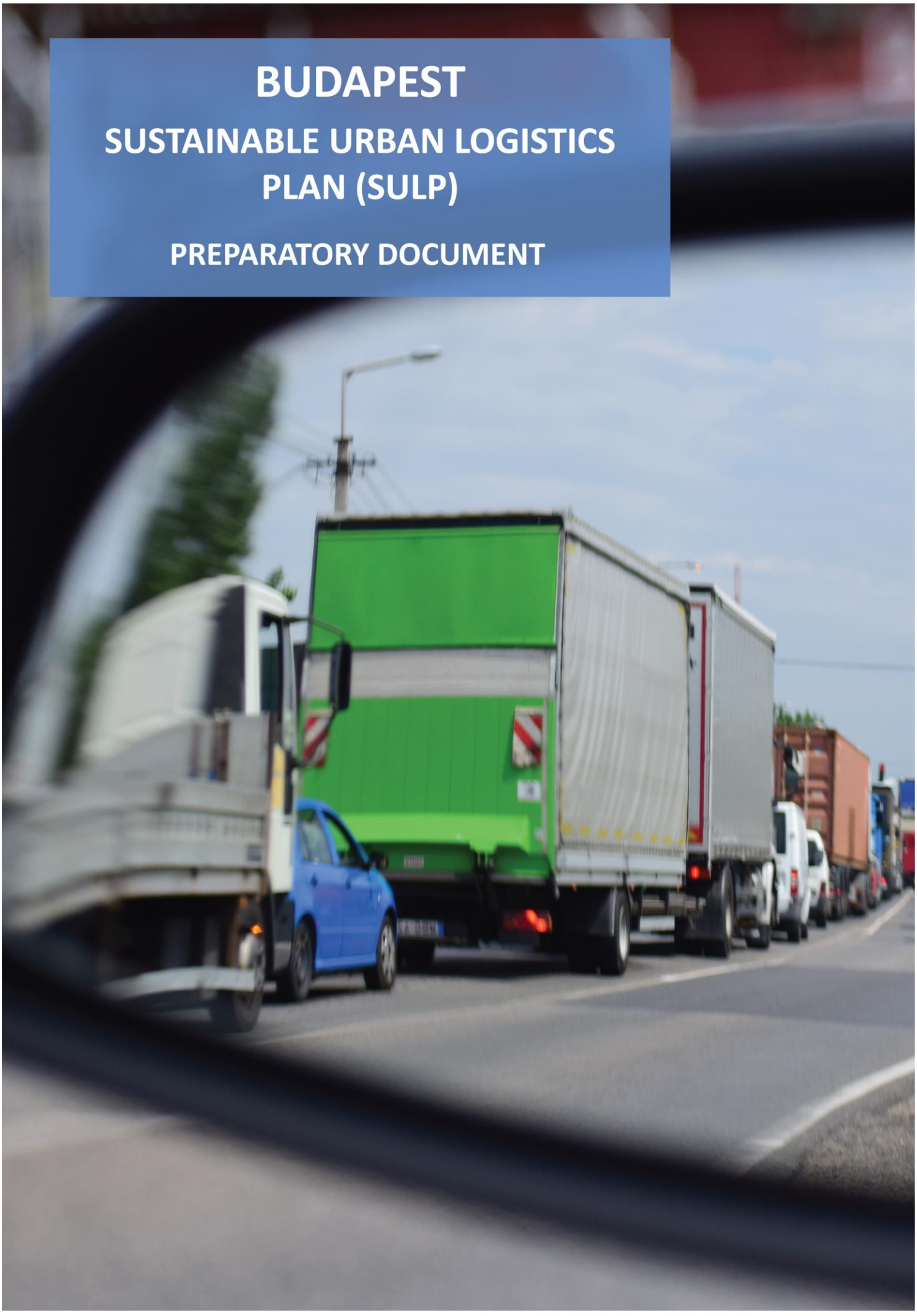
BUDAPEST

SUSTAINABLE URBAN LOGISTICS PLAN (SULP)

PREPARATORY DOCUMENT



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PREPARATORY DOCUMENT

FINAL VERSION

D.T 3.2.2

Mobilissimus Ltd.

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1. Introduction

Transport is the second largest energy-consuming sector, with a 32 % of share of final energy consumption. Therefore it is necessary to consider the White Paper (2011) of the European Commission, which sets 10 goals for a competitive and resource-efficient transport, two of which are specific for urban areas: “Halve the use of ‘conventionally-fuelled’ vehicles in urban transport by 2030, phase them out by 2050“ and “Achieve essentially CO2-free city logistics by 2030 - in major urban centres.” Paris climate agreement (2015) – the world's first comprehensive climate agreement – has an important role also in the logistic sector, if we are looking into the aims of it: "Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.". Recognising the important role Sustainable Urban Mobility Plans can play, the European Commission proposed in its Action Plan on Urban Mobility of 2009 to accelerate the take-up of Sustainable Urban Mobility Plans in Europe by providing guidance material, promote best practice exchange, and support educational activities for urban mobility professionals.

To fully understand possibilities for mitigating urban freight flows and to solve the problem holistically, we would need to tackle urban freight on the level of entire supply chain (including enterprise’s strategies) and from the perspective of Functional Urban Areas (FUA). By the definition, FUA consists of the city and its commuting zone and is identified as polycentric cores and the hinterlands of FUAs identified based on commuting data, including all settlements from where at least 15% of the workers commute to any of the core settlement(s) (OECD, 2016).

The project SULPiTER (Sustainable Urban Logistics PlannIng To Enhance Regional freight transport) has been developed to support policy makers in improving their understanding of the FUA freight phenomena in an energy and environmental perspective, enhancing their capacity in urban freight mobility planning in order to develop and adopt Sustainable Urban Logistics Plans – SULPs. The Project focused on several FUAs in Central Europe, namely Bologna, Budapest, Poznan, Brescia, Stuttgart, Maribor and Rijeka, whose authorities were involved in the project as fully-fledged partners.

SULPiTER designed and developed a tool aimed at estimating the freight demand generated by the economic activities in the FUA individuated by the project partners. SULPiTER tackles urban freight in the perspective of FUAs, taking into consideration the functional transport and economic relations between inner urban centres (the usual and limited territorial target of public regulations) and the surrounding urban territories, as well as the functional transport and economic relations within FUAs not affecting downtowns. The SULPiTER tool is intended to be a decision support system for policy makers to facilitate the process of elaboration of alternative city logistics scenarios.

2. Transport policies - state of the art analysis

The topic of freight transportation is a complex process involving many different players. In addition to the players of the logistics chain (manufacturers, carriers, traders), there are several professional organisations – such as the Association of Hungarian Logistics Service Centres (MLSZKSZ) – involved in the efficient organisation of the logistics chain. Naturally, the logistics process also includes public administrative stakeholders, the government, and the municipal governments. One of the drivers of the logistics chain is the general public, whose demands are in the focus of the activities of the players involved in freight transportation.

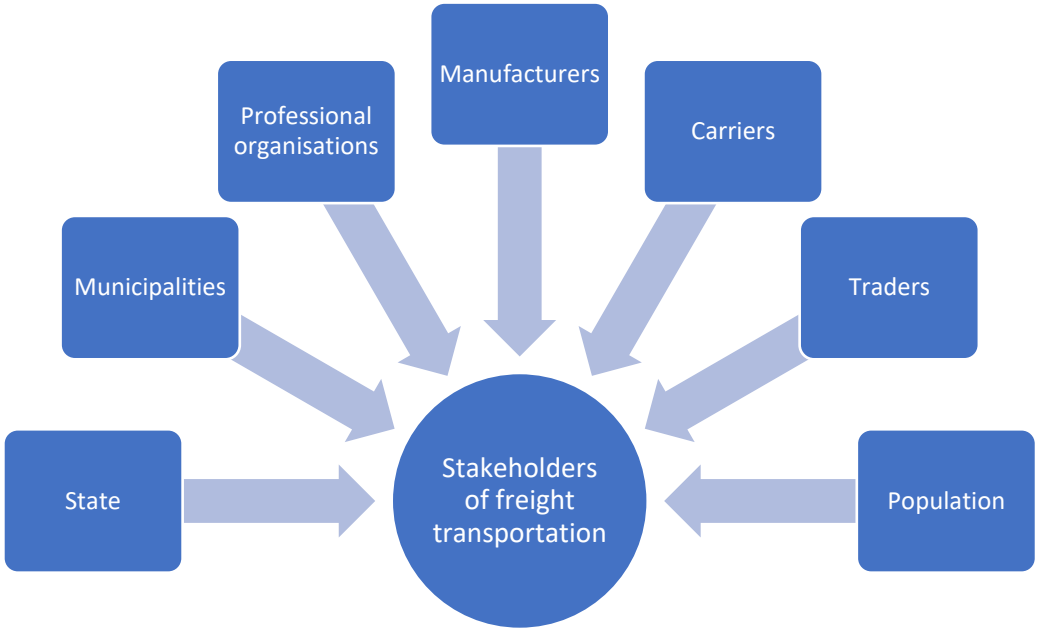


Image 1: Players of the logistics chain

In order to make sure that the needs and interests of all concerned stakeholders are met without conflict, and to ensure that market position of the market players compared to one another remain balanced, a complex regulatory is system is needed.

The regulatory foundation is ensured by way of legislation, and strategic documents created by a hierarchically built organisational system with different scopes of authority. The regulatory system, in terms of both legislation and strategy, territorially consists of national, regional, metropolitan, and municipal levels.

The table below shows the most important acts of legislation and strategic documents that determine the specific features of the domestic transport system, and within that the unique characteristics of the freight transport system.

KEY LEGISLATION		
Law	Scope	Law type
Act I of 1988 on public road transport	national	law
Act CLXXXIII of 2005 on railway transport	national	law
Decree 92/2011. (XII. 30.) of the General Assembly of the City of Budapest on the regulation of freight transport within the administrative boundaries of Budapest	local (Budapest)	Decree of the General Assembly of Budapest

Joint Decree 1/1975 of Minister of Postal Services and Transport and of the Minister of the Interior (II.5) on the rules road traffic	national	ministerial decree
Act LXVII of 2013 on distance-based toll payable for the use of motorways, highways and main routes	national	law
Decree 13/2010 (X.5) of the Minister of National Development on the traffic rules applicable to vehicles exceeding allowed gross vehicle weight, axle load and size parameters	national	ministerial decree
Decree 101/2003 (XII. 23) of the Minister of Economy and Transport on the specific conditions of international road transport of goods and persons	national	ministerial decree
Decree 190/2008 (VII. 29) on the restrictions applicable to heavy truck traffic	national	government decree

Table 1: Acts of legislation and strategic documents that determine the specific features of urban logistics

The national legislation related to traffic and freight transport is based on the laws that concern the individual traffic sectors (Act I of 1988 on road traffic; Act CLXXXIII of 2005 on railroad traffic; Act XLII of 2000 on water traffic, and Act XCVII of 1995 on air traffic). These laws cover the entire system of traffic sectors: they cover topics on safety, integration into the international system, state and municipal tasks, the rights and obligations of the participants of traffic, and environmental conditions.

The most important act of legislation at the national level is the decree on the basic rules of road traffic. This law sets out the rights and obligations of the participants of road traffic. Another important law that affects vehicle road traffic is the act on the rules of road usage of 2013, which sets out the regulatory framework of the usage-based toll system created in line with the relevant directives of the European Union.

Three of the most important national legislation that specifically concerns the process of freight transport are included in this table. All of these concern the traffic restrictions applicable to heavy trucks, and the legislative framework of the process of freight transport.

Image 2: Trucks awaiting entry into the country at the border, as the main resources of road logistics[1]

Of the local legislation that concerns freight transportation in Budapest, the decree of the General Assembly of the City of Budapest on which the document entitled "The Freight Transportation Strategy of Budapest" (Budapest Teherforgalmi Stratégiája) is based is the most important act of legislation.

STRATEGIC DOCUMENTS	
Strategic document	Scope
National Transport Infrastructure Development Strategy (2014)	national
Medium-term Logistics Strategy	national
Balázs Mór Plan (2013)	local (Budapest)
Freight Transportation Strategy of Budapest (2008)	local (Budapest)
Budapest 2030 – Long-term Urban Development Concept (2013)	local (Budapest)
Uniform Concept Proposal For City Logistics Objectives In Budapest (2014)	local (Budapest)

Table 2: Main strategic documents concerning urban logistics

Of the strategic documents, the National Transport Infrastructure Development Strategy – which sets out the transport development objectives of Hungary and the tools necessary for their implementation – concerns transportation development at the national level.

The Medium-term Logistics Strategy – a projection of logistics developments planned for the 2014-2020 period – concerns the area of logistics.

The Balázs Mór Plan contains the concepts that determine the future of transport in Budapest in the 2014-2030 period, which places great emphasis on the development of sustainable forms of transport. This is the official transport development strategy of Budapest; the review of which is still ongoing.

The Budapest 2030 Long-term Urban Development Concept sets out the future milestones of the urban development of the city based on the specific economic, social and environmental aspects that characterise the city. The strategy also covers the necessary developments in the field of urban freight transport and logistics.

[1] The photos in the document – if it is not indicated differently – were taken by András Ekés.

The "Freight Transportation Strategy of Budapest" and the "Uniform Concept Proposal For City Logistics Objectives In Budapest" documents deal specifically with the topic of urban freight transportation. In order to influence truck traffic within the boundaries of Budapest, the former document envisions different kinds of zones that would be based on gross vehicle weight, as well as protected zones, and sections of roads that would only be accessible to terminating traffic. The latter document is a document that deals with the topic of urban freight transportation and provides a comprehensive look into the problematic areas of freight transportation in Budapest, and sets out recommendations for its resolution as well. The document that was prepared in 2014 is not, however, current at this point, it is under review.

The creation, updating, and implementation of the regulatory framework is the responsibility of different organisations. The organisations are hierarchically built: decisions are made at the ministerial level, which are then implemented by organisations at the national and local levels.

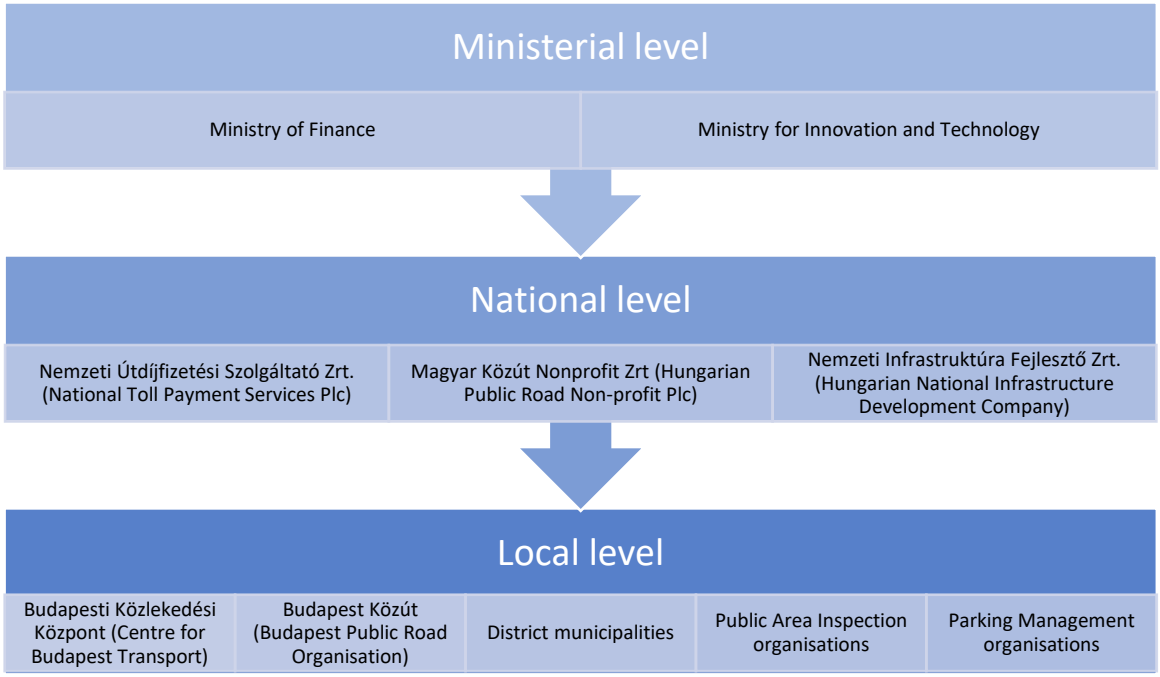


Image 3: Organisational background of the regulatory framework of logistics

Currently in Hungary, there is no separate ministry that deals with transport policy, this policy area belongs in the scope of authority of two ministries. On the one part, the determination of the most important directions and areas of development belongs within the purview of the Ministry for Innovation and Technology, while the economic aspects belong under the Ministry of Finance.

Three organisations are worth mentioning in particular when it comes to national-level executive organisations: Magyar Közút Nonprofit Zrt (Hungarian Public Road Non-profit Plc) operates, maintains and repairs motorways and the national public road network, while the implementation of the development projects are commissioned by a state-owned company, Hungarian National Infrastructure Development Company (Nemzeti Infrastruktúra Fejlesztő Zrt.).

The tasks of the collection of tolls, provision of tolling services and the related control functions linked to the usage-based toll system that was introduced in Hungary in July 2013 are tasks performed by the National Toll Payment Services Plc (Nemzeti Útdíjfizetési Szolgáltató Zrt). Around 6500 km of public roads are toll roads in Hungary, and the size of the toll that is proportionate to the distance travelled depends on the vehicle category (J2, J3, J4).

At the local level, in Budapest, the municipal organisational system is also involved in the handling of transportation related matters. Budapest has a two-tier municipal system, comprising metropolitan and district municipalities.

The Municipality of Budapest carries out all the urban development, urban restoration and urban settlement operation tasks that concern the whole of Budapest, or which are related to the special role that Budapest plays in the country. The Municipality of Budapest performs the local government tasks for the whole of Budapest as well as several districts, and those related to Margaret Island, which is an area that is directly managed by the Municipality.

The individual district municipalities within Budapest carry out all the tasks and responsibilities of a municipality – within the framework of the law –, which are not delegated to the exclusive competence of the Municipality of Budapest by law, and are also responsible for the urban development, urban planning and urban operation activities that do not fall within the competence of the Municipality of Budapest.

Out of the organisations with executive powers engaged in activities related to transportation, the following organisations have the largest scope of authority:

Budapest Közút Zrt is responsible for the operation and maintenance of roads, bridges, built objects owned by the Municipality of Budapest, traffic control systems within the whole of Budapest, as well as of the roads that are not the property of the Municipality of Budapest but are used by public transit services in Budapest.

The Budapesti Közlekedési Központ (Centre for Budapest Transport) is organisation owned by the Municipality of Budapest, whose most important tasks include the establishment and implementation of the transportation strategy of the city, management of the transport system of the city, as well as the ordering and financing of the public transit services of the city.

In connection with traffic, the public area inspection organisations are responsible for executing the control processes related to the authorised use of public areas, and ensuring that activities subject to road management permits are compliant with the applicable rules and regulations. In Budapest public area inspection activities are performed by the Law Enforcement Directorate of the Municipality of Budapest, and there are also independent public area inspection organisations operated by the district municipalities.

As a general rule, the Municipality of Budapest Law Enforcement Directorate is the competent authority in terms of public areas, mostly main roads operated by/owned by the Municipality of Budapest, while public areas, roads operated by/owned by the district municipalities fall within the competence of the district-level public area inspection organisations. Any public areas, roads within districts that do not have a public area inspectorate organisation in place fall within the competence of the Law Enforcement Directorate of the Municipality of Budapest.

Parking services management related matters are generally delegated to the competence of organisations owned by the municipal governments.

3. Urban Freight Transport - state of the art analysis

3.1. The process of freight transportation

3.1.1. Intermodal zones of international significance in freight transportation

On account of its central location in Europe, in particular in the Central Eastern European region, Hungary plays an important role in freight transportation and logistics processes on both a continental and intercontinental scale. The largest logistics regions of international significance in Hungary are those in Budapest (BILK, Csepel Freeport, Debrecen, Székesfehérvár and Sopron. The image below presents the national logistics centres, four of which – Csepel, Győr-Gönyű, Baja, Debrecen – are tri-modal (road-rail-waterway, and road-rail-air), while the others are bi-modal (road-rail).

The key foreign partners in road freight transportation, based on turnover, are:

- export: Austria, Germany, Italy, Romania, Slovakia
- import: Austria, Slovakia, Germany, Italy, Romania

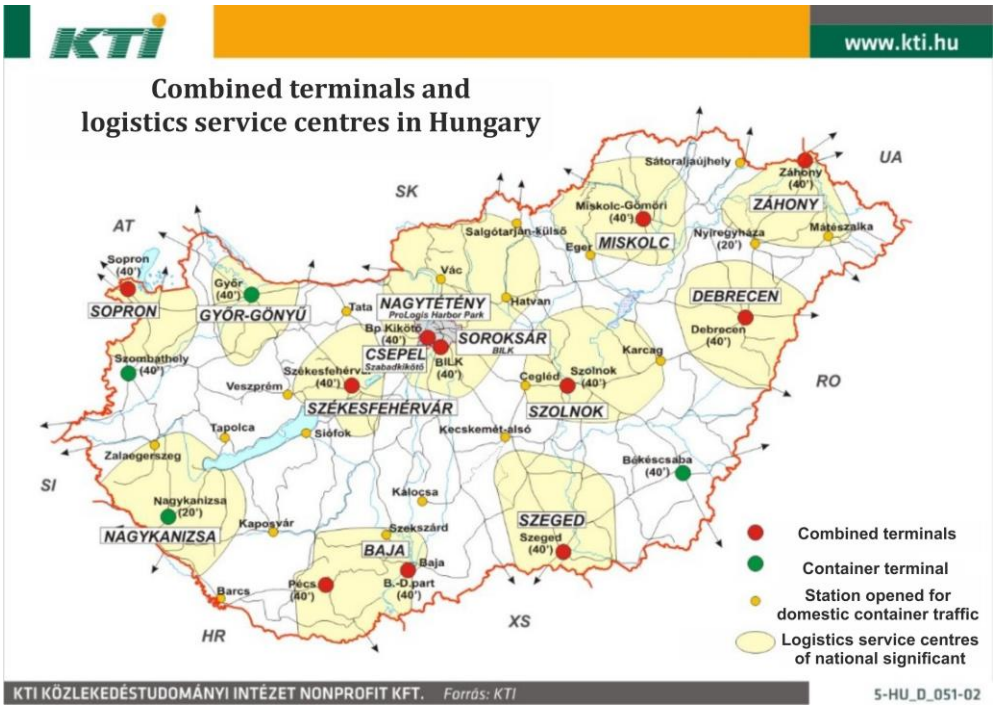


Image 4: Hungarian combined terminals and logistics service centres of national significance (OLSZK)[2]

The capital city and its functional area provide appropriate conditions for the establishment of multi-modal transportation chains, with three intermodal logistics centres of international significance located in the region:

Budapest Freeport and Industrial park

The Freeport located on the northern section of Csepel Island is an important port of the Danube-Main-Rhine waterway, playing a crucial role in Europe's waterway trade. In addition to the waterway, the Freeport and the connecting intermodal logistics service centre has both road and rail connections. On its premises, it has (uniquely in the country) a waterway container terminal with side capacity, with an additional RO-RO terminal, warehouses, offices and outdoor storage areas fulfilling

[2] source: http://www.kti.hu/uploads/images/Trendek/6_Hatodik/a01_5-150.jpg

transportation and logistics needs. There are 187 ship docks overall in the three basins within the port; of which two basins are dedicated to handling commercial traffic and one basin is dedicated to the handling oil and oil product traffic.

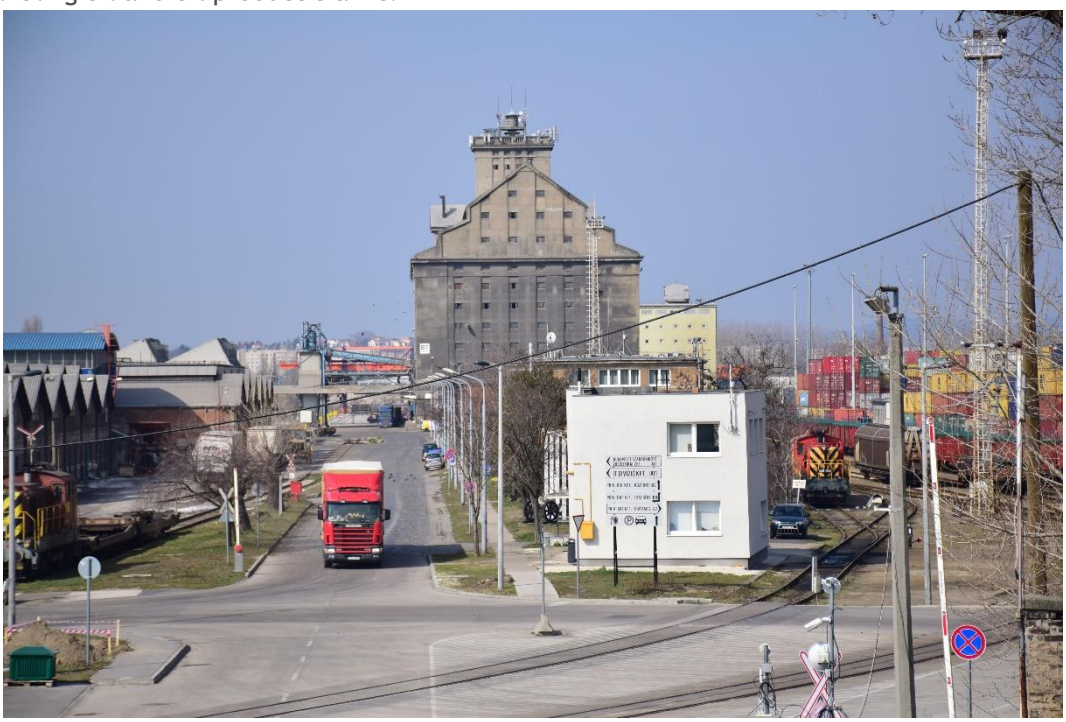


Image 5: Budapest Freeport and Logistics Centre

BLIK - Budapest Intermodal Logistics Centre

The BLIK - Budapest Intermodal Logistics Centre is located in the Ócsai út industrial area, next to a warehouse base and the Soroksár terminal freight rail station. The location of the area at the intersection point of the M0 ring and the Budapest-Kelebia railway line makes it ideally suited to fulfil a logistics function as in addition to being a meeting point of public road and the railway, there are also waterway and air connections available within 20 km. The Centre is accessible via a separate exit from the M0 ring.

