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Grand Paris Express: 175km of orbital automated metro to remodel the city

Public transport in the Île-de-France (Greater Paris) region has been undergoing radical change for a number of years now. Notable illustrations of this are the transfer of responsibility for transport organisation to the Paris Region (formerly government-controlled), the gradual opening up to competition and, most importantly, an explosion in the number of new projects after close to a 30-year hiatus (with the notable exceptions of the Eole and Météor projects).

Revitalising transport in Paris

As part of this revitalisation, two metro lines (lines 4 and 12) are being extended; the tram network will reach 100km by 2015 composed of extensions to the three existing lines and the building of four new ones, making Paris's tram network Europe's third-biggest; new rolling stock, offering greater comfort and using less energy, and refurbished equipment are currently being introduced on many lines (e.g. RER Lines A and B, Metro Line 5); Paris Metro Line 1, which carries 725,000 daily passengers, is being automated marking a world 'first' (see article p.20). Alongside this, Paris's metro stations are being refurbished and a new passenger information system has been successfully rolled out.

This new dynamism has gone hand in hand with a significant rise in investment: RATP investment has risen by 50% in five years to reach EUR 1.5 billion in 2011.

Change of model to a 'polycentric' metropolitan area

Despite the progress made in recent years, particularly in the suburbs, the Paris metropolitan area is at a fundamental disadvantage because of its 'concentric' structure, comprising on the one hand a central area – inner Paris – which is very attractive and has

one of the world's densest and most efficient public transport networks, and then the suburbs, which are often difficult to reach, thus hampering the growth and attractiveness of the employment hubs located there.

Travel flows reflect this dichotomy between historic Paris and its suburbs: 64% of trips in inner Paris are made using public transport, but this proportion falls to 10% in the city's outer suburbs. Cross-suburban journeys, three-quarters of which are made by car, have grown by 50% in 25 years and now account for 70% of trips in the region. Overall, the share of public transport has fallen by around five points since the 1970s.

As a result the main arteries are congested, public transport networks are saturated in the centre of Paris since they are used for suburb-Paris-suburb trips, disparities are increasing between districts, the growth rate is moderate, quality of life is on a downward slide and the situation in terms of energy consumption, air quality and climate impact is unsatisfactory.

Grand Paris Express: the result of discussion and consensus

Against this backdrop the public authorities launched the *Grand Paris* project in 2009, aiming to link up the main economic development hubs with Paris and

above all interconnect these hubs via a high-capacity orbital transport network.

Grand Paris is not simply a transport project: by promoting the transformation of Paris into a 'polycentric' metropolitan area, the project embodies a vision of urban planning and aspires to increase the appeal of the French capital in the face of competition from other leading cities around the world.

This vision took shape under the 'international consultation on the future of metropolitan Paris', in which ten multidisciplinary teams, which now form a joint group within the 'Atelier international du Grand Paris', put forward scenarios for the city of tomorrow.

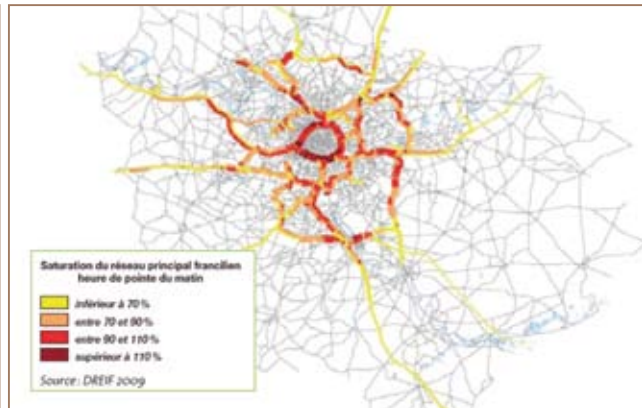
A wide-ranging discussion was held between September 2010 and January 2011 by France's national public debate committee, the independent body whose impartiality guaranteed a high standard of dialogue between the various stakeholders.

Over 15 000 people were able to gain information and express their views during the 55 public meetings held across the whole of the Greater Paris region. 255 'stakeholder contributions' were compiled and the website for the debate received 200,000 visitors – proof of the interest shown by residents, politicians and socio-economic actors in the Paris region.

Metro network: saturation at morning peak hour



The road network of the inner suburbs is heavily congested, particularly orbital arteries



Left: The saturated metro lines during peak hours highlights the need to create orbital lines to reduce the number of trips passing through Paris.

Right: Suburb-to-suburb trips, three quarters of which are by car, have grown by 50% in the last 25 years.

These debates were unprecedented in terms of their scale. They brought divergent viewpoints closer together and took on board the expectations of Greater Paris residents. Under an agreement between the French Government and the Region they led to a unifying project emerging in early 2011: the *Grand Paris Express*. The project consisted of plans for an automated orbital metro, closely interwoven with the existing network, accompanied by a mobilisation plan in support of public transport to strengthen and modernise the existing network used daily by millions of Greater Paris residents in the short and medium term.

