakowska association – support for Niepołomice Commune in efforts to obtain EU funds.

Timeframe
2018-2024.

Costs

- Construction of a bicycle road with an asphalt surface and design documentation: 300.00-350.00 PLN/m^2
- Painting a bicycle lane on the roadway – 100 linear meters with the design: PLN 2500

Sources of funding

- Niepołomice Commune's own funds,
- Regional Operational Program for Małopolska Province for the period 2014-2020 – after the project has been submitted and qualified for execution and co-financing.

3.5.2 Installation of bicycle racks

Another factor, aside from the line bicycle infrastructure, that influences the conditions of travel by bicycle is the availability of roofed, safe bicycle racks at the destination and at public transport stops, allowing transfer from bike to bus/train, etc. The need to provide covered parkings at public transport stops is also noticed by the NSI employees – in research carried out for the needs of the mobility plan for Niepołomice Commune, 8% of the surveyed employees indicated this factor as being able to encourage them to change the transport means to a bicycle[43].

Action description

It is proposed to locate bicycle racks both in town area and villages in Niepołomice Commune, primarily at the following facilities:

- transport (railway and bus stops, especially main and complementary interchanges, indicated in Fig. 3.20),
- public utility (police station, offices, libraries, health centers etc.),
- commercial (supermarkets, commercial centers, market places etc.),
- sacral (churches, cemeteries, etc.),
- cultural, sport and recreational (museum, cinema, sports facilities, etc.),

[42] Via Vistula, Koncepcja rozwoju systemu transportu rowerowego na terenie Krakowskiego Obszaru Funkcjonalnego [Concept of development of the bicycle transport system in the Krakow Functional Area], http://metropoliakrakowska.pl/wp-content/uploads/2016/09/Koncepcja-rozwoju-systemu-rowerowego-na-terenie-KrOF.pdf.
[43] Mobility plan for the Municipality of Niepołomice, Via Vistula, Krakow 2016.

- large human clusters (e.g. housing estates).

It is recommended to install racks in the form of an inverted letter "U" (it is absolutely not possible to use racks that allow a bike to be fastened only by a wheel and do not allow to rest a vehicle against the frame). Depending on terrain conditions, one should strive to build covered parkings, especially those located in the immediate vicinity of bus and railway stops. At railway stops it is recommended to install from 15 to 20 bicycle racks that allow to attach two bicycles to one rack, in other locations – 5 to 10 racks.

It is also recommended to install self-service bike repair stations in the key locations (e.g. railway stops, interchanges, Niepołomice town center). The number of bicycle racks and bike repair stations should be increased successively, as new needs appear.

In addition, it is extremely important to carry out activities aimed at convincing the management of the plants and schools that the availability of a sufficient number of roofed and secure places to park bicycles in their areas is crucial for encouraging employees and the youngest road users to bicycle trips.

Stakeholders involved

- Niepołomice Commune – installation of bicycle racks and bike repair stations in the areas owned by the commune, encouraging other entities, including private entrepreneurs, schools, parishes do provide places to park bicycles.
- Public institutions in the commune, private entrepreneurs, parishes – providing land for parking spaces, potential installation of the racks on their own account.

Timeframe

Installation should start in 2018 and continue in the future, according to appearing needs.

Costs

- Purchase and installation of a bicycle rack: PLN 500-800 apiece
- Purchase and installation of a self-service bike repair station: PLN 6000-7000 apiece.

Sources of finance

- Commune's own funds, public entities' own funds, private funds, parishes' funds.

3.5.3 Concept of a city bike system

Introduction of a public bicycle system may be an effective complement to the bicycle infrastructure. This proposal is justified in areas where there is a movement related to work and school, as well as tourist traffic[44,45]. The system, improving the availability of a bicycle (minimizing the disadvantages of a private bicycle: purchase and maintenance costs, and problem with storage), can be an alternative for people making compulsory and optional journeys by an individual car.

A great potential for the development of a city bike system results also from its use as part of the journey to the railway stops, in particular in daily commuting. Providing the possibility of using the bike in travels to stops located in the area covered by the system, without having to carry your own bike on the train, or leaving it at the parking at the railway stop, significantly improves the comfort of travel and can be a factor encouraging commuters by car to change transport mode – according to research conducted among the NSI

[44] Studium koncepcyjne systemu roweru publicznego dla Miasta Stołecznego Warszawy, TransEko, Warszawa, grudzień 2009

[45] „Veturilo po 2016 roku", Koncepcja funkcjonowania warszawskiego roweru publicznego, ViaVistula, Krakow, grudzień 2015

employees, more than 60% of interviewed commuters feel the need to change the transport mode from a car to another, for various reasons[46].

A large public interest in launching such solutions may be crucial to the success of the system. The idea of implementing the system is in concordance with the general, growing interest in using the bike in travels in Poland, and the general development trend when it comes to cycling infrastructure.

Action description

It is recommended to create a public bike system, which operations are based on self-service bike rentals, to travel on (relatively) short distances.

The stations of the system should be located primarily in the Niepołomice Investment Zone area (system will be a new possibility in travels between the NSI and interchange hubs), but also in Niepołomice center area and at interchange hubs planned in the commune.

It is also recommended to use public bike in recreational travels (the system should cover the recreational area of Niepołomice Forrest) – this is not in contradiction with the main goals of the system, as trips typical for working days disappear on non-working days. This can ensure an improvement of economic efficiency of the undertaking.

Based on the experiences of cities in which the public bicycle system is already operational, the location of self-service bicycle rentals has been proposed. The location map is shown in Figure 3.21, where it has been marked with red points.

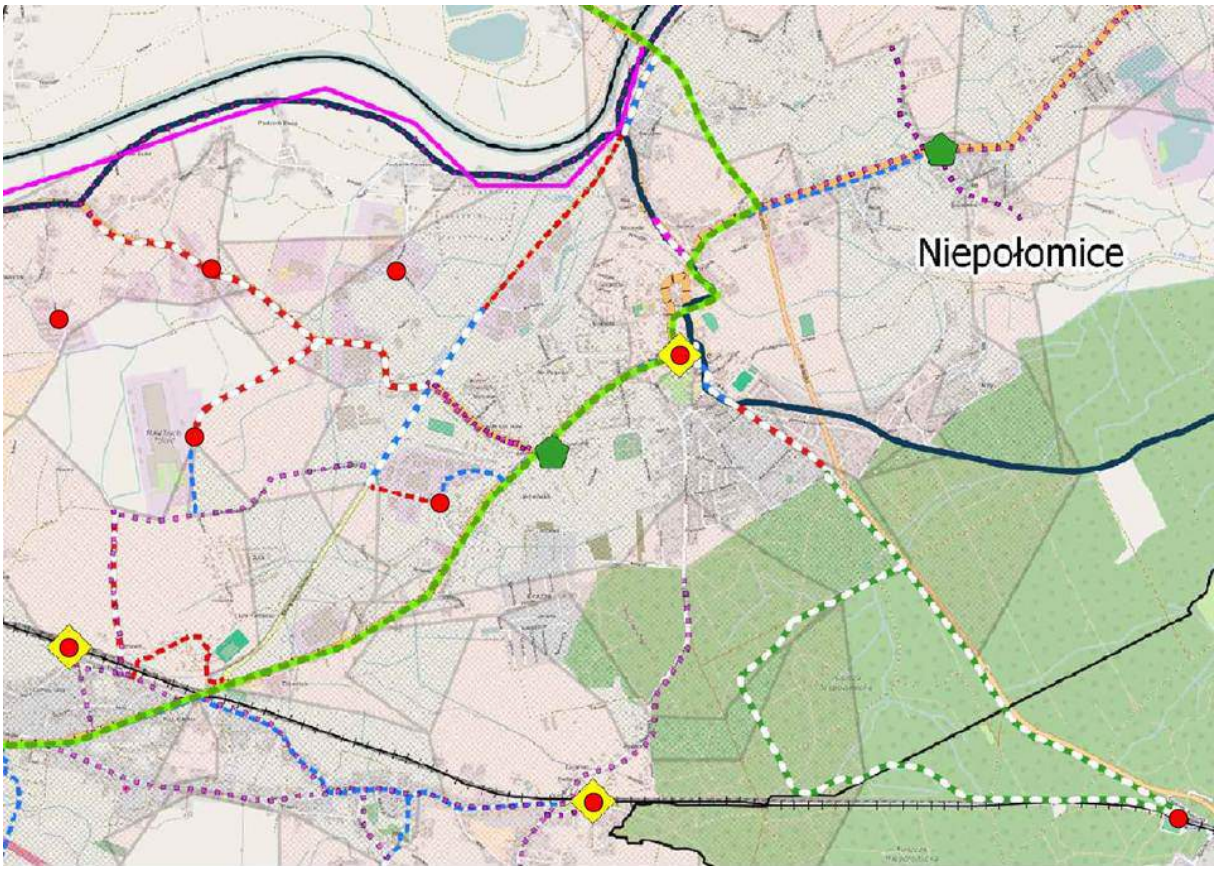

Fig. 3.21. Proposed locations of city bike stations
Source: own elaboration

[46] Mobility plan for the Municipality of Niepołomice, Via Vistula, Krakow, 2016

Due to the fact that the system will be used mainly by the employees of the Niepołomice Investment Zone, it is recommended to implement it in a partnership of the self-government and the NSI. Stations outside the investment zone (as part of interchange hubs, i.e. at the bus station and railway stops) should be built and maintained using the communes' own funds, while stations near the NSI plants – under the agreement – should by managed by the owners of the enterprises.

In the case of location of a public bicycle station in a recreational area near Niepołomice Forest – the exact location of the station and the conditions for its maintenance should be determined in agreement with Kłaj commune.

However, the launch of a public bike rental system should be preceded by an additional analysis and a separate study. It is recommended to:

- Identify transport behavior of commune residents – in terms of transport means used, length of travels, motivation and the most common destinations,
- Identify potential groups of public bike system users,
- Identify the most attractive places and areas from the point of view of the operations of public bike system,
- Identify ways of financing the system,
- Identify potential system operators,
- Identify technical solutions used in the context of bike rentals, bicycles as well as technical and IT services of the system,
- Identify appropriate solutions to counteract vandalism.

Stakeholders involved

The role of the leading stakeholders for the analyzed action is fulfilled by the authorities of Niepołomice commune and the Niepołomice Investment Zone (or management of individual companies in the NSI). They are responsible for:

- Niepołomice Commune – leading role; responsible for:
  - preparation of the implementation and system development plan,
  - providing the execution and supervision of the investment,
  - financing the implementation and operation of the system,
  - promotion of the system.
- Małopolska Province Marshal's Office – supporting role; maintenance of the system in integration with public transport system: railway transport (IMKA system),
- Zarząd Infrastruktury Komunalnej i Transportu w Krakowie [Municipal Infrastructure and Transport Authority in Krakow] – supporting role; maintenance of the system in integration with public transport system: urban bus transport (integrated ticket).

Timeframe

Implementation of the investment has been planned for: 2020

Costs

Costs of the implementation and operation of a public bike system for Niepołomice Commune has been estimated based on analogous estimates made for the Vertulio urban bike concept for the capital city of Warsaw[47].

Costs of the implementation of a public bike system are estimated as follows:

[47] Studium koncepcyjne systemu roweru publicznego dla Miasta Stołecznego Warszawy, TransEko, Warszawa, grudzień 2009

- unit cost of a bicycle is PLN 2 000,
- unit costs of additional elements, i.e.: rack (with bike docking), control panel and cost of sheds: PLN 1 500, PLN 10 000 and PLN 20 000.

The above-mentioned costs do not include:

- costs of IT system and management,
- costs of technical equipment for service and bicycle relocation,
- costs of preparation of tender documentation,
- costs of system design.

Operating costs of the public bicycle system:
Annual operating costs are estimated with the assumption of recreating a bicycle park in 4-year periods. Therefore, annual costs of replacing the bicycle park and annual costs of operating the system will depend on a size of the system (number of stations, bikes and the scope of system operation).

Due to the high costs of both implementation and operation of the system, it is recommended – if possible – to create a public bicycle system in Niepołomice, as an extension of the Wavelo city bike system operating in Krakow.
The main advantages of this solution:

- Lower costs of implementation and operations of the system,
- Extending the scope of a city bike: from the point of view of a user traveling from Niepołomice – creating the possibility of traveling by city bike to Krakow (with or without using rail connections) and from the point of view of a user traveling from Krakow – creating the possibility of traveling by city bike to recreational areas of Niepołomice Forest (with the possibility of using railway connections).

Before introducing the proposed solution, it is recommended to carry out a test implementation of such a system on a smaller scale to prove the attractiveness of the solution for users.

Sources of funding
The source of financing of the construction and operation of a public bicycle system depends mainly on the manner of implementation (selection of the system operator), the decision on the share of the commune's own resources and the possibility of obtaining fund from the EU budget.
In practice, it is possible to finance/co-finance the operation of the system from the following sources (in the case of a system operating independently):

- Commune's budget,
- Revenues from advertisements placed in the public bicycle system,
- EU funds,
- Revenues from users,
- External funds in public-private partnership.

Due to the small scope of the system and the initial phase of low popularity of the solution, revenues from advertisements and from system users will not be sufficient to cover at least part of the funds for system maintenance, so it must be financed from the budget of Niepołomice commune.

Noting the fact that the city bike system in Niepołomice commune is recommended in a partnership of the local government and the Niepołomice Investment Zone, the financing of the construction and maintenance of the system should, at least in part which will be used by the NSI employees, be provided by the NSI as a general partner, or by individual companies.

3.6 "Soft" measures (information, promotion and marketing)

The process of encouraging and persuading inhabitants of the Regio-Mob area, including residents of Niepołomice Commune, to change their views, opinions and transport behavior requires more than a rational approach, because decisions regarding the choice of transport means are implied by a number of sociological, cultural, psychological or economic factors, therefore, when implementing the objectives of the mobility plan, the specific needs and requirements of different users should be taken into account[48].

Thus, the application of the range of instruments described in the previous points (investment, financial, planning, organizational) must be supported by the implementation of the so-called "soft" measures of mobility management. "Soft" measures serve to meet the individual users' needs; they can be flexibly adapted to different conditions and specific expectations. In addition, in comparison to, for example, investment instruments, they do not require large financial outlays and are characterized by maintaining a high benefits/costs ratio. The "soft" measures include, mainly:

- activities related to information and consulting, which consist in providing residents with information on the functioning of transport means alternative to car and recommending the best solutions for the trip,
- educational activities aimed at raising citizens' awareness of the existence of sustainable forms of mobility and their ability to cater for transport needs; with this type of activity, residents are made aware that the choices of individuals affect the way and quality of travel, so if possible, environmentally-friendly transport means should be used,
- marketing activities that promote means alternative to car, using a wide range of resources: leaflets, brochures, gadgets, events and happenings, individual conversations with residents, etc.

The scope, form and theme of "soft" measures should always be adapted to specifics and characteristics of various groups of beneficiaries. Therefore, it is recommended to divide the residents of the area into the following groups to which measures and activities will be addressed:

- all residents (including residents of the entire Regio-Mob area, as well as only residents of Niepołomice Commune),
- pre-school and school children,
- employees.

3.6.1 "Soft" measures addressed to all Regio-Mob area residents

Not all "soft" measures, the implementation of which in the Regio-Mob area is justified, are within the competence of Niepołomice Commune. Some of them must be initiated and managed by regional authorities – the Marshal's Office, so that their impact could affect as many inhabitants of the area as possible and stimulate their balanced transport behavior. This mainly applies to proposals to organize educational and promotional events in particular communes.

[48] Nosal K., Działania edukacyjne i promocyjne w zakresie zarządzania mobilnością, Transport Miejski i Regionalny, 1/2011.

Action description

Initiation of activities related to European Mobility Week

As part of the initiation of educational and promotional activities addressed to all the Regio-Mob area residents, it is suggested that the Marshal's Office take the initiative and encourage communes in Małopolska to participate annually in European Mobility Week. It is all the more justified that at the Marshal's Office, a specially delegated person already performs the function of the so-called regional campaign coordinator, cooperating with the national coordinator in the Ministry of Infrastructure[49].

Sustainable Mobility Week, organized annually in the second half of September by many cities around the world is the most popular campaign promoting sustainable mobility, which culminates in the Car-Free Day, which always falls on September 22. During Car-Free Day drivers are encouraged to abandon cars for one day and to travel with other, sustainable means of transport.

Municipal offices, public transport operators, civil society organizations, schools, kindergartens, libraries, community centers, city guard, police, fire brigades, enterprises and media are involved in carrying out both events. The most commonly organized activities include[50]: organization of bicycle trips; free travels or discounts on public transport; competitions and sports games; distribution of leaflets, brochures and posters; training on road safety rules and first aid; educational campaigns in kindergartens and schools; promotion in the mass media: TV programs, radio programs, articles in the press, press conferences.

During the campaign, "soft" measures are usually accompanied by some investment and organizational measures, and the most frequently implemented ones include:

- installation of bicycle racks,
- traffic organization activities, i.e. introduction of new vertical and horizontal signage, as well as bicycle routes marking,
- launching a city bike rental,
- measures to improve the public transport operations, such as: creation of new bus lines, construction of new stops, replacement of the vehicles fleet with more ecological or more modern,
- activities related to traffic calming and introduction of new legal regulations, e.g. speed limits, redesigning of street space for a more pedestrian and cyclist friendly,
- temporary or permanent closing of selected routes for car traffic, etc.

European Mobility Week is a good opportunity to test solutions that may be controversial and which benefits are not necessarily perceived by residents immediately e.g. traffic restrictions and car parking. Being part of the campaign, one-day or several-day application of solutions makes it possible to convince residents of positive aspects, and as a result facilitates their permanent implementation.

It is worth emphasizing that in 2017 campaign in which 105 Polish cities and communes took part, Małopolska was the most active province (in terms of the number of registrations in relation to the province area)[51]. However, it is important that all Małopolska

[49] Perkuszewska M., Europejski Tydzień Zrównoważonego Transportu jako narzędzie wsparcia zrównoważonej mobilności miejskiej, prezentacja wygłoszona podczas warsztatów Civitas Prosperity, 28 listopada 2017, Katowice.

[50] Nosal K., Skuteczność kampanii „Tydzień zrównoważonej mobilności" oraz „Dzień bez samochodu" promujących proekologiczne środki transportu, Logistyka 3/2014.

[51] Perkuszewska M., Europejski Tydzień Zrównoważonego Transportu jako narzędzie wsparcia zrównoważonej mobilności miejskiej, prezentacja wygłoszona podczas warsztatów Civitas Prosperity, 28 listopada 2017, Katowice.

communes join the initiative, and the actions were taken not only in cities, but also in rural areas.

Stakeholders involved

- Małopolska Province Marshal's Office – leading role – encouraging communes in Małopolska to join the campaign and its coordination; information, educational and promotional activities of the campaign at the regional level.
- Communes in the province – organization of local campaigns, cooperation with local stakeholders during their realization.
- Transport systems authorities, carriers, non-governmental organizations, schools, kindergartens, libraries, community centers, city guard, police, fire brigades, enterprises, media – participation in campaign organization.

Timeframe

- Organization of European Mobility Week – every year in September.

Costs

- Małopolska Province Marshal's Office: PLN 50,000-100,000 per year, according to the scope of activities,
- communes: PLN 20,000-70,000 per year, according to the scope of activities and commune size.

Sources of funding

- Own funds of: Małopolska Province Marshal's Office, public and private entities, non-governmental organizations.

3.6.2 Substantial organizational activities as basis for the implementation of „soft" measures in Niepołomice Commune

In order for the "soft" measures of the mobility management in Niepołomice Commune to bring expected results in the form of changes of opinions, attitudes and transport behavior of its residents, they cannot be undertaken temporarily and sporadically as isolated, unrelated events, but should be implemented in a continuous manner and properly planned.