Budapest Ferenc Liszt International Airport

Budapest's only international airport, the Ferenc Liszt International Airport, plays a crucial role at a European level, especially in Central Eastern European air logistics traffic. The airport is located in the heart of Europe, making it an ideal site for distributing and managing cargo arriving from or departing to overseas regions. The airport is the meeting point for air, public road and rail freight transportation. On account of the economic development and the spreading of e-commerce in recent years, airport cargo traffic has been increasing dynamically. In the two years between 2015 and 2017, cargo traffic at Budapest airport grew by nearly 40%, with volumes exceeding 100,000 tonnes for the first time in September 2016.

Air cargo transport can be realised in one of two ways: through dedicated cargo flights or as belly cargo on passenger flights. The three companies currently responsible for the greatest cargo traffic at Ferenc Liszt International Airport are Qatar Airways Cargo, Cargolux and Turkish Cargo. Of the main courier companies, the flights of DHL, TNT, UPS and FedEX are most significant, usually flying at night. The airlines that play the most important role in belly cargo transportation are Emirates, Air China and Air Canada Rouge.

Numerous large logistics service providers have business sites in the vicinity of the airport, which areas (due to the rise in volume of air cargo) have undergone major development in recent years. In 2017, DHL and TNT took possession of new logistics facilities measuring 13,000m2 and 12,500m2,

respectively. The two capital investment projects created a total of 300 new jobs. In the addition, Cargo City Logistic Centre is also adding a new 160,000m2 cargo handling facility on the large development area located next to Budapest Airport 2, which is expected to be completed in the 2nd quarter of 2019. Thanks to the investment project – which now has a valid construction permit –, the airport's annual cargo traffic could reach 250,000 tonnes per year in the near future.

There are numerous logistics service providers present in the vicinity of the airport, including AIRMAX Cargo Budapest Zrt., the Vecsés Logistics Centre and Trans-Pack Logisztika Kft.

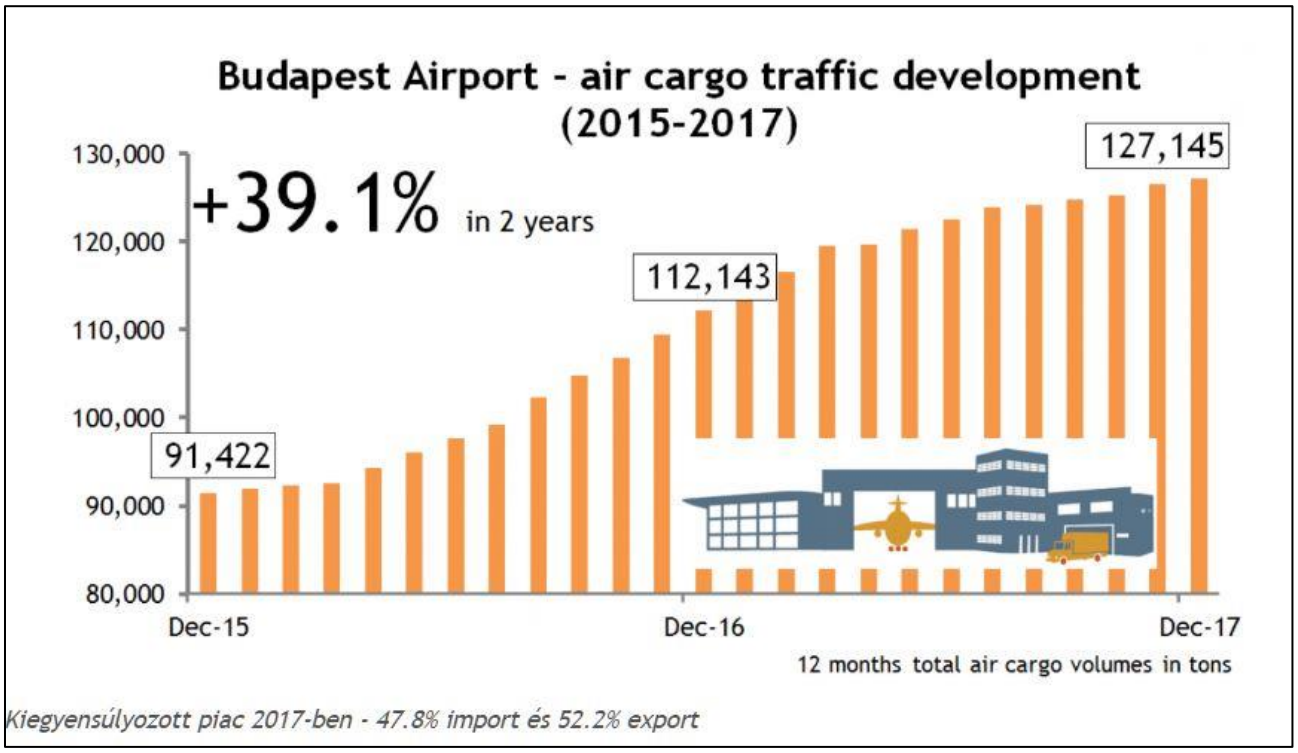


Image 6: Change in the volume of air cargo between 2015 and 2017[3]

3.1.2. The logistics zone of Budapest and its region

The Budapest FUA (Functional Urban Area) is Hungary's cultural, economic and administrative centre. The city has a population of 1.7 million, but close to 2.5 million including the agglomeration region. Budapest and its region today has a central role in logistics and freight transportation processes not just on a national scale, but is also seen as a key logistics hub in the Central Eastern European region.

On account of Hungary's accession to the European Union in 2004, the role of road networks has appreciated in value.

The Trans-European Transport Network (TEN-T) is a planned Europe-wide network of roads, railway lines and waterways. The Pan-European transport corridors (Helsinki Corridors) were defined in the 1990s. The ten corridors are an extension of the TEN-T network towards the eastern directions of Europe. On account of the expansion of the European Union, these are, for the most part, now located in the EU, and as such are part of the TEN-T network. The following image shows the elements of the TEN-T network and the Helsinki Corridors crossing Hungary.

Of the TEN-T priority projects, only Priority Project 7 ("Motorway axis Igoumenitsa/Patra-Athina-Sofia-Budapest") contains public road sections within the territory of Hungary. Pan-European Corridor IV stretches from the Austrian/Slovakian border towards Romania, passing by Budapest and including

[3] source: https://www.bud.hu/cargo

410 km of public roads. Corridor V also has a public road section in Hungary, with the main branch (Corridor V) arriving to the country from the direction of Slovenia, while branches V/B and V/C from the direction of Croatia, linking into a single branch at Budapest, and continuing towards the Ukraine. This section includes 784 km of public roads. Corridor X/B stretches from Budapest to Serbia and the length of public roads is 171 km.

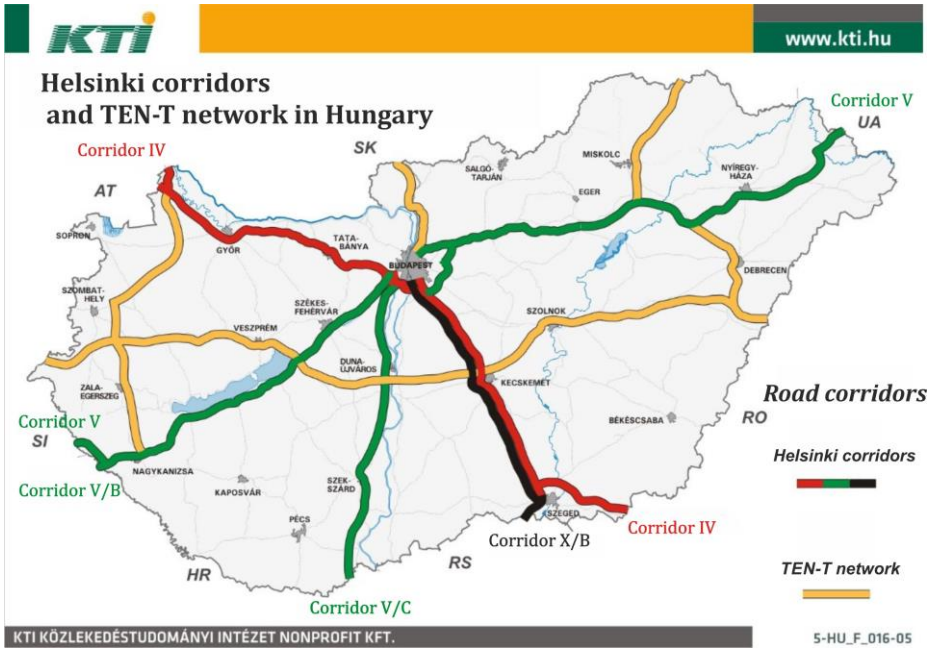


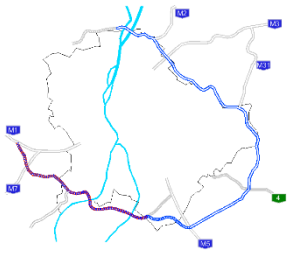
Image 7: The Helsinki Corridors and the public road elements of the TEN-T network in Hungary4

The national road network has a radial structure, with the majority of roads meeting up in the Budapest region, which in turn reinforces the capital's central position. The current elements of the express road network also link up in the Budapest region, as a result of which, prior to the completion of the M0 bypass ring, urban transit traffic was substantial on Budapest roads. The idea for the M0 express road by-passing Budapest already arose in 1942, but construction only commenced in 1987. The southern sector was constructed first, followed by the eastern and northern sectors. The bypass road is still uncompleted, with the section between the M1 motorway and Main Road 11 still missing. As the route of the planned missing section falls on the territory of the Buda Hills and the Buda Landscape Protection Area, its planning and construction generates greater debate and conflicting interests than the other sections. Thus, although plans have already been completed for the northern part of the missing section, constriction has not started, while there are no plans at all in place for the western section (which would progress entirely in a tunnel.)

[4] source: http://www.kti.hu/uploads/images/Trendek/2_Masodik/a02_5-090__on.jpg

Image 8: Intense heavy truck traffic on the southern section of the M0 motorway

Image 9: The M0 motorway sees international and national transit traffic, as well as freight traffic departing from or arriving to Budapest

M0 Around Budapest	
M1 Between Budapest and Austria part of Helsinki Corridor 4	
M2 Between Budapest and Vác	
M3 Between Budapest and the Ukraine part of Helsinki Corridor 5	
M5 Between Budapest and Serbia part of Helsinki Corridor 10/B	
M6 Stretches from Budapest towards the Croatian border, along the right bank of the Danube part of Helsinki Corridor 5/C	

M7 Between Budapest and Croatia/Slovenia part of Helsinki Corridor 5	

The logistics sites that have national and regional significance have been established on the city's boundaries, along the M0 ring, primarily in the vicinity of the intersection points of the M0 ring and the motorways as well as near Ferenc Liszt International Airport (Budapest's only international airport) and the Csepel Freeport.

Image 10: Heavy truck traffic entering the M0 ring obstructs public transportation in Csepel, on II. Rákóczi Ferenc út

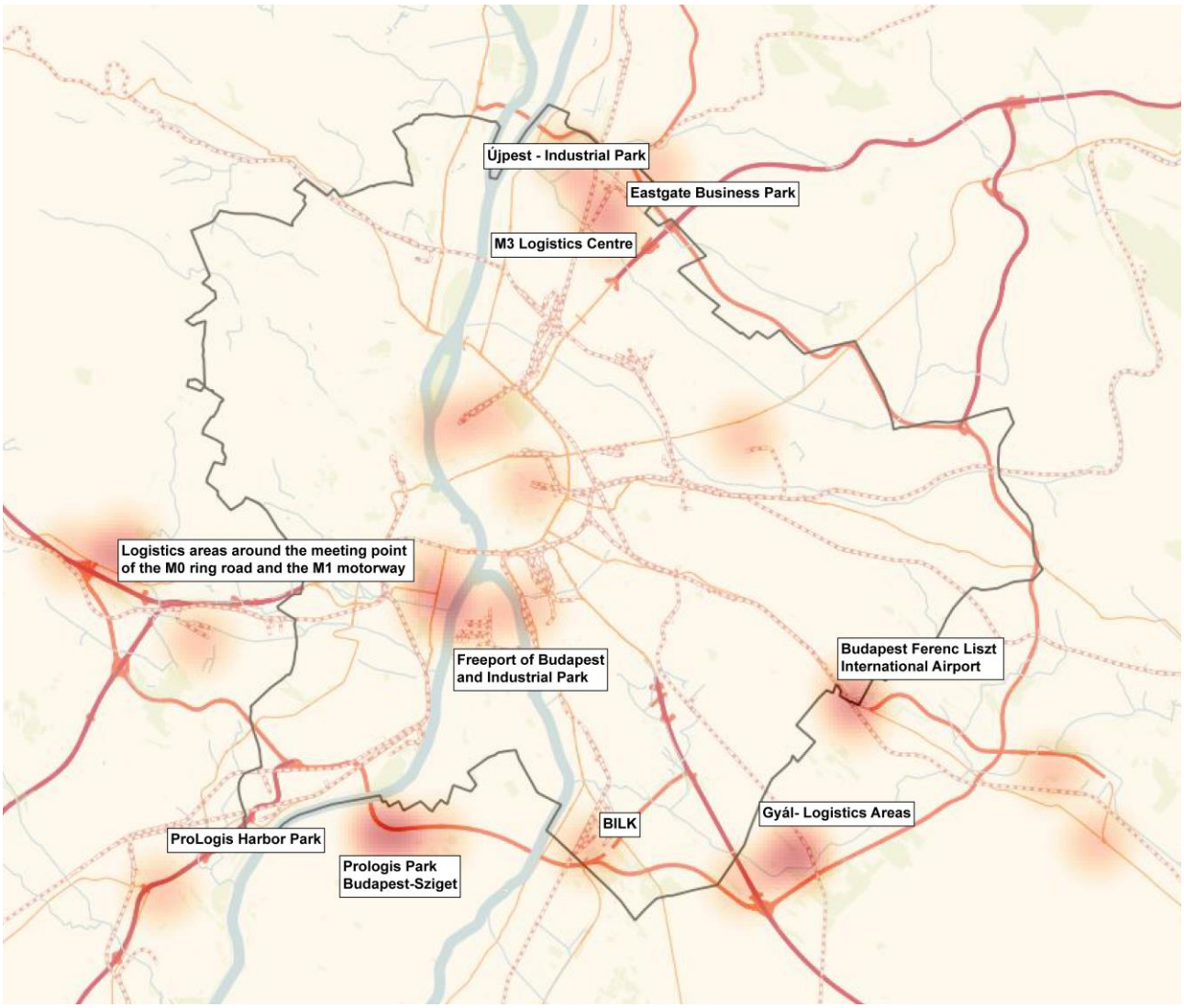


Image 11: Logistics centres of regional and national significance in and around Budapest

The major logistics areas of regional and national significance in and around Budapest are the following:

Újpest Industrial Park/North-Pest Industrial Park

Újpest Industrial Park, also known as North-Pest Industrial Park, is located near the northern sector of the M0 ring, approximately 500 m from the Újpest exit. The area has been home to logistics activities since 1999.

Eastgate Business Park

The Business Park, established in 2006, is located near the intersection point of the M0 ring and the M3 motorway. From a public administration perspective, it belongs to the area of Fót and has an area of 37 ha. The Business Park is accessible via a separate exit from the M0 ring.

M3 Logistics Centre

The Logistics Centre is also located near the intersection point of the M0 ring and the M3 motorway. From a public administration perspective, it belongs to District 15 of Budapest, located between the M0 motorway and Rákospalota. The centre has warehouses, offices as well as a container terminal and an industrial track to facilitate railway connections.

Gyál logistics areas

The area located at the intersection point of the M3 and M5 motorways is the site for the M5 Gyál Industrial Park and the Tesco Logistics Centre. The Industrial Park offers logistics services as well as warehouses and offices to rent on 35,000 m². In addition, the park is to be expanded with another area of 24,000 m² as part of Phase 2 development.

BLIK - Budapest Intermodal Logistics Centre

For details see: 3.1.1

Prologis Park Budapest-Island

Prologis Park is located on Csepel Island, and from a public administration perspective it is located in the area of Szigetszentmiklós. Its premises are 201,000 m², comprising 10 warehouses and an office building.

ProLogis Harbor Park

The more than 100,000 m² logistics area is located in District 22, at the boundary of Budapest, between the Danube and the M6 motorway, approximately 2.5 km from the intersection point of the M0 and the M6 motorways. Its premises have 11 buildings serving logistics purposes and a development reserve area which allows for the construction of four more buildings.

Prologis Park Budapest M1

The logistics area located in Páty, along the M1 waterway, has been owned by Prologis since 2015. The 70,000 m² area currently houses five facilities.

Logistics areas near the intersection point of the M0 ring and the M1 motorway

There are significant logistics areas located in Biatorbágy, at the intersection point of the M0 ring and the M1 motorway, however, in contrast with the above, these represent the logistics bases of larger retail chains (e.g.: Aldi Logistics Centre, IKEA Budaörs external depot/collection point).

Budapest Freeport and Industrial park

For details see: **Hiba! A hivatkozási forrás nem található.**

Logistics areas near Budapest Ferenc Liszt International Airport

For details see: **Hiba! A hivatkozási forrás nem található.**

District XVIII of Budapest (Pestszentlőrinc, Pestszentimre):

In the autumn 2017, in the context of the questionnaire survey conducted as part of the project, we polled 3.5% of retail units concerned (92 stores) in District 18 of Budapest (Pestszentlőrinc, Pestszentimre), about the process and problems of freight transportation. Reviewing the results, it should be highlighted that based on the assessment of the process of deliveries not made with own vehicles, at one quarter of the stores polled freight transportation vehicles were illegally parked for the duration of loading/unloading. In the case of deliveries made with own vehicles, the ratio of illegal parking was substantial lower at 11%.

The question where respondents were allowed to formulate problems and make recommendations, 18 respondents said that they feel there are no problems with delivery and unloading, 16 stores stressed inadequate parking and loading opportunities and 7 emphasised the lack of accessibility. According to the majority of recommendations (11), the establishment of loading and parking areas would be required, while 4 stores recommended the amendment of regulations.

Vecsés:

During the survey conducted in the area of Vecsés, we polled 3.5% of retail units, a total of 20 stores. The responses in this case were significantly different from those in District 18, and with one exception all respondents said that delivery vehicles are able to park legally for purposes of loading and unloading, at the designated parking areas or in private spaces.

When formulating problems and recommendations, 17 respondents said that they feel there are no problems with loading or delivery, with one store raising the issue of accessibility as a problem. Despite this fact, numerous stores gave recommendations, typically pertaining to changing the time of delivery, the establishment of loading points and parking spaces and the amendment of regulations.

3.1.3. Regulation of Budapest's freight transportation

Freight transportation activity, routes and truck management in Budapest is currently regulated by the document entitled "Budapest's Freight Transportation Strategy"[5], prepared in 2008. Pursuant to the Strategy, decrees on entry to gross vehicle weight (GVW) restricted zones or waiting in protected zones regulate freight transportation activity.

The list of protected zones and the conditions of entry into such zones is regulated by *Decree No. 30/2010. (VI. 4.) on the uniform rules for waiting with vehicles within the administrative boundaries of Budapest, the fees payable for waiting and the rules on storing inoperative vehicles* as adopted by the General Assembly of Budapest. The document sets out 11 protected zones within the area of Budapest, which include parks and green areas that are considered to be of great significance at the city level (such as Városliget, Népliget, Margitsziget) as well as historic city sections of priority value (such as Buda Castle and the Basilica area). Entry to the protected zones for freight transportation purposes, or waiting inside zones is subject to obtaining an entry or a waiting permit. The start of the wait must be indicated on a disc placed behind the windshield. Environmentally-friendly vehicles are eligible for a discount on the fee of freight transportation entry/waiting permit.

The list of GVW-restricted zones and the conditions of entry to such zones is regulated by *Decree No. 92/2011. (XII. 30.) on the regulation of freight traffic within the administrative boundaries of*

[5] Adopted with Decree 2030/2008. (XII. 18.) of the General Assembly of the City of Budapest

Budapest, as adopted by the General Assembly of Budapest. The decree sets out three different zones, 3.5 tonne, 7.5 tonne and 12 tonne GVW-restricted zones, where vehicles exceeding the largest permitted gross vehicle weight can only enter by paying for the entry permit, which permit is issued by the mayor. Vehicles belonging to the EURO 0 and EURO 1 environmental categories cannot be issued entry permits for 3.5 tonne restricted zones, and vehicles whose registration certificate indicates environmental category 0, 1, 2 or 3, or does not contain a code indicating an environmental classification or has a foreign registration certificate and is fitted with a EURO 0 or EURO 1 engine cannot be issued entry permits for 7.5 tonne restricted zones.

The decree sets forth the following time restrictions for the various zones in Budapest, taking gross vehicle weight (GVW) as basis:

There is a restriction for 7.5 tonne vehicles in the following areas and time intervals:

- North-Buda – time restriction: from 07.00 to 18.00 and from 22.00 to 05.00
- Central-Pest – time restriction: from 07.00 to 18.00 and from 22.00 to 05.00
- South-Pest - time restriction: none
- Csepel-Csillagtelep - time restriction: none

There is a restriction for 3.5 tonne vehicles in the following areas and time intervals:

- Pest – time restriction: from 07.00 to 18.00 and from 22.00 to 05.00
- Buda – time restriction: from 07.00 to 18.00 and from 22.00 to 05.00
- Kelenvölgy – time restriction: none
- South-Pest - time restriction: from 12.00 to 17.00 and from 19.00 to 10.00

In addition to GVW-restricted zones, the Freight Transportation Strategy also sets out roads and areas (the latter primarily larger industrial areas in the transitional zone) that are accessible without restriction in terminating traffic as well as roads without restrictions.

In the capital city, Budapest Közút Teherforgalom (Freight Transportation Department of Budapest Public Road Organisation) is responsible for managing protected and restricted-traffic freight traffic zones. Since 2012, the fee for the entry permits and waiting permits can be paid using an online administration system called TOBI.

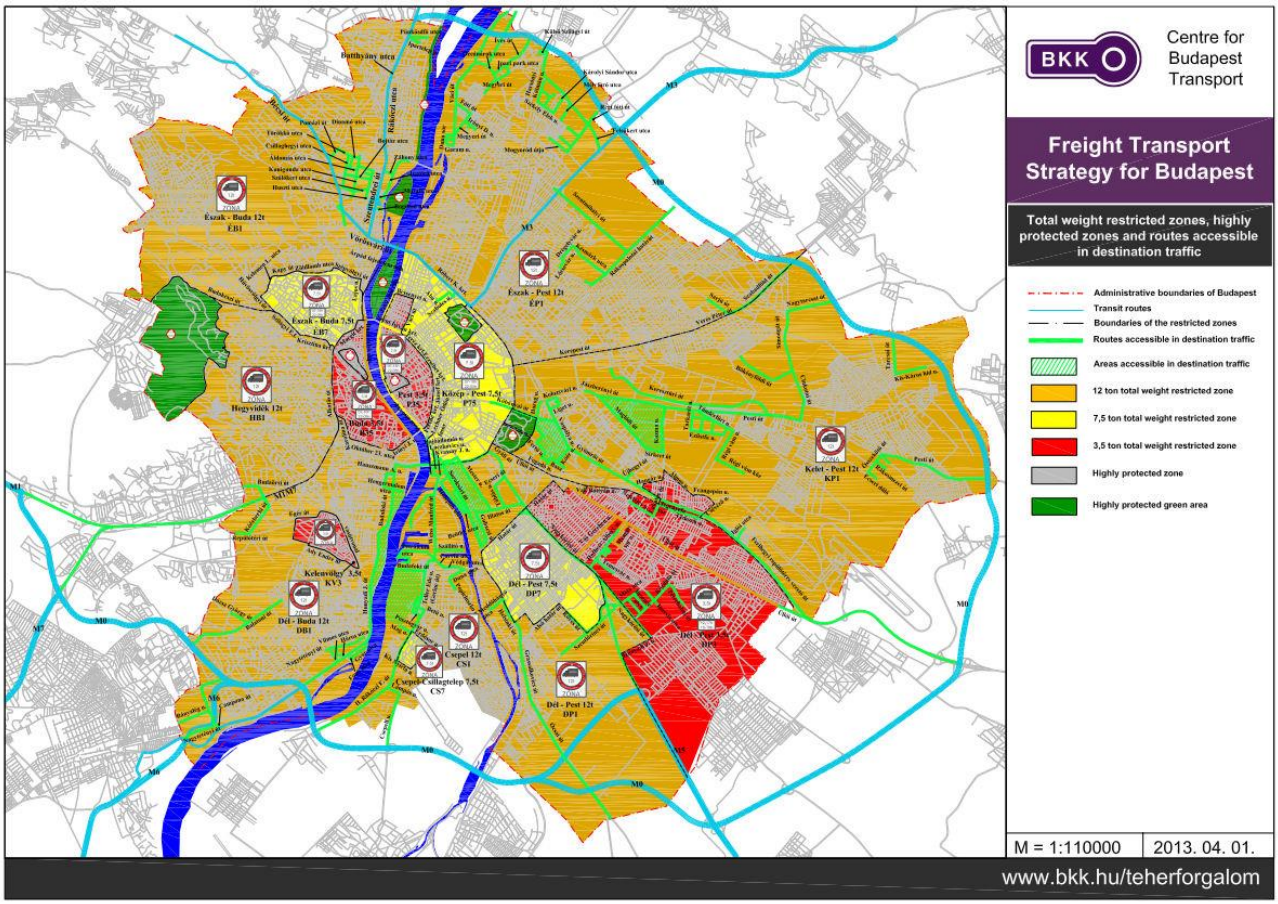


Image 12: Freight Transport Strategy for Budapest[6]

One of the greatest current problems of freight transportation and logistics regulation is that the decrees adopted based on Budapest's freight transportation strategy only apply to the area of the capital city, and no regulation that uniformly handles the agglomeration areas exists.

