

Kapsch TrafficCom

***Innovating for a
greener future:
3 solutions to reduce
vehicle emissions***

Public concerns over vehicle emissions – and how cities and highways agencies can address them

Regional and national governments are demanding rapid action on climate change and air quality through low-emissions zone schemes and other initiatives. However, a recent survey from Kapsch TrafficCom shows that members of the public also want greener transport options and most are prepared to moderate their road-use to scale down their carbon footprints.

In the survey, 74% of respondents thought that current approaches to reducing road transport emissions were no longer acceptable, and 71% fear increased health problems due to excessive traffic and negative air-quality impacts. Additionally, 82% of respondents thought that reliance on private vehicles will only increase, especially due to continuing concerns about COVID-19 infection risks on buses, trains, and other public transport services.

When asked about potential solutions to the problem of excessive traffic and related air quality and climate change issues, 81% of Kapsch's survey respondents said the transition to zero-emissions vehicles is taking too long.

Dissatisfied with existing approaches to reducing vehicle emissions, most survey respondents are willing to moderate their road use behavior to reduce environmental impacts.

Driving positive outcomes for citizens with technology

The perfect storm of air quality legislation and public concerns means that cities and highways authorities need to drive the transition to electric vehicles as quickly as possible. However, they also need technology solutions that can be deployed today to deliver tangible and auditable reductions in traffic congestion and related emissions.

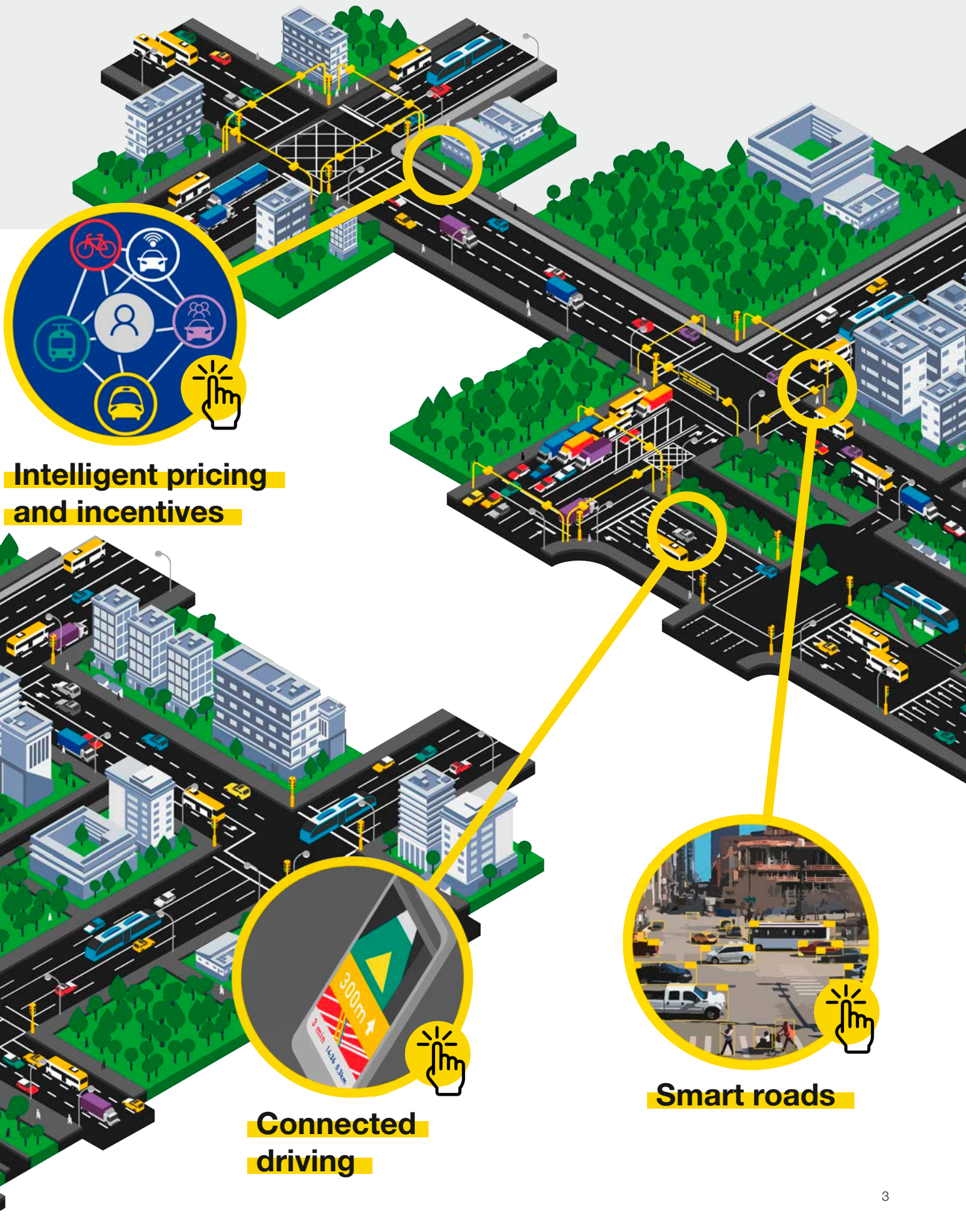
In this paper, we present three innovative solutions that can help cities and highways authorities to reduce traffic congestion, lower emissions and improve road user experiences – starting today.

