LOCAL STRATEGY – GUIDELINES FOR POZNAŃ ŁAWICA AIRPORT LOW CARBON EMISSION LANDSIDE ACCESSIBILITY

D.T3.1.8 - Building the strategy for Poznań airport long term mobility integration into the FUA

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1. INTRODUCTION

In 2017 the City of Poznan joined the Interreg - LAirA project "Airport Accessibility". The area of research adopted in the project was the area of Poznan metropolis comprising 23 municipalities, including the City of Poznan, with over 1 million residents. At present, in Poznan strategic documents which determine the development policy on a FUA-regional scale and for the state in a holistic way are valid. They are quite general, which is why the proposed directions can be interpreted in different ways. Every local document takes into account the assumptions determined in a general strategy – policy of the whole voivodeship or the country. They contain such assumptions as: sustainable development, innovative economy, development of a widely understood transport.

On the City level:

- A Sustainable Public Transport Development Plan For The City of Poznań for 2014-2025
- Low-Emission Economy Plan for the City of Poznań adopted by Resolution No. XXV/339/VII/2016 of the City Council of Poznań of 23 February 2016
- Environmental protection programme for the City of Poznań for the years 2017-2020 with a perspective to 2024
- Development Strategy of The City of Poznań 2020+

At the regional level:

- Study of Conditions and Directions of Spatial Planning 2014
- Development Strategy for the City of Poznań until 2030
- Updated Development Strategy of the Wielkopolskie Voivodeship until 2020
- Concept of directions of spatial development of Poznan Metropolis 2015
- Integrated Territorial Investment Strategy in the Functional Urban Area of Poznan (FUA)

On a national level:

- National Regional Development Strategy
- Transport Development Strategy until 2020 with a perspective for 2030

The Sustainable Urban Mobility Plan (SUMP) is currently being developed and this strategy will contribute to this.

1.1 Aims and subject of the Strategy

The strategy aims to reduce the CO2 emissions produced by access to the airports in functional urban areas and will be included in the official legal acts of the City of Poznan in accordance with their statutory mission and in consultation with interested FUA stakeholders. The strategy will be the executive act for mobility measures within the already approved policy framework. LAirA will develop a transnational process for the implementation and transfer of its results within the CE FUA, including

macro-regional strategies. The specific objective is related to the evolution of innovative strategies in the light of agreements on visa facilitation and the development of a project (transnational strategy) transferred to CE visa facilitation agreements. The Office for Coordination of Projects and Revitalisation of the City, the Mobility Policy Division will create SUMP. The strategy will be a contribution to it in terms of accessibility of the Poznań airport. The document will come into force at the end of 2020 and will be a determinant for the city authorities in terms of development/investments.

2. METHODOLOGY OF WORK

Based on contributions from previous LAirA tasks:

- D.T1.1.2 Capitalizing Practices in Airports: Multimodal and low-carbon mobility Best practice
- D.T1.2.2 Analysis of policies and mobility plans-FUA Poznan
- D.T1.2.9 Analysis of the multimodal mobility system in the Poznan airport FUA
- D.T1.3.9 Poznan report on passengers mobility
- D.T1.4.9 Poznan report of employees mobility
- Action Plan

4 proposals for directions to improve accessibility of Ławica Airport were selected:

- proposal to create a tram line to Ławica Airport, which could be used by passengers (e.g. commuting from PKP), employees and local residents

- operation of the bus line by an electric bus and adjustment of its running hours to the shift hours of airport employees. In addition, it is also important to increase the number of bus passes from the city centre to the Airport

- building a city bike station by the Airport to encourage employees to use the free ride to work (the first 20 minutes of using the bike is free of charge) - it requires the involvement of ZTM and establishing contact with the company nextibike, which is the operator of the city bike in Poznań

- the use of electric cars in car-sharing systems and building the charging station at the airport, but this requires the airport's approval and the designation of a suitable location

While writing the strategy we mainly used the Strategy of the City of Poznań 2020+, which was adopted by Resolution No. XLI/708/VII/2017 of the City Council of Poznań of 24 January 2017. The strategic goal is: "Improving the quality of life of all residents and the role of Poznań in the international arena". The implementation of the Strategy is supported by 5 strategic priorities:

- A Strong Metropolis

- Modern entrepreneurship
- Green, mobile city
- Friendly housing estates
- Community and social dialogue.

3. BASELINE SITUATION

The international Henryk Wieniawski Poznań-Ławica Airport (IATA code: POZ, ICAO code: EPPO) is one of the oldest airports in Poland, situated 7 km west of the center of Poznań. In terms of the number of served passengers and the number of air operations, this is the 7th largest Polish airport, after Okęcie in Warsaw, Balice in Krakow, Rębiechowo in Gdańsk, Pyrzowice, Starachowice in Wrocław and Modlin. The Ławica Airport is situated in the western part of the administrative territory of the City of Poznań, only 7 km from the city center. The Airport connects Poznań with cities in Europe and around the world, and serves about 1.5 million passengers a year.

The Airport can be accessed only by road (using 307 voivodeship road – Bukowska Street). The Port is in the western part of the city, only 7 km away from the center of Poznań. Its location is presented in the figure below.

FIGURE 1 LOCATION OF THE POZNAN AIRPORT

The Airport can be accessed easily by car using the modernized Bukowska Street. The most convenient way to get to the Airport from the east and south leads through Poznań A2 motorway.

