



Ministry of Foreign Affairs

# *Smart and sustainable mobility market in Hungary*

*Commissioned by the Netherlands Enterprise Agency*

*>> Sustainable. Agricultural. Innovative.  
International.*



# Table of contents

Smart and sustainable mobility business opportunities in Hungary	2
Doing business in Hungary	6
Links between the Netherlands and Hungary	10
Overview of the smart and sustainable mobility sector in Hungary	18
Important smart and sustainable mobility subsectors in Hungary	31
Annexes	51-63
Annex I: Establishing a business presence in Hungary	51
Annex II: Relevant funding programmes	53
Annex III: List of cooperations in Horizon 2020 projects	55
Annex IV: Key players in the Hungarian e-mobility sector	57
Annex V: Dutch logistics companies in the CEE-region	59
Annex VI: Key Hungarian logistics associations	61
Annex VII: Upcoming events and conferences	62

# Smart and sustainable mobility business opportunities in Hungary

The transition towards sustainable and smart mobility has become an emerging pattern in Hungary in recent years. The Hungarian government has adopted the National Energy and Climate Strategy in 2020 focusing on the transition to a carbon neutral economy. One of the priorities of this strategy is the greening of the transport sector. In 2019, the law on electromobility was adopted which encourages the use of e-cars and e-vans and the necessary charging infrastructure.

Due to many government incentives, Hungary has developed and continues to build a unique standing in the sector, among others in the area of battery production.

**The Netherland's view is that the New Green Deal has to be reached** by the EU and therefore has a major role in promoting sustainable mobility. *On 14 November 2019*, three partners<sup>1</sup> from the public, private and non-governmental sectors have set up the *Hungarian Lean&Green Platform* and officially signed a Memorandum of Understanding. The Embassy of the Kingdom of the Netherlands in Hungary (**the "Embassy"**) is among the founding members and actively contributes to the work of the platform, which is aiming to reduce the carbon emission of the transport sector.

The platform shares knowledge, tools and good practices, facilitates connecting companies of both countries, coordinates efforts in organizing events and promotes international cooperation in the logistics and manufacturing sectors.

As one of the top sectors of the Embassy is transport & logistics, the Embassy has decided to conduct a market study together with Deloitte Hungary to identify the smart and sustainable mobility business opportunities for small and medium-size Dutch enterprises in Hungary in accordance with Dutch business interest.

The study's key takeaways are presented on the following pages.



Sustainability is one of the leading themes at the Embassy:

Among others, it has co-founded the Hungarian Lean&Green platform.

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<sup>1</sup> Embassy of the Kingdom of the Netherlands in Hungary, GS1 Hungary Nonprofit Plc, Hungarian Association of Logistics, Purchasing and Inventory Management

## Smart and sustainable mobility – summary of business opportunities in Hungary

**The Hungarian market's demand for smart mobility solutions** is framed by (long-term) strategies & plans up to 2050 as well as planned support schemes in the EU funding period of 2021-2027, inter alia the Mobility Operational Programme. The focus is rather shifting towards smart mobility solutions that are service-based and tailored to the flexible needs of users.

### E-charging infrastructure

In Hungary, the development of the charging infrastructure for electric vehicles lags behind the planned expansion: Currently, there about 1,200 charging points throughout the country with many areas left uncovered. The respective development plan expects at least 5,900 charging points by 2030, for which around 362 million EUR of funding is expected (together with the Green Bus Programme). Dutch businesses with expertise in the area of charging infrastructure hardware could enter the market, especially in the rapid charging segment.

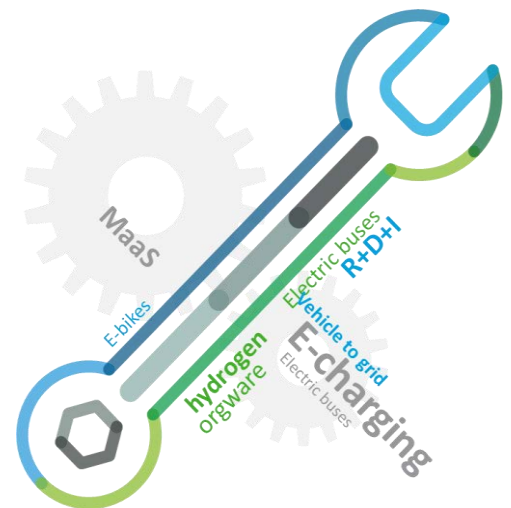
### Software solutions

Concerning software solutions, there are good opportunities in the area of MaaS (Mobility as a Service) as the basis for the respective stakeholder ecosystem was laid in the past two years. Furthermore, decentralized energy production and energy storage solutions integrated through IoT platforms shall contribute to the efficient balancing of the electricity system, for which vehicle to grid solutions are needed.

Currently, customers are bound to the charging points operated by the charging point operators (CPOs) they are registered to. The CPOs currently do not offer roaming or interoperability between their networks. The flexibility and the competition in this market could be significantly improved by introducing an extensive solution for mobility service providers, which would allow consumers to use stations of several CPOs through one access.

### Electric vehicles

From 2022 onwards, only electric buses can be put into operation in larger settlements. At least 1,300 electric buses shall be operating by 2030, financially supported by the Green Bus Programme. The competition for funds is tight as Hungarian companies produce around 200 e-buses per year themselves. However, Dutch bus and charging manufacturers could explore their options individually or as part of a consortium, as a large amount of public funding will be available in this segment in the next decade. Pioneering work might be needed in heavily funded showcase projects.



### Railway infrastructure

According to subject matter experts, one of the heavily funded areas with more than one billion EUR of investments will be the development of inland railway infrastructure. These will include investments into rail vehicles, wagons and developments enabling P+R and intermodal transport options, supported by the Budapest Suburban Railway Strategy (2021).

### Research, Development & Innovation

There are many options for research cooperation between Dutch and Hungarian research institutions in the area of smart mobility and city logistics, for which financial support can be obtained under Horizon Europe or the Connecting Europe Facility (CEF). Dutch and Hungarian companies have already successfully collaborated in the area of sustainable mobility while utilizing funds from Horizon 2020 (see Annex III).

In the area of hydrogen propulsion and hydrogen fuel cell technologies, an extensive ecosystem is currently building in the framework of the National Hydrogen Technology Platform, which is actively searching for international cooperation partners.

### City logistics

At the time this document was created, complex city logistics system solutions were not applied in any major city in Hungary. At the same time, the outstanding upturn in demand related to e-commerce services in 2020, equivalent to 2-3 years of growth, has further increased the pressure on cities' transport networks. **Budapest's Smart Mobility Plan recognizes** that the Capital needs smart and sustainable solutions to decrease the stress on the urban living space. Current opportunities for the first step towards the development of intelligent city logistics mainly lie in the utilization of unused brown-field areas in the inner city, e.g. for consolidation centers.

Furthermore, there will be demand for:

- IT-based organization and supervision of urban transport, and the optimization of the use of designated loading space in public areas
- Efficient organization of the link between long-distance transport and the last stage of transport ("last mile")
- Collection, management, analysis and monitoring of urban transport data to develop a user- and environmentally friendly transport system

### Sustainable logistics & digitalization of the supply chain

Due to its central location and highly developed transport infrastructure in Europe and especially in the CEE-region, Hungary not only plays an important role in the continental, but also in the intercontinental freight and logistics processes. An important area of further development towards sustainable transport is the expansion of inland rail freight capacity. The budget of the new EU programming period will be soon available for the related goals. Furthermore, the options for inland waterway freight on the Danube are planned to be exploited further as it represents the only waterway corridor in the country.



## Upcoming events

Smart mobility is one of the most popular topics discussed in multiple stakeholder fora in Hungary. For 2021, many important events have already been cancelled due to the pandemic situation. Still, some important events are being held online:

### Ökoindustria

Ökoindustria is a leading international green economy expo in Central Europe for environmental technologies, products and services with special focus on brownfield industry, circular economy and green education; where the Netherlands will be present as a guest country this year. Main topics include: sustainable mobility and Lean&Green

Date: 28-30 April 2021

### Automotive Hungary

Automotive Hungary (Hungexpo) brings together the domestic and international suppliers and service providers of the automotive industry at all levels. Official information about the programs has not yet been published.

Date: 16-18 November 2021

Information on further events can be found in Annex VII.

Concerning digitization, the main development areas in recent years were standardisation processes and the utilization of system connecting applications (so called transport management systems), which can provide a more resource effective and automated communication. In terms of supply chain management, these (ITC<sup>2</sup> based) technologies, mainly GPS tracking systems (in trucks for example), are also used in an increasing number by subcontractors. Even though these technologies develop rapidly, their distributors only entered the Hungarian market a few years ago, therefore we can still assume a great market potential in the deployment of such efficiency improving solutions. Further business opportunities lie in waterway and port-related investments as well as the cooperation in R+D activities with Hungarian SMEs and universities.



Greening of transport is essential for carbon neutrality to be reached by 2050 in Hungary

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<sup>2</sup> Information Communication System

# Doing business in Hungary

The Netherlands is Hungary's seventh most important trading partner, and the tenth most valuable investment community is formed by Dutch companies.

## Hungary – the business hub in the heart of Europe

Hungary is situated in the heart of Europe, which makes the country an ideal base for companies planning cross-border business developments in the Central Eastern European (CEE) region:

By our interviewed experts, Hungary is perceived as an **optimal hub** for manufacturing companies, services of all kinds as well as logistics-related activities among others due to its **convenient geographic situation** and the **highly skilled and educated labour force**; around two-thirds of the workforce in Hungary have at least completed a secondary, technical or vocational education.<sup>3</sup>

Furthermore, **digital transformation and fitness** in all economic sectors is supported through the **Industry 4.0 program**, including an emphasis to train the workforce to achieve a high level of digital professional qualification.<sup>4</sup> Concerning digital infrastructure, Hungary is currently developing the 5G network, which is already available in the capital area as well as in larger cities like Debrecen and Szeged. According to the Europe 5G Readiness Index, Hungary ranges midfield compared to other European countries. Overall, the network is well developed which provides optimal conditions for the further expansion of the 5G network.<sup>5</sup>

The country has **one of the highest motorway densities in Europe** (after Belgium and the Netherlands); main European cities can be reached from Budapest within a couple of **hours' drive**. Furthermore, Hungary is crossed by three Pan-European Transport Corridors (TEN-T).<sup>6</sup> Although landlocked, Hungary has **direct connection** to all **significant harbours** and terminals in Europe. Several **main train lines** connect Hungary with the **main ports of Western Europe** (e.g. Hamburg, Bremerhaven, Rotterdam) as well as the **Adriatic** (Koper, Rijeka, Trieste) and the **Mediterranean** (Piraeus) with regular block train services.<sup>7</sup> Furthermore, Hungary has access to the North Sea and the Black Sea **via the river Danube**. The **Danube-Rhine-Main Canal** connects Rotterdam, Amsterdam, Antwerp and the industrial centres of Western Europe with the Black Sea, through the Danube–Black Sea Canal with Constanta.<sup>8</sup>



<sup>3</sup> [https://hipa.hu/images/publications/hipa-invest-in-hungary\\_2018\\_09\\_20.pdf](https://hipa.hu/images/publications/hipa-invest-in-hungary_2018_09_20.pdf)

<sup>4</sup> [https://hipa.hu/images/publications/hipa-logistics-transportation-in-hungary\\_2018\\_09\\_20.pdf](https://hipa.hu/images/publications/hipa-logistics-transportation-in-hungary_2018_09_20.pdf)

<sup>5</sup> <https://www.incites.eu/>

<sup>6</sup> [https://www.flandersinvestmentandtrade.com/export/sites/trade/files/market\\_studies/2019-Hungary\\_Logistics.pdf](https://www.flandersinvestmentandtrade.com/export/sites/trade/files/market_studies/2019-Hungary_Logistics.pdf)

<sup>7</sup> [https://hipa.hu/images/publications/hipa-logistics-transportation-in-hungary\\_2018\\_09\\_20.pdf](https://hipa.hu/images/publications/hipa-logistics-transportation-in-hungary_2018_09_20.pdf)

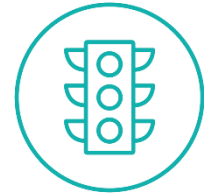
<sup>8</sup> [https://hipa.hu/images/publications/hipa-invest-in-hungary\\_2018\\_09\\_20.pdf](https://hipa.hu/images/publications/hipa-invest-in-hungary_2018_09_20.pdf)



Hungary is within two hours by air from most major European capitals, and provides a key link between Europe and the markets of the East.<sup>9</sup>

The Hungarian government has committed to streamline business processes and to increase the competitiveness of both SMEs and large enterprises through a wide range of incentives.

Both refundable and non-refundable incentives are available to companies coming to or expanding in Hungary. According to our understanding, the current restructuring of the Ministry (Ministry for Innovation and Technology) responsible for the allocation of EU funds, will be beneficial for a more efficient release of financial subsidies in the financing period of 2021-2027. In general, the main types of incentives are direct financial subsidies (either from the Hungarian Government or from EU Funds) and tax incentives – see next chapter. The regulations on incentive opportunities are in accordance with EU-rules.<sup>10</sup>



## Potential challenges for foreign businesses

### *Infrastructural issues*

Being a hub in the CEE region can also have its setbacks. Due to the fact that Hungary is a transit country, high pressure on the road networks is common and heavy congestions might occur. Furthermore, despite its ideal connectivity, the Danube is not used as an international waterway at the moment.

### *Challenges for business acquisition*

The World Bank offers a thorough overview of the conditions for starting a business in Hungary issued every year<sup>11</sup>, including the potential difficulties investors face. In **Hungary's case, the results** for 2020 highlight the following issues:

- *Dealing with Construction Permits* – In Hungary it takes about 192 days to deal with construction permits and involves navigating 26 procedures.
- *Getting Electricity* – The World Bank and IFC rank Hungary in the bottom 70 countries in the world for ease of getting an electrical connection, taking 257 days to complete in total.
- *Paying Taxes* – Paying taxes can take an average of 277 hours of business hours to complete. Local business tax, rehabilitation contribution, training contribution and R&D tax are levies with which most companies are unlikely to be familiar. **Hungary's rate of value-added tax (VAT)** for most products and services is 27%, which is the highest in the EU.



### *Caveats to obtain funding*

In general, in order to apply for direct financial subsidies in Hungary, either a head office located in the country, or a head office in the European

<sup>9</sup> [https://hipa.hu/images/publications/hipa-invest-in-hungary\\_2018\\_09\\_20.pdf](https://hipa.hu/images/publications/hipa-invest-in-hungary_2018_09_20.pdf)

<sup>10</sup> <http://eugo.gov.hu/doing-business-hungary>

<sup>11</sup> <https://www.doingbusiness.org/en/data/exploreconomies/hungary>

Economic Area with a Hungarian branch office is required following Government Decree 255/2014.<sup>12</sup>

According to our interviewed experts, it has proven to be cumbersome for foreign businesses to participate in tenders for EU funds that are directly managed in Hungary. Experience has shown that in general, Hungarian-owned companies and suppliers are preferred in these tenders. However, foreign companies have good chances to join consortia led by Hungarian companies or to participate in projects as subcontractors or technology suppliers, in case the solution/knowledge is not available in Hungary yet.



#### *Current restrictions on business acquisition for foreign companies*

In the course of the COVID-19 pandemic situation, new reporting requirements for foreign-owned companies were introduced in order to protect Hungarian business ownership. Act LVIII of 2020 – in force since January 2021 - contains the respective measures. The main provision stipulates that a report must be made to the Ministry of Innovation and Technology when a foreign entity either directly or indirectly receives **ownership in a business in a sector that is of “strategic importance” for the Government.**<sup>13</sup>

**Companies located in the EU or in the EEA are not considered “foreign”,** however, in accordance with the law, they are still required to report any change in majority ownership in a Hungarian-owned company.<sup>14</sup> The regulation is expected to be repealed by June 30, 2021.<sup>15</sup>

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<sup>12</sup> [https://net.jogtar.hu/jogszabaly?docid=a1400255\\_kor](https://net.jogtar.hu/jogszabaly?docid=a1400255_kor)

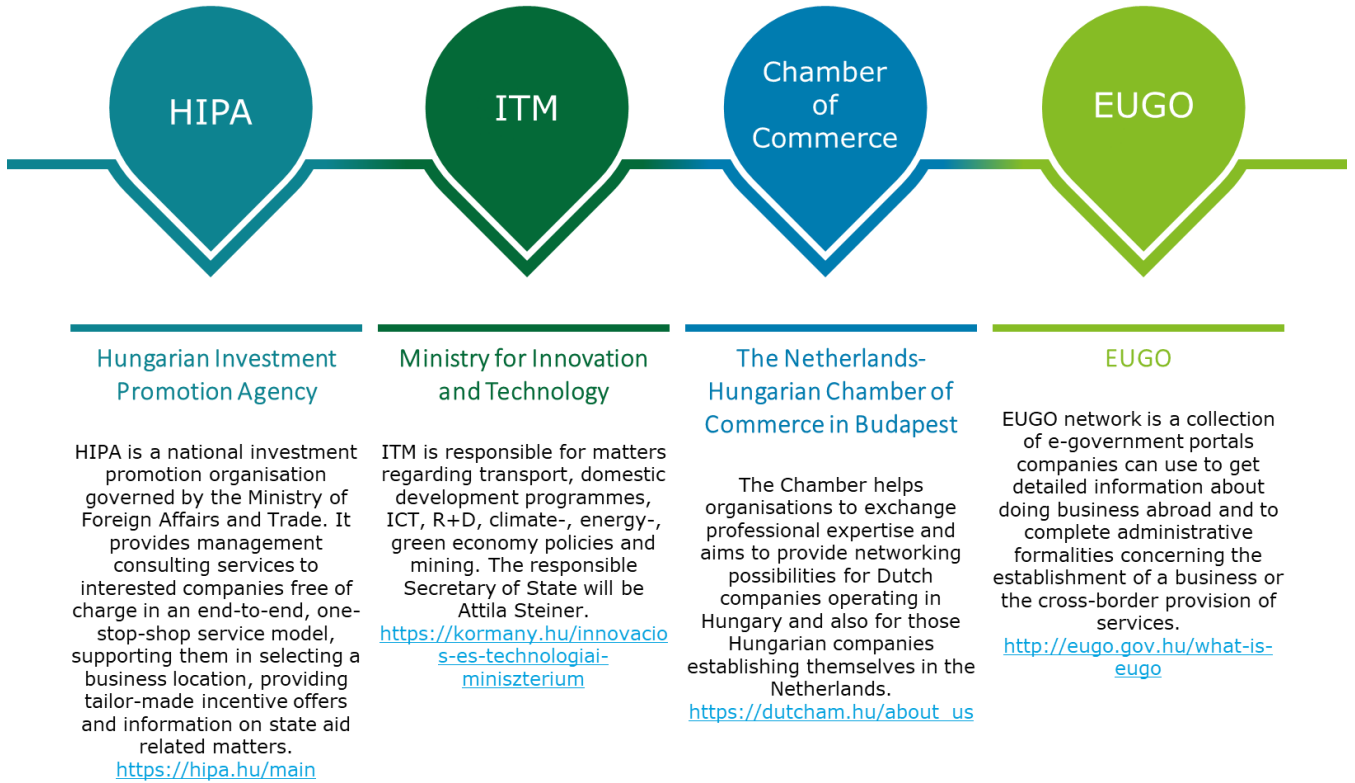
<sup>13</sup> [http://njt.hu/cgi\\_bin/njt\\_doc.cgi?docid=220120.384972](http://njt.hu/cgi_bin/njt_doc.cgi?docid=220120.384972)

<sup>14</sup> <https://www.bnt.eu/hu/hirek/aktualis-jogi-hireink/3027-magyarorszag-korlatozasok-kuelfoeldiek-cegvasarlasa-eseten?layout=bnt:news>

<sup>15</sup> [http://njt.hu/cgi\\_bin/njt\\_doc.cgi?docid=220120.384972](http://njt.hu/cgi_bin/njt_doc.cgi?docid=220120.384972)

## When starting your endeavor

If your company considers expansion to Hungary, a number of organisations can be contacted for information and support:



For further information on establishing a business presence in Hungary, consult Annex I.

# Links between the Netherlands and Hungary

One of the **study's** objectives was to find connections between the Dutch approach in the area of smart and sustainable mobility and the respective demand on the Hungarian market.

We interviewed several Dutch and Hungarian experts in order to learn more about successful and exportable Dutch solutions in the field of sustainable and smart mobility as well as the current and future demand in Hungary for these solutions.

## *The Dutch approach to zero emission mobility<sup>16 17</sup>*

E-mobility (or zero emission mobility in general) is an innovation that offers significant economic opportunities for Dutch businesses, which has been actively supported since 2008 by the Government and the Netherlands Enterprise agency, RVO.

Dutch zero emission transport ambitions are among others:

- 100% zero emission cars for new sales by 2030
- 100% zero emission public transport by 2030
- 100% zero emission city logistics: All trucks and vans operating in urban areas have to be zero emission vehicles by 2030
- Emission free Amsterdam by 2030 which concerns every vehicle in the larger city area
- Zero emission zones for city logistics in inner city areas by 2025 already announced in Amsterdam, Rotterdam, The Hague, Utrecht and 10 other cities

Moreover, municipalities have already elaborated comprehensive concepts in order to enable the dissemination of e-mobility, among others through the construction of smart public infrastructure or zero emission urban logistics.



