

Kapsch TrafficCom

Optimizing Congestion Charging and access controls to reduce traffic congestion



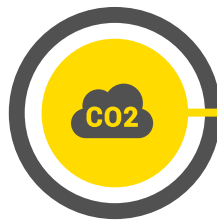
Today, over 55% of the world's population live in urban areas.

By 2050, this figure is expected to increase to nearly 70%.



The number of city dwellers will increase by 2.5 billion globally until 2050.

Private car ownership is growing rapidly, especially in emerging markets.



Rising traffic congestion and increasing air pollution.

lost time and productivity¹ – costing EU countries more than €100 billion a year, or 1% of GDP.



¹ Numbers following the EU Handbook (2019) on the internalization of external costs (<https://ec.europa.eu/transport/sites/transport/files/studies/internalisation-handbook-isbn-978-92-79-96917-1.pdf>), page 96 (table) are as follows (for EU28) = inkl UK.

Total Deadweight loss (Wohlfahrtsverlust) 46,2 bn EUR = 0,3% GDP

Total delay costs 270,61 bn EUR = 1,8% GDP

Total DWL & Delay = 316,81 bn EUR = 2,1% GDP

If 1,8% GDP = appr. 270 bn EUR / 1% GDP = appr. 150 bn EUR

Why today's approaches to congestion charging are a major missed opportunity for cities.

For many cities, congestion charging schemes are the only tool available to help limit traffic congestion in key zones and on key traffic corridors. However, schemes tend to be unconnected, limited in size and scope, and overly simple – often resulting in congestion management that is either ineffective or unfair due to blanket pricing approaches.

For example, typical schemes apply standard charges for vehicles entering a restricted area, or during restricted times. This means that vehicles, and especially those used for taxi or Uber work, can circulate indefinitely for the entire day with no need to pay more than the initial access fee. Additionally, this kind of standard, over-simplified approach charge takes no account of whether journeys are essential or not, or if drivers have other realistic travel options available – both factors that should influence access charges. Simple schemes are also unable to differentiate affluent drivers from those who are less able to pay, which is often perceived as unfair by the road users. For these reasons, local residents often push back against planned congestion charging schemes, or heavily criticize schemes that are put in place.

Finally, but equally importantly, cities rarely, if ever, offer journey time SLAs for paying motorists entering restricted areas – except where managed lanes exist to enable priority traffic to flow freely. In schemes where no managed lanes are available, many drivers pay significant charges, only to continue to be caught in frustrating traffic jams. To create the most effective, equitable congestion charging schemes, many cities are now looking to implement next-generation congestion charging as an element of a broader Integrated Mobility Management (IMM) strategy. This approach makes it possible to expand existing traffic management capabilities, to further reduce congestion, and to improve productivity and quality of life for road users and residents.



What is next-generation congestion charging?

Congestion charging concepts and capabilities are rapidly evolving to meet the needs of modern cities and drivers. This is leading to a number of key innovations that can help to reduce traffic congestion and to improve the health, safety, and productivity of drivers and citizens. The challenge now is to ensure that cities' congestion charging strategies evolve at the same rate as the available technology to deliver better experiences and quality of life for city dwellers.

The key features and benefits of next-generation congestion charging include:

1

Integration with Integrated Mobility Management (IMM) solutions that improve 'traffic supply'

While congestion charging aims to reduce traffic demand, next-generation approaches integrate with Integrated Mobility Management (IMM) solutions that increase 'supply' – or road traffic capacity. This can be achieved with solutions such as adaptive signal control, which reduces congestion on the city road network by up to 30% by continually optimizing traffic light settings in line with fluctuating vehicle flows.

Another solution for reducing traffic congestion is intelligent route guidance, which coordinates traffic information with GPS navigation providers to ensure cars are sent to locations via appropriate and diverse routes (i.e. not all on the same route at the same time). Combined with adaptive signal control, this helps to increase utilization and traffic control on city roads – potentially reducing congestion up to 50%

For more information on IMM solutions that can help to maximize the effectiveness of your congestion charging scheme, [click here](#).

2

Expansion of congestion-charging benefits to high-demand areas across the city – not just the city centre

Often, city centres are key target areas for congestion charging, but such schemes only benefit a small percentage of the urban population. Subject to local political conditions, next-generation congestion charging schemes need to expand their reach and focus to include local traffic hotspots across the city, to improve traffic flow, reduce travel times, and control air pollution. This holistic approach will be far more effective than traditional schemes that are limited to central zones only – as demonstrated with this approach in Singapore.

