Working toward smart, sustainable, and optimised transport by 2030 in Ile-de-France

A White Paper by the Forum Métropolitain du Grand Paris

Forum Métropolitain du Grand Paris

Amif Association des Maires d'Ile-de-France

Métropole du Grand Paris

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apur

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Editorial

Joint review of future travel in the Ile-de-France region

We have decided to jointly review, in a forward-looking manner, changes in travel patterns across the Ile-de-France region as we are convinced that issues concerning movement are at the heart of the challenges currently affecting metropolitan areas.
Away from the political debate, and in cooperation with a group of relevant public and private stakeholders as well as residents, we have brought together over one hundred people to see what they think about travel patterns today as regards the future.

The "Forum métropolitain du Grand Paris", an organisation which brings together all the Ile-de-France authorities (region, départements, inter-communal bodies, regional public bodies, communes and large municipal unions) in a transpartisan manner, seemed to be the natural place for this review to take place.
Close links to the City of Paris, the Métropole du Grand Paris and the Association of Ile-de-France Mayors were maintained throughout the management of the review, ensuring that all organisations in the Ile-de-France were well represented during the process.

Meeting of the steering committee - March 2017 - rights reserved

To act in light of the urgency of the situation and the current changes

Congestion on the various transport networks and health problems linked to air pollution are the issues which concern all Ile-de-France residents, who, at the same time have increased travelling requirements. Expansion of the public transport network (Grand Paris Express, extension of the métro, RER, T-zen, tramway, etc.), the advent of the driverless car and the rise in shared travel are some examples of what the future might hold in terms of improvements to our daily lives.

However, the success in implementing these new solutions requires taking concerted public action which will involve us all, and which also requires us to alter our behaviour. In addition, we are preparing to host major international events: the Rugby World Cup in 2023 and the Olympic Games and Paralympics in 2024. We must successfully meet this challenge, whilst also giving priority to improving the day-to-day travelling experience of Ile-de-France residents.

To set out existing research and already established objectives

The idea is not to replace the white paper with other existing planning documents, but on the contrary to use the various elements in our review for future mobility. The results of the research on mobility must be put into perspective together with our experience as local elected representatives and the insights of Ile-de-France residents, in accordance with the expertise of each party.

This white paper is not a comprehensive handbook about future transport patterns in the Ile-de-France, but is a policy paper which is based, first and foremost, on a shared diagnosis and an assessment of the future. Using the concrete proposals shown in the second part, we want to develop conditions for more sustainable, fairer and better quality transport, and we are challenging all the stakeholders concerned. We have not sought to be exhaustive, but wish to highlight ten main focal areas to work on which we recommend for the start of 2030.

To work together with all stakeholders concerned with travel in the Ile-de-France

We launched our initiative at the "Salon des Maires d'Ile-de-France" last March with the aim of challenging all parties involved to come and take part in our work.

Press conference and launch at the 'Salon des Maires d'Île-de-France' - March 2017 - © AMIF.

With this goal in mind, we brought together all the stakeholders concerned (organisations, researchers, businesses, representatives of associations) into first class technical working groups, which allowed us to focus on eight themes: the future and modelling, shared transport and transport services, the future of major road infrastructures, clean engines, energy and logistical supply, innovative travel (driverless and joined-up travel), intermodality near stations, the growth of active modes of transportation and parking policies.

We would like to thank everyone who took part in this initiative as, without their cooperation and knowledge, the white paper would not exist.

To open our review up as much as possible to the wider public

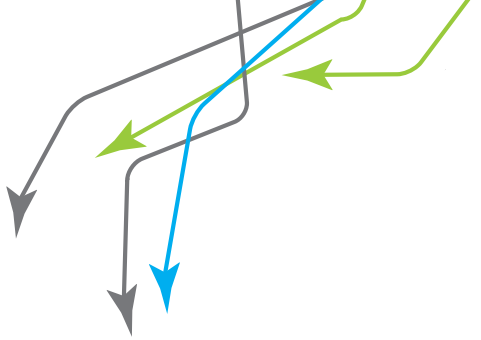
We organised a special morning event at the 'Sommet des Mobilités' which took place at the Autonomy Summit in October 2017. We were able to present our ten proposals here to a larger number of people, and to enhance our proposals further.

Special morning event at the Autonomy Summit - October 2017 - rights reserved

We questioned inhabitants about the future individual use of cars in Ile-de-France in order to further inform our work, using the experience and thoughts of the primary persons involved. These findings were presented at the Forum, organised in partnership with the Libération newspaper, "Le Grand Paris bouge-t-il? – Du RER à la trottinette - Une soirée de débat sur les Mobilités en Île-de-France" (Is Greater Paris moving at all? - from the RER to the scooter - An evening of debate about Travel in the Ile-de -France) held on 6 February, which over 300 people attended.

Working session of residents involved in the gathering of residents' views - October 2017 - rights reserved.

Forum "Le Grand Paris bouge-t-il ?" organised in collaboration with the 'Libération' newspaper- February 2018 - rights reserved.



To move forward in close liaison with the Government and its action on mobility

We have conducted this review in collaboration with the Government - we have been able to meet several times with the Minister for Transport - as well as State services. As the National Conference on Transport was held in the autumn, the involvement of the trade union has further enhanced the Ile-de-France focus. Our proposals appeared in “the handbook of key figures of elected representatives of the Forum métropolitain du Grand Paris ” sent to the Government.

A white paper which reflects research carried out over the course of a year

Our research took over a year and involved around fifty technical meetings and ten or so meetings with elected representatives. We have tried to create an overview here, by distinguishing between technical and scientific work in the policy proposals.

The white paper is presented in two parts: a prospective diagnosis, followed by the proposals made by residents and elected representatives in response. It begins with an overview of transport in the Ile-de-France, and this is followed by forecasts for the start of 2030. The second section takes into account the prospective diagnosis and assessment of future prospects, and pools the proposals put forward by the residents concerned into a specific topic (the future of the individual use of cars in Ile-de-France), followed by our ten key areas of focus for sustainable, smart and optimised travel.

The elected representatives who led the initiative “Mobilités 2030” at the Forum métropolitain du Grand Paris

Jean-Marc Nicolle
President of the Forum métropolitain du Grand Paris in 2018, Mayor of Kremlin-Bicêtre

Jean-François Vigier
President of the Forum métropolitain du Grand Paris in 2017, Mayor of Bures-sur-Yvette

Stéphane Beaudet
President of l’AMIF, Mayor of Courcouronnes, vice-president of the Ile-de-France region

Patrick Ollier
President of the Métropole du Grand Paris, Mayor of Rueil-Malmaison

Jean-Louis Missika
Deputy to the Mayor of Paris, in charge of urban planning, architecture, projects in Greater Paris, economic development and improving the area’s attractiveness

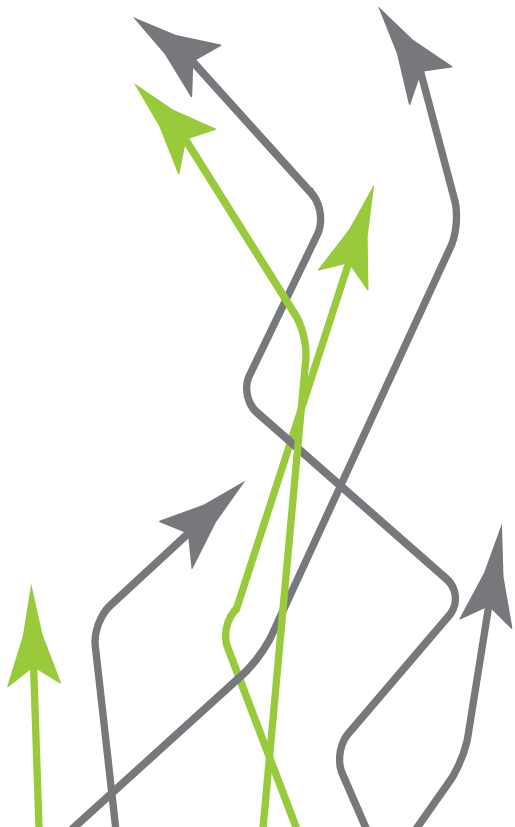
Christophe Najdovski
Deputy to the Mayor of Paris, in charge of transport, the road network, movement and public spaces

Valérie Mayer-Blimont
metropolitan Advisor elected official of the Métropole du Grand Paris, deputy to the Mayor of Santeny

PART ONE

An ongoing transformation in travel in the Ile-de-France?

Factors for diagnosis and forecast



Overview of travel in the Ile-de-France

This section introduces some of the key insights provided by informative statistics, as all future-orientated debate first requires the consideration of the main historical trends, as well as the geographical context.

The Ile-de-France is blessed with a strong public transport network which is the result of many decades of proactive public policies. However, the provision of this network remains unequal across the region, and at times proves to be limited when faced with the changing travel patterns of both people and goods. It is specifically challenged by developments in technology (digital, communication) and changes in society (consumption, lifestyle, work), while at the same time having to cope with economic issues (accessibility, congestion) and key environmental factors (pollution, health).

Overview of travel in the Ile-de-France: summary

A polycentric region where the majority of day-to-day travel is made close to home
Over 80% of journeys in the Ile-de-France are inter-départemental and 50% inter-communal. Very long distance journeys (> 21 km) remain in the minority (5 %) and are made in equal part by car and on public transport. Short journeys (< 3 km) are in the majority (66%) and are mainly carried out on foot (59%), although quite a few are done by car (29%). Aside from walking, the situation is very divided: public transport dominates where connections to Paris are concerned, whereas the car dominates in other areas.

Lifestyles have changed as well as patterns in travel
The amount of time given over to travel by residents in Ile-de-France has increased by 15 mins in 30 years, however the amount of journeys undertaken has also risen over the same period, from 3.49 to 3.88 journeys made per person per day. Travel networks must respond to the increasingly complex nature of schedules of activities: work is no longer the main reason for travel. Journeys linked to leisure activities have increased in particular. However, journeys between work and home remain dominant in terms of time spent travelling (30%) and in the distance travelled (41%), and are very dependant on motorised modes of transport: public transport is mostly used into and around the conurbation, and individual cars outside of the conurbation.

A regularly congested road network, although traffic is declining; public transport increasingly used as availability increases
Even if regional travel by car is decreasing (-5% between 2001 and 2010), as is the rate of car ownership per household (-2% in Ile-de-France, -7% in the Metropolis of Greater Paris between 1994 and 2014), road congestion still remains chronic, with the most frequently used routes at full capacity. 8.5 million people use public transport daily in the Ile-de-France. The use of public transport has increased across the region in line with an increase in availability. This is particularly the case for the bus and tram system.

Ile-de-France residents are first and foremost walkers, and are starting to become cyclists
Walking takes up 39% of the total share of Ile-de-France travel, which places it in pole position amongst modes of transport. It is also the main mode used to connect with public transport (76% of methods used to connect in the Ile-de-France). Cycling is steadily moving up the ranks in terms of mobility, driven by two reasons for travel: work and leisure. This important role for active travel explains the fact that the distances covered are mostly short. With this in mind (DRIEA study, 2014,) we can estimate that 5.3 million journeys (EGT, 2010) could be made by bike, representing a share of the total which would rise from 1.6 to 14%.

The requirement to take into account logistical flows, a sector which is changing rapidly
The movement of goods constitutes 700,000 delivery trips per day, of which nearly 2/3 are within the area of the city. This sector has been overwhelmed by the arrival of e-commerce, which has recorded a particularly high rate of growth (over a billion transactions made online in France in 2016, representing an increase of 20.5% compared to 2015). This has resulted in an increase in deliveries.

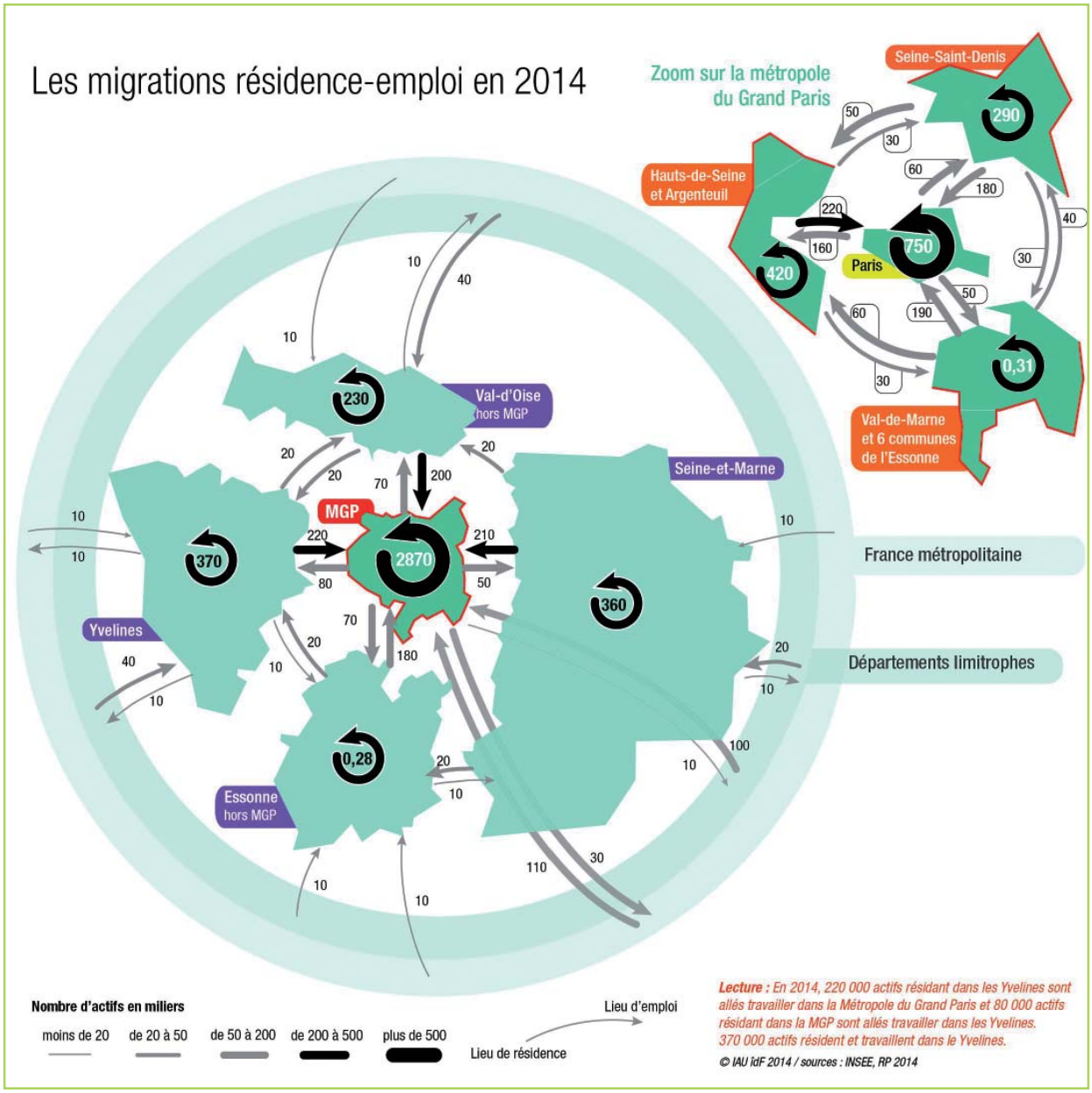
Mobility of people: the main findings

A complex map of movement

Over 80% of journeys in the Ile-de-France are inter-départemental and 50% inter-communal. Taking into account the size of the region, this concentration in travel within the area is normal, considering the many different employment areas and life structures, sub-regional levels and daily lives of Ile-de-France residents.

Although the radial routes, and those of the extensive public transport system in particular, concentrate the flow towards Paris and the centre of the conurbation and are, as a result, the most affected by the challenges faced by Mass Transit*, the issue of the development of the bypass infrastructure, although under way, remains vital. The goal is a network like the Grand Paris Express.

Map of home/work travel in the Ile-de-France

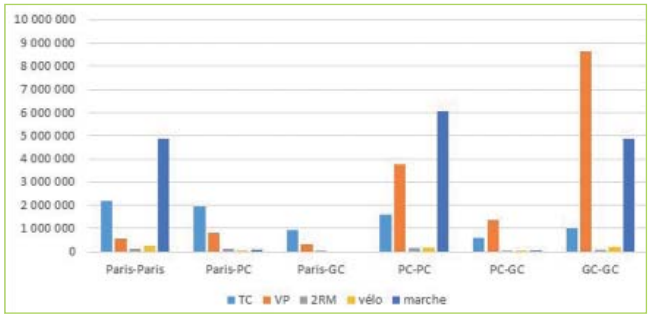


© IAU-IdF, - Source : RGP 2011.

** Extensive public transport system.*

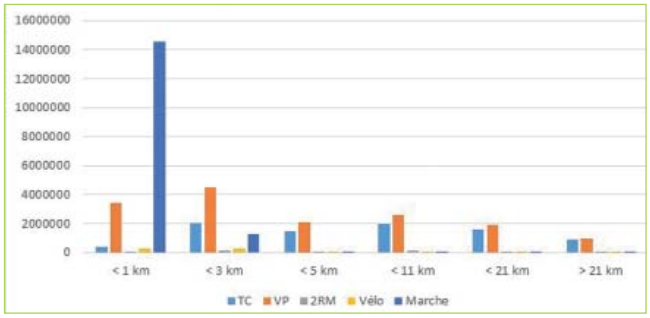
Choice of different modes of transport in accordance with connections and distance to travel

Number of journeys in Ile-de-France by mode and by connection



Sources: EGT 2010 STIF-OMNIL-DRIEA - Procedures IAU-IdF.

Number of journeys in Ile-de-France by mode and by distance



Sources: EGT 2010 STIF-OMNIL-DRIEA - Procedures IAU-IdF.

Walking is the primary mode of transport in the Ile-de-France, ahead of cars*. It is also the top mode of transport for journeys made within Paris and the inner suburbs. Public transport is used the most for connection journeys between Paris and the inner suburbs. Cars are the most popular way to travel for connecting journeys within the outer suburbs and between the inner suburbs and the outer suburbs. Aside from walking, the situation is very divided: public transport dominates where connections to Paris are concerned, whereas cars are used the most for other connecting journeys.

Very long distance journeys (> 21 km) remain in the minority (5 %) and are made in equal part by car and on public transport. Short journeys (< 3 km) are in the majority (66%) and are mainly carried out on foot (59%), although quite a few are done by car (29%).

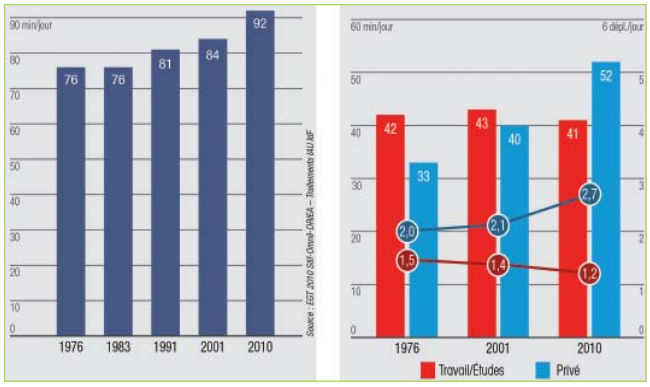
Mobility is on the rise, in line with changing lifestyles

In 2010, Ile-de-France residents travelled on average 17 kilometres each day and spent 1 hour 32 minutes on the move. The amount of time given over to travel has increased by 15 mins in 30 years, however the amount of journeys undertaken has also risen from 3.49 (journeys per person per day) in 1975 to 3.88 in 2010.

Although work was the most time-consuming reason for travel, the last study showed that today it is personal activities, i.e. those not linked to work or study. These take up the most time and have resulted in the increase. Travel has also changed alongside changes in the organisation of daily life. There are now more connected journeys and less single round trips from home. The aim is both “to gain time” by optimising movement, and to increase flexibility in order to adapt to the complex nature of schedules of activities

Changes in residents’ time-use in Ile-de France in minutes from 1976 to 2010

Changes in mobility and time-use in minutes according to activity type from 1976 to 2010

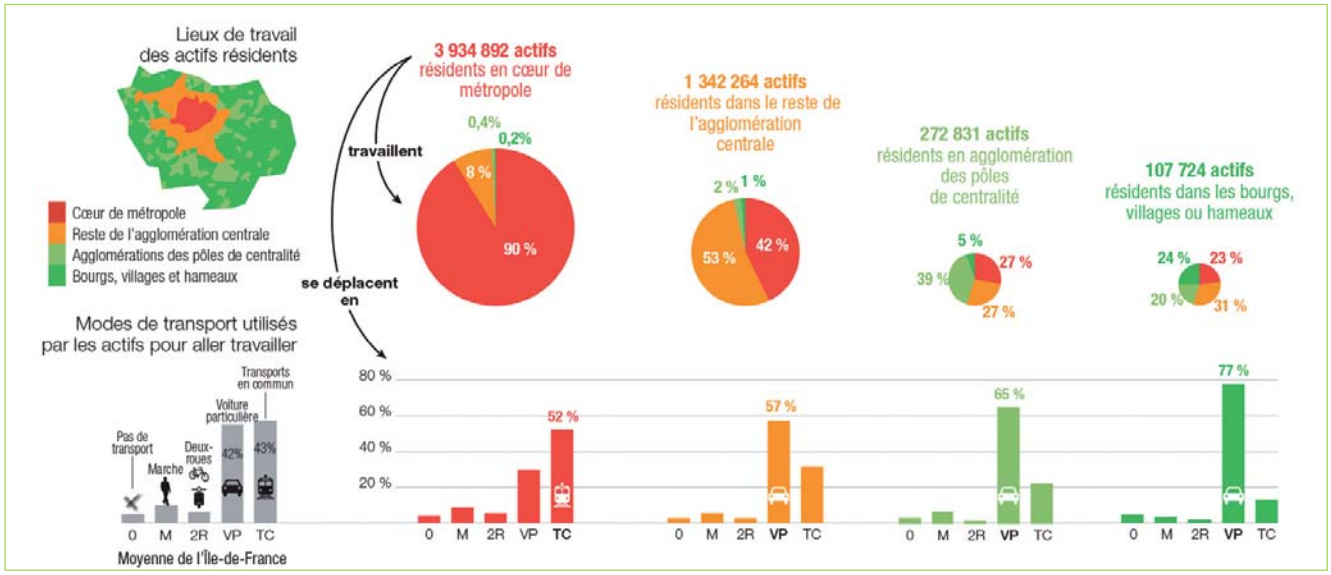


Sources: EGT 2010 STIF-OMNIL-DRIEA - Procedures IAU-IdF.

** journeys made just on foot are recorded.*

Transport for getting to work which remains structured around the car and public transport

Places of work and the type of transport used by workers according to their place of residence in 2011



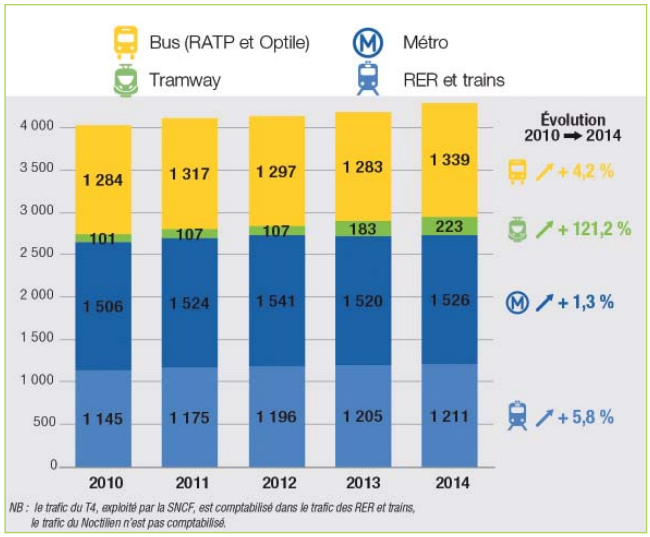
© IAU-IdF 2015 - Source : Insee RGP 2011.

Although they only count for 18% of all journeys made in the Ile-de-France, travelling between work and home remains dominant in terms of time spent travelling (30%) and in the distance travelled (41%). Working people use 33% of all their travel on getting to and from work, 51% of their time spent travelling and 58% of the distance they travel.

Journeys between work and home remain very dependant on motorised forms of travel, with public transport being the most popular within and to the centre of the conurbation, and individual car use being the most popular outside the centre.

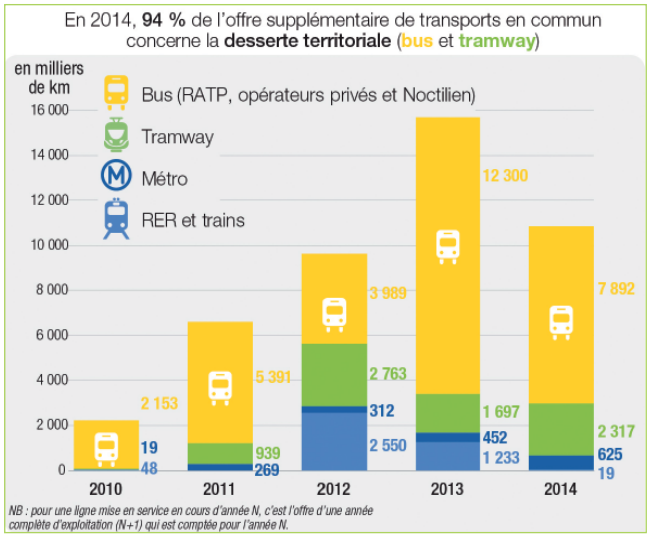
Public transport is being used more and more

Number of journeys made each year on public transport (in millions of journeys)



© IAU-IdF - Sources: STIF-OMNIL 2015.

Additional public transport available each year (contractual commercial kilometres)

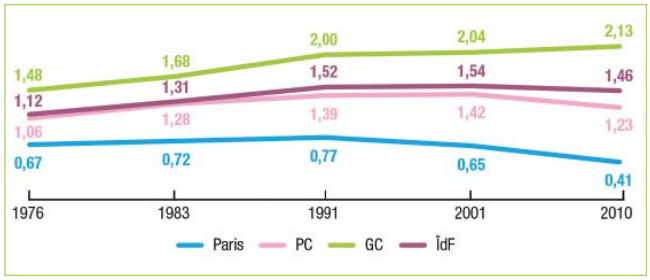


© IAU-IdF - Sources: STIF-OMNIL 2015.