3.1.4. The logistics and freight transportation potential of Budapest's transitional zone

The Budapest 2030 Long-Term Urban Development Concept prepared in 2011 sets out five zones within the area of the capital city: the inner zone, the transitional zone, the suburban zone, the Danube zone and the hilly zone. The transitional zone is located between the inner zone and the suburban zone, and while both the inner and the suburban zone have a primarily residential function, the in-between areas mainly contain industrial areas, areas of economic activity, and quite a few abandoned brown-field plots. The reason for the creation of a transitional zone without residential function is that subsequently attached areas did not organically connect to the core of Budapest, and business sites and warehouses for economic activities were constructed in the empty areas between residential sections.

[6] source: https://bkk.hu/terkep-6/

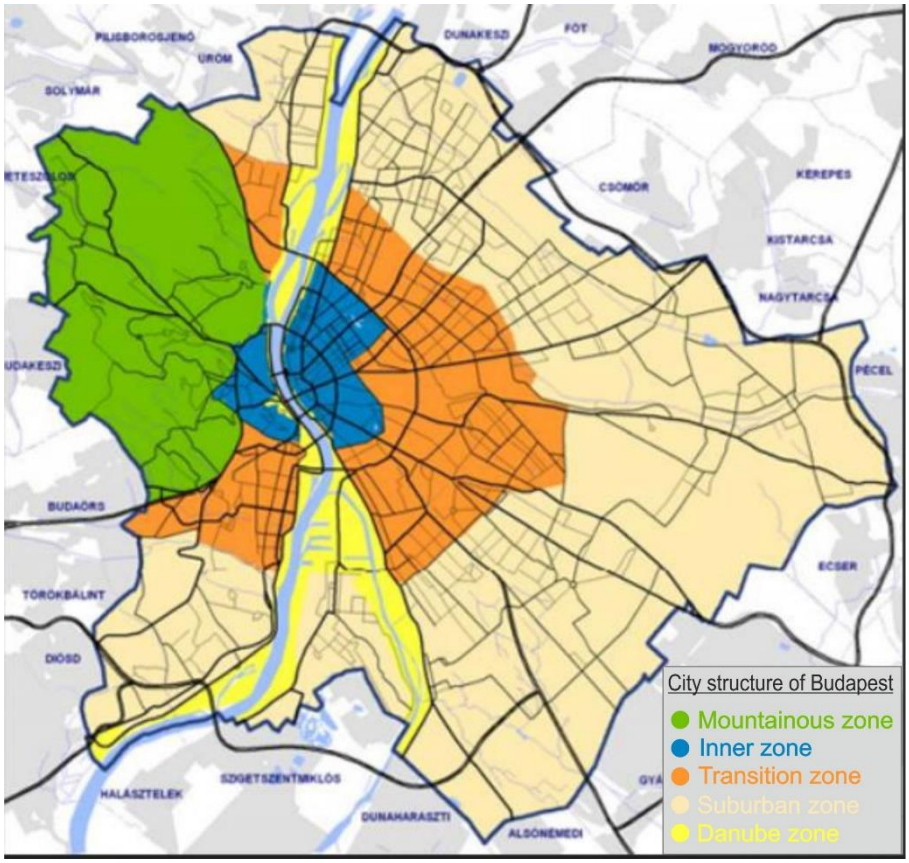


Image 13: Budapest's zonal system [7]

Today, substantial areas in the transitional zone have lost their former industrial functions and appear in urban fabric as under-utilised brown-field areas. There are important underlying logistics opportunities in these areas, as they represent territorial potential within the city limits, easily accessible by public road using express roads, while also located near the city centre, thus potentially serving as appropriate starting points for the servicing of dense, inner areas. These plots, and brown-field areas would provide ideal locations for consolidation centres that, for the time being, are missing from Budapest today, which centres would be suitable for commissioning goods and their forwarding in a lower-scale, more environmentally-friendly fashion.

[7] source: Budapest 2030 hosszú távú városfejlesztési koncepció

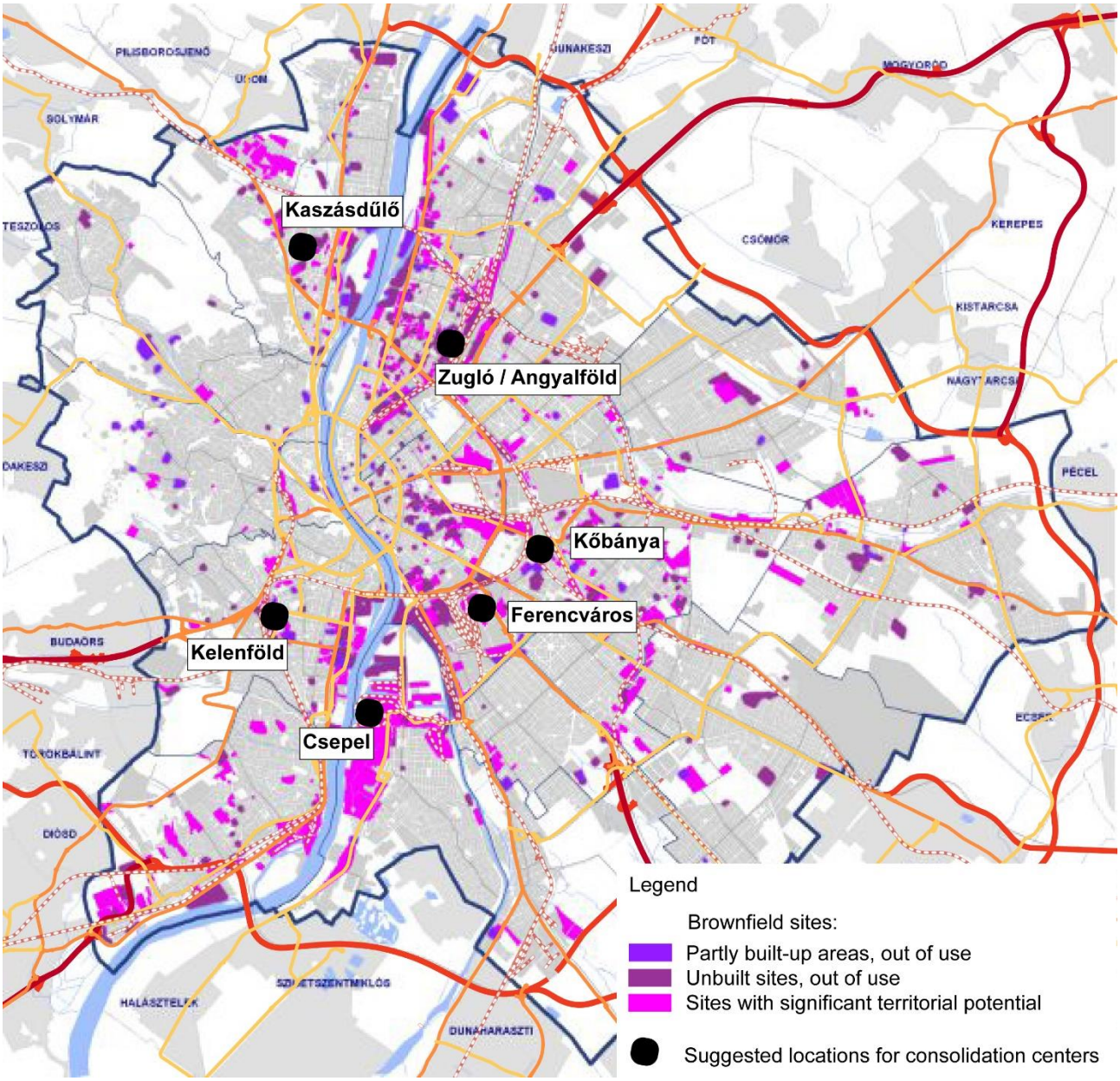


Image 14: Suggested locations for consolidation centers in the transition zone

Image 15: Switching from brown-field area to office activity

Image 16: Currently unutilised brown-field area in the former location of Nagyvásártelep in District 9

3.1.5. Freight transportation and city logistics overview of Budapest's inner city

In Budapest, the traditional urban inner city core of the city is surrounded by the transitional zone, i.e. on the Pest side, inwards from Hungária körút, essentially characterised by dense construction, 3-4 storey buildings and very few green areas.

Image 17: Traditional trucks in Budapest's freight traffic on Petőfi Bridge in 1983[8]

The survey conducted during the preparation of 2014's "Uniform Concept Proposal For City Logistics Objectives In Budapest" shows which activities generating freight transportation needs are most significant in the four sectors along the ring roads. During the survey, three sectors were established in the area within Hungária körút: between Hungária körút and Nagykörút, between Nagykörút and Kiskörút, and the area within Kiskörút, with the distribution of businesses generating freight transportation activities varying from sector to sector. While the proportion of food trade, clothing trade and hospitality/catering industry between Nagykörút and Hungária körút is practically equal, catering activities are more dominant within Nagykörút, followed by food stores between Nagykörút and Kiskörút, and clothing stores within Kiskörút. The most restaurants, bars and stores are found in the area between Kiskörút and Nagykörút, which is why most freight transportation-related problems are observed in this particular sector.

[8] source: http://download.fortepan.hu/_photo/download/fortepan_67069.jpg

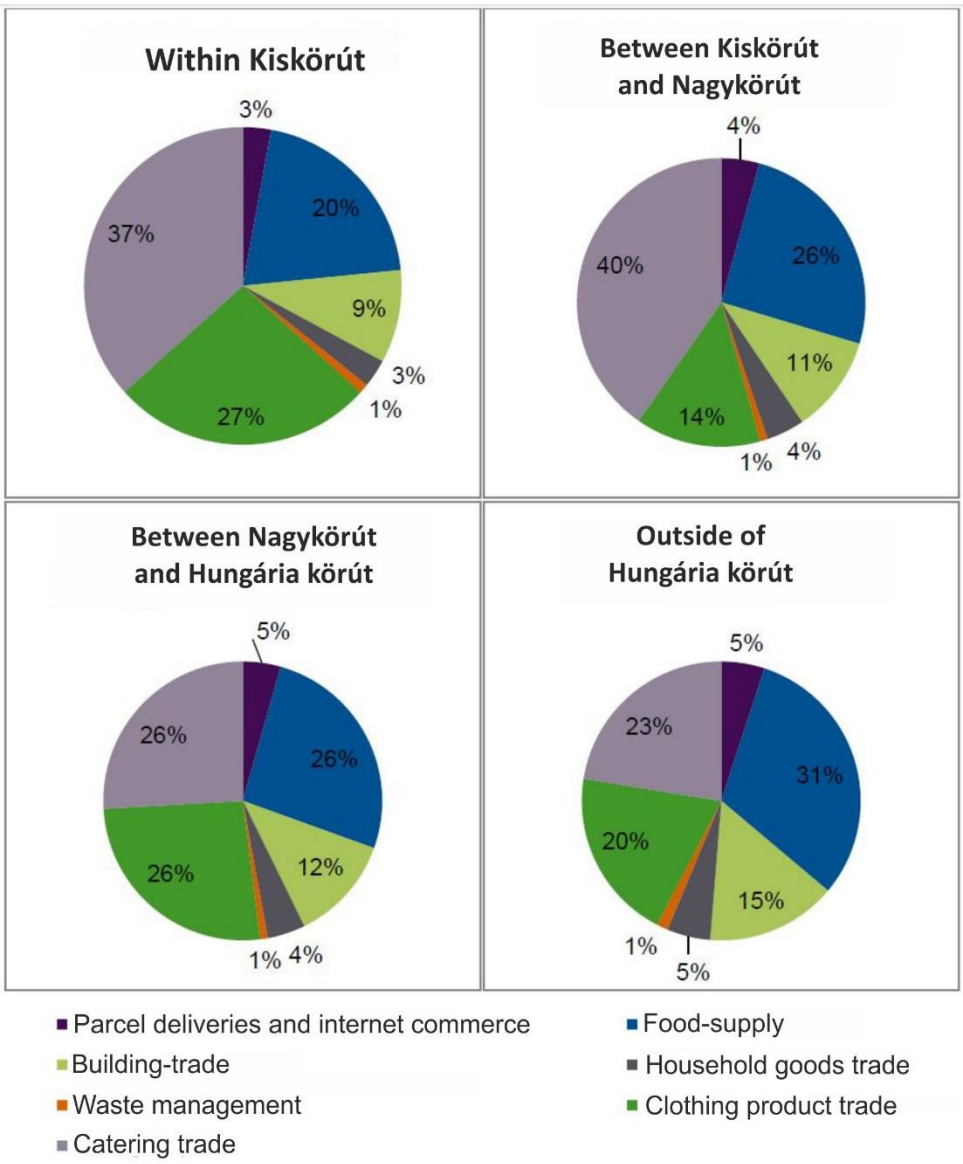


Image 18: Distribution of businesses generating freight transportation activities in Budapest, source: Uniform Concept Proposal For City Logistics Objectives In Budapest, 2014

Entry and waiting for freight transportation purpose in the inner city is regulated by the Decree on the regulation of freight traffic within the administrative boundaries of Budapest, drawn up on the basis of 2008's Freight Transportation Strategy of Budapest. Although, as a result of the adoption of the decree, larger vehicles were forced out of the city centre and the truck fleet has shifted towards vehicles with lower gross vehicle weight, the noise and air pollution and vibration caused by freight transportation is still a major problem, caused by the very low ratio of sustainable transportation methods. Of available sustainable freight transportation methods, the city has only seen the appearance of cargo-bike transportation, which started dynamically expanding in recent years, but the number of electric vehicles is still negligible.

Image 19: Loading on Rákóczi út in 1972[9]

One of the reasons of the high number of trucks observed in inner-city areas is the lack of efficient organisation. A basic prerequisite of efficient organisation and logistics would be the existence of consolidation centres as mentioned in the previous chapter as, with the exception of larger store chains, smaller stores, primarily food and grocery stores, typically have the various types of goods delivered by a different supplier, and this process generates considerably greater traffic than if those were commissioned at a suburban point in the city, and only a single vehicle would deliver to a given store each day. Only larger chains have the means to maintain their own logistics centres, where such commissioning can be carried out.

Concentrated loading points, the majority of which are located near boulevards (Kiskörút, Nagykörút) and avenues (Kossuth Lajos utca, Rákóczi út, Andrássy út, Bajcsy-Zsilinszky út) and near stores located in pedestrian streets are important points of urban, primarily inner-city freight transportation. The objective of loading points is to provide dedicated waiting areas near stores for freight transportation vehicles for the duration of loading/unloading. There are currently 527 concentrated loading points in Budapest. The use of certain concentrated loading points is only possible within permitted time intervals, but within period, the time available for loading/unloading is not maximised. A single loading point is typically able to serve stores and hospitality/catering units in a 50 m radius. Vehicles spend an average of 15-20 minutes at a loading point. Although the number of loading point has increased in recent years, their numbers are still far from required levels, which leads to parking and loading in illegal areas. Another deficiency identified in the system of concentrated loading points is that these currently do not have an intelligent, IT-based management system that would allow for more efficient use and predictability. In the city centre, in addition to concentrated loading points, some of the waiting zones also allow for loading/unloading, but for a maximum of 20 minutes.

[9] source: http://download.fortepan.hu/_photo/download/fortepan_15922.jpg

Image 20: Partly illegally used concentrated loading points in District 6

The problems described by inner-city retail units, during the surveys conducted in the autumn of 2017 as part of the project, are in line with the above. In Districts 1, 5, 6, 7, 8 and 9, 60% of respondents identified inadequate parking and loading opportunities as a problem.

Image 21: Food delivery in the inner city

Image 22: Illegal loading in a disabled waiting place in District 5

Image 23: Illegal waiting and unloading in District 9 on account of an occupied concentrated loading point

3.1.6. Characteristics of the vehicle park participating in freight transportation in Budapest

Small and medium-sized trucks are a major segment of public road traffic and transportation in Budapest. Since the implementation of the freight transportation strategy and the launch of the entry system, as well as the handover of the eastern and northern sections of the M0 motorway, transit truck traffic has decreased substantially in the city. The dominant parts of the vehicle fleet are trucks with a gross vehicle weight (GVW) under 3.5 tonnes, trucks with a GVW between 3.5 and 7.5 tonnes and trucks with a GVW between 7.5 and 12 tonnes. The vehicle fleet used is undergoing renewal in respect of environmental protection and emission aspects, but is also becoming polarised. The vehicles of large chains maintaining a substantial fleet or working with a significant range of subcontractors are relatively modern, but at the same time, the freight transportation vehicles of smaller companies or sole proprietors (primarily trucks with a GVW under 3.5 tonnes) used in freight transportation in Budapest and its agglomeration are frequently in bad condition and have unfavourable emissions categories.

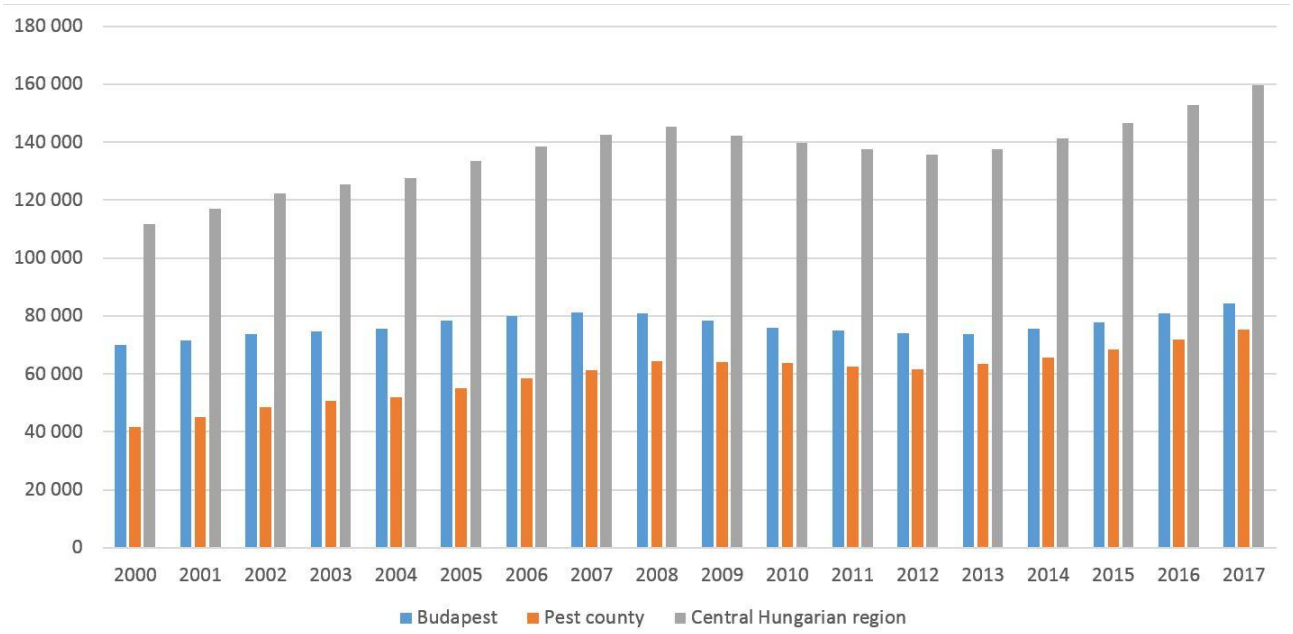


Image 24: Change in the number of trucks in the Budapest, Pest county and Central Hungarian region

Following a decline during the years of the crisis, the number of trucks has been rising steadily and significantly. Since 2012, it has increased by nearly 24,000 in the Central Hungarian region. However, the vehicle fleets of many companies not solely active in Budapest or not active in Budapest at all are registered in the region of the capital city, which distorts statistics, but the increasing trend is definitely perceivable.

The number of vehicles below a GVW of 3.5 tonnes registered in District 13 was 4,316 in 2011, but 4,632 in 2017. However, the number of trucks in the range over this value dropped from 706 to 581.

Image 25: Trucks with a GVW smaller than 3.5 tonnes in Budapest's city centre

3.2. Currently unutilised waterway and track-bound urban freight transportation methods

3.2.1. Waterway freight transportation options

The regulation of the Budapest section of the Danube was drawn up at the end of the 19th, beginning of the 20th century. In the central section (between Margit Bridge and Petőfi Bridge), interchanging vertical embankment walls and embankments with steps were constructed. From Margit Bridge to the Northern Rail Bridge, and south of Petőfi Bridge until Budafok-Háros, a stone-covered embankment was constructed, while stone-reinforced embankments were created for the remaining sections.

In 1920, the function of quays changed, with roads constructed alongside, which ensured public road connections between the northern and southern parts of the city. Until the 1930s, goods were delivered to Vásárcsarnok by boats at night to Budapesti Közraktárak (Budapest Public Warehouses), from where they were forwarded by rail. After 1945, only ports servicing passenger ships were constructed on the quays.

From 2013, the utilisation rights of Budapest's river bank sections were assumed by the Municipality of Budapest (there is an opportunity for a regulation and infrastructure suitable for freight transportation to be established).

Main international waterway routes

Of the TEN-T priority projects, only Priority Project 18 ("Waterway axis Rhine/Meuse-Main-Danube") contains waterway sections within the territory of Hungary. The total length of Pan-European Corridor VII within Hungary is 378 km (Image **Hiba! A hivatkozási forrás nem található.**).

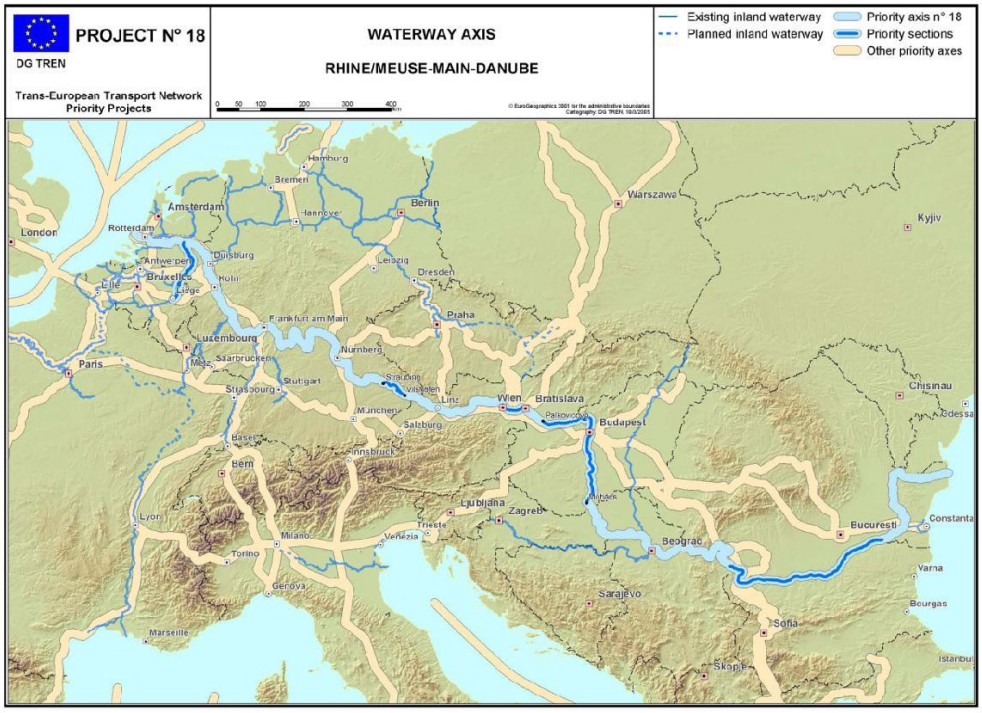


Image 26: Priority element 18 of the TEN-T network [10]

The Hungarian section of the Danube is 417 km long, while the Budapest section is 20 km. The TEN-T network comprises eight Hungarian ports: Győr-Gönyű, Komárom, Budapest-Csepel, Dunaújváros, Paks, Baja, Mohács, and Szeged. Of these, only one, Budapest-Csepel, is located in the capital city and is one of the key ports of the Danube-Main-Rhine waterway.

Budapesti Szabadkikötő Logisztikai Zrt. (BSZL for short) has great significance in Budapest, as in addition to public road and railway connections, it also has a waterway connection. In terms of location, it is found of the southern part of Csepel Island, serving as a port to the TEN-T corridor. The RO-RO and container terminal found in the Freeport has a covered area of 92,800 m^2, open storage premise of 49,120 m^2 and a silo capacity of 5,000 m^2.

Arising problems

3.2.2. Container transportation on the Hungarian section of the Danube is difficult as the ships cannot sink to sufficient depth and the water level fluctuation characteristic of the Danube makes inland freight transportation difficult. In addition, traffic and transportation in the vicinity of Budapest is also obstructed by fords, flood waves, drift ice and rocky sections.

3.2.3. Track-bound freight transportation options

Urban track-bound systems have been used for freight transportation purposes since the second half of the 19th century, primarily to supply plants and factories. Freight transportation on HÉV suburban train lines was substantial from the very beginning. With the construction of these lines, MÁV-HÉV connections were established, which were primarily used for freight transportation: Törökőr, Gödöllő, Kén utca. HÉV had its own vehicle fleet, but at the same time, MÁV-owned vehicles were also used to carry out goods transportation tasks on HÉV lines.

[10] source: http://iho.hu/img/galery/140501-kozop_4.jpg

The industrial track network servicing the area of the Csepeli Weiss Manfréd plant (today Csepel Művek) from the direction of Pesterzsébet was established in 1911, through the Gubacs coffer-dam (with the Gubacsi Bridge in its place today).

The 40 engine-powered cargo wagons procured from Rossemann and Kühnemann in 1926 was a milestone in freight transportation by tram. The vehicles nicknamed 'Muki', some of which are still in operation today, carried out the servicing of Budapest plants as well as internal transports through the Budapest tram network for more than 70 years.

Image 27: A 'Muki' tram used for industrial purposes, at one point also participating in freight transportation

In 1960, the HÉV network had 62 industrial track connections, the majority of which were in constant use. From the 1960s, urban mass transportation commenced, and concurrently so did the shifting of freight transportation to public roads and, as a result, the slow decline of the industrial track network. From the second half of the 1970s, the decline of freight transportation by tram and HÉV accelerated. The most important urban freight transportation connection operated between Déli pályaudvar (South railway station) and the Esztergom railway line through the urban tram network. This railway transportation connection was in existence up until 1996, primarily for the purpose of supplying the one time GANZ plant on Margit körút. Freight transportation on BKV lines was discontinued on 15 November 1996. From this point onwards, only industrial and internal freight transport was carried out on HÉV and tram lines.

