D.T1.5.8 – ACTION PLANS TO IMPROVE MULTIMODAL NODES EFFICIENCY AND CONNECTIONS – BUDAPEST

Last mile connections
Multimodal nodes optimalisation
Assessment of multimodal services

Final version
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1. Figure - Arial picture of FBL
Source: https://tervlap.hu/cikk/show/id/6340#pid=5)

A PROJEKT AZ INTERREG CENTRAL EUROPE PROGRAMBÓL, AZ EURÓPAI REGIONÁLIS FEJLESZTÉSI ALAP TÁMOGATÁSÁVAL, AZ EURÓPAI UNIÓ ÉS MAGYAR ÁLLAM TÁRSFINANSZÍROZÁSÁVAL VALÓSUL MEG.

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Executive summary

This action plan of the TalkNET project details the problems, needs and challenges of the Budapest region with the respect to the last mile connections of its multimodal nodes in freight transport logistics. The action plan aims to answer the following needs:

- The review of the operation of concentrated loading areas;
- The review of public space usage and estimate the transport needs;
- And reducing the number of older, not environmentally friendly vehicles.

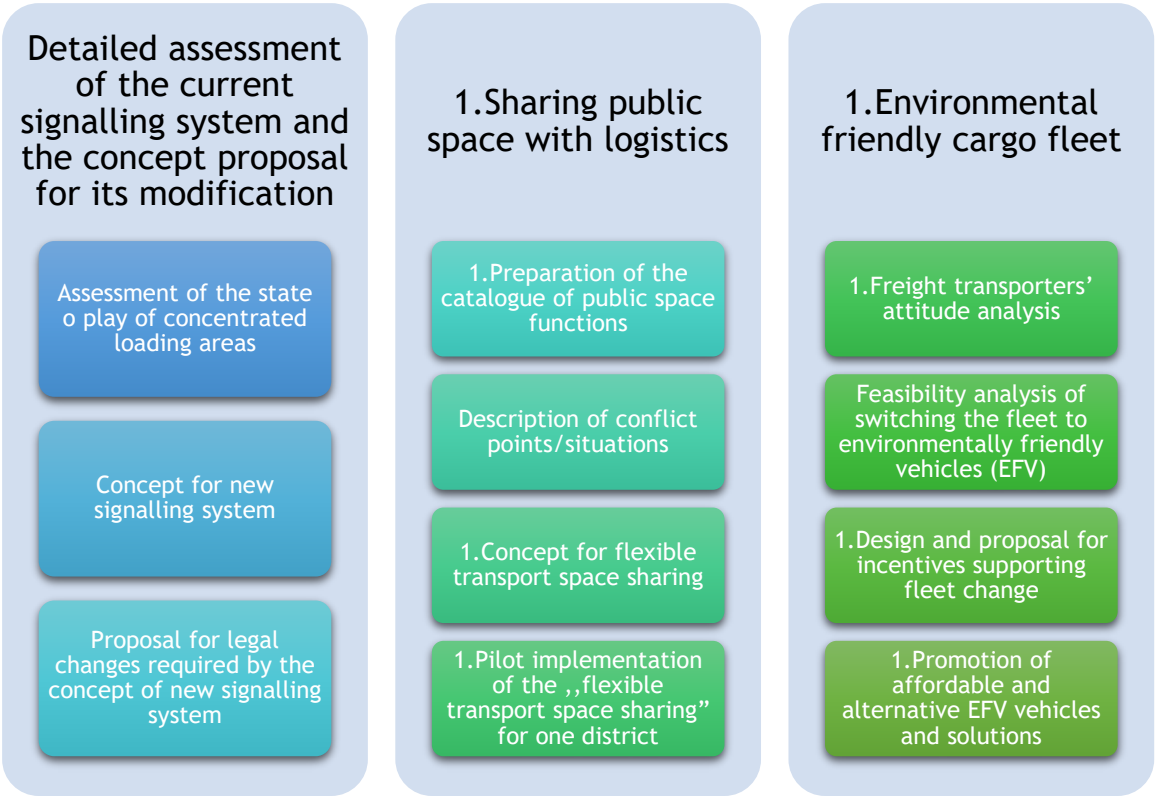
This document will present the "Action Plans to improve multimodal nodes efficiency and connections - Budapest" that will focus on the development of multimodal terminal optimization, one of the sub-topics dealt with the TalkNET project in the field of Multimodality.

Starting point to present the actions that are planned is the "Analysis on multimodal nodes efficiency and connections - Budapest" developed within the project, that reports the main challenges that Freeport of Budapest has to face in order to improve its efficiency, that is related mainly to the upgrading of the port logistics.

In fact, the actions that will be presented in details in this document are the answers to the problems, needs and challenges identified within the first step of the project activities, that is to say the analysis phase of the TalkNET nodes' regions, both for Multimodality and Eco-innovation as the two main fields of action of the whole project.

The actions were designed based on the knowledge tools including the analysis of international best practices in this field. Among the best practices examined, the Dresden CargoTram was identified as an example with relevant lessons learnt for the situation in the Freeport of Budapest: the CargoTram is a good example of sharing public transportation space involving last mile connections in city logistics functions, while using an environmental friendly, electrically powered vehicle for the transportation of goods.

Several actions have been identified to provide adequate answers to the needs and challenges identified. The chart below summarizes the main steps to be taken.



2. Figure: Action plan for the last mile infrastructure of city logistics

Source: Own editing

The analysis has foreseen the assessment of the last mile connectivity, node management, optimisation, multimodal services and to understand how is the state of art (AS-IS analysis) and what are the methods to improve the situation (TO-BE) that will be performed in the following stages of TalkNET implementation. The tool chosen to achieve these aims is the S.W.O.T. analysis.

Therefore, the core intervention logic of the project is the following:

1) to detect the problems affecting the nodes (analysis phase)
2) to find solutions through specific actions planned (planning phase)
3) to test and implement the solutions presented (testing phase)

Moreover, the document will offer also a brief overview of the best practices that can offer good solutions to better plan actions and the pilot action foreseen in the project (the complete collection of best practices is available in the knowledge management activity of the project: Outputs Knowledge tools).

The implementation of these actions requires the direct or indirect involvement of the following stakeholders:

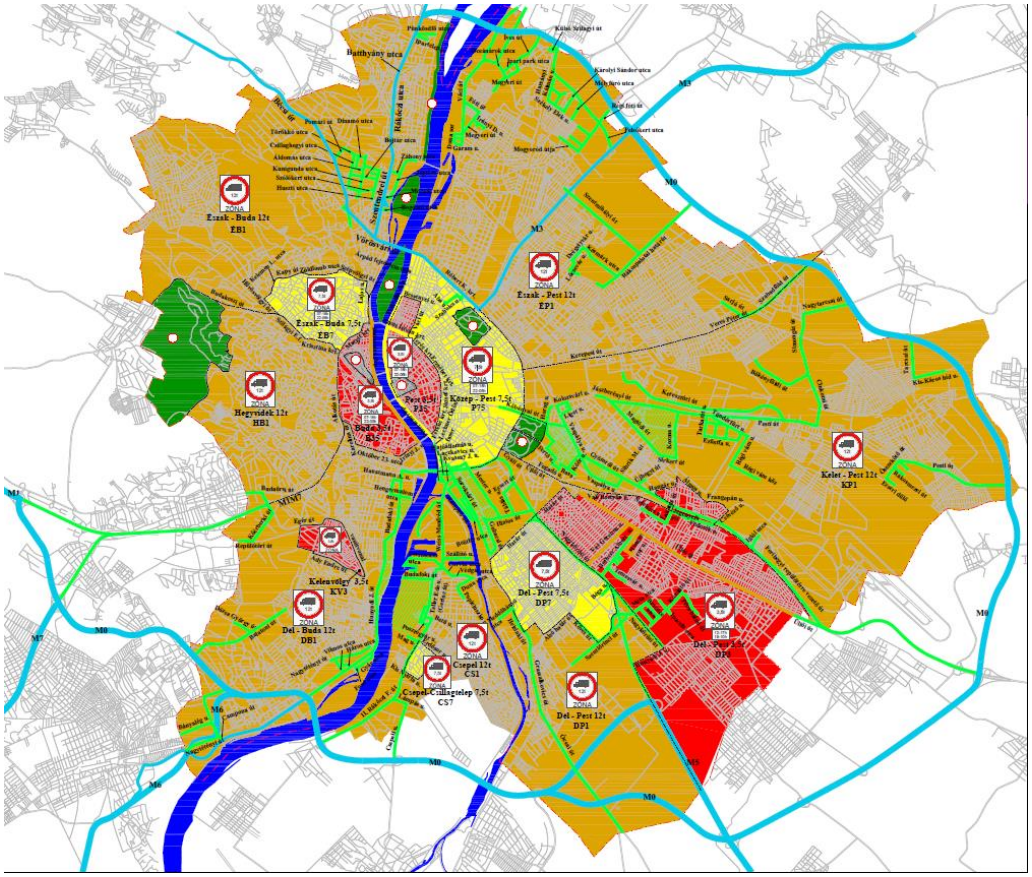
- Ministry of Innovation and Technology;
- Municipality of Budapest (Unit Responsible for Transport);

- District Municipalities and district parking management companies;
- Budapest Public Roads (Közút) Ltd.;
- Clean Air Action Group (CAAG, Levegő Munkacsoport) and other NGOs;
- Freight forwarders;
- MLSZKSZ (Hungarian Association of Logistic Service Centers).

The implementation of the action plan requires three years, starting from the middle of 2019.

The main expected result of the two actions targeting the review of the current system of concentrated loading areas (Concept for new signalling system concentrated loading areas and Concept for flexible transport space sharing) will be a better functioning system of concentrated loading areas and the better use of public space available (or by default used) for freight transport's loading needs. The main expected results of the roadmap for fleet transition, set of incentives and promotion campaign will be the acceleration of the transition to EFVs in the fleet of the urban freight transport companies.

1. Cluster - Last mile connections: overview of needs and best practices in cooperation with stakeholders to develop the action plan



3. Figure: Freight transport zones of Budapest

Source: https://bkk.hu/wp-content/uploads/2014/06/BMT.pdf

A sound framework of analyses has been developed as first step of TalkNET implementation. The analyses have outlined gaps in last mile connections at the Freeport of Budapest as an intermodal logistics hub.

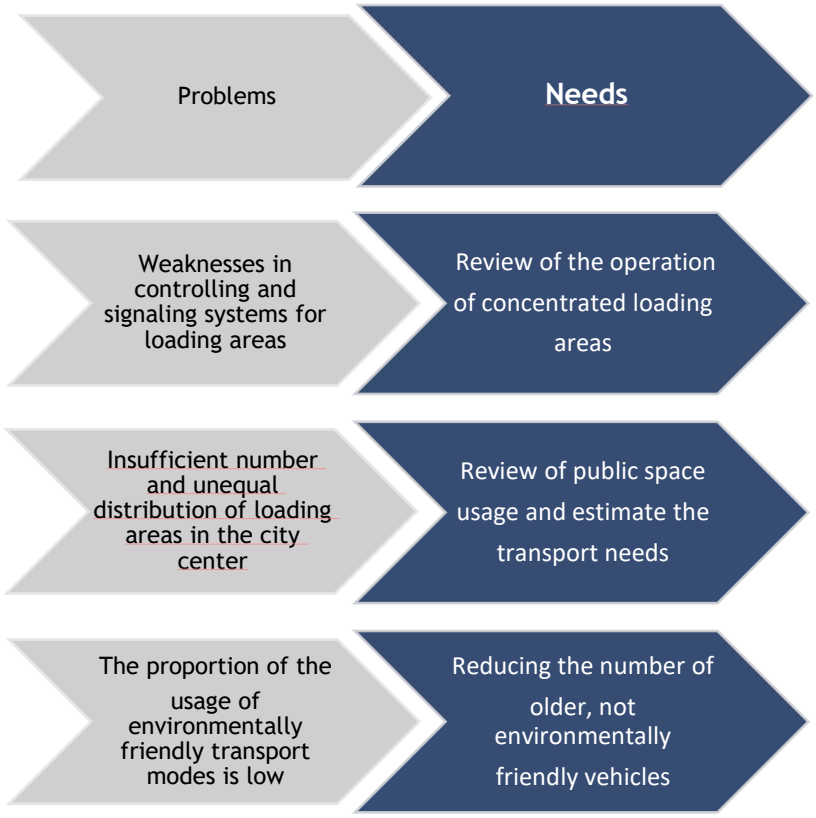
This action plan details the problems, needs and challenges of the Budapest region with the respect to the last mile connections of its multimodal nodes in freight transport logistics. The action plan is a detailed plan defining the main actions to be performed in order to achieve the selected goals and results. As such, the Action Plan consists of two main parts: the so-called Knowledge Tool and the 'narrower' action plan that specifies the futures actions and tasks that need to be implemented along the predefined strategy for achieving the desired results.

Needs

Based on the pre-identified needs during the previous analysis phase of the TalkNET project, two main directions arose for further development of the last mile connection's infrastructural needs in Budapest region. Significant part of the needs unequivocally relates to the review of the use of the

concentrated loading areas, while the other main element of needs relates to the promotion of environmentally friendly vehicles.

The Figure below summarizes the needs of the Budapest region's needs related to last mile infrastructure of city logistics in general.



4. Figure: The identified problems and needs of last mile infrastructure of city logistics in general in the Budapest region

Source: own edition

Review of the use of concentrated loading areas

In the vicinity of freight destinations within Budapest, the concentrated loading areas (loading bays) provide the space for loading from and to vehicles. Each loading bay serves approximately a 50 m area. On average, 15-20 minutes are spent by each vehicle in the loading bay. Based on this, the loading places have (10 hours duration) 30 deliveries maximum a day. Practically deliveries are concentrated in time from 9-16 h, even more in the morning hours (10-13 h). Therefore, these loading bays are overused, and many vans do not find free places for loading – causing often illegal parking and illegal and longer loading processes.

There are 527 concentrated loading bays located in Budapest. Significant part of them are concentrated in the vicinity of the shops located along the boulevards (Kiskörút, Nagykörút, Kossuth Lajos utca, Rákóczi út, Andrássy út, Bajcsy-Zsilinszky út) and pedestrian streets. In the area between the Kiskörút and Nagykörút there are many restaurants, bars, shops and offices so this location is suffering of the insufficient quantity and quality of the loading bays and the lack of intelligent city logistic solutions.

The use of some concentrated loading areas is only possible at certain intervals, but the time spent in loading areas is not limited. In addition to loading areas, some parking spaces can be used for loading, but only for 20 minutes maximum.

In the recent year shopping patterns has also changed, and instead of the big shopping parks in the suburban areas, the smaller shops in downtown and central area has been flourishing reducing the individual transport needs of the population, but increasing the freight transports needs to provide goods in the strictly regulated inner city area where the loading area is scarce. This process also implies that there is a growing pressure for the designation of new concentrated loading areas in Budapest.

The key to more efficient loading (and parking) management is to coordinate the various functions, so that the conditions for the use of different traffic surfaces/spaces are clear to everyone. In addition, care must be taken to regulate the use of concentrated loading areas.

In the city centre there are transport surfaces whose functions can be used to serve the different freight transport processes with providing the right regulatory background. Whether in taxi stations, in beyond the peak periods or bus stops or bus lanes at night time can be used for loading vehicles.

Increasing the number of new or designated loading areas can eliminate congestion and obstructions caused by loading. In this way, the evolving conflicts of the road users and the emission of harmful substances can be reduced.

Reducing the number of older, not environmentally friendly vehicles

In Budapest region currently the proportion of the usage of environmentally friendly transport modes in freight transport is very low. Considering the bad air quality and problems caused by that, but also the urban noise pollution issues there is a strong and urgent need to reduce the number of older, not environmentally friendly vehicles. Taking into account environmental and efficiency considerations, it is necessary to reduce the number of older vehicles which are the main emitters of gases and dust (particles) responsible for bad air quality. By using environmentally-friendly vehicles last mile delivery's transport efficiency can be also increased.

Currently the following types of alternative propulsion systems are available:

- Alternative-fuel vehicles (AFVs);
- LPG (liqufied petroleum gas);
- CNG (compressed natural gas);
- Bio-fuel technology;
- Electric vehicles;
- Hybrid-electric vehicles (HEV);
- Hydrogen-based (fuel cell) technology.

Other solutions can be the classical propulsion systems equipped with innovative technology, which are for example able to:

- Reduce fuel consumptions and gas emission;
- Reduce noise level;
- Increase the load capacity.

Past solutions

At present, freight transport concerning Budapest as destination is mainly managed on road. Previously, urban rail systems served freight destinations, but the use of rail systems for these purposes has gradually dropped from the seventies of the last century, with the increase of road network and road transport, and completely disappeared in the mid- '90s. This kind of freight transport was not specifically designed for city-logistics purposes. The commodities were transported to the factories in the city by rail and semi-finished or finished products were transported from there.

The Municipality of Budapest has already recognized the need to better regulate freight transport and loading within the city and based on its Budapest Urban Freight Strategy, a limited access system has been introduced in the city since 2008, when so-called protected and restricted transport areas have been designated. In order to reduce the environmental burden and pollution, improve the quality of life of the city and protect the priority areas, there are 15 restricted and 11 protected zones in Budapest. The freight access system facilitates the coordinated transport of goods, thereby reducing road traffic and reducing air pollution and noise. Accessing these areas is only permitted after paying a fee which requires a prior registration at the Budapest Public Roads (Közút) Ltd.

Since 2012, the so-called TOBI online management system handles the access requests. The system is constantly being developed by extensive consultations with professional and non-governmental organizations.

There are discounts and surcharges in both type of areas. Vehicles are eligible for discounts from the access fee based on their environmental performances.

In the protected areas the access fee can be reduced according to the EURO environmental classification of the vehicle as follows:

- If the vehicle is at least fulfilling the EURO 5 or higher standard, the discount rate is 30%;
- If the vehicle fulfils the EURO 4 environmental standard, there is no discount.