8.5 million people use public transport daily in the Ile-de-France. The use of public transport has increased across the region. This is particularly the case for the inner suburbs and in Paris where it represents the main mode used in terms of distance travelled. Mid-term evaluation of the "Plan de déplacements urbains en Ile-de-France (PDUIF)" (Ile-de-France urban travel plan) confirms an increasing use of routes, with a rise of 2.4% in users in the inner suburbs, and of 2.8% in the outer suburbs (2015, PDUIF). This is largely linked to additional bus and tram services (17.2% between 2010 and 2015).

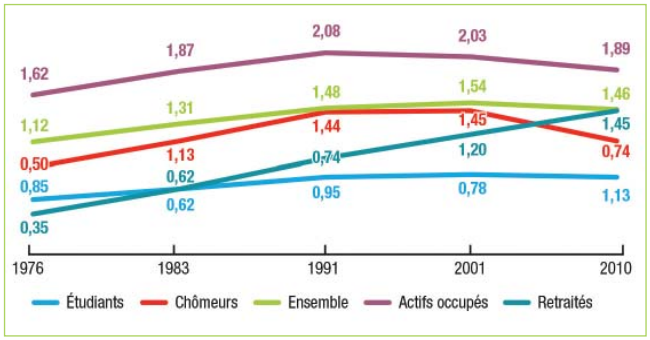
Decrease in travel by car

Changes in car travel according to place of residence (number of journeys per person per day)



Source: EGT 2010 STIF-OMNIL-DRIEA - Procedures IAU-IdF.

Changes in car travel according to individual category

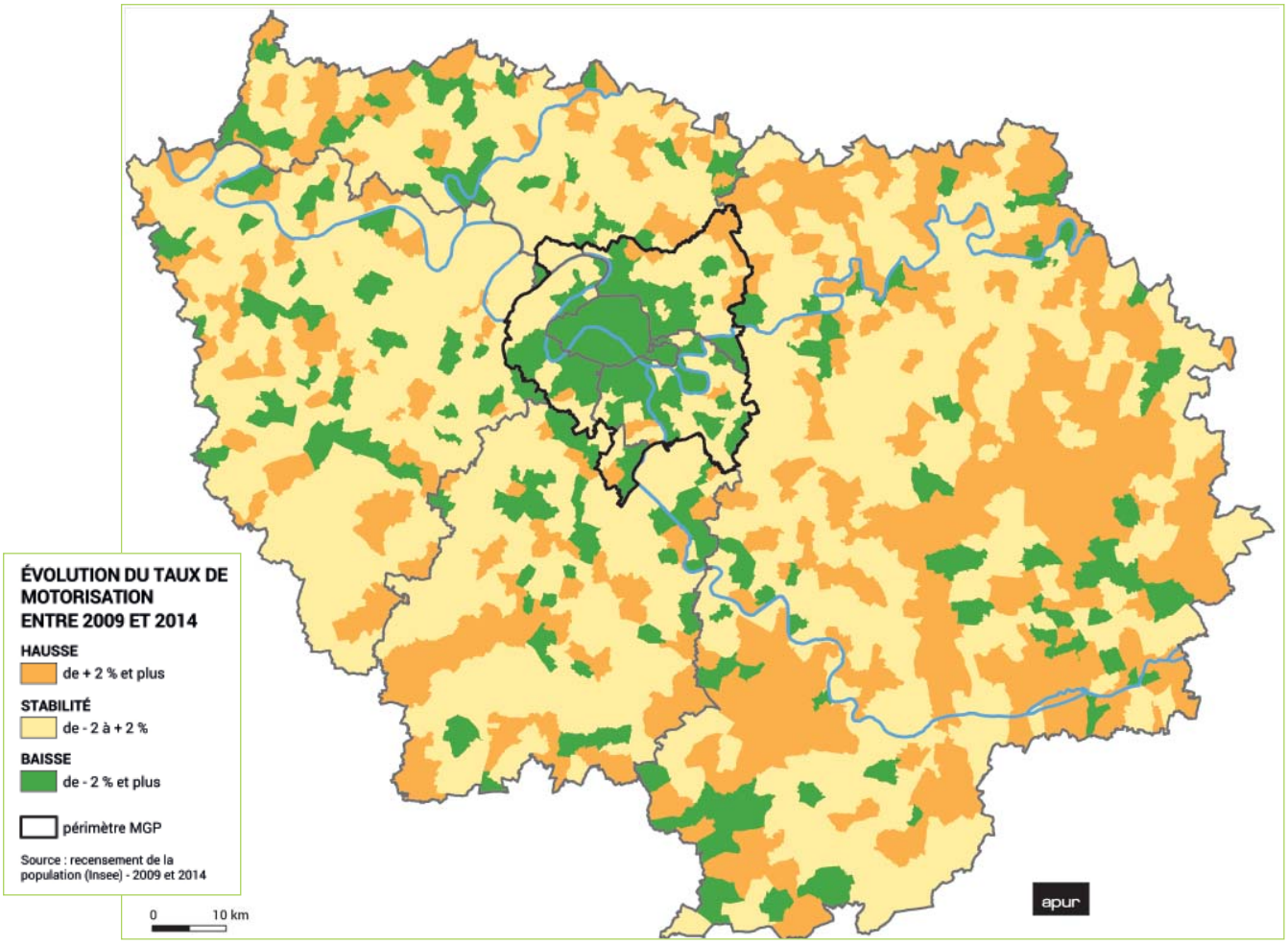


Source: EGT 2010 STIF-OMNIL-DRIEA - Procedures IAU-IdF.

15.3 million journeys by car were made daily: 0.5 million journeys in Paris; 1.1 million journeys between Paris and the suburbs: 13.7 million journeys outside Paris. The decrease in travel by car was first observed at a regional level in 2010 (-5%). However, this decrease was mainly seen in Paris (-37%) and the inner suburbs (-13%). In contrast, travel by car continues to rise in the outer suburbs.

The number of journeys made by car according to different categories in the population have altered in a similar way, with a steady decrease seen across all users, with only the retired bucking the trend.
The decrease in car travel has gone hand in hand with a decrease in car ownership: - 2% at a regional level between 1999 and 2014. This decrease is particularly noticeable in Paris (-18%), whereas car ownership is still on the rise in the outer suburbs

Changes in car ownership between 2009 and 2014



© APUR - Source: Population census (Insee) 2009 and 2014.

Use of the road network remains very high despite traffic becoming less

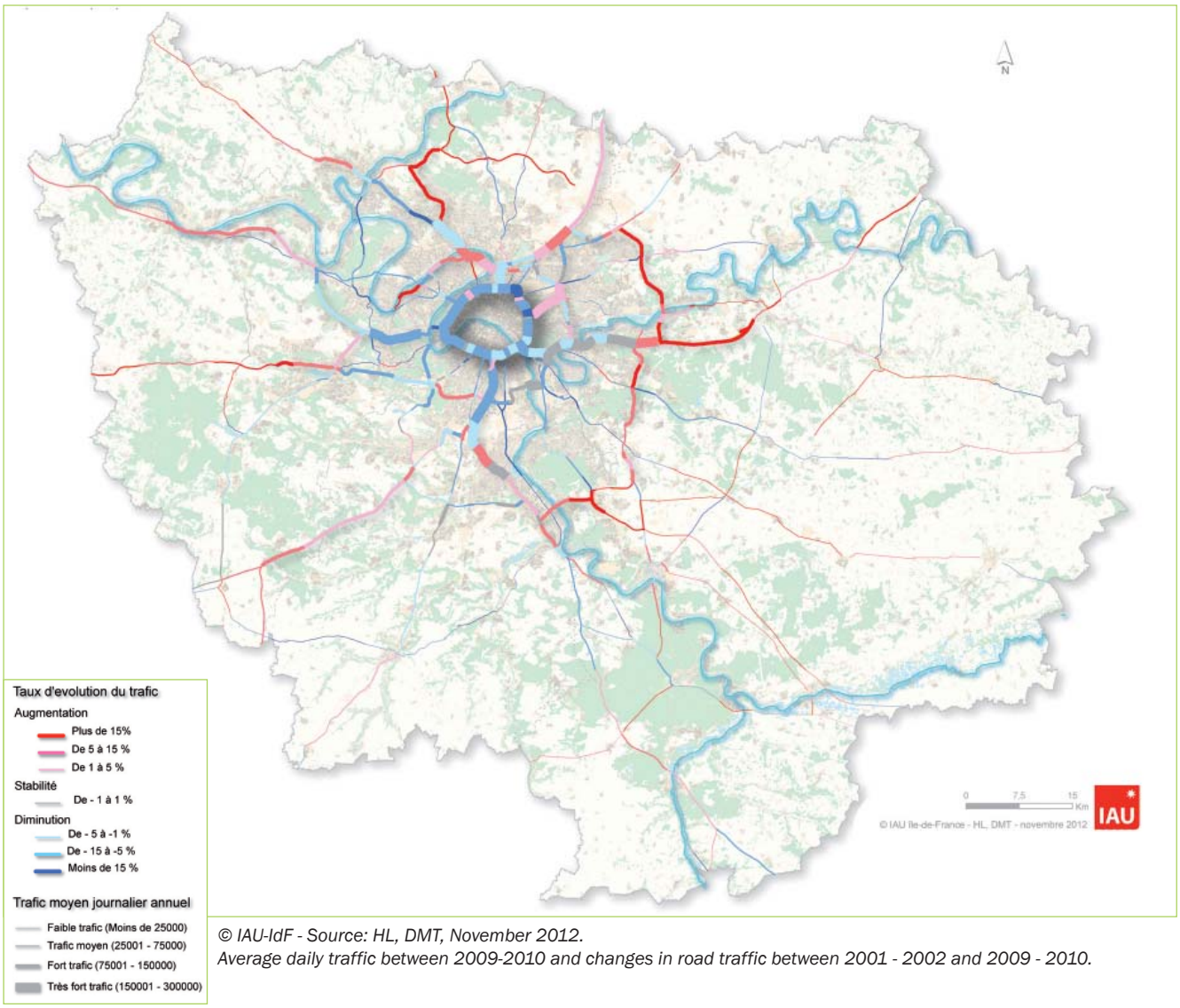
The declining use of the car for daily travel has a direct impact on road traffic. The “boulevard périphérique” ring road and the radial routes which connect to it at the heart of the conurbation are experiencing less traffic, but still have very high levels of volume. On the outskirts, the outer radial routes and bypasses continue to see a rise in traffic. However, in terms of overall volume, it still remains lower than that seen on the central routes.

The decrease in traffic is particularity noticeable in the heart of Paris, with a decrease of 31% in traffic flow seen between 2001-2015 (in vehicles per km per hour).

Despite all this, there is chronic road congestion, with the most-used roads at full capacity. Peaks in traffic during rush hour are especially critical in terms of traffic flow on the network.

Road traffic in the Ile-de-France is still characterised by a low rate of vehicle occupancy (on average 1.28 people per car and only1.06 for journeys made between work and home), as well as chronic congestion. The imbalance in employment rates in the Ile-de-France region also has an impact on volume on the network and the balance in flow borne by the infrastructure between the most and least popular directions.

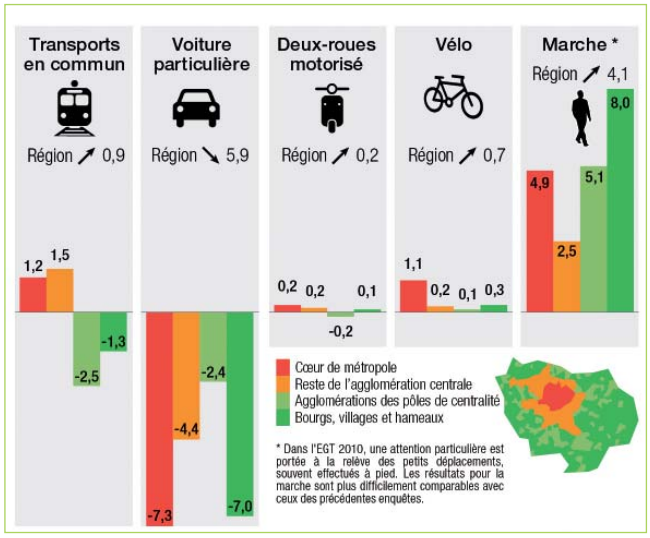
Changes in road traffic in the Ile-de-France



© IAU-IdF - Source: HL, DMT, November 2012.
Average daily traffic between 2009-2010 and changes in road traffic between 2001 - 2002 and 2009 - 2010.

An increase in active travel - walking and cycling

Changes in the modal share for daily journeys between 2001 and 2010 (in percentage points)



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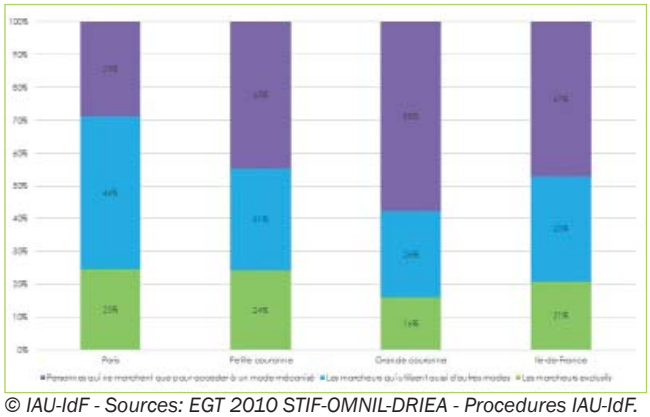
1/5 of residents in the Ile-de-France carry out their daily travel solely on foot

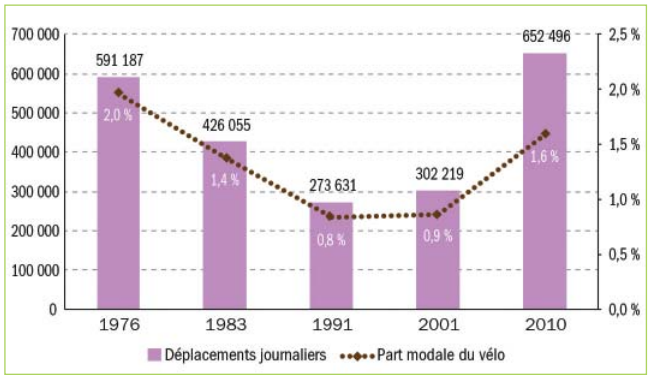


© IAU-IdF - Sources: EGT 2010 STIF-OMNIL-DRIEA - Procedures IAU-IdF. *Typology of residents who walk in the Ile-de-France, excluding immobile people (those who have not moved out of their home at all the day before the survey, and who represent 7% of the Ile-de-France population)*

The decline in the use of the car for travel by residents in the Ile-de-France is a result of the rise in active travel, as well as an increase in public transport. In 2010, walking became the most popular mode of travel in the Ile-de-France, with 39% of journeys made solely on foot.

50% of Ile-de-France residents walk over 1 km per day, and 40% of Parisians walk over 2 km per day. Most people who walk in the Ile-de-France use a mix of transport, but 21% just walk.

Changes in cycling in the Ile-de-France



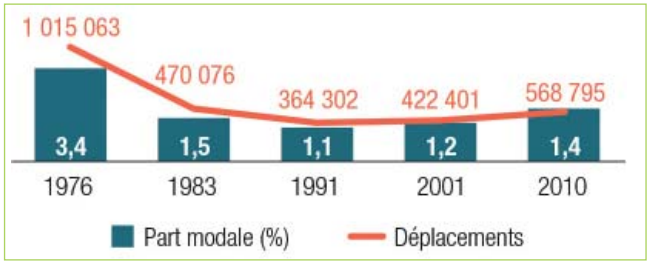
© IAU-IdF - Sources : EGT 2010 STIF-OMNIL-DRIEA - Traitements IAU-IdF.

Cycling is on the rise as a daily mode of transport. This increase has coincided with an improvement in the provision for this method of transport. The amount of cycle routes has tripled in less than twenty years across the region, and the self-service hire of bikes has expanded, with the arrival of Vélib in particular. The rise of cycling is seen mainly in two areas - for getting to work, and for getting to leisure activities or for visiting places. As a result, cycling accounts for 8% of home to work journeys made in 2010 within Paris.

Powered two-wheel vehicles prove popular mainly in Paris and the inner suburbs

For the past two decades, powered two-wheel vehicles have increased in popularity in the Ile-de-France. This has occurred mainly in Paris and the inner suburbs, and is where the majority of journeys made on this type of transport take place. However, their use today appears to be levelling out in light of a decrease being noted in sales of new vehicles and registrations.

Number of journeys made by powered two-wheel vehicles, and share of the total in the Ile-de-France



© IAU-IdF - Sources: EGT 1976, 1983, 1991, 2001 and 2010.

Transportation of goods: a rapidly changing area

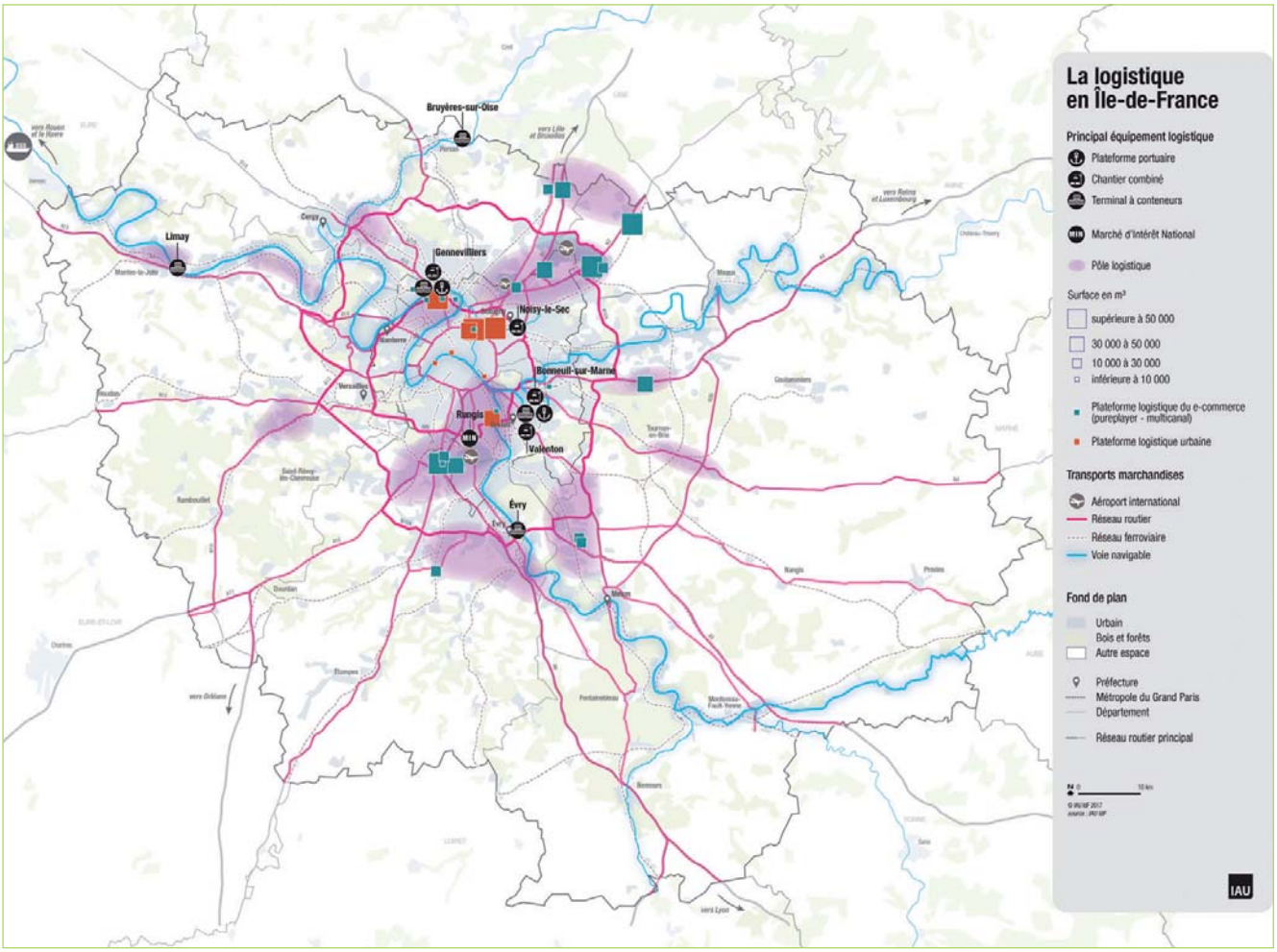
Distribution is having to adapt and change quickly to an increasingly fast-paced world and to today's consumers, who are predominantly urban dwellers. There are also new types of shops reinvesting in city centres, as well as the use of smartphones which make practically instantaneous deliveries to a chosen place always possible, even for food purchases to your own fridge.

Logistics are essential for a mobile society

The freight transport and logistics sector has become an essential part of an increasingly mobile consumer society. With over 400,000 jobs in the Ile-de-France, the majority of which are not relocatable, the control and movement of goods represents 10% of jobs in the region.

There are 16 million m² of warehouses in the Ile-de-France, of which two thirds are in the outer suburbs. This makes it far from being the top region for logistics in France. With the growth in e-commerce, logisticians are now requesting very large-scale warehouses (100 000 m², 150 000 m² and over) from which deliveries can be subsequently organised to shops and customer's homes.

Logistics in the Ile-de-France



Source : IAU-IdF.

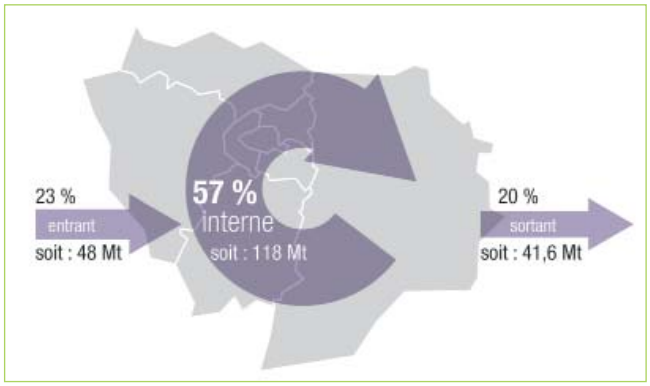
The explosion in e-commerce and the conundrum of the last kilometre

E-commerce was almost non-existent at the start of the millennium, but is now showing a particularity marked increase (+ 14.6% in 2017), which is higher than in-store sales.
In this context, attracting and retaining increasingly demanding customers requires a delivery service of faultless quality. The choice of delivery places and times is increasingly open, with deliveries becoming almost instantaneous.
To respond to this key challenge, innovative services are developing. These include intermediation platforms for couriers, the use of shops and restaurants as local depots, the implementation of increasingly automated systems and robots, etc.

Increasing numbers of lorries and vans in the heart of the conurbation

The flow of goods in the Ile-de-France represents a total of 210 to 230 million tonnes (incoming flow, outgoing flow or flow exchanged internally). This constitutes more than 700,000 delivery trips per day, of which nearly two thirds are within the area of the Métropole du Grand Paris. It is here that economic activity and the population in the region are concentrated, and is where transport associated with deliveries over the last kilometre are the most intense, and are rising rapidly.

Flow of goods in 2016

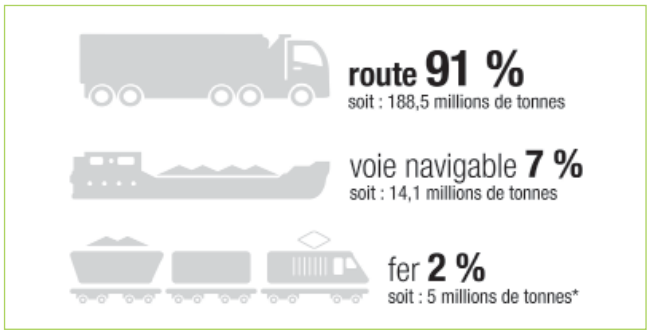


Source: IAU-IdF.

The need for immediacy and ubiquity requires the use of lorries and vans in particular,
the adaptability and responsiveness of which is highly prized. The delivery of hundreds and thousands of parcels by lorries and vans, which are not always full to capacity, is radically altering supply chains and is having an increasingly detrimental impact on public spaces and the environment.

As a result, 90% of goods transported in the Ile-de-France are transported by road. Under current conditions, it is difficult to find a solution which uses a mix of transport modes including water and rail which is economically viable.

The transport of goods could be carried out by:



Source: IAU-IdF

The Seine, an uncongested artery into the heart of Paris which is underused

A few freight transport operators, supported by public authorities, are interested in how they can limit the impact deliveries have on the environment in particular. However, at the moment, they remain in the minority. They include: deliveries to Franprix stores via the Seine, and supplying the logistics hotel in Chapelle International in future by train.

Apart from these urban distribution operations, transport by river is the preferred mode for aggregates and building materials. The last two examples represent 12 of the 20 million tonnes of goods dealt with each year by inland ports in the Ile-de-France. The use of river transport may be increased for supplying construction work for the Olympic Games in 2024 and the removal of spoil, as well as the supply of logistics throughout the duration of the Games.

What are the prospects for 2030?

In order to look ahead to 2030, major structural trends have been considered, as well as projects that have already been planned or that are emerging today and will potentially lead to significant changes in the coming years. To plan ahead, urban transformation projects and expected demographic changes must be taken into account, as well as economic and societal developments in gestation, since all these factors will affect day-to-day travel.

Mobility-related measures must be part of an overall objective to improve air quality through increasingly strict carbon footprint regulations.
Transport is expected to undergo major changes by 2030, largely due to the arrival of the Grand Paris Express, but also to technological innovations and changes in practices and behaviours. The role of public authorities is expected to evolve, in terms of both offer of services and its organisational and regulatory role in a transport system that is increasingly diverse and complex.

