



**TRANSPORTATION & INFRASTRUCTURE**

**ADVISORY COMMITTEE**

**TUESDAY, JUNE 28TH, 2022**

**A  
BETTER  
CITY** 



**RICK DIMINO**

**WELCOME & INTRODUCTION**



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# TRANSPORTATION & INFRASTRUCTURE ADVISORY COMMITTEE

Tuesday, June 28, 2022 | 12:30 – 2:00 PM

- 12:30 **WELCOME & INTRODUCTION**  
Richard Dimino, President and CEO, A Better City
- 12:30 – 12:45 **MBTA SAFETY UPDATE**  
Glen Berkowitz, Program Manager, A Better City
- 12:45 – 12:55 **UPDATE ON I-90 ALLSTON MULTIMODAL PROJECT**  
Tom Nally, Senior Advisor, A Better City
- 12:55 – 1:15 **TRANSPORTATION & INFRASTRUCTURE POLICY AGENDA:  
2022-2023**  
Tom Ryan, Senior Policy Advisor  
Scott Mullen, Director, TDM/TMA
- 1:15 – 2:00 **LESSONS FROM THE PARIS REGION METRO & REGIONAL  
RAIL / Q&A**  
Franck Avicé, former Executive Vice President of Business  
Operations and Customer Experience, RATP, and  
Executive Director of the Paris Metro and Regional Rail



# MBTA SAFETY UPDATE

GLEN BERKOWTIZ

# MBTA SAFETY UPDATE

- Growing Concerns Since 2019
- 1<sup>st</sup> Half 2022: 2 Deaths
- FTA: Safety Management Inspection (SMI)
- SMI: Interim and Final Reports



# FTA INTERIM DIRECTIVES

## MBTA Faces Deep Systemic Challenges in

- Maintaining a state of good repair; and
- Administering workforce to deliver safe op.

## DPU

- Failed to take the necessary actions

## Directives Address:

- Track disrepair
- Yard ops
- Driver certification
- Oops control center (OCC)

# A BETTER CITY RECOMMENDATIONS

- Appoint a Special Safety Directorate to Oversee
- Restore Full Service: July 18<sup>th</sup>
- OCC Staffing: 14 to 18 (or 20+)
- OCC Supervisor: 9 to **11**





**UPDATE ON ALLSTON**

**I-90 MULTIMODAL PROJECT**

**TOM NALLY**



# UPDATE ON I-90 ALLSTON MULTIMODAL PROJECT

- Notice of Project Change Anticipated Next Week
- A Better City meeting with MassDOT on July 7<sup>th</sup> to discuss Construction Phasing
- Launch Economic Benefits Report in mid-July



**TRANSPORTATION & INFRASTRUCTURE**

**LEGISLATIVE & POLICY PRIORITIES**

**TOM RYAN**

# A BETTER CITY PRIORITIES

1. Advance MBTA service restoration, capital enhancements, safety improvements, and addressing equitable access
2. Finalize design and secure funding for the I-90 Allston Multimodal Project, including the release a regional economic benefits study and shared Neighborhood Connector Plan
3. Support the decarbonization of the transportation sector
4. Deploy new tools to grow Transportation Management Associations (TMAs), encouraging more sustainable commuting and bringing riders back to the T
5. Maximize the potential impact of federal infrastructure funds at the city, regional, and state level

# LEGISLATIVE ISSUES

## Transportation Bond Bill - Passed the House on June 23

- - Limited A+B Bidding provision to expand capital delivery rules
- Commission on "Mobility Pricing" to examine roadway pricing
- Bond Authorizations for MBTA safety & partial West-East rail
- Transit Tax benefits & E-bike incentives included
- House did not include MBTA Means Tested Fares

## Climate Bill - in conference

- Senate Bill includes mandates for electrification of commuter rail & EV incentives

## Gas Tax Proposals

A photograph of a city street during a heavy snowfall. In the foreground, a white and orange bus is driving towards the camera. The bus's destination sign reads "504 WATERTOWN EXPRESS" and its license plate is "0464". The bus has a "T" logo on the front. The street is wet and reflective, with snow falling heavily. In the background, there are city buildings, including one with a "Santander" sign. A few people are visible on the sidewalk, some wearing winter gear. The overall atmosphere is cold and wintry.

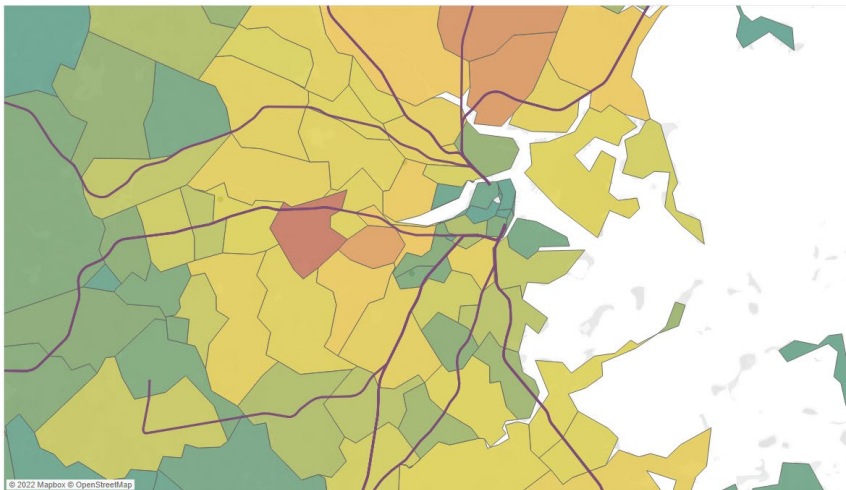
# TRANSPORTATION DEMAND MANAGEMENT & TRANSPORTATION MANAGEMENT ASSOCIATIONS

**SCOTT MULLEN**

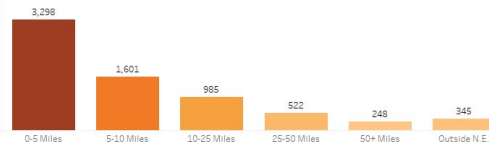
Zip Code Analysis

- Full View
- New England View
- Granular MBTA View
- Employee Distribution by Zip Code
- Employee Distribution by State/ies Municipality
- Park and Pedal

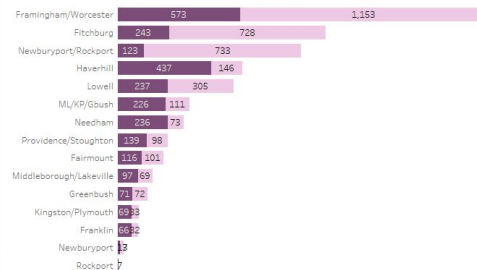
Employee Distribution by Zip Code



Employee Distribution by Distance



Employee Distribution by Commuter Rail Line



- Individual Employer TDM planning
- Supportive calculators
- Focus on impact and accountability
- Use aggregated data for state/local policy
- Coordinate and collaborate with state and local agencies

# ZIP ANALYSIS: INDIVIDUAL AND REGIONAL IMPACT



# PUBLIC TRANSIT IN THE PARIS REGION

FRANCK AVICE

# FRANCK AVICE

## French Government

- *Franck started out in consulting and auditing as Inspector General of Finance in the French Government*
- *He held various positions in the French Ministry of Economy and in State-owned agencies dealing with public-private investments, framework conditions for business development and Innovation policies.*

## RATP

*In 2008, he joined the cabinet of the French Minister of Sustainable Development as senior advisor for climate and energy.*

*In 2009, he was appointed Senior Vice President for Auditing and Strategy for the RATP Group*

*In 2012, he became the group Executive Vice President in charge of Business Operations and Customer Experience, and Executive Director of the Metro and the Regional Rail of the Paris Region.*