The environmental surcharge for vehicles with higher emissions increase the access fee as follows:

- For EURO 3 vehicles, the surcharge is 10%;
- For EURO 2 vehicles, the surcharge is 20%.

For vehicles with EURO 0 or EURO 1 motors, the access permit may not be issued at all.

The discounts and surcharges for limited access zone are more complex, but as a general rule they are also based on the vehicles EURO category, besides that there is a night discount of 50% between 20 pm and 6 am.

Best practices

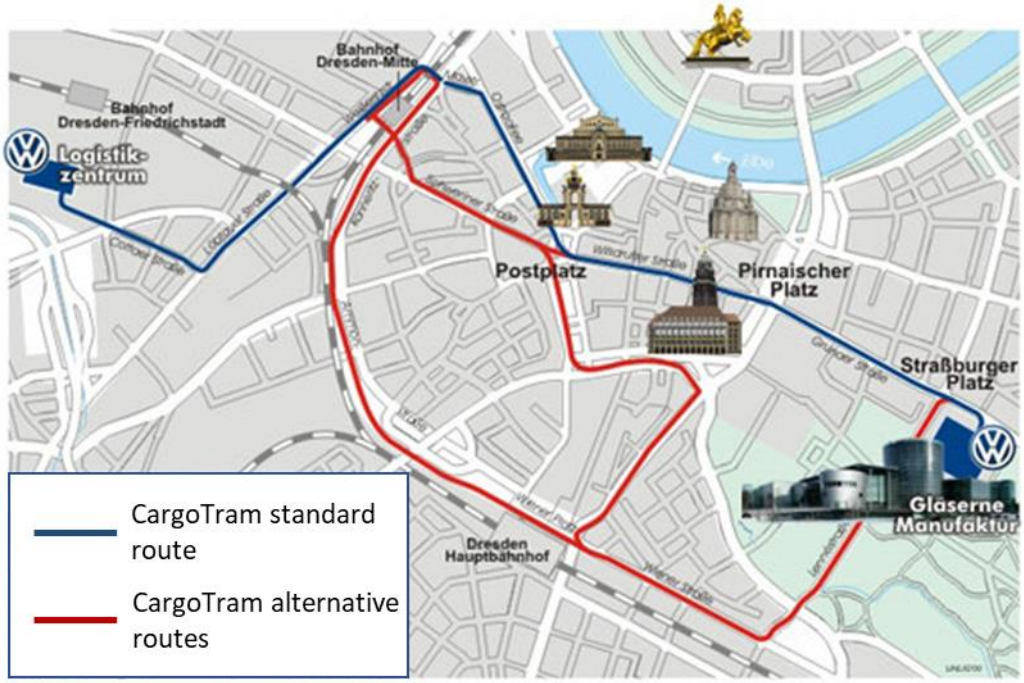
As part of the TalkNET knowledge tool, international best practices have been revealed and analysed. Among the best practices examined, the Dresden CarGoTram (link by references) was identified as an example with relevant lessons learnt for the situation in the Freeport of Budapest: the CargoTram is a good example of sharing public transportation space involving last mile connections in city logistics functions, while using an environmental friendly, electrically powered vehicle for the transportation of goods.

General overview

The usage of trams for transport of people and goods is looking back to its almost 190 years long history. From the beginning of the tram era, they were horse-drawn, the transfer to electrically powered trams succeeded since the '80s years of the 19. century. Since the very beginning of the tram era the usage of trams was not limited to only passenger transport, but also common for transport of goods. This aspect of the tram history might not be obvious from the present point of view, though there are several modern initiatives to utilize the existing tramway tracks network for freight transport. One of these initiatives is CarGoTram in Dresden, which started its operation beginning of 2001.

Historically seen cargo trams have been operating actively in Dresden until mid-1960s, the prominent Bienenmühle trams were used to connect the two mills of this company located in Plauen and Friedrichstadt quarters. In 1998, when Volkswagen announced to be willing to settle its production of luxury car model Phaeton in Dresden, the City Council approved the VW request under condition of creating a city-compatible logistic concept. Since VW located its production in the Gläserne Manufaktur, location close to the green heart of Dresden, this choice has been causing concerns of the citizens on how much the centrally located manufacturing site would negatively contribute to the environment – in terms of air quality, traffic congestion and noise. The citizens' initiative to stop VW from settling in the Gläserne Manufaktur site did not succeed. Under these aspects the search of a city-compatible solution needed to happen in reasonable amount of time. The option of cargo tram was reconsidered and chosen as being a suitable one.

During the preparation for the start of the CarGo Tram project the objective was to use the existing tramway tracks network through Dresden inner city. The VW production site as well as the logistic centre from which the car parts are being transported needed to be connected to the existing tramway track network, keeping the initial infrastructure investment need modest. Another general challenge faced is the competitive usage of tramway tracks used for passenger's transport provided by DVB (Dresden public transport provider, Dresdner Verkehrsbetriebe AG). Dresden Inner City was intended not to be (additionally) loaded with commercial vehicle transport, which was in general not causing major congestion and pollution issues in central parts of Dresden nor in the Saxony region as such.



5. Figure – The CargoTram service line in the City of Dresden, Germany

Source: EnercitEE blog

Preparation phase was rolled out during 1999 and 2000. DVG offered to be the service provider for this project. The cargo trams were made by Eisenhütte Schalke from Gelsenkirchen, using motors delivered by Sachsenwerk Niedersedlitz. The cost of one cargo tramway train was around 6,5 million DEM (cca. 3,3 million EUR). In line with logistic concept the drivers and the maintenance of the cargo trams were provided by Dresden's DVG. The total length of the route used by CarGo Tram is 12 km in both directions. As planned, the route should be served in up to 8 cycles daily, including Saturdays in case of need. Each of the two trains could be loaded with maximum of 60 tons of freight – with volume of 214 m³. The start of the CarGo Tram project was in March 2001 for the initial period of 15 years. Production site was opened somewhat later, in December 2001. The daily number of transport cycles has been varying according to the needs of VW production site, with 2 tram compositions being used for freight transport.

Motivation for considering the solution proposed

Positive effects of CarGo Tram can be primarily noted on the field of environment – next to generating less than half of the CO2-emissions compared to the number of freight trucks with equivalent load, the CarGo Tram is producing significantly less noise. Cargo trams also contribute to better usage of the tramway tracks infrastructure and have hence minimal impact on the traffic density in Dresden inner city.

Financially seen the cargo tram cost-efficiency grows the more it is used. The operational costs are then comparable to those of commercial road vehicles. The limited storage capacity at VW production site Gläserne Manufaktur turned out as challenging and has been causing difficulties in loading the cargo trams to their full capacity.

In 2016, as VW stopped the production of the model Phaeton the CarGoTram stopped its operation for more than a year. The cargo trams were utilized again after VW decided to start assemblage of its e-Golf in Dresden's Gläserne Manufaktur production site. This way the cargo tram is again emphasizing its role as the environmentally friendly link in the VW logistic chain, bringing not lastly positive reputation to VW.

The engagement of local politics and community in decision making before the start of the project led to the benefit of both the local community as well as the investor. Environmental aspects were emphasized as the most important in the preparation phase of the cargo tram project. Dresden public transport provider was testing the interest of further potential enterprise customers in Dresden's inner city for usage of cargo trams, however, there has been no interest for this type of logistic service. The cause for this might be the application of own logistic concepts by the commercial enterprises located in the Dresden inner city.

This example from Dresden shows Cargo tram concept as a feasible solution for freight transport in a city area. While the environmental advantage of this solution is a strong pro-argument, Dresden example shows that the existing infrastructure and needs of actors such as enterprises and local community need to be considered and do influence the implementation of similar logistic solutions. The further factors to be considered is the density and usage of the infrastructure for the matters of passengers' transport. Also, the distance and position of the end points related to the present tramway tracks network need to be considered, as the construction of additional tramway tracks leads to boost of the investment costs. After all the sort of goods that needs to be transported needs to be compatible with tramway transport. Similar solutions with trams used for cargo transport exist in Zurich (for transport of waste), the pilot projects were launched in Amsterdam and Vienna.

Experiences gained during the Dresden study visit

As part of the TalkNET stakeholder consultation process organised around the pilot action to be implemented by the Freeport of Budapest, a study visit for professionals was organised in early April

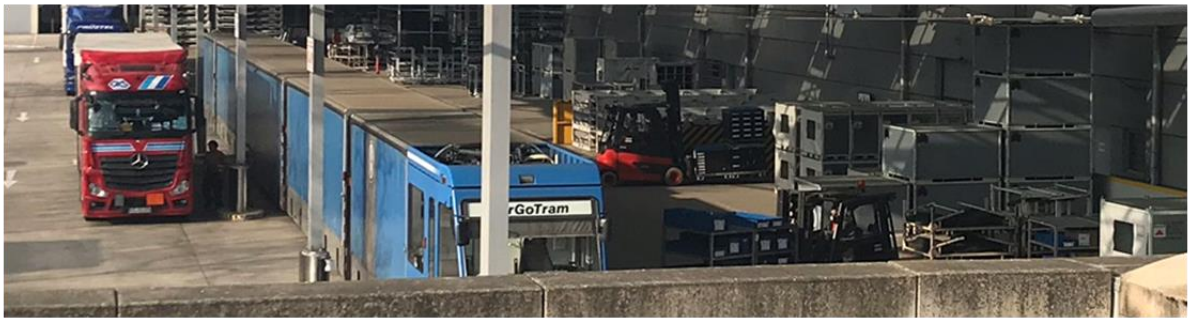
2019 to Dresden. The participants of the study tour included the project manager and the technical director of FBL, the external experts working on the current action plan, and a logistic expert invited from KTI, the Hungarian national institute for transport sciences.

The aim of the study tour was to observe and understand the operation of the Dresden CargoTram in real life situations.

The Dresden CargoTram in operation

The CargoTram using the public tram network

Entering and exiting the Volkswagen factory



Loading and unloading

6. Figure – The Dresden CargoTram in operation

Source: own edition

The main experiences and observations of the study tour were as follows:

- The CargoTram service is smoothly integrated into the tramway traffic of the city. The CargoTram was using the normal public tramway lines, not disturbing the public transportation service;
- The CargoTram technically does not require any special feature from the line (tracks) and the drivers other than the passenger tramways;
- An access line attached to the tramway network needs to be established to reach the destination. In the Dresden Volkswagen factory, the infrastructure was designed from the beginning to be able to be accessed by cargo trams. However, establishing similar tramway connection to already existing factories or logistic centres might be challenging;
- The loading and unloading can be easily organised, using the normal devices (forklifts) usually available at logistics facilities. The total loading/unloading exercise for a fully loaded CargoTram takes only 8-10 minutes with two forklifts;
- The CargoTram can be loaded with standard containers or pallets;
- The loading capacity of the CargoTram equals to 4-5 trucks used in city logistics functions, while only one driver is needed for the operation.

Replicability and adaptability

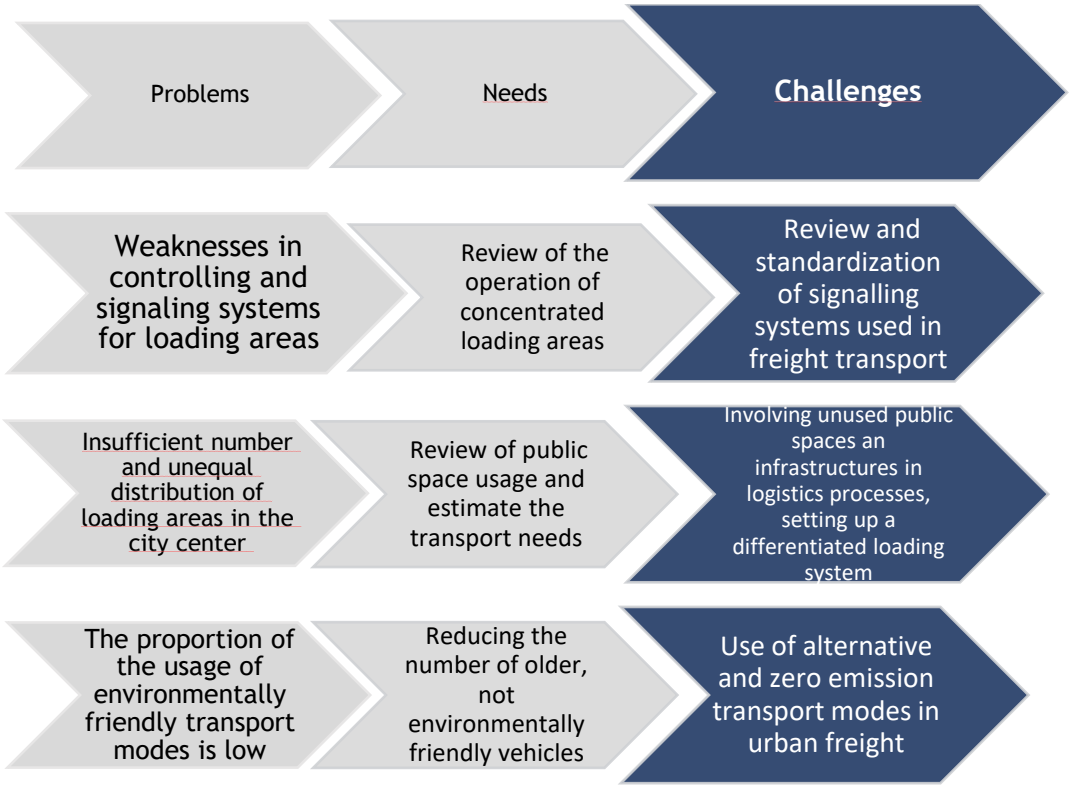
The basic preconditions for the replicability of the above example are mostly given in the city Budapest and beyond, in its agglomeration that is connected with the city with the suburban railways (HÉV). The tram network of Budapest is extensive and also there are quite a lot of unused sections of tracks which are also connected with former or current industrial sites or with brownfield sites which are currently unused but would be ideal for city logistics developments.

1. Action: Increasing of the role of environmentally-friendly vehicles in the last mile delivery's transport solutions in the area of Budapest

Several needs and challenges were identified in the field of last mile connections. Action fields were identified to meet these challenges: the development of a new signalling system, sharing public spaces for logistics, and influencing freight transporters' willingness to switch to eco-friendlier fleet. These action fields cover the most important elements of the needs identified, and they are recognized as topics having the highest possible impact.

2. Main challenges tackled

The challenges related to last mile connections has already been identified during the analysis phase of the TalkNET project.



7. Figure - The problems, needs and challenges of last mile infrastructure of city logistics in general in the Budapest region

Source: Own editing

Challenges related to the use of concentrated loading areas

An important part of the urban logistics system are the retail endpoints, the so-called *concentrated loading areas* which are subject to increased use. This represents a growing problem in the urban structure, and it causes everyday conflict situations among the public space users. The concentrated network of loading areas has been stable for decades, and the related regulations (such as licensing) for urban logistics have hardly changed in the past years, meanwhile, the transformation of public space usage was explosive in some parts of the city, and new features with significant logistical needs appeared and are booming. Concentrated loading areas are essential elements of a well-designed city logistics concept and system, therefore their further development should focus on the following issues which are in fact the key elements of the challenges relate to this issues:

- Increase the number of loading spaces by establishing new loading areas where they are not present in evenly;
- Levelling the use of loading spaces in terms of time;
- Develop a clear and unified signalling and labelling system;
- Facilitating their access.

Also, there is a need for reviewing the public spaces usage in general within the city to better know the usage patterns of the public spaces which share the space with city freight transport and loading, or which might offer alternative spaces by introducing their flexible use shared among different

functions. This might be a first step for creating more concentrated loading areas. Better estimation of transport needs is also needed. Optimally divided loading areas and mixed-usage areas can be formed. This way the various demands (residents, shops, carriers) can be coordinated and successfully fulfilled.

Consequently, the revision of the concentrated loading areas is absolutely necessary because of the lack of the available (public) space which is one of the reasons for the identified major irregularities. For the better utilization of the available space for concentrated loading areas infrastructure and legal actions are needed.

As presented identified in the problem analysis and presented under the needs, the review of the operation of concentrated loading areas should be twofold. First, it is an organizational issue that covers the rules and regulation of the use of these areas based on the extensive practice gained so far since their introduction. The organizational review should also cover the need to redefine the signalling and labelling system of these are in order to reduce the conflicts arising from bad signalization and possibly to introduce (even more) flexible public space use. Second, it is an issue of available space and locations. Based on the results previous problems and needs analysis and related surveys the number of concentrated loading areas is insufficient, thus the designation of new concentrated loading areas is essential for a better freight transport management system in Budapest. Due to the chronic lack of available public space, these newly designated areas can be introduced on the basis of 'flexible transport space sharing' so that not (only) exclusive loading areas can or should be formed, but they can share the space with various functions (with other transport, primarily with parking functions.