The Ławica Airport is connected with the city center by public transport. There are bus stops right in front of the passenger terminal and in its immediate vicinity. At present, there is only one bus

connection between the Airport and the city center - Line 159 - connects the Airport with Poznań Główny Railway Station in 22 minutes, and depending on the time of the day – shuttles every 15 – 20 minutes. Equally fast but more comfortable transport services are rendered by taxis.

In order to accelerate travel between the Airport and the city center, special facilities for buses and taxis have been arranged along Bukowska Street, e.g. bus-only lanes and right-of-way at intersections.

At present, the Ławica Airport is not connected with public railway transport (tram or train).

The Ławica Airport is accessible also for cyclists. Around the railway station there is bicycle infrastructure enabling people to get around using bicycles. The city center is connected with the Airport by a bicycle lane with a total length of 6.1 km, running mainly along Bukowska Street. When weather and traffic conditions are favorable, the travel time is about 21 minutes.

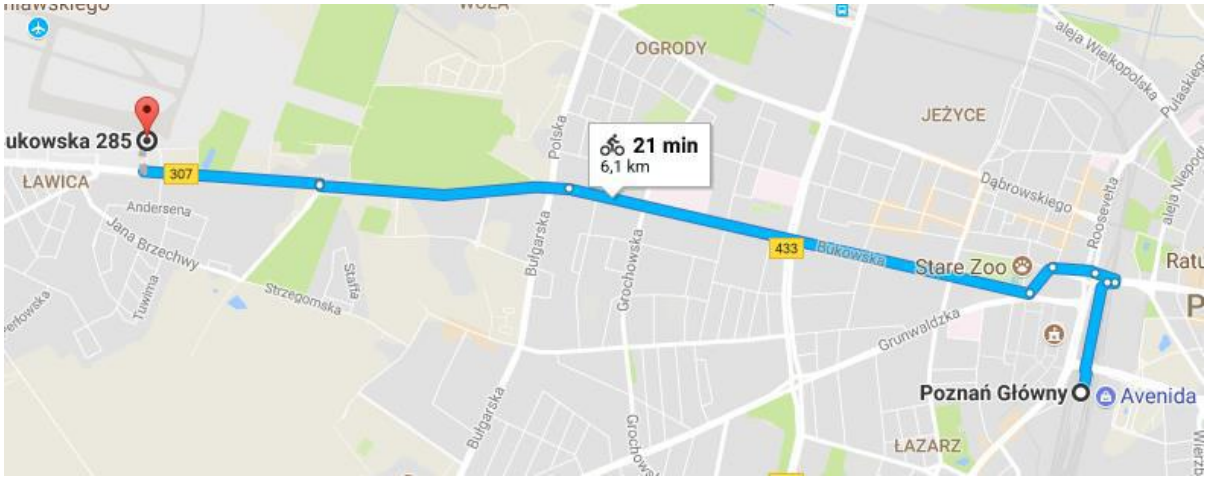

FIGURE 2 ACCESS TO THE AIRPORT BY BICYCLE

The city of Poznań has developed a car-sharing concept providing for self-service pay-per-minute car rental. It is assumed that hybrid cars will be deployed first, to be followed by electric ones. Furthermore, thanks to cooperation with Blinkee, the City of Poznań offers electric scooters which can be rented per minute using a mobile application.

Besides sharing cars and scooters, it is possible to rent a private car – the price is to be agreed in an agreement concluded with the private owner operating the sales point in the Airport lobby.

So the problem is how to get to the airport by public transport. Currently there are too few connections and the hours are not adjusted to the working hours of the employees. A advantage is the bicycle path to the airport, but there is no bicycle station directly next to the airport.

3.1. LAirA FUAs mobility plans and policies analysis

All the strategic documents determine the development policy on a FUA-regional scale and for the state in a holistic way. They are quite general, which is why the proposed directions can be interpreted in different ways. Every local document takes into account the assumptions determined

in a general strategy – policy of the whole voivodeship or the country. They contain such assumptions as: sustainable development, innovative economy, development of a widely understood transport.

TABLE 1 STRATEGIES AND PLANS RELEVANT FOR THE POZNAN FUA

Document Type	City of Poznan	FUA Poznan
Mobility/Transport	Plan for Sustainable Development of Public Transport for the City of Poznan for years 2014-2025	Coherent Parking Policy fort the Functional Urban Area of the Poznan Agglomeration - 2015
Regional Development Strategy	Study of Conditions and Directions of Spatial Planning 2014 Development Strategy for the City of Poznan until 2030	Updated Development Strategy of the Wielkopolskie Voivodeship until 2020 Concept of directions of spatial development of the Poznan Metropolis 2015
	Integrated Territorial Investment Strategy in the Functional Urban Area of Poznan (FUA)	
	Sustainable Urban Mobility Plan (SUMP)	
National Development Strategy	National Regional Development Strategy	
	Transport Development Strategy until 2020 with a perspective for 2030	

TABLE 2 STRATEGIES AND PLANS RELEVANT ON A NATIONAL SCALE

Document type	City of Poznan and Poznan FUA
Law	Regulation of the Minister of Transport on the maximum noise levels for air operations to limit the noise emitted on an airport
Strategy	Transport Development Strategy until 2020 with a perspective for 2030, 2011
Action plan	Integrated Territorial Investment Strategy in FUA Poznan Transport Plan for The Wielkopolskie Voivodeship within a timeframe until 2020

The Regulation of the Minister of Transport on the maximum noise levels for air operations to limit the noise emitted on an airport complies with the norms binding in the European Union. The "Ławica" Poznan Airport endeavors to limit noise and pays compensations to the residents of the zone for whom the acoustic climate is unfavourable. All plans concerning mobility and improvement of transport refer in a general way to the policy of the "Ławica" Airport. The assumptions that were adopted were presented in subsequent materials.

