“bONuszsáv”

Save the bus lanes in Budapest

“Prioritising buses is one of the fastest and most cost-effective ways to move more people using less urban space while reducing congestion and emissions in Budapest.”

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Executive summary

This report assesses bus priority in Budapest using corridor case studies, operational data and simplified economic modelling. Its principal finding is that low-cost bus-priority measures can deliver substantial benefits for the city and the passengers, improve service reliability and reduce operational pressures across the bus network. In a city where buses remain a core part of everyday mobility, especially on corridors and in districts with limited rail access, improving bus performance is not a niche technical issue but a practical way to move more people more efficiently within constrained street space.

The analysis shows that Budapest's main problem is not the complete absence of bus priority, but the fragmentation and uneven continuity of the existing system. Many bus lanes are short, discontinuous or operationally weak, which means that buses often gain some advantage on one section only to lose it again at the next junction or bottleneck. This weakens the effectiveness of the network as a whole and reduces the value of already existing infrastructure.

The three reviewed corridors — Hegyalja Road, Egressy Road and Szentendrei Road — show that targeted interventions can reduce delays, narrow travel-time variability and improve the relative performance of buses on congested corridors. Although the three case studies represent different traffic contexts and intervention types, together they demonstrate that even modest measures can generate visible operational gains. The strongest opportunities lie in connecting fragmented priority sections, removing bottlenecks and improving enforcement, rather than relying only on large new infrastructure projects.

The corridor analysis also shows that the benefits of bus priority go beyond simple time savings. More stable and predictable travel-times improve timetable resilience, reduce delay variability and can support better fleet utilisation. In some cases this may reduce vehicle requirements; in others it may create room for more reliable operations or improved frequencies. Either way, stronger bus priority makes the service more efficient and more dependable for passengers.

The monetised assessment in this report is limited to passenger time savings and public transport operating benefits. Emissions and energy impacts are discussed as additional, non-monetised benefits. Under a conservative interpretation, the three example corridors still indicate strong value for money. Even with cautious assumptions, the results suggest that targeted bus-priority measures are among the most cost-effective urban transport interventions available to the city, particularly where they address high-demand corridors and recurring congestion points.

Faster and more reliable public transport, as a universally accessible public service, benefits a broad spectrum of city users and should also be understood in a wider social-equity context. Improving it benefits not only those who travel by bus every day, but also everyone who wants more predictable access, less congestion and more efficient use of public street space in Budapest. At the same time, these benefits are particularly significant for people whose everyday mobility strongly depends on bus services, including residents of outer districts, lower-income households and users with limited modal choice. In this sense, prioritising buses is not only an operational improvement, but also a social-equity measure: a way to improve accessibility and make more efficient use of public street space.

For Budapest, the next step is therefore not a city-wide expansion of entirely new infrastructure, but a focused programme of corridor completion, bottleneck removal, signal priority and enforcement on the busiest bus corridors. A practical, corridor-based approach offers the best near-term opportunity to strengthen bus performance, increase the efficiency of the wider transport system and support a more balanced allocation of urban road space.

Table of content

1 Background and aim

Public transport is a fundamental pillar of sustainable urban mobility. In large European cities, buses play a particularly important role because they provide flexible, high-capacity services across extensive urban networks and serve areas where rail-based systems are not available. In Budapest, buses carry a significant share of daily public transport passengers and are essential for ensuring access to employment, education and services across the metropolitan area.

However, buses frequently operate in mixed traffic conditions and are therefore vulnerable to congestion. Traffic congestion, driven primarily by private car use, represents one of the greatest inefficiencies in urban mobility systems. According to European studies on the external costs of transport, congestion generates substantial economic losses, increased emissions and reduced reliability of urban transport services. When buses are delayed in the same traffic as private cars, the societal impact is particularly significant: a single delayed bus affects dozens of passengers simultaneously. Improving bus travel-times and reliability therefore represents one of the most efficient ways to increase the overall performance of the urban mobility system.

Bus priority measures — including dedicated bus lanes, traffic signal priority and targeted corridor interventions — are among the most cost-effective measures available to cities to improve public transport performance. In many cases these measures require only limited construction work, relying instead on the reallocation of existing road space. When implemented along high-demand corridors or at key bottlenecks, such measures can significantly reduce travel-times, increase reliability and improve the attractiveness of public transport.

In most European cities, buses carry far more passengers per lane than private cars, yet they often remain the most vulnerable mode in congested street networks. Improving bus priority is therefore one of the fastest and most cost-effective ways to increase the overall efficiency of urban mobility systems.

Budapest provides a particularly relevant case: despite a relatively extensive network of bus lanes, their discontinuity and operational limitations often prevent buses from fully benefiting from the available infrastructure.

This assessment is also supported by public opinion evidence. According to the 2025 OpinionWay survey for Clean Cities[1], Budapest residents report extensive everyday use of both walking and public transport, while also identifying congestion, parking pressure and public transport performance among the city’s major mobility challenges. This suggests that bus priority in Budapest should be framed not as a niche technical issue, but as a response to already perceived everyday urban dysfunctions.

In Budapest, bus priority measures have been introduced gradually over several decades. Early dedicated bus lanes appeared in the late 1990s, followed by broader network

[1] English version: https://cleancitiescampaign.org/research-list/cities-speak/
Hungarian version: https://cleancitiescampaign.org/cities-speak-magyarorszag/

expansion in the 2000s and more recent corridor-based interventions. Despite this long history, bus priority measures have often been implemented incrementally and their system-wide impacts have rarely been assessed in a comprehensive analytical framework. Bus priority in Budapest should be understood mainly as a network issue. The city already has an extensive bus-lane system, but many sections are short or discontinuous therefore they do not function effectively in operational terms, so buses still lose time at the most critical points of the corridor.

This matters in a wider multimodal context. In Budapest, walking remains the main access mode to public transport, and cycling increasingly complements public transport on the first and last mile. Improving the reliability of the bus network therefore strengthens the wider urban mobility system, not bus operations alone.

Building on the analytical logic of the Warsaw report, this study combines Budapest-specific corridor evidence, operational analysis and simplified economic modelling. It is intended as a background report for communication and policy discussions on bus priority in Budapest.

Key message: Why bus priority matters for Budapest

Buses are a high-capacity and space-efficient part of Budapest's public transport system. When buses are delayed in the same congestion as private cars, large numbers of passengers lose time at once.

Targeted bus-priority measures can often be implemented quickly and at relatively low cost by reallocating existing road space. On the busiest corridors, they can improve travel-times, reliability and the overall performance of the transport system.

In Budapest, bus priority should therefore be understood not as a niche technical issue, but as a practical tool for improving the everyday functioning of the city, while also generating several billion HUF in annual savings for the operator.

2 Scope of the research

Improving the performance of bus services in congested urban environments requires a clear understanding of where and how priority measures can deliver the greatest benefits. While bus lanes and other forms of public transport priority have been implemented in Budapest over several decades, their impacts have generally been assessed only at the local level or on a project-by-project basis. A more systematic analysis is needed in order to understand how targeted interventions can improve the overall performance of the bus network and contribute to broader urban mobility goals.

This study therefore focuses on the operational, economic and policy dimensions of bus priority measures in Budapest. The analysis builds on existing data sources, corridor-level case studies and international experience, including the methodological approach used in the Clean Cities Campaign report on bus priority in Warsaw. Particular attention is paid to identifying **high-impact interventions along major transport corridors and at congestion bottlenecks**, where relatively small infrastructure or operational changes can produce significant improvements in travel-time reliability and passenger experience.

The study also considers the wider mobility context in which bus priority measures operate. Public transport corridors form the backbone of the mobility system, while walking and cycling provide first- and last-mile access. The analysis therefore looks not only at bus operations, but also at how street-space allocation can support both public transport and active mobility.

Understanding how bus priority interacts with these modes — and how street space can be allocated in a way that strengthens both public transport and active mobility — is therefore an important element of the analysis.

In addition to evaluating current conditions, the study explores potential policy scenarios and implementation pathways that could strengthen bus priority in Budapest. This includes identifying priority corridors, examining enforcement mechanisms, analysing traffic signal priority strategies and considering design solutions that allow public transport and cycling infrastructure to coexist effectively on major urban streets.

Against this background, the research focuses on four key questions:

2.1 What is the current role and performance of bus priority measures in Budapest?

This question examines the existing network of bus lanes and other priority measures in Budapest, analysing their spatial distribution, operational characteristics and performance. Particular attention is given to identifying where bus priority measures already improve travel-times and reliability, and where congestion or network gaps continue to undermine bus service performance.

2.2 Where can targeted corridor interventions deliver the greatest improvements?

Building on the performance analysis, this question identifies corridors and bottlenecks where relatively small infrastructure or operational management changes could significantly improve bus travel-times and reliability. The analysis focuses on locations where bus services carry large passenger volumes and where delays caused by congestion have the greatest system-wide impacts.

2.3 What are the economic and environmental benefits of strengthening bus priority?

This question assesses passenger time savings, operational efficiency — including reductions in operating costs — and emission reductions. Using corridor-level modelling and broader scaling approaches, the study estimates the potential economic and environmental benefits of improving bus priority along major corridors in Budapest.

2.4 What policy and implementation measures could support a coherent bus priority strategy?

The final question explores the practical steps required to strengthen bus priority in Budapest. This includes identifying priority corridors, examining enforcement mechanisms, analysing traffic signal priority strategies and proposing design solutions that allow bus priority and cycling infrastructure to coexist effectively on major urban streets.

3 Structure of the report

The report is structured around five work packages that together provide an evidence-based assessment of bus priority in Budapest and pinpoint opportunities for developing a targeted communication strategy. The report combines two layers. The opening chapters provide a concise analytical overview, while WP1–WP5 present the corresponding deliverables in a structured form. Detailed assumptions, source notes and calculation logic are kept in the annexes to avoid overloading the main text.

Section 2 (WP1 – Infrastructure, operations and system context) provides an overview of the role of buses within the Budapest urban mobility system. It examines the development of bus priority measures in the city, the structure of the existing bus lane network and the broader mobility context in which these interventions operate, including the interaction between public transport and active mobility modes such as walking and cycling.

Section 3 (WP2 – Performance analysis) analyses the operational performance of selected bus priority corridors and bottlenecks. Using available transport data and corridor-level case studies, WP2 assesses travel-time reliability, congestion impacts and the effectiveness of existing bus priority measures.
Section 4 (WP3 – Economic and environmental impact assessment) evaluates the economic and environmental benefits of improving bus priority. Drawing on corridor-level modelling, the analysis estimates passenger time savings, operational efficiency gains and potential emission reductions associated with strengthening bus priority measures along major corridors in Budapest.
Section 5 (WP4 – Policy scenarios and implementation options) explores potential policy scenarios for improving bus priority in the city. It examines design options such as continuous bus corridors, targeted bottleneck interventions, enforcement mechanisms, traffic signal priority and solutions that enable bus-priority measures and cycling infrastructure to coexist on major urban streets.
Section 6 (WP5 – Communication and policy roadmap) summarises the key findings of the study and presents a targeted roadmap for strengthening bus priority in Budapest. It outlines priority corridors, implementation pathways and communication activities that can support public understanding and political acceptance of bus priority measures as part of a broader strategy for sustainable urban mobility.

3.1 Infrastructure and operations

How many kilometres of bus lanes exist, and what is their condition?

- Budapest has around 88 km of lanes reserved for public transport, of which around 75 km function as conventional kerb-side bus lanes and the rest as combined public-transport lanes on tram tracks or in centre-running alignments.
- Most bus lanes are implemented as the right-hand lane of multi-lane roads. Their physical condition broadly reflects the condition of the surrounding road network: acceptable but far from perfect. Only a limited number of sections are centre-running or physically separated from general traffic; these provide higher and more stable commercial (operating) speeds.
- Several factors reduce the effective usability of kerbside lanes: right-turning traffic, illegal stopping and parking, and, in some locations, the presence of people cycling in the lane. These factors do not necessarily make the bus lane unusable, but they can reduce its reliability and weaken its corridor-level effect independent of congestion.
- For details of the total length and the breakdown by lane types (bus lane, shared tram–bus lane, cycling permitted / prohibited), see Annex 1.

Where are the discontinuities and critical bottlenecks?

- The bus-lane network is currently fragmented. Many sections operate as isolated priority interventions before major junctions, rather than as continuous corridors. Typical examples are the approaches to Károly körút at Astoria, Széll Kálmán tér and Puskás Ferenc Stadion, where a short inbound bus lane helps buses before a

signalised junction, but the priority section ends at the junction instead of continuing as part of a corridor-level treatment.
- Because of this, buses still lose considerable time in mixed traffic between priority sections, especially on radial approaches to bridges and in inner-city sections with heavy turning traffic and loading activity.
- See Map 1 for the main discontinuities ("missing links"), with the three example corridors (Hegyalja, Egressy, Szentendrei) highlighted.

How effectively are lanes protected and enforced?

- Most bus lanes in Budapest are not physically protected. Centre-running tram-bus lanes are separated by kerbs or raised medians, but typical kerb-side bus lanes are only marked by road signs and surface markings.
- For political reasons, automated camera enforcement has not been in use for several years. As a result, illegal stopping, parking and unauthorised use by taxis and private cars significantly reduce the effective capacity and reliability of bus lanes.
- In some inner-city streets, former general-traffic lanes have been converted into "public transport + access only" streets. Here buses share space with private vehicles belonging to residents and delivery vehicles; these solutions work relatively well in terms of traffic volumes, but enforcement and turning movements still need careful management.

3.2 Performance

Introduction – three recent Budapest bus-lane projects

In this analysis we present three recent bus-lane projects in Budapest. They support bus routes with very different demand levels, but they share one key feature: in all three cases the new bus lanes were created by reallocating existing general-traffic capacity, and their implementation generated public debate.

The first bus lanes in Budapest appeared on **Rákóczi út** in 1973, as a response to public outrage after the removal of the tram line when Metro line M2 was opened. The original idea was that metro-to-bus transfers would replace the direct tram service, but passengers quickly switched to the new, direct **line 7** bus services from the inner city to South-Buda. Service levels had to be increased rapidly; within a short time headways dropped to around one minute on this corridor.

In the early 1970s Rákóczi út still operated without permanent congestion; experts expected the "congestion threshold" to be reached only around 1975. Bus lanes were initially introduced mainly as a political response to the tram removal and the surprisingly strong public resistance.

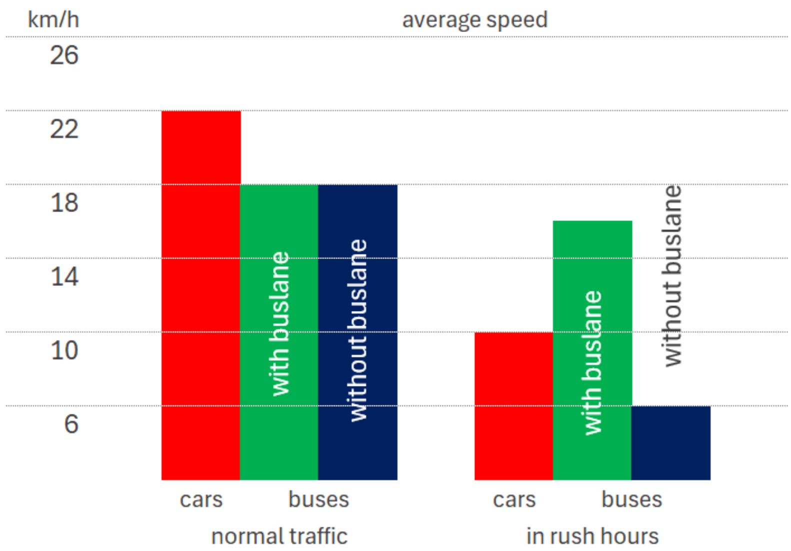
The renaissance of bus lane development came in the 1990s, when the explosion in car ownership led to widespread congestion. A large share of today's bus-lane network dates from the period 1990–2002, implemented under a range of design standards and enforcement regimes.

The historical evolution of bus priority in Budapest – from early bus lanes such as **Bimbó út (1997)** through the **network expansion on Bartók Béla út and Erzsébet királyné útja in the 2000s**, to recent corridor-level interventions on the **Hegyalja (2019), Szentendrei (2020) and Egressy (2024) corridors** – is summarised in Figure **10**. **(WP5)**.

How do bus travel-times compare to car travel on major corridors?

Available measurements indicate that the average car speed in inner-city Budapest is around **22–23 km/h**, dropping to roughly **10 km/h** in peak periods. Without bus lanes, bus commercial speeds in congested sections would fall to **6–8 km/h**, i.e. roughly equivalent to walking speed.