Main international railway network elements

The following image shows the routes of the transportation networks crossing Hungary. Of the TEN-T priority projects, only two, Priority Project 6 ("Motorway axis Igoumenitsa/Patra-Athina-Sofia-Budapest") and Priority Project 22 ("Railway axis Athina-Sofia-Budapest-Wien-Praha-Nürnberg/Dresden" contains railway sections within the territory of Hungary. Pan-European Corridor IV includes 487 km of railway sections, while Corridor v 996 km. The Hungarian railway section of Corridor X/B is 156 km long.

Hungary's key trading partners in rail freight transportation are: Austria, Slovakia, Italy, Germany, Romania, and as non-European Union countries, the Ukraine and Russia.

Transit traffic crossing the country departs from Poland, Romania and Slovakia, with Romania, Germany, Slovenia, Slovakia and Austria as the main destinations.

Budapest plays a central role, as this is where the key railway lines depart from to the various regions of the country in radial directions. The capital's two largest marshalling yards are those in Soroksár and Ferencváros. The Csepel Freeport has an important role in Budapest's rail freight transportation. MÁV ensures freight transportation to the port through Gubacsi Bridge, which is in essence part of the 150 line departing from the Soroksár marshalling yard towards Kelebia.

Arising problems

The use of railway infrastructure and the connecting systems is costly; there is competition for track use with passenger transportation. The current tram infrastructure in Budapest for the most part covers the inner city, however, HÉV network elements are fragmented, and do not reach inner city destinations.

3.3. Existing sustainable logistics solutions

The aspect of sustainability, for the time being, only manifests itself in Hungarian urban logistics to very slight degree. There are only an extremely few sustainable and intelligent urban logistics solutions functioning, even at the level of pilot projects. In Budapest, it is typically solutions brought to life by market needs that are trying to make way and remain standing, and regulation and urban management follows and adapts to market-based initiatives. The objective of the European Union is for the logistics of major city centres to essentially become carbon-dioxide emission free by 2050[11]. To achieve this goal, further major steps are needed in the area of Hungarian urban freight transportation.

In Budapest, the initiatives listed below are those that may contribute to a shift towards a more sustainable direction in urban logistics.

1. Bicycle courier services

For lower-volume cargo, cargo transport by freight bicycle is the most ideal method of urban freight transportation. On the one hand, it is environmentally-friendly, there is no noise or air pollution even with electrically-assisted bicycles, while on the other, it is a swift and space-efficient solution in the case of downtown/urban distances of just a few kilometres, with daily traffic jams or parking problems not causing any significant impact.

In Budapest, freight transport by bicycle was still in its infancy at the beginning of the 1990s. Since then, it has developed substantially as part of the 'bicycle revolution'. Today, there are close to a dozen bike courier services operating in the city, which work with varying staff numbers and bicycle fleets. In addition to traditional bicycles, these courier services frequently use cargo bikes, which are suitable for carrying loads of up to 250 kg.

The oldest and most dominant by courier service in the city is Hajtás-pajtás, which in its heyday employed a staff of 150. In 2015, a forward-thinking initiative was launched by the company and GLS, as part of which packages transported by GLS trucks were delivered to a joint redistribution centre, from where Hajtás-Pajtás service forwarded the consignments towards downtown areas with bicycles and the country's first 100% electric van, a Nissan e-NV200.

[11] White Paper (2011)

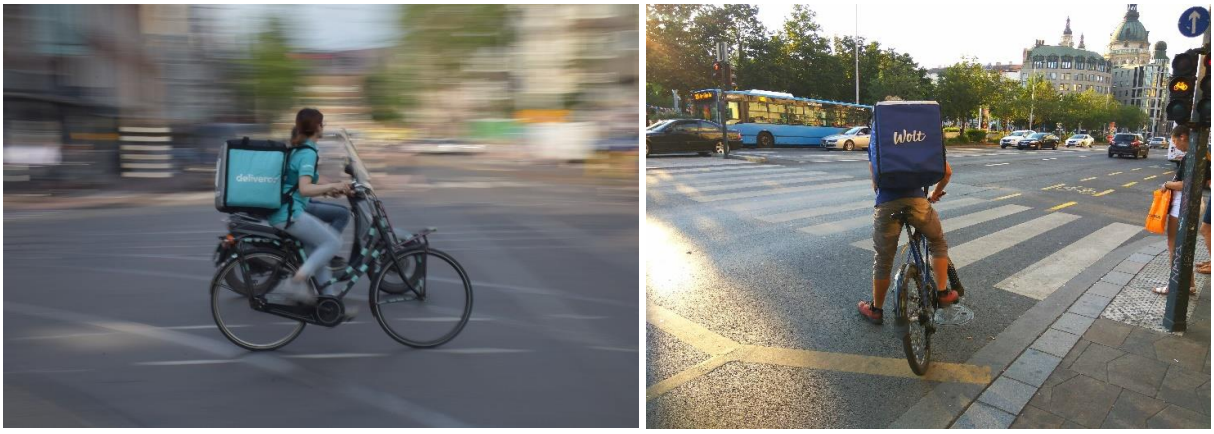


Image 28: Modern bicycle-powered urban logistics, food home delivery (examples from Amsterdam and Budapest)

2. Concentrated loading points

The establishment of concentrated loading points is an important basic component of efficient logistics. There are currently 527 loading points in the city, that greatly contribute to eliminating illegal and parallel parking, or parking and loading/unloading on the sidewalk. (For more details see Section **Hiba! A hivatkozási forrás nem található.**)

3. Jedlik Ányos Plan

Electromobility could play a key role in the future in the field of sustainable urban logistics solutions. In order to catalyse the spreading of electromobility in Hungary, in July 2015 the government adopted the government decree on the legislative tasks related to the Jedlik Ányos Plan, as well as the Jedlik Action Plan attached as annex thereto. The government decree also stipulated that the Ministry of Finance will start development of the electric charging infrastructure against the quota revenues, and also launch pilot projects, primarily in the fields of healthcare, urban and agglomeration public transport and communal waste collection. Although these pilot projects currently have no projects focused on urban freight transport, the development of the charging infrastructure, the establishment of the regulatory background and subsidising the procurement of electric vehicles are all important steps in the process of the gaining of ground of freight transport vehicles using alternative fuel sources.

4. Electric vehicle subsidy

In October 2016, based on the Jedlik Ányos Plan, the government introduced the electric vehicle subsidy scheme. As part of the scheme, the government provides various subsidies for thirteen 100% electric vehicle models, including three freight transport vehicles (Peugeot Partner Electric, Citroen Berlingo Electric, Nissan e-NV200 van), and as such, upon the purchase of these vehicles there is no registration tax, transfer tax and output tax, and there is also a maximum amount of HUF 1.5 million in state support that can be applied for. Despite the subsidies and support, relatively few 100% electric vehicles have been purchased in the country in recent years, and their number at the national level was still less than 1,000 in 2017.

4. The problems of urban freight transportation and city logistics

Today, in Budapest, the regulation, management and control of logistics processes is fractured, far from unified. In respect of the capital city, the area of the FUA in particular, there are no organisations that would govern freight transport and city logistics processes in a single unified and coherent system. In addition, fundamental problems also include the deficiencies of regulation; the lack of a freight transport, road usage, entry and city logistics plan pertaining to the city and its agglomeration; infrastructure of inappropriate quality and capacity, the lack of the use of IT-based systems and inefficient inspections. Players of the logistics chain (carriers and those responsible for loading, unloading and delivery) try to resolve their day-to-day tasks under these circumstances, however, the methods based on customary law, that violate regulations out of necessity, can cause system-level problems, especially in congested inner-city areas.

In reviewing the problems of urban freight transportation in Budapest, we have established four main groups. We have identified organisational problems, which can be traced back to regulatory deficiencies and the shortcomings of management and control. In addition, approaching problems from an infrastructural perspective, we also saw deficiencies related to the vehicle fleet and the built logistics infrastructure arise. The presence of the latter clearly hinder the establishment of an efficient freight transportation chain, thereby contributing to the obstruction of traffic and resulting in considerable environmental load.

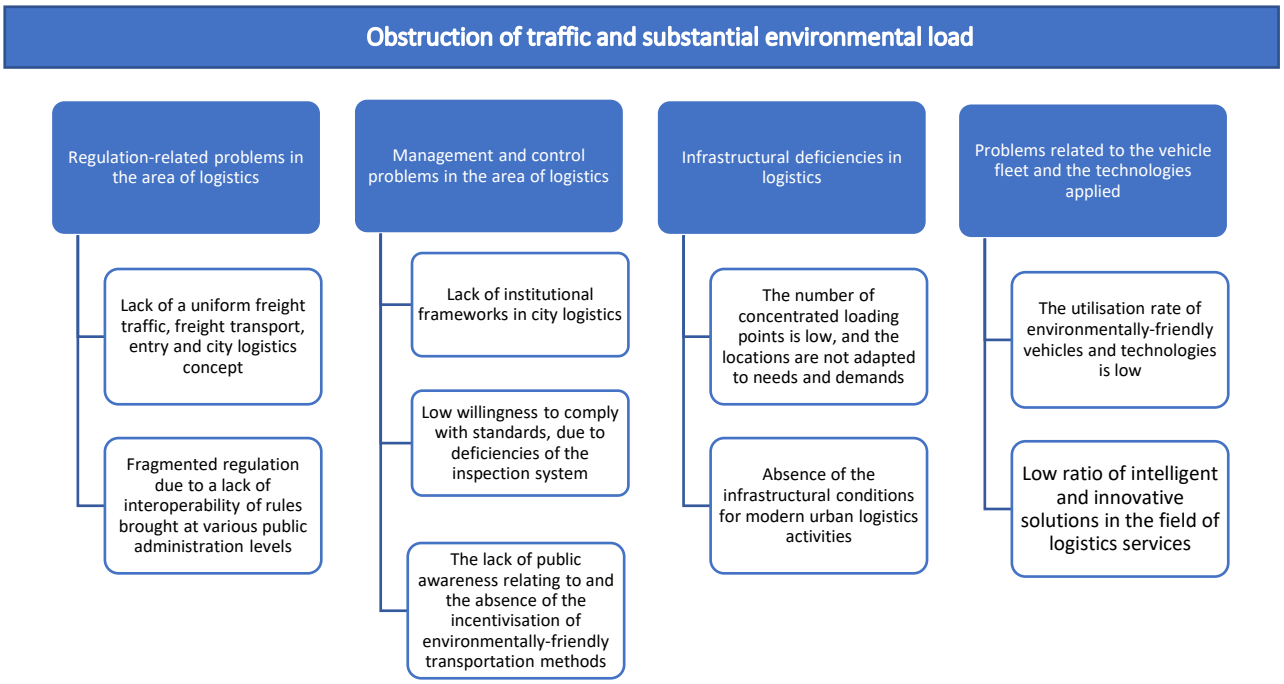


Image 29: Problems

4.1. Regulation-related problems in the area of logistics

4.1.1. Lack of a uniform freight traffic, freight transport, entry and city logistics concept

The issues of freight transportation and logistics are fragmented from an organisational and regulatory aspect, and the scopes of decision-making and responsibility belong to different institutions. The freight transport entry strategy currently in force manages the entry permits of trucks over 3.5 tons within the area Budapest, however, its operation is lacking in several respects. There are no records whatsoever on the movements of freight transportation vehicles below 3.5 tons in or in the vicinity of the capital city.

At the level of Budapest, the Balázs Mór Plan comprehensively formulates and identifies problems and objectives regarding the issues of logistics and freight transportation; not viewing logistics only as a single sector, but treating it alongside and together with other sectors.

For the moment, the “Uniform Concept Proposal For City Logistics Objectives In Budapest”, drawn up in 2014, is the only document that manages city logistics issues in detail for the area of the capital city, formulating problems and looking for solutions. This document, however, has no approved status after having been prepared.

In summary, therefore, at the moment there is no uniform concept that deals with freight traffic entry, transportation and city logistics issues from a strategic and operative aspect, covering Budapest and its agglomeration region.

4.1.2. Fragmented regulation due to a lack of interoperability of rules brought at various public administration levels

As a result of the regulation of logistics at various levels and by various bodies, the regulatory system is not coherent, is inefficient, and due to the alignment of rules with public administration areas, administrative boundaries often appear within processes as unjustifiably large dividing lines.

It is the result of the lack of interoperability of the national and Budapest regulation that the national road toll system and the Budapest freight traffic entry systems operate on different platforms. In addition, the non-uniform regulation of the Budapest FUA, as well as the regulatory discrepancies in Budapest districts arising as a result of the two-tier administrative system in Budapest are also problems.

4.2. Management and control problems in the area of logistics

4.2.1. Lack of institutional frameworks in city logistics

It is a fundamental requirement of efficient and uniform city logistics management and regulation to set up a body that can focus data collection and analysis related to logistics processes in one hand, while also managing and controlling processes as well as impacting regulations. There is currently no such body in Budapest, and as a result the management and handling of processes is fragmented and less emphatic than it should be given its significance. In the capital city, managing logistics falls under the competence of metropolitan and district municipalities as well as the BKK, while control and inspection fall into the scope of liability of to the police and public area inspection bodies. As a result, the fact that data collection, control and strategy-making are present at different levels and at different bodies becomes a problem, meaning that the management of city logistics does not operate in a uniform and coherent manner.

4.2.2. Low willingness to comply with standards, deficiencies of the inspection system

The low willingness to comply with standards in freight transportation can, for the most part, be traced back to deficiencies of the inspection system. In the absence of appropriate inspection activity, sanctions can for the most part be avoided, therefore, carriers do not obtain the required entry permits. The efficiency of inspections is also reduced by the fact that currently effective regulations distribute parking and loading-related inspection tasks among multiple organisations: these fall within the competence of the Police, FÖRI (Municipality of Budapest Law Enforcement Directorate) and district public area inspectors, and in addition, the inspection of waiting vehicles is carried out by parking companies in certain districts. In the vicinity of delivery destinations, on account of a lack of options or an absence of inspection, trucks and vans frequently park illegally during the time of loading, obstructing public road and/or pedestrian traffic.

Image 30: Truck unloading in a parking space reserved for disabled drivers[12]

[12] Photo: András Ekés

Image 31: Small truck obstructing bicycle traffic

Another major problem related to inspections is that the appropriate application of the parking disc that ensures a 20-minute loading window at parking areas is impossible to verify, and carriers are free to set the time of the start of loading/unloading on the parking disc.

4.2.3. The lack of public awareness relating to and the absence of the incentivisation of environmentally-friendly transportation methods

The number of environmentally-friendly transportation vehicles in Hungary is currently low, which may also be traced back to a lack of motivation. There are no subsidy and support systems currently in place that would favour companies using environmentally-friendly vehicles. Given that the purchasing of environmentally-friendly (electric, LPG, CNG) vehicles incurs greater costs than vehicles using traditional fuel, only larger logistics businesses are able to finance such vehicles using own funds.

Image 32: Illegal parking by a truck with low environmental classification[13]

Environmentally-friendly solutions in freight transportation are not emphasised in public awareness at all, and have no visible manifestations in the city apart from a few pilot projects. In many cases, the heads of smaller logistics companies are not aware of the existence of environmentally-friendly technological solutions at all, which is why transportation-related awareness raising would be much needed at the level of society.

4.3. Infrastructural deficiencies in logistics

4.3.1. The number of concentrated loading points is low, and the locations are not adapted to needs and demands

One of the most critical components of Budapest's freight transportation is ensuring the appropriate conditions of loading/unloading. The number of concentrated loading points proved to be insufficient, as the 527 loading points are unable to satisfy traffic demand.

[13] Photo: András Ekés

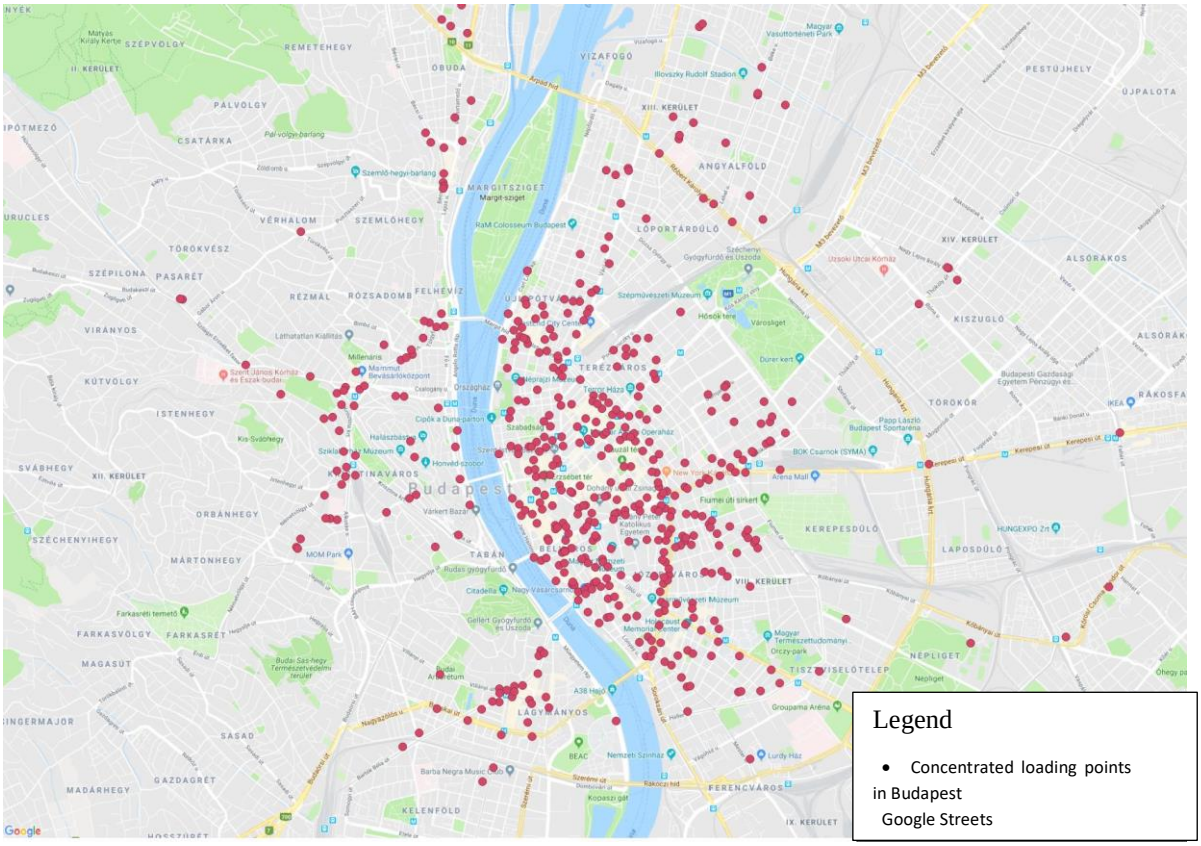


Image 33: Location of concentrated loading points in Budapest

Another problem is that many stores do not have their own dedicated loading infrastructure, given that the regulatory environment is not adequately strict in this regard, meaning the public areas are used to serve the goods traffic needs of these stores.

In many cases, loading points and parking spaces are not clearly distinguished, meaning that vehicles not performing any loading activities can also occupy the places reserved for loading.

Image 34: Signage systems are unclear, and loading points and parking spaces are difficult to distinguish[14]

[14] source: http://kreszklub.hu/kreszforum/rakodasi-terulet-kijelolese/

As the number of loading points is finite and their capacity is low in the city centre, the process of loading/unloading is frequently prolonged on account of searching for an appropriate loading area and illegal stoppages. As a result, determining the times of arrival to transportation chain target stations is often difficult.

Image 35: Illegal stoppage that obstructs traffic and also prolongs the loading process[15]

4.3.2. Absence of the infrastructural conditions for modern urban logistics activities

One of the important characteristics of a modern and sustainable logistics system that is sensitive to the needs and demands of city-dwellers is efficient freight transportation, which means that half-empty or barely loaded freight transport vehicles cannot enter dense inner-city environments, thereby not occupying space that is already scarce and not polluting the air. This, however, requires a system that manages the goods (that until now have been transported and delivered by different transport vehicles and companies) together, and the infrastructural prerequisite of this is the existence of consolidation centres and a parcel point network, as well as the establishment of the IT background required by the process.

Today in Budapest, only large retail chains have their own consolidation centres, but there are no consolidation centres near the city centre that could be used by multiple manufacturers/suppliers, and most carriers deliver the product groups distributed or manufactured by them separately to each store. In the absence of consolidation, the number of vehicles arriving to the stores does not contribute to uninterrupted traffic flow and reducing environmental loads.

[15] Photo: András Ekés

4.4. Problems related to the vehicle fleet and the technologies applied

4.4.1. The utilisation rate of environmentally-friendly vehicles and technologies is low

Traffic is responsible for the greatest ratio of soot, dust and greenhouse gas emissions. The replacement of the fleet with vehicles that are more environmentally-friendly incurs substantial costs for carriers, and it is generally true that they are unable to do so using own funds. Consequently, most carriers – especially smaller businesses – use ageing vehicles using traditional fuels and with lower environmental classification.

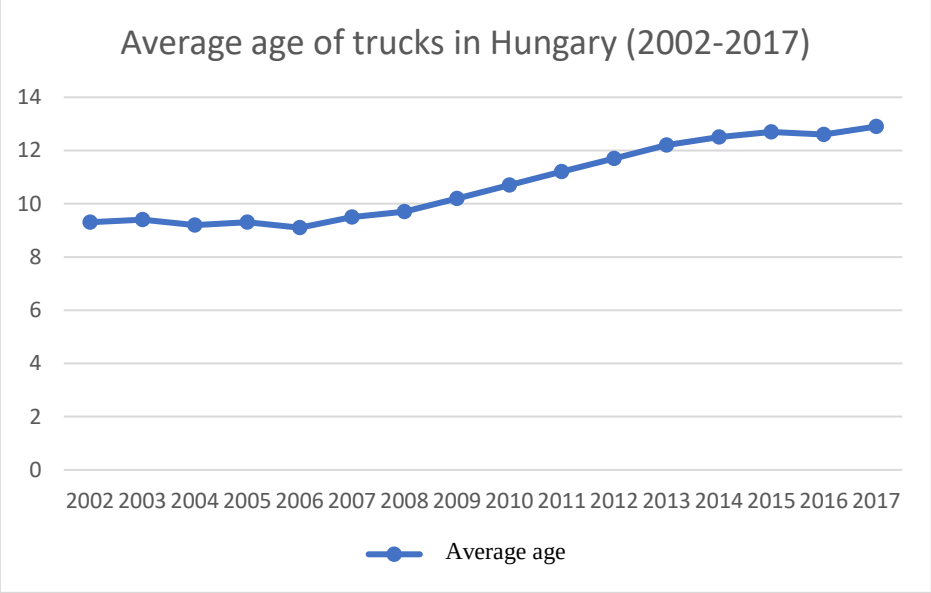


Image 36: Average age of trucks in Hungary (2002-2017)

This statement is also supported by the fact that since 2006, the average age of trucks in Hungary has been increasing continuously (was 13 years in 2017). One of the many reasons for the ageing of vehicles in use is the almost complete lack of positive incentives supporting the widespread use of environmentally-friendly trucks, as well as the rudimentary charging structure for vehicles using alternative fuel sources.

Image 37: Outdated truck used in an inner-city area[16]

[16] Photo: András Ekés

4.4.2. Low ratio of intelligent and innovative solutions in the field of logistics services

The final section of delivery represents a significant challenge for vehicles performing freight transportation. In general, it can be said that approximately 28% of total shipping costs are incurred on the last few kilometres before the destination, as approaching the target destination and vehicle parking is often very difficult. However, if freight transport is carried out using smaller and more energy-efficient vehicles or if, using innovative technologies, the consignments can be delivered to a common target station (parcel points), the efficiency of delivery increases.

The use of last mile technologies or sharing-based solutions is not widespread in Budapest for the time being, and there are only a few larger logistics companies that operate smaller, more energy-efficient vehicles, or freight transport vehicles that can be rented for the short term.

Image 38: Consecutively arriving freight transport vehicles obstruct each other and hinder traffic flow in a narrow inner-city environment[17]

4.5. Problems indicated during the polling of retail units

During the questionnaire survey carried out at 381 retail units in the Budapest and Vecsés area in the autumn of 2017, respondents were free to describe various problems, which were then categorised. 30% of respondents (N=208) said they have no problems with logistics, while the remaining categories are distributed as shown in **Hiba! A hivatkozási forrás nem található.**Most respondents (55%) indicated inappropriate parking/loading points, 9% feel loading points (on account of physical barriers or regulations) are inaccessible, 3% feel loading points are inappropriate (e.g. frequently occupied by

[17] Photo: András Ekés

passenger vehicles for parking purposes), while the others object to the time of delivery and the duration of goods acceptance. It merits special mention that 9.62% of the problems lead to certain unlawful conduct, but this number could actually be greater because uncertain cases were not included in this value.

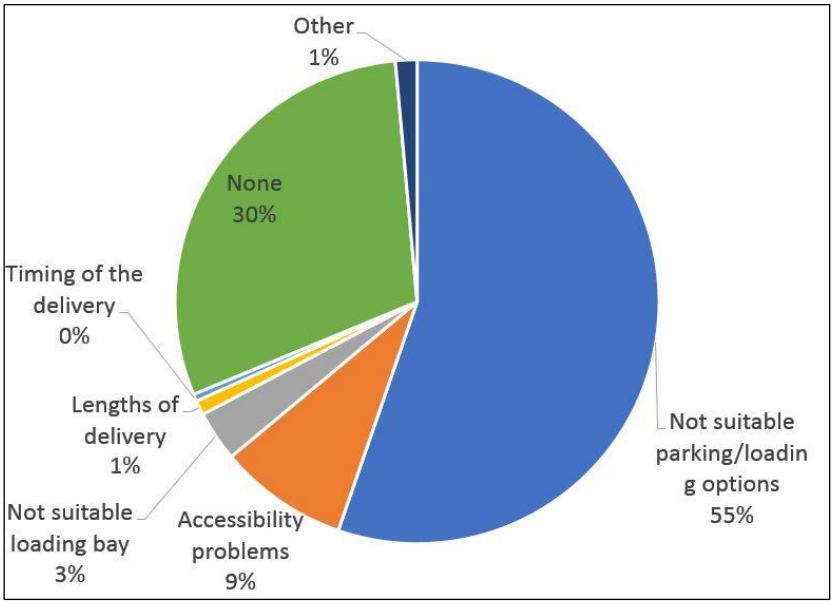


Image 39: Problem occurrence ratio

Approximately two thirds (66%) of respondents (N=129) had some sort of proposal to resolve problems. Again, respondents were free to formulate their responses, which were again categorised, mainly into classes pertaining to the establishment of loading points (34%), requiring an amendment of regulations (19%), looking to change delivery times (2%) and other classes, as shown in the following image.