What are the prospects for 2030? : summary

Health crisis: urgency to improve air quality by reducing polluting modes of travel
The Act of 17 August 2015 sets an objective to reduce by 2030 the consumption of primary fossil energy by 30% in comparison with 2012, and to divide greenhouse gas emissions by four between 1990 and 2050. To meet this objective, road traffic, which is the main generator of GHG and pollutants in the dense area, must evolve. Hence, the PDUIF (Ile-de-France urban travel plan) fixes targets for a 20% increase in the number of journeys made by public transport, a 10% increase for active modes, and a 2% decrease in the individual use of motorised vehicles (cars and two-wheelers)..

Expected increase in travel demand
According to an INSEE forecast, the Ile-de-France population should continue to increase, exceeding 13.5 million in 2050. The arrival of the Grand Paris metro will support this economic and urban development, but will not suffice to meet travel needs entirely.

Redesigning the 21st century motorway to increase capacity and quality
With a car occupancy rate of 1.06 in peak hours, urban expressways carry very few people in comparison with RER trains. Road congestion has increased by 26% in 4 years, especially within the A86 motorway ring. At the same time, the motorway network has evolved very little over the last 50 years; it has now become necessary to transform it in order to improve the travel experience, increase capacity and reduce noise levels and urban discontinuities.

Walking and cycling, short-term levers to relieve transport networks
The occupation of public space by the car remains both uncomfortable and dangerous for pedestrians, cyclists and persons with reduced mobility. More street space needs to be set aside for active modes which are more efficient and generate less pollution. This can be significantly facilitated by the arrival of the Grand Paris metro and the growing momentum of the self-service bicycle system, Vélib' Métropole, and the electric bike, but major work is needed to rearrange the public space and develop a continuous, structuring cycle path network in the city and along major structuring roads.

Challenge: intermodality and transfer to current and future stations
The 42 Nouveau Grand Paris transport projects will facilitate peripheral travel and multimodality (Grand Paris Express, extension of the RER line E and certain underground lines, ERW, eco-bus stations, etc.). More than 95% of inhabitants and jobs in the Métropole du Grand Paris (not including Paris) will be within two kilometres, or a 10-minute bike ride, of a station. Efficient transfer to rail modes by 2030 remains an essential lever for sustainable mobility. At the same time, the development of alternatives to the individual car, such as carpooling and carsharing, is vital to meeting the needs of all areas, especially the outer ring.

Key role of public authorities for mobility-as-a-service
Technological and digital developments, shared vehicles, free-floating services, clean engines and autonomous vehicles are kick-starting a real mobility revolution driven by the notion of a service-based economy. Optimising the travel chain to provide an integrated transport offer requires a redesign of the network, to devote public space to new uses. The public authorities' role is expected to evolve, as regulator and coordinator of the different services, both public and private. Therefore, free access to data, of private operators in particular, is a key issue in the building of a system that adapts quickly to changing needs.*

Behavioural evolution and users who are more agile and more selective about travel
Changes in attitudes towards mobility, with the development of teleworking, independent employment, third places, peak-hour spread and parking management, will also make it easier in the future to regulate travel and move towards the "15-minute city". This will result in a better quality of life in Ile-de-France, a reduction of urban stress and decreased pressure on transport networks... Transport must also become more inclusive by taking into account disabled accessibility issues.

Innovations to be multiplied for urban logistics
Faced with the rise of e-commerce and air quality issues, adaptations and innovations are needed in the transportation of goods. While vehicle fleets are beginning to adopt clean engines (electrical, NGV, hydrogen...), the deployment of a logistics network, from warehouse to "last mile" delivery, requires the multiplication of partnerships between operators. The creation of logistical hotels in the centre, providing a diversity of well-integrated programmes, enables multimodal rail and river solutions to be implemented.

** Shared vehicles (cars, bicycles, scooters...) which have no dedicated pick-up point and can therefore be parked freely on the street.*

Environmental urgency in the transport sector

Objectives to improve air quality and fight against global warming.

The question of air quality is a public health issue, because 1.5 million Ile-de-France residents (including 1 million Parisians) are exposed to nitrogen dioxide (NO2) levels which exceed regulatory limits. Air pollution accounts for more than 6,600 premature deaths each year in Paris and the inner suburbs.
The Senate report entitled "Air Pollution and the Cost of Inaction" assesses the cost of air pollution in France at approximately 100 billion euros per year: Social Security cover of acute and chronic diseases linked with air pollution, implementation of emergency measures during atmospheric pollution peaks (alternating or restricted traffic, free public transport, etc.), work absenteeism, reduction in crop yields... In the long term, therefore, the implementation of major air-quality measures would save considerable costs for businesses, local authorities and the State.
Air quality improvement is also important to maintain the attractiveness and influence of the Metropolis. Indeed, a survey conducted by the Association for Executive Employment (APEC) in 2012 shows that climate, air quality, mobility conditions and ease of access to natural spaces, are the most important quality-of-life criteria to attract graduates and young executives.

European law in the field of air quality and atmospheric pollution

The release of pollutants into the atmosphere is strictly regulated by European law, which is transposed into French regulations. At national level, the Act of 17 August 2015 relative to energy transition for green growth sets medium- and long-term objectives in a joint action framework for citizens, businesses, local governments and the State, in particular:

- *To reduce emissions of greenhouse gases by 40% between 1990 and 2030 and divide by four the emissions of greenhouse gases between 1990 and 2050 (factor 4);*
- *To reduce primary energy consumption of fossil energies by 30% in 2030 compared to the reference year, 2012;*
- *To increase the share of renewable energy to 23% of gross final energy consumption in 2020 and to 32% of gross final energy consumption in 2030;*
- *To reduce the share of electricity produced by nuclear energy to 50% by 2025.*

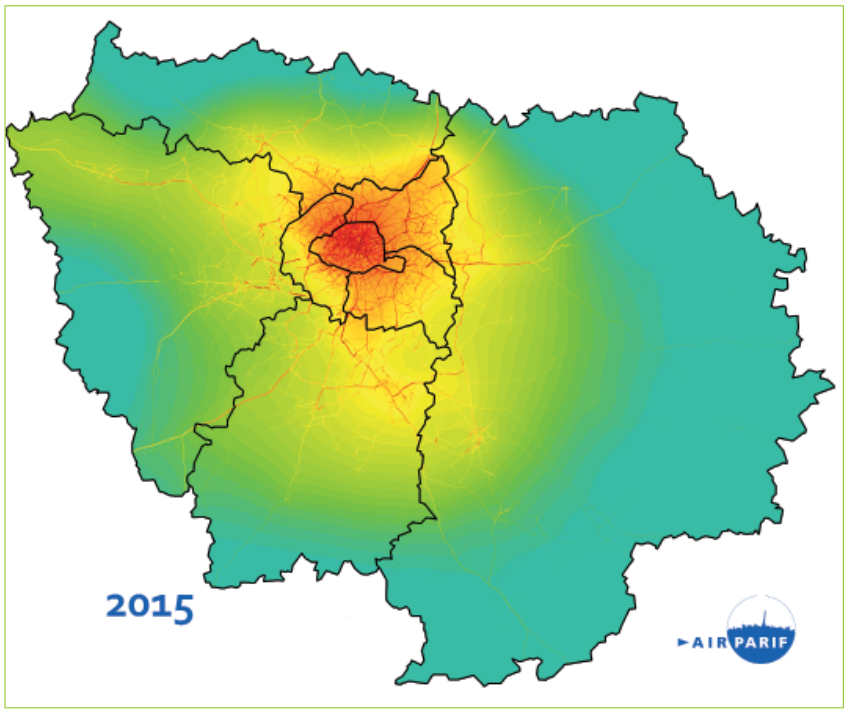
On several occasions, France has been given notice by the European Commission (in 2015 and 2017) for non-compliance with regulatory limits relating to PM10 and NO_2 fine particles, and for lack of action against pollution in several areas, including the Paris conurbation.

Indeed, non-compliance with these limits continues, despite the implementation by the Ile-de-France regional prefecture of a first plan for the protection of the atmosphere (PPA) in 2006, a second plan in 2013, and a third in 2018. As a result of the Council of State judgement of 12 July 2017 requiring the State to develop and implement "a plan relating to air quality", the Minister for ecological transition and solidarity asked the Prefects of the areas concerned, in cooperation with local authorities, to formalise by 31 March 2018 a roadmap aimed to bring together and enhance actions in favour of the improvement of air quality.

Actions undertaken by local authorities

In the scope of powers bestowed by law for the fight against air pollution, the Métropole du Grand Paris has launched several actions since its creation, notably, the deployment of the scheme "Métropole Roule Propre!" ("Metropolis drives clean!") to help individuals to purchase clean vehicles and accompany the metropolitan climate, air & energy plan (PCAEM). Among other measures, the plan provides for the launch of preliminary studies for the creation of a metropolitan area of low-emission travel. A number of local governments are also actively committed to the fight against climate change and the reduction of air-pollutant emissions, in line with numerous initiatives in support of alternative mobilities to the individual car. The City of Paris is resolutely committed to the fight against air pollution with its Parisian air quality plan, which has implemented concrete, effective measures: restricted traffic zones where the most polluting vehicles have been banned since 2015; financial aid to encourage the purchase of clean vehicles or to help professional and private users to avoid using motorised means of travel...

High concentrations of nitrogen dioxide NO_2



© Air-Parif.

Growth in Ile-de-France

Prospects for 2030 and 2050

According to the latest trend forecasts published by INSEE in November 2017 (based on the census of 2013 and the Omphale projection model of 2017), **the population of Ile-de-France should continue to increase steadily, exceeding 13.5 million by 2050, as compared to 12 million today, while ageing at the same time**. In 2030, the population of Ile-de-France is estimated at between 12.8 and 13.1 million inhabitants.

This progression is expected to concern the outer ring and, to a lesser extent, the inner suburbs, with the population of inner Paris remaining stable.

	Population in 2013	Population in 2050	Average annual growth rate between 2013 and 2050 (in %)	Average age in 2013	Average age in 2050
Paris	2 229 600	2 233 000	0,00	39,2	42,2
Inner ring	4 497 900	5 149 900	0,37	36,8	40,8
Outer ring	5 232 300	6 122 000	0,43	37,1	41,0
Ile-de-France	11 959 800	13 504 900	0,33	37,4	41,1

Source: Insee, Population Census 2013 and Omphale Model 2017 (trend scenario).

Such growth comes primarily from the higher age brackets, from 60 years upwards, and it would seem that Ile-de-France is less concerned by the ageing of the French population overall (with the baby-boom generations now reaching old age), and this trend accentuates the impact of migration on demographic evolution.

Orientations of the SDRIF (Ile-de-France master plan) and the Grand Paris Act

To accompany this growth, the Greater Paris Act of 3 June 2010 fixed the SDRIF objective of creating 70,000 new homes each year in Ile-de-France, while the SDRIF aims to achieve 38,000 jobs per year.

In 2016, authorisations were passed for the construction of more than 85,000 new homes in Ile-de-France, half of which are within the Métropole du Grand Paris (source sit@del 2 - DRIEA 2017).

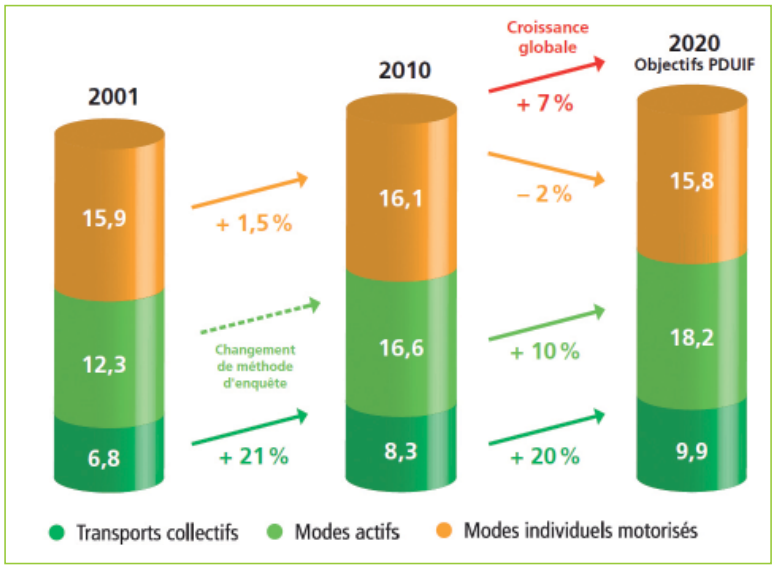
The progressive opening of the Grand Paris metro lines will accelerate the conurbation's economic and urban development, resulting automatically in an increase in travel demand.

The conurbation's structure could resemble that of a more compact city, with concentrations in the town centres and around stations.

Projects undertaken to improve public transport by 2030

Ile-de-France urban travel plan (PDUIF)

PDUIF travel objectives for 2020



Daily movements in Ile-de-France (in millions per day)
© Ile-de-France Mobilités – PDUIF, 2014.

The Ile-de-France urban travel plan (PDUIF), approved by the Regional Council in 2014, coordinates transport and parking policies. Within the objectives to improve air quality and reduce greenhouse gases, and considering an overall increase in travel estimated at 7%, **the PDUIF has set travel targets for 2020: a 20% increase in the use of public transport, a 10% increase in active modes (walking and cycling), and a 2% decrease in travel by car and motorcycle**. A roadmap for the period 2017 to 2020 recently reinforced the actions initially planned by the PDUIF while at the same time integrating new regional ambitions.

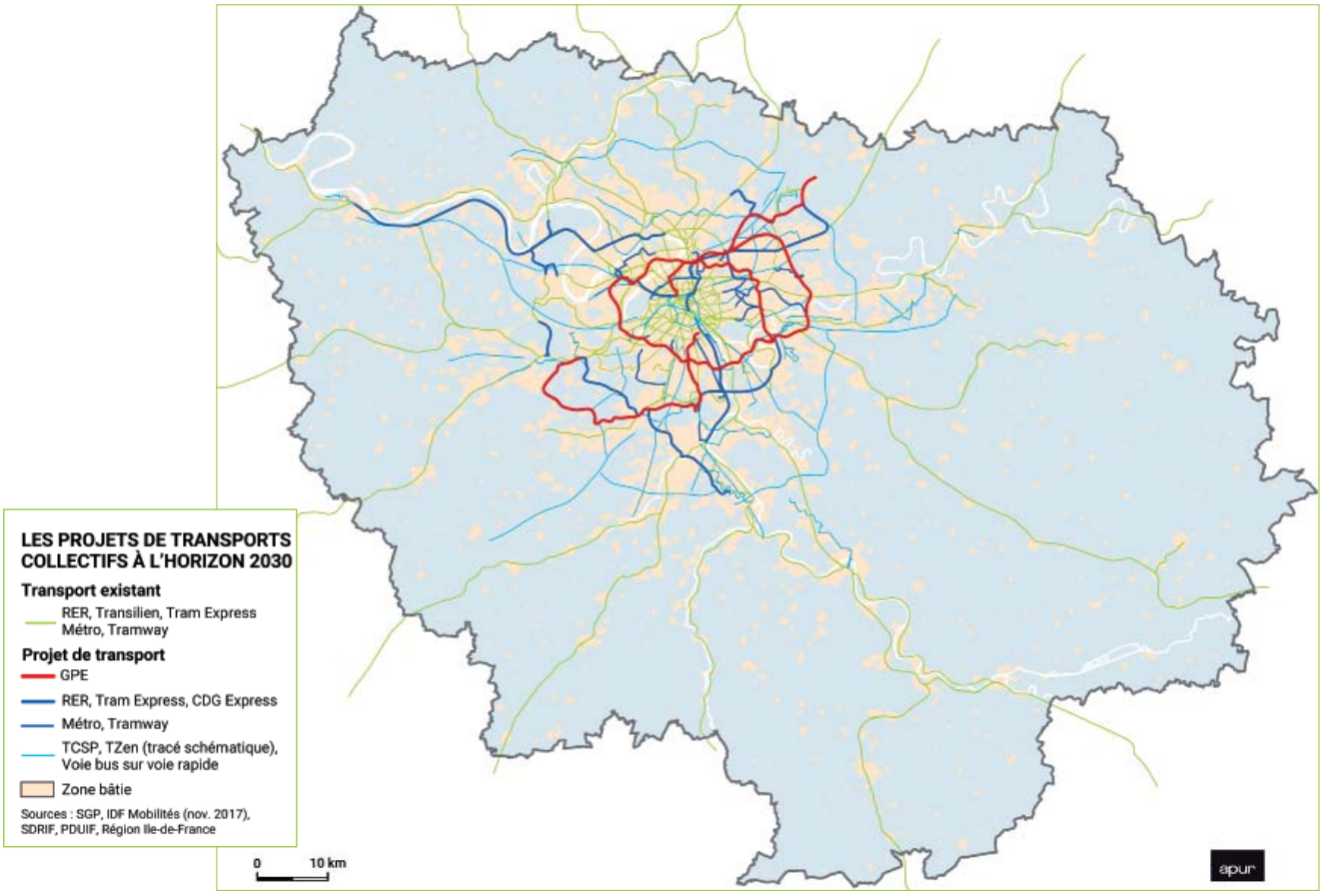
The "New Greater Paris for Transport" project

Public transport plays an increasingly important structural role in the movements of residents of Ile-de-France. The region's heavy network is mainly radial and does not cater for long and medium distances without the traveller having to go via Paris, although 70% of journeys are from suburb to suburb. This particular structure leads to the saturation of underground and RER lines in the city centre. Faced with a heavily-used infrastructure in need of modernisation, the Ile-de-France Regional Council has set up a transport modernisation plan to renovate current lines and provide better services in dense areas. **By 2030, the transport network must cater for the needs of a multi-centre metropolis, reaching all catchment areas and providing all inhabitants with better access to transportation.**

The "New Greater Paris for Transport" project, to which the State and the Region committed in 2013 together with local councils, aims to strengthen the regional transport network and create efficient peripheral routes, in order to provide links between catchment areas without transit via the centre.

In addition to the Grand Paris metro, the investment plan concerns a total of 42 projects, for extension of the RER line E and modernisation of all RER lines, the extension of metro lines, an increase in the overground network (express tram system, trams, buses and exchange hubs) and the replacement of diesel-fuelled buses.

Public transport projects for 2030



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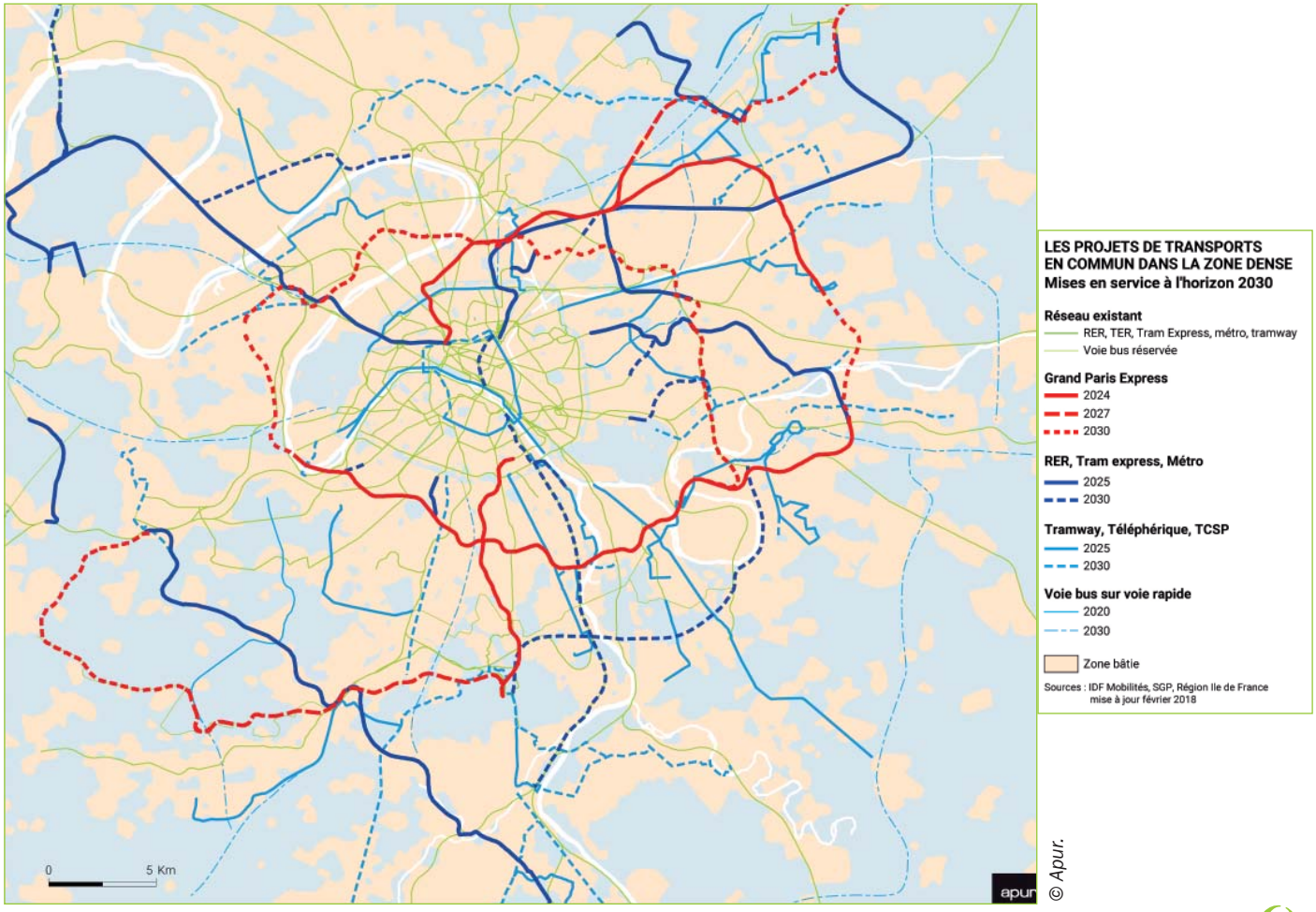
Public transport projects in the dense area



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This project deals with the needs of the existing network for both modernisation and extension, and includes the creation, by 2030, of a total of 93 new train and metro stations in the Ile-de-France region. New peripheral services are essential in order to establish an efficient radial and concentric network by 2030 with stations operating as proper transport hubs.

With 68 new stations, the Grand Paris Express provides as many network entry points, the majority of which will interconnect with the RER or metro networks. The new lines will connect new districts, reduce travel times, significantly increase local accessibility, and make it easier to reach employment basins.

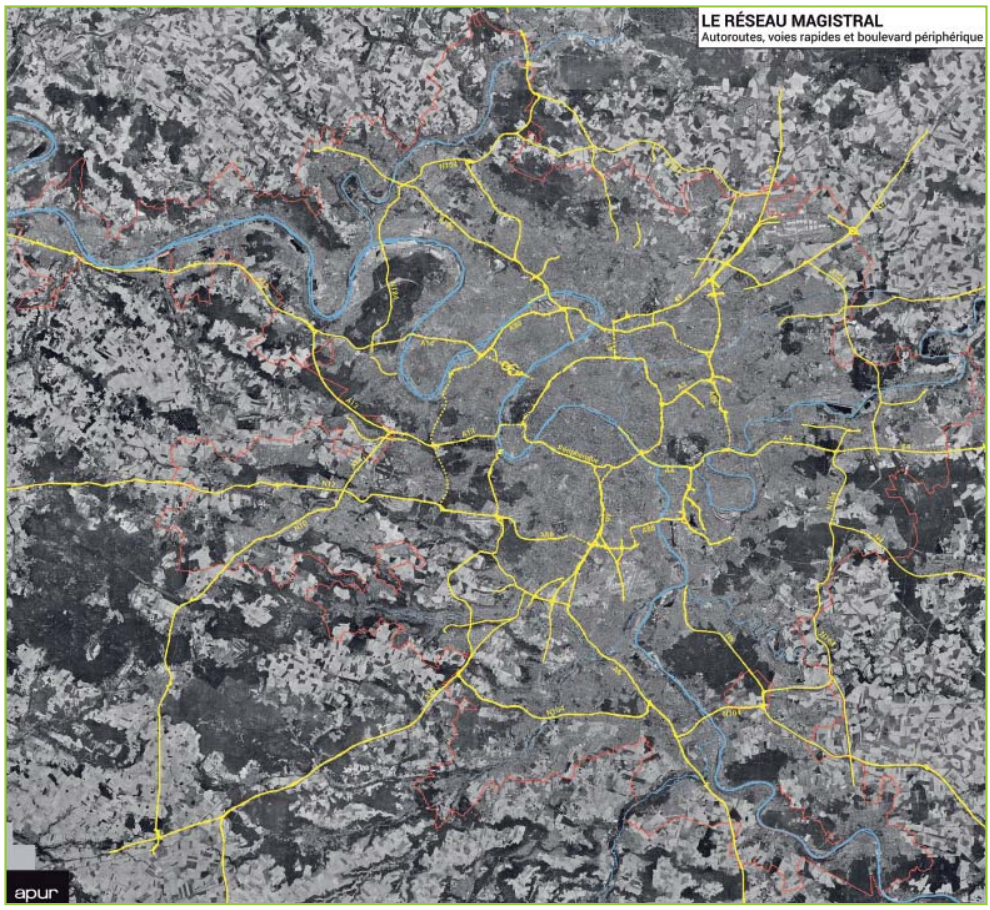
Motorway network optimization issues

Despite an exceptionally dense network of expressways compared to other European cities, the Paris region remains extremely congested with record traffic and congestion, and the situation is worsening.

The trends observed over the past 10 years are set to continue, and inhabitants will have more and more possible alternatives to the individual car. At the same time, this diversification of transport modes accompanies and encourages changes in our relationship with the car. These behavioural changes are reflected in the accelerating decline of household motorisation, which had already been observed in Paris and is now happening in the rest of Greater Paris (outside Paris itself), where the motorisation rate fell by 5% between 1999 and 2014 (source: INSEE). Also, road traffic in the dense area within the A86 ring is also decreasing. These important developments bring into question the future role of the car and its place in the public space, after decades of street development in its favour.

A dense but congested network

Urban highways in the conurbation



© Apur.