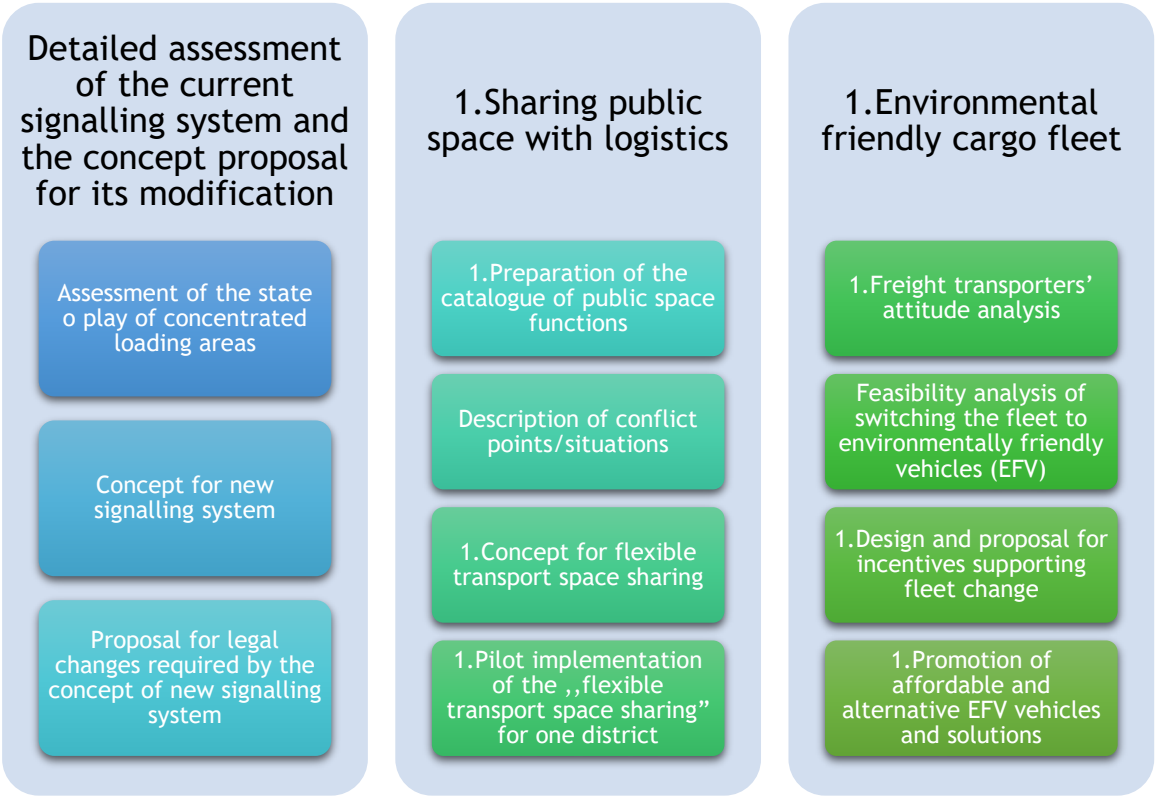
Challenges related to use of low emission transport modes

In urban freight transport, especially in the city centres, efforts should be made to improve the quality of the environment while maintaining transport efficiency. Alternative solutions not only refer to zero emission systems, but also to all modes and devices that use an alternative way is suitable which is better than the currently used solutions.

For freight transporters, it is important to give information and make regulations to enforce the creating of environmentally friendly fleets. Very few freight transporters can afford to purchase more expensive, environmentally friendly vehicles. At present, only larger parcel shipping companies use environmentally friendly solutions.

3. Tasks to be performed

Several actions have been identified to provide adequate answers to the needs and challenges identified. The chart below summarizes the main steps to be taken.



8. Figure – Action plan for the last mile infrastructure of city logistics

Source: Own editing

Detailed assessment of the current signalling system and the concept proposal for its modification

Assessment of the state of play of concentrated loading areas

Despite the existing experience and knowledge on the operation of the concentrated loading areas, for a well-founded change of their signalization, a more detailed assessment is needed which thoroughly explains the state of play with the description of the detailed legal and the development since the introduction of this instrument, with special attention to its signalling system. It should also incorporate the opinion of the various actors and users, thus interviews and/or focus group meetings should be also organized to gain valid input for the analysis and also for the new concept as a next step.

Concept for new signalling system

The concept is based mostly on the assessment made as a first step, but it can also use the experience of foreign best practices. Once the draft concept proposal for the new signalling system is prepared, it should undergo an extensive consultation with the involvement of all the key stakeholders, but also of the residents, too, who will be also affected by the new concept. After all the relevant stakeholders

gave their opinion, the concept can be finalized and distributed among the affected parties. The concept should consider the main points of the new concept for flexible transport space sharing (0) thus the elaboration of the two concepts should be parallel, the latter should be finalized prior to the completion of new signalling system's concept.

Proposal for legal changes required by the concept of new signalling system

The concept will most probably propose changes that require legal changes in the concerned local legislation, thus a detailed proposal for the modification of the affected regulation should be prepared.

Sharing public space with logistics

In this action, a catalogue of the type of functions sharing public space with logistics shall be established, with the description of conflict points/situations, concept for flexible transport-space use and a pilot map for 'flexible transport space sharing' use for one district

Preparation of the catalogue of public space functions

The catalogue of public space functions is an exercise for better understanding of the public space use. It is a descriptive document which should go further than just simply list the obvious functions and users of the public space that is (potentially) also used by logistic services/concentrated loading areas. It should use the urban planners and sociologist methods (such as mental map) to better understand use of public space and categorize its functions.

Description of conflict points/situations

Conflict points and situations related to use of concentrated loading areas will be based partly on the assessment of the state of play of concentrated loading areas (0) and partly on the experience and findings defined in the catalogue of public space functions. Typical conflict points (locations) should be presented on maps possibly with informative illustrations presenting the typical conflict situations at the identified typical conflict points. The description of the conflict situations should reflect the opinion of the various users.

Concept for flexible transport space sharing

Based on the experience gained in the previous exercises but also on other best practices the concept should propose a flexible transport space use for the concentrated loading areas in Budapest. This will be not a totally new feature because the system of concentrated loading areas already uses shared spaces in some cases. It should also pay attention to the main elements of the (draft) concept for new signalling system (0) but also serve as an important input for that, because one of the preconditions for the flexible transport space sharing is an effective signalling system that make clear the function of the given piece of public space at every part of the day. The draft concept should be consulted with all the relevant stakeholders in order to make them clear what is about, what would be the benefits of its application for them and to minimize the chance for forming further conflict situations.

Pilot implementation of the "flexible transport space sharing" for one district

Selection of the locations

Once the concept for flexible transport space sharing for concentrated loading areas has been finalized, the selection of the locations for testing of the concept's application in real conditions and

situations can be commenced. The locations should be selected based on the previous exercises, particularly on the catalogue of public space functions while keeping in consideration the necessity of the minimization of potential conflict situations. Also, local stakeholder's opinion should be a decisive factor and of course the available space for such pilot actions.

Designation of the locations

It means that the previously selected locations should be legally designated by the district authorities and after that they should be signalled appropriately (in line with the concept of 0)

Information campaign prior to the start of operation

One of the most important steps is that the affected companies and other actors should be thoroughly informed about the newly designated areas for flexible transport space sharing. All the potentially affected actors should have enough information on what the new system means for him/her and what would be the potential benefits for this new instruments. The information campaign should be adapted to best target the affected actors and groups.

Environmental friendly cargo fleet

This action aims to influence city logistics freight transporters' attitude and provide for a feasibility analysis of switching the fleet to environmentally friendly vehicles (EFV), to design and propose for incentives supporting fleet change, underpinning the promotion of affordable and alternative EFV vehicles and solutions.

Freight transporters' attitude analysis

As a first step to understand the hindering factors of the spreading of environmentally friendly vehicles (EFV), the freight transporter companies in-depth analysis should be completed focusing on their attitude towards environmental and sustainability issues. Besides the obvious economic factor and widespread opinion (ie. that EFVs are more expensive than vehicles with internal combustion engines) there might be other factors and reasons for the low share of EFVs in Budapest. A detailed mapping of the freight transporters' view and needs should be done in order to define measure for the expansion of EFVs.

Feasibility analysis of switching the fleet to environmentally friendly vehicles (EFV)

The feasibility analysis of switching the fleet of freight transport companies to environmentally friendly vehicles should be a comprehensive and detailed analysis on the feasibility of the gradual fleet change to raise the EFVs share in (city) logistics operations. It will cover the regulative and financial framework and the highlight their main points that need to be changed, and also it should strongly build on the attitude analysis made in the previous step.

Design and proposal for incentives supporting fleet change

The proposal for incentives supporting fleet change should focus mostly of financial and regulatory aspects of this issues, but to a lesser extent the technical and human (pre)conditions as well. It might build also on the relevant experiences from abroad, in order to make realistic and feasibly recommendations. The relevant national level stakeholders should be strongly involved in the design

process in order to make a feasibly proposal that might have a real impact on speeding up the fleet change. The proposal should incorporate two annexes for facilitating the desired change: the roadmap for fleet change and a proposal for the set of incentives (or other type of state support, compatible with the relevant state aid regulations).

Promotion of affordable and alternative EFV vehicles and solutions

The promotion of EFVs should focus on the currently available alternative and affordable options to the vehicles with internal combustion engines. The promotion campaign should primarily emphasize the favourable environmental aspects of the EFVs, but also the possible gains of their operation on the long run where cost-savings might also apply.

4. Key actors

Municipality of Budapest and its Unit Responsible for Transport and the company that is implementing the city freight transport policy, Budapest Public Roads (Közút) Ltd. are the main actors related to the regulation of concentrated loading areas on the local level. By defining the protected and limited freight transport zones they also have a decisive role in permitting which type of vehicles are allowed to access the public roads (and other spaces) thus in they can clearly prefer or positively discriminate vehicles with better environmental performances. On the other hands switching the vehicles' fleet to environmentally friendly vehicles (EFV) is not only a regulatory issue, but an economic one, as well, where the national level has much more means to facilitate and support the process primarily through offering incentives for the affected private actors to switch their fleet to EFV.

9. Figure - Stakeholders mapping

STAKEHOLDER	KIND OF ORGANISATION	DESCRIPTION	STAKEHOLDER'S NEEDS	LEVEL OF INVOLVEMENT
Ministry of Innovation and Technology	Public body/authority	Responsible ministry for defining the national transport (development) and e-mobility policies and for their implementation. The Ministry owns public ports in Hungary, such as the area of Budapest Freeport and the area of some logistics centers (BILK).	Stable and safe operation, to reduce the negative environmental impact of the transport modes, ensuring competition in transport sectors where it is desirable and purposeful.	Legislative regulation on national level based on EU and national policies.
Municipality of Budapest (Unit Responsible for Transport)	Public body/authority (local level)	The Municipality of Budapest creates rules of urban planning; regulates the parking and parking management system of the capital, the specially protected and protected parking zones, the establishment of applicable waiting rates, the use of public space, the organization and tasks of the public space administration.	Ensuring effective and smooth transport in Budapest while taking into consideration most of the needs of the population, industry and service sector, as well as ensuring that the negative environmental impacts are mitigated or they are decreasing due to the measures taken.	Legislative regulation on local level based on the national and local policies.

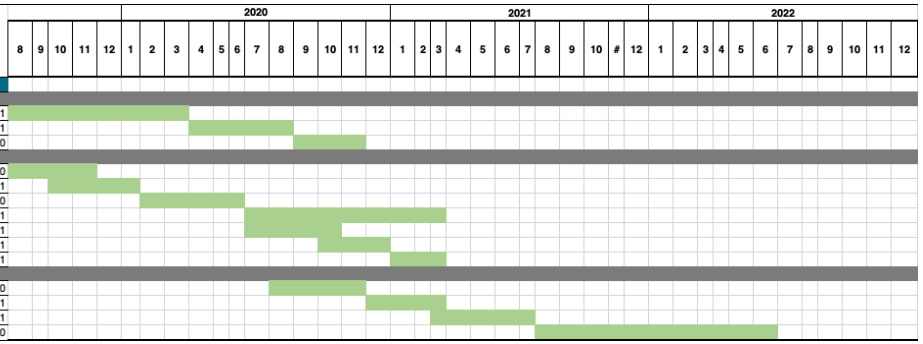
STAKEHOLDER	KIND OF ORGANISATION	DESCRIPTION	STAKEHOLDER'S NEEDS	LEVEL OF INVOLVEMENT
District Municipalities and district parking management companies	Public body/authority (local level) and 100% publicly owned companies by District Municipalities	In cooperation with the Municipality of Budapest, district municipalities are involved in the development of freight traffic regulation. On the other hand their interest is to ensure the most possible parking space for their local residents and to maximize the revenues from parking services that are in their	To balance between the resident's parking, public space etc need and between the other users (eg. logistic companies) needs while maximizing the revenues form parking spaces.	District regulation for urban planning, designation of parking areas, concentrated loading areas etc.
Budapest Public Roads (Közút) Ltd.	100% owned public company by Municipality of Budapest	Preparing and implementing the transport strategy of Budapest, including city logistics issues. It is responsible for the operation and maintenance of roads, bridges owned by the Municipality of Budapest, and the operation of traffic facilities throughout Budapest. It is also responsible for the freight transport organization within the city boundaries, for the designation and maintenance of freight zones and it also operates the online freight transport toll system called TOBI.	To implement the tasks defined by the Municipality of Budapest, ensuring smooth freight traffic in the city and maximize the revenues collected from freight transport companies.	Implementation of policies, measures defined on higher levels. Practical knowledge on the issues related to the use of public spaces.

STAKEHOLDER	KIND OF ORGANISATION	DESCRIPTION	STAKEHOLDER'S NEEDS	LEVEL OF INVOLVEMENT
Clean Air Action Group (CAAG, Levegő Munkacsoport) and other NGOs	Non-governmental organization(s)	They have a wide range of activities including research, consulting, public awareness campaigns, publishing and advocacy at the local, national and international levels with the overall goal to reduce air pollution and to make clean air available for the citizens. greening the state budget. Their main field of interest are the following: sustainable transport, sustainable energy policy, sustainable urban development and protection of green areas in the cities.	• To ensure that new developments, regulations etc. do no cause the deterioration of the air quality, but they contribute to make the air cleaner in the cities.	Indirect involvement through public consultations and professional consulting (optionally).
Freight forwarders	Private companies	Current and potential tenants of the FBL dealing with different logistics and storage activities.	Smooth and unlimited, less-regulated operation all over the city with the least possible payment for public space use. Good road and public space infrastructure. Good infrastructure and quality services corresponding to their needs within the FBL for reasonable price.	Indirect involvement by consultations ie. by giving their opinion on the proposed measures to help in prioritizing the development needs and to form the service offer.

STAKEHOLDER	KIND OF ORGANISATION	DESCRIPTION	STAKEHOLDER'S NEEDS	LEVEL OF INVOLVEMENT
MLSZKSZ (Hungarian Association of Logistic Service Centers)	Association of private logistics operators	A professional networking and lobby organization lobbying for the interests of their members such as the development of combined freight transport, increasing the inland and international competitiveness of its members, to create incentives and state subsidies for switching the fleet to EFV.	Smooth and unlimited, less-regulated operation of their members all over the city with the least possible payment for public space use.	Indirect, consultative involvement in defining and designing the city logistics regulations on national and local level.

5. Timeline and financial resources

Subject	Actions	Responsible	Deadline
LAST MILE CONNECTIONS OF MULTIMODAL NODES IN THE BUDAPEST REGIOnFreeport of Budapest Action Plan	Detailed assessment of the current signalling system and the concept proposal for its modification		
	Assessment of the current signalling system		2020.03.31
	Concept for new signalling system		2020.08.31
	Proposal for legal changes required by the concept of new signalling system		2020.11.30
	Catalogue of the type of functions sharing public space with logistics		
	Preparation of the function catalogue		2019.11.30
	Description of conflict points/situations		2020.01.31
	Concept for flexible transport space sharing		2020.06.30
	Pilot implementation of „flexible transport space sharing" use for one district		2021.03.31
	Selection of the locations		2020.10.31
	Designation of the locations		2020.12.31
	Start of the operation with information campaign		2021.01.31
	Freight transporters' attitude and feasibility analysis of switching the fleet to environmentally friendly vehicl		
	Freight transporters' attitude analysis		2020.11.30
	Feasibility analysis of switching the fleet to environmentally friendly vehicles		2021.03.31
	Design and proposal for incentives supporting fleet change		2021.07.31
	Promotion of affordable and alternative EFV vehicles and solutions		2022.06.30



10. Figure - GANTT chart of the Action plan of implementation of last mile connections of multimodal nodes

Source: Own editing

6. Expected results

The main expected result of the two actions targeting the review of the current system of concentrated loading areas (Concept for new signalling system concentrated loading areas and Concept for flexible transport space sharing) will be a better functioning system of concentrated loading areas and the better use of public space available (or by default used) for freight transport's loading needs. As a synergic effect of the two parallel actions valid solutions will be offered the needs and challenges related to the use of concentrated loading areas, as presented in the text earlier, which will be working under real life conditions as tested in a pilot action. The following challenges will be answered:

- **Increase the number of loading spaces** by establishing new loading areas where they are not present in evenly and levelling the use of loading spaces in terms of time: the Concept for flexible transport space sharing's main goal is to create more loading areas with the least possible conflicts and the least possible public space use. Flexibility means that the space for loading will be used only for the time that is really required or that reasonably available for this purpose, and it will allow co-existence with other functions on the same space. The timing of loadings will be adapted to the specific needs of the given space: eg. in cases when daytime access is essential, the late afternoon and night 'shifts' will be free for residents.
- **Develop a clear and unified signalling and labelling system:** signalling and labelling of concentrated loading areas will be solved by the new concept made solely for such purpose.
- **Facilitating their access:** it will be also facilitated through new signalization**,** but this aspect will be also a main precondition during the design of the Concept for flexible transport space sharing.

The Roadmap for fleet transition (to environmentally friendly vehicles) and set of incentives are the most tangible inputs of the activity 'Design and proposal for incentives supporting fleet change'. The roadmap serves as a feasible schedule for achieving the transition to EFVs in the urban logistics sector. Its feasibility will be ensured primarily through the preceding Feasibility analysis of switching the fleet to environmentally friendly vehicles. For the roadmap's (full) implementation, it is necessary to prepare a realistic set of incentives for the fleet transitions because economic factors will continue to play a major role and precondition for fleet change, thus the accompanied promotion campaign of EFV should also stress the financial gains on the long run. The main expected results of the roadmap set of incentives and promotion campaign will be the acceleration of the transition to EFVs in the fleet of the urban freight transport companies. The pace and extent of the transition will be hard to measure, but it is possible through surveys to the target group. As a desirable result the doubling of growth rate of the share of EFV among urban freight is expected in the next two years after the completion of the activities.

