# HIGH SPEED LINE INFRASTRUCTURE

I – HIGH SPEED LINE NETWORK IN FRANCE

II – HIGH SPEED LINE EAST EUROPE LINE CONSTRUCTION

III - HIGH SPEED LINE CONSTRUCTION IN MOROCCO

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# SNCF GROUP AT A GLANCE

## THE BENCHMARK FOR MULTIMODAL TRANSPORT SOLUTIONS AROUND THE WORLD

### 2018 KEY FIGURES

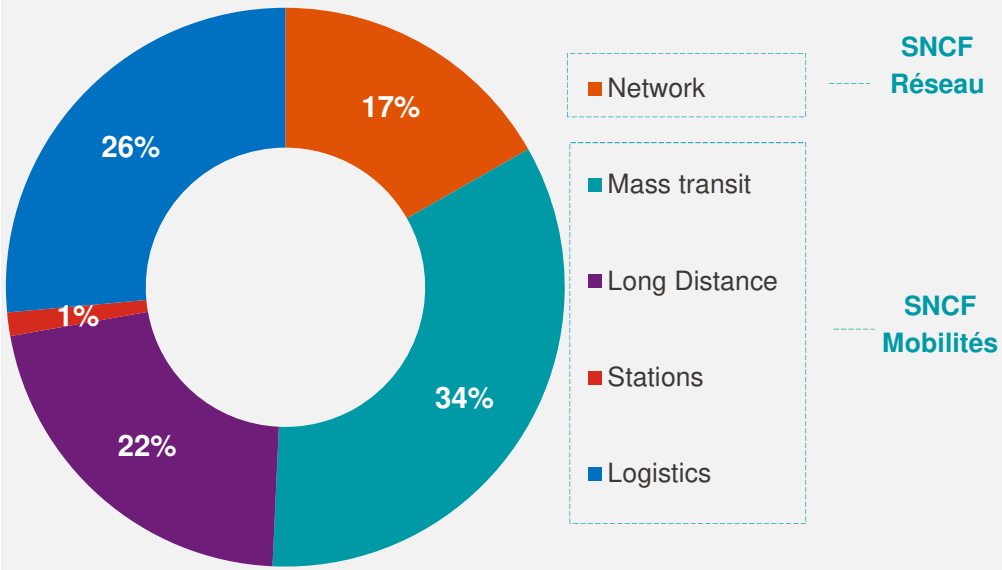
**€33.3 Bn**
revenue

**272,000**
employees

**15 M**
passengers/day

**170,000**
logistics companies served

### 2018 REVENUE BREAKDOWN



# MAJOR INTERNATIONAL PLAYERS IN ONE GROUP

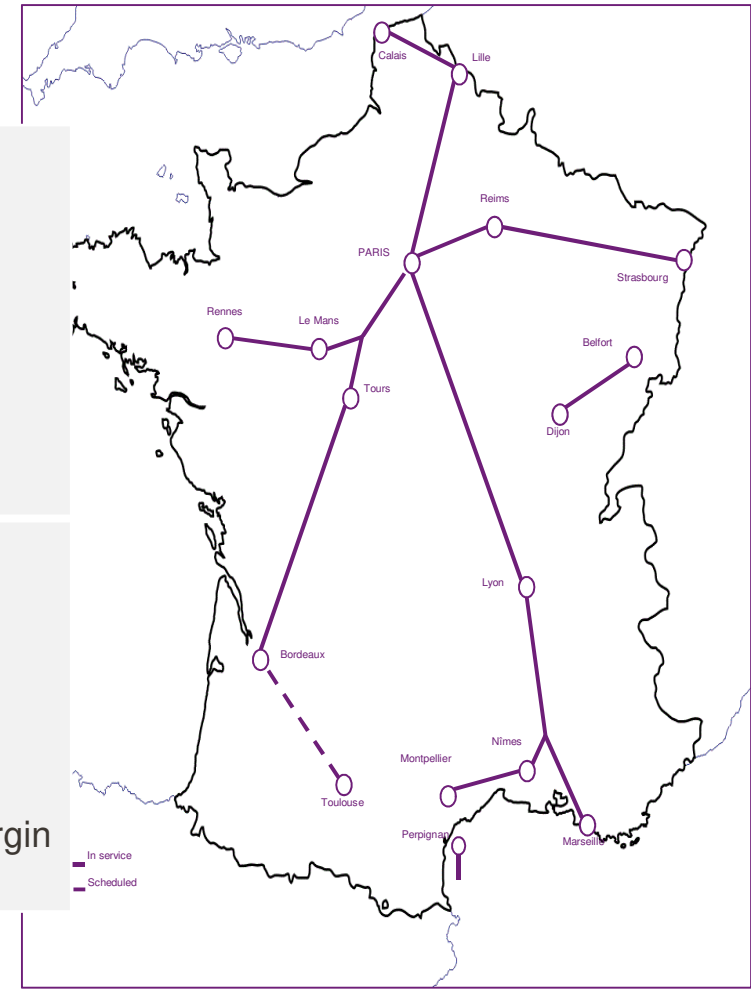
| FREIGHT & LOGISTICS | MASS TRANSIT | LONG DISTANCE PASSENGER RAIL | ENGINEERING | STATIONS |
|---|---|---|---|---|
| SNCF LOGISTICS<br>GEODIS | KEOLIS | SNCF<br>Ouigo SNCF<br>RAIL EUROPE | SYSTRA<br>(in JV with RATP) | AREP<br>HUBS & CONNEXIONS<br>SNCF |