It is essential to inform the public in advance about their organization, then to implement them in accordance with the assumed timeframe, engaging residents and other stakeholders to the maximum possible extent and presenting the effects of their application. It is important to ensure a "feedback mechanism" in relations with residents, so that both positive and negative signals about all the implemented activities of the mobility plan reach the commune's authorities, and thus to be able to react quickly to emerging problems.

It is also important to undertake cooperation with the economic sector and the education sector, and to stimulate joint mobility management activities to influence the transport behavior of employees and the youngest traffic participants.

Action description

Mobility coordinator in the Commune

The implementation of the "soft" measures and all the accompanying activities, described above, require to designate a person in a municipal hall who will be responsible for their execution. Accordingly, it is recommended to create a position in a municipal hall of a so-called mobility coordinator, i.e. a person whose tasks would include, among others:

- development and implementation of mobility management instruments in the area of the commune,
- cooperation with traffic generators (companies, schools, etc.), carriers and transport authorities in the process of implementing mobility management activities,
- organization of educational, informational and promotional events for various groups of users,
- using various tools of social participation to engage residents in planning sustainable mobility and their active participation in the implementation of activities,
- organization of trainings and workshops, e.g. for companies management, educational entities,
- undertaking cooperation with residents' associations, non-governmental organizations operating in the fields of transport, mobility and ecology for the joint implementation of activities promoting mobility,
- cyclical study of transport behavior, monitoring the implementation process and assessing effects of their implementation.

A person holding such a position could only deal with activities related to the implementation of "soft" mobility management activities or, depending on the needs, carry out other tasks, e.g. to engage in the work of the department responsible for the promotion of Niepołomice Commune.

Shaping the pro-ecological image of the Municipal Office

Furthermore, it is suggested to build a pro-ecological, sustainable image of Niepołomice Commune by developing and implementing a mobility plan for the Municipal Office with measures to shape sustainable transport patterns of its employees. The mobility plan is a set of mobility management instruments implemented to change people's transport behavior towards limiting the use of private cars when traveling to facilities and areas generating large traffic flows. As part of mobility plans, workplaces, in cooperation with transport authorities and operators, implement, among others, the following activities[52]:

- regarding improving travel conditions by public transport (for intra- and inter-municipal journeys), e.g. changes in the existing bus lines routes, etc.,
- regarding improving cycling conditions, e.g. installation of bicycle stands, building changing rooms and showers for cyclists,
- regarding improving access to facilities/areas for pedestrians and people with reduced mobility, e.g. providing pedestrian routes guaranteeing access to workplaces,
- solutions regarding organization of working time, e.g. adjustment of timetables to the time of starting/finishing work,
- financial instruments, e.g. bonuses for people commuting by bicycle,
- regarding parking management, e.g. related to limiting the number of parking spaces, introducing payments for parking,
- encouraging vehicle sharing in commuting to facilities/areas, e.g. organization of the company carpooling system,
- educational, informational, promotional activities, etc.

A mobility coordinator should be the person responsible for the development and implementation of the mobility plan for Niepołomice.

In addition, it is recommended that to give a good example, the mayor and his deputies, on the occasion of various types of events, presented pro-ecological transport behavior, e.g. to participate in bicycle rides organized during various types of events.

[52] Nosal K., Zasady tworzenia planów mobilności dla obiektów i obszarów generujących duże potoki ruchu, Transport Miejski i Regionalny, 2/2016.

Stakeholders involved

In the implementation of the mobility plan for Niepołomice Commune – depending on the scope of actions envisaged for implementation – transport authorities and carriers as well as bicycle equipment sales and repair businesses, etc. may be involved.

Timeframe

Activities implemented on a continuous basis.

Costs

- The employment costs of a mobility coordinator will depend on the form of employment (full or part-time contract, etc.) and the type of duties performed.
- The costs of implementation of the mobility plan will depend on the number, specificity and scope of activities carried out, the number of employees involved in the activities and the amount of funds obtained from sponsors, e.g. businesses providing bike repair services. It is estimated that it may amount from PLN 20,000 to PLN 50,000 annually.

Sources of funding

Niepołomice commune own funds. In the case of implementation of the mobility plan for the Municipal Office, there is also a possibility of using funds from sponsors, e.g. bicycle equipment sales and repair businesses, etc.

3.6.3 „Soft" measures addressed to all residents of Niepołomice Commune

In order to be able to the maximum extent to influence transport awareness of the residents of Niepołomice Commune and stimulate their choices regarding the use of bicycle and public transport and travel on foot, measures applied in the commune should cover a wide range of informational, educational and promotional activities. They should also be combined with the promotion of an active and healthy lifestyle and environmental protection. In turn, to ensure the residents' participation in the planning and implementation of the mobility plan activities it is recommended to use various tools of social participation.

Action description

New engaging forms of social participation

Actions proposed for implementation in this document will require the development of detailed concepts for their implementation, design studies, etc., followed by gradual implementation.

Ensuring the active residents' participation in the phase of detailed planning and implementation of activities will allow to design solutions that take into account the needs of various user groups and gather residents' opinions on tasks already completed, what consequently will facilitate future implementation processes. It is recommended that social participation take place through consultations organized at the earliest possible stage of projects' development.

The consultations should allow for expressing opinions, submitting comments or proposals for solutions, receiving answers to the questions asked or choosing one of the proposed options. Taking into account the specifics of solutions and the subject of consultations, they could cover the whole area of the commune or have local or sectoral character. It is proposed, depending on the needs and circumstances, to use not only standard forms of consultation, but also innovative, interesting forms of engaging residents, including:

- workshops and conferences as well as meetings with residents and representatives of specific interest groups,
- focus groups, meetings using the "World Café" method and discussions with moderators in a group of several or a dozen people, selected according to the objectives of the research,
- consultations in the form or on the occasion of events such as open days, happenings, promotional campaigns, street shows, presentations, etc.,
- surveys carried out using the Internet platform of the Commune,
- crowdsourcing tools that, using websites and applications on mobile devices, enable residents to report existing problems, which usually are marked by them as points on the map and which require local authorities' intervention (examples of this type of tools are shown in Fig. 3.22 and 3.23).

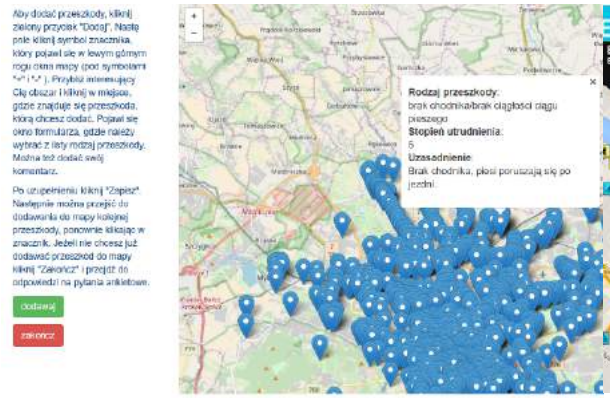

Fig. 3.22. Online tool to map problems experienced by people with limited mobility in Krakow.
Source: http://www.mobilnykrakow.pl/utrudnienia-mobilnosci/

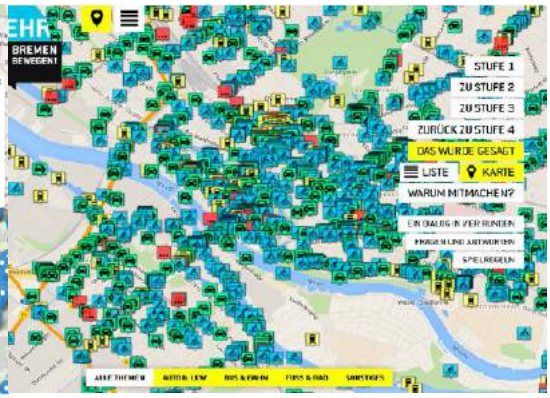

Fig. 3.23. Online tool to map problems experienced by residents while traveling in Brema.
Source: City Hall in Brema.

"Mobile Niepołomice" tab on Commune's website

In order to inform about the activities undertaken by the Commune, it is recommended to create an additional tab called "Mobile Niepołomice" on the website of Niepołomice Commune, dedicated strictly to mobility issues in the commune and solutions implemented as part of the mobility plan. It could also serve to provide information on travel carried out in the commune with all available means of transport. The respective sections of the tab could contain the following information:

- Section on public bus and rail transport – bus and railway transport network layout, list of lines with timetables, information on available tariffs and applicable discounts, ticket purchasing options, facilities introduced in the commune to improve travel conditions (e.g. new bus lines, solutions for improving waiting conditions at stops), etc.
- Section on services provided by private carriers – list of carriers providing services in the commune, list of available connections, timetables, information on tariffs, etc.
- Section on bicycle traffic – existing and planned roads for bicycles and recreational routes, location of bicycle stands and self-service bicycle repair points, information on planned activities, e.g. about plans to run B+R parkings at railway stops, etc.
- Section on pedestrian traffic – information on pedestrian-friendly streets and solutions introduced for the comfort and safety of pedestrians.
- Section on travel by car – information about location of parking lots, including P+R

parkings, etc.
- Section on events and campaigns – with information on "soft" measures organized by the Commune, addressed to various groups of users.
- Section for surveys on mobility, including mapping tools described above.
- Links to existing regional web pages on travel and trip planning.

„Tickets for waste" action

In order to promote sustainable mobility combined with environmental education in the field of waste segregation, the organization of "Tickets for waste" action is recommended, consisting in the creation in specific periods of special waste reception points for waste brought by residents. In return, residents receive one-off tickets for public transport. This type of campaigns are a form of promoting collective transport services, addressed especially to people who rarely use it – tickets allow to take a test bus ride, which may be the first step in the process of changing transport behavior. It should be emphasized that such "eco-exchange" must be accompanied by transparent organizational rules (e.g. specification of the type and amount of waste entitling to receive tickets). It is suggested to organize this type of actions periodically (e.g. several times a year), and to promote them in the media.

Walking festivals and cycling festivals

To promote walking and cycling, it is recommended to organize walking festivals and cycling festivals with excursions to Niepołomice Primeval Forest. This type of festivals includes organization of events lasting from one to several days, during which the residents are offered participation in organized walks and hiking or biking tours along specially designed routes (Fig. 3.24). Routes, depending on local conditions and the target group, may lead residents to trace historical events, tourist attractions, parks and green areas, and may include access to cultural spots, etc. It is suggested that such events be organized by Niepołomice Commune in cooperation with non-governmental organizations and cultural institutions. In particular, for the organization of the "walking festival" and "cycling festival" routes, existing routes in Niepołomice Forest or created as part of the Vistula Bicycle Route project should be used. The festivals should be accompanied by the promotion of walking and cycling, as part of a healthy lifestyle and the cheapest and environmentally friendly form of movement, combined with discovering nature.

Fig. 3.24. Poster promoting walking festival in Manchester
Source: www.nordicfitplus.co.uk.

Fig. 3.25. Poster promoting „Museums by bike" action in Krakow
Source: http://www.mhk.pl/aktualnosci.

Other activities

It is also recommended to provide promotional tickets and discounts to the cinema, museum and sports facilities for people traveling to them by transport means alternative to car (e.g. in Krakow – a bike route was created between Muzeum Historyczne Miasta Krakowa branches (Historical Museum of the City Krakow), and visitors who ride on bicycles receive discounts on entrance tickets – Fig. 3.25).

In turn, it is recommended that every year in September the commune engages actively in the organization of European Mobility Week, described in section 3.6.1. Moreover, it is recommended to prepare informational, educational and promotional materials (in the form of leaflets, brochures, posters, gadgets, videos and promotional spots, etc.) and their distribution among the community's residents, e.g. during organized events related to mobility or on the "Mobile Niepołomice" website.

In this context, it is also recommended to provide special packages of materials to the new residents of the commune to familiarize them with local transport system and mobility facilities introduced. Such activities were carried out, among others, in Almada (Portugal), where during the registration procedure residents received information and education brochures, gadgets related to (among others) cycling as well as a package of one-off tickets entitling to travel by public transport.

It should be emphasized that, depending on the availability of financial resources, human resources and the emerging possibilities of using innovative solutions (e.g. IT), the Commune should not limit itself only to the activities listed above, but introduce new forms of information, education, promotion and social participation.

Stakeholders involved

As regards social participation:

- Municipal Office in Niepołomice – initiating and organizing social consultations and other forms of social inclusion.

- Non-governmental organizations dealing with issues of social participation – support for the Office in organization of various forms of social inclusion.
- Private businesses – providers of software using crowdsourcing methods mapping problems related to mobility.
- Research institutions, consulting firms – support for the Office in creating tools and questionnaires for surveys.

As regards the creation of the "Mobile Niepołomice" tab on the website of Niepołomice Commune:

- Municipal Office in Niepołomice – launching the tab, managing it, its ongoing maintenance.
- Transport systems authorities and carriers – providing data to maintain the platform up and running.

As regards "Tickets for waste" action:

- Municipal Office in Niepołomice – organization of the action.
- Non-governmental organizations dealing with ecological issues – support for the Office in organization of the action.

As regards organization of walking festivals and cycling festivals:

- Municipal Office in Niepołomice – organization of the action.
- Non-governmental organizations dealing with ecological issues, sustainable transport, etc. – support for the Office in organization of the action.
- Bicycle equipment sales and repair businesses – festivals sponsorship.
- Transport systems authorities, schools, kindergartens, libraries, community centers, sports clubs, civil guard, police, media – participation in the organization of the campaigns.

As regards distribution of materials to new residents of the commune:

- Municipal Office in Niepołomice – preparation of information package and its distribution.
- Transport systems authorities and carriers – providing data to maintain the platform up and running.

As regards other "soft" measures addressed to all residents of Niepołomice Commune:

- Municipal Office in Niepołomice – organization of the actions.
- Transport systems authorities and carriers – providing data o transport operations.
- Non-governmental organizations, schools, kindergartens, libraries, community center, sports facilities, municipal police, police, media – support for the actions.

Timeframe

- Creating „Mobile Niepołomice" tab on the website of Niepołomice Commune: 2019,
- Organization of „Tickets for waste" action: every year in September,
- Organization of walking festivals and cycling festivals: every year during warm months.
- Other activities carried out on a continuous basis.

Costs

It is assumed that the Commune should allocate in its budget for the activities described above from PLN 70,000 to PLN 100,000 annually (depending on the number and scope of planned activities).

Sources of funding
Own funds of the Commune, public and private entities as well as non-governmental organizations engaged in the activities.

3.6.4 „Soft" measures addressed to children attending kindergartens and schools located in Niepołomice Commune

Children who attend kindergartens and schools, in a dozen or so years will make independent decisions about what transport means to use in their travels, and some of them may even be in position to shape transport policy. Therefore, it is crucial to influence their beliefs and transport behaviors already today, in accordance with the principle of "as the twig is bent, so is the tree inclined". If the youngest road users are made aware of the importance of using alternative to car means of transport in their travels, it is very likely that when adults they will show these beliefs and behaviors[53].

Action description
Encouraging schools to implement mobility plans

The increase of transport awareness of the youngest road users and shaping their balanced transport behavior may be achieved through implementation of mobility plans for schools. School mobility plans respond to the needs of educational units and problems related to traveling to education. In addition to pupils, their addressees are also teachers and parents, and the purposes of their application are most often to increase the number of journeys made with active forms of mobility (on foot, by bicycle) and public transport modes, as well as to improve personal and motor safety of the youngest road users.

Mobility plans actions are related to providing information, increasing transport awareness and improving travel conditions in the case of alternative to car transport means and most often consist of[54]: providing parking spaces for bicycles; organization of cycling courses; organization of bicycle repair points; adjusting the arrival/departure times of vehicles and public transport routes to the needs of students and teachers; encouraging parents to fetch their children to school using the carpooling system; implementing traffic calming measures and improving pedestrian infrastructure; improving access to schools by bicycle through the construction of bicycle roads; organization of educational, informational and marketing activities.

Niepołomice Commune should encourage schools to develop and implement mobility plans and offer them substantive support, provided by the mobility coordinator described above. In the case of mobility plans for schools, it is also possible to use their teaching potential by involving students in their development (e.g. conducting analyzes of the existing state, selection of actions to be implemented).

This allows for putting in practice the knowledge acquired during school lessons or educational activities of mobility management (e.g. knowledge on how to reduce the negative effects of mobility carried out using passenger cars). In order to stimulate the didactic function of mobility plans, it is recommended to encourage teachers to involve children in the preparation of plans, e.g. as part of additional activities and based on materials posted on the website of the Ministry of Environment entitled "Junior high school project – Mobility plan for your school"[55].

[53] Nosal K., Przykłady planów mobilności i ocena ich skuteczności, Transport Miejski i Regionalny, 1/2011.
[54] Nosal K., Zasady tworzenia planów mobilności dla obiektów i obszarów generujących duże potoki ruchu, Transport Miejski i Regionalny, 2/2016.
[55] http://nauczyciele.mos.gov.pl/index.php?mnu=55

„Bicycle May" promotional campaign

As part of the "soft" measures addressed to children, it is also recommended to organize every year "Bicycle May" campaign[56], whose initiator and coordinator is the City of Gdańsk, and the goal – to promote a healthy lifestyle and bicycle transport in primary schools and kindergartens[57]. During the campaign, children for each arrival by bicycle or scooter receive stickers that they place in their own "bicycle booklets" and on class or group posters. Teachers keep records of active commuting in an interactive bicycle class journal. The most active pupils and preschoolers receive prizes, the most active classes and kindergarten groups are offered an opportunity to spend time in educational and entertainment centers. Schools and kindergartens, which recorded the highest percentage of active commuting in relation to the number of students, receive cash prizes. The campaign is very popular and the number of participants is gradually increasing. A similar impact has the STARS campaign organized annually in Krakow schools by Krakow Commune[58].

Competitions for children

Furthermore, it is suggested that the Municipal Office in Niepołomice organize competitions for children on sustainable mobility, including:

- art contest "My journey to school by bus/by bike/on foot" (authors of the most interesting works should be rewarded, e.g. with a possibility to exhibit them at a specially organized exhibition at the castle in Niepołomice),
- competition for the most interesting cycling route in the commune (reward for the authors would be funding a trip),
- competition for the most interesting use of a part of the car parking located in front of the school (temporary and permanent changes).

"Play streets"

During the holiday season, in turn, it is recommended to organize so-called "play streets", which consist in temporarily transforming streets into spaces where various events take place, and children may play. In foreign cities, selected streets are closed completely for vehicular traffic or only for transit, usually during the holiday season, depending on the location – for a day, a few days or more (if local traffic is allowed on the street, cars move at maximum walking speed). In these public spaces devoted especially to pedestrians and children, games, parties, communal meals, sports activities, etc. are organized (Fig. 3.26).

Such streets are friendly and safe for pedestrians and cyclists, and their creation provides reasons for satisfaction not only for children, but also for adults who can appreciate the advantages of temporarily recovered urban space, participating in communal meals and games, meeting new people or tightening neighborhood ties.

In Niepołomice, "play streets" could be created on streets selected by the Municipal Office, located in the city center or on residential streets (in this case – proposed by residents), e.g. during European Mobility Week or on selected Sundays. Residents, informed about such a possibility in an informational campaign, would submit to the relevant department of the Office (or mobility coordinator) requests to temporarily close the street, proposing at the same time period of closing of the street to traffic.

[56] http://www.rowerowygdansk.pl/start,169,121.html

[57] The following communes participated in 2017 edition of campaign: Warsaw, Krakow, Wrocław, Lublin, Gdynia, Rybnik, Tychy, Elbląg, Płock, Zamość, Tczew, Sopot, Skawina, Żukowo, Wadowice, Włodawa, Puck, Kalety, Nowy Dwór Gdański, Cedry Wielkie.

[58] http://starseurope.org/pl/about_stars.php

Fig. 3.26. Event organized on „Play streets" in Chicago
Source: worldsportchicago.org.

Other actions

It is also worth noting that activities addressed to children and students should also be organized as part of European Mobility Week, including already mentioned in section 3.6.1 cycling exams, competitions and sports games, or training on road safety rules.