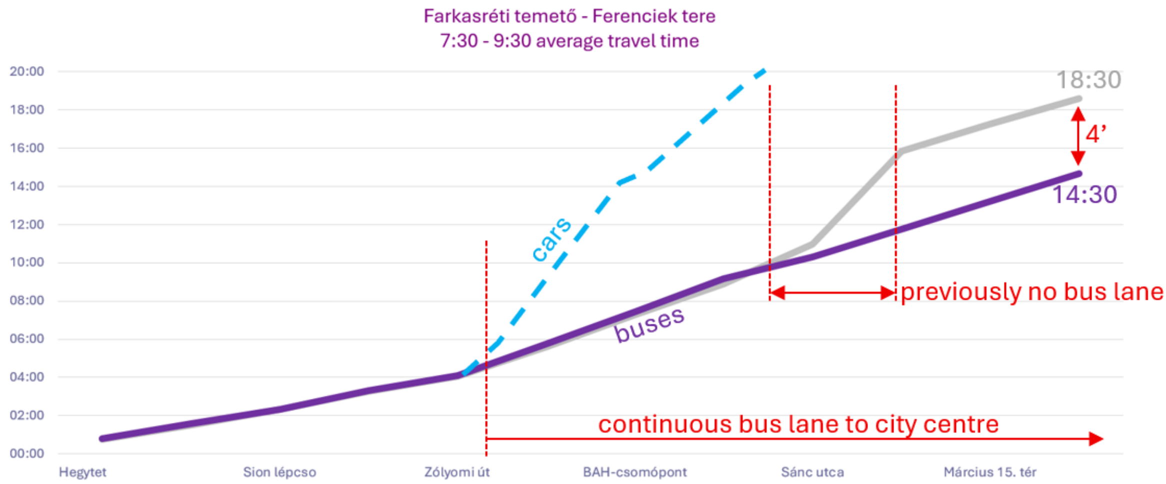
With bus lanes and complementary traffic-engineering measures, typical peak-hour bus speeds can be kept in the **15–18 km/h** range. The difference is enormous: a factor of roughly three between buses stuck in general traffic and buses with priority. This factor also appears in operating costs and fleet requirements.



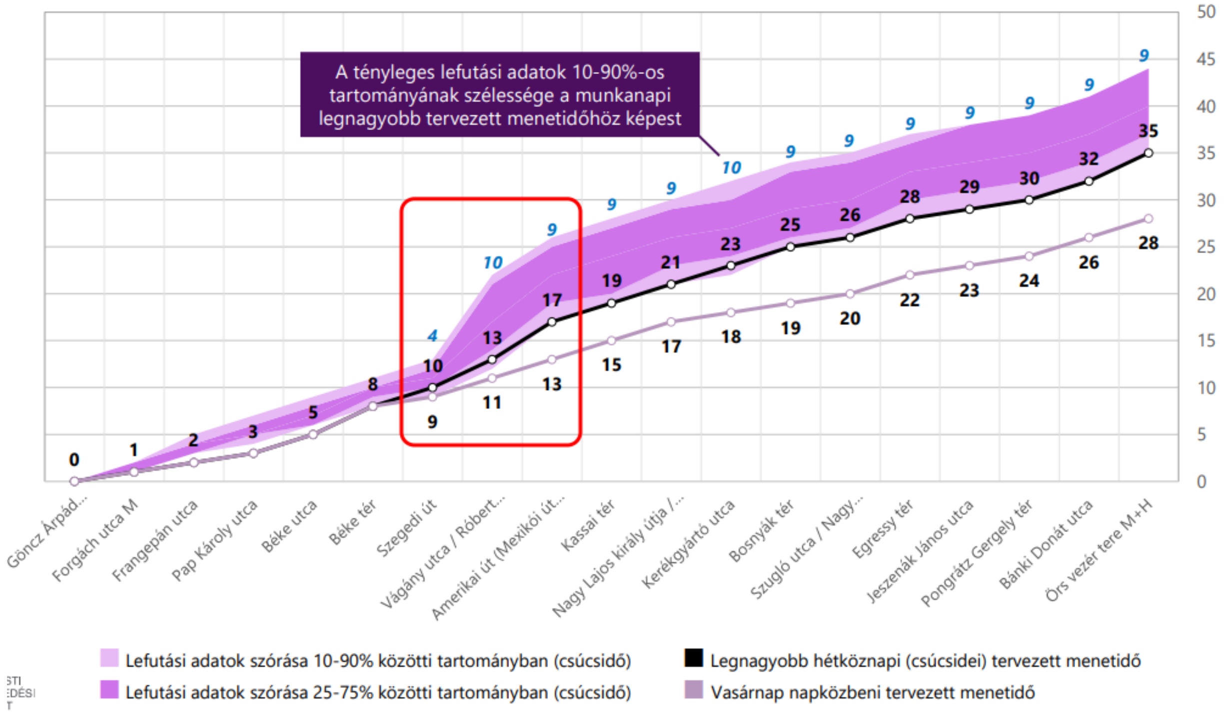
1. Figure Observed average road speeds in inner-city Budapest, by traffic condition.

How does punctuality change with/without priority measures?

- On typical Budapest corridors, average peak-hour delays of **10–15 minutes** are common when there is no effective priority. In case of incidents on the outer motorway ring, spill-back of traffic into urban arterials can lead to extreme delays of **30–50 minutes** on some bus lines.
- Before–after analysis of the **8E** and **32** lines shows that continuous bus lanes drastically reduce both average travel-time and its variability. The distribution of running times narrows, and the worst-case delays become much rarer.



2. Figure Running time diagram of bus line 8E before and after the introduction of bus lanes. The stabilizing and travel-time–reducing effect of the bus lanes is clearly visible.



3. Figure Detailed running time data from bus line 32. The dark blue line represents peak-hour travel-times, while the lighter purple line shows off-peak travel-times. The width of the purple band indicates the range within which travel-time falls with a 10–90% p

Where do buses lose the most time, and why?

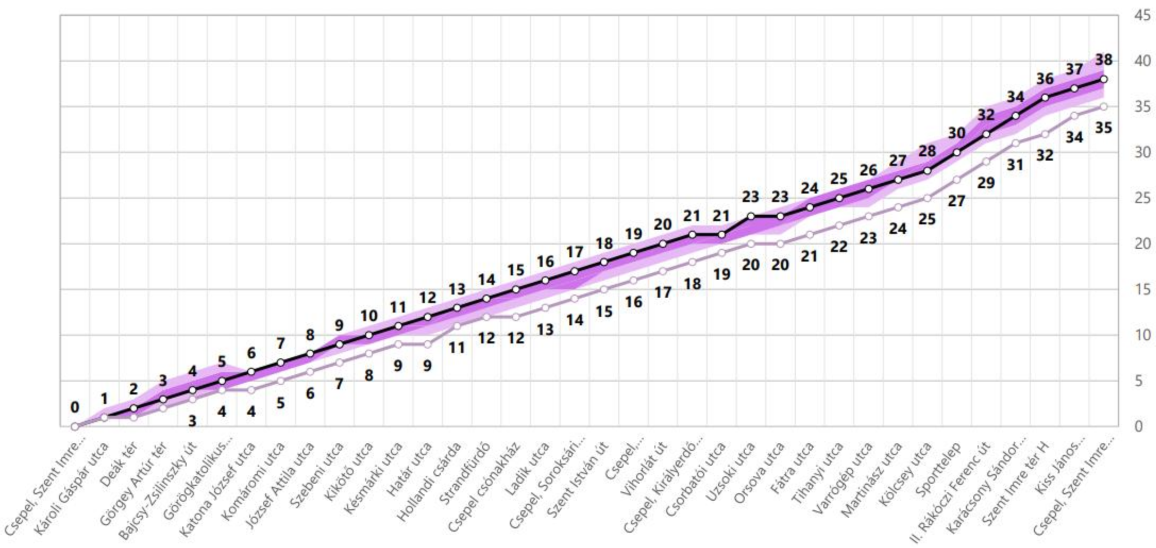
General mechanisms causing bus delays

- **Bus bays**
  Conventional recessed bus bays allow general traffic to flow freely while buses are serving stops, but in dense urban traffic the time required to re-enter the traffic stream can be significant. A typical dwell time of **18–25 seconds** can easily be extended by an additional **5–15 seconds** as the driver waits for a gap. On long routes this cumulates into several minutes of extra running time.
- **Signal coordination**
  Where buses and cars share lanes, traffic-signal coordination, often implemented as "green waves" is usually optimised car traffic flows. If car queues block junction approaches, buses are trapped in the same queues and also lose time at successive signals. With separate bus lanes, signal plans can be tuned differently for public transport and general traffic between junctions, giving buses more predictable progression without necessarily penalising cross-traffic.
- **Bottlenecks with saturated capacity**
  Every city has short sections where road capacity is at or above 100% for most of the day. If no additional lane can be built, the only way to give buses an advantage is to reallocate existing capacity. This requires a clear, public transport-centred strategy, but international experience shows that such schemes can be successful where carefully designed.

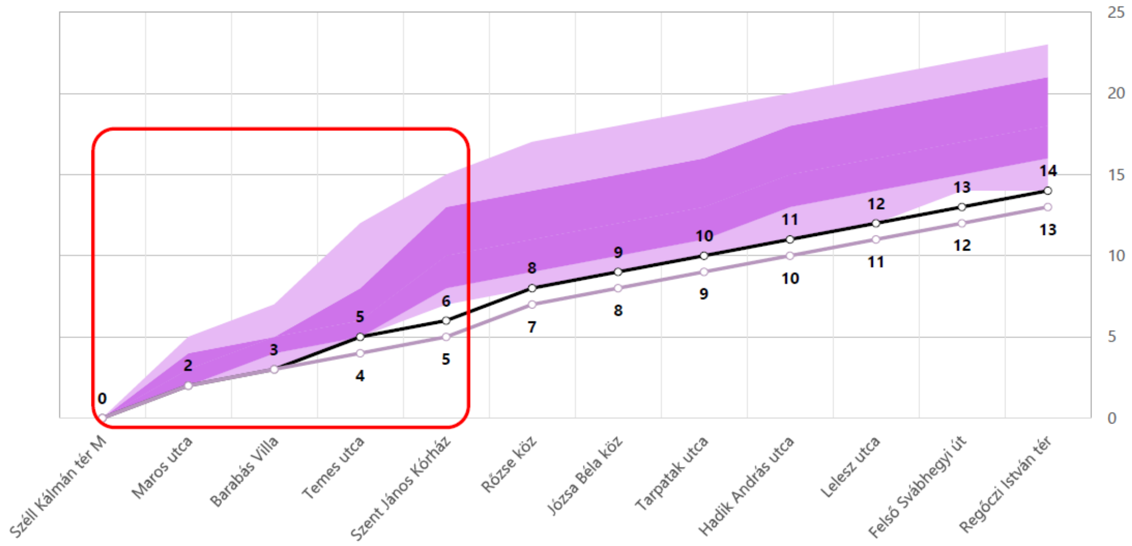
- **Front-door boarding policies**
  In recent years Budapest has introduced front-door boarding with driver ticket check on most bus lines. This increases dwell times even under moderate load, particularly on the outer sections where there are few traffic signals and buses previously moved freely between stops. Up to around 50% load factor, the additional delay may remain modest, but above this level the cumulative effect on running time becomes very visible.

Concrete locations (according to BKK data) – typical peak-hour bus time losses without priority:

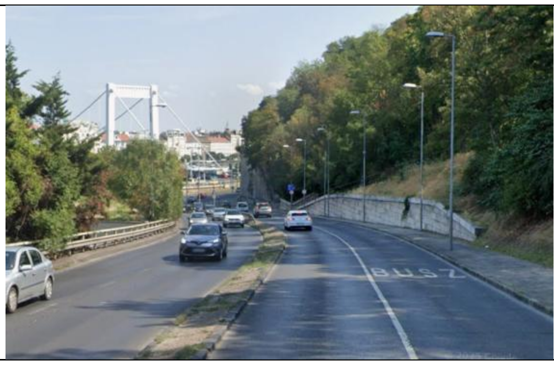
- Csömöri út, approach to Bosnyák tér: **5–8 min** (lines 7E and parallels)
- Törökbálinti út, approach to Márton Áron tér: **8–12 min** (8E)
- Budakeszi út towards the city centre: ≈**15 min** (22 and 780 family)
- M3 motorway urban approach: **8–10 min** (25 family)
- Rákospalotai overpass: **7–9 min** (25, 196 family)
- Pasaréti tér area: **8–12 min** (29)
- Hűvösvölgy terminal area: **5–10 min** (29, 57, 63, 64 family)
- Róbert Károly körút overpass: ≈**10 min** (32)
- M0 interchange at Csepel–Lakihegy: **10–12 min** (38 family)
- Nagykovácsi út: ≈**15 min** (63)
- Egressy út: ≈**15 min** (77 trolley)
- Szent István körút: **5–10 min** (9 and 91)
- Veres Péter út, Sashalom: **8–10 min** (44 and 92)



4. Figure Illustrative travel-time profile of an uncongested bus service (Line 71, Csepel suburban route). Travel-time is stable and the average speed is relatively high.

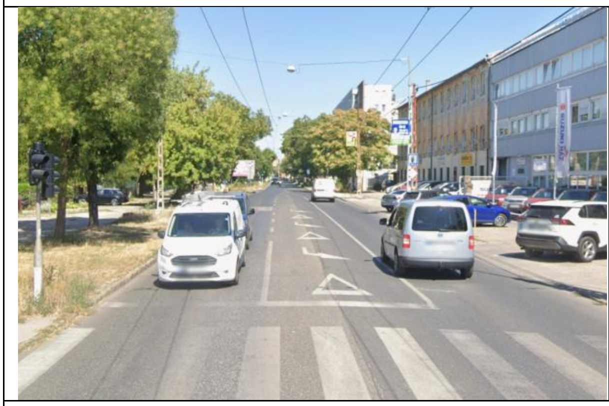


5. Figure ***Illustrative diagram of a bus service affected by congestion.*** *This example shows a short but heavily used route starting from a downtown metro station. Compared to uncongested periods, peak-hour travel-time can more than double. On the congested section of the line, the designation of a dedicated bus lane would be justified, but it has not gained political support due to the significant loss of on-street car parking spaces it would entail.*



Hegyalja Road in 2013 and 2025

Road traffic capacity remained unchanged at around 500 PCU per hour[2]. However, the practical headway of buses decreased from **4.5 to 2.85 minutes**, resulting in a **57% increase in public transport capacity**. During peak hour in the direction of the city centre, the hourly passenger volume increased from **800 to 1,260 passengers**.



Egressy Road in 2023 and today

Road traffic capacity has decreased by approximately **15%**, while public transport capacity has increased by the equivalent of **two trolleybuses' worth of passengers per hour**. The total number of people passing through the section has remained unchanged, but **overall travel-time and public service operating costs have decreased**.

Szentendrei Road in 2023 and today

On Szentendrei Road, road capacity now operates on two lanes instead of three, while the significant turning movement at Bogdáni Road has been retained. The bus lane was introduced

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[2] i.e. passenger-car equivalents representing mixed traffic

as a temporary, low-cost traffic-management measure, with the explicit intention that it could become permanent if traffic forecasts proved to be broadly accurate, if it delivered a meaningful benefit for buses, and if the wider operation of the Flórián Square junction remained manageable. Official monitoring indicates an average public transport travel-time reduction of around 1.5–2 minutes. In practice, this mainly increases terminal recovery time under the unstable traffic conditions associated with the ongoing overpass reconstruction. Once the renovation is completed and road traffic patterns stabilise, the travel-time advantage for buses may become more pronounced, but this will require further monitoring.

Three recent bus lanes in Budapest

3.3 Impact

What are the economic benefits of time savings (productivity, operator savings)?

- By stabilising and increasing commercial speeds, bus priority allows the same level of service to be provided with fewer vehicles and fewer driver hours – or, conversely, it allows higher frequencies to be offered without proportionally higher operating costs.
- A typical urban bus in Budapest has an annual operating cost of around **€210,000**. On a route with a round-trip time of about 60 minutes and a **5–7 minute** headway, a single congested junction that adds **4–5 minutes** in one direction may require **2–3 additional buses** to keep the timetable.
- If congestion affects several junctions, the scheduled round-trip time may grow from 60 to **80–100 minutes**, requiring **4–6 extra buses** to maintain headways. The incremental operating cost of these extra vehicles can exceed **€1 million per year** on a single busy corridor.
- Preliminary estimates for Budapest suggest that, because bus priority has not yet been fully exploited, BKK currently operates roughly **70 additional buses** compared to an optimised scenario. This represents an annual cost of up to **€15 million**, i.e. roughly the purchase price of **around 50 new articulated buses** – effectively spent on keeping vehicles in congestion.[3]

What are the environmental benefits (reduced emissions, improved air quality)?