<sup>16</sup> [https://www.youtube.com/watch?v=RWVAFgH5azY&feature=emb\\_logo](https://www.youtube.com/watch?v=RWVAFgH5azY&feature=emb_logo)

<sup>17</sup> <https://www.youtube.com/watch?app=desktop&v=dTIHHe5gGCA&feature=youtu.be>

## **DOET – Dutch Organization for Electric Transport**

One of the important driving forces behind the development of electric mobility in the Netherlands is the Dutch Organization for Electric Transport, DOET. The industry association has been active in the field of e-mobility since 2009, representing the entire chain of one of the fastest growing sectors in the Netherlands. The members of DOET are Dutch entrepreneurs and parties that center their business operations around electric transport or have leading policies in this area. For them, DOET is actively lobbying in order to reach the mission of 100% electric mobility in the Netherlands, with the country becoming Europe's frontrunner in the field.

Source: doetdoet.nl

As of today, the Netherlands has the densest electric charging network worldwide with more than 20 charging stations per 100 km of paved road (China comes 2nd with approx 4 chargers) and is a world leader in the field of charging infrastructure and smart charging. Existing rapid charging options on motorways with 50 kW electrical power are constantly being upgraded to 350 kW and are all located within a radius of at least 50 km. Thanks to smart technology and the convenient policy, every electric vehicle can be charged at every charging point, regardless of the provider.<sup>18</sup> In 2020, the second best selling car was the purely electric Volkswagen ID.3 in the Netherlands. The demand for e-buses, light electric vehicles and e-lorries is also growing exponentially.<sup>19</sup>

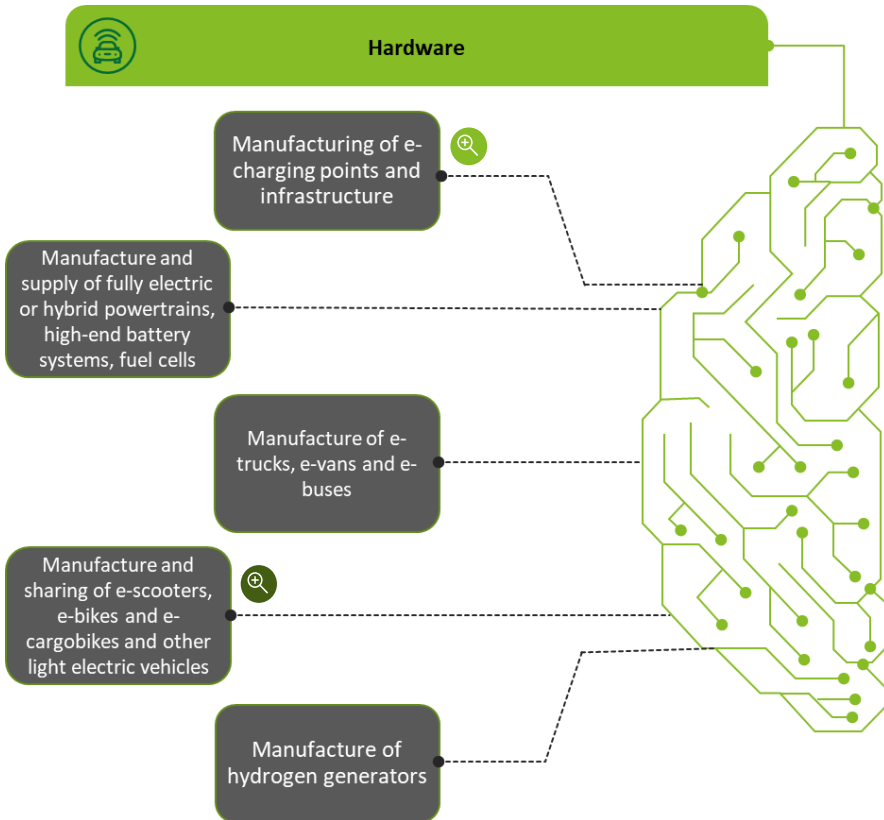


<sup>18</sup> <https://www.3sat.de/wissen/nano/201112-elektroauto-nl-nano-104.html>

<sup>19</sup> Netherlands Enterprise Agency – Statistics Electric Vehicles in the Netherlands up to and including December 2020

### What can Dutch companies offer to foster smart and sustainable mobility in Hungary?

A large number of Dutch products, services and solutions in the area of smart and sustainable mobility have already been successfully exported to other (European) countries. Among others, Dutch companies are active in the following areas of smart and sustainable mobility<sup>20</sup>:



#### Charging stations along the French motorways

The French motorway and toll road group (Autoroutes Paris-Rhin-Rhône, APRR) has selected Dutch company Fastned to develop and operate 9 fast charging stations along the highway from Paris to Lyon. The construction of the charging stations is planned for 2021 after which Fastned will be able to operate the stations for 14 years. At each location, Fastned plans to build a large charging station capable of charging up to 16 vehicles simultaneously by solely using renewable energy derived from wind and solar sources.

Source: Fastned

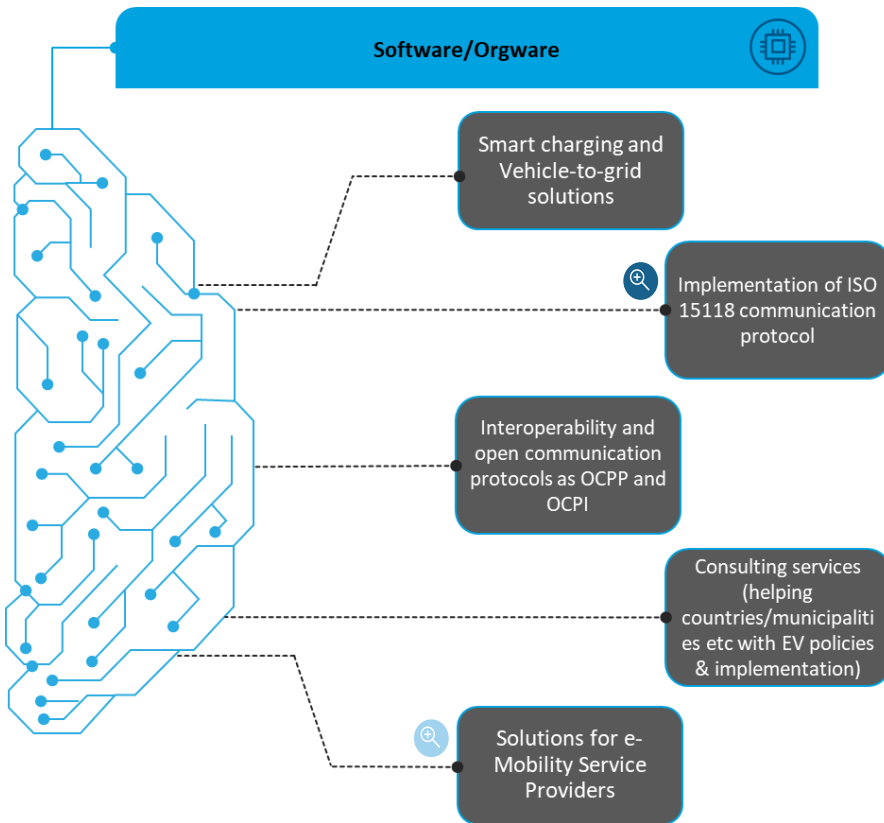


#### E-Cargobike Sharing (e.g. Cargoroo/Nijland Cycling)

Cargoroo plans to set up a Europe-wide sharing service with electric cargo bikes. Following the launch in large cities in the Netherlands, the next locations in the Interreg eHub pilot project are Leuven (BE), Manchester (UK), Kempton (DE) and Dreux (FR). In addition, according to the company, talks are already being held with other cities in Germany and other countries.

Source: Emobilitaet.online

<sup>20</sup> The following list does not claim to be exhaustive, but rather reflects the assessment of our interviewed experts



### Solutions based on Communication protocol ISO 15118

The smart mobility market is functioning based on a communication protocol called ISO 15118. This protocol is being developed for communication between the charging station and the vehicle. Because of this development, it is possible to replace the physical charge card, keyrings, and apps with the vehicle itself. Other solutions imitating this protocol can be found in e.g. smart charging cables.

Source: Last Mile Solutions



### Solutions for e-Mobility Service Providers

The e-Mobility Service Provider often referred to as e-MSP (or EMSP, MSP) is the company with which the EV-driver has a contract for all services related to electric charging. The e-MSP has several responsibilities; ranging from charge card provisioning, apps to locate and navigate to charge points, the management and expansion of the roaming network, billing and invoicing, customer management and defining the pricing of charging sessions towards the EV-driver. Dutch companies can help creating one-stop-shop solutions making the service convenient for EV-customers or increasing price transparency through software solutions.

Source: Last Mile Solutions

### Good practice in public private partnerships: Cooperation between Heliox and Eindhoven

Heliox is the market leader in fast charging systems within public transport, e-trucks, marine, mining and port equipment. The premium quality and highly efficient chargers enable operators to improve their performance while lowering environmental impact. Heliox operates on a global level with headquarters in the Netherlands and local offices in the UK, US, Australia, Singapore and India.<sup>21</sup>

The public transport operator in Eindhoven committed to electrify its entire bus fleet and commissioned Heliox to provide the respective charging infrastructure, covering depot charging at 30 kW and charging at 300 kW, using roof-mounted pantographs for communication. The goal was to charge 43 e-buses, while keeping the highest up-time and overall minimal adjustments to the bus operation. The project was first of its kind in Europe, proving that changing to a smart electric bus fleet does not only contribute to lower the carbon footprint, but also to higher efficiency in operations.<sup>22</sup>

<sup>21</sup> Mission booklet e-mobility Poland

<sup>22</sup> <https://www.heliox.nl/customer-cases/our-projects/largest-full-operation-e-bus-project-in-europe>





develop the first articulate hydrogen fueled bus in Europe, which demonstrates that the know-how is present in the country.<sup>30</sup>

For further information on the current stage of the hydrogen sector in Hungary, consult the chapter on **“Important smart and sustainable mobility subsectors in Hungary.”**



A myriad of Dutch hardware and software solutions in the area of smart mobility have already been successfully exported to other (European) countries. For example, a Dutch company has recently won a tender in France to build the fast-charging infrastructure along the country’s motorways.

### *What is the demand on the Hungarian market in the area of smart and sustainable mobility?*

The Hungarian market’s demand for smart mobility solutions is framed by (long-term) strategies and plans up to 2050 as well as planned support schemes in the upcoming funding period of 2021-2027, inter alia the Integrated Transport Operational Programme Plus. The details of the past, current and expected funding programmes are outlined in the forthcoming chapters.

In addition, we have asked for our Hungarian experts’ opinion concerning investment tendencies based on their subject matter expertise and their experience within the Hungarian administration, respectively. They expect that the Government’s emphasis in the transport sector will be less on road construction in the future, given that the EU’s expectations are met in this regard. The focus is rather shifting towards smart mobility solutions that are service-based and tailored to the flexible needs of users.

<sup>30</sup> <https://index.hu/belfold/2021/01/28/goldi-csuklos-hidrogenbusz-elektromos-busz-magyar-fejlesztes/>

The largest investments (> 1 billion EUR) in the upcoming decade (2021-2030) are expected in the following areas:



Railway infrastructure developments, mainly related to urban and suburban public transport investments, incl. investments into rail vehicles, wagons and developments enabling P+R and intermodal transport options. This is supported by the Budapest Suburban Railway Strategy, released in February 2021.<sup>31</sup>

Electrification in all areas of private and public transport: e.g. purchase of electric passenger cars and (low emission) buses

Infrastructure related to electrification, both hardware (establishment of further charging points) and software, mainly for eMSPs and vehicle to grid solutions

According to our interviewed experts, one of the potential setbacks for Dutch companies who aim to do business in Hungary could be the different expectations concerning quality and price of the relevant products and services. This issue is prevalent in areas of smart mobility where the competition is already tough. For example, the e-bus manufacturing Dutch companies (e.g. VDL, DAF, EBusCO) might find it difficult to enter markets in the CEE region because of the presence of several Hungarian competitors (e.g. Ikarus). According to our experts, Dutch businesses offer better quality while CEE-companies offer more favourable prices. In the Hungarian market, in the light of the current economic situation, it could be especially difficult to succeed with higher prices than the domestic companies.

#### Opportunities in research cooperation

A further opportunity for Dutch-Hungarian businesses to cooperate while exploiting funding opportunities could be in R+D+I projects related to smart mobility and city logistics. Until today, several Dutch and Hungarian companies have worked together in the area of sustainable mobility while successfully retrieving funds from Horizon 2020 (see Annex III).

There are already several cases of cooperation between Hungarian universities (Szent István University, Budapest University of Technology and Economics) and Dutch universities, research institutes, but according to our interview partners, there are still a myriad of opportunities in this area, however, platforms are missing to find the best fit.

*The Faculty of Transportation Engineering and Vehicle Engineering at Budapest University of Technology and Economics*<sup>32</sup> has an international cooperation with many universities and research institutions EU-wide, including the *Delft University of Technology* and the *National Aerospace Laboratory* in Amsterdam.

The Faculty currently works on multiple e-mobility related projects, such as the Electric Travelling Platform to support the implementation of electromobility in Smart Cities based on ICT applications, in cooperation with TU Delft.<sup>33</sup> **The project's main objective is to assist travelers in choosing the best travel mode (including EVs) and route (by using ICT**

#### ZONE Cluster

The Connected and Automated Mobility Cluster of Zala was established by leading Hungarian infocommunication technology, electronics, UTM aviation, and automotive companies, with the goal of institutionally connecting research, development and innovation capacities in the field of intelligent transport systems. The activity of the cluster is focused on Hungary, but with involving regional (Hungary, Austria, Croatia, Slovenia) countries and European Union countries as well.

Source: zonecluster.eu



<sup>31</sup> [Budapest Vasúti Stratégia – Budapest Vasúti Stratégia \(budapestvasut2040.hu\)](https://transportation.bme.hu/)

<sup>32</sup> <https://transportation.bme.hu/>

<sup>33</sup> <https://transportation.bme.hu/research/international/>

applications) and will support local authorities in the definition of strategic goals for the development of e-mobility.<sup>34</sup>

Hungary could also be involved in consortia related to Clean Hydrogen Europe/Partnership projects. These projects may be funded by the Horizon Europe programme and CEF/TEN-T programme. In general, the [Fuel Cells and Hydrogen Joint Undertaking \(FCH-JU\)](#), a partnership between the European Commission and the industry supports the development of innovative hydrogen technologies. For further information on these funding programmes consult Annex II.

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<sup>34</sup> <http://www.electrictravelling.com/index.html>

# Overview of the smart and sustainable mobility sector in Hungary



Hungary aims to cut greenhouse gas (GHG) emissions by at least 40% by 2030 compared to 1990, meaning that the overall emissions have to be reduced by another 7.6 million tCO<sub>2</sub>eq in order to reach the goal. As a large contributor to GHG emissions, the transport sector will play a fundamental part in reaching the climate objectives.

## Overview of the sector

In Hungary, the transport sector is responsible for 20% of all GHG emissions or 13.8 million tons of CO<sub>2</sub> equivalent<sup>35</sup> of which 92.8% are attributable to road transport. Since 2013, transport emissions have increased by 31.4% and further growth is expected in the near future. The reason for the dynamic expansion is mainly due to the increase in the level of motorization in connection with the increase in income and the dynamic development of road freight transport, especially the transit traffic through Hungary.<sup>36</sup> In terms of logistics, a large share of goods (approx 85%) is either transported via road or rail.

In December 2019, Hungary signed the greenhouse gas emission reduction agenda of the Green Deal, which will require a significant structural transformation of the economy. Attila Steiner, **Hungary's State Secretary** for the Development of Circular Economy, Energy and Climate Policy emphasized that the greening of transport is a cornerstone to reach **Hungary's climate goals**.

## *The smart mobility sector's status quo*

In Hungary, e-mobility started to develop a real market after 2015 upon implementation of the Anyos Jedlik plan 1.0. The charging infrastructure is still underdeveloped in certain areas in 2021, however, due to massive policy and financial support, the growth was exponential both in vehicles and charging stations, thanks to following measures:

**"The transport sector is responsible for one fifth of Hungary's carbon dioxide emissions – its greening is of utmost importance."**

Attila Steiner, State Secretary



In Hungary, e-mobility has mainly started to develop a real market after 2015

<sup>35</sup> Eurostat, data from 2017

<sup>36</sup> <http://zoldbusz.hu/files/NTFSt.pdf>

- ✓ non-reimbursable funding for the purchase of e-vehicles
- ✓ free parking in larger cities
- ✓ free charging in public spaces (until 2019)

The discontinuation of the free charging option demonstrates that the electromobility market in Hungary has achieved a certain degree of maturity<sup>37</sup>. **Based on the Hungarian Statistical Office's data, until 2015,** there were less than 500 purely e-vehicles on the road.<sup>38</sup> Until the end of November in 2020, about 11,810 were registered (as well as 5,655 plug-in hybrid and 8,214 full hybrid cars).<sup>39</sup> In addition, the number of exclusively electric trucks and special purpose vehicles and buses altogether exceeded 500, and the number of motorcycles was higher than 200.<sup>40</sup>

At the time of creating this report (March 2021), approximately 1,200 charging stations were registered in Hungary. The new strategy on electromobility (2019) states that the charging infrastructure is still considered underdeveloped. In this regard, significant expansion is expected to take place: The National Plan for the Development of the E-Charging Infrastructure<sup>41</sup> expects at least 5,900 charging points by 2030.

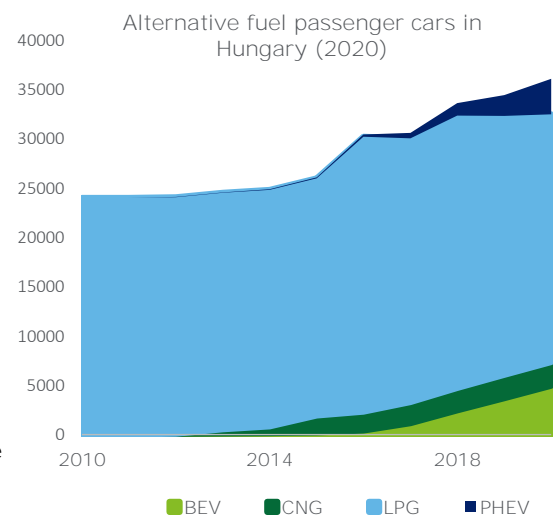
Due to the large number of government incentives, Hungary has developed a unique standing in the sector:

In addition to the significant research and development capacities related to electric propulsion (AVL, Bosch, Thyssenkrupp), Hungary now occupies a leading position in the field of battery production. Three of the five largest Asian battery manufacturers for electric vehicles have chosen Hungary as their European production center: Samsung SDI, SK Innovation, and GS Yuasa. Following these decisions, the suppliers of large manufacturers also turned to Hungary (e.g. Bumchun, Doosan, INZI Controls, Shinheung, Toray).<sup>42</sup>

Next to decarbonization of the transport sector and attracting foreign investors, promoting the spread of e-mobility serves another purpose:

Electric vehicles shall become part of the intelligent energy ecosystem in the future, and decentralized energy production and energy storage solutions integrated through IoT platforms shall contribute to the efficient balancing of the electricity system.<sup>43</sup>

1,200 charging points throughout the country as of 2020  
at least 5,900 by 2030



Source: European Alternative Fuels Observatory (2021)

<sup>37</sup> Vokony et al. 2020

<sup>38</sup> <http://statinfo.ksh.hu/>

<sup>39</sup> [https://nyilvantarto.hu/letoltes/statisztikak/Zold\\_rendszam\\_statiztika2020.xlsx](https://nyilvantarto.hu/letoltes/statisztikak/Zold_rendszam_statiztika2020.xlsx)

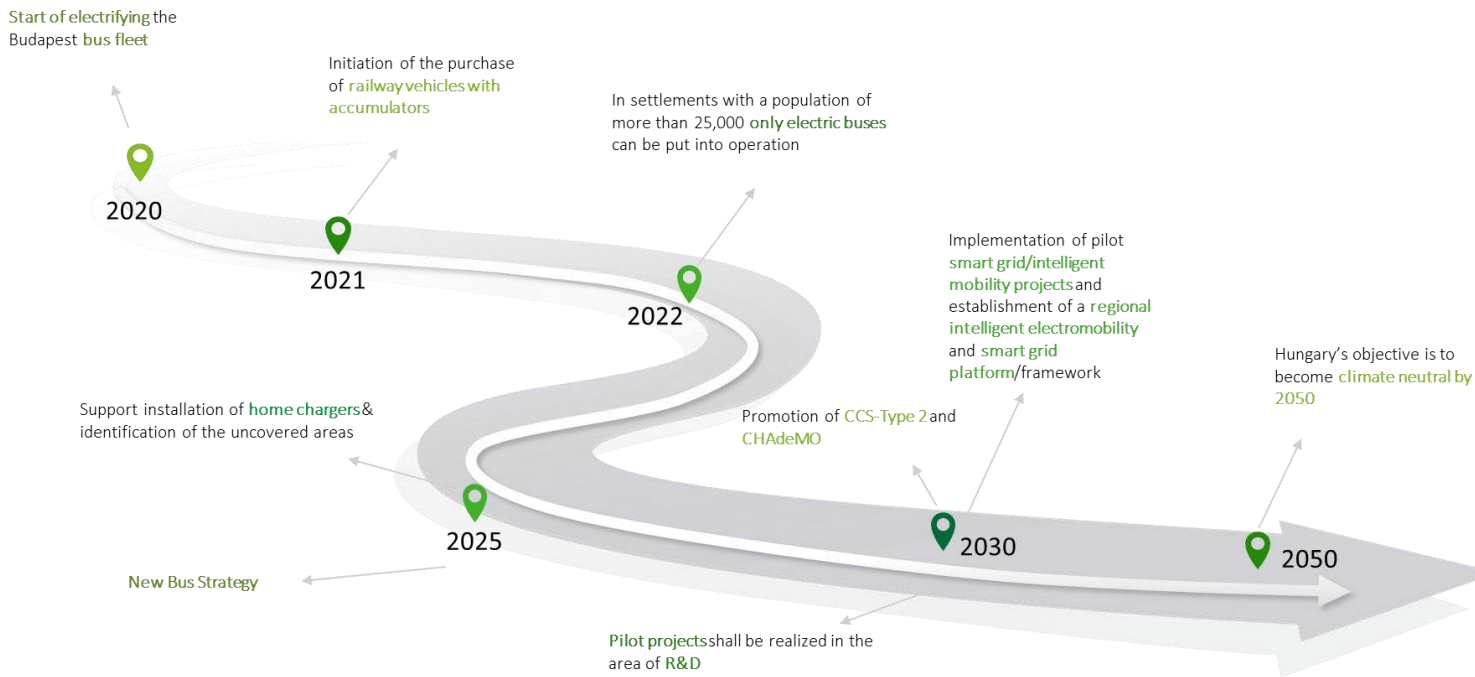
<sup>40</sup> Területi Statisztika, 2020, 60(4): 461–476; DOI: 10.15196/TS600403

<sup>41</sup> [https://2015-2019.kormany.hu/download/a/0c/e0000/A%C3%9CINK\\_fin.pdf](https://2015-2019.kormany.hu/download/a/0c/e0000/A%C3%9CINK_fin.pdf)

<sup>42</sup> Ibid.