Of course, it is suggested to complement activities addressed to the youngest road users, depending on the availability of financial resources and demand, and with time, with other, additional activities and campaigns of informational, educational and promotional nature.

Stakeholders involved

- Municipal Office in Niepołomice – encouraging schools to implement mobility plans, organization of "Bicycle May" and "Play streets" campaigns as well as competitions.
- Schools – implementation of mobility plans, encouraging pupils to join „Bicycle May" campaign.
- Transport authorities and carriers – cooperation with the Office and schools to improve conditions of travel with transport means alternative to car.
- Residents of selected areas/streets in the town, non-governmental organizations – cooperation with the Office in organization of "play streets".
- Municipal Office in Gdańsk – „Bicycle May" campaign coordinator.
- Private enterprises – sponsors of the action.

Timeframe

Encouraging schools to implement mobility plans, competitions for children – activities carried out on a continuous basis.
Organization of "Bicycle May" campaign – every year in May.
Organization of „Play streets" – every year during holidays.

Costs

It is assumed that the Commune should allocate in its budget from PLN 70,000 to PLN 90,000 annually to finance the above mentioned activities (depending on the number and

scope of the activities).

Sources of funding
Own funds of the Commune, schools, transport authorities and carriers, sponsors.

3.6.5 „Soft" measures addressed to employees in Niepołomice Commune area

People who commute daily generate a large number of trips, including those performed by car, contributing to the formation of traffic congestion during rush hours. Individual transport is also the main transport mode in business travels. In the case of commuting, the negative consequences of car use should be considered not only at the scale of the town, but also in terms of problems experienced by employees (e.g. loss of time spent in congestion, stress associated with driving), employers (e.g. costs related to construction and maintaining of parking lots), and local communities in the vicinity of the workplaces.

The problem of excessive use of cars in commuting is also observed in the case of people employed in the NSI – the car share in the trips of the NSI employees is as high as 85%! Just over 7% of journeys to the zone are made by a private carrier microbus, and the share of the remaining forms of transport is negligible. It is due to the fact that 80% of people employed in the zone live outside Niepołomice Commune, but also due to the lack of an attractive alternative to individual transport. What is important, 60% of the NSI employees declare the need to change in their current commuting to the workplace, for them the current commuting is too expensive, too long and tiring.

These results are a clear signal that it is justified to implement actions that would aim at changing the current habits of the NSI employees. According to their declarations, these actions should primarily focus on increasing the frequency of public transport courses, shortening travel time by public transport and reducing travel costs. In the case of encouraging cycling, it seems that the most effective would be providing a safe bicycle route to the workplace and financial incentives offered by the employer.

It should be emphasized that the activities used to change transport behavior of people working in the NSI require not only commitment of the municipal authorities, but also of the employers and cooperation with transport authorities and carriers. In addition to the above-mentioned organizational and infrastructural instruments to improve cycling and public transport, it is also important to implement "soft" measures and implement all instruments in an integrated manner, in the form of mobility plans, what enables synergy effects.

Action description
Encouraging employers to implement mobility plans

In order to influence transport behavior of people doing work-related travel, it is recommended that the Commune introduce activities that encourage companies, especially those located in the NSI and employing a large number of employees, to develop and implement mobility plans described in section 3.6.2. The implementation of such projects by employers and their simultaneous cooperation with the transport systems authorities and operators enables shaping the desired transport behaviors of employees. The activities of Niepołomice Commune that stimulate the implementation of mobility plans should concern the creation of a system of incentives (including financial ones related to, e.g. tax exemptions in the case of tax paid to the commune), and providing support to employers, consisting of:

- providing information and organization of training for employers on the implementation of mobility plans,
- providing information and promotional materials for employees,
- shaping transport systems and improving quality of services provided, depending on the needs reported by enterprises.

Initiation of cooperation of employers in the field of mobility

Furthermore, Niepołomice Commune should encourage employers whose plants are located in the same area (in the NSI) to undertake joint activities in the field of implementation of mobility management instruments, what will allow to achieve higher efficiency, e.g. as a result of implementation of the instruments in an integrated manner and the participation of many employers in the costs of implementing them.

An inspiring example of this type of cooperation may be the Golden Mile Transport Group initiative[59], which is a cooperation platform for the implementation of mobility plans for the business area located in West London. It is a joint project of the public and private sector (initiated by the municipal unit) aimed at improving the mobility and economic vitality of the area. As part of the initiative, several dozen companies and organizations share resources and concepts for the development and implementation of mobility plans in line with the key idea: "cooperation increases the chances of success".

The advantages of such cooperation are: exchange of ideas and good practices in terms of improving travel conditions, reduction of costs and improvement of the economic vitality of the area; improvement of communication between various sectors; empowering private entities to have a say in organizing mobility and shaping the transport policy of the area; achieving better efficiency of operations as a result of integration of transport services and sharing financial resources; greater chances of obtaining domestic funds and EU funds for projects implementation; enabling small businesses to take advantage of the support and studies of larger entities.

It is recommended that the Municipal Office in Niepołomice initiate a similar initiative in the field of cooperation of employers operating in the NSI and act as its coordinator (the coordinator role could be taken over by a person employed in the Office as a mobility coordinator described in section 3.6.2).

One of the activities undertaken within the framework of employers' cooperation should be to create a platform for shared journeys of people employed in the NSI to work, of various types. suited to the form of working time and the place of residence of users (buspooling, carpooling, vanpooling). The concept of sharing vehicles in commuting to work to the NSI is described in detail in the document constituting Appendix 1 to this mobility plan. Information on stakeholders, timeframes, implementation costs and possible sources of finance was also provided there.

„Bike to work" promotional campaign

In terms of shaping the desired transport behavior of employees, the Office's activities could also consist of organizing the annual campaign "Bike to work". This campaign is organized in many cities around the world (including Gdynia since 2012 and Krakow since 2017) in the form of a competition involving the rivalry of people employed in various enterprises – the winner would be a company which employees during the campaign (usually lasting for a few months) will commute the largest number of kilometers by bike. Participants also have an opportunity to win individual prizes awarded to people who have traveled the greatest distance by bicycle.

The campaign is organized by municipal offices and they usually launch a special website (or a tab on the existing city site) for the purpose of its implementation, enabling interested companies to register participants and allowing for monitoring the results of the competition (providing data on the number of kilometers traveled by a two-wheeled vehicle).

Town's support may consist in providing bicycle participants with bike accessories or meals. For example – in Gdynia, the organizer, Zarząd Dróg i Zieleni in Gdynia [Roads and Greenery Authority] provides breakfast sets to participants who during the week made four two-wheeled vehicle trips to/from work – it is also a way to motivate employees to

[59] http://www.goldenmilegroup.org.uk/

systematically use the bike[60]. The effects of the implementation of the campaign prove that the competition may be an incentive to commence commuting to work with a two-wheeler and continue after the end of the campaign[61].

Thanks to the use of competitive elements and responsibility for the final result, employees engagement is strengthened, what motivates them to use bicycles regularly.

Fig. 3.27. Promotional poster of the "I travel to work by bike" campaign in Gdynia in 2017
Source: Zarząd Dróg i Zieleni w Gdyni

Stakeholders involved

- Municipal Office in Niepołomice – encouraging employers to implement mobility plans, initiating cooperation of employers, organization of the "Bike to work" campaign.
- Entrepreneurs – implementation of mobility plans, cooperation with other entities located in the NSI, encouraging employees to join the "Bike to work" campaign.
- Transport authorities and carriers – cooperation with the Office and employers to improve conditions of traveling by transport means alternative to car.

Timeframe

Organization of the „Bike to work" campaign – every in a cycling season; other activities carried out on a continuous basis.

Costs

It is assumed that the Commune should allocate in its budget from PLN 70,000 to PLN 90,000 annually to finance the above mentioned activities (depending on the number and scope of the activities).

The costs of implementing the concept of vehicle sharing in commuting to the NSI are indicated in the document constituting Annex 1 to this mobility plan.

[60] Zarząd Dróg i Zieleni w Gdyni , "I travel to work by bike" cycling competition 2015. Campaign summary, Gdynia 2015.

[61] Zarząd Dróg i Zieleni w Gdyni , "I travel to work by bike" cycling competition 2015. Campaign summary, Gdynia 2015.

Sources of funding

Own sources of the Commune, entrepreneurs, transport authorities and carriers.

4 ACTIONS MONITORING AND EVALUATION SYSTEM

In the process of the regional mobility plan implementation, monitoring of the implemented actions will play an important role, enabling, among others, drawing conclusions from their gradual implementation and adapting the implementation process to emerging circumstances and current needs, as well as technical assessment, allowing to quantify the effects of the measures applied.

4.1 Monitoring of actions

Monitoring will enable ongoing monitoring of the implementation process in the scope of progress made. It will be aimed at identifying barriers and obstacles appearing in this process and undertaking actions to minimize a negative impact on the final result. It will ensure the desired quality of both the implementation process and the measures implemented. The monitoring procedure should be carried out using the following instruments:

- cyclical working meetings for monitoring the implementation process in the group of regional stakeholders of the Regio-Mob project – the meetings will serve to present the activities carried out so far, discuss emerging difficulties, identified barriers and delays, or deviations from the implementation plan, and joint discussion to modify implementation process, apply remedial measures and implement future activities,
- interviews with persons directly responsible for the implementation of individual actions (action leaders) to obtain detailed information on emerging difficulties, obstacles and actions undertaken to eliminate them / minimize their impact,
- stocktaking and short surveys at various stages of implementation of selected activities to gather information about residents' opinions on their use and their reaction, especially in terms of changing transport means.

It is also recommended to create a special database for monitoring work progress and its ongoing update. The database would include important data on the process of implementation of individual activities, including information on the purpose of each action, consecutive implementation stages, their final products, costs incurred, and information on emerging difficulties and problems, and the current or planned strategy to eliminate/solve them.

4.2 Technical assessment of actions

Technical assessment of the implementation of the mobility plan, enabling the quantification of the effects achieved as a result of the implementation of individual measures will require the adoption of a set of assessment indicators – selected and defined variables for the quantitative and qualitative recognition of the results of activities. The values of the adopted assessment indicators should be set for the state before and after the implementation of activities. In turn, the comparison of these two values will allow to conclude whether the application of the actions defined in the mobility plan affected the change in the values of the analyzed indicators, what is the level of this change, whether the planned goal has been achieved and whether, as a result, the measures proved to be effective.

For the assessment of the regional mobility plan for the Regio-Mob area, it is recommended to adopt the following assessment indicators:

- product indicators – refer to products created during the implementation of activities envisioned in the plan and relate to measurable elements, consistent with the adopted schedule, such as the number of kilometers of bicycles roads created, the number of places built in P+R parking lots, etc.,

- result indicators – refer to the effects of activities following completion and as a result of the implementation of actions, e.g. the number of people who used a particular service, transport modes types, the number of transport accidents, etc.

The appropriate selection of assessment indicators is a very important issue because the adoption of inadequate indicators may lead to an incorrect diagnosis of the effectiveness of the measures implemented. When selecting the indicators of the mobility plan assessment for the Regio-Mob area, the following principles were followed:

- the issue of access to data constituting the basis for the establishing assessment indicators and ways of obtaining/generating data was considered (data acquisition should not require complicated actions and too large financial expenditures),
- the indicators have been adopted in such a way that they are relevant and acceptable from the point of view of stakeholders interested in the assessment results, and at the same time simple and understandable (e.g. for decision-makers, general users),
- the criterion of versatility has been met, so that the indicators concerned various transport means,
- special care has been taken that the indicators corresponded to the most important objectives of the mobility plan and facilitated presentation to what degree they have been achieved.

The recommended assessment indicators are summarized in Table 1. It lists in detail compulsory indicators, i.e. those on the basis of which an assessment of the mobility plan implementation should be carried out, as well as optional, complementary indicators, set when needed by the implementers of the mobility plan. Table 1 also contains information about the source of data used to determine indicators values, indicators base values and the desired direction of their changes (increase or decrease in the indicators values).

The technical assessment of the mobility plan is recommended to be carried out in 2020.

Table 1. Mobility plan assessment indicators

No.	Indicator category		Indicator	Unit	Data source	Indicator's base value (year)	Desired direction of change
1.	Product indicator	Mandatory indicator	Number of P+R parking lots in Niepołomice Commune	[-]	Municipal Office in Niepołomice	0 (2017)	Increase
2.	Product indicator	Mandatory indicator	Number of kms of bicycle roads in Niepołomice Commune	[km]	Municipal Office in Niepołomice	26,5 (2017)	Increase
3.	Product indicator	Non-mandatory indicator	Number of stations and bikes in the city bike rental system	[-]	Municipal Office in Niepołomice	Number of bicycles: 0 Number of stations: 0 (2017)	Increase
4.	Product indicator	Mandatory indicator	Number of train courses per day on working day (stop: Podłęże, Staniątki)	[-]	Number of courses stock take	Number of courses: Podłęże: 47 Staniątki: 38 (2017)	Increase
5.	Product indicator	Mandatory indicator	Number of train courses in peak hours on working day (6:00-8:30 and 15:00-17:30) on the route Tarnów - Podłęże, Podłęże - Tarnów, Tarnów -Staniątki, Staniątki - Tarnów	[-]	Number of courses stock take	Number of courses in the hours 6:00-8:30: Tarnów - Podłęże: 6 Podłęże - Tarnów: 4 Tarnów - Staniątki: 4 Staniątki -Tarnów: 2 Number of courses in the hours 15:00-17:30: Tarnów - Podłęże: 4 Podłęże - Tarnów: 5 Tarnów - Staniątki: 3 Staniątki -Tarnów: 2 (2017)	Increase

Table 1. Mobility plan assessment indicators

No.	Indicator category		Indicator	Unit	Data source	Indicator's base value (year)	Desired direction of change
6.	Output indicator	Mandatory indicator	Natężenie ruchu ciężarowego na odcinku DW964 Wieliczka – Staniątki (Zakrzów)	[veh/day]	2015 General Traffic Measurement	737 (2015)	Decrease
7.	Output indicator	Non-mandatory indicator	Track traffic share in a traffic flow on regional road No. 964, on the section Wieliczka – Staniątki (Zakrzów)	[veh/day]	2015 General Traffic Measurement	5,8 (2015)	Decrease
8.	Output indicator	Mandatory indicator	Average number of vehicles parking at P+R parking lot during the day	[%]	Survey conducted by the Municipal Office in Niepołomice	0 (2017)	Increase
9.	Output indicator	Mandatory indicator	Railway share in obligatory travels of Niepołomice Commune residents	[%]	Survey conducted by the Municipal Office in Niepołomice	1,4 (2016)	Increase
10.	Output indicator	Mandatory indicator	Railway share in travels of the NSI employees	[%]	Survey conducted by the Municipal Office in Niepołomice and enterprises' management	0 (2016)	Increase
11.	Output indicator	Non-mandatory indicator	Number of users of city bike rentals	[-]	System operator	0 (2017)	Increase
12.	Output indicator	Mandatory indicator	Number of towns and villages in Małopolska engaged in the European Mobility Week	[-]	Marshal's Office	12 (2017)	Increase

Table 1. Mobility plan assessment indicators

No.	Indicator category		Indicator	Unit	Data source	Indicator's base value (year)	Desired direction of change
13.	Output indicator	Non-mandatory indicator	Number of participants of action organized by the Municipal Office Niepołomice: „Walking festivals" „Cycling festiwal" „Bicycle May" „Bike to work"	[-]	Municipal Office in Niepołomice	0 (2017)	Increase
14.	Output indicator	Non-mandatory indicator	Number of schools implementing mobility plans	[-]	Schools' management	0 (2017)	Increase
15.	Output indicator	Mandatory indicator	Number of enterprises implementing mobility plans	[-]	Enterprises' management	0 (2017)	Increase
16.	Output indicator	Mandatory indicator	Number of road traffic accidents in Niepołomice Commune	[-]	Police data	31 (2015)	Decrease
17.	Output indicator	Mandatory indicator	Car share in obligatory travels of Niepołomice Commune residents	[%]	Survey conducted by the Municipal Office in Niepołomice	58 (2016)	Decrease
18.	Output indicator	Mandatory indicator	Car share in travels of the NSI employees	[%]	Survey conducted by the Municipal Office in Niepołomice and enterprises' management	85 (2016)	Decrease
19.	Output indicator	Mandatory indicator	Share of employees traveling alone to the NSI	[%]	Survey conducted by the Municipal Office in Niepołomice and enterprises' management	64 (2017)	Decrease

5 RECOMMENDATIONS ON SUSTAINABLE TRANSPORT FOR THE UPDATE OF THE DOCUMENT: DEVELOPMENT STRATEGY OF MAŁOPOLSKA PROVINCE

The analyzed area of the Regio-Mob project includes a significant area of Małopolska Province territory. The greater part of communes in the western part of the Regio-Mob area is strongly influenced by Krakow – a capital of the province – while the eastern part of the designated area lean towards local urban centers. Therefore, the recommendations presented here will mainly concern areas with a significant impact on the development of Małopolska Province (i.e., primarily KrOF area), with particular emphasis on Niepołomice Commune.

It should be noted that the economic life in Niepołomice Commune is concentrated in three investment zones: the Niepołomice Investment Zone, the Western Investment Zone in Ochmanów and the Eastern Investment Zone in Wola Batorska. In the Niepołomice Investment Zone (Polish acronym: NSI), areas covered by the Special Economic Zone status have been designated. Companies from various industries have located their businesses in Niepołomice – thanks to which it was possible to create a safe situation for those who work there. The crisis of one industry does not automatically cause major difficulties in the whole commune's economy system.

The Niepołomice Investment Zone is one of the most dynamically developing zones of economic activity in Poland. It is the largest of all subzones of the Krakow Special Economic Zone – it concentrates production facilities aimed at servicing Krakow and Małopolska Province markets.

Proposals of measures to balance the development of Małopolska Province have been listed below, elaborated as a result of the Regio-Mob project – Interregional Learning Towards Sustainable Mobility in Europe: the Regio-Mob Experience, implemented under the INTERREG Europe program, under the European Regional Development Fund – recommendations resulting from the following analyzes/actions:

- analysis of regional needs, SWOT analysis, related to mobility development and planned increase of employment in the Niepołomice Investment Zone (detailed description of the analyzed area in the context of mobility development, characteristics of transport connections, including: analysis and evaluation of road transport, public transport and rail transport on a given area, assessment of transport behavior of the inhabitants of the area under analysis),
- workshop activities on the development of new transport solutions in the region,
- implementation of the Regional Mobility Plan for the designated region based on the analysis of regional needs and SWOT analysis.