Currently, daily occupancy rates on major roads are extremely low, with an average of 1.06 persons per car at peak hours.
Despite additional roads and new traffic management and optimisation measures (Sytadin), congestion at peak hours is continually increasing in Ile-de-France, with a 26% rise in 4 years. Without real changes in the use and development of motorways, traffic growth linked with the growth in population and employment is expected to reach critical saturation levels, despite the fact that the Grand Paris Express metro will go into service by 2030.

Carpooling solutions offer new prospects for the optimisation of motorways, but are struggling to become established as a mode of transport in their own right. This service is gradually being rolled out in a number of areas, thanks to online user platforms and various company schemes, as well as new services supported by Ile-de-France Mobilités and local governments.

Individual cars carry very few people compared to public transport and walking.

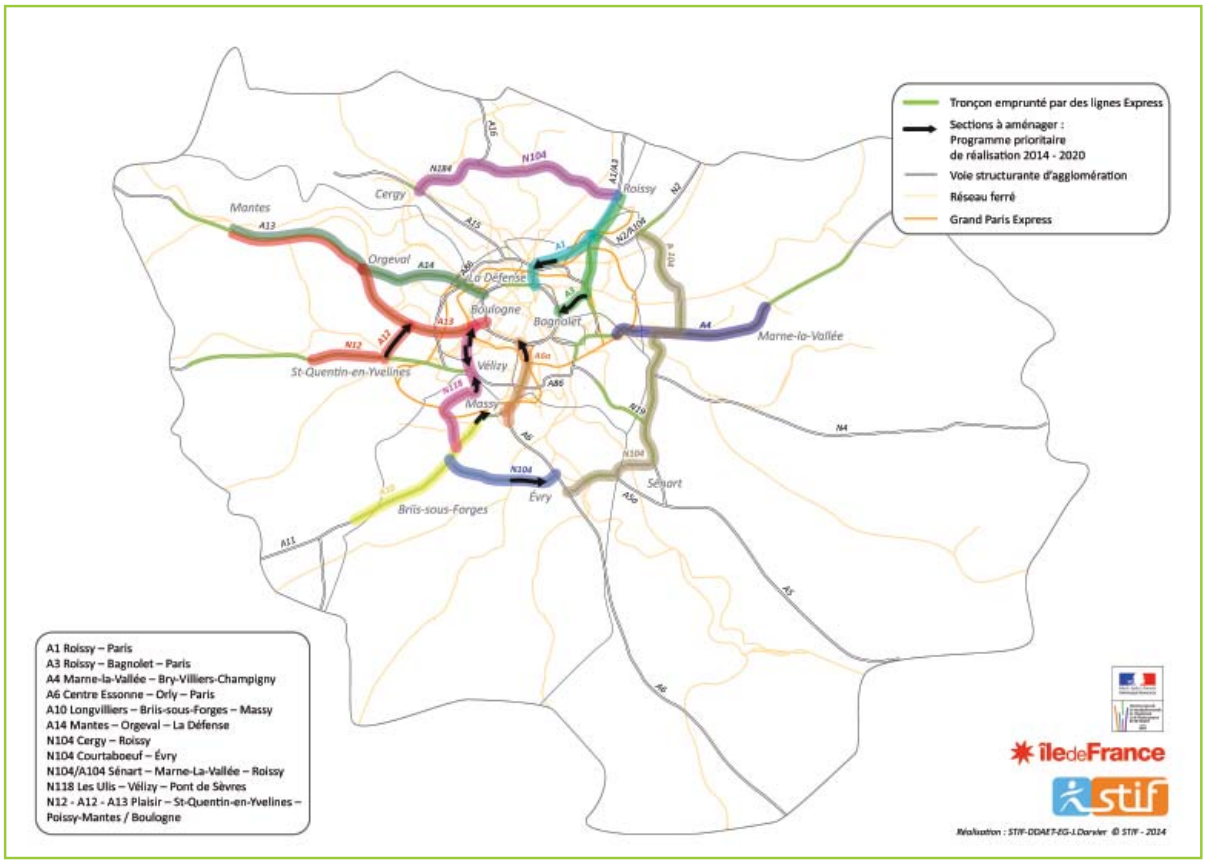
© SGP.

Designing the motorway of the 21st century, for higher capacity and better conditions

These changes now bring into question the development and utilisation of the motorway network, which has changed very little over the fifty years since its creation.
In addition to operating measures already implemented to reduce congestion (temporary hard shoulder use, dynamic traffic management and access-ramp control), other structural measures could make it possible to carry more travellers more efficiently, while generating less atmospheric pollution and less noise
Many examples in metropolitan areas in France and abroad demonstrate potential development solutions: carpool lanes, congestion charging, exclusive-right-of-way bus lanes connecting with exchange hubs, etc.

In Ile-de-France, a network of dedicated express lanes for buses and taxis is being developed with some sections open on the A1 and A6a motorways. Eventually, it will include 11 expressways, but the management and control systems still need to be improved (sanctions, extended sequences, dedicated facilities...). The motorway transport hub of Briis-sous-Forges on the A10 is another example of a bus station connecting with a park and ride system, which is particularly appealing on this sequence without interchanges. The effectiveness of the system has been heightened by the development of a dedicated lane which covers 3.3 km of the A10 and reduces journey time by 8 minutes.

11 Express roads in Ile-de-France



© DRIEA - Ile-de-France Mobilités.

The expressway network could be improved further and gain in performance, by allowing use of the dedicated lanes by other vehicles, such as carpool and clean vehicles, including heavy vehicles.

In this way, the 21st century motorway infrastructure could be better used and redesigned in order to carry more people, becoming both an innovative resource and a pluralistic solution that integrates better into the affected areas.

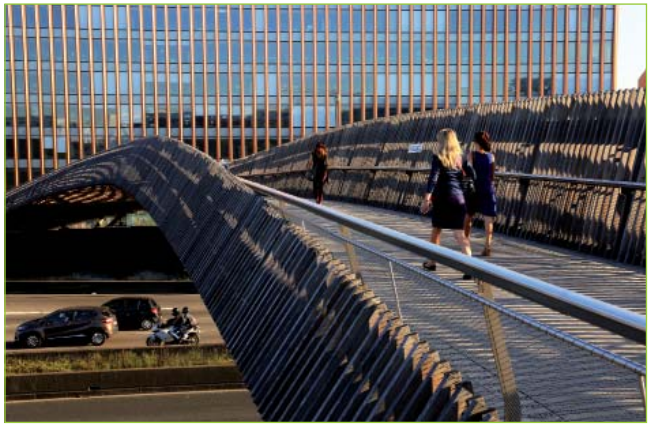
New operating measures with dedicated bus lanes and use of the hard shoulder

© DiRIF.

Footbridge over the A10 motorway, linking the park-and-ride facility and bus station at Briis-sous-Forges

© Véronique Pagnier - Wikimedia Commons.

Claude Bernard footbridge: operation in North-East Paris to better integrate the Boulevard Périphérique ringroad



© Mairie de Paris - DU - MCC - C. Jacquet.

More place for active modes in the public space

Most journeys are short, with an average of 4.4 km in Ile-de-France and 2.7 km in the metropolis of Greater Paris, where 60% of journeys cover less than 2 km (EGT 2010 transport survey).
So, in Ile-de-France, walking is the most popular way to travel locally or to a station *(39% of all daily trips according to the EGT 2010), with the car and public transport coming afterwards. Yet the majority of public space is allocated to road traffic and parking. Facilities are not user-friendly towards pedestrians and disabled persons; pedestrian crossings are rare and dangerous, pavements are narrow or congested, and the cycle path network remains insufficiently developed.*

From road to street

Reclassification of structuring roads and former main roads

The conurbation's major structuring roads are still reserved essentially for cars. The layout of roads and junctions is not favourable to buses and is impractical, sometimes even dangerous, for pedestrians and cyclists.

To accommodate changes in mobility, a new way of sharing the available space is required, including local roads and former main roads, for the benefit of the most vulnerable users, pedestrians and cyclists.

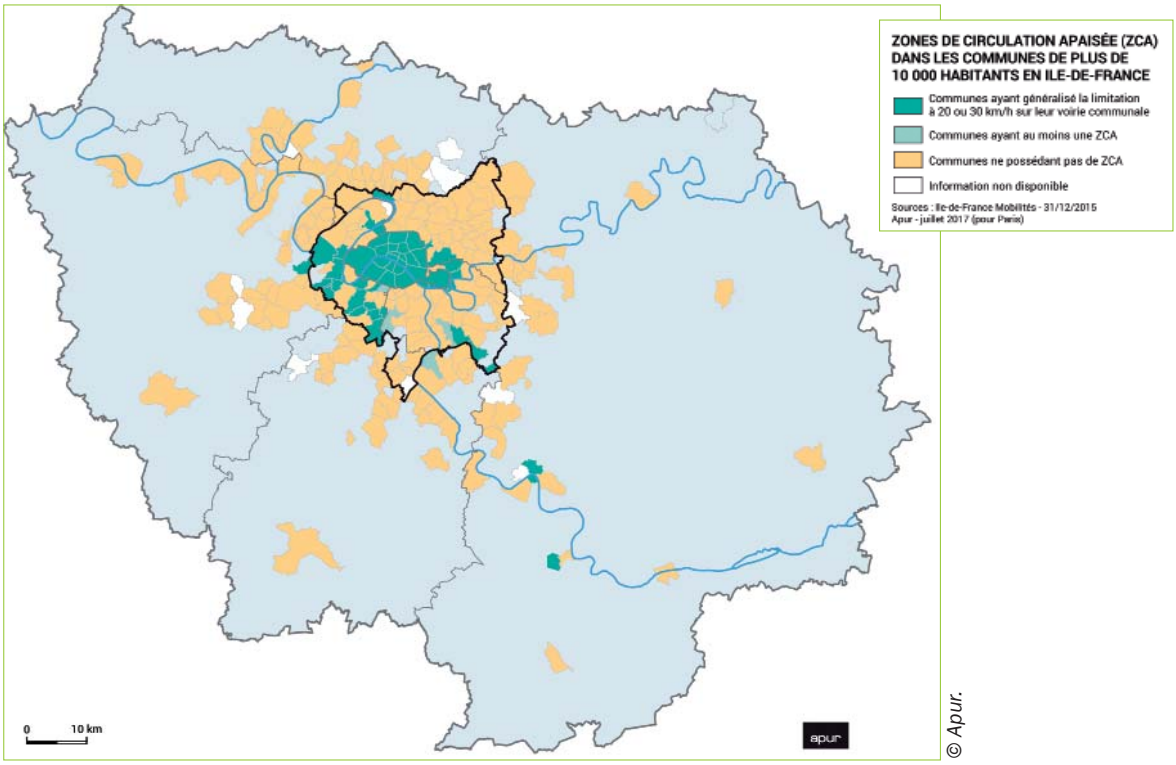
The arrival of exclusive-right-of-way tram and bus systems has made it possible to undertake a reclassification of several major roads into "Metropolis boulevards". By 2030, this change could be extended to the entire conurbation.

Reclassification of Avenue Morane Saulnier in Viroflay along the T6 tramlines

© RATP.

Calmer town centres and residential neighbourhoods

Traffic calming areas in towns of more than 10,000 inhabitants in Ile-de-France



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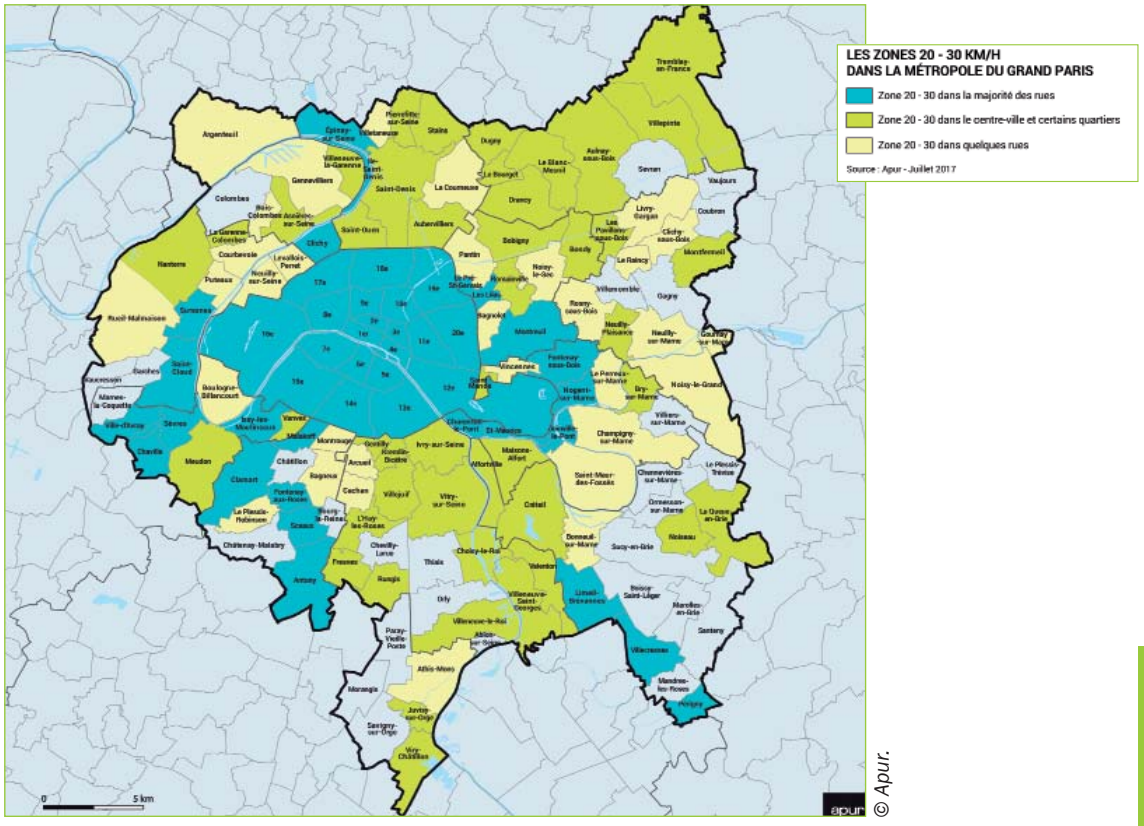
Traffic calming in the Métropole du Grand Paris - January 2017



© Apur.

More than 60% of roads in inner suburban towns are less than 12 metres wide. The fact that the vast majority of roads are narrow makes it difficult to accommodate coexisting modes: bus lanes, traffic lanes, cycle paths, pavements that are practical for pedestrians, etc.

The scarcity of public spaces requires innovative and imaginative solutions to allow users requiring less room and generating less pollution (public transportation and active modes) to take their proper place on the street.

The calming of town centres, the development of 30 km/h zones and 20 km/h pedestrian priority areas, are components of a general trend in the dense area for the recapture of public space devoted to pedestrians. The reclassification of roads, the reduction of discontinuities and public spaces that are dangerous for pedestrians and cyclists, are important issues which fall within the competence of local authorities. These changes will gradually lead to the transformation of roadways into tree-lined “in-town” public spaces with greenery and seats, as well as pavements that cater for the disabled...

Reclassification of Charenton-le-Pont town centre

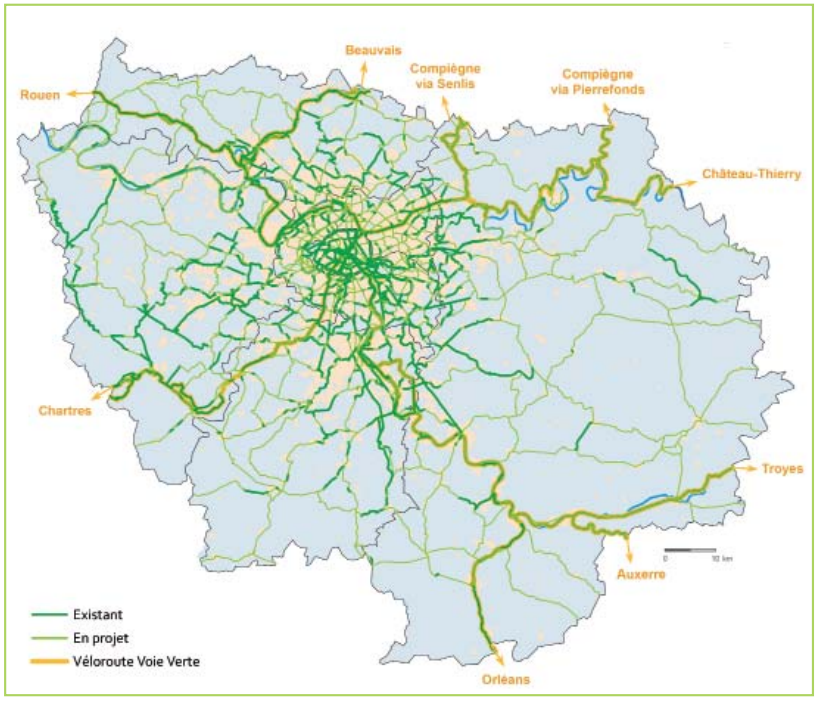
© Apur.

Cycling policy to be encouraged

The number of daily trips made by bicycle doubled between 2001 and 2010 in the region, and tripled in the Métropole, especially in Hauts-de-Seine (+ 294%).
Used for daily commuting and in addition to public transport, the bicycle also remains a highly popular recreational tool. In Paris, after the success of Vélib', introduced in 2007, the Cycle Scheme set goals to increase the modal share from 5% to 15% by 2021, create 10,000 bike parking spaces, and increase two-fold the bicycle path network to reach a total length of 1,400 km.
The development of the electrically-assisted bike and of free-floating services, as well as the ongoing extension of the new "Vélib’ Métropole" service, may quickly give momentum to the bicycle as a structuring mode of travel for short and medium distances.

The success of Vélib' is an example of the impact a new service can have on travel behaviour in the city. With 40% of bicycle trips being made with Vélib' Métropole, the system will have been a major lever in Paris and the neighbouring municipalities.
For the 67 municipalities which are members of the Autolib' Vélib' Métropole association, the arrival of this solution provides a real opportunity to make cycling a structuring mode of travel for short and medium distances.

Le réseau cyclable structurant

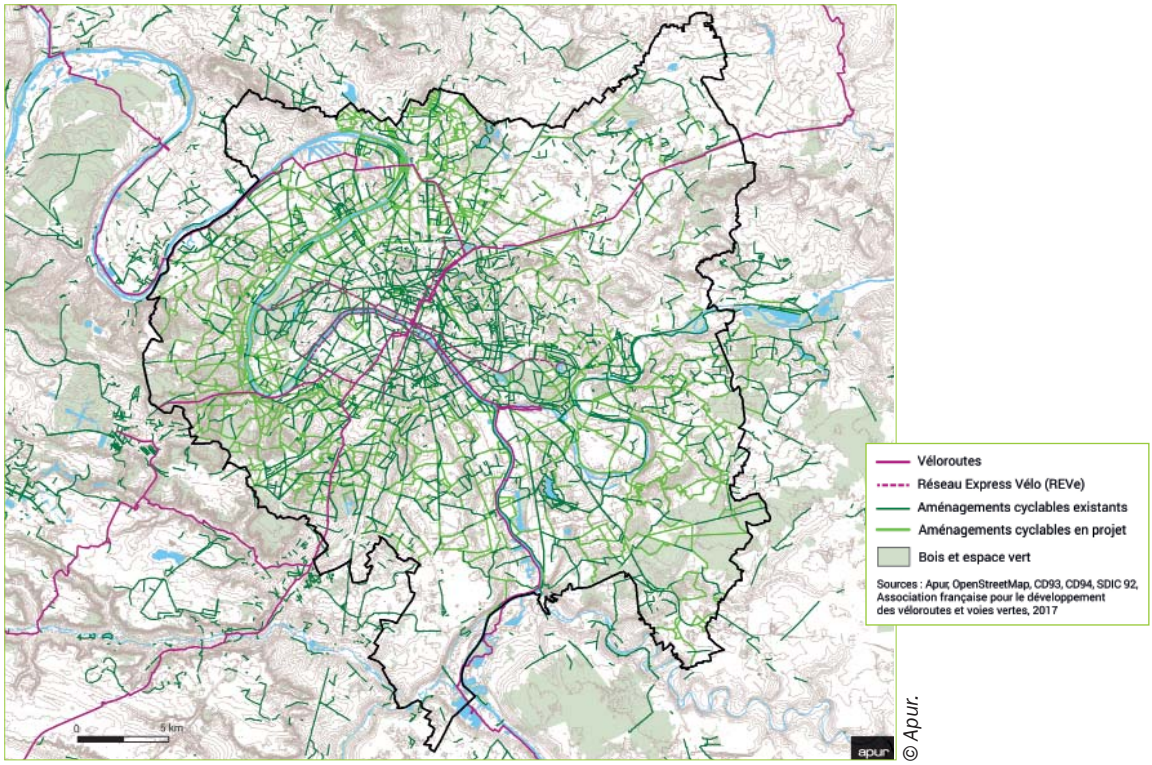


Évaluation en continu du PDUIF – Éléments à mi-parcours 2010-2015/Ile-de-France Mobilités à partir des éléments fournis par l’IAU Ile-de-France 2016, enquêtes par questionnaire papier ou par échanges de SIG avec les conseils départementaux, intercommunalités, communes et ONF.

170 new stations are expected to serve around 35 new towns in 2018, increasing the appeal of these bicycles, of which almost a third are electrically-assisted.

At the same time, the cycling network in the Ile-de-France region remains under-developed and discontinuous, and is more adapted to recreational needs. The 2,400 kilometres of cycle path developments carried out since 2010 remain below the targets set by the PDUIF. **The design and construction of a continuous network of cycling routes are important issues, as is the need for a structuring network**. The prioritisation of projects requires good communication between the different road management systems and must integrate existing stations as well as future ones.

Existing and planned cycle path network in the Métropole du Grand Paris



© Apur.

Pending completion of the Greater Paris network, the mass development of cycling, to truly change daily mobility behaviours, (local travel, transfer to rail, and commuting) is a genuine challenge.
Local authorities have a key role to play in cycling policy, through the installation of bicycle parking facilities (including secured bike parks), the roll-out of services and, above all, the development of a continuous, user-friendly bicycle network with special focus on the crossing of urban discontinuities and in line with the controlled development of self-service bicycles and user applications.

Cycling facilities alongside T3 tramlines in Paris

© Apur – David Boureau.

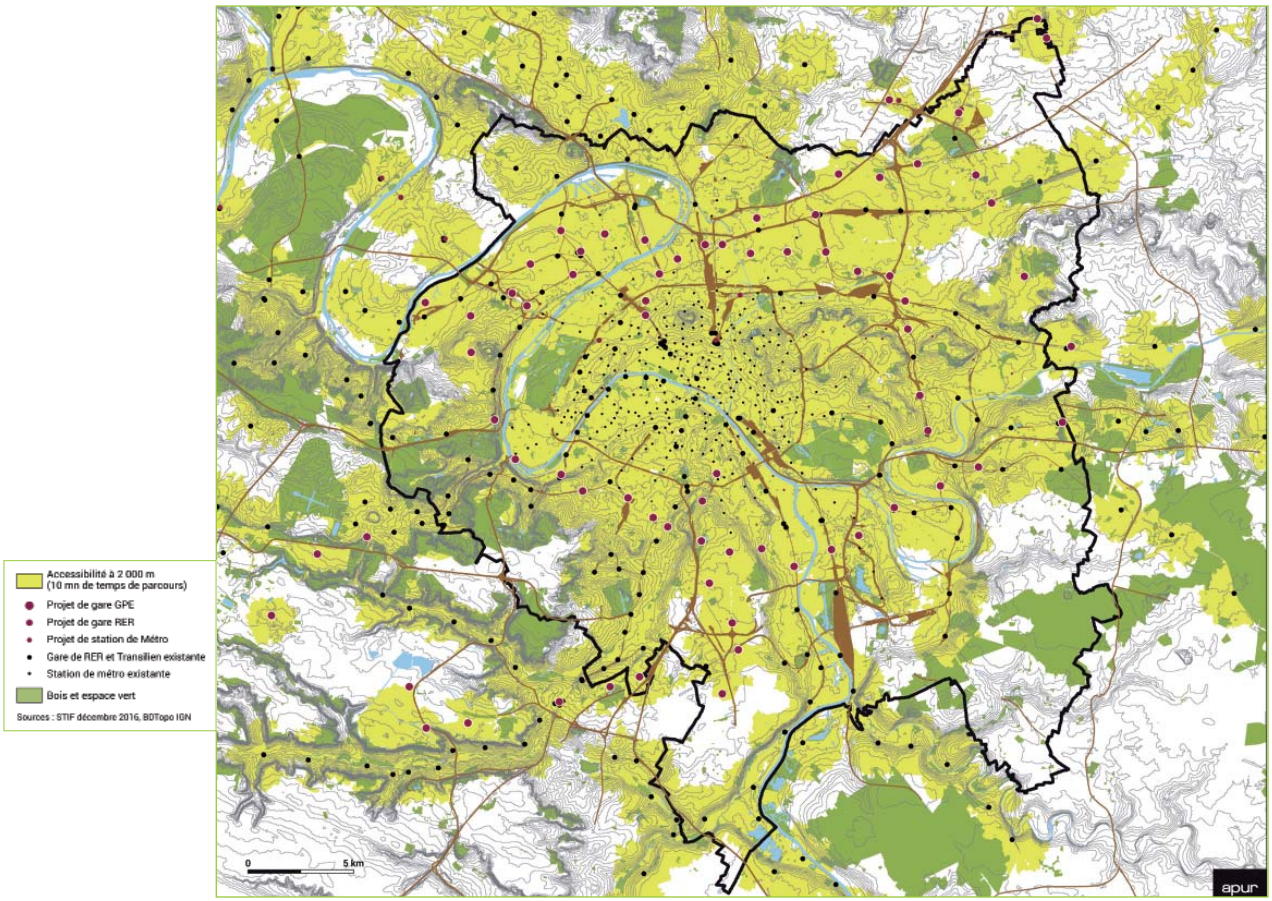
Mobipôle station in Rueil-Malmaison: 450 bicycle parking spaces under subscription and a mobile bicycle repair service

© Apur – David Boureau.