Under ideal urban traffic conditions, a modern Euro VI diesel bus consumes around **45 litres per 100 km**. With a typical daily mileage of **300 km**, this means ≈**135–150 litres** of fuel per day.
In heavy congestion, when large parts of the duty are spent in stop-and-go traffic, consumption can rise towards **100 litres / 100 km** during peak periods. This may increase

[3] The city-wide estimate should be interpreted as an order-of-magnitude indication based on corridor-level modelling, rather than as a precise forecast.

fuel consumption by around 25 litres per day compared to free-flow conditions – an increase of 15–20%.[4]

By keeping buses moving through congested sections, bus lanes therefore reduce fuel consumption and associated **CO_2, NOx** and particulate emissions by roughly **15–20%** on affected routes. The same order of magnitude applies to electric buses and trolleybuses in terms of electricity use: smooth operation with fewer stops and accelerations lowers energy consumption and reduces wear on vehicles. See Figure 11. about the typical emissions per passenger-km in urban transport.

What are the social equity implications?

In Budapest, bus priority is not only a transport-efficiency tool, but also a social-equity measure. International research on public transport economics and inclusive urban mobility shows that faster and more reliable public transport tends to benefit those who rely on it most: lower-income households, people living in peripheral districts, women and caregivers, children, older people, and other vulnerable groups. [5], [6], [7]

Designing bONuszsáv corridors from this perspective makes clear that reallocating road space to buses is progressive rather than regressive.

In Budapest, the primary beneficiaries of bus priority are people without cars and residents of outer districts who depend on public transport for everyday access to jobs, education, and services. Research in public transport economics shows that the largest welfare gains from better frequency and reliability accrue to passengers with limited modal choice, who cannot simply switch to driving when congestion worsens. The European Group on Urban Mobility (EGUM) likewise underlines that good public transport is a precondition for social inclusion, especially for people and neighbourhoods with restricted transport options.[2] On Budapest's radial and tangential bus corridors, giving priority to buses therefore shifts travel-time and reliability in favour of groups who already depend most on public transport, rather than towards better-off car users.

Reducing bus travel-times and improving reliability is especially valuable for lower-income, time-poor passengers, and caregivers, because long and unpredictable commutes are a well-established driver of transport poverty and social exclusion. EGUM highlights long and unreliable journeys as a major barrier to labour-market access and education, and as a mechanism through which inequality is reproduced in European cities. Hörcher and co-authors likewise show that passengers place particularly high value on reliable and uncrowded public transport, and that delays and

[4] Assuming an average speed of 8 km/h under congested conditions and a congestion period of 4 hours.

[5] Hörcher & Tirachini — *A review of public transport economics*

[6] EGUM — *How to guarantee public transport inclusiveness considering societal, technological, climate, economic, financial, governance and institutional changes?*

[7] Laa, Shibayama, Brezina et al. — *A nationwide mobility service guarantee for Austria: possible design scenarios and implications*

irregular headways generate substantial social costs.[8] Brezina's work on an Austrian mobility service guarantee similarly argues that improving service quality on key public transport corridors is an effective way to reduce transport poverty in peripheral areas. In this sense, time savings and reliability gains from bONuszsáv corridors function as a de facto increase in "time income" for those with the least flexibility.

High-quality bus corridors in outer districts can also narrow accessibility gaps between central and peripheral neighbourhoods and support wider European objectives related to inclusive mobility guarantees. Brezina et al. show that such guarantees require frequent and reliable public transport on the main axes so that people can reach urban and regional centres without needing a car. This logic translates directly to Budapest: residents of outer districts and commuters from the agglomeration need fast and dependable bus links to metro and tram nodes if they are to have a realistic alternative to everyday car use. Eurocities has similarly stressed that well-funded public transport systems are essential for keeping cities socially cohesive and affordable, especially in a period marked by cost-of-living pressures and energy insecurity.[9] Strategically prioritised bus corridors are therefore a relatively low-cost way for Budapest to deliver this principle in practice.

Bus priority also has important gender and care-work equity dimensions. European guidance on inclusive urban mobility highlights that women and caregivers tend to make more complex trip chains — involving school, shopping, and care-related trips — and are more dependent on public transport and walking than men.[2] Unreliable services and long waits at interchanges therefore impose a disproportionate daily time burden and additional stress on them. By making journeys faster and more predictable on key corridors, bONuszsáv projects help reduce this often invisible time penalty and support a fairer distribution of care-related responsibilities.

Children, older people, and disabled passengers also gain disproportionate benefits from bus priority. EGUM and related European work frame access to reliable and affordable public transport as a basic condition for social participation for these groups. The International Association of Public Transport (UITP), in its "Mobility for All" and accessibility guidance, stresses that beyond step-free access and accessible vehicles, service regularity and predictable journey times are essential for people with reduced mobility or cognitive impairments to travel independently.[10] On Budapest's busy arterial corridors, bus lanes that keep services moving and reduce delay variation therefore support children's independent school travel, older people's access to healthcare and social life, and the everyday mobility of disabled residents.

Finally, where bus lanes shift trips from cars to public transport and enable traffic calming, the health and safety benefits — including lower air pollution, less noise, and reduced road danger — accrue first to residents living along busy arterial roads, who are often socio-economically more

[8] Hörcher, Graham & Anderson — *Crowding cost estimation with large scale smart card and vehicle location data*
[9] Eurocities — *Cities stand together for a sustainable, accessible public transport*
[10] UITP — *UITP, EDF, IRU Accessibility Guide*

vulnerable. The Warsaw bus-lane analysis prepared for Clean Cities shows that buses, especially when electrified, generate much lower external costs per passenger-kilometre than private cars, and that reallocating road space to bus priority can significantly reduce congestion and emissions on key corridors. These findings are also consistent with the European Commission's Handbook on the external costs of transport, which quantifies the substantially higher environmental and safety externalities of car traffic compared with public transport.[11] In Budapest, prioritising buses on congested tangential and radial routes would therefore also deliver environmental-justice gains to communities that are currently most exposed to traffic impacts.

[11] European Commission / Publications Office — *Handbook on the external costs of transport (Version 2019)*

3.4 System improvements

Which corridors should be prioritized for upgrades?

We recommend compiling a priority list based on two main factors:

1. **Annual passenger-time savings**, categorised by order of magnitude;
2. **Implementation cost** of each measure.

The combined indicator is the **implementation cost per minute of passenger time saved**. This ranking logic can be further supported by the segment-level bus lane database presented in Annex 1, which helps highlight where high-demand corridors already contain fragmented priority sections and where relatively short missing links could unlock disproportionately large system-level benefits. In this sense, the dataset is not only a descriptive inventory, but also a practical prioritisation tool. BKK already uses a simple matrix to categorise projects:

	peak-hour passengers affected		
Time saving per bus	> 500	200-499	< 200
> 5 min	1	1	2
1-5 min	1	2	3
< 1 min	2	3	4

Within Category 1 (large passenger volumes and large time savings) there is still a wide spread in cost-effectiveness, so individual ranking is needed. We also suggest including a light weighting for **"time since identified"**, so that long-standing but smaller schemes gradually move up the list.

An illustrative mini-ranking is shown below, included purely for illustrative purposes, based on the Szentendrei–Hegyalja–Egressy examples.

Location	**Annual passenger time savings (minutes)**	**Implementation cost (EUR)**	**Cost-effectiveness (annual passenger-minutes saved per EUR invested)**
Szentendrei Road	1.210.000	26.000	46,53
Hegyalja Road	1.584.000	26.000	60,92
Egressy Road	399.300	13.000	30,71

What enforcement mechanisms and policy reforms are required?

Bus-priority implementation in Hungary faces several legal and regulatory barriers. Hungary's core traffic code, the KRESZ, dates back to 1975 and has been amended many times, often resulting in incoherent or outdated provisions. Examples include:

- Bus lanes may formally be left by buses only when operating as "express" services, which complicates overtaking illegally parked vehicles or slow-moving people on bicycles.   .
- The carriageway marking "BUSZ" on the carriageway is ambiguous for foreign coach drivers, who may interpret it as permission to bypass congestion.
- Dedicated "BUS" traffic signals are only allowed where there is an official bus lane, even though signal priority could also be useful without a formally marked lane.
- A separate decree still links the eligibility for bus-lane designation to a threshold of **20 buses / hour**, which is often ignored by practitioners but frequently cited by opponents.
- The concept of a general "public transport lane" (used by trams, buses and sometimes taxis) is not formally recognised, even though it exists in practice.

A consolidation and modernisation of these provisions in a single, up-to-date section on **public transport, cycling, walking and liveable streets could be considered**, with emphasis on the efficiency of public transport and the reduction of dangers towards vulnerable road users.

In some locations it is more effective to tackle congestion by **area-wide traffic calming** rather than by adding bus lanes. The case of route **15** in the inner city is a good example: instead of continuous bus lanes on narrow streets, the creation of a large access-only zone with filtered permeability removed most through-traffic of private cars, and buses became reliable without heavy infrastructure.

On major network elements and strategic radial corridors, however, conventional traffic calming is usually not feasible. In these cases bus lanes – ideally with physical separation – are essential. Where illegal use of bus lanes would confer a disproportionate advantage, **automatic camera enforcement** or, where appropriate, physical measures such as automatic rising bollards or gates should be considered, coupled with automatic penalty processing.

Where full-length bus lanes cannot be provided, **traffic-signal "gating"** can be used to keep flows below the "congestion threshold" on the shared section, and **queue-jump lanes** can give buses a clear advantage at key junctions.

Modern modular protection elements – bolt-down kerbs, plastic posts, dome-shaped bollards that can be crossed by buses but not by cars, etc. – allow for relatively cheap, reversible implementations. This is particularly useful for **"pilot" bus lanes**, where a temporary layout can be tested and fine-tuned before making it permanent.

Designating bus or public transport lanes usually does not require building new carriageway. In most cases it can be done by re-allocating the existing lanes and making minor geometric adjustments.

For physical protection there is now a wide range of modular products on the market that can be bolted into the pavement without breaking it up. These elements are mobile, quick to install and remove. This is advantageous because, on the one hand, it makes implementation much cheaper, and on the other hand, when the traffic regime needs to be changed, the layout of the bus lane can be modified within a few hours – for example during low night-time traffic – by simple installation works.

Typical off-the-shelf solutions include, for example:

		
Dome-shaped bollards made of steel or concrete; certain types are designed so that buses can drive over them, while private cars cannot.	**Screw-down plastic bollards**, a cheap and fast solution for visually and physically separating the lane.	**Modular separators** that allow the bus lane to be merged with, or separated from, tram tracks.

Because car drivers usually perceive the introduction of bus lanes contrary to their interests, communication and change management are particularly important for each such measure. Public acceptance can be improved if the bus lane is first introduced as a **temporary scheme** using these removable elements. During a trial period of a few months, traffic can adapt to the new situation, the benefits for public transport users become tangible, and any sections that genuinely need correction can be fine-tuned. After this, making the bus lane permanent usually meets much less resistance.

4 Data analysis and data availability

The analysis of bus priority performance in Budapest benefits from a relatively strong data environment. Several key datasets relevant to the operational performance of bus services are publicly available, while additional detailed datasets exist within the transport authorities but require specific institutional access.
A consolidated overview of the main data sources, their role in the analysis and the distinction between publicly accessible and institutionally held datasets is provided in the References and data sources section, with the main network inventory documented in Annex 1 and the corridor-level modelling assumptions documented in Annex 2.

First, the complete public transport network and timetable data are openly available in **General Transit Feed Specification (GTFS)** format. These datasets provide detailed information on routes, stops, scheduled travel-times and service frequencies across the entire public transport network. In addition, **real-time vehicle position data from the FUTÁR system** are publicly accessible through application interfaces. These data streams make it possible to reconstruct bus trajectories and derive key performance indicators such as actual travel-times, delays and service reliability.
Using these sources, it is possible to perform robust operational analysis of bus services, including corridor-level comparisons of scheduled and actual travel-times, variability of travel-times under congestion conditions and the examination of bottlenecks where buses experience recurrent delays.
Beyond these open datasets, further detailed information exists within the internal systems of the Budapest transport authorities. The Budapest Transport Centre (BKK) maintains passenger demand data, operational cost structures, fleet utilisation statistics and detailed traffic performance indicators. These datasets would allow more precise modelling of passenger impacts, operating costs and network performance, but access to them typically requires specific institutional agreements.
Similarly, a comprehensive **GIS layer of the bus lane network** is likely maintained by the relevant transport authorities, such as BKK or Budapest Közút. While such a structured dataset is not publicly available, it is expected to exist internally for traffic management and infrastructure planning purposes. Access to this dataset would enable a more detailed spatial analysis of the bus priority network.
Given these conditions, the analysis presented in this report relies primarily on **publicly accessible transport data combined with corridor-level case studies and targeted modelling**. This approach allows a transparent and reproducible assessment of bus priority performance while identifying areas where more detailed institutional data could further refine the analysis in future studies.[12]

[12] Where corridor-level impact figures are reported, bus travel-time values are derived from on-board operational data filtered by route, segment and date; car travel-times are approximated from time-of-day

4.1 Corridor analysis

In this part of the study we present three corridors in detail, including their historical background, implementation context and before/after results:

- **Hegyalja Road**,
- **Egressy Road**,
- **Szentendrei Road**.

For each corridor we summarise:[13]

- the original problems and rationale for bus priority;
- the traffic-engineering solution (type of lane, signal changes, turning restrictions);
- implementation cost;
- impact on travel-times and reliability for buses and cars;
- passenger time savings and changes in fleet requirement.

	Hegyalja Road[14]	**Egressy Road**[15]	**Szentendrei Road**[16]
Implementation			
Context and rationale	Implemented as part of a temporary traffic management scheme during a major bridge renovation project; later retained permanently.	Implemented specifically to improve the speed of **Trolleybus Route 77**; an independent project.	Implemented as part of the temporary traffic management scheme for a major overpass renovation project; the project is still ongoing.
Traffic management solution	Designation of an existing lane; traffic engineering measures only. No signal modification was required.	Conversion of a turning lane with the turning movement removed. After the bus lane, a shared section with restricted traffic operates without congestion.	Designation of an existing lane, currently in a temporary configuration. Signal green times were also adjusted at the entry point.
Cost (approx. EUR)	26,000	13,000	26,000
Operational results			

route-planner data; passenger volumes are based on BKK automated passenger counts; and road-traffic values rely on the permanent detector network.

[13] Source note: Bus travel-time and reliability values are derived from on-board vehicle data available across the Budapest bus fleet, filtered by route, segment and date for before–after comparison. Car travel-times were approximated using time-of-day journey-time data from Google route planning. Passenger volumes are based on BKK's automated passenger counts, carried out twice a year over two-week periods and tabulated by line and corridor. Road-traffic volumes are derived from the city's permanent detector network at major junctions. Where monitoring is still ongoing, reported values should be treated as provisional.

[14] https://maps.app.goo.gl/qsTphCwC9prJriid8

[15] https://maps.app.goo.gl/87WhU2TmZv7xY6s5A

[16] https://maps.app.goo.gl/QrNHe1yBrRSqbzSV8

	Hegyalja Road[14]	Egressy Road[15]	Szentendrei Road[16]
Travel-time reduction achieved (min)	4	5.5	5
New bus travel-time after implementation (min)	2	6.5	4
Car travel-time (min)	6	10	8
Travel-time variability before the project (min)	8	5	10
Travel-time variability after the project (min)	3	4	5
Peak-hour passenger volume	approx. 1,800	approx. 330	approx. 1,000
Estimated passenger time savings per weekday[17]	7,200 minutes	1,815 minutes	5,500 minutes
Indicative fleet requirement effect	Up to 2 articulated buses	Up to 1 articulated trolley bus	Up to 2 articulated buses

4.1.1 Key takeaway

All three interventions required very low-cost traffic management measures (EUR 13,000–26,000) yet produced substantial travel-time savings and reduced vehicle requirements, delivering thousands of passenger-minutes saved every weekday.

