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Planning and developing transport infrastructure in France: context and case studies

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Ladies and gentlemen, dear colleagues,

I am honoured and very much pleased to address your audience to present some aspects of the french experience in Public Works Planning and Projects in Transportation.

My professional experience, and therefore, the point of view I shall speak from during the next hour, is that of a civil servant belonging to the ministry in charge of transportation. A civil servant who over the last ten years has been involved in policy-making and coordination of policies in land and maritime transport (with the exception of road infrastructure).

My previous involvement with Brazil regards road transport services, as the chief negotiator on the french side of the road transit agreement between out two countries, in the perspective with the opening of the international bridge on the Oyapock river due to take place later this year.

My task within the next hour will be to acquaint you with the problems the french ministry in charge of transportation has to deal with, and the ways and means it gets things done.

If today's audience had been not brazilian, but european, either italian, german, spanish or british, my account would have been a rather different. I would have skipped most of the comparisons as the common characteristics as regards geography, economics, transport network and legislation existing between major european countries far exceed the differences. On the other hand, I would have devoted much time to european networks, competition and interoperability issues, that are irrelevant for a brazilian audience.

Therefore, in order to give you in synthesis the context and the ways and means of transport infrastructure development policy in France, I shall develop five points during the ext hour:

1. Some comparisons between the context of transportation policies in France and Brazil
2. The main political technical and environmental issues infrastructure planning and development in France
3. The phasing of a development project
4. Today's context of financing transport infrastructure with classical procurement and public- private partneship solutions (concessions and Private finance initiative or PPP as such solutions are called in Brazil)
5. Case studies of new high-speed railway lines currently under development, one under a concession regime the LGV SEA from Tours to Bordeaux,two others, the LGV Bretagne Pays de la Loire, one the LGV est (stage 2) under a classical procurement contract. I shall also provide information on the carbon-assessment of the LGV Rhin –Rhône (Eastern leg) that became operational last december.

SOME ELEMENTS OF COMPARISON BETWEEN BRAZIL AND FRANCE

I- GEOGRAPHY

Comparing the respective areas or populations of our countries is, of course, pointless. However, some comparisons regarding areas and population between France's european territory and some States of Brazil are telling:

France's area equals Minas Gerais State's (MG's population is 3 times smaller)

France's area and population (2010 data) roughly equal the combined areas and populations of the States of Sao Paulo, Rio de Janeiro and Parana.

(Alternate option)Sao Paulo Parana and Santa Catarina

So, for the sake of better understanding, I suggest that during the next hour you mentally translate the word 'France'as something akin to 'the combined area and present population of Sao Paulo State and two of its neighbouring smaller states'

A brief comparison of our two institutional systems is also necessary, as central States have to interact constantly with territorial political authorities, as regards the development of transport infrastructures.

II - INSTITUTIONS

Central State : Brazil and France have been both been created by monarchies– from a very different background of course- that gave them their strong national characteristics that remained a prominent feature when in the second half of the XIXth century both countries became republics. Today, providing economic and territorial cohesion in countries with many widely different regions and fostering sustainable development are at the heart of the policies of both governments of France and Brazil.

States and regions Brazil and France have-oddly enough- just the same number of major territorial political units (27). In Brazil 26 Estados and distrito federal, In France 27 regions (5 of them overseas including Guyane Française, bordering Brazil). Thus, within the area of the 3 Brazilian states I mentioned above, the french State has many times that number of major terrritorial political partners to deal with, in transport policies in particular as we shall see later. French regions own no transport infrastructure of their own, except in some cases some intermediate-level maritime ports. Regions are transport authorities for regional passenger transport –mostly railway transport and they usually own the regional passenger trains and subsidize the railway operator for such services. Regions are also financing partners for infrastructure they do not own, local but also national with recent and substantial financial inputs into high speed railway lines financing (more on that later)

Département An intermediate level of political territorial unit (with no brazilian equivalent).The 100 departements own most of the main roads (377 986 km) and some local interest maritime ports. French european regions include between 2 (Corsica) and 8 départements (capital region of Paris). Lately, departments also became interested in high-speed rail develoment.

Municipalities: French Municipalities (*the french equivalent of brazilian municipios*) number more than 36 000; like the departments they date date back to the time of the french revolution.Their population ranges from 2,2 millions to a few inhabitants. However, Institutional cooperation between municipalities is very strong, in particular in urban areas in the field of urban transport as well as on other issues. In recent years municipalities' communities have even become financing partners of national infrastructures such as high speed railway lines. Municipalities own a road network 642 256 km long as well as another network of inferior quality in rural areas known as chemins vicinaux (*akin to brazilian 'estradas vicinais'*). Like regions and departments, large size groupings of municipalities have also become financially involved in high-speed railway development.

III BASIC DATA ABOUT FRENCH TRANSPORT INFRASTRUCTURE AND ITS PRIORITIES

Urban transport is -like in Brazil- within the sphere of competence of the municipalities who are transport authorities (usually within the frame of an ad hoc organisation encompassing all the municipalities of a conurbation or even a region in the case of the capital region of Paris with 12 M inhabitants) The transport authority is responsible for all public transport, including the development of metros, light rail transit and tramways. In France, the vast majority of urban public transport is operated under delegated management to a private operator. Development of urban transport infrastructure is a national priority. Sustainable urban transport projects developed by local transport authorities can get government grants. The sustainable local transport plan is be carried out in ten years, at a cost of 35 billion € funded by the State, local governments and new debt. An important part of the project is in the Paris capital region a driverless subway linking important business areas residential areas and the Charles de Gaulle airport through a figure-eight track 140 km long and. The system will be operating 24-hour; its estimated cost is 21 billion euros. Another 14 billion will be spent in the extension and re-equipment of existing metro, regional and suburban lines.

Roads, as previously mentioned, are overwhelmingly owned by local political authorities. The State-owned roads network (the equivalent of Brazil's federal roads) is only 11000 km long (it was eight times longer 50 years ago). The central State gives no specific grants for development or maintenance of non-State roads. Development of the network takes place exclusively in urban areas to improve traffic conditions, the overall network in the countryside has in service predominantly for at least a century or two and the present challenges are its maintenance and where necessary, its upgrading.

State motorways network (*autoroutes)* is 11163 kms long,(2432 under direct management and 8431 under concession) Motorways are reserved for the traffic of cars, lorries and motorbikes above 150 cm3; there are no crossroads on motorways and the lanes are separated by a central divider strip, crash barriers and an emergency side strip (*bande d'arrêt d'urgence*) is provided on the right side of the traffic lane; emergency call boxes are put up at regular intervals, so are rest and service areas; maximum speed on motorways cannot exceed 130 km per hour. The french motorway network was built from scratch from the early 1960s. Without the widespread use of concessions, the level of funding by the State could not, by far, have enabled to complete in 50 years the third longest network in Europe (sixth longest the world). Developing the motorways network development has ceased being a major priority; the existing projects are few and limited in length, as high speed railway lines has become the priority in a sustainable transport development approach. A loud and clear and unambiguous priority is given to modes other than road transport of passengers and freight.

Railways: 29273 km (lines) and 51 217 km (tracks) with the longest high-speed network outside Japan: 1884 km of high-speed lines (*lignes à grande vitesse LGV*). The network is owned, developped and run by a government agency: Réseau ferré de France (*Rede Ferroviaria de Françà*). The difference between France and Brasil –and the Americas - is that in France-and in Europe - rail transport is basically passenger –oriented. The development of the high-speed rail network has been given the utmost priority as it improves the national and some international mid and long distance connexions, reduces long distance domestic traffic by car as well as domestic air traffic makes available more paths on the classical railway lines for more freight trains and region-funded regional passenger trains.