# I - KEY FIGURES FOR FRENCH HS RAIL SYSTEM

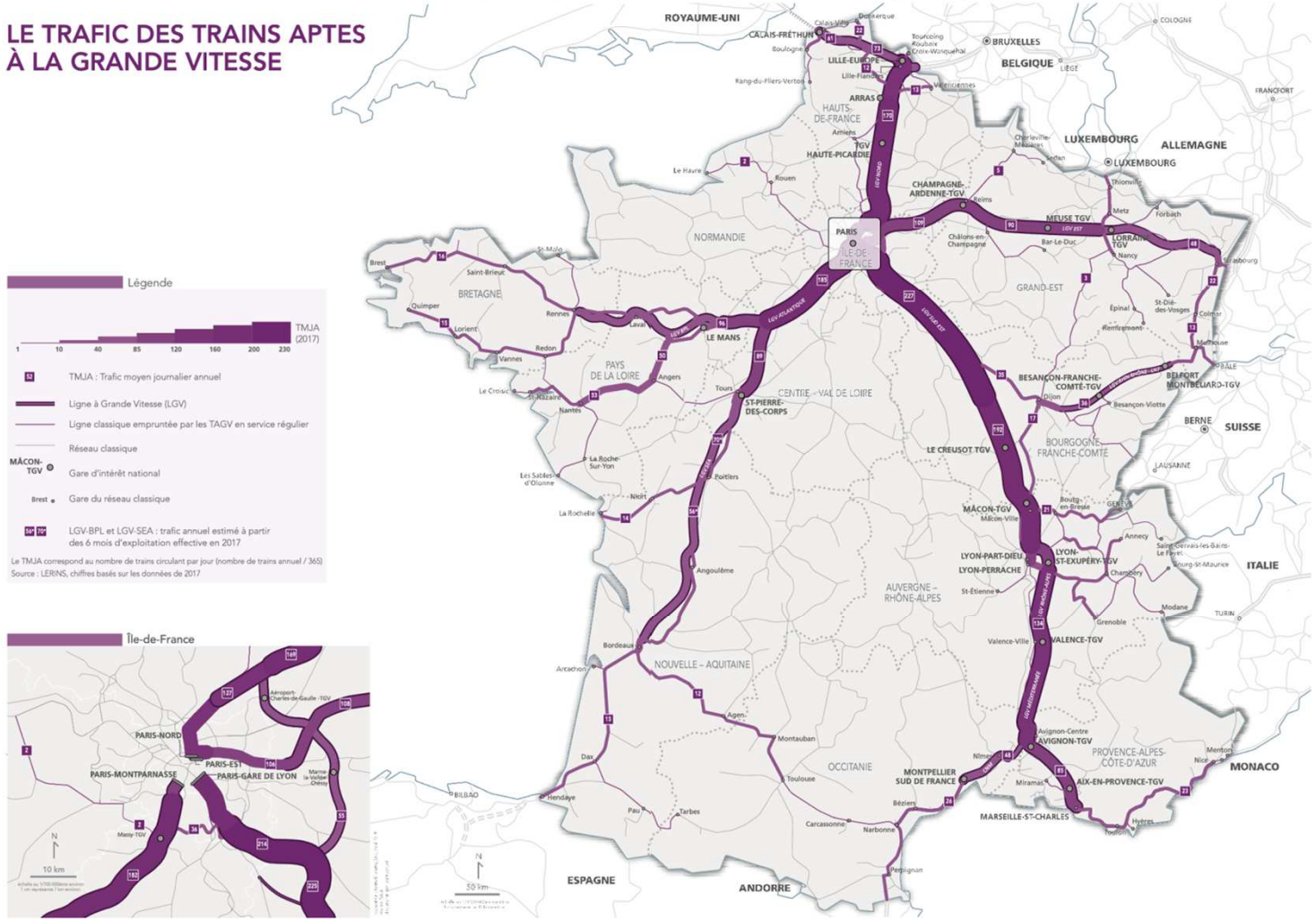
# I - SNCF FRENCH HSR NETWORK

KEY FIGURES 2018

| | | | |
|---|---|---|---|
| 39 years of experience (first HSL in 1981) | 2 840 km 10 HSL 350 kph design 320 kph operation | 230 stations served (1/3 of the French network) | 800 services per day |
| 107 M passengers | 367 trainsets | €4.7bn revenue | 9.9% operating margin |



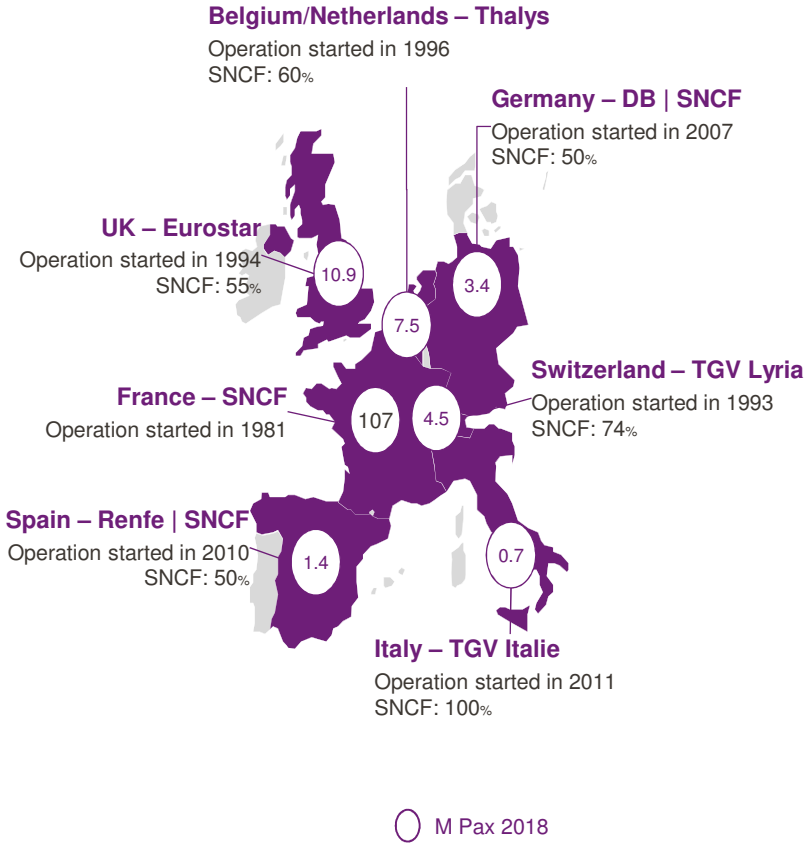
# I - HIGH SPEED TRAIN SERVICE IN FRANCE