7. References

Budapesti Közlekedési Központ (2014): Budapest közlekedésfejlesztési stratégiája 2014-2020, Balázs Mór-Terv Available at: https://bkk.hu/wp-content/uploads/2014/06/BMT.pdf [Accessed 15.04.2019]

CarGoTram Dresden Available at: https://www.bahnfotokiste.de/strassenbahn/dresden/index.html [Accessed 15.04.2019]

Webpage of EnercitEE blog Available at: http://enercitee.eu/blog/tag/e-foxes/ [Accessed 15.04.2019]

2. Cluster - Multimodal nodes optimization: overview of needs and best practices in cooperation with stakeholders to develop the action plan

11. Figure - Arial picture of FBL
Source: https://tervlap.hu/cikk/show/id/6340#pid=5)

Needs

At FBL, there is an urgent need to modernize access control and traffic management system; establishing a reliable, high-precision vehicle identification, access control, routing and port information system.

- Development of a license plate recognition and event recording camera system for the access control and monitoring of port stays of road vehicles.

- For traffic control of road vehicles, establishment of a Central Monitoring and Control Office (Command Center) is essential, where all the information required for traffic management, operator measures (e.g. fire protection, law enforcement, operators) is available and the right information, instruction can be issued to all internal and external customers.

- The installation of outdoor electronic signboards that can be read in strong sunshine and customer information (INFO) points for drivers that is related to the Command Center at designated areas of the port.

- Providing geospatial information, statistical analysis of the data generated in the system, connection to the existing integrated ERP systems.

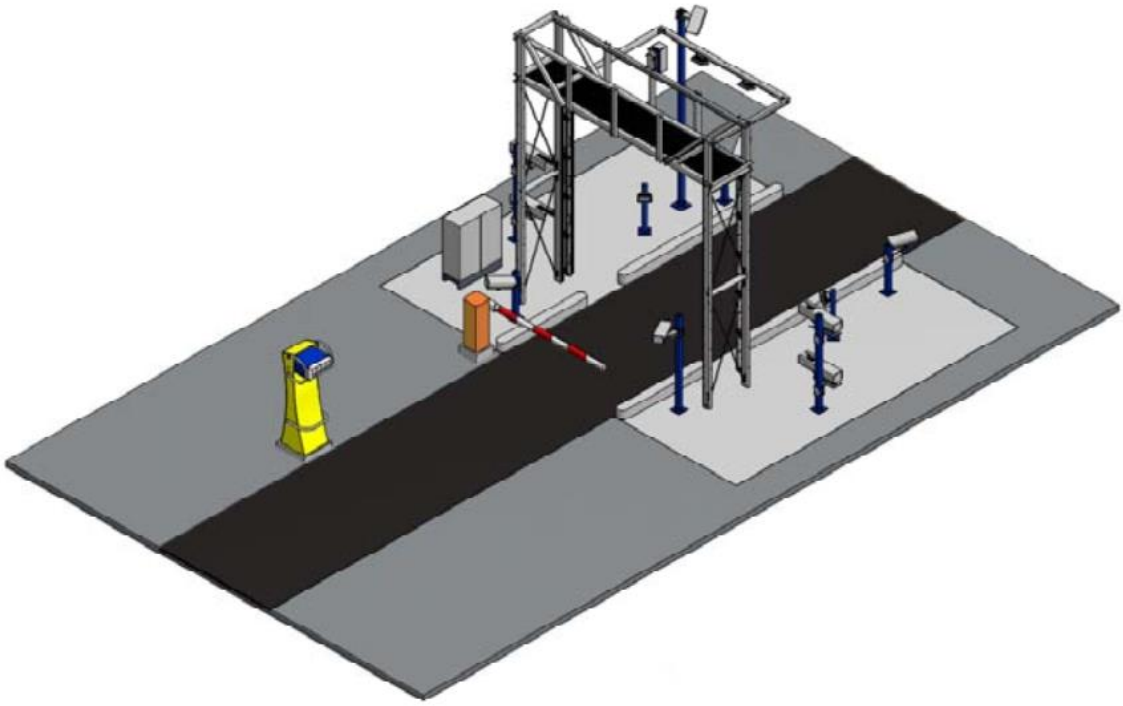
- Possibility of modular installation of the system.

Best practices

For a limited-extent pilot action within the newly launched CE CORCAP project, the focus of this action plan is on access control system implementation in Phase 1. In European intermodal logistic centres, several best practices in operation were identified.

12. Figure – Access control system from CAMCO Technologies (Self-Service Kiosks)
Source: https://www.camco.be/

13. Figure - Access control system from CAMCO Technologies (Self-Service Kiosks)
Source: https://www.camco.be/



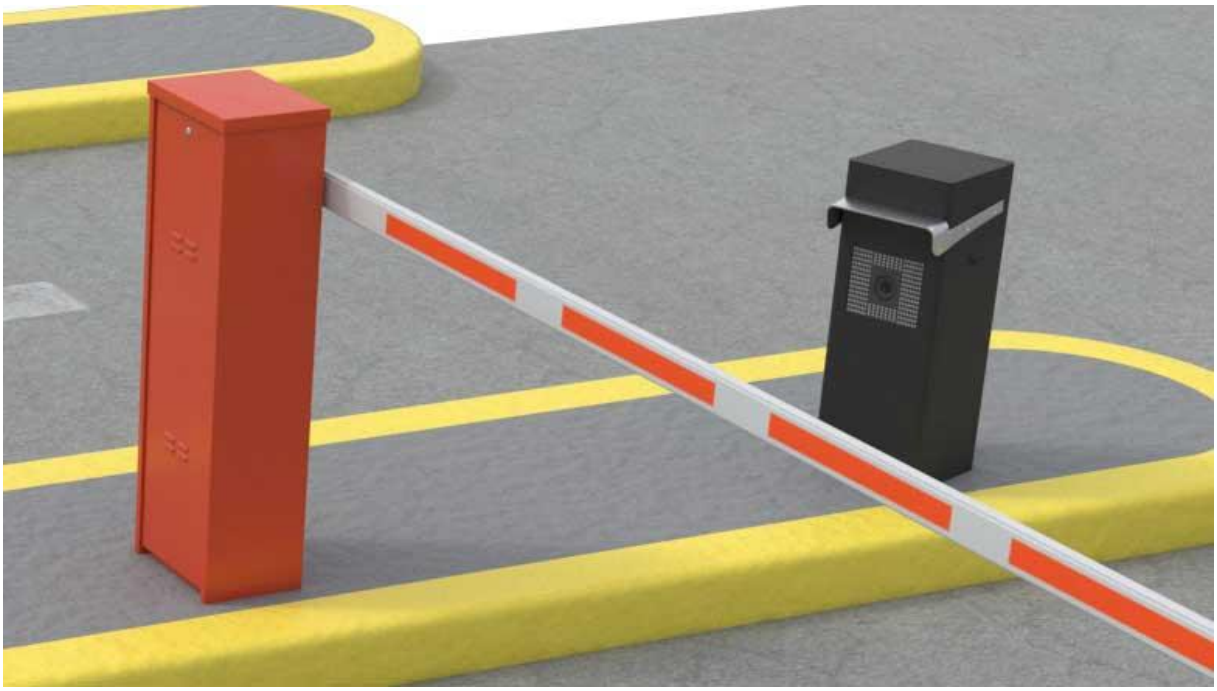
14. Figure - Access control system from CAMCO Technologies (Truck OCR camera portal)
Source: https://www.camco.be/

15. Figure - OCR gate automation at KTL Kombi-Terminal Ludwigshafen GmbH.
Source: http://www.intermodal-terminals.eu/content/e2/e543/inhalte547/3OCRWorkshopKTLTerminalandGateSystemKlein_eng.pdf

Among the best practices revealed, Amazon´s logistics center in Martorelles (Barcelona) was identified having similar needs to FBL. (link by the references) The complexity of their entrance and exit of trucks, the difficult reading and recognition of license plates made it necessary for them to find an Automated Licence Plate Recognition (ALPR) solution that allows to operate in a lane with a width greater than 5 meters and with vehicles whose access point is made from different places, being able to offer an accurate reading of license plates even if they have different inclinations and positions.

Amazon has implemented SIRAM, a vehicle access control system from Innova Systems Group based on ALPR. With this technology, all the license plate recognition cameras have been installed at the entrance and exit lanes of trucks, as well as the automated access control of vehicles to control the transit of trucks and other vehicles.

To control the access of vehicles and to guarantee maximum security of Amazon's center and surroundings, their system provider have designed a solution that combines their SIRAM Suite technology and SIRAM Totem capture units, see on the figure below.



16. Figure - SIRAM Totem capture units
Source: http://innovagroupbcn.com/en/project/access-control-amazon/

Taking into account the location and size of lanes, this capture unit has the largest number of LEDs, guaranteeing a 100% effective license plate reading and recognition. An important feature of this installation is the versatility and reliability of the license plate recognition system.

SIRAM OCR is an advanced technology that allows the automatic recognition of license plates in an efficient and unambiguous way through the installation of capture units or LPR cameras.

The technology is linked to the operation process of the logistics center, being a tool that adds efficiency and security to the vehicles and trucks access control management.

The features of SIRAM:

- Automatic access of all authorized vehicles, whether trucks, vans or cars.
- Registration of vehicles with temporary access authorization.
- Total control and management of the stay periods inside the logistics center
- Information of all vehicles inside the center at all times.

An important factor in this installation is the speed and reliability of the license plate recognition system using SIRAM OCR, as the entry and exit of vehicles is concentrated in very small time slots, demanding a license plate recognition solution to operate without interruptions in moments of maximum affluence. Besides others, FedEX also choose SIRAM Suite as a perfect solution for their workflow.

State-of-the-art digital intelligence guarantees a smooth, efficient operation. The control systems of Innova Systems Group are world-leading, while the interaction between sensor technology and analysis, forecasting and information systems delivers huge efficiency improvements. This is not only good for business but also protects the environment, hence a highly recommended good example of systems for FBL.

1. Action: Access control and traffic management system installation

This action plan details the problems, needs and challenges of FBL as a multimodal terminal. It presents the systems currently in use and the realistic needs and challenges, also the required actions that the port will face when developing the access control and traffic management system.

FBL serves as a trimodal transport hub in the centre of Hungary and it could be one of the end stations of the planned Corridor Train, which highlights the necessity of developing the conditions of the intermodality of the port, specially between road and railway transport.

Road capacity within the port of FBL is restricted, and the options for modifying the roads to take more vehicles are limited. There is a newly established container terminal that is foreseen to boost the traffic of the port, so the occupancy of the port is increasing, which means that FBL needs an alternative way to meet rising demands.

The management of FBL is committed to make measures so that port could be a state-of-the-art trimodal centre while paying special attention to the introduction of environmentally friendly systems.

Like in other industrial processes over the world, the European inland port sector is undergoing a transformation because of digital technologies and the further digitalization of logistic processes. As trade and cargo volumes are expected to grow on a global level, new technologies and digitalization as well as further integration of existing IT systems will help to increase efficiency of logistics and manage flows of goods in the port in a more sustainable and cost-effective manner. Without digitalization, the logistic sector is not competitive enough. Many inland ports are currently in transition towards greener and more efficient practices with the help of technology enabled by the Internet of Things (IoT). The competitive position of inland ports is not only dependent on infrastructure development, but nowadays also linked to the way in which digital approaches and solutions are integrated in the port community system (as part of the digital infrastructure of ports). As the benefits in efficiency and energy savings are far-reaching for inland ports, so will be the impact on current port communities.

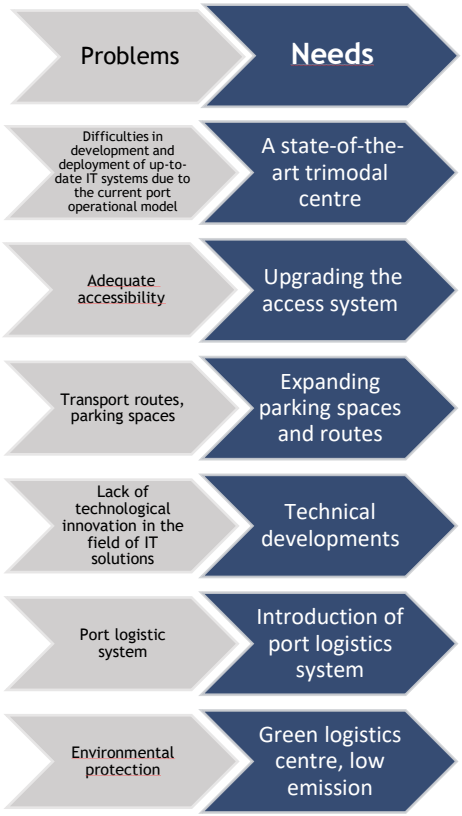
In general, digitalization of logistic services can improve efficiency and ultimately increase sustainability and profitability of a port when organised well.

Technical, logistical and other management systems of the port must meet the following requirements.

1. Fast and efficient delivery of goods arriving (entry, weighing, internal management)
2. Ensure internal freight traffic taking into account the crossings of modalities (rail/road)
3. Continuous information of the tenants about the arrival of goods affecting them and leaving the site
4. Security control of the logistic centre as a strategic economic zone, protection of goods placed on the site and on inner public spaces
5. Information service to the supervisory bodies for the control of the operation of the centre
6. Application of environmentally friendly systems (renewable energy, low consumption machines, disposing of waste etc.)

To be able to do all this, it is inevitable to develop not only the necessary infrastructure (road, railway, water side), but also an IT network and communication system that supports internal operation.

The below figure shows the needs of FBL.



17. Figure - The identified problems and needs of FBL
Source: Own editing

2. Main challenges tackled

European Federation of Inland Ports (EFIP) defined the challenges facing the inland ports. The meaning of digitalization is not always well understood, and the level of digitalization differs from one port to another. An important challenge is to find the right balance between on one hand finding tailor-made solutions (programmes and support schemes) for digitalization in inland ports and on the other hand securing harmonised and standardised Intelligent Transport Systems in ports.

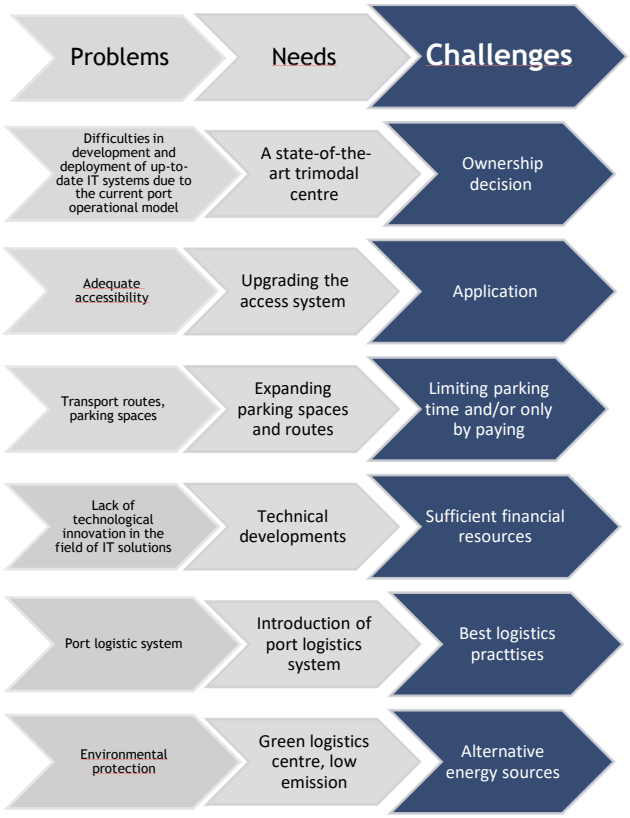
The goal is clearly that, in parallel with the Budapest smart city model, FBL operates as a smart port within a short time frame.

The European Union defined in 2014 its means for Smart City and Smart Community. (link by references) As the Ports are considered a special case of a Smart Community, they have to meet the same requirements that are asked for a Smart City, adapted to the port situation, European Smart Ports should be designed based on the Regulations on Transport, Energy and Information and Communications Technology (ICT).

The operating model of a modern harbour and the measures needed to achieve this status must be presented to the owner of the property rights. Ownership decision, support, and resources are needed to implement development programs. The best logistical solutions should be explored, the necessary financial resources must be created, and the human resources development measures needed to be developed and implemented. The

use of alternative energy and low-consumption machines not only contributes to environmental protection, but it is also beneficial to reducing costs.

Below figure summarizes the challenges of FBL.



18. Figure - The problems, needs and challenges of Budapest Freeport
Source: Own editing

Road vehicles

FBL's territory hosts annual road traffic of appr. 800,000 to 1,000,000.

In FBL, large-scale developments are currently in progress, new logistics-related halls are being built. It is often the case that non-target foreign drivers who stop at the port in an irregular manner, ask for information about their destination from anyone they meet. Road vehicles to reach targets should primarily be facilitated by placing standard road signs at road entrances, intersections and roundabouts, but it can be simplified and supported by the development of a state-of-the-art, innovative traffic management IT system. This is one of the main goals of FBL.

Entitlement to access:

Permanent entry until revocation.

Currently, authorization in a central security office is the responsibility of the security officer. When applying for an entry, the license is recorded in the system. Modification or withdrawal is also done here. The system does not allow a license plate to be definitively deleted if there is a history of the data. Periodic archiving of data.

Daily entry, one-time entry permit

Currently road traffic flows on 4th freight gate where the current WinAccess Central Integrated Access Control System is used.

Between the personnel of the porter cab and the pedestrian staff of the gate there is a walkie-talkie connection.

In the summer, during the grain season, 4,500 transport vehicles per day are on the road.

Arrival check

- license plate recognition camera
- delivery note to hand, presentation of other documents
- container number reading by pedestrian staff announcement (walkie-talkie).