Survey summary

- **92%** of road users would like to drive in the most environmentally friendly way possible
- **82%** would like to drive without stops at traffic lights, with a „green wave“
- **80+%** would follow the suggestions of a reliable navigation app and would consider taking alternative routes to avoid congestion



How the latest generation of connected mobility and demand management solutions are supporting cleaner, greener road transport



**Intelligent pricing
and incentives**

**Connected
driving**

Smart roads



Defining a new era of traffic management

Connected mobility:

A new ecosystem of technologies that generates, collects, and analyzes data from roadways and vehicles in real time. This supports better traffic management and planning decisions, including measures to reduce congestion and related emissions.

Demand management:

Solutions that rely on data from connected mobility infrastructure and systems to influence driver behaviour in positive ways. One example of this is a congestion or tolling scheme that dynamically adjusts pricing based on real-time traffic demand, offering drivers incentives to change their travel times or transport mode.

How agencies can deliver environmental quick wins with connected mobility and demand management solutions

The good news for city and highways authorities is that the latest generation of connected mobility and demand management solutions can deliver reductions in congestion and emissions in a very short timeframe.

By enabling real-time traffic awareness and future traffic predictability, authorities can begin to influence citizen's use of road networks. It becomes possible, for example, to give drivers incentives to change their behavior: such as the time they travel, the routes and corridors they use, or even their choice of transport mode – especially if it's faster or less expensive to leave their car at home.

As an additional benefit, these kinds of solutions can cross-reference real-time traffic data with historical data and other data sources to predict changes, and to anticipate congestion during specific times, and on specific routes. This predictive capability supports more proactive traffic and demand management strategies, as well as more effective capacity planning in the long term.

These benefits are achieved by combining data from multiple sources – including roadside sensors, connected vehicle data, data from navigation providers, and more – to provide a holistic view of traffic demand and current traffic conditions. In doing so, they allow authorities to respond far more quickly to traffic build-up and incidents that cause delays, while also supporting direct communications with drivers to help them make better decisions.

find out more





How Kapsch TrafficCom is driving innovation for improved environmental outcomes

In practice, effective traffic and demand management requires rapid innovation across agencies' road and technology infrastructure. This allows data from multiple sources to be collected and analyzed in real time for a clear view of traffic conditions, and cross-referenced with historical data to predict demand, both in the near future, and during regular peak times.

These kinds of solutions also support demand management initiatives that help to influence road-user behavior, and to ensure that city and highways networks can meet their targets for congestion and emissions reduction, while also satisfying the public's requirements for more effective environmental and traffic management.

Kapsch TrafficCom is an industry leader in the field of traffic management and demand management. Our innovative solution portfolio, which can already be deployed today, is helping cities and highways agencies around the world to reduce traffic congestion and emissions and to support initiatives that reduce demand and overall traffic volumes.

Our connected driving solutions

Since the earliest days of the automobile, drivers have been making decisions exclusively based on what they see on the road. Then, with the arrival of in-car navigation devices and navigation apps and services, road users could choose their routes based on information about road and traffic conditions, tolls, journey times, and more.

Now, Kapsch TrafficCom is making it even easier for road users to get where they're going faster with our connected driving solutions. These include digital driver assistance solutions that allow road users to take an active role to speed up their journeys and to reduce emissions associated with traffic jams.