## US/President of the French American Chamber of Commerce of Texas

- *Franck Avice has been since 2019 the President of the French American Chamber of Commerce of Texas and*
- *He also runs consulting activities for companies and nonprofits in the US and in France.*

## Education

- *Franck holds Master's in law studies and in oriental languages and is graduated from a French School of Administration.*







# PUBLIC TRANSIT IN THE PARIS REGION Overview & Take-aways

A Better City – June 28, 2022 – Franck Avice



1. Paris Region public transit network

2. Governance & Budget

3. Safety

4. Grand Paris project

# The Paris Region public transit network

Quick overview

- The Metro
- The RER
- The Bus
- BRT & LRT

# Compared data

	Area (sq. m.)	Pop	Density (per sq. m.)	GDP/hab. (KUSD)
Paris Region (Île-de-France)	4,638	12,2mn	2,630	66 (2015)
Paris intra muros	40,5	2,2mn	54,320	-
Greater Boston	MSA: 4,674	MSA: 4,9mn CSA: 8,5mn	MSA: 1,048	MSA : 86 (2019)
Boston	48,4	675,600	13,958	-

MSA Metropolitan Statistical Area  
CSA Combined Statistical Area

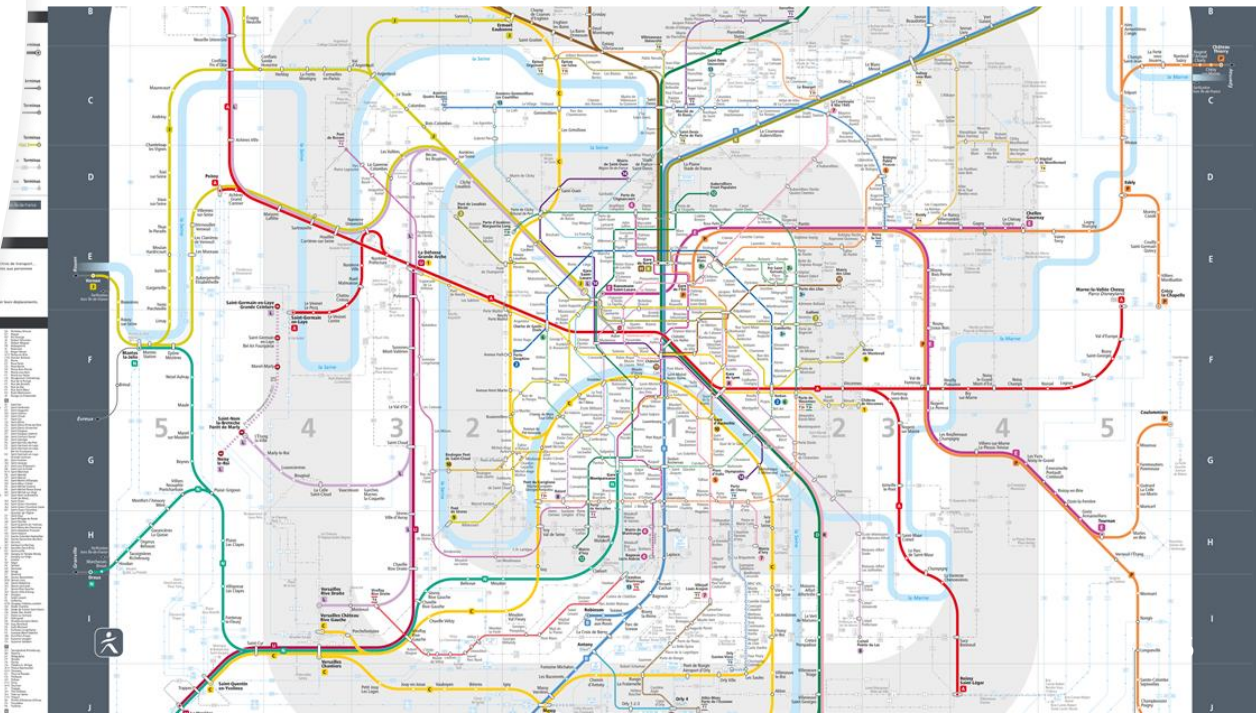
# Paris region network overview

❑ Massive road congestion

❑ Transportation network :

- 17 metro lines – 5 mn+ rides p. weekday
- 5 express regional lines – 3,7 mn+ rides p. weekday
- 10 regional lines - 3 mn+ rides p. weekday
- 10 lightrail lines
- 1,500+ bus lines, incl. BRT and mini-shuttles, day lines and night lines - 4 mn+ rides p. weekday

=> 22% of daily rides via public transit (roughly 15mn) (2019)



# Fares

- ❑ Yearly, monthly, weekly, daily passes or one-way fares
  - Flat rates: No pay-as-you-go & no zoning
  - €75 per month for metro, RER, Buses, LRT all over the region
  - Half price for teenagers, seniors, jobless
  - Specific offers for tourists (fares + museums, etc.)
- ❑ Free fare project abandoned
- ❑ Vending machines or sales booths



# The 'Metro' network

- Quick overview
- Perks & issues





# Metro – Quick overview

- ❑ 140 miles (225 kms)
- ❑ 14 classic lines (GOA2 & GOA3), 2 automated lines (GOA4) within Paris intra muros & adjacent cities
- ❑ 1 automated line outside Paris (Orlyval)
- ❑ 300+ stations with staff 20/7 (maintenance 2 am – 5 am)
- ❑ The metro network is being expanded into the suburban areas: L4, L11, L12, L14
- ❑ One train every 85 sec. to 150 sec. at peak hours
- ❑ Rubber-tyred and iron-wheeled trains
  
- ❑ In-house maintenance for systems, trains, stations
- ❑ In house security staff
  
- ❑ 5mn+ rides p. day; 600,000+ rides p. weekday on the busiest line (line 1, automated)
  
- ❑ All stations are staffed from 5am to 1am: business operations, passenger information and care, equipment management
- ❑ Cleaning robots in stations
- ❑ Relamping 100% LED lighting

# Metro – Perks & issues

## PERKS

- Fastest way to circulate within Paris
- Serves close suburbs (1st ring) and expanding to suburbs
- Very frequent at peak hours (85 sec - 180 sec)
- Frequent, even off-peak (5-7 min.)
- Very dense network (a station every 500 yards)
- Connected with the regional rail in major hubs
- Fully video-surveilled

## SOME ISSUES

- Record attendance at peak hours
- Incident management (single track-system)
- Poor accessibility for wheelchair users
- Water infiltrations and risk of flooding, cleanliness
- Homeless
- Fare evasion