3

Reduction of charges to the lowest effective levels

Pricing for congestion charging is a balance between optimizing traffic demand and ensuring that authorities can generate returns on investment and, in certain cases, generate adequate funding for their infrastructure projects. As such, next-generation schemes should use data from vehicles and mobile devices to establish appropriate charging levels to achieve local traffic management objectives. While many motorists will always take their cars to restricted zones whatever the cost, influencing just 5% of motorists to use alternative modes of transport can help cities to meet their traffic management and congestion reduction targets.

4

Fair pricing based on journey impact and motorists' ability to pay

In the context of congestion charging, some trips are more 'damaging' than others. These include trips that happen on already congested roads, might be replaced with other forms of transport, or trips made in polluting vehicles, for example. Using technology that is already available, it's possible to gain a range of insights that support fairer charging based on journey impact, including the nature of the motorist's trip, the vehicle type, and the driver's ability to pay. These parameters can be fed into a variable tariff or discounting scheme that ensures pricing is always fair – for every driver and every trip.

5

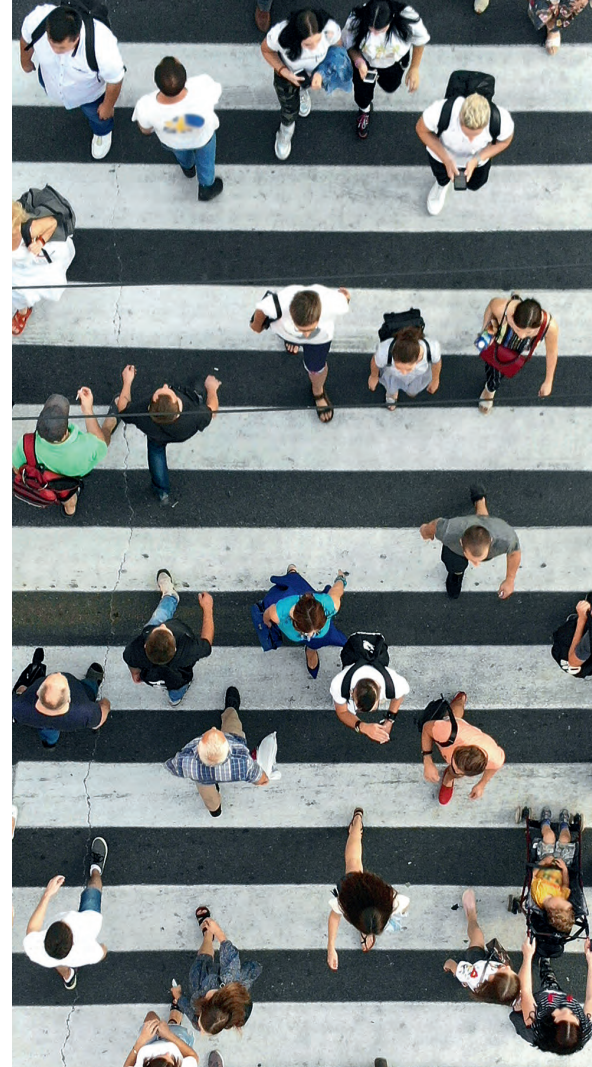
Sustainable traffic and journey time reductions for motorists

Most current schemes demand payment for entering restricted areas, do not ensure that traffic will flow smoothly. Today, express lanes in the US ensure that traffic flows freely and that motorists' journey times are reduced. However, in the future, we will see increased citizen demand for sustainable reductions in congestion at city level. Using journey-building and other technologies could even enable refunds if travel times exceed pre-defined parameters for selected vehicle categories such as logistics vehicles, taxis and others. By aiming to reduce congestion in cities to keep traffic flowing, negative public opinion about congestion charging can potentially be overcome and schemes can be promoted effectively to the local city population.

6

End-to-end data protection for compliance with EU's GDPR and other global data protection regulations

Fair pricing and other innovations require data from a range of sources to be collected and analysed – including drivers' personally identifiable information (PII) and trip data. For this reason, next-generation congestion charging schemes will use innovative technologies that anonymise or 'obfuscate' data, even preventing semantic deanonymization, which ensures that any breach does not put drivers' sensitive personal or trip information at risk.



“Congestion charging is highly political, and is often unpopular with citizens, in spite of the benefits in terms of reduced congestion, air pollution, and travel times. However, when these six key capabilities come together in a congestion charging scheme, public acceptance will undoubtedly increase. We have seen this in cities around the world where initial opposition to congestion charging has turned around and become overwhelming public support.”

➤ Gabriel Makki,
Product & Solution Manager
Tolling Solutions,
Kapsch TrafficCom

What kinds of demand management schemes and initiatives can be delivered with next-generation congestion charging?

