# KEEPING SUCCESSFUL GLOBAL CITIES ON THE MOVE

----> MASS TRANSIT 🟯

22.27



## **KEEPING CITIES ON THE MOVE**

**BILLION PEOPLE** living in cities by 2045, up from c.4 billion today\*

#### SNCF:

**MILLION PASSENGERS** 

Carried every day in Greater Paris

#### **Keolis:**

**MILLION PASSENGERS** every day worldwide

> \* United Nations, Department of Economic and Social Affairs, Population Division (2014)

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## A WORLD LEADER IN MASS TRANSIT

SNCF and Keolis are among the world's largest mass transit operators. Our global businesses include rail, metro, tram and bus rapid transit services in 11 cities with populations of over one million people.

Across the world, we have won a reputation for working constructively with public transport authorities (PTAs) to respond to the challenge of rapidly rising patronage driven by economic growth and migration to urban areas. As cities continue to become more prosperous and densely populated, high frequency, integrated mass transit will be increasingly important as the only means of meeting demand for travel in a safe, convenient and sustainable manner. Drawing on decades of experience, we are at the forefront of developing new and existing transport networks to meet the needs of global cities now and in the future.



SNCF operates rail services throughout France, including high density urban lines in Greater Paris and the long distance TGV high-speed network.



Keolis, in which SNCF has a 70% shareholding, designs and operates networks combining all modes of transport in 16 countries.

## SERVING CITIES ON FOUR CONTINENTS

#### Our global mass transit networks

in cities with over one million people.



## UNPRECEDENTED MODERNISATION

E1000 RENEWAL OF PARIS RAIL INFRASTRUCTURE from 2015-2025

€10bn RENEWAL OF PARIS TRAIN FLEET by 2021

## EUROPE'S Most Popular Network

**LYON -** 350 public transport journeys per resident each year



MASS TRANSIT

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## OUR WORLD-LEADING NETWORKS, SERVICES AND KNOWLEDGE



#### WE MANAGE SOME OF THE WORLD'S LARGEST AND TOP-PERFORMING MASS TRANSIT NETWORKS, DELIVERING SERVICES TO PTAS INCLUDING:

- Operation of entire city transport networks
- Fleet and infrastructure maintenance
- Design review of new rolling stock and infrastructure
- Network renewal and modernisation
- Fleet replacement
- Recruiting and training the entire workforce for new networks
- Station upgrades and operational improvements to make networks accessible for all passengers.

#### OUR LEADERSHIP IN MASS TRANSIT KNOWLEDGE INCLUDES:

- Operation and maintenance of automated metros with networks in Lille, Lyon, Rennes, London and Shanghai, and soon in Doha
- Managing the introduction of world-first automated train control systems for heavy rail in London and Paris
- Integrating mass transit networks with all other forms of transport and providing innovative 'last mile' journey options.







Lyon, Franc







### OUR MAJOR NETWORKS AND THEIR ACHIEVEMENTS

#### **PARIS, FRANCE**

Greater Paris heavy rail network - 15 lines: 1.39 billion passenger iournevs per day: 3.700km of track maintained: 30% patronage growth over the past decade. **Kev achievement:** Over 650 services operate simultaneously in the peaks with a train entering or leaving a station everv second - making it the world's second busiest urban railway.

#### *Q* **LONDON, UK**

Docklands Light Railway automated metro – 5 lines; 123 million passenger journeys per year; maintenance of 40km of double track; 14% patronage growth since Keolis started operating the DLR in December 2014.

#### Key achievement:

Record punctuality (>99%) and passenger satisfaction (average score: 88/100).

#### *Q* **LYON, FRANCE**

Citywide public transport network – includes 4 metro and 5 tram lines; 455 million passenger journeys per year; maintenance of 105km of double track; 20% growth in metro patronage (2010 – 2017).

**Key achievement:** 350 public transport journeys per resident each year – highest in Europe.

#### MELBOURNE, AUSTRALIA

World's largest and oldest tram network – 24 lines; over 200 million passenger journeys per year; maintenance of 250km of double track; 12% patronage growth in 2015-16. **Key achievement:** Passenger satisfaction improved or maintained every year (2009-17).