Organising the service offer and the transfer to rail

By 2030, more than 95% of inhabitants and jobs in the Métropole du Grand Paris will be within two kilometres, or a 10-minute bike ride, of an RER-TER or GPE station.
More than 85% will be located within a distance of 1 km from a railway or metro station. Thanks to the organised transfer to these transport hubs, a significant proportion of service hubs and university campuses of the outer suburbs will become accessible through a combination of active modes and the rail network.

More than 95% of the population will live less than 2 km away from a railway station in the Métropole du Grand Paris of 2030

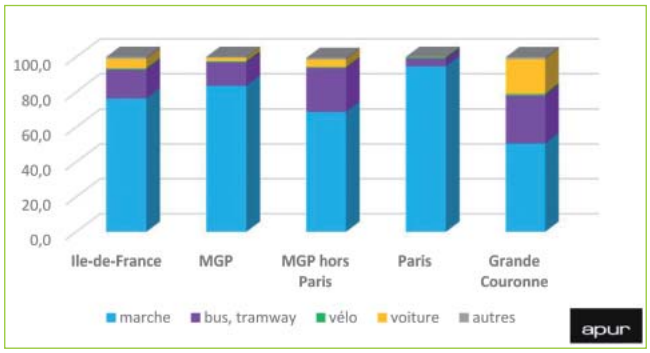


© Apur.

In terms of transfer to the rail network, walking is already the most popular means of reaching the heavy transport network, followed by buses and trams. 76.5% of Ile-de-France residents also go to their metro or railway station on foot, and the figure reaches 83.5% in the Métropole du Grand Paris, weighted by the inner Paris figures relating to walking and metro travel.

Buses and trams also play an essential role in the transfer to rail, representing 25% of all modes used in the Métropole other than Paris itself, and 28% in the outer suburbs. The car is also an important mode of transfer in the outer ring (20% of users).

Modes of transfer to railway and metro stations



Sources : EGT 2010 Ile-de-France Mobilités – Omnil – DRIEA , exploitation Apur.

Intermodality at stations, an essential and imminent issue

The modal choice for transfer to a station, as well as the diversity of smartphone applications and mobility services enabling users to adapt their journey in real time, clearly highlight **the importance and urgency of considering travel as a continuous intermodal sequence that is chosen in a flexible manner by the user** depending on the day of the week, the weather, time available, traffic conditions and services offered at the station...

Intermodality and transfer facilities are key issues in travel chain optimisation and reduced dependency on individual car travel, even in the outer ring.
Already today, Ile-de-France Mobilités, SNCF and local stakeholders are turning stations into true mobility centres, with bus hubs (which are to become "eco-bus stations"), bicycle parking facilities and services (Véligo programme), electric vehicle and bicycle rentals, shared taxi services, park and ride facilities, and carpool parks, especially in the outer ring...

Tomorrow, **the diversity of services available at stations could result in the necessity to anticipate and organise a highly abundant offer, in order to propose intermodal sequences that are continuous and comprehensible to users**.

Following the example of hub committees, Société du Grand Paris, with Ile-de-France Mobilités, local authorities and developers, are already working on bus services, pedestrian accessibility of the public space, and the installation of bike shelters at stations (Véligo) with a target of 20,000 spaces by 2020. For Société du Grand Paris, through its ongoing spatial workshop approach, the space around stations must have the capacity to evolve over time in order to adapt to future transport whose impacts on the public space remain uncertain.
The success of these actions relies on a shared vision of mobility transformations to come and of responses to them, as well as full involvement of the local authorities concerned by the future stations.

Intermodal hub at Villejuif Louis Aragon

© Apur – David Boureau.

Coexistence of trams and pedestrians on the Ile-Saint Denis Bridge near Saint-Denis RER station.

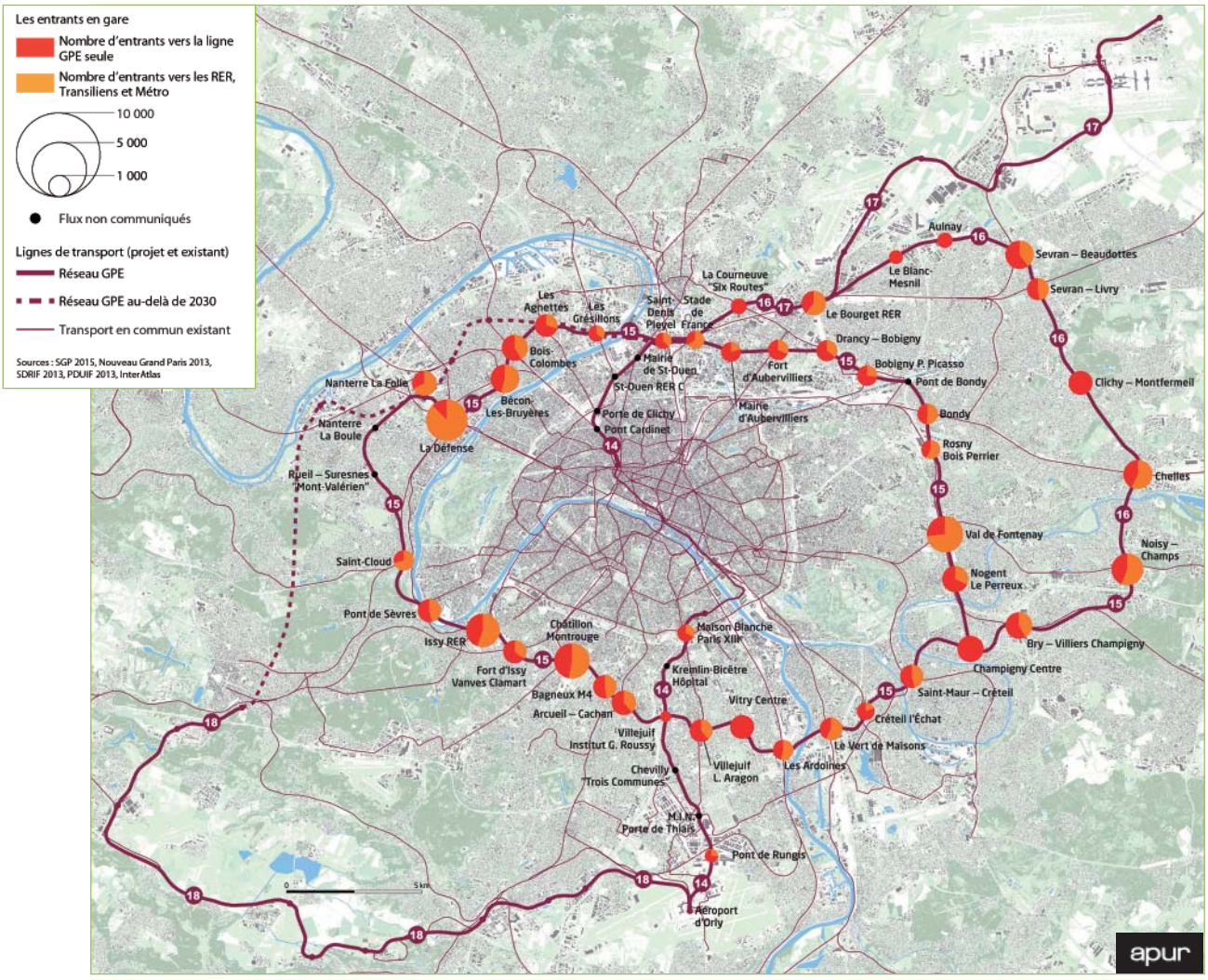
© Apur – David Boureau.

A rise in active modes and innovative transport with the arrival of the Greater Paris metro

The Grand Paris Express will bring in its wake a considerable increase in pedestrian activity in the vicinity of stations. According to Société du Grand Paris and Ile-de-France Mobilités, during peak hours, **more than 75 pedestrians per minute will converge towards the station of Bry-Villiers-Champigny and 128 pedestrians per minute towards Val de Fontenay station**.

In the framework of its "Grand Paris de la mobilité" trials programme, Société du Grand Paris launches each year a call for projects to test innovative solutions both in the field of new mobility and the design of new public spaces. These calls for projects are an opportunity to reorganise active mobility, as well as electric and digital solutions, to accommodate the future metro and "be prepared" to create future exchange hubs that can cater for the needs of tomorrow.

Transfer of space to GPE stations



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Innovation at the core of the new mobility ecosystem

The recent rise of innovative mobility services - shared vehicles, demand-responsive travel (DRT), carpooling, autonomous shuttles - will optimise future mobilities by providing more flexible solutions that adapt more readily to the diversity of Ile-de-France territories. Such radical changes in solutions and services will lead to major evolutions in the mobility ecosystem, with a multitude of stakeholders extending to the private sector and to users. The role of public authorities is set to evolve; as managers of the public network, they must also organise and regulate a transport system that is increasingly diverse and complex.

Collaboration and innovation through data access

Technologies offer numerous possibilities in terms of services. **To support the innovation economy, an *open data* policy must be implemented, and joint efforts and partnerships with private actors, starts-up and user communities** (incubators, partnerships, research programmes...) must be launched.

The development of *open data* platforms, at the initiative of the different département councils, Ile-de-France Mobilités, RATP or Apur (Paris Urbanism Agency)... also responds to a significant demand from private actors for access to dynamic data of the public sphere. Efforts are still needed to enrich open data and accelerate this process.

In parallel, access to the data of private operators, although only partial and still emerging, opens up new partnership and experimentation prospects. The increasing use of smartphones and connected vehicles by commuters needs to be exploited. Public actors also need to obtain more refined travel data for their area in order to adapt mobility policies.

Public stakeholders are to maintain control over the provision of public mobility services and at the same time be capable of adjusting quickly to market developments, as well as regulating private services and the occupation of the public domain, and playing a key role in terms of access to mobility data. Another challenge lies in the development of new services accessible to the disabled.

The increased importance of the traveller-oriented approach and new mobility solutions makes it necessary to forge new relationships between public and private services (public transport as well as shared transport, smartphone apps, etc.).

Toward integrated mobility services and a comprehensive offer for users

The development of new demand-responsive services and vehicle-sharing solutions such as carpooling, carsharing, DRT or vehicle rentals demonstrates the expectations of Ile-de-France inhabitants for services allowing a flexible transport sequence as an alternative to the individual car. **Tomorrow, new smartphone applications, user networking solutions and alternative mobilities will drastically change services both in dense areas and more sparse ones, as current trials are revealing**.

The multiplication of alternatives to the individual car in the dense area (vehicle-sharing circuits, one-way solutions, rentals between individuals, free-floating bicycles and scooters) as well as the consolidation of information on existing services (journey-comparing apps using different criteria, parking space finders...) induce changes in behaviour.

Electrically-assisted pedal cycles (EAPC), 30% of the new Vélib' fleet, 50 km autonomy and a speed of 25 km/h

© Vélib' Métropole.

The rise in vehicle-sharing services: free-floating bicycles and Autolib' cars

© Apur.

© Apur – David Boureau.

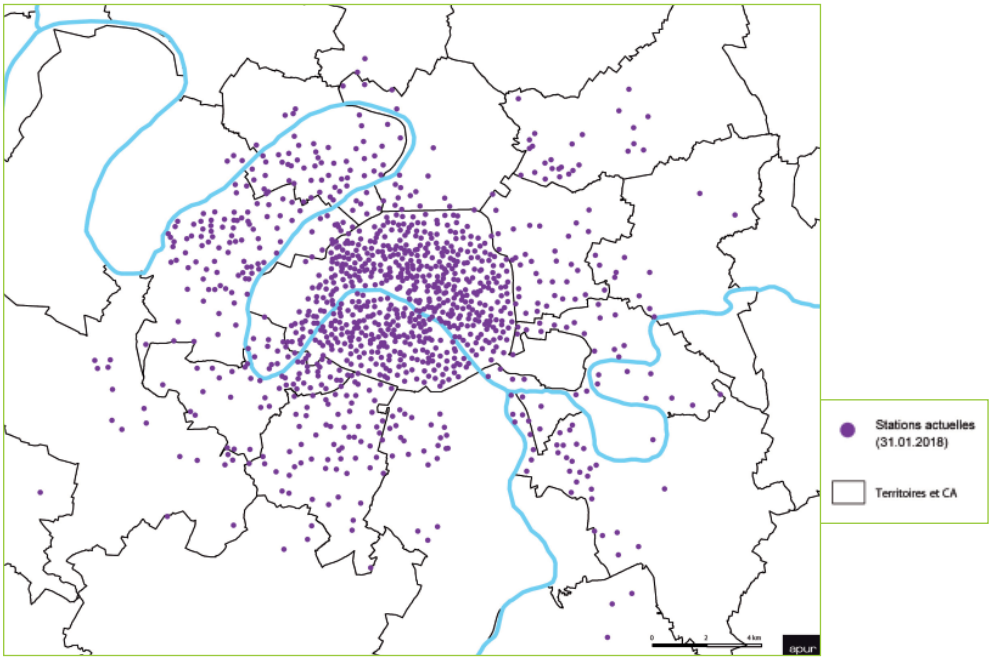
Concerning the fight against air pollution and greenhouse gas emissions, new mobilities offer genuine door-to-door alternatives, which complement public transport.

These are accompanied by a reduction in the number and use of cars, since a carshare vehicle substitutes for the individual use of 3 to 13 cars and makes available 2 to 6 extra parking spaces (source ADEME).

This offer remains to be improved in terms of cover and structure, at both metropolitan and regional levels, either through metropolitan services, or by making organised carsharing and carpooling systems more widely available. Such services are to be incorporated in a single, multimodal traveller portal providing access to onboard ticketing systems. Ile-de-France Mobilité has already added carpooling to the ViaNavigo portal.

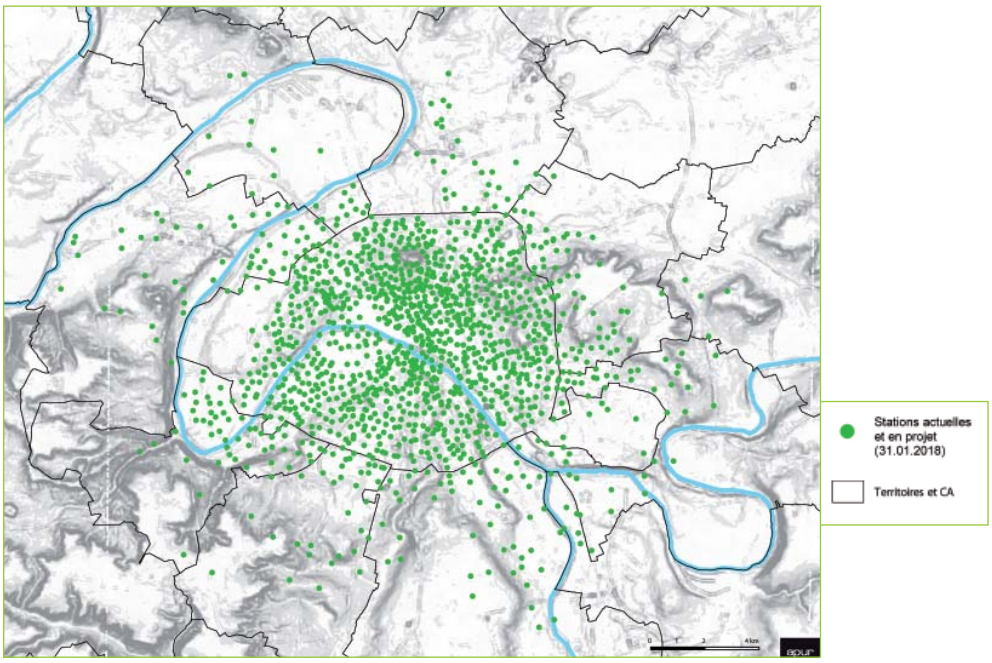
Other services need to be boosted, like the autonomous shuttles tested on the esplanade of La Défense and between Lyon and Austerlitz stations, and between Château de Vincennes metro station and the Parc Floral, in order to propose public demand-responsive transport and platooning* services. Autonomous vehicles and suitable stopping facilities, in urban areas and on motorways, await general roll-out, after trials in cooperation with private actors.

Location of Autolib' stations



© Apur - Source : Autolib' Vélib' Métropole.

Location of Vélib' stations



© Apur - Source : Autolib' Vélib' Métropole.

** A technique allowing vehicles to safely travel close behind one another, for lower fuel consumption (as air resistance increases consumption).*

Other levers for streamlined travel

Digital applications are omnipresent in our daily lives. **Innovative tools and practices are pushing out the boundaries, radically changing travel behaviour and even leading to "non-mobility" with increasing teleworking trends**.

Information and communication technologies (ICT) make it possible to work from home or to share or reduce commuting, especially for independent professionals and self-employed workers. The spread of teleworking and part-time solutions in companies and public institutions is already changing attitudes towards the workplace and the weekly routine, affecting commuter travel, with the spread of peak travel periods and the development of third places and coworking spaces.

Creation of coworking spaces, rebalancing of catchment areas, encouragement of third-place facilities... In 2016, 620 third places were identified in Ile-de-France, of which 80% were in the heart of the conurbation.
The Regional Council aims to help the creation of 1,000 third places by 2021, in particular in peri-urban and rural areas.

To achieve the "15-minute city" and "non-mobility" by 2030, means continuing to create third places close to population catchment areas, and to develop online training and services, as well as providing incentives to travel outside of peak hours.
It is also necessary to pursue the implementation of public town planning policies in favour of East/West employment and housing rebalancing, and of a multi-centre metropolis.
Parking regulation is another key lever to reducing the use of the car for commuting to work. The role and use of off-street parking facilities* and the regulation of on-street parking have been considered in the framework of a reform of paid parking systems allowing cities to adapt parking fees and sanctions to the neighbourhoods concerned.

A policy that is consistent with the ambitions of the Paris Agreement for the fight against climate change requires all of these solutions to be boosted and properly managed: regulation of individual car parking, adaptation of street parking to accommodate new mobility solutions, postponement of non-compulsory travel, organisation of e-commerce deliveries, encouragement of teleworking, development of coworking facilities and city networks..., all these factors can reduce pressure on future transport networks and improve the quality of life in the city of tomorrow.

Higher sustainability of roads and vehicles

By 2020, the Ile-de-France Urban Travel Plan (PDUIF) provides for a 20% reduction in greenhouse gas emissions. The Métropole du Grand Paris, the Regional Council and the City of Paris have committed to the Plan through measures to improve air quality, and the launch of preliminary studies for the establishment of a low-emissions zone in the Métropole. **The levels of air pollution generated by the transport sector demand the progressive abandoning of fossil energies in favour of energy sources generating less atmospheric pollutants and CO_2** (electric, hydrogen, natural gas for vehicles - NGV - BioNGV).

Changes in street-parking rules provide another lever to encourage cleaner engines: preferential pricing, electric recharging points and hydrogen/NGV refilling stations that comply with regulations.

Network of Belib' electric recharging stations

© Apur.

** Underground and multi-storey car parks.*

Autolib' and Cityscoot electric vehicle services

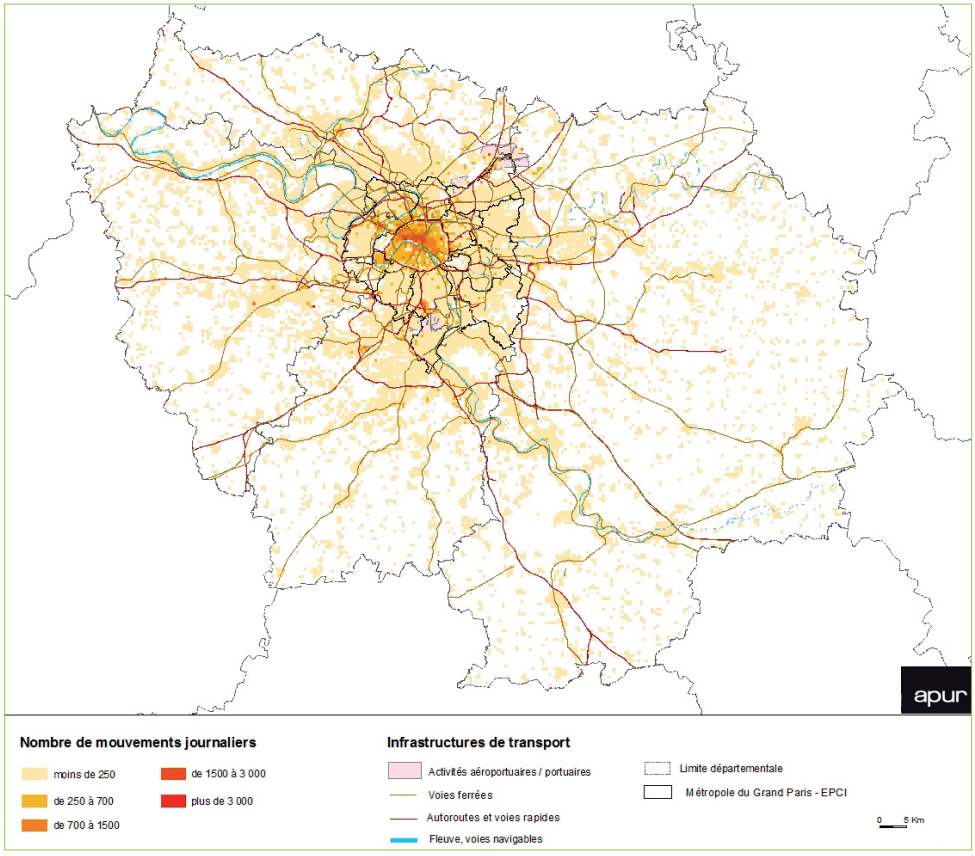
© Sophie Robinchon - Ville de Paris.

Finally, a more global consideration of sustainability issues is underway, since vehicle engines running on alternative fuel sources still have some environmental impact. Friction from brake pads and tyres produces fine particles. In addition, the ecological impact of energy production and the origin of vehicle components has to be taken into account, as well as the vehicle's life cycle. Then there is the issue of environmentally-friendly road infrastructure. Indeed, trials concerning road surfaces (phonic coatings, collection of rainwater, recycling of materials, embedded sensors, etc.), could, by 2030, be fully integrated into road construction techniques implemented in Ile-de-France. Issues relating to biodiversity and the resilience of such infrastructure to climatic risks will no doubt also be taken into account.

Encouraging logistical innovations

The conurbation's supply needs are increasing and specific requirements in terms of delivery times and places, especially with the impact of e-commerce, must be considered. At the same time, the rising number of warehouses concerns mainly the major roads of the outer ring, particularly the region's eastern crescent. Distances covered by commercial vehicles in particular, which represent 90% of the flow of goods, have tended to increase, resulting in lost time and a rise in congestion and atmospheric pollution.

Movement of goods in Ile-de-France
(number of daily journeys per 25 ha square)



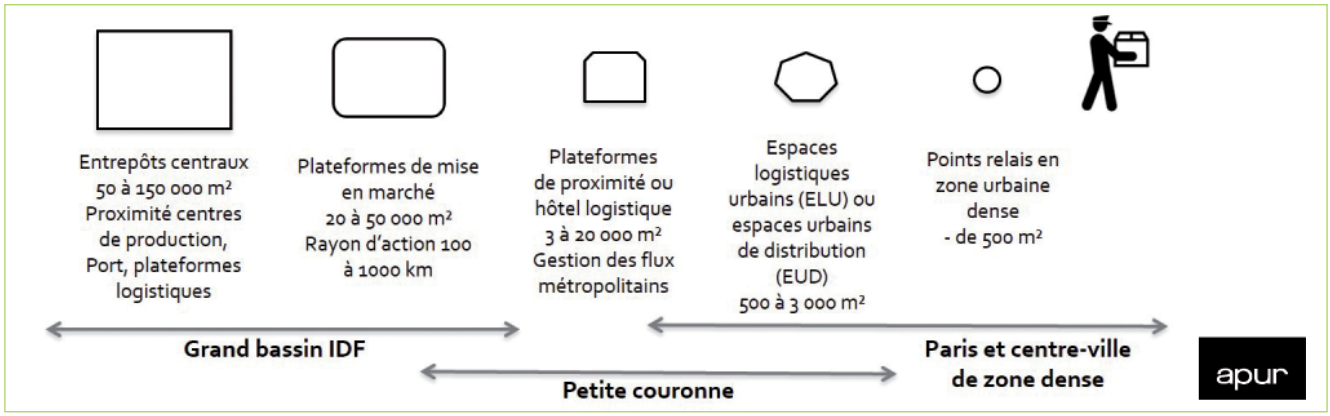
© Apur - Sources: Insee, Sirene, IGN.

Faced with the issues of air quality, the logistics industry must pursue its efforts to adapt and innovate. Thus, the development of a fleet of low-emission road vehicles (electric, NGV, hydrogen, etc.) and small delivery vehicles, more suitable for the last-mile dense area (bicycles, scooters...) meets an environmental challenge, together with local supply stations, recharging points and storage areas, whose deployment requires the support of public stakeholders.

The new technologies already used also offer great opportunities to fill vehicles and optimise each trip. New logistic structures are emerging as a result of the development of e-commerce and new marketing practices which demand more frequent deliveries and local storage facilities.

In the future, the regional logistics framework must be based on the notion of local-level networks with four types of facilities on different scales: warehouses on the outer limits of the conurbation; urban redistribution platforms (known as "logistical hotels"), urban distribution areas ("last mile") and finally, town-centre offices (parcel drop-off points) of a few tens of square meters maximum.

Diagram of the logistics chain



© *Apur.*

Every component of this logistical structure requires flexible facilities to be dedicated to multimodal logistics. In agreement with the SDRIF and the PDUIF which provide for the preservation of strategic multimodal platforms, the local authorities remain involved with these objectives through urban planning schemes (SCOT, PLUi) and by helping with the creation of logistical facilities. In practice, the establishment of logistics facilities, even of modest size, is faced with issues relating to land scarcity and high property costs in the conurbation. As a result, operators, in cooperation with local authorities, are developing a new logistical hotel concept, along the lines of Chapelle International or Les Ardoines, with a high diversity of approaches (offices, shops, crafts, education, sports facilities, etc.).