Ports : The 7 major ports in the european part of France as well as the overseas trading ports(including Degrad des Cannes in Guyane Française) are State- owned; the other ports belong to the regions or departments. At the present time, the major challenge in ports development is to increase container handling capacities in the major ports in order to cope with the challenges of the

development of container traffic from the Far East and the ever-increasing draught and size of containerships. Developing railway and waterway connections to and from the hinterland of our major ports is on the same level of high priority.

Waterways: France has four main waterways basins with freight transport activity. The Rhône, strictly domestic, whose delta on the mediterranean sea is close to Marseilles, the main french port. The Seine is also domestic whose estuary is at Le Havre,the n°2 french seaport. The Rhine –Moselle, is international and connected with the german and dutch networks and the. The last one is the North a somewhat smaller basin of waterways in connexion with the belgian and dutch networks, the North sea and the major european port Rotterdam Currently a high-capacity canal project 106 km long linking the domestic basin of the Seine with the international North basin and the belgian and dutch networks is at an advanced stage , as competitive dialogue preliminary to the conclusion of a partnership contract (equivalent to the brazilian PPP created by the law of december 2004) is currently underway. When this new infrastructure becomes operational, the Seine basin will be international and Paris a major international waterway port.

IV COMPARISONS BETWEEN BRAZIL AND FRANCE REGARDING TRANSPORT INFRASTRUCTURE MANAGEMENT AND REGULATIONS

While plying the same transport ministry trade, our civil servants' brazilian and french experiences are not exacty the same. Leaving aside the peculiarities of geography and environment, Brazil's institutional organisation regarding transport is different from Frances's. While in Brasil, procurement for infrastructure is done directly by the State (*i.e Ministerio dos transportes*) while, it is mostly done in France through government agencies dedicated to one mode under the supervision of the ministry of transportation: for the railways Réseau Ferré de France-RFF- (*Rede Ferroviaria de França)* for the waterways Voies navigables de France VNF (*Hidrovias navigaveis de França*), for maritime ports the 7 State –owned Grands ports maritimes (*grandes portos maritimos*).

In the field of national roads and non -conceded motorways, however, procurement is made directly by the ministry in charge of transportation. Regulatory policies in France, are mostly implemented directly by the State, while in your country they are implmented by government agencies such as ANTT in land transportation. We are heading towards regulation outside the ministry in railway transport where an independent regulatory authority has been set up, this is basically due to the obligations imposed by European legislation that compels member States to separate legally railways infrastructure management from railways services, with an independent authority acting as a referee between conflicting interests in an open railway market.

POLITICAL PRIORITIES IN INFRASTRUCTURE DEVELOPMENT

When speaking about political priorities in infrastructure development policies, some brief historical reference appears necessary for a better understanding of present-day policies.

I – LOOKING BACKWARDS

Transport infrastructure development has for three centuries been a priority for the rulers of this centralized and militarily mighty country with many frontier States, as well as coasts on two seas and an ocean, and was for a long time the most populated country in Europe.

The modern road network was developed from the XVIIIth century by the monarchy –with the creation of a highly qualified roads and bridges state engineers - and by Napoleon's Empire. The development was initially for military purposes and later for economic development. The modern road network had been completed by the end of the XIXth century in most parts of the country. In the first half of XXth century the main priority in road infrastructure was, in order to cope with the development of the automobile, to upgrade the dirt-road network into a nation-wide tarmac –road network. In the second half of the XXth century, the major issue in roads was to cope with the mass diffusion of car-ownership and widespread urbanization: the development of a nationwide motorways network, now the third longest in Europe and the 6th longest in the world was the major

answer to that challenge. The central State could only meet it through a massive use of partnership between the State and private partners, and the second half of the XXth century was the second phase of public-private partnership to develop the country's transport infrastructure.

The first phase of public- private partnership had been in the XIXth century the development of the nation's railway network. France's railway network, was from the 1840's developed -unlike Brazil's- under rigid State supervision as well as State-private sector partnership, as a 1842 law defined what cities would be included in a network radiating from Paris and buit under a regime of concessions. Under such a system, the State owned the land to be devoted to the railway and built the infrastructure. The private partners (6 of them each with a geographical range radiating from Paris) laid the tracks, built the superstructure, bought (or built) and operated the rolling stock within the range of their own concession over which each concession holder was given complete monopoly of railway operations. Private capital was the only financial resource available to the State for developing a network that from 1840 to 1880 sprang from 300 km to 21000 km and when World War I broke out in 1914 was 38000 km long –that is one quarter more than today's. The total population of France when the railway network was started in the 1830's was around 35 million inhabitants. It was 40 million when the network was completed less than 80 years later.

When in the first third of the XXth century railway concession-holders all went bankrupt, States in Europe had no choice but to become railway system owners–and France was no exception. During most of the XXth century, railway infrastructure development virtually came to a standstill in Europe. Railway infrastructure development re-started in the 1980's with the development of high speed networks first by France and Germany, by State-owned companies with public funding.

As regards France, once again, like more than half a century ago, when some years after the first high speed line became operational, it was decided that high-speed railway lines should not be piecemeal additional lines domestic or international added to a classical network, but a nationwide as well as Europe–minded high-speed network, the issue of finding financing partners was central if the intent was to turn into facts. Co financing agreements with regions and other local authorities directly interested by the economic bonuses came first. At a later time came the unavoidable return to public/private partnership for railway development.

One other fundamental feature to keep in mind is that, contrarily to what was the case for centuries, the State cannot any more make its national infrastructure development choices alone. Two recent political partners that came into life during the last 50 years cannot be overlooked as regards political priorities ,as well as financing: they are the regions – the french equivalents of the brazilian states- and the European Union.

II- DEFINING PRIORITIES WITH POLITICAL PARTNERS (1) REGIONS AND OTHER LOCAL PARTNERS

The french regions, unlike the brazilian States are newcomers in the national political landscape, They were created only 49 years ago with very limited powers. Over the last half century their field of competence as well as their financial resources has considerably increased. Economic and regional development and transport are their major fields of competence. They act as transport authorities for the regional railway passenger services and usually own the regional trains operated at the time being by the SNCF. Regions are, thus, major stakeholders for the definition of the priorities in high speed lines development. A high speed rail service is indeed a major booster for the economic attractiveness of a capital city of the region and its neighbouring territories. As well as political, regions have financial powers. For decades State and regions had been negociating partners in the local infrastructure (not only transport) development programs (*contrats de plan Etat région*) negotiated every five years and now defunct. When regions were given ten years ago competence over regional railway passenger transport services rail infrastructure development ran places up on their political agenda. As the high-speed network is interconnected with the classical network, the issue is not only where will be the new tracks and –possibly – the new interconnection stations, but also which cities (big or small) on the classical network will be served by high-speed trains running at 'classical network' speed

When speaking later about case studies I will provide information about financing by local political institutions: regions departments and cities.

It is also worth mentioning that in three separates occasions, foreign states (namely the Grand Duchy of Luxembourg (twice) and Switzerland (once) have been financial contributors for the development of high speed railway lines entirely located on the French territory, as those lines, although located abroad, significantly improved railway transit time to/from some of their major cIties and as a consequence, their economic appeal.