The currently binding strategic documents (especially national ones) contain very general information about FUA Poznan, which mainly relate to strengthening the competitiveness of the region on the national and continental scale. Only carrying out further modernisation, among others increasing the capacity and number of operations can contribute to the economic growth of the region, which will result being beneficial to the entire Wielkopolska Region. However, if we refer to local plans concerning in particular the area of the FUA or its capital – the city of Poznan – we will also find there general assumptions contained in the visions of supra-regional or national documents.

The records of the study and the local plan include detailed records concerning the airport itself and its adjacent areas. An even better source of information about the "Ławica" is a document called the General Plan of the airport, which was created in 2013 after a significant decrease in the number of operations and thus inflow of people to the City of Poznan. These changes were mainly caused by Euro 2012 due to the city being one of the hosts, and in June Poznan received a record number of tourists, especially from Ireland and Italy. The General Plan of the Airport contains very detailed information about air operations, carriers, interest in flight data, as well as financial issues of the company. It does not refer too much to the assumptions of urban mobility to the city centre, but relates to its improvement within its area. The completion of the LAirA project will contribute to the development of a strategy that will significantly improve the mobility of residents and employees to the "Ławica" Poznan Airport.

3.2. Analysis of the multimodal mobility system in the Poznan airport FUA

The Ławica Airport in Poznań can be easily accessed, mainly by passenger cars. This is possible due to the modernization of Bukowska Street which connects the Port with the city center and the western part of the FUA. It is particularly convenient to travel by car at night, from 10 p.m. to 6 a.m., as the traffic is light then and there are no sufficient public transport connections at that time. The City sees the need to enhance the role of public transport, which it struggles to achieve by introducing optional solutions, such as access to the Airport by train or tram. An alternative direct train route from Dworzec Główny Railway Station to the Airport would be covered in about 12 minutes. So far, a concept with a dozen or so options has been developed, but no decision has been made to date as regards the launch of the project.

In case of further modernization of the Ławica Airport (related e.g. to the extension of the infrastructure), it will be necessary to develop a long-term strategy accounting for the planned enhanced accessibility of the Airport based on low-carbon means of transport. Providing a train/tram

connection between the city center and the Airport may encourage people to use other means of transport. The development directions proposed in the final document will be consistent with other projects which are being developed.

The City faces a great deal of challenges that need to be responded to improve the mobility of passengers using the Ławica Airport. Poznan's strength is undoubtedly a number of mobile applications dedicated to public and air transport which makes travelling much easier for residents of the city. All these factors will make the city more passenger-friendly, which will be reflected in the constantly increasing number of users.

3.3. FUA reports on passengers landside mobility demand, needs ąnd behaviours

The survey allowed for learning the characteristics of passengers using the Ławica Airport, as well as exploring their opinions about services provided by the airport. In the light of the analyses carried out, the following findings should be singled out:

- Customers of low-cost airlines are most prevalent in the passenger stream, accounting for almost 60% of the total, and the remainder is equally divided between charter passengers and traditional carrier customers.
- The share of frequent-travellers is relatively low, and this percentage is significantly higher than the average among persons using the services of traditional carriers at the time of the study.
- Passengers departing from the Ławica Airport predominantly buy tickets way ahead of departure, i.e.,over a month in advance - they most often use carrier websites or travel agency services. A particularlylarge share of travel agency clients are charter flights passengers.
- Taking into account the factors determining the use of the Airport services, the main thing is whether it offers direct connections - this opinion prevailed regardless of the motives of the journey.
- Both for arriving and departing passengers, the most commonly used means of transport is a passenger car. However, the share of public transport is higher among those arriving than departing.
- For people declaring their willingness to use a bicycle, it would be an attractive option to locate a City Bike Station next to the Terminal, from which short-distance commuters with hand-luggage only can use it. It should also be noted in this context that the survey conducted among airport employees demonstrated that City Bike could be an attractive alternative way of travelling to work for people living near the airport
- Passengers declare a relatively high level of familiarity with alternative forms of transport, and display an especially high brand awareness.

- The idea of introducing a railway connection to the airport terminal was very popular - 76% of respondents declared their readiness to use such a solution. This way of accessing the airport would not only be faster, in particular to those passengers commuting from outside of Poznań, but it would also be cheaper than the car access. It should be noted that the popularity of this solution is significantly higher among passengers (76%) than airport employees (62%).
- The mobile applications that are used most often by the respondents are Uber and Jak Dojadę. None of the other options turned out to be very popular. In the case of the application dedicated to the Ławica Airport there is a clear contrast between a general interest in and a relatively low level of the actual use of the existing Poznań Airport Guide application. Among the answers to the question, the most popular one was "other", which relates to the fact that the respondents also use other popular mobile applications other than the ones mentioned in the cafeteria, like e.g. Google Maps.