One key example of this is our 'green wave' solution, which allows drivers to maintain the optimal speed to avoid stopping at traffic lights. By integrating data from traffic systems, traffic light (signaling) systems, and connected vehicle data, and communicating with drivers in real time, it becomes possible to avoid stop-start traffic, while also improving driver experiences and reducing journey times.

Drivers who maintain the ideal speed can ride the green wave, minimizing stops at red lights and making traffic far more fluid across the entire city.

Top benefits of Kapsch connected driving solutions

Kapsch connected driving solutions help road users save time on every journey, while also reducing stress caused by delays and difficult driving conditions. Additionally, driving within recommended speed guidelines and 'riding the green wave' helps road users to save fuel, while also reducing wear and tear on their vehicles and tyres, and lowering related maintenance costs.

For city and highways agencies, our connected driving solutions provide quick wins in terms of reducing congestion and emissions, while ensuring compliance with EU and other regional climate legislation. Engagement with road users is also increased, building trust among members of the public and paving the way for new and ever more sophisticated demand management solutions that further reduce traffic volume over time.

“The popularization of navigation applications, together with the growing connectivity of vehicles, enables a new ecosystem of connected mobility, allowing cities and highways agencies to influence drivers' behaviors and to improve environmental performance.”

Michael Ganser,
VP Demand Management,
Kapsch TrafficCom

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Our smart roads solutions

While today's connected vehicles provide a wealth of data and insights that support greener, safer driving, road networks are often falling behind in terms of connectivity, digital capabilities, and data generation. This is because sensor technologies embedded in vehicles are far more advanced than many roadways, which lack the sensors and other infrastructure needed to provide a real-time view of traffic conditions, incidents, and other factors that hinder effective traffic management and emissions-reduction.

To close this gap between vehicle and roadway capabilities, Kapsch TrafficCom has developed a range of smart roads solutions. These use advanced AI, Machine Learning, and analytics technologies to collect, fuse, and process data from a wide range of sources, including induction loops, radar, laser, video cameras, acoustic sensors, and more. All of the data generated by these sensors is used to create a 'digital twin' of the road network or corridor, allowing both a real-time view of traffic load and incidents, and the deployment of advanced data models to support effective prediction of near-future changes in traffic and congestion.



Key offerings by Kapsch TrafficCom

The two key smart road solutions by Kapsch TrafficCom that help agencies reduce congestion and associated emissions are:

■ Kapsch Performance Measures

Providing a real-time view of traffic conditions based on insights from roadside sensors and third-party systems such as Waze, Inrix, connected vehicle data, and Floating Car Data (FCD). Performance Measures make it easy to identify the roadways and corridors most prone to congestion, and to understand when peak traffic creates bottlenecks and tailbacks. With real-time data aggregation and analytics capabilities, and a set of traffic-specific dashboards, traffic operators can respond to changing traffic conditions and incidents quickly and effectively.

■ Kapsch Origin-Destination software modules

Allowing authorities to manage traffic effectively and – ultimately – to implement effective demand management strategies, by allowing agencies to fully understand traffic flows and volumes across their networks. These solutions are based on in-depth analysis of where road users begin, and end, their journeys, often referred to in the industry as 'Origin-Destination', or 'O/D' analysis. Kapsch O/D solutions include:

■ Kapsch Origin-Destination Module

Enabling cities and highways agencies to calculate O/D matrices automatically based on data from roadside sensors, vehicles, and third-party systems (including navigation providers). Traffic demands can be calculated between or within zones or regions, with changes in journey volumes predicted and tracked on an intuitive dashboard.

■ Kapsch Travel Time Calculation Module

Analyzing vehicle and smart road data in real time to calculate current travel times between different locations on the road network, and to predict how travel times will change in the short term. This solution is critical for agencies looking to implement demand management solutions, allowing them to inform drivers about current travel times, suggest alternative routes or transport modes, or to increase pricing in peak times to dissuade road users from making unnecessary journeys and contributing to already elevated rush-hour congestion and emissions.

Top benefits of Kapsch smart roads solutions

For road users, smart road solutions, in conjunction with connected driving solutions, provide greater insights and visibility into road conditions. In this way, they help drivers to take specific actions that shorten journey times, increase road safety, and reduce emissions from vehicles.

For cities and highways agencies, smart roads solutions support increased performance across a range of traffic management KPIs.