<sup>43</sup> Anyos Jedlik Plan 2.0

## Relevant policies – overview

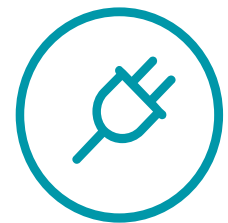


In the country's National Energy and Climate Plan (NECP) Hungary lays down the foundations for a comprehensive policy to enable the dissemination of electric vehicles and the establishment of the corresponding infrastructure. All the strategic decisions in this regard are formulated by the Ministry for Innovation and Technology.

The NECP points out that the transport sector will play an important role in cutting emissions in Hungary. In alignment with the EU's Renewable Energy Directive aiming for at least 14% for the share of renewable energy in gross final energy consumption of the transportation sector, Hungary's target until 2030 is 16.9%. It shall be mainly reached by increasing the share of biofuels and by significantly enhancing the role of electromobility (e-mobility). Furthermore, the growth rate of energy consumption should be slowed down by developing and increasing the utilization of public transport and a higher emphasis of rail freight in logistics. The plan also says that natural gas and biogas could play a greater role to decarbonize the logistics sector.<sup>44</sup>

Furthermore, Hungary intends to enable the integration of hydrogen in its mobility, industry, building, gas and power systems. The NECP states that in the longer term, "hydrogen can play a significant role in integrating renewable electricity generation, strengthening domestic security of supply and achieving Hungary's decarbonisation goals". In an optimistic scenario, hydrogen could cover 1% of the total transport energy needs by 2030.<sup>45</sup>

The range of transport projects related to electromobility has been included in the National Energy Strategy, in connection with which the Parliament



The purchase of electric cars and e-bikes should be encouraged through direct financial support.

# 16.9%

Target for the share of renewables in the transport sector until 2030.

<sup>44</sup> [https://ec.europa.eu/energy/sites/ener/files/documents/hu\\_final\\_necp\\_main\\_hu.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/hu_final_necp_main_hu.pdf)

<sup>45</sup> [https://www.fch.europa.eu/sites/default/files/file\\_attach/Brochure%20FCH%20Hungary%20%28ID%209473092%29.pdf](https://www.fch.europa.eu/sites/default/files/file_attach/Brochure%20FCH%20Hungary%20%28ID%209473092%29.pdf)

adopted the [Second National Climate Change Strategy](#) for the period 2018–2030<sup>46</sup>, which also provides an outlook for the period up to 2050.

The respective [Climate and Environment Protection Action Plan](#)<sup>47</sup> states that Hungary shall become climate-neutral by 2050. One of the 8 key action points to reach this goal is the electrification of road transport. The purchase of electric cars and e-bikes shall be encouraged through direct financial support. In order to provide the necessary infrastructure for the use of electric vehicles, it will be made possible to charge electric cars in all newly built apartment blocks and offices. In addition, the Green Bus Programme is launched, under which only electric buses can be put into operation in settlements with a population of more than 25,000 from 2022 onwards.



Under the Green Bus Programme, only electric buses can be put into operation in settlements with a population of more than 25,000 from 2022 onwards.

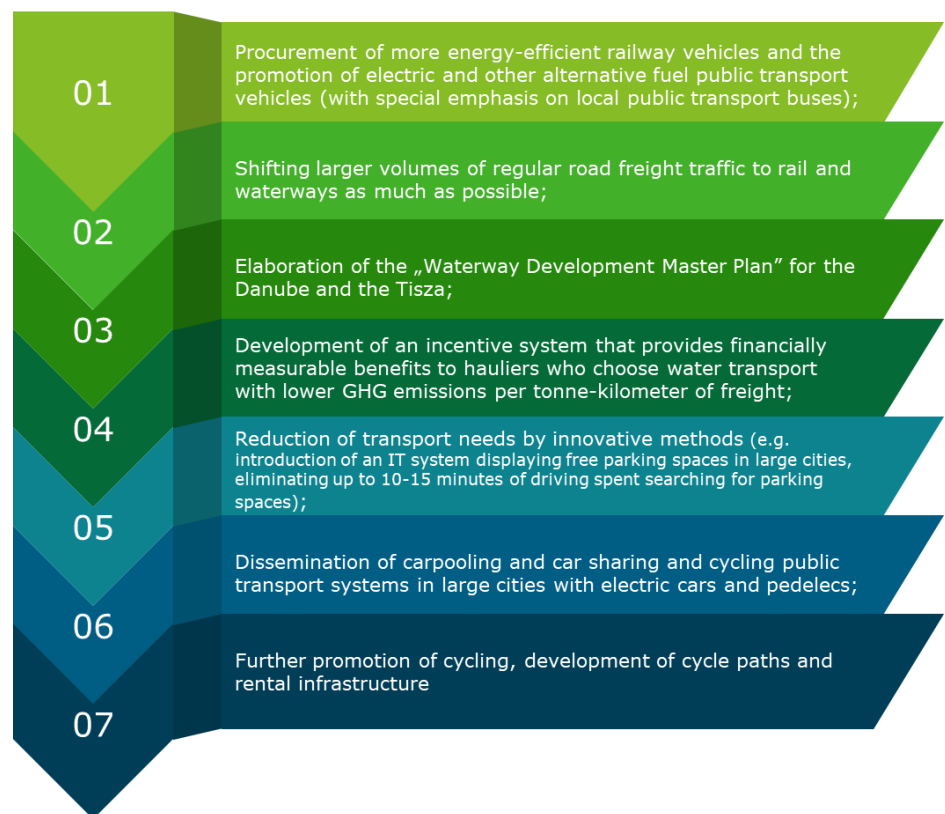
## Hungary's objective is to become **climate neutral by 2050**

The National Green Development Strategy (draft) supports the objective of Hungary becoming climate neutral by 2050. With regard to the transport sector, an **"absolute zero"** shall be reached, which means a complete phase out of oil and gas until 2050. Furthermore, action shall be taken in order to restrict the import of non-environmentally friendly vehicles. Moreover, steps should be undertaken to electrify the railway sector; the purchase of railway vehicles with accumulators should be initiated in 2021. Concerning cycle transport, the strategy recognizes that electric bicycles and scooters can play a greater role in urban transport and its decarbonisation in the long term. The development of the necessary infrastructure should be fostered.

### *National Electromobility Strategy – the "Anyos Jedlik" Plan 2.0*

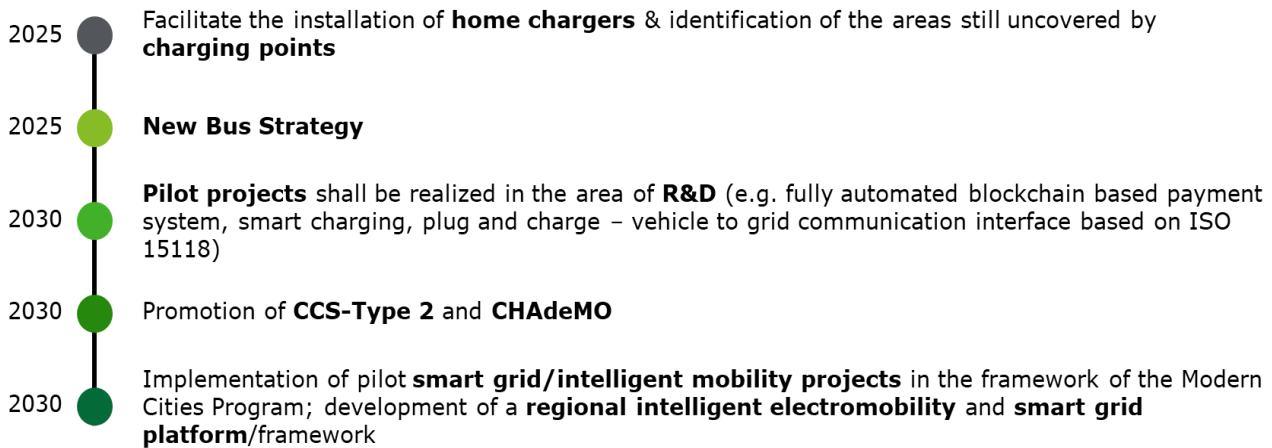
The National Electromobility Strategy sets clear objectives until 2030 for electromobility-related developments. However, there are more ambitious goals that shall be reached by 2025. One of the cornerstones of the strategy is the development of charging-related intelligent solutions. The goals relevant from a business perspective are listed below:

Concrete relevant actions listed by the draft strategy are as follows:



<sup>46</sup> Parliamentary Decision 23/2018. (X. 31.)

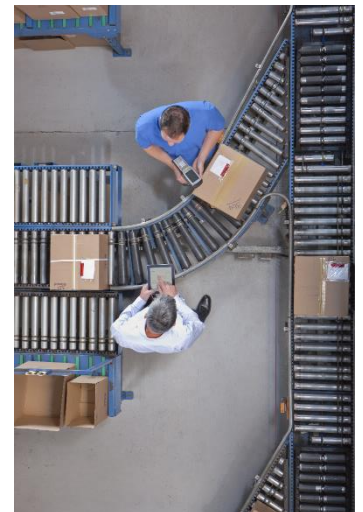
<sup>47</sup> <http://zoldbusz.hu/files/KTA.pdf>



The **Transport Greening Program** aims to reduce the growth rate of the sector's GHG emissions by encouraging the spread of electric vehicles and car sharing, as well as increasing the use of biofuels. Another goal is to promote the domestic production of electric vehicles and to support domestic research related to the secondary use of used electric car batteries. Priority support is proposed for the use of second-generation biofuels; the related pilot project would serve the testing of such fuel production technologies.

The main goal of the **Budapest Mobility Plan**<sup>48</sup> is to improve the competitiveness of the metropolitan area and to create a sustainable and healthy urban environment through intelligent mobility solutions. In order to put this goal into action, an investment plan was developed for 2019-2030. The most relevant upcoming projects are:

- Electrification of the Budapest bus fleet as of 2020 (ongoing)
- Implementation of a comprehensive city logistics regulation including the introduction of IT-based technology until 2025 (recommended with a budget of approx. 280 tsd. EUR)
- Establishment of inner city cargo handling points and environmentally **friendly „last mile” solutions** until 2025 (recommended with a budget of 280 tsd. EUR)
- Development of demand-driven community transport solutions (planned)
- Implementation of information technology developments in the city in transport management (decided)
- Elaboration of a concept related to the development and operation of the electric charging infrastructure in the capital (decided)



## Regulatory Landscape

### The “Law” on Electromobility

In order to set the framework for policies and measures to achieve low emission mobility, the “**Law on Electromobility**” was introduced in 2019, which defines the concept of electromobility services and respective rules foremost affecting services, licensing and reporting obligations around charging. However, this is not a law per se (yet) but a package of

<sup>48</sup> [https://budapest.hu/Documents/II\\_BMT\\_k%C3%B6zleked%C3%A9sfejleszt%C3%A9s%20beru%20progjavaslat\\_20190409.pdf](https://budapest.hu/Documents/II_BMT_k%C3%B6zleked%C3%A9sfejleszt%C3%A9s%20beru%20progjavaslat_20190409.pdf)



stipulations in principal laws like the Laws on Road Traffic or Electricity as well as Government Decrees.

The most important clauses are outlined below.

Law or Decree	Important clause(s)
Law on Electricity ("VET")	<p>The Law stipulates that the public electric car charging is regulated by the Hungarian Energy and Utilities Regulatory Authority (HEA). The activity cannot be carried out without a permit from the HEA. This permit enables the resale (charging) of the electricity without having to obtain an energy trading license. The permit has to be claimed 75 days before the charging station becomes operational.</p> <p>The operator of the electric charging point or station may enter into a network connection and network use contract with the locally competent Distribution System Operator (DSO), and may obtain electricity from any electricity trader on a market basis.</p> <p>The related Government Decree (273/2007) stipulates the regulation of the charging permit in more detail.</p>
Law on Road Traffic	<p>The Law contains the basic rules of electromobility, e.g. it separates the role of electric car charger operator and electromobility service provider, and excludes distribution system operators (DSOs) from being e-mobility related operators or service providers.</p>
Government Decree 369/2015	<p>This decree declared the installation of the basic charging infrastructure as a matter of special importance and enabled its fast development-</p>
Government Decree 443/2017	<p>Certain public duties related to the spread of electromobility in Hungary are performed by the former e-Mobi Electromobility Nonprofit Ltd., which is now part of the NKM Mobilitás Kft. Among others, it helps to coordinate the spread of the charging infrastructure and implements certain government projects, which are financed from funds from the central budget or the EU for the construction of the charging infrastructure.</p>
Government Decree 243/2019	<ul style="list-style-type: none"> <li>• Defines the concept of a charging station and a charging point. The differentiation was introduced in order to avoid the need of integrating a Combined Charging System (CCS) connector onto every charge point.</li> <li>• Regarding e-mobility services, the regulation introduces a delineation between the operator of the charging station (CPO) and the e-mobility service provider (MSP). The former is <b>responsible for maintenance, the station's remote accessibility and provision of electricity</b>. The latter is responsible for customer relations. The operator and the service provider can be the same person (legal or natural), but the tasks must be divided along this line.</li> <li>• Duties of the CPO: it is the responsibility of the operator to provide and manage the metering data needed for billing so that the service provider can bill the customer as required by law. In practice, this means that there is an obligation for online connection with chargers and the collection of data per charge. Concerning chargers installed in recent years, this is probably no longer a problem, but for simpler chargers this task is certainly not possible without expansion or device replacement due to the lack of a data connection.</li> <li>• Billing: <b>The customer's bill</b> must display the unit price and the amount of energy used for charging, measured in kWh. Thus, billing and payment can only take place after the charging has been completed, unless the customer buys a fixed amount of energy in advance before the charging starts. It is important that service providers do not bill the amount of energy charged into the car, but the amount of energy used for charging.</li> </ul>

	<ul style="list-style-type: none"> <li>• Disclosure: Service providers are obliged to publish real-time access data for chargers on their own websites and applications. In addition, the following information must be disclosed on the website or the application: <ul style="list-style-type: none"> <li>✓ General terms and conditions (GTC)</li> <li>✓ Fee packages announced according to the GTC, as well as fees to be paid within the framework of occasional charging</li> <li>✓ Details of the exact geographical location of the chargers.</li> <li>✓ Charger performance and connector information.</li> <li>✓ Expiration data for the verification of meter calibration</li> </ul> </li> </ul>
Government Decree 253/1997	<p>The modified Decree on urban spatial planning and construction supports the spread of electromobility in inhabited areas. Among others, it requires shops selling everyday consumer goods to install a number of electric car chargers in accordance with the size of their parking space. Although the statutory obligation for shops with a net sales area of more than 300 m<sup>2</sup> already requires the installation of chargers in settlements with a population of more than 50,000, many shops still do not comply with the requirement. With a net sales area of 1500 m<sup>2</sup>, shops or malls are obliged to install at least two electric chargers per 100 parking <b>spots regardless of the settlement's size</b>. There is a similar obligation for operators of chargeable parking places who should be in compliance with this regulation since 2017, however, there are issues with compliance in this segment.<sup>49</sup></p>
Government Decree 467/2015	<p>This Decree introduces the green license plate, which enables the differentiation between environmentally friendly cars and those which are not. The concept of an „environmentally friendly car” and the categories within it are defined in Decree 6/1990. (IV. 12.) on the technical and operating conditions of new cars entering into service. In sum, the current regulation provides a green license plate for any externally chargeable purely electric or hybrid car that is capable of running at least 25 km in electric mode. Cars with a green license plate receive a set of benefits, which are further described in the section on support schemes.</p> <p>Recently, in the Anyos Jedlik Plan 2.0, the government proposed to tighten the green license plate legislation, i.e. to eliminate the green license plate for high-emission, high-mass plug-in hybrid-powered cars. No legislation has yet been published on the amendment.<sup>50</sup></p>
Government Decree 1537/2019	<p>As far as bus traffic is concerned, a special support scheme was developed for the replacement of buses for local public transport tasks by purchasing new buses, mainly electric buses, taking into account the provisions of the 1537/2019 (IX. 20.) Clean Vehicle Directive. It elaborates on the tasks related to the new bus strategy concept of Hungary and the Green Bus Model Project. Furthermore, it is the basis for the new bus strategy concept of Hungary, the Green Bus Program.</p>
Different regulations on tax relief	<p>The legislator grants a number of benefits to owners and operators of “environmentally friendly vehicles” (as defined in Decree 6/1990. (IV. 12.) in the following acts:</p> <ul style="list-style-type: none"> <li>✓ Elimination of the registration tax (Act CX of 2003 on registration tax)</li> <li>✓ Exemption from the company car tax (Act LXXXII of 1991 on motor vehicle tax)</li> <li>✓ Acquisition of property rights is exempt from taxation (Act XCIII of 1990 on taxes)</li> <li>✓ The costs for the installation of charging stations can be deducted from the corporate tax (Act LXXXI of 1996 on Corporate Tax)</li> </ul>

<sup>49</sup> <https://villanyautosok.hu/2018/12/05/modosult-az-otek-rendelet-mi-lesz-a-kotelezo-toltokkel/>

<sup>50</sup> Erika Farkas Csamangó: The legal environment of electromobility in Hungary – Az elektromobilitás jogszabályi környezete Magyarországon. *Journal of Agricultural and Environmental Law* ISSN 1788-6171, 2020 Vol. XV No. 28 pp. 181-201, <https://doi.org/10.21029/JAEL.2020.28.181>

## Funding policies and related support schemes for smart and sustainable mobility

### *Overview of funding sources in the upcoming decade*

In the upcoming funding period (2021-2027), the most significant budgets for sustainable and smart mobility projects will be available in the framework of the nationally managed programmes of the Cohesion Fund and the European Regional Development Fund. These funds will finance the policy objectives of a **"greener, carbon-free Europe", and a "better connected Europe"**. In the latter case, the transport sector can receive funds for improving trans-european transport networks and digitization.<sup>51</sup>

Exact information on the allocation of the funds will be mainly presented in the Integrated Transport Operational Programme Plus (ITOP Plus) to which 5.8 billion EUR and in the Economic Development and Innovation Operational Programme Plus (EDIOP Plus) to which 5.6 billion EUR are expected to be allocated. In the framework of the ITOP Plus, inter alia, the government plans to spend approx. 362.5 million EUR on further developing the e-charging infrastructure as well as on the continuation of **the „Green Bus Programme"**. Within the Competitive Hungary Operational Programme (CHOP), the government plans to spend a total of 446 million EUR on municipal infrastructure development under the "livable settlements" programme.<sup>52</sup> Further nationally managed programmes are expected to be funded by the Recovery and Resiliency Facility (see table below).

Besides the operational programmes, the Green Economy Financing Scheme<sup>53</sup> will also serve as a financial resource for sustainable mobility, which is expected to be 2.3 billion EUR in the period of 2021-2030.