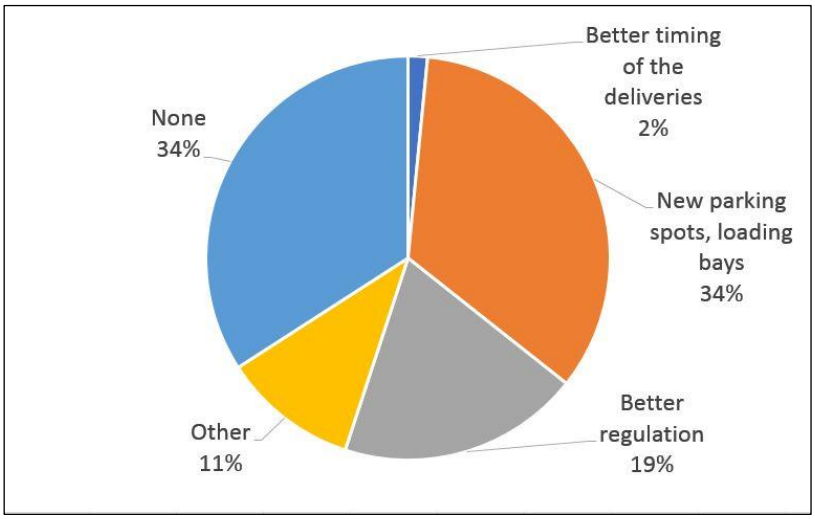


Image 40: Distribution of proposal types

5. International best practices

5.1. Public road examples

5.1.1. Cargohopper, Utrecht (Netherlands)

In 2008, as part of the CIVITAS MIMOSA project, Utrecht developed a freight distribution plan, which included time restrictions for vehicles entering the city and the designation of low-emission zones. However, in addition, in co-operation with MIMOSA, the city introduced two additional measures (Cargohopper and Beer Boat).

The Cargohopper is a miniature electric vehicle on pneumatic tyres, also able to transport containers. It has been operating in the city since April 2009, able to easily get around Utrecht's pedestrian streets and city centre due to its narrow design. It also has a solar panel on its roof. Pursuant to an agreement concluded with an Utrecht waste management company, it also collects waste from stores. The Cargohopper proved to be so successful that Cargohopper 2 was launched in the autumn of 2011.

Image 41: Cargohopper, Utrecht (Netherlands)[18]

5.1.2. Distripolis – Paris (France)

As part of the Distripolis project, special battery-electric vehicles were developed for urban freight deliveries. Freight transport is carried out on the basis of a new information system, where a 5% decrease was observed in distances travelled during the initial tests. Vehicle range is limited by battery charge to 105-155 km.

[18] source: http://evworld.com/press/cargohopper_01.jpg

Image 42: Electric freight transport vehicle - Paris[19]

In addition to the electric van fleet, power-assisted tricycles were also designed for urban deliveries, which can access bicycle lanes and pedestrian zones. Their capacity is 180 kg (1.5 m^3).

Image 43: Tricycle used for freight transport - Paris[20]

5.1.3. Italy – Padua – Cityporto service

The Cityporto solution has been operational since 21 April 2004. Freight transport operators can voluntarily decide whether to participate in the initiative, through which they can access the city centre more easily than earlier restrictions. Those that decide to participate have their goods delivered to the urban consolidation centre at the Interporto logistics terminal. From here, the goods are forwarded to stores in the city centre's limited traffic zone using environmentally-friendly, methane gas-powered vehicles. The numerous incentivising tools include lanes reserved for public transportation, loading points and the use of other logistics facilities.

[19] source: http://www.eltis.org/sites/default/files/styles/threshold768/public/casestudies/distripolis_electron_jpg_2.jpg?itok=N0fHQao4

[20] source: https://static.latribune.fr/120333/distripolis.jpg

Image 44: CNG vehicle - Padua (Italy)[21]

5.1.4. Toulouse – Chronopost

Chronopost is a large carrier firm in France. They carry out urban freight transportation using three types of vehicles: electric vehicles, CNG vehicles and Chronocity vehicles.

Image 45: Manually-controlled Chronocity vehicle[22]

[21] source: https://www.researchgate.net/profile/Jacques_Leonardi/publication/283150066/figure/fig8/AS:614022172921883@1523405702826/CNG-van-used-for-last-mile-deliveries-by-Cityporto-Padova-Innovation-and-transferability.jpg

[22] source: http://www.chronocity.fr/resources/_wsb_481x357_LM006546.jpg

5.2. Track-bound examples

5.2.1. Monoprix – Paris (France)

In 2004, a French supermarket chain (Monoprix) participated in a research project conducted by a few local municipalities and the operator of the French railway network. The project was launched three years later, primarily aimed at developing a new concept for supplying stores in Paris, thereby reducing congestion on roads in and around the city. Starting from November 2007, Monoprix combined rail freight transportation and the use of CNG vehicles. They transported goods from a suburban distribution centre to a building in Paris by rail, from where CNG-powered trucks forwarded the goods to their destination. As a result of the project, CO_2 emissions dropped, but transportation costs increased.

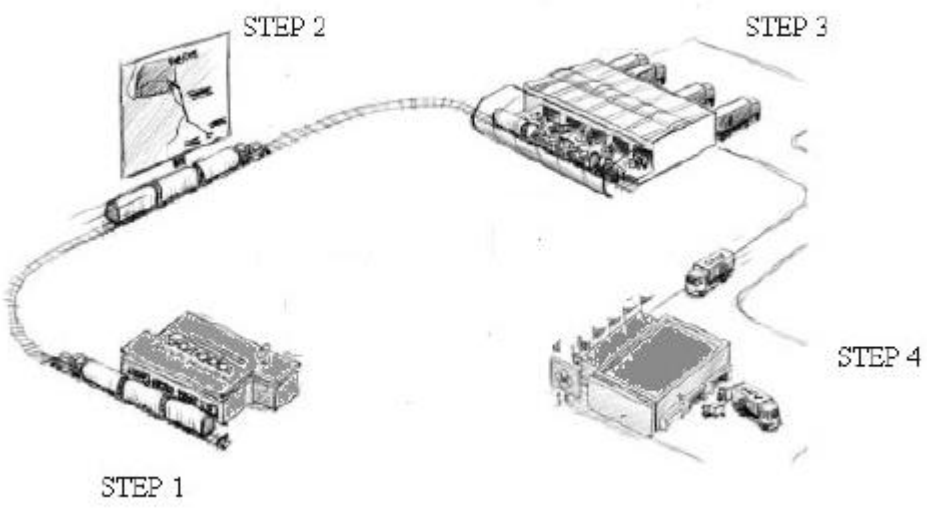


Image 46: The process of transporting goods to Monoprix stores[23]

5.3. Waterway examples

5.3.1. Beer Boat, Utrecht (Netherlands)

In 2008, as part of the CIVITAS MIMOSA project, Utrecht developed a freight distribution plan, which included time restrictions for vehicles entering the city and the designation of low-emission zones. However, in addition, in co-operation with MIMOSA, the city introduced two additional measures (Cargohopper and Beer Boat).

Utrecht previously used a diesel-powered boat to transport goods to stores and hospitality facilities along the canals. In January 2010, they introduced a zero-emission electric boat, which supplies more than 60 catering businesses. Prompted by this success, in 2012 the city purchased another boat to transport other goods, such as waste.

[23] cource: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S2238-10312013000300005

Image 47: Beer Boat, Utrecht (Netherlands)[24]

5.3.2. Boat and bicycle couriers – Amsterdam

On 23 October 1997, Amsterdam launched the very first pilot systems solution supporting urban distribution, which uses waterways to service the historic city centre, thereby relieving the load on public road traffic. The project was primarily developed for the deliveries of small packages by DHL Worldwide Express.

The objective of the project was for a boat to progress along Amsterdam's canals, with pre-specified landing stations. Until 1997, the canals were only allowed to be used for passenger transport, but the rule was amended for this initiative. The boat carried bicycle couriers, who at the given landing stations boarded or exited the boat, and forwarded the small packages to the city centre. The boat allowed for the transportation of 20 bicycle couriers. The efficiency of the solution was increased by the use of information technology, thanks to which the relationship (location) of the couriers and the boat can be monitored and tracked.

[24] source: http://smartcitystudio.com/wp-content/uploads/2012/10/bierboot.jpg

Image 48: Boat carrying bicycle couriers for the purpose of delivering small packages – Amsterdam (Netherlands)[25]

5.3.3. Electric boat – Amsterdam

Freight operator Mokum Mariteam uses the canals of Amsterdam to transport goods and waste, thereby reducing the number of small and medium-sized trucks operated in the inner city. The vessels are fitted with electric engines. Goods are transported through the city and delivered to their destination, where waste and left-overs are picked up on the way back. In addition, they also implement several minor projects using the boat for the municipality, hotels and various events.

5.4. Regulatory examples

5.4.1. Measures to improve freight transportation – Stockholm

In 2013, the city of Stockholm introduced multiple methods to improve freight transportation. A close cooperation was established between the city and the various stakeholders, and as a first step they established a trade consolidation solution in the city centre, and a pilot project for freight transportation outside of peak hours (at night).

In 2014, these and a few other measures were included in the "Stockholm Freight Plan 2014-2017". The trade consolidation solution was launched in 2017 under the ÄLSKADESTAD. This combines the last-mile delivery of packages with waste collection, using electric vehicles. The solution was realised with the cooperation between the city, the waste management company, the logistics service provider and the real estate company. This is a commercial business model, and as such its operation receives no state funding.

During freight transportation outside of peak hours, it was examined how the prohibition pertaining to the use of heavy vehicles during night-time transportation could be lifted using silent vehicles, and how the capacity of the existing infrastructure could be expanded. Two trucks (one electric hybrid and one operating with biogas) delivered foodstuffs to restaurants, hotels and grocery stores in the city centre. The primary obstacle was the noise effect disturbing residents, and as such they placed particular emphasis on studying this matter. The project's results were positive in respect of efficiency

[25] source: http://cargobikefestival.blogspot.com/2017/10/boat-bike-dhls-multi-modal-amsterdam.html

and pollutant emissions. Another important conclusion drawn was that the largest noise-related problem arose during last-mile delivery.

Stockholm continuously updates its freight transportation plan. As part of the CIVITAS ECCENTRIC programme, one of the new night-time freight transportation projects contributes to establishing the new regulatory framework for night-time freight transportation.

Starting from the summer of 2018, the ÄLSKADESTAD project will also be expanded to the old town, with new partners most likely also joining in. Important mobility and environmental aspects – such as electrification processes, digitalisation and automation – will also be included in the new plan.

5.4.2. Optimised routes

The meeting point of Big Data and logistics: the delivery trucks of UPS are prohibited from turning left, because during the analysis of data it was uncovered that the company can save substantial costs and kilometres travelled this way. The trucks waste considerable time and fuel by waiting for oncoming traffic to pass when trying to turn left at intersections. The settings of the route planning software were modified, with left turns minimised. The result was not just a reduction in kilometres travelled and costs incurred, but the company also requires fewer vehicles.

5.4.3. Distribution of goods – Aalborg (Denmark)

The city of Aalborg was one of the three Danish cities involved in the "Sustainable City Logistics Solutions" project between 2001 and 2003. The project was aimed at improving freight distribution, and subsequently to reduce negative environmental effects arising during freight transportation activities. Freight delivery activity in the city centre is concentrated to four main streets, all of which are located in a pedestrian zone. The streets have approximately 200 stores in total, which all require daily deliveries. Numerous measures were taken in order to achieve the goals set out:

- Loading and 'non-loading' zones were established
- Goods transportation between distributors was coordinated
- Electric vehicles were used
- Regulation and entry permit requirements for freight deliveries in pedestrian zones were tightened
- The 'one shop' principle was employed, where in essence one shop serves as a centre, from where goods are delivered to nearby stores.

5.4.4. Toulouse

There was a freight transportation regulation in place in the city, but it was highly complex and did not meet the demands of traders. Accordingly, nearly 50% of deliveries to the city centre were carried out in non-compliant fashion.

The city's transportation department studied the transportation regulations of other cities, analysed the positive features and any potential obstructing factors. They then formulated a proposal for a new regulation for Toulouse.

In January 2006, they presented their ideas to various public road carriers, which ideas stipulated smaller, more environmentally-friendly vehicles as well as a goods distribution centre in the suburban area. The carriers agreed on the necessity of renewing the regulation, but only with the cooperation of store owners. Between January and March 2006, city representatives collaborated with store owners and public road carriers in drawing up the new freight transportation regulation and also

designated dedicated loading facilities in the city centre. In January 2007, the city's management decided to give up on establishing the new distribution centre as numerous carriers resisted.

The new regulation restricted the weight allowed to be transported by trucks as well as the times of deliveries in the city centre. The new parking space management regulation and the re-planning of public areas helped free up places in the city centre for freight deliveries. The sales representatives accepted the moderate restrictions incurred by the regulation.

5.4.5. Low emission zone – London

Low emissions zones were introduced in London in 2008, with the regulation tightened further in 2012. There are no barriers or toll-gates, instead cameras monitor anyone entering the low emission zone, reading the registration plate, then checking the given vehicle's emission type against a database.

5.4.6. Multi-purpose lane – Barcelona

Depending on time of day and time interval, certain lanes have variable use, namely they may serve as parking spaces, loading facilities or bus lanes. In peak hours, for example, they function as bus lanes. Current information is shown on displays. Implementation was carried out as part of the CIVITAS SMILE project between 2002 and 2006.

5.5. Innovations

5.5.1. Drones – Experimental phase

Remote-controlled or automated drones are still in the experimental phase, and to date are used primarily for delivering medical packages and other urgent deliveries. Amongst others, Deutsche Post DHL, Amazon, Google and UPS are also experimenting with such solutions. The first drone was tested by Deutsche Post DHL for the purpose of freight transportation, flying a total of 12 km. It weighs 5 kg, with a cargo capacity of 1.2 kg, flying at a height of 50 m and a with a speed of 18 m/s. Using these data and results, the drone was further developed, with the new design shown in the image below.

Image 49: Advanced drone used by DHL[26]

5.5.2. Robots – Experimental phase

Since 2013, certain start-ups, such as SideWalk, Starship or Dispatch, have been designing and testing robots for last-mile deliveries. The robots designed by SideWalk have been tested by DHL in Lithuania

[26] source: https://m.wsj.net/video/20140925/092514dhldrone/092514dhldrone_640x360.jpg

since 2015, while Dispatch has been testing the robot named Carry in China. In 2016, Starship also tested its proprietary robot in the United Kingdom.

Image 50: Robot designed by Dispatch[27]

5.5.3. Citylog EMF – Austria

Citylog EMF is a new type of electric freight vehicle, developed in Austria by a consortium led by HET. The electric motor propulsion is fuel-cell based, and the vehicle concept consists of a series of 'self-driven' vehicles and 'trailers', that can be coupled to a train, and un-coupled for loading and unloading operations. Citylog EMF is a type of road train that uses an electronic and not a normal mechanic drawbar. Every vehicle is 'self-driving', led by electronic signals to follow the trajectory of the first one, but there is no physical drawbar linking the vehicles to each other. The fuel-cell uses hydrogen as fuel. Brake-energy is saved and stored, and can be used if the vehicle needs more power (e.g. to drive up-hill). Emissions are only water vapour.

The first Citylog EMF vehicle was tested in Klagenfurt. The vehicle was designed for the transportation of goods or passengers. As part of a project called "E-log Klagenfurt", the Citylog EMF will be used for transportation from the local logistics distribution centre to the inner-city area.

Image 51: Citylog EMF vehicle[28]

[27] source: https://zdnet4.cbsistatic.com/hub/i/r/2018/06/19/a910d6c0-4eaa-48b3-93be-094cfb8dc794/resize/1170x878/f912d49c3a77f230d2eb849a58c88784/dispatch.png

[28] source: https://encryptedtbn0.gstatic.com/images?q=tbn:ANd9GcQojSJwlpmbQTa0iEsjVQfsIn4ZLroRGbZegx4V7NjQzAEneYKe

6. The SULP's system of objectives

When setting out the system of objectives, we placed emphasis on the results of problem analysis on the one hand, and also took the objectives of previously completed strategic documents into account on the other. We categorised problems into four groups, which covered the area of the legal framework and regulation, the organisational directions of logistics, as well as issues related to built infrastructure and rolling stock. Overall, the problems linked to all of these negatively impact air-quality and dynamics of traffic organisation, but in many cases the efficiency of logistics, transportation and loading as well. The primary requirement of the system of objectives is to provide answers to the outlined problems that are in line with the vision of the city and its region, and that future measures are able to serve the accomplishment of these objectives.

It was on the basis of this system that we defined the various levels of the system of objectives. At the highest level, we highlighted a comprehensive goal, which presents the solution for the entire problem-set, and then broke this down into strategic and operative goals. The strategic goals set out the key tasks related to the various problem areas, while the operative goals focus on the more specific, but still generalised objective of the given problems. The implementation of operative goals is served by the measures that are presented in the following chapter.

When establishing a system of objectives, we also paid attention to the logistics-related content of strategic documents already presented. The following subchapter contains the city logistics-related content of the various documents.

6.1. Review of the logistics-related objectives of strategic documents

The following section presents the most important future ideas and objectives related to city logistics culled from the strategic documents presented in Chapter 2.

The development tools of the National Transport Infrastructure Development Strategy feature the enhancement competitiveness-increasing freight transport (logistics, functional transit network) infrastructure as a clear goal. It considers the development of strategic and urban freight transport to be one of the implementable priority tools, which has great social usefulness. The supporting of urban disperse goods supply and inverse logistics functions – through the development of urban and regional supply centres – could be implemented in the future typically in Budapest, but potentially in other large cities as well.

The tool-kit of the Medium-term Logistics Strategy also features the supporting of city logistics activities. The strategy mentions intense developments in the areas of "city logistics", "green logistics" and "inverse logistics" as necessary, as these developments, on the one hand, can contribute to modernising logistics infrastructure and, on the other, can also promote related R+D+I activity.

In respect to creating the conditions of city logistics, the document considers reforming local decrees regulating logistics activity and freight transport, and laying the foundations for city logistics pilot projects to be an issue of priority significance.

In the Balázs Mór Plan, as an SUMP, (sustainable urban mobility plan), the establishment of an appropriate vehicle fleet is featured as an area of intervention, as in not only aims to renew the vehicle fleet of community transportation, but also aims at the replacement of passenger and freight transport vehicle fleets as well through measures regulating taxi and city logistics services.

As part of integrated network development, the development of the system of concentrated loading points is also a priority task. The aim is not only to increase their number, but also to balance out the

utilisation in terms of time, to create an unambiguous and clear signage system and to facilitate access.

The establishment of accessible and convenient 'mode switching points' is an important task, not just in terms of community transport, but for urban freight transport as well. By developing logistics centres and their connections, their operation can be made more cost-efficient, and by favouring environmentally-friendly modes of freight transport, environmental load can also be reduced. The strategy also features the objective of expanding waterway freight transport connections in the area of the Budapest-Érd city limits, as currently only the Csepel Freeport conducts freight transportation.

The study brings up as a problem the transportation of freight from producers directly to inner city commercial units using larger vehicles, as well as the strengthening of the role of direct home delivery that accompanies the growth of online trade. The solution to offsetting the negative effect of these processes is to tighten the zonal system regulation which is based on gross vehicle weight and to develop traffic restrictions based on environmental protection properties. According to the study, urban freight transportation should be resolved using low pollutant emission urban trucks, thereby, by using electric, hydrogen-powered and hybrid technologies, both the volume of pollutants and noise pollution would be reduced.

The strategy also feels that the review of the freight traffic entry system would also be justified, and that the continuous development of inspections is essential. 'Stop-and-inspect' inspections are insufficient and outdated, and the inspection process should be modernised by establishing and operating a system based on intelligent technology, by connecting to the road toll system introduced – in part – on the national public road main network, and by taking nationwide experiences into consideration.

The primary task of the 2014-2020 period is to put in place a regional time regulation of logistics supply in the area of city logistics. Special attention should be paid to the IT-based organisation of urban deliveries, to their supervision, and to optimising the use of concentrated loading points in public areas (which primarily ensure basic supply). A comprehensive city logistics concept must be drawn up in the interest of establishing an institutional and service background, to create urban service points in order to regulate logistics supply in terms of area and time.

Based on area usage set out in the Budapest 2030 – Long-term Urban Development Concept, some Danube-adjacent economic areas, and certain economic areas on the outskirts of the city must be used for logistics purposes.

The study defines development target areas along the Danube, for which it also determines possible functions. Of these, the areas of South Buda and Csepel Island have been designated for logistics functions. The external areas of Pest – primarily in already existing economic areas – have areas suitable to cater for functions incurring environmental loads, and this is where the areas that can specifically be used for logistics and freight transportation are located (in the areas adjacent to the M0). In the most southern part of Buda, next to Érd, the opportunities offered by the motorway, the railway and the Danube also predestinate the region for logistics functions.

In the suburban zone, in the areas with appropriate infrastructural properties, ensuring settlement opportunities for the logistics and freight transportation sector is an important economic objective. The study assigns priority significance to traffic mitigation, one of the tools of which according to the study in the inner-city region could be the restriction of entry and the establishment of a city logistics system.

We built on the document entitled "Uniform Concept Proposal For City Logistics Objectives In Budapest" to a great extent when formulating the system of objectives – on account of its durability and its recommendations and proposal that hold significance to this day –, meaning that the objectives formulated in this document are partly identical to those presented in the concept.

6.2. Presentation of the levels of the system of objectives

The system of objectives was fundamentally based on the system of objectives of the previously presented strategic documents as well the problems formulated herein. We placed great emphasis on the vision and objectives set out in the Balázs Mór Plan, which for the most part overlap with the objectives formulated in this document. The Balázs Mór Plan is a comprehensive document that deals with multiple sectors. This document essentially corresponds to the sections of the Balázs Mór Plan pertaining to the logistics sector, but having been further developed and formulated in detail.

We defined three levels of objectives: a comprehensive goal, strategic goals and operative goals.

The comprehensive goal defines the necessity of the resolution of the most urgent problems: improving the efficiency of the city logistics process and urban freight transportation, as well as reducing the load on the environment.

Breaking down the comprehensive goal further, we defined strategic goals which apply to various areas of freight transport and city logistics, contributing to the implementation and accomplishment of the comprehensive goal. These areas are as follows: regulatory and legal area, logistics management and process regulation, logistics environment infrastructure and vehicles performing freight transportation and loading.

Within the various logistics areas, we broke strategic goals down further into operative goals, which are objectives based on a given specific problem and providing responses to these problems.

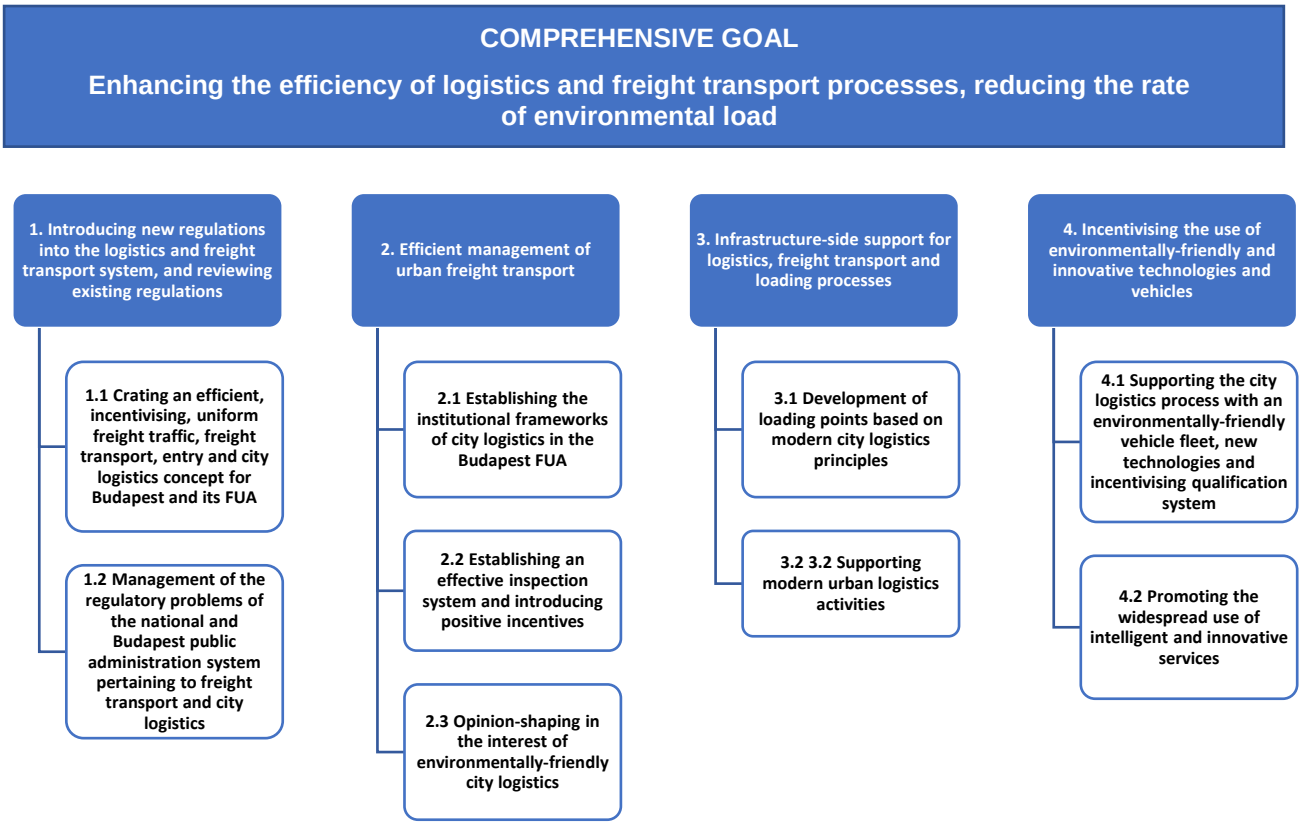


Image 52: System of objectives

6.2.1. Strategic goals

The strategic goals are derived from breaking down the comprehensive goal into logistics areas.