4.1.2 Investment efficiency indicator

	Hegyalja Road	Egressy Road	Szentendrei Road
Estimated passenger time savings per weekday[18]	7,200 min	1,815 min	5,500 min
Implementation cost	€26,000	€13,000	€26,000

[17] Passenger-time savings are estimated for the directly affected passenger flows and analysed time periods. They are not calculated as total corridor peak-hour ridership multiplied by the maximum observed time saving.

[18] Passenger-time savings are estimated for the directly affected passenger flows and analysed time periods. They are not calculated as total corridor peak-hour ridership multiplied by the maximum observed time saving.

	Hegyalja Road	Egressy Road	Szentendrei Road
Passenger-minutes saved per €1,000 investment	277	140	212

6. Figure Estimated passenger-minutes saved per €1,000 of implementation cost, based on weekday passenger-time savings in the analysed periods.

Rank	Corridor	**Passenger-minutes saved per €1,000 investment**
1	Hegyalja Road	277
2	Szentendrei Road	212
3	Egressy Road	140

7. Figure Illustrative mini-ranking of bus priority interventions based on passenger time savings per €1,000 invested (Hegyalja, Egressy and Szentendrei examples).

4.1.3 Bus vs car travel

Delay distribution by segment

Because of corridor lengths and data availability, we analyse delay distributions at corridor level rather than at the level of individual segments.. On Hegyalja út the new bus lane connects two existing priority sections; on Szentendrei út it extends an inner bus lane further out; on Egressy út it is an isolated, relatively short priority section.

Punctuality and variability

In all three cases the variability of bus running times has decreased significantly. On the longer, more continuous priority sections (Hegyalja, Szentendrei) the spread of travel-times has fallen by around **50%** in peak hours. On Egressy út, where the intervention is shorter and more localised, the improvement is more modest (around **10%**), but still visible.

Turning times and layover impacts

On all three corridors, terminal layover times have been reduced: buses no longer need to absorb large and unpredictable delays at the end of the route. Effectively, vehicles that were previously needed as “insurance” against congestion have been freed up. All three corridors have very frequent services with no scheduled inter-line connections, so the main benefit has been in resource efficiency and perceived reliability.

4.1.4 Impact of taxi and/or bicycle traffic on different types/sections of bus lanes

Hungarian traffic law allows **licensed taxis** that are actively carrying passengers to use bus lanes. In practice, enforcement is weak and many types of taxi use the lanes, which can reduce bus speeds if volumes are high.

People cycling often disregard formal restrictions on bus-lane use. Where a lane is narrow and heavily used by buses, cycle traffic tends to remain low even if it is legally permitted. Conversely, if using the bus lane is clearly more comfortable and direct than the adjacent general-traffic lane, cycling people will appear even when the lane is formally restricted. This confirms the importance of consistent and realistic designs for shared bus–bike sections.

4.2 Economic modelling

For the purposes of the economic appraisal, the monetised analysis distinguishes between two direct benefit streams:

• passenger-time savings;

• public transport operating benefits from lower fleet and driver requirements.

Emissions and energy impacts are discussed separately as additional, non-monetised benefits.

A simplified cost–benefit analysis (mini-CBA) has been carried out for the three example corridors analysed in this study. The calculation combines corridor-level travel-time improvements with operational parameters such as service frequency, passenger volumes and vehicle operating costs. The results provide indicative estimates of the economic value of travel-time savings and potential operating cost reductions associated with bus priority measures. Beyond these direct economic benefits, reliable public transport corridors also support school-related travel patterns, reducing the need for car-based escort trips by parents.
The corridor-level results of this simplified economic appraisal are summarised in WP3 and in the accompanying corridor-level benefit table, while the methodological assumptions are documented in Annex 2.

4.2.1 Emissions avoided (per corridor and city-wide)

If the introduction of a bus lane or signal-priority scheme reduces corridor round-trip times by roughly equivalent to the service headway, then one vehicle can be removed from the operating schedule or reallocated to provide higher service frequencies without worsening reliability. This can directly reduce fuel or electricity consumption and, at the same time, lower requirements for capital investment, staff resources and depot capacity.

More generally, by keeping buses moving and enabling some mode shift from car to bus, priority schemes reduce total vehicle-kilometres driven by private cars. Based on standard European emission factors and the simplified economic modelling described above, the analysis estimates

CO_2 and pollutant reductions per corridor. These results are then used to produce an indicative city-wide estimate of potential emission reductions under a scenario in which bus priority is systematically introduced along the main bus corridors of the city.

The corridor-level modelling results also provide the basis for the city-wide extrapolation presented in the summary table of economic benefits, which indicates the potential order of magnitude of annual societal benefits if the “bONuszsáv” approach were applied systematically across the main bus corridors in Budapest.

The detailed assumptions and calculation steps of the simplified corridor-level cost–benefit analysis are documented in the accompanying Annex 2, which contains the simplified corridor-level CBA model used for Hegyalja út, Egressy út and Budafoki út, including travel-time assumptions, headways, passenger volumes, time-value assumptions, fleet-saving logic and indicative annual benefit estimates. It provides the transparent numerical basis for the direct-benefit calculations summarised in the main text.

Economic results summary

The simplified economic modelling carried out for the three example corridors suggests that bus priority measures can generate substantial societal benefits even with relatively modest infrastructure interventions.

For the analysed corridors, the estimated annual benefits consist primarily of passenger travel-time savings and operational efficiency gains. Together, these amount to approximately €3–4 million per year across the three example corridors.

When extrapolated to the main bus corridors of Budapest under a scenario of systematic bus priority implementation, the potential order of magnitude of the annual monetised benefits is estimated at €20–30 million per year. This estimate covers passenger time savings and operating cost-savings only. Emissions and energy effects are additional benefits but are not monetised in this report.

The results underline that targeted corridor interventions — particularly at congestion bottlenecks — can deliver disproportionately large benefits relative to their low implementation costs.

5 WP1: Report on the bus lane status of Budapest

Budapest currently has about **88 km** of lanes reserved for public transport, combining classic kerbside bus lanes and public-transport lanes on tram tracks or centre-running alignments. Officially the Hungarian Highway Code (KRESZ) does not recognise a separate "public transport lane" category; such lanes are defined by combinations of signs and markings, and typically serve trams and buses together.

Bus lanes in the legal sense are usually implemented on the outer lane of the carriageway. Taxis providing passenger transport are allowed to use them, and in practice many taxis do. Protection is generally weak; legal turning movements, parking manoeuvres and illegal stopping all reduce the effective capacity of bus lanes. Effective enforcement is therefore essential if their operational benefits are to be realised in practice.

Overall pavement condition mirror the general state of the road network.

Type of lane	No bicycle access	Bicycle access allowed
BKK lanes (excluding taxis)	22 km	1 km
Bus lanes	42 km	23 km
Total	**64 km**	**24 km**

8. Figure Characteristics of the current bus-lane network in Budapest

Of the 88 km total, 64 km do not permit bicycle use and 24 km do. Within the full 88 km network, 23 km are stricter BKK-managed lanes that exclude taxis; the remaining 65 km operate as regular bus or public-transport lanes, some of them shared with bicycle traffic. From a network-development point of view, most of the politically and technically "easy wins" have already been realised. The symbolic high-profile example is **Chain Bridge**, where private cars were removed and the bridge now serves passengers of public transport, taxis and people cycling. The more difficult next generation of projects is different in nature: these are missing bus-priority sections where **continuous peak-period delays of around three minutes or more** could still be eliminated, but only through more substantial works. Examples include the **Róbert Károly körút overpass**[19], the **Csepel access crossing**[20], and the **M0–Lakihegy interchange**[21], all of which would require significant structural intervention rather than simple re-striping.

A more detailed inventory of the existing and missing bus-lane network in Budapest, including indicative ratios of protected and unprotected sections on the affected routes, is provided in Annex 1 which also provides a segment-level inventory of the network by corridor, lane type, alignment and shared-use characteristics, while Map 1 visualises the main discontinuities and the logic of connecting fragmented priority sections into larger functional corridors. Together, these materials illustrate that the key challenge in Budapest is not the complete absence of bus lanes, but the fragmentation and uneven continuity of the existing network.

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[19] https://maps.app.goo.gl/Huhjv7UyW9Gve8qN7
[20] https://maps.app.goo.gl/Huhjv7UyW9Gve8qN7
[21] https://maps.app.goo.gl/Huhjv7UyW9Gve8qN7

6 WP2: Corridor performance profiles

To illustrate the operational impacts of bus priority measures, the study examines three representative corridors in Budapest: Hegyalja út, Egressy út and Szentendrei út. These corridors represent different types of urban traffic environments and demonstrate how bus priority interventions can improve reliability and operational efficiency.

The key issue is not individual bus-lane segments in isolation, but whether priority works across the full corridor and the wider line network. Even well-designed segments lose much of their value if buses still face delay at the next junction or bottleneck.

The analysis reconstructs corridor performance using publicly available timetable data and real-time vehicle position information. This allows the comparison of scheduled and actual travel-times, the analysis of travel-time variability, and the estimation of operational impacts such as vehicle requirements.

The results show three main effects of bus priority measures.

- They reduce average travel-time.
- They improve reliability by reducing the frequency and severity of delay events.
- They improve the relative performance of buses compared with general traffic, especially on congested corridors.

A further operational consequence is that shorter and more predictable round-trip times can reduce fleet requirements or support higher frequencies with the same resources.

Together, the three corridor examples demonstrate that bus priority can improve urban mobility through a combination of travel-time savings, reliability improvements and operational efficiency gains. These operational findings provide the empirical basis for the Economic modelling chapter.

The diversity of intervention types in Budapest—from minor operational improvements to corridor-level redesign—illustrates the range of implementation pathways available. Selected examples of both “light” and “structural” interventions are summarised in the chapter 9.2 Implementation pathways for bus priority in Budapest (WP5).

Detailed visualisations supporting the corridor analyses – including travel-time profiles, bottleneck locations and user impacts – are provided in the visual chapter (WP5).

Historically, the design of bus lanes in Budapest has often prioritised maximising intersection capacity for general traffic. As a result, many bus lanes end a few tens of metres before traffic signals, forcing buses to merge with general traffic at the most critical points of the corridor. This design approach explains why several corridors experience significant bus delays despite the presence of bus lanes.

7 WP3: Economic impact assessment

Improvements in service reliability generate passenger benefits beyond simple travel-time reductions, as shown in several studies on public transport reliability and crowding costs [22]

7.1 Scope and methodological approach

The economic assessment evaluates the direct benefits generated by bus priority interventions on three representative corridors in Budapest. These corridors illustrate different types of operational improvements within the existing bus priority network, including the extension of existing priority sections, the removal of bottlenecks between fragmented segments, and targeted interventions at specific congestion points.

The analysis is based on corridor-level modelling of operational improvements resulting from bus priority measures. The calculations focus primarily on **travel-time savings and fleet requirements**, which represent the most immediate and measurable impacts of bus priority. However, the assessment also considers the broader chain of economic benefits generated by improved public transport performance.

The monetised assessment focuses on two direct benefit categories: [23]

- passenger time savings,
- public transport operator savings resulting from reduced fleet requirements.
- Operational efficiency, emissions and energy effects are discussed as additional impacts but are not included in the monetised total.
-

The modelling uses operational and economic parameters derived from the corridor-level calculations and the Budapest bus lane database.

[22] Hörcher et al., 2017

[23] Emission factors and external cost estimates used in the calculations follow the methodology of the European Commission’s Handbook on the External Costs of Transport.

7.2 Corridor-level results

The corridor-level modelling was carried out for three representative corridors in Budapest where bus priority interventions were analysed in detail:

- **Hegyalja Road corridor**
- **Egressy Road corridor**
- **Szentendrei Road corridor**

These corridors represent different types of operational bottlenecks and bus priority interventions within the Budapest bus network.

Corridor	Estimated annual benefits (€)	Primary benefit of drivers	Intervention type
Hegyalja Road	1.42 million	passenger time savings, reliability improvements	connecting fragmented bus lanes
Egressy Road	0.46 million	Travel-time reduction, targeted bottleneck removal	short bottleneck bus lane
Szentendrei Road	1.53 million	passenger time savings, improved operational efficiency	corridor priority extension

9. Figure Corridor-level economic benefits

Total annual direct benefits (three corridors):
approximately **€3.42 million per year**
These benefits arise primarily from passenger time savings and improved fleet utilisation resulting from faster and more reliable bus operations.
The three analysed corridors correspond to the detailed modelling cases presented in the previous chapters of the study (Hegyalja út, Egressy út and Szentendrei út), which together represent different types of bus priority interventions within the Budapest network.[24]

7.3 Passenger time savings

Passenger time savings represent the largest component of the economic benefits generated by bus priority measures.
Passenger benefits result from three related but distinct effects:

- lower average in-traffic delay,
- more predictable running times,
- fewer extreme delays that increase transfer risk and buffer-time needs.

[24] A city-wide estimate should be interpreted as an order-of-magnitude indication based on corridor-level modelling, rather than as a precise forecast.

This distinction is important because passengers benefit not only from shorter average journeys, but also from more reliable and more easily planned ones, especially where delays affect transfers or require additional time buffers.

-

Because bus corridors carry thousands of passengers per hour during peak periods, even small reductions in travel-time per passenger translate into significant aggregate benefits. The corridor modelling uses observed before–after travel-time differences on the affected corridor sections, while keeping the wider service pattern unchanged.

7.4 Public transport operator benefits

Bus priority also generates significant benefits for public transport operators by improving operational efficiency.
Reducing travel-times and delays reduces round-trip times, which allows the same level of service to be operated with fewer vehicles.
The modelling assumes an **average operating cost of approximately €210,000 per bus per year**, based on the assumptions included in the corridor-level benefit calculations. Even small reductions in round-trip time can therefore translate into substantial economic value through improved fleet utilisation.
In practice, the resulting operational savings may be used either to reduce costs or to reinvest resources into higher service frequency.
Where cycle-time savings are insufficient to remove a full vehicle from the schedule, the benefit should be interpreted as improved resilience or scope for frequency improvement, rather than as a immediate cash saving.

7.5 Role of bus corridor intensity

The Budapest bus lane database also provides information on the **number of bus routes operating on each corridor during peak periods**.
This indicator is important because the economic benefits of bus priority are strongly correlated with corridor intensity. Corridors with a higher number of bus services generate greater passenger time savings and operational benefits.
This information is therefore used as a proxy measure when identifying corridors with the highest potential for bus priority interventions.

7.6 City-wide implications

The three analysed corridors represent only a small portion of Budapest's bus network. The bus lane database shows that Budapest already has a substantial number of bus priority segments. However, these sections are often fragmented and do not form continuous priority corridors.
This means that the main potential lies not only in constructing new bus lanes, but also in **connecting existing priority sections and removing bottlenecks**.

Applying the bONuszsáv approach – systematically improving the main bus corridors by eliminating priority gaps and operational bottlenecks – could therefore generate significantly larger annual system-level benefits.

A simple extrapolation based on the corridor-level results suggests that upgrading the main bus corridors of Budapest could generate benefits in the order of €20–30 million per year in total societal value.
The detailed assumptions and calculation steps underlying the corridor-level model and the city-wide scaling logic are documented in Annex 2.

This figure should be read as an order-of-magnitude estimate based primarily on passenger time savings and operational efficiency. Passenger experience gains such as improved predictability and lower transfer risk remain relevant, but are not monetised separately here in order to avoid double counting.
[25]

7.7 Interpretation

The results support the view that bus priority measures are typically among the most cost-effective urban transport interventions available to cities, especially where they address high-demand bottlenecks with limited implementation cost. This report does not present a full comparative appraisal of all alternative capacity-expansion options, but the corridor results are consistent with that broader conclusion.

Compared with large infrastructure investments, bus priority measures:
require relatively limited investment,
can often be implemented quickly,
deliver benefits to a large number of passengers.

Alternative ways of increasing capacity on major urban corridors also exist, including new metro construction, urban road tunnels or bypass-type road projects. However, these operate on a very different cost and delivery scale. As an illustrative reference point, recent Hungarian projects suggest that one kilometre of metro or urban road tunnel infrastructure can be in the order of €140 million, while bypass-type road construction may be around €2.5 million per kilometre, before considering any additional network-management measures needed to protect inner urban streets.[26]

[25] See **Annex 3** for the methodological explanation of the corridor-to-city extrapolation.
[26] Illustrative order-of-magnitude references only. The metro/tunnel benchmark is based on indexed cost references from recent Hungarian projects such as Metro Line 4 and the M85 Bécsi Hill tunnel. The bypass-road benchmark refers to typical at-grade bypass-type road construction costs and is included here only to indicate the very different cost scale of alternative capacity-expansion approaches.