III- DEFINING PRIORITIES WITH POLITICAL PARTNERS (2) THE EUROPEAN UNION

France was a founding member (1957, 6 original member States) of the European Union. The European Union- much more compelling for member-States than Mercosul-is a single economic market (free flow of person goods and capital) of 27 States (once again...)totalling 500 million citizens from Cape North in Norway to the Oyapock river. The founding principles of The European Union are translated into legislation in many fields, (including transport and environment) in order to ensure a completely unified single market on which firms from all member States can compete on a fair competition basis with no kind of discrimination between operators from different member- States. As regards infrastructure, the European Union promotes infrastructure development through the Trans-European Network Program (TEN- in France RTET) aims at facilitating the development of trade and of the single market as well as regional development of outlying areas, in particular through complete interoperability of the various national networks. EU transport policy also aims at increasing the modal share of transport modes other than road transport (i.e. primarily railways. Thus, out of the 30 ear-marked priority TEN-T projects that represent a 225 billion € investment up to 2020, only 4 are road projects the overwhelming majority being railways projects. European financing is vital for trans-national border – crossing projects as well as some others improving international connexions; (more on that later under case studies°

IV – LOOKING FORWARD (1): DELIVERING SUSTAINABLE DEVELOPMENT

As Brazil hosts next month the United Nations Conference on Sustainable development, Rio +20, 20 years after the first Rio conference that was a milestone for environmental policies all over the world, I need not insist on the challenges that all States – whatever their present level of development - are faced with common but differentiated responsibilities, in order to secure a sustainable future for the generations that take over from us. And transport is very much part of the game.

France's pledge as regards climate change is to divide its greenhouse gas emissions by 2050 in order to decrease from 6 tons equivalent carbon dioxide per person a year to 1,4 ton per person a year The mid term target is 2020, when European Union countries are expected to have reduced their emissions by 20%,

The national measures against climate change given the highest priority are the reduction of energy consumption by buildings as well as the reduction of greenhouse gas emissions by the transport and energy sectors.

It is worth mentioning that national measures taken aim to incorporate the cost of greenhouse gas emissions into the price of the goods and services, in particular by providing information about the ecological cost of such goods and services. To that respect, the french authorities have taken ad hoc regulations: from now on, the amount of greenhouse gas emissions resulting from any transport delivery -and determined following government -approved criteria has to be clearly made known to the customer.

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V– LOOKING FORWARD (2): DELIVERING SUSTAINABLE TRANSPORT

Transport accounts for 27 % of France's greenhouse gas emissions,

According to legislation the transport policy contributes to sustainable development and to the enforcement of France's international commitments as regards greenhouse gas emissions and other

pollutants and limits natural and agricultural land consumption. The target set is a 20% reduction from 2010 to 2020 of transport generated greenhouse gas emissions in order to bring them back to their 1990 level.

Following a logic aimed at developing multi-modal and integrated transport, the State will see that the increase in road capacity shall be limited to bottlenecks, road safety issues and local interest questions.

As regards freight transport, the priority is to increase the modal shares of rail waterways and maritime transport.

As regards infrastructure, regeneration and modernisation of the existing network is defined as a priority, in particular for railway lines that are vital for the opening-up of local areas.

*A*s regards passenger transport, priority is given to the reduction of fossil fuels consumption, greenhouse gas emissions, other air pollutions and other nuisances. Developing public passenger transport is a priority and railway infrastructure projects will have precedence over airport or motorways projects.

At the present time 50 % of European high speed pax.km are performed on the french high speed network France. Carrying on the development of the high speed network improves the connections between the provincial capitals and Paris as well as the connections between the regional capitals thanks to transversal lines and interconnections in the Paris area. The development also improves the european integration thanks to more connections with border States network. The target set up by a 2009 legislation is to launch 2000 more kilometres from 2010 to 2020, with estimated State funding around 16 billion€. The projects whose inclusion in the 2000 km target is mentioned in this legislation are:

LGV Sud-Europe—Atlantique, Tours—Bordeaux (launched 2011 more on that later) and three more branches: Bordeaux to Toulouse, Bordeaux to the spanish border and Poitiers to Limoges

LGV Bretagne—Pays de la Loire (launched 2011 more on that later)

The méditerrean ark with the Nîmes and Montpellier by-pass (partnership contract in the final stages of negociation), the Montpellier to Perpignan line (a high speed line from that city to the spanish city of Figueras is operational since 2009) and the Provence -Côte d'azur line (Marseilles to Nice close to the italian border)

The completion of the LGV Est from Paris to Strasbourg (last phase launched in 2010 – more on that later)

The three legs of the LGV Rhin—Rhône (eastern leg phase I operational december 2011)

The interconnection south of Paris of the high sped lines

The high speed link to the international tunnel of the Lyons to Turin high-speed line

MAKING AN INFRASTRUCTURE PROJECT– FINANCING INCLUDED- ACCEPTABLE TO ALL STAKEHOLDERS

This section I will try to convey the gist of the issues project developers are faced with in France. The finance issue is mentioned, but will also be developed more in detail in the next chapter.

I shall refer to high-speed rail projects, as for the last three decades, they represented the major transport infrastructure projects developed; they are most likely to remain at the top of the agenda for decades.

Giving at that stage detailed indications on the legal proceedings appears irrelevant: each country has its own peculiarities and idiosyncrasies. Giving a broad idea about the challenges we face is certainly more concrete for a foreign audience than giving a detailed and theoretical lecture about administrative proceedings. I will give a few concrete illustrations when mentioning case studies at the end of the talk.

One very important observation has to be made before any exposition on the topic of infrastructure Project development: Brazil and France have experienced totally different demographic histories as well as human settlement patterns.

France has been a densely populated country for many centuries and has experienced very limited population growth over the last 200 years (the total french population just doubled in size over the last two centuries). Brazil's population has grown five times to 200 million inhabitants since the 1930's when brazilian and french population were at the same level (40 million inhabitants -France now has 65 million inhabitants) France has also a very fragmented land ownership pattern and farmers are most of the time owners –or at least long lease holders of the agricultural land. France has also a very developed cultural heritage dating back rather frequently before Christ, such an extent that 'preventive archeology legislation'had to be taken with regard to infrastructure projects. Last but not least, private property protection ranks very high in the legal order since the French revolution and expropriation requires following rigid rules under the vigilant control of two kinds of jurisdictions.

The relative stability of the population- even with internal population movements from an densely populated countryside for centuries towards the towns makes that, railway infrastructure 'studies 'abound from the XIX th century onwards, local political authorities as well as the French railways, and later the railway infrastructure development agency have studied for long–with various degrees of accuracy - potential new railway links.

I – STAGE 1 (PRE-OFFICIAL) ASCERTING THE NEED FOR A NEW LINE

That ' informal 'stage is what could be called 'self-commissioned 'studies, as no government interest has yet been officially formalized. Such needs are usually expressed either by local pressure groups, local politicians, by the French railways SNCF or by the infrastructure owner RFF. This informal early stage 1 has 'focuses the searchlight' on the effects of an increase of the transport offer as well as on wider economic and social opportunities that might be brought out by such a project. When the initiative is taken by the railway service operator SNCF, it presents a so-called 'initialization file ' to the infrastructure owner-developer RFF (website: www.rff.fr) This early informal stages enables to draw preliminary indications regarding costs and planning for the various possible variant versions. Such variant versions may at a later stage, either be studied more in depth or discarded.