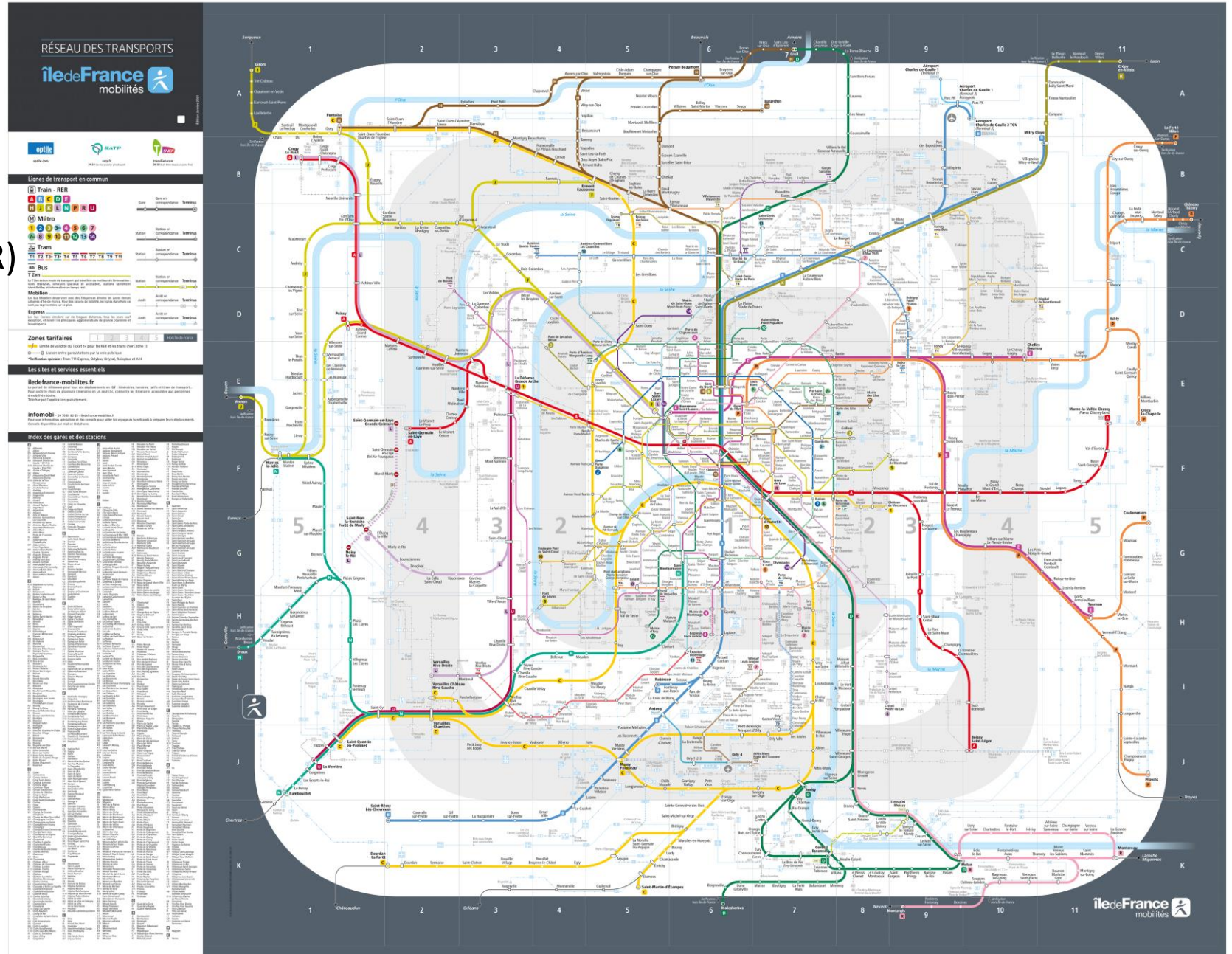


# The Regional Rail

- 'Transilien'
- 'RER'

# The RER & regional trains

- ❑ 5 Regional Express lines (RER)
- ❑ 10 regional lines (Transilien)
- ❑ Multimodal nodes



# Regional rail: the 'Transilien'

# The 'Transilien'

- ❑ 10 lines (700 miles) from outer suburbs to Paris intramuros
- ❑ Terminal station = national railway stations within Paris
- ❑ Iron-wheeled, fully electrified since the 70's
- ❑ 5am to 12:30am => night bus lines
- ❑ 3mn rides p.weekday
- ❑ Omnibus trains plying all stations or semi-direct trains
- ❑ Accessible for wheelchair users (in autonomy or not)
- ❑ Same tracks as the national railway network (except for high-speed trains)
  - Diversity of trains
  - Fast (up to 75 miles/hour)
  - More or less frequent (3 to 15 min. at peak hours, up to 30 min. time interval off peak)
- ❑ Stations with staff or not



# The 'Transilien'

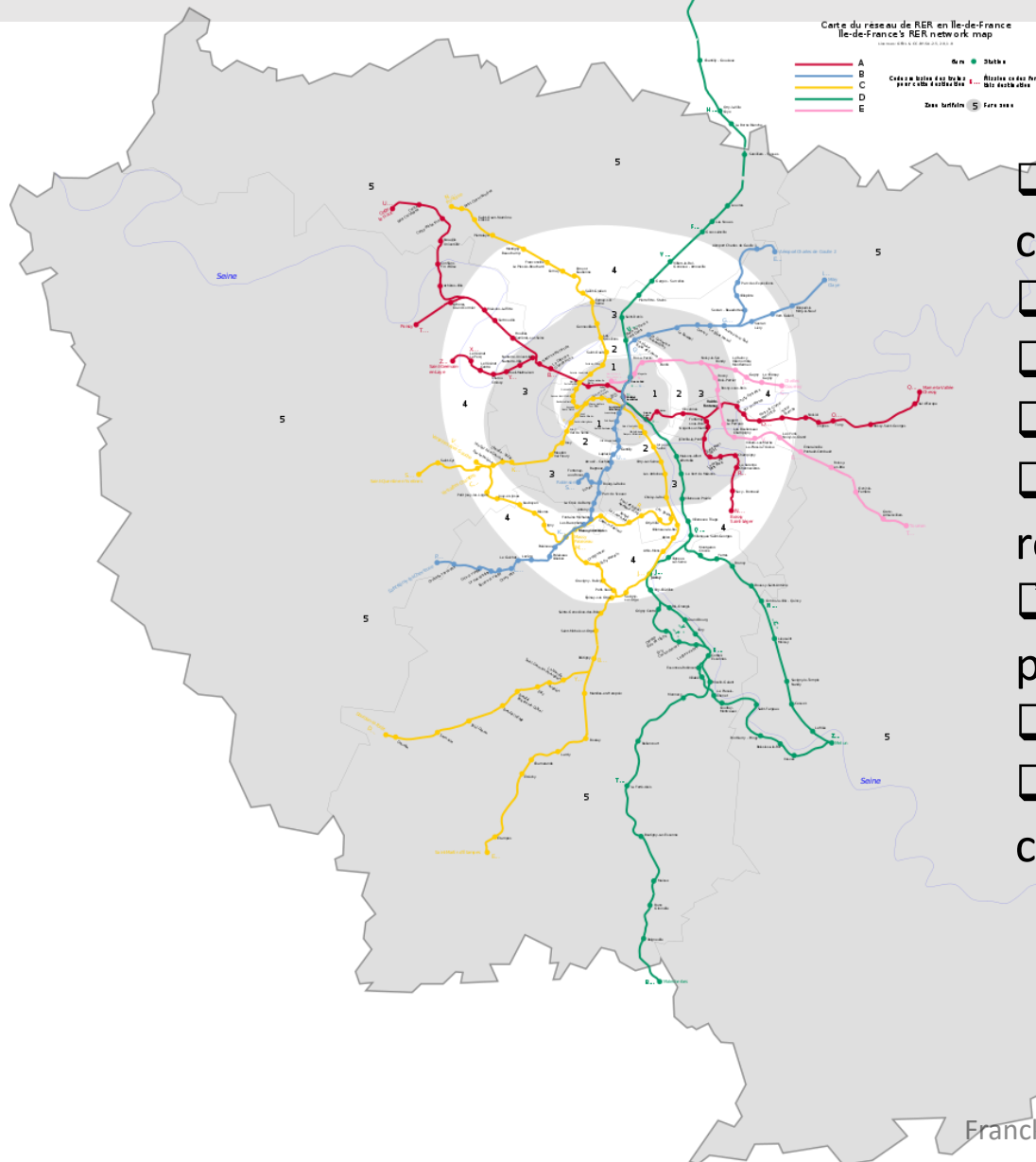
- ❑ 2 lines « Tram-train »
  - Operates like a train outside downtown
  - Works as a light train downtown
- ❑ Dedicated short vehicles, low platforms



Regional rail:  
the 'RER'  
Express Regional Rail



# The 'RER': main features



- ❑ Masterplan approved in 1965 by the State, construction mainly in the 70's
- ❑ 5 lines from suburbs to suburbs through Paris
- ❑ Dedicated tracks
- ❑ 365 mi (587 kms), 257 stations
- ❑ Built to quickly connect far-flung suburbs and to boost regional economic development
- ❑ Connection of existing suburban lines with Paris and partly building from scratch
- ❑ The network is still growing
- ❑ Fares & investments by the Transit authority, O&M contracted