The analysis of the three example corridors demonstrates that even targeted improvements can generate substantial economic returns. For this reason, systematic bus priority programmes should be considered a key component of sustainable urban mobility policy.

7.8 Operational factors and implementation conditions

The corridor analyses and the economic modelling presented in the previous sections demonstrate that bus priority measures can generate substantial benefits in terms of travel-time reliability, operational efficiency and emissions reduction. However, the magnitude of these benefits depends not only on the physical presence of bus lanes but also on several operational and regulatory factors.

In particular, the effectiveness of bus priority corridors is strongly influenced by signal priority at intersections, enforcement of lane restrictions, the continuity of priority lanes, and the interaction with other street uses such as cycling infrastructure, loading activities and local access. These benefits should be interpreted as contingent on effective implementation. Signal priority, enforcement, lane continuity and curbside management are not side issues; they are conditions for achieving the estimated results. These aspects determine whether a bus priority intervention functions as an isolated corridor improvement or as part of a coherent network-level strategy.

The following chapter therefore translates the analytical findings into a targeted implementation roadmap for Budapest. It assesses priority intervention types, key user groups and institutional conditions required for successful implementation, including enforcement reform, traffic signal prioritisation strategies and design approaches for shared or adjacent bus–cycling corridors.

8 WP4: Policy recommendations input

This chapter translates the analytical findings of the previous work packages into a Budapest-specific targeted roadmap. It brings together three elements: who benefits from improved bus priority, on which corridors the first visible changes should take place, and which policy tools are most appropriate in each context. The roadmap is designed to bridge the gap between the technical analysis and the bONuszsáv public campaign, so that decision-makers, NGOs and citizens can all see how bus lanes deliver tangible everyday benefits.

8.1 Rationale and scope

Improving bus priority in Budapest is not only a question of traffic engineering. It is about making everyday travel more predictable for current passengers, creating a credible alternative for habitual car users, and reducing inequalities between neighbourhoods with strong rail connections and those that rely almost entirely on buses. It is also about supporting the implementation of the Budapest Mobility Plan and the BKK network development strategy by giving buses priority where they carry the largest number of people.

The targeted roadmap focuses on three interlinked dimensions:

- user groups – who is most affected by bus priority, what are their typical daily problems on Budapest streets and what kind of messages can convince them;
- priority corridors – where bus lanes and related measures can deliver the largest combined benefits in terms of time savings, reliability and social equity;
- implementation toolbox – which mix of enforcement, traffic light priority, shared bus–bike designs and logistics solutions is suitable for different corridor types (inner-city axes, radial arterials, outer-district sections, airport and regional approaches).

The following sections describe the main target groups and corridor types that will later be quantified and illustrated with Budapest-specific data, focusing in particular on three flagship example corridors: Hegyalja út, Egressy út and Szentendrei út.

8.2 Target groups and core messages

Bus priority measures affect a broad range of people, not only those who already use the bus. For each key group below we highlight typical issues on Budapest corridors, perceived risks and potential gains, and sketch the type of narrative that can support both policy-making and the bONuszsáv campaign.

The communication case for bus priority is strengthened by survey evidence showing that a clear majority of respondents in Budapest support converting some traffic lanes on major roads into bus or tram lanes if this helps make public transport faster and more reliable. This is highly relevant for the bONuszsáv campaign, as it indicates that lane reallocation can be framed not as an anti-car gesture, but as a publicly understandable way to improve mobility performance.

8.2.1 Existing bus passengers on the core network

Existing bus passengers on the main radial and ring corridors – for example those using the “bus-line family” 7 between the outer districts and the inner city, or the intensive services on Szentendrei út and Hegyalja út – are the first natural beneficiaries of bus lanes. They experience day-to-day variability in travel-times: a Hegyalja–Erzsébet híd–Belváros trip can feel reasonably fast on one day and much slower on another, even at similar hours. This makes it difficult to plan arrival times and contributes to the perception that buses are an unreliable, “second-best” mode compared to rail or car.

For this group, the most important gain is not only a shorter average travel-time but a more stable and predictable one. The core message is that bus lanes and signal priority are tools to protect their time: to ensure that the bus is not trapped in the same congestion as cars and that scheduled headways can be maintained more reliably. On the three flagship corridors, before–after figures on delay and variability during the morning peak will be used to make these benefits visible.

8.2.2 Potential bus users: today mostly driving, sometimes cycling

A second key group consists of people who currently commute mainly by car and occasionally by bicycle, for example along Szentendrei út, Hegyalja út, Egressy út or other multi-lane arterials. Many of them feel that, given current service levels and congestion patterns, public transport does not represent a competitive option on their main routes. At the same time, they are confronted daily with the hidden costs of car use: time lost in congestion, stress and uncertainty of parking, and exposure to volatile fuel and maintenance costs.

For communication purposes, this group should not be addressed as an "opponent" to bus priority, but as a group whose everyday travel frustrations are also rooted in congestion, unpredictability and the lack of credible alternatives. The aim is therefore not to "punish drivers", but to make the limited street space work better for more people, while also creating a realistic option to leave the car at home on some trips.

For them, bus priority must create a clear and credible advantage: the perception that in certain corridors and time periods "it actually pays off to take the bus". On Hegyalja út this means visibly overtaking stationary traffic queues on the climb and at the approach to Erzsébet híd; on Szentendrei út it means that buses can bypass predictable bottlenecks near major junctions and shopping areas; on Egressy út it means that a well-timed bus lane and queue-jumps protect buses from evening peak congestion. These advantages need to be backed up by simple comparative figures (door-to-door travel-times, variability) and by any frequency improvements that become possible thanks to more reliable running times.

8.2.3 Car commuters from outer districts and hinterland

In several outer districts and neighbouring municipalities – for example Rákosmente, parts of Csepel, Soroksár or the northern suburbs along Szentendrei út – public transport still struggles to compete with the car, especially for longer multi-leg trips. For these car commuters, the introduction of bus lanes may initially be perceived purely as a loss of road capacity, without any visible alternative.

The roadmap proposes an honest framing: bus lanes on certain sections and at certain times do make car use less attractive, but they are a precondition for launching or upgrading bus services that can eventually offer a viable option to the same people. On outer sections of Szentendrei út and on corridors like Pesti út, this means that new or strengthened “metrobus” type services can be run at high frequency with reliably shorter and more predictable running times. In the long run, this group gains a genuine choice: they can continue to drive, accepting more realistic travel-times and parking constraints, or they can switch to a bus service that is no longer stuck in the same traffic.

8.2.4 Taxi drivers and passengers

Taxi drivers share road space with buses in a specific way. In Budapest they are generally allowed to use bus lanes, which is a significant operational advantage – provided that lanes are actually kept free from illegal stopping and parking. At the same time, they need safe and legal places for pick-up and drop-off near major attractors such as the inner city, large office clusters or transport hubs.

From their perspective, the roadmap underlines that well-designed and well-enforced bus lanes, combined with clearly marked stopping bays at key locations along corridors such as Hegyalja út, Szentendrei út or Rákóczi út, are (or would be) beneficial. They ensure more predictable travel-times and fewer conflicts with enforcement. Messaging towards this group should focus on maintaining their access to bus lanes while clarifying stopping rules and avoiding designs that put them in impossible situations (for example, long stretches without any legal pick-up anddrop-off possibilities).

8.2.5 Children and families (including independent school travel)

A significant share of everyday urban mobility involves children travelling with parents or independently to schools, sports facilities and leisure activities. Reliable public transport corridors combined with safe walking and cycling access are essential for this group.

Bus priority corridors play a key role in enabling these trips by ensuring predictable travel-times for school-related journeys and by reducing traffic pressure in the surrounding street network.

8.2.6 Bicycle users using or crossing bus corridors

Bicycle users are both direct users of some bus corridors and important allies in rebalancing street space away from car dominance. In Budapest there are several precedents of shared bus–bike lanes on wide outer lanes, as well as cases where bus lanes and cycle traffic interact closely on multi-lane radials such as Bajcsy-Zsilinszky út.
The roadmap distinguishes between corridors where shared bus–bike lanes are a good solution and where they should be avoided. On carriageways with wide outer lanes, professional and trained bus drivers, and predictable, well-organised bus operations, a well-designed shared lane can provide a calmer environment for people cycling than mixed car traffic, provided that speed is controlled and stopping patterns are clear. Elsewhere, protected cycle lanes, tracks or other parallel calm could be applied – for example along sections of Egressy út or on inner-city axes with very high bus and general traffic volumes. Communication towards cycle users should stress that the design of each corridor will explicitly consider their safety and comfort, rather than treating them as an afterthought.

8.2.7 Local residents along bus corridors

Residents living along busy bus corridors such as Hegyalja út, Egressy út, Szentendrei út or Rákóczi út are both potential public transport users and people directly exposed to the impacts of traffic: noise, air pollution, road safety risks and parking pressure. Some residents may initially perceive bus lanes as a measure that primarily benefits “through traffic” at their expense, especially if car travel becomes slower at certain times.
The roadmap highlights that residents stand to gain in two ways. As passengers, they benefit from faster and more reliable access to jobs, schools and services (for example, reaching the inner city or major interchanges on time). As residents, they gain calmer traffic patterns and a clearer hierarchy of movement and parking. Priority should be given to corridor designs that combine bus lanes with measures to reduce through car traffic, improve crossings for people walking and cycling (by the reduction of danger towards VRU’s) and manage loading and parking in a way that reduces chaotic stopping on the carriageway.

8.2.8 Urban freight and delivery operators

Reliable access to shops, offices and residential buildings is essential for urban freight and delivery operators, especially in dense urban areas inside the Hungária ring. The lack of designated, usable loading spaces is not only a logistics problem, but also a broader shortcoming in kerbside management and everyday street operation. Such loading spaces should be provided much more consistently regardless of whether a bus lane is present, particularly around busy inner-city corridors and major junctions.

From the perspective of bus priority, this becomes especially important because the same lack of kerbside management that leaves delivery vehicles without proper loading options also weakens the operation of bus lanes. On corridors such as Rákóczi út, Kossuth Lajos utca, Üllői út or the Grand Boulevard, if loading needs are not addressed in advance, delivery vehicles may easily end up stopping in the outer lane or directly in the bus lane. This is not a problem because logistics operators are "in the way", but because the city does not provide predictable and lawful operating conditions for them. The result is reduced bus reliability, more conflicts around enforcement and a less orderly use of street space.

For this group, the roadmap therefore proposes not merely a complementary measure to bus-lane development, but a broader kerbside-management framework: designated and concentrated loading areas at strategic points, combined with time windows and predictable rules. These measures are needed regardless of bus lanes, but they become particularly important where outer lanes also serve public transport or cycling functions.

The aim is not to push urban logistics operators out, but to organise their activity in a way that enables lawful loading and delivery, protects the reliability of bus services, and makes streets safer and more orderly.

8.3 Priority corridors and flagship projects

Based on the network overview and performance analysis, the roadmap identifies a limited number of flagship corridors where bus lanes and complementary measures can deliver particularly strong benefits. These corridors serve as demonstrators: places where citizens can clearly see and feel what bus priority means in practice. In Budapest, three such corridors are examined in detail: Hegyalja út, Egressy út and Szentendrei út.

8.3.1 Hegyalja út – radial Buda corridor

Hegyalja út is one of the most important radial corridors on the Buda side of Budapest. It carries significant bus passenger volumes while also being strongly exposed to peak-hour congestion. The corridor is served by several bus routes connecting the Buda hills and the south-western parts of the city with the inner city and with major nodes of the rail-based public transport network. Improving bus travel times and reliability here can therefore have a visible impact not only at the level of individual routes, but also at corridor level.

Hegyalja út is particularly well suited to presenting bus priority not simply as the designation of bus lanes, but as a high-quality, high-frequency surface public transport service. In this sense, this is the corridor where the "Metrobus" concept fits most naturally: a frequent, reliable, clearly recognisable and consistently prioritised bus service that can provide a level of predictability in everyday travel comparable to rail-based systems, in areas where metro or rapid rail access is not directly available.

The Hegyalja út interventions are therefore not only about speeding up buses, but also about using street space more efficiently on one of the city's key radial corridors. More continuous bus lanes, junction-level priority, traffic-signal interventions and enforcement can together deliver a quality-of-service improvement that offers a visible alternative to car travel. From a communication perspective, Hegyalja út can therefore serve as a strong example of how bus priority is not a narrow traffic-engineering issue, but a practical tool for improving the everyday functioning of the city.

8.3.2 Egressy út – inner-district connector with local functions

Egressy út is an important connector in the eastern Pest districts, linking residential areas, schools and workplaces to the Hungária ring and beyond. It combines relatively high bus traffic with local access needs, cycling activity and significant turning movements at junctions. In peak periods, buses are exposed to queues at traffic lights and to friction from parking and loading on the outer lanes.
Selective bus lanes, queue-jump sections and junction-level priorities can significantly improve bus reliability on Egressy út without fundamentally altering its local access role. Because of the mix of functions, this corridor is well suited to demonstrate how bus priority can be combined with better organised parking, loading and cycling facilities, rather than being presented as a zero-sum game between modes.

8.3.3 Szentendrei út – high-volume northern radial

Szentendrei út is one of Budapest's most important northern radial corridors. It carries substantial general traffic as well as significant bus passenger demand, while being shaped by frequent signalised junctions, roadside commercial functions and side-street connections. It is also one of the key Budapest access corridors for the northern suburban area and regional traffic.

A specific feature of this corridor, however, is that many bus routes run in parallel with the H5 suburban railway. For this reason, bus priority on Szentendrei út should not primarily be framed as a standalone "Metrobus"-type trunk service. The question here is rather how the bus network can provide a reliable complementary, feeder and local access function along a corridor where a rail-based service already exists, but does not cover every travel need, destination or local connection.

On Szentendrei út, bus priority therefore primarily serves to improve the performance of existing network functions. Longer and better-enforced bus lanes, targeted traffic-signal priority, and clearly designated loading and access points can bring significant travel-time and reliability benefits for passengers using the corridor. This is particularly important on sections where buses provide local links, access to HÉV stations, or connections to destinations that cannot be reached directly by the H5.

Szentendrei út is therefore not primarily a demonstration corridor for the “Metrobus” concept. Rather, it is an example of how bus priority can improve the overall functioning of the public transport network even alongside an existing rail-based corridor. The aim here is not to set parallel services against each other, but to clarify their roles: the H5 provides the high-capacity trunk connection, while the bus network works best when it reliably connects local destinations, feeder movements and travel directions that the suburban railway alone cannot serve.

8.3.4 Other corridor types and future candidates

Beyond the three detailed examples, the roadmap also looks at other corridor types. Inner-city axes such as Rákóczi út–Kossuth Lajos utca or Üllői út offer strong visibility and historical precedents for bus priority, but their development also concentrate political and operational risks; they may thus be framed as later-phase or “once conditions allow” projects. Outer-district corridors like Pesti út or routes in Rákosmente, Csepel and Soroksár are essential from a social equity perspective, as they serve large bus-dependent populations with limited rail alternatives.

For each corridor type – inner-city axis, radial arterial, outer-district connector, airport and regional approach – the roadmap proposes indicative phasing and a small number of pilot locations, to be refined as data and political conditions evolve.

8.4 Implementation and communication considerations for bus priority measures

The corridor analysis and economic modelling demonstrate that bus priority measures can generate significant benefits in terms of travel-time reliability, operational efficiency and emissions reduction. However, international experience and the recent examples from Budapest show that the success of such measures depends not only on their technical design but also on how they are introduced, enforced and communicated.

For this reason, the implementation of bus priority corridors should be accompanied by a careful strategy addressing several operational and political risk factors.

The success of bus-priority measures depends not only on engineering quality, but also on how they are introduced and communicated.

First, implementation should preferably be **gradual**. If car traffic is slowed down suddenly and visibly, this can quickly become a media and political story. One hundred cars standing in a queue becomes the headline; one delayed bus carrying one hundred passengers usually does not. Pilot schemes, temporary layouts and phased roll-out can accordingly be more robust than abrupt permanent changes. This gradual approach is consistent with recent Budapest practice: the BKK's February 2026 committee note[27] describes a bus-acceleration programme based on low-cost, staged interventions such as signal retiming, bus-lane extensions and other traffic-management corrections, with measurable time savings already reported on multiple corridors.

