

## ACTION PLAN FOR BKK BUDAPEST CENTRE FOR TRANSPORT IN BUDAPEST (HUNGARY)

<b>DELIVERABLE D.T1.2.3</b> ACTION PLANS FOR NEW INNOVATIVE LOW-CARBON MOBILITY SOLUTIONS & IMPROVED AIR QUALITY IN FUA	<b>FINAL</b> 05/2022
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Project index number and acronym	CE1671 DYNAXIBILITY4CE
Lead partner	PP1 - Leipzig Transport Company (LVB)
Deliverable number and title	D.T.1.2.3 - ACTION PLANS FOR NEW INNOVATIVE LOW-CARBON MOBILITY SOLUTIONS & IMPROVED AIR QUALITY IN FUA
Responsible partner(s) (PP name and number)	PP6 - BKK PP4 - Redmint PP2 - RC
Project website	<a href="https://www.interreg-central.eu/Content.Node/Dynaxibility4CE.html">https://www.interreg-central.eu/Content.Node/Dynaxibility4CE.html</a>
Delivery date	06/2022
Status	Final version
Dissemination level	Internal

Document history of revisions			
Date	Name	Action	Status
28/01/2022	Daniel Franco, Rupprecht Consult	Structure and brief content description	Template
30/05/2022	Miklos Gabor Banfi, BKK	Full description of actions	Draft
13/06/2022	Miklos Gabor Banfi, BKK	Final version	Final
24/06/2022	Gabriele Grea, Anja Seyfert, Redmint	Final check	Final



## Development of action plans for new innovative mobility solutions & improved air quality in FUAs

The objectives of the Dynaxibility4CE project are twofold: on one hand, to make mobility trends sustainable, on the other hand, to elaborate a MaaS (Mobility as a Service) master plan. In addition to Budapest and Leipzig (lead partner), Parma, Krakow and Stuttgart are participating in the two-year project. To carry out the tasks, BKK utilises the results of some of its projects (SUNRISE, Cities4People, community design workshops), but first and foremost relies on the pilots and their results of the MaaS4EU project and on the basis of the experience gained, elaborates a MaaS master plan (action plan), which contains the steps to business-based operable MaaS services in Budapest. On the different levels of the action plan, among others, the stakeholders involved on a given level, the time schedule, the technical description and also the financial background and business model of the service are specified. With regard to Budapest, the project result is an elaborated action plan, which can be directly used to create and operate an integrated transport service platform in Budapest.

The action plan was developed parallel with the integrated mobility application of BKK, called BudapestGO. As the frontend of the MaaS ecosystem to be established in Budapest, this application's development plan contains:

- BKK's mobility as a service strategy plan (developed in Dynaxibility4CE project);
- the assessment of infrastructure and tools needed to implement the desired functionality;
- assessment and development of regulation and policy tools for Budapest Municipality in order of harmonisation
- enhancing stakeholder engagement (reaching out to potential customers, 3<sup>rd</sup> party service providers, researchers, communication experts, etc.)
- detailed technical specification of desired functions identified during the action plan development process.



## Executive Summary

BKK as the mobility manager of Budapest is responsible for all modes of transport, all travellers and for sustainable urban mobility, and planning according to the SUMP, the Budapest Mobility Plan (BMT). In the BMT integration is a key concept when defining strategic objectives, in addition the city leadership (Municipality of Budapest, Directorate of BKK) supports the integration approach in the field of mobility. Budapest already has experience in integration in public transport, having run projects focusing on integrated electronic ticketing, mobile ticketing and a mobility-as-a-service pilot integrating more mobility service providers.

Budapest has an extensive public transport network, many shared mobility services and various mobility service operators. To reach the set-up modal-split goals in 2030, Budapest has to develop an integrated system that supports sustainable transport modes and makes it easily accessible for citizens. BKK joined the Dynaxibility4CE project and started to develop a MaaS action plan (launched the Digital Transport Organizer and Settlement System project to establish an integrated, digital financial and accounting background system for digital transport solutions, to realize the objectives). The process has many challenges including technical and organizational issues.