#### SOUTHERN ENGLAND, UK

Govia Thameslink Railway, Europe's largest rail franchise – 3,182 services each weekday; 321 million passenger journeys per year.

**Key achievement:** 552 new carriages introduced in 2017.

#### *<b>Q HYDERABAD, INDIA*

World's largest elevated metro with 30km of double track launched – 3 lines when completed; 450 million passenger journeys per year forecast; 72km of route maintained.

#### **Key achievement:**

2,000 employees recruited and trained to international standards for the state's first mass transit network.

## OUR PROMISES TO CLIENTS, PASSENGERS AND COMMUNITIES

In every city, our service is based around a set of promises that combine to make mass transit a natural choice.



#### 2 Zero harm

We have set ourselves the highest possible safety standard – zero injuries to our passengers, workforce and the public. We use proven processes and behaviours to drive progress.



#### Sustainable business

We work with PTAs to develop mass transit systems and encourage a shift from car travel so that public transport becomes a key means of delivering cities' ambitions for sustainable growth.



#### Service excellence

We use precision planning and efficient operational techniques to provide services people can depend on whatever the conditions, while adapting timetables, maintenance and infrastructure to meet changing needs.



## Economic efficiency

Our operations, commercial and asset management expertise increases revenue, optimises costs and strengthens businesses, providing value for money to our clients.



## S Adding value through innovation

Our 'connected mobility' programme helps us keep pace with, and exceed, expectations by using new technology to simplify and personalise travel, understand asset condition and integrate networks.



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## HOW WE KEEP OUR PROMISES

To keep our promises wherever we operate, we base our actions on five pillars of excellence that reflect the entire lifecycle of the network – from design and construction to start of operations, improving day-to-day performance and developing the network.

Securing successful takeovers

1

(2) Optimising operational performance 3 Thinking Like a

Passenger

Enhancing network capability

Helping to fulfil cities' ambitions

5

Each pillar has a set of processes and systems which our companies adopt. It guarantees that throughout each phase we:

- Understand what our clients and passengers want
- Transfer approaches that work and adapt them to local needs
- Work with suppliers, clients and stakeholders to continually improve results
- Take account of future requirements so that we deliver best value
- Capture lessons and share success.

To assist our teams on the ground we provide a wealth of central knowledge and support, including research centres staffed by our leading engineering, safety, operations and customer service specialists. A team of experts advises every new business and major project. Our success is evidenced by a record of world class performance, continual improvement and industry leading solutions.



#### MASS TRANSIT

## PILLAR #1 SECURING SUCCESSFUL TAKEOVERS

Our preparations to take over new businesses guarantee a seamless start and create momentum for early improvements to service quality. Informed by global experience, our approach during this key period in the life of a mass transit system works time and again.

### \_\_\_\_ **5**

major mass transit networks taken over or launched between 2014-17

### → **20-35**%

increase in capacity on DLR routes within eight months

"KeolisAmey Docklands settled quickly into the role of DLR operator, maintaining our excellent performance record and delivering improvements for our customers before the first anniversary of the new franchise was in sight."

Jon Fox, Director of Rail and Sponsored Services, Transport for London

#### SAFETY AND SERVICE QUALITY FROM THE START

Working well with PTAs and stakeholders - Our expert operations. IT and HR teams work collaboratively with PTAs so that kev requirements for services to continue seamlessly are completed on schedule Sessions with stakeholders mean we fully understand the network's importance and dependencies.

#### Strong workplace

relations – To ensure smooth employee transfer and build trust, we hold early meetings with trade unions and work with the outgoing operator to arrange Q&A channels and roadshows for staff. Surveys show our open approach creates confidence in our plans for the network.

#### Safety preparations

- Before starting operations, we provide network-specific safety training for incoming managers, run a crisis management exercise and assess safety culture.

#### Understanding

the business – Audits of assets, operating practices and skills establish the business' capability and inform our plans to deliver each clients' objectives.

#### ENERGISING NEW BUSINESSES

We energise new businesses by recruiting a top team with local and international expertise. Before contract start, the team develops



plans for service improvements and culture change. Early communication campaigns set a dynamic vision for the network which we back up with quick wins to improve performance, demonstrate the difference we make and lay foundations for longer term initiatives.