Checking in / checkout

- license Plate Recognition Camera
- delivery note in hand
- container number reading by pedestrian staff announcement (walkie-talkie)
- inspection of empty truck and containers, responsibility of pedestrian staff

The possible directions and steps of development at FBL are as follows:

PRIMARY tasks (Phase 1 – Pilot action within CORCAP):

- upgrading the access system

(current system cannot read foreign license plate number and in dark)

Development that can be introduced at a **SECOND** phase:

- parking time limitation, and/or only by paying
- smart display panels, light control boards, interactive map
- to be a green logistic centre

Development that can be introduced at a **LATER** stage:

- connecting the bookkeeping and tenant recording software

PROSPECTIVE developments

- application

<u>Upgrading the access system</u>

License plate recognition can automate the operation of vehicle traffic gateways. More advanced software can also detect foreign license plates. Currently, cameras at FBL are only used to store a digital photograph of the vehicle registration number. The software is capable of searching for identified registers in multiple registers and displaying stored information. The registration number of each passing vehicle with the associated date and other information is stored in the database. With the appropriate permissions this database can be searched at

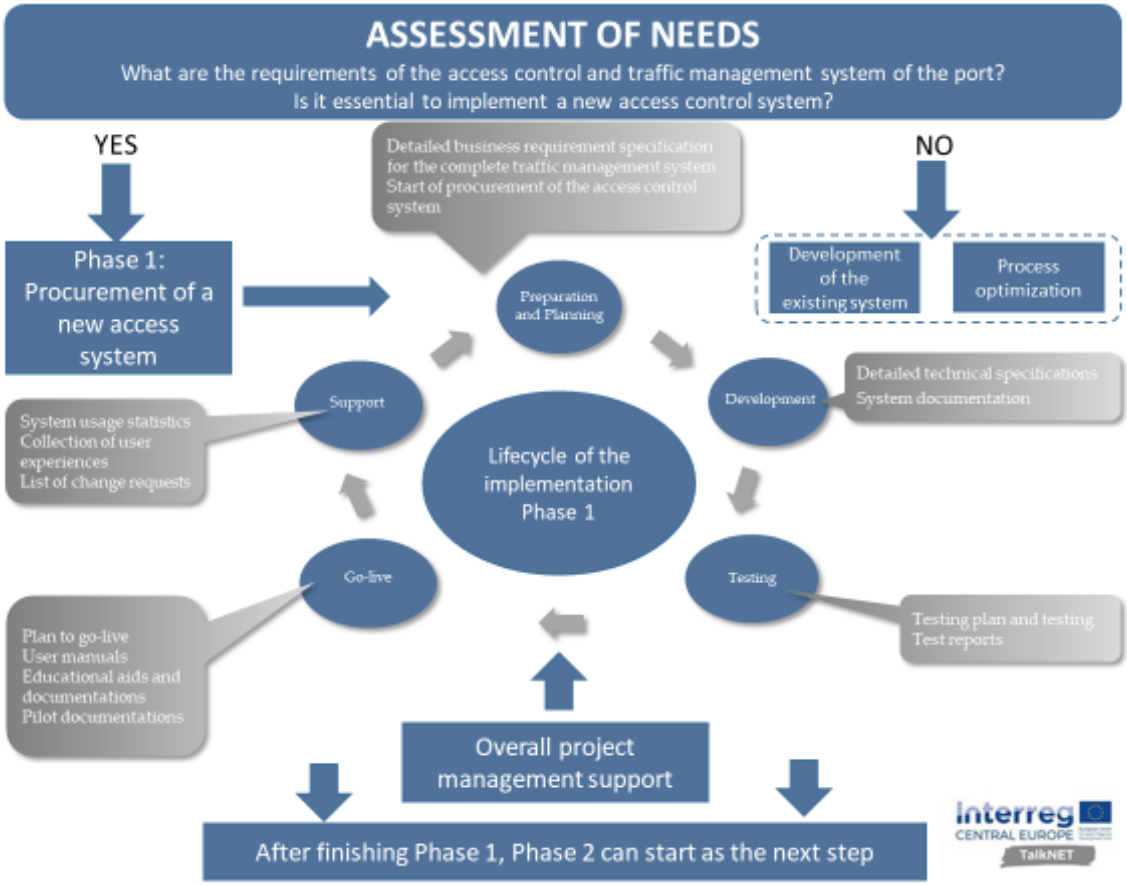
any time and the data and images of each vehicle can be traced back as per different aspects. With wide-angle night vision IP cameras the system can read the license plates in the dark as well.

Requirements for a new, reliable, high-precision license plate recognition, entry and exit information tracking system:

- Quick license plate recognition (front and back) camera and integrated software with existing or newly built barriers and markers.
- Automatic barrier opening, green signalling, license plate recognition and vehicle type identification, as well as photo capture and storage of the vehicle.
- Tracking a vehicle, using number plate recognition cameras located at the harbour area (main intersections, target cameras)
- Register all vehicles with logging and exit time, image, detected vehicle type, retrievable, store the data on the central computer (server) that is part of the system, available to the Command Centre.
- If the driver at the entry point indicates that does not know exactly where the port destination is, then it is possible to help (e.g. voice, headlining, GPS coordinates, SMS, posting of staff)
- By navigating through the area, recognizing the vehicle in the predefined nodes through the image recognition application of the camera system, registering its location and providing further instructions on how to proceed further (even by displaying the license plate number)
- INFO point: creating multilingual INFO point(s) in the designated traffic non-disturbing area at the port for drivers not knowing the area despite the outboard control signs
- Exit information about exit points and main directions (e.g. centrum, M0 motorway) at exit reading license plate (front and back, image recording)
- Simple search facility in the system by registration number, vehicle type, location.
- It is important how many vehicles at the port are at a given moment, which are only stopped for parking purposes in the area, how to charge the parking fee for them, and how to prevent parking for itself or for illegal purposes in the port area
- The Command Centre and the data entry device are planned near the II ports because there is enough space for it, and because of the lower traffic there is no problem with a system failure, from where the system can be built, tested, presented.

3. Tasks to be performed

As detailed above, the system requirements of the access control and traffic management system shall be defined, but as a first step, only a limited-extent pilot action will be executed within the CORCAP. This limited-extent CORCAP pilot action and after that the whole system development and implementation, will take place based in another phase later, based on the following methodology.



19. Figure - Methodology of a new system implementation at FBL
Source: Own editing

Preparation and planning phase

The primary goal of IT systems' implementation is to:

- support decision-making
- enable the company to review and control its operations
- make the operation more efficient
- effectively support the conduct of business processes

Every developing and growing company arrives to a stage in its life cycle where it is necessary to further develop, replace its existing solution, or to bring new solutions to the organisation. The implementation of an IT system is usually a complex process that has many pitfalls.

The most important thing is to assess whether there is a real need for a new system or problems, gaps has to be found elsewhere? The management decision about purchasing must be preceded by

thorough surveys, tests and analyses in order to be able to make a real decision about the need for procurement.

New system procurement

It is advisable to start purchasing an IT system if:

- it is well known to decision makers what problem will be solved by implementing a new system
- those measurable goals have been identified, that achievement is secured by the implemented solution
- it is clear what are the success criterias of the system implementation
- the resources and competencies required to implement the system are available (including the reserves for unexpected events)
- the management of the company is committed to the success of the project and can provide sufficient support for its implementation

Detailed business requirement specification

Considering the project goals, a business specification with detailed requirements for the solution to be procured must be developed.

The following topics should be included in the specification:

- A detailed description of the business processes that the system has to support
- Defining input and output data for each process
- Defining the content and form of the documents produced from the system
- Identification of the users of the system, and the definition of each authority and role
- Performance, availability and response time parameters required from the system
- Ergonomic and other non-functional requirements

It is important for the users of the current system to be involved in the specification phase as they have the knowledge of the advantages, disadvantages and missing functions of the old system, and can also provide useful ideas for the new system to be developed, while avoiding that the new system is based solely on end user needs. Information collected should be synthesized, needs that support strategic goals can be used to develop system concept.

As part of the detailed business requirement specification, an exact functional definition and separation of Phase 1 (CORCAP Pilot action) and Phase 2 (system completion) will be done.

Start of procurement

Purchase documentation

- Operational details of the procurement process
- Requirement specification

- Evaluation criteria

The Purchasing Documentation must be compiled in such a way that it includes criterias for system selection.

From the system side:

- The cheapest solution is usually not worthwhile in the long run, so more can be lost than saved on purchasing.
- Not the appearance of the system is important, but the services it provides, the business logic mapped in the system, and the ergonomic, logical structure.
- Just because a system is recommended by others, it should not be choosen. Own experience should be obtained during system demonstrations or reference visits during the selection process.
- Functions of current system should not be looked, but services that solve the underlying problem. The real need should be considered.
- Feasibility studies to conduct, a specific problem specified for the vendor, and the solutions of the system analyzed, based on the responses received.
- Multiple systems to compare, detailed analyzes of their advantages and disadvantages performed.

From the supplier side:

- Offer from too many candidates (usually 3-5 competitors) should not be asked. Due to the large number of suppliers, the entire procurement process can disproportionately deplete resources and time. Market research should be conducted before starting the procurement and the potential participants filtered out.
- To get to know the experiences of previous system implementation projects carried out by applicants, request references, and if possible, the representatives of the companies listed in the references contacted, and to see how the systems introduced work.
- To get to know the vendors' staff, the CVs of the project participants retrieved, and key players to participate in the procurement negotiations asked.

In order to identify the differences between the current and future IT systems that is wanted to be set up, GAP analysis should be used. The essence of the analysis is that it highlights the differences, gaps the gaps between the current system and business expectations. Based on the results it should be determine what is worth keeping from the old system and what new features will be needed.

The selection phase may consist of one or more rounds. In case of a higher number of applicants, it is advisable to choose multiple rounds. In this case, after getting to know the incoming applications, it is only worthwhile to negotiate deeper with those suppliers that have the best offers for the needs and opportunities. In all cases, the evaluation of bids should be carried out in a transparent and objective manner in order to prevent future disputes. Of course, subjective aspects can also be enforced, but it must be avoided that this factor be dominant.

Evaluation criteria system

The evaluation criterion system is prepared in parallel with the procurement documentation. The evaluation system has qualitative and quantitative elements as well. Each element needs to be prioritized for business purposes. This provides the basis for the evaluation criteria system.

Receiving and processing bids

Incoming offers are processed based on the evaluation criteria system. In the event of a deficiency, documentation to close the offer should be asked. If the bidding phase allows, personal consultations should be conducted with the applicants to clarify the details.

Decision supporting material / Decision

In order to facilitate the decision about the finalist bidders, a decision-making material is prepared for the decision-makers. The decision-making material is based on the results of the evaluation criteria system.

Schedule review

Following the final decision, the schedule (deadlines, tasks, responsible) of the next stages of the project will be reviewed and the modified schedule will be validated by stakeholders and project sponsors.

Implementation phase

Detailed technical specifications

There are two types of IT solutions that need to be taken into consideration.

1. Package software

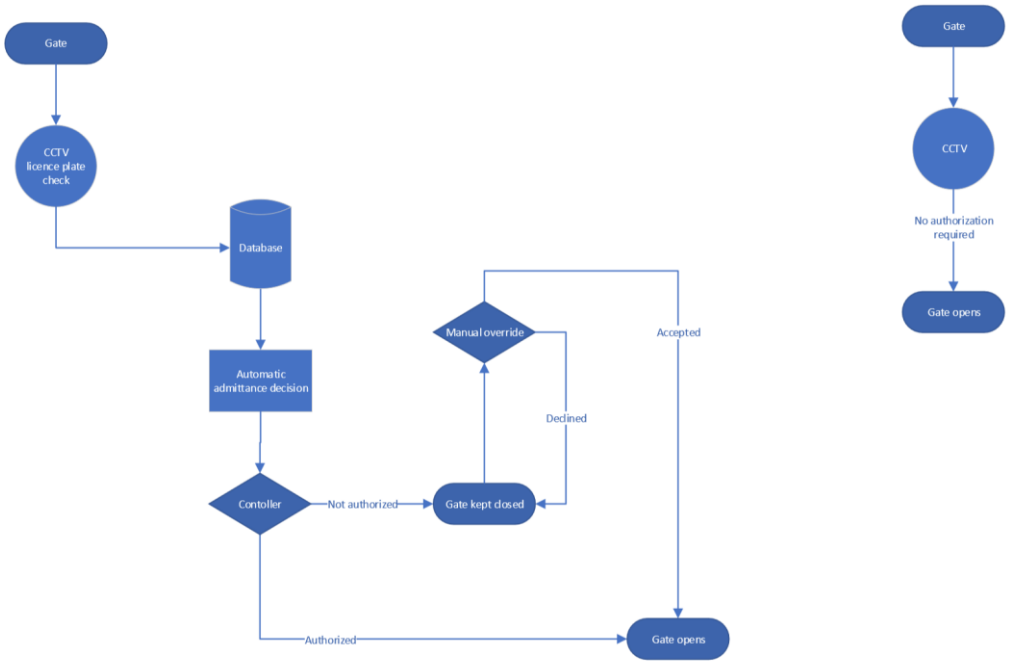
   In the case of a package software, the technical specification is non applicable, rather a specification of implementation is required.

2. Custom software development

   Technical specification is required.

System documentations

- Technical Specification – Technical documentation based on the specification of the technical requirement detailing the IT details of each business requirement.
- Interface Specification – IT description of connections to the system, eg. architecture illustration.
- Back-end operation – full technical description for data warehouse.
- Front-end operation – full technical description for access control system.
- Other documentations – other IT documentations related to the operation of systems.
- (e.g.The flowchart below shows the current access system on the right side, and the proposed process on the left.)



20. Figure - Flowchart of access system of FBL
Source: Own editing

Development

The development phase may vary with the intensity of the selected product (package, custom development). It is important that the development phase is divided into reasonable phases and that the testing of the completed sub-products begins in parallel with the development process. The project should maintain cooperation between project management and development personnel. The needs for change identified in the development / testing phase should also be documented and their implementation integrated into the project plan. The development process also includes the implementation of data migration, which should also be planned in detail so that the strategically important elements of the previously collected data assets will be available in the future.

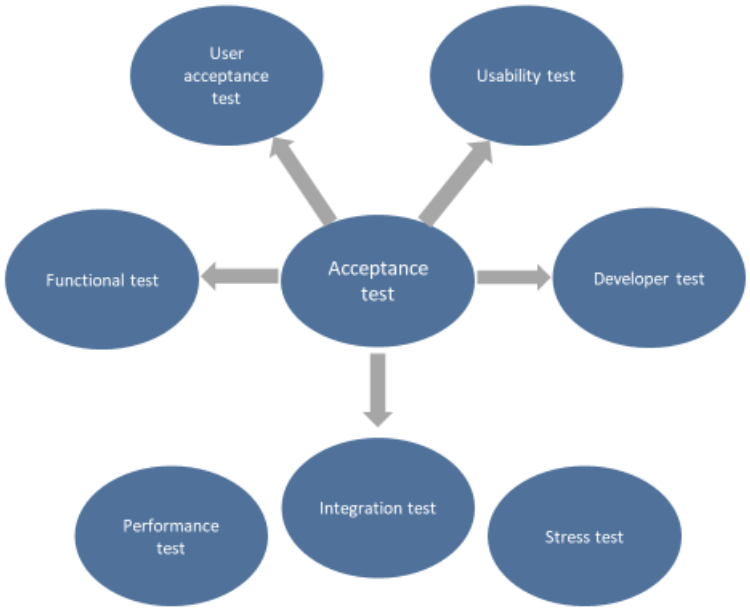
Testing

Testing plan and testing

One of the main tasks of the system development and implementation projects is the go-live of the completed system. In doing so, the completed system must be subjected to thorough testing procedures to ensure that it is safe and fault-free. It is recommended that a test plan is created that describes the testing process, what test with what documentation along with which users will be tested and how the test will be scheduled.

Testing:

Through testing activities, it can be ensured that the developed system works as planned, and that the system is accepted by customers and users during testing. The system acceptance test is a very complex task, usually consisting of the units shown in the figure below:



21. Figure - Test phases
Source: Own editing

The individual test phases:

- **Developer test:** As its name suggests, it is up to the system developer to complete it. By executing the developer test and creating the documentation of its results prove the developer that the system he has prepared meets the specified requirements.
- **Integration test:** Its purpose is to verify the adequacy of system-system connections and to examine the co-operation of each system component.
- **Load test:** Testing the adequacy of hardware and software resources to ensure the operating environment of the system under load beyond the operating load.
- **Stress test:** Designed to check the system for its fail-safe capability, it examines the impact of unexpected loss of system components on system performance.
- **Functional test:** A quick functional test of the system (usually in a live environment) designed to ensure that the system user can verify that the system is functioning and ready for the user acceptance test; that is, to verify that the developed software element meets the functional and non-functional expectations given in the specifications (business and IT concept).
- **UAT – User Acceptance Test**: The most important milestone in the system's takeover process. The UAT must be tested for compliance with the functional and non-functional requirements of the system.
- **Usability test:** Regression testing examines how a previously developed module or function behaves, works with the implementation of a new module or function.

Test reports

Test Protocol is made for every test that the developer fixes for errors.

Preparation to go-live

In order for the system implementation project to achieve its purpose, it must also be prepared carefully for its launch. It is recommended to do the following tasks:

- Create system documentation, including documents related to system use, system operation, and emergency management.
- Prepare system users for system use, doing trainings, system demonstrations.
- Review and if necessary, modify business processes to address the effects of the new system.
- In focus of this limited-extent pilot action a small real life test shall be run. This means that a small pilot with a few users should be run in order to check the system reliability.

The following documents are required for this, but it is recommended to prepare them as required:

Planning to go-live

List of actions and plans have to be put together based on the experiences of the preparation, so that a rigorous plan can be followed for going live.

User manuals

Manuals, descriptions and instructions are prepared for the system users to help the process of going live and to learn operation quicker, safer and saving man hours educating.

Educational aids and documentations

Besides user manuals, system operation principles and additional best practices of procedures are documented for future reference to help integration and correct usage of systems for new labours.

Pilot documentations

All the experiences of the pilot and the above-mentioned documents and aids are collected and filed for use and further reference and review.

Go-live phase

If all developments have been completed and the customer side acceptance has been completed, the preparations have been completed, so the system can go-live. It should be planned carefully and be prepared to restore the old system in a short time if something goes wrong. After going live, system users should be given priority support to fulfil their core business tasks in changed circumstances.

Support

The system's live operational use should be continuously monitored and the support of processes that is required for smooth operation, should be ensured. No matter how thorough the design and testing process of the system was, it is always advisable to analyse the experience of the live operational use from time to time, and to transfer the experience and the need for modification to the system. Beyond live operational experience, there may be external factors (such as changes in legislation) that require changes to the system.

