Autumn 2022 No.9 Magazine

PULSE

Insights Ideas Inspirations

Sustainable mobility: longer asset service life

Sharing ideas to shape the future of mobility

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FOREWORD

Pulse No.9

Pulse — your thought leadership magazine dedicated to the future of mobility — has been restyled. Clearer and lighter, the new format focuses on the fundamentals, making it easier for readers to grasp the big issues shaping daily mobility.

The new "Insights" section sheds light on the issues surrounding mobility by providing a forum for expression to those involved in its transformation. These articles bring together viewpoints from experts and people on the ground to answer important questions like: What options are available for financing the energy transition? Will America's infrastructure deal deliver the boost everyone's hoping for? How does the digital transformation fit into the picture?

After a summer blighted by catastrophic fires and floods around the globe, we decided to look at how cities are preparing for the consequences of climate change, by adapting their networks to cope with extreme weather conditions. "On the ground" takes readers on a tour to discover the initiatives underway to make mobility more sustainable, more inclusive and — especially — more resilient.

If resilience is the new holy grail, achieving it requires effective asset management. But what exactly does that mean? Should assets be electric or hybrid? Should rolling stock be refurbished or replaced? In this issue, we delve into a topic that is rarely addressed and often deemed obscure to find out more about how public transport authorities and transport operators make key investment decisions.

And since the shortage of drivers remains an issue for many operators, we pay tribute to these "driving forces" from around the world in our "In Pictures" section.

Pulse: sharing ideas to shape the future of mobility

Enjoy your magazine!

Marie-Ange Debon

Chairwoman & Chief Executive Officer of Keolis Group and Chair of the French rail and public transport union (UTP)

In a post-Covid world, Marie-Ange Debon highlights the need for political impetus to drive investment in public transport and make modal shift a reality.

Frédéric Baverez

CEO Keolis France

Frédéric Baverez explains how energy transition funding is accelerating in France to address the climate emergency.

Emmanuel Sorin

Maintenance Director, Keolis Group

In our feature article, Emmanuel Sorin provides insight into the role played by data — and more broadly by digital technology — in the life span and maintenance of industrial assets.

Key contributors to this issue

Arnaud Julien

Chief Innovation, Data & Digital Officer, Keolis

Innovation expert Arnaud Julien explains how sustainable mobility and the digital transition go hand in hand, thanks to the power of data.

Ed Lawson

Chair of Washoe County's Regional Transportation Commission (RTC) and Mayor of the city of Sparks, in Washoe County, Nevada (US)

With his sights set on zero-emission buses, Ed Lawson explains how America's new infrastructure law could bolster his city's investment plans over the next 50 years.

Bob Schneider

Executive Director of OmniRide, a public transport authority in Prince William County, Virginia (US)

Following the major shift in employee work habits due to the pandemic, Bob Schneider sees the US Infrastructure Deal as an opportunity to promote equal access to transport services across communities.








6 months in headlines

APRIL. Crude prices shot up… taking pump prices with them! As a combined result of the global economic recovery and the war in Ukraine, fuel prices reached record levels in April and June before falling in subsequent months. Faced with this high volatility, governments introduced tax cuts and discounts at the pump to help people struggling with increases in the cost of living.

MAY. Mask mandates ended on most transport networks. The European Union announced that passengers were no longer required to wear masks on flights to many EU countries. In France and the United States, the mandate was also lifted for public transport users. Nonetheless, wearing a mask on public transport continues to be recommended by the authorities and remains mandatory in other countries, including Australia and Canada.

JUNE. Germany initiated a summer trial of an unlimited monthly pass for travel on regional train networks, metros, trams and buses, for just €9. Despite some difficulties in service provision related to high demand, the trial saw 52 million tickets sold in three months. Around 10% of the journeys taken replaced the use of a car, cutting carbon emissions by 1.8 million tonnes. In the same month, the EU agreed draft legislation in favour of electric mobility by banning the sale of new petrol and diesel vehicles from 2035.

JULY. Driver shortages led to service cancellations. Operators stepped up their efforts to showcase how rewarding careers in public transport can be. Keolis ran the #DiversityDrivesUsForward campaign to fill 1,000 driver and maintenance vacancies in 14 countries, while Transilien SNCF held “job dating” sessions to hire 600 new recruits and the Ottawa Student Transportation Authority launched a web-based campaign to attract more drivers.

AUGUST. Transport networks overheated! Soaring temperatures affected transport, leading to the cancellation of trains parked in full sunlight by Belgium’s SNCB, the closure of 380 kilometres (230 miles) of railway tracks in London, and reductions in operating speeds by RATP to prevent accidents in Paris. Europe’s hottest summer on record highlighted the need to rethink infrastructure to make it more resilient. (See our article “Extreme weather: how prepared are our cities?”, pages 18-21).

SEPTEMBER. Fewer cars, fresher air! As part of European Mobility Week, urban networks across France ran a host of initiatives to raise awareness about clean air and promote multimodal travel. In the United Kingdom, free trips were offered as part of “Catch the Bus Month” — a campaign to promote buses as a sustainable, inclusive and accessible form of transport. And in Paris, the iconic Champs-Elysées avenue became a pedestrian-only thoroughfare for two Sundays.

Public transport

A new post-Covid trajectory

Marie-Ange Debon, Chairwoman & Chief Executive Officer of Keolis Group and Chair of the French rail and public transport union (UTP)

“We’re not lacking in vision and solutions but more is needed in terms of political impetus and the resources to make the requisite investments.”

“To bring about the modal shift, we need to create a supply shock.”

Although passengers have returned to public transport networks, private vehicles are still the main mode of transport for close to 80% of daily journeys in many countries, including France. Yet, with pump prices as high as €2 per litre, private car use is no longer a choice but rather a constraint for many. The current situation is a complete paradox: commuters are increasingly aware of public transport’s environmental and financial benefits but they can’t opt for this solution because of the inadequate offering.

From poor local coverage, insufficient frequency and safety concerns to overly complicated connections, timetables that aren’t compatible with working hours or simply a lack of awareness about the solutions available, the issues underlying the lag in modal shift from private car to public transport have been clear to us for years. The good news is that we also have the solutions.