In the field of the new regulatory system, supporting the city logistics system by establishing a new statutory environment and by updating existing legal regulations is an important objective.

The vast majority of urban freight transport problems arise due to disorganised frameworks. The efficiency of freight transport can be increased by appointing an organisation responsible for city logistics tasks, as well as establishing an easy-to-use integrated information system for managing the organisation of logistics processes.

The lack of built infrastructure (consolidation centres, concentrated loading points) hinders the widespread dissemination of city logistics. Another objective that can be defined is the implementation of infrastructure investment projects, as well as lower-scale infrastructural modifications (which perhaps do not even involve construction), such as the clarification of signage systems (road markings, signs).

The use of environmentally-friendly technologies and incentivising their use contributes to reducing harmful environmental impacts, and as such this was also defined as a strategic goal.

6.2.2. Operative goals

The strategic goals have been further broken down into operative goals.

Within the strategic and legal regulatory area of logistics, formulating a uniform city logistics concept at the level of Budapest and its agglomeration is also important. By defining this strategy, city logistics can develop within planned frameworks.

At the regulatory level, by remedying the problems caused by the two-tier administrative system, the development of city logistics solutions can be made more dynamic.

It is important to strengthen compliance with standards, which can be accomplished not just by improving the quality of inspections, but also through incentivisation, instead of the current system which essentially builds on sanctioning. By harmonising and coordinating freight transport needs, the number of vehicles required during such transportation can be reduced, thereby also reducing pollutant emissions and the rate of traffic obstructions.

Through opinion-shaping campaigns and involvement in pilot city logistics projects, public awareness and perception of modern city logistics activities could improve.

The freight transport process could also be made more efficient by improving the locations of concentrated loading points and increasing their numbers, and by supporting it with an IT system.

Elements incentivising the use of environmentally-friendly vehicles can contribute to creating a cleaner and more energy-efficient freight transport system in Budapest and its catchment area.

1. Introducing new regulations into the logistics and freight transport system, and reviewing existing regulations		
Operative goals	1.1. Crating an efficient, incentivising, uniform freight traffic, freight transport, entry and city logistics concept for Budapest and its FUA	*1.1.1. Drawing up the city logistics concept of the Budapest FUA*
	1.2. Management of the regulatory problems of the national and Budapest public administration system pertaining to freight transport and city logistics	*1.2.1. Uniform logistics regulations for Budapest's entire FUA* *1.2.2. Harmonised and coordinated parking and loading for Budapest's districts* *1.2.3. Ensuring the interoperability of the national road toll system and Budapest freight traffic entry systems*

2. Efficient management of urban freight transport		
Operative goals	2.1. Establishing the institutional frameworks of city logistics in the Budapest FUA	*2.1.1. Establishing an organisational background for city logistics tasks*
	2.1. Establishing an effective inspection system and introducing positive incentives	2.2. Efficient inspection system and consistent sanctioning
	2.3. Opinion-shaping in the interest of environmentally-friendly city logistics	2.3.1. Opinion-shaping schemes, programmes and campaigns 2.3.2. Launching R+D and pilot projects, and involvement in such projects

3. Infrastructure-side support for logistics, freight transport and loading processes		
Operative goals	3.1. Development of loading points based on modern city logistics principles	*3.1.1. Development of concentrated loading points* *3.1.2. Innovative solutions to support the loading process*
	3.2. Supporting modern urban logistics activities	*3.2.1. Establishment of consolidation centres and neighbourhood consolidation points*

		3.2.2. Establishment of the IT background required for the supporting of consolidation and city logistics processes *3.2.3. Enhancing the network of parcel points*

4. Incentivising the use of environmentally-friendly and innovative technologies and vehicles		
Operative goals	4.1. Supporting the city logistics process with an environmentally-friendly vehicle fleet, new technologies and incentivising qualification system	*4.1.1.Introducing positive incentives to support the widespread use of environmentally-friendly vehicles* *4.1.2. Establishment of charging infrastructure for trucks using alternative fuel sources* *4.1.3. Introduction of the Qualified Budapest Freight Transporter System*
	4.2. Promoting the widespread use of intelligent and innovative services	*4.2.1.Supporting alternative methods for last mile freight transport* *4.2.2. Application of sharing-based solutions* *4.2.3. Elaboration of the technology of logistics as a service*

7. Types of measures

7.1. Regulatory measures

Regulatory measures are among the strongest tools. In the case non-compliance with regulations, examples of conduct to follow and obligations to be observed during logistics processes can be enforced by way of sanctioning.

Regulation can be imposed at various levels: on the one hand on a territorial basis, and on the other the hierarchical basis. At the territorial level in Hungary, we distinguish national, regional, county, district and municipal regulations. Hierarchically, there are laws or decrees by the Prime Minister or ministers, adopted by the National Assembly or the government. In Budapest, the joint presence of the Municipality of Budapest and district municipalities creates and adopts municipal, local level regulations, and freight transportation in the capital city and its catchment area operates on the basis of a national regulatory framework.

Also considered as regulations are the various road toll and entry systems, that are able to implement the “user pays, polluter pays” principle. These allow for the influencing of traffic volumes and quality on road sections and specific areas.

Loading and parking regulations are also able to impact the operation of the players in the logistics chain. Loading regulations include the regulation of the use of loading areas, the regulation of maximum loading times and the regulation of other loading-related criteria.

Drawing up strategies and opinion-shaping are special tools of regulation. Strategies lay down visions and objectives, allowing for the development of the logistics sector within a regulated framework.

Opinion-shaping is a looser form of regulation, which does not force users to adhere to a mode of conduct set out by legal regulations, instead presenting new opportunities to and educating players of logistics processes.

7.2. Technology

On account of the development of technology, the range of possibilities afforded by technological tools is expanding continuously. By employing information and communications technology (ICT), intelligent transportation systems (IPS) and automotive industry developments, the efficiency of the logistics chain is enhanced.

Technological measures, for example, include the creation of various information systems, such as the information system handling real-time traffic conditions, the information system managing loading points (systems indicating the occupancy of loading points, systems suitable to reserve loading point time windows) and information systems managing the harmonisation and coordination of freight transport.

Intelligent transportation systems allow for the monitoring of vehicles, their tracking over time, which in the case of road toll or entry systems support the verification of toll payment.

Automotive industry developments continue to offer more efficient, cleaner and energy-efficient drive systems. Their use contributes to reducing pollutant emissions.

7.3. Infrastructure development

The tools of infrastructural development are among the measures that require the greatest resources. Infrastructural developments can be implemented by constructing new infrastructure elements or by renewing and modernising already existing infrastructure components.

Infrastructure elements that require the largest investment resources are consolidation centres. The establishment of these centres is essential in order to make city logistics processes more efficient.

The establishment of concentrated loading points is a less investment-demanding measure. When establishing loading points, multi-functional area usage can be an important aspect. It is possible to designate areas not only for loading, but for loading in certain periods, and for parking or other functions in other periods. This can improve the capacity utilisation of the given area.

Infrastructural measures include infrastructure constructions serving the charging or filling of electric or other alternative fuel sources (e.g. CNG). Another significant aspect, in order to promote the widespread use of electric vehicles, is for the given area to have an electric charging station network that is as dense as possible.

Another less frequently encountered solution, but one that is still used is the promotion of the use of trackbound systems. Infrastructure investments allow for the use of urban trackbound systems for purposes other than passenger transportation.

Image 53: Designated loading point in Vienna's inner city

7.4. Services

In the field of logistics, new services are typically called to life by market needs, and they provide a solution, a response to an actual market niche or problem, by which they greatly contribute to making processes more efficient. In Budapest, the most significant "gap-filling service" observed in recent years was the appearance of food delivery companies, which connect multiple restaurants to customers using a common platform and service. Adapting to the inner city environment, the majority of couriers uses a bicycle, which allows the service to significantly contribute to the sustainability of the sector. There are, however, missing services that for the moment have not been launched on account of high investment costs or deficiencies of the regulatory system, even though these would substantially increase process efficiency (e.g.: establishment of consolidation centres and services).

Image 54: Logistics as a service – left: food delivery courier in Vienna, right: parcel point of the Hungarian Post in Budapest

Image 55: Cargo bicycles and a truck for rent at a DIY store in Berlin – solution for home delivery[29]

7.5. Energy

The energy use of urban freight transportation in Hungary is today almost 100% characterised by the use of non-renewable fossil fuels. This, on the one hand, leads to the depletion of fossil fuels and, on the other, as a more directly observed problem, a contribution to urban air pollution and smog. Although the gradual spreading of electric vehicles may be observed in traffic, this process is still in its infancy in respect of vehicles used in freight transportation. This can be explained firstly by the low number and high price of available electric freight transportation vehicles, and secondly by the deficiencies and shortcomings of the statutory environment (the absence of regulators and incentives).

[29] https://www.facebook.com/Pedalpower-Tandems-und-Lastenfahrr%C3%A4der-handmade-in-Berlin-193112290700948

Image 56: Electric freight transport vehicles – left: small parcel delivery by tricycle in Vienna, right: 100% electric small truck (Citroën Berlingo Electric)

7.6. Possible new technologies

Of the changes that came about on account of the technological developments of recent decades, the widespread use of the internet had the greatest impact on logistics processes. The possibilities offered by the internet have greatly transformed the traditional system of commerce, with virtual commercial spaces, online purchasing and home delivery replacing brick-and-mortar stores and shopping malls. The growth of the ratio of e-commerce within total trade can still be observed today, and it is difficult to forecast at what ratio this will settle in at in the coming decades.

In addition to the use of the internet, there are several other new technologies under development that are expected to greatly impact freight transport and logistics processes, but for the time being we can only estimate what specific impact these might have on urban freight transport processes down the line. The most important of these is automation, primarily self-driving cars and devices, as well as the spreading use of drones. Both self-driving cars and drones will, in essence, replace human workforce, and while a self-driving car will not reduce traffic and congestion in a tight urban environment, the use of drones might be suitable for this purpose as well. Another direction may be the use of freight transport pipelines, but this may not actually be a viable solution on a wide-scale on account of significant infrastructural development needs.

8. Measures

Name of measure	1.1.1 Drawing up the city logistics concept of the Budapest FUA
Strategic goal	1. Introducing new regulations into the logistics and freight transport system, and reviewing existing regulations
Operative goal	1.1 Crating an efficient, incentivising, uniform freight traffic, freight transport, entry and city logistics concept for Budapest and its FUA
Justification	Currently, there are no logistics concepts or plans pertaining to the Budapest FUA that have been approved by the General Assembly of Budapest, and thus considered official. A document authenticated by decision-makers is a fundamental prerequisite for the logistics problems of the FUA to be at managed with foresight and in a sustainable manner.
Description	The objective of the city logistics concept prepared as an industry plan for the Balázs Mór Plan is to define a long-term vision pertaining to the Budapest FUA in respect of urban logistics, freight transportation and freight traffic, then building on this vision to draw up a system of objectives and the related operative measures. The document was prepared with widespread industry consultation, in a manner that allows all stakeholders to contribute and provide opinions. Forerunners to the above document are the present document and the Uniform Concept Proposal For City Logistics Objectives in Budapest drawn up in 2014.
Target area	FUA
Preconditions	Preparation of the 2nd part of the Balázs Mór Plan
Related measures	2.1.1. Establishing an organisational background for city logistics tasks

Name of measure	1.2.1 Uniform logistics regulations for Budapest's entire FUA
Strategic goal	1. Introducing new regulations into the logistics and freight transport system, and reviewing existing regulations
Operative goal	1.2. Management of the regulatory problems of the national and Budapest public administration system pertaining to freight transport and city logistics
Justification	Although from a public administration perspective the Budapest FUA is made up of individual settlements, in reality these form an organic unit, a single region, especially in terms of mobility. Logistics regulations must be adapted to this actual geographical

	space and group of settlements, otherwise the coordination of logistics activities becomes difficult, and the goals of the compact city and sustainability are also impacted. It is important that city boundaries do not act as city walls, instead the whole functional urban area should act as an engine for freight transport and city logistics processes.
Description	Common legislation is required in respect of logistics processes for the areas of settlement municipalities located in the area of the Budapest functional urban area (FUA), which FUA is defined according to OECD methodology. The legal regulation applies to the following: review of the zones of the freight traffic zonal system and the creation of a new unified regulation review of the signage system of loading activities, improving the distinction of loading and parking surfaces and setting these out in legal regulations creation of a regulatory background pertaining to the establishment and operation of an organisation responsible for the logistics management of the capital city - establishment of a legal environment supporting the establishment and operation of a positive incentive system
Target area	FUA
Preconditions	Cooperation of the settlement municipalities of the Budapest FUA with one another, as well as the drawing up of a logistics regulation for the area, in consultation with state players concerned
Related measures	1.2.2 Harmonised and coordinated parking and loading for Budapest's districts 1.2.3. Ensuring the interoperability of the national road toll system and Budapest freight traffic entry systems

Name of measure	**1.2.2 Harmonised and coordinated parking and loading for Budapest's districts**
Strategic goal	1. Introducing new regulations into the logistics and freight transport system, and reviewing existing regulations
Operative goal	1.2. Management of the regulatory problems of the national and Budapest public administration system pertaining to freight transport and city logistics
Justification	The anomalies and problems arising from the two-tier municipal system of Budapest and the fact that the system of parking and loading are ensured by separate legal regulations and their

	supervision by different bodies greatly contribute to irregular conduct and, as a result, the improper use of urban spaces and mobility services.
Description	The discrepancies in the regulation and control of loading and parking lead to a contradictory situation, as vehicles in both cases have need for the same area, and share the use of the same urban surfaces among each other. The most important goal of the measure is to ensure that the regulation and supervision of parking and loading is coordinated and harmonised to the greatest possible extent. The harmonisation of freight transport, parking and loading can be realised through the following steps: uniform designation of waiting and loading points at the level of Budapest the opening for loading purposes of surfaces that are not exclusively designated as loading points (on a temporary basis), and the establishment of a regulatory background (e.g.: taxi bays, bus stops, parking surfaces) the establishment of a uniform and unambiguous signage system for waiting and loading points supervision of parking and loading by a single body In relation to the measure, the enhancement of the system of concentrated loading points (measure 3.1.1) is also recommended, as is the phasing out of the use of the loading disc.
Target area	Budapest
Preconditions	-
Related measures	1.2.1 Uniform logistics regulations for Budapest's entire FUA 2.2.1. Efficient inspection system and consistent sanctioning 3.1.1. Development of concentrated loading points

Name of measure	**1.2.3. Ensuring the interoperability of the national road toll system and Budapest freight traffic entry systems**
Strategic goal	1. Introducing new regulations into the logistics and freight transport system, and reviewing existing regulations
Operative goal	1.2 Management of the regulatory problems of the national and Budapest public administration system pertaining to freight transport and city logistics
Justification	Within the process of freight transport, Budapest's entry system is currently not aligned with the national road toll payment system.

	The absence of the harmonisation of the national and capital city toll payment system places additional burdens on participants of transportation processes, and familiarity with entry restrictions and obtaining permits is especially problematic in the case of carriers that are not familiar with the Budapest system (e.g. foreign vehicles). For the moment, different road usage regulations are in force at national and Budapest levels for vehicles below and above a gross vehicle weight (GVW) of 3.5 tons. For vehicles with a GVW under 3.5 tons, including trailers, and for buses, there is currently no road usage fee in force in Budapest, while at the national level, these vehicle categories are subject to the vignette system of the motorway network, just like in the case of passenger vehicles. These vignettes may be purchased for specific periods, meaning that the tariff is not proportionate with the amount of distance travelled or with environmental categories. In the case of vehicles with a GVW over 3.5 tons, the national road toll system (HU-GO) determines a tariff proportionate to the distanced travelled, whose per kilometre unit cost depends on the category of the road section used, the vehicle category (J2, J3, J4) and the vehicle's environmental classification. In the HU-GO system, reporting of road usage can be carried out by purchasing an individual ticket, or in the case of frequent users, with an on-board device. In contrast, the Budapest freight traffic entry system applicable to vehicles with a GVW over 3.5 tons divides the city into zones (road sections accessible in terminating traffic, zones restricted to vehicles with a GVW under 12 tons, zones restricted to vehicles with a GVW under 7.5 tons, zones restricted to vehicles with a GVW under 3.5 tons, protected zones, protected green zones) and road sections accessible in terminating traffic have also been designated. The simplest way to submit a request for an entry permit is via the online TOBI system. The tariff is, currently, not proportionate either to gross vehicle weight or the distance travelled. In the interest of fairness and enforcing the "user pays, polluter pays" principle set out by the European Union, the review of the Budapest entry system is recommended. The national road toll system is operated by Nemzeti Útdíjfizetési Szolgáltató Zrt. in respect of all vehicle categories. In Budapest, the entry system is operated by Budapest Közút Zrt.
Description	The prerequisite for the interoperability of the systems forming two different philosophies is a common regulatory base and the establishment of tariffs based on identical standards. Interoperability alleviates the burdens of freight traffic carriers

	caused by additional administration or the lack of familiarity with the systems (particularly in the case of occasional users and foreigners). When reforming the Budapest toll system, it is important to keep in mind that the on-board devices currently allowed and used in the HU-GO system should also be usable for the Budapest entry system. This allows for the reduction of the on-board devices needed, and thereby the arising additional costs. During the implementation of the interoperability of the Budapest and the national road toll payment system, similarly to the network subject to the national road toll, road sections must also be designated in Budapest that are suitable for truck traffic of different categories (GVW). The tariff should be aligned with the philosophy of the national system: a kilometre-based unit cost depending on vehicle type, environmental classification, the classification of the road section used, and proportionate to the distance travelled must be set out. The road toll payment philosophy applied in the urban environment – at the level of Budapest – and based on the national road toll structure may also be applied in other Hungarian large cities down the road. The increased protection of valuable inner-city areas must form an important part of the toll payment system, even for the under-3.5-ton GVW vehicle category. The regulation on the road system must stipulate that the revenue generated through the road usage on the given road section must appear at the owner of the road section, and incoming funds should only be used for the operation of the transportation system, and maintenance and development works. The establishment of the passenger vehicle entry fee system, which has not been introduced in Budapest as yet and which has been formulated with variable intensity and content, should also be implemented in a uniform and interoperable system, which is aligned to the system operating at the national level. At this time, the review of the national road usage fee system pertaining to under-3.5-ton GVW vehicles is recommended.
Target area	national level
Preconditions	The review and updating of road usage restrictions and regulations for Budapest freight traffic, and that of the national road toll system, and the formulation of the need for the interoperability between the two systems at the level of decision-makers.
Related measures	1.2.1 Uniform logistics regulations for Budapest's entire FUA 2.2.1 Efficient inspection system and consistent sanctioning

Name of measure	2.1.1 Establishing an organisational background for city logistics tasks
Strategic goal	2. Efficient management of urban freight transport
Operative goal	2.1 Establishing the institutional frameworks of city logistics in the Budapest FUA
Justification	Freight traffic and city logistics are multi-player processes, which are primarily driven by demand and supply aspects of the market. There is no information available for Budapest or its FUA on the quality and quantity indicators of freight transport pertaining to these areas. This is in part due to the protection of the positions of market players, and in part to the lack of institutional frameworks. It would be important (even by involving logistics associations and freight carrier interest representation organisations) to become familiar with the key trends and needs of freight traffic, and to conduct data collection beyond the Uniform Traffic Model (UTM). Of course, this need is not aimed at intervening into market processes, but to facilitate the establishment of the institutional frameworks of city logistics.
Description	At the Budapest level, there are currently no organisations comprehensively dealing with logistics organisation issues or ensuring communication with stakeholders of the logistics process. There are two data sources on freight traffic processes in the capital city: on the one hand, data on freight traffic generated by the traffic counts conducted annually or in respect of longer periods, which serve to update the Uniform Traffic Model of Budapest. On the other hand, freight traffic entry permit requests also serve as data sources, but only on destinations for trucks with a GVW over 3.5 tons. In logistics, in the interest of harmonising the needs of players on the supply, customer or recipient sides, a new organisation should be established or an existing organisation should be assigned powers to organise logistics. This will allow for the operation (even at the national level) of an organisation that could represent the participants of domestic logistics processes, even in legislature. This organisation could provide a communication platform for logistics players, contribute to facilitating more efficient freight organisation, and to expanding logistics knowledge. It can also function as a knowledge base of sorts. Firstly it will be able to provide information to logistics players on current legal amendments, provide assistance in interpreting legal regulations, and promoting environmentally-friendly and efficient freight traffic ‘good solutions‘ in public awareness. This information

	should not only be provided online, but also as at conferences and forums. The management of logistics data collections, and the analysis and archival of data collected would be an important task of the organisation. Data collection would not only cover freight traffic processes (transport distance, destinations, quantity and quality of goods delivered), but also loading processes and indicators of the efficiency and sustainability of logistics (e.g. pollutant emissions). By collecting data directly from market players, we can gain a picture on logistics processes based on much more reliable and wider-range of data (e.g. small trucks under a GWV of 3.5 tons, including two and four-wheeled vehicles involved in food deliveries), and thereby more substantiated recommendations can be made regarding directions of development.
Target area	Budapest
Preconditions	'-
Related measures	1.1.1 Drawing up the city logistics concept of the Budapest FUA 2.2.1 Efficient inspection system and consistent sanctioning

Name of measure	**2.2.1 Efficient inspection system and consistent sanctioning**
Strategic goal	2. Efficient management of urban freight transport
Operative goal	2.2 Establishing an effective inspection system and introducing positive incentives
Justification	In respect of compliance with the rules of the freight traffic zonal system and loading, a very low willingness to follow standards can be observed in Budapest today. The deficiencies of regulation, the low number and inadequate establishment of concentrated loading points and the extremely low level of inspections all contribute to this. Vehicles disregarding freight traffic zone restrictions substantially contribute to noise and air pollution, while irregularly waiting and loading vehicles obstruct the flow of urban traffic, and also increase the chances of the occurrence of traffic accidents.
Description	The two main arenas of logistics-related inspections in Budapest are the inspection of entry permits and that of loading areas. In both cases, the police and the public area inspection bodies are responsible for the checks. Inspections are conducted by random checks in both areas, but the number of such checks is negligible. Development opportunities in the field of the inspection of loading areas are as follows:

	Establishment of a loading system put in place aligned to the uniform parking regulation, integration of the existing inspection system (involvement of parking attendants, surcharging) Making the public area inspection body invested in the inspection Charging money for the use of loading surfaces in high prestige areas Introduction of a reservation system (the user reserves through a mobile application, and the inspecting authority uses data from the system) Surveillance camera inspection – assistance provided to the public area inspection authority using data from the permit system or the reservation system Campaign-like inspections Development opportunities in the field of entry permits inspections are as follows: Increasing the number of camera inspections (with mobile and fixed cameras) Increasing the frequency of live force inspections, with technical assistance Making the public area inspection body invested in the inspection Campaign-like inspections Assigning inspection powers to the permit granting authority, and the introduction of surcharges as a sanction
Target area	Budapest, in particular the inner-city districts, and densely built district sub-centres that have increased significance from a retail trade perspective
Preconditions	-
Related measures	1.2.2. Harmonised and coordinated parking and loading for Budapest's districts 1.2.3. Ensuring the interoperability of the national road toll system and Budapest freight traffic entry systems 2.1.1. Establishing an organisational background for city logistics tasks

Name of measure	**2.3.1. Opinion-shaping schemes, programmes and campaigns**
Strategic goal	2. Efficient management of urban freight transport
Operative goal	2.3 Opinion-shaping in the interest of environmentally-friendly city logistics

Justification	In addition to the appropriate establishment of physical infrastructure and the necessary regulation, the training of human resources involved in the processes (which human resources also define these processes) is another criteria of making urban logistics processes sustainable. Opinion-shaping programmes and campaigns allow freight carriers to understand the objectives of measures and regulations brought by decision-makers, also enabling them to be more open to compliant conduct.
Description	The goal of opinion-shaping campaigns and programmes is in all cases to raise awareness about the complexity of urban logistics processes and the impacts of freight transportation on the population and the environment, but their target audience and form may vary. In addition to general campaigns and the provision of marketing-type information, the training of the players involved is also necessary. The training of drivers (key players of freight transportation) may be executed through targeted programmes, as well as traditional and online courses, during which they receive training that call attention to the sustainable aspects of urban logistics, the vulnerability of the population as well as the principles behind traffic safety and regulation. Beyond the programmes and training courses for drivers, the freight and route planners of logistics companies must also be given training. The establishment of an appropriate training and education system is also necessary as part of the Qualified Budapest Freight Transporter System. Vehicle drivers that successfully complete the accredited training courses organised by the qualification system obtain a qualified vehicle driver certificate, thereby strengthening the position of the company that employs them within the Qualified Budapest Freight Transporter System, allowing them access to freight transportation-related benefits.
Target area	FUA
Preconditions	Adoption of the Balázs Mór Plan and the consistent implementation of its measures facilitating opinion-shaping
Related measures	2.3.2 Launching R+D and pilot projects, and involvement in such projects 4.1.1. Introducing positive incentives to support the widespread use of environmentally-friendly vehicles 4.1.3. Introduction of the Qualified Budapest Freight Transporter System 4.2.1. Supporting alternative methods for last mile freight transport 4.2.2. Application of sharing-based solutions

Name of measure	2.3.2 Launching R+D and pilot projects, and involvement in such projects
Strategic goal	2. Efficient management of urban freight transport
Operative goal	2.3 Opinion-shaping in the interest of environmentally-friendly city logistics
Justification	With the 21st century rate of consumption, making the traffic and logistics of city centres sustainable requires more than tight regulations and the use of traditionally sustainable logistics equipment (e.g. bicycles); and the creation, experimenting, testing and introduction of technologies, methods and devices is needed, which provide a response to the new consumption habits, training systems and technological features of our day. This is what research and development and innovation activities aim for, including the need for domestic partnership.
Description	The Hungarian sector may also launch sustainability-related research and development projects by using their own financial and HR resources, but it also has the opportunity to participate in European Union-backed projects, such as H2020, Interreg and LIFE. The benefit of the latter, in addition to lower cost expenditures by municipalities and other public sector stakeholders, is that during the project they become involved with other cities, become familiar with their logistics systems, regulations, good practices and results, which can then be tested and introduced in a domestic environment, while also sharing their own results and knowledge in a different setting. The tools, technologies and methods that, as a result of R+D and pilot projects, are still able to operate in a reasonable material framework even after the grant funds of these projects have been depleted, and which contribute to making cities more people-oriented and sustainable, must be encouraged to be used in everyday practice.
Target area	FUA
Preconditions	Adoption of the Balázs Mór Plan and the consistent implementation of its measures facilitating opinion-shaping
Related measures	2.3.1. Opinion-shaping schemes, programmes and campaigns 4.2.1. Supporting alternative methods for last mile freight transport 4.2.2. Application of sharing-based solutions 4.2.3. Elaboration of the technology of logistics as a service