#### LEARNING FROM EXPERIENCE

Our review of each takeover includes

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Three-carriage trains have arrived on DLR giving you more seats, space

assessing whether there were sufficient expert resources for kev tasks (e.g. IT installation), the effectiveness of communication with staff. and our understanding of local regulations and stakeholder concerns. It enables us to continuously improve processes for taking over mass transit networks and adapting them to meet local requirements.

#### **RAPID DLR IMPROVEMENTS**

In 2014, our preparations to take over **London's** DLR network laid the ground for rapid improvements. Roadshows, audits and business reviews gave employees a clear vision of our agenda for the network and informed plans for new operating, maintenance and customer service initiatives. Within eight months, creative new timetables increased capacity 20-35% on high demand routes, while maintaining punctuality above the 99% target. In addition, we achieved and maintained record customer satisfaction.

#### STRONG PARTNERSHIP WITH MANCHESTER PTA

In **Manchester**, where we operate and maintain the UK's largest tram network, we built a strong relationship with the PTA from contract award. During mobilisation, we shared weekly updates on our readiness to take over the network and resolved risks together. The trust developed meant we worked closely from the day we began running services. Early joint initiatives included a team to address a historic signalling fault, more security staff on the network and advising the PTA on customer experience initiatives. We also attended each other's business plan meetings to co-ordinate arrangements for future projects.

London, UK

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## PILLAR #2 OPTIMISING OPERATIONAL PERFORMANCE

On the world's newest and oldest mass transit networks we are improving punctuality and safety while catering for high growth. Our success is based on a whole system approach to planning, operations and maintenance, informed by advanced analysis which allows us to present attractive options to stakeholders.

#### →>**99**%

punctuality on DLR network

### $\longrightarrow$ **450,000**

passengers per day managed smoothly at Paris Saint-Lazare station

### → **30**%

rise in central Bordeaux frequency with the existing fleet

#### PROVIDING RELIABLE, HIGH-CAPACITY SERVICES

We assess all constraints on operational performance, and develop solutions based on precision planning and working practices. Simulation tools ensure plans are robust, particularly at key junctions, and that small delays will not escalate into larger incidents. On Paris' 150-year old railway, these techniques have improved punctuality by up to 7% within a vear on lines where we have revised timetables. On our metro and tram networks we refine operating methods with staff. PTAs and regulators. Benefits include highly efficient timetables which release vehicles to raise service frequency and reliability. On all networks, we investigate every delay and how to prevent reoccurrence.

#### HIGH-PERFORMANCE, SAFE ASSETS

Our maintenance systems increase the reliability of infrastructure and vehicles by preventing faults. We design, schedule and adapt maintenance to reflect assets' condition. age and use. On critical infrastructure and new rolling stock, sensors and digital diagnostics alert us to emerging issues before repairs are needed. Our culture change and annual safety improvement plans embed safe asset management. For example, there has never been a serious safety incident on our automated metro systems.

#### MANAGING LARGE PASSENGER VOLUMES

We equip networks to withstand performance pressures created by huge passenger volumes. We develop smart ticketing for rapid station entry and exit, adapt platforms to increase space and specify vehicle designs to speed up boarding. In Paris these measures contribute to an average 4% punctuality gain when we introduce new trains. Passenger flow management includes remote monitoring of busy stations and 'Nudge' projects to help passengers move through stations easily.

#### **PARIS LINE L PUNCTUALITY JUMPS TO 94%** In 2015, we revised **Paris'** Line L timetable to provide more punctual journeys, cater for new travel patterns and meet growing demand. Precise funnelling of services from branches onto the core route and removal of timetable conflicts raised punctuality from 87% to 94%

and reduced the number of cancelled services by 40%. Currently, we are presenting choices to the PTA and communities for new timetables on five other lines.

#### **30% BORDEAUX FREQUENCY INCREASE**

In **Bordeaux**, we redesigned services on the three-line tram network to cater for ongoing patronage rises of 6%/year. We now run a mix of new city centre loop and 'length of the line' services. The change raised city centre frequency by 30% using the existing fleet. Punctuality improved to over 95%. To make the case to the PTA, we provided an operations plan showing performance would be robust and most passengers would benefit. We will propose similar changes in Lyon.