II STAGE 2 EARLY OFFICIAL CONSULTATION OF THE GENERAL PUBLIC AND INITIAL OFFICIAL SURVEYS

Stage 2,t he first 'official ' stage –is reached when the State, after a dialogue with local political authorities – who often will have taken the initiative- announces that it has asked the railway infrastructure development agency RFF to carry out pre-functional surveys (*études pré-fonctionnelles*) as well as public debate (*débat public*). This stage is politically fundamental because it enables public authorities to ascertain whether or not the project –or more precisely, the overall concept of a project from A to B through C and D with possible variant options has a real economic and social interest. This stage assesses the technical and environmental feasibility of technical solutions meeting the needs expressed at stage 1, as well as the acceptability of the project by the population of the territories the new line will go across. This stage also enables to understand the expectations of the people about the advantages the new line might bring and their opinions about what should be avoided.

I will not at that stage develop on surveys. I will only mention that usually the local political authorities will be partners of the State for their financing. On the other hand, the early consultation process called public debate deserves to be explained somewhat in detail.
Early consultation of the public at large at this early stage has been carried out for more than 20 years now .The law states that when they may affect directly and significantly the environment, the draft decisions to be taken by the State or its agencies are subject to preliminary consultation of the public at large. This open debate is crucial in order to detect at the main, political, economical environmental and land use issues that will be part of the 'landscape 'all over the conception, construction phases, and that if not properly identified and properly addressed from the earliest stage might make life very difficult for a project development. Our italian partners who have for long being facing resilient difficulties with local acceptance of infrastructure projects, in particular on the new high –speed line between Turin and Lyon in France have recently indicated that they intended to adopt a public debate legislation based on the same principles as ours regarding early public debate, in order to prevent protracted issues of local discontent for future projects.

With regard to infrastructure projects – whether public or private - the consultation of the general public and stakeholder is held since 2002 under the supervision of an independent authority national Commission for public debate (*Commission nationale du débat public*): website www.débatpublic.fr/

By the end of stage II, the State has at his disposal:
An overall analysis of the challenges in various fields, possible variant solutions and estimates of total estimated cost and estimated timetables for these variant solutions and proposals for an optimized program to be implemented at stage 3 (preliminary project)with some room left for secondary variants.

III- STAGE 3 SUBSTANCE, ESTIMATED COST, SEARCH FOR FUNDS AND ASSESSMENT OF PUBLIC UTILITY OF THE PROJECT

Stage 3 :

Finalizes the *substance* of the projects and determines the estimated provisional cost of the whole operation (in *french coût prévisionnel provisoire de réalisation)* more or less 20%.

Proposes a financing plan for the project (see under–from the drawing board to real life)

Prepares and gets into motion the administrative proceedings such as public utility inquiry

At the end of stage 3 that the State determines the amount of the funding it will bring for the project in association with other public partners (regions, cities even foreign countries) and from 2006 private partners with he possibility of a concession or a partnership contract. Of course discussions with local authorities on financial issues have been carrying on from a very long time, even before 'stage 2'

The main options possibly left open at the end of stage 2 are compared during stage 3 using technical , environmental criteria in order to choose the most relevant solution to be proposed for a public utility declaration (this declaration enables expropriations to take place at stage 4)

Stage 3 is of the utmost importance as it implies a decision (yes or no) as well as financing by the infrastructure owner/ developer. It is frequently a 'no way back 'stage for a project as a financed and phased project becomes politically extremely difficult to be 'shelved'.

STAGE 4 EXPROPRIATIONS, ENVIRONMENTAL MEASURES, CONSTRUCTION

This stage sees the final phase of the administrative proceedings (detailed review of the concrete measures to be taken measures to be taken in order to comply with legislation regarding water and

endangered species of fauna and flora). Project studies are completed and the project's form is now final. Individual expropriations take place under the authority of the judiciary judges who are 'the guardians of private property. Construction works take place, the infrastructure is delivered and, finally, the infrastructure becomes operational.

STAGE 5 OPERATIONAL LIVES
The law provides that five years after a transport infrastructure has become operational, a socio – economic and environmental assessment s carried out.

FROM THE DRAWING BOARD TO REAL LIFE / THE FINANCE ISSUE

Although the financing convention comes in the middle of the administrative proceedings –and financing issues have been discussed – between ministries of finance and transportation as well as with local authorities since the very beginning of the proceedings, it is useful for the sake of clarity to make it a chapter of its own, developed after the chapter devoted to proceedings.

Financial issues rather than technical ones have always been the major issue in infrastructure development. Finding money outside the State budget in order to finance infrastructure development has been a long standing feature in french history. The first public private infrastructure partnership entered by the State dates back to 1564; it was a concession for a canal in southern France.

I –HOW THE PRESENT NETWORK OF HIGH SPEED LINES WAS FINANCED

While the ' historical railway network was built under concession status, the first 30 years of development of the high speed railway network took place under 'classical 'procurement contracts. This seemingly odd situation is largely explained by the fact that railways concessions, having gone bankrupt in the 1930s a single public railway company (SNCF) had been formed and was in charge of both the infrastructure and the operations in a monopoly situation. It was therefore not feasible to use the concession status, while the State remained the owner of the infrastructure, and SNCF was in charge of its development, maintenance and of passenger and freight railway services, The State had therefore to develop the initial stages of the network as it had done for its roads network: direct procurement, using the SNCF as a developer. Needless to say, this put a strain on public finance and the priority given to high speed development had consequences on the level of public expenditure on the classical railway network, where it is estimated that during 20 years –ending 2008- the yearly renovation target of 1000 km a year was reduced by half.

II – THE RETURN TO PUBLIC PRIVATE PARTNERSHIP IN RAILWAY INFRASTRUCTURE DEVELOPMENT

The creation in 1997 of a specific railway infrastructure development and maintenance agency Réseau Ferré de France that was given railway infrastructure ownership by the State changed the situation. This opened the possibility to turn, once more to private-public partnership for railway infrastructure development. However, a return to old style XIX th century concessions was not feasible. European legislation had in the meantime provided for equal access of railway operators to the network, it is in the XXIst (european) century impossible to develop a high speed railway network the way the classical network had been developed more than one century and a half ago. Political decisions taken in 2003 had given the development of a complete high speed railway network top priority as regards infrastructure development. In line with this full speed ahad policy, a 2005 law gave Réseau Ferré de France the possibility to conclude concession or 'contrast de partenariat '(i.e the french equivalent of PPP created in Brazil by the law of december 2004).

This return to railway public -private partnership was the only way forward for meeting the political objectives of improving the classical network and developing the high speed. As regards the

classical network I mentioned earlier the inadequate rate of renewal of classical lines. As regards the high-speed network development, the high profile targets set as government priorities were not compatible with the limited budget resources (even though from next year a tax on lorries traffic on the major roads -except toll motorways – will improve somewhat the financial situation of the Agence de Financement des Infrastructures de Transport AFITF that procures State funding for transport infrastructures) as well as with public-deficit reduction policies.