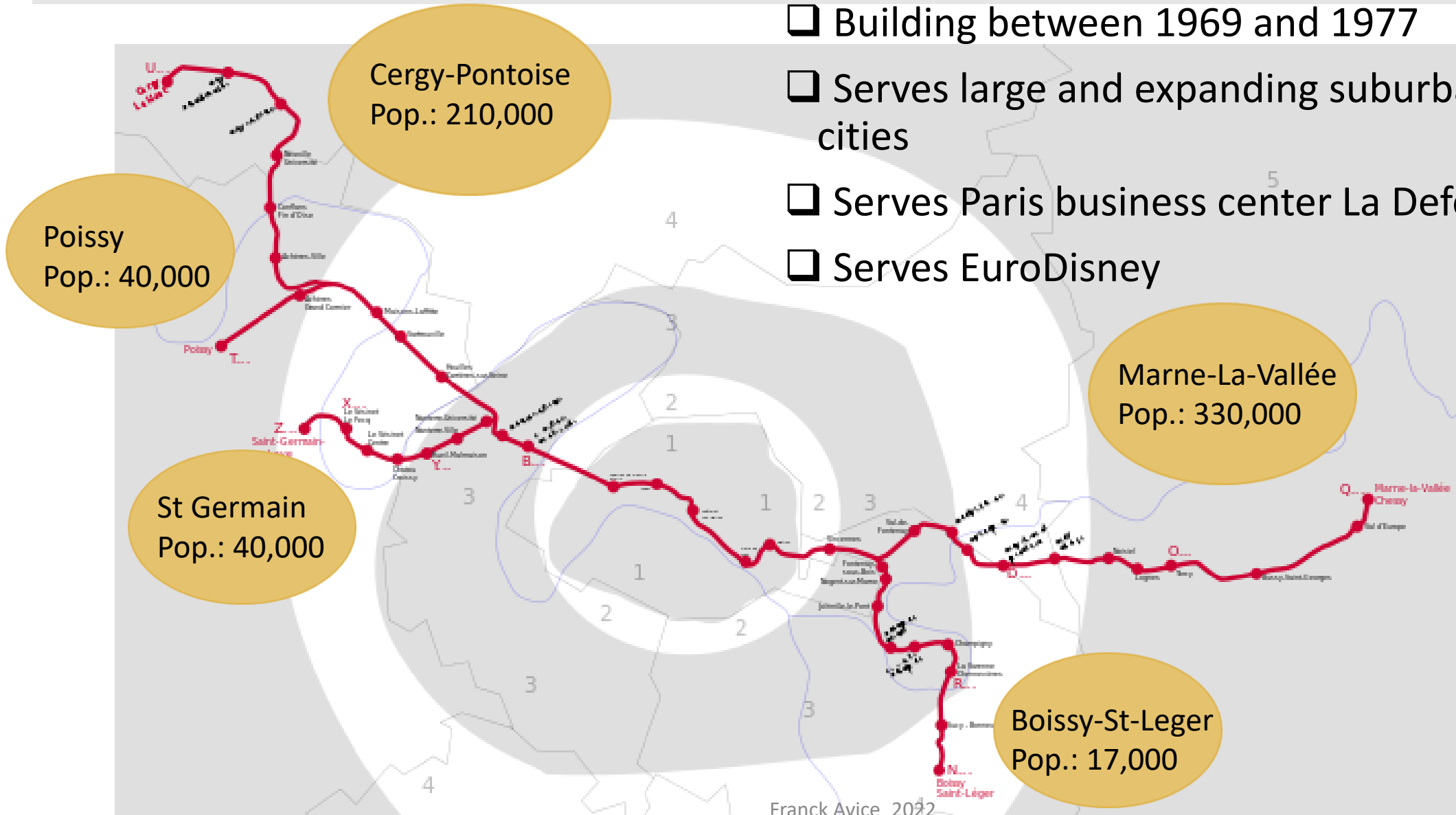
# The 'RER': main features

- ❑ Operated 20h/7d
- ❑ Iron-wheeled, fully electrified with overhead catenary power supply
- ❑ High-capacity transit system: 3,7mn+ rides p. weekday, fully accessible for wheelchair users
- ❑ Mainly single-track infrastructure

Line	First operation & last extension	Length	Number of Stations & Average distance between stations	Rolling stock	Ridership (2019)
RER A	1978 / 1994	108.5 km / 67.5 mi	46 / 2,4 kms – 1.5 mi	140 MI09	1,200,000
RER B	1977 / 1981	80.0 km / 49.8 mi	47 / 1,7 km – 1.05 mi	116 MI79 42 MI84	983,000
RER C	1980 / 2000	185.6 km / 115.5 mi	84 / 2,2 kms – 1.4 mi	168	540,000
RER D	1987 / 1995	190.0 km / 118.1 mi	59 / 2,8 kms – 1.7 mi	195	615,000
RER E	1999 / 2003	52.3 km / 32.5 mi	22 / 2,6 kms – 1.6 mi	103 (RER E & Line P)	380,000

# The 'RER': Line A

- ❑ Building between 1969 and 1977
- ❑ Serves large and expanding suburban cities
- ❑ Serves Paris business center La Defense
- ❑ Serves EuroDisney



# The RER: Line A

- ❑ Double-length & double-decked trains (max capacity: 2,500)
- ❑ Up to 1,3mn rides p. day
- ❑ Semi-automated trains (with driver), Dynamic traffic control system (SACEM) since 1989: allows short spacing between trains - New system after 2025
- ❑ One train every 2' at peak hours - 10' to 20'-headways on the branches off-peak



- ❑ One commanding center for transportation, power, passenger information, incident management
- ❑ 7-hour shift, 35 working hours per week for regulators and dispatchers

# The 'RER': Line A

- ❑ Political goal in the 70's: serving the business center Paris-La Défense
  - => Largest business center in Europe with 2,950 companies (75% headquarters) and 180,000 employees
  - => Largest commercial mall in Europe (Les 4-Temps)
- ❑ 87% ride the public transportation system
- ❑ RER E should connect La Defense and Gare du Nord by 2025