## 1. Introduction

The goal of this document is to establish a clear strategy plan for future development of mobility as a service activities of BKK. BKK is aiming to provide a MaaS ecosystem in Budapest, where public transportation is the core of service and other 3<sup>rd</sup> party providers offers their solutions to establish a net-zero transport opportunity for customers.

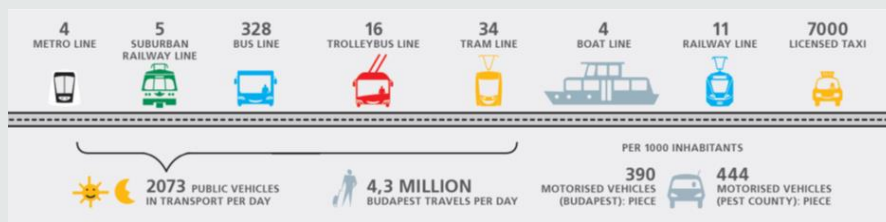
BKK already launched its MaaS application, BudapestGO although with limited additional functionalities towards free mode-choice. However, further development targets the introduction of such services as shared micromobility, shared cars and even taxis within this ecosystem.

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## 2. Planning and policy framework

As BKK is responsible for Budapest's mobility management, they were included in several integration and digitalisation endeavours (ITS, BMT - Budapest SUMP, BKK internal strategy development, in line with EU policy).

Budapest has an extensive public transport network, with 4 Metro, 5 suburban railway, 328 bus lines, 16 trolleybus lines, 34 tram and 328 bus lines, 16 trolleybus lines, 4 boat lines, 11 railway lines. These lines are transporting 4.3 million passenger every day. The distance based modal share of public transport within the city borders of Budapest is around 40-45%, while the goal for 2030 is to reach 50%, so the further development and optimization of the public transport network is necessary to reach this goal.



Distance based Modal split of Budapest:





The main actors and stakeholders in Budapest are:

- Budapest Municipality and municipalities of the 23 districts of Budapest, municipalities of the functional urban area (approx. 3.5 million inhabitants)
- MaaS operator (if it is not the BKK itself)
- Customers
- Mobility service providers (train and suburban bus providers, shared mobility providers)

Currently, there are no official initiatives for mobility as a service in Hungary, but as BKK acts as mobility expert for Budapest Municipality, regulation can be influenced by international standards assessed in research and development projects. However, there are some regulation processes which can be mentioned:

- National Mobile Payment System (NMFR): there is uncertainty about the coverage of legislation, the role of NMFR is questionable;
- No micro mobility, sharing regulation and monitoring exists, only cooperational Codex. (data provision, zone establishment, pricing model, the contribution of the vehicle fleet, API provision, keeping the given behavioural norms) - shared micro mobility regulation is under development in cooperation of BKK, Budapest Municipality and municipalities of the 23 districts of Budapest;
- Mode based regulation is under development: AMS, car-sharing, taxi concept

BKK would like to implement initiatives identified from good practices throughout Europe (Amsterdam, Graz, Helsinki, London, Vienna):

- Create the right regulatory framework to promote MaaS
- Build up institutional and policy integration
- Build the eco-system: set-up participative processes that include public and private actors, research institutes and customers to encourage all actors to draft a code of conduct.
- Ensure public transport and active mobility options are at the centre of any MaaS solution. As mass public transport is the backbone of the urban mobility ecosystem, it is a key success factor of all MaaS models.
- Data reciprocity & protection: data is key. Impose data protection and data reciprocity to the MaaS providers to enable the optimisation of the urban mobility system. Aggregated, anonymised usage data (including demand data such as origin-destination requests) is to be shared in a reciprocal way with PTA's, PTO's and other mobility providers.
- Make use of the data from any MaaS operation to optimise the urban mobility offer.



### 3. Key results and findings

The aim of BKK's MaaS Action Plan is to define MaaS functionality to be achieved within the service groups and their implementation schedule. Additionally, identification of infrastructural, regulatory and procurement preconditions is essential for any strategic plan.