Recommendations on the development of a sustainable transport system of Małopolska Province and shaping desired transportation behavior

- continuation of modernization of railway infrastructure in Małopolska Province and improvement of the quality of the transport offer by: modernization of existing lines and construction of new ones (especially in relation Podłęże – Piekiełko – Nowy Sącz / Zakopane), adaptation to passenger services of lines that are currently not used for this purpose, adaptation of the infrastructure to AGC/AGTC standards for international Transport Corridors and modernization and replacement of rolling stock, taking into account interoperability requirements. It is particularly important to adapt the railway infrastructure to the above standards, what will contribute above all to increasing the maximum speed of trains;
- encouraging communes and public transport organizers to improve the accessibility

of communal areas by public transport, including the areas of economic activity, by:
  - ensuring integration of public transport at railway interchanges with individual transport subsystems (car, bicycle, walking) and collective feeder transport (bus, microbus) through creation of facilities, Kiss & Ride, bus stops and bus loops as well as formation of direct and attractive walking access. Park & Ride, Bike & Ride,
  - launch of feeder lines from/to railway stops/stations of the Fast Agglomeration Railway dedicated to inhabitants, taking into account the necessity to bring employees of plants located in economic activity zones to the railways,
  - coordination of timetables of railway transport means with other public transport means of a feeder function,
  - increasing frequency of vehicles courses of the SKA lines,
  - introduction of an attractive, joint tariff and ticketing offer for journeys made by rail, public urban transport, operating throughout Małopolska Province,
  - implementation of uniform information systems for travelers, including various transport means;
- encouraging communes located in Małopolska Province to actively act on the improvement of the development of the immediate surroundings of railway stops to create of a space that would be attractive and friendly to rail transport passengers;
- encouraging communes located in Małopolska Province to properly shape the spatial structure (in the scope of increasing the degree of building multi-functionality and intensity) in the vicinity of railway stations and stops in such a way as to stimulate the number of trips made by rail;
- in the phase of Park & Ride interchange parkings planning, paying particular attention to their location: providing parking lots outside the city center area, to eliminate the risk of increasing traffic in central areas and in places where transfer to the public transport will guarantee that a combined travel time be competitive to travel time carried out only by car;
- initiating inter-communal cooperation and encouraging communes located in Małopolska Province to gradually develop the bicycle road system, including improving the conditions of obligatory travels (to work or education), carried out especially to areas generating a large number of work-related trips, such as economic activity zones, and in terms of improving accessibility of stations and public transport stops by bicycle;
- encouraging communes to provide opportunities for safe parking of bicycles at the destination, including installation of bicycle racks in the vicinity of work places and educational facilities, public utility buildings (including: commercial, sacral, cultural and sport facilities) and recreational and large human concentrations. It is particularly important to create safe and roofed parking places for bicycles at interchanges, especially those of regional character, to ensure their accessibility by bicycle and to stimulate the number of journeys made by public transport;
- encouraging communes to introduce parking indicators for parking bicycles (the minimum number of roofed bicycle stands) at various types of traffic generators, including production and service facilities, and applying them to local plans;
- encouraging communes to create a public bicycle system in areas where a bicycle can be an effective transport mode, especially when there is potential for its use in multimodal travels. A public bicycle is then a convenient alternative to one's own bike. Its introduction must, however, be preceded by analyzes of economic and functional efficiency;

- in the case of creating city bike systems – encouraging communes to include a public bicycle system service in the integrated services package, aside from a railway and public transport system ticket;
- providing the possibility of obtaining comprehensive information on potential ways of traveling in the region, including creating an internet information platform for inhabitants;
- encouraging communes located in Małopolska Province to organize educational and promotional events that promote travels carried out with alternative means to car, and, in particular, campaigns within European Mobility Week;
- encouraging communes to initiate cooperation with the education sector and the economic sector to implement activities aimed at changing the transportation behavior of students and employees towards increasing the use of transport means alternative to car;
- encouraging communes to use various tools of social participation to increase involvement of residents in transport systems development in order to match their functioning to the maximum extent to existing needs;
- encouraging communes located in Małopolska Province to develop and implement mobility plans to create desired transportation behavior of the residents.

Recommendations on transport services for investment zones in Małopolska Province and shaping desired transportation behavior of their employees

1) **Recommendations for Małopolska Province on existing investment zones:**
   - setting up transparent rules for shaping the course of feeder lines to the stops of the Fast Agglomeration Railway and a mechanism to finance them, in cooperation of local governments of lower level, and, possibly, business entities or managements of industrial zones,
   - creating a layout of the Fast Agglomeration Railway lines with a higher frequency, but with a shorter range in the immediate vicinity of Krakow and possibly Tarnów,
   - creating a position of a provincial mobility coordinator to coordinate activities carried out by mobility coordinators in individual communes, as persons responsible for encouraging employers / zone managements to implement mobility plans, providing them with substantive support and for coordination of activities carried out by communes, managers, transport operators and individual employers,
   - taking into account in the comprehensive traffic surveys (travel research) carried out in the province the real and declared changes in transportation behavior of people traveling to investment zones, what will allow to infer about the effectiveness of mobility management activities and planning their future implementation.

2) **Recommendations for Małopolska Province on planned investment zones:**
   - support and encouraging creation of investment zones in the vicinity of railway stops as transport hubs enabling not only service in the sphere of freight, but also commuting of employees, sometimes from greater distances,
   - supporting investments consisting in the construction of Park & Ride parking lots in locations with high regional intermodal travel potential – with a good range of connections on a regional scale, especially at railway stations located in the immediate vicinity of the zones,
   - encouraging companies investing in the planned zones to co-finance feeder transport and bicycle traffic solutions (parking lots and bicycle paths).

3) **Recommendations for communes on existing investment zones:**
   - development by the communes of the postulated routes of the feeder line to the Fast Agglomeration Railway system, taking into account expectations of both residents

and employees of the plants located there,
- successive modernization of the infrastructure of bus stops with their surroundings, especially those used by feeder lines,
- ensuring the accessibility of investment zones by bicycle through the development of a bicycle roads system in the communes and a location of a city bike rentals nearby,
- creation of Park & Bike parking lots for bicycles in the vicinity of bus stops, allowing for increasing the distance of convenient accessibility to public transport for non-motorized traffic,
- making employers aware of the necessity and benefits of implementation of mobility plans that affect transportation behavior of employees, including by creating a system of incentives and providing support to employers, including:
  - providing information and organizing training for employers on the implementation of mobility plans,
  - providing information and promotional materials for employees;
  - providing discounts on selected transport services, e.g. for city bike rentals,
  - shaping transport systems and improving the quality of services provided, depending on the needs reported by plants,
- encouraging owners / managers of facilities located in the zones to regularly monitor and assess the filling of the available parking space and in the case of a trend indicating changes in the speed of overfilling – early implementation of activities aimed at limiting the number of trips made by own car,
- encouraging employers whose plants are located in the same investment zone to undertake joint activities in the scope of implementation of mobility management activities, which will allow to achieve higher efficiency, among others as a result of the instruments being implemented in an integrated manner and the participation of many employers in the costs of implementing the activities,
- implementation of mobility plans addressed to employees of municipal entities as a good example for employers from investment zones,
- creating positions of urban mobility coordinators as persons responsible for encouraging employers / facility managers to implement mobility plans, for providing them with substantive support and for coordinating activities carried out by city authorities, managers, transport operators and individual employers,
- taking into account in the surveys of trips carried out in individual communes the real and declared changes in transportation behavior of people traveling to investment zones, which will allow to infer about the effectiveness of mobility management activities and planning their future implementation,
- assessment of existing and forecast of future transport needs in relation to investment zones and on this basis – improvement of current and planning of future transport services.

4) Recommendations for communes on planned investment zones:
- shaping planned investment zones along with the road network taking into account providing good pedestrian and bicycle accessibility, and laying out a convenient feed line,
- negotiating (at the stage of issuing a building permit) with the owners of workplaces / facility managers the scope of providing / financing by them selected elements of linear or point transport infrastructure to facilitate access to facilities by means other than car (e.g. construction of a bicycle road linking the facility with an existing road network in the commune, construction / modernization of a railway stop, etc.),
- negotiating / determining (at the stage of issuing a building permit) with the owners of workplaces / facility managers the maximum permissible number of parking spaces intended for cars of the zone employees, to counteract an excessive use of cars in

commuting;

- providing future zone employees with the possibility of intermodal travels, through creation of integrated transfer hubs in places with anticipated significant interchange traffic, e.g. through the creation of Park & Ride, Bike & Ride parking lots, striving for spatial integration of the transport system,
- at the stage of projects preparation and implementation of planned Park & Ride interchange parking lots, adherence to the standards adopted for the infrastructure elements and integration of the Park & Ride premises and solutions in the area of communes associated in Metropolia Krakowska Association (according to document Recommendations on park and ride parking lots (P+R) in Metropolia Krakowska - annex to Resolution No. 6/I/2016 of the ordinary general assembly of members of Metropolia Krakowska Association of May 10, 2016.).

It should be noted that the above recommendations concern not only investment zones, but also other selected areas of cities and communes that generate a large number of travels every day, such as business areas, technology parks, large service areas, etc.

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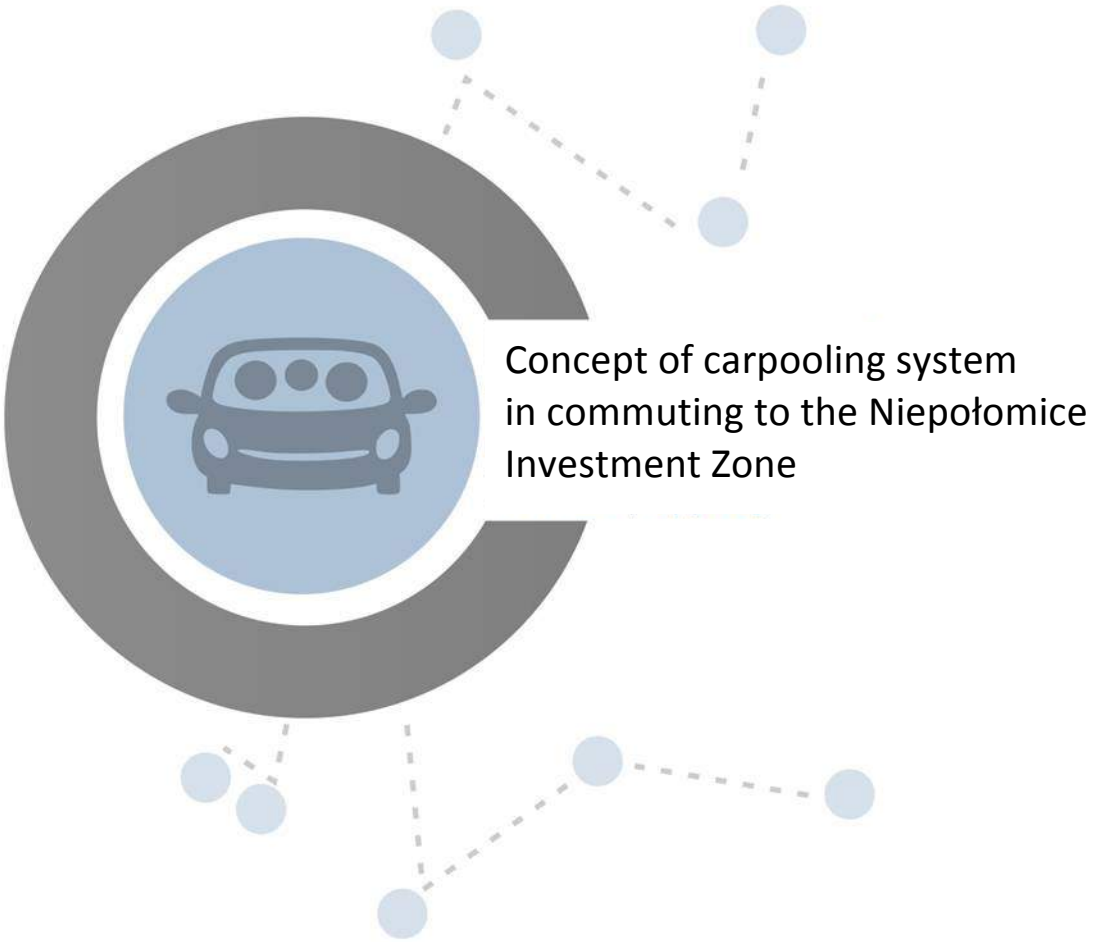
6 ANNEX NO. 1 – CONCEPT OF CARPOOLING SYSTEM IN COMMUTING TO THE NSI



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6.1 Introduction

Workplaces without good public transport services are conducive to commuting to work by car. The advantages of this transport means are independence from the timetable, the journey from door to door, as well as its high comfort. Nevertheless, commuting by car generally generates higher travel costs in comparison to public transport. In addition, attention should be paid to nuisances resulting from searching a place to park. An additional argument in favor of public transport is the issue related to the driving itself, during which the driver must focus primarily on driving. Unfortunately, it is not possible to provide a high quality public transport service in every area, mostly due to the large dispersion of settlement structures and the occurrence of too low passenger flows. In this situation, a good solution may be an introduction of shared transport systems, operating on similar principles as public transport, but equal to individual transport in terms of comfort.

Shared transport systems include: buspooling, vanpooling or carpooling which is the most popular in recent times.

6.2 General characteristics of vehicle sharing systems

Table 6.1 presents the classification of land transport means. This classification takes into account two criteria: organization (private, public) and availability (collective, individual).

Tab. 6.1. Forms of land transport means

	Public	Individual
Public	train tram bus metro **on-demand transport** **buspooling** **vanpooling** employee transport	car and bike rentals taxi bike sharing car sharing **peer to peer sharing**
Private	carpooling: - established - flexible carpooling - ad hoc (slugging)	pedestrian bike car

Source: Public Transport at the Heart of the Integrated Urban Mobility Solution, UITP International Association of Public Transport.

According to the above classification, land transport means are divided into four groups:

1. Collective transport means:
   - characterized by regularity of journeys on designated routes,
   - available to passenger with various travel origins and destinations,
   - there may be many stops on their route.
2. Individual transport means:

- characterized by irregularity of journeys,
- it's the driver who decides about the time and route of the journey.

3. Public transport means:
   - available to everyone.
4. Private transport means:
   - available to a selected person or a group of people.

In the past, human mobility was limited to walking, a private bicycle or a private car, or to using traditional transport services (bus, tram, train, etc.). Currently, thanks to easy access to the Internet and the development of mobile technologies, transport means combine features of more than one category. In this way, modern forms of transport are created, giving greater opportunities for traveling.

An example of such a modern form of travel is a peer to peer service[62]. It differs from classic transport services in that it can be offered by every resident, not only by a transport company. It applies to journeys made, for example, as a result of the driver offering a place in the car or borrowing a vehicle.

Peer to peer services include the carpooling system. It consists in the fact that the driver makes available a place for selected passengers in his car. A feature of this system is that usually its users share a common destination. Those who are willing to use a free space in a car, knowing the itinerary, can join the system, usually paying a small fee. There are several variations of the carpooling system.

In the most popular one, the driver and passengers pre-arrange a joint ride, and the driver moving along the designated route takes more passengers from the established "collection" places. There are also variations of the carpoooling system, in which the driver does not set the details with passengers in advance, but just meets them on his route, or at the origin of his journey. This kind of carpooling system is called "flexible". An example of a flexible car-pooling system is slugging, in which the driver does not look for passengers for the passage in advance, just takes casual passengers waiting in a place specially prepared for this purpose. If one uses a company car carrying more passengers, such a system is called vanpooling, a similar idea to the carpooling system.

When considering innovative forms of transport, one should also mention transport on demand and buspooling. The first one operates on similar terms as collective transport, but its vehicles do not run on specific routes and at a specific time. These parameters are selected depending on the needs of users. On the other hand, buspooling is a more flexible form of transport on demand – it guarantees the possibility of buying permanent journeys, for example directly from home to the workplace. For more information on vehicle sharing systems described above, see section 6.4.5 of this elaboration.

It should be emphasized that the described vehicle sharing systems are a relatively new mode of transport, combining the advantages of individual transport (such as immediacy and flexibility of travel) with the advantages of public transport (for example, no need to own means of transport, low travel cost, regularity). The difference between shared transport and public transport lies in the fact that in the first case, it is the users who decide on the route and the time of transit, while in the second – managing entities, e.g. local government units. Shared systems are therefore part of the idea of sharing economy. It claims that it is important to use a good or service rather than having it.

6.3 Characteristics of the area under analysis

The Niepołomice Investment Zone (Polish acronym: NSI) is a dynamically developing

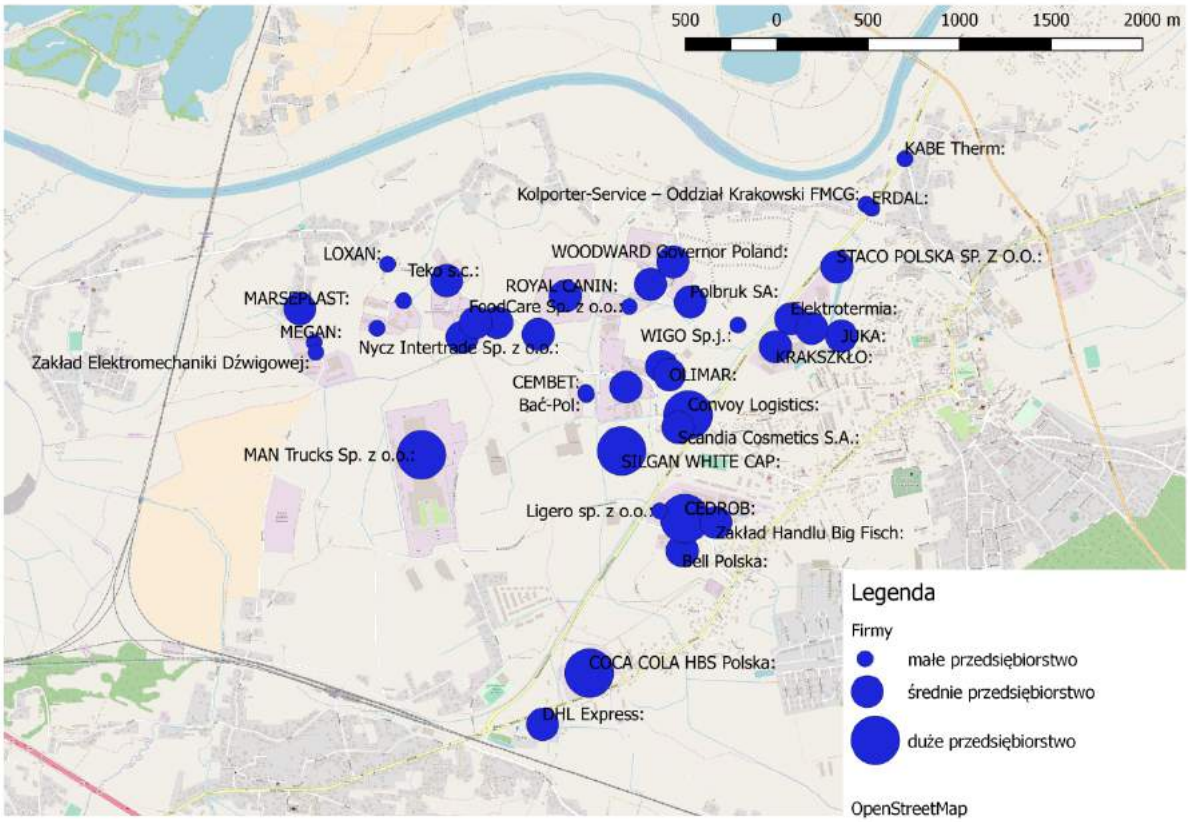
[62] Giełzak M., „Ridesharing, carsharing i transport w czasach sharing economy" https://wethecrowd.pl/przewodnik-sharing-economy-1/ (accessed 31.01.2018)

economic zone in Niepołomice. It is located in the western part of Niepołomice Commune, in the vicinity of the provincial road No. 964, ensuring, among others, connection of the town center of Niepołomice with the area of Wieliczka Commune, and the national road No. 75. Niepołomice Commune, together with the Investment Zone, is also served by agglomeration bus lines of Komunikacja Miejska w Krakowie [Urban Transport in Krakow] and private carriers lines.

There are 9 bus/microbus bus stops nearby or within the NSI. Some of these stops are located at the border of the zone, and due to its size and dispersion of workplaces it is difficult to clearly determine if they are actually used in the access to the zone. It should be noted that only two lines penetrate the NSI area, performing a total of 10 courses through the zone during the day. In addition, the NSI area is served mainly by Podłęże railway station located on the railway line no. 91, SKA3.

About 60 large enterprises from various industries operate in the NSI, employing over 7,000 employees. These are both residents of Niepołomice Commune, as well as people commuting to the NSI from other communes. According to the provisions of the Niepołomice Commune Development Strategy of 2011[63,64], the NSI is the main element influencing the Commune's economic development as well as an important source of incomes to the Commune's budget.

The employment size and the location of individual NSI companies are presented in Figure 6.1. Most of the companies are located along Wimmera Street and Grabska Street. MAN plant, together with Trefl and BTH, is located at the intersection of Diesla Street and Kwiatkowskiego Street.