To guarantee a high-quality public transport offering and achieve our emissions reduction target by 2030, we’ve already invested heavily. Our buses, coaches and trams are now greener, faster and more reliable. And they’re also more economical – up to five times cheaper than private cars. That’s all thanks to the work we’ve carried out with our 300-plus PTA partners. Together, we’re convinced that the modal shift will be achieved through an affordable, multimodal, low-carbon public transport offering that makes life easier for all passengers.

The future of public transport is about being able to pay for travel more easily, via a contactless, open-loop payment method such as a bank card or smartphone, for example. It’s about seamless journeys with smooth intermodal connections, facilitated by up-to-the-minute information and passenger-friendly signage. It’s also about trams, metros, buses and coaches that are powered by electricity, biogas or hydrogen, alongside walking, cycling and car sharing. And lastly, it’s about a shift to rail and river freight to ease congestion on roads and reduce carbon emissions.

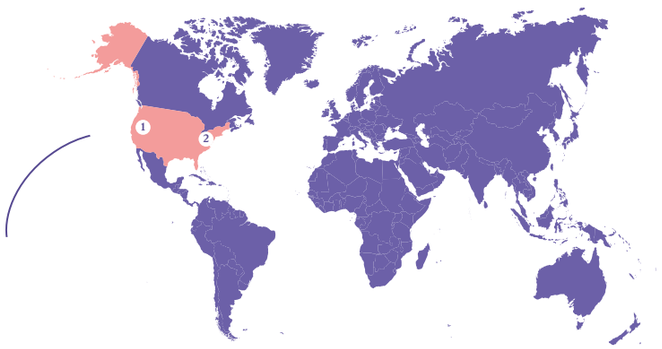
We’re not lacking in vision and solutions but more is needed in terms of political impetus and the resources to make the requisite investments. As public authorities tackle the triple challenge of meeting environmental, economic and energy concerns, we urgently need to make our voices heard and take action. Because the green transition simply won’t happen without a smart, responsible public transport offering.

Infrastructure: what's the big deal?

With billions of dollars in guaranteed funding, the United States' new Bipartisan Infrastructure Law (known formally as the "Infrastructure Investment and Jobs Act" (IIJA)) is the largest Federal investment ever in public transportation. Clearly, the extra funds can boost plans to improve mobility through better, greener and more equitable service. But transit operators are pressing ahead regardless of any windfalls. In this roundtable, two leaders of local transit authorities discuss what the new law means to them and what their priorities are, in line with its goals.

"For me, it's also about cleaner air — having fewer cars on the street and more people riding electric buses."

Ed Lawson



Ed Lawson,
Chair of the Regional Transportation Committee (RTC) Washoe and Mayor of Sparks, a city in Washoe County, Nevada
①

Bob Schneider,
Executive Director of OmniRide, a public transport agency in Prince William County, Virginia
②

Pulse – Enacted in November 2021, the Bipartisan Infrastructure Law seems like an exciting new step forward for public transportation. Would you agree?

ED LAWSON – As with all government programs, we're excited there's a pot of money there, but access to it is the real trick. We have to play it by ear — submit a grant application and if comes, great. In that case, we'll take some of the money we were going to use for that particular project and move it to another. But if it doesn't come, we'll continue down the road. We can't really count on this funding but we're always hopeful.

BOB SCHNEIDER – It's good for the industry, and transit systems that sit at the head of the table of their own region are going to do well. However, if you're a system like OmniRide, who isn't a major recipient of federal funding, you're going to be making decisions on projects without really understanding what your fiscal future looks like. We're not focused on that sole source of money for our success. Our success is driven by passengers in seats.

"The law is good for the industry, but our success is driven by passengers in seats."

Bob Schneider

Pulse – What grants have you applied for?

E. L. – Mostly for bridge improvement. That seems to be one area that's funded readily, especially in our area, which is very earthquake prone. We've also applied for additional funding to continue on our path of zero-emissions buses and build a new bus maintenance facility. Our ultimate goal is to be zero emissions with our entire fleet. Additionally, we're hoping to get formula (non-competitive) funding for projects like widening existing roadways and improving safety for drivers, pedestrians and cyclists. Rebuilding American Infrastructure with Sustainability and Equity (RAISE) funding could also help RTC complete projects on major regional roadways in our community.

B. S. – We put in a small application to start doing paratransit vehicles and staff cars, which is a slam dunk as the technologies are readily available, but we didn't get approved for that. When you run a bus system, there's only two things you're really spending money on: buying equipment or replacing a facility. So far, the infrastructure deal has delivered an extra $2 million in formula funding, but ironically, we've got more than that from the State.

Pulse – So, you're pressing ahead without necessarily relying on extra funding. What are your priorities and how do these fit with the aims of the deal?

E. L. – We have a 50-year plan and our priorities change as we go along, but the bottom line is expanding the system and getting more riders. For me, it's also about cleaner air — having fewer cars on the street and more people riding electric buses. That's good for the environment, good for the community and hopefully good for the productivity of those citizens.

B. S. – I think what transit systems should pay attention to is how travel patterns have changed and what customers need. We're starting to look at equity in services. Historically, it's all been about how well routes perform and cutting them if you don't have a certain level of ridership. Now we recognize that you have underserved communities that are always going to have low ridership and that's OK. That's one thing the new law can help fund. You can now spend money in economically distressed areas, and the question becomes: can we give someone the same value of transportation in that community that you get in a denser, wealthier area?

Pulse – Can you give some concrete examples?

E. L. – One priority is our arterial roads, because most people who live in the North Valleys have to commute. There's only one road, the I-80, so having alternate routes would help tremendously. We've planned a road to connect La Posada in North Sparks to the Tahoe-Reno Industrial Center, which would take a lot of commuting off the I-80, save traffic accidents and cut the commute time in half. It would also save about 25 tons of carbon emissions every day.(1) Other priorities, for example, are the feeder links to the I-80 that come from the North Valleys.

B. S. – Our system is predominately commuter based but we also have a free local service. Recently we debated whether to improve our Saturday service or add a Sunday service to provide access to the community seven days a week. It's much cheaper to do more on Saturday, but because of the equity question, we added Sunday. We're also implementing microtransit, which is basically our version of Uber, with technology that Keolis is helping us deploy. Microtransit creates a zone in which everyone has access to a transit route by taking people to bus stops.

> **"The question is: can we offer everyone the same value of transportation that you get in denser, wealthier areas?"**
>
> **Bob Schneider**

$2M

more available for public transport in Prince William County thanks to the Infrastructure Deal.