The development of BKK's MaaS Action Plan identified the following essential steps to be included in the process:

#### Preparation:

- Preparation and situational analysis
  - Shaping the working structures, establishing the MaaS work team, aligning the internal developments
  - Selecting the members of each working group (leader, MaaS responsible, technical staff)
  - Defining the planning framework
  - Analyzing the mobility situation in Budapest
  - International experience
- Introducing the benefits of the MaaS conception with the Directorate
  - MaaS-themed Balázs Mór-Klub (panel discussion of internal and external experts)
  - Presentations and discussions with the Directorate in the topic of MaaS
  - Presentation in the Municipality of Budapest as the main regulation body
- Aligning the internal developments
  - Futár+ (BudapestGO) development, e-ticket conception, Mobile ticket, CRM alignment
  - using R&D resources (e.g. Dynaxibility4CE)
  - Introducing the pilot experience of MaaS4EU to the members of working groups, to the Directorate and the Municipality of Budapest
- Defining the regulatory and legal frameworks and opportunities
  - Analyzing the city-level competence opportunities of Budapest (regulation, codex, appearance insurance, positive incentive)
  - Data protection and security legislations, the rights of clients
  - Exploring the additional regulatory framework
  - Analyzing the opportunities about the law related to the National Mobile Payment System

#### Strategy planning:

- Establishing and evaluating future scenarios (scenarios and ecosystem)
  - Establishing and evaluating a scenario in Budapest
  - Selecting an ecosystem with the involvement of the residents and the stakeholders (data platform, data integrator function)
    - The plan established for the involvement of stakeholders and residents gives the basis of the active involvement of the above-mentioned ones and decision makers in terms of structuring the MaaS ecosystem. It also promotes in the education of the system and in shaping the local future visions. Participants of the public and private sectors, research institutes, and participatory processes involving customers should be encouraged to discuss elements, like the sharing of risk, profit, data management models, supportive and incentive frameworks. This process might result in shaping a commonly created behavioral codex.



However, to encourage all key participants for the cooperation of delivering a common, sustainable mobility strategy, it can be a challenge for the city leaders. MaaS is one part of this whole strategy, for which a dozen of functions are formed and defined together, such as strategic goals or incentive systems. Defining the comprehensive strategy of MaaS is the task of authorities, in cooperation with all other key participants, regardless the role played by the Municipality and its authorities in the legislation models of MaaS.

- Defining BKK's role in a MaaS ecosystem (depending on the opportunities given by the legislation)

Visions for the future, the implementation of the aims together with the stakeholders (Defining the required level of integration, integrated services and functions)

- Scheduling the integration steps of services
- Supervising the previous schedules due to the legislation changes and the progress in the meantime
- Defining the stakeholders, integrated-to-be services and the front-end/back-end functions
- Measuring the open-mindedness of the transport service providers (following codex norm, motivational opportunities, data sharing)

Defining the measurable goals and indicators:

- A modal change towards sustainable transport modes (including cycling, walking as well) should be relevantly aimed during the planning process of MaaS. Gaming and encouragement are motivational techniques that, when combined with an application, can be used to encourage recognized sustainable travel behavior in MaaS schemes, such as using bonus schemes.
- Establishing an evaluation framework is essential, so that the impact of MaaS on travel behavior can be compared with the goals of local transport policies. The MaaS-supportive policy of the SUMP process can be evaluated by considering modal splits and additional indicators (decrease in car ownership/usage, increase in public transport effectiveness). The effectiveness and operation of transport system can be measured by the introduction of main performance indicators (Key Performance Indicators) and adapted supervising systems, where the feedbacks received by residents and tourists are required to be contained as well. For a user-friendly solution like MaaS, it is essential that the evaluation should be done for the end user and the appropriate goals and indicators should be consisted of as well.

Planning of implementation actions

- Selecting the planning measures with the stakeholders
- Measures applied during the introduction of the MaaS system largely depend the role of the main stakeholders- depending on previous decisions and roles
- Decision about shaping an experimental system depending on previous decisions and roles
- Defining measures depending on the available funding opportunities and legislation framework
- Modernizing the booking and ticket provider systems - in progress
  - FUTÁR+ (BudapestGO)
  - Mobil ticket, e-ticket, TVM