Bordeaux, France

## PILLAR #3 THINKING LIKE A PASSENGER

All our companies apply our Thinking Like a Passenger approach to every aspect of their business, informed by surveys and bespoke research. The result is a simple and increasingly personalised customer experience and high satisfaction.

## → RECORD SATISFACTION

on the Melbourne and DLR networks and Paris Line H

## $\rightarrow$ 8 million

downloads of the new SNCF app in 24 months

## —→ €1.5bn

invested by 2024 to make 209 Paris stations accessible to all – covers 90% of passenger journeys

"Mass transit is about the daily management of very large passenger flows timed to the second, while meeting the needs of each passenger looking for personalised information and customer service."

Alain Krakovitch, Director, SNCF Paris Mass Transit

#### EASY, COMFORTABLE JOURNEYS

We develop networks so passengers can travel easily and comfortably from door to door. Facilities include:

- Online and mobile systems for people to plan journeys and buy tickets at their convenience
- Simple wayfinding and connections at stations
- Real-time information on demand

- New rolling stock
  with spacious
  interiors and simple
  boarding
- Extra staff at key points on the network
- Accessible stations for passengers
- Last mile travel options (e.g. car share, bike hire).
   It improves passenger perceptions significantly.
   In Melbourne ratings for information and

## SNCF APP BECOMES 'JOURNEY COMPANION'

In 2016 we relaunched the SNCF app to simplify and personalise travel on our 15-line **Paris network**. As well as providing real-time service information and customised travel itineraries and alerts, the new app advises passengers about any network disruptions and whether trains are crowded. With SNCF's other journey planning tools (e.g. Twitter feeds, blogs, our chatbot virtual assistant, website, digital maps of stations), it helps ensure passengers have the right information when and where they need it.

#### PASSENGER EXPERIENCE BUILT IN TO STATION DESIGN

In **Hyderabad**, the PTA accepted our offer to review design plans for the main station on the new metro system. After we analysed passenger experience from entering the station to boarding trains, the PTA approved changes to separate entry and exit flows, improve signage, widen platforms and make ticket gates two-way. Benefits include reducing the time needed for connections by 10%, and an easier, safer environment for the 1.5 million people expected to use the network each day. staff have increased every year (2009-17). In Paris satisfaction with comfort rises at least 6% when we introduce new trains.

## TECHNOLOGICAL INNOVATION

We enhance customer services with technological innovations. In France, Keolis' world-first app combines journey planning with ticket purchase for mass transit and connecting transport, and stores tickets on passengers' phones, Local initiatives to make payment easier include using NFC technology to cut purchase time to a few seconds and a monthly billing option. In Paris we are fitting mobile signal receivers in tunnels so passengers can receive travel updates at all times, and have piloted virtual reality journey

planning. Projects are informed by our digital lab, which investigates how people use technology.

#### EFFECTIVE DISRUPTION MANAGEMENT

All our companies have practised rapid response plans for passengers to complete journeys as quickly as possible, if services are disrupted. In Paris plans are in place within 10 minutes. To provide extra help for passengers, we train back office staff to assist on the front line. We minimise the impact of engineering projects that cannot be completed at night by using techniques to run a reduced service during the works.



## PILLAR #4 ENHANCING NETWORK CAPABILITY

Our companies work with PTAs to anticipate and respond to the challenges of networks reaching full capacity and the need to replace ageing assets. We offer proven solutions and innovative technology to create step changes in network performance and reduce the cost of infrastructure renewal.

### → <mark>24</mark>

trains per hour on GTR's core route from December 2019

## $\rightarrow$ $\in$ 500m

saving for Lyon PTA

## 362km

of track renewed in 2016 and 2017, equivalent to 10% of the Greater Paris network

"NExTEO is a major breakthrough for the mass transit industry, merging dynamic signalling and intelligent train control technology to increase capacity and reliability."

#### TECHNICAL LEAPS TO MEET RISING DEMAND

We are at the forefront of mass transit innovation, working with PTAs to introduce automated systems that increase service frequency, speed and punctuality. We began operating and maintaining the world's first fully automated metro in Lille in 1983, and remain the world leader with networks in four (soon to be six) cities.