3.4. FUA reports on airports employees mobility needs and behaviours

When summarizing the results of surveys conducted among the employees of the Poznań-Ławica Airport, it can be concluded that the car is the main means of transport to the workplace. Modern road infrastructure of Bukowska Street certainly makes it easier for people to travel by car. Bus availability is partly a problem. Dedicated bus lanes are only present along a certain section on the way to the airport, which is why buses report regular delays at the final stop. Restoring the "L" express line, which was passing the test, may also contribute to the improvement of the airport's accessibility. With regard to cycling, it is commonly accepted that a distance of up to 5 km is not a problem for cycling; the lack of sufficient technical infrastructure in the form of cycling paths constitutes a barrier through which it is difficult to convince people to change e.g. from a passenger car to a two-wheeled vehicle. During subsequent meetings with stakeholders where the results of the study will be presented for both employees and travellers, we hope that the resulting discussion will indicate problem areas and possible solutions.

3.5. Potentials

Based on the above-mentioned documents, the potential for low-carbon airport accessibility has been defined.

Electromobility for the airport - electric airport buses (delivering passengers to planes). This requires an appropriate infrastructure - building an electric charging station. Moreover, passengers and employees can use electric cars or hybrids currently available in the carsharing offer.

Bicycle access is also provided by bicycle infrastructure - the airport can be reached from the city centre by a bicycle path.

3.6. Problems and challenges

Problem of low C02 mobility for Poznan Airport is not very developed public transport. The introduction of faster bus lines requires the development of infrastructure (construction of bus shelters) and the purchase of electric buses so that they do not produce large amounts of exhaust fumes. There is also a lack of a tram line and a city bike station at the airport.

The challenge is to encourage people to change means of transport. They are not convinced by environmental issues, but by economic issues. People are more likely to change means of transport if they see a financial benefit in it. Advertising campaigns are needed to promote green commuting.

4. VISION AND OBJECTIVES

Based on local analysis, the following objectives have been identified:

- Objective 1 – passengers and airport employees cycle to the airport
- Objective 2 – connection of the airport with a tram line
- Objective 3 – operation of the line to the airport by electric buses
- Objective 4 – airport access by car-sharign/electric cars

5. INTERVENTIONS/INVESTMENTS

5.1. Interventions and investments

Objective Title: Passengers and airport employees cycle to the airport	Objective Number: 1
Intervention/Investment: Placing a city bike station at/near the Ławica Airport	**Intervention/investment number: 1.1**

Origin of the action:

◯ Transfer (x) New Concept ◯ Other

Action description - What will be done.

On the basis of the Business Model Canvas analysis conducted together with airport employees, we have identified the following values:

Value:

- Green access to the airport regardless of the volume of traffic on the road
- Reducing costs
- Environmental protection
- Noise reduction
- Healthy attitude
- Convenience (in particular compared to congested public transport, especially in summer without air conditioning)
- Flexibility - no timetable
- Faster than on foot
- Freedom of movement
- Attractive price
- Availability (many docking stations, 4th generation bikes)
- Short travel time when there are traffic jams
- No need to service your bike

For whom:

- Residents of the city of Poznań
- Airport staff

- Residents of the area
- Existing Nextbike users
- Passengers/tourists without baggage
- Persons picking someone up from the airport
- Existing road users

Actions:

- Establishing cooperation with identified partners
- Calculation of demand and costs
- Engaging in discussions with the airport on a contribution to the costs of building and operating the station
- Arrangement with the Airport and Urban Road Administration location of the station
- Building the station
- Real dialogue with customers
- Public consultation
- Organization of events promoting cycling to the airport
- Engaging in discussions with the airport about the possibility of building showers for airport employees
- Marketing
- Public consultation
- Negotiations with Nextbike

Technologies & solutions:

- Financial resources for IT service (website)
- Financial resources for marketing services
- Know-how (application, administrative support)
- Poznan City Hall employees
- System operator
- Accepted agreements/permits
- Location

How to encourage people to use:

- The application must work smoothly and be intuitive.
- Notification of exceeding free riding time
- More bicycles and stations
- Good technical condition of bicycles
- Improving bicycle comfort by building a shower at the airport
- After-sales service (user satisfaction survey, analysis of user preferences)
- Quick phone/email/application support
- Free rides, discounts
- Discount coupons
- Loyalty programs
- The process is automated (application)

Promotion:

- Internet: website of the city and airport, social media, newsletter, mailing,
- Advertising in trams, buses, taxis
- Advertising in the local press, radio and TV
- Billboards at the airport
- Social campaigns
- Health Fair
- Bike advertising
- Notifications in the application
- Information at stations
- Social campaigns

Minimum viable action

Must have:

- Calculation of demand and costs
- Engaging in discussions with the airport on a contribution to the costs of building and operating the station
- Arrangement with the airport and Urban Roads Administration about the station location
- Station building
- Negotiations with Nextbike

Should have:

- Engaging in discussions with the airport about the possibility of building showers for airport employees
- Marketing
- Public consultation
- Promotion

Could have:

- Real dialogue with customers
- Organization of events promoting cycling to the airport
- Establishing cooperation with identified partners

Responsibility - Who will implement the action?