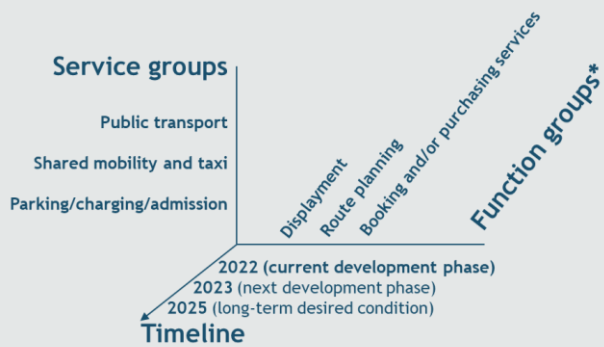
- User account
- Providing interoperability and support between various services
- High-quality standards should be adopted and harmonized for the new mobility service providers by the authorities. Such directives should be implemented in terms of using algorithms, in which a level playing field can be guaranteed for transport service providers, while the undesired impacts can be eliminated, like modal splits from public to private transport modes or from sustainable towards motorized solutions.
- Making an agreement about tasks and responsibilities, particularly in public funding, depending on previous decisions and roles

**Implementation and tracking**

- Implementation supervision
  - Establishing an experimental system
  - Establishing a real-life system
  - Following the change of trends and technology, Fine turning the system
  - Monitoring and adapting progress and keeping in touch with residents and stakeholders
- Tracking, adaptation and communication
  - Monitoring of indicators to evaluate the results of MaaS and its contribution to the achievement of the set goals
- Tracking feedbacks and gained knowledge

**4. Action Plan towards MaaS in Budapest**

The action plan identified the following desired functionality for short-middle-long term development purposes. The identification process used a 3-axis structure:



Two groups related to the certain functions are about to be defined:

- Regulation (service control and management)
- Infrastructure and tools

**Commented [DF2]:** Please also write a bit in relation to the needs for capacity building (responding to diagnosed knowledge gaps for MaaS implementation?) and about the conclusions from the discussions with local stakeholders: would you plan to continue such communication (both within BKK and/or with other actors?), and how it can be structured.



Currently available functions:

	<u>Map based service info</u>	<u>Route planning</u>	<u>Booking and purchasing services</u>
<u>Public transport</u>	<u>BKK vehicles, services és MÁV vehicles</u>	<u>BKK and MÁV</u>	<u>BKK and Volán products</u>
<u>Shared mobility and taxi</u>	<u>Available bikes at Bubi stations</u>	<u>Bubi (shared-bicycle)</u>	<u>Bubi (link)</u>
<u>Parking/charging/Admission</u>	-	<u>(bicycle)</u>	-

Functions to be achieved by the end of 2022:

	<u>Map based service info</u>	<u>Route planning</u>	<u>Booking and purchasing services</u>
<u>Public transport</u>	<u>Tracking of Volán vehicles</u> <u>Stop-group displaying</u> <u>Displaying the available services on vehicles</u>	<u>Integration of Volán vehicles in the route planner</u> <u>Step-free pedestrian paths (level difference)</u> <u>Displayment of the accesibility restrictions</u> <u>Inclusion of demand-responsive transport services (deep link)</u>	<u>MÁV-START, MÁV-HÉV agglomeration ticket integration</u> <u>Volán automatic distance measurement (in km)</u> <u>Purchasing agglomeration monthly passes</u>
<u>Shared mobility and taxi</u>	<u>Displaying the capacity of the shared mobility access point</u> <u>Shared mobility vehicle tracking in areas without mobility points</u> <u>Filters for various vehicle types</u>	<u>Combined static route planning</u> <u>Planning for groups</u> <u>The planning of journeys with special requests (based on users' preferences)</u>	<u>Link to make a reservation/purchase</u> <u>The reservation of a service instead of a vehicle in terms of taxi services</u>
<u>Parking / charging / Admission</u>	<u>Location and occupancy data of the P+R Sites in Budapest</u> <u>Location data of state-owned P+R Sites</u> <u>Parking zone layers</u> <u>Location data of electric charging points in public areas</u> <u>Location data of bike parking sites</u>	-	-



**Preconditions:**

- **Development:**
  - Extending the existing public transport database of services and vehicles
  - API development (micro mobility services)
  - Improving the route planning function
- **Supply:**
  - Supplying parking database
- **Infrastructure and tools:**
  - Establishing Mobility points (Pilot + 1st phase)
- **Regulation:**
  - The co-operation of BKK, MÁV and Volán
  - Shaping an appropriate regulatory environment related to Mobility Points