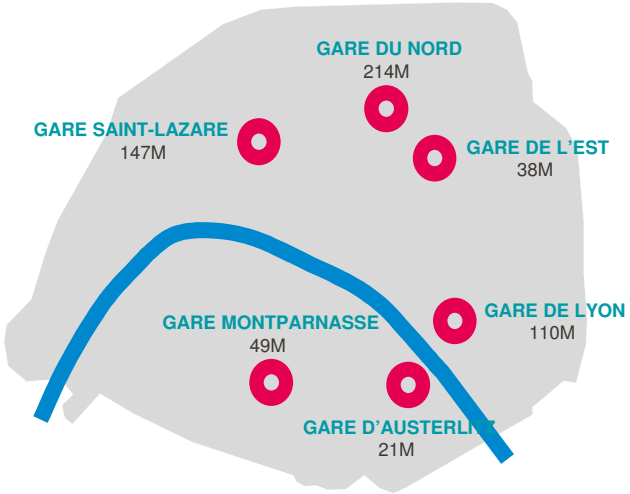
# I - SNCF EUROPEAN HSR NETWORK

KEY FIGURES 2018

| | | | |
|---|---|---|---|
| 8<br>European countries served | 95<br>trainsets (26% of total fleet) | 260<br>cross border daily services | 44<br>European stations served |
| 28.4 M<br>passengers | 48%<br>European market share (pmi) | $2.2 bn<br>revenue overseas | 30%<br>revenue overseas |



# I - PASSENGERS PER ANNUM IN STATIONS

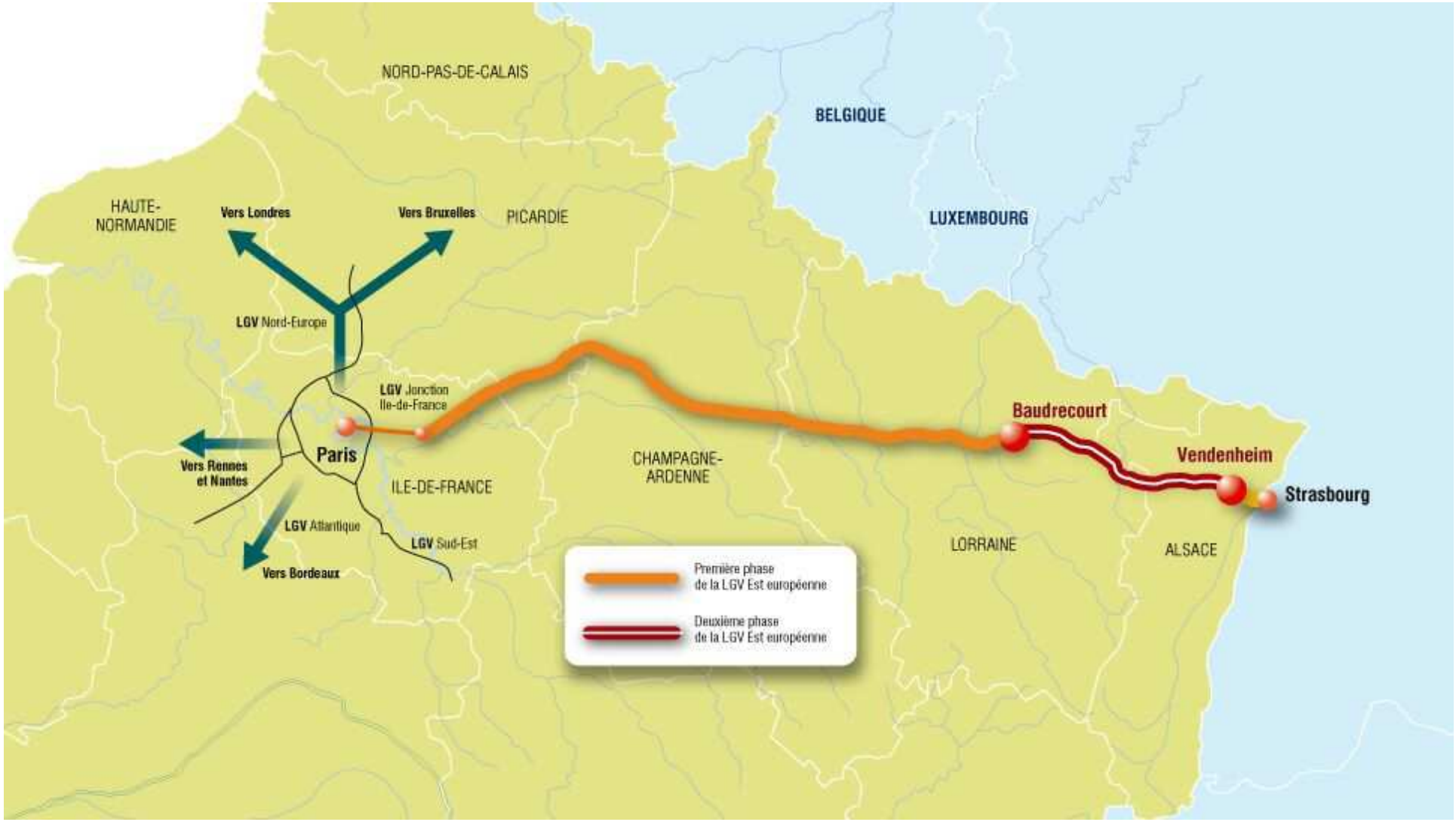




Belfort-Montbeliard station

avelers (million)