- Airport - the action will be addressed to its passengers and employees, location of the station
- Urban Road Admistration - permission to use the road/rental of land for locations
- Urban Transport Administration - City Bicycle Service
- Nextbike- city bike operator
- IT companies - process improvement
- Companies involved in spatial planning - station location
- Marketing companies - promotion
- Companies operating at the airport - encouraging participation
- Health promoting organisations - encouraging to use
- Partners offering free travel from the airport by bicycle in addition to their products/services

Estimated budget and resources

Costs:

- Equipement
    - Costs of purchasing bicycles
- Procurement
    - Contribution to station construction costs
- Staff
    - Staff costs

- Other costs
    - Costs of station location designation
    - Costs of application administration
    - Service, call center service
    - Marketing costs
    - Discounts and promotion costs

Resources:

- Toll payment
- Nextbike fee
- Bicycle advertising
- Bicycle damage
- Leaving the bike out of the zone

Measuring success
We would like to increase the number of people commuting to the airport by bicycle - we will measure the number of bicycle rentals at the city bicycle station
Timeline - Start and end dates
Pilot station setup can be planned for 2021 (one year, city bike is open from March to October)
City/region vision and beyond
The activities will be part of the strategy for the whole city and will contribute to the development of the city bicycle.

Objective Title: **Connection of the airport with tram line**	**Objective Number: 2**
Intervention/Investment: Building tramway line	**Intervention/investment number: 2.1**
Origin of the action: ◯ Transfer (x) New Concept ◯ Other	
Action description - What will be done.	
On the basis of the Business Model Canvas analysis conducted together with airport employees, we have identified the following values: Values:	

- Travel comfort (e.g. air conditioning, low floor)
- Shortening the arrival time
- Reduction of transport costs
- Punctuality of the journey
- Travel safety
- Predictability of the service (according to the timetable)
- Reduction of pollutant emissions
- Social attitudes towards environmental protection
- Efficient use of time during the movement (work, book, news, other)
- Diversification of forms of access
- Frequency and timing
- Independence from your own vehicle (e.g. need to look for parking spaces, etc.)
- Possibility of transporting large dimensions (e.g. luggage, bicycle)

For whom:

- Airport staff
- Airport passengers (charter passengers during summer and others)
- Inhabitants of Poznań and its surroundings (e.g. Bajkowe estate, Przeźmierowo municipality)
- Employees of other companies
- Pupils and students
- Pensioners (doctor's access)
- Users of future buffer parking facilities

Actions:

- Cost-benefit analysis
- Public consultations - presentation and acceptance of the project by e.g. Settlement Councils
- Resolution of the City Council
- Acquisition of funds
- Project development
- Line construction
- Launch of the investment (employment, purchase of rolling stock)
- Integration of timetables (for employees, other means of transport, etc.)

- Information campaign

Technologies & solutions:

- Financial resources for the project, its implementation and fleet purchase
- Modern and comfortable fleet (e.g. USB ports, air conditioning, low floor, etc.)
- application with up-to-date timetable
- Information boards (on-line) at bus stops
- Human resources required for the implementation of the project

How to encourage people to use:

- More affordable fares for airport staff
- Loyalty programs
- Vouchers from the employer for coffee, breakfast, etc. for the use of the tram
- Free transportation for air ticket holders

Promotion:

- Whispered marketing
- Internet services (airport, city, MPK, other)
- Urban Transport Company - visual advertisement in vehicles and at bus stops, text message,
- Bilboards
- Traditional media (press, TV, radio) and social media (FB, Instagram, Twitter)
- Settlement councils (information boards, local press)
- Visual information at the airport and railway station
- Information leaflets in housing estate stores, mailboxes

Minimum viable action

Must have:

- Public consultations - presentation and acceptance of the project by e.g. Settlement Councils
- Resolution of the City Council
- Acquisition of funds

- Project development
- Line construction
- Launch of the investment (employment, purchase of rolling stock)

Should have:

- Cost-benefit analysis
- Integration of schedules (for employees, other means of transport, etc.)

Could have:

- Information campaign
- Promotional campaign

Responsibility - Who will implement the action?

- MPK or other operator in the future - tram operator
- ZDM, ZTM - road and transport management in the city
- Airport authorities - agreement on the location of the stop
- Neighbouring villages, Municipalities (e.g. Przeźmierowo, Tarnowo Podgórne) - co-financing of investments
- Poznań City Council - adoption of the tram construction project
- Councils of neighboring housing estates - residents - social consultations
- Designer - route design
- Contractor - construction of the route
- Construction companies - route construction
- Financing institution - sponsor
- Tram manufacturer - delivery of vehicle fleet
- PKP S.A. - start of the route from the main railway station
- Pro-ecological institutions (NGOs) - promotion
- Landowner - permits for the construction of the route
- Architectural companies (design) - route and bus stops design (e.g. Green)

Estimated budget and resources

Costs:

- Equipement

- Purchase of a fleet of trams

- Procurement
  - Project, permissions, approvals
- Staff
  - Increased employment related to the construction and operation of lines (tram driver, City Hall employee)
- Other costs
  - Costs of land repurchases
  - Advertising Campaign
  - Social costs
- Subcontracting
  - Construction and maintenance of the line

Resources:

- One way and commutation ticket
- Advertising on trams (travel agencies, airlines, other cities and holiday regions)
- Advertising in vehicles (monitors, posters)
- Advertising on tickets
- Renting a tram (events)
- Thematic stops (sponsored)
- Buffer parking fees
- Advertisements in applications
- Automatic vending machines in vehicles and at bus stops (water, snacks, etc.)
- Free wifi in vehicles for residents, paid by visitors

Measuring success

In order to build another tramway route, it is necessary to first carry out analyses, social consultations and functional and spatial projects. In case of realization of the investment, the profit from the tickets sold on this route can be counted.