We are now using this experience to manage the introduction of automated systems on heavy rail lines. On our Paris and GTR networks, automatic train operation is being fitted along with digital in-cab signaling to provide the precision and control to operate radical, very high frequency timetables.

#### EFFICIENT ASSET MANAGEMENT

Our companies look beyond our usual role of network maintainer to offer clients choices on efficient asset management. We assess whether remodelling infrastructure (e.g. terminals, junctions) offers a good value solution to raise capacity and punctuality, and analyse whether asset replacement or renovation is the best choice. The options we identify help clients manage capitalintensive rail networks at affordable cost.

#### NETWORK MODERNISATION

We have significant experience of modernising some of the world's largest and oldest mass transit systems. In Paris, unprecedented renewal works will help us maintain and improve punctuality as patronage grows. In 2016 and 2017 we renewed 362km of track and 357 sets of points on behalf of the PTA. on time and within the €2.6bn budget. We will invest a further €800m each year until 2025, and complete a €10bn fleet renewal by 2021, replacing or refurbishing 700 trains. In Melbourne we have been renewing the tram network since 2009 with a solution to deliver more work at lower cost than the PTA anticipated.

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#### **AUTOMATION TO RAISE CAPACITY**

In **Paris**, SNCF is leading the NExTEO project, the world's first automated train operating system for heavy railways. We will introduce the technology on Line E, then roll it out on other lines. Using intelligent radio communication and automated train control, it will reduce headways between trains from 180 seconds to 108, adjust trains' pathing dynamically to maintain punctuality, and contribute to higher speeds – from 60km/h to as high as 120km/h in some areas. Line E frequency will increase in phases from 16 trains per hour today to 22 in 2024.

#### €500M SAVING FOR LYON PTA

In **Lyon**, the PTA asked us to identify rolling stock options for metro Lines A and B after the 40-year-old trains reach the end of their design life in 2018. After defining alternative scenarios and running lifecycle cost simulations, we recommended retaining the trains until 2033, with modifications that will allow them to continue operating reliably. It will save Lyon taxpayers €500m over the next 15 years.

Paris, France

# HELPING TO FULFIL CITIES' AMBITIONS

Across the world we are helping cities achieve their vision for sustainable growth and prominence on the global stage. We ensure new and extended lines contribute to cities' competitiveness and quality of life, design timetable changes to reduce car use, and contribute to the success of famous special events.

### → <mark>55km</mark>

extension of Paris Line E will carry 625,000 people from the day it opens

## → <mark>35</mark>(

public transport journeys per person in Lyon – the highest in Europe

### → **120**

extra train services to carry fans to each Euro 2016 match in Paris

"The SNCF national and regional network and the company's involvement in providing increased services for fans played an important part in the success of the UEFA EURO 2016 football tournament in France."

Martin Kallen, Chief Executive, UEFA Events

#### TRUSTED PARTNER IN NETWORK DEVELOPMENT

We act as a trusted partner in cities' plans to build and extend mass transit networks. Our role includes providing international experts to advise on technical solutions to attract more passengers. reduce costs and improve reliability, so that new lines deliver the intended economic and lifestyle benefits. At present we are assisting cities on four continents with new rail. tram and metro projects. We are also building



partnerships with research organisations to further our understanding of the links between transport and urban development.

#### SHIFTING JOURNEYS FROM CAR TO MASS TRANSIT

We support cities' sustainable development policies by designing routes and timetables that encourage people to switch from cars to safer, low emission alternatives. We work with communities to understand travel needs, and re-plan services accordingly with mass transit lines. as the backbone of integrated networks fed by high frequency bus routes. We connect the entire network at transport hubs and co-ordinate all modes. In Bordeaux. tram and bus trips rose 45% to 138 million from 2009-16. In Lvon only 42% of trips are by car compared to 52% in 1995. Cities including Melbourne and Shanghai have asked us to lead integrated transport initiatives.

#### SUCCESSFUL SPECIAL EVENTS Our networks play a

key role in the success of world famous festivals. We revise timetables to operate at maximum frequency on routes to the venue, reschedule maintenance so sufficient vehicles are available, control passenger numbers at stations, and run services until crowds have dispersed. It caters successfully for one-off and annual events (e.g. taking 1.5 million fans to Euro 2016 football matches; 300,000 spectators to the Australian Open tennis each year). Our proven record was a key part of Paris' winning bid for the 2024 Olympics.