All in all, the public consultation of the allocation of funds that are managed by the Hungarian administration is still ongoing and despite the announcement of the EU budget allocation plan, new EU tender plans have not been published yet.<sup>54</sup> Furthermore, it has to be noted that the content of the programmes and the form of the funding instrument might change from year to year. However, most of the financial resources are expected to be allocated to the following relevant areas:

- railway development (track-side and quality of service improvements)
- urban and suburban public transport investments
- electric transport solutions (both software and hardware on a private, public and company level).



**362 million  
EUR**  
are expected to be  
allocated to further  
develop the  
charging infrastructure

<sup>51</sup> <https://eur-lex.europa.eu/legal-content/HU/TXT/HTML/?uri=CELEX:52018PC0375&from=EN>

<sup>52</sup> [https://www.portfolio.hu/unios-forrasok/20210105/kiszivargott-hogy-milyen-kozlekedesi-es-videkfejlesztési-celokra-akar-2050-milliardnyi-uj-eu-penz-kolteni-a-kormany-464070?utm\\_source=index.hu&utm\\_medium=dohoz&utm\\_campaign=link](https://www.portfolio.hu/unios-forrasok/20210105/kiszivargott-hogy-milyen-kozlekedesi-es-videkfejlesztési-celokra-akar-2050-milliardnyi-uj-eu-penz-kolteni-a-kormany-464070?utm_source=index.hu&utm_medium=dohoz&utm_campaign=link), based on the shared information during the public consultations of the operational programmes there were changes in the names of the programmes – further information: <https://www.palyazat.gov.hu/tarsadalmi-egyeztetes-2021-2027>

<sup>53</sup> The Green Economy Financing Scheme is financed by unused carbon-dioxide quotas

<sup>54</sup> <https://www.portfolio.hu/en/eu-funds/20200116/hungarys-plans-for-eu-funds-allocations-in-2021-2027-leaked-412689>

Furthermore, Hungary plans on the greatest exploitation of EU funding sources that are managed by the EU directly, such as from Horizon Europe and InvestEU, respectively. The experience from the past years has shown that in the framework of the Horizon 2020 programme, mostly transportation-related projects were funded in Hungary, i.e. in the category of **“intelligent, environmentally friendly and integrated” transport**. In the previous funding cycle of 2014-2020, Hungary received a budget of 17 million EUR in this pillar.<sup>55</sup> In the upcoming funding cycle of 2021-2027, the proposed budget of the programme’s „Climate, Energy and Mobility” cluster is 15 billion EUR (for all EU-27). However, the funds are not allocated to certain countries beforehand; projects are competing for resources on an EU level.<sup>56</sup> Furthermore, significant funding resources for transportation projects are expected from the Connecting Europe Facility (CEF 2).



#### Beneficiaries of support schemes until 2020

During the 2014-2020 cycle, the nationally managed budget of the EU structural funds were allocated in the framework of the Széchenyi 2020 programme. Sustainable transport development was supported by a number of tenders within the Operational Programmes with the following sectoral priorities:

- 1 Development of sustainable urban transport, improvement of suburban rail accessibility
- 2 Developing a regional economic environment to promote employment (including improvement of mobility)
- 3 The transition to a low-carbon economy concentrating on urban areas (including sustainable transport)
- 4 Regional development (including sustainable transport)
- 5 Sustainable transport in Budapest and Pest County

It is also important to mention that the Economic Development and Innovation Operational Programme in 2014-2020 allocated a significant budget for calls in R+D and innovation, including sustainable transportation projects.

The Connecting Europe Facility (CEF), became another important source of transport-related funds during the 2014-2020 period. The list of the projects is [available online](#).

#### *Assessment of previous support schemes*

Within the 2014-2020 operational programmes, taking into account the priorities of the closed tenders, it can be stated that more than half of the budget was allocated for sustainable mobility. Examples of previously

<sup>55</sup> [https://ec.europa.eu/energy/sites/ener/files/documents/hu\\_final\\_necp\\_main\\_hu.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/hu_final_necp_main_hu.pdf)

<sup>56</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52018PC0435&from=EN>

closed projects for smart mobility with external (foreign) suppliers are shown below<sup>57</sup>. These projects should demonstrate the range of options Dutch companies have to participate in EU projects in Hungary:

1. BKK FUTÁR, the public transport planner of Budapest

Increasing the attraction of public transport is an essential measure towards a more sustainable transport system. As a Hungarian pioneer in this regard, the Centre of Budapest Transport has already implemented several EU funded projects, of which the BKK FUTÁR project is the most notable. The project aimed at developing an IT-based public transport route planner, which calculates the best options to reach selected destinations within Budapest (presenting the connections and estimated time of arrival), based on the GPS signals of the more than 2000 vehicles of the company. The project costs reached approx. 22.5 million EUR, of which the EU grant covered 60%. The general contractor was a Hungarian company that subcontracted the German IVU Traffic Technologies AG in order to deliver the most important elements of the system. The real time based information screens that operate at the stops were produced by another German supplier, Lumino GmbH.

**BBK FUTÁR developed an IT-based public transport route planner, which calculates the best options to reach selected destinations within Budapest**

2. New public transport vehicles for Budapest and other Hungarian cities

The Centre of Budapest Transport purchased 47 new trams and 36 electricity-fueled trolleybuses between 2012 and 2018. The new "CAF Urbos3" trams were delivered by the Spanish CAF<sup>58</sup>, while the trolleybuses were purchased from the Skoda-Solaris, Slovakian-Polish supplier consortium (via internationally launched public procurements). The EU support covered the 99.4% of the approx. 154 million EUR (46.3 billion HUF). CAF trams were purchased by the city of Debrecen as well (18 of them), using EU funds in the period 2007-2013.

3. Integration of the European Train Control System

As railway plays an important role in achieving sustainability in the transport sector, respective investments have been one of the most important priorities of EU programmes. In Hungary, the Hungarian Railway Company (MÁV Zrt.) operates the railway system and as such, is one of the main beneficiaries of EU funded programmes. In order to fulfill the EU's requirements related to the network integration of the European Train Control System (ETCS), MÁV Zrt. initiated the ETCS LE2 project<sup>59</sup>, supported by the CEF scheme (2014-2020). The project will be implemented by a Hungarian-Belgian consortium, the Alstom Transport Hungary Zrt. and Alstom Belgium SA. The CEF support is approx. 24.5 million EUR (7.6 billion HUF), and the contribution from the national budget is close to 43.4 million EUR (1.4 billion HUF).



<sup>57</sup> <https://bkk.hu/fejlesztések/unios-projektek/>

<sup>58</sup> Construcciones y Auxiliar de Ferrocarriles

<sup>59</sup> <https://www.mavcsoport.hu/mav-start/bemutakozas/etcs-vonatbefolyasolo-fedelzeti-berendezesek-flirt-motorvonatokon>

### Upcoming support schemes **in the EU's 2021-2027** funding cycle

In the upcoming funding cycle, the EU's budget basically focuses on fostering innovation, which includes the further growth of (urban) electromobility and smart mobility in general. In Annex II, those funding programmes are listed that can become relevant for the financing of smart and sustainable mobility projects, carried out by Dutch-Hungarian consortia.

### Current smart and sustainable mobility support schemes in Hungary

#### A. Direct financial support

##### a) Private and company cars/taxis/scooters

The Ministry of Innovation and Technology published several calls for tender in May 2020 to encourage the spread of electromobility with a budget of approx. 14 million EUR (5 billion HUF), financed from the Green Economy Financing Scheme. The tenders, implemented by IFKA Közhasznú Nonprofit Kft., support the purchase of purely electric passenger cars, taxis as well as electric scooters.<sup>60</sup> Due to the fast exhaustion of the funds, the budget was extended by approx. 245.000 EUR. 350 companies applied for the funding of e-scooters. All in all, the overall budget could support the purchase of approx. 2000 electric vehicles.<sup>61</sup>

Extent of support:

	Purchase price	Max. support intensity
Purely electric vehicles	2.800 EUR – 30.800 EUR	50% or 7000 EUR
	30.800 EUR – 42.000 EUR	5% or 1.400 EUR
Purely electric vehicles intended for passenger taxi service or passenger transport by car	2.800 EUR – 42.000 EUR	55% / de minimis
Scooters	280 EUR – 2.800 EUR	55% / de minimis



Eligibility:  
All natural persons residing in Hungary, individual entrepreneurs as well as non-governmental/civil organizations/companies with a registered office, site or branch in Hungary.

Due to the program's success, it is expected to be continued in early 2021.

##### b) E-bikes

In order to promote environmentally friendly transport and electromobility, the Ministry of Innovation and Technology provides a total of 2.8 million EUR financial support for the purchase of electric bicycles.<sup>62</sup> The first

<sup>60</sup> [https://elektromobilitas.ifka.hu/medias/4/zfr\\_d\\_o\\_2020\\_pk\\_0520.pdf](https://elektromobilitas.ifka.hu/medias/4/zfr_d_o_2020_pk_0520.pdf)

<sup>61</sup> <https://villanyautosok.hu/2020/09/05/tovabbi-882-millio-jut-villanyauto-tamogatasra/>

<sup>62</sup> <https://www.enhat.mekh.hu/palyazat-elektromos-rasegitesu-kerekparok-vasarlasara>

application period took place in November 2020. Thereinafter, applications can be submitted on a monthly basis until 29 October 2021 or until the budget is exhausted. In the tender, individuals can receive subsidy for the purchase of electric bicycles, primarily for commuting purposes.<sup>63</sup>

Extent of support:

	Purchase price	Max. support intensity
Bicycles with pedal sensors	Up to 1120 EUR	50% or 250 EUR
Bicycles with torque sensors	Up to 2500 EUR	50% or 420 EUR

The tender is implemented by IFKA Közhasznú Nonprofit Kft. The launch of the support programme was initiated jointly by two non-governmental organizations, the Hungarian Cycling Club and the Hungarian Cycling and Trade Association.

Currently, there is a great public interest in the programme. Du to its success, a renewal and extension of the tender is expected.

#### c) Electric buses

Under the Green Bus Programme **as part of the government's Climate and Environment Protection Action Plan**, nearly 2,900 environmentally friendly local buses are expected to be operational by 2029 (according to the draft of the National Green Development Strategy, it shall be 7,000, even). As a first step of the Green Bus Programme, a pilot project was launched with the aim of deploying electric buses in large rural cities, gaining experience in the field of vehicle acquisition and use, and infrastructure construction. In the first years, the programme will also provide the opportunity to purchase compressed natural gas (CNG) and modern diesel buses classified EURO-6. The Hungarian government supports the programme with 100.5 million EUR until 2029, financed by the Green Economy Financing Scheme.<sup>64</sup> In the period of 2020-2021, the budget of 11.8 million EUR shall cover the purchase of approx. 40-50 buses and the related infrastructure.<sup>65</sup> It was possible to submit grant applications from 4 January 2021 until the exhaustion of the grant.

#### B. Fiscal incentives

Fully electric or partially rechargeable and zero-emission cars are exempt from car tax, partially from company car tax and registration tax. In addition, the rate of vehicle tax on buses, trucks, and lorries varies depending on the environmental rating of the vehicle. Trucks receive an additional tax credit when using combined transportation. The rate of the company car tax as well as the registration tax is determined by the environmental classification of the vehicle.



The first tender in the framework of the Green Bus Programme was published on 30 November 2020. The total budget until 2021 will be 11.8 million EUR. Direct and non-reimbursable financial support can be requested for electric passenger transport vehicles and the construction of the related infrastructure.

<sup>63</sup> <https://iho.hu/hirek/hetfotol-lehet-palyazni-az-elektromos-kerekparokra>

<sup>64</sup> <https://kormany.hu/hirek/klima-es-termeszetvedelmi-akcioterv-elerheto-a-zold-busz-programme-elso-jarmubeszerzesi-palyazata>

<sup>65</sup> <https://kormany.hu/hirek/klima-es-termeszetvedelmi-akcioterv-elerheto-a-zold-busz-programme-elso-jarmubeszerzesi-palyazata>

The Hungarian legislation does not prescribe special tax rules for electric car charging. The service is taxed at the normal (27%) VAT rate, and there is no excise tax burden on either home or public charging:<sup>66</sup>

i. Electric and hybrid vehicles<sup>67 68</sup>

Until the end of 2020, companies could benefit from corporate tax („TAO”<sup>69</sup>) relief when purchasing electric or plug-in hybrid vehicles, electric high-load cars and forklifts. Since January 2021, only cars with large loading capacities are eligible.<sup>70</sup> The rate of tax reduction is 30-65% of the difference between the net purchase price of an electric car the net purchase price of a vehicle of a similar category but with a combustion engine. The extent of the tax relief depends on the region the company is located in (i.e. companies settled in the least developed region receive the highest tax relief). In addition, an additional tax credit can be claimed, +20% for small businesses and +10% for medium-sized businesses.

ii. Electric charging stations – reduction of corporate tax base<sup>71</sup>

As the number of electric cars increases, it has become important to extend the respective infrastructure, i.e. to support the dissemination of electric charging stations. Since 1 July 2017, companies can apply for pre-tax profit reduction for the installation of electric charging stations. The reduction amount is the fair value of the charging station, but not more than the difference between the fair value of the electric charging station and the positive operating result of the electric charging station achieved during the 3-year period after the end of the tax year. This means the higher the profit expected from the use of the charging station, the lower the discount.

C. Other flanking measures/supporting policies

Hybrid and electric cars are eligible for the green license plate, to which legislators can assign discounts and benefits. One of the benefits related to green license plate is free parking in urban areas, like the inner city of Budapest and several other large cities. Cars with zero emissions, pure electric propulsion or internal combustion engines with a capability of at least 25 km in pure electric operation are eligible for a green license plate. It is important to note that free parking is linked to the Hungarian green license plate, not to electric propulsion, so the free parking is not available for foreign cars with green license plates.

Fully electric or partially rechargeable and zero-emission cars are exempt from car tax, partially from company car tax and registration tax

<sup>66</sup> <https://villanyautosok.hu/2020/04/30/az-elektromobilitas-jogi-szabalyozasa-magyarorszagon/>

<sup>67</sup> <https://www.getenergy.hu/tao-beruhazas/>

<sup>68</sup> <https://www.portfolio.hu/gazdasag/20201104/mar-iden-megszunhet-a-ceges-adokedvezmeny-az-elektromos-szemelyautokra-455488>

<sup>69</sup> Hungarian Income Tax Act: 1996. évi LXXXI. törvény, a társasági adóról és az osztalékadóról („TAO”)

<sup>70</sup> <https://ado.hu/ado/meglepetes-ugrik-az-e-autok-tao-kedvezmenye/>

<sup>71</sup> [https://www.nav.gov.hu/tarsasagok/print/nav/ado/tarsasagi/Elektromos\\_toltoallomas.html](https://www.nav.gov.hu/tarsasagok/print/nav/ado/tarsasagi/Elektromos_toltoallomas.html); <https://5percado.hu/elektromos-toltoallomasok-letesitesenek-tao-kedvezmenye/>



# Important smart and sustainable mobility subsectors in Hungary



The in-depth review of sustainable mobility and transport subsectors should support Dutch businesses explore their opportunities in Hungary.

In the following section, the status of three areas related to sustainable mobility and transport in Hungary will be presented in depth. The first chapter explores the e-mobility and other smart and sustainable mobility sectors. The second chapter focuses on city logistics and e-commerce, taking into account the plans for zero-emission transport being part of the smart city strategy of Budapest. The third chapter analyses international logistics, focusing on digitization in supply chain.

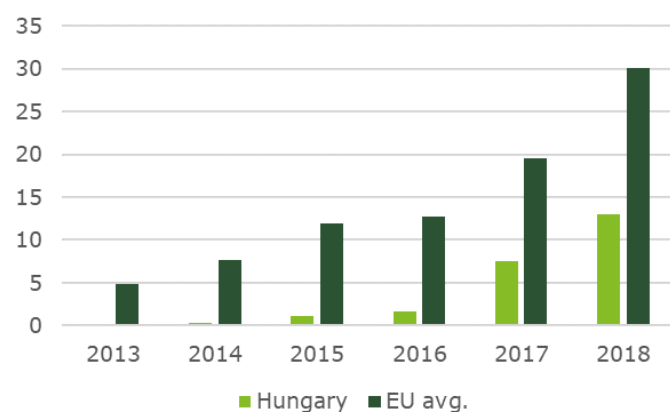
## E-mobility & other sustainable mobility solutions

### Electromobility

Electric vehicles – what is the Hungarian customer like?

Although the number of registered electric vehicles (EVs) is constantly increasing, the market for electromobility has yet to mature in Hungary. According to expert opinion, the main reason for the relatively slow diffusion of EVs compared to other (Western) European markets is the domestic purchase value, which is still an obstacle for Hungarian customers despite different support schemes offered by the government. At the present, key customers of EVs are found in the urban wealthy stratum over the age of 40 who use their private e-vehicles for urban transport. Younger generations, however, are rather turning to services that meet their demand for sustainable mobility without having to bear the financial consequences of vehicle ownership. The Hungarian market offers a variety of EV/e-scooter sharing services, which seems to be the most appropriate solution to address the latter demand.

Number of newly marketed EVs



Source: KBKA, 2020

## Eco-friendly vehicle sharing

The most important companies and brands involved in this sector in Hungary are MOL Limo, BMW ShareNow and GreenGo. In addition, **E.On's** Blinkee service offers the sharing of electric scooters<sup>72</sup>. These providers have built an appropriate infrastructure that can be considered as well developed, but which is offered only in certain districts of Budapest and cannot be used to take trips further than the border of Pest country. In general, car sharing solutions are not available in other cities yet.

## Charging infrastructure

### Current status of the charging infrastructure

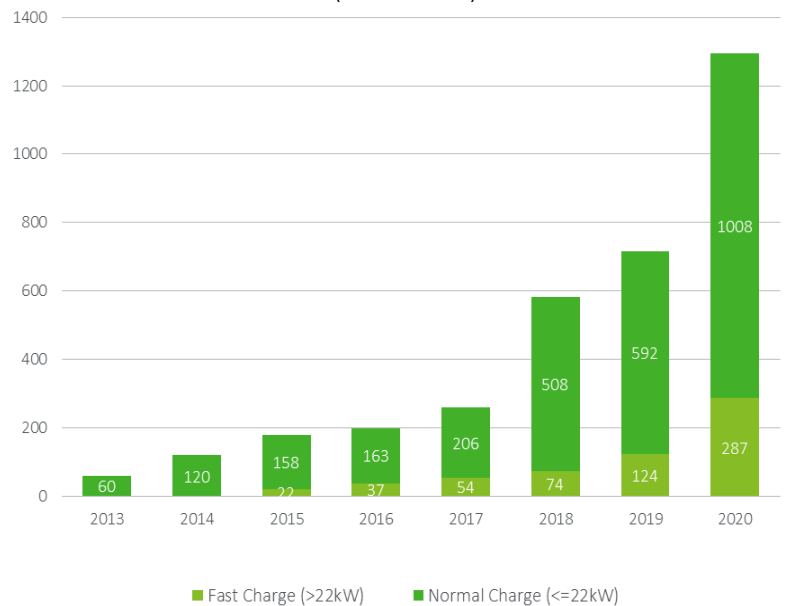
By 2017, most of the larger Hungarian cities had their first charging stations installed, mainly near shopping centers, parking lots, universities and offices of energy distribution companies. In rural areas, new charging stations have been installed mainly in connection with tourism and car rental services.<sup>73</sup>

Regarding the charging infrastructure, currently there is no *official* list of publicly available charging stations. There is an official Hungarian charging point signaling application, but as of today, the most comprehensive, up-to-date and widespread source is provided by private sources like Plugshare and Open Charge Map or the EU-financed EAFO database<sup>74</sup>.