System usage statistics

Data of the system that is generated during operation have to be collected and analysed, reviewed and used for learning, control and intervention, in case it is needed.

Collection of user experiences

To make sure that the chosen and implemented solution is fulfilling the needs, it is vital that the experience of the users is good, that they are satisfied and an ergonomic system is in operation as a result of all the above detailed efforts.

List of change requests

Whatever need and experience comes up during live usage of the new system, demands and requests has to be collected and whenever it is possible implemented.

Another prerequisite of successful implementation is the presence of an overall project management.

There are a number of project management activities that need to be continuously provided throughout the project life cycle to ensure the success of a system implementation project.

These are the following:

- Overall project management
- Risk Management
- Quality assurance
- Change management

4. Key actors

The FBL national public port has been operated by the FBL as of 2005. The company's main profile in the FBL is real estate development and operation, rental property but real logistics activities and services are provided by port operators.

The main roles in the FBL:

- port owner (MAHART Freeport Plc.)
- port manager (FBL)
- port operator/logistics service providers (tenants).

The term of port operator is used in a double sense. On the one hand, for the operator of the port, that FBL, and on the other hand for the tenants, who really carrying out the port activities.

22. Figure - Stakeholders mapping

STAKEHOLDER	LINKED PARTNERS	KIND OF ORGANISATION	DESCRIPTION	STAKEHOLDER'S NEEDS	LEVEL OF INVOLVEMENT
Ministry of National Development	Freeport of Budapest Logistics Ltd. (FBL)	Public body/authority Responsible for national transport development	100% owner of the MAHART Freeport Plc.	Stable operation	Indirect involvement in project implementation.
MAHART Freeport Plc.	Freeport of Budapest Logistics Ltd. (FBL)	Port owner and port operator (public body)	Represents the owner rights.	Stable operation	Direct involvement in project implementation.

STAKEHOLDER	LINKED PARTNERS	KIND OF ORGANISATION	DESCRIPTION	STAKEHOLDER'S NEEDS	LEVEL OF INVOLVEMENT
Freeport of Budapest Logistics Ltd. (FBL)	-	Port manager	Responsible for running and maintaining the Freeport of Budapest. Maintenance, coordinated operation and development of the entire port by law. From 2005 FBL is the director of FBL. Main profile of the company is to operate and develop buildings in the area of the Freeport, renting treatment.	Attracting new clients and serve, the exsiting ones by providing appropriate infrastructure (e.g. for tenants' needs optimized buildings) and efficient marketing activity. Need for developing strong networking within the port and within the country and abroad. Enhance the enabling of the technologies in the port to give better service and conditions for operation. Energy and maintenance cost saving operation and infrastructure development.	Direct involvement in project implementation.

STAKEHOLDER	LINKED PARTNERS	KIND OF ORGANISATION	DESCRIPTION	STAKEHOLDER'S NEEDS	LEVEL OF INVOLVEMENT
ArcelorMittal Distribution Hungary Ltd.	Freeport of Budapest Logistics Ltd. (FBL)	Tenant – Port operator	Dealing with wholesale of steel products	Enhancing networking among logistics companies, freight transport operators.	Indirect involvement in project implementation as user
Ekol Logistics Szolgáltató Ltd.	Freeport of Budapest Logistics Ltd. (FBL)	Tenant – Port operator	Transport of medicines	Enhancing networking among logistics companies, freight transport operators.	Indirect involvement in project implementation as user
Ferroport Ltd.	Freeport of Budapest Logistics Ltd. (FBL)	Tenant – Port operator	Loading and storing products of agriculture	Enhancing networking among logistics companies, freight transport operators.	Indirect involvement in project implementation as user
Ghibli Ltd.	Freeport of Budapest Logistics Ltd. (FBL)	Tenant - Port operator	Dealing with freighting, warehousing	Enhancing networking among logistics companies, freight transport operators. Testing, implementing new services in terms of citylogistics.	Direct involvement in project implementation in case of potential pilot realization
Kelet-Trans 2000 Ltd.	Freeport of Budapest Logistics Ltd. (FBL)	Tenant – Port operator	Storage, warehousing	Enhancing networking among logistics companies, freight transport operators.	Indirect involvement in project implementation as user

STAKEHOLDER	LINKED PARTNERS	KIND OF ORGANISATION	DESCRIPTION	STAKEHOLDER'S NEEDS	LEVEL OF INVOLVEMENT
Lagermax Autótranszport Ltd.	Freeport of Budapest Logistics Ltd. (FBL)	Tenant – Port operator	Ro-Ro port operation, loading and storage of vehicles	Enhancing networking among logistics companies, freight transport operators.	Indirect involvement in project implementation as user
Lagermax Autótranszport Ltd.	Freeport of Budapest Logistics Ltd. (FBL)	Tenant – Port operator	Ro-Ro port operation, loading and storage of vehicles	Enhancing networking among logistics companies, freight transport operators.	Indirect involvement in project implementation as user
MAHART Container Center Ltd.	Freeport of Budapest Logistics Ltd. (FBL)	Tenant – Port operator	Providing container terminal services	Enhancing networking among logistics companies, freight transport operators.	Indirect involvement in project implementation as user
MAHART Gabonatárház Ltd.	Freeport of Budapest Logistics Ltd. (FBL)	Tenant – Port operator	Providing loading and storing products of agriculture	Enhancing networking among logistics companies, freight transport operators.	Indirect involvement in project implementation as user
MASPED Logisztika Ltd.	Freeport of Budapest Logistics Ltd. (FBL)	Tenant – Port operator	Dealing with storage, warehousing	Enhancing networking among logistics companies, freight transport operators.	Indirect involvement in project implementation as user
RSR Cargo Ltd.	Freeport of Budapest Logistics Ltd. (FBL)	Tenant – Port operator	Freighting of containers, customs, storage	Enhancing networking among logistics companies, freight transport operators.	Indirect involvement in project implementation as user

STAKEHOLDER	LINKED PARTNERS	KIND OF ORGANISATION	DESCRIPTION	STAKEHOLDER'S NEEDS	LEVEL OF INVOLVEMENT
Dunatár Ltd.	Freeport of Budapest Logistics Ltd. (FBL)	Tenant – Port operator	Dealing with loading and storing petroleum products	Enhancing networking among logistics companies, freight transport operators.	Indirect involvement in project implementation as user
Royal Sped Zrt. (Royal Sped Ltd.)	Freeport of Budapest Logistics Ltd. (FBL)	Tenant – Port operator	Dealing with customs service operation	Enhancing networking among logistics companies, freight transport operators.	Indirect involvement in project implementation as user
More than 60 different type of service providers in the Freeport	Freeport of Budapest Logistics Ltd. (FBL)	Tenant	Dealing with different logistics and storage activities.	Enhancing networking among logistics companies, freight transport operators.	Indirect involvement in project implementation as user
Potential E-commerce companies, web shops	Freeport of Budapest Logistics Ltd. (FBL)	Potential tenants	Companies selling mainly electrical devices and food via on-line as potential new tenants to be settled in the port.	Reducing storing costs, delivery time. Need for modern and innovative storage solutions.	Direct involvement in project implementation in case of pilot realization.
Centre for Budapest Transport	Freeport of Budapest Logistics Ltd. (FBL)	100% owned public company by Municipality of Budapest	Preparing and implementing the transport strategy of	Need for legislative framework and policies on national level in fields of freight	Indirect involvement in project implementation.

STAKEHOLDER	LINKED PARTNERS	KIND OF ORGANISATION	DESCRIPTION	STAKEHOLDER'S NEEDS	LEVEL OF INVOLVEMENT
			Budapest, including city logistics issues. Managing, ordering and financing public transport services, etc.	transport and city logistics.	
MLSZKSZ (Hungarian Association of Logistic Service Centers)	Freeport of Budapest Logistics Ltd. (FBL)	Association of private logistics operators	Interests in development of combined freight transport, increasing the inland and international competitiveness of its members.	-	Direct involvement in project implementation in the design/specification phase.
RSOE (National Association of Radio Distress-Signalling and Infocommunications)	Freeport of Budapest Logistics Ltd. (FBL)	Association	RSOE is operating RIS and currently developing and implementing KIR, a national IT system for port management.	All port-level management systems shall be interlinked with KIR.	Direct involvement in the project implementation.

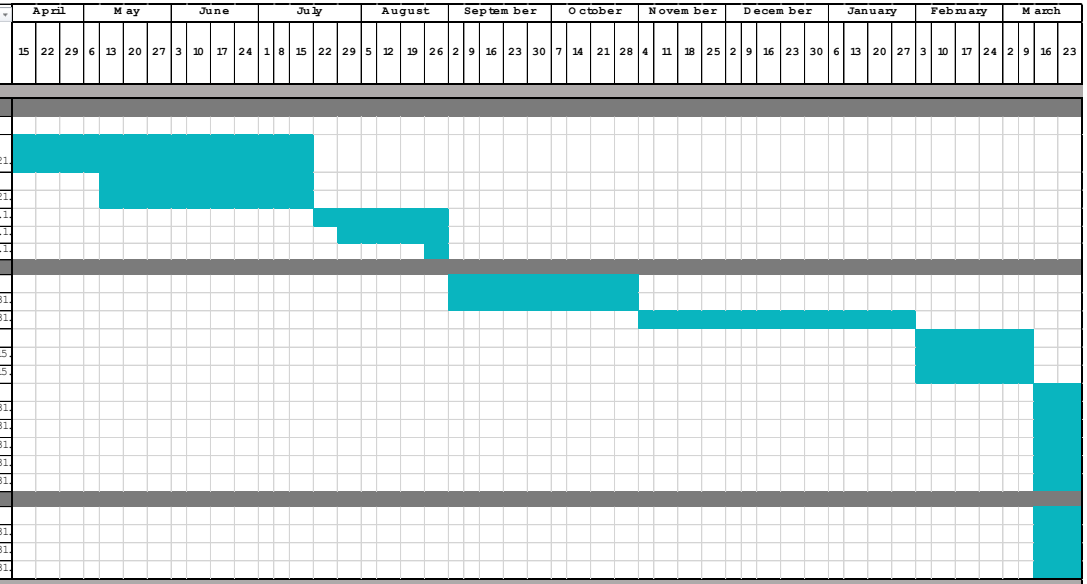
Source: Own editing

Besides the stakeholders, further key actors are:

- Development team
- Overall Project management

5. Timeline and financial sources

	Actions	Responsible	Deadline
CORCAP – Limited-Extent Pilot Action Access Control and Traffic Management System Implementation Freeport of Budapest Action Plan	**Phase 1**		
	Preparation and planning phase		
	New system procurement		
	Detailed business requirement specification for the entire port traffic management system		2019.júl.21.
	Start of procurement		
	Purchase documentation		2019.júl.21.
	Receiving and processing bids		2019.szept.1.
	Decision supporting material/Decision		2019.szept.1.
	Schedule review		2019.szept.1.
	Implementation of Phase 1		
	Detailed technical specifications		
	System documentations		2019.okt.31.
	Development		2020.jan.31.
	Testing		
	Testing plan and testing		2020.márc.15.
	Test reports		2020.márc.15.
	Preparation to go-live		
	Planning to go-live		2020.márc.31.
	User manuals		2020.márc.31.
	Educational aids		2020.márc.31.
	Educational documentations		2020.márc.31.
	Pilot documentations		2020.márc.31.
	Go-live of Phase 1		
	Support		
	System usage statistics		2020.márc.31.
	Collection of user experiences		2020.márc.31.
	List of change requests		2020.márc.31.
Phase 2			
Port traffic management system development	Based on the detailed business specification in Phase 1 Timeline will be agreed in Q2 2020		



23. Figure - GANTT chart of the Action plan - Phase 1 (Limited-Eextent Pilot Action within CORCAP)
Source: Own editing

6. Expected results

The access control and traffic management system upgrade at FBL in Phase 1 is scheduled at all 3 gates and would need to not only be able to recognise data based on licence plate reading but be able to connect and store data that can be integrated through a modular system later on in Phase 2.

Possible further development of the traffic management system in Phase 2 will include besides the automatic access control a navigation system within the port area, and aims to efficiently manage flows of goods, improve truck throughput, eliminate congestion, and gain a bird's eye-view of operations, and to deliver, access and integrate all relevant data in real time. As a result, all stakeholders – from port and fleet managers, to freight carriers, drivers – enjoy role-specific, up-to-the-minute visibility. The system will contribute to the optimization both traffic and logistics operations in order to allow larger quantities of goods to be transhipped in the port area.

Thanks to smart-port philosophy, ports are achieving sustainable economic growth and maximum benefit for their customers and the people of area, while minimising the environmental impact. Moreover smart-port system is constantly being developed and adapted.

Such system shall include state-of-the-art IT solutions including smart technologies, such as artificial intelligence (e.g. image recognition algorithms), smart sensors, cameras, and cloud based solutions. A comprehensive IT platform shall also incorporate mobile applications (Apps) and thus make it possible for traffic information and port-related services to be accessed from mobile devices such as tablets and smartphones.

The solution streamlines port logistics – from the moment goods arrive, to when they reach their final destination – and benefits all process participants.

Introducing a new management system, central portal and mobile applications would support seamless communications, enabling port managers, terminal staff, freight carriers and parking slot coordinators to exchange information with each other and with drivers and vehicles. Rapid insight into the current traffic situation and entire port infrastructure would enable faster responses, ultimately saving time and money. In addition, less congestion around the port benefits drivers and the environment. So far, only large seaports have applied such systems.

Since a new and innovative IT system will be developed including software and hardware elements, the system must be thoroughly designed and well tested before installation. During the development, the most up-to-date IT solutions shall be applied, but the risks of malfunctioning of these solutions are negligible. Regarding the impacts on the environment, the implementation of a traffic management system in Phase 2 will cause less traffic jams in and around the port area, less waiting time at docks, less time to respond to traffic disruptions and optimised trip planning. Thus, the planned development has a clearly positive environmental effect contributing to the reduction of carbon dioxide emissions of the trucks entering into the port area.

7. References

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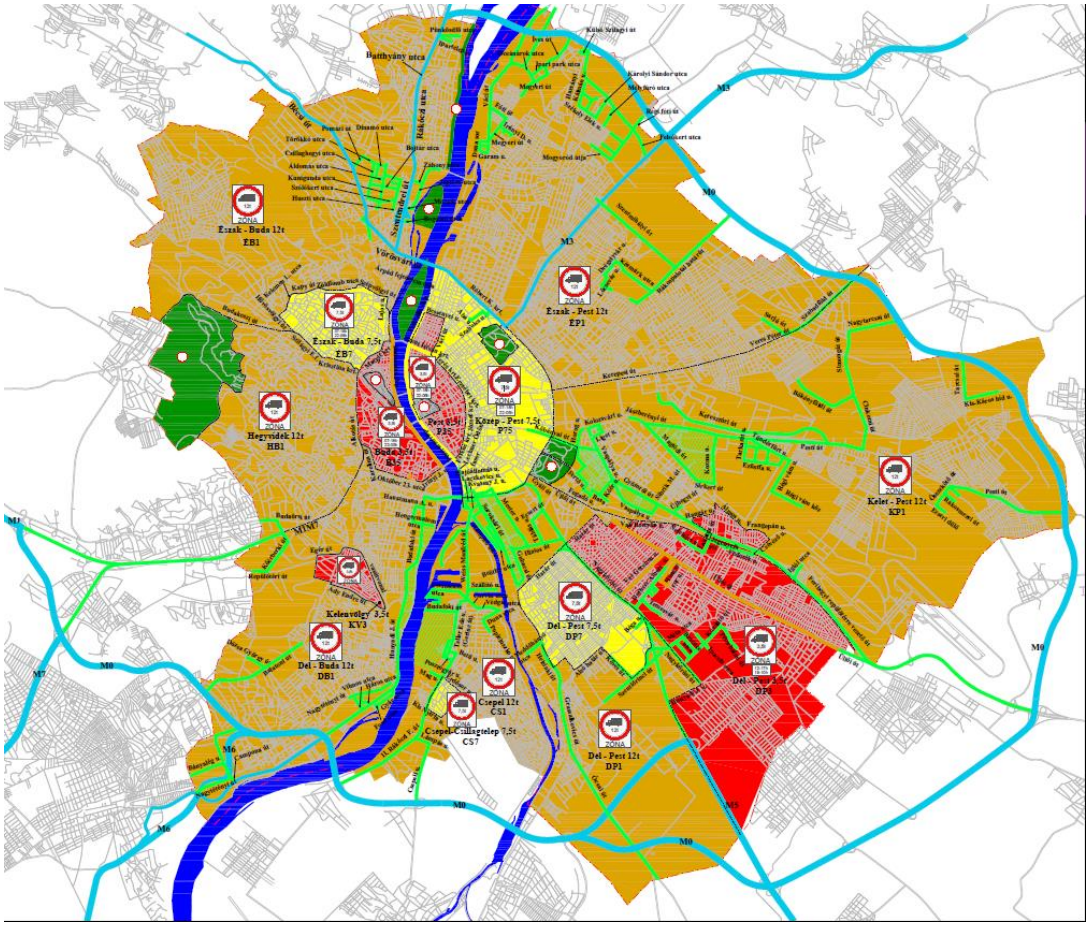
3. Cluster – New multimodal services: overview of needs and best practices in cooperation with stakeholders to develop the action plan

A sound framework of analyses has been developed as first step of TalkNET implementation. The analyses have outlined problems, needs and challenges related to market opportunities to reinforce or activate new multimodal services at the Freeport of Budapest as an intermodal logistics hub.

This action plan details the problems, needs and challenges of the Freeport of Budapest (FBL) related to the introduction of the desired city logistics functions which are, at the same time, significantly affected and determined by the policies applied by the Municipality of Budapest, and to lesser extent by national logistics policies. The action plan is a detailed plan defining the main actions to be performed in order to achieve the selected goals and results.