**Functions to be achieved by the end of 2023:**

	<u>Map based service info</u>	<u>Route planning</u>	<u>Booking and purchasing service</u>
<u>Public transport</u>	<u>Estimated vehicle occupancy with historical data</u>	<u>Direct and immediate booking of demand-responsive services</u>	<u>Direct and immediate booking of demand-responsive services</u>
<u>Shared mobility and taxi</u>	<u>Real-time vehicle display (only available ones)</u>	Complementing the <u>combinated route planning</u> with the impact of transport management and by emphasizing the transport modes towards sustainability Dynamic planning based on traffic and unforeseen events The option to rank by the cost of the journey	<u>Direct booking and purchase for external service providers as well</u> <u>Pre-bookable vehicles</u> <u>Booking and purchasing directly from the route planning option</u>
<u>Parking / charging / Admission</u>	<u>Displaying parking garages connected to the system</u> <u>Available public parking places</u> <u>Occupancy data of public charging points</u> <u>Location data of e-bike chargers</u>	<u>Route planning option for individual vehicles</u> <u>Navigation to an available parking place in public</u>	<u>P+R parking place reservation</u> <u>P+R regulation of admissions</u> <u>Reserving and purchasing parking places in car parks</u>



**Preconditions**

- Integrating external systems (reservation and purchase)
- Improving the public transport database
- Integrating and supplying databases of admission zones
- Improving the route planning function
- Regulating P+R admissions (managing available spots, recognising license plates)

**Functions to be achieved by the end of 2025:**

	<u>Map based service info</u>	<u>Route planning</u>	<u>Booking and purchasing services</u>
<u>Public transport</u>	<u>The crowdedness of vehicles based on real-time data</u>	-	-
<u>Shared mobility and taxi</u>	-	<u>Navigation in various levels</u>	<u>Pre-arranged mobility packages</u> <u>Integrated payment</u>
<u>Parking/ Charging / Admission</u>	<u>Occupancy data of state-owned P+R Sites</u> <u>Displayment of zones without physical admission restrictions (LEZ/ULEZ)</u> <u>The displayment of available bike park storages</u>	<u>Combined route planning option (for all supported modes)</u> <u>Combined navigation</u> <u>The management of zones without any physical admission restrictions (LEZ/ULEZ)</u>	<u>The management of claims and purchase for parking tickets for residents</u> <u>The management of zones without any physical admission restrictions (LEZ/ULEZ)</u> <u>The integration of lockable bike storages</u>

**Preconditions**

- Improving the public transport vehicle database
- Improving the route planning function
- Establishing a financial clearing house
- Creating various mobility packages



## 5. Conclusions and recommendations for innovative low-carbon mobility planning In FUA

- Consideration of functional urban area
  - Promoting transport users in the selection and usage of the appropriate mobility solution (tool, combination, mobility mix) through city borders, both in an individual and in a social way
- Development of a long-term scope and clear implementation plan
- Evaluation of the current and future ‘MaaS performance’
  - MaaS could provide new tools to evaluate urban and regional transport systems, based on the facts that the appropriate capacities, resources, and institutional background are available
- Improving all transport modes in an integrated way
- Cooperation beyond institutional level
- Involvement of residents and stakeholders
  - The involvement of residents is essential as MaaS places travellers to the centre of the solution. Through the participation of residents, not only the MaaS-related awareness can be enhanced, but the residents can also be informed about the impacts of the transport decisions, particularly those, related to environmental changes
- Continuous monitoring and follow-ups
  - The organisation and management of mobility data needs the unification of various data source and platform interfaces (such as transport management) to meet the follow-up and evaluation demands related to MaaS-systems. To implement such a system, the corresponding resources and competences are also required
- Providing high quality services
  - Involving citizens, stakeholders and institutional partners is a key factor to improve the quality of the process from the aspect of defining the MaaS controlling framework and consciousness formation.

## 6. Dissemination and exploitation plans

Results will be disseminated via BKK’s website.

For further enhancing stakeholder engagement, public workshops will be held throughout the BudapestGO application development process.