Timeline - Start and end dates

The construction time of the route from the moment of booking funds for the construction by the City to the opening of the route is 6 years.

For example:

- 2020 The City of Poznan reserves the budget for investment

- 2021 Functional and utility project implementation procedure

- February 2022 Documentation Receipt - May 2022 Tender for the General Contractor of the investment - November 2022 Signing of the contract with the General Contractor - December 2022 Start of execution of the investment. - December 2025 Finishing of construction works - May 2026 Acceptance of the construction investment
City/region vision and beyond
These activities would lead to the implementation of the Strategy of the City of Poznan 2020 +. They would also make it possible to increase the attractiveness and efficiency of public transport and to make use of the city's transport potential.

Objective Title: **Operation of the route to the airport by electric buses**	Objective Number: **3**
Intervention/Investment: **Servicing of the bus line arriving at the airport by electric vehicles and adjustment of driving hours to the shifts of airport employees**	Intervention/investment number: **3.1**
Origin of the action: ◯ Transfer ◯ New Concept (x) Other	
Action description - What will be done.	
On the basis of the Business Model Canvas analysis carried out together with airport employees, we have identified the following values: Values: • Travel time (buspas) • Financial savings • Correlation with working time • Ecology • Congestion • Additional services (usb etc., air conditioning) • Fuel economy	

- Comfort (also psychological)
- Free Internet
- Efficient use of time during the movement (work, book, FB, other)

For whom:

- Airport staff
- Employees of partner companies and neighbouring companies
- Passengers (arriving at the airport)
- Residents of the city and neighbouring municipalities
- Airport tours
- Airline crews
- Pupils of local schools
- Spotters

Actions:

- Interactive boards with arrival timetable
- Integration of schedules with working time of employees
- Obtaining projects co-financing e.g. from cohesion funds
- BUS lane, construction and operation
- Public consultation
- Competitions for research work
- Mobility strategy of the City of Poznań
- Cooperation between the Airport and the City
- Promotional campaigns

Technologies & solutions:

- Information at the airport
- Inside information for employees at the airport
- Coordinator of the airport's activities with UTC
- funds

How to encourage people to use:

- Good service (reliability)
- Punctuality
- loyalty programs
- vouchers
- Discounts for employees
- Efficient passenger information system

- Compensation for delays
- Reliability
- Possibility to leave the bike at the bus stop

Promotion:

- Application with current data
- Information boards at the airport
- Port's website
- Buses carrying passengers to an aircraft
- Advertising on airplanes
- By employers
- Social media
- Television
- Timetables at workplaces

Minimum viable action

Must have:

- Obtaining projects co-financing e.g. from the cohesion funds
- Cooperation between the Airport and the City
- Purchase of an electric bus

Should have:

- Interactive boards with arrival timetable
- Integration of schedules with working time of employees
- BUS lane, construction and operation
- Public consultation
- Mobility strategy of the City of Poznań

Could have:

- Competitions for research work
- Promotion

Responsibility - Who will implement the action?

- Urban Transport Company - operator
- Urban Road Administration - construction of bus lanes
- ENEA - the supplier of charging infrastructure

- Bus manufacturers - delivery of an electric bus
- Poznan City Hall - promotion
- Urban Transport Administration - application for co-financing
- Advertising agencies - promotion
- Airport - stops at the airport area
- Airlines - discounts on bus travel + flight
- Local and municipal authorities - cooperation in creating a timetable

Estimated budget and resources

Costs:

- Equipment
    - Chargers
    - Electric buses
- Subcontracting
    - Bus belt construction
    - Construction of bus stops with bicycle parking lots
- Other costs
    - Information system
    - Advertising in workplaces, schools
    - Investments in information system and applications
    - Promotion
- Staff
    - UTC employees

Resources:

- Bus tickets
- Advertising
- Travel agencies, airlines
- Funds for infrastructure development
- Paid applications

Measuring success

Construction of bus infrastructure (bus lanes, bus stops). The effects of increasing the number of passengers after the introduction of changes (currently the line is operated by regular buses, and the bus lanes are only a part of the route) can be counted from the income from tickets on this route.

Timeline - Start and end dates
Until the end of 2019, electric buses will appear on the streets of Poznan.
City/region vision and beyond
Implementation of solutions ensuring fast, punctual and efficient public transport in the city will contribute to increasing the attractiveness and efficiency of public transport and using the city's transport possibilities. The construction of road infrastructure improving the quality of the transport system and the functioning of public transport will contribute to the reduction of car traffic in the city centre.

Objective Title: **Access to the airport by car-sharing/electric cars**	Objective Number: **4**
Intervention/Investment: **Building electric charging station at the airport**	Intervention/investment number: **4.1**
Origin of the action: ◯ Transfer (x) New Concept ◯ Other	
Action description - What will be done.	
On the basis of the Business Model Canvas analysis carried out together with airport employees, we have identified the following values: Value: • Service: comfortable access to the airport with luggage at a competitive price compared to alternative solutions • Convenient transport of luggage • Independence from weather conditions • Independence from the timetable of the MPK • No problems with parking at the airport - designated free of charge parking spaces for the user • Travel comfort • Eco-friendly driving • Speed of the ride (bus-pass option) For whom:	

- Passengers arriving at the airport
- Airport staff
- Residents settled in the surroundings of the airport

Actions:

- Needs analysis - whether there will be users
- Signature of contracts
- Construction of charging stations