# II - HSL EAST EUROPE – PHASE 2

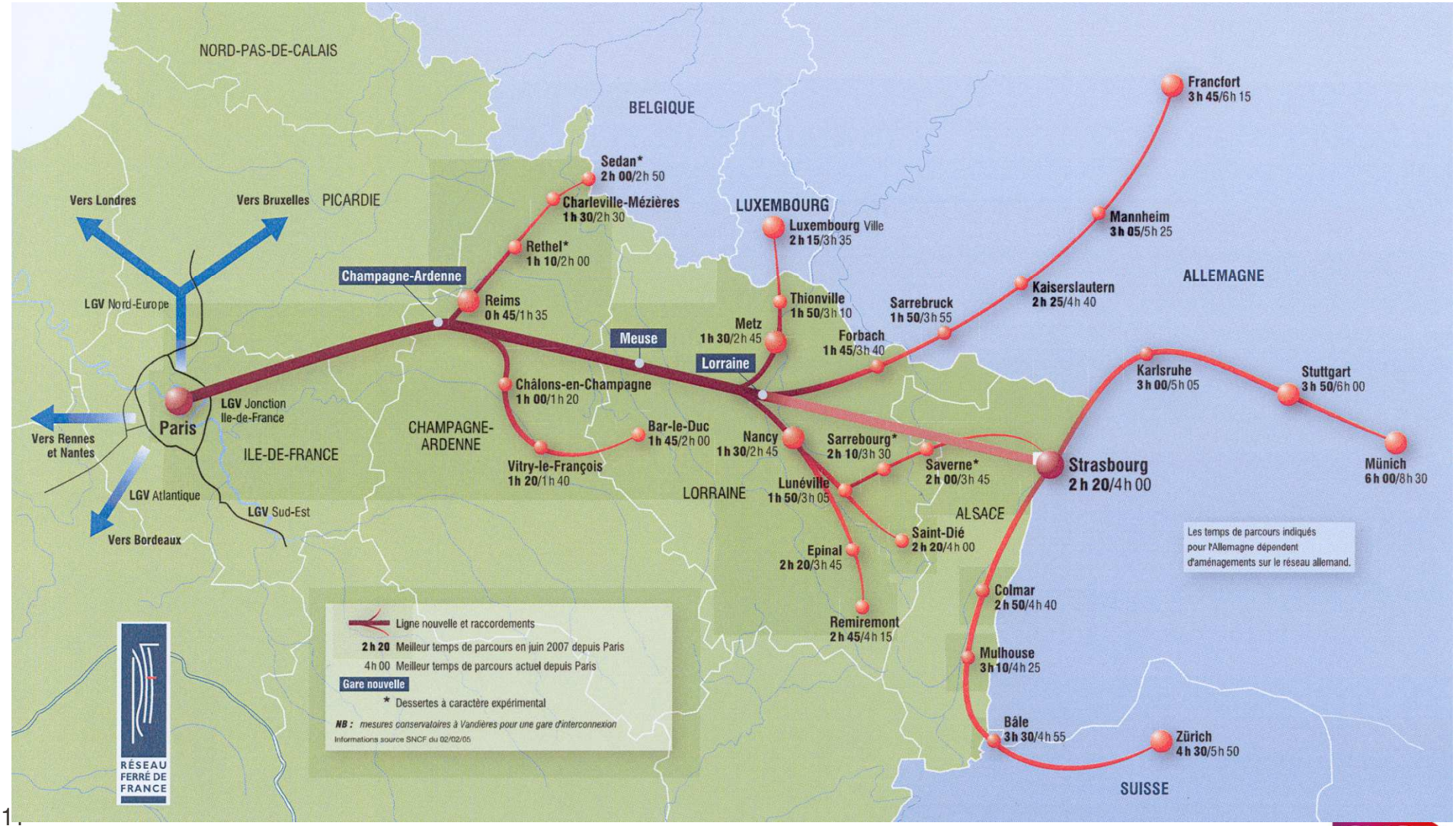


# II - HSL EAST EUROPE PHASE 2
## PROJECT OBJECTIVES

### Three main objectives

1. Link Paris to France East cities, stations in city centers
2. International : connect Germany , Switzerland , Luxemburg
3. Link North to East part of France without going through Paris city