Chapelle International logistical hotel with links to rail services, the Boulevard Périphérique and the A1 motorway, a project by Sogaris in Paris

© *SAGL, architectes associés.*

Les Ardoines logistical hotel project with links to the River Seine and the A86 motorway

@ *Chartier Dalix Architectes – Sogaris.*

Multimodal solutions integrating rail and river transport are also sought, the issue being to retain the control of ports in order to sustain current and future activities relating to goods, but also to meet the requirements of major metropolitan projects (excavation and building materials...).
The example of the "En Seine!" project to "Réinventer Paris 2", thus combines a last-mile river platform with a multi-energy supply station, an educational hub and a business incubator. The pooling of car park spaces with differentiated day/night uses can further enhance these emerging concepts of more flexible and more adaptable urban spaces.

Use of waterways for urban logistics.

© Apur – David Boureau.

PART TWO

Proposals for smart, sustainable and optimised transport by 2030 in Ile-de-France

Proposals resulting from a citizen consultation

In the framework of the "Mobilities 2030" process led by the Forum métropolitain du Grand Paris (Grand Paris Metropolitan Forum) in cooperation with the Association des Maires d'Ile-de-France (Ile-de-France Mayors Association), the Métropole du Grand Paris (Grand Paris Metropolitan Authority) and the Ville de Paris (Paris City Council), elected officials decided to open up the debate by organizing a citizen consultation. The consultation was conducted between September and December 2017 by a specialised consultant and supervised by an independent committee in charge of moral code, in order to avoid any biases (in terms of expertise provided, institutional contributions, etc.). The committee included, among others, representatives of the National Public Debates Commission and Décider Ensemble.

The consultant proposed a choice of possible questions on current mobility issues, the idea being to work within a restricted thematic frame in order to ensure qualitative discussions, since not all subjects could be tackled head on. The "Mobilities 2030" leaders decided to ask citizens for their opinion on the issue presented hereafter.

The result was presented to elected members of the "Mobilities 2030" Steering Committee. It was then made public on the occasion of the Forum Le Grand Paris bouge-t-il? organized in partnership with the newspaper Libération on 6 February, 2018.

Citizen opinion formulated in November 2017: towards a reduction of individual car use in Ile-de-France

We are 20 citizens, 10 women and 10 men, all residents of Ile-de-France.

4 of us live in Paris itself, 10 in the inner suburbs, and 6 in the outer ring of Greater Paris.
10 of us work, the other 10 are retired or unemployed, or are students.
5 are between 18 and 30 years of age, 7 between 30 and 60, and 8 are over 60.

We hereby express our opinion as formulated after attending a training session and hearing experts at a meeting devoted to mobilities in Ile-de-France.

To answer this question, we first of all wanted to understand the context and issues surrounding it.

We have chosen to share our thoughts on this context before expressing our opinion.

In response to the question :

In your opinion, should we be aiming to drastically reduce individual car usage in Ile-de-France by 2024-30?

If so, what strategies should be developed: carpooling (long- and short-distance), intermodality with public transportation and active mobilities (walking, cycling, electric bikes, scooters, etc.), carsharing, car rentals between individuals, collective taxis, incentives and coercive measures...?

How can solutions which increase vehicle occupancy rates be made more appealing to all Ile-de-France residents?

1 - Our understanding of the context

The question that is asked of us is part of a complex situation raising issues related to land use planning and the environment, as well as technological, economic and financial resources, which all have a strong impact on the question of mobility and generate very different challenges between one area of Paris and another.

With regard to land use planning:
Ile-de-France (IdF) is a heterogeneous territory with significant differences not only in population density, between Paris and the inner and outer suburban areas, but also in the public transport infrastructure network, the heart of the agglomeration having a higher network density than the outskirts.

We understand that this situation arises from **territorial specialisations** (habitat, employment, other activities...) and **from the choices and limitations of all Ile-de-France residents households** often relating to differences in property prices which make some areas inaccessible to many inhabitants, but also from life choices (quality of life, proximity of services and commuting time for first jobs). Although developers have been trying for several years to attract more activity to the East of the metropolis, **we know that this rebalancing will be very slow**.

We are aware that public space has been designed and developed for motor vehicles and that these remain predominant in IdF, except in Paris and the inner ring where cars are giving way to alternative solutions and soft modes. We believe that, in the long term, this trend will extend outwards throughout Greater Paris..

We believe that **major events** to come can play a catalyst role in the move towards cleaner mobility: the Rugby World Cup in 2023, the Olympic Games in 2024, the Saclay Universal Exhibition candidature, or the Ryder Cup golfing event in 2018...
The environmental context is a matter of major concern to us, just as it is to the rest of the planet (COP21, the 15,000 scientists' warning...). Population increases, pollution, and the need to preserve natural resources force us to review our development model. While the car is not responsible for all pollution, it is a major source that we must reduce.

Technological developments can help us to reinvent mobilities: development of electric cars (which are still expensive and raise questions about how the energy they run on will be produced), autonomous vehicles, digital tools...
The individual use of the automobile will, however, continue to be questioned, despite the fact that the end of the combustion engine in cars has been announced for 2040, or perhaps 2050.

Mobility, whether for professional necessity, family needs or personal use, **is a societal issue**. Travel needs vary with people's age, the location of their home and their place of work. To a certain extent they have no choice, which explains why the road network is saturated at peak hours.
But **mobility is also a prerequisite for individual freedom**. Everything that the automobile has represented since the Glorious Thirties (freedom, social status, wealth, ownership and comfort) is now undergoing change. For the new generations, having the use of a car is becoming more important than owning one: carpooling, carsharing, etc. However, specific needs relating to the ageing population must also be taken into account. Today, the automobile accounts for 40% of journeys in IdF which is double the figure for public transport. It therefore remains the preferred means of travel.
We consider that professional usages (for trades and businesses) should also be taken into account, as well as transit traffic.

We have also considered the fact that the public transport system , which handles 20 per cent of Parisian travel, is now saturated at peak hours. While much-needed network extension projects have been planned, (GPE...), they will not completely solve all Ile-de-France residents' travel problems. Services do not reach all areas and intermodal solutions (PT, carpooling, soft modes...) are currently insufficient.

We understand also that the development of public transport is facing a significant lack of financial means. In this respect, we regret that investments have been postponed for so long and we feel it is absolutely necessary to continue to invest in this sector, especially in rail transport.

Finally, we understand that **legislation and regulations regarding travel and carbon emissions are evolving towards the restriction of car usage**: Paris Agreement (COP21), CritAir disk, increase in parking fees, announcement of the end of the diesel car in Paris by 2025...

2 - Our perception of the general interest in the field of mobility

According to us, designing future mobility requires consideration of several issues of general interest:

- The preservation or recovery of **public spaces**, which must be adapted to accommodate mobility means and, more importantly, must remain common assets, places where sociability and democracy have free rein;
- The preservation of the planet and its resources, the respect of living beings and the essential issue of **public health improvement** require the reduction of pollution (air quality and noise levels) to minimise public costs in both human and financial terms;
- Respect for **freedom of movement and freedom of choice among several modes of green mobility**.

In order to act in the general interest in IdF, we believe it is essential to design mobility at regional level, adjusting to the needs of each area, rather than reasoning in terms of administrative boundaries.

We are convinced that **the evolution of mentalities** is key to the issues mentioned. The Glorious Thirties urban development model in Ile de France (car-oriented, horizontal expansion, specialisation of spaces, etc.) is beginning to be challenged by new awareness of its limitations and the need for a sustainable approach to development. **But these changes need to be accentuated through a change in behaviours**.

To this end, we have identified various levers:

- Firstly, measures to communicate, raise awareness, and educate **the general public from a very early age**. These measures must aim at providing a long-term, forward-looking, global vision. They must promote alternative mobilities and future solutions to encourage their acceptance by all Ile-de-France residents. They must be repeated, via all communication channels, to ensure that good practices are adopted;
- **Different systems need to be designed to adapt to different audiences**. For example, schools can raise awareness about eco-friendly transport modes among children so that they grow up with good habits, and personalised guidance for senior citizens, trades people and small businesses can be organised around the specific needs of each category, etc.;
- In addition to online solutions offering various information and support services, we would like to see **mobility centres** become more widespread;

- Awareness must also be raised among **public authorities** to facilitate the development and implementation of alternative mobility solutions.

We discussed **costs relating to the automobile and the resources it generates**: infrastructure is financed by public funds and the car by individuals, while pollution-related impacts represent a collective cost, and the automotive industry is a source of private resources and profit, as well as public expenditure for specific incentives...

We would like the cost of the car to be considered in an overall manner and for charges related to its use (parking, fines, tax on fuel, etc.) to help fund the development of alternative travel modes and contribute to correcting the car's negative impacts in the public sphere.

Finally, it is essential for us that the opinion of inhabitants and users be systematically sought and taken into account in decisions concerning mobility; that all public actors share a coherent reasoning and, above all, that this reasoning be followed up by actions relating to travel facilities.

Our reply to the question

Because we are convinced that it is urgent and in the general interest to act against pollution caused by use of the car, we believe it is necessary to substantially reduce individual car usage in Ile-de-France by 2024-2030. We consider this to be a necessary step that must be taken in addition to ambitious development measures in favour of alternative modes of travel

To increase the occupancy rate of vehicles, we believe it is necessary **to develop a system that combines the different ways of avoiding empty car seats**: carpooling, collective taxis, carsharing, hitch-hiking, autonomous multi-passenger vehicles, optimisation of company fleets, etc. **rather than handling each of these concepts separately**.

Our aim is not necessarily to influence 100% of the population, nor is it to deal with individual cases, **but to impact the heaviest flows of travellers and those users who are most able to modify their behaviour**.

We do, however, consider it **necessary to take into account disabled travellers**, many of whom would benefit from adapted transport systems, especially in situations where it is not possible to implement public transport accessibility measures.

We are convinced that, to build such a system, **it is necessary to involve all mobility actors**: transport operators, car park companies, businesses, local authorities... and users.

We believe that the solutions must be adapted to the different areas of the metropolis. We can **be coercive in areas where the PT network is good (as in the dense heart) and use motivational measures in less dense areas.**

- In the dense heart of the metropolis, we think it is necessary, via proper dialogue with all interested parties, **to strongly discourage** the use of cars by a single occupant (unless the car has been shared for part of the journey), with measures such as tolls, taxes, increased parking costs, etc. and by adapting roads to limit the space devoted to cars, but without blocking traffic. This coercive approach should, however, be more flexible for people with reduced mobility.

- In less dense areas, we believe it is necessary to develop **carsharing incentives**, and to enhance intermodality solutions, while allowing individual use of the car.

To develop this vehicle "filling" system, we have identified the following solutions:

- Development of **digital tools** (apps...) bringing together all existing and future solutions, including mobility advice adapted to different audiences;
- Creation of a single, **moderately-priced pass** to be made available for single or repeated journeys on all modes of travel and throughout IdF;
- Development of **carsharing spaces** both in existing residences and new buildings, as well as residential P+R (park and ride) sites to discourage the use of the car for short distances;
- Development of car parks/meeting points. Rather than building immense new car parks on the edge of the metropolis, we believe it is preferable **to re-employ existing car parks (day only) and/or build new medium-sized ones in order to create a large number of meeting points offering all available shared-use solutions** (carpooling, carsharing, collective taxis, hitch-hiking, company fleets, etc.). It is essential that these meeting points be linked to the PT network and to all active modes...

Conclusion

We wish to conclude our statement by expressing our desire for participatory approaches of this nature to be developed. We found this approach interesting because it integrates us into the public debate from which we often feel excluded. .

The opinion that we have formulated is the product of collective intelligence. It is based on what we learned from the trainers and experts who helped us improve our knowledge. .

We have had a constructive debate, thanks to the indispensable guidance of consultation professionals, and ***we have succeeded, despite our diversity and our differences, in building a collective opinion which we strongly hope will contribute to the decisions of elected officials****.*

We recommend pursuing this type of participatory approach, both at local, regional and national levels, for all topics of general interest.

The participants :

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1
Promote the development of active modes of transport throughout the region

2
Promote intermodal passenger transport to ensure the implementation of efficient access to train stations

3
Optimise urban motorways in dense areas by promoting a better utilisation of these spaces and uses

4
Develop incentives to replace polluting motorised vehicles with new models and take measures to improve traffic flow

5
Encourage carpooling and carsharing

6
Promote consistency regarding parking policies

7
Anticipate the arrival of autonomous vehicle

8
Support the digital innovation and the Ile-de-France innovation ecosystem through the question of open data

9
Implement service-based mobility in Ile-de-France

10
Mobilise all stakeholders to reduce commuting

The elected representatives' proposals of the Forum Métropolitain du Grand Paris for sustainable, intelligent and optimised mobilities by 2030 in Ile-de-France

We, the local elected representatives of Greater Paris, with all political affiliations and all regional levels combined, are convinced that we must now strengthen the role of public stakeholders in terms of mobility policies, because they are the only guarantor of public interest in this domain. We must go through renewed links between the State and local authorities, as they can define more closely the areas with mobility policies enabling all inhabitants' needs to be met, in a logical course of subsidiarity. This mission must also involve a coherence and harmonisation of the major objectives of public policies between local stakeholders, in order to be heard by new private stakeholders regarding mobilities and to strengthen our position in an ecosystem of changing mobilities. Innovations open up new solutions to diversify and improve transport services; but the local public stakeholder must continue to play the role of conductor, so that the offer is effective (need for coordination), so that it involves all areas (by thinking of mobility as a service, on the basis of the passenger's constraints), and so that it does not generate new negative externalities (need for regulation upstream and downstream of innovation). At the same time, public stakeholders must also know how to adapt and transform their practices by opening up to innovation and by supporting it, in the aim of providing the best possible service to the user and by acclimatising to a world shaken by the arrival of digital technology.

We share the need for a renewed approach regarding public mobility policies - which many stakeholders have already implemented - based on three principles:

- *place the citizen at the heart of mobility policies: by better identifying the needs but also by involving citizens in public decisions to co-build public policies and thus act effectively on people's behaviours, by creating more transparency in the evaluation of mobility policies. As we have been able to observe in our consultative citizen approach (see above), soliciting the opinion of citizens by informing them beforehand about the issues enables us to assess that they can advocate solutions aiming for effectiveness in the public interest, in excess of specific interests;*
- *include all areas in the reflection in order to start with local specificities to act more effectively and to fight against the enclosing of certain spaces on the one hand, and populations who do not have access to mobility on the other hand, through a new approach of local public policies, that of mobility as a service, and via an objective for a mobility system with disabled access;*
- *dare to work on a renewed governance, based on economic models that give real action levers to public stakeholders.*

Our capital conurbation has considerable strengths: a powerful public transport system, soon to be reinforced by a new service via the bypass thanks to the Grand Paris Express. But at the time of a growing saturation of these networks - roads and railways - at rush hour, and while demographic assumptions predict with some certainty an increase in the number of inhabitants, the question of these transport systems' resilience is raised today with acuity..

As the networks will not be able to face any more saturation by 2030... We are at the risk of going from being an attractive metropolis to a malfunctioning metropolis because it has not been able to cope with its growth. The renewal of rolling stock, initiated by the Ile-de-France region and implemented by Ile-de-France Mobilités, and the construction of the Grand Paris Express, managed by the Société du Grand Paris (SGP), will respond in part to this challenge. We recall that it is essential that the Grand Paris Express is carried out in full, and in the shortest possible time frame. This project is all the more important given that France has been cautioned by Brussels for

non-compliance of its objectives regarding the reduction of air pollution. The Grand Paris Express will not only reduce congestion, but also improve the quality of the air.

But it will be necessary to implement additional solutions to meet the growing needs of mobility, by fighting in order to massively reduce the pollution generated by the transport of people and goods, from now onwards. For example, river transport could become a better exploited method of transport in the future. Urban cable cars are also an example of a solution to overcome disruption to urban ecology in the metropolitan region, which would be relevant to develop by 2030. In our work, we have made the choice to firstly focus on the transport of people, in order to limit our object of study, and because a freight transport plan is already under development within the Ile-de-France region.

The conclusions of the citizens' opinions about the future of the individual use of cars in the Ile-de-France region (see above) are in this way enlightening: citizens claim that the latter should decrease, while proposing strategies to act according to the specific characteristics of the areas. We have worked for more than a year, at the Forum Métropolitain du Grand Paris, on a number of priority topics which relate to these major issues, in order to achieve concrete proposals for the mobilities of the future.

Here are the major items.

RER station of Nanterre, 2017

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These proposals were developed in many meetings with elected representatives at the Forum Métropolitain du Grand Paris, relying on the technical work bringing together more than a hundred mobility stakeholders in the Ile-de-France region (see acknowledgements).

They resume, for each item, the major issues shared by the elected representatives as well as their proposals for concrete actions.

The primary stakeholders concerned are listed below each of the proposals.

1 Promote the development of active modes of transport throughout the region

We agree on the following issues:

The development of active modes of transport (walking, cycling) is one of the main objectives of the mobility policies in the Ile-de-France region, on all levels, and is integrated in a regulatory context (Urban Travel Plan of Ile-de-France, plan for the protection of the atmosphere in Ile-de-France...) and in a context of strong initiatives (the region's cycling plan, Vélib' Métropole, etc.).

Indeed, the practice of walking, cycling, and cycling with electric assistance is one of the main levers to decrease pollution caused by other means of transport. Encouraging people to walk and cycle helps establish a sustainable mobility but also meets the objectives of public health: we need to act against the decline in physical activity linked to the evolution of our lifestyles and its consequences on certain pathologies such as obesity.

Finally, it is also a major lever in the face of road congestion growth in the Ile-de-France region, as road space can hardly be enlarged in the dense zones, and demographic assumptions tend to predict an increase in the Ile-de-France population: the space occupied by a pedestrian or a cyclist is much less than that occupied by a motorist.

Also, we suggest that the following actions are undertaken:

Relaunch a national plan of action in favour of the development of cycling and walking

The implementation of the national plan of action for active mobilities could be strengthened. The latter could be developed to include ambitious goals for France, with the Olympic and Paralympic Games in 2024 in mind. This national event is an opportunity to acknowledge a transformation of our everyday practices by placing physical activity at the core of all our journeys. This national plan could suggest medium and short-term actions, such as the renewal of financial assistance from the State for the purchase of an electric bike after 31st January 2018..

→ ***State, citizens, local authorities hosting the Olympic Games***

Towards a cycle path network in the Ile-de-France

As regards to cycling, in agreement with the cycling plan recently adopted by the Ile-de-France region, we wish to encourage and contribute to the development of a cycle path network which is continuous, safe and understandable, for daily mobilities.
Indeed, the development potential of cycling and the cycling with electric assistance is major, since the residents of Ile-de-France travel an average of 10.5 km going from home-work. Yet, Ile-de-France Mobilités is going to develop, on a regional level, an electric bike service for long term rentals, which will be gradually implemented from September 2019, for an implementation over time of 20,000 electric bikes. The role of the territories is also crucial in order to aim for a true "bike system" adapted to local specificities, and which is coherent on a regional level (adapted infrastructures, but also strengthening in terms of secure parking and development of maintenance and repair services). It is a question of implementing an idea that is just as structured as that which exists for public transport, on different scales.

→ ***Interconnected authorities (linked to the Ile-de-France region and Ile-de-France Mobilités), communes, departments***

Active modes of transport, a priority for access routes around the train stations

The development of active modes of transport can only be done in connection with the structured public transport system, given the average distance of Ile-de-France residents' daily movements. Also, the development of the Grand Paris Express is a necessary prerequisite so that each inhabitant in the dense zones can live less than 10 minutes by bike from a train station. Access for bikes and the "walkability" (namely, environmental conditions that make walking pleasant in a given area) in the vicinity of train stations and the creation of disabled access must be priorities in the implementation of a strong intermodal passenger transport. In the framework of the future stations of the Grand Paris Express, where new infrastructures will be created and may generate disruptions to urban ecology, we must anticipate pedestrian and cyclist access and guarantee adapted disabled access. We must also create a large parking area specifically for bicycles, in a secure area and in close proximity to the train station. An important effort must be carried out by local authorities regarding these issues (bike parking, markings and disabled access guidance which shall be the subject of a comprehensive reflection on a city level), in connection with the actions undertaken by Ile-de-France Mobilités and other stakeholders such as the SNCF.

→ ***State, Société du Grand Paris, authorities welcoming the future stations of the Grand Paris Express***

Place de la République in Paris

© Pierre-Yves Brunaud.

Vélib' Métropole

© Alain Longeaud - Mieux.

Innovation for the development of active modes of transport

Innovation for the development of active modes of transport must be supported. As an example, there are initiatives such as applications supporting "cowalking", disabled guidance or shared bicycle services. Innovation can also lead to the creation of more efficient services for the maintenance of bicycles, or new possibilities for strategies against theft and damage.

→ ***Ile-de-France Mobilités, local authorities, private stakeholders of mobility services***

Towards a mobilisation of all Ile-de-France areas in favour of the development of active modes of transport

To mobilise all areas and stakeholders concerned, it seems necessary to spread existing good practices amongst Ile-de-France authorities more broadly, such as, for example, the levers that have allowed the population to accept transformations in favour of active modes of transport and in particular, cycling.
An educational and communicative effort is also required for the general public, on the possibilities of electric-assistance bikes, for medium-distance journeys (around 10 km per day).

→ ***Local authorities, exchange networks of good practices (associations of elected representatives, regional cooperation structures), citizens***

Adapt the regulations to strengthen controls in favour of active modes of transport

Regulations could be adapted to enable the use of video-surveillance in order to give fines for offences in pedestrian areas (camera checks, payment of fines by SMS, etc.). In order to facilitate automatic checks, it would involve creating a global file using registration documents to record exemptions (such as cards for disabled people). These devices could eventually facilitate the checking of vehicles allowed to circulate in low-emission areas or to use dedicated infrastructures, and allow systems to restrict access for certain vehicles to be established.

→ ***Legislator, local towns and villages***

Implement a specific support system for professionals and artisans

In order to encourage the use of efficient alternatives in certain cases (electric tricycles, bikes with carts), and low-emission utility vehicles, a financial support device could be set up for professionals (artisans, retail traders, independent professionals, delivery drivers).

→ ***Ile-de-France region, Métropole du Grand Paris, local towns and villages***

K-Ryole, a new solution for transporting mail

© *La Poste*

Develop shared indicators of "walkability"

A job could be carried out on a metropolitan or regional level in order to define shared indicators of "walkability", i.e. to measure the comfort and ease of walking in different areas (no disruption to urban ecology, welcoming urban environment, etc.). This diagnostic work must be aimed at facilities promoting mobility for everyone (disabled people, the blind, pushchairs, etc.) and reinforce the feeling of safety in public areas.

→ ***Métropole du Grand Paris, Departments, Ile-de-France Mobilités, urban planning agencies***

Support the development of micro-mobilities

The strong growth of micro-mobilities related to the practice of various forms of "urban board sports" (scooters, segways, skateboarding) and new solutions for disabled people (electric wheelchairs, electric mobility scooters) has led us to consider their place in public areas and dedicated policies. It is important to limit the risk of accidents for different road users, as well as to implement a shared use of the streets that does not harm pedestrians.

→ ***Local authorities, users, State***

2 Promote intermodal passenger transport to ensure the implementation of efficient access to train stations

We agree on the following issues:

Rail transport must supply the region in full, thanks to efficient links, by relying on multimodal exchange centres. It involves thinking about the access to centres, as well as connections within them. It is also about developing possibilities for efficient access to train stations for heavy goods transport networks: on the one hand, by promoting buses firstly, and active modes of transport in denser sectors; on the other hand, by creating effective links, for all modes of transport and services combined, connecting the areas of Greater Paris to the train stations. It is as much a matter of regional equity in terms of transport services, as a matter of overall efficiency of the system.

This principle is fundamental and must be at the heart of the projects to develop effective intermodal passenger transport facilities accessible to all (disabled people, the elderly, pushchairs) adhering to spaces of quality enabling traffic flows, and generating new parts of the city, in a context of changing mobilities.

The development of a structured offer in terms of public road and intercity transport (buses and coaches) must be taken into consideration concerning the subject of access routes, in two different ways: for a good coordination of road and rail services for users and for the emergence of new multimodal interchange stations around bus stations

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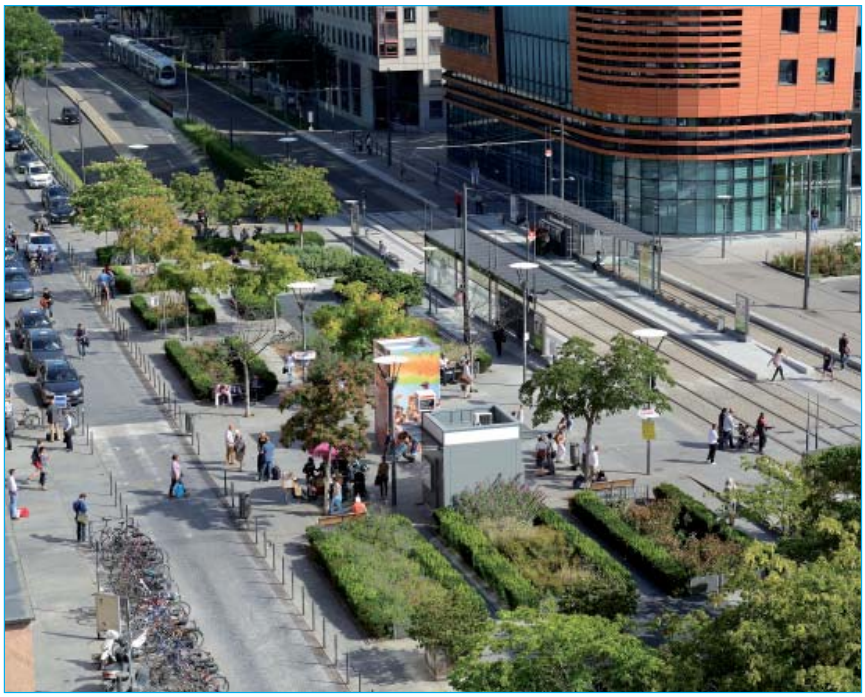
Part Dieu Station (Lyon)



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Also, we suggest that the following actions are undertaken:

We consider that the planning for areas around the stations, and in particular for the future stations of the Grand Paris Express, must allow for efficient access in order to maximize access to the network and to guarantee its performance. That is why we support the actions undertaken by Ile-de-France Mobilités and the Société du Grand Paris, which aim to respond to these issues

Develop intermodal passenger transport around the stations for efficient access

It seems necessary to us that the development of these interchange stations allow for the implementation of a real intermodal passenger transport, in coherence with Ile-de-France Mobilités' objectives and actions. Active modes of transport (cycling, walking) must be the priority: their use must be developed through urban road planning and by multiplying bike parking areas by train stations (see proposals on the development of active modes of transport). Accessibility for all must be guaranteed by means of access routes to new train stations: mobility services with disabled access, adapted public areas, accompanying services in train stations and physical or abstract guidance systems (mobile application, safety lines). Accessibility needs to be reflected upon in order to ensure better links between accessible stations within the metropolis.