> **"The pandemic turned everything on its ear and we're still working on how to bring ridership back. I think if people try public transit, they'll embrace it."**
>
> **Ed Lawson**

Pulse – How do you expect ridership to evolve in the near future?

E. L. – The pandemic turned everything on its ear and we're still working on how to bring ridership back. I spent a couple of days just riding the bus two months ago and it's pretty convenient if you get out of the car-driver mindset. I think if people try public transit, they'll embrace it. So, I've partnered with the principal of an elementary school to give out free bus passes for the parents to try, and that will get some increased ridership. We're a pretty small community and I think grassroots is where we're going to make it work.

B. S. – On our commuter service, one of the big impacts we're seeing is with "The Great Relocation" and remote work. We're getting an influx of residents to the community, so it's not the same number of people commuting less, it's more people commuting less, which helps stabilize numbers. Our local services have bounced back quickly, although one group that has not really returned is our senior citizens, who remain very concerned about Covid. Because we're a robust system, we're able to adjust our services to match demand.

(1) By comparison, the average American's carbon footprint is 14 tonnes of CO_2 per year.

The Bipartisan Infrastructure Law in figures

Formally known as the "Infrastructure Investment and Jobs Act", the new law is aimed at rebuilding America's "crumbling infrastructure" to boost the economy sustainably and equitably over the next five years.

The additional funds impacting transportation include:

$110 billion
for repairs to roads and bridges

$89.9 billion
for public transit

$66 billion
for rail

$7.5 billion
for a national network of EV chargers

These and other investments are expected to create

1.5M
jobs annually in the next 10 years.

Source: The White House.

Energy transition

What funding for public transport?

Frédéric Baverez, CEO Keolis France, answers our questions.

As energy costs continue to rise, while public transport business models have been undermined by the Covid pandemic, how can we step up funding for the energy transition to address the climate emergency?

Pulse – What are the issues around funding the ecological transition in public transport today?

FRÉDÉRIC BAVEREZ – The energy transition will result in higher costs for public transport operators. This is because rolling stock — especially electric and hydrogen vehicles — is more expensive than conventional diesel vehicles. These alternative energies also require investments in charging and fuelling infrastructure. At the same time, beyond the extreme price volatility we've seen in the last six months, we also face the prospect of a structural increase in energy costs. So far, most of these additional costs have been borne by the transport authorities, because it's difficult to pass them onto users if our value proposition doesn't change.

Pulse – Why should the State do more to fund the energy transition?

F. B. – First, because public transport in itself is part of the solution to the necessary shift to greener energy — it directly contributes to decarbonisation. Second, because it supports people in the face of the rising cost of living, especially private motorised mobility. And third, because the role of government is to encourage innovative technology-driven sectors and technological change. Currently, however, government subsidies are too small and too sporadic, since they're typically allocated in response to a call for projects. The government needs to live up to its stated priority to help drive the energy transition and provide consistent structural support for the shift to green public transport.

Pulse – What mechanisms could we envision to fund the energy transition?

F. B. – To be effective, public subsidies must be clearly targeted, transparent, easy to access and above all sustainable. On this basis, the best way would be to offer a significant subsidy over a two or three-year period, like the €100,000 per vehicle under the last ADEME (French environment and energy management agency) call for projects for any electric or hydrogen bus or coach purchased by a transport authority or operator. Part of the funds available under the European Union's Green Deal could be allocated to this type of support, which would have a real multiplier effect.

Pulse – Will the cost of electric vehicles come down?

F. B. – The total cost of ownership of an electric bus over 15 years is about 30% higher than a diesel bus. But as the electric ecosystem continues to develop, that cost will gradually come down. While battery performance is constantly improving, especially in terms of range and service life, the main uncertainty right now is the price of electricity, with the crisis caused by the war in Ukraine. We face a spectacular rise in prices, which can affect the economic balance of projects. It's also hitting public transport hard because metro and tram networks use a lot of electricity.

Pulse – Is retrofit a credible solution?

F. B. – Retrofit has come a long way in France since the government decree of March 2020, which makes it easier to convert diesel vehicles to electric. Keolis's engineering teams have identified nearly 20 retrofit initiatives where we could convert diesel vehicles to natural gas, battery electric or hydrogen. While the technical solutions and costs aren't fully stabilised at this time, these initiatives offer a lot of possibilities. At this stage, three things are worth noting. First, the initial age of the retrofit vehicle and the potential for extending its service life are decisive factors. Second, retrofit is economically more relevant for coaches than buses. And third, converting to electric makes more economic sense than buying a new electric vehicle.

Protecting the transport payroll tax

In France, the "versement mobilité" — a payroll tax to raise capital for investment in transport infrastructure — accounts for 45% of funding for urban transport. The amount raised in 2021 was just over €9 billion. Levied on the payroll of public and private-sector companies with 11 or more employees, it's frequently challenged by some employer organisations. This makes it more important than ever to formally protect how it currently operates. The science committee of the French transport authorities association GART is planning a consultation on a new funding model for public transport. The committee will be looking especially at how resources can be made more dependable and sustainable. Making taxation more ecologically and socially sustainable is one avenue it will explore.

Digital transition a fundamental of sustainable mobility

Arnaud Julien,
Chief Innovation,
Data & Digital Officer,
Keolis, explains.

At Keolis, innovation is helping us meet our goal of providing sustainable, efficient and resilient mobility solutions that help improve everyone's daily lives. Data in particular is an essential tool in the transition to greener forms of shared mobility. By providing greater insight into how transport is used, data enables us to enhance our operational performance and improve the passenger experience.

Pulse – Why is innovation important for Keolis?

ARNAUD JULIEN – Innovation allows us to develop and deploy safe, sustainable mobility solutions that meet each community's specific needs. It also contributes to the creation of seamless, personalised passenger journeys, which helps cut down on solo driving. Our efforts are focused on the Group's four strategic stakeholders: passengers, PTAs, our employees and the planet. Digital tech and data play an essential role in meeting our objectives.

Pulse – How is data used today to enhance the passenger experience?

A. J. – The first step is to help public transport authorities get a clearer picture of mobility trends in their community, so that the transport offering is as efficient and attractive as possible for users. Our Patterns solution, for example, leverages smartphone GPS data to analyse the movements of passengers across all modes of transport, helping us design and adapt services accordingly. Our Impulse solution, on the other hand, analyses all the data relating to a network — everything from ticketing to the fleet management system. This makes it possible to measure the performance of the public transport offering in order to help reduce its carbon footprint and align it more closely with users' needs.