# II - TRAVEL TIME AFTER HSL EAST EUROPE PHASE 1



# II - ALIGNMENT

# II - FINANCING

**Cost - 2010 Millions Euros from :**

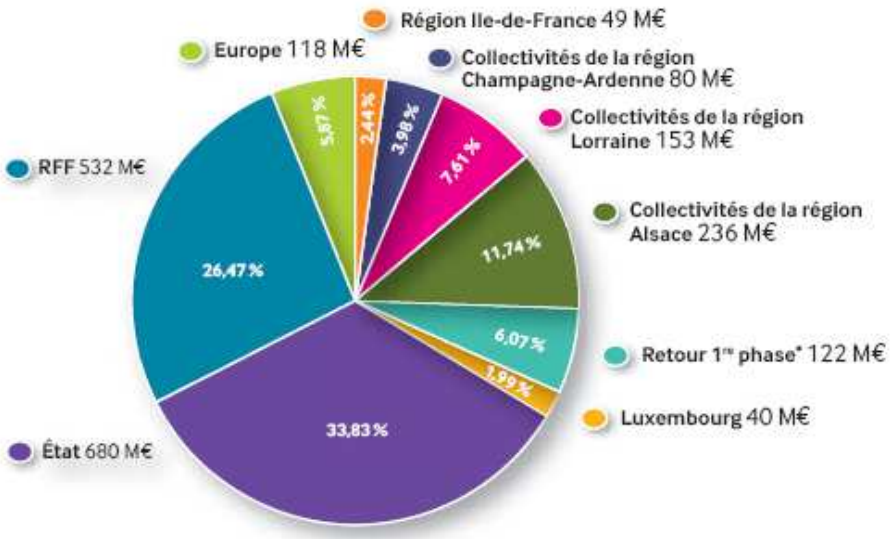
16 regional entity

French central Gov.

European Union

Luxembourg Gov.

SNCF Réseau




**Le plan de financement comprend le réinvestissement, par les collectivités locales, du « retour à bonne fortune » prévu à leur profit par la convention de financement de première phase. Cette convention prévoit, en effet, le reversement aux collectivités d'une partie des recettes de péages dépassant le niveau prévisionnel retenu en 2000. Le montant de ce « retour à bonne fortune » a été estimé à 122 M€.*

# II - PROJECT OUTLINE

Project involves:

✓106 km of HSL.

✓2 connections to conventional rail

✓HSL East Europe phase 2 allows speed up to 350 km/h and will operate 320 km/h

1 sub-station à Sarraltroff

Train Control Command from Pagny-sur-Moselle

Interoperability using GSM-R et ERTMS

V1

## Diapositive 14

**V1** Explications des acronymes?
Véro; 21/05/2012

# II - PROJECT OUTLINE

## Civil works included :

Earthworks :

+ 23,7 millions de m³ de cuttings
+ 13,5 millions de m³ de embankments
+ 10,5 millions de m³ of depots
+ et 3,5 millions de m³ raw materials

132 special structures such as :

+ 1 tunnel of 4 km
+ 7 viaducts
+ 12 animal passages

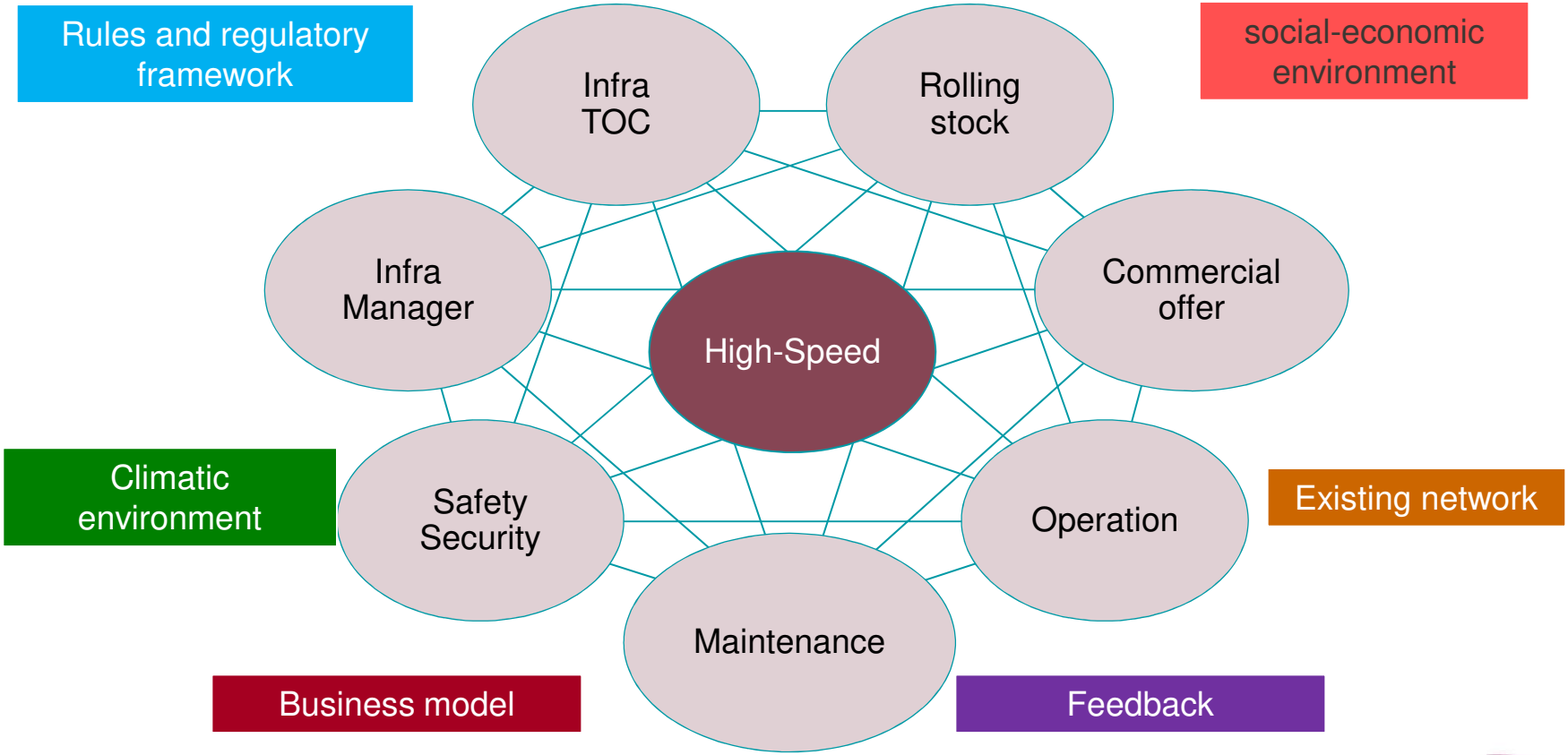
# II - OBJECTIVES OF PROJECT MANAGEMENT

**Main objectives of High Speed Line construction are :**

- **Performances compliance (travel time, destination cities & frequency )**
- **Infrastructure reliability and longevity**
- **Easy to operate**
- **Maintanibility**
- **Control Cost & construction timing**
- **Comply with Public enquiries conclusions**
- **Optimised Balance between all disciplines**