# The RER: Line B

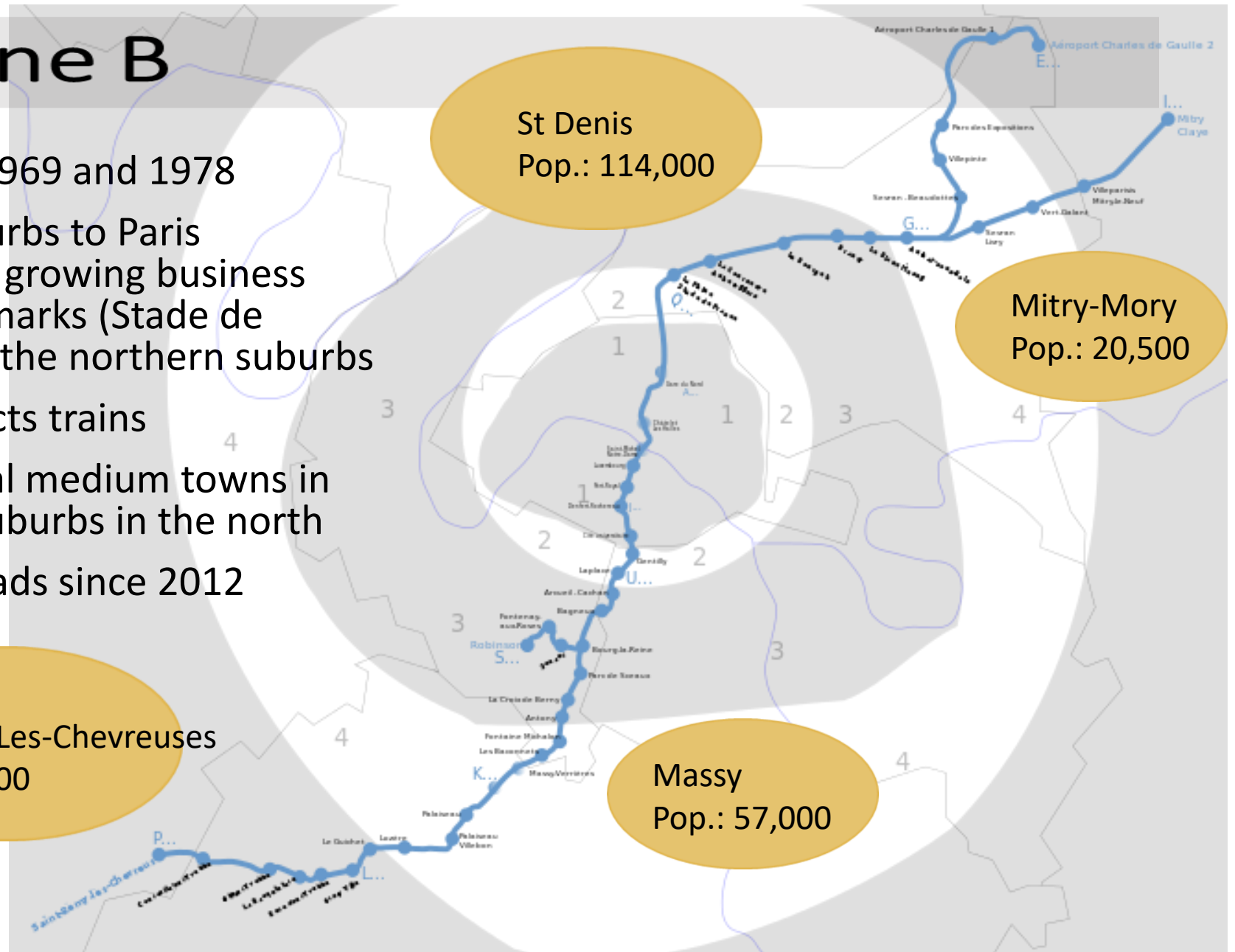
- ❑ Construction between 1969 and 1978
- ❑ Connects southern suburbs to Paris downtown, CDG airport, growing business areas and leisure benchmarks (Stade de France in Saint-Denis) in the northern suburbs
- ❑ Omnibus and semi-directs trains
- ❑ Mainly serves residential medium towns in the south and poorest suburbs in the north
- ❑ No more crossing railroads since 2012

St Rémy-Les-Chevreuses  
Pop.: 7,800

St Denis  
Pop.: 114,000

Mitry-Mory  
Pop.: 20,500

Massy  
Pop.: 57,000



# The 'RER': Line B

- ❑ Double length trains
- ❑ Commercial speed: 31 m./h (max: 70 m./h)
- ❑ Ridership: almost 1 mn per weekday (2019)
- ❑ One train every 2'30 min at peak hour within Paris
- ❑ Intra-muros tunnel shared with Line D
- ❑ On-going semi-automation: Nexteo system for 2025
- ❑ Refurbished trains MI76 & MI84 - New trains for 2025



# The 'RER': Mobility hubs

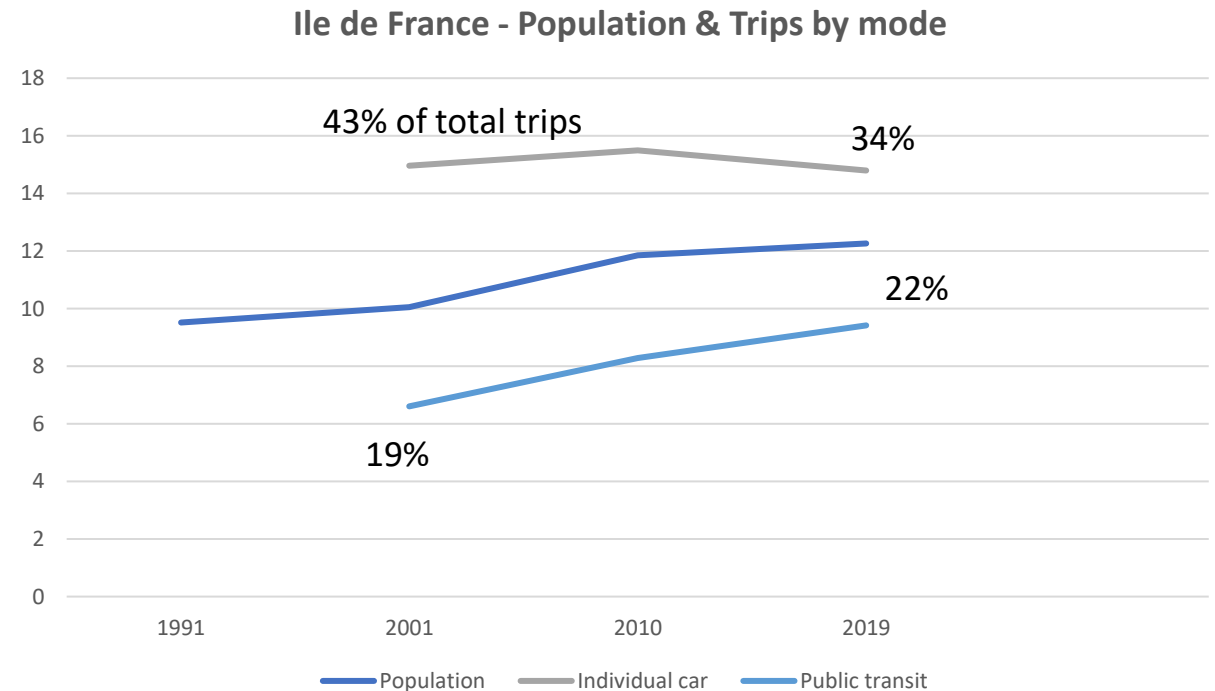
- ❑ Largest RER stations are multimodality hubs
- ❑ Connections with rail, metro & buses, soft mobility means at walking distance
- ❑ Timetable coordination with the bus network
- ❑ Retail & wifi





# The 'RER': Perks

- ❑ Based on a vision, with sustained investment since the 70's and continuous improvements, the RER is a large success
- ❑ Frequency, speed and smooth connections between stations within Paris have boosted the ridership on the RER : +32% between 2006 and 2019, 25% of public transportation ridership in 2019 and 10% of regional mass transit
- ❑ 80% of pre-pandemic ridership level in April 2022
- ❑ Growth of the region and of the network are linked: fast regional rail is a driver of economic development
- ❑ Economic development is now moving from the western suburbs to the northern suburbs, all along RER tracks



# The 'RER': Issues

- ❑ Overcrowded with record attendance at peak hours in trains & platforms => new infrastructure and modernized systems to come
- ❑ Single-track system + saturation
  - = hard to manage incidents
  - = maintenance on short nights
  - = heavy maintenance during closures at summer time
- ❑ RER C & D harder to operate: Line design is crucial
- ❑ Low density in suburban areas (1 station per town) => last mile issue, bus shuttles in case of incident
- ❑ Power of unions to block the regional commute

# The 'RER': some takeaways for the Greater Boston

- ❑ Both metropolitan histories and cultures are different
- ❑ However, similar patterns: size, population, GDP, traffic congestion, share of transportation in CO<sup>2</sup> emissions
- ❑ In public transit, supply begets demand
  - Supply means a political vision and a sustained effort of capital investment and modernization
  - Supply means density of infrastructures, frequency, reliability, comfort
  - Supply can tap the regional ridership potential and make travel habits change over the long run

# The 'Bus' network

- Quick overview
- Perks & issues
- Recent innovations:
  - Bus stops
  - Garages
  - Electrification
  - Autonomous vehicles