Pulse – How does Keolis's innovation strategy strengthen its position as an actor in the green transition?

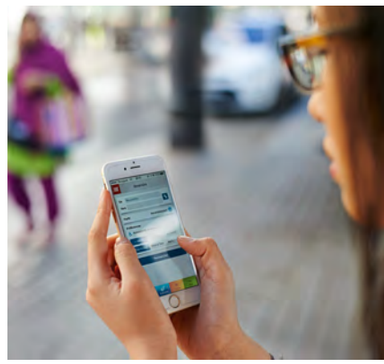
A. J. – These days, managing a transport network generates an ever-increasing volume of data about usage trends, operations, maintenance and more. This invaluable information can be used to optimise the network's energy consumption, carry out preventive and predictive maintenance, and even tailor the offering to the realities of ridership. To handle all this data, we've established a data governance framework, defined guiding principles and optimised data organisation to enhance the service offering.

Pulse – What role does a transport operator like Keolis play in this dual — environmental and digital — transition?

A. J. – In relation to the green transition, we accompany PTAs that want to invest in low emission vehicles, taking into account the data at our disposal and the specific features of each network. Regarding the digital transition, we harness data on network usage, including journeys, connections, passenger numbers, to enhance the passenger experience. Operational data enables us to optimise network performance, while maintenance data helps us anticipate breakdowns, prevent service disruptions and minimise vehicle downtime for fleet optimisation purposes. That's why we call it a twin transition: the digital transition feeds into the green transition, and vice versa.

Mobility data: an evolving legal framework

Personal mobility data is governed by the EU's General Data Protection Regulation (GDPR), part of an evolving legal framework. In the four years since it came into effect, the GDPR has been fully integrated into Keolis's anonymised data management processes, notably thanks to the recruitment of a data protection officer. In Europe, a proposal for an EU directive on digital transport platforms – transposed into French legislation via the "LOM" mobility law – provides for a national access point (NAP) in each country, so that Europe-wide mobility data can be collated and shared to improve understanding of users' needs and enhance the performance of transport networks.



Extreme weather

How prepared are our cities?

Heavy rainfall, Mumbai, India, 2020.

Tuesday, 16 August 2022, just after 6 pm. Following a heatwave that lasted several weeks, the equivalent of two to three weeks' rain fell on Paris in the space of a few minutes. Thousands of properties were flooded and several stations on five different metro lines had to be closed.

Elsewhere in the world, torrential rain that begin in June triggered catastrophic flooding in Pakistan, submerging one-third of the country, while people in California and other parts of the US West sweltered under a heat dome, with temperatures above 45°C for over a fortnight.

Climate change has become a real problem for thousands of cities worldwide — with immediate and tangible consequences for millions of people as they go about their everyday travel. Faced with frequent breakdowns and sometimes significant material damage, network operators have struggled to maintain service continuity. To reduce the cost of these climate-related incidents, which will undoubtedly occur more frequently in the future, public transport authorities are seeking simple but effective solutions to strengthen their networks' resilience and allow them to cope with severe weather conditions.

← Flexible, water resistant flood barriers on an entrance to the New York subway.

In 2012, New York City was devastated by Superstorm Sandy, flooding streets and subway lines. In 2021, the city was hit again, this time by Hurricane Ida, with flash flooding bringing life to a standstill and wreaking havoc on the underground subway system. In both cases, the cost of the damage was colossal, totalling $50 billion, including repairs to public transport networks. To better prepare for severe weather events, the Metropolitan Transportation Authority (MTA) has deployed the "Flex-Gate" flood barrier system developed by Delaware-based manufacturer ILC Dover.

← Helicopters drop water on a wildfire in Castaic, California.

Made with Kevlar and housed at street level above the stairwells that lead down to stations, the floodgates can be deployed ahead of flood events to create a kind of lid over the openings. Capable of withstanding thousands of pounds of tension, the tarp-like sheets can be rolled out using a simple crank, turning the entrance into a waterproof seal. So far, the system has been installed at 68 New York City subway stations, at a cost of $2.6 billion. Compared with $50 billion worth of damage, that certainly sounds like a wise investment!

As well as flooding, cities have had to bear the brunt of periods of intense heat, engendering drought, wildfires and even megafires. Local authorities are implementing various solutions to offset the impact of soaring temperatures, which can bring their transport systems to a halt. In Paris, for example, the new T9 tram line operated by Keolis is laid with soft green track beds to absorb heat. Developed by Ecovégétal, the turf is made from four varieties of local plants that are hardier and require less watering and fertiliser than conventional grass. Not only does the vegetation look good, it also significantly reduces noise, requires 70 to 90% less water for irrigation than conventional surfaces, and absorbs heat, helping to mitigate the 'urban heat island' effect, thereby providing an enhanced experience for passengers and residents alike.

← Soft green track beds along the new T9 tram line in Paris.

climate change, strengthening the resilience of public transport systems is now high on the agenda for PTAs everywhere. Part of the solution lies in better anticipating and factoring in this new reality, either right from the design stage or as part of transport infrastructure upgrades. Many authorities have already started adapting their cities to alleviate the huge costs likely to be incurred due to damage caused by future extreme weather events. Adapt or bear the consequences — either way, everyone must take action.

In the UK and Belgium, at the height of the summer heatwave, the railway network owner and infrastructure manager painted sections of track with white paint to prevent rails from buckling and misaligning. This simple but effective solution can bring the track's temperature down by 5°C to 10°C – in the same way that painting buildings white helps reflect sunlight and make them cooler.

In Australia, Western Sydney is projected to experience up to 7 additional days above 35°C per year by 2030. For the 600,000 passengers who use the city's buses every day, this could be a major issue. To help beat the heat, a smart, climate-adapted solution has been developed collaboratively through a partnership of Australian research institutes. Dubbed Climate Adapted People Shelters (CAPS), the new bus shelters are made of insulated aluminium to minimise the absorption of heat and feature solar powered LED lighting for safety. Readings have shown that the roof surface temperature on the new shelters is up to 15°C lower than the ambient temperature — making waiting for the bus a much more pleasant experience.