# II – AN INTEGRATED SYSTEM

A real Know-How to help change management

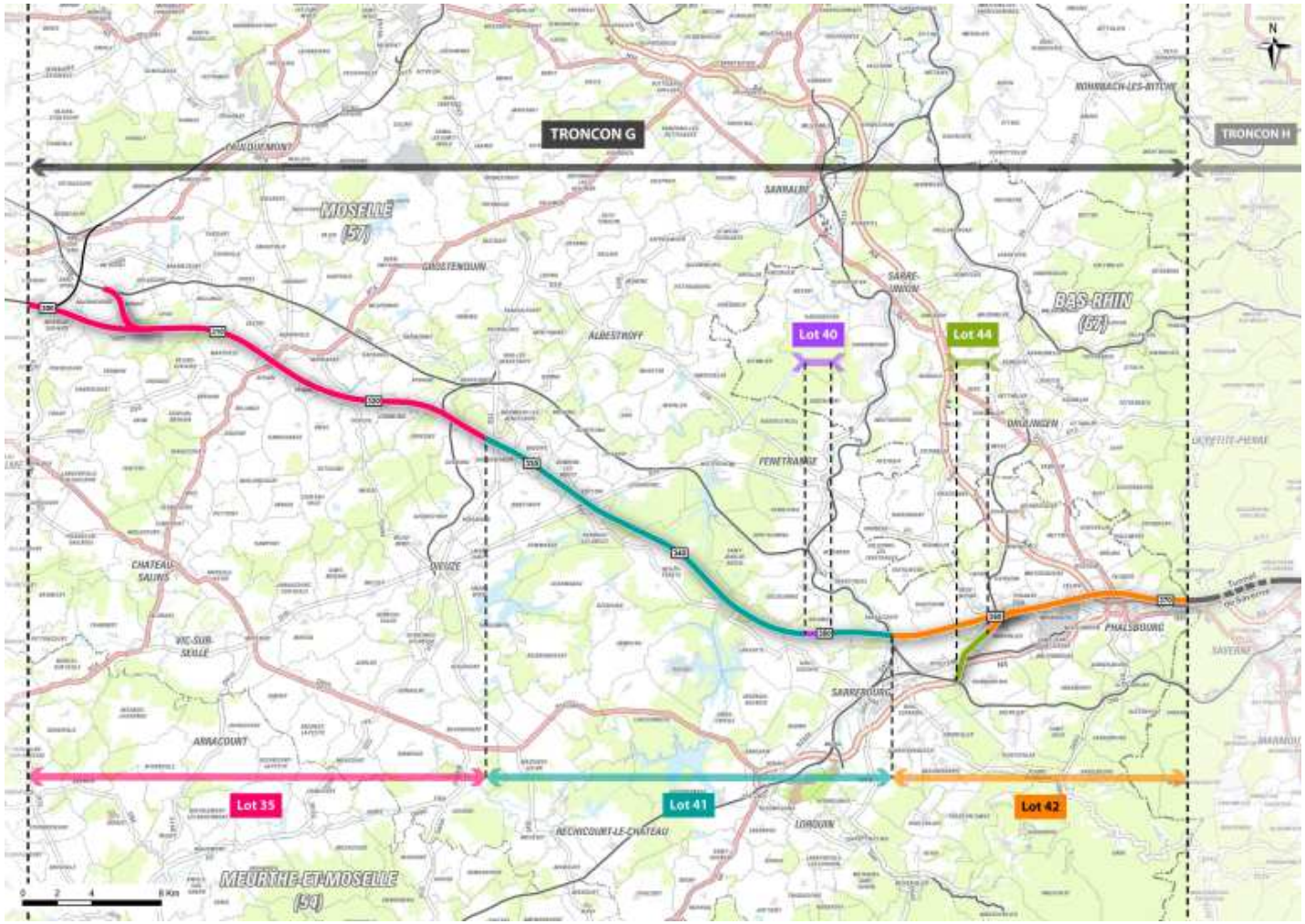


# II – PROJECT MANAGEMENT

## Main Tools for project management are

- **Functional project definition**
- **Design , Maintenance , Operation standards**
- **Interfaces management**
- **Test & Commissioning plan**
- **Project organisation**