During the preparation of the action plan it is proposed that the Freeport of Budapest reconsiders its pilot and modifies its content: instead of LNG to e-mobility. The reason is dual: the LNG terminal is currently under planning and implementation will start in 2019, meanwhile city logitics is better served with a range of electric vans and other vehicles than LNG which is for longer distances.

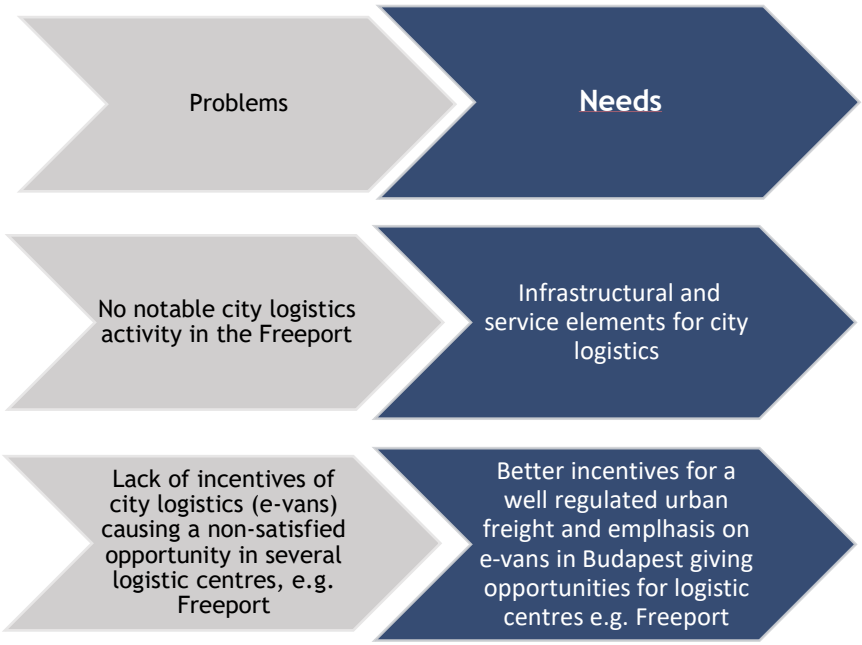


14. Figure: Freight transport zones of Budapest

Source: https://bkk.hu/wp-content/uploads/2014/06/BMT.pdf

Needs

The Figure below summarizes the needs of the FBL's and Budapest region's needs related to the city logistics in general, based on the analysis carried out in the initial phase of the TalkNET project.



24. Figure: The identified problems and needs related to city logistics in the Freeport and in general in the Budapest region

Source: Own editing

Infrastructural and service elements for city logistics

To be the lead in city logistics FBL has decided to make efforts to become the main city logistics hub in Budapest for what it has very (pre)conditions: closeness to the downtown, good connection to major roads (M0, M5 and Hungaria-ring), multimodal accessibility (road, inland water and railway). To reach that goal it should make much more efforts to promote itself as a comprehensive city logistics center by creating the image of "the city logistics hub" of Budapest, but to fully benefit from its good location and accessibility, it should also modernize its infrastructure and premises and offer an attractive environment and services for those companies who would be keen on using the Freeport as a city logistics hub.

The development needs for creating the operational conditions of city logistics activities in the Freeport, do not need to be defined by the Freeport itself primarily, since an area for such purpose has been already designated. Furthermore, a sort of city logistics practice is already functioning (Ghibli) in the port. Based on this experience, the main obstacle for the further spread of city logistics services (in general in Budapest and particularly at the FBL) appears to be lack of a strict city logistics regulation. If the regulation would change and there would be a bigger pressure on the companies to apply city logistics and also to use e-vehicles in the inner-city zone, then the Freeport could offer potential development places for them. Then should be the specific development needs of interested companies defined concerning the Freeport.

Several elements are were identified in TalkNET study D.T. 1.2.7. for creating a well operating city logistics service focusing on the material (infrastructural) and service sides, as follows:

- On strategic level the attitude and willingness of the decisionmakers and the effective organization are the main questions: involvement of companies, use of proper vehicles tends to be the success factor of the enterprise;
- Human resources, technical skills of the personnel: drivers, security guards, representatives of public utilities, etc.;
- Tenants: haulage contractor, commercial companies, businesses, etc.;
- Telecommunication: appropriate telecommunication solutions between the companies and the end users, and between companies and companies;
- Place for the city logistics: there is already a designated place for the city logistics in the „Budapest Dock development concept" within FBL;
- Logistic facilities: Warehouse space, buildings, etc.;
- Logistic equipment: Trucks, trolleys, etc.;
- Infrastructure: Road, rail infrastructure, public utilities, etc.
- electric charges and a designated area which is able to serve an e-vehicle fleet

On the level of the company (i.e. Freeport of Budapest) and especially its image and commercial offer which would be for sale as the 'product' for potential tenants who are interested in using FBL as a city logistic hub, the identified needs form a complex matrix where the infrastructural (technical) and service elements are examined and seen by potential tenants as a single package and FBL should concentrate on offering a package that is attractive for the wider possible range of potential tenants.

Better incentives for a well-regulated urban freight in Budapest giving opportunities for logistic centres e.g. Freeport

Currently, city logistic solutions in Budapest do not work due to the lack of regulation which would apply a "stick and carrot" policy by providing incentives and restrictions at the same time. Suppliers are not forced and therefore not interested to use sustainability-oriented city logistics solutions. Larger commercial chains and major parcel transporter companies (TNT, DHL, GLS, DPD) use some city logistics solutions to achieve greater efficiency within the city, because of reducing delivering time with cargo bikes for example, but e-fleet is not present yet.

By aligning the interests of those involved in the logistics chain the current urban freight transport practice shall be transformed into an organized city logistics system. Particular attention should be paid to the IT-based organization and supervision of urban (including freight) transport, and to the optimization of the use of concentrated loading areas in public spaces, primarily providing basic care. A comprehensive city logistics concept should be formulated to provide institutional, service background, urban service relationships, and territorial and temporal regulation of logistics.

In freight transport, the link between long-distance transport and the last stage of transport (the "last mile") should be organized more efficiently so that the individual delivery, i.e. the least efficient section of the freight, is as short as possible. Using intelligent transport systems can shorten delivery times and reduce congestion. On top of that, an e-fleet can reduce local pollution and noise in the city centre. The aim of city logistics over time is to make intra-urban freight transport much more during the night-time to ease road congestion during morning and afternoon peak traffic hours.

Past solutions

Except the designation of the area for city logistics within the Freeport, no other relevant past solutions in the Freeport of Budapest or Budapest Region were identified for this action plan.

The TalkNET knowledge tool on market opportunities to reinforce or activate new multimodal services revealed and analysed several international best practices. This exercise was challenging, as very few relevant, well-documented best practices exists in this field. The aim was to identify a good example where an already existing intermodal terminal repositioned its services to focus its activities more towards city logistics services.

Among the international practices examined, the SOGARIS terminal at Arenc in Marseilles (link by references) was identified as an example with relevant lessons learnt for the situation in the Freeport of Budapest.

General overview

Like several large urban agglomerations, Marseilles has real estate constraints leaving limited availability for land to be used for urban freight distribution. In such a context enterprise involved in freight distribution were electing for sites further away from the city center, exacerbating congestion. To mitigate this issue (logistics sprawl) SOGARIS, a major manager of distribution centres and logistics zones, in partnership with SNCF (the French national railway company), developed a logistic zone on a highly accessible site adjacent to the port, with good road (motorways A7, A50 and A55) and public transit accessibility (underground Bougainville or National stations, RTM bus line, tramway station 'ARENC Le Silo') and with national rail connectivity.

25. Figure: The location of the SOGARIS intermodal terminal site in the City of Marseilles

Source: Own editing based on Google Maps

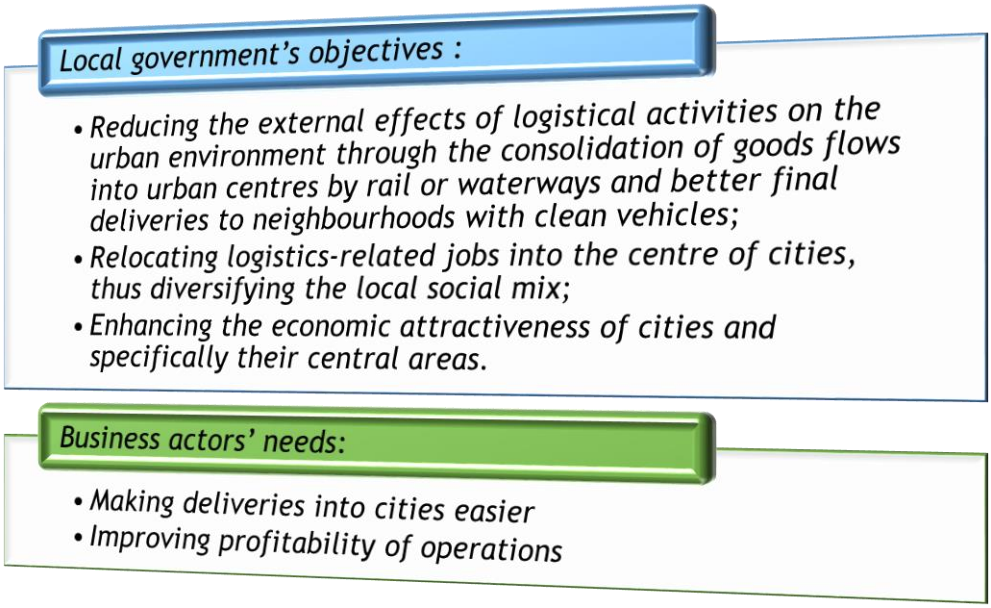
26. Figure: Aerial view of the SOGARIS intermodal terminal site in the City of Marseilles

Source: SOGARIS-CARREDIS

The 9-hectare brownfield site is located about 2 km from Marseilles city centre and the Euroméditerranée business district. It was built on land owned by SNCF (part of a former rail yard, known as Arenc). The logistic centre outstands not only by its excellent location, but also by its resolutely contemporary conception integrating photovoltaic cells on the roof that makes it a symbol of a new building generation dedicated to welcoming logistic activities and incorporated in sustainable development logic.

The Sogaris Arenc logistic platform is owned and managed by the company Sogaris which is a public-private corporation involved in designing, developing and managing logistics facilities.

The vision and operation of Sogaris is to make local government objectives and business needs meet according to the following model.



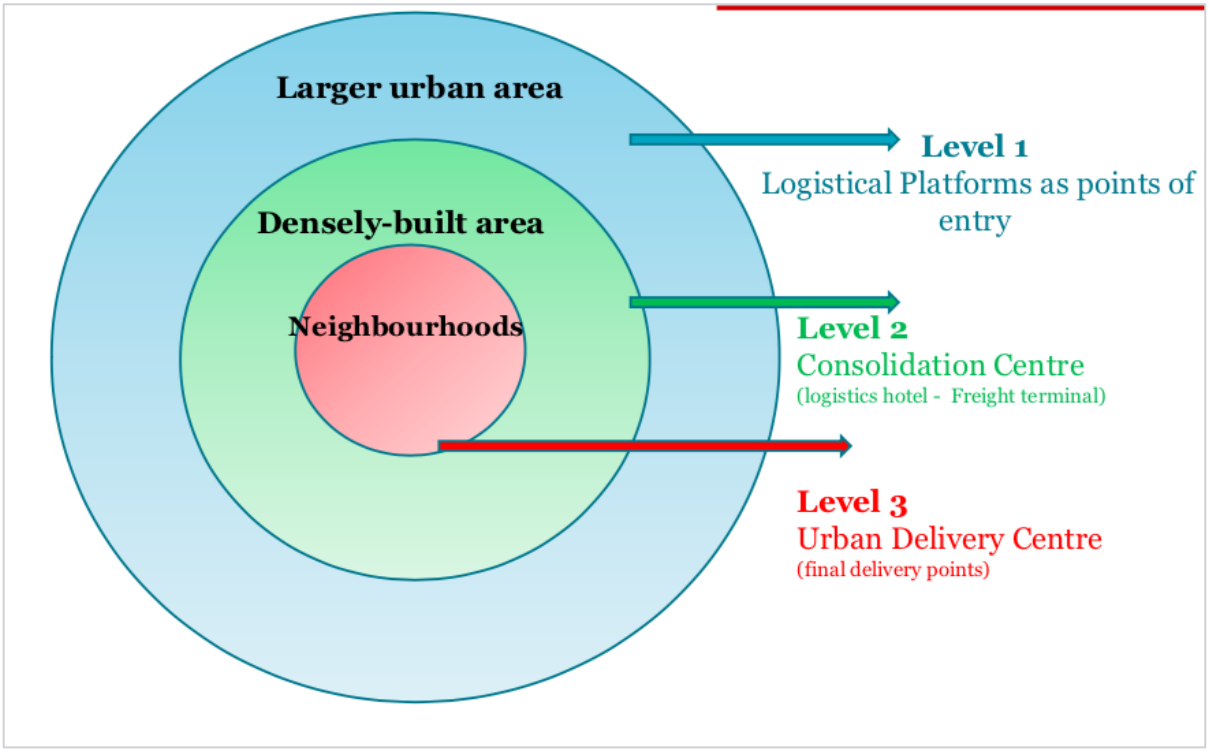
27. Figure: Stakeholder interests in the business model of SOGARIS intermodal terminal in Marseilles

Source: Own editing

In order to meet these objectives, the strategy of Sogaris is to locate a network of purpose-built logistical facilities of three types, respectively servicing*:*

- Entire urban areas with logistical platforms as points of entry;
- The most densely-built areas with consolidation centres (logistics hotel);
- Neighbourhoods with final delivery points.

Thus, the urban freight strategy of Sogaris is defined on three geographical levels with three different service offer as the following figure.



28. Figure: The three level logistic approach of Sogaris

Source: https://www.slideshare.net/MIPIM/urban-logistics-next-challenge-for-cities?from_action=save and www.sogaris.fr

Motivation for considering the solution proposed

Despite not being an inland port, but a former railway yard, the Arenc logistic platform in Marseille represents a good example of transition from a traditional (brownfield) logistic function site to a state-of-the-art city logistic hub. It is geographically also very close to the city centre (2 km, while the Freeport is approximately 3 km from the edge of Budapest downtown). Sogaris-Arenc is also a good example for the Freeport because of its up-to-date environmental solutions and because of the design and quality of the buildings which were one of the reasons of winning few property awards after its completion. Although, the latter cannot be simply replicated by the Freeport, it suggests that attention should be paid to the renovation of the buildings in a way to offer attractive environment for possible tenants seeking not solely warehouses but representative headquarters, too. Based on the above described success factors, the occupancy rate in Sogaris-Arenc is almost full, which proves the success of this model.

Replicability and adaptability

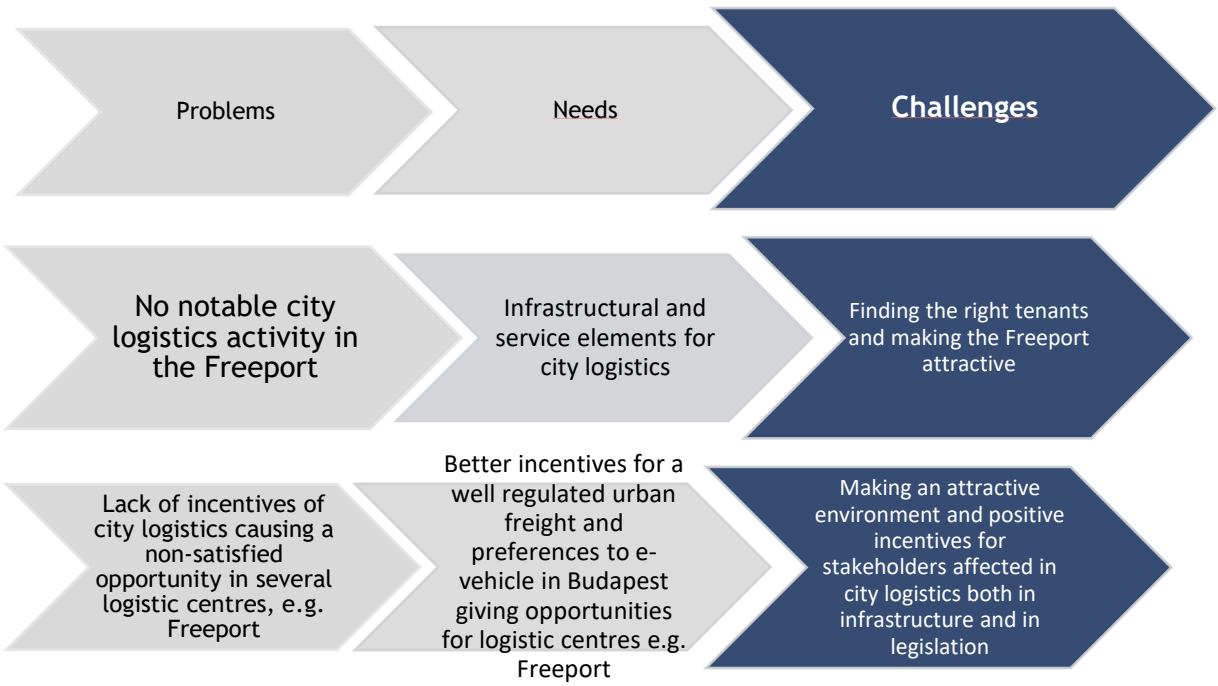
Being on level 1 the managing company's strategic approach, Sogaris Arenc serves exactly the same scale of geographical area (larger urban area) as the Freeport of Budapest which is also the same type of logistical point of entry ro the city as Arenc. The Freeport can repeat the success of Arenc and even offer more in terms of multimodality due to its outstanding multimodal accessibility.