Whether it's to offset heatwaves, cold snaps, floods, droughts or other consequences of

← Rails painted white during the 2022 heatwave, Liège, Belgium.

← Australia tests climate-resilient bus shelters, 2021.

1, 2, 3... programmes to improve service quality in Bayonne!

For over a year, Keolis has been trying something completely new in Bayonne by simultaneously implementing three programmes: Keolis Signature Service (KSS), Keolis Industrialises and Harmonises Operations (KIHO) and Keolis Industrialises and Harmonises Maintenance (KIHM). The goal? To meet performance, safety, wellbeing and environmental requirements in collaboration with passengers, PTAs and employees. *Pulse* looks back after a year of deployment.

It all started in April 2021 when Patrick Cozan — head of the Keolis Côte Basque-Adour (KCBA) subsidiary — decided to implement the Keolis Signature Service (KSS) programme in Bayonne. Around since 2015 (see insert), the KSS programme is designed to improve the quality of customer relations in all regions where Keolis operates. "On the Côte Basque-Adour network, we had to meet several challenges," explains Patrick Cozan. "We needed to enhance service quality, boost our operational efficiency and increase customer satisfaction rates." To achieve this, the Keolis team opted for the synergistic effect of carrying out not one but three programmes at the same time!

As a result, two months after kicking off KSS, Patrick's teams rolled out the KIHO and KIHM programmes — a first for the Group. The public transport authority's key concern was to improve satisfaction and loyalty among passengers by addressing their concerns and expectations more effectively. "The first initiative implemented through KSS was the systematic handling of irritants reported by our passengers during their journeys," says Patrick. "We also trained network staff in customer relations using role-play and peer-to-peer discussion sessions." These efforts have already produced results, with the network recording a decrease in passenger complaints and a significant increase in customer satisfaction.

← Launch day for the KSS programme tailored to KCBA, 21 October 2021.

← KIHM programme presented to Keolis Côte Basque-Adour staff.

Joint implementation of the KSS, KIHM and KIHO programmes has also had the knock-on effect of enhancing employee wellbeing. "By conducting out all three programmes at the same time, we've given Keolis teams something tangible to work towards and enhanced their sense of purpose," says Patrick. "The co-construction process, which is central to the KIHM and KIHO programmes, has enabled staff to really get involved and have their opinions and suggestions taken into account."

Thanks to deployment of the KIHM programme, progress has also been made on improving network maintenance and operations. "We've introduced regular five-minute reports, for example," says Olivier Debalanger, who heads up maintenance at KCBA. "Through this simple procedure, we've been able to improve the clarity of information transmitted, benefit from immediate feedback on work carried out during the day and get a clearer picture of the vehicles available."

"After just over a year, the benefits observed have been significant, for passengers and staff but also for the public transport authority," says Patrick Cozan. "This three-way approach has enabled our PTA partner to offer services that are more closely aligned with the community's expectations." Mission accomplished for KCBA, which has successfully measured up to the local PTA's expectations in terms of safety, reliability and quality of service. Hopefully, this innovative example of operational performance will inspire many other Keolis subsidiaries!

In a nutshell

Annelise Avril, Senior Executive Vice President - Marketing, Innovation & New Mobility Services at Keolis Group.

Rolled out at Group level in 2015, the Keolis Signature Service programme involves 12,000 employees and 5,000 ground staff. "KSS puts into action the Group's commitment to offering the best possible passenger service," says Annelise Avril, Group Senior Executive Vice President - Marketing, Innovation & New Mobility Services. A practical manifestation of the "Thinking Like a Passenger" philosophy, the programme is all about getting network staff and supervisors to jointly develop practices that improve service quality: greeting and guiding passengers, reassuring them throughout their journeys and keeping them informed of any unexpected disruptions. Keolis hopes to triple the number of Group entities that benefit from the KSS programme to 60 by 2025.

200

out of 350 employees, have been trained for KSS and 60 for KIHO and KIHM

NaviLens one step closer to inclusive mobility

To improve independence for visually impaired people, Keolis is trialling NaviLens technology at Versailles-Chantiers rail station in France. This easy-to-use smartphone app combines voice guidance and a QR code reader, with codes located along a dedicated route through the station. This inclusive initiative — a first in France — is being conducted in partnership with Île-de-France Mobilités, Versailles Grand Parc, SNCF and nonprofit organisation Valentin Haüy. We join one NaviLens user on their journey…

#1.

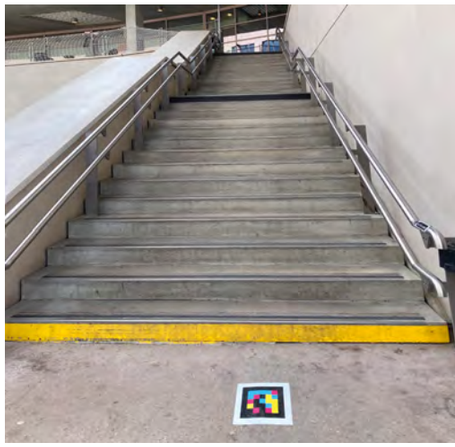
Easy, ultra-fast QR code detection
NaviLens is a simple, user-friendly mobile app. Simply hold your phone upright in front of you, or around your neck. The camera automatically detects the large, coloured QR codes up to 15 metres away, with no need to point it at them directly. The voice assistant then tells you how to find your way. For example, from outside the station, it says: “To enter the station, start by following the tactile guide strip on your right until you reach the ticket gates, then scan the code on the floor near your feet”.

#2.

Clear and precise voice prompts
Based on feedback from passengers, all the necessary guidance has been carefully thought out and included in the app — from static information like location, direction and name of line and next stop to dynamic information such as real-time timetables, next bus arriving, service disruptions and events. Pierre, who uses the service, said: “NaviLens means you don’t need to have a guide with you. It gives you more independence. You can travel freely”.

#3.

An easier, safer station experience
At the foot of a staircase, for example, NaviLens detects the QR code. The voice assistant says: “19 steps to climb, then continue to follow the handrail”. A short prompt, but it makes a big difference for anyone with a visual impairment. Did you know that in France there are 1.7 million visually impaired people, including 207,000 blind people? For these passengers, navigating a station can be a real obstacle course.



#4.

Inclusive intermodal technology
Versailles-Chantiers bus station, just across from the rail station, has also installed the NaviLens system. This makes it easier for a lot more people to make intermodal connections for their onward travel.