As regards to walking, all areas could develop plans for "walkability" to make walking more pleasant and easier with substantial planning developments such as the resorption of disruptions to urban ecology, or through smaller-scale developments, such improved road lights for the comfort of pedestrians.

In the continuity of orientations decided upon by Ile-de-France Mobilités on the new eco-bus stations, we believe that the adjustments in favour of buses are essential for the functioning of the Grand Paris Express' future stations, in particular to enable access for residents of Greater Paris to these stations.
This question could be studied regarding the future works on motorway developments in Greater Paris. In low density areas, an adapted offer for access by private or shared car (or even autonomous cars, in the future) must be developed. The availability of park-and-rides near train stations must be considered, in consistency with the street parking policy on a larger scale, in order to avoid significant numbers of parked cars on the street. Solutions to encourage users to go to the train station via carpooling would also reduce the number of vehicles in car parks.

→ ***Ile-de-France Mobilités, Société du Grand Paris, local authorities, RATP, SNCF***

Create changeable spaces to allow for future mobilitie

We do not know what the future mobility services will be, nor the importance that this mode of transport may have in relation to another, or even at what pace the changes will occur. Also, in agreement with what the SGP has started to develop in the framework of "Atelier des places du Grand Paris", we believe that the design of public areas surrounding train stations must be flexible and upgradeable. And this will occur, in order to follow urban transformations as new uses develop, while responding to current issues: charging stations for more environmentally-friendly types of engines near the train station, organisation of multimodal transport to ensure everyone's safety, taking into account, as necessary, emerging practices related to new vehicles and new urban mobilities. Thus, the arrival of autonomous vehicles must be anticipated through adapted spaces (stations and drop-off zones, near the stations).

NorreportStation in Copenhagen

© Gottlieb Paludan.

To that end, the question of financial balance regarding urban development zone projects in areas surrounding train stations is crucial: we believe that this necessary adaptability of space must not be compromised by the financial profitability of projects.
Finally, it is necessary to take into account the question of logistics in the development of future stations, in order to have a comprehensive approach of flows regarding the transport system in the Ile-de-France region; also, experiments are currently being carried out for

the delivery of small parcels in left-luggage lockers in train stations. Delivery areas for shop supplies, for shops based in the train station, must be included in the amenities surrounding the stations

→ ***Ile-de-France Mobilités, Société du Grand Paris, local authorities welcoming future stations***

Towards a supra-communal and more coherent governance regarding the areas surrounding the stations

Due to the dividing up of managerial competencies regarding roads, the development of future train stations generates, in the current institutional state, complex operational layouts with multiple contracting authorities with sometimes contradictory objectives but who must nevertheless work together.
We believe that the municipal level cannot take precedence over the intercommunal level in terms of reflection, while the network of the Grand Paris Express has been designed to widely serve the Ile-de-France conurbation.

We also ask that the governance of station development be simplified and more coherent, and we would like the contracting authorities to work on a supra-communal level rather than a communal level, in order to encourage the consideration of feeder traffic at least on this level (for example, with regard to the bus service).

In this perspective, we also believe that the harmonisation of parking policies on an intercommunal level would avoid the impact of delays causing congestion and additional traffic at rush hour around the stations.

→ ***Société du Grand Paris, Ile-de-France Mobilités, local authorities***

TVK - Place de la République in Paris

© Clément Guillaume.

3 Optimise urban motorways in dense areas by promoting a better utilisation of these spaces and uses

We agree on the following issues:

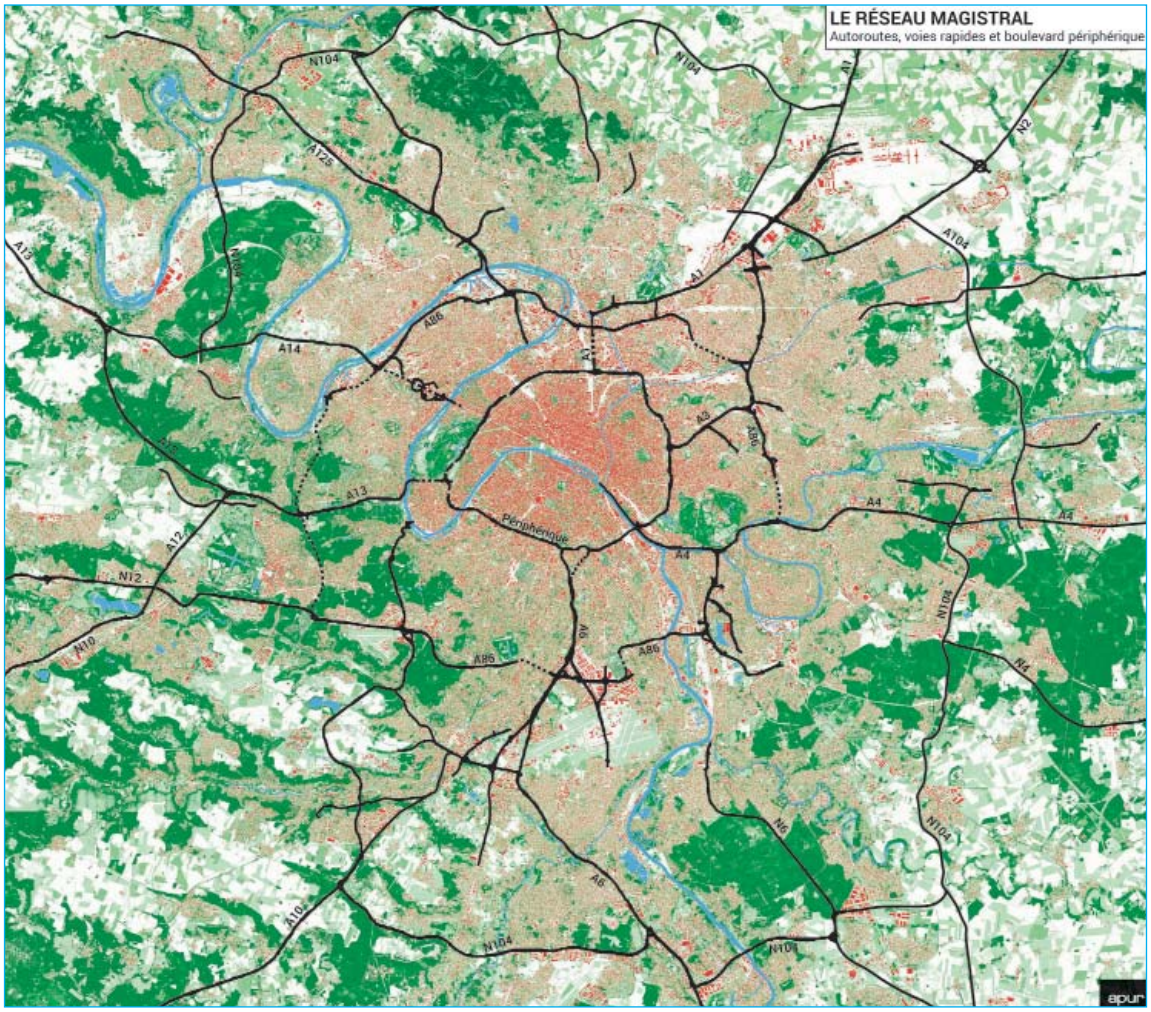
The major road network, consisting of motorways and dual-carriageways, ensures an essential role in the mobility of Ile-de-France residents. Fifty years after its creation, the network hasn't changed much, and a paradigm shift has become necessary to adapt to technical and societal developments, as well as the increasing saturation of this network.

Today, road infrastructures and what they are being used for generate intense negative externalities: adverse health effects for Ile-de-France residents (air pollution, noise pollution); road congestion at rush hour harmful for the economic operation of the French capital and for regional attractiveness, but also significant disruptions to the urban ecology in the areas.

Despite chronic saturation, it appears that the major network is under-used if you consider the average occupancy rate of 1.06 people per car, at rush hour. It is therefore necessary to enable an optimisation of use of these infrastructures, while working to reabsorb the negative externalities caused by road traffic.
The experiment of our approach among citizens confirms that these citizens encourage effective solutions to make behaviours evolve, if they are previously informed regarding the issues and are consulted.

We are convinced that 21st century motorways must be better used, their exploitation and uses must be optimised in order to become a resourceful and pluralist infrastructure, which is better integrated in the areas that they go through.

The major network (motorways, dual carriageways, ring roads)



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Also, we suggest that the following actions are undertaken in the medium term (by 2024) and in the longer term (2030 and beyond):

Reduce congestion via operational measures and via the increase of users per vehicle

In the framework of the anti-traffic road map, the region of Ile-de-France aims to modernise and complete the network, in order to respond to its growing congestion. In addition, temporary solutions, which are currently being tested, enable congestion to be reduced and may be developed, such as the use of the additional lane during rush hour and the regulation of merging lanes with traffic lights.

But it is possible to go further to implement structural and long-term optimisation measures regarding the network, for longer lasting effects on congestion. Firstly, through the development of dedicated lanes* (for collective transport: public transport, carpooling; taxis; more environmentally-friendly vehicles, including heavy goods vehicles: electrical, natural gas vehicle (NGV), hydrogen), which must be accompanied by efficient monitoring tools. The installation of dedicated lanes for athletes for the Olympic Games of 2024 will enable new experiments.

** Regarding this question, please see the citizens' proposals on page 44.*

Secondly, we would like the prospect of a pricing system to be considered regarding roads in dense areas, via different types of devices: stickers, urban tolls...
Thirdly, it could be interesting to study the impact of harmonisation and the lowering of maximum speed limits for traffic on the dual carriageway in light of the fluidity of traffic, road accidents, noise and pollutant emissions

Finally, the question of information for users of the network must be subjected to particular treatment: the transmission and analysis of data in real time by road managers must be improved, in a context where private stakeholders are offering more and more efficient solutions.

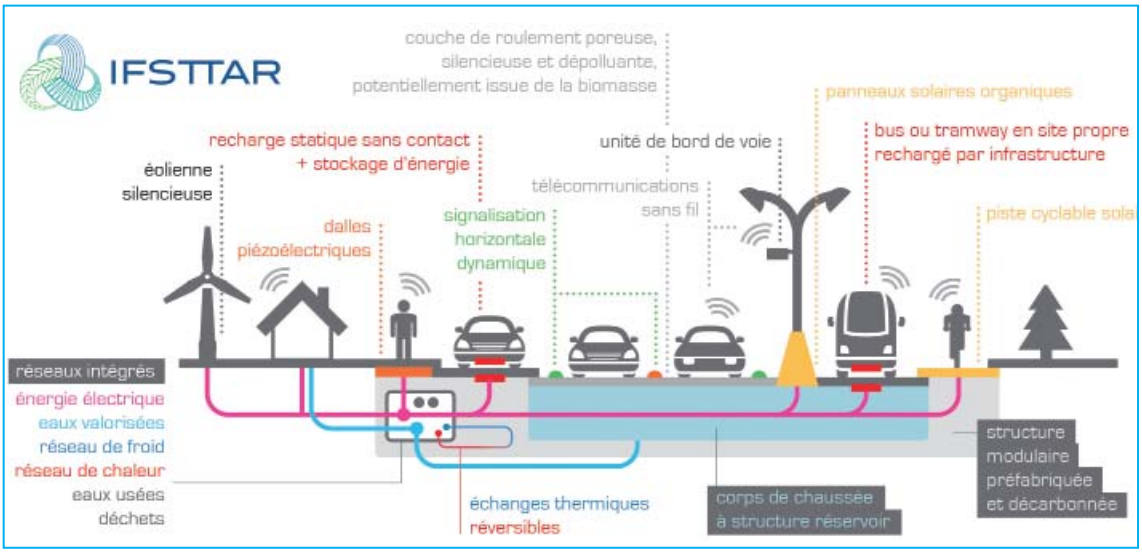
In addition, experiments relating to motorised two-wheeled vehicles may be developed, such as circulation on the hard shoulder, to replace the accident-prone way of riding "between two lanes".

→ ***Ile-de-France Mobilités, Métropole du Grand Paris, Ile-de-France region, DRIEA/DIRIF***

Transform the infrastructure so that it is adapted to new mobilities: towards a connected route, which is resilient, with a low environmental impact

It is necessary to move from collective information (SIRUS panels) to personalised information in order to modernise existing devices. It is more about working towards a goal of multimodal transport, where the information could suggest journeys combining the road and heavy public transport (for example, by presenting public transport alternatives near a driver who has encountered an incident during his journey).

5th generation roads



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In addition, the network of supply points for alternative forms of mechanisation as opposed to combustion engines (charging stations for NGV, electric, hydrogen, etc.) must be developed in order to significantly encourage the transition towards more environmentally-friendly vehicles. Note that the motorway service stations in Ile-de-France have a total of 12 charging stations in service and 8 underway, which cannot be regarded as satisfactory in terms of offer.

We support experiments carried out in the framework of research on 5th generation roads: energy-producing motorways (heat recovery, production of electricity linked to roadway vibrations, etc.), insertion of data sensors or smart highways, new solutions for rainwater management, or even bio-based tarmac manufacturing, in order to move away from the dependence of hydrocarbons for road maintenance. The question of resilience regarding major road infrastructures, faced with climatic variations, will be a major issue in the future, one that we must work on now.

In this framework, we believe that it is necessary to work on economic modelling linked to temporality (lifespan of the infrastructure/lifespan of new technologies in particular concerning transport methods). It is also necessary to anticipate the arrival of autonomous vehicles through the maintenance and management of roads. More broadly, we recommend that motorway experiments are encouraged, such as collective transport routes or systems to group individual vehicles (platooning). We do not know with certainty what future mobilities will be; also, whatever the changes that we can make today, it seems necessary to ensure that these road areas remain adaptable.

In order to reduce the negative externalities generated by the presence of motorways, and in particular by improving their urban insertion, we propose the following actions:

- optimize the roadways to transport more people, and in a more sustainable manner (collective transport, carpooling, environmentally-friendly vehicles);
- encourage the generalisation of innovative road surfaces to reduce the noise generated by vehicles, with a positive effect regarding the fight against the urban heat island (more breathable and drainable surfaces...);
- create new crossings, promote regional continuity (urban or countryside), improve the insertion of interchanges in the city, reduce the effects of disruption and make the invisible land along the dual carriageways more attractive;
- develop countryside continuity and a green metropolitan infrastructure by creating ecological corridors;
- equip entrances to the Parisian conurbation, make views and the greater landscape more attractive.

→ ***Road managers, Métropole du Grand Paris, Ile-de-France region, departments, motorway service station managers, research laboratories, Ile-de-France Mobilités***

** It seems to be especially necessary to serve business parks and to improve supply routes.*

Integrate possible developments of urban motorways to the overall process of reflection about the transport system

We believe that it is necessary to deepen the reflection on the roles and uses of motorways within the travel system and the metropolitan operation. Indeed, it must foster an intermodal passenger transport both on the road and via the development of multimodal areas and park-and-rides enabling an easier connection to railway network stations. Multi-modal platforms (for example, located on motorway service stations) could include individual parking, with carpooling access points, a fleet of shared or environmentally-friendly vehicles, or collective transport on the motorway.

Particular attention must be paid to optimise freight traffic. The question of freight and logistics must be taken into consideration in the overall process of reflection, because this sector will be heavily affected by any changes in the use of the roads. At the same time, the question of road freight transport optimisation is raised; it is also interesting to consider the experiments tackling this problem, such as platooning. The question of these economic stakeholders' contribution to the maintenance of French motorways must be chased up.

→ ***Legislator, Ile-de-France Mobilités, Ile-de-France region, Métropole du Grand Paris, logistics stakeholders, motorway service station managers, research laboratories***

Reflections to be continued

We would like to eventually get rid of urban motorways in the dense areas, which is why we are asking for a decommissioning of these roads to consider a long-term evolution towards "metropolitan avenues". To do this, it would involve overcoming the blockages meaning that this decommissioning cannot be considered today, due to a fragmented governance.

In this context, we want to launch an international consultation to open new possibilities and confront new ideas about the fate of the motorways of Greater Paris and the Boulevard Périphérique according to innovative and sustainable mobility systems adapted to the areas, by integrating the possible consequences of these developments regarding mobility in Ile-de-France.

Among the topics of study, we will need to reflect on an infrastructure that allows for the management of connected vehicles (these can be vehicles in circulation but equipped with connected devices), for example through lanes dedicated to this type of vehicle, enabling traffic to be regulated and less congested. The international consultation proposed will allow us to outline concrete scenarios on these questions (possible locations, calendar, effects on traffic, costs, etc.).

→ ***State, Ile-de-France region, Forum Métropolitain du Grand Paris and partners***

4 Develop incentives to replace polluting motorised vehicles with new models and take measures to improve traffic flow

We agree on the following issues:

It is urgent to strengthen the incentive and restrictive measures with a view to renew the car fleet, light-duty vehicles and lorries, towards more environmentally-friendly engines. Indeed, the transport sector generates more than a third of particulate pollutant emissions in the Ile-de-France. However, it is necessary to take into account the demand for mobility, the economic and social consequences of such measures, to allow for an ecological transition that is carried out with all the stakeholders concerned and not to the detriment of these stakeholders.

In addition, reflection relating to pollutant emissions by travel cannot be solved by a simple transfer to more environmentally-friendly vehicles. For example, brake wear and tyre friction of vehicles generate a significant share of pollutant particles; or again, concerning electric vehicles, the challenge is to ensure that vehicles can be recharged when the energy mix is at its most environmentally-friendly.

NGV bus of Maisons-Alfort, close-up on a bus running on biogas

© Pascal Aimar, CAPA Pictures, GRDF, 2016.

Also, we suggest that the following actions are undertaken:

Towards a structured and efficient network of charging stations for more environmentally-friendly vehicles

The network must be strengthened in order to anticipate different types of needs, with a view to a rise in power and a deployment of power supply networks within the conurbation and on a regional level, adapted to individuals as well as transport logistics: with a fine grid of charging station networks, including NGV and hydrogen stations in the city, via the production of NGV, but also via the certification and supply of bio-NGV through short circuits.

NGV station in Villeurbanne

© Grégory Brandel – GNVERT, 2015.

User constraints must be taken into account: thus, as regards to electric vehicles, terminals must allow for accelerated, slow or semi-accelerated charging in order to meet the needs of a whole range of possible uses of charging stations.

In addition, we must encourage electrical charging stations to become two-way, in the context of a more global reflection of the city's electricity consumption: in the future, an electric vehicle could be both a receiver and a supplier of energy for the entire urban network (smartgrid).

The mobilisation of all stakeholders to adapt all or part of the current network of service stations, as well as free some land, is essential in order to multiply the NGV, bio-NGV, electric battery, and electric hydrogen charging stations. It is also necessary to provide charging stations for more environmentally-friendly vehicles in logistics areas, by adapting to professionals' needs and constraints.
From a regulatory point of view, reflections must be conducted to make the procedures more flexible relating to the installation of charging stations for more environmentally-friendly vehicles for individuals and professionals. Thus, as regards to domestic parking areas, the long delays and complex approaches to establish them actually means that individuals are less likely to purchase rechargeable or electric hybrid vehicles. In addition, the local mobility plans and the local intercommunal urbanism plan are tools for identifying sites which meet the regulatory constraints for NGV stations, for equipping public areas, or encouraging the installation of charging stations in public and private car parks.

Concerning electric vehicles, we therefore propose that the texts relating to the "rights to electricity sockets" for domestic car parks be modified, without the person requesting a power supply terminal being obliged to go via the General Assembly (which is generally only held once a year), but by simply submitting the information to the Co-ownership board. We would also like the recommendations from the Civil Security and Crisis Management Division of the Interior Ministry to be loosened, relating to the existing technical conditions of installation for charging stations in the car parks of establishments open to the public.
Concerning the structure of an NGV and hydrogen charging station network, we would like the procedure relating to the Inspection of Classified Facilities to be revised, with a view to making the authorisation acquisition more simple (approximately 2 years currently).

Forsee_Power

© J.Cresp

Electric vehicle

© La Poste

Finally, concerning businesses and individuals, the establishment of incentives or grants from the State would help building works to be carried out, which are often very costly, for secure private underground car parks for electrical charging stations or NGV service stations.

The question of the supply of taxis should also be subjected to specific treatment on a metropolitan level and beyond (network of quick-charge terminals reserved for taxis, incentives, developments of regulations, etc.). Thus, the city of Paris has oriented its support, aiming to promote the electrification of the taxi fleet, to help with the installation of charging stations at home (in addition to purchasing support.

→ ***Government, Legislator, Métropole du Grand Paris, economic stakeholders, energy suppliers, energy network managers***

Raise awareness and increase the legibility of infrastructures

We would like educational and communication campaigns on the benefits of new forms of energy supply to be multiplied, both on a national and local level, due to the recurring mistrust regarding the danger of these new sources of energy for vehicles (in particular concerning NGV and bio-NGV: we must raise awareness to improve the acceptability of NGV and hydrogen stations and methane units for residents), and with a view to a improve general user information.

We confirm that the network of existing infrastructures must be enhanced and benefit from greater visibility in the public area, and readability, in general. Indeed, it can easily be seen that one of the key factors that has enabled the development of a service like Autolib' is its presence in the public area, the fact that it is easily recognisable and identifiable as a system for users. By contrast, it is often necessary to use digital mapping to identify the electrical charging stations, which are also subjected to strong heterogeneity in term of interfaces and would benefit from more homogeneity.

→ ***State services, local authorities, Métropole du Grand Paris, Ile-de-France region, Ile-de-France Mobilités***

Develop incentive and binding measures in the framework of a coherent governance on all levels

It is necessary to compel car manufacturers to market vehicles that pollute less, in the short term. Such an ambition cannot be done without the support of a national policy with an acceleration of the timetable and the objectives announced by the State in terms of support for environmentally-friendly vehicles and the plan to withdraw from diesel, and even combustion engines, in order to get closer to the objectives set by certain authorities in the Ile-de-France conurbation. We believe that the authorities at the dense core of the conurbation will need to agree on a timetable and clear objectives regarding the circulation of polluting vehicles (withdrawal from diesel, the end of petrol-run vehicles, etc.), in conjunction with the regional level.

However, given the time necessary to renew a fleet of vehicles, the trajectory announced by public policies must be coherent, including its schedule, and continued by different local executives, to enable economic stakeholders to adapt to this new deal, in the framework of respect for free competition.

Research and experimentation programmes aimed at anticipating the arrival of autonomous vehicles must include the prerequisite of more environmentally-friendly engines, and in particular the constraints related to electric, battery or hydrogen engines.

In addition, it is necessary to move forward on the creation of a low-emission circulation zone on a metropolitan level, in order to respond to the issues of air quality and public health in dense areas. All stakeholders concerned must therefore help support the objectives of the work undertaken by the Métropole du Grand Paris on this subject.
At the same time, it is necessary to strengthen the mobility advisory, for citizens and businesses. For example, economic stakeholders and inhabitants need a higher visibility concerning existing aid tools in order to change their vehicle or concerning the offer of existing transport to adapt their mobility practices.

→ ***Government, Métropole du Grand Paris***

NGV station in Villeurbanne

© Grégory Brandel – GNVER, 2015

Experiment in preparation for the Olympic Games 2024

All local authorities concerned may take part in actions in the framework of the Olympic Games 2024 in order to contribute towards the objective of 100% low-emission goods transport:

- for carrying out construction sites, for example, by using rail and inland waterway networks for the disposal of rubble, and to transport building materials, the use of NGV tipper trucks and concrete mixing transport trucks used to supply building sites;
- for last mile deliveries throughout the Olympic Games: use of electric and hydrogen vehicles, prioritisation of these vehicles for the use of certain equipment and in public areas (delivery areas, etc.), establishment of urban logistics areas...

→ ***Local authorities hosting the Olympic Games, economic stakeholders***

NGV in Saint-Denis

© Grégory Brandel -GRDF 2014.

Transport by barge of industrial waste from building demolition, Quai de Seine in Paris Bercy

DRIEA/Gobry, 2013.

5 Encourage carpooling and car sharing

We agree on the following issues:

We believe that car sharing and carpooling are solutions to meet the different needs of the areas and their inhabitants, but that the question of their massive development is currently being raised. Obviously, the conclusions of the inhabitants consulted on this issue contribute to this aim.

Concerning carpooling, the Region is conducting an experiment through the subsidising of journeys, for a specified period of time, in order to encourage these new practices. As regards to the dense zone, carpooling is one of the solutions considered to relieve car traffic, even if we need to strengthen the development of public transport on the road above all. In addition, the City of Paris is experimenting the implementation of carpooling solutions for its agents living outside of Paris and operating in shifts.

Concerning car sharing, the service Autolib', whose recharging infrastructure was heavily subsidised by the City of Paris, and today by the member-authorities of the Autolib' Vélib' Métropole federation, has progressed car sharing as a daily form of mobility, providing it with greater visibility. The line between individual and collective transport could in the future become more and more blurred. Indeed, the development of an economy based on usage and not on the ownership of a vehicle is underway (cars, as well as also scooters, bikes, etc.), and authorities must contribute to its growth.

