High speed rail in France

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Overview

- RFF and the rail industry in France
- High speed experience in France
- Network extension plan
- Role of PPP
Réseau Ferré de France (RFF)

- Infrastructure manager
- Public (100% French State ownership)
- Vertical separation (mandatory in the EU, directive 91/440)

Railways

- SNCF (incumbant)
- New entrants (2010: open access for international passenger transport)

Regulatory bodies

- Until now: French State
- From december 2010: ARAF (regulatory body)
RFF Network

- RFF is the owner and manager of the French railway network
  - RFF: 30 000 km
  - DB Netz: 34 000 km
  - Network Rail: 31 000 km

- Operation and maintenance is delegated to SNCF-Infra
29 years of high speed development (1981-2010)

- Largest HS network in Europe (1800 km)

- 7 high-speed lines
  - LN1 (1981-1983) HSL Paris-Lyon, 410 km
  - LN2 (1989-1990) HSL Atlantique, 290 km
  - LN3 (1993) HSL Nord Europe, 350 km
  - LN4 (1992) HSL Rhône-Alpes, 120 km
  - HSL Interconnexion IDF (1996), 120 km
  - LN5 (2001) HSL Méditerranée, 250 km
  - LN6 (2007) HSL Est, 340 km
  - LGV Rhin-Rhône Est 1 (under construction, to be opened in 2011)

- World speed record: 575 km/h (2007)

- Economic data of high speed for RFF
  - 25% of the network traffic
  - 45% of the revenues
High speed rail is the main driver of rail demand

Current demand for high speed transport (2008)
- 50 billions of passenger-km
- 60% of total demand

Source: SNCF
High speed rail allows an increasing rail modal share
High speed rail facing air transport

- **The example of HSL Est**
  - In operation in 2007

- **Paris-Strasbourg by train**
  - Before: 4 h
  - After: 2 h 20

- **Paris-Strasbourg by air**
  - Before: 1 000 000 pax
  - After: 400 000 pax

- **Airlines strategy: no direct competition**
The economics of high speed rail

Breakdown of costs

- **49%** of HSR costs are infrastructure related
  - A total cost of around 3.3 billions euros (2004 estimates)

- **30%** of HSR revenues went to the infrastructure manager
  - A global turnover of 3.3 billions euros (2004 estimates)
  - Tracks access charges costs around 1 billions euros
Network extension plan

- Government extension plan
  - Climate change policy
  - Objective: launching 2000 km new lines in 2020
The cost of the extension plan

### Previous investments (1981-2010)
- 29 years
- 1850 km

### Extension plan (2010-2020)
- 10 years
- 2000 km

### Estimated cost
- Basic cost of 20 m€ / km
- An estimated cost of 40 billions €

### The issue of financing
- Until now: 2 G€ / year for rail
- Required: almost 4 G€ / year
The scarcity of public funds

Governement should provide the most efficient infrastructure within the available ressources

- Mediocre profitability of future projects
  - Most profitable projects achieved
  - Need of subsidies

- Public debt
  - Maastricht criteria
  - Impact of the crisis

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009 (p)</th>
<th>2010 (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debt/GDP</td>
<td>63.7</td>
<td>63.8</td>
<td>68.1</td>
<td>77.1</td>
<td>84.0</td>
</tr>
</tbody>
</table>

- The governement agency for transport infrastructure financing lacks funds
  - Revenues from highway privatization (2004) are no longer available
  - Road users charge (« Eurovignette ») will not be implemented until 2012
Motivations for Public Private Partnerships (PPPs)

Advantages of PPPs

- Leverage new resources for rail sector (private funds)
- Optimize the global investment cost
  - Integration of construction, operation and maintenance tasks
- Incentives on delivering the most efficient infrastructure
  - Reduce cost and delay overruns
  - Private sector expertise (innovation)
- Transfer some of risks to the private sector
  - Traffic
  - Construction (investment costs, delays)
  - Maintenance / operation

However a PPP can’t make a good project out of a bad one: private investment will never compensate for the lack of profitability
Regulation framework of PPPs in France

Public tender

- Standard scheme for high speed lines until 2006

Since 2006, the law allows the participation of private parties

- The State and RFF are allowed to use PPPs for the provision of national rail infrastructure

Private sector can take two forms

- Concessions (délégation de service public)
- Partnership contracts (contrat de partenariat)
Public tender

The standard scheme for high speed lines (HSL Rhin-Rhône, Est)