Every city has unique circumstances, unique road conditions and capacity, and unique traffic demand. For this reason, next-generation congestion charging must be able to support the specific and fast-changing needs of city authorities – from schemes that permit free entry to permit holders, to zone-based, cordon-based, and mileage-based charging schemes. Based on the specific needs of the city, next-generation congestion charging and access management should support:

Charging by vehicle type

which require different tariffs to be implemented for different types of vehicles, with the option to add specific restrictions such as diesel ban zones.

Zone-based charging

which apply a one-off ‘day’ charge when a vehicle enters a restricted zone. This kind of scheme reduces traffic and discourages short car journeys from surrounding areas and is also simple to implement and operate. However, this approach does nothing to stop vehicles circulating within the restricted area all day, potentially reducing traffic-control effectiveness.

Cordon-based charging

which charges vehicles when they cross the boundary or ‘cordon’ of a restricted traffic area. This is still relatively simple to deploy using low-cost monitoring cameras. It also reduces the risk that vehicles will circulate in a restricted area all day (as is the case with zone-based charging). In spite of the benefits, however, this kind of scheme can penalise drivers who need to access restricted areas multiple times, but for quick trips – such as delivery vehicles.

Mileage-based charging

which uses ‘anonymized’ and compliant GPS data and data from drivers’ mobile devices to establish the distance a vehicle has travelled in a restricted traffic zone and to charge the driver accordingly. This is seen by many cities and citizens as the fairest approach to congestion charging, although it requires GPS data to be collected accurately in complex urban road networks, and with variable mobile signal quality.



The unique benefits of next-generation congestion charging

By supporting multiple scheme types and supporting future innovations for more effective, fairer traffic management in restricted zones, next-generation congestion charging delivers a number of key benefits. These include:

Support for a city's specific demand-reduction needs

With the ability to apply cordon-based or mileage-based schemes that ensure motorists are unable to circulate in restricted areas for entire days at no extra cost.

Fairer charging

Based on the ability to set charges at the lowest effective level and to implement new innovations such as mileage-based charging and reduced charging based on motorists' ability to pay.

Traffic-jam-free journeys for paying motorists

With the ability to support SLAs for journey times and to implement 'pay per use' models that are fairer and more cost-effective for users.

Holistic, city-wide congestion reduction

Based on full integration of congestion charging schemes with a broader portfolio of Integrated Mobility Management solutions.



Accelerate your journey to next-generation congestion charging with Kapsch TrafficCom.

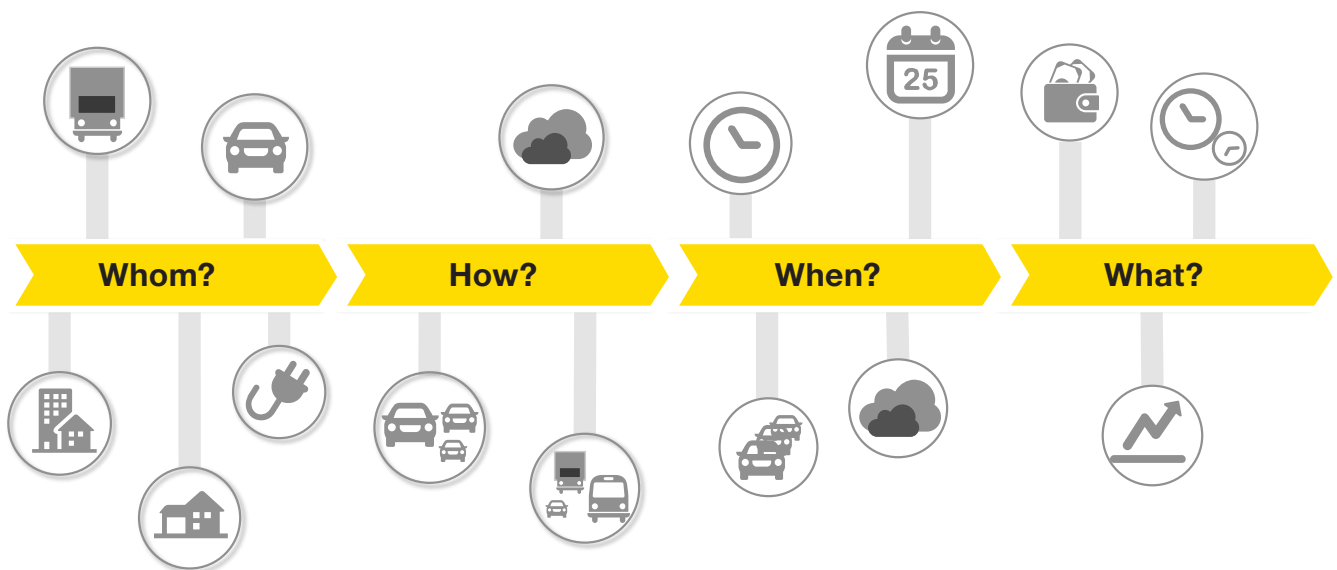
Kapsch TrafficCom provides the infrastructure, business logic, and data protection technologies needed to support effective congestion charging.