1. Action: Assessment of market opportunities to reinforce or activate new multimodal services - city logistics

Currently, only a few companies in the Freeport deal with city logistics. E-commerce is becoming increasingly important in the economy today. Every year, the number of online web shops and their performance is increasing. The near-town location of the Freeport to the city centre and the designated areas of city logistics make it possible for this commercial sector to settle in FBL. The main challenge is thus finding the right companies who are willing to deal with city logistics within the area of the Freeport of Budapest. Possible companies are those who have willingness for environmental protection and who have better condition (advantages) if they are transporting their goods from the port where the main advantage would be either cost or times efficiency. It is important to note the majority of the activities located in the Freeport are already not benefitting from the Freeport's inland water port function, but rather they had chosen the Freeport because of its other characteristics such as the good location and accessibility (by road and rail), availability of enough space and competitive prices. This means that the Freeport currently operates more as a 'traditional' logistic centre than a typical port. Consequently, the main challenge for the Freeport is to facilitate the transformation from a logistic centre to a city logistics centre. But due to its current image which's key element is still the port function, in terms of image and marketing, the main challenge is to change its image from a port to a comprehensive city logistics hub.

2. Main challenges tackled

The challenges related to new market opportunities in city logistics were identified in the initial phase of the TalkNET project. These challenges focus on finding the right tenants and making the Freeport attractive as a city logistics centre through infrastructural and legislative changes and incentives.



29. Figure: The problems, needs and challenges of city logistics in the Freeport of Budapest

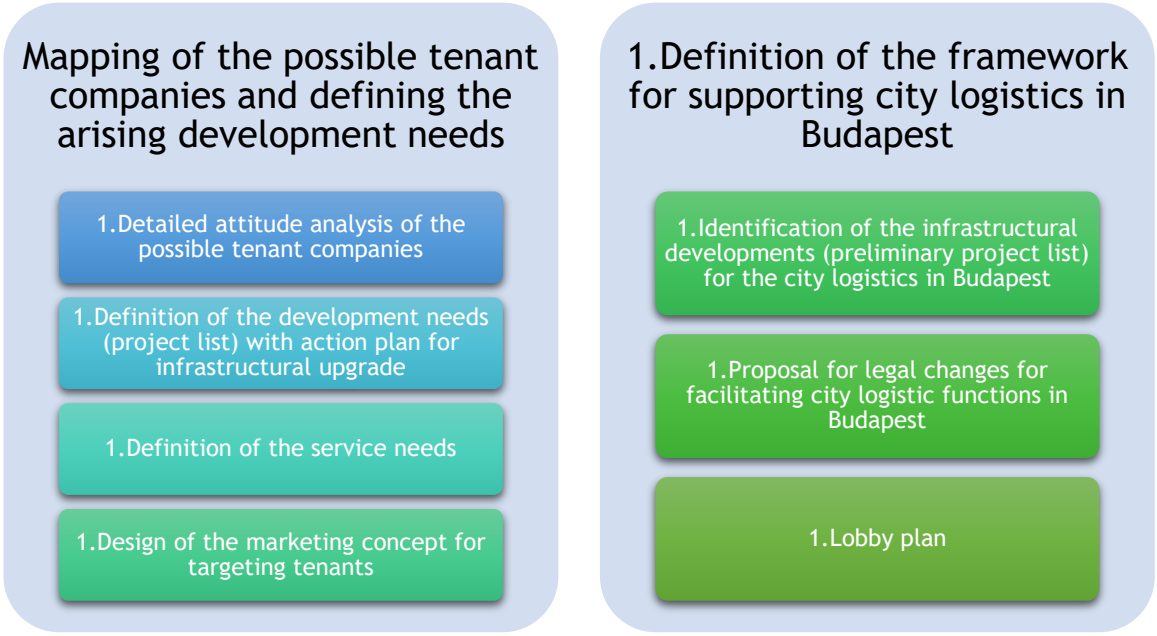
Source: Own editing

Despite that there are two preidentified challenges, the challenge of the Freeport of Budapest to attract new tenants interested in dealing with city logistic activities can be seen also as one complex challenge: the lack of (enough) attractivity of the Freeport's current offer which is mostly due to external factors: the lack of pressure from the regulatory side (legal framework) and the lack of infrastructural capacity on the potential recipient areas (e.g. along the downtown area of Danube quay) or in the possible multimodal connection points (infrastructural barrier eg. the connection to the suburban railway tracks). In much smaller extent the inner infrastructure and service offer of the FBL also needs to be upgraded as an e-fleet needs a charging infrastructure but these deficiencies are not among the decisive factors for (not) choosing the Freeport by the tenants.

Based on the results of an online questionnaire made for the purpose of the TalkNET study 1.2.7. which surveyed a wide range of web-shops based in Budapest, there is a significant potential in attracting these web shop's warehouses into the Freeport. Most of the surveyed web shops (who had indicated that they want to move their warehouse to a new location) were open to move to the Freeport area. These companies sell mainly electrical devices and food and they currently have a storage area over 200 square meters. In these companies the share of the personal pick-ups is only 15%, so the location of the Freeport suits for them. The main difficulties they are facing are the lack of loading areas and, partly as a consequence, the unpredictable delivery times. The Freeport has the enough area to offer them, but due to its image as a 'traditional' port and as a brownfield site (which is also isolated within the structure of the city, to some extent, despite its good transport connections), it is currently not an attractive and desired destination for the potential tenants. However, to fully exploit the advantages of its location, the Freeport should upgrade its infrastructure (the upgrade of the railway connection is already in the pipeline) and offer innovative solutions for transport companies by offering multimodal transport options (primarily via water and in the future also possibly through connecting to the local public transport railway network). The Freeport as a city logistics hub could fully exploit its advantages only if it would strengthen its multimodal accessibility in order to create the image and unique selling point of being the only city logistic centre in Budapest accessibly by water, road and railways, at the same time. The option for connecting to and use the public transport's railway system would be another extraordinary option. However, the strengthening of its multimodal offer does not rely only on the Freeport only: there should be adequate docks for smaller, urban freight barges at various points on the Danube quays and they should have an easy access to the adjacent roads. This could be reached only through strong collaboration with the Municipality of Budapest, with national level stakeholders and also with the interested end-users, the companies which would use this option for their logistics activities.

3. Tasks to be performed

Several actions have been identified to provide adequate answers to the needs and challenges identified. The chart below summarizes the main steps to be taken.



30. Figure: Actions to promote city logistics in the Freeport of Budapest

Source: Own editing

Mapping of the possible tenant companies and defining the arising development needs

Detailed attitude analysis of the possible tenant companies

There was a preliminary online questionnaire sent for the potential tenant pool (online shops dealing with smaller, mostly electronic items) surveying the involved companies needs and opinion on several aspects of city logistics and explicitly about the Freeport of Budapest as a potential site for their further operation. But there is a need for better and deeper understanding the possible tenants' companies' attitude and motivations. For such purpose a detailed attitude analysis should be carried out by using several tools to get valuable inputs on their views and opinion (e.g. mental mapping, in-depth interviews, focus group meeting etc.). Relevant consultants from the property market should be also involved to collect their experience related to site selection in the logistics and warehouse segment.

Definition of the development needs (project list) with action plan for infrastructural upgrade

Based on the findings and needs identified in the previous step and based also on international best practices, the detailed definition and description of the developments needs in the Freeport of Budapest should be done. In this task, the development needs relate to the infrastructural and technical upgrade needs. They shall be grouped in two category based on the importance of their fulfilment according to the possible tenants and best practices: those needs which fulfilment is of absolute importance (by the option of the majority of possible tenants), the 'priority list', and those which would be desirable to fulfil in mid- or medium-term ('complementary list'). The definition of the concrete development needs on the priority list should be formulated as potential (short-term) projects with time-frame indications and preliminary cost-estimations.

Definition of the service needs

The description of the service needs is also based on the task 0, but it should strongly build on international best practices, given that some services are less or not known at the domestic market, so there is no current need for them, so their introduction could ensure a competitive advantage for attracting tenants. The service needs shall be also grouped as priority and complementary services and the priority service list should be also formulated as a project list with time-frame indications and preliminary cost-estimations.

Design of the marketing concept for targeting tenants

The design of the city logistic marketing concept for the Freeport of Budapest should be partly also based on the findings of task 0 and international experience, but it should strongly use the existing property market marketing approach and tools supplemented with strong environmental arguments. Better sustainability features of city logistics and the FBL is one of the main advantages that can be a selling point for environmentally conscious companies. The marketing concept should focus on building a strong distinction between FBL and other logistic centres in Budapest and to sell the Freeport as 'the city logistic hub of Budapest'.

The new marketing concept of FBL, launched in 2018, already incorporates this concept. The new "Budapest DOCK" image positions the Freeport and a logistics and industrial park offering trimodal logistic services in the heart of Budapest.

31. Figure: The opening page of the new website of FBL designed according to the new marketing concept

Source: www.bszl.hu

Definition of the framework for supporting city logistics in Budapest

Identification of the infrastructural developments (preliminary project list) for the city logistics in Budapest

For the full exploitation of its location and multimodal accessibility the Freeport should take into account and (start to) deal with the limitations present outside its area and responsibility. With the involvement of the Municipality of Budapest, national level stakeholders and also with the interested end-user companies, FBL shall define and propose the list of necessary infrastructural developments

(preliminary project list) for the city logistics in Budapest in order to promote the need for ensuring the adequate accessibility on the various points of the city (primarily along the Danube quay).

Proposal for legal changes for facilitating city logistic functions in Budapest

Some of the necessary infrastructural developments for the city logistics in Budapest might need minor (technical) changes in the existing regulations, either on national or on local level, or in some cases on both levels. Given that that modification of such regulations is a long process, the detailed proposal for the required legal modifications would speed up and facilitate the process. The proposal should be well-established from technical and legal aspects and I should go through adequate consultation process involving all the relevant stakeholders. The proposal shall be accompanied by a detailed description justifying the need for the change of the legal acts.

Lobby plan

For the better positioning, gaining support among decision-makers and enhancing the chance for the implementation needs there is a need for strong lobby activity initiated and/or made by the Freeport and possibly by other companies interested in promoting the spread of the city logistics in Budapest. The lobby plan serves as an agenda for the identification of specific goals and targeted decision-makers in order to transfer them the messages of the FBL (and other interested companies, in case the creation of a lobby groups is feasible) on the most appropriate and effective way.

4. Key actors

Municipality of Budapest and its Unit Responsible for Transport and the company that is implementing the city freight transport policy, Budapest Public Roads (Közút) Ltd. are the main actors who could promote the city logistics on local level. Municipality of Budapest might define the policy objectives for the development of city logistics.

32. Figure: Stakeholders mapping

STAKEHOLDER	KIND OF ORGANISATION	DESCRIPTION	STAKEHOLDER'S NEEDS	LEVEL OF INVOLVEMENT
Ministry of Innovation and Technology	Public body/authority	Responsible ministry for defining the national transport (development) and e-mobility policies and for their implementation. The Ministry owns public ports in Hungary, such as the area of Budapest Freeport and the area of some logistics centers (BILK).	Stable and safe operation, to reduce the negative environmental impact of the transport modes, ensuring competition in transport sectors where it is desirable and purposeful.	Legislative regulation on national level based on EU and national policies.
Municipality of Budapest (Unit Responsible for Transport)	Public body/authority (local level)	The Municipality of Budapest creates rules of urban planning; regulates the parking and parking management system of the capital, the specially protected and protected parking zones, the establishment of applicable waiting rates, the use of public space, the organization and tasks of the public space administration.	Ensuring effective and smooth transport in Budapest while taking into consideration most of the needs of the population, industry and service sector, as well as ensuring that the negative environmental impacts are mitigated or they are decreasing due to the measures taken.	Legislative regulation on local level based on the national and local policies.

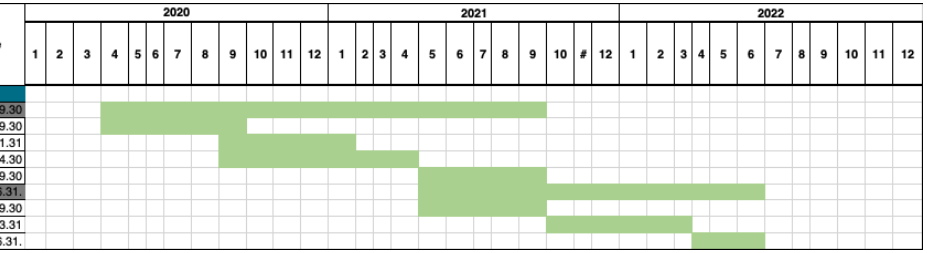
STAKEHOLDER	KIND OF ORGANISATION	DESCRIPTION	STAKEHOLDER'S NEEDS	LEVEL OF INVOLVEMENT
Budapest Public Roads (Közút) Ltd.	100% owned public company by Municipality of Budapest	Preparing and implementing the transport strategy of Budapest, including city logistics issues. It is responsible for the operation and maintenance of roads, bridges owned by the Municipality of Budapest, and the operation of traffic facilities throughout Budapest. It is also responsible for the freight transport organization within the city boundaries, for the designation and maintenance of freight zones and it also operates the online freight transport toll system called TOBI.	To implement the tasks defined by the Municipality of Budapest, ensuring smooth freight traffic in the city and maximize the revenues collected from freight transport companies.	Implementation of policies, measures defined on higher levels. Practical knowledge on the issues related to the use of public spaces.
Clean Air Action Group (CAAG, Levegő Munkacsoport) and other NGOs	Non-governmental organization(s)	They have a wide range of activities including research, consulting, public awareness campaigns, publishing and advocacy at the local, national and international levels with the overall goal to reduce air pollution and to make clean air available for the citizens.	• To ensure that new developments, regulations etc. do no cause the deterioration of the air quality, but they contribute to make the air cleaner in the	Indirect involvement through public consultations and professional consulting (optionally).

STAKEHOLDER	KIND OF ORGANISATION	DESCRIPTION	STAKEHOLDER'S NEEDS	LEVEL OF INVOLVEMENT
		greening the state budget. Their main field of interest are the following: sustainable transport, sustainable energy policy, sustainable urban development and protection of green areas in the cities.	cities. To ensure that city logistics concept and services are developed with taking into account sustainability and environmental considerations.	
Freight forwarders	Private companies	Current and potential tenants of the FBL dealing with different logistics and storage activities.	Smooth and unlimited, less-regulated operation all over the city with the least possible payment for public space use. Good road and public space infrastructure. Good infrastructure and quality services corresponding to their needs within the FBL for reasonable price.	Indirect involvement by consultations ie. by giving their opinion on the proposed measures to help in prioritizing the development needs and to form the service offer.
MLSZKSZ (Hungarian Association of Logistic Service Centers)	Association of private logistics operators	A professional networking and lobby organization lobbying for the interests of their members such as the development of	Smooth and unlimited, less-regulated operation of their members all over the city with the least	Indirect, consultative involvement in defining and designing the city

STAKEHOLDER	KIND OF ORGANISATION	DESCRIPTION	STAKEHOLDER'S NEEDS	LEVEL OF INVOLVEMENT
		combined freight transport, increasing the inland and international competitiveness of its members, to create incentives and state subsidies for switching the fleet to EFV and to introduce city logistics services.	possible payment for public space use.	logistics regulations on national and local level.

5. Timeline and financial resources

	Actions	sponsil	Deadline
Subject			
ASSESSMENT OF MARKET OPPORTUNITIES TO REINFORCE OR ACTIVATE NEW MULTIMODAL SERVICES Freeport of Budapest Action Plan	Mapping of the possible tenant companies and defining the arising development needs		2021.09.30
	Detailed attitude analysis of the possible tenant companies		2020.09.30
	Definition of the development needs (project list) with action plan for infrastructural upgrade		2021.01.31
	Definition of the service needs		2021.04.30
	Design of the marketing concept for targeting tenants		2021.09.30
	Definition of the framework for supporting city logistics in Budapest		2022.06.31.
	Identification of the infrastructural developments (preliminary project list) for city logistics in Budapest		2021.09.30
	Proposal for legal changes for facilitating city logistic functions in Budapest		2022.03.31
	Lobby plan		2022.06.31.



33. Figure: GANTT chart of the Action plan for the implementation of activating city logistic services in FBL

Source: Own editing

6. Expected results

The tasks and actions described in this action plan were defined with regards to the overall aim to develop and promote the Freeport of Budapest as the city logistic hub of Budapest. This takes a long time in order to reach this goal, there are concrete infrastructural, technical and services improvement needs to be done, as well as a need for repositioning the image of the Freeport from a 'traditional' port and a brownfield site to a modern city logistic centre.

Consequently, the action plan has defined tasks both on internal and external level, and the two layers would finally lead to the reach the desired goals.

By implementing the actions defined as a precondition for facilitating the attraction of new tenants interested in setting up an activity in city logistics, the Freeport will offer adequate infrastructural environment and services for the possible tenants that is attractive for them and competitive with the offer of other logistic centres. Part of the infrastructural upgrade will be targeted to ensure and improve multimodal accessibility of the Freeport of Budapest. The preparation of well-designed development proposals both for the infrastructural and technical needs and service needs will make the base for their short-term implementation thus to attract new tenants to the Freeport. The accompanying marketing concept will serve as a supporting to tool to reach these goals and facilitate the change of the vision on the Freeport from port to a city logistic centre.

The expected result of the above task will be the following:

- Better understanding of the needs of possible tenants,
- A complete set of infrastructural and service development needs which is in line with the potential tenants' expectations,
- A ready-to-use marketing concept focusing on the unique selling point of the Freeport of Budapest and on its other advantages based on location and accessibility, complemented with strong sustainability arguments.

    - To fully exploit the advantage of its multimodal accessibility Freeport of Budapest should consider the facilitation of the improvement of the external conditions for multimodal city logistic transport in Budapest. For this purpose, there are tasks targeting to support and prepare the necessary infrastructural upgrade needs outside the Freeport i.e. in other locations of Budapest and also the attributed changes in the legal regulation.
    - The following results will be achieved through these activities:
- A complete list of necessary infrastructural developments (preliminary project list) for the city logistics in Budapest in order to promote the need for ensuring the adequate accessibility on the various points of the city,
- Detailed proposal for the required legal modifications accompanied by a detailed justification of the need for the change of the legal acts.
- A lobby plan for the better positioning, gaining support among decision-makers and enhancing the chance for the implementation needs.

As an overall result, the city logistics needs in Budapest will be clearly identified and presented to the decision-makers.

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