Second, **public transport priority alone is rarely a sufficient political narrative**. Recent Budapest experience broadly supports this pattern. Politically more difficult bus-priority measures were often introduced either in connection with a wider project or through temporary traffic-management arrangements, while stand-alone signal-priority or lane-reallocation schemes proved more vulnerable to public backlash and political reversal. More substantial reallocations of road space are easier to introduce when linked to a wider and more understandable urban objective, such as a bridge renovation, a railway project, a safety intervention or a public-space upgrade. Temporary or modular implementation is especially useful in such cases, because it lowers the political threshold and allows fine-tuning before permanent works are carried out.

Third, **bus lanes need visible passenger legitimacy**. Their strongest justification is that they protect large numbers of people travelling on frequent and busy routes. On corridors with infrequent or lightly used services, dedicating road space is much harder to defend in public debate. On corridors with full buses and short headways, the argument is far easier to communicate.

Fourth, **operator cost savings should not be the leading public argument**. While reduced fleet requirement and lower operating cost are real benefits, these are better kept

27 https://einfoszab.budapest.hu/Session/DvdItem/130479?sessionType=4&organizationtype=2&parentId=18540&parenttype=4&key=fovarosi-kozgyules-bizottsagainak-nyilvanos-ulesei&type=5&fbclid=IwY2xjawQgA9hleHRuA2FlbQIxMABicmlkETBVVUk3N25JdldrYjk3M21Xc3J0YwZhcHBfaWQQMjIyMDM5MTc4ODIwMDg5MgABHqv1LQGTC3f_AvVsfGhyajXTFE8Uii8VUPnhLu291Al1i_E5QA_aleIAGMgv_aem_o3cp7PB71KOBYiHLxIqQ6Q

as secondary, expert-level arguments. In public communication, the emphasis should remain on passenger time savings, reliability, predictability and safety.

The same logic applies to traffic-light priority, enforcement, continuous lanes and modal filters. Signal-priority schemes are usually acceptable as long as they do not create highly visible new queues. Enforcement is necessary, but mass punishment can trigger backlash if it is not combined with clear communication and supportive street design. Continuous bus lanes are operationally preferable, but politically sustainable only if surrounding bottlenecks are also addressed. In dense urban areas, modal filters and access-control measures can sometimes achieve similar benefits with lower resistance, especially when framed as traffic calming rather than "taking lanes away".

In short, the political durability of bus priority depends on sequencing, framing and the ability to make its benefits tangible before its costs become visually dominant.

8.4.1 Traffic signal priority

Traffic-light priority is often one of the most effective tools for improving bus travel-times, particularly at intersections where delays accumulate.[28] However, signal-priority schemes remain politically robust only as long as they do not create highly visible congestion for general traffic.

If a change in signal timing suddenly slows down car traffic on a major approach, this can quickly trigger mass complaints, media attention or social media campaigns. In such situations decision-makers may come under pressure to roll back even technically well-designed priority measures.

For this reason, signal-priority schemes should be introduced cautiously and monitored closely in the first weeks of operation. Adjustments should be possible quickly if unexpected side effects occur. In many cases it is more effective to combine moderate signal adjustments with complementary measures such as queue-jump lanes, turn restrictions or selective access control rather than attempting to solve corridor delays through signal timing alone.

[28] Operational studies on bus signal priority (e.g. Brezina et al.) demonstrate that targeted signal adjustments at a limited number of critical intersections can produce system-wide improvements in bus travel-times without major impacts on overall traffic capacity.

8.4.2 Enforcement and compliance

Enforcement is essential for the credibility of bus priority measures, but its implementation must also be politically sustainable.

Mass enforcement through automated cameras can easily generate public backlash if a large number of fines is issued within a short period. In such cases political actors may side with drivers who were penalised, potentially leading to restrictions on enforcement tools.

Hungary provides a well-known example of this dynamic: after a high-profile case in which the spouse of a senior political figure received a fine for using a bus lane, the use of bus-lane cameras as an enforcement tool became politically constrained.

In this context enforcement should be framed not primarily as a revenue-generating activity but as a fairness and safety measure protecting bus passengers and people walking or cycling. Targeted enforcement at locations where bus-lane abuse causes the greatest disruption is generally more effective than blanket enforcement across the entire network.

In addition, enforcement should be supported by physical design solutions that reduce the temptation or opportunity for illegal lane use, such as modular separators, bollards or filtered turning movements.

8.4.3 Network continuity and corridor design

From an operational perspective, creating continuous bus lanes and closing remaining gaps in the network can significantly improve reliability. In practice, however, the political acceptability of such measures depends strongly on their perceived impact on surrounding traffic conditions.

A newly continuous bus lane may be technically sound but still become politically contested if it is perceived as the direct cause of a visible bottleneck. In such situations the debate often focuses on “giving the lane back to cars” instead of addressing the actual upstream or downstream constraints in the network.

For this reason, the design of continuous bus corridors should ensure that adjacent junctions and parallel routes are able to absorb traffic redistribution before remaining gaps are closed. Communication should emphasise that these projects are corridor upgrades improving reliability, safety and overall urban mobility rather than isolated bus-lane schemes.

8.4.4 Modal filters and access control

In dense urban areas where road space is particularly constrained, modal filters and access-control measures can sometimes achieve the same operational effect as a bus lane without formally reallocating an entire traffic lane.

Examples include filtered permeability schemes, bus gates or access-only street sections that remove through traffic while maintaining access for residents, deliveries, taxis and emergency services. These interventions allow buses (and often bicycle users) to pass freely while preventing rat-running traffic.

Such approaches are often easier to communicate locally because they are framed as protecting neighbourhood streets and improving liveability rather than as a generic restriction on car use.

A relevant example from Budapest is the reorganisation of parts of the inner-city network around bus route 15. In this case reliability improvements were achieved mainly through access management and traffic filtering rather than through extensive construction of dedicated bus lanes.

In residential areas these measures are particularly relevant around schools and playgrounds, where reducing through traffic improves safety and encourages independent mobility for children.

8.4.5 Shared bus–bike lanes

Shared bus–bike lanes can be an efficient use of space where bus frequencies, speeds and cross-sections allow for safe co-existence. Research projects such as BiTBi (Buses with Bikes)[29] have explored the conditions under which buses and bicycles can safely share street space. Their findings underline that shared lanes can function well where traffic

[29] https://bitibi.eu/

speeds are moderate and lane widths are sufficient, but alternative cycling infrastructure is preferable on high-frequency bus corridors. The roadmap builds on Budapest's experience with shared outer lanes on a few corridors such as the Bajcsy-Zsilinszky út.[30] It proposes clear criteria for their use: adequate lane width, professional and predictable behaviour of bus drivers, and designs that minimise overtaking conflicts and stopping in the lane.

On corridors that do not meet these criteria, especially where bus frequencies are very high and junctions are complex – for example on certain sections of Szentendrei út or Rákóczi út – alternative solutions are preferred: protected cycle tracks, parallel calm routes or a reallocation of road space that gives bicycle users their own safe alignment. This distinction needs to be clearly communicated to avoid framing bicycle users and bus users as opponents.

8.4.6 Logistics and loading zones

Inside the Hungária ring, logistics and loading activities create constant pressure on kerb space. Corridors such as Rákóczi út, Kossuth Lajos utca, Üllői út and parts of the Nagykörút concentrate both bus services and delivery needs. Without deliberate planning, delivery vehicles will tend to occupy bus lanes at the exact locations and times when buses most need a clear path.

This recommendation is also consistent with public attitudes. The OpinionWay survey for Clean Cities[31] suggests that goods and delivery vehicles are widely perceived as having negative impacts in urban neighbourhoods, while there is broad support for better organised and cleaner delivery systems. In this sense, curbside management and loading-zone reform are not only technical complements to bus priority, but also publicly intelligible quality-of-life measures.

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[30] Budapest has experimented with several forms of shared bus–cycle lanes, particularly in outer traffic lanes where both buses and people cycling use the same alignment. However, only a small number of these locations provide conditions that allow comfortable and predictable co-existence. In many cases lane widths are limited (typically around 3.0–3.25 m), bus frequencies are high, or the cycling connection is discontinuous and therefore does not function as part of a coherent city cycling network. Bajcsy-Zsilinszky út is therefore used here as a reference example, as it represents one of the few corridors where the shared lane operates relatively well in practice due to moderate bus frequencies, manageable speeds and a relatively continuous cycling connection through the city centre. Other locations listed in the municipal database of bus lanes formally allow cycling but often operate under more constrained conditions – for example along parts of Szentendrei út, Rákóczi út or Üllői út – where high bus volumes, complex junctions or narrow cross-sections make shared operation more challenging. For this reason the study focuses on the Bajcsy-Zsilinszky corridor as an illustrative case rather than presenting a broader set of examples.

[31] English version: https://cleancitiescampaign.org/research-list/cities-speak/
Hungarian version: https://cleancitiescampaign.org/cities-speak-magyarorszag/

The roadmap recommends sufficient curbside management by identifying concentrated loading zones on or near these corridors, with clear spatial demarcation and, where necessary, time windows for operations. These zones should be integrated into enforcement and communications so that logistics operators can adapt their practices, while the public can see that the city is not simply pushing deliveries “somewhere else”, but organising them more rationally.

8.5 Implications for the bONuszsáv campaign

The targeted roadmap provides the narrative backbone for the bONuszsáv campaign. By identifying who benefits, where the first visible changes will happen and which tools will be used, it helps move the debate away from abstract “car versus bus” arguments and towards concrete gains for specific groups: shorter and more predictable journeys from the Buda hills and large housing estates, better access to jobs and services from outer districts, calmer streets in the inner city and more organised logistics along the main corridors.
In subsequent iterations of the work, the elements outlined in this chapter could be populated with Budapest-specific quantitative indicators and visual materials: before–after charts for Hegyalja út, Egressy út and Szentendrei út, network maps of bus lanes and social equity maps. This will allow the campaign to repeatedly communicate a small set of clear, evidence-based messages along the priority corridors, anchored in everyday experiences rather than in technical jargon.

8.6 Policy implications

The findings of this study indicates that improving bus performance in Budapest does not primarily require large infrastructure investments. In many cases, targeted operational measures can already deliver significant benefits.

Key priorities include:
• closing short but critical gaps in the bus-lane network,
• introducing signal priority at congested junctions,
• improving enforcement of existing bus lanes, and
• implementing small-scale bottleneck interventions where delays are concentrated.

9 WP5: Communication support

In Budapest, the strongest communication case for bus priority is not the abstract defence of bus lanes as such, but the promise of faster, more reliable everyday journeys for large numbers of people. This includes not only current bus passengers, but also families with school-age children, older residents, and outer-district travellers whose daily routines depend on predictable access to schools, jobs, services and interchanges. In this sense, bus priority should be presented as an an essential measure for the day-to-day functioning of the city rather than a narrow traffic-engineering intervention.

A useful communication baseline for the bONuszsáv campaign is provided by the 2025 OpinionWay survey for Clean Cities[32]. The results suggest that the core campaign narrative is well aligned with public attitudes in Budapest: walking and public transport are widely used in everyday life; congestion and parking pressure are recognised as major urban problems; and there is majority support for converting some traffic lanes into bus or tram lanes where this improves public transport speed and reliability. The campaign can as a result frame bus priority not as a technocratic intervention, but as a response to already perceived everyday mobility problems in the city.

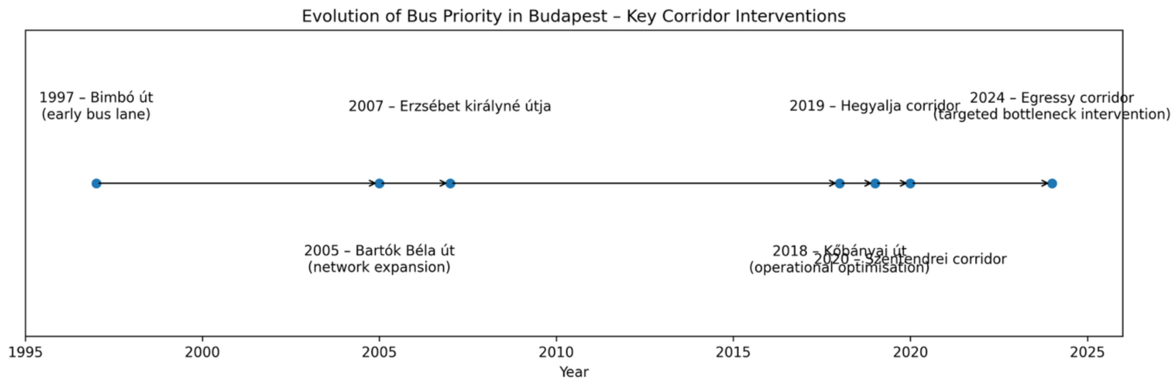
The campaign can also build on a very recent and concrete Budapest policy context. According to the BKK's February 2026 briefing note to the Climate Protection, Transport and Urban Development Committee[33], 29 low-cost bus-priority interventions had already been introduced since spring 2025, including new bus lanes, signal-timing changes and other traffic-management measures, while a further package of measures was under preparation for 2026. The same material indicates that the next set of interventions could improve travel-times on more than 30 routes and shorten daily journeys for approximately 8,000–10,000 passengers by around 1–6 minutes, depending on location. This is highly relevant for communication purposes, because it shows that bus priority in Budapest is already producing measurable results and can be presented as an ongoing programme to improve urban mobility rather than a purely theoretical proposal.

[32] English version: https://cleancitiescampaign.org/research-list/cities-speak/
Hungarian version: https://cleancitiescampaign.org/cities-speak-magyarorszag/

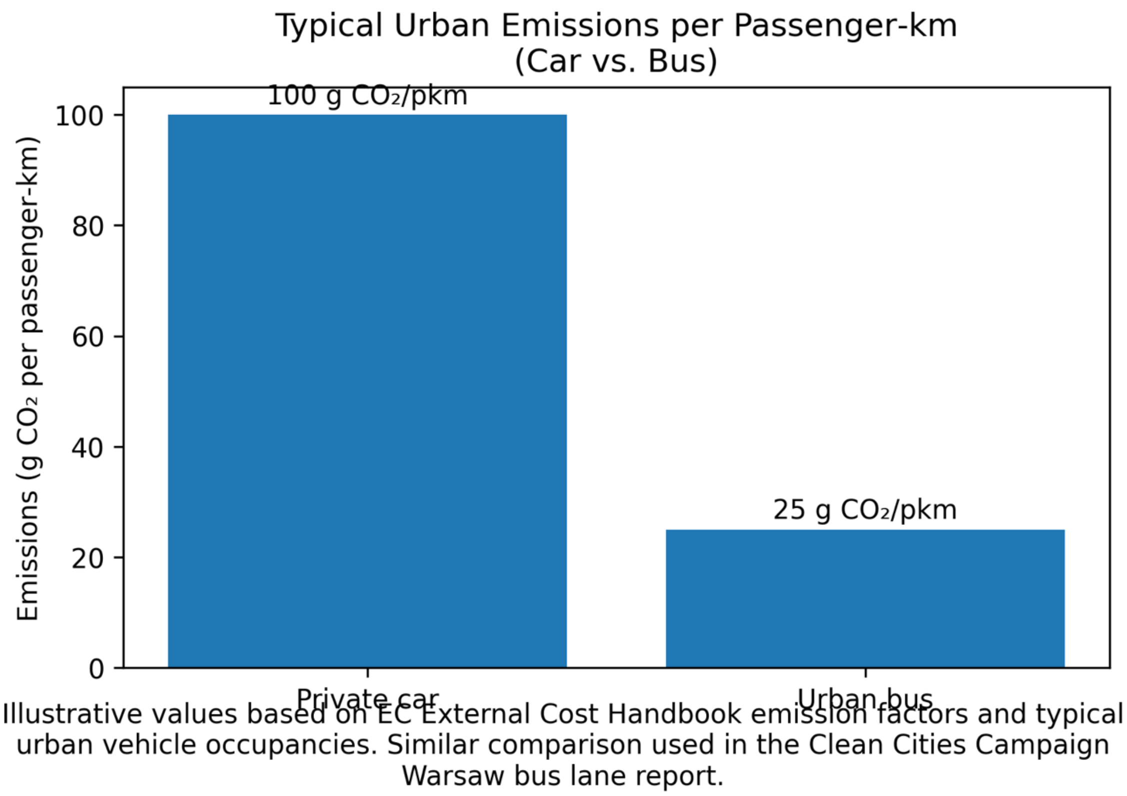
[33] https://einfoszab.budapest.hu/Session/DvdItem/130479?sessionType=4&organizationtype=2&parentId=18540&parenttype=4&key=fovarosi-kozgyules-bizottsagainak-nyilvanos-ulesei&type=5&fbclid=IwY2xjawQgA9hleHRuA2FlbQIxMABicmlkETBVVUk3N25JdldrYjk3M21Xc3J0YwZhcHBfaWQQMjIyMDM5MTc4ODIwMDg5MgABHqv1LQGTC3f_AvVsfGhyajXTFE8Uii8VUPnhLu291Al1i_E5QA_alelAGMgv_aem_o3cp7PB71KOBYiHLxIqQ6Q