#### SUPPORTING PARIS TRANSPORT REVOLUTION

In **Paris** we are a key partner in the most significant expansion of the mass transit network for 50 years. It will create faster journeys, new links to employment, relieve crowded lines and connect neighbourhoods across the city. Our projects include extending rail Line E by 55km. We are also advising on plans for new automated metro routes and how to remodel rail stations to provide efficient connections and passenger flows to the new lines. Our input draws on our expertise in automated metro operation and new tools that track how people travel.

#### HIGHEST PUBLIC TRANSPORT USE IN EUROPE

In **Lyon**, we work with the PTA to continually adapt the transport network to meet the city's economic, housing and environmental policies. In the past six years, we have provided design reviews for extensions to four tram and metro lines and a dedicated link to the football stadium. We also overhauled bus services to provide high frequency connections to mass transit routes. Our successful operation and integration of the city's network means Lyon's residents make an average of 350 public transport journeys per year – the most in Europe.

lelbourne, Australia



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## HARNESSING TALENT AND KNOWLEDGE

The skills and passion of our people are essential to our world-leading position. We are committed to supporting them with continuous professional development, knowledge sharing platforms and expert advice – geared towards driving operational excellence and service development across our businesses.

→ **4,000** 

answers provided to businesses through our KeoShare knowledge platform

Mass Transit Academy provides new perspectives

"As director of Line K in Paris, I tended to focus on operational requirements and underestimated the impact of renewals work on passengers. The academy helped me gain a more integrated view of operations and maintenance and I now have a better understanding of the challenges and requirements of everyone involved. Another benefit was learning about issues Keolis faces outside France. It helped me form a new perspective on issues in the Paris region and the way we operate. Stakeholder sessions provided a deeper understanding of the importance of mass transit to Paris."

Guillaume Darsonville, Director, Line K, Paris Nord, SNCF



ADVANCED MASS TRANSIT SKILLS

To meet today's mass transit challenges, our managers need technical skills along with a deep understanding of the whole network and how track, stations and vehicles function as a system. Our Mass Transit Academy provides this integrated perspective. Training covers all aspects

#### **KNOWLEDGE TRANSFER TO BOSTON**

In **Boston**, our rail services division is supporting performance improvement plans by providing proven timetabling and station operation systems that have raised punctuality by up to 7% on lines in Paris. Modelling on Boston's network shows we will achieve similar results. New technology being transferred through our innovation networks and adapted to local conditions includes drone systems for infrastructure monitoring. Benefits will include early warnings on fallen trees and leaf fall on the wooded Boston network.

> has changed the way we work and confirmed our view that people thrive when working collaboratively.

#### EXPERT SUPPORT FOR OUR PEOPLE

We offer expertise and proven solutions to support our managers at key times - e.g. when taking over networks and during performance improvement plans. Our rail services division advises on techniques and innovations used successfully by other networks. Our international projects team and secondments programme provide on-the-ground support from leading experts.

of mass transit management from maintenance to traffic control and passenger flow, how they affect each other and how individual decisions impact the overall service. Courses also pool expertise and consider future transport needs. stimulating new thinking. Presentations from clients reinforce the importance of efficient mass transit

to cities' prospects and quality of life. In 2016, we also opened our Maintenance Management Training Centre to assist our companies in improving network availability, reliability and safety.

#### SHARING KNOWLEDGE WORLDWIDE

We have built an online platform that harnesses and shares

the knowledge held by all our businesses worldwide. The system brings together communities of experts. covering all aspects of mass transit, to pool experience, create best practice libraries and offer advice to any business that needs it. Over 4,000 answers have been provided in three years and tens of thousands of documents shared securely. The system

## HIGH QUALITY SERVICE DELIVERY FOR CLIENTS AND PASSENGERS AT EVERY STAGE

#### PILLAR #1 Securing Successful Takeovers



- Technical leaps to meet rising demand
- Efficient asset management
- Network modernisation

 Technological innovation
 Effective disruption management

PILLAR #2

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### **TO FIND OUT MORE**

For more information on our service offer, visit www.keolis.com and www.sncf.com

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