The political decisions taken in 2003 to build a complete high-speed network, later confirmed and developed in 2008, 2009 and 2010 made it necessary to switch from classic procurement solution (still used for the second leg of the LGV Est that will complete the all -high speed line from Paris to Strasbourg on the Rhine river on the german border) to railway concessions and the new formula of 'partnership contracts akin to brazilian PPP's

III PROCUREMENT VS CONCESSION

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The main differences between classical procurement and are well known:

	PUBLIC PROCUREMENT	CONCESSION CONTRACT
DEFINITION	Provision of supplies component (s) of a works program or supplies or a service determined by a public authority	Creation of a public facility and management of a public service via an agreement negotiated with the public authority
PRIMARY CHARACTERISTICS -THE CONTRACT -THE CONTRACT AWARDEE	- single objective - short term - lack of association with service management - not granted a public service delegation	- multiple objectives - long term - definite association with service management - is granted a public service delegation
BASIC CHARACTERISTICS	- Supervision of the execution of works by the public authority - No pre-financing co-financing or financing of the works by the contracted builder - No capital investment by the contracted firm - No freedom in services or facility design granted to the builder - Contract devoid of any service creation or organization function (‘ secondary contract) - The contracted firm is not the project developer - No contract management leeway granted to the firm - No long –term hold of the public domain - No joint construction – management- maintenance responsibility	- Supervision of service operations by by the concession holder - Pre-financing co-financing or financing of the works by the contracted builder - Capital investment contributed by the concession holder - Freedom granted in service/ facility design - Contract instituting and organizing the service specified by the PA (primary contract) - The concession holder is the project developer - Contract management leeway granted to the concession holder - Usually associated with a long term lease of the public domain - Long-term joint responsibility assigned to the concession -holder

The railway concession reintroduced from 2005 is a very different one from the 'historical model ': It was –physically and legally impossible to grant monopoly traffic rights on a new line as the aim of a new line was to improve the existing global high speed network on which no monopoly of operation is legally possible. The only way open for a renewed railway concession system was to reward the

concession-holder by the tolls paid by the railway operators for each trip on the new line (in the classic procurement system built high-speed lines, the railway tolls are paid by the railway operators to the network owner- manager Réseau Ferré de France). The concession holder runs this therefore the commercial risk linked to the level of traffic on the infrastructure by third parties to the contract (in the old monopolistic scheme the commercial risk was his trains'). More on that under 'case studies'

IV PRIVATE FINANCE INITIATIVE / FRENCH PARTNERSHIP CONTRACTS /(AKIN TO BRAZILIAN PPP's)

As previously mentioned, the ' partnership contract' was introduced in French legislation by a 2004 order. Contracting ' partnership contracts' is open to the State, its agencies and the regions, departments and municipalities. The aim of the partnership contract is to optimize the performance of both public and private sectors in order to make operational within the shortest possible time and under the best possible conditions public projects that are either urgent and complex or both: these can be hospitals, schools computerized systems, or transport infrastructures. Due to the novelty and also the potential risks a dedicated structure – A support mission for private public partnership (*mission d'appui aux partenariats public-privé MAPP* - website www.economie.gouv.fr/ppp -)has been created within the ministry of finance. The mission is in charge of giving advice to all public authorities intending to contract a ' partnership contract '.When the authority is the State or a government agency, the MAPP decides whether or not the project can be financed with a partnership contract.

Since 2005 to the present day, 110 partnership contracts have been awarded by municipalities, departments or regions and 30 by the State or government agencies. Most of the partnership contracts concluded by the State are for buildings (schools, hospitals prisons) or energy and waste processing and one for high-speed railway lines: the LGV Bretagne– Pays de la Loire: the award decision is dated january 1st 2011.The convention was signed in june 2011 (more on that later) A second partnership contract is in the final stage of negociation for the high-speed railway by-pass of Nimes and Montpelier. The approached partner has been nominated on january 13th 2012. In both cases the duration of the partnership contract will be 25 years.

Interestingly, a partnership PPP contract has been concluded for the conception and implementation of the eco –tax on lorries trafficking the more important non –motorway roads that will increase the financial resources dedicated to investment in transport of the AFITF , the State transport infrastructure financing agency.

V CONCESSION VS PARTNERSHIP CONTRACT

Like in a concession, the private partner has to finance, conceive build and maintain the infrastructure but unlike the concessionary, the private partner in this PPP gets its remuneration from public grants while construction of infrastructure is underway and later, when the infrastructure is operational from rents paid by the contracting public partner.

The difference is quite obvious with railway lines:
In a concession system, the concession-holder receives investment grants from public partners while works are in progress and once the line is operational is paid tolls by the various railways operators who are users of the line. This implies that the concession holder runs a commercial risk, whatever the quality of his performance as regards its contractual obligations towards the public authority. The appreciation of the commercial prospects of the line by the potential private partner is central to its decision.

In a '*contrat de partenariat*' the commercial risk is not an issue for the private owner as the tolls are paid by the railway companies not to the private partner as in a concession, but to the public infrastructure owner. In a 'partnership contract ', the private partner is funded by public grants and during the operational period by rents paid to him by the infrastructure owner, in relation with the performance level of the private partner's fulfilment of his contractual obligations performance and availability criteria (reliability , steadiness etc) that have been negotiated with the public partner. The appreciation of the commercial prospects of the line by the potential private partner is c therefore not central to its decision.

CASE STUDIES OF LINES UNDER DEVELOPMENT OR OPERATIONAL SINCE LAST YEAR: CLASSICAL PROCUREMENT CONCESSION PPP (PARTNERSHIP CONTRACT) REGIONS CO-FINANCING AND CARBON ASSESSMENT

In order to make things more accessible, I shall present now case studies relating to the development of new high speed railway lines currently taking place. I shall go first into detail on two projects on which works are going to begin this year and who are being built respectively under a partnership contract (akin to a brazilian PPP), the LGV Bretagne Pays de la Loire from Le Mans to Rennes 182 km long, an extension of the westward Paris to Le Mans high-speed line 190 km long operational since 1989, I will in particular give a very detailed chronology with some comments. I will, in parallel, present you in a slightly less detailed way the LGV Sud Europe Atlantique from Tours to Bordeaux (340 km) which is an extension of the Paris to Tours line (230 km) operational since 1990. The Paris to Le Mans and Paris to Tours lines share a common section 130 km long. I will then provide some details on the second leg of the LGV Est that will connect high-speed all the way Paris to Strasbourg on the german border of the Rhine that is being built under the classical procurement formula. Finally I shall present some data on a line operational since last december the LGV Rhin -Rhône Eastern leg phase 1 also built under the classical procurement formula, focusing on its carbon assessment.

THE LGV BRETAGNE PAYS DE LA LOIRE FIRST EVER PARTNERSHIP CONTRACT (PPP) FOR A HIGH SPEED RAILWAY LINE

I – MAIN CHARACTERISTICS OF THE LGV BRETAGNE PAYS DE LA LOIRE

This 182 km long line will reduce transit time from Paris to Rennes to 1h27 (from 2h05 at the present time) . It will improve by more than half an hour transit time to and from the other cities of Brittany. Brittany is one of the most economically performing areas of France, in particular for agriculture and agro-industrials products. Brittany's location at the westernmost tip of France, jutting into the Atlantic Ocean is a handicap for its competitivity on the domestic and european markets.

In order to compensate for this transport handicap, no motorways inside Brittany are conceded and local political authorities have been very active for decades in financing or co-financing with the State a local high quality roads network (as well as ports which are now region-owned). The very active involvement of the local political authorities was instrumental in securing a high speed line. This LGV Bretagne Pays De La Loire line is due to geography the only high-speed line with no possibility of traffic increase possibly result from further development of the high- speed network. This is the main reason why, unlike the LGV SEA Atlantique, later mentioned, a concession contract would not have been attractive for a private partner.