9.1 Set of draft infographics

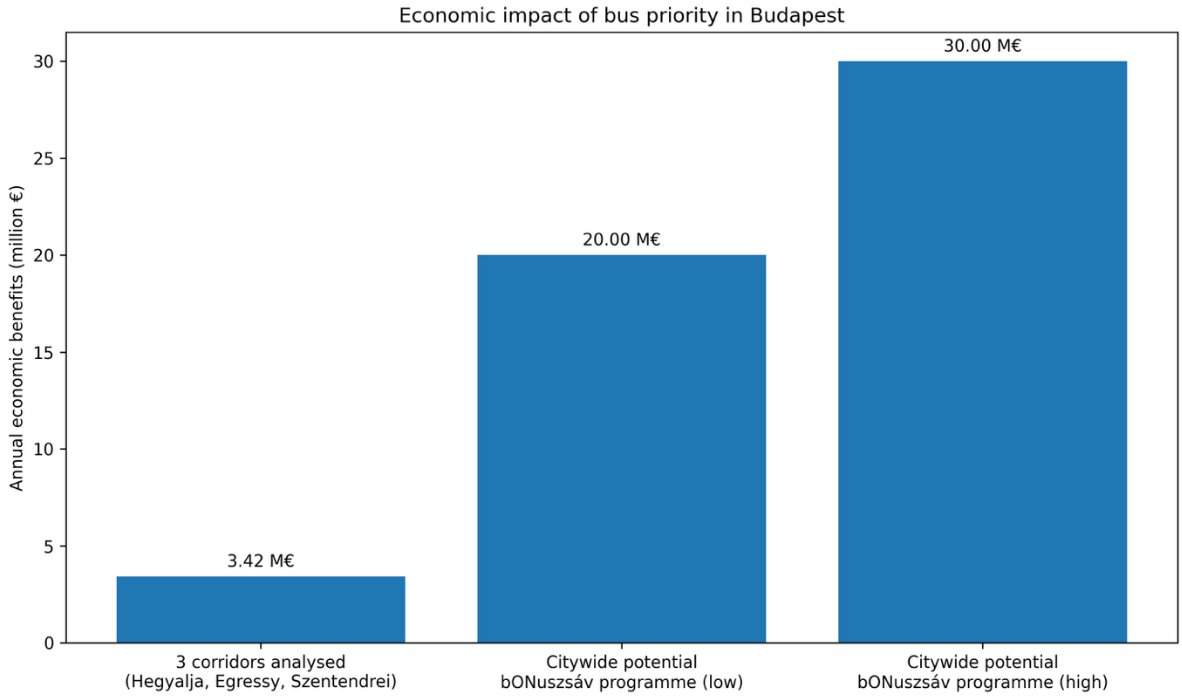
Find below the required set of infographics ready to be handed over to a graphic designer.



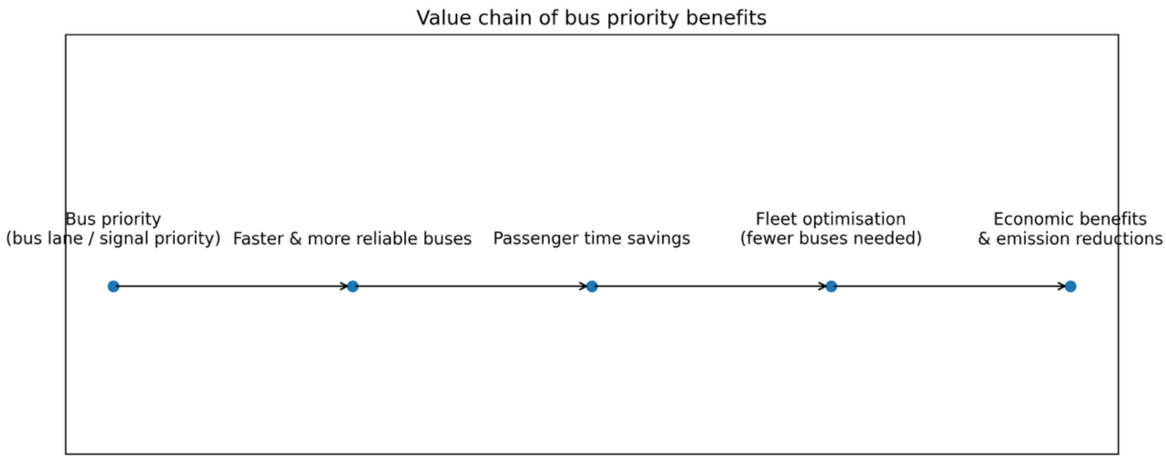
*10. Figure **Development of bus priority in Budapest.***
Bus lanes have been introduced incrementally since the late 1990s. Early examples such as Bimbó út (1997) were followed by a broader expansion phase in the 2000s (e.g. Bartók Béla út, Erzsébet királyné útja). More recent interventions – including the Hegyalja, Szentendrei and Egressy corridors – illustrate the shift towards targeted operational improvements forming the basis of the bONuszsáv approach.



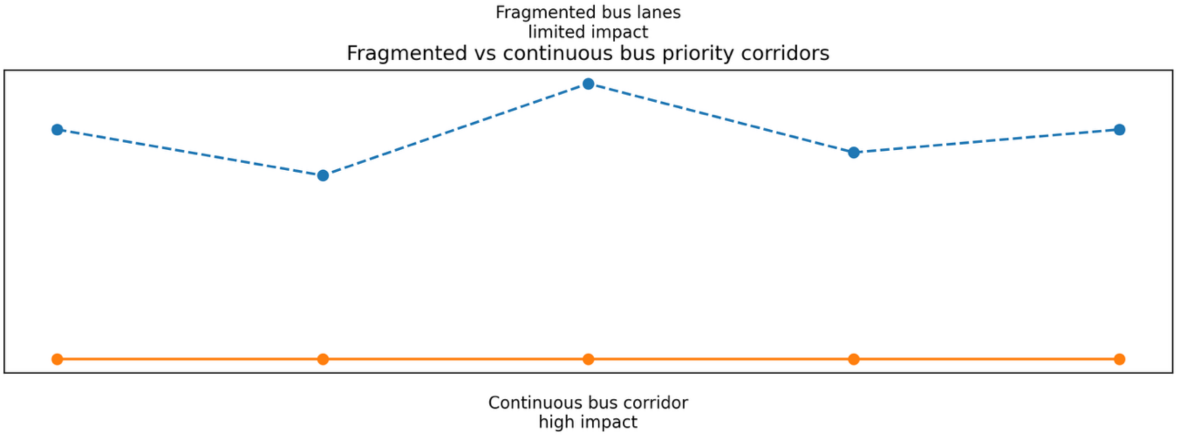
*11. Figure Typical emissions per passenger-km in urban transport. The comparison illustrates the order-of-magnitude differences between private car and bus travel when calculated per passenger-kilometre. Values are derived from emission factors reported in the **European Commission's External Cost Handbook** and typical urban vehicle occupancy assumptions used in urban transport analyses, including the **Clean Cities Campaign Warsaw bus lane report**.*



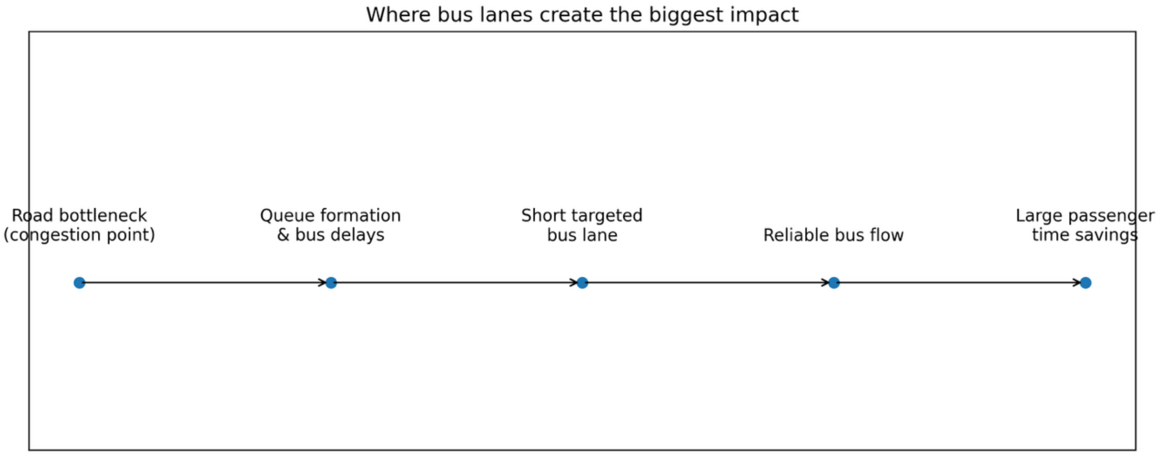
12. Figure Economic scaling of bus priority interventions. Corridor-level modelling shows that three analysed corridors are estimated to generate approximately €3.4 million of annual benefits. Scaling similar improvements across Budapest's main bus corridors could generate €20–30 million of societal value per year.



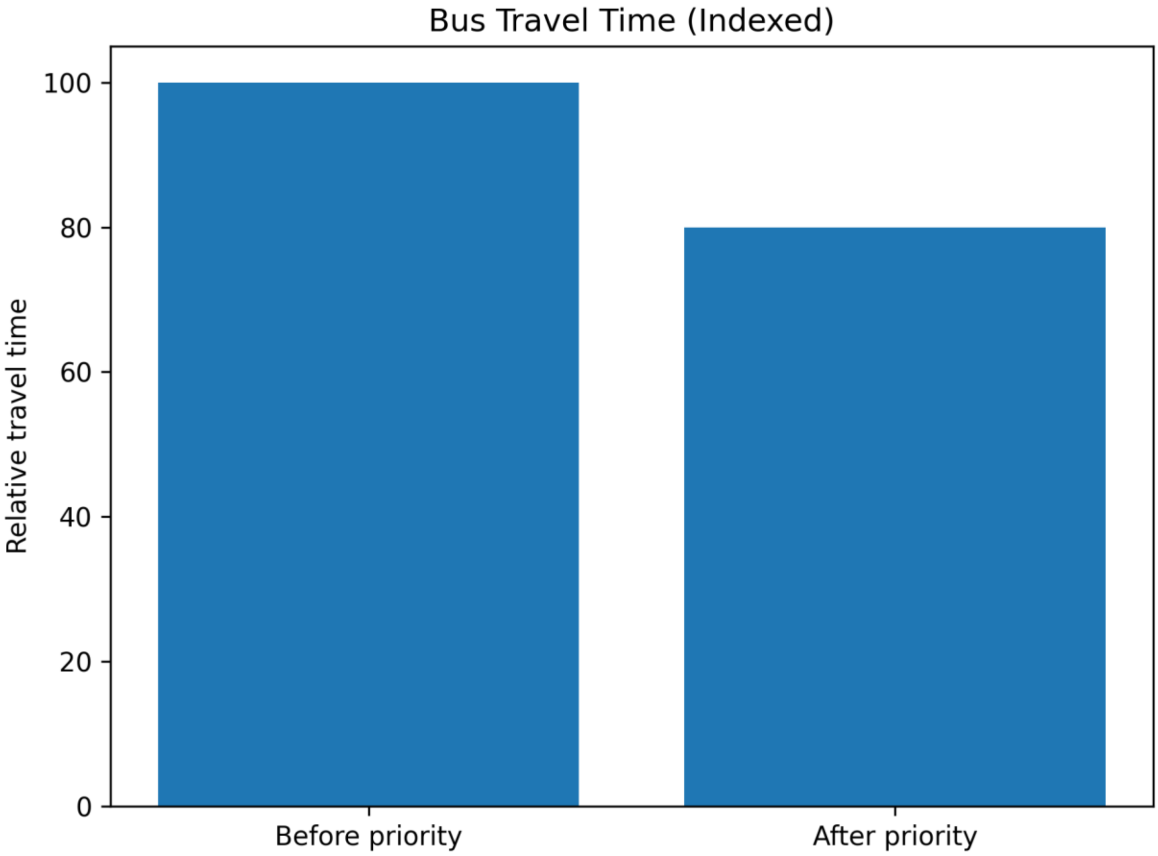
13. Figure Benefit chain of bus priority interventions. Bus priority improves reliability and travel-times, generating passenger time savings, operational efficiency and wider societal benefits.



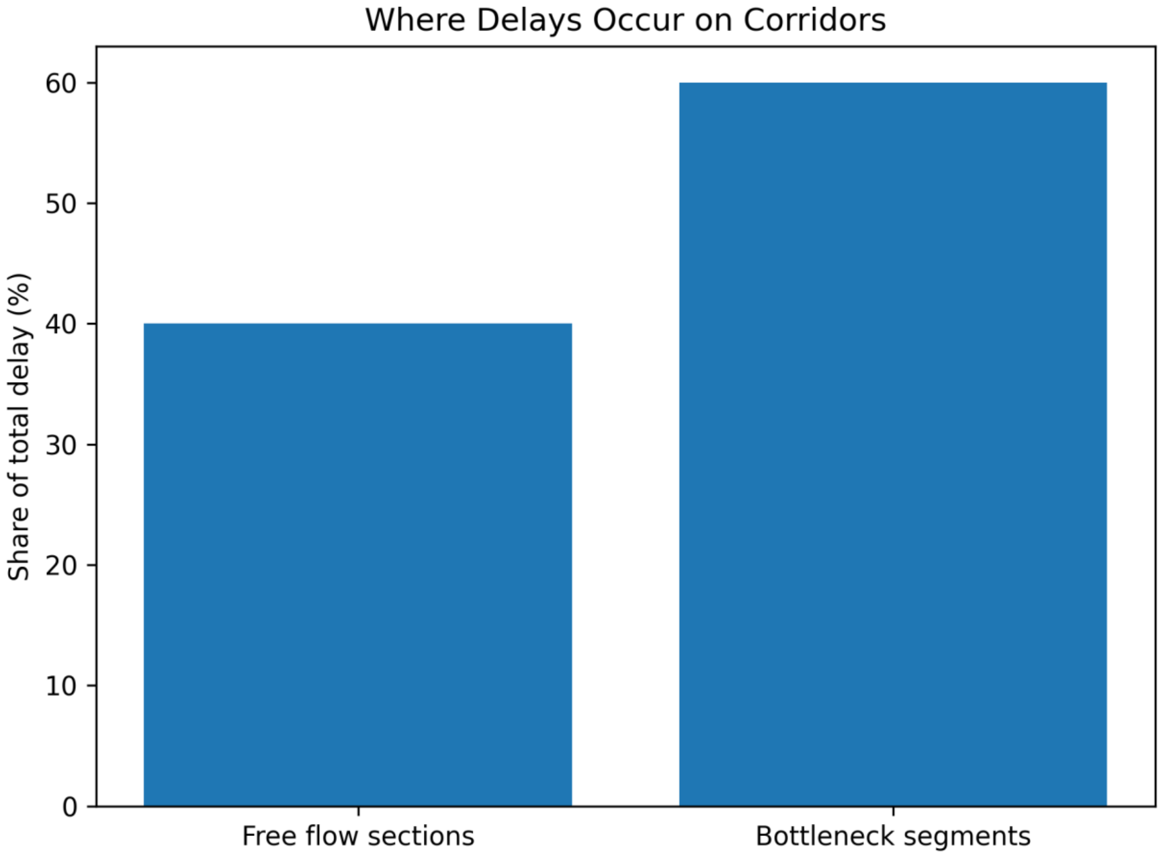
14. Figure Fragmented vs continuous bus priority corridors. Connecting existing priority segments into continuous corridors can significantly increase their system-level impact of bus priority measures.