For example:

- **Preventative actions based on predictive insights**
supporting effective responses to worsening traffic conditions, such as informing drivers of potential delays and using dynamic routing applications to keep traffic flowing as quickly as possible.
- **Improved long-term traffic planning and management**
with the ability to understand journey trends, current and near-future demand, and events and factors that are likely to influence traffic conditions over the coming 10 days, agencies can take preventive measures and minimize negative impacts for road users.

“The ability to capture, manage, analyze, and draw actionable insights from vast quantities of data across the road network supports faster, more effective traffic management responses, better long-term capacity planning, increased safety, and reduced congestion as well as related emissions.”

Aritza Aldama,
Product Manager
Mobility Data Platform,
Kapsch TrafficCom

[find out more](#)



Our intelligent pricing solutions

For many cities and highways authorities, congestion charging and tolling 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 and limited in terms of size and sophistication – 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, can circulate indefinitely for the entire day with no need to pay more than the initial access fee.

Additionally, this kind of standard approach 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 makes current charging practices unfair. 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 are currently unable to offer journey time service level agreements (SLAs) for paying motorists entering restricted areas. This means that many drivers pay significant charges, only to continue to be caught in frustrating traffic jams that interfere with their schedules.

To overcome these challenges, and to create more effective, equitable congestion charging schemes that provide fast journey times in return for driver payments, cities and highways authorities can benefit from implementing dynamic pricing across their schemes.

By enabling dynamic pricing based on current and predicted future traffic demand, Kapsch TrafficCom solutions help authorities to reduce congestion, and improve productivity and quality of life for road users and residents while also helping to shape future traffic demand.

One key example of this kind of solution is the **Kapsch Predictive Analytics Module (PAM)** which combines real-time traffic data with historical data to predict changing traffic conditions – both for the next 30 minutes, and for a period of up to 10 days into the future. The solution draws on a number of relevant data sources, including GNSS data, data from roadside sensors, weather data, information about planned events in the locality, and more.

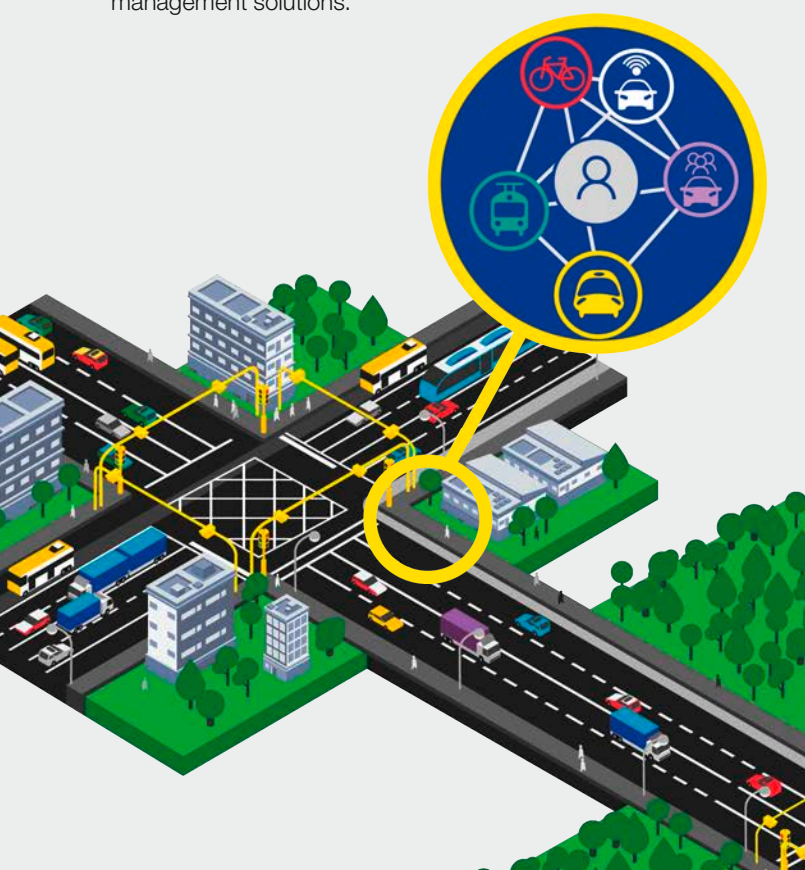
Top benefits of Kapsch intelligent pricing solutions

For road users, intelligent pricing solutions help to improve traffic flow during peak hours, reducing negative environmental impacts, such as poor air quality.

For cities and highways agencies, intelligent pricing solutions lay the foundation for a range of effective demand management solutions.