After the PPP partnerhip has been signed RFF keeps being in charge of the connections to the existing network and of the centralized management systems for operations and energy supply (remote control command unit and central sub-station. As the contracting authority, RFF is in charge of checking that the private partner’s actions are in line with its contractual commitments

II- THE FINANCING ISSUE: THE FIRST -EVER PARTNERSHIP CONTRACT (PPP) FOR A HIGH-SPEED LINE: 3 BILLION €

Public grants total **1851 M€** (60.5% of resources) and private partners funding 1158 **M€ (**38.5%)

PUBLIC GRANTS FOR LGV BRETAGNE PAYS DE LA LOIRE

PARTNERS	AMOUNT	REMARKS
State	**940 M€**	Agence pour le Financement des Infrastructures de Transport AFIT
Réseau Ferré de France	**1400 M€**	
BRETAGNE local authorities	**858 M€**	BRETAGNE Region+ 4 departments +2 municipalities groupings
PAYS DE LA LOIRE Region	**86.9M€**	

PRIVATE FUNDS FOR LGV BRETAGNE PAYS DE LA LOIRE

CATEGORIES	AMOUNT	REMARKS
Equity	**129 M€**	Equity represents 4,3 % of the total funding
Debt	**1029 M€**	Senior debt represents 34,2% of the total funding

III- LGV BRETAGNE PAYS DE LA LOIRE CHRONOLOGY

1989 (sept): The first leg of the LGV Atlantique from Paris to Le Mans becomes operational.

1994-1995 :Public consultation (public debate) about the socio-economic interest of bringing forward a high-speed railway line west from Le Mans to Rennes (due west) and Nantes (southwest) takes place.

1995 (may): The minister of transportation decides to launch the preliminary surveys.

1996- 2000: Preliminary surveys are carried out: those surveys will lead to ministerial decisions taken respectively in december 1998 and april 2000. They decided on a definitive estimated track location zone 1 km wide chosen among alternative zones as well as on the objectives regarding the services and the stations, the survey of the track location zones was carried out taking into account the following issues: human settlement, agriculture , forestry biodiversity ,cultural heritage, hydrogeology, geotechnics and hydraulics. The 1998 ministerial decision chose one track location zone for the western leg of the projected line to Rennes wrote off the possibility of a new soutwestern leg to Nantes, due to its high cost with regard to reduced transportation, as well as significant environmental problems. Further technical environmental and socio-economic studies studies carried out in 1999 led to the 2000 ministerial decision that chose the track-location zone of the eastern most leg.

2002-2005: Surveys of summary draft project were carried out: These technical and environmental, led in concertation with all stakeholders were aimed at determining the tracing within the 1km estimated track location zone with the minimal impact while compatible with the technical requirements of the frames of reference, mostly for safety reasons. Following this phase and on the basis of the surveys and consultation a summary draft project file was prepared.

2006(jan): Summary draft project file is approved by ministerial decision.

2006 (may-june): The public utility inquiry took place on the basis of a dossier largely based on the summary draft project file approved by the minister. After some further surveys regarding local tracings

had been made at the request of the ad hoc inquiry commission, the commission gave a positive opinion to the project

2007 (oct): Government issues a regulation stating the public utility of LGV Bretagne Pays de la Loire.

2008 (may): Local authorities agree on the level of their financial commitment

2008-2009: Further studies in order to prepare the detailed draft project survey (*études d'avant projet détaillé*). Those surveys regarded both technical and environmental issues;
The technical surveys dealt mostly with the connections with existing railway lines, the conditions for the restoration of roads and other networks. The environmental surveys were extensions of previous surveys dealing mostly with surface and underground waters and biodiversity,in order to prepare the ad hoc proceedings for the implementation of the legislations regarding water and protected fauna and flora species.

2008 (dec): call for tender is issued.

2009 (jan): State commitments file is issued: it recalls the options chosen in the public utility statement and presents the commitments taken by the State and RFF regarding environmental issues and integration of the new line into the territories , determines the principle of the measures to be implemented in parallel with the carrying out of the project and decides to create an environment monitoring observatory . This observatory taking into account all the surveys carried out to describe the situation as it was before works started will make the environmental monitoring while works are in progress, will follow and manage the avoidance steps to be taken as well as reduction and compensation measures as well as the assessment of residual impact. If needed, the observatory will propose corrective steps to be taken, in case that what should have been done has not been done, or if impacts not anticipated before are noticed.

2009(may): Three candidates are agreed (Bouygues Eiffage, Vinci)

2009 (july): Statement of intent on financing issigned by the ministers RFF and the presidents of the Bretagne and Pays de la Loire regions . The regions -and other local political authorities inside both regions will finance the new line at the same level than the State (not including Réseau Ferré de France's).

2009 (dec) : Preventive archeology surveys begin as well as land purchases and deforestation.

2011 (jan) Eiffage (its subsidiary Eiffage Rail Express (ERE) website www.ere-lgv.bpl.com nominated as the 'approached partner'; final financial talks under way .

2011 (july): Final financing convention is signed by public and private partners. ERE becomes responsible for its completion and after the line has become operational for maintenance and renewal during the whole duration (25 years) of the partnership contract.

from july 2011: ERE has become operational developer of the project in place of RFF and carries out the definitive technical project as well as the relevant 'in detail 'surveys in relation with it as well as the further administrative proceedings to be made after the 'in detail ' surveys (legislation on water, endangered species of wild fauna and flora, inquiries on the division list of land property, and remaining property to be bought)

2012 (feb): parcel inquiries–a preliminary to the expropriations –begln.

2012 (march): Archaeological preventive measures contract is signed (15 sites)

june 2012: Construction begins.

end of 2016: Construction end .

2017: New line becomes operational

CASE STUDY 2 THE LGV SUD EUROPE ATLANTIQUE FIRST EVER RAILWAY CONCESSION FOR A DOMESTIC HIGH SPEED RAILWAY LINE

I - CHARACTERISTICS OF LGV SUD EUROPE ATLANTIQUE

302 km high speed lines + 38 km of connexions to the existing network. The Paris to Bordeaux journey time will be 2h05 (today 3h00) 3 million more railway passengers a year from Paris to Bordeaux are expected. The LGV SEA is a prolongation of the Paris to Tours high-speed line operational since 1989. The LGV SEA is a component of the trans-European axis linking by the Atlantic Ocean coast the regions of Northern Europe with the Iberian Peninsula.
The prolongation of the high speed line from Bordeaux to Toulouse and from Bordeaux to the Atlantic side of the Spanish border are projects likely be developed after 2020, so is an eastern branch from Poitiers to Limoges.

II- THE FINANCING ISSUE: THE BIGGEST EVER CONCESSION CONTRACT

The concession's total estimated cost is 7.8 billion€. 1 billion will be covered by Réseau Ferré de France and 3 billion€ by the State and local authorities (4 regions 19 departments and 33 groups of municipalities)The 302 km of the new line from Tours to Bordeaux will be built in a single operation , while previously the surveys took into account the completion of the project in two successive phases ,from Angoulème to Bordeaux first and then from Tours to Angoulème , mostly for financial reasons, as the classical procurement formula had been the only solution initially considered.