[63] „Development strategy of the Municipality of Niepołomice, Centrum Doradztwa Strategicznego, Niepołomice, 2011

[64] „Mobility plan for the Municipality of Niepołomice” Via Vistula, Krakow, 2016

Fig. 6.1. Employment size in individual NSI enterprises
Source: own elaboration, based on data provided by companies operating in the NSI
Map: OpenStreetMap

In order to facilitate the location of enterprises, the NSI area was divided into 11 sectors. The largest area of the NSI is occupied by sectors E, D and G (Figure 6.2).

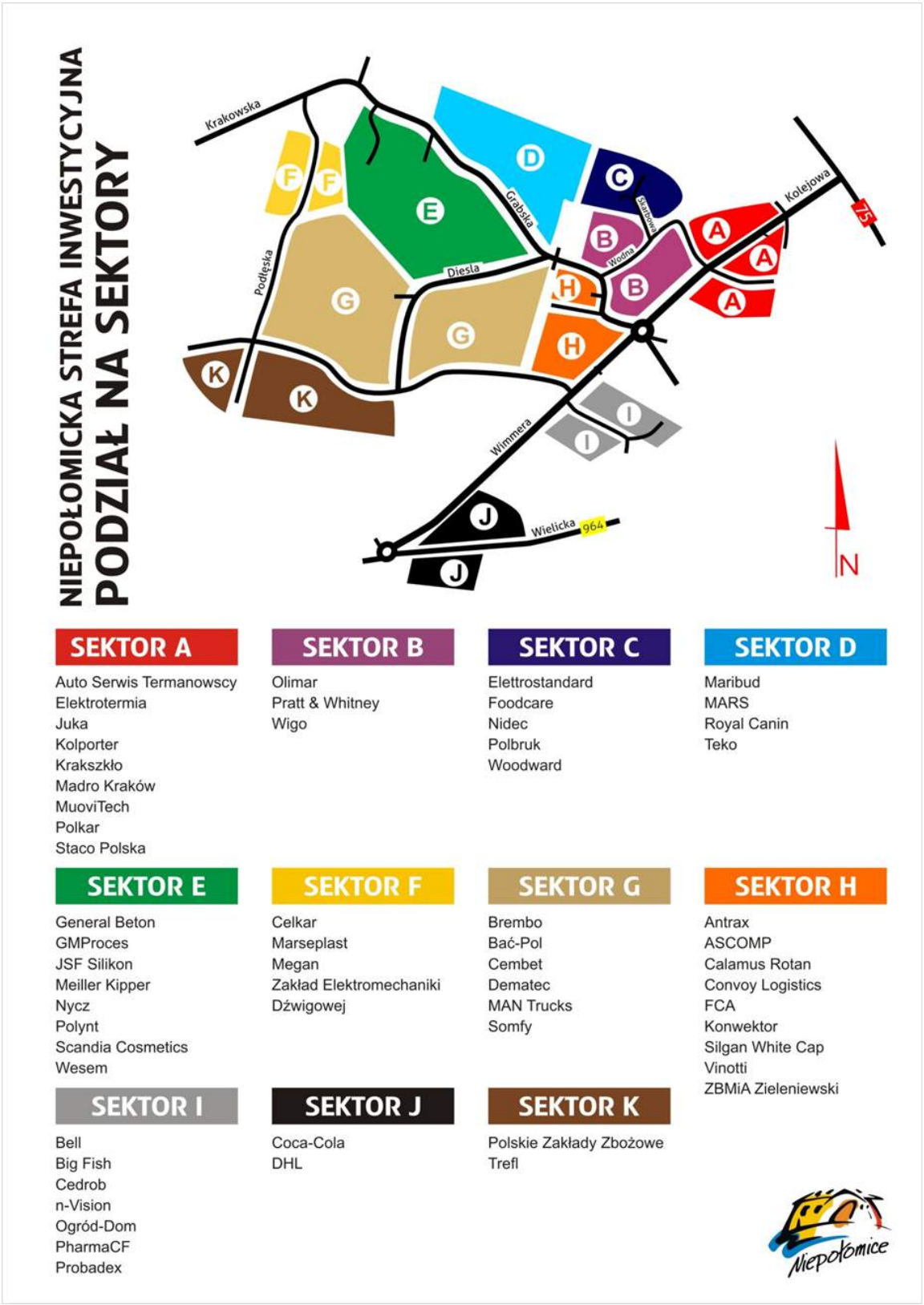


Fig. 6.2. Division of the Niepołomice Investment Zone into sectors
Source: wiadomosci.niepolomice.eu

6.4 Survey among the NSI employees

6.4.1 Purpose of the survey

In October 2017, survey among the NSI employees was conducted which main purpose was to obtain information on their transport behavior and preferences. Questions in the survey concerned a type of work (physical, mental), type of position (managerial, other), working time (flexible, permanent, shifts), as well as a place of residence and travel costs. The most important part of the questionnaire contained questions about the current way of commuting and about the willingness to participate in the carpooling system, in the case of its launch for the NSI. Respondents not interested in using such a system were asked to justify their answer, while those who are ready to share vehicles were asked about preferred aspects of its functions.

To illustrate the results of the survey, a map illustrating the distribution of travel origins (places of residence) of the NSI employees was prepared. Furthermore, analyzes were carried out to determine transport modes share in the employees' journeys and the calculation of costs of their commuting to work. These and other survey results are illustrated on diagrams. The conclusions formulated on the basis of the research results were used to develop the concept of carpooling system for the NSI and other common commuting systems that meet expectations of employees.

Characteristics of the research sample:

The NSI employees were provided with questionnaires, both in electronic and paper form. They contained 17 questions, including nine closed, seven open and respondent's data. 167 responses were obtained online and 233 in the traditional way. In total, 400 responds were obtained. Women accounted for 33% of all respondents, men – 60%, and 7% of respondents did not answer a question about gender (Figure 6.3).

The dominant age group constituted people between 25 and 40 years old. They make up 56% of all respondents. Older people (40-65 years old) constitute almost a quarter of the respondents, while the youngest respondents (18-25 years) constitute the remaining 16% (Figure 6.4).

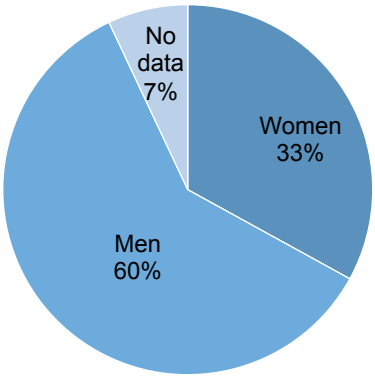


Fig. 6.3. Respondents by gender
Source: own elaboration

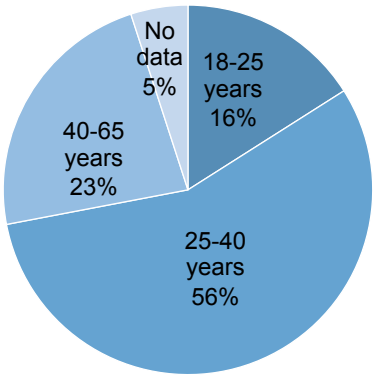


Fig. 6.4. Respondents by age
Source: own elaboration

The vast majority of respondents are people who perform mental work (64%), in managerial positions (73%). Only 28% of employees perform a physical work, as shown in Figures 6.5 and 6.6. It should be noted that such a large percentage of respondents holding managerial positions and performing mental work most likely results from the fact that usually such employees are more willing to take part in surveys, they also have daily access to a computer at work, which means that participation in the study is more convenient and does not require as much effort as in the case of a paper survey.

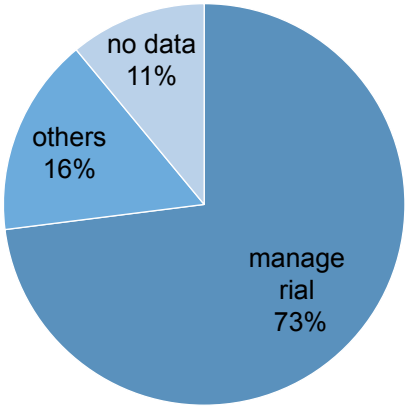


Fig. 6.5. Respondents by position held
Source: own elaboration

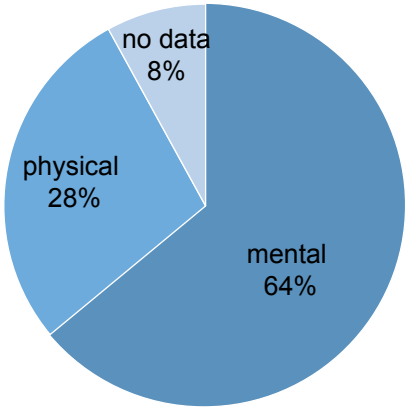


Fig. 6.6. Respondents by work performed
Source: own elaboration

The largest number of surveys was obtained from employees of Pratt & Whitney Tubes Sp. z o.o. and Nidec Sp. z o.o (respectively 127 and 55 questionnaires). In other cases, the number of surveys from one company did not exceed 34 sheets. Table 6.2 presents the number of questionnaires completed among employees of individual companies.

Tab. 6.2. Number of surveys completed in individual companies in the NSI

Company name	Number of questionnaires
Pratt & Whitney Tubes Sp. z o.o.	127
Nidec Sp. Z o.o	55
BTH Import Stal	34
Trefl	33
Sopem (Somfy)	32
MAN Trucks Sp. z o.o.	30
Woodward Governor Poland	27
Alpha Technology	26
Coca-Cola HBC Polska	22
PXM	9
Tesar	2
DTH	1
Fertinger Automotive Polska	1
Sarel Polska	1

Source: own elaboration

6.4.2 Error of the survey estimation results

For the sample of 400 respondents, an error in the estimation of the survey results was determined. It was determined for the most important question in the survey regarding

transport modes share. It should be noted that in 2016, as part of the implementation of the “Mobility plan for the Municipality of Niepołomice”[65], surveys were carried out among the NSI employees, in which, inter alia, transport modes share in the access to the zone was examined. The research results revealed 85% share of the individual car in employees’ travels. On this basis, it was assumed that the structure indicator in the question regarding transport modes share, illustrating the share of trips carried out by car, is known and, for determining the error, the following formula was applied:

$$b = \frac{u_\alpha \sqrt{p \cdot (1-p)}}{2\sqrt{n}}$$

where:
b – maximum error of estimating the structure index
n – sample size
p – structure index (for calculations, value of the structure index should be taken from 0 to 1)
u_α – confidence ratio determined from a standardized normal standard distribution; one should accept the confidence level 1-α = 0.90 or 1-α = 0.95, then the value of the confidence ratio is equal to 1.64 or 1.96 respectively.

In calculations, the confidence level u_α equals: 1-α = 0.95, what gives a confidence value of 1.96. The n test is 400, and the structure index is 0.85.

$$b = \frac{1{,}96\sqrt{0{,}85 \cdot (1-0{,}85)}}{2\sqrt{400}} = \frac{0{,}7}{40} = 0{,}0175 = 1{,}75\%$$

As results from the above calculations, for the confidence level of 1- α = 0.95, 400 collected questionnaires and the structure index equal to 0.85, the maximum error of estimation of the structure index is 1.75%.

6.4.3 Results of the survey

System and time of work

Analysis of the results of the survey presented in Figure 6.7 shows that a similar percentage of respondents indicated possible variants of the work system. Most people work in shifts (37%). In turn, people working in flexible and regular working hours constitute respectively 32% and 30%.

Within the shift work, it is still possible to differentiate between constant and variable shifts (Figure 6.8). The vast majority of respondents work variable shifts (85%). In the case of an eight-hour shift, in most cases the shifts start and end at the following time intervals: 6:00-14:00, 14:00-22:00, 22:00-6:00. In turn, in the case of a 12-hour work, shifts take place between 6:00 and 18:00 and from 18:00 to 6:00.

[65] ”Mobility plan for the Municipality of Niepołomice” Via Vistula, Krakow, 2016

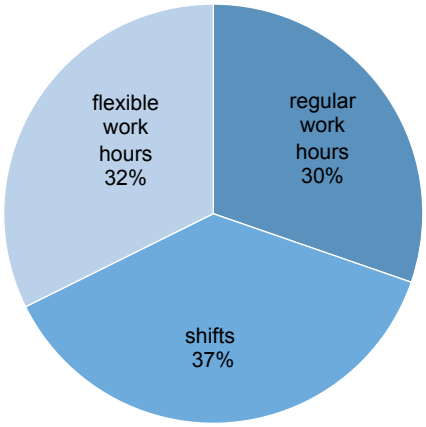


Fig. 6.7. Respondents' work system
Source: own elaboration

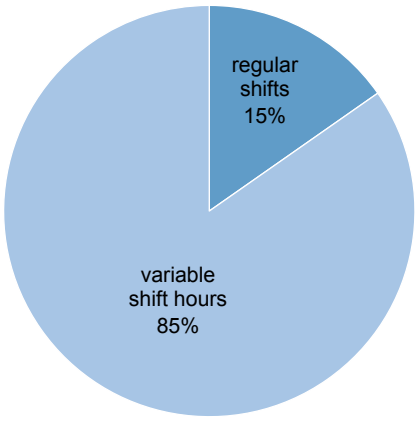


Fig. 6.8. Types of shift work
Source: own elaboration

Respondents with flexible working hours were asked to indicate possible time periods in which they can start and end their work. They stated different time intervals. Sometimes their work time is twice as long as the work time of other employees. Some people work 3 hours and some work up to 9 hours.

In the case of regular working hours, the time of starting work ranges between 6:00 and 9:00, with the biggest number of arrivals at 8:00 (Figure 6.9). The time span of finishing is, in turn, much larger – from 13:00 to 18:00, with the most trips taking place at 16:00 (Figure 6.10).

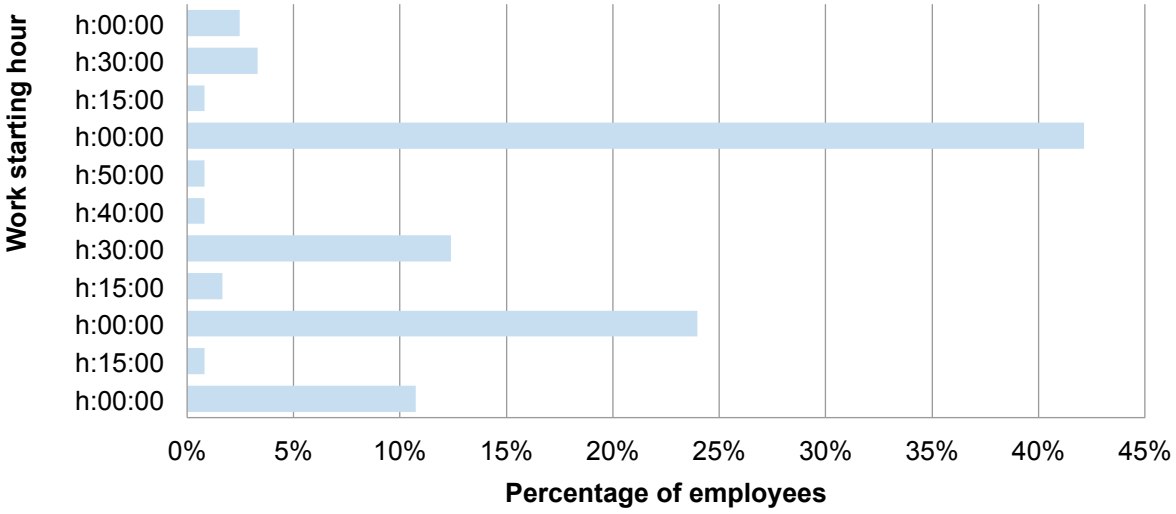


Fig. 6.9. Work starting hours in the case of regular working hours
Source: own elaboration

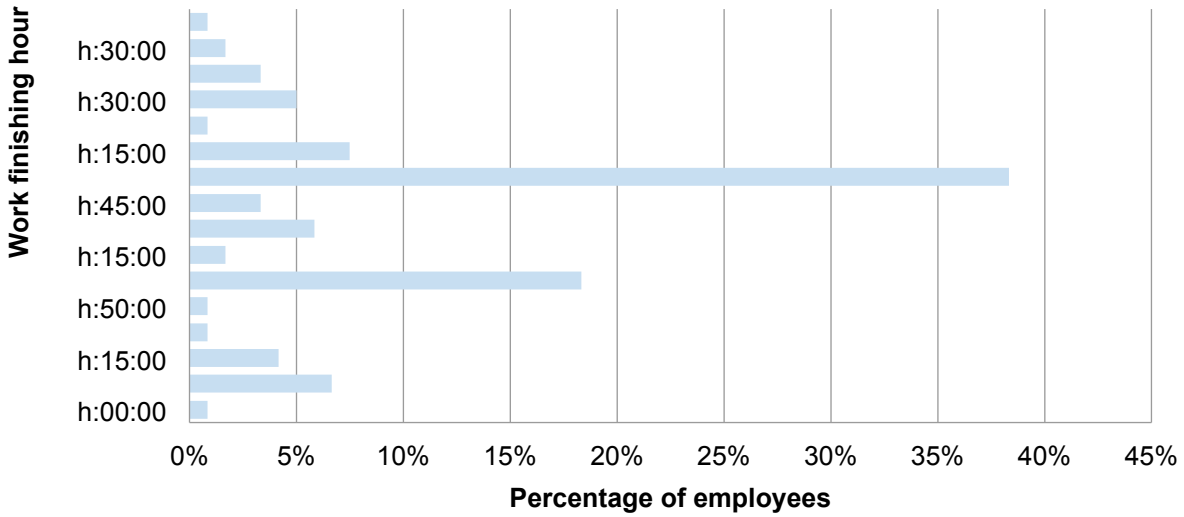


Fig. 6.10. Work finishing hours in the case of regular working hours
Source: own elaboration

Due to the above, there is no dominant working time in the NSI. This translates into the lack of unambiguous rush hours.

Place of residence of employees and the distance of travel to work

The question regarding the place of residence of the respondents was used to analyze the origins of their travels. Addresses and zip codes indicated by the respondents were geocoded (changed into coordinates) and placed on the map. Almost all employees commute to work from Małopolska Province, therefore it is the background used for the data visualization.

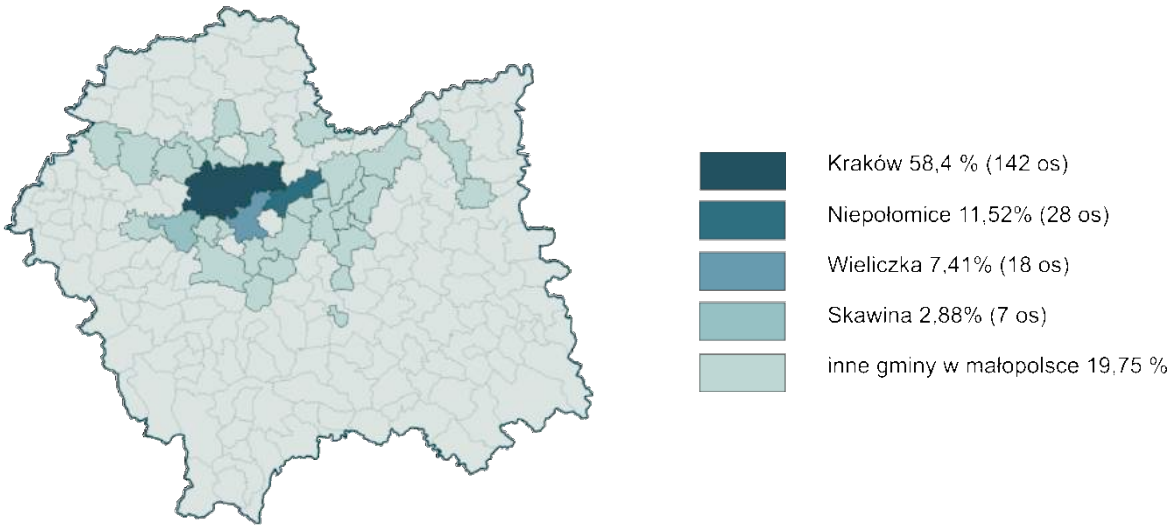


Fig. 6.11. Percentage of the NSI employees living in particular communes of Małopolska Province
Source: own elaboration

The two main origins of travels to work to the NSI are: Krakow Commune, from where 58.4% of respondents commute, and Niepołomice Commune. Local residents account for 11.52% of respondents. A significant percentage of employees in the zone constitute also

residents of Wieliczka Commune – this location was indicated by 7.41% of respondents.