In 2017, the e-Mobi (Electromobility Non-Profit Ltd.) was established under the supervision of the Ministry of Innovation and Technology. **E-Mobi's main task is to promote the spread of** electromobility in Hungary and is therefore responsible for establishing the public charging infrastructure for EVs. The main objective is to reach national interoperability, i.e. to create the possibility for electric vehicles to cross Hungary only by using public electric charging points.<sup>75</sup>

As one step towards this goal, the Electric charging station support scheme was established, through which cities with a population of 15,000 or more were eligible to apply for support for the construction of charging equipment in public areas. Furthermore, operators of all major supermarkets and hypermarkets with car parks have been obliged to set up a certain number of electric charging stations<sup>76</sup>. As a result, the number of charging stations surpassed 1,200, making it available for more than 2,000 EVs to be charged simultaneously. With the

Total number of Fast and Normal charging points in Hungary (2013-2020)



Source: EAFO, 2021

<sup>72</sup> A list of market participants can be found in the annex.  
<sup>73</sup> <http://www.ksh.hu/docs/hun/xftp/terstat/2020/04/ts600403.pdf>  
<sup>74</sup> EAFO – European Alternative Fuels Observatory  
<sup>75</sup> <http://www.ksh.hu/docs/hun/xftp/terstat/2020/04/ts600403.pdf>  
<sup>76</sup> See overview of regulation in the first chapter

exception of one northern and northeastern region, at least one public fast charger is now available within 50 kilometers of each settlement.<sup>77</sup>

### Conditions of EV home charging in Hungary

In Hungary, most of the electricity grids in residential buildings were not designed for extended, intensive use, which comes with the home charging of an EV. Due to safety reasons, a fast-charger can only be installed by a professional in order to assure that the right conditions are given and the network performance is sufficient. In general, the installation of a charger does not require a permit, but in certain cases, the network performance has to be enhanced, which requires a permit from the local DSO and can be an expensive undertaking.<sup>78</sup> Then again, charging at home is considered to be more favourable in the long-run due to the fact that the electricity costs in Hungary are among the lowest in Europe.<sup>79</sup>

There is currently no infrastructure in place for the installation of in-home charging meters. Therefore, it is for example cumbersome to reimburse the charging of company cars at home, as they have no means to monitor the amount of energy used.<sup>80</sup>

At the moment, there are no special taxation rules in Hungary regarding home charging (e.g. additional excise duty).<sup>81</sup>

### Important stakeholders on the charging infrastructure market

By the number of investments made, e-Mobi had the highest market share with 30%, followed by supermarkets falling under the regulation (25%), other investors (15%) and local governments (15%). E-Mobi Ltd. was recently acquired by NKM Mobilitás Kft. ("**Mobiliti**"), owned by Hungary's largest energy utility MVM Zrt. and became the leading Charging-Point-Operator (CPO) in Hungary with more than 500 stations.<sup>82</sup>

Mobiliti is already cooperating with a Dutch company, namely EVBox, which has installed 66 EVBox charging points throughout the country for the supermarket chain SPAR in the framework of this cooperation.<sup>83</sup>

Another large player is Mobility Network operated by ELMŰ-ÉMÁSZ Ltd. (subsidiary of Innogy), which operates 120 smart charging points throughout the country and offers home and business charging solutions as well.<sup>84</sup> Concerning fast charging, IONITY is one of the important operators with five rapid charging stations and 14 charging points in the Northwestern part of Hungary.<sup>85</sup>



ELMŰ-ÉMÁSZ  
operates  
**120**  
smart charging  
points in  
Hungary

<sup>77</sup> <http://www.ksh.hu/docs/hun/xftp/terstat/2020/04/ts600403.pdf>

<sup>78</sup> <https://www.eon.hu/hu/blog/e-mobilitas/elektromos-auto-toltese-otthon.html>

<sup>79</sup> <https://raketa.hu/elektromos-auto-toltes-otthon>

<sup>80</sup> <https://www.eon.hu/hu/blog/e-mobilitas/elektromos-auto-toltese-otthon.html>

<sup>81</sup> <https://villanyautosok.hu/2020/04/30/az-elektromobilitas-jogi-szabalyozasa-magyarorszagon/>

<sup>82</sup> <https://www.mobiliti.hu/emobilitas/elektromobilitas/mobiliti-eredmenyei>

<sup>83</sup> <https://news.evbox.com/en-WWW/180914-spar-offers-free-electric-vehicle-charging-for-hungarian-shoppers>

<sup>84</sup> <https://e-autozas.hu/toltes-kozteruleten/toltoallomas-halozat>

<sup>85</sup> <https://ionity.eu/en/where-and-how.html#>

In May 2020, Hungary's e-mobility market reached a milestone, as Mobiliti's public charging service ceased to be available for free, implying that the market became sufficiently mature to operate on an economic basis.<sup>86</sup>

## *Mobiliti, a major player in Hungarian e-mobility*

In addition to its previously successful CNG service, Mobiliti launched its e-mobility business in 2017 and started the installation of public electric charging stations in the beginning of 2018. With the acquisition of the e-Mobi e-charging network, the company, as a Charge-Point-Operator (CPO), operates the largest electric charging infrastructure in Hungary and as an e-mobility service provider (eMSP), has the greatest number of registered customers in Hungary.

By the end of 2020, through its own investments and partnership agreements with several local governments and other private partners including Decathlon, Auchan and Spar, Mobiliti provided charging services with 65 stations equipped with 50 kW rapid (DC) chargers and 465 stations with 22 kW AC fast chargers already available to users.

The Mobiliti application, developed according to domestic needs, offers convenience functions such as charging station search, real-time access data and navigation functions. The constantly updated charging station database contains both the chargers operated in Mobiliti's own network and all the public charging points in Hungary.

The company's roaming service came to life through partnerships with french and german e-MSPs. During its future development, Mobiliti will certainly need to form further international partnerships, where Dutch companies may find suitable business opportunities.

Oil companies are becoming active in the area of e-charging

In 2020, **Shell ("Shell Recharge")** already put five rapid charging stations into operation among others in cooperation with Mobiliti and IONITY at the Székesfehérvár (M7) and Gelej (M3) motorway rest areas.<sup>87</sup> Depending on the type of the electric car, the 50 KW Shell DC Recharge quick charger provides 80% load in about 30 minutes.<sup>88</sup> The Hungarian oil company MOL Group is also active in this area with its own CPO brand, called MOL Plugee.<sup>89</sup>

Distribution system operators have an important role in supplying the charging points

Further stakeholders are electricity distribution system operators (DSOs), which have a crucial role in the development of the necessary electricity infrastructure (LV/MV transformers, high performance cables) which is capable of supplying the charging points. Some DSOs also take part in the operation of public charging points and private charger establishment services under brands of drive.ON and ELMŰ-ÉMÁSZ Solutions. Currently, there is a great need to further develop the LV electricity infrastructure, before the number of charging points can increase.

### **„Anyos Jedlik” Cluster**

The Hungarian E-mobility Cluster „Anyos Jedlik” is the platform organisation of the relevant stakeholders that are committed to the development of electric mobility. The Cluster was established in 2014 primarily as a consultative and advisory platform for the government. It is involved in shaping the necessary development policies, exploring the economic, social and environmental potential of electric mobility and recommending actions for politicians and business.

Source: jedlikanyosklaszter.hu

<sup>86</sup> <https://www.aldautomotive.hu/hirek/ArticleID/4011/Elektromos-utozas-majus-1-tol-megszunt-az-ingenyes-toltes>

<sup>87</sup> <https://ceenergynews.com/transport/shell-enters-the-e-mobility-market-in-hungary/>

<sup>88</sup> <https://www.shell.hu/autosok/elektromos-auto-toltes.html>

<sup>89</sup> <https://molplugee.hu/hu>

Conclusion: Business opportunities for Dutch companies in the area of e-mobility infrastructure

Overall, while state-promoted charging stations have boosted territorial coverage, in larger cities the first signs of competition between different providers has become apparent. However, the fast charging network is not fully developed yet: The market provides good options for new entrants as the Hungarian government's plan aims for at least 5,900 charging points until 2030<sup>90</sup> and the further expected rapid increase in the number of electric cars will require a similar pace of development of the charging infrastructure. This is especially true for high-performance fast chargers, as in the CEE-region, only Croatia has a lower share of fast chargers in the total charging network (13%) than Hungary (14%).<sup>91</sup> In this regard, there are still significant uncovered areas in the network, especially in the more disadvantaged (northeastern, southwestern, lowland) regions of the country; for example, no charging option is available within the Zalaegerszeg – Siófok – Pécs, Szolnok Debrecen – Békéscsaba or Sárvár – Győr – Veszprém triangles.<sup>92</sup>

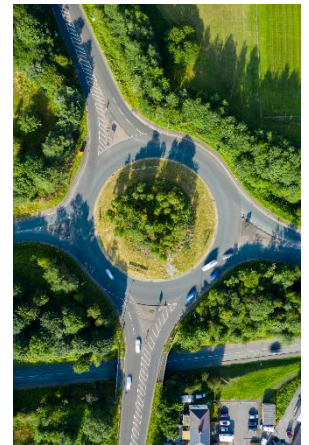
Furthermore, currently each CPO has its own mobile application which enables charging and payment only for their charging stations. Thus, the customers are bound to the charging points operated by the CPOs they are registered to. The flexibility and the competition in this market could be significantly improved by introducing an extensive MSP solution, which would allow consumers access to stations of several CPOs.

### Low and zero emission buses

The Green Bus Programme initiated within Hungary's Climate and Environmental Protection Action Plan supports the dissemination of low and zero emission buses. As of 2022, only electric buses are allowed to be put into operation in larger settlements (>25,000 inhabitants). The related budget of approx. 100 million EUR for the next ten years shall also support domestic bus production.<sup>93</sup> There are several CNG fueled and electric/hybrid bus manufacturers in Hungary and the CEE-region, such as BYD, MABI-Bus, Credobus (in a consortium with Kravtex-Kühne Group), EvoBus (Daimler AG) as well as the Polish company, Solaris who are expected to compete for these funds. Further players who are already present on the Hungarian market are Volvo, Mercedes Citaro and Van Hool. In the long term, electric buses are expected to dominate the Hungarian market due to their low maintenance costs, especially when compared to CNG buses.<sup>94</sup>

Currently, the Green Bus Project Office is establishing a register of qualified bus (charging equipment) manufacturers and distributors that should help identify market players that will be eligible for future funding programmes and demonstration projects.<sup>95</sup> Any representative of a Hungarian or foreign-based company in an EEA Member State with a gross turnover of at least approx. 55,000 EUR related to EV charging equipment

only **14%**  
of the chargers  
in the Hungarian network are  
high performance  
fast chargers



The  
Green Bus Project Office  
is establishing a  
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manufacturers and  
distributors

<sup>90</sup> <https://e-cars.hu/2019/07/31/erkezik-a-jedlik-anyos-terv-2-0-gyorsabban-terjedhet-az-elektromobilitas/>

<sup>91</sup> [https://kbka.org/wp-content/uploads/2019/05/201908\\_e-mobililita%CC%81s.pdf](https://kbka.org/wp-content/uploads/2019/05/201908_e-mobililita%CC%81s.pdf)

<sup>92</sup> <http://www.ksh.hu/docs/hun/xftp/terstat/2020/04/ts600403.pdf>

<sup>93</sup> <http://zoldbusz.hu/files/KTA.pdf>

<sup>94</sup> [https://rekk.hu/downloads/events/Corvinus\\_REKK\\_BKV\\_0403.pdf](https://rekk.hu/downloads/events/Corvinus_REKK_BKV_0403.pdf)

<sup>95</sup> [http://zoldbusz.hu/files/ZFR-ZBP-004\\_20210106.pdf](http://zoldbusz.hu/files/ZFR-ZBP-004_20210106.pdf)

is eligible for registration.<sup>96</sup> Already verified market players are listed in the Annex and [here](#).

## Smart mobility research, development and innovation activities

Hungary carries out significant R+D+I activities in the smart mobility sector. Among others, the already operating ZalaZone Automotive Test Track offers the opportunity to try out innovations and carry out simulations in an area of 300 hectares. In addition, there is **a large number of “Tier I”** automotive suppliers in Hungary, such as Bosch, Knorr-Bremse, AVL, operating not only production capacity, but also R&D centers.

One noteworthy research project related to smart mobility is the development of a **Mobility as a Service (MaaS) concept**, which was supported in the framework of a Horizon 2020 project<sup>97</sup>. As far as Hungary is concerned, the **Budapest University of Technology and Economics carries out the “MaaS4EU project”, which aimed to examine smart solutions** to overcome traffic issues caused by urbanisation. MaaS is a user-centric, intelligent mobility concept, in which user needs are met via a single platform and one service provider (MaaS operator) offers transport options.<sup>98</sup>

As an initial goal, the Budapest pilot project aimed to test the MaaS concept including every sector of transportation. **Among others, Budapest’s public** transport provider BKK as well as the Hungarian Railways (MÁV) were involved. From shared services (e.g. electric scooters, bikes, cars), GreenGo car-sharing and MOL-Bubi bike-sharing were selected to represent both station-based and free-floating solutions. From several taxi operators, City Taxi was chosen, and for national and international ride-sharing services, Motar, which is the most wide-spread service provider in Hungary.<sup>99</sup>

Based on the data collected from the stakeholders in three study cities (next to Budapest; Manchester and Luxembourg city), it results that all the three areas have made substantial efforts to prepare the ground for the usage of more sustainable mobility options. In Budapest, a multimodal development approach has been introduced to promote public transport and cycling infrastructure projects.<sup>100</sup>

However, technological issues such as lack of open services and data, inconsistency in internet coverage and costs, insufficient multilingual services, and data handling automatization, coupled with a lack of cooperation among stakeholders, still appear to hinder the development of effective MaaS solutions.<sup>101</sup> For example, Budapest public transport ticketing system still relies mainly on paper-based solutions, making the deployment of MaaS a challenging task.

## Hungarian participants of the MaaS4EU project:

Budapest University of Technology and Economics

Hungarian Railways

BKK

GreenGo

MOL-Bubi

City Taxi

<sup>96</sup> [http://zoldbusz.hu/files/ZFR-ZBP-004\\_20210106.pdf](http://zoldbusz.hu/files/ZFR-ZBP-004_20210106.pdf)

<sup>97</sup> <https://ec.europa.eu/inea/en/horizon-2020/projects/h2020-transport/intelligent-transport-systems/maas4eu>

<sup>98</sup> [https://ewgt2020.eu/wp-content/uploads/extended\\_abstract/EWGT2020\\_abstract\\_225.pdf](https://ewgt2020.eu/wp-content/uploads/extended_abstract/EWGT2020_abstract_225.pdf)

<sup>99</sup> [https://ewgt2020.eu/wp-content/uploads/extended\\_abstract/EWGT2020\\_abstract\\_225.pdf](https://ewgt2020.eu/wp-content/uploads/extended_abstract/EWGT2020_abstract_225.pdf)

<sup>100</sup> <https://www.tandfonline.com/eprint/DFIMJYCVQTV6MMOMHFJY/full?target=10.1080%2F19427867.2020.1815141&>

<sup>101</sup> <https://www.tandfonline.com/eprint/DFIMJYCVQTV6MMOMHFJY/full?target=10.1080%2F19427867.2020.1815141&>

## Data-driven shift towards sustainable mobility in Szeged

The city of Szeged aims to keep and increase the sustainability of its public transport system by attracting car users to use public transport through smart fare strategies. The "SASMob" project builds a data-driven and responsive IT-system through the partnership of public entities, private businesses and transport providers in Szeged to progress towards environmentally friendly urban mobility.

The project will encourage cross-sector cooperation between businesses and the city of Szeged to co-design and tailor sustainable commuting solutions for employees, the largest car-dependent mobility group. It will be called the "SASMob Pledge". A data management process will be developed to analyse the complex urban mobility behaviour through data collected by smart phone applications, which will be called the "SASMob Response."

## Electric bicycles and electric scooters

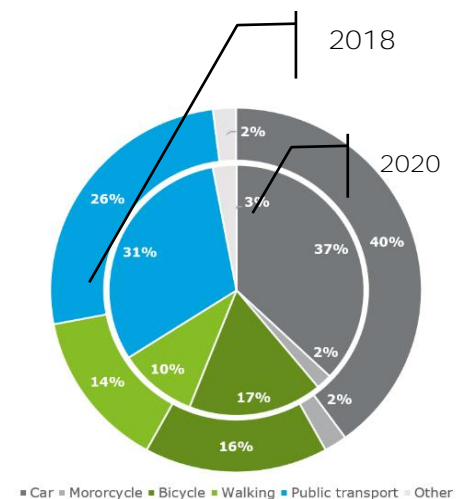
There are several policy measures in place aiming to improve public cycling habits and infrastructure in Hungary. However, according to expert opinion, development of cycle paths is mainly focused on tourist routes, leaving city cycling infrastructure underdeveloped. This might be one of the reasons why inhabitants of larger cities still refrain from using bicycles as a regular mode of transport.<sup>102</sup> In general, there is a lack of a "cycling culture" in Hungary; in Budapest bicycle is the primary means of transport for only 6% of the adult population.<sup>103</sup>

Then again, cycling and also e-bikes became more popular since the outbreak of the pandemic mostly to the detriment of public transport modes, which urges the establishment of further cycling routes in cities.<sup>104</sup> According to experts, the support schemes that are currently available for the purchase of e-bikes could lead to a fivefold increase in demand until the end of 2021. There is already a shortage for certain e-bike types, as dealers are not prepared to meet the increased demand and might face shortages in the upcoming years as well.<sup>105</sup>

More than half of the adult population in Hungary (56%) already chooses sustainable modes of transport (e.g. public transport, cycling and walking) for everyday commute.<sup>106</sup>

Overall, there are approximately ten public bicycle sharing service companies across Hungary, of which the most prominent is the Capital's MOL Bubi, who is present on the market since 2014. Other operational bikesharing systems can be found in larger cities like Szeged, Győr, Esztergom, Hévíz, Kaposvár, Nagykanizsa and Debrecen.

In 2020, MOL Bubi introduced 1,200 brand new, lighter bicycles in the metropolitan area, including a new mobile application, multi-level pricing and more flexible terms of use. There are 158 docking stations currently



MOL Bubi operates

158

bicycle docking stations in Budapest

<sup>102</sup> [https://kereparosklub.hu/kereparoskutatas\\_2020](https://kereparosklub.hu/kereparoskutatas_2020)

<sup>103</sup> [https://kereparosklub.hu/kereparoskutatas\\_2020](https://kereparosklub.hu/kereparoskutatas_2020)

<sup>104</sup> [https://index.hu/kerekagy/2020/11/19/e-bringa\\_elektromos\\_kerepar\\_bicikli\\_allami\\_tamogatas/](https://index.hu/kerekagy/2020/11/19/e-bringa_elektromos_kerepar_bicikli_allami_tamogatas/)

<sup>105</sup> [https://index.hu/kerekagy/2020/11/19/e-bringa\\_elektromos\\_kerepar\\_bicikli\\_allami\\_tamogatas/](https://index.hu/kerekagy/2020/11/19/e-bringa_elektromos_kerepar_bicikli_allami_tamogatas/)

<sup>106</sup> [https://kereparosklub.hu/kereparoskutatas\\_2020](https://kereparosklub.hu/kereparoskutatas_2020)

available across the city. E-bikes, however, were not yet introduced to the public sharing services in Hungary.

Thanks to the visibly emerging market of vehicle sharing in Budapest, US company, Lime introduced its electric scooters in Budapest, competing with both car- and bikesharing solutions. As the traffic regulations have not been adjusted to the use of rollers on roads, these devices are seen as a safety risk for users. Due to that, e-rollers are usually not included in support schemes.

## *Bicycle-friendly government in Bács-Kiskun Country*

Within the framework of the "Green County Hall" Program, the Hungarian Energy and Public Utility Regulatory Authority is aiding the purchase of electric bicycles at the Local Government of Bács-Kiskun County. The aim of the municipality is to encourage staff to cycle to their workplace, replacing car use in the city. Similar incentives available for further municipalities are also expected for the upcoming years, boosting demand for electric bicycles in Hungary.

## Railway transport

The development of railway transport and infrastructure in Hungary has been heavily subsidised in the past years, mainly through EU co-financing. In the period between 2016 and 2024, the Hungarian government will have spent a total of about approximately **14 billion EUR on railway and road investments**. In addition to enforcing the customer-centric, service provider approach, the goal is to establish railway traffic as a backbone of environmentally friendly intercity transport.<sup>107</sup> The main coordinator is the state public railway company MÁV Zrt., who has a market share of almost 100% in railway operations in Hungary. The main suppliers for intercity trams and trains are Siemens (Desiro) and Stadler (Flirt & Kiss).<sup>108</sup>

In Budapest, public transport is already electrified to around 70% due to the emphasis on deploying trams, metros and suburban trains.<sup>109</sup> According to city development plans and expert opinion, in the upcoming 10-15 years, **train traffic will play an even more important role** in the capital's and intercity public transport network to support further electrification. Furthermore, hydrogen can also play a role in the decarbonization of this sector.



## The LPG/CNG and hydrogen markets

LPG in road transport in Hungary has developed a stable market in the last decade. The demand of approximately 24,000-26,000 vehicles is supplied by the 500-600 available fueling points throughout the country. However, the number of LPG fueled vehicles and LPG fueling points is stagnating.<sup>110</sup> Another increase in low emission heavy-duty vehicles could be initiated by updated EU legislation on road charging which aims at better reflecting the

# 500-600

LPG fueling points in Hungary

<sup>107</sup> <https://www.portfolio.hu/unios-forrasok/20200110/rekordmeretu-vasutfejlesztes-lesz-iden-magyarorszagon-412099>

<sup>108</sup> <https://www.portfolio.hu/unios-forrasok/20200110/rekordmeretu-vasutfejlesztes-lesz-iden-magyarorszagon-412099>

<sup>109</sup> [https://rekk.hu/downloads/events/Corvinus\\_REKK\\_BKV\\_0403.pdf](https://rekk.hu/downloads/events/Corvinus_REKK_BKV_0403.pdf)

<sup>110</sup> [https://www.eafo.eu/uploads/temp\\_chart\\_/data-export-260221.pdf](https://www.eafo.eu/uploads/temp_chart_/data-export-260221.pdf)



environmental impact of vehicles in the tariffs. The Council is working on a proposal for the revision of what is commonly referred to as the 'Eurovignette' directive. According to this proposal, member states should calculate charges on the basis of the vehicle's CO2 emissions, thus incentivising the use of cleaner vehicles.<sup>111</sup>

Based on expert opinion, from a business perspective, it would be relevant to further equip truck parks next to high-traffic road transit routes with high-capacity (mainly LNG) charging stations to meet the increasing needs of transit traffic in the future.