Key benefits of our solutions include:

- **Influencing road user behavior to achieve positive environmental outcomes**
based on dynamic pricing at peak times and the ability to communicate with road users in real time to recommend alternative routes or transport modes that could reduce their journey time and increase their safety.
- **Increased efficiency, with reduced effort and costs for demand management**
with the ability to calculate journey times between different locations on the network quickly and reliably in a fully automated way, and to track current and future predicted traffic conditions on an intuitive dashboard.
- **Improved traffic planning**
based on an accurate, current view of traffic load on the network, with granular insights into traffic flows and volumes on busy routes and between locations – both between and within zones. Improved visibility of traffic flows also ensures that road capacity is utilized in the best possible way to meet road users' needs and to minimize journey times across the network.



[find out more](#)



Kapsch TrafficCom connected mobility and demand management solutions in action

Kapsch TrafficCom has experience in delivering next-generation connected mobility and demand management solutions in some of the world's biggest and busiest cities. These include:

Bilbao, Spain

where we are using Wi-Fi sensor data to analyze multi-modal mobility throughout the city, and to monitor temporal and spatial traffic and mobility developments. In this way, we are providing a holistic view of how people are moving around the city, supporting data-driven traffic-management and demand-management decisions. This helps the local authority to develop well-informed policy measures, traffic operations and mobility planning, and prioritization, to make city mobility more efficient and sustainable.

Vienna, Austria

where we collect and analyze data from roadside sensors to give the city authority a real-time view of traffic conditions. The city's traffic lights are also being integrated into a management system that adjusts timings during peak times to optimize traffic flow and reduce congestion and related emissions. We are also providing a 'green wave' solution that will allow drivers to stick to a recommended speed to arrive at traffic lights when they are green – speeding up their journeys and reducing the negative environmental impacts of their trip.

Buenos Aires, Argentina

where we are supporting a citywide project to integrate multiple traffic management systems and devices into a single, coordinated environment. This will support centralized aggregation and analysis of traffic data, giving city authorities a real-time view of traffic across the city for faster, more effective responses that help to reduce congestion and optimize traffic flow. Ultimately, the aim is to deploy demand management solutions that influence driver behavior and, over time, reduce reliance on private vehicles in the city.

Melbourne, Australia

where we have deployed our Kapsch Mobility Hub within the University of Melbourne AIMES (Australian Integrated Multimodal EcoSystem). Our urban testbed serves to measure the effectiveness of our demand and C-ITS based technologies. Our focus is supporting the deployment of our latest Kapsch Smart Intersection and Kapsch Intelligent Corridor applications to improve road safety, support and facilitate the adoption of C-ITS / Connected Vehicles and demand based multimodal management technology to reduce congestion and improve the air quality within dense urban areas.



The future is greener – and it all starts now

While the transition to EVs and expansion of public transport networks remain major priorities for cities and highways agencies, connected mobility and demand management solutions can also provide rapid improvements in traffic flow and reductions in vehicle emissions, and related climate and air quality impacts. As such, these solutions provide a unique opportunity for agencies to accelerate their emissions reduction strategies, and to improve environmental performance across a range of KPIs.

Not only will this help to ensure compliance with government regulations on vehicle emissions. It will also help to meet demands among members of the public for reduced congestion, improved air quality, and reduced climate impacts.

To support agencies' emissions targets, Kapsch TrafficCom has developed one of the industry's most comprehensive portfolios of connected mobility and demand management solutions. By integrating connected driving capabilities, smart roads capabilities and intelligent pricing capabilities, we are helping agencies around the world to achieve their congestion and emissions goals in the fastest and most efficient way possible.

**Discover Kapsch TrafficCom solutions
for your emissions challenges
at experts@kapsch.net.**

Kapsch TrafficCom

Kapsch TrafficCom is a globally renowned provider of transportation solutions for sustainable mobility. Innovative solutions in the application fields of tolling, tolling services, traffic management and demand management contribute to a healthy world without congestion. Kapsch has brought projects to fruition in more than 50 countries around the globe. With one-stop solutions, the company covers the entire value chain of customers, from components to design and implementation to the operation of systems. As part of the Kapsch Group and headquartered in Vienna, Kapsch TrafficCom has subsidiaries and branches in more than 25 countries. It has been listed in the Prime Market segment of the Vienna Stock Exchange since 2007 (ticker symbol: KTCG). In its 2020/21 financial year, around 4,660 employees generated revenues of about EUR 500 million.

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