When combined with our Integrated Mobility Management (IMM) solutions which optimize 'supply' by improving road capacity and traffic flow, our congestion charging solutions help cities to significantly lower your road use demand, reducing jams and associated delays and supporting traffic-free SLAs for paying motorists. By effectively reducing traffic demand, our solutions also help you to reduce air pollution and to increase the productivity and quality of life for local people.

To meet the specific needs of your city and residents, we can help you adopt next-generation congestion charging models such as mileage-based charging and dynamic charging based on current traffic volumes, road conditions, and environmental conditions. We can also ensure that congestion charging is pitched at the lowest possible cost to achieve effective traffic-reduction outcomes in key city zones.

Additionally, we offer the business logic to support sophisticated charging schemes that consider:

- > Vehicle type (commercial, private, resident-owned, electric, etc.)
- > Time-of-day traffic peaks and rush hours (including the potential to integrate real-time traffic info)
- > Changing environmental conditions
- > Dynamic charging based on journey type and the availability (or otherwise) of alternative travel options and, potentially, a motorist's ability to pay



Kapsch provides infrastructure and business logic for sophisticated, highly effective, next-generation congestion charging schemes

In action: Next-generation congestion charging in London

Challenge:

In 2003, London was the first city to introduce congestion charging for vehicles entering the city centre. Key goals of the scheme were to reduce traffic congestion and air pollution, and to speed up journey times for residents and visitors.

While the current scheme has achieved some success, it is limited in its ability to reduce traffic on the city streets. Traffic, for example, has increased during 'off-peak' hours when the charge does not apply, and traffic around the periphery of the charging zone has increased, with motorists taking circuitous routes to avoid the charge. With home deliveries increasing the number of light vans and other vehicles entering the city centre, London needs a new, more joined-up approach to congestion charging

Solution:

Experts from the Centre for London have designed a next-generation congestion charging scheme for London that aims to expand beyond the city centre and to implement a much fairer, more effective 'mileage-based' charging approach based on the true cost of every journey (in terms of both environmental and congestion cost). In a recent report, Centre for London says: "Our fundamental recommendation is for London to move to a more sophisticated and comprehensive distance-based road user charging scheme, closely integrated with the rest of the capital's transport system."

Benefits:

The London scheme offers significant benefits for the city and its residents by making congestion management:

- > Simpler**
as the proposed scheme replaces multiple charging and tolling schemes with a single system that is easy to run and, for citizens, also easy to use
- > Smarter**
based on integration of data on alternative travel options and motorists' ability to pay, as well as a range of other criteria
- > Fairer**
based on the ability to understand the 'damage' caused by every journey (including road-surface damage, economic impacts and environmental damage), and to charge motorists accordingly
- > Healthier and more efficient**
based on the ability to promote public transport, walking and cycling, with the added ability to reduce harmful vehicle emissions
- > Greener**
with the ability to incentivise an overall reduction in vehicle usage

For more information on London's proposed next-generation scheme, visit <https://www.centreforlondon.org/publication/road-user-charging/>



To find out more

about Kapsch TrafficCom's congestion charging capabilities and how we can help you reduce traffic demand in restricted zones and deliver major economic and environmental benefits for your city and residents, please contact us today at ktc.info@kapsch.net or on +43 50 8110.

You can also read more about our congestion charging solution at <https://www.kapsch.net/ktc/Portfolio/IMS/Smart-Urban-Mobility/Access-Management>.





Kapsch TrafficCom

Kapsch TrafficCom is a globally renowned provider of transportation solutions for sustainable mobility. Our innovative solutions in the application fields of Tolling, Traffic Management, Demand Management and Mobility Services contribute to a healthy world without traffic congestion.

We have brought projects to fruition in more than 50 countries around the globe. With our one-stop solutions, we cover the entire value chain of our customers, from components to design and implementation to operation of systems.

As part of the Kapsch Group and headquartered in Vienna, Kapsch TrafficCom has subsidiaries and branches in more than 30 countries. It has been listed in the Prime Market segment of the Vienna Stock Exchange since 2007 (ticker symbol: KTCG). Kapsch TrafficCom's about 5,100 employees generated revenues of EUR 731.2 million in financial year 2019/20.

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