Meanwhile, the number of CNG-fuelled vehicles is continuously growing, which was 2,400 by the end of 2020. The fueling infrastructure follows the increase in demand; however, currently only 22 CNG fueling stations are operating in Hungary.<sup>112</sup> CNG-fueled vehicles are mainly used in urban public transport. The Budapest Public Transport company BKV Zrt. operates around 70 CNG fueled buses, of which around 70% (company: Van Hool) were bought second-hand from abroad. However, the operation and maintenance of CNG buses is considered expensive and cumbersome compared to the fuel costs saved. Therefore, it is likely that electric buses and trams will be preferred in public transport in the future.<sup>113</sup>

### *FKF, CNG vehicles in communal waste management*

In 2015, Fővárosi Közterület-fenntartó Nonprofit Zrt., the communal service provider in Budapest, launched around 70 CNG-powered vehicles, thus reducing the emissions of the company's fleet. The vehicles now ride the streets of Budapest on computer-optimized routes.

Hydrogen fuel-cell vehicles and their fueling infrastructure have not yet penetrated the Hungarian market.

Hungary is one of the 14 EU members who included the development of a hydrogen fuel infrastructure into their national plans until 2030. The plan envisions a quite unambitious number of 200 hydrogen fueled vehicles (buses, trucks and cars) and 2-14 fueling stations until 2030.<sup>114</sup> Then again, a projection based on scenarios developed by the Fuel Cells and Hydrogen Joint Undertaking expects between 80-160 stations for 45,000-90,000 fuel cell vehicles on the road until then.<sup>115</sup>

There is not a single hydrogen fueling station yet, despite the planned installation of two stations in 2020. Large-scale hydrogen production takes place in Százhalombatta by the Hungarian oil company MOL Zrt., however,

### **Hungarian Hydrogen and Fuel Cell Association**

The Hungarian Hydrogen and Fuel Cell Association was founded in the summer of 2011 as an independent non-governmental professional organization with a scientific and technical orientation. The Mission of the Association is to promote the use of hydrogen as an environmentally friendly energy source and hydrogen technologies in Hungary, in particular fuel cell technologies. Its long-term goal is to achieve hydrogen-centric energy and transport and facilitate the transition to it.

Source: [www.hfc-hungary.org](http://www.hfc-hungary.org)



The Hungarian company Goldi Mobility Kft. manufactures the first hydrogen fueled articulate bus in Europe („GOLDiON H18”) in an international consortium with engineers from Singapore, Australia, Pakistan, America and China. Goldi Mobility Kft. claims to have exclusivity in the Hungarian hydrogen sector, be it a hydrogen fuel cell, or a hydrogen electrolyser, a refueling station, or even a hydrogen drone, a hydrogen fuel cell bus.

Source: [goldimodi.com](http://goldimodi.com), [index.hu](http://index.hu)

<sup>111</sup> <https://www.consilium.europa.eu/en/policies/clean-and-sustainable-mobility/>

<sup>112</sup> [https://www.eafo.eu/uploads/temp\\_country\\_/country-export-130121.pdf?now=1610518485025](https://www.eafo.eu/uploads/temp_country_/country-export-130121.pdf?now=1610518485025)

<sup>113</sup> [https://rekk.hu/downloads/events/Corvinus\\_REKK\\_BKV\\_0403.pdf](https://rekk.hu/downloads/events/Corvinus_REKK_BKV_0403.pdf)

<sup>114</sup> <https://www.eafo.eu/sites/default/files/npf/2%20HUNGARY%20NPF.pdf>

<sup>115</sup> [https://www.fch.europa.eu/sites/default/files/file\\_attach/Brochure%20FCH%20Hungary%20%28ID%209473092%29.pdf](https://www.fch.europa.eu/sites/default/files/file_attach/Brochure%20FCH%20Hungary%20%28ID%209473092%29.pdf)

this amount of fossil-based hydrogen is used up entirely for the refinery process.<sup>116</sup> In addition, some industrial gas companies (e.g. Linde) also produce hydrogen at their own sites, which they deliver by truck to smaller-scale hydrogen end-users.<sup>117</sup> Overall, the [potential for hydrogen production is given](#) among others due to the existence of nuclear power generation capacity that could be used at full load while converting excessive output into hydrogen.<sup>118</sup>

In general, distribution options of hydrogen across the value chain have not been explored yet. Moreover, storage possibilities have not been mapped, however, it is known that salt caverns are not largely available in the CEE region. There are also no underground salt layers that could provide suitable storage opportunities for hydrogen. However, Hungary considers using its depleted natural gas fields for potential hydrogen storage.<sup>119</sup>

Furthermore, research and development activities are on the rise in this area: in 2019, the [National Hydrogen Technology Platform](#) was established in a consortium with Eötvös Lóránd Research Network and the [Hungarian Hydrogen and Fuel Cell Association](#) as well as MVM Zrt. (largest Hungarian energy company) and MOL Zrt. to foster research and innovation. At the end of 2020, already [60 companies joined this initiative](#). One of the main tasks is to identify domestic competency and international opportunities for cooperation. A White Paper on current domestic trends and expertise as well as opportunities for flagship projects is supposed to be published until February 2021.<sup>120</sup> MOL Group has also committed to the development of hydrogen energy projects in CEE together with the Slovakian company InoBat and to develop hydrogen-rich liquid fuel.<sup>121</sup>

60

Hungarian companies have joined the [National Hydrogen Technology Platform](#)

<sup>116</sup> [https://www.hfc-hungary.org/hylaw/NPP-Category-4-Hydrogen\\_Fuel\\_and\\_Infrastructure\\_HUN\\_FINAL.pdf](https://www.hfc-hungary.org/hylaw/NPP-Category-4-Hydrogen_Fuel_and_Infrastructure_HUN_FINAL.pdf)

<sup>117</sup> [https://www.hfc-hungary.org/hylaw/NPP-Category-4-Hydrogen\\_Fuel\\_and\\_Infrastructure\\_HUN\\_FINAL.pdf](https://www.hfc-hungary.org/hylaw/NPP-Category-4-Hydrogen_Fuel_and_Infrastructure_HUN_FINAL.pdf)

<sup>118</sup> [https://www.fch.europa.eu/sites/default/files/file\\_attach/Brochure%20FCH%20Hungary%20%28ID%209473092%29.pdf](https://www.fch.europa.eu/sites/default/files/file_attach/Brochure%20FCH%20Hungary%20%28ID%209473092%29.pdf)

<sup>119</sup> [https://www.fch.europa.eu/sites/default/files/file\\_attach/Brochure%20FCH%20Hungary%20%28ID%209473092%29.pdf](https://www.fch.europa.eu/sites/default/files/file_attach/Brochure%20FCH%20Hungary%20%28ID%209473092%29.pdf)

<sup>120</sup> [https://www.hfc-hungary.org/NHTP/NHT%20Platform%20ismerteto\\_update.pdf](https://www.hfc-hungary.org/NHTP/NHT%20Platform%20ismerteto_update.pdf)

<sup>121</sup> [https://www.fch.europa.eu/sites/default/files/file\\_attach/Brochure%20FCH%20Hungary%20%28ID%209473092%29.pdf](https://www.fch.europa.eu/sites/default/files/file_attach/Brochure%20FCH%20Hungary%20%28ID%209473092%29.pdf)

## City logistics and e-commerce

### Sustainable mobility and city logistics

The challenges posed by the growing pressure on traffic and the related polluting emissions in larger urbanized areas serve as a motivation to induce change in how logistics in cities is organized. However, this is a complex issue as the logistics process naturally affects a myriad of stakeholders, e.g. actors in public administration, at the state level and the local governments. The driving force of the logistics chain is partly the population, the needs of which are helped by the actors involved in transportation.<sup>122</sup>

Certain capitals have already created policies that will have a great impact on the organization of urban traffic in the future: For example **Amsterdam aims to completely ban traffic emissions in the city until 2030**, including from heavy goods traffic. On top of that, all electricity and hydrogen used for traffic and transport in Amsterdam shall be produced in a sustainable way.<sup>123</sup>

At the time this document was created, complex city logistics system solutions were not applied in any major city in Hungary.

Tightening of zoning regulations based on the total weight of freight vehicles and traffic restrictions based on environmental performance are planned in Hungary, however, there are no concrete objectives to limit traffic emissions in larger settlements – mainly Budapest - that are comparable to the measures taken in the Netherlands. Concerning sustainable modes of freight transport in the city, only the use of cargobikes has appeared so far. The vehicle fleet of smaller companies that supply the metropolitan area is considered outdated and belongs to an unfavourable emission category.<sup>124</sup>

Budapest has approx. 1.7 million inhabitants (around 2.5 million including the metropolitan area), which can be called average in Europe, but the supply of the city still causes many logistical problems.<sup>125</sup> So far, initiatives were mainly taken to solve the issues in the area of passenger transport. In the area of logistics and waste management, the capital has dealt with the problems only symptomatically.<sup>126</sup> According to expert opinion, the outstanding upturn in demand related to e-commerce services in 2020, equivalent to 2-3 years of growth, has nothing but further increased the pressure on cities' transport networks.

The **Budapest's Smart Mobility Plan (2030)** somewhat recognizes that organising city logistics in a smart and sustainable way is one of the greatest challenges of the logistics sector today. Among others, it acknowledges that in recent decades, the key role of cycling in urban and transport development was completely neglected which is reflected in the **current design of the capital's road network**. Furthermore, city logistics is

### E-commerce in Hungary

Owing to the pandemic situation, e-commerce has undergone an outstanding development in 2020, equivalent to 2-3 years of growth. However, The market penetration of e-commerce in Hungary is still lower than in Western countries, which is among others due to a lack of digital skills in broader sections of the population and mistrust in online merchants.

Based on expert opinion, domestic companies were prepared for the situation to varying degrees, and the phenomenon caused a significant burden on both intra- and extralogistics systems. For some retailers, a functioning webshop interface was already available, but their supply chain was not prepared to handle the increased material flow. Other companies have opened their webshops in turn, and their logistics systems have required even more significant restructuring.

There is still an extraordinary demand among companies for the design and development of webshops as well as proper database management.

<sup>122</sup> [https://www.bp18.hu/images/181212\\_Budapest\\_Fenntarthat%C3%B3\\_V%C3%A1rosi\\_Logisztikai\\_Terve.pdf](https://www.bp18.hu/images/181212_Budapest_Fenntarthat%C3%B3_V%C3%A1rosi_Logisztikai_Terve.pdf)

<sup>123</sup> [http://carbonneutralcities.org/wp-content/uploads/2019/12/Amsterdam-Climate-Neutral-2050-Roadmap\\_12072019-1.pdf](http://carbonneutralcities.org/wp-content/uploads/2019/12/Amsterdam-Climate-Neutral-2050-Roadmap_12072019-1.pdf)

<sup>124</sup> [https://www.bp18.hu/images/181212\\_Budapest\\_Fenntarthat%C3%B3\\_V%C3%A1rosi\\_Logisztikai\\_Terve.pdf](https://www.bp18.hu/images/181212_Budapest_Fenntarthat%C3%B3_V%C3%A1rosi_Logisztikai_Terve.pdf)

<sup>125</sup> [http://citylog.kku.bme.hu/publications/LH\\_201104.pdf](http://citylog.kku.bme.hu/publications/LH_201104.pdf)

<sup>126</sup> [http://citylog.kku.bme.hu/publications/LH\\_201104.pdf](http://citylog.kku.bme.hu/publications/LH_201104.pdf)

not subjected to a regulatory framework while at the same time, environmental pollution is increasing.

Further **current issues** that hinder the unfolding of smart city logistics are as follows:<sup>127</sup>

Danube is not used as a transport corridor among others due to frequent and unpredictable restrictions caused by fluctuations in the water level

Rail transport has a minor role in the inner city area and letting the infrastructure to third parties (e.g. logistics companies) is not planned

Lack of thorough planning and system integration

Fragmented regulations that hinder comprehensive solutions and multi-stakeholder cooperation

However, there are certain **opportunities** for city logistics development in the metropolitan area due to:<sup>128</sup>

Plenty of unused brown-field areas for consolidation centers

The Danube's good geographical location that could be exploited in supplying the inner city areas

Availability of highly skilled experts in the area of urban development

## *The City Logistics Research Group at BUTE*

The City Logistics research group –operating under the Department of Material Handling and Logistics– at the Budapest University of Technology and Economics (BUTE) is at the forefront of domestic R&D in the field of city logistics and would welcome cooperation with Dutch institutions. The group is examining the possibilities of integrating the river Danube, Csepel and other islands into the logistics system of the capital. BUTE also has a Health Care Logistics Research Group, which is also open to international cooperation.

The research group's recent publications are available on their [website](#).

According to the aforementioned Plan, a transformation of the current urban supply practice is necessary as designated loading areas are becoming scarce while the demand increases. The network of loading areas designated for urban logistics and related regulations (such as the issuance of permits) have hardly changed in recent years.

The regulation of transport of the **Budapest section of the Danube** (approx. 20 km) dates back to the beginning of the 20<sup>th</sup> century. In 2013, the Budapest Municipality took over the right to utilize the Budapest section and therefore obtained the possibility to build an infrastructure and regulate freight transport.<sup>129</sup>



<sup>127</sup> [https://budapest.hu/Documents/20190411\\_Bp\\_Mobilit%C3%A1si\\_Terv\\_2030\\_egyeztet%C3%A9si%20v%C3%A1ltozat.pdf](https://budapest.hu/Documents/20190411_Bp_Mobilit%C3%A1si_Terv_2030_egyeztet%C3%A9si%20v%C3%A1ltozat.pdf)

<sup>128</sup> [www.logisztika.bme.hu/citylog](http://www.logisztika.bme.hu/citylog): <https://nkfih.gov.hu/hivatalrol/nyomtatott-sajto/atlatatobb-aruszallitas>

<sup>129</sup> [https://www.bp18.hu/images/181212\\_Budapest\\_Fenntarthat%C3%B3\\_V%C3%A1rosi\\_Logisztikai\\_Terve.pdf](https://www.bp18.hu/images/181212_Budapest_Fenntarthat%C3%B3_V%C3%A1rosi_Logisztikai_Terve.pdf)

## *Freeport of Budapest Logistics Ltd.*

One of the main activities of the Freeport is the letting of property, within the frameworks of which, approximately 34 ha free space, more than 157,000 square meters of covered storage space and more than 10,000 square meters of office space is used by more than 70 lessees operating within the Port. The location and layout properties of the Freeport have made it possible to build an internationally significant port and logistics centre. The container terminal operating within the Freeport - which is the only container terminal with water-side loading capacities in the country - provides an opportunity to join the expectedly prospering container traffic of the Danube. The Port has a very large development area in the immediate vicinity of the city centre, in one of the most promising areas of Budapest expected to undergo significant developments; this development area offers further development opportunities in addition to the port-logistics functions.

(source: bszl.hu)

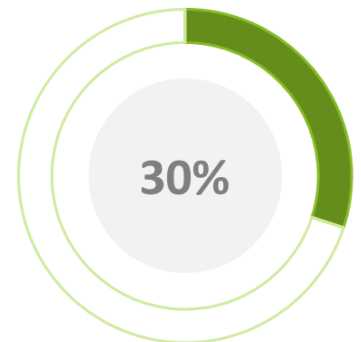
In the territory of Budapest, freight transport activities, routes and truck management are currently regulated by the freight traffic strategy of Budapest from the year 2008. Based on the strategy, several Decrees regulate the entry and time limits in permissible weight restricted zones. There are around 11 of these protected zones in Budapest, where entering and waiting has to be compensated with a respective fee. According to the Decree<sup>130</sup>, environmentally friendly vehicles are entitled to a discount.

In the upcoming years, there will be demand for:

- IT-based organization and supervision of urban transport, and the optimization of the use of designated loading space in public areas
- Efficient organization of the link between long-distance transport **and the last stage of transport ("last mile")**
- Collection, management, analysis and monitoring of urban transport data to develop a user- and environmentally friendly transport system

Related actions planned until 2030

- Expansion of the water transport network and development of the service infrastructure; integration of the waterways into the public transport in the inner city and agglomeration
- Stricter regulations for the Budapest inner zone including development of a regulatory system for freight traffic restrictions
- Development of logistics centers, consolidation centers and their connections
- Purchase of zero emission vehicles
- Introduction of environmentally friendly technologies in logistics
- Establishment of a city logistics system with regulations related to zoning



Approx. 30% of all transport costs are attributable to the "last mile"

<sup>130</sup> Decree 92/2011 (XII. 30. adopted by the General Assembly of the Capital)

## *The Municipality of the Capital City of Budapest*

Budapest is committed to placing a special emphasis on the "smart city" approach in the future of the city, therefore it has initiated the development of an independent program on the cooperation for smart city related measures. The first step in this was the preparation of the Smart Budapest strategy, which introduced the smart city objectives of the capital in a coherent framework both in the smart mobility and city logistics sector. The Budapest Freight Strategy and the non-binding Proposal for a Unified Concept of the Budapest City Logistics Objectives deal specifically with the topic of urban freight transport.

As a supporting document to the Smart Mobility Plan and the planned actions, the Budapest City Sustainable Urban Logistics Plan (SULP) was published by the end of 2019.<sup>131</sup>

The future of smart and sustainable city logistics in Hungary  
Summary of the interviews with leading Hungarian experts

One solution to reducing the pressure on city logistics lies in operating local depots and strategically placed distribution centers at the inner city outskirts, following the principles of the "**gateway concept**". From there, zero-emission logistics appliances (electric vans, electric and conventional bicycles and trains) could take over delivery, thereby significantly reducing air pollution in congested areas. Then again, further expanding the urban charging infrastructure is essential so that zero emission vehicles can be used in an economically feasible manner.

Overall, our experts seemed pessimistic about the state and near future of smart city logistics in Hungary: According to them, the development of intelligent urban logistics lacks resources and interest from key stakeholders. Significant change could solely be induced by amending the legislation (e.g. clear traffic restrictions in congested areas). Implementation of such complex concepts like the gateway concept would require strong organization efforts, which is among others hampered by the two-tier<sup>132</sup> local government structure. Implementation of pilot projects could reduce information asymmetries and strengthen the relationships within the complex stakeholder structure.

Future proof city logistics business models in Hungary

Certain major domestic players, mostly parcel companies, are already implementing solutions and business models that will become indispensable when inner city traffic restrictions come into force eventually.



Drones – a solution to the last mile problem?

There are many possibilities for the use of drones in the field of logistics. However, remote-controlled or automatic drones are still in the experimental phase and have so far been used mainly for medical and other urgent deliveries. Deutsche Post DHL, Amazon, Google and UPS, among others, are experimenting with such solutions. At present, the use of drones has technological and regulatory constraints at both national and European level. Due to the most recent, stricter domestic regulations, out-of-sight flights are currently not allowed. According to one of our leading Hungarian experts, the penetration of drone use has little chance in Hungary.

Source: Légtér Blog, Budapest Fenntartható Városi Logisztikai Terve

## *GLS, market leader in Hungary*

GLS is considered to be the most developed market player in the domestic parcel delivery sector in Hungary. GLS operates 940 drop-off points, and within the framework of the company's pilot project, it has achieved that the parcel deliveries of District V. in Budapest are all delivered by (electric and conventional) bicycles. In the near future, the company will invest in solar panels at 25 sites and procure 100 EVs, without recourse to state support.

<sup>131</sup> [https://www.bp18.hu/images/181212\\_Budapest\\_Fenntarthat%C3%B3\\_V%C3%A1rosi\\_Logisztikai\\_Terve.pdf](https://www.bp18.hu/images/181212_Budapest_Fenntarthat%C3%B3_V%C3%A1rosi_Logisztikai_Terve.pdf)

<sup>132</sup> Budapest is both governed on a district and on a municipality level

A good and unprecedented practice example is the cooperation between the bicycle courier company “Hajtás Pajtás” and the parcel company GLS in the field of small parcel delivery. In 2015, GLS opened a new depot from where bicycle couriers leave to downtown Budapest, thus parcels are delivered to individuals and companies without any pollutants being emitted. Parcels of various sizes are delivered with cargo bikes (50-100 kg) and electric powered tricycles (100-250 kg). The great advantage of bikes is that they can travel more flexibly on busy downtown roads than traditional trucks and couriers can access areas blocked to car traffic. Larger and heavier shipments are delivered with a zero-emission electric truck. At present, the use of an electric car in Hungarian parcel logistics is unprecedented. The car is 100% environmentally friendly and can cover up to 170 km with a single charge.<sup>133</sup>

In general, in the field of freight transport vehicles, Budapest has proven to be particularly suitable for increasing the share of (electric) bicycle and cargobike transport.