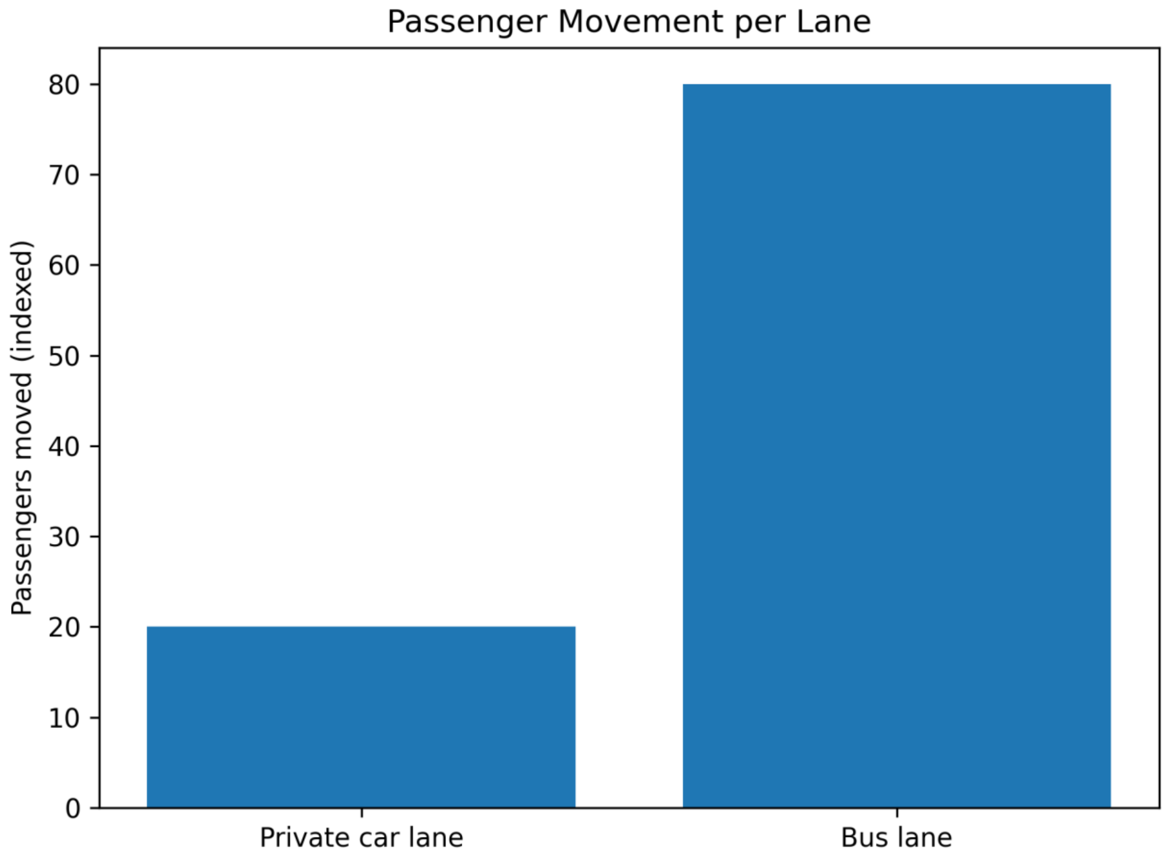
15. Figure Where bus lanes create the biggest impact. Targeted bus priority interventions at congestion bottlenecks can unlock substantial passenger-time savings even when the physical intervention is relatively short.



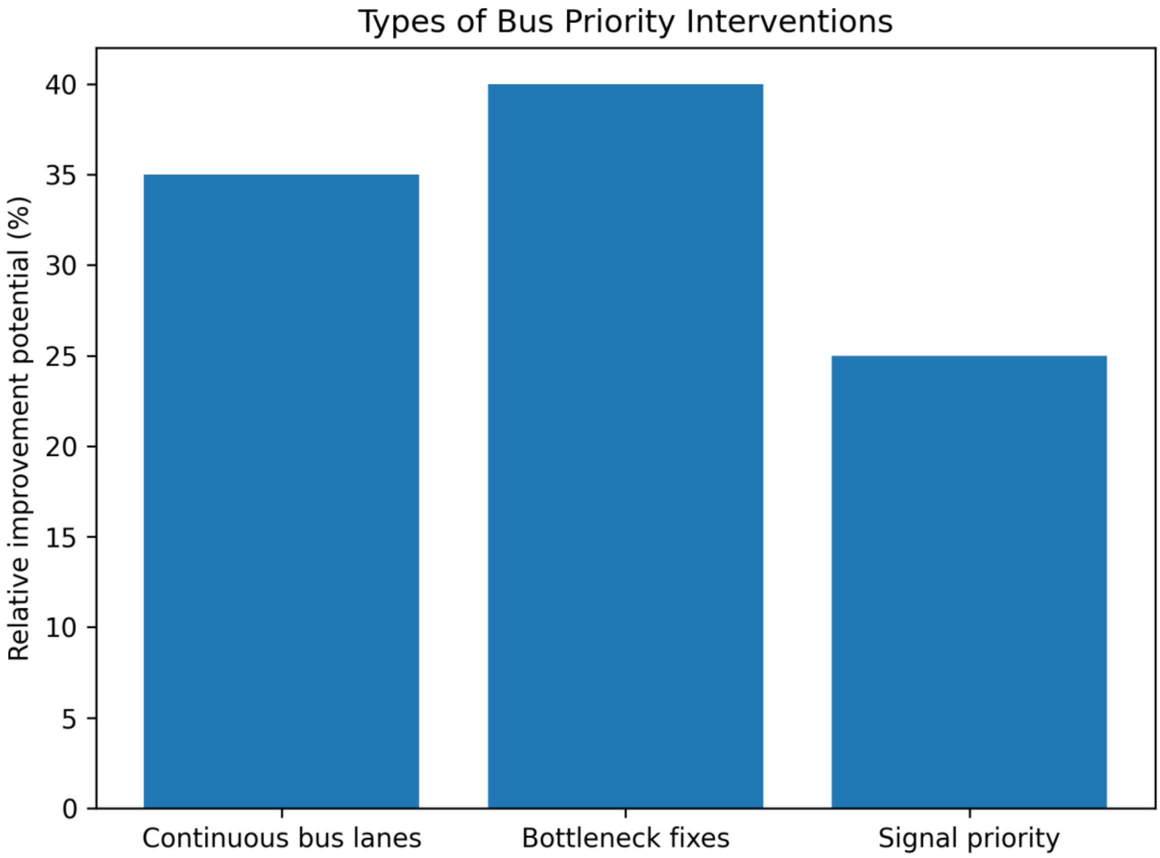
16. Figure Before–after bus travel-time comparison. Key message: priority → faster buses, smaller delay variability



17. Figure Where delays actually occur: bottlenecks. Message: most delays come from few critical intersections or queue points



18. Figure People moved per lane. One bus lane moves far more people than a car lane



19. Figure Intervention potential. Improvement can be achieved through: continuous bus lanes, bottleneck fixes, signal priority

9.2 Implementation pathways for bus priority in Budapest

Experience from recent corridor interventions suggests that bus priority measures in Budapest fall into two broad categories:
(1) "light" interventions, which can be implemented relatively quickly through traffic management tools such as lane reallocation, signal priority or short bus-lane segments; and
(2) "structural" interventions, which require more substantial redesign of the street cross-section or reconstruction of junctions.

The first category has already produced visible results in several Budapest corridors, demonstrating that significant improvements in bus performance can be achieved with relatively limited investment. The second category represents the next generation of bus-priority projects, where larger-scale redesign of road space is needed.

Table X summarises selected examples of both categories. The table highlights locations where bus priority has already been implemented successfully as well as corridors where more substantial infrastructure interventions may be required.

A special case is the Lánchíd (Chain Bridge), which illustrates a symbolic but important example of prioritising public transport and active mobility over private car traffic in a central urban corridor.

Bus Priority Implementation Pathways in Budapest

Location / corridor	Type of intervention	Implementation status	Strategic relevance / main effect
Hegyalja út corridor	Continuous bus lane and signal optimisation	Implemented	Reduced peak-period travel times and improved service reliability on a major radial corridor.
Egressy út bottleneck	Short targeted bus-lane section	Implemented	Removed a recurrent congestion bottleneck affecting several bus routes and trolleybus operations.
Szentendrei út corridor	Corridor-level priority and operational optimisation	Implemented / ongoing	Improved reliability and reduced delay variability on a high-volume northern radial axis.
Bartók Béla út (earlier network expansion)	Bus priority lane	Implemented	Expanded the inner-city network of priority lanes and demonstrated the wider applicability of bus-priority measures.
Bajcsy-Zsilinszky út	Shared bus-bike lane	Implemented	Provides an example of a combined bus-bike corridor in the city centre and of multimodal allocation of limited road space.
Rákóczi út corridor	Potential structural redesign (bus priority + cycling infrastructure)	Missing / long-term	A major corridor where reallocating road space could substantially improve public transport performance and corridor legibility.
Szentendrei út outer sections	Continuous bus lane	Missing / medium-term	Would extend corridor-level priority on sections where bus services remain exposed to congestion.
Budafoki út corridor	Bus lane extension and junction redesign	Planned / under discussion	Would strengthen public transport access from the southern districts and support future service development.
Lánchíd (Chain Bridge)	Traffic restriction prioritising PT, cycling and walking	Implemented (policy intervention)	A symbolic and practical example of reallocating road space away from private cars towards sustainable modes.

20. Figure Bus priority implementation Pathways in Budapest

Symbolic example: the Lánchíd

The reconfiguration of the Lánchíd corridor demonstrates that reallocating road space in favour of public transport and active mobility can have strong symbolic and practical impacts. Although the bridge does not operate as a conventional bus lane corridor, restricting private car access has effectively prioritised bus passengers and walking and cycling on one of the most prominent links in the city centre.

At the same time, the example also shows that bus priority should be treated at corridor level. On the approaches to the bridge on both sides — especially in the Tunnel and on József Attila utca — a similar level of consistent priority has not been implemented. As a result, the benefits of the intervention are only partly realised: within the bridge section itself, the advantage for public transport, walking and cycling is strong and clearly visible, but the reliability of the full route is still limited by remaining congestion and continuity gaps on the connecting sections.

9.3 Myths vs Facts about bus lanes in Budapest

Public debates about bus priority in Budapest often involve recurring misconceptions. Addressing these transparently can help improve public understanding of why bus lanes are an important element of a more efficient and sustainable urban mobility system.
Myth: Bus lanes take road space away from everyone.
Fact: Bus lanes primarily reallocate space from private motorised traffic in order to move far more people in the same corridor. A single bus lane can carry several times as many passengers per hour as a general traffic lane.

Myth: “If one traffic lane becomes a bus lane, car capacity is automatically cut in half.”

Fact: This is often a misleading simplification. In an urban corridor, capacity is rarely determined by the number of lanes between two junctions alone. The overall capacity of the corridor is usually constrained by bottlenecks, above all by the throughput of signalised junctions. This is the bottleneck effect: even if two lanes are available before or after a junction, the actual flow is still limited by the capacity of the junction itself. For this reason, introducing a bus lane does not necessarily reduce the effective car capacity of the road section. In many cases, what changes is not the number of cars that can pass through the corridor, but the way the queue is organised. A queue that was previously spread across two lanes may become concentrated in one lane over a longer section, while the number of cars actually passing through the junction changes little. The queue may look longer or more visible, but it can also become more orderly and may even move faster if junction operation, turning movements and lane changes become more predictable. The impact of a bus lane should therefore not be assessed simply as “taking away a lane”, but at corridor level: does junction throughput change, does bus reliability improve, does total passenger time decrease, and does the city make more efficient use of the available street space? In many cases, a bus lane does not remove effective car capacity; rather, it gives high-occupancy buses a reliable way through a corridor that is already constrained by junction bottlenecks.

Myth: Bus lanes are often empty and therefore waste road capacity.
Fact: Buses carry dozens of passengers at once. Even if buses pass only every few minutes, the number of passengers moved per lane can be significantly higher than in mixed car traffic. Bus lanes also improve schedule reliability, which benefits thousands of passengers daily.

Myth: People cycling and bus passengers must compete for the same street space.
Fact: Hungarian traffic regulations already allow several design solutions, including protected cycle tracks, parallel cycling routes or shared bus–cycle lanes where conditions allow. The key policy challenge is not to allocate street space between passengers of buses and people cycling at the expense of each other, but to rebalance street space currently dominated by private motorised traffic.
Myth: Bus lanes inevitably cause more congestion for car drivers.
Fact: International experience shows that bus priority measures often improve the overall efficiency of urban mobility systems. When more passengers choose reliable public transport instead of driving, total congestion levels can decrease.
Myth: Bus lane rules cannot be enforced effectively.
Fact: Hungarian traffic law already provides a basis for enforcing traffic violations, and many European cities successfully use automated camera systems to enforce bus-lane regulations. Where enforcement is consistent, compliance increases significantly and bus travel times become more reliable.

9.4 Children's mobility as a communication anchor

International experience shows that public support for bus priority measures increases significantly when projects are framed in terms of children's mobility and everyday accessibility rather than traffic management alone.

This framing is also supported by the Budapest public-opinion findings used in the project: families do not respond only to abstract transport-efficiency arguments, but also to everyday accessibility and safety concerns. Better public transport to and from school appears among the measures that can encourage less car-dependent school travel, which makes children's mobility a particularly effective and publicly understandable communication entry point.

Reliable bus corridors combined with safe walking routes enable children and teenagers to reach schools, sports facilities and cultural destinations without requiring car escort by parents. This reduces peak-hour congestion generated by school-related car trips and supports independent mobility for young people.

The role of bus priority corridors in supporting school mobility and children's independent travel is highlighted in the following box.

Children's mobility and access to public transport
Children and young people represent a distinct mobility group in cities. Unlike most adult travellers, they often rely on a combination of walking, cycling and public transport rather than private cars. Reliable public transport corridors therefore play a key role in

enabling everyday school travel, access to sports facilities and participation in social and cultural activities.

In Budapest, school mobility is largely integrated into the regular public transport network rather than dedicated school bus systems. As a result, the reliability of bus corridors directly affects the daily travel conditions of school-aged passengers and families.

Bus priority measures can support children's mobility in several ways:

• by improving the reliability of bus routes used for school travel
• by reducing congestion and traffic pressure around schools and residential streets
• by supporting safe walking and cycling access to public transport stops (ideally equipped with safe and attractive cycle-parking facilities)

International experience shows that framing bus priority projects around everyday accessibility – including children's mobility – can strengthen public acceptance. Reliable bus corridors help reduce the need for car-based escort trips by parents and enable more independent travel for young people.

9.5 Law-reform "wishlist"

In line with European Sustainable Urban Mobility Planning principles and international recommendations on public transport priority, the following section outlines several regulatory adjustments that could facilitate the more effective implementation of bus priority measures in Budapest as a consequence of possible law-reforms.

1. Clarifying the operational status of bus lanes.

Although Hungarian traffic regulations allow the designation of bus lanes, clearer national guidance on their design, signage and operational rules could support more consistent implementation. This includes clearer provisions for situations where people cycling are permitted to share bus lanes, as well as the possibility of flexible or conditional use by other vehicles when operationally justified.

2. Enabling more effective automated enforcement.

Compliance with bus lane regulations is essential for their effectiveness. In many European cities, camera-based enforcement has proven to be one of the most effective tools for ensuring that bus lanes remain unobstructed. In Hungary, however, the practical use of automated enforcement for bus lane violations remains limited. Clarifying the legal framework and enabling wider deployment of such systems could significantly improve the reliability of bus services.

3. Supporting systematic traffic signal priority.

Traffic signal priority for buses is a key complement to dedicated bus lanes. Regulatory and technical frameworks that facilitate the systematic deployment of bus priority at signalised junctions — including dynamic or conditional priority — would help cities improve travel-time reliability without requiring major infrastructure investments.

4. Allowing flexible and reversible street interventions.

Many bus priority measures rely on relatively small physical interventions, such as modular separators, temporary lane reallocations or experimental traffic management schemes. Regulatory frameworks that explicitly support pilot projects and reversible street design interventions would allow cities to test and refine solutions before implementing permanent changes.

5. Enabling integrated corridor design for sustainable mobility.

Modern urban street design increasingly aims to integrate public transport priority with active mobility. Regulatory frameworks should support design approaches that enable bus priority and safe cycling infrastructure to coexist on major corridors, while reallocating street space primarily from private motorised traffic. This approach aligns with the principles of Sustainable Urban Mobility Planning and the broader European shift towards more efficient use of urban street space.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this report, the author used ChatGPT to support language editing, structure testing and drafting alternatives. All outputs were critically reviewed, verified and edited by the author, who takes full responsibility for the final text.

Annexes are available on the Clean Cities website:

https://cleancitiescampaign.org/bonuszsav-mellekletek

10 References and data sources

The footnotes throughout the report provide point-of-use source pointers, links and short explanatory notes. The consolidated list below brings together the main external references and core data sources used repeatedly or as key background for the analysis, in a consistent format.

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