Name of measure	3.1.1 Development of concentrated loading points
Strategic goal	3. Infrastructure-side support for logistics, freight transport and loading processes
Operative goal	3.1 Development of loading points based on modern city logistics principles
Justification	A cardinal component of the last-mile phase of freight transportation, namely the obstruction of traffic by loading arises from two sources: firstly, the distribution of concentrating loading points is not aligned with the number of freight traffic targets in their environment, and secondly deliveries are concentrated in time (trucks typically arrive to stores in the morning peak traffic and in the hours before noon).
Description	In order to better utilise capacities, we recommend the following method to be used for the review of the existing system, and later to consider the installation of new concentrating loading points: 1. If there is no concentrated loading point within 50 m of walking distance from the focal point of a given group of stores, the option of establishment must be examined, as well as the suitability for loading of surfaces available for other functions 2. In order to determine the necessary number of concentrated loading points, the following steps should be taken: The daily goods requirement of stores, the number of vehicles required to service the stores, and the traffic requirements must be determined in cooperation with the management of stores (partners) The need for area usage for other purposes at the given site over time must also be assessed. The usage period of concentrated loading must be defined 3. The introduction of ITS support serves to mitigate time concentration. The terminals to be installed next to concentrated loading points are infrastructural elements of this support, using which the eligibility of use can be ascertained, and real-time information can be forwarded and communicated on the occupancy of a given loading point. The maintenance costs of these terminals must be proportionately divided among the stores served through the loading point (based on the number of vehicles or the volume of goods). Similarly to the structural construction of bus bays, a high performance basalt concrete surface should be used for

	concentrated loading points as well, which also facilitates distinguishing loading surfaces. In addition to a change in quantity, the quality of the system must also be enhanced, loading points must continuously be equipped with appropriate 'intelligence', which allows for the automated checking of area use and the constant monitoring of their operation. This allows intelligent loading points to be booked for a specific time, and their occupancy/availability can be monitored continuously.
Target area	local
Preconditions	Existence of strong city logistics regulations, incentivisation to use environmentally-friendly methods, technologies and vehicle fleets
Related measures	1.2.2 Harmonised and coordinated parking and loading for Budapest's districts 3.1.2 Innovative solutions to support the loading process 3.2.2 Establishment of the IT background required for the supporting of consolidation and city logistics processes

Name of measure	**3.1.2 Innovative solutions to support the loading process**
Strategic goal	3. Infrastructure-side support for logistics, freight transport and loading processes
Operative goal	3.1 Development of loading points based on modern city logistics principles
Justification	The process of freight transportation and loading is not efficient, with freight carriers frequently only able to stop some distance away from the stores, obstructing traffic, on account of the absence or occupied status of concentrated loading points. The situation is made even worse by the fact that deliveries are typically made in busy, peak traffic periods, meaning that the need for the use of concentrated loading points arises simultaneously.
Description	A number of innovative solutions can be applied to facilitate loading: Firstly, innovations may be applied in marking loading points. Increasing the number of loading points and improving their density cannot just be implemented by reducing the number of parking spaces or public areas designated for other functions, but also by using sites that are already used in relation to traffic. Taxi bays are rarely used by taxis for long-term waits, as in an effort to be as efficient as possible the vehicles are constantly

	moving. Taxi bays are typically located near busy road sections, larger nodes and railway stations, which sites are otherwise difficult to access for freight traffic. In the case of taxi bays, a larger portion of places should primarily be reserved for taxis, but there are a few places that may be assigned to function as both a taxi station and a loading point. In order to avoid conflicts, 'time slots' marked by signs should be used, which allow for periods during the day to be assigned when it either functions as a taxi station or a loading point for trucks. By installing occupancy/availability checking systems, loading points may be monitored continuously, and freight carriers can see loading point availability through an online real-time system. Efficiency can be increased even further if loading points can be reserved in advance. In this case, pre-determined time windows can be allocated to users. At night, when traffic is negligible to begin with and when the number of public transportation services is reduced, on road sections that are not impacted by busy night-time bus traffic (and on the lines of the trolleybus network where – for example in Districts 6, 7, 8 and 9 – there are no buses at night to replace trolleybuses), bus lanes and bus stations can be used for night freight traffic and loading. In order to issue permits for these, the amendment of the applicable regulations of the Traffic Code is also required. However, in the case of night-time freight transport, noise load is also an important aspect. At locations where there are typically residential buildings near or in the vicinity of the transport destination, the interests of residents should also be taken into consideration. In the interest of eliminating noise, in addition to encouraging loading workers to work quietly, there are also technological solutions available: the use of low noise emission vehicles (electric vehicles), the use of quiet trucks, special "silent" containers on wheels, lifting forks and transport carts. There are also specially-designed noise insulating curtains available that filter out any potential noise arising during the loading process. During night-time loading, it must also be taken into consideration that often there is no one at the freight transport destination that could accept the delivered goods. This is what the cross-docking systems were developed for. During the cross-docking acceptance of goods, the goods are not delivered and accepted at the same time, and the freight carrier places the goods in a secure closed space outside of the store, where the goods are stored until the opening of the store. Today there are also special refrigerated cross-docking systems available for the longer term storage of

	refrigerated products. A single cross-docking system is able to serve multiple stores, however, mutual trust is essential.
Target area	national level
Preconditions	Supporting the establishment of multi-function loading areas through legal amendments.
Related measures	3.1.1 Development of concentrated loading points 3.2.1 Establishment of consolidation centres and neighbourhood consolidation points 3.2.2 Establishment of the IT background required for the supporting of consolidation and city logistics processes

Name of measure	**3.2.1 Establishment of consolidation centres and neighbourhood consolidation points**
Strategic goal	3. Infrastructure-side support for logistics, freight transport and loading processes
Operative goal	3.2 Supporting modern urban logistics activities
Justification	Within the city logistics process, consolidation activity is not of a sufficient rate, and is not sufficiently developed at the last-mile level, and this is what partly causes the problems of urban freight transport. The availability of modern consolidation possibilities could considerably facilitate freight transport optimisation.
Description	We recommend establishing urban surfaces of two different dimensions to facilitate the consolidation process: establishing a system of regional consolidation centres and neighbourhood consolidation points. Regional consolidation centres should be established in areas of Budapest where major traffic facilities and services are available, and which are also accessible for vehicles and trailers with large GVW (primarily in the region outside the Hungária ring). The primary role of consolidation centres is to implement consolidation processes outside the boundaries of the city's densely built and populated areas. The centres are accessible even for vehicles with a GVW of 40 tons, and after the urban logistics and consolidation process, the goods and consignments commissioned specifically to store needs are transported to stores and retail units in dedicated fashion. The final, 'last-mile' element of transport is performed by optimal size, environmentally-friendly modern vehicles, that are responsible for performing the distribution transport between the centre and stores and retail units. The key characteristics of regional consolidation centres are as follows:

	If possible, a separated location, at some distance from residential areas, in a manner that is not sensitive from an environmental aspect Brownfield areas and existing hall and warehouse facilities should be prioritised The option of connecting to facilities of public transportation is a benefit As a local supplementation to regional consolidation centres, the establishment of neighbourhood consolidation points is also recommended. In densely populated inner-city areas, in protected and priority zones, points responsible for performing micro-logistics activities are needed to mitigate freight transport, loading and parking problems, through which inner-city freight transport becomes more reasonable and sustainable. Neighbourhood consolidation points would operate on a similar principle as regional consolidation centres, but would be aimed at a considerably smaller target areas and a much lower volume of consolidated goods (e.g. inner-city pedestrian streets or the protected zone of Buda Castle, etc.). The key characteristics of neighbourhood consolidation points are as follows: Quick and simple accessibility from inner-city intermediate roads and boulevards (Nagykörút, Kiskörút). Unused areas, buildings, industrial facilities and empty plots should be prioritised Consolidation points are loading surfaces and warehouses (non-open-air if possible) of lower floor-space, that in their construction and design are innovatively aligned with the construction methods and image of the neighbouring residential area. The consolidation process must be performed without disturbing residents. In priority and protected areas, Qualified Budapest Freight Transporters would be favoured in terms of both entry and delivery, as well as the distribution of consolidated products and goods, e.g. through the free-of-charge use of available equipment. Importantly, the distribution of goods from neighbourhood consolidation points must be performed using environmentally-friendly technologies and equipment to as great an extent as possible. (E.g. cargo bicycles, e-bikes, e-tricycles, e-mopeds, small electric cars, as well as other vehicles with a GVW of 1.5 tons at the most, and the charging of these vehicles must also be ensured). By way of neighbourhood consolidation points, the service needs of retail units per a single vehicle can be reduced, meaning that a

	fewer freight carriers would visit a single store, while through consolidation activity the given store would receive the products it needs in a single package. Consolidation points would also allow for timing the deliveries, as the goods will only need to travel a small distance, and this would facilitate the satisfaction of just-in-time needs. The system would only be viable if the costs of additional loading could be financed as part of operation without increasing the price of the goods. Initially, this could implemented as part of project financing (e.g. as part of an EU R+D project), after which a self-sustaining consolidation process must be developed, during which the goods thus distributed would not incur higher costs on the route from the manufacturer to the retailer than in the case of goods distributed traditionally.
Target area	Budapest
Preconditions	Existence of strong city logistics regulations, incentivisation to use environmentally-friendly methods, technologies and vehicle fleets
Related measures	3.1.2 Innovative solutions to support the loading process 3.2.2 Establishment of the IT background required for the supporting of consolidation and city logistics processes

Name of measure	**3.2.2 Establishment of the IT background required for the supporting of consolidation and city logistics processes**
Strategic goal	3. Infrastructure-side support for logistics, freight transport and loading processes
Operative goal	3.2 Supporting modern urban logistics activities
Justification	Logistics processes can be made more efficient through the establishment and widespread use of an appropriately developed IT background. On account of the extremely fast development of technology, with application-based solutions and by equipping loading points and vehicles with intelligent components, city logistics processes can be substantially optimised.
Description	In the interest of increasing the efficiency of consolidation and freight transport, the following IT developments are available to use: • Virtual Consolidation Centre (VCC): By establishing VCCs, transports can be harmonised and coordinated, the number of vehicles needed for deliveries can be reduced, thereby the volume of emissions and traffic obstructions drops. With the customer submits their order, it is not the store's address that is specified as the place of delivery, but rather the

	consolidation centre. As a result, the goods to be transported are registered in the consolidation centre's system, and the properties of the given goods are also shown in the VCC's online system. The customer can also specify the desired time and location for final delivery, the priority of transportation, the quality and quantity of the goods transported as well as other special needs. These delivery needs are then reconciled with other similar needs in the VCC system, which generates a consignment that can be jointly delivered as per the arising needs. The assignment of carriers to the consignments to be delivered as shown in the VCC is carried out through an online auction. After the compilation of the consignments to be delivered, the carriers receive the compiled list of potential deliveries, and they can select which transport they wish to take on. The system can be linked to the entry permit request system as well as the system managing concentrated loading points, which means that entry permit requests and the reservation of loading points can also be automatically carried out when selecting the transport. It is fundamental for the operation of the system that the VCC system be more cost-efficient than the management of transports carried out by other market players outside of the VCC. This requires that discounts and benefits are provided to carriers operating in the VCC, e.g. the waiving of loading point reservation fees, etc. After the fulfilment of delivery, the customer is obligated to pay the costs incurred both to the operator of the VCC and the carrier, which settlement can be executed as either an advance or a subsequent settlement. • Concentrated loading point reservation system: The creation of an online interface that also has a map search function. Entering the target station into the search engine, the system recommends the nearest loading point, also showing availability data based on a calendar. The needed time slot can be reserved in the system with just a few clicks. The time slot reserved should also take the possibility of delay on account of congestion into consideration as well (e.g. the system upholds the reservation for an additional 10 minutes after the start of the reserved slot). • Intelligent pole function: A pole equipped with an intelligent camera, display and input panel, which is responsible for the operation of concentrated loading points. The loading point essentially distinguishes between two statuses: arrival and positioning of vehicles arriving for a pre-reserved slot, and the arrival and positioning of trucks without a

	reserved slot. The signal light can indicate whether the given loading point is reserved for a specific vehicle or can be used by any vehicles. The driver of the vehicle arriving to the reserved site at the time of the reservation can log in to the loading point reservation system after occupying the loading point. The available time remaining at the loading point is displayed on the pole. If the driver has not reserved a slot at the loading point, the display shows the time remaining until the next reserved slot. In the meantime, based on reservation data in the system, the camera can also verify the eligibility of occupying the loading point. If the driver is not eligible to occupy the parking space, a fine may be imposed on those unlawfully occupying the loading point, by contacting the public area inspection authority. • Real-time traffic information system and online route planning The main nodes, junctions and routes of the Budapest road network are equipped with sensors (loop detectors, cameras). These devices are able to automatically detect traffic congestions, and intervention is also possible using variable message signs and traffic light control. By creating an online information interface, these data can also be made available to truck drivers. This function can also be provided by numerous route planning and mobile applications. This does not mean information flow and sharing through a centre, but rather background support by way of data provision from the user side.
Target area	FUA
Preconditions	The amendment of the legal environment in order to introduce these systems. To this end, we recommend that a separate decree by the Municipality of Budapest set out provisions on the use, operating conditions and potential tariffs of loading points, as well as the modes of sanctioning.
Related measures	3.1.1 Development of concentrated loading points 3.1.2 Innovative solutions to support the loading process 3.2.1 Establishment of consolidation centres and neighbourhood consolidation points

Name of measure	**3.2.3 Enhancing the network of parcel points**
Strategic goal	3. Infrastructure-side support for logistics, freight transport and loading processes
Operative goal	3.2 Supporting modern urban logistics activities

Justification	With the growth of online trade, a considerable portion of purchases are today made online. In most cases, the goods ordered are not accepted by buyers in person, but are requested to be delivered. However, the last-mile section of delivery does not necessarily end at the recipient, but may also be an arbitrary intermediate point that serves as transfer between the carrier and the recipient.
Description	In order to increase the efficiency of the whole of the delivery process, some packages today are not delivered directly to the customer, but to a collection point. Parcel collection points have been in operation in Hungary for approximately 10 years. In such cases, the customer does not order the packages to their own address, but rather to these collection points. The customer goes to the parcel point, where they receive their package against an identifier sent out via SMS or email. These collection points are typically gas stations, stores, post offices or retail units, where a staff member hands over the package to the customer during opening hours. There are also mobile containers placed in busy junctions that serve to facilitate the delivery of increased parcel quantities in holiday periods on a temporary basis. Another form of parcel collection is the use of automated parcel machines that do not require the presence of staff. These automated parcel machines are typically found in busier traffic nodes and shopping malls. In most cases, parcel machines are suitable for both sending and collecting packages. Package collection can be performed on any day of the week, 24 hours a day. The development of parcel collection points provides very clear benefits, not just for carriers but for customers as well. There is no need to be on site with the package is delivered, as these may be collected at the parcel collection points at any time. The expansion of the number of parcel collection points will be very necessary in the future, as electronic trade is expected to continue to grow. The increased use of such collection points can be incentivised through pricing.
Target area	FUA, national level
Preconditions	Settlement of the ownership of areas designated for automated parcel machines
Related measures	-

Name of measure	**4.1.1 Introducing positive incentives to support the widespread use of environmentally-friendly vehicles**
Strategic goal	4. Incentivising the use of environmentally-friendly and innovative technologies and vehicles
Operative goal	4.1 Supporting the city logistics process with an environmentally-friendly vehicle fleet, new technologies and incentivising qualification system
Justification	Positive incentivisation is a fundamental approach employed by the SULP which, instead of sanctioning and behaviour aimed at circumventing the rules, favours opinion-shaping and incentivisation. A major factor in this is the effort aimed at renewing the vehicle fleet, the primary motivation of which is to enforce environmental protection aspects in urban freight transport. The state subsidy system currently provides a maximum subsidy of HUF 1.5 million to private individuals and legal entities for the purchase of electric passenger vehicles, 100% electric trucks with a maximum GVW of 3.5 tons and/or L7e-CU category (heavy quadri-mobile) quads for freight transport purposes, but only up to a maximum of 21% of the gross purchase price, provided the price of the vehicle does not exceed HUF 20 million (gross). Given their high price, even with the subsidy small electric trucks are unable to appropriately compete in less capitalised segments, which is why further forms of subsidies and territorial-based regulations should be introduced. Another component of incentivisation is the making of the loading process more efficient through the development of concentrated loading points, as part of the Qualified Budapest Freight Transporter System and by using intelligent solutions.
Description	Environmentally-friendly transportation is a priority for European politics, and after passenger vehicles, e-mobility is also gaining strength in the transportation of light goods. This is why it is important that the state subsidy system remains in place for the purchase of electric light vans, but in itself this cannot provide a sufficient incentive on account of high purchase prices, especially for less capitalised companies. The forms of subsidy/incentivisation must at the same time induce the prohibition of the use of outdated and polluting vehicle fleets, especially in inner-city areas, while also facilitating the procurement of new, environmentally-friendly, even zero-emission vehicles. The Qualified Budapest Freight Transporter System could prove to be a serious motivational component in this respect. In the spirit of sustainability, zero-emission and environmentally-friendly modes of freight transportation are increasingly gaining

	ground today. These vehicles do not pollute the environment either with their drives or energy usage, and their noise pollution is also considerably lower. This category includes electric vehicles, of which small trucks with a GVW under 3.5 tons (whose use is widespread abroad) is used to transport large volumes of goods. One of the types of these vehicles is fully electric, but there are also hybrids that can also operate in diesel mode. In the case of the latter, however, pollutant emissions are generated. There are numerous alternatives also available for the transportation of lower volumes of goods. The benefit of these is that they are able to easily travel in high-traffic, narrow urban fabrics, without obstructing traffic. Such electric vehicles include e-mopeds and electrically assisted bicycles and cargo bicycles. Their disadvantage is that they are able to transport considerably less goods compared to a small truck, however, in combination with a neighbourhood consolidation point, they have been proven to be extremely efficient tools on account of swift access to retail units in the vicinity. They can be stored on the premises of the consolidation points, while bicycle stands need to be installed near the delivery targets, that are suitable to lock the cargo bicycles.
Target area	national level
Preconditions	Introduction of the Qualified Budapest Freight Transporter System, standardisation of the national and Budapest regulation and entry and road toll policy.
Related measures	2.3.1. Opinion-shaping schemes, programmes and campaigns 4.1.2 Establishment of charging infrastructure for trucks using alternative fuel sources 4.1.3 Introduction of the Qualified Budapest Freight Transporter System

Name of measure	**4.1.2 Establishment of charging infrastructure for trucks using alternative fuel sources**
Strategic goal	4. Incentivising the use of environmentally-friendly and innovative technologies and vehicles
Operative goal	4.1 Supporting the city logistics process with an environmentally-friendly vehicle fleet, new technologies and incentivising qualification system
Justification	The spreading of modern, energy-efficient and green transport equipment can only be truly successful if the conditions of use for

	these vehicles are ensured, and that the capital city is well equipped with charging stations of appropriate quality.
Description	There are very few vehicles among large trucks used in freight transport that use only alternative fuel sources, however, hybrid vehicles are less rare. For larger vehicles, the various types of natural gas (CNG, LNG) and LPG (auto-gas) as fuels are highly popular, as are drives assisted by electric engines. Smaller trucks, that are responsible for the final (last-mile) phase of the logistics process, however, frequently have purely alternative fuel drive-trains. The use of CNG, LPG and LNG gases is also popular for small trucks, as is the purely electric drive-train. There is a great need for the development and expansion of the network of electric charging stations in Budapest, in the interest of encouraging the use of electric freight transport vehicles. The establishment of rapid charge stations plays a priority role in the expansion and development of charging stations, as a freight transport vehicle only has the chance for extended charging during the night, as it is in constant movement for deliveries during the day. The expansion of the network of gas-filling stations (CNG, LPG, LNG) is also required, but these are for the most part relevant on the outskirts of the city and near consolidation centres.
Target area	FUA
Preconditions	The schedule of the construction of electric charging stations, the types of charging stations and the rights of use of these charging stations must be supported by a legal background.
Related measures	4.1.1 Introducing positive incentives to support the widespread use of environmentally-friendly vehicles

Name of measure	**4.1.3 Introduction of the Qualified Budapest Freight Transporter System**
Strategic goal	4. Incentivising the use of environmentally-friendly and innovative technologies and vehicles
Operative goal	4.1 Supporting the city logistics process with an environmentally-friendly vehicle fleet, new technologies and incentivising qualification system
Justification	The regulatory, vehicle usage, pricing and loading problems underlying freight transportation in Budapest can only be remedied through complex solutions. One of the components of the SULP's complex recommendations for solutions is the establishment of the Qualified Budapest Freight Transporter category, reinforcing the

	proposals made in the Uniform Concept Proposal For City Logistics Objectives in Budapest (2014). The aim of the system is to increase the predictability of delivery and loading processes, the implementation of time slot reservation, and to improve environmental quality in protected locations and locations that have increased environmental sensitivity.
Description	The point of the qualification system is to create a solution that provides benefits to those involved in freight transportation, at the same time mitigating chaotic waiting and loading problems, especially in inner city areas. The introduction of the qualification system requires the development of the system of concentrated loading points and their equipment with intelligent technology. This will ensure that separate loading points are available to qualified freight transporters in inner-city and district sub-centre areas, and regulatory implications and message signs must be drawn up and integrated into the Traffic Code. The Qualified Budapest Freight Transporter category represents the following obligations and provides the following opportunities to carriers, merchants and vehicle operators: Registration Logging in to the Qualified Budapest Freight Transporter System Installation of an on-board unit (OBU) into the vehicle, which is based on technological solutions compatible with the national road toll system. Obligations arising from registration: Display of image and identity elements on the vehicle (e.g. decal) When the system becomes subject to fee payment, the payment of such fee Following registration, the completion of the questionnaire on vehicle usage habits, and continuous feedback to the BKK and other Budapest stakeholders, automated data collection, thereby assisting future planning and the development of the Uniform Traffic Model (UTM) Benefits arising from registration: Eligibility to use the Qualified Budapest Freight Transporter category Eligibility to use the concentrated loading points established or reclassified for Qualified Budapest Freight Transporters Discount purchase of entry permits for trucks with a GVW over 3.5 tons

	Use of specific, low-traffic bus lanes in certain periods (the prerequisite for this is the initiation and adoption of related Traffic Code amendments). The Qualified Budapest Freight Transporter category is efficient only if in the meantime carriers performing irregular waiting and loading activities are sanctioned.
Target area	FUA
Preconditions	Existence of strong city logistics regulations, incentivisation to use environmentally-friendly methods, technologies and vehicle fleets
Related measures	2.3.1. Opinion-shaping schemes, programmes and campaigns 4.1.1 Introducing positive incentives to support the widespread use of environmentally-friendly vehicles

Name of measure	**4.2.1 Supporting alternative methods for last mile freight transport**
Strategic goal	4. Incentivising the use of environmentally-friendly and innovative technologies and vehicles
Operative goal	4.2 Promoting the widespread use of intelligent and innovative services
Justification	During freight transport, especially in an urban, inner city environment, the process of loading and delivery is difficult and time-consuming, often obstructing traffic (traffic violations), and the high number of small freight vehicles and other trucks reduce the liveability of public urban spaces. The goal is to uncover solutions, through which the final, last-mile section of delivery and, in the case of goods posted, the initial section can be resolved using new technologies.
Description	In urban freight transportation, especially in inner cities and district sub-centres, the aim should be to use solutions which, in addition to maintaining or even improving the efficiency of deliveries, also aim at protecting the quality of the environment and reducing environmental load. Alternative solutions do not exclusively mean zero-emission systems, but all modes and tools of transportation, whose use represents an alternative to those used currently. The objective is to seek out solutions that meet the following three criteria as much as possible: Use of the traditional vehicles of urban freight transportation, with territorial restrictions

	The use of small size modes and tools of transportation, that are easy to use in an inner-city environment The use of zero-emission systems or systems that represent modern technologies from an environmental perspective, with particular emphasis on the benefits of e-mobility and the autonomy of bicycles, and drone-based forms of transportation On the one hand, these criteria have contradictory effects, and on the other, incentivising their use can be established by way of appropriate regulation and smart city logistics solutions. There are numerous alternatives also available for the transportation of lower volumes of goods. The benefit of these is that they are able to easily travel in high-traffic, narrow urban fabrics, without obstructing traffic. Such electric vehicles include e-mopeds, electrically assisted bicycles, electric tricycles and other mini vehicles. In combination with neighbourhood consolidation points, they can be extremely efficient tools on account of swift access to retail units in the vicinity. The following solutions may be recommended, depending on which point of the city logistics process and in which urban area they are to be used: incentivising the urban use of electric trucks and trucks with other alternative drives (CNG, LPG) the use of trackbound infrastructure for last-mile tasks (at the theoretical level, for the assessment of test projects and their results) improving the technology and vehicle fleets of food delivery, and the use of electric bicycles, bicycles, modern food delivery racks increasing the ratio of bicycle freight transportation (e.g. incentivising the use of cargo bikes) drone-based transportation (in the case of the adoption of appropriate regulations, in suitable areas and segments) establishment and testing of night-time transportation and loading, without disturbing residents reinforcing parcel point collection use for residents and other recipient groups
Target area	Budapest
Preconditions	Existence of strong city logistics regulations, incentivisation to use environmentally-friendly methods
Related measures	2.3.1. Opinion-shaping schemes, programmes and campaigns