It should be noted that although in the research carried out under the "Mobility plan for the Municipality of Niepołomice"[66], the inhabitants of Niepołomice constituted significantly more respondents, about 28%, the results of both surveys in areas generating the largest number of the NSI employees' travels are the same. In both cases, these areas are communes of: Krakow, Niepołomice and Wieliczka. The low percentage of employees living in Niepołomice Commune participating in this survey is most likely due to the fact that it is employees who live outside the commune who do not have many options when choosing a means of transport in commuting and thus are more interested in implementing solutions that improve conditions of travel to the NSI which this survey referred to.

The question about a place of residence also allowed to estimate a distance between the place of residence and the place of work. For each given place of residence the distance in a straight line from the NSI was measured. The results are shown in Figure 6.12.

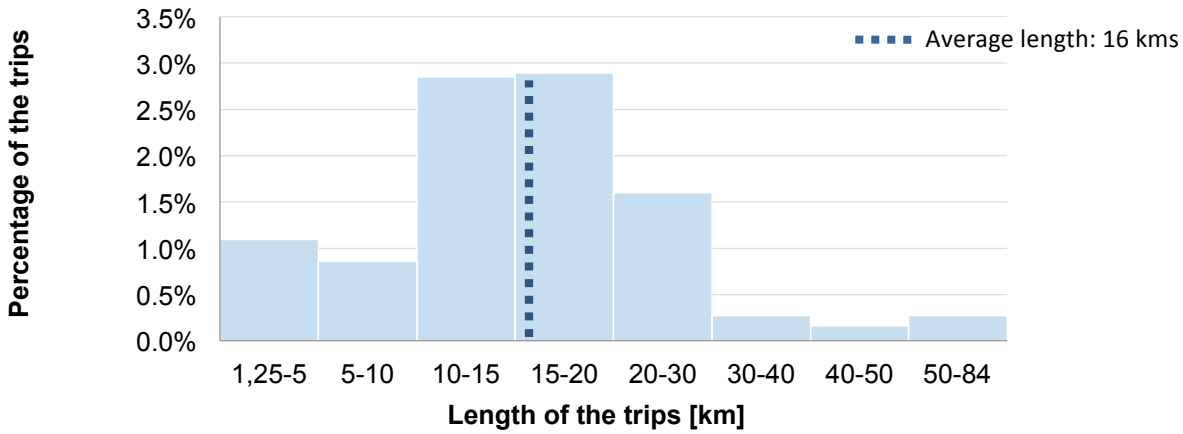


Fig. 6.12. One-way travel distance in daily commuting of the NSI employees
Source: own elaboration

The largest part, more than half, are journeys, the distance of which in one-way ranges between 10 and 20 kilometers. The average value of the distance from home to the place of work, calculated on the basis of all trips, is 16 km and also falls within this range. This may result from the fact that most of the travels to work take place from the areas of Krakow Commune or adjacent communes. Travels over 30 kilometers are exceptions.

Transport modes share

Commuting to the NSI is mainly based on individual transport – as presented in Figure 6.13.

[66] „Mobility plan for the Municipality of Niepołomice" Via Vistula, Krakow, 2016.

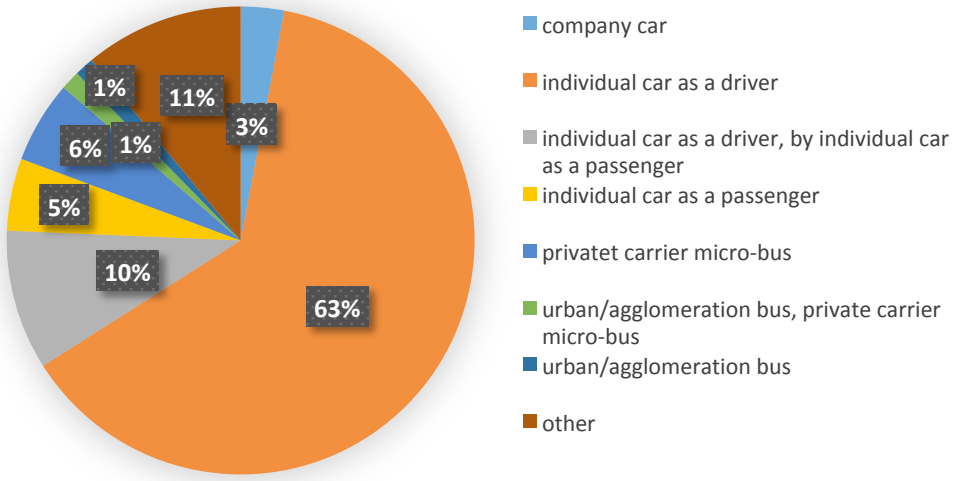


Fig. 6.13. Transport modes share in commuting of the NSI employees throughout the whole year
Source: own elaboration

Trips to work carried out by car account for as much as 81% of all trips. Within this mode of travel, one can distinguish journeys made by car only as a driver (63%), only as a passenger (5%), sometimes as a driver and sometimes as a passenger (10%) and those when drivers travel by business car (3%). Public transport plays a marginal role. 8% of respondents use urban agglomeration bus services and services provided by private carriers.

Regardless of the length of travel and place of residence, transport modes share is at a similar level. The difference can be seen only in the case of different work systems. It turns out that people working shifts are more likely to use public transport (often the services of private carriers), and commute to work by car as a passenger.

What is interesting – the respondents' answers testify to the tendency of employees to travel alone (Figure 6.14). Over half of people using individual transport in commuting to work do not take any passenger. 36% of drivers use shared transport, taking with them one, two, three or very rarely – four or more passengers. The situation is slightly better among people working shifts. In this case, only 50% of drivers travel alone, 24% take one passenger, 10% – two and three passengers.

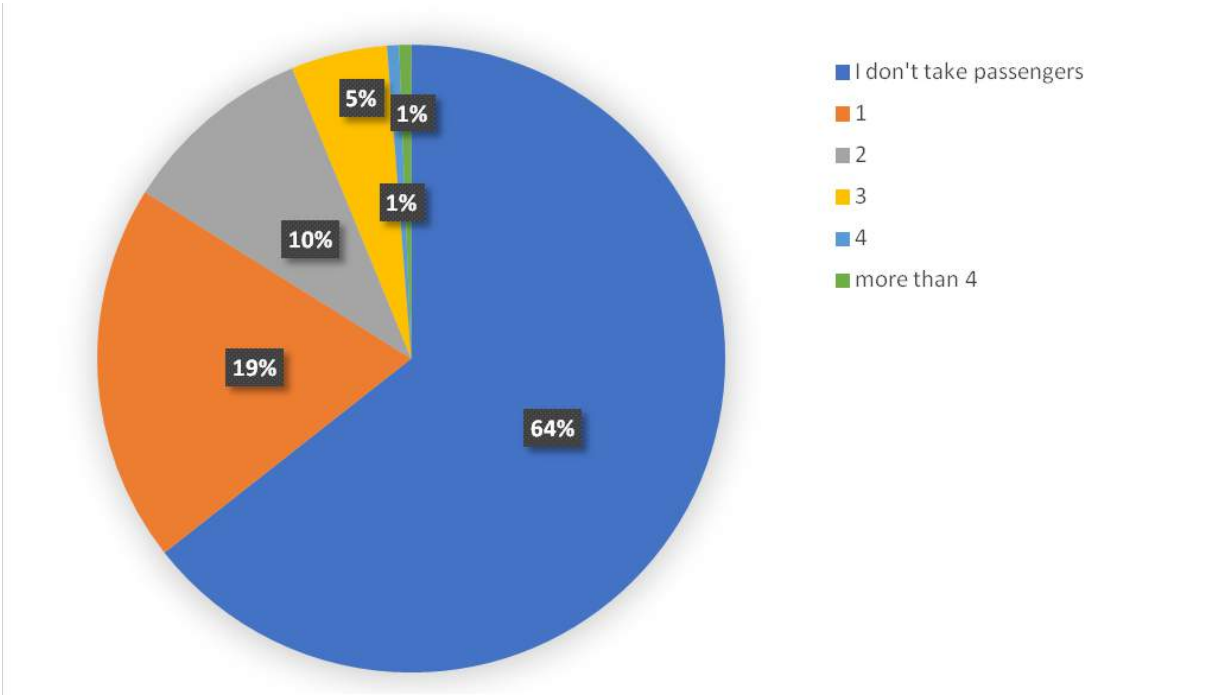


Fig. 6.14. Number of passengers taken by the drivers of individual cars
Source: own elaboration

Respondents were also asked if the season of year influences the change of transport means they use to get to work. In 91 cases out of 400, they answered in the affirmative. In the winter season, 90% of respondents choose a passenger car as a means of transport (as a driver or passenger). In turn, in the summer season, the share of passenger car journeys decreases in favor of non-motorized means of transport – bicycles (7% of travels) and walking (in the case of Niepołomice Commune residents). Despite this, the variability of the way of traveling depending on the season is small. These changes were observed in the case only 24% of respondents. On this basis, it can be concluded that the employees of the zone are rather stable in the way of commuting.

Costs of commuting

The costs of commuting to work were divided into two categories. The first category included the costs of commuting by collective transport, in the case of which only the purchase cost of the ticket was taken into account, the second – the costs of commuting by individual transport, in which the costs of fuel purchase and additional costs of vehicle maintenance were taken into account. In both cases, respondents were asked to declare monthly travel costs. To increase the readability of the results, respondents' answers were grouped into ranges of PLN 50 for public transport and PLN 100 for individual transport. In addition, the arithmetic mean was calculated for each cost category. The results of the survey revealed that employees traveling by public transport spend about 3 times less money on commuting to work than those who commute by car. The costs of commuting are presented in Figures 6.15 and 6.16.

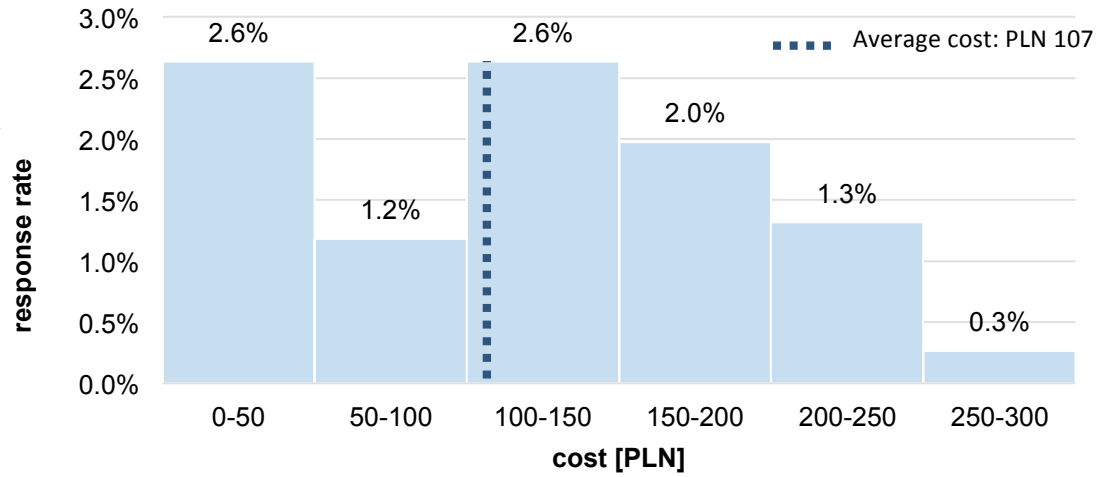


Fig. 6.15. Monthly cost of commuting with public transport
Source: own elaboration

The most frequently quoted values of public transport tickets were in the ranges of PLN 0-50 and PLN 100-150. The arithmetic mean of all answers is PLN 107.

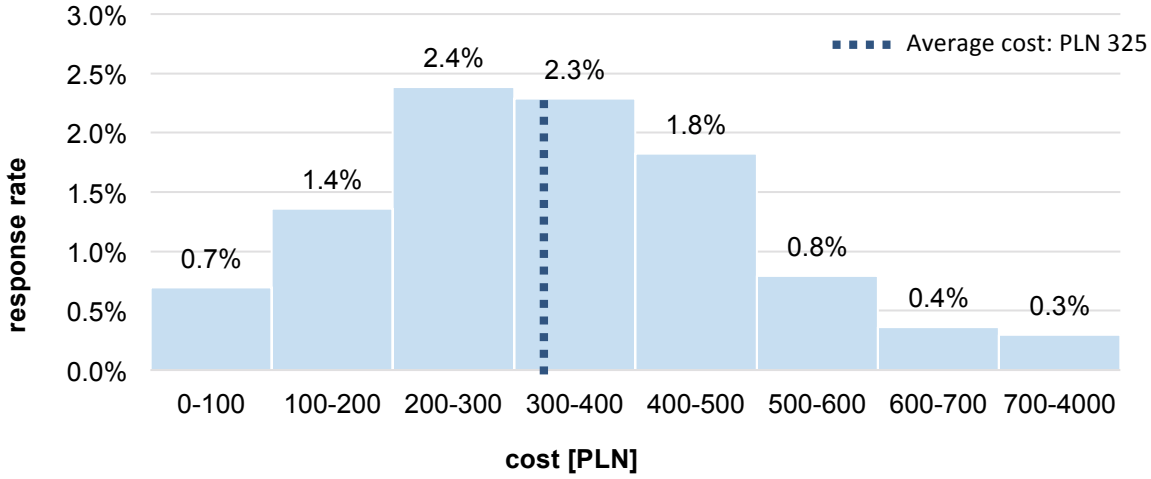


Fig. 6.16. Monthly cost of commuting by car (fuel cost)
Source: own elaboration

In the case of costs of commuting by individual transport, expenses from PLN 200 to 400 per month prevail. The average cost is PLN 325. In the case of travel costs by private car, insurance cost should also be added to the fuel cost. Respondents were asked about the annual cost of the insurance policy. After recalculation of annual policy amounts for monthly amounts, it turned out that in half of the cases these expenditures amount to PLN 50-100. The results are presented in Figure 6.17.

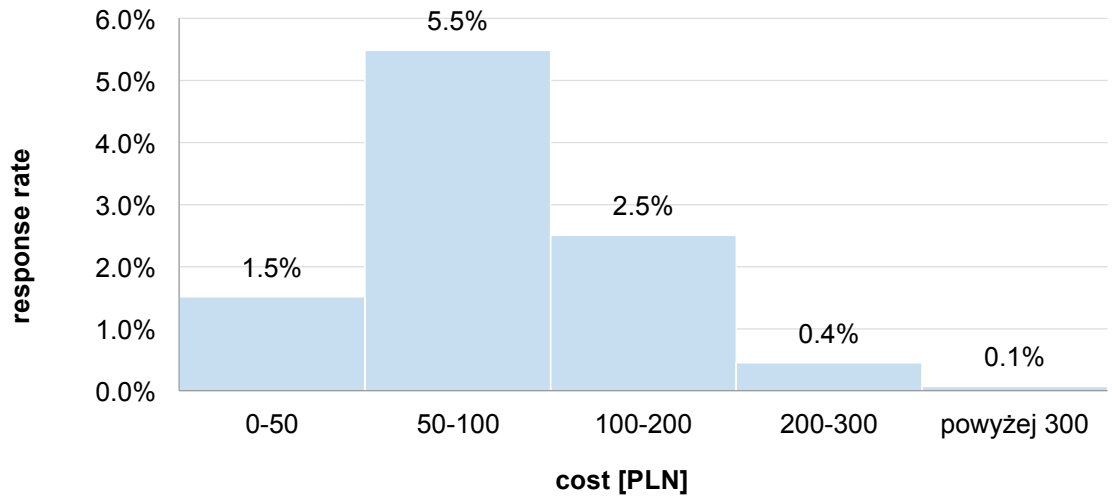


Fig. 6.17. Monthly cost of car insurance
Source: own elaboration

Average travel distances are similar for both those commuting by car and those commuting by public transport. The average distance traveled by car is 16.11 km, while by public transport – 15.78 km. Comparing the costs of one kilometer driven to work, commuting by car is almost four times more expensive than commuting by public transport. It is 59 groszy per kilometer, while commuting by public transport costs only 16 groszy per kilometer.

Interest in the carpooling

Analyzing the Figure 6.14 presented above, it can be noticed that despite the lack of any platform for the carpooling system, even now about 36% of drivers travel with one, two or three passengers. Cars with four or more people constitute only a few percent.

When asked: "Would you be interested in getting to work traveling in a car belonging to you or to one of the employees of the NSI", the majority of respondents answered in the affirmative (63% of respondents). Answers to this question are illustrated in Figure 6.18. People interested in this way of traveling mostly express their readiness for interchangeable journeys, as a driver or passenger. The respondents would be the least willing to use such a system as a driver (6%). After analyzing the respondents' responses regarding their work system, some differences can also be noticed. The group of people working in regular working hours stands out from the rest. In this group, the most respondents, as many as 41%, are opposed to common commuting. Among the most common reasons for such a response were the following statements: "My current journey satisfies me", "I do not have time", "I consider such a way of traveling uncertain".

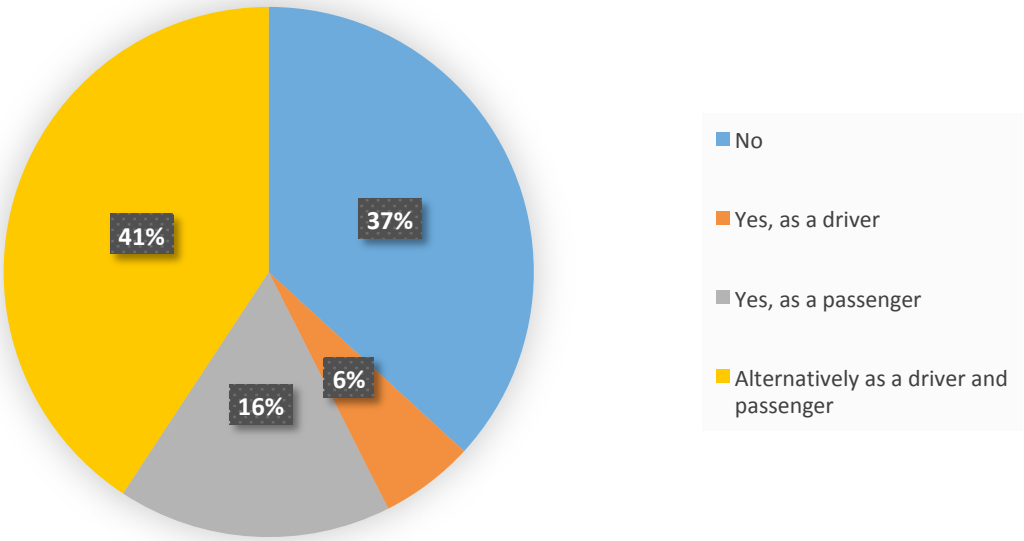


Fig. 6.18. Interest in the carpooling system
Source: own elaboration

To those who answered in the affirmative the question about the willingness to travel in the carpooling system as a driver or interchangeably as a driver – passenger, two additional questions were asked. The first concerns the maximum number of potentially taken passengers. Figure 6.19 shows that respondents would be more likely to take as many passengers as possible. 54% of respondents answered that they would take 3 passengers with them, while 27% – 4 passengers. Taking the number of passengers higher than 4 would imply having a larger car, which is why this answer was chosen sporadically.