# II - DIFFERENT WORK PACKAGES – SECTION G

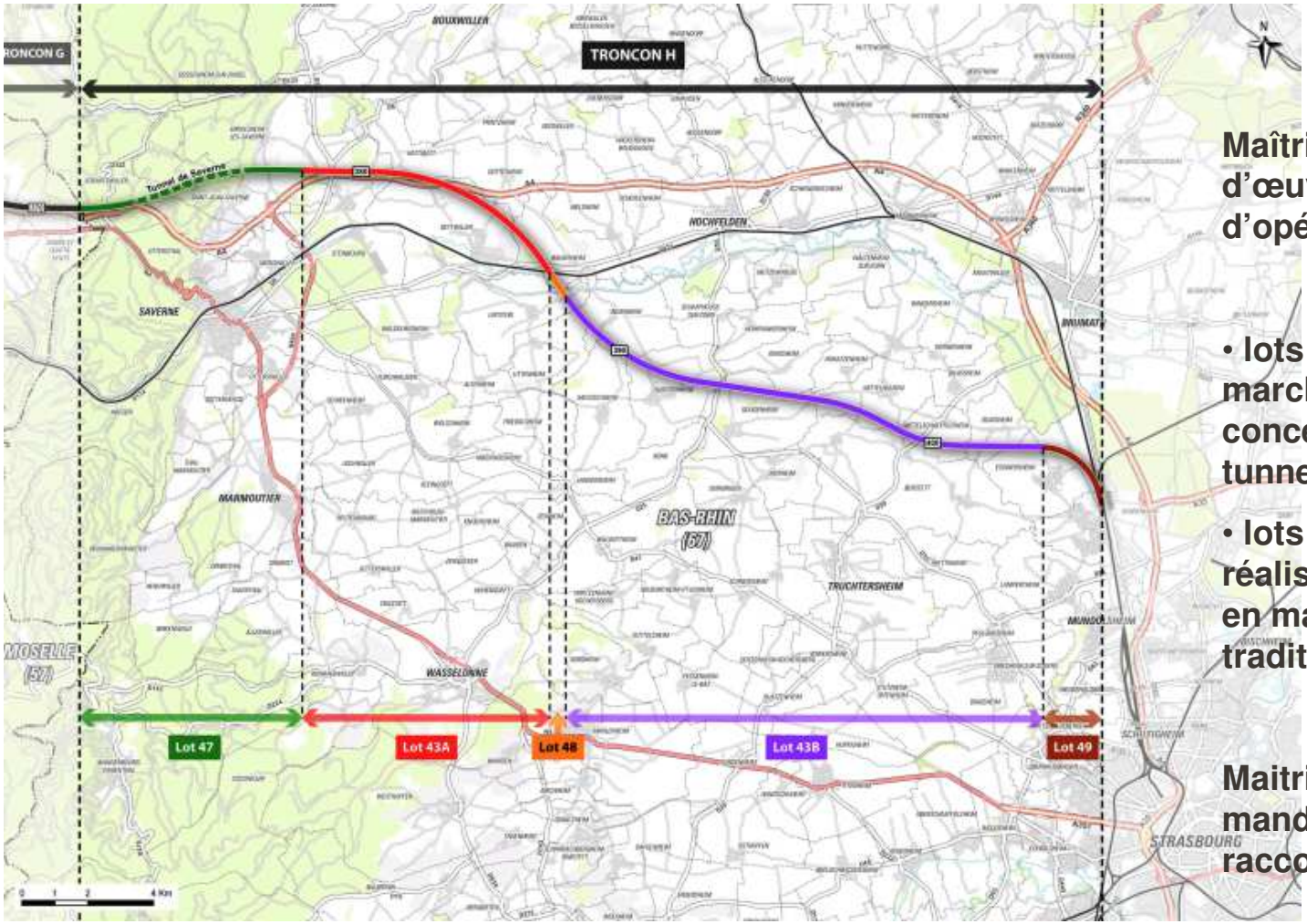



**Maîtrise d'œuvre/conducteur d'opération : Inexia**

- **lots 35 et 40 réalisés par des marchés de conception/réalisation**
- **lots 41, 42 et 44 réalisés par des marchés en maitrise d'œuvre traditionnelle**