NaviLens

NaviLens is a patented technology for inclusive mobility. It combines a QR code reader, with a detection range of 15 metres, with voice guidance and a user-friendly interface. Available in 33 languages, NaviLens can assist people with all types of disabilities, as well as vulnerable travellers such as seniors and tourists.

FEATURE ARTICLE

Sustainable mobility

longer asset service life

Signalling or switching problem on a metro, engine fault on a bus, overhead line failure on a commuter rail link — these are just some of the issues we regularly deal with on a public transport network. But beyond these routine problems caused by normal wear and tear, there's a more fundamental question about the service life of our transport infrastructure and how to optimally improve it. Against a backdrop of climate emergency and energy crisis, what are the wisest investments? Repair or replace? Refurbish or recycle? *Pulse* opens the black box of industrial asset management and unpacks the financial decisions that will help make the transportation of the future more resilient.

INSIGHTS P. 28-31 | **FOCUS** P. 29 & 31 | **BUSINESS CASES** P. 32-33

"Asset management." Behind the rather impersonal vocabulary, the question affects all stakeholders in the mobility value chain. First, passengers and transport workers, who personally suffer the fallout of any fault on their network. Then, the public transport authorities (PTAs), who are accountable to their users and must prepare the mobility of tomorrow by making the right investment decisions at lowest cost. Manufacturers, whose orderbooks depend directly on the investment choices by the PTAs. And transport operators, who maintain the networks and whose on-the-ground expertise is vital for helping PTAs with their investment decisions.

WHAT EXACTLY IS AN "ASSET"?

"Asset" is the accounting and financial term for rolling stock (literally, "movable assets") and all infrastructure (real estate, etc.) that make up a transportation system. In the mobility sector, assets include the tracks of a rail network, a diesel bus, a tram, an information system or a metro station. In other words, all the infrastructure and all the vehicle fleets we need to deliver transport services.

AN OBSESSION: LONGER SERVICE LIFE

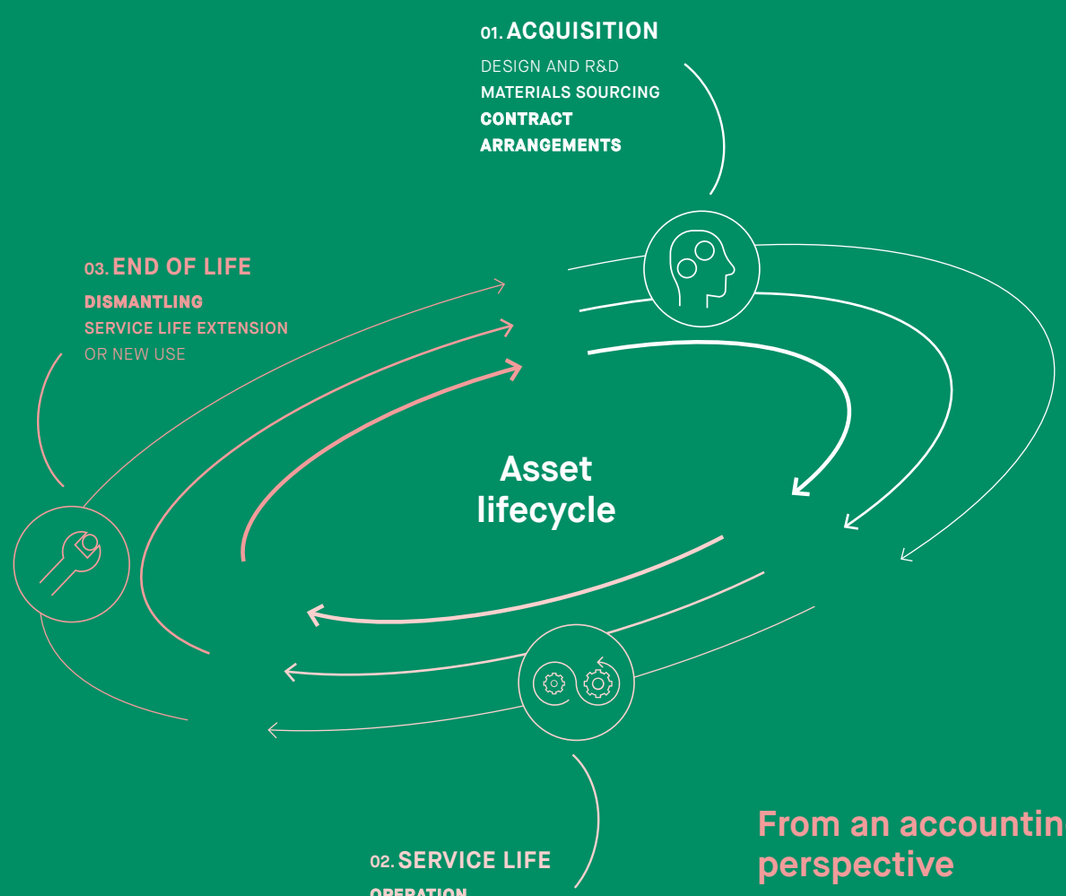
"Asset management aims to optimise the long-term operation of vehicles, equipment and infrastructure by guaranteeing their availability, safety and performance," says Marie-Eve Decroocq, vice president, transportation consulting at CGI Business Consulting. An asset's lifespan has three main phases. First, the acquisition phase, which is the asset's "before" life. This includes its design and the R&D needed for its manufacture, but also the sourcing of materials, the tests performed to validate or further develop the first prototypes and its market launch and contract arrangements. The second phase is the asset's service life, or "during" period, which is the phase all public transport users are familiar with. An asset's service life includes everything needed for its operation for passenger service, but also its maintenance and any refurbishment or upgrades. Third, the "after" phase is called "end of life". The end of an asset's life can be simply its dismantling (see *Pulse* 8). Increasingly, PTAs and operators are looking to extend the service life of their assets, or repurpose them for new uses — for reasons of both economic and environmental sustainability.