Some areas, due to their low density, do not allow for the establishment of efficient transport systems. However, public stakeholders must play a role in the organisation of mobility services aimed at these populations, to decrease dependence on individual cars (ecological, social, economic impact, etc.). Car sharing and carpooling help create solutions which can be implemented in order to offer mobility services in these areas.

Also, we suggest that the following actions are undertaken:

Massively develop carpooling

We strongly support ongoing public policies to develop carpooling, carried out by the Ile-de-France region along with Ile-de-France Mobilités, which aim to reduce the environmental footprint of each car user, and to reduce traffic congestion. It would be possible to go even further, for example by experimenting with the establishment of carpooling lanes on a large scale in order to allow a "mass-effect" over the entire road network (motorways and dual carriageways) and by developing more carpooling areas that are equipped and connected to motorway nodal points, including in dense areas, and around the train stations of greater Paris. For example, the A4 motorway could be an area of experimentation in the short term, with a view to downgrading it to a “metropolitan avenue”, as shown by studies carried out in the framework of the Association des collectivités du territoire de l'Est parisien (ACTEP). Experiments are to be carried out in dense areas in connection with the restricted circulation zone project, without damaging the functioning of the lane shared by buses.

Carpooling should also gain a following in its organisation thanks to digital technologies and the development of adapted applications and services, thus renewing Demand Responsive Transport, which until now has been costly, for a better service in sparsely-populated areas.

→ ***Ile-de-France region, Ile-de-France Mobilités, road managers, DRIEA/DIRIF, managers of motorway service stations***

Car sharing, a lever for public mobility policies

The question of car sharing must be treated with regard to objectives of public policies, in particular “zero emission” mobilities. Indeed, the implementation of this type of service may, in dense areas, be destined to get households to go “car-free”, in order to free up road space or replace the current fleet with environmentally-friendly vehicles more quickly. Thus, electric car sharing services must be strengthened in the metropolitan area, in order to move towards a more sustainable mobility through the use of city cars with electric engines.

In less dense areas, the objective may be to promote accessibility to areas not easily accessible by public transport, and for people who do not have a personal vehicle, or through the creation of a new transport offer at night time to serve employment areas such as Roissy or Rungis. However, the economic model in the low density areas remains to be found. The issue of public funding relating to the development of car sharing and its duration must be worked on in collaboration with economic stakeholders and citizens. Public stakeholders may have to present all mobility services in a given area, including private car sharing services.

→ ***Ile-de-France Mobilités, economic car sharing stakeholders, local authorities***

6 Promote consistency regarding parking policies

We agree on the following issues:

Parking policies are a major lever regarding the effectiveness of mobility policies in the areas. Parking strongly influences the quality of life in the city, since it affects the fluidity of the traffic, the attractiveness of urban spaces, the supply of goods...

There are different types of parking requirements which are not necessarily compatible (resident parking, disabled parking, commuter parking, visitor parking), which is why there is a need for regulations by the authorities, who must set up a public policy on these issues. Access to parking becomes a service of mobility, and it is therefore one of the levers for the establishment of mobility policies within the community. In order to regulate parking, it must act both on supply and demand.

In addition, the decentralisation and decriminalisation reform for paid parking on the roads is the opportunity for territories to re-examine their parking policies in connection with their objectives in terms of public mobility policies.

Also, we suggest that the following actions are undertaken:

A harmonisation and consistency of policies relating to parking on a metropolitan level and beyond

It seems necessary to us that the communes work towards a consistent pricing system concerning street parking on a supra-communal level, so as, in particular, to not attract more cars which would only increase congestion. Ile-de-France Mobilités has made proposals concerning minimum prices in the framework of the PDUIF road map, which can fuel the communes in their reflection. The local mobility plans are tools to be used to develop parking policies on an intercommunal level. Concerning motorcycles, tricycles and motorised quadricycles (small cars without a license), a free car park for environmentally-friendly vehicles could be supported in the dense zones, parallel to a car park for polluting combustion-engine vehicles.

In greater Paris, a harmonisation of price policies concerning parking near train stations must be conducted in order to promote access to heavy public transport, while avoiding a saturation of urban centres due to commuter vehicles.

The harmonisation of regulations concerning delivery areas remains problematic: in fact, as parking warden authorities have been seldom transferred to the local authorities, regulations are made on a municipal level. It is therefore difficult for stakeholders involved in the transport of goods and for artisans to conduct their activities while complying, due to the diversity of existing timetables. Furthermore, no Local Transport Plan is prescriptive in the matter. We therefore propose that work is conducted on a metropolitan level regarding the harmonisation of regulations governing access to delivery areas, in order to work towards an optimisation of goods traffic and facilitation for the activity of artisans and other mobile professionals. We would also like a harmonisation of parking standards in the Local Transport Plans, concerning the standards relating to car parking limitations when new homes and offices are built, which are well served by public transport, in order to discourage motorised travel. In addition, it is also necessary to harmonise the parking policies of motorized two-wheelers on a supra-communal or even metropolitan level, particularly with regard to parking prices.

→ ***Ile-de-France Mobilités, communes, intercommunal bodies, Métropole du Grand Paris***

Foster innovation for mobility policies: new solutions through smartparking

Concerning road parking checks, smartparking* provides new solutions which can be mobilised by the authorities.
Concerning the applications enabling people to find parking spaces more easily, it would be ideal if they were integrated in a more global application, proposing first and foremost modal alternatives to driving cars. We need to be careful, in order to make sure that they do not generate an increase in the use of personal vehicles. However, this type of service can also help mobilise the offer of off-road parking, often private, which doesn't fall within public jurisdiction, moving towards a decrease in cars in public areas.

→ ***Ile-de-France Mobilités, private smartparking stakeholders, communes, intercommunal bodies***

** Smartparking refers to technological innovations related to digital technology applied to parking issues; for example, applications to find a parking space.*

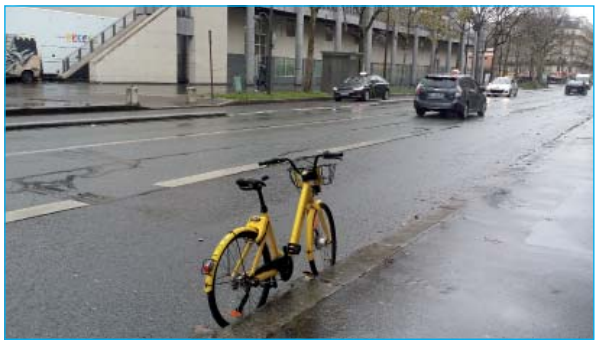
Tools to be created to anticipate parking for new mobility services

The multiplication of private mobility services which are based on the principle of free parking on public roads (chauffeur-driven vehicles, free-floating) raises the question of sharing the road amongst different methods of transport, and amongst different uses of traffic and parking.
Local public stakeholders must have the means to implement their role of policing and public safety, through regulatory tools relating to this issue. This is why we would like to be able to grant operating licenses for these services to the private stakeholders, to allow the dense centre of the conurbation to authorise (or not) a private mobility service, through the delegation of an organising mobility authority. Note that these can generate negative externalities (pollution and safety problems within the public area). This license could therefore contain quality of service commitments, data transfer and, where appropriate, the payment of a licence-fee for the service operation in the area in which it is used. The licenses could be issued with regard to the environmental impact of mobility services of persons or goods.

Finally, street parking could be developed into a strip of services, oriented towards more sustainable vehicles and energies (shared mobility services, carpooling, charging stations for environmentally-friendly vehicles, logistics areas etc.).

→ ***Ile-de-France Mobilités, private stakeholders, local towns and villages***

Self-service bikes in Rue de Lyon in Paris



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Self-service bikes in front of the RER station of Maisons-Alfort

Rights reserved

7 Anticipate the arrival of autonomous vehicles

We agree on the following issues:

It is now necessary to fix public choices that will guide the development of autonomous vehicles, on a European, national and local level, in order to move towards more sustainable, more inclusive and more efficient mobilities.
However, the development of autonomous vehicles is at a crossroads: a deregulated development, driven by private initiatives, or a development regulated by public authorities, and designed in a complementary manner with the public transport in Europe.
We identify the following risks, which must be anticipated:

- *competition with public transport;*
- *increase in congestion and pollution (for example through the phenomenon of the "cruising", empty vehicles in circulation);*
- *cyber attacks having an impact on property, people, and road safety.*

We identify the following opportunities:

- *use the technology of autonomous vehicles to create new public services and enhance accessibility for everyone (disabled people, blind people, experiments underway of autonomous shuttles for last mile transportation in low density areas);*
- *facilitate urban logistics, especially at night;*
- *reduce road accidents.*

The arrival of autonomous vehicles must be considered in relation to the overall mobility system and its ongoing developments (car sharing, carpooling, environmentally-friendly engines). In addition, their development will be carried out in successive phases; also, the question of the coexistence of different levels of autonomy has been raised. This transition period is a complex issue to apprehend in the short term for local elected representatives and public regulators.

Also, we suggest that the following actions are undertaken:

Autonomous vehicles must serve a sustainable mobility system

Autonomous shuttle on the esplanade of La Défense

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The development of autonomous vehicles must have an influence on a decrease in greenhouse gas emissions and other polluting particles. To make sure that autonomous vehicles do not increase the problems related to urban road transport, we ask that their development is influenced by several principles that contribute to sustainable mobility:

- co-construction of experiments with local authorities and users. In dense urban areas, they must be focus on the relevant uses for the community (transport of people and goods). They must also help public authorities to anticipate the potential needs for investment in infrastructures to accommodate these new mobilities (connected traffic lights, floor signage, etc.) and define the economic models that would limit costs for taxpayers;
- optimisation of use of space thanks to shared vehicles: the circulation of empty or under occupied vehicles must be avoided, but in dense areas, vehicle autonomy must also free up road parking spaces;
- encourage innovations in the urban logistics sector by studying the convertibility of vehicles for more flexibility and articulation between the transport of passengers and goods;
- create complementarity with the public transport system through a regional approach (encourage passenger transport in areas with little or poor public transport services), a time-based approach (encourage times where there is no or little public transport, such as to serve the employment areas of Rungis or Roissy), a solidarity approach (general public with no vehicle: persons with reduced mobility (PRM), visually impaired, young population, elderly people, disadvantaged households);
- develop open norms and standards in close relationship with local authorities to define the safety criteria adapted to these new mobilities in urban areas, but also the criteria of accessibility and environmental impact. Autonomous vehicles will have to be zero-

emission vehicles regarding particulate emissions (electric/hydrogen). They should also be eco-designed to reduce the impact on production (e.g. a lower weight), energy consumption (e.g. smart charging) and end-of-life (e.g. recycling of batteries)

→ ***Ile-de-France Mobilités, regional authorities, State, research and innovation stakeholders***

Anticipate the arrival of autonomous vehicles by regulating the circulation of connected vehicles from now onwards

The multiple prospective exercises carried out to anticipate the arrival of autonomous vehicles have led us to imagine new ways of regulating which can now be applied to connected vehicles. More and more transport services are connected thanks to smartphones, especially to use digital platforms (taxis, chauffeur-driven vehicles, car sharing, delivery, etc.). In addition, vehicles marketed since 1st January 2018 are equipped with a GPS, while V2V (vehicle-to-vehicle) and V2X (vehicle-to-everything) communication technologies are beginning to unfold. The rules that need be applied to regulate the movement of autonomous vehicles can now be experimented on connected vehicles.
The impact of these vehicles varies greatly depending on each region (rural, suburban, dense areas), and also, governance can not be performed on a national level regarding this subject. The intervention capacity of local elected representatives must be strengthened in order to support this new regulation of connected road transport in the framework of a decentralised approach.

We would like the following actions to be implemented:

- allow a genuine pooling of experiences concerning the experiments initiated in different areas;
- implement a regulatory regime which obliges service operators to communicate their data to local authorities in exchange for the right to circulate in public areas;
- use pricing to regulate the movement of autonomous vehicles, for example by creating a license-fee on moving vehicles (a deterrent during rush hour or variable depending on the passenger's characteristics. Example: disabled user or number of passengers per vehicle, etc.) to avoid vehicles circulating with no passengers, or even to encourage garage parking rather than kerbside parking;
- experiment service-based infrastructures which improve the circulation of connected vehicles (connected traffic lights, best geo-tracking, anticipation of obstacles on the road, reserved lanes on the motorway etc.) and which also enable a better control of these vehicles (compliance of traffic rules, filling of vehicles, etc.);
- create dedicated parking areas to ensure that vehicles do not drive around with no passengers (reuse of existing land, individual car parks not used in the day, etc.).

→ ***Legislator, Government, regional authorities, car park managers***

8 Support the digital innovation and the Ile-de-France innovation ecosystem through the question of open data

We agree on the following issues:

The European and French legislative context encourages the opening of public data or public interest data, and hence, the creation of new mobility services by private stakeholders who seize upon these services. While public authorities are massively opening their data - which generates innovation - they also use the information in a significant way to develop public mobility policies. It therefore seems crucial that public stakeholders are not only in a position to diffuse information, but that they have the means to create value using other data from the mobility stakeholders' ecosystem - in particular in the framework of a long-term vision which involves thinking in a comprehensive way about all mobility services ("Mobility as a service").

This new set of stakeholders in the collection and reuse of data, and in the creation of mobility services, questions the role of public stakeholders, who ensure the compliance of public interest issues relating to users (safety, service neutrality, protection of personal data) and characteristics of the provided service (efficiency, sustainability, regional and social equity, etc.). In this perspective, public stakeholders need to have an overall picture of the mobility system, stability between the regulated and non-regulated parts, in order to be able to make appropriate decisions.

Also, we suggest that the following actions are undertaken:

Strengthen the tools allowing regional authorities to develop their open data policies

It is essential today to inform all the authorities concerned in a somewhat educational manner regarding issues to do with open data policies and in particular, regarding mobility issues. To do this, the exchange of good practices needs to be encouraged between local authorities on the new possible modes of partnership with private stakeholders regarding public data reuse. In addition, we suggest that all local authorities are called upon to place all data relating to their roads in a common database in open data, to encourage innovation.

→ ***Regional authorities, associations of elected representatives***

For a regional open data policy that promotes innovation

We would like the foundations to be laid down as of now for a harmonisation of open data policies by local authorities in Ile-de-France, in order to, in particular, promote the Ile-de-France innovation ecosystem with a view to the best mobility services. Also, open data for accessibility data can promote the emergence of new innovative solutions for disabled people.
We support the experimentation of new forms of public action:
playing the role of a neutral third party by bringing together private stakeholders, with a view to make public interest initiatives emerge; stronger presence in the power relationship with digital platforms.

→ ***Ile-de-France Mobilités, regional authorities***

Lay down the foundations of a data governance that would allow public authorities to be capable of continuing their role as a traffic regulator in the future

The new ecosystem of mobility stakeholders has resulted in, for public authorities, a comprehensive reflection on mobility services (including the services performed by private stakeholders), and the need to have comprehensive information on this global system in order to implement adapted public policies. In order to do this, new forms of partnerships must be able to develop, and the legal framework must evolve. In particular, it is necessary to implement national or even European regulations, to allow regional authorities be able to legally compel private operators to give them access to their public interest data, due to the fact that their being brought to attention would enable the implementation of a more adapted action - including regulations.
We believe that we must move towards a collective positioning of public stakeholders to gain weight against Google, Amazon, Facebook, Apple (GAFA) on a local, national and European level, and if applicable, be a prescriber regarding data reuse procedures. Public authorities must be able to have access to the rules that govern the algorithms of private mobility services. Finally, we support the creation of public platforms for mobilities data management.

→ ***Economic mobility stakeholders, regional authorities, Ile-de-France Mobilités, legislator***

9 Implement a service-based mobility in Ile-de-France

We agree on the following issues:

The concept of "Mobility as a Service" (MaaS) can be defined as the merging of information and ticketing tools relating to all existing mobility services, whether public or private. This approach aims to facilitate the passenger's experience with a single interface (expressed in particular by a Smartphone application) which centralises all elements enabling the passenger to use different modes of transport.

The development perspective of such a service requires powerful questions for public stakeholders, particularly as it would involve public and private transport services.

As a result of the work carried out by Ile-de-France Mobilités, we have identified the following opportunities as regards to the development of a "MAAS" system in Ile-de-France:

- *a tool enabling a mass data collection, that public stakeholders can use to know more about needs, and adapt mobility policies;*
- *a service that is of public interest by giving passengers a better visibility and easier access to existing offers (centralised payment even in the case of multiple modes of transport);*
- *a lever to achieve the objectives of the urban travel plan in Ile-de-France, in particular regarding the question of behavioural changes, where the strengthening of information and education plays a major role (especially concerning modal alternatives to individual cars).*

We have identified the following risks:

- *the appearance of conflicts between the objectives of mobility policies and the objectives of private stakeholders;*

- maturity of economic models: disparity of possible uses of services/cost borne by the user and by the public stakeholder;
- personal data protection.

Also, we suggest that the following actions are undertaken:

We support the work undertaken by Ile-de-France Mobilités regarding the implementation of a public system in order to expand public mobility services, and to facilitate the passenger's experience through a ticketing and integrated fare system, including disabled access.

First of all, we believe that the establishment of a MaaS will need to reach all Ile-de-France residents, and not a specific population or region, including all users, and in particular those who travel daily in personal vehicles. Indeed, on the one hand, it is necessary to optimise the use of the road, and on the other hand, it is about reaching this public via a policy encouraging more virtuous behaviours in term of mobility. The implementation of an integrated tool on a regional level could suggest a local range of mobility solutions, in the framework of a governance with the full involvement of authorities in dense areas. Moreover, we support local experiments enabling technological developments to be taken into consideration with a view to share and provide experience feedback on a regional level. In order to be able to take the flow of goods and people beyond the regional borders into consideration, all MaaS systems in Ile-de-France must be able to be interoperable with the surrounding areas but also, more broadly, this interoperability must be possible on a national or even European level.

In addition, we support a proactive implementation policy of a public MaaS service on an Ile-de-France level. Reluctance regarding common carriers to relinquish part of the control over their ticketing in Ile-de-France has been noticed, while in the provinces, ticketing systems belong to the public authorities. Ile-de-France Mobilités' ongoing project to launch a unified ticketing system deserves to be supported.

More generally, it seems essential to promote flexibility and innovation for new public/private organisations enabling the promotion or creation of new mobility services. In this case, it will involve working on the criteria enabling a private mobility service to be included in a MaaS (compatibility condition with the objectives defined in the mobility policies and conditions of neutrality, safety, personal data protection, etc.). This will go through upstream work with private stakeholders for the integration of new services proposed as part of a partnership logic. It seems essential to support French innovation stakeholders in the context of developing ticketing on smartphones, a necessary condition for the implementation of a MaaS. Finally, we would like to implement a coherent, viable, and sustainable governance project, dealing with a system of ever more complex stakeholders.

→ ***Ile-de-France Mobilités, Ile-de-France region, pioneer regional authorities, economic stakeholders***

10 Mobilise all stakeholders to reduce commuting

We agree on the following issues:

Over the past twenty years, the world of work has undergone some profound changes (employment flexibility, massive digital development, growth of self-employment, etc.). The types of work and employment have changed, with both spatial and temporal consequences, including, among other things, an opening towards "non-mobility".

Today, the high diversity of home-based practices must be taken into account: informal, institutionalised or nomadic; frequency of working from home and the proportion of time spent working from home... These diverse situations have very different impacts in terms of transport, which is why it is difficult to achieve an accurate diagnosis and adapted offers for public stakeholders (complexities associated with predicting different needs).

Working from home remains a major lever in terms of economic dynamism as well as in the context of an overall resilience strategy (as an alternative in the event of a problem with the transport network, pollution peaks, staggering of rush hours, etc.). It is therefore appropriate to promote development by grasping the complexity of the needs induced by the diversity of practices, in a context of increasing demand for mobility.

The question of forced mobility is part of a broader reflection on the geographic organisation of metropolitan functions. Thus, the question of East/West rebalancing has been raised (distribution jobs/housing), a goal that planning documents tend to implement these days. Similarly, the gradual establishment of polycentrism aims to enable an operation on

multiple scales in Ile-de-France, and in particular, access to housing, employment and proximity services for inhabitants. In this "city of short distances", the use of soft mobility is possible for daily travelling. The objectives of social diversity (Solidarity and Urban Renewal Act, access to housing and urban renewal law) also participate in the need to implement housing policies which give workers opportunities to live near their places of employment.

Also, we suggest that the following actions are undertaken:

Promote multimodal transport for access to third places (co-working areas, telecentres, etc.)

Most existing third places and co-working areas are today concentrated in Paris and in the Métropole du Grand Paris. The Ile-de-France region will support the creation of 1000 third places by 2021, in particular in suburban and rural areas. Thus, 30% of self-employed people do not work in a third place because there are no possibilities near to where they live.

One of the conditions to install these new places of work lies in the possibility of having access to fibre optic high-speed Internet for public use, and in particular professional use. This is a matter of digital development in the areas with variable situations in 2017. In the stations of the future Grand Paris Express, the creation of third places of work and innovation was one of the six priority areas selected in 2014 by the Société du Grand Paris in the framework of reflections regarding the digital dimension of the Grand Paris Express, in connection with the establishment of a fibre optic network, a mobile infrastructure and a very high-speed wireless network, with Wi-Fi. We believe that the locations of these third places should meet several conditions to enable sustainable mobility: have good access to collective transport to "optimise" the home-to-work commute, or to be located in certain places, such as small town centres, in order to allow workers to carry out their local journeys on foot or by bicycle. Parking spaces around third places could also promote the use of bikes or car pooling

.

→ ***Ile-de-France region, Ile-de-France Mobilités, Société du Grand Paris, SNCF, RATP, departments, local towns and villages***

An exemplary role of regional authorities in the development of home-based work

Working from home in France symbolises a significant delay compared to other OECD* countries, in particular in the public sector. We believe that regional authorities must play an exemplary role in the field, in order to contribute to decreased travel and to relieve network congestion during rush hour. This device complies with the guidelines defined in the framework of the low carbon National Strategy, adopted by decree in November 2015. Working from home may involve a whole day at home or just part of the day, to avoid going back and forth for meetings outside the main workplace. As local elected representatives, we are committed and are pushing ahead with this development.

→ ***Regional authorities***

Staggered rush hours

Despite developments linked to new digital technologies, enabling greater flexibility during working hours, the rush hour from home to work in Ile-de-France has not changed much since 1976, and remains very marked. There is nevertheless a progressive shift of the rush hour which is getting slightly later, in both the morning and evening, as well as an increase in off-peak traffic. This saturation of the rail and road networks requires new solutions to maximize the staggering of rush hours, in order to optimise the use of transport systems.

→ ***Employers, economic stakeholders, employees, labour-management organisations, consular chambers***

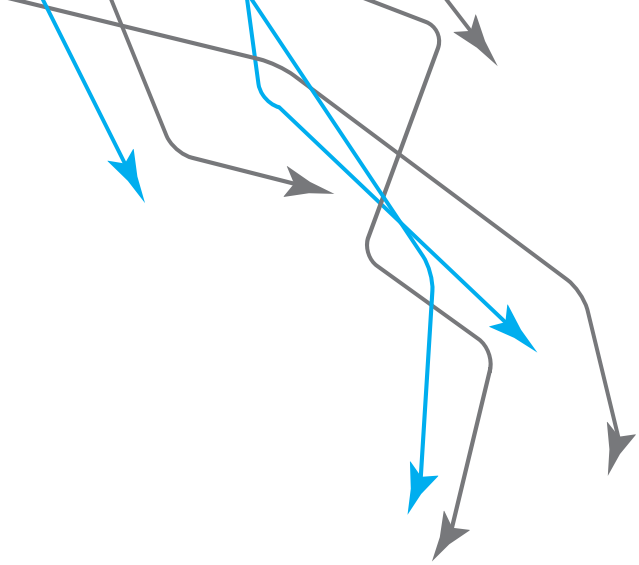
Multiply solutions to decrease journeys

The employer, in reflecting on his/her employees' travel (and in particular in the framework of the obligatory mobility plans for companies with more than 100 employees since January 1st 2018), can play a crucial role in decreasing the frequency or distance of journeys from home to work.

Working from home is of course a possibility; but other innovative solutions are being developed and may be subject to temporary solutions. For example, start-up companies offer, for major groups, algorithms to organise workplace exchanges based on the position occupied (thanks to big data analyses of the data provided by chief human resources officers). This also enables solutions to be offered to intermediate occupations or those with little qualifications (for example, employees in commercial centres), while working from home is primarily available to executives. We are even already supporting the availability of shared premises in some jurisdictions, in order to allow the staff to have places of work near their place of residence. The development of such solutions, even if they may appear to be temporary and concern only a few people (if they are considered on a case-by-case basis), may actually have a global and non-negligible impact if they are all added up.

→ ***Consular chambers, employers, economic innovation stakeholders***

** Report from 2009 from the Centre for Strategic Analysis.*



Towards a shared and open governance

The systemic and evolutionary nature of the mobility system, the multiplicity of stakeholders, the need for coherence, the central role of changes in practices and behaviours, and the need to take demand and use into account, as well as the democratic need, invite us to imagine a governance that is open and shared regarding future mobilities.

Institutions will need to cooperate to co-build mobility policies, in connection with civil society, the economic world and residents. We are pleased with the work environment in which we have been able to discuss at the Forum Métropolitain du Grand Paris, linked to a shared desire to grant us these future mobilities, and move forward together. We hope that this method will prefigure a calm and efficient governance for our transport policies by 2030, respecting each and everyone's skills.

The shared proposals of this White Paper call for, in very different ways, continued reflection, experiments, regulatory developments, awareness, etc. which we wish to continue working on together.

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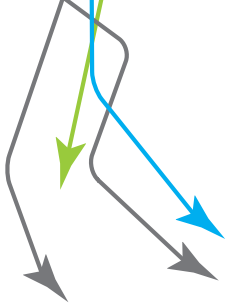

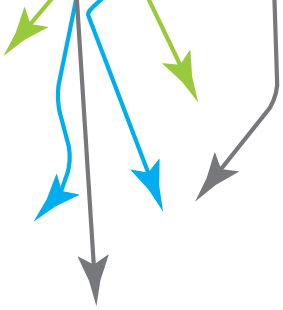

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