	2.3.2 Launching R+D and pilot projects, and involvement in such projects 4.2.2 Application of sharing-based solutions

Name of measure	**4.2.2 Application of sharing-based solutions**
Strategic goal	4. Incentivising the use of environmentally-friendly and innovative technologies and vehicles
Operative goal	4.2 Promoting the widespread use of intelligent and innovative services
Justification	Sharing-based use is an increasingly frequently utilised solution nowadays. 'Sharing' in mobility started with bicycles, and today shared solutions are available for practically all personally-owned modes of transportation, meaning that these increasingly strengthen community use. The objective is to promote and facilitate shared use in the various elements of city logistics as well.
Description	In freight transportation and city logistics, especially during the moving, delivery and last-mile transportation of light goods, it is very important to adapt new solutions which, concurrently with the development and diversification of technology and vehicle fleets, decrease the size of urban areas used by freight transport and the number of simultaneously used vehicles. The essence of sharing is for the given vehicle to only be used at the time and only for the purpose it is truly needed. These solutions are applicable primarily in the case of ad-hoc and non-regular transports, especially in the following areas: use of IT solutions to support sharing (e.g. applications, web platforms) cargo bikes, e-cargo bikes to rent, or in the case of light goods bicycles small trucks and trailers to rent small trucks to rent, even for commissioned companies and merchants that serve and regularly deliver to multiple stores mopeds to rent The 'sharing' solutions of city logistics can be linked to a specific company (e.g. a company rents small trucks for residential transports if a larger object or furniture needs to be transported), but in the short and medium-term, solutions will also exist that will make these tools available in a docked or dockless system.
Target area	Budapest

Preconditions	Existence of strong city logistics regulations, incentivisation to use environmentally-friendly methods
Related measures	2.3.1. Opinion-shaping schemes, programmes and campaigns 2.3.2 Launching R+D and pilot projects, and involvement in such projects 4.2.1 Supporting alternative methods for last mile freight transport

Name of measure	**4.2.3. Elaboration of the technology of logistics as a service**
Strategic goal	4. Incentivising the use of environmentally-friendly and innovative technologies and vehicles
Operative goal	4.2 Promoting the widespread use of intelligent and innovative services
Justification	Parallel to the extremely swift development of infocommunications and data generation and accessibility, Mobility as a Service (MaaS) is now available in an increasingly number of cities, especially in Western Europe and overseas. The system involves the planning of combined travel chains and the payment thereof via a service provider. The measure is justified by the possibility of putting logistics as a service into place.
Description	Logistics as a service (Logistics as a Service, LaaS) is a technology based on MaaS, but focusing on city logistics processes. Its objective (from the perspective of goods or the vehicles used or the services taken advantage of alike) is the combinability of processes, by opening up the logistics chain used. In this case, similar to MaaS, the transportation and delivery of goods becomes the subject of the service only from the perspective of goods and products; where the sender, carrier or recipient of the goods can also select the optimal solution.
Target area	FUA
Preconditions	Existence of strong city logistics regulations, incentivisation to use environmentally-friendly methods and new technologies
Related measures	2.3.2 Launching R+D and pilot projects, and involvement in such projects

9. Road-map for implementing the measures

Measure	Recommended duration	Scope	Players impacted
1.1.1 Drawing up the city logistics concept of the Budapest FUA	medium-term	municipal (FUA settlement-level)	Municipality of Budapest BKK - Budapesti Közlekedési Központ (Centre for Budapest Transport) Municipalities of agglomeration settlements Ministry for Innovation and Technology Freight carrier interest representation groups Logistics associations
1.2.1 Uniform logistics regulations for Budapest's entire FUA	medium-term	municipal (FUA settlement-level)	Municipality of Budapest Municipalities of agglomeration settlements Ministries, government players concerned Freight carrier interest representation groups Logistics associations
1.2.2 Harmonised and coordinated parking and loading for Budapest's districts	medium-term	municipal (Budapest-level)	Municipality of Budapest BKK - Budapesti Közlekedési Központ (Centre for Budapest Transport) BK - Budapest Közút (Budapest Public Road Organisation) District municipalities Companies tasked with public area inspection Freight carrier interest representation groups Logistics associations
1.2.3. Ensuring the interoperability of the national road toll system and Budapest freight traffic entry systems	short and medium-term	municipal (Budapest-level)	Nemzeti Útdíjfizetési Szolgáltató Zrt. (National Toll Payment Services Plc) Municipality of Budapest BK - Budapest Közút (Budapest Public Road Organisation) Ministries, government players concerned Freight carrier interest representation groups Logistics associations

2.1.1 Establishing an organisational background for city logistics tasks	medium-term	municipal (Budapest-level)	Municipality of Budapest BKK - Budapesti Közlekedési Központ (Centre for Budapest Transport) BK - Budapest Közút (Budapest Public Road Organisation) Participants of logistics processes Logistics-related associations, institutions
2.2.1 Efficient inspection system and consistent sanctioning	medium-term	municipal (FUA settlement-level)	Police Public area inspection bodies Parking supervision bodies Municipality of Budapest BKK - Budapesti Közlekedési Központ (Centre for Budapest Transport) BK - Budapest Közút (Budapest Public Road Organisation)
2.3.1. Opinion-shaping schemes, programmes and campaigns	short-term	municipal (Budapest-level)	Municipality of Budapest Municipalities of agglomeration settlements BKK - Budapesti Közlekedési Központ (Centre for Budapest Transport) Organisation responsible for urban logistics (see: 2.1.1)
2.3.2 Launching R+D and pilot projects, and involvement in such projects	medium-term, continuous	municipal (Budapest-level)	Municipality of Budapest Municipalities of agglomeration settlements District municipalities BKK - Budapesti Közlekedési Központ (Centre for Budapest Transport) Organisation responsible for urban logistics (see: 2.1.1)
3.1.1 Development of concentrated loading points	short-term	municipal (Budapest-level)	Municipality of Budapest BK - Budapest Közút (Budapest Public Road Organisation) Organisation responsible for urban logistics (see: 2.1.1)
3.1.2 Innovative solutions to support the loading process	continuous	partly municipal (Budapest)	Market players performing freight transportation ITM - Ministry for Innovation and Technology Municipality of Budapest BKK - Budapesti Közlekedési Központ (Centre for Budapest Transport)

			BK - Budapest Közút (Budapest Public Road Organisation) District municipalities
3.2.1 Establishment of consolidation centres and neighbourhood consolidation points	short-term	partly municipal (Budapest)	Municipality of Budapest BKK - Budapesti Közlekedési Központ (Centre for Budapest Transport) BK - Budapest Közút (Budapest Public Road Organisation) District municipalities Players impacted by urban development Property developers Property owners with suitable areas
3.2.2 Establishment of the IT background required for the supporting of consolidation and city logistics processes	short-term	partly municipal (FUA settlement-level)	Participants of logistics processes Municipality of Budapest BK - Budapest Közút (Budapest Public Road Organisation) Companies involved in mobile communications and IT development
3.2.3 Enhancing the network of parcel points	short-term	not municipal, but requires municipal enforcement of interest (FUA settlement level)	Market players involved in freight transportation Municipality of Budapest
4.1.1 Introducing positive incentives to support the widespread use of environmentally-friendly vehicles	continuous	municipal (FUA settlement-level)	Market players performing freight transportation ITM - Ministry for Innovation and Technology Stakeholders of the Jedlik Ányos Cluster Municipality of Budapest BKK - Budapesti Közlekedési Központ (Centre for Budapest Transport) Vehicle manufacturers, manufacturers and distributors of charging infrastructure e-Mobi Elektromobilitás Nonprofit Kft.
4.1.2 Establishment of charging infrastructure for trucks using alternative fuel sources	medium-term	municipal (FUA settlement-level)	Market players Municipality of Budapest

			Ministry for National Economy e-Mobi Elektromobilitás Nonprofit Kft.
4.1.3 Introduction of the Qualified Budapest Freight Transporter System	short-term	municipal (FUA settlement-level)	Market players performing freight transportation Stakeholders of the Jedlik Ányos Cluster Municipality of Budapest BKK - Budapesti Közlekedési Központ (Centre for Budapest Transport) Vehicle manufacturers, manufacturers and distributors of charging infrastructure e-Mobi Elektromobilitás Nonprofit Kft.
4.2.1 Supporting alternative methods for last mile freight transport	continuous	municipal (Budapest)	Market players involved in freight transportation Municipality of Budapest BKK - Budapesti Közlekedési Központ (Centre for Budapest Transport) Representatives of vehicle manufacturers and distributors (cars, trucks, bicycles, scooters, etc.) Start-up companies and innovative mobility players
4.2.2 Application of sharing-based solutions	continuous	not municipal, but requires municipal enforcement of interest (Budapest)	Market players involved in freight transportation Municipality of Budapest BKK - Budapesti Közlekedési Központ (Centre for Budapest Transport) Representatives of vehicle manufacturers and distributors (cars, trucks, bicycles, scooters, etc.) Start-up companies and innovative mobility players
4.2.3. Elaboration of the technology of logistics as a service	continuous	not municipal, but requires municipal enforcement of interest (Budapest)	BKK - Budapesti Közlekedési Központ (Centre for Budapest Transport) Start-up companies and innovative mobility players

10. Evaluation of impacts - Multi-Criteria Decision Analysis (MCDA)

For the evaluation of the measures, we used a multi-criteria analysis (MCA). As a result all the measures got a score between 21 and 100 points. The MCA consisted of 3 different components: the evaluation of costs, efficiency and feasibility. These three together made up the overall score of the measure taking into account the partial points with different weights.

During the evaluation of the costs we categorised the measures into 3 groups according to the estimated costs of realization. During the evaluation of efficiency we rated the measures by the following aspects: estimated impact on the efficiency of the logistics system, estimated economic and social impact, estimated impact on the liveability of the urban environment and the innovativeness of the measure. During the evaluation of feasibility we analysed the projects according to the level of preparation, the financial feasibility and the level of risks.[30]

[30] See the detailed MCA in the annex.

		Cost		Efficiency										Feasibility						
Name of the measure	Summarised value	Estimated cost	Cost score	Estimated impact on the efficiency of the logistics system	Estimated economic impact	Estimated economic impact	Estimated impact on the liveability of the urban environment	Innovativeness	Impact area	Number of affected	Directness of the impact	Impact area/number of affected - score	Efficiency score	The level of preparation	Financial feasibility	Level of risks	The level of preparation	Financial feasibility	Level of risks	Feasibility score
Weights	1		0,33	0,04	0,04	0,04	0,04	0,17					0,33				0,11	0,11	0,11	0,33
1.2.2 Harmonised and coordinated parking and loading for Budapest's districts	78	minimum	3	2	2	1	2	3	on city level	less	direct	2	1,69	medium	low cost	medium	2	3	2	2,33
1.1.1 Drawing up the city logistics concept of the Budapest FUA	74	minimum	3	3	2	2	2	2	on FUA level	many	indirect	2,5	1,31	high	partly from EU funding	medium	3	2	2	2,33
3.1.2 Innovative solutions to support the loading process	69	minimum	3	3	3	3	3	3	on FUA level	less	direct	2,5	1,92	low	private funding	high	1	2	1	1,33
4.2.3. Elaboration of the technology of logistics as a service	69	minimum	3	3	3	2	3	3	on FUA level	many	indirect	2,5	1,88	low	private funding	high	1	2	1	1,33
2.3.2 Launching R+D and pilot projects, and involvement in such projects	69	minimum	3	2	2	2	2	2	on city level	less	indirect	1,5	1,17	medium	partly from EU funding	medium	2	2	2	2,00
3.2.3 Enhancing the network of parcel points	68	minimum	3	2	2	2	3	1	on FUA level	less	direct	2,5	0,81	medium	private funding	low	2	2	3	2,33
4.1.3 Introduction of the Qualified Budapest Freight Transporter System	67	minimum	3	3	3	3	3	3	on city level	many	indirect	2	1,83	low	with the use of Municipality resources and private funding	high	1	1,5	1	1,17
1.2.1 Uniform logistics regulations for Budapest's entire FUA	66	minimum	3	3	2	1	2	2	on FUA level	less	direct	2,5	1,28	low	low cost	high	1	3	1	1,67
4.2.2 Application of sharing-based solutions	66	medium	2	3	3	3	3	3	on FUA level	many	indirect	2,5	1,92	medium	private funding	medium	2	2	2	2,00
4.2.1 Supporting alternative methods for last mile freight transport	65	minimum	3	2	3	3	3	2	on FUA level	many	indirect	2,5	1,38	low	with the use of Municipality resources and private funding	medium	1	1,5	2	1,50
2.3.1. Opinion-shaping schemes, programmes and campaigns	65	minimum	3	2	1	3	3	2	on city level	less	indirect	1,5	1,19	medium	with the use of Municipality resources	medium	2	1	2	1,67
4.1.1 Introducing positive incentives to support the	65	medium	2	2	2	3	3	3	on FUA level	many	indirect	2,5	1,85	medium	with the use of	low	2	1	3	2,00

widespread use of environmentally-friendly vehicles															Municipality resources				
3.1.1 Development of concentrated loading points	63	medium	2	3	3	2	3	3	on city level	less	direct	2	1,81	medium	with the use of Municipality resources and private funding	medium	2	1,5	2	1,83
1.2.3. Ensuring the interoperability of the national road toll system and Budapest freight traffic entry systems	60	medium	2	3	3	2	2	3	on city level	less	direct	2	1,78	medium	with the use of Municipality resources	medium	2	1	2	1,67
4.1.2 Establishment of charging infrastructure for trucks using alternative fuel sources	60	medium	2	2	3	3	3	2	on city level	less	indirect	1,5	1,23	medium	with the use of Municipality resources and private funding	low	2	1,5	3	2,17
2.1.1 Establishing an organisational background for city logistics tasks	59	minimum	3	3	2	2	3	2	on city level	less	direct	2	1,28	low	with the use of Municipality resources	high	1	1	1	1,00
2.2.1 Efficient inspection system and consistent sanctioning	58	medium	2	3	3	3	3	1	on city level	many	direct	2,5	0,92	medium	low cost	medium	2	3	2	2,33
3.2.2 Establishment of the IT background required for the supporting of consolidation and city logistics processes	57	medium	2	3	3	1	2	3	on FUA level	less	direct	2,5	1,81	low	private funding	high	1	2	1	1,33
3.2.1 Establishment of consolidation centres and neighbourhood consolidation points	55	medium	2	3	3	2	3	3	on city level	less	direct	2	1,81	low	with the use of Municipality resources and private funding	high	1	1,5	1	1,17

11. Role of the stakeholders involvement

As part of the SULPiTER project, implemented with the participation of the Municipality of District 18 of Budapest (Pestszentlőrinc-Pestszentimre) and the Municipality of Vecsés, there were regular consultations during the project which focused on the current situation and future of urban logistics. These consultations were conducted within the framework of the Freight Quality Partnership (FQP), whose goal is to join and coordinate various local and national players involved in logistics and urban freight transportation, as well as opinion-shaping and increasing receptiveness to the topic. There have been four meetings to date as part of the project, where regulatory, retail, planning, supplier or other stakeholders sat down and conducted successful negotiations on various freight transportation and city logistics topics.

The meetings and their results also played an important role in the preparation of this document, as the current status of the plan was presented to the FQP at various phases of planning. The participants provided opinions, and enriched the document under preparation with their comments and observations, and also validated its content.

The following groups and sectors were represented at the FQP meetings:

- municipalities from Budapest districts and settlements of the agglomeration
- small, medium-sized and large regional logistics companies
- traffic planning and consultant firms, as well as scientific institutions
- the Budapest transport organiser (BKK)
- small, medium-size and multinational retail chains
- non-profit companies with an urban management, city administration and city operation profile
- tradesmen's associations from Budapest districts and settlements of the agglomeration

The following topics were raised and discussed at FQP meetings:

1. FQP meeting (27.02.2018): Traffic development projects of the Budapest Airport Region, Passenger traffic, daily commute and logistics at the Liszt Ferenc Budapest Airport, Freight supply to Budapest’s retail stores – Survey results
2. FQP meeting (04.07.2018): Expected road and railway developments of the region of the Liszt Ferenc Budapest Airport, Urban freight transportation and city logistics challenges in Budapest, Issues and logistics-related problems of retail and hospitality industry facilities impacted in the region
3. FQP meeting (09.10.2018): Brief presentation of the SULPiTER project, Sustainable urban logistics plan for Budapest and its FUA, Electric mobility & infrastructure
4. FQP meeting (07.11.2018): Presentation of the SULPiTER project, Discussion on specific logistics development directions (possibilities of freight transport by cargo bikes, modes of developing concentrated loading points, establishment of consolidation centres, use of intelligent logistics solutions, developing the network of parcel points, introduction of the Qualified Budapest Freight Transporter System)

The advantage of the partnership that has started is that it has introduced the stakeholders to each other, and has also started co-thinking in the interest of resolving problems and aiming at the establishment of more effective interest representation. We find it to be important that the FQP consult on sector, topic and area-specific issues in the future as well, and work as a catalyst in city

logistics and urban freight transport, in order to develop the Budapest functional urban area in this direction.

Image 57: Second FQP meeting

12. Main steps for the adaptation of the SULP

City logistics and freight transportation are part of urban mobility, which is why logistics processes should only be interpreted and managed as part of the complex transport system. Accordingly, the SULP (sustainable urban logistics plan) can only be drawn up as part of the SUMP (sustainable urban mobility plan), as a documentation thereof supported by industry-specific aspects, in alignment with the general objectives laid out in the complex transportation plan.

The document establishing the sustainable urban mobility plan for Budapest (the Balázs Mór Plan) was completed in 2013. At the moment, building on part one, the preparation and closing of the second volume containing specific operative projects is in progress, but at the same time the elements of involving society are not comprehensive, and very little information is available on this process. Despite the fact that this SULP document was drawn up in alignment with the objectives and vision laid out in the Balázs Mór Plan, taking recommendations on city logistics into account, it cannot act as the official industry plan of the Balázs Mór Plan, it can only catalyse its preparation and its becoming increasingly whole. The reason for this is that the plan was not prepared, commissioned and initiated by the city of Budapest, but as part of the SULPiTER project, with the support of its two regional partners, District 18 of Budapest and the town of Vecsés. The document (that will at one point be prepared as part of the BMT and which will have a city-level and agglomerational outlook) will have to be prepared by involving the Municipality of Budapest, the traffic organiser responsible for all Budapest transport, as well as all district and agglomeration municipalities.

The steps required for the introduction of the SULP to be prepared as part of the Balázs Mór Plan are as follows:

1) The preparation of the SULP document for the Budapest FUA, with support from the city of Budapest, in a manner that it is in line with Budapest's existing strategic plans, in particular the BMT; and for it to take the Uniform Concept Proposal For City Logistics Objectives in Budapest (2014) and this document as basis, and for it to progress from strategic objectives to specific measures and steps of implementation, also including financing needs.
2) Providing opinions and adopting the plan by the Municipality of Budapest, district and agglomeration municipalities as well as all other industry stakeholders.
3) Implementation of SULP measures.
4) Continuous monitoring and feedback in the interest of developing the BMT and the SULP.

13. Application and monitoring

13.1. Scopes of responsibility

The goal of this document is to provide a foundation for and to catalyse the SULP to be prepared down the line in respect of Budapest as part of the Balázs Mór Plan. Accordingly, implementation is not a direct goal of this document, and as such scopes of liability are not to be define here, but rather in the SULP that will be prepared subsequently with support from the Municipality of Budapest. In the following, we are merely making recommendations on (once the Budapest SULP is completed) which organisations will have what scopes of liability at implementation.

The SULP must be completed commissioned by the Municipality of Budapest, with the support and awareness by Budapest, its 23 district municipalities as well as the municipalities of settlements in the FUA, which must all be consulted with in various stages and phases of planning. The legitimisation of the completed plan will require approval by the Municipality of Budapest, after which the BKK - Budapesti Közlekedési Központ (Centre for Budapest Transport), the organisation responsible for the organisation of Budapest transport, will be tasked with implementation. The BKK will implement the pan in cooperation with Budapest Közút (Budapest Public Road Organisation), in consultation with logistics industry organisations nationwide, as well as from the Budapest agglomeration area.

13.2. Implementation Plan

The implementation plan, as well as the monitoring system and the related indicators play a key role in that the SULP is not only drawn up, but the measures specified therein are also integrated into everyday city and logistics processes. The implementation plan contains all the steps that guarantee the implementation of measures, while the monitoring system and the indicators serve to ensure that by monitoring the efficiency and success of specific measures, the direction of development can be modified if needed.

The SULP is prepared as an industry document to the Balázs Mór Plan, as a part thereof. This means that both implementation and the system of monitoring and indicators can be established based on the contents of the BMT. The second part of the BMT, which contains the aforementioned chapters, has not been prepared yet, and as such neither the implementation plan nor the monitoring system and indicators are currently known.

13.3. Risk analysis

An effort must be made to minimise risks when implementing measures aimed at sustainable and efficient logistics. This is possible if the risks threatening the success of given measures are already identified during the preparation of the document, as the reasonable management of risks prior to implementation requires less resources and lower costs than remedying damages that have already occurred.

During the implementation of logistics measures, the following risk types may be encountered:
- technical, technological risks,
- financial risks,
- economic risks,
- risks arising from decision-maker support,
- risks arising from city-industry support,
- social risks.

Technical and technological risks mean the risk types arising during preparation, implementation and operation, that can be minimised with thorough planning, appropriate project management and by clearly setting out scopes of powers and liability. The probability of occurrence and, in case of

occurrence, the severity of this risk type is substantially reduced if sufficient time and resources are available for planning and preparations, and all uncertainties related to implementation are cleared up during the preparation phase.

Financial risks mean the limits and restrictions arising from the scarcity of funds. This risk can be reduced if the necessary funds and reserves are available. At the same time, it is important to note that in case of the limitation of funds, the technical content of the project can also be modified (reduced) to ensure that risks are minimal, but the project objective and effect suffer as little damage as possible.

In the case of the implementation of the project, its return on investment represents an economic risk, which can be mitigated during planning by a cost-benefit analysis based on exact measurement data, and by minimising unexpected costs during the investment project. In addition, the maintenance of a completed facility also represents economic burdens in the case of infrastructural investment projects. These costs must be taken into account during the project's financial planning, and an effort must be made to minimise these and the required financial budget must be allocated to cover maintenance costs when planning the project.

Risks arising from decision-maker support arise if there is considerable deviation between the objective and spirit of the project and decision-maker aspects. Their occurrence can primarily be mitigated through continuous consultation between planners, experts and decision-makers. It is important for decision-makers to have all information available to them, based on which they can make decisions with certainty on the given projects and their variations, keeping the spirit of the SULP and the objectives specified by it in mind.

Risks arising from city-industry support represent a transition between technical risks and risks arising from decision-maker support. The most efficient manner of preventing these risks is continuous consultation between industry, decision-maker and planner stakeholders, uncovering all risks in advance that maybe prevented already during the planning and the preparatory phase.

Social risks primarily apply to players impacted by the implementation of the project. While there are certain social groups that will benefit from a given development, it may have unfavourable effects for other groups. Risks arising from temporary or permanent negative effects can best be mitigated with preliminary information provision and involvement in planning, which both the planners and decision-makers must take into account.

Measures	Risks	Probability of realization	Risk management
1.1.1 Drawing up the city logistics concept of the Budapest FUA	risks arising from decision-maker support financial risks	medium	- creating a need for the elaboration of the document - frequent consultations with decision-makers
1.2.1 Uniform logistics regulations for Budapest's entire FUA	risks arising from decision-maker support risks arising from city-industry support	high	- thorough planning - joint advocacy of the settlements in Budapest FUA - frequent consultations with decision-makers
1.2.2 Harmonised and coordinated parking and loading for Budapest's districts	risks arising from decision-maker support risks arising from city-industry support	medium	- thorough planning
1.2.3. Ensuring the interoperability of the national road toll system and Budapest freight traffic entry systems	risks arising from decision-maker support risks arising from city-industry support	medium	- thorough planning, proper project management - clear responsilities and scopes of the different actors
2.1.1 Establishing an organisational background for city logistics tasks	risks arising from decision-maker support financial	medium	- dedicated budget for the operational costs - clear responsilities and scopes of the different actors
2.2.1 Efficient inspection system and consistent sanctioning	financial risks arising from city-industry support	medium	- dedicated budget for the operational costs - clear responsilities and scopes of the different actors

Measures	Risks	Probability of realization	Risk management
2.3.1. Opinion-shaping schemes, programmes and campaigns	financial risks risks arising from city-industry support	medium	- secure financial background - proper project management
2.3.2 Launching R+D and pilot projects, and involvement in such projects	financial risks risks arising from city-industry support	medium	- secure financial background - proper project management
3.1.1 Development of concentrated loading points	financial risks risks arising from decision-maker support social	low	- secure financial background - giving proper information to the residents - involving all stakeholders into the planning and the decision-making process
3.1.2 Innovative solutions to support the loading process	technical, technological risks economic risks financial risks risks arising from decision-maker support risks arising from city-industry support	medium	- thorough planning - preparation of a cost-benefit analysis
3.2.1 Establishment of consolidation centres and neighbourhood consolidation points	economic risks financial risks risks arising from decision-maker support risks arising from city-industry support	medium	- secure financial background - thorough planning, proper project management - clear responsilities and scopes of the different actors - involving all stakeholders into the planning process

Measures	Risks	Probability of realization	Risk management
3.2.2 Establishment of the IT background required for the supporting of consolidation and city logistics processes	technical, technological risks financial risks risks arising from decision-maker support	high	- secure financial background - involving all stakeholders into the planning process
3.2.3 Enhancing the network of parcel points	risks arising from city-industry support	low	-
4.1.1 Introducing positive incentives to support the widespread use of environmentally-friendly vehicles	financial risks risks arising from decision-maker support	low	-
4.1.2 Establishment of charging infrastructure for trucks using alternative fuel sources	financial risks risks arising from decision-maker support	low	-
4.1.3 Introduction of the Qualified Budapest Freight Transporter System	risks arising from decision-maker support social	medium	- thorough planning, preparation, involving all stakeholders into the process - elaborate operational model - elaborate financial model
4.2.1 Supporting alternative methods for last mile freight transport	financial risks risks arising from decision-maker support	low	- thorough preliminary analysis and case studies - secure financial background
4.2.2 Application of sharing-based solutions	technical, technological risks risks arising from city-industry support	low	- thorough preliminary analysis and case studies - elaborate operational and financial model

Measures	Risks	Probability of realization	Risk management
4.2.3. Elaboration of the technology of logistics as a service	technical, technological risks risks arising from decision-maker support	low	- thorough preliminary analysis and case studies

14. Promotion and Communication Plan

The SULP, to be prepared as the industry document for the Balázs Mór Plan, must be communicated as per the specifications of the BMT Communication Plan, however, as the Communication Plan will form part of the second part of the BMT, it is not available as yet.