## International logistics, digitalization in supply chain

### International transport connections

Due to its central location and highly developed transport infrastructure in Europe and especially in the CEE-region, Hungary not only plays an important role in the continental, but also in the intercontinental freight and logistics processes. The three TEN-T Network Corridors (Mediterranean, Orient/ East Med, Rhine-Danube corridors) which are crossing the country, guarantee the connection with all parts of Europe by road, railway, waterways and air routes.<sup>134</sup> Based on these strengths, the logistic sector represents 6% within the Hungarian GDP (2019), and this share has never dropped under 6% since 2010.<sup>135</sup> The World Bank ranked Hungary at the 32<sup>nd</sup> place in 2018, according to its Logistics Performance Index.<sup>136</sup>

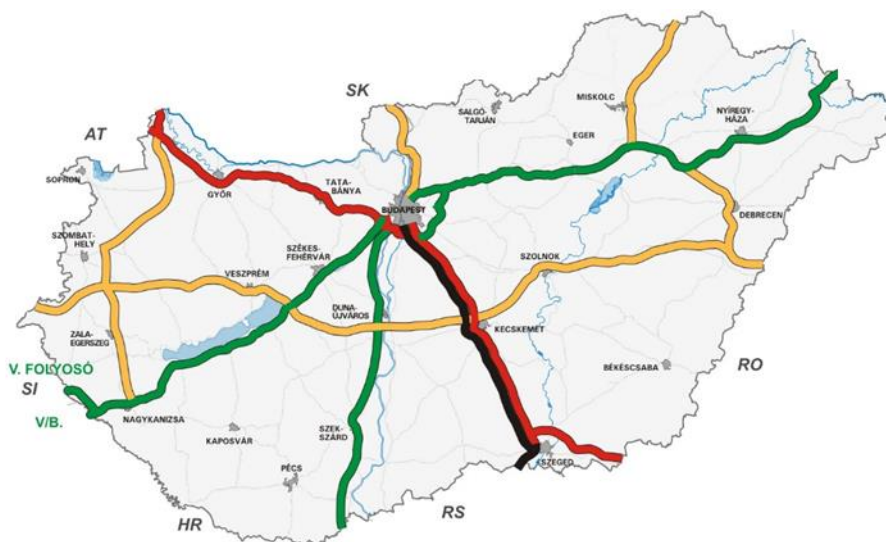
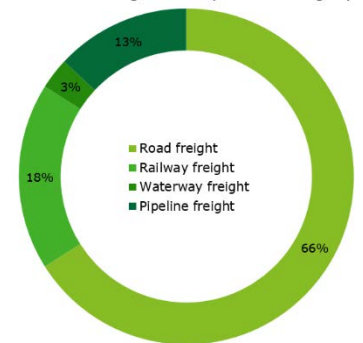


Figure 1: TEN-T and Paneuropean Corridors in Hungary. Source: KTI

In 2018, more than 305 million tonnes of goods were moved in the various modes of freight transport in Hungary. The share of road freight transport is still the largest, 200 million tonnes of goods were transported on roads. The

Share of freight transport in Hungary



The World Bank ranked Hungary **32<sup>nd</sup>** in 2018 within the **Logistics Performance Index**

<sup>133</sup> <https://gls-group.eu/HU/en/company/corporate-responsibility/social-commitment>

<sup>134</sup> <https://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/map/maps.html>

<sup>135</sup> Központi Statisztikai Hivatal (ksh.hu)

<sup>136</sup> <https://lpi.worldbank.org/international/aggregated-ranking>

share of railway freight was 17% in terms of volume. Via the inland waterways, around 3% of the total freight volume was transported. Pipeline transport took 13% of the total mass; air cargo was negligible.<sup>137</sup>

In regard of road freight transport, the main foreign partners are:

- export: Austria, Germany, Italy, Slovakia, Romania
- import: Austria, Germany, Slovakia, Italy, Romania<sup>138</sup>

In case of air cargo, Budapest and Debrecen airports should be highlighted as important international freight transport connections.

## Market players and subsectoral interests

As approx. 40 000 companies operate in the Hungarian logistics sector, business opportunities arise in various subsectors. In order to assess business opportunities, it is suggested to take into account the status of **innovative technologies' applications, the presence** of other international companies, and the strategic investment plans of the Hungarian State.

In the case of internationally important logistics activities, especially related to waterway and air cargo, the market is dominated mostly by foreign companies, among others German and Dutch ones as well, while around 75% of logistic needs that arise due to inland production, mainly road freight transport needs, are supplied by Hungarian companies.<sup>139</sup> The list of the 100 most important sector players, based on employees and income, can be found [here](#).

Dutch companies in Hungary usually offer services throughout the whole supply chain, with an emphasis on intermodality. A list of Dutch logistics companies who are already active in the CEE-region can be found in Annex V.

In many cases, Hungarian road freight transport companies operate internationally, although their international importance seemed to decrease in the last few years.<sup>140</sup> Due to COVID-19, the market performance of international road freight decreased by 17%, and by 8% in case of inland road freight, compared to Q3 2019.<sup>141</sup>

A list of Hungarian logistics companies can be found in Annex V.

The list of associations who represent the interests of logistics companies registered in Hungary can be found in Annex VI.

The logistic sector represents **6%** within the Hungarian GDP (2019)

There are several Dutch logistics companies that already have business activities in Hungary, such as:

Den Hartogh Logistics  
Ewals  
Jan de Rijk  
Raben Logistics  
Seacon Logistics  
Vos Logistics  
Reining Transport  
Versteijnen logistics  
Nijhof-Wassink

<sup>137</sup> <https://www.ksh.hu/docs/hun/xftp/idoszaki/jelszall/jelszall18.pdf?fbclid=IwAR3Vla0Z7f3FWza-gD3wKSNBoOvnVMEC8E453gJIUPN7AJq1JkSXzV8CIXE>

<sup>138</sup> <https://www.ksh.hu/docs/hun/xftp/idoszaki/jelszall/jelszall18.pdf?fbclid=IwAR3Vla0Z7f3FWza-gD3wKSNBoOvnVMEC8E453gJIUPN7AJq1JkSXzV8CIXE>

<sup>139</sup> <http://mle.hu/a-magyar-fuvarozok-piacvesztese-erzekelheto-de-a-hazai-szallitmanyozok-ketharmad-reszben-ma-is-rajuk-tamaszkodnak/>

<sup>140</sup> <https://www.kozlekedesvilag.hu/cikk/nv/fuvarozoi-toplista-2/>

<sup>141</sup> Szállítási teljesítmények, 2020. III. negyedév (ksh.hu)



## Rail freight – an important area of further development

The economic market shares of intra-Hungarian and international rail freight activities are 30% and 70%, meaning that currently, inland rail freight has a minor role in Hungary. The Hungarian Government, on the other hand, is dedicated to support capacity expansion of inland rail freight,

### Lean&Green Offroad Joint Corridor

Since 2015 shippers Samsung and SABIC have been using a synchromodal transport solution to Slovakia and Hungary in collaboration with NewWays and GVT. The partnership's primary advantage was the cost saving of the transport, but they also managed to save 45% CO<sub>2</sub> emissions with the transfer from road to rail.

Source: [www.lean-greenoffroad.nl](http://www.lean-greenoffroad.nl)

among others by an ongoing bridge development in Budapest that aims to increase the railway connections across the Danube<sup>142</sup> as well as future investment plans, such as the Budapest-Belgrade railway line<sup>143</sup>. As mentioned in the chapters before, strategic documents put an emphasis on railway development as well and the budget of the new EU programming period will be soon available for the related goals.<sup>144</sup>

The future of inland waterway use

As previously stated, the options for inland waterway freight on the Danube are planned to be exploited

further as it represents the only waterway corridor in the country. Then again, as water-level regulations would require drastic measures, like building hydro power plants on the river, there is no simple solution for this problem in the near future.<sup>145</sup> Despite this issue, it is a positive sign that the Hungarian Government supports the area (funded by CEF projects), and there has been a significant, 30% increase in regard of the waterway freight performance between 2018 and 2019, right before the COVID-19 era.<sup>146</sup>

## Research and innovation actors already cooperating in the logistic sector

As the result of Horizon 2020 funding projects and the increasing Hungarian interest in the development of the logistics sector, there are already 3 R+D cooperation projects in the field of logistics, led by Dutch stakeholders and include Hungarian companies (SMEs) as participants. These specific collaborations, started in 2020 and 2021 and focus on rail freight services (smart rail solutions)<sup>147</sup>, and inland waterways solutions (concepts, navigating systems etc.)<sup>148</sup>. For more information, regarding these projects, it is suggested to visit the CORDIS database of the European Commission.



In January 2021, the Hungarian state bought a property in Trieste (Italy) with 300 m direct water connection in order to build a marine port for supporting the international freight needs of Hungarian companies. This investment plan, taking into account the Dutch expertise in port infrastructures, should be considered as an important business opportunity for Dutch companies.

Source: [index.hu](http://index.hu)



Next to the initiatives of the private sector, there are some universities, like the Budapest Corvinus University, the University of Technology and Economics of Budapest, Szechenyi István University in Győr, and the University of Debrecen which address the logistic sector within their research areas, focusing mostly on sustainability targeted solutions and supply chain aspects.

<sup>142</sup> <https://iho.hu/hirek/mar-epul-az-uj-deli-osszekoto-vasuti-hid-200428>

<sup>143</sup> <https://magyarepitok.hu/vasutfejlesztes/2020/07/elrajtolt-a-budapest-belgrad-vasut-fejlesztese>

<sup>144</sup> [http://bvs.hu/wp-content/uploads/2019/11/BRN\\_masodikszakcikk\\_v4\\_20191126-1.pdf](http://bvs.hu/wp-content/uploads/2019/11/BRN_masodikszakcikk_v4_20191126-1.pdf)

<sup>145</sup> Logisztikai szövetség - Magyar Logisztikai, Beszerzési és Készletezési Társaság

<sup>146</sup> Helyzetkép a szállítási ágazatról, 2019 (ksh.hu)

<sup>147</sup> <https://cordis.europa.eu/project/id/636071>

<sup>148</sup> <https://cordis.europa.eu/project/id/723009>; <https://cordis.europa.eu/project/id/101006364>

## Main international logistics centres in Hungary

The largest logistics areas of international significance in the country are in Budapest, Debrecen, Székesfehérvár and Sopron. There are twelve national logistics centers, of which, four are trimodal (road-rail-waterway and road-rail-air) centers, located in Csepel, Győr-Gönyű, Baja and Debrecen, while the others provide bimodal (road-rail) connections.<sup>149</sup> The map of the national logistics centers is accessible on the following [link](#).<sup>150</sup>

The capital, its agglomeration as well as three internationally important intermodal logistics centers in the region provide suitable conditions for the development of multimodal transport chains. According to expert opinion, intermodality, however, still needs further development in Hungary, in which Dutch companies could get involved.<sup>151</sup>

### *Budapest Freeport and Industrial Park*

The Freeport in the northern part of Csepel Island is an important location on the Danube-Main-Rhine waterway, playing an important role in Europe's inland waterway trade. The Freeport and its intermodal logistics service center has road and rail connections too. There is a container terminal with the only water-side capacity in the country, in addition, a RO-RO terminal, warehouses, offices and outdoor storage areas serve transportation and logistics needs.

### *Budapest Liszt Ferenc International Airport (BUD)*

Airport cargo traffic has grown dynamically in recent years due to economic development and the rise of e-commerce. As the only international airport in Budapest, BUD plays an important role at European level, but especially in air logistics traffic in Central and Eastern Europe. The airport is located in the heart of Europe, therefore it serves as a hub for the distribution and handling of air cargo coming from or going overseas. The airport was designed as a meeting point for air, road and rail freight. The annual cargo turnover could reach a quarter of a million tons in the near future.

Air cargo can be transported in two forms, with dedicated cargo flights or in the form of belly cargo in the hold of passenger aircraft. At Liszt Ferenc International Airport, the 3 largest air cargo companies are currently Qatar Airways Cargo, Cargolux and Turkish Cargo. Of the courier companies, DHL, TNT, UPS and FedEx have the most significant aircraft, which usually operate at night. The most important airlines in belly cargo transportation are Emirates, Air China and Air Canada Rouge.

In the vicinity of Budapest Airport, there are a number of large logistics service providers, which have developed significantly due to the increase in the volume of cargo transported by air. The most important logistics facilities are Cargo City Logistic Center, DHL, TNT, AIRMAX Cargo Budapest Zrt., Vecsés Logistics Center and Trans-Pack Logisztika Kft.

<sup>149</sup> [https://www.bp18.hu/images/181212\\_Budapest\\_Fenntarthat%C3%B3\\_V%C3%A1rosi\\_Logisztikai\\_Terve.pdf](https://www.bp18.hu/images/181212_Budapest_Fenntarthat%C3%B3_V%C3%A1rosi_Logisztikai_Terve.pdf)

<sup>150</sup> <http://www.kti.hu/trendek-archivum/magyarorszag-i-kombiterminalok-es-olszk-k/>

<sup>151</sup> [https://www.bp18.hu/images/181212\\_Budapest\\_Fenntarthat%C3%B3\\_V%C3%A1rosi\\_Logisztikai\\_Terve.pdf](https://www.bp18.hu/images/181212_Budapest_Fenntarthat%C3%B3_V%C3%A1rosi_Logisztikai_Terve.pdf)

## *BILK - Budapest Intermodal Logistics Center*

In the industrial zone of Ócsai út, next to a warehouse base and the Soroksár terminal freight station, lies the BILK - Budapest Intermodal Logistics Center. The location at the junction of the M0 ring road and the Budapest-Kelebia railway line makes it excellent for its logistical function, as waterm road and air connections are available within 20 km of the area. The City Center is accessible via a separate exit from the M0 motorway.

### Supply chain technology trends

In Hungary, one of the most important economic development factors is the presence of automotive and other manufacturing international market players (such us Audi, Mercedes-Benz, Bosch, Suzuki, Siemens, Bridgestone, Hankook Tire etc.). These large international companies introduce the most innovative interlogistic technologies and system applications, following global trends.

**Leading development areas** in recent years were standardisation processes and the utilization of system connecting applications (so called transport management systems), which can provide a more resource effective and automated communication. In terms of supply chain, these (ITC<sup>152</sup> based) technologies are used in an increasing number by subcontractors as well, meaning the deployment of GPS tracking systems (in trucks for example). Even though these technologies develop rapidly, their distributors entered the Hungarian market only a few years ago, therefore we can still assume a great market potential in the deployment of such efficiency improving solutions.

The **application of warehouse automation (intra-logistic) systems**, including the use of piece picking robots, stock-taking drones and smart tracking, has only started in the last few years in Hungary; international and national market players just started to enter the Hungarian market in this field.<sup>153</sup> There are already Hungarian owned companies, like Gamma Digital Ltd.<sup>154</sup>, that play not just a national, but also an EU wide distributor role of automation technologies, like for the Chinese-owned Hikrobot systems.<sup>155</sup>

Based on global innovation trends, **robotization** can be expected in several areas of logistics. However, there is still no significant progress on the market in this regard. One of the reasons are the still comparably low wages in Hungary, due to which the work stages before and after warehouse phases (for instance sorting) are mainly performed by humans. However, according to our subject matter expert, the shift towards robotization is inevitable, as wage adjustment to Western European standards is just a matter of time.



Some promising Hungarian start ups specialized in warehouse-automation are e.g. the drone software providers Aeriu, and Pozitech, which develop smart tracking solutions for different work phases.

Source: piacesprofit.hu

<sup>152</sup> Information Communication System

<sup>153</sup> <https://logisztika.hu/2020/03/05/megjelentek-a-piacon-az-okos-raktarak/>

<sup>154</sup> [https://gammadigital.hu/?page\\_id=2097&lang=en](https://gammadigital.hu/?page_id=2097&lang=en)

<sup>155</sup> <https://kongresszus.logisztika.hu/wp-content/uploads/2020/10/Gamma-Digital-mobil-robot-bross%C3%BAra.pdf>

## Concluding the opportunities in the area of logistics

From a Dutch business point of view, the following areas of logistics could be important for exploring opportunities:

- Deployment of interlogistic smart solutions (mainly warehouse automation technologies, including smart tracking and drone technologies),
- knowledge transfer about standardization processes of logistics sites/systems (certification processes related to specific industries for instance),
- deployment of technologies that automate the communication throughout the whole supply chain (transport management systems),
- solutions targeting the improvement of intermodality,
- cooperation in the field of R+D and innovation activities, with Hungarian SMEs and universities,
- deployment of innovative rail freight solutions (system operation etc),
- participation in waterway and port related investments.

# Annex I

## Establishing a business presence in Hungary.<sup>156</sup>

The most common options for foreign companies to establish a business presence in Hungary are:

- Establishing or acquiring a company
- Establishing a branch
- Establishing a joint venture
- Contracting with an agent or local distributor

### *Establishing or acquiring a company*

Since foreign natural and legal entities can establish or acquire a Hungarian company, the most common option for establishing a business presence in Hungary is the creation or acquisition of a company seated in Hungary. *Limited liability companies* are used for that purpose.

### *Establishing a branch*

Under Hungarian law, a branch office is an organisational unit of a foreign company. A branch has no legal personality, but has legal capacity to acquire rights and undertake obligations under its corporate name on behalf of the foreign parent company.

### *Establishing a joint venture*

Foreign investors can establish a joint venture with Hungarian natural or legal entities by setting up any of the business entities mentioned in the list below. In a corporate joint venture, the members usually conclude a shareholders' agreement to regulate their rights and obligations.

In Hungarian law, it is Act CXXXII of 1997 which regulates Branch Offices and Commercial Representative Offices. General and limited partnerships, limited liability companies, private companies limited by shares and public companies limited by shares are regulated by the Civil Code (Act V of 2013).<sup>157, 158</sup>

**Another important step is to select the company's form which suits best the company's planned scope of activities.**

The main types of business forms used in Hungary are:<sup>159</sup>

- General partnerships
- Limited partnerships
- Limited liability companies
- Private companies limited by shares
- Public companies limited by shares

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<sup>156</sup> <https://doingbusinessinhungary.com/en>

<sup>157</sup> <https://net.jogtar.hu/jogszabaly?docid=99700132.tv>

<sup>158</sup> <https://ptk2013.hu/uj-ptk-normaszoveg/uj-ptk-iii-konyv/704>

<sup>159</sup> <https://doingbusinessinhungary.com/nehany-lenyeget-jogszabaly#minosített-befolyásszerzes>

*General partnership (Közkereseti Társaság) (Kkt)*

The partners of a Kkt agree to make available to the partnership the capital contribution required for its activities. They have joint and several liability for the obligations of the Kkt that are not covered by the partnership's assets.

*Limited partnership (Betéti Társaság) (Bt)*

The partners of a Bt agree to make available to the Bt the capital contribution required for its activities. There must be at least one general partner and one limited partner. General partners are jointly and severally liable for the Bt's obligations that are not covered by its assets. Limited partners are not liable for the obligations of the Bt, unless the Civil Code (Act V of 2013) provides otherwise.

*Limited liability company (Korlátolt Felelősségű Társaság) (Kft)*

Kfts are founded with an initial capital consisting of capital contributions of a pre-determined value. The obligation of the members is limited to the provision of their initial capital contribution, and of other contributions set out in the memorandum of association. The members of a Kft are not liable for the Kft's obligations, unless the Civil Code provides otherwise. The initial capital of a Kft must be at least HUF3 million.

*Private company limited by shares (Zártkörűen Működő Részvénytársaság) (Zrt)*

Zrts are founded with a share capital consisting of shares of a pre-determined number and nominal value. The shareholders' obligations are limited to the provision of the nominal value or accounting value of their shares. The members of a Zrt are not liable for the Zrt's obligations, unless the Civil Code provides otherwise. The shares of a Zrt cannot be listed on any stock exchange. The initial capital of a Zrt must be at least HUF5 million.

*Public company limited by shares (Nyilvánosan Működő Részvénytársaság) (Nyrt)*

Nyrts are similar to Zrts. The most significant difference between the two corporate forms is that the shares of a Nyrt are listed on a stock exchange. The initial capital of a Nyrt must be at least HUF20 million.

# Annex II

## Potentially relevant funding programmes for Dutch-Hungarian cooperation

Funding programmes	Budget	Overview
Recovery and Resilience Facility <sup>160</sup> 2021-2027	672.5 billion EUR	The Recovery and Resilience Facility (the Facility) will support reforms and investments undertaken by Member States. The aim is to mitigate the economic and social impact of the coronavirus pandemic and make European economies and societies more sustainable, resilient and better prepared for the challenges and opportunities of the green and digital transitions.
Cohesion Fund/ESIF/European Regional Development Fund <sup>161</sup> 2021-2027	*	Most Cohesion Fund and ERDF funding (65% to 85%) will focus on smart growth (including innovation) and the green economy, while it will also support other activities such as connectivity (strategic transport), social issues (quality employment, etc.) and local development (sustainable urban development). <sup>162</sup>
Horizon Europe <sup>163</sup> 2021-2027	95.5 billion EUR	The main objective is to support breakthrough and disruptive innovations and projects that are too risky for private investors without support <sup>164</sup> . Mission areas: adaptation to climate change, including societal transformation; climate-neutral and smart cities; transport; etc.
Connecting Europe Facility - Blending Facility <sup>165</sup>	198 million EUR <sup>166</sup>	The CEF Transport Blending Facility is an innovative approach to promote the substantial participation of private sector investors and financial institutions in projects contributing to the environmental sustainability and efficiency of the transport sector in Europe. Supported areas: Deployment of the European Railway Traffic Management System (ERTMS), Deployment of Alternative Fuels, etc.
Innovation Fund <sup>167</sup> 2020-2030	10 billion EUR	The goal is to help businesses invest in clean energy and industry to boost economic growth, create local future-proof jobs and reinforce European technological leadership on a global scale. Main focus areas: innovative low-carbon technologies and processes in energy-intensive industries, including products substituting carbon-intensive ones; innovative renewable energy generation.
Digital Europe <sup>168</sup> 2021-2027	7.5 billion EUR	Digital Europe aims to trigger investments by the EU, Member States and industry in the key areas of artificial intelligence (AI), advanced computing and data handling, cybersecurity, and the advanced digital skills necessary to deploy them. The programme has the potential to connect businesses, public administrations and citizens to the latest technologies and resources. It will provide funding for projects in five crucial areas: supercomputing, artificial intelligence, cybersecurity, advanced digital skills, and ensuring the wide use of digital technologies across the economy and society. The programme's priorities have been shaped by broader policy discussions on the future of Europe, in particular environmental, circular economy, and climate policy goals, etc.