# Bus - Overview

- ❑ 1,500+ bus lines in the whole region, incl. BRT
- ❑ 4,500 vehicles in Paris & close suburbs
- ❑ Weekday, weekend & night lines
- ❑ 4mn+ rides p. weekday
- ❑ Depending on the routes, 18 or 12 meter-buses, mini-shuttles
- ❑ Mostly dedicated lanes within Paris, less in the suburbs except for BRT
- ❑ Specific on-demand service for disabled people



# Bus – Perks & issues

## PERKS

- Dense network & frequent stops
- Frequent at peak hours (10 buses per hour on busiest lines)
- Accessible for wheelchair users
- Less stressful than the metro for older riders

## SOME ISSUES

- Slower and slower within Paris intra-muros
- Low attendance on some lines/off-peak
- Space for garages in dense urban areas
- Pollution & town regulations
- Fare evasion
- Staff shortage



# Bus: recent innovations - Bus stops in Paris intra muros

- ❑ 2,000 new bus shelters, for 15+ years
- ❑ Solar panels, USB chargers
- ❑ Accessible for wheelchair people
- ❑ Owned by the city of Paris, 100% paid by advertisement, operated by RATP



# Bus stops in Paris intra muros

- ❑ New poles for passenger information
- ❑ 2 kinds of screens and poles for real-time passenger info
- ❑ Vocal information for blind people



Ligne	Destination	Temps d'attente
361	ARGENTEUIL	3 min
	ARGENTEUIL	14 min

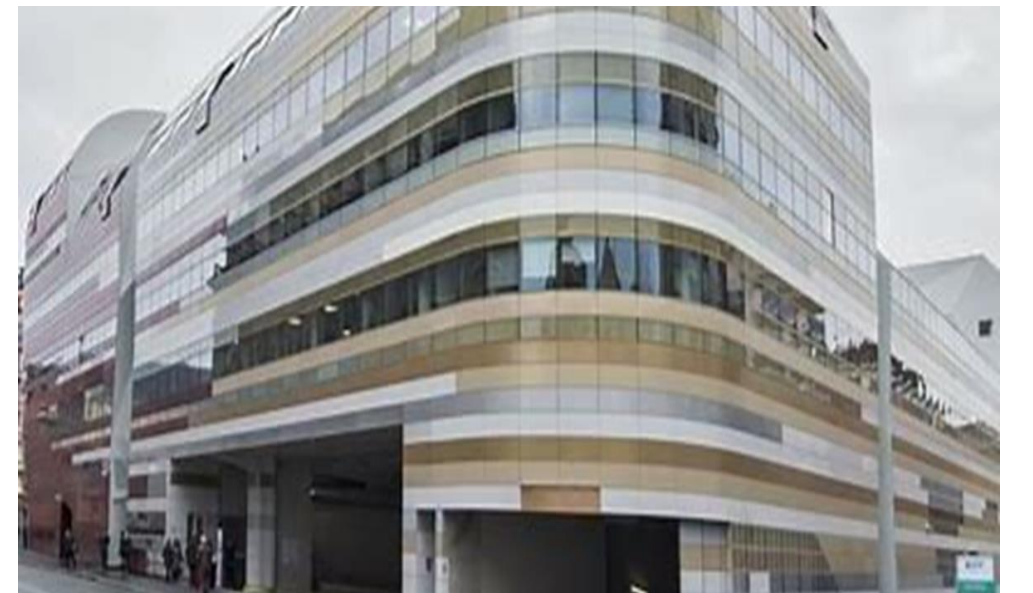
At the bottom of the screen, there is a row of colored buttons: a blue button with an hourglass icon, a green button with "256", a blue button with "361", and several other buttons in shades of green and blue.





# Bus: recent innovations

Garages: urban space & financial optimization



# Bus: recent innovations (c)

## Project of 'electrification'

- Decision in 2014 to phase out diesel buses in 10 years
- Goal 2025:
  - 4,500 buses => 1,000 electric, 1,600 biomethane, 1,900 hybrid
  - No hydrogen buses
  - 13 garages for electric buses & hybrid, 12 for biomethane
  - 600 new buses each year 2021-2024
  - Save half of corporate carbon emissions
- EV charging within garages at night
- In-house maintenance to overhaul
- Significant works on garages because of safety issues
- Halve carbon emissions
- Financed through cash-flow, debt & public grants



# Bus: recent innovations

## Autonomous vehicles

- Experiments in Paris since 2018
- Electric shuttles, lidar tech, smart poles
- Dedicated lanes with several stops, up to 4 miles back & forth
- Crossing roads and mingling with road traffic are emerging abilities
- Slow speed
- Up to 12 riders, always one staff member on-board



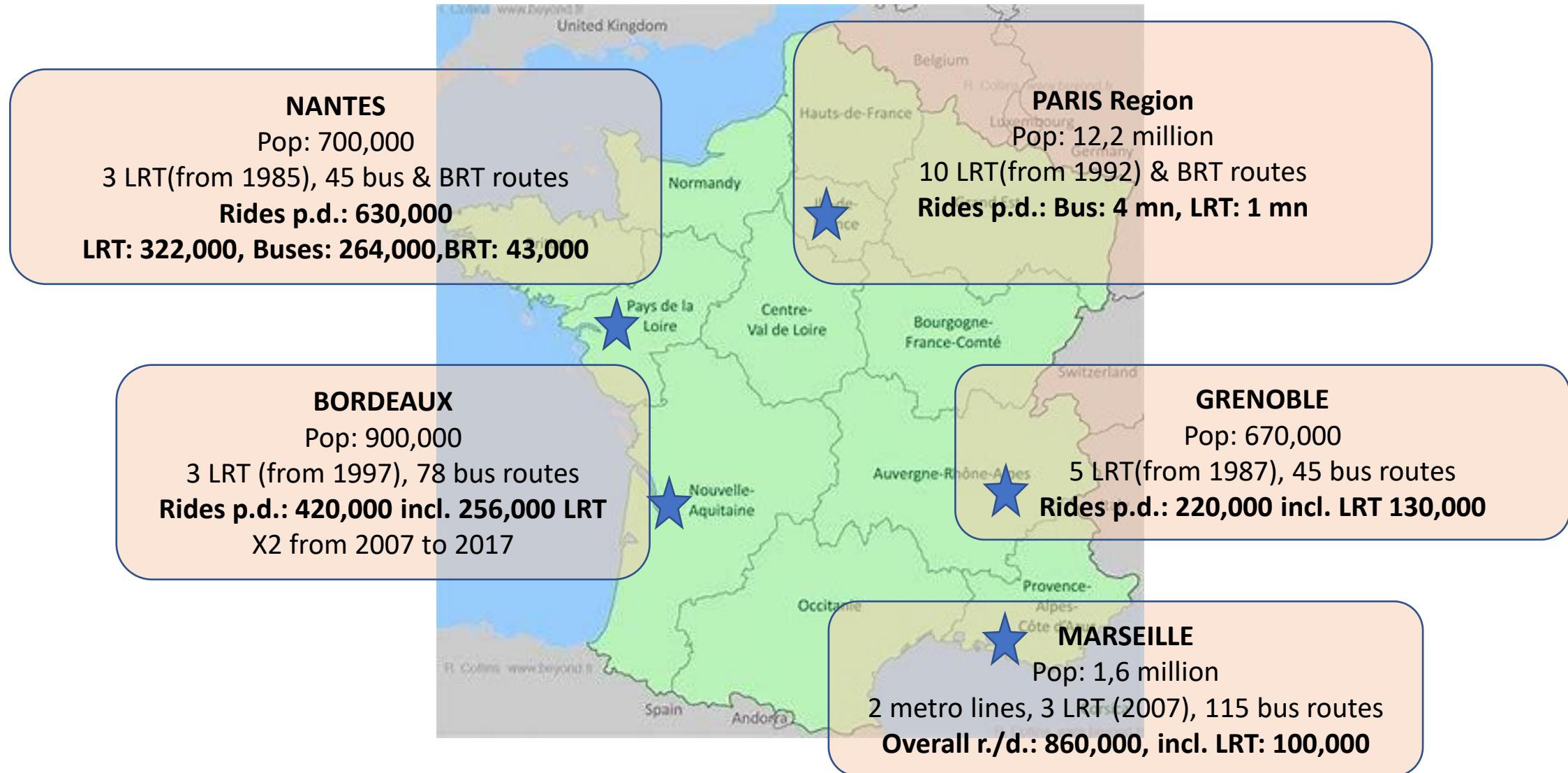
=> More research & marketing than helpful service up to now