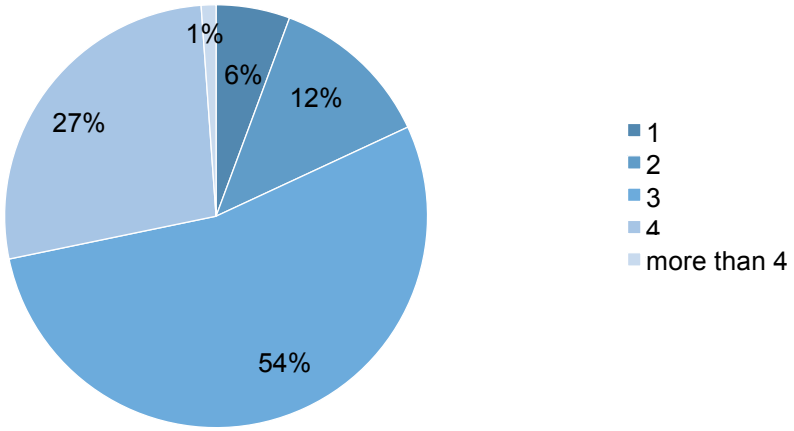


Fig. 6.19. Maximum number of potentially taken passengers in the carpooling system
Source: own elaboration

The second question concerned the maximum additional time spent on taking passengers. Analysis of Figure 6.20 shows that both in the morning and in the evening, the most preferred time, which respondents would be willing to spend on activities related to taking additional passengers is 10 minutes. Generally, the longer this time is the respondents are less likely to carry passengers. The slight difference between the morning and evening hours lies in the fact that in the evening respondents are able to spend more time than in the morning.

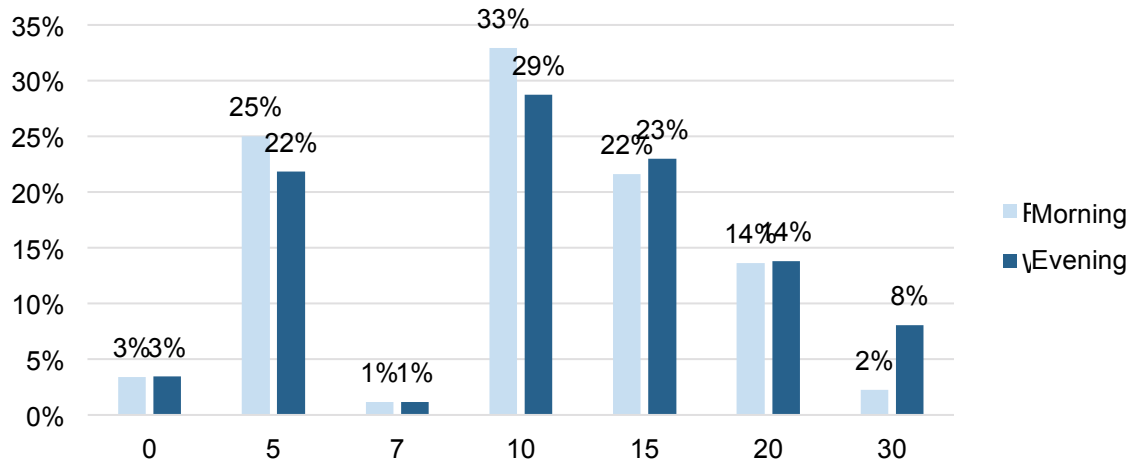


Fig. 6.20. Maximum time respondents would be willing to spend on taking passengers
Source: own elaboration

In addition, people who would be willing to use the carpooling system as a passenger or interchangeably as a driver – passenger were asked a question about the time, which they would be willing spend to get to the agreed meeting place with the driver. Answers of the respondents are shown in Figure 6.21. In this case, the dominant answer was also 10 minutes.

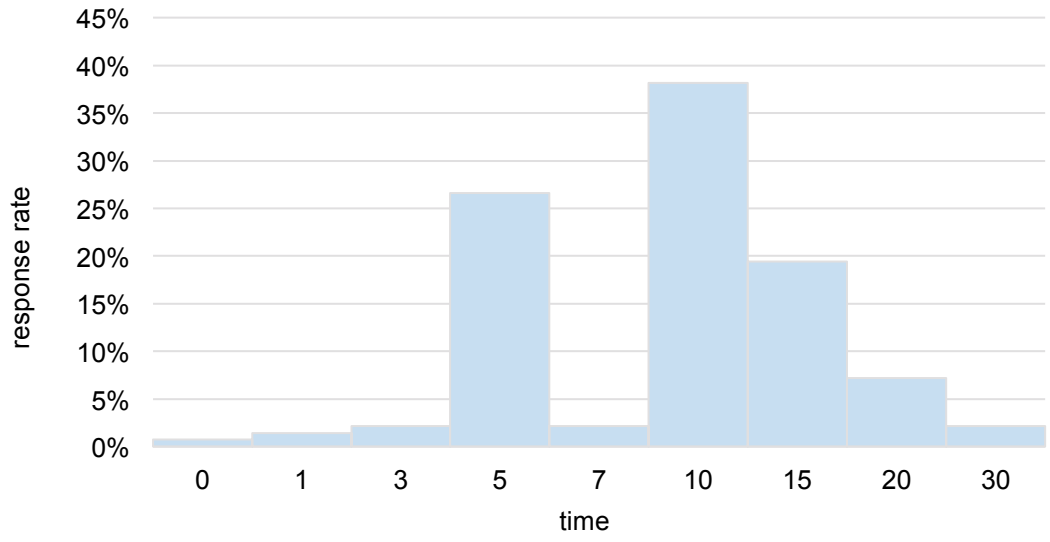


Fig. 6.21. Maximum time respondents would be willing to spend to get to the agreed meeting place with the driver
Source: own elaboration

Attractive price may entice users to use the carpooling system. Respondents were asked a question about the cost of travel in the carpooling system which would encourage them to give up the current way of travel. Some people indicated a one-off payment of PLN 2-15, and some of them – a monthly cost of PLN 50-300. These amounts are characterized by a large discrepancy.

Respondents were also asked about the three most important factors that determine the choice of potential traveling companions. The answer to this question is presented in Figure 6.22.

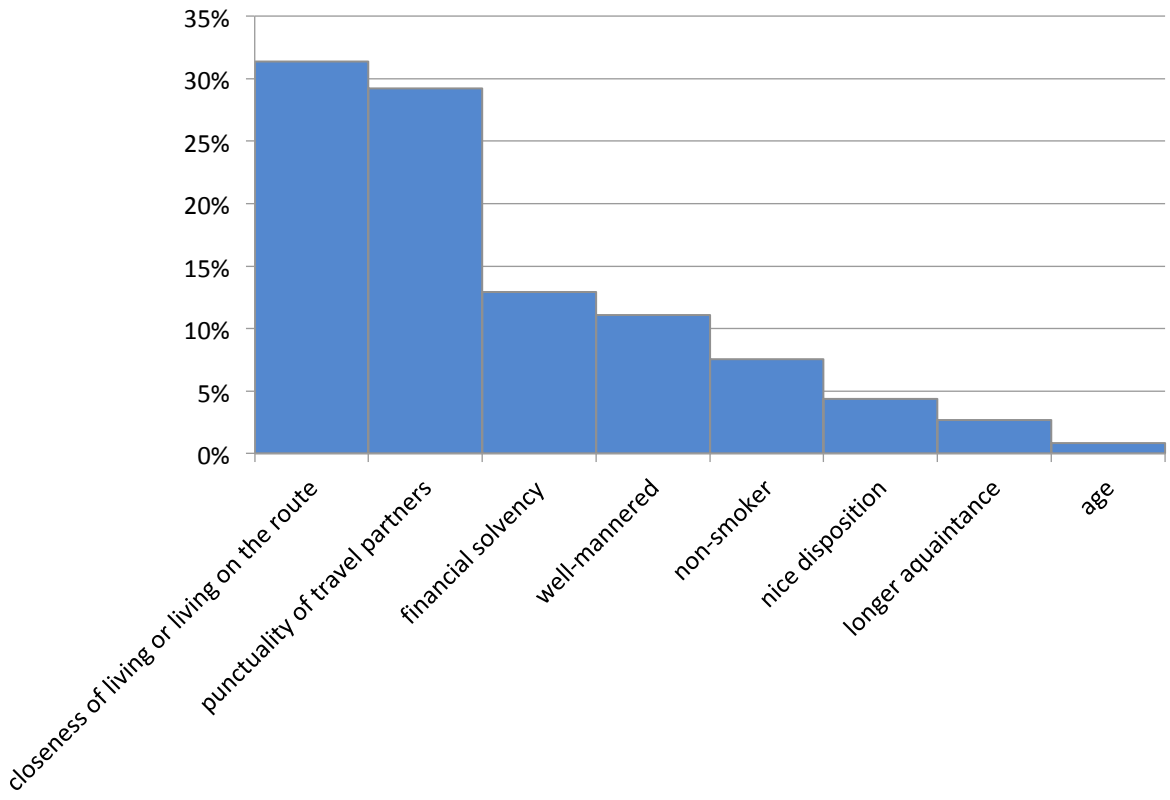


Fig. 6.22. The most important factors that determine the choice of potential co-passengers
Source: own elaboration

Undoubtedly, the closeness of living or living on the route and punctuality of travel partners are the most desirable features. They constituted respectively 31% and 29% of all responses. In addition, financial solvency and good manners are important.

The respondents were also asked about the most convenient form for finding people who would like to travel by one car. According to the respondents' answers, the majority of people consider it the best way to use a public or internal website, e.g. created for the NSI needs (33% and 30%). Another group are people who prefer telephone contact with a consultant (25%). Only a small percentage of the respondents indicated a bulletin board as the preferred solution (7%). Respondents also suggested creating a mobile application or looking for partners via social networks.

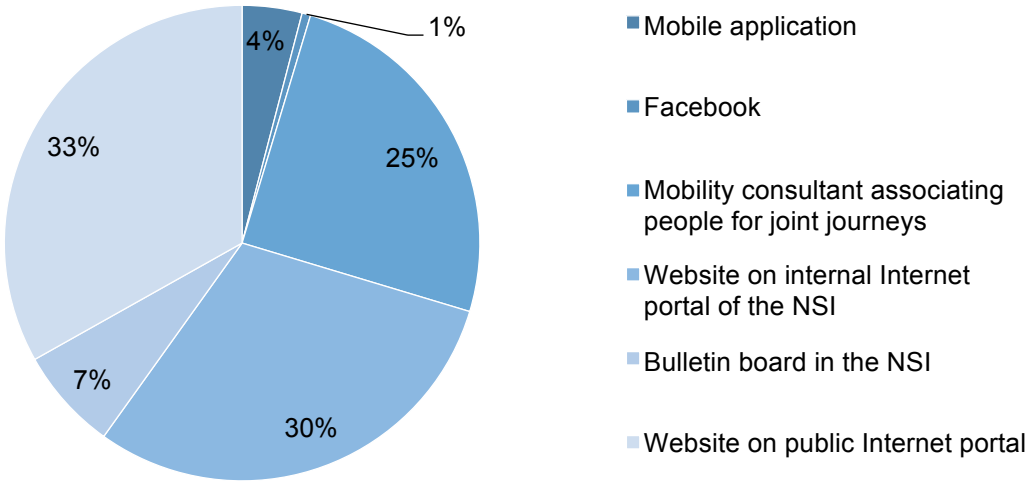


Fig. 6.23. Preferred forms of finding co-passengers in the carpooling system
Source: own elaboration

Despite the high interest in the carpooling system, there is also quite a large group of respondents (37%) who are not willing to use it. When asked about the reason for the lack of interest, they most often answered that for other reasons not mentioned in the questionnaire. Of the suggested answers, respondents most often indicated that they are satisfied with the current commuting (25%) and that they consider this way of commuting unsure (17%). In addition, some respondents do not simply have time (11%). These and other answers are presented in Figure 6.24.

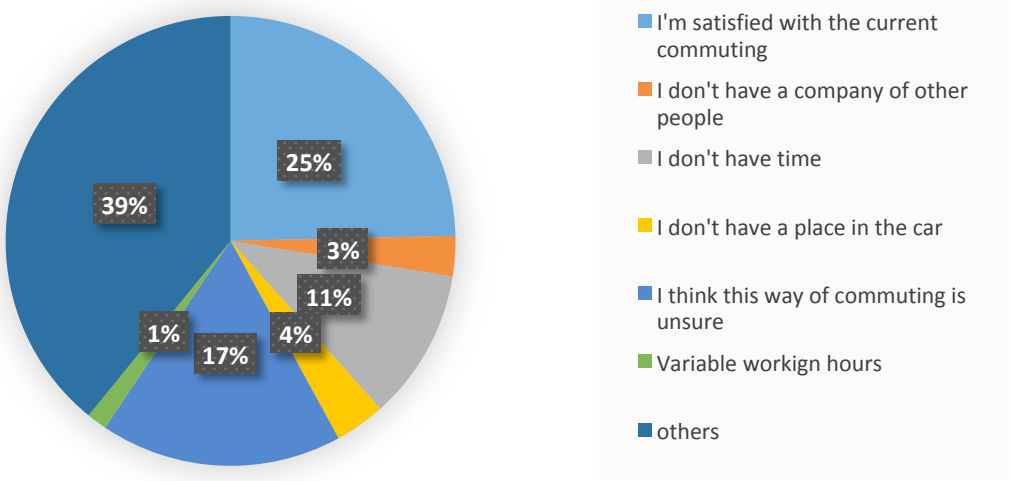


Fig. 6.24. Reasons for the lack of interest in carpooling system
Source: own elaboration

6.4.4 The most important conclusions from the survey

The most important conclusion from the survey is that employees who commute by car bear much higher travel costs than public transport users – counting both fuel costs and additional costs, such as car insurance. These costs should also include the cost of buying a car, repairs etc., which were not included in the questionnaire. As mentioned earlier, those traveling by car pay on average four times higher travel costs than those traveling by public transport. This is a very serious argument in the discussion aimed at encouraging the NSI employees to share car journeys. Most passenger cars can comfortably accommodate four people, which allows for significant reduction in travel costs.

Special attention should also be paid to the responses of employees who work shifts. 40% of them do not travel alone to work. This means that unofficial carpooling is already in operation among this group. The least convinced of the carpooling system are people working regular working hours. It is worth trying to change their attitude and convince them that sharing vehicles does not involve the risk of losing the possibility of returning home, associated with the need to stay longer at work. An important issue in this case will be the implementation of a campaign informing and promoting the benefits of using the carpooling system.

6.4.5 Concept of carsharing systems in commuting to the NSI

Proposed systems

The results of the survey revealed that the transport means used most frequently by the NSI employees in everyday commuting is a car. This is mainly due to the lack of an alternative, attractive connection by public transport to Krakow and the communes adjacent to Krakow and Niepołomice. It is also affected by the large dispersion of employees' domiciles.

The first of these problems can be solved by the development and integration of Krakow public transport and railways, so that those who use these means of travel have a convenient connection with the NSI. Among the NSI employees there are also many people living in areas where the operations of these systems are and may still be limited (in terms of routes and frequency of running). For this reason, employees are dependent on uncoordinated transfers and, consequently, a long journey time. In this case, it may be a good idea to offer them a possibility of using shared transport systems, including buspooling, vanpooling and carpooling. It is worth noting that the Romanian partner of the Regio-Mob project[67] has positive experiences in the introduction of the carpooling system – these experiences were used at the stage of creating a carpooling concept for the NSI and while working on recommendations on activities aimed at promoting vehicle sharing systems among its employees.

Intermodal transport

In terms of creating opportunities for the NSI employees to carry out intermodal travels, by combining different transport means during one journey, it is worth remembering that Niepołomice Commune is planning to build four major interchange hubs, including two hubs located in the vicinity of the NSI – at Podłęże railway station (located about 4 km from the NSI) and in the center of Niepołomice at the new bus station (located about 6 km from the NSI). This creates a possibility of using the railway, bus and microbus lines serving hubs in commuting to the NSI (as well as using a place in the car of people traveling to the hubs by car, and leaving the vehicle at P+R parking lot), under the condition of providing employees with means of transport guaranteeing access to interchanges from the workplace. The role of feeder lines servicing the NSI area and providing access to both hubs and a

[67] Vladut G, Mogosan A., CHUMS: Changing Habits for Urban Mobility Solutions, presented during Regio-Mob workshop, May 2017.

transfer to rail, microbus, other bus line or a car will be essential.

The subject to further consideration is to determine the routes of feed lines in such a way as to obtain a compromise between a short travel time between the Podłęże hub and the center, and a short time of access to individual enterprises located in the NSI. The proposal for the layout of feeder lines servicing the zone is presented in section 3.2.1 of the regional mobility plan.

Moreover, an important issue in regard to offering efficient intermodal transport, adjusted to the needs of the NSI employees, will be integration of feeder lines timetables with lines serving interchanges and tariff integration, including public transport in Krakow, rail transport and bus lines serving Niepołomice Commune (issues described in section 3.2.1 of the regional mobility plan). This integration is a complicated process and requires many negotiations between carriers and individual local government units.

Another means of transport that may allow the NSI employees access to interchanges is the bike, the more so in the situation of the development of a linear bicycle infrastructure in the commune and the provision of secure and roofed bicycle stands at interchange hubs. In this context, it is proposed to encourage employers operating in the NSI to purchase company bicycles and make them available to employees who would like to get to transport hubs by bicycle, in order to continue their journey by public transport or by car together with other people. After finishing work, the employees would travel by bicycle to the interchange and park them at designated parking places. They would take them again the day after, after having arrived from the house to the interchange. Another possible solution is a purchase of bicycles using employees' own resources and financing part of the purchase costs by the employer.

Transport on demand

Transport on demand derives from public transport. Usually it is served by mini- or microbuses. It is characterized by lack of a fixed route and timetable, which are set depending on the users' requests. This type of transport is introduced in areas with low population density, dispersed buildings, and consequently – a small passenger flow, where regular bus with fixed route operations is unprofitable.

An example of on-demand bus transport system operating in Poland is so-called Tele-Bus, operating in southern-eastern area of Krakow. It operates as part of the urban transport tariff system and its operator is Miejskie Przedsiębiorstwo Komunikacyjne S.A. w Krakowie (Municipal Transport Company in Krakow).

Fig. 6.25. Tele-bus Krakow
Source: http://www.przestrzeninnowacji.pl/

Depending on the service strategy, on-demand transport can be divided into five categories. The possible service strategies are presented below.

1. **Permanent route** – changes are permitted in the route at a passenger's request. It is assumed that derivations from the route are not longer than 1-1.5 km.
2. **Route layout depending on the needs** – the route includes a number of permanent stops, where the bus stops every time, and stops that are only served as needed.
3. **Start and end of the route are fixed** – only the start and end points of the route are fixed, while the route between them changes.
4. **Only one waypoint is fixed** – a fixed point is usually a transfer node, a railway station, a tram loop, etc., and other places are served according to users' needs.
5. **No fixed route** – the route is determined on an ongoing basis, as needed. It runs between fixed points – stops.

Details regarding the operations of this system created for the NSI needs are described in the following paragraph, in regard to the concept of its integration with the buspooling system.

Buspooling

Buspooling is a more flexible form of on-demand transport. It is a system that guarantees users access to work by buses with a variable route, determined according to their needs. Most often, it consists in the fact that a customer (employee) purchases a transfer to work, giving the address of residence and the address of the place where he works, and the hours at which he will usually travel. Based on this, routes are laid out. The area of its operation may increase, depending on the inflow of customers (employees) from new locations.

The buspooling system provides a direct journey from the origin to the destination. The travel time by such a transport mode is not much longer than commuting by car. In return, it allows a passenger to perform other activities instead of driving a vehicle. The price of such a service is higher than traveling by public transport, but similar or lower than the cost of fuel in the case of car travel. The great advantage of this system is its openness. This means that if on a given day a customer is going to move on a different route or at other times, a new, optimal route is chosen for him. Thanks to the use of an internet platform to serve the system, the introduction of such changes is possible on an ongoing basis. Additional features may also be available, such as the location of buses on the map or information on traffic disturbances.