175km of automated metro up and running in 2018

The final version of the project comprises three lines of automated metro with a total length of 175km and 57 new stations:

- An orbital main line (the Red Line) will link the districts around Paris and thus ensure efficient suburb-to-suburb trips without the need to travel in and out of central Paris; this line will connect with radial railway lines, making it possible notably to connect the *départements* in the outer suburbs of Greater Paris;
- Line 14 (the Blue Line), the Paris Metro's state-of-the-art automated line designed and operated by RATP,

will be extended to Saint-Denis (one of the main development hubs in the north of Paris) and as far as Orly airport in the south;

- A third line (the Green Line) will run services to the *Plateau de Saclay* campus, a hotspot for innovation (major companies' R&D sites, universities and laboratories, public research centres, higher education institutes, etc.) accounting for 10% of French research – this line initially will link Orly with Versailles before being extended to Nanterre.

44 of the 57 stations will provide interchanges with the existing or planned network and seven stations will connect with the high-speed railway network.

The project, whose contracting authority will be a newly-created public body known as the *Société du Grand Paris*, will be augmented, under supervision of the STIF (Syndicat des transports d'Île-de-France), by a "supplementary backbone network" (the Orange Line), which notably will boost services in the east of Paris. Commissioning of the various sections of this project, whose estimated cost will be EUR 20.5 billion, is scheduled to start in 2018.

A project providing a structural long-term answer to the challenge of saturation

RATP, the reference transport operator in the Greater Paris region, has con-

tributed strongly to the project's development and to the public debate, and is very positive about the *Grand Paris Express* project in its adopted form today, for several reasons.

In 2006, RATP produced its own diagnosis of the situation in its *Métrophérique* project, urging the creation of an orbital metro as the only way to improve suburb-to-suburb trips and as a permanent solution to decongest the radial lines.

The Paris Metro has some 15 sections of line between stations that are already at saturation point, while a further 45 similar sections are at 85% saturation and causing concern: RER A, with the development of the business district at La Défense, has to cope with very high peak loads, as do Metro Line 13 and (to a lesser degree) Metro Line 1. Despite the technology innovations that RATP has introduced on these lines (e.g. improved train control, platform doors to optimise station flows, higher-capacity rolling stock, automation) the degree to which the transport offer can be physically extended is now starting to reach a point beyond which technology will be no avail.

The *Grand Paris Express* project therefore provides a long-term answer to alleviating saturation on the busiest lines and represents a crucial addition

Building capacity



With ridership set to reach 2 million by 2025, the project provides a long-term solution to decongest over-crowded lines.

to the measures currently in place on the lines. *Grand Paris Express*, which is expected to have a ridership of two million a day by 2025, should reduce average peak loading by 10 to 15% on metro lines by 2025 (down by as much as -25% in the case of Line 13) while RER peak loads should decrease by as much as -30% or even -40% according to the section.

RATP is also satisfied with the choice of automated metro: one of its acknowledged areas of expertise.

Line 14, which scores an impressive 99.8% reliability rating, and an operating headway that can be trimmed to 85 seconds and a high level of service, has been hugely successful (daily passenger numbers up from 150 000 when it opened in 1998 to 500 000 today). The line is considered a gold standard that some 200 delegations travel to Paris to visit each year.

In the course of discussions, automated metro emerged clearly as the most suitable option: able to meet the fluctuating capacity needs of between 9000 and 37,500 passengers at peak times, while offering the benefits of

regularity, flexibility, adaptability to demand and energy savings.

The agreement between the French Government and the Region on the *Grand Paris Express* project has sounded the starting gun for the extension of Line 14 in the north as far as Saint-Ouen, which will ease saturation on Line 13 of the network. RATP, which is the joint contracting authority for this extension alongside STIF, has made this project a priority.

Services to and from Roissy airport: another missed opportunity?

The picture would not be complete without mentioning a sense of regret on RATP's part: whilst the initial project submitted for public debate, in the spirit of the Greater Paris Act of 3 June 2010, made provision for a direct automated metro connection between Paris and its main gateway to the world – Roissy-Charles de Gaulle airport – the same was no longer true when the finalised project was adopted.

As a result, the *Grand Paris* network will not fully cater for the needs of air passengers, 85% of whom either come from or are going to the centre

of Paris and, weighed down with luggage, want a direct link to and from the terminals. Simulations and experiences with Orlyval show that an interchange at Saint-Denis, however well-designed it may be, will hamper the attractiveness of the new network.

RATP Group engineering mobilised

The *Société du Grand Paris* reports that the engineering skills needed to implement the Greater Paris transport network are worth some EUR 2 billion, i.e. 10% of the cost of the project (EUR 20.5 billion). This project, the largest in Europe's urban transport sector, will therefore be utilising vast engineering capacities, particularly those of RATP and its subsidiaries.

Following its strategic policy aim of "supporting and taking part in *Grand Paris*" and in the road map established by its shareholder, the RATP Group is actively placing its engineering expertise at the project's disposal. RATP and its subsidiaries are heavily involved in assisting the project managers. After a round of competitive tendering, they were selected to help the *Société du Grand Paris* in four main areas: infrastructure, railway systems, maintenance systems and stations.

RATP has won contracts for infrastructure consultancy for the southern extension of Line 14, automated systems and the Champigny Le Plant workshop as well as the contract to design the station model for the *Grand Paris* network.

RATP is more than ever committed to making the *Grand Paris Express* project a benchmark success that will improve the daily lives of millions of Greater Paris residents, speed up economic development in the Paris Region and allow the "City of Light" to steer a course for the 21st century that ranks it as a worldclass city.

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