SQUARING AVAILABILITY, COSTS AND SAFETY

For PTAs, managing the ageing state of a transport infrastructure is a high-stakes task. Faced with growing urbanisation, traffic congestion, ever greater demand for transport in terms of quantity and quality (greener, safer, etc.), what's the best way forward? What's the right investment decision that will not only ensure continuity of service, but also allow improvements for a safer, more reliable and higher-quality mobility service?
Investment decisions must meet three criteria: availability of the technology, its cost and the level of safety it provides. "The central issue of a [transport] company's strategy can be summed up by the need to strike a balance between maximum availability of assets, acquisition and operating costs and safety requirements in service," says Laurent Mezzini, Business Unit Director, Railway Systems at SYSTRA.
If these three key criteria are met, the PTA can identify and manage potential risks, optimise investment and operating costs and enhance the availability and performance of its network over the long term, in line with the mobility strategy for the area it serves.

Focus: service life explained

In the lifecycle approach, the life of an asset has three main stages:



Source: Wavestone consultants

From an accounting perspective

In accounting terms, all these assets are a company's property and as such, they have an economic value. They also include inventories, receivables, fixed assets (or property, plant and equipment) and cash. An asset is the opposite of a company's liabilities, which consist of its equity capital, expenses and debts. In other words, assets and liabilities are everything the company owns or owes.

BEYOND SERVICE LIFE: THE ENERGY TRANSITION CHALLENGE

Against a backdrop of heightened climate and energy tensions, the issue of asset management is no longer the preserve of mobility experts. It's becoming a social issue and directly concerns users and their mobility habits. Which technology should we invest in first to decarbonise public transport and reduce air pollution? Electric, hybrid or hydrogen? How much of the fleet should we convert? On what timescale? How can we make this transition to low-carbon or carbon-free transport while minimising inconvenience for users? Should we retrofit our fleets or extend their service lives? Asset management is now a key factor in the energy transition. "We provide PTAs with technical solutions to help them reach their sustainable development goals, even though the short-term investment costs are higher," says Emmanuel Sorin, Maintenance Director at Keolis Group. "We help our customers understand the issues and constraints. And we offer deep insights into the pros and cons of each technical solution or energy source." With this support help, PTAs can make much more informed decisions when they acquire new trams or replace their bus fleets, for example. "We give our customers confidence and a clear picture of all possible solutions in the short, medium and long term," says Emmanuel Sorin.

TCO: THE IMPOSSIBLE EQUATION?

With rising energy costs and resources in short supply, it's becoming increasingly difficult to estimate the residual value of an asset. This uncertainty is made worse by regulations, as Bernard Soulages, Chairman of the GART Scientific Council, the French transport authorities association, explains: "The situation is complex from the perspective of our PTAs. Vehicles are one thing, but there's also infrastructure and energy costs, etc. Buying a bus that meets Euro 6 standards, for example — which are readily available today — lets us grow our service offering further than a hydrogen bus, which costs €600,000. On the risk management front, "the use of biogas mustn't be expanded if it means more land being given over to biofuels," he adds. In terms of safeguarding investments, "the increase in the price of batteries makes it hard to switch to electric vehicles, and we're still a long way from green hydrogen and short-term profitability of hydrogen," says Bernard Soulages.

All these parameters are at the heart of the black box of asset management and make calculating the total cost of ownership (TCO) of an asset over its life extremely complex. Yet it's precisely TCO that informs any investment decision to extend the service life of an asset, or to refurbish, replace or dismantle it.

Faced with this uncertainty, some countries have adopted a more proactive policy. Italy, for example, has decided to "no longer fund the purchase of diesel buses, but to buy electric buses for urban routes and biogas for the rest of the country," says Arrigo Giana, CEO/General Manager of Azienda Trasporti Milanesi, the PTA in Milan. "Hydrogen will undoubtedly be a good alternative to biogas for long-distance routes and non-urban use in the future, but battery capacity is still a major obstacle today." A proactive policy is needed to jumpstart the transition. But above all, trust between PTAs and operators is the key to maximising the service life of assets and making transport infrastructures and networks more intelligently resilient in the future.

Focus: digital to the rescue of asset service life

Viewpoint from Emmanuel Sorin Maintenance Director, Keolis Group

Pulse – What's the role of data in the lifecycle of industrial assets?

Emmanuel Sorin – Every asset has a finite lifespan. It's vital to effectively manage its use, maintenance and replacement, so we can provide a safe and high-quality service at lowest cost. Digital tools and especially data science are being used today to predict potential vehicle, equipment and infrastructure faults, trigger a response, adjust maintenance schedules and ultimately increase the reliability of transport services.

8 to 10%

reduction in maintenance costs by installing a fault detection system on overhead lines, according to a European operator (source: UITP, Digitisation and Asset Maintenance, 2019.)

Pulse – A real-world example of how data science is used in asset management?

E. S. – Proactive risk management includes condition-based and predictive maintenance, with IoT sensors, digital twins and virtual interactive replicas of infrastructure. In Doha, for example, we're advising the local PTA on how best to integrate building infrastructure management (BIM) from the construction phase of a project. BIM includes a digital twin, which helps the PTA anticipate all decisions it will need to make throughout the lifecycle of its assets.

Pulse – How do new digital tools optimise the maintenance of assets and extend their lifespan?

E. S. – Digitisation brings with it new technologies that help us keep closer track of the status of each asset. Drawing on our expertise and using simulation tools, we can increase the productivity of our maintenance operations and make work easier for operators. For example, Keolis' maintenance department is working on how to capture data from the batteries on our vehicle fleets, so we can better understand their evolving status. In Boston, Massachusetts, the commuter trains operated by Keolis are fitted with sensors that count passenger numbers, record vibrations and measure the temperature inside coaches. By anticipating faults and failures, digitisation improves network performance and reduces response costs and times. The goal now is to help operators and mechanics gain the necessary skills in the digitisation of maintenance. We're also training our staff to work on alternative energy vehicles.

Business case 01
Melbourne tram network

CHALLENGES

In Melbourne, Keolis is responsible for maintaining the largest and oldest tram network in the world. The 1,750 stops along its 250 kilometres of track are served every day by a fleet of 500 trams, representing nine different tram classes with an average age of 30 years. From tracks, stops and overhead lines to signage, fleet management and passenger information systems, the scope is exhaustive. And Keolis has to meet the sizeable challenge of maintaining and renovating the ageing network in a fast-growing city, while also upholding service quality and punctuality.