An example of a buspooling system open to everyone is a service operating in Cairo

(Figure 6.26). Everyone can become a customer and buy a monthly subscription for a selected route and time. The Beeline system in Singapore works similarly (Figure 6.27). It allows to book a place on a chosen route, on selected days of the week, at selected times. In addition, if there is no convenient route, the customer can propose his own route. If a sufficient number of people book it, it will be activated.

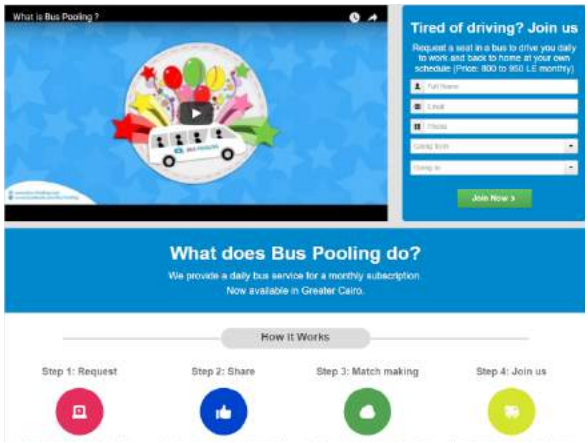


Fig. 6.26. Webpage of the buspooling system in Cairo
Source: http://www.bus-pooling.com/

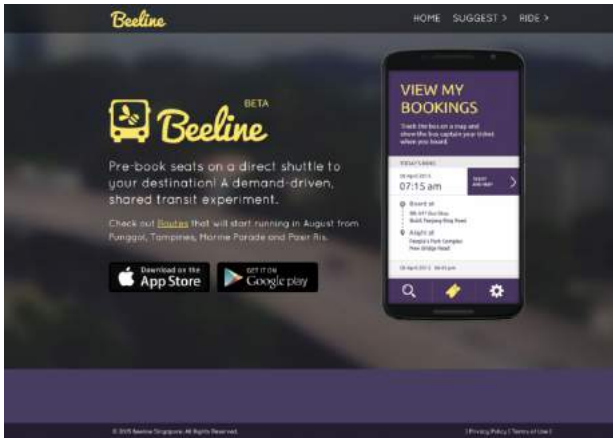


Fig. 6.27. Webpage of the Beeline system, Singapore,
Source: http://www.straitstimes.com

For the needs of the NSI, it is proposed to combine a buspooling system and on-demand transport in such a way as to adapt the functioning of this system to variable working hours in enterprises. Its utilization in fetching the NSI employees to work would be based on the introduction of bus zones. These zones would cover the areas of residence of the NSI employees. Analyzing the results of the survey in terms of the place of residence of the employees, the basic areas of its functioning can be determined:

- areas located to the north-east of Krakow, Kocmyrzów-Luborzyca Commune and the surrounding area;
- eastern part of Krakow, north of the Vistula river and east of the Kombinat bus terminus;
- areas between Krakow and Niepołomice, between railway line no. 91 (Kraków – Rzeszów) and the Vistula river, and east of the Mały Płaszów tram terminal;
- area of the commune between the communes of Niepołomice and Wieliczka, south of the A4 motorway.

The starting points would be located at any stops within the designated zones. However, it would be necessary to eliminate stops located in remote areas of the zone and those that would require a time-consuming deviation from the fastest route. The entire NSI area could be treated as one endpoint of the route of all lines.

It is important that the bus access be not much longer than the car's access, and that passengers have the opportunity to use the service irregularly (as to the number of days per week and the start time of the journey).

It would also be possible to offer the system to persons who are not employees of the NSI. The system would complement the transport system operating in the area of Niepołomice Commune, which could increase the number of its users and range of operation. It would allow, among others, for increasing the filling of buses going to Krakow, by commuters traveling there to work.

It is proposed that the organization of transport should be based on the use of the Internet tool (portal). Such a system should generate bus routes depending on the needs declared by employees. The operations on the routes may be commissioned to private

carriers. Co-financing of commuting by employers is not necessary, but it will encourage employees to use this system.

An example of the financial model of employee transport services is a model created by the Westpoort Foundation[68], which operates in the port part of Amsterdam – Westpoort. In 2008, due to the limited accessibility of the area by public transport, 20 enterprises from this area established their own transport entity and launched bus lines connecting their headquarters to Sloterdijk railway station. In the years 2010-2012, the transport was half-subsidized from public funds. This influenced the development of the system. At the end of 2012, it was used by 1,000 employees from 40 enterprises. After the end of the subsidies, the scope of the system was significantly reduced – it returned to the state before co-financing.

Carpooling, slugging and vanpooling

In areas more distant from the NSI, where it is unprofitable to operate a buspooling system, carpooling may be the solution. It is an agreement between users for "sharing a place in a car"[69]. The driver together with passengers (in a number not exceeding the number of places specified in the vehicle registration document) travel together in the same direction. The operation scheme of this system is simple. The driver picks up those interested in the journey from their homes or from other previously established places to get together to a common place of work or a place of transfer to a public transport vehicle. Agreements between the driver and passengers differ and may include the following rules:

- one person drives their own car, and costs are shared among all passengers;
- there is a rotation of drivers and their cars (e.g. weekly change of drivers);
- a driver using a company car is appointed (so-called vanpooling system).

There are several sub-types of the carpooling system:
The first division takes into account the nature and frequency of trips – in this case it is possible to distinguish occasional and regular carpooling trips.

Occasional commuting in the carpooling system

The first category consists of organized journeys on interurban or international routes, where drivers offer space in their vehicle to save on travel costs, while passengers register in order to travel faster, more comfortably or in a more direct way than using public transport means.

Regular commuting in the carpooling system

The second category includes the carpooling system used in daily journeys on the same route, e.g. commuting to work. Thanks to the regularity of these connections, it is possible to establish new contacts that last for a long time. This increases mutual trust between co-passengers and also enables the exchange of vehicle drivers so that this duty does not burden only one driver.

In the case of the carpooling system used in companies, a distinction can be made from the point of view of ownership of the vehicle used to carry out trips. Shared commuting can therefore be carried out using employees’ private cars or using company vehicles (so-called pool cars). The allocation of a company car means that the vehicle is assigned to one,

[68] „Step-by-Step: learning from implementing behavioural changes in transport” https://www.researchgate.net/publication/268489653_Step_By_Step_Learning_from_implementing_behavioural_changes_in_transport (accessed 31.01.2018).

[69] „Ogólna specyfikacja techniczna systemu carpooling na Politechnice Krakowskiej”, unpublished materials, 2007.

specific employee, while in the case of pool vehicles, cars are intended for all employees, and managed by the fleet manager. A great benefit from using this solution is the possibility of a significant reduction of expenses incurred for maintaining company vehicles (VAT deduction for fuel, technical and periodic inspections, and many others).

In addition, the carpooling system has two other variations:
The first – similar to hitchhiking is called "slugging". It consists in the fact that the driver and passengers do not settle on the travel in advance. Potential passengers are waiting at a designated point, and are then picked up by random drivers going in the same direction.
The second variant is the vanpooling system. It differs from the standard carpooling system in that a car with a larger passengers' capacity is used. This vehicle is a company car, provided by the employer. During business hours, it may be used for business purposes, while outside of them it may be used to commute employees to and from work.

An example of a city that has introduced a carpooling system dedicated to commuting is Zagreb in Croatia, which in 2008 as part of the CIVITAS ELAN project, covered eight large companies and institutions by the system. In Germany, on the other hand, a website was created for carpooling in Saxon region. As a result of the marketing campaign, the website had 400 registered users after only 4 months of its operation.

The Romanian partner of the Regio-Mob project, as part of the CHUMS project, launched the carpooling system as an urban service, addressed to all residents of Craiova[70]. Although the system met with suspicion at the beginning, over time carpooling turned out to be successful. Currently, over 4,000 participants use the system (including more than 2,000 people working in industrial areas), and more than 10 public and private entities allocate areas for parking places for system users. The total number of carpooling groups is 1,521 and they consist of 2, 3 or 4 people. Thanks to the service, 1,500 travels a day are performed (back and forth) in this way.

It is proposed to introduce the carpooling system for the NSI with the implementation of the slugging system. This type of travel can be successful between Podłęże and the NSI train stops until a convenient bus connection is established on this route. Drivers who park in the vicinity of the bus stop can share places in the car for people who want to get to the NSI or to Niepołomice.

Ultimately, the operation of the carpooling system could be based on the positive experiences of the partner of the Regio-Mob project from Craiova[71], using a website and/or an application that allows for finding travel companions. The principle of the system operation is presented below:

1. A driver indicates a willingness to take passengers through an application for mobile devices or a website. He/she gives information about the starting and ending point and time of the start of the trip, as well as the number of places offered and the maximum prolongation of travel time they can accept to reach passengers.
2. The offer with basic information is published and visible to all users who want to book a travel.
3. Persons interested declare a willingness to travel together with a given driver. Booking of journeys is possible after prior registration. It eliminates the need to fill in personal data repeatedly. The driver and passengers contact each other using the contact details provided in the registration form.

[70] Vladut G, Mogosan A., CHUMS: Changing Habits for Urban Mobility Solutions, presented during Regio-Mob workshop, May 2017.
[71] Vladut G, Mogosan A., CHUMS: Changing Habits for Urban Mobility Solutions, presented during Regio-Mob workshop, May 2017.

4. Just before the start of the journey, the driver has the opportunity to use the navigation, making it easier to find and reach all passengers.
5. Passengers, based on GPS data, also have the option of tracking the driver's location. Thanks to that, they know in how many minutes the driver will appear at the meeting point.
6. The driver reaches the passengers. A common journey is taking place.
7. It is possible to make non-cash payments for completed trips directly to the user's account.

The implementation of such a system would be attractive to both users and enterprises in which people traveling in this way are employed. The solution would reduce the problem related to the need to ensure an adequate number of parking places in the workplace, improve relations among employees and positively affect the punctuality of employees, as well as improve the image of enterprises in terms of supporting the development of sustainable transport.

6.4.6 Service and access to transport solutions for the Niepołomice Investment Zone

In order to enable users to use various transport systems, including those discussed above, it is important to ensure information integration in terms of their operation and easy access to reservations. To this end, it is proposed to create an internet platform, also available as a mobile application. Due to various preferences of users, access to the platform should also be ensured by contacting a consultant (in the case of creating a coordinator/mobility consultant in the Municipal Office in Niepołomice, this person could provide information services to the NSI employees. Another option is employment in one of the NSI companies of a person acting as a mobility consultant). Figure 6.28 presents the scheme of the platform and its main elements.

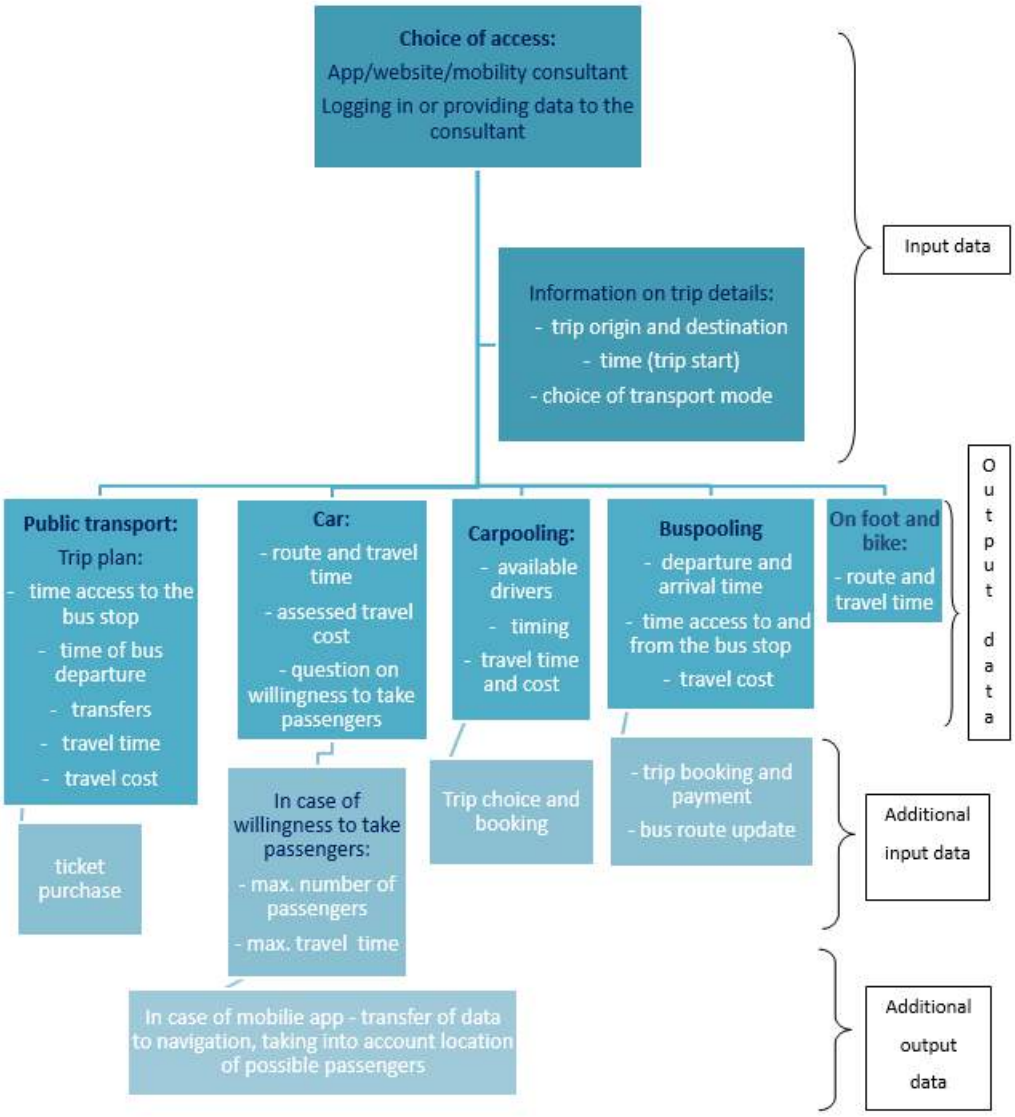


Fig. 6.28. Scheme of the integrated transport platform
Source: own elaboration

After logging in and entering user data (place of work and residence, information about owing a car), starting and ending point of the trip and desired start time, connections by all possible transport means will be found, including public transport, carpooling, buspooling, by car, by bike and pedestrian access. For each of these options cost and time of travel will be given. Additionally, the person who chooses the car travel option will be asked if he/she wants to take passengers.

The application may also have a payment system, with a prepaid account or a connected card payment, in order to make cashless payments for carpooling and buspooling services. It is also important to provide prices for public transport tickets and to include in the application a link to the iMKA or SkyCash application, which allows for buying public transport tickets in Krakow and train tickets by phone.

An example of such an application is Polish long-distance route search engine e-podroznik.pl. It includes timetables for urban and private carriers, railway and Blablacar carpooling system. The site also has its own ticket sales system that can be used by interested carriers. Otherwise, the page refers the user to the carrier's reservation system.

Adding additional ways to traveling to the platform/application should be done gradually, as demand arises. At the beginning, it should be a carpooling platform and possibly be integrated with the public transport connections search engine. It is suggested that employers whose plants are located in the NSI be responsible for its launch and management. The data collected by the application about users' travels will allow to identify areas with a large number of travels, in which it may be cost-effective to introduce a buspooling system or even regular bus services in the next stage.

As the experiences of the Romanian Regio-Mob project partner show, an extremely important issue is the increase in awareness of the target group to which the service is directed, about its existence and possible benefits from its use, and its broad promotion[72].

Therefore, it is recommended to implement described below educational and informational activities promoting systems of vehicle sharing in commuting to the NSI (the experiences of the Romanian partner has also been proved their effectiveness).

Activities carried out by employers from the NSI:

- dissemination of informational, educational and promotional materials, such as leaflets, posters, gadgets (e.g. t-shirts, reflective vests, window scrapers, thermal mugs),
- presentation of the system among employees,
- organization of lotteries and competitions for system users.

Activities carried out by the Municipal Office in Niepołomice:

- support for employers in preparation of informational and educational materials about vehicle sharing in commuting to work,
- visits at workplaces to promote this form of travel,
- dissemination of information in the media on the activities carried out by the NSI employers in regard to introducing vehicle sharing systems.

It is also essential to implement the promotion of systems in the form of financial incentives offered by employers to people who share a place in a car, e.g. in the form of a monthly supplement to a salary.

Stakeholders involved

- Municipal Office in Niepołomice – encouraging the NSI employers to facilitate employees to take intermodal travels by offering or co-financing the costs of bicycle purchase; providing conditions for parking bicycles at interchange hubs; promotion of vehicle sharing systems among the NSI employees and residents of the commune; possibly letting the mobility coordinator/consultant employed in the Office to provide information services for the NSI employees,
- Entrepreneurs – facilitating employees to take intermodal travels by offering or co-financing the costs of bicycle purchase; launching a platform promoting the vehicle sharing systems and its management; providing vehicles for carpooling/vanpooling users; promoting vehicle sharing systems among employees; possibly employment in one of the companies of a person performing the function of a mobility consultant,
- Carriers – provision of buspooling services; cooperation with the companies in the NSI to provide information to facilitate the functioning of the platform promoting vehicle sharing systems,
- Transport authorities – cooperation with the companies in the NSI to provide

[72] Vladut G, Mogosan A., CHUMS: Changing Habits for Urban Mobility Solutions, presented during Regio-Mob workshop, May 2017

information to facilitate the functioning of the platform promoting vehicle sharing systems,
- Regio-Mob project partner from Romania – sharing experiences from the introduction of carpooling in Craiova.

Timeframe

Establishment of vehicle sharing systems and a platform promoting its functioning: 2018-2020. The promotion of the system should be carried out continuously, with the greatest intensity after launching the platform promoting vehicle sharing systems.

Costs

The cost of building a platform to promote vehicle sharing systems depends on human and hardware (server) resources of the administrator. The costs of its establishment depend also on the functionalities and the number of tests, integration with payment systems, etc.

After consultations with specialists for Internet services, and after the initial appraisal using the web application[73], it is estimated that the costs of building such a platform with the functions described above may range between PLN 20,000 and 40,000.

In addition, building a mobile application costs about PLN 8,000-10,000. Fluctuations in costs also result from the existence of external factors, such as the possibility of access to timetables, through the integration and use of API, for example Jakdojadę [How do I get to] platform. The cost of renting a server for such a system can be small and amount to about €15-20 per month.

In summary, the costs of building a platform depend on the level of its complexity. For example – they will be smaller if it only allows passengers to find carpooling partners, and larger if it additionally offers a system of making payments so that the settlement between the driver and passenger take place without cash. The costs will also be higher in the case of integration with the public transport connections search engine or the map application for mapping the route.

The preferred method of operating the platform by telephone contact with a mobility consultant should also be taken into account – as mentioned in section 3.6.2 of the regional mobility plan, the employment costs of a mobility coordinator/consultant depend on the form of employment (full-time or part-time contract, etc.) and the type of duties performed.

In the case of the Municipal Office in Niepołomice, promotional activities carried out by the Commune may be implemented using the funds described in section 3.6.5 of the regional mobility plan.

It should be noted that the costs described above do not include the costs of the buspooling service, or any additional public transport lines that could be launched at a later stage, if a demand arises.

Source of funding

Commune's own funds, entrepreneurs' own funds.

6.4.7 Conclusions

The proper functioning of the Niepołomice Investment Zone is an important factor affecting the development of Niepołomice Commune. The process of managing the zone is a great challenge and includes, among others, solving problems related to daily commuting of employees. Nowadays, the use of modern technologies enables easy and without significant financial outlays travel to work for several thousand people a day. What's more, the introduction of innovative solutions will increase the attractiveness of the zone among

[73] http://estee.me/

potential employees and investors. The shortening of travel time will improve the time accessibility of the one what will enable to recruit employees living at further distances. In addition, the implementation of innovative solutions will make the Niepołomice Investment Zone a precursor of innovation and an example for other zones in terms of the optimal way of organizing the commuting of their employees.

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