# Bus Rapid Transit & Light Rail Transit

# BRT & LRT

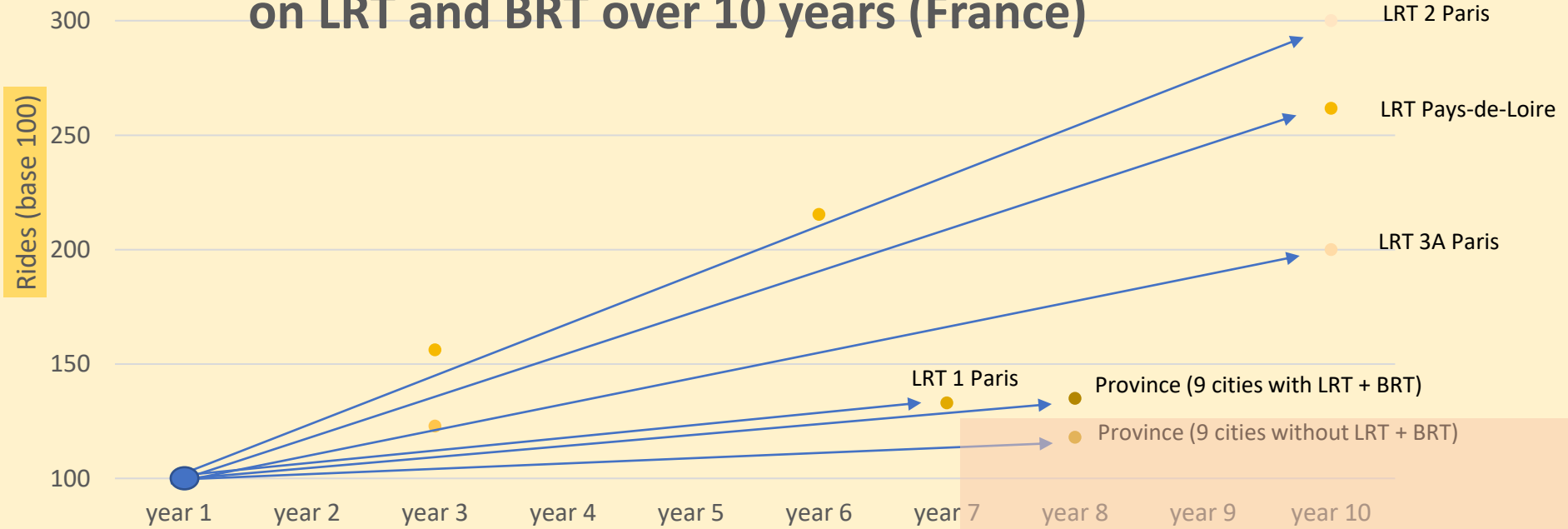
- ❑ Paris & some regional capitals have decided to revive LRT and set up BRT since the late 80's
  
- ❑ Strong and continuous political will to transform cities :
  - Less space for cars
  - More soft mobility areas
  - Redesign & expansion of bus routes
  
- ❑ A dozen of LRT & BRT lines in Paris region in 2021; More to come
  
- ❑ Growing interest for BRT:
  - Faster to build
  - More flexible to operate
  - way less expensive than LRT

# Some city examples

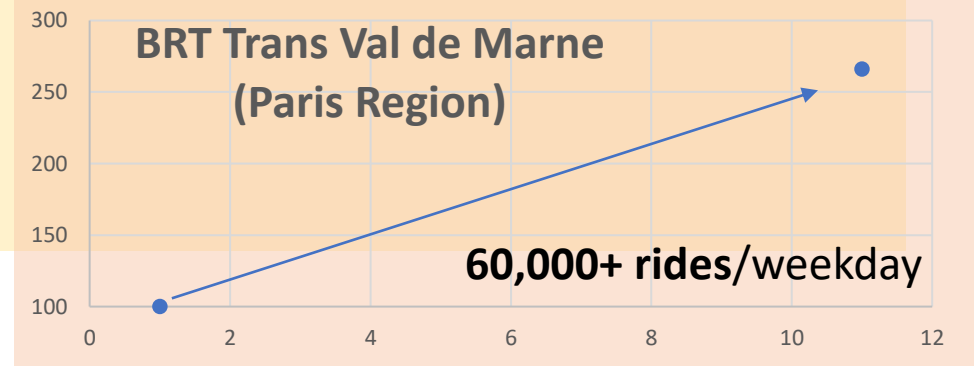


# BRT & LRT

## Evolution of ridership on LRT and BRT over 10 years (France)



- ❑ LRT Ridership increase has been globally proven
- ❑ BRT has been also an excellent way to foster riderships



# BRT & LRT : keys to success

- ❑ Thought to transform neighborhoods in more liveable areas
- ❑ Convenient and time-saving:
  - High-frequency on core routes
  - Fast : Dedicated lanes
  - Priority at intersections & signals
- ❑ Comfortable vehicles and bus stops: attractive and modern mean of transportation



Franck Avice\_2022



© - RATP - Bruno Marguerite



# Safety

# Safety: Scope

- ❑ **Kind of risks:** Fatalities and injuries, in consequence of fire, flooding, transit accident, electrical shock, mishaps, equipment failure, collapse of building, etc.

- ❑ **Who is concerned?**

- Employees
  - Health & safety at work
  - Risk of assault on staff & customers
- Contractors
- Customers

⇒ Risk is everywhere

⇒ Risk can affect anybody hanging out the network

- ❑ **What is concerned?**

- ❑ Infrastructure: Tracks, tunnels & bridges, Stations (buildings, platforms)
- ❑ Operating equipments:
  - Vehicles
  - Station equipments: stairs, elevators, escalators, gates, fences, poles, suspended screens, fire equipments, etc.
  - Catenaries, electric wiring in stations and tunnels, 3rd rail, signals
- ❑ Projects
- ❑ IT failures (breakdowns, cyber attacks)
- ❑ Non-professional behaviors, including intoxication (alcohol, drugs)

# Safety: Governance & good practices

Building a safety culture, managing it and maintaining it at the highest standards

## Governance:

- Safety of operations directly linked with the business model
  - Loss of mileage
  - Equipment failures
  - Loss of ridership
  - Customer satisfaction
- Dedicated internal division & Inspection bodies
- Safety Scoreboard
- Safety KPI used for calculation of manager bonuses
- Capital investments to replace out-of-date equipments and mitigate safety risks