Public grants total 4039 **M€** (51.49 % of resources) and private partners funding 3806 **M€ (**38.51%)

PUBLIC GRANTS FOR LGV SUD EUROPE ATLANTIQUE

PARTNERS	AMOUNT	REMARKS
State AQUITAINE POITOU CHARENTES LIMOUSIN CENTRE local authorities	**2992 M€**	Agence pour le Financement des Infrastructures de Transport AFIT 1505 M€ 57 local authorities from 4 regions had pledged themselves some have not yet taken the final steps. Thus, a transitory solution has been found pending their definitive decisions with additionnal transitory funding from the State and some local authorities
Réseau Ferré de France	**1047 M€**	

PRIVATE FUNDS FOR LGV SUD EUROPE ATLANTIQUE

CATEGORIES	AMOUNT	REMARKS
Equity	**129 M€**	Equity represents 9.85% of the total funding
Debt	**3029 M€**	Senior debt represents 38.61 % of the total funding

III CHRONOLOGY OF LGV SUD EUROPE ATLANTIQUE

1995-1996 Public consultation (public debate) about the socio-economic interest of bringing forward a high-speed railway line southwest from Tours to Bordeaux takes place.

1997-1998: Preliminary surveys take place.

1999-2002: Further surveys for the Tours to Angoulême (northern) leg take place.

2001-2003: Surveys of summary draft project for the Angoulême to Bordeaux (southern) leg take place.

2005: Public utility inquiryfor the Angoulême to Bordeaux '(southern) leg takes place.

2006 (july): government issues regulation stating the public utility of the Angoulême to Bordeaux southern)leg .

2003-2007: Surveys of summary draft project for the to Tours to Angoulême(northern) leg take place.

2007 (jan): Declaration of intent on financing by local authorities signed by the minister of transportation and the presidents of the four regions interested and the chairman of Réseau Ferré de France

2007-2008: Public utility inquiry for the to Tours to Angoulême (northern) leg takes place.

2008 (feb): call for tender for the concession is issued.

2008 (Sep): Initial offers are submitted.

2009(June): Government issues regulation stating the public utility of the to Tours to Angoulême(northern) leg.

2009 (July): Preventive archaeology surveys and land purchases begin.

2**009(July):** Call for tender (whole line is issued.

2009 (dec) Tours to Angoulême**):** final offers submitted

2010 (March): approached partner nominated

2011 (June) concession contract signed with LISEA a subsidiary of VINCI (website www.lgv-sea-tours-bordeaux.fr)

CASE STUDY 3 A CLASSICAL PROCUMENT- FINANCED LINE: THE LGV EST- LEG 2

I - MAIN CHARACTERISTICS OF LGV EST-phase 2

The LGV EST is 406 km high speed line from Paris to Strasbourg; its first leg 300 km long from Paris to Baudrecourt is operational since 2007. Phase 2 currently under construction is 106 km long. The completion of the line will improve France's European accessibility, reduce once again transit time between eastern France and Paris as well as to the other french regions. Transit time from

Strasbourg, where the European parliament sits will be 1h50 from Paris and 1h20 from Luxembourg where many european institutions have their headquarters.

This second phase of the high speed line is also a key element of the 'magistrale for Europe', a 1500 km long european high priority railway connexion from Paris to Budapest that someday will be high-speed all the way. This explains the reason for the financial contribution of the European Union to the project for nearly 6% of the total.

II- THE FINANCING ISSUE: A CLASSICAL PROCUREMENT CONTRACT 2010 M €
As for leg 1 the line is developed under the classical procurement scheme with local authorities + a foreign State providing for more than a third of total funding for the line(33.83%)

PARTNERS	AMOUNT	REMARKS
State	**680 M€**	Agence pour le Financement des Infrastructures de Transport de France (AFITF)
Réseau Ferré de France	**532 M€**	
ALSACE local authorities	**236 M€**	ALSACE Region+ 2 departments +3 municipalities groupings
LORRAINE local authorities	**153 M€**	LORRAINE Region + 4 departments
CHAMPAGNE-ARDENNES local authorities	**80M€**	CHAMPAGNE-ARDENNES Region+ 2 departments +1 municipalities grouping
ILE DE FRANCE REGION	**49 M€**	
GRAND DUCHY OF LUXEMBOURG	**40 M€**	Tracks do not run on Grand Duchy's territory
EUROPEAN UNION	**118 M€**	LGV EST is part of trans-european networks
Left-overs from phase1	**122 M€**	

III CHRONOLOGY OF LGV EST-part 2

1996 (oct) : Government regulation states the public utility of LGV EST from Paris to Strasbourg.

2000 (Nov): The State, RFF SNCF+ 17 french local authorities and the Grand Duchy of Luxembourg sign a financial agreement for leg 1 (Paris to Baudrecourt).

2002 (June) : Works start on leg 1.

2004 (June) : Government regulation states the public utility of LGV EST from Paris to Starsbourg prorogated for 12 more years in order to enable leg 2 (Baudrecourt to Strasbourg) to be started within the 12 next years.

2007(Jan): financial agreement of the surveys and preliminary works on leg 2

2007 (April): World rail speed is beaten on leg 1.

2007 (June): Leg 1 goes operational .

2008 (April -may): Preventive archaeological diagnoses begin.

2009 (1st term): surveys regarding the legislation on water.

2009 (March) :archaeological searches begin.

2009 (Sept): The State , RFF SNCF+ 17 French local authorities and the Grand Duchy of Luxembourg sign a financial agreement for leg 2.

2009 (Sep): Tendering for civil engineering works starts

2009 (end): Works are authorized with regard to the legislation on water.

2010: Civil engineering works begin.

2012: Railway equipment work starts

2015 (end): LGV EST operational all the way.

CASE STUDY 4 LGV RHIN RHONE (EAST LEG PHASE ONE): THE FIRST HIGH SPEED LINE WITH A CARBON ASSESSMENT

I – MAIN CHARACTERISTICS OF LGV RHIN RHONE (EAST LEG PHASE ONE)

140 km long, 2,3 billion€ this line operational since december 2011 is the first high-speed line not to be Paris- bound, It improves the connections between 4regions in eastern and south eastern France(Alsace, Franche-Comté Burgundy and Rhône-Alpes and develops a North -South link between Germany , Switzerland, Spain and Italy. Drastically reduces transit time from the northern part of Switzerland to France (Zurich to Dijon is now 2 h25 instead of 4h30 and Zurich to Paris is now 4h02 instead of 6h 07 until last december.

II- THE FINANCING ISSUE: CLASSICAL PROCUREMENT CONTRACT

PARTNERS	AMOUNT		REMARKS
State	**751 M€**	32%	Agence pour le Financement des Infrastructures de Transport de France (AFITF)
Réseau Ferré de France	**642 M€**	28.6%	
ALSACE local authorities	**206 M€**	11,74%	ALSACE Region+ 2 departments +3 municipalities groupings
FRANCHE COMTE local authorities	**316 M€**	14 %	FRANCHE COMTE Region + 4 departments
BOURGOGNE local authorities	**31 M€**	6 %	BOURGOGNE Region+ 1 department + 1 municipalities grouping
SWITZERLAND	**59 M€**	3%	Tracks do not run on swiss territory
EUROPEAN UNION	**200 M€**	3%	LGV RHIN RHONE is part of trans-european networks

III – AN INNOVATION: THE CARBON ASSESSMENT OF THE NEW LINE

I mentioned earlier France's greenhouse gas emissions reduction target: 1.4 tons a year per person by the year 2050. This makes necessary to build a mobility project whose emissions do not exceed 40 grams CO_2 per kilometre. In order to make a carbon assessment of the new line an initiative was taken by Réseau Ferré de France in 2006, in close partnership with the SNCF and the french agency for energy savings (ADEME).