Technologies and solutions:

- External experts to carry out feasibility studies
- Financial resources for parking operators' fees, information campaigns
- City Hall employee responsible for organizing this form of transport, maintaining relations with partners and current analysis of the effects and implementation of indicators

How to encourage people to use:

- Airport staff shall benefit from special conditions
- Residents of nearby housing estates can receive loyalty discounts for frequent visitors.
- Travellers can purchase packages or receive vouchers for charging (in consultation with PKP and travel agencies)
- Easy and safe charging service

Promotion:

- Airport website
- City Hall website
- Advertisements and information materials at railway stations and travel agencies
- Video displayed at the airport and on buses delivering to the aircraft
- Dedicated information for airport employees
- Radio advertising campaigns
- Social media

Minimum viable action

Must have:

- Signature of contracts
- Construction of charging stations

Should have:

- Needs analysis - whether there will be users

Could have:

- Promotion

Responsibility - Who will implement the action?

- Airport authorities - permission to build a charging station
- Company operating parking lots around the airport - station location
- Travel agencies - information about the possibility of charging cars
- - ENEA or another energy supplier - connection of charging stations

Estimated budget and resources

Costs:

- Equipment
    - Charging station
- Procurement
    - Signature of contracts
- Subcontracting
    - Construction of charging stations
- Other costs
    - Needs analysis - whether there will be users

Resources:

- Fees from partners - travel agencies, PKP, other railway operators
- Subscriptions to airport staff

Measuring success

Increase the share of electric cars in road traffic.

Timeline - Start and end dates

By the end of 2020, 200 charging points for electric cars will have been established in Poznan.

City/region vision and beyond

Increasing the use of environmentally friendly means of transport, improving road safety and supporting the development of electromobility will contribute to the overall development of FUA eco-mobility.

Objective Title: **Access to the airport by car-sharing/electric cars**	Objective Number: **4**
Intervention/Investment: **Using carsharing system to get to the airport**	Intervention/investment number: **4.2**

Origin of the action:

◯ Transfer (x) New Concept ◯ Other

Action description - What will be done.

On the basis of the Business Model Canvas analysis carried out together with airport employees, we have identified the following values:

Value:

- Service: comfortable access to the airport with luggage at a competitive price compared to alternative solutions
- Convenient transport of luggage
- Independence from weather conditions
- Independence from the timetable of the MPK
- No problems with parking on site - designated free parking spaces for car-sharing are available for the user
- Travel comfort
- Eco-friendly transport
- Shareability
- Travel voucher from a travel agency selling an air ticket

For whom:

- Passengers arriving at the airport
- Airport staff
- Residents settled in the surroundings of the airport

Actions:

- Needs analysis - whether there will be users
- Undertaking talks with car-sharing operators
- Definition of indicators for which car-sharing to the airport remains a periodical pilot and for which it is a permanent fixture

- Formulating draft partnership agreements with car-sharing operators, partners and the airport parking operator
- Signature of contracts
- Construction of charging stations
- Development of an information campaign in cooperation with car-sharing operators

Technologies and solutions:

- External experts to carry out feasibility studies
- Financial resources for fees for car-sharing, parking, information campaigns and car-sharing operators
- City Hall employee responsible for organizing this form of transport, maintaining relations with partners and current analysis of the effects and implementation of indicators

How to encourage people to use:

- Airport staff shall enjoy special conditions
- Residents of surrounding housing estates can receive loyalty discounts for frequent visitors
- Travelers can purchase packages or receive travel vouchers (in consultation with PKP and travel agencies)
- Quick automatic operation via application

Promotion:

- Airport website
- City Hall website
- Website(s) of car-sharing operators
- Advertisements in mobile applications of airports and car-sharing companies
- Advertisements and information materials at railway stations and travel agencies
- Video displayed at the airport and on buses delivering to the aircraft
- Dedicated information for airport employees
- Radio advertising campaigns
- Social media

Minimum viable action

Must have:

- Undertaking talks with car-sharing operators

- Drafting of partnership agreements with car-sharing operators, partners and airport parking operators
- Signature of contracts

Should have:

- Definition of indicators for which car-sharing to the airport remains a periodical pilot and for which it is a permanent fixture

Could have:

- Development of an information campaign in cooperation with car-sharing operators

Responsibility - Who will implement the action?

- Companies operating car-sharing in Poznań - operator
- Airport authorities - Parking spaces
- Company operating parking lots around the airport - parking spaces
- Travel agencies - discounts on carshairng
- Rail operators - carsharing discounts

Estimated budget and resources

Costs:

- Procurement
    - Draft partnership agreements with car-sharing operators, partners and airport parking operators
    - Signature of contracts
- Subcontracting
    - Undertaking conversations with car-sharing operators
- Other costs
    - Needs analysis - will there be users
    - Definition of indicators for which car-sharing to the airport remains a periodical pilot and for which it is a permanent fixture
    - Development of an information campaign in cooperation with car-sharing operators

Resources:

- Fees from partners - travel agencies, PKP, other railway operators
- Subscriptions to airport staff

Measuring success

We would like to increase the share of shared cars. One car-sharing car can replace between 7 and 11 private cars, which is due to the fact that on average the private car is used for 1 hour a day and the car-sharing car even up to 10 hours. It is possible to check the statistics of car rentals in the airport area.
Timeline - Start and end dates
City/region vision and beyond
Increasing the use of ecological means of transport, improving road safety and supporting the development of electromobility will contribute to the overall development of FUA eco-mobility.