} Penalties & loss of revenue

## Processes:

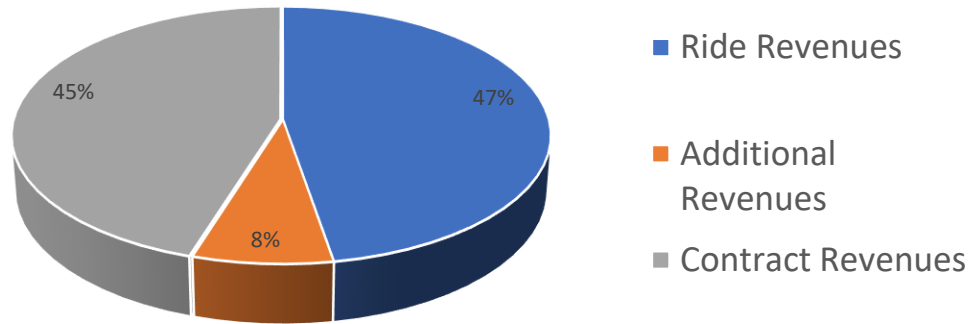
- Written rules
- Safety certifications & training: drivers, station attendants, maintaineurs, firefighters
- Maintaining the skills, stable staff
- Daily inspections with reporting and second look, periodical audits by dedicated teams & experts
- Analysis of shortcomings, defects, incidents & accidents, decisions & Follow-up
- Managing decisions after safety violations (intoxication, overspeed, running red lights, texting while driving, maintenance mistakes, etc.)
- On-the-ground visits by the top managers
- Benchmarking
- Preventive maintenance
- Periodical review of the scoreboard by the top management and the board of directors

# Governance and Budget

- Governance
- Main features of operating contracts
- Investment projects funding
- Focus on RATP

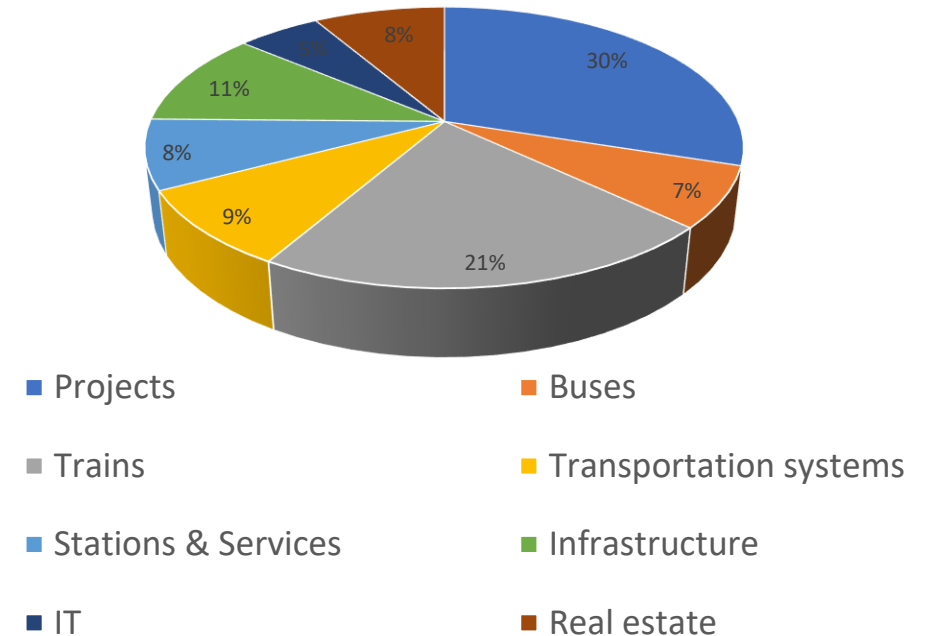
# Focus on RATP in Paris Region

## Operational Revenues (pre-covid)



- ❑ EBIT margin : 23%
- ❑ Operating spendings : Payroll 73%, Energy 5%
- ❑ Net Profit : 4%
- ❑ Gearing rate (debt against equity): 1.2

## Investments (pre-covid)



- ❑ Infrastructure management split from Operations

# Governance

## Regional Transportation Authority:

- Not an operator
- Led by the President of the Paris Region:
  - Members: Region, Departments, city of Paris, Paris Chamber of commerce
  - In charge of multimodality, excepting roads and cabs
- Operating Budget: \$12b/y, fed by a specific Transportation tax levied on companies of 11+ employees (up to 3% of payroll) and the regional part on local taxes

## Operating companies:

- Call for tenders both for operations & maintenance
- Contracts for 5 years +
- Industrial risk on operating companies
- Shared revenue risk (fares = 28% on average of companies operating budget)

## Businesses:

- Pay a specific tax for mass transit
- Pay at least 50% of their staff mass transit subscriptions
- Urban mobility Plans for their staff when locating/relocating in the region

# Main features of contracts

- ❑ The operator is mainly paid for delivering miles, for ferrying a set number of riders and for providing a set level of quality of service & customer satisfaction
  - ❑ Goals of mileage output is detailed by mode; number of vehicles per hour on each line x a fee per km
  - ❑ Ridership goals to be reached on each mode, with revenue sharing below and above the monthly goal
  - ❑ Tons of KPI on quality of service & customer satisfaction (sales & after sales, passenger information, working rate of équipements, cleanliness, fare evasion, video surveillance, etc.) monitored through daily reports and surveys ; bonus-malus system
- ❑ Interruption of service for large works on the network are negotiated with the transit authority
- ❑ Fares are decided by the transit authority
- ❑ Monthly payments
- ⇒ Any loss of mileage is a loss of revenue
- ⇒ Any equipment disfunctioning jeopardizes the achievement of quality of service

Strong incentive to design and implement a safety culture

# Investment projects funding

- ❑ Led by Regional Transportation Authority, subcontracted operators, dedicated public agencies
- ❑ Program of \$26b over 2016-2025 for new trains, 1,000 electric buses, 2 new light train lines, 1 urban cable line
- ❑ Budgets come from :
  - State and European grants
  - Bonds (debt) (rating AA+)
  - Operating companies that re-invest their net profit in infrastructure





# Grand Paris Project

- Design
- Project funding
- Issues



Motivation to speed up the pace!

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# Design

- ❑ Electrified and automated metro
- ❑ 200 kms of new lines & lines extension
- ❑ 68 new stations
- ❑ 7 new technical centers
- ❑ Public works groundbreaking in 2015
- ❑ Operating between 2024 and 2030



## Project financing (ceiling: €35bn)

Société du Grand Paris (SGP), a dedicated agency with a long-term financing model backed by dedicated local taxes:

- Office-space tax (based on the stock of office spaces)
- Special equipment tax
- Flat-rate tax on communication and energy networks (IFER)
- Regional tourist tax
- Regional parking spaces tax

complemented by additional funding :

- Investment grants
- Bonds

## Loans and Bonds

Goal: secure long-term maturities at competitive costs (up to 40 years)

Bilateral financing contracts signed with public institutions (EIB, French CDC)

+ Day to day treasury financed from money market instruments (€3bn)

+ Green Bond issues in the international debt capital market (€5bn)

# Green Bonds

A project qualified as a new clean transportation asset (carbon avoidance, urban densification, land artificialization mitigation...), in line with a “low carbon” sustainability strategy (mass transit, key environmental commitments to mitigate any externalities, anticipating natural risks, organizing soft mobility options & schemes around the project, conducting eco-responsible worksites, fostering circular economy)

Impact Reporting : An annual report with metrics for economic development (jobs created, housing units created around new stations), waste management, clean transportation Projects (modal shift, gain in travel time, energy savings, CO2 reduction)

2 bond issues: €1,75bn in September 2018 and €2bn in March 2019. Coupon of the bonds set at 1.125% maturing in 2028 and 2034. Exceptionally well-received transaction with a final orderbook in excess of €4bn.

# Issues

- ❑ Geological and technical difficulties
- ❑ Excess of demand for public works
  - ⇒ Rising pricing
  - ⇒ Shortage of workforce
- ❑ Impact of COVID on public works

- ❑ Late groundbreaking
- ❑ Delays
- ❑ Ribbon-cutting expected after 2024

An aerial night photograph of a city, likely Boston, showing a river (the Charles River) winding through the urban landscape. The city lights are illuminated, and there are prominent light trails from traffic on a multi-lane highway in the center. A large yellow banner is overlaid on the top left, and a logo with the letters 'A' and 'BETTER CITY' is on the right.

**THANK YOU**

**A**



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