<sup>160</sup> [https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility\\_en](https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility_en)

<sup>161</sup> [https://www.europarl.europa.eu/RegData/etudes/BRIE/2018/625141/EPRS\\_BRI\(2018\)625141\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2018/625141/EPRS_BRI(2018)625141_EN.pdf)

<sup>162</sup> [https://ec.europa.eu/regional\\_policy/en/2021\\_2027/](https://ec.europa.eu/regional_policy/en/2021_2027/)

<sup>163</sup> [https://ec.europa.eu/info/horizon-europe-next-research-and-innovation-framework-programme\\_en](https://ec.europa.eu/info/horizon-europe-next-research-and-innovation-framework-programme_en)

<sup>164</sup> <https://nkfih.gov.hu/hivatalrol/hivatal-hirei/1-peterhaertwich-horizon>

<sup>165</sup> <https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/apply-funding/blending-facility>

<sup>166</sup> <https://ec.europa.eu/inea/en/news-events/newsroom/eu-launches-blending-facility-to-support-sustainable-transport-projects>

<sup>167</sup> [https://ec.europa.eu/clima/policies/innovation-fund\\_en](https://ec.europa.eu/clima/policies/innovation-fund_en)

<sup>168</sup> [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_20\\_2406](https://ec.europa.eu/commission/presscorner/detail/en/ip_20_2406)

InvestEU <sup>169</sup> 2021-2027	15.2 billion EUR <sup>170</sup>	With InvestEU – which is a new fully integrated investment fund – significant private resources can be mobilised for necessary investments using relatively limited public money. Supported policy areas: sustainable infrastructure; research, innovation and digitisation; small and medium-sized businesses; and social investment and skills.
EIT <sup>171</sup>	3 billion EUR	The main objective of the programme is to further strengthen the innovation capacity of European higher education institutions.
Marie Curie Actions - multinational training network <sup>172</sup>  2021-2027	6.8 billion EUR	MSCA provides support for all stages of the research career and encourages transnational, cross-sectoral and interdisciplinary mobility. MSCA enables research-oriented organisations to receive talented foreign researchers and develop strategic partnerships with the world's leading institutions.
INTERREG <sup>173</sup>  2021-2027	*	Interreg Europe offers opportunities for regional and local public authorities across Europe to share ideas and experience on public policy in practice, therefore improving strategies for their citizens and communities. Supported areas: research and innovation, SME competitiveness, low-carbon economy, environment and resource efficiency.
InnovFin Energy Demo Projects <sup>174</sup>	7.5 - 75 million EUR/project	InnovFin Energy Demonstration Projects provides loans, loan guarantees or equity-type financing to innovative demonstration projects in the fields of energy system transformation, including but not limited to renewable energy technologies, smart energy systems, energy storage, carbon capture and storage or carbon capture and use. <sup>175</sup>
European Climate Bank <sup>176</sup>  2021-2030	1000 billion EUR	<b>The European Investment Bank is one of the world's main financiers of climate action.</b> EIB's goal is to limit global warming to 1.5°C above pre-industrial levels by the end of this century, combat environmental degradation, halt biodiversity loss, and stop widening inequalities. <sup>177</sup>

\* At the time this document was created, the size of the budget has not yet been disclosed.

<sup>169</sup> [https://ec.europa.eu/commission/priorities/jobs-growth-and-investment/investment-plan-europe-juncker-plan/whats-next-investeu-programme-2021-2027\\_en](https://ec.europa.eu/commission/priorities/jobs-growth-and-investment/investment-plan-europe-juncker-plan/whats-next-investeu-programme-2021-2027_en)

<sup>170</sup> [https://eur-lex.europa.eu/resource.html?uri=cellar:c2bc7dbd-4fc3-11e8-be1d-01aa75ed71a1.0009.02/DOC\\_1&format=PDF](https://eur-lex.europa.eu/resource.html?uri=cellar:c2bc7dbd-4fc3-11e8-be1d-01aa75ed71a1.0009.02/DOC_1&format=PDF)

<sup>171</sup> <https://ec.europa.eu/education/sites/education/files/document-library-docs/proposal-decision-eit-2021-2027-annex.pdf>

<sup>172</sup> [https://ec.europa.eu/research/mariecurieactions/actions/research-networks\\_en](https://ec.europa.eu/research/mariecurieactions/actions/research-networks_en)

<sup>173</sup> <https://www.interregeurope.eu/about-us/2021-2027/>

<sup>174</sup> <https://www.eib.org/en/products/blending/innovfin/products/energy-demo-projects.htm>

<sup>175</sup> <https://www.eib.org/en/products/mandates-partnerships/innovfin/products/energy-demo-projects.htm>

<sup>176</sup> <https://www.eib.org/en/about/priorities/climate-and-environment/index.htm>

<sup>177</sup> <https://www.eib.org/en/about/priorities/climate-action/index.htm>



# Annex III

List of Dutch companies & organisations which cooperated with Hungarian companies in Horizon 2020 projects (smart and sustainable mobility and logistics) during 2015-2020

UNIVERSITEIT VAN AMSTERDAM	AMSTERDAM
TNO	DEN HAAG
UNIRESEARCH BV	DELFT
HAVENBEDRIJF ROTTERDAM NV	ROTTERDAM
PRORAIL BV	UTRECHT
SEACON VENLO EXPEDITIE B.V.	VENLO
PANTEIA BV	ZOETERMEER
TASS INTERNATIONAL	HELMOND
TECHNISCHE UNIVERSITEIT DELFT	DELFT
ZIGHT BV	HOLTEN
STRATEGIC STUFF BV	AMSTERDAM
ISAVE BV	SPAKENBURG
LVW BEHEER BV	HOLTEN
VERENIGING REIZIGERS OPENBAAR VERVOER	AMERSFOORT
TOMTOM INTERNATIONAL BV	AMSTERDAM
STICHTING DELTARES	DELFT
STICHTING MARITIEM RESEARCH INSTITUUT NEDERLAND	WAGENINGEN
STICHTING PROJECTEN BINNENVAART	ROTTERDAM
STICHTING BUREAU TELEMATICA BINNENVAART	ROTTERDAM
AUTENA MARINE BV	NIJMEGEN
CHESS IT INTERNATIONAL BV	HAARLEM
STICHTING WAAG SOCIETY	AMSTERDAM
DAMEN SCHELDE NAVAL SHIPBUILDING BV	VLISSINGEN
AIRBORNE COMPOSITES BV	DEN HAAG
SCHEEPSWERF DAMEN GORINCHEM BV	GORINCHEM
STICHTING NETHERLANDS MARITIME TECHNOLOGY FOUNDATION	ROTTERDAM
INFRACORE COMPANY BV	ROTTERDAM
FIBERCORE EUROPE B.V	ROTTERDAM
STICHTING VOOR DE TECHNISCHE WETENSCHAPPEN	UTRECHT
MINISTERIE VAN INFRASTRUCTUUR EN WATERSTAAT	DEN HAAG
MINISTERIE VAN ECONOMISCHE ZAKEN EN KLIMAAT	DEN HAAG
STICHTING NATIONAAL LUCHT- EN RUIMTEVAARTLABORATORIUM	AMSTERDAM
SCHIPHOL NEDERLAND B.V.	SCHIPHOL
ATOS NEDERLAND BV	AMSTELVEEN
SITA INFORMATION NETWORKING COMPUTING BV	AMSTERDAM
DYNNIQ NEDERLAND BV	AMERSFOORT
DE GRAAFF ADRIAAN (AD CUENTA)	NOOTDORP
GEMEENTE 'S-HERTOGENBOSCH	DEN BOSCH
WARTSILA NETHERLANDS BV	ZWOLLE
UNIVERSITEIT UTRECHT	UTRECHT
RIJKSINSTITUUT VOOR VOLKSGEZONDHEID EN MILIEU	BILTHOVEN
MIMETAS BV	LEIDEN
VSPARTICLE BV	DELFT
STICHTING BREDA UNIVERSITY OF APPLIED SCIENCES	BREDA
DTV CONSULTANTS BV	BREDA

FOUNDATION WEGEMT - A EUROPEAN ASSOCIATION OF UNIVERSITIES IN MARINE TECHNOLOGY AND RELATED SCIENCES	DELFT
GEMEENTE DEN HAAG	DEN HAAG
DHL EXPRESS (NETHERLANDS) BV	SCHIPHOL
ARGUSI BV	BREDA
KONINKLIJKE LUCHTVAART MAATSCHAPPIJNV	AMSTELVEEN
STICHTING STC-GROUP	ROTTERDAM
STICHTING DUNAMARE ONDERWIJSGROEP	HAARLEM
KONINKLIJKE BLN SCHUTTEVAER	ZWIJNDRECHT
STC BV	ROTTERDAM
STC-NESTRA BV	ROTTERDAM
CURVE WORKS BV	HAZERSWOUDERIJNDIJK
10XL BV	DORDRECHT

# Annex IV

## Key players in the Hungarian electromobility sector

Sector	Subsector	Stakeholder	Scope of activities
E-mobility	Private	MOL Limo	Car sharing system
E-mobility	Private	GreenGo	Car sharing system
E-mobility	Private	BMW ShareNow	Car sharing system
E-mobility	Private	E.ON Blinkee	Electric moped sharing service
E-mobility	Private	Lime	Electric scooter sharing service
E-mobility & CNG	Private	Shell	CNG filling stations & rapid chargers
CNG	Private	MOL	CNG filling stations
E-mobility	Private	MOL Plugee	E-charging stations
E-mobility	Private	IONITY	Installation of fast-charging stations
E-mobility	Private	ALTE-GO	Installation of e-charging stations in office buildings, parking garages, corporate premises, detached houses
E-mobility	Private	Shell	Shell Recharge point – charging stations, development and installation of high-powered charging stations
E-mobility	Private	E.ON	DriveE.ON application - EV charging station; charging point operator
E-mobility	Private	ELMŰ-ÉMÁSZ	eCharge+ application, charging point operator
E-mobility	Private	Mobiliti, e-Mobi	Charging stations; application - EV charging station <sup>178</sup>
E-mobility	Private	PlugShare	Application - EV charging station
E-mobility	Private	Optimum Way	Development of electric car chargers and related solutions (private, restaurants, supermarkets, municipalities)
E-mobility	Public, R+D	EIT – Urban Mobility	Transformation of urban mobility; research of more liveable, cleaner, silent and emission free cities
E-mobility	R+D	ZalaZone Automotive Test Track	Testing new developments
E-mobility	R+D	Bosch	System development for E-baby stroller, light EVs, passenger cars

<sup>178</sup> <https://e-mobi.hu/en>

E-mobility	R+D	Knorr-Bremse	Research and development of EV automation
E-mobility	R+D	AVL	Development of EV fast charging and long-distance battery solutions
E-mobility	Private	Ebusco	Dutch bus manufacturer, verified partner of the Green Bus Programme
E-mobility, LNG	Private, R+D	Ikarus	Development of an LNG fueled bus prototype, verified partner of the Green Bus Programme
E-mobility	Private	BM Heros LEK Kft.	Verified partner of the Green Bus Programme
E-mobility	Private	Electrobus Europe Zrt.	Verified partner of the Green Bus Programme
E-mobility	Private	EvoBus Hungária Kft. (Daimler AG)	Verified partner of the Green Bus Programme
E-mobility	Private	Credobus	Verified partner of the Green Bus Programme
Hydrogen	Private	Goldi Mobility	Development of a hydrogen fuel cell bus
E-mobility	Research Institute	Budapest University of Technology and Economics	Cooperation in multiple EU-wide e-mobility projects
Hydrogen	Private	Hy-Hybrid Energy	Fuel cell service provider; cooperation with Goldi Mobility for the exploration of hydrogen refueling solutions for Hungary
LNG	Public - Private	MVM - Shell	Established a new natural gas supply route for Hungary and Croatia
E-mobility	Private	BYD	Electric bus manufacturing and verified partner of the Green Bus Programme
E-mobility	Private	MABI-BUS	Electric bus manufacturing

# Annex V

## Dutch logistics companies active in the CEE region

Company	Poland	Czech Republic	Romania	Hungary	Bulgaria	Ukraine	Slovakia	Slovenia	Moldova
André van Olst				X					
Axell Logistics	X								
Bolk Transport			X						
Broekman Logistics	X	X							
Den Hartogh Logistics	X			X		X			
E. van Wijk Logistics			X			X			X
Emons Group	X	X							
Ewals	X	X	X	X	X		X		
Farmtrans	X								
H&S Group	X								
Heisterkamp Transport	X		X						
HSF Logistics	X							X	
Jan de Rijk	X			X	X		X		
KLK Europe			X						
Mandersloot	X	X	X	X	X				
Müller Fresh Food Logistics		X							
Neele-Vat Logistics	X	X			X				
Nijhof-Wassink	X			X					
Nunner Logistics	X	X	X					X	
Raben Logistics	X	X	X	X	X	X	X		
Reining Transport				X					
Seacon Logistics				X					
Van der Vlist	X								
Versteijnen Logistics				X					
Vos Logistics	X			X	X				
Totals by country	17	8	8	11	6	3	3	2	1

## The largest Hungarian logistics companies

Name of company	Service provided
Magyar Posta Zrt.	Postal activity
Budapest Airport Zrt.	Air freight related services
FGSZ Földgázz szállító Zrt.	Pipeline freight
MÁV Magyar Államvasutak Zrt.	Road freight related services
Rail Cargo Hungaria Árufuvarozási Zrt.	Railway freight
National Toll Payment Services Zrt.	Road freight related services
<b>WABERER'S INTERNATIONAL Szállítványozó és Fuvarozó Zrt.</b>	Road freight
E. ON Földgáz Storage Földgáztároló Zrt.	Storage
Magyar Közút Nonprofit Zrt.	Road freight related services
MMBF Földgáztároló Zrt.	Storage
HungaroControl Magyar Légiforgalmi Szolgálat Zrt.	Air freight related services
DHL Logisztika Magyarország Szállítványozó és Logisztikai Kft.	Other freight related services
Raabersped Nemzetközi Szállítványozási Kft.	Other freight related services
EURASIA LOGISTICS Kft.	Other freight related services
DHL Exel Supply Chain Magyarország Kft.	Storage
UPS United Parcel Service Magyarország Szállítványozó Kft.	Other freight related services
Kühne + Nagel Szállítványozási Kft.	Other freight related services
LIEGL & DACHSER Szállítványozási és Logisztikai Kft.	Other freight related services
MALÉV GH Földi Kiszolgáló Zrt.	Other freight related services
Geodis Calberson Hungaria Kft.	Storage

# Annex VI

## Key Hungarian professional associations for logistics

Name	Contact
MLBKT - Hungarian Association of Logistics, Purchasing and Inventory Management	<a href="https://logisztika.hu/">https://logisztika.hu/</a>
MLSZKSZ - Association of Hungarian Logistic Service Centres	<a href="https://mlszksz.hu">https://mlszksz.hu</a>
MLE – Hungarian Logistics Association	<a href="http://mle.hu/">http://mle.hu/</a>
MSzSz – Association of Hungarian Forwarders	<a href="https://www.szallitmanyozok.hu/en">https://www.szallitmanyozok.hu/en</a>
Hungarian Road Transport Association (MKFE)	<a href="https://mkfe.hu/">https://mkfe.hu/</a>

# Annex VII

## Upcoming events and conferences

Title	Date	Overview
International Academic Conference On Transport, Logistics, Tourism And Sport Science <sup>179</sup>	19-20 March 2021	The conference is an important gathering of scholars, educators and PhD students, to discuss, among others, transport and logistics related topics.
Logistics Day - „A Logisztika napja” <sup>180</sup>	15 April 2021	The Hungarian Association of Logistics, Purchasing and Inventory Management has been helping Logistics Day organizers (educational institutions, professional organisations, companies) for a decade to spread the word about their programs to those interested in logistics. Logistics Day includes a number of separate events, such as factory visits, workshops and conferences.
Ökoindustria <sup>181</sup>	28-30 April 2021	Ökoindustria is a leading international green economy expo in Central Europe for environmental technologies, products and services with special focus on brownfield industry, circular economy and green education; where the Netherlands will be present as a guest country this year. Focus topics this year: sustainable mobility and Lean&Green.
4th International Joint Conference On Clean Energy And Smart Grid CCESG <sup>182</sup>	09-11 July 2021	CCESG 2021 welcomes researchers, engineers, scientists and industry professionals to an open forum where advances in the field of Clean Energy and Smart Grid can be shared and examined. The conference is an ideal platform for keeping up with advances and changes to a consistently morphing field. Leading researchers and industry experts from around the globe will be presenting the latest studies through papers and oral presentations.
4th ICSTR Budapest – International Conference on Science & Technology Research <sup>183</sup>	16-17 July 2021	Further information is not yet available. Topics covered: Transport, Energy, Renewable energy, etc.
Automotive Hungary <sup>184</sup>	16-18 November 2021	Automotive Hungary (Hungexpo) brings together the domestic and international suppliers and service providers of the automotive industry at all levels. Official information about the programs has not yet been published.
Translog Connect Congress - Central and Eastern Europe's Leading Logistics & SCM B2B Networking Event <sup>185</sup>	23-24 November 2021	TRANSLOG Connect Congress is the market leading cross-industrial B2B business summit and partnering event for transportation, logistics and supply chain management professionals in the Central Eastern European region taking place annually in November, in Budapest, Hungary. The conference programme offers the most up-to-date market insights into supply chain management, logistics, production, IT, transportation and warehouse management-related topics.

<sup>179</sup> <https://www.conferences-scientific.cz/inpage/conference-budapest-iactlts-2021>

<sup>180</sup> <https://logisztikanapja.hu/2021-aprilis-15-en-lesz-a-logisztika-napja/>

<sup>181</sup> [https://www.iswa.org/nc/events-courses/calendar/eventdetail/show\\_detail/oekoindustria-2021/#:~:text=%C3%96koindustria%202021%20is%20a%20leading,circular%20economy%20and%20green%20education.](https://www.iswa.org/nc/events-courses/calendar/eventdetail/show_detail/oekoindustria-2021/#:~:text=%C3%96koindustria%202021%20is%20a%20leading,circular%20economy%20and%20green%20education.)

<sup>182</sup> <http://www.ccesg.org/>

<sup>183</sup> <https://straevents.org/conference/budapest-icstr-16-17-july-2021>

<sup>184</sup> <https://automotivexpo.hu/en/>

<sup>185</sup> <https://translogconnect.eu/>



Planet Budapest 2021 – Sustainability Expo and Summit <sup>186</sup>	29 November - 5 December 2021	The Sustainability Expo and Summit is the largest sustainability related event in Central Europe. The expo gives the chance to businesses and start-ups open to environmental sustainability to share their knowledge and solutions and to offer new technologies and innovation. At the summit the heads of state and government, decision makers, experts of international organisations and the representatives of the scientific and business world can discuss topics such as sustainable water management or energy and transport.
Budapest LNG Summit <sup>187</sup>	6-7 December 2021	The Budapest LNG Summit connects regional CEE demand with the international supply chain while providing a platform for sharing and discussing insights and perspectives on the key LNG-related developments in the region. The goal of the Summit is to create an exclusive, high-level forum for the top industry leaders from the region and beyond, enabling them to network, explore and consider the medium and long-term prospects for the LNG business in CEE.
Budapest Energy Summit <sup>188</sup>	2022	Budapest Energy Summit is an energy forum in Budapest, where high-level industry leaders, experts, policymakers and top executives in energy, finance and technology from all over the world can discuss the driving trends of the industry and can identify the opportunities and challenges.

<sup>186</sup> <https://planetbudapest.hu/en>

<sup>187</sup> <https://budapestlngsummit.hu/>

<sup>188</sup> <https://budapestenergysummit.hu/>



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This publication was commissioned by the ministry of Foreign Affairs.

© Netherlands Enterprise Agency | March 2021  
Publicationnummer: RVO-072-2021/RP-INT

NL Enterprise Agency is a department of the Dutch ministry of Economic Affairs and Climate Policy that implements government policy for Agricultural, sustainability, innovation, and international business and cooperation. NL Enterprise Agency is the contact point for businesses, educational institutions and government bodies for information and advice, financing, networking and regulatory matters.

Netherlands Enterprise Agency is part of the ministry of Economic Affairs and Climate Policy.