6. SUMMARY

Vision: *Low carbon emission access to Poznan Airport*				
objective	**Intervention/investment title**	**Responsible**	**Budget**	**Timeline**
Passengers and airport employees cycle to the airport	Placing a city bike station at/near the Ławica Airport	City of Poznan	25 000 €	
Connection of the airport with tram line	Building tramway line	City of Poznan	80 000 000 €	
Operation of the route to the airport by electric buses	Servicing of the bus line arriving at the airport by electric vehicles and adjustment of driving hours to the shifts of airport employees	City of Poznan		
Access to the airport by car-sharing/electric cars	Building electric charging station at the airport	City of Poznan	30 000 €	
	Using carsharing system to get to the airport	City of Poznan	Depends on operator 0,3-0,4 €/min	

The development of a LAirA document under the name of a long-term strategy taking into account the planned development of the airport's availability based on low-emission means of transport will be a material that will contribute to many changes. Precise analyses of the arrival of employees, as well as passengers to the airports, as well as a study of traffic flows, allowed for a performance of economic analyses in terms of investments such as an airport connection with the Metropolitan Railway or tram line (which seems to be an unlikely option due to costs).

Analysing the collected information, a horizontal analysis of the considered variants was made, analysing their impact on urban logistics, development and feasibility of each of the projects.

Suggested target group of users of particular transport solutions is much wider than just airport passangers and employees. Among permanent employees, there were also included airline crews, who today often have dedicated buses collecting them from the city centre after the so-called "overnight stay" of the aircraft at the airport. The number and variety of target segments to which the offer could be addressed is so wide that it has an impact on the assessment of each of the analysed means of transport.

The analysis of the value brought by individual solutions significantly differentiates them, even in the case of trams and electric buses, which are similar to trams in terms of their functionality, (but only if they use dedicated bus-buses). In the current shape of the street network, bus lanes can only be found along a very limited number of streets (e.g. fragments of Bukowska street in both directions). Car-sharing is an option for people who value freedom and independence of movement. It benefits from the development of a fleet of car-sharing companies in Poznań with electric cars and the creation of car-sharing parking spaces at the airport parking lot. This requires time and compliance with certain procedures by the City and investment in the fleet by the operators, which is already taking place in several Polish cities (e.g. Innogy Go in Warsaw launched 500 electric BMWi3 cars in April). In the off-winter season, with reference to airport employees and companies connected with the airport, commuting by bicycle to work is a very good idea, also referring to the aspect of independence, but also to care for the environment, time and finances.

All of the analysed means of transport require the promotion of their benefits. In the case of traditional transport (tram, electric bus), the City of Poznań is responsible, while in the case of car-sharing, the marketing aspect of services depends on the service provider - the operator. The same applies to the costs of launching individual projects. Definitely the most expensive and organisationally demanding at the stage of planning, preparation and construction is to start a tram.

The business model also included an analysis of possible incomes that could be generated during the use of particular transport solutions. Car-sharing has a very precise target segment and financial indicators to be achieved by the market participants. In the case of a bicycle, bus or tram, incomes rarely counterbalance expenditures, but non-financial benefits, e.g. reduced carbon footprint or reduced congestion, are significant. In addition, considering the current legislation on electromobility and tackling traffic-based pollution, these are important issues that need continuous improvement.

A valuable analysis has been developed which can be used to estimate the impact of the involvement of resources in solutions improving access to the local airport. Eleven evaluation criteria were used and scores ranging from 1 (the best solution in a category) to 4 (the solution with the lowest score in a category) were set.

	The evaluation criteria	**City Bike**	**Tram**	**Electic bus**	**Car-sharing**
1	Cost of implementing the solution	2	4	3	1

	The evaluation criteria	City Bike	Tram	Electic bus	Car-sharing
2	The level of complexity of the solution (speed of implementation, resources, procedures)	1	4	3	2
3	Public response	3	1	2	4
4	Environment-friendly (impact on emissions, noise, etc.)	2	3	1	4
6	Flexibility of the solution (possibility of pilotage)	2	4	3	1
7	Number of potential users	3	1	2	4
8	Territorial coverage of the service	3	1	2	4
9	Reputational effect for the city and the airport	3	2	1	4
10	Flexibility of the solution (baggage transport possibility)	4	3	2	1
11	Relationship potential with partners	1	4	3	2
12	Socio-economic benefits	3	2	1	4
13	Side effects	1	4	3	2
14	External costs	1	4	2	3
TOTAL SCORE		**29**	**37**	**28**	**36**

The analysis clearly shows that despite the expected significant impact on the reduction of congestion, launching a tram line is the least preferred solution, followed by car-sharing, which despite the ease of implementation, independence and a significant level of comfort does not solve the important problems of city residents and airport employees. The situation is different in the case of an electric bus, which seems to be at the other end of the road - a city bicycle, which has gained favor among the employees of the Poznan airport. However, the winner was an electric bus, which is a relatively inexpensive, mass solution, which does not require any expensive infrastructure (e.g. bus-pass and charging stations) in compared with a tram. In case of a quick implementation of this solution, the image of the city will definitely gain, and both employees/passangers of the airport and the companies associated with it, after adjusting the timetables to their working hours, will commute to work efficiently. It is also important to note that line 159, going to the airport, is already moving on the bus lanes, and its electrification was indicated in the strategic documents of the City.