- Classical scheme for railways infrastructures until 2006
  - Historically, scarce participation of the private sector in the rail sector
  - Law and regulation provide for both State and public companies monopoly on project undertakings, as well as on infrastructure maintenance

- RFF is the only project undertaker
  - RFF pays the NPV of the free cash flow

- Subsides *ab initio* pay for the rest (if needed)
  - French State
  - Local authorities (regional council, departments, cities…)
  - Other neighbouring States (e. g. Luxembourg for LGV Est)

- All risks (construction, maintenance, traffic) are borne by public sector
Concessions (Délégation de service public)

Standard scheme for transport infrastructures

- Local public services in France (public water supply)
- French toll highway network (8000 km)
- Recent in rail infrastructure

Risk sharing

- Traffic risk borne by the concessionaire
- Subsidies *ab initio* if needed

Possible difficulty

- Transfer traffic risk to the concessionaire
Traffic risk is inherent to rail projects

Rail projects are inherently risky due to the uncertainty related to traffic forecasting errors

- Flyvberg, Bruzelius and Rothengatter (2003) observe that the average number of rail passengers is 40% lower than forecast.
- An average traffic overestimation of around 20% for high speed rail in France (after 5 years, less after that).

<table>
<thead>
<tr>
<th>Route</th>
<th>Traffic ex post / ex ante</th>
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</thead>
<tbody>
<tr>
<td>HSL Paris – Lyon</td>
<td>+1%</td>
</tr>
<tr>
<td>HSL Atlantique</td>
<td>-12%</td>
</tr>
<tr>
<td>HSL Nord Europe</td>
<td>-50%</td>
</tr>
<tr>
<td>HSL Interconnexion IDF</td>
<td>-34%</td>
</tr>
<tr>
<td>HSL Rhône Alpes</td>
<td>-26%</td>
</tr>
<tr>
<td>HSL Méditerranée</td>
<td>-8%</td>
</tr>
</tbody>
</table>

- Some exceptions (HSL Est: traffic probably underestimated)
**HSL Sud Europe Atlantique: a concession**

- **HSL Sud Europe Atlantique**
  - In March 2010, RFF has started negotiations with a consortium led by the French construction group VINCI for the concession of the high-speed line Tours-Bordeaux

- **The largest railway concession in Europe**
  - 300 km of high speed line
  - 7,2 billions €
  - Long term contract: 50 years

- **Interface with existing network and future projects** (cf. map)

- **Cofinancing with State and regional authorities**
  - 50% of the investment cost to be shared by the French State and local authorities
Partnership contract (Contrat de partenariat)

Newest scheme
- Created in 2004 by French Parliament
- Inspired on PFI

Risk transfer
- Construction risk (delays, costs) borne by the private partner
- Traffic risk is carried by the public sector
  — RFF will pay the private partner for the contract duration

Examples
- Future LGV Bretagne Pays de la Loire
- Future Nimes Montpellier bybass
- ....
### Summary: risk sharing matrix

<table>
<thead>
<tr>
<th>Risk</th>
<th>Public tenders</th>
<th>PPP (Contrat de partenariat)</th>
<th>Concession (Délégation de service public)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financing</td>
<td>RFF</td>
<td>Private</td>
<td>Private</td>
</tr>
<tr>
<td>Design / Construction</td>
<td>RFF</td>
<td>Private</td>
<td>Private</td>
</tr>
<tr>
<td>Operation and maintenance</td>
<td>RFF</td>
<td>Private</td>
<td>Private</td>
</tr>
<tr>
<td>Availability</td>
<td>RFF</td>
<td>Private</td>
<td>Private</td>
</tr>
<tr>
<td>Traffic</td>
<td>RFF</td>
<td>RFF</td>
<td>Private</td>
</tr>
<tr>
<td>Examples</td>
<td></td>
<td>HSL Bretagne Pays de la Loire (BPL)</td>
<td>HSL Sud Europe Atlantique (SEA)</td>
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<tr>
<td></td>
<td>HSL Est</td>
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<td></td>
<td>HSL Rhin Rhône</td>
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Conclusion

- High speed rail in France has been a success and has become the dominant mode for interurban collective passenger transport in France

- High speed rail network development is strongly supported by French government
  - Climate change policy

- A new role for the private sector
  - PPPs should deliver the most efficient infrastructure within the available resources (value for money)
Thank you for your kind attention