The carbon assessment of the new line is a 'first 'as it concerns all the life span of the line (conception1992-2006/ Construction 2006-2011/ Operations 2011-2111)

The results are the following: From 1992 to 2041 (30 years after the line became operational, the line will have been responsible for an amount of 2 million teCO2 (i.e. the total amount generated during a year by a 200,000 inhabitants town today.

Estimates are the new line will become ' carbon-positive ' 12 tears after it became operational, This means that from then on, the emissions generated by the modal shift of travellers who will have chosen to travel by rail rather than by car or plane will exceed the emissions generated by the conception, the construction and the operations and maintenance of the new line. Those environmental benefits will carry on far beyond the 30 years of operational life taken into account the life span of this kind of infrastructure being about a hundred years.

When comparing the emissions resulting from the whole life-cycle of the high-speed line with the emissions that shall not be due to the line's presence, it is quite obvious that the assets, in terms of sustainable development are by far, well above the liabilities of its carbon footprint.

The data speak by themselves: nearly 4 million teCO2 (3.895 000) shall not be emitted thanks to the transport supply provided by the new LGV leading to a modal shift of 1.2 M travellers a year from road and air transport over the years 20120 to 2042 (scenario taking into account of a reduction by half of air transport emissions per pax.km from 301 g CO2 per pax.km between 2009 and 2040 and as regards road transport a reduction from 145 g CO2 and 2.2 pax.vehicle. km in 2007 to 91 g CO2 and 2.7 pax.vehicle.km by 2050.

The emissions generated by the line from conception to 2042 have been estimated: conception phase 22 000 teCO2 (1%) construction phase 1116 000 teCO2 operational phase 685 000teCO2:

CONCEPTION PHASE; 22 000 teCO2
In that early phase, emissions are due to engineering surveys (criterion 110 teCO2 for a million€)

CONSTRUCTION PHASE: 1116 000 teCO2:

110 000 teCO2 for <u>preliminary</u> works (10 hectares per km, 6 workers a month for each kilometre – 4 for deforestation purposes 2 for archaeological purposes)

750 000 teCO2 for civil engineering works

1100 of inner energy of buildings dedicated to LGV (electricity)
41000 extractions and processing of materials
107 400 transport by trucks of materials (earth = 83000teCO2)
47300 transport of staff (construction workers and any other staff dedicated to the works, 20% of the staff is local 80% are not permanent residents in the area
550000 for inbound materials (lime 282 000/47 300 cement / 51 3000reinforcement steel /33000 profiled steel for construction works /others 55 000)
2750 for depreciation for equipment acquired by contractors and dedicated to the works but will be also used later on other places
9200 subsidiary works

5500 teCO2 for railway connections with the existing railway network

117 000 teCO2 for railway equipment

5500 signalling energy
106 300 tracks catenaries work base
730 technical buildings
730 telecommunications
1100 energy supply for trains (2 new electricity sub-stations)
2200 signalling

95000teCO2 for construction of the TGV trains

29000 teCO2 for construction of 2 TGV stations, 1 command unit and 2 maintenance buildings

OPERATIONAL PHASE: 685 0000 teCO2

5600 teCO2 for operations of the two new stations

26000 teCO2 for TGV trains maintenance

19900teCO2 for infrastructure maintenance

635 000teCO2 for traction energy

On these bases, the new line will become carbon-positive after 12 years operations (i.e. the volume of emissions that have been avoided thanks to the entry into service of the new line becomes superior to the combined emissions resulting from the conception/ construction / operations. Of course these environmental benefits will continue after the first thirty years of operation, as the expected life-span of such an infrastructure is around a hundred years.

IV CARBON RELEVANCE OF RAILWAY INFRASTRUCTURE PROJECTS TO COME

This carbon assessment (compulsory since 2009) will be used as a standard in order to determine the carbon-utility of the railway projects presently under study. This new approach –that will be developed and improved by RFF SNCF and ADEME enables to check the interest of the projects through a 'greenhouse gas approach ' that is a necessity due to the commitments taken by France as regards climate change. The envisaged paths for progress are the following:

WORKS PHASE:

Preliminary works: The national institute for agronomical research is to determine whether new techniques of soil scrapping might improve the conservation of the carbon contents of the soils impacted by preliminary works.

Materials used for works: Lime accounts for 33% of civil engineering emissions. The main priority is to reduce the quantity of lime in a global environmental approach (conservation of sensitive natural areas, wetlands and agricultural lands). Among the possible solutions are a better planing of works allowing for a longer drying period in order to improve their bearing capacity and thus reduce the amount of lime needed and the opening of quarries located closer to the works site. Cement accounts for 15% of civil engineering emissions. The possible paths for improvement are the studies of variant solutions with high performance concrete, reducing as possible the use of concrete and derived products when building and renovating stations. Steel amounts for 10% of civil engineering emissions. The solution considered is to determine with the trade whether or not a massive use of recycled steel might not have unwanted side effects.

Transport of materials accounts for 9.5% of civil engineering emissions: one third of fuel is consumed for material extraction, the rest for transportation of materials; the possible alternate solutions for transportation are a major use of the conveyor belt technique, of cable transport, electric trolleys and other alternative modes.

Hydraulic works: Prefab concrete, pig iron, PVC and other plastics: The feasibility of an increased use of plastic-much more carbon efficient is to be assessed.

Commuting of staff: The hypothesis taken into account is that an average public works employee travels about 3350 km a month, 95% of the distance being covered at week-ends to go home.

Railway equipment: Try to facilitate a supply by rail near the work sites.

OPERATIONS AND MAINTENANCE PHASE:

Traction energy: The target set is to reduce by 30-40% traction energy from now on to 2025. The steps considered are training engine-drivers to energy-saving driving that might result in a 5% reduction of energy spent, reducing energy spent during long stopovers, and acquiring more energy –efficient rolling stock: more aerodynamic trains, 15 to 20% lighter, in particular using composite materials, thus braking energy spending can be reduced, and auxiliary consumption better managed.

Railway buildings: In conformity with the targets set by legislation, the SNCF should in the long run reduce by 38% their energy consumption. 500 000 sq.m2 shall be fitted with photo-voltaïc cells starting from 2010, all other railway buildings shall be fitted as well, and all stations of the national network will have their thermal isolation optimized up to 2020.

High speed trains: 30 years after the first high-speed line became operational the SNCF. Prepares the replacement of the earlier batch of trains; the renewal of the rolling stock includes the energy efficiency issue.

Infrastructure maintenance: A significant part of carbon emissions generated during maintenance operations is due to road transportation of the maintenance staff. Clean vehicles should be privileged.

X X X

Ladies and gentlemen, Transport infrastructure development is, we all know, a vital issue for societies, whatever their own specificities. I have tried to illustrate some of the various challenges my country faced in a not very distant past, faces at the present time, and will face in the predictable future. I have also mentioned the solutions we found and the innovative solutions we are now experiencing.
Today's Brazil's challenges in infrastructure development are partly similar to ours, and partly very different in a different spatial and demographic context, but some solutions can follow the same pattern. I hope that some the issues I presented during the last hours can provide food for thought for some of you, in the fascinating task which is yours, of implementing the transport part of the very high profile second phase of the plano do acceleracào do crescimento, o PAC dois.

Thank you for your attention