SOLUTIONS

Keolis has helped Yarra Trams deploy a new generation of E-Class trams that are longer than their predecessors (33.5 metres versus 16.6) and can therefore carry more passengers. The new vehicles also benefit from predictive maintenance thanks to onboard sensors that capture data for analysis. A special tram equipped with both sensors and cameras is used to analyse the network's tracks and roads, as a supplement to physical inspections. Keolis's unique expertise in this area led to ISO 55001 certification in August 2019, entailing the creation of around one hundred standards and the development of 26 asset class strategies.

NEXT STEPS

Scheduled for rollout from 2025, the next generation of trams (G-Class) will bring a range of technical and environmental improvements, including onboard energy storage, regenerative braking, cutting-edge accessibility technology and the latest safety systems. Project plans also include a new tram refurbishment and maintenance facility.

"The expertise of Keolis Downer's engineers and the quality of our partnership with the Department of Transport have put us on a positive trajectory these past few years. Despite an ageing fleet, the network's reliability has improved and rolling stock availability is no longer a concern for our passengers."

JULIEN DEHORNOY,
CEO OF YARRA TRAMS

Business case 02
Rennes metro

CHALLENGES

Twenty years after inaugurating its first automated metro line in March 2002, Rennes opened its new Line B on Tuesday 20 September, making it the world's first city to benefit from Cityval[1] technology — ahead of Frankfurt and Bangkok airports. Crossing Rennes diagonally from southwest to northeast, this second automated line is the cornerstone of Rennes Métropole's new transport masterplan. The infrastructure project included three new park-and-ride facilities (2,000 car parking spaces and 500 more bicycle spaces). And on 24 October, Rennes launched a new bus network to increase the number and frequency of buses across all 43 towns in the Greater Rennes area, beyond the ring road. By 2025, Rennes is aiming for 25% more passengers on public transport.

SOLUTIONS

With its 2.65-metre-wide trains (compared to 2.08 metres before) and large glass panel surfaces, the Cityval rolling stock on Line B can carry more passengers — 179 seats compared to 158 on the Val trains. Its 21 new-generation two-car trains (25 planned) ride on pneumatic tyres and are guided by a single central rail on a concrete track. Inside, the trains have an open-space design that allows passengers to move easily within and between cars. Each car has a dynamic, real-time passenger information display. At a total cost of €1.3 billion, the Line B infrastructure project was delivered on budget.

NEXT STEPS

In the longer term, Line B will make the equivalent of 110,000 passenger-journeys a day, carrying an average of 4,000 passengers per hour per direction. Initially, the higher number of journeys will be achieved by increasing the frequency of trains (currently every 2 min. 15 sec.). In a second phase, a third, central car will be added to the Cityval trains. The 15 stations and 35-metre-long platforms on Line B have all been designed with this in mind.

(1) Cityval: new generation of automated rubber-tyred metro (automated people mover) trains developed by Siemens.

"Line B is the cornerstone of Rennes Métropole's new transport masterplan."

RONAN KERLOC'H, MANAGING DIRECTOR OF KEOLIS RENNES

Driving forces

From Christchurch to Kathmandu via Paris and Singapore, meet the men and women who get people where they need to go, in this visual tribute to the world's "driving forces".

Mohamad Al Said is a Syrian refugee who's been living in Berlin since 2015. In Syria, he studied literature and hoped to become a teacher. He now earns a living as a Berlin bus driver, thanks to a special training programme for refugees.

01 Drivers around the world

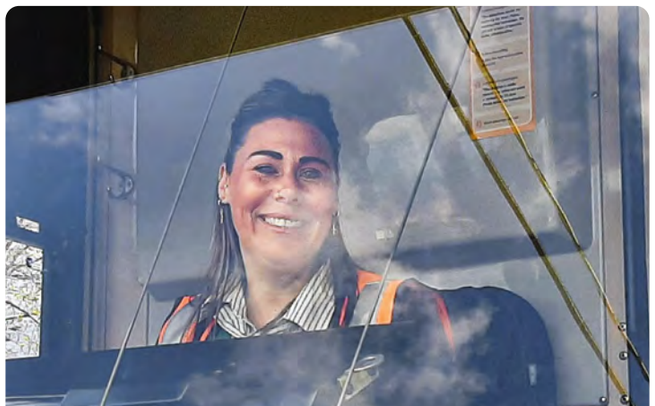
Sreni Pillai has been driving trams since 2019. She's one of seven women drivers on the electric tram network that serves Qatar Foundation's Education City campus.

Nisha Chaulagain, 25, is the youngest woman driving electric buses in Kathmandu, Nepal. After getting her licence, she began her career as a taxi driver at the age of 21.

Former events manager Tom Vavasour has been driving trams in Christchurch, New Zealand, for the past five years. Despite being close to 60, he has no plans to retire because he loves his job so much!

Singapore bus driver Matthew Tay, 22, has a heart-warming story to tell. Fascinated by buses since childhood, he pursued his vocation with support from his godmother – a kind and dedicated bus driver he met in 2012.

Kelly Bendall has been driving trams in Melbourne since 2021. After working as a flight attendant for over 20 years, she lost her job because of Covid-19.



European Tram Driver Championship, Leipzig, May 2022. The first non-European team to take part in the competition was Australian Keolis subsidiary Yarra Trams.

02 Recognition for drivers

Golden Bus Awards, Paris, June 2022. This contest recognises and rewards Europe's best bus drivers, based on a series of tests designed to assess not only their technical driving skills, but also their sustainable development impact and their sense of customer service.

1– **Best Driver 1st prize winner:**
Florent James - Caen - Keolis Caen Mobilités
2– **Best Driver 2nd prize winner:**
Patrice Fouquet - Poitiers - Poitiers Transport Authority
3– **Best Driver 3rd prize winner:**
Thibaut Corbin - Laval - Keolis Laval

Pulse, new format!

A Keolis initiative, *Pulse* is aimed at shared mobility decisionmakers, stakeholders and influencers. Available in print format, as an e-magazine on pulse-mag.com and via social media, its purpose is to inform the conversation and foster dialogue around the issues and trends shaping our sector.

Check out the online version at keolis.com

And stay informed about *Pulse* via social media

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Pulse new format - tell us what you think!

You may have noticed that *Pulse* has changed with a new look, layout and structure. The aim of the overhaul is to enhance our readers understanding of the mobility issues we cover.

We'd really appreciate your feedback on this new-look *Pulse*. To do so, scan the QR code and respond to our survey - it only takes a few minutes.


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