**Maitrise d'ouvrage mandatée pour le raccordement à l'ouest**

# II - DIFFERENT WORK PACKAGES – SECTION H

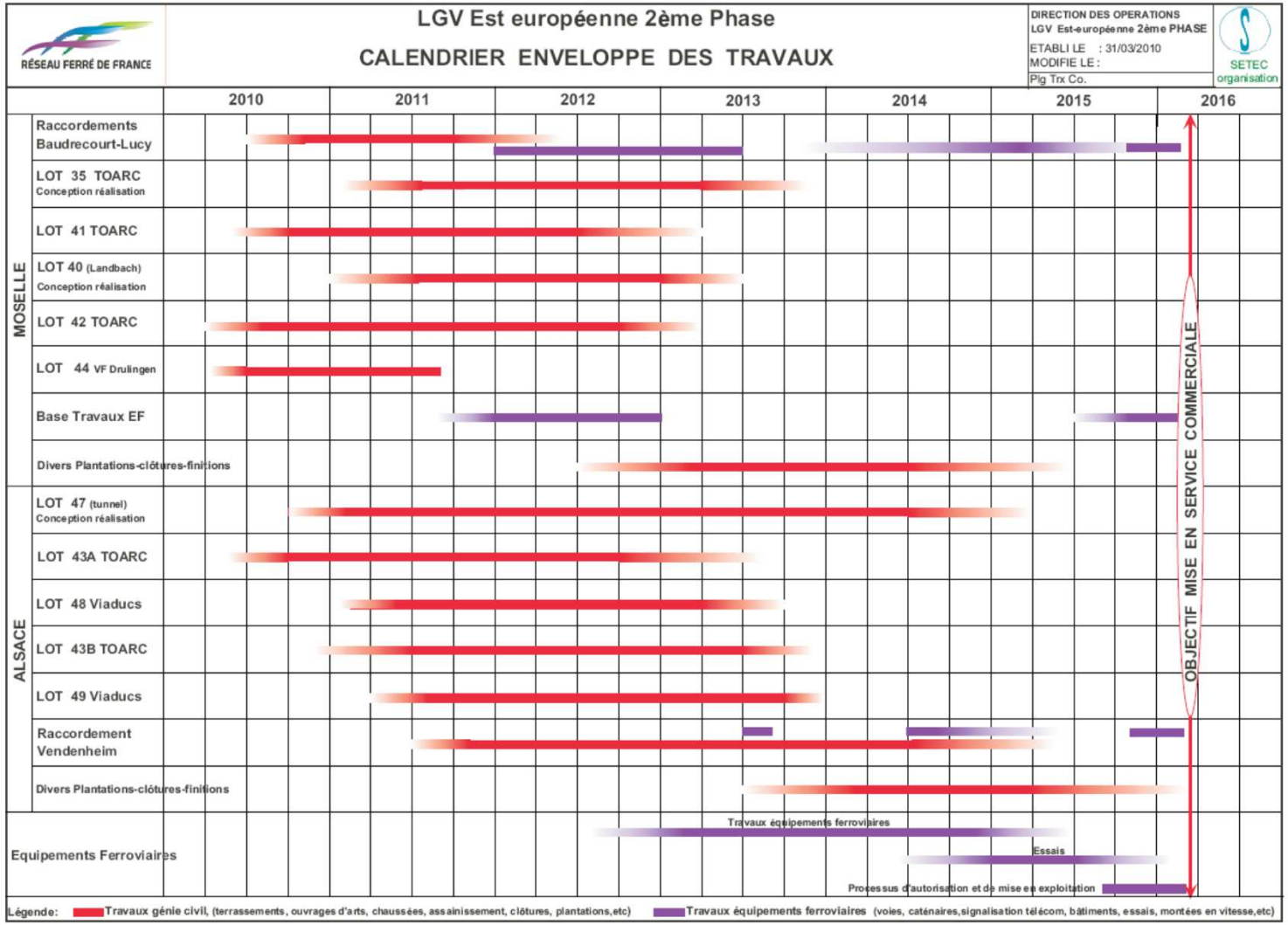



**Maîtrise d'œuvre/conducteur d'opération : Setec**

- **lots 47 réalisé par un marché de conception/réalisation : tunnel de Saverne**
- **lots 43a, 48, 43b, 49 réalisés par des marchés en maitrise d'œuvre traditionnelle**

**Maitrise d'ouvrage mandatée pour le raccordement à l'est**

# II - CONSTRUCTION SCHEDULE



# HIGH SPEED RAIL WORLD RECORD : 574 KM/H

# III - HIGH SPEED LINE IN MOROCCO

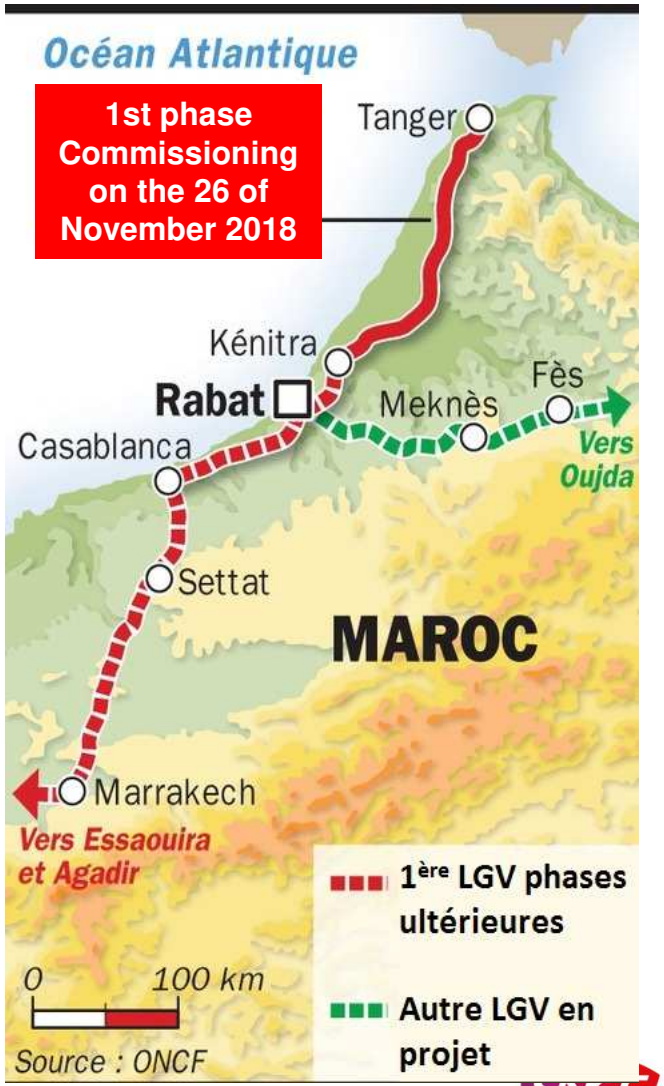
# III - PROJECT DESCRIPTION

## HSL TANGER - CASABLANCA

- The line connects the major economic hubs of the Kingdom of Morocco with a travelling time reduced from 4h45min to 2h10min from Tangier to Casablanca, and 1h20min instead of 3h45min between Rabat and Tangier.

## 1st African HSL

- A complex project, integrated and technically complex
- 200 km of double track line designed for 350km/h , commercial speed of 320km/h . Includes:
  - ✓ The entire Studies, Design and works for infrastructure (earthworks and civil engineering)
  - ✓ The entire Studies, Design and works for the railway equipment's (tracks, signalling, catenaries, electric traction, GSMR)
  - ✓ The entire supply chain (Ballast, Rails, switches)
- Purchase of 12 Alstom 2N2 type trainsets specially fitted for Morocco named RGV (HS Rolling Stock for Morocco)
- A depot dedicated to the maintenance of RGV trainsets
- Adaptation of terminal installations to enter the stations of Tangier and Kenitra
- Building 4 HS stations: Tangier, Kenitra, Rabat Agdal and Casa Voyageurs
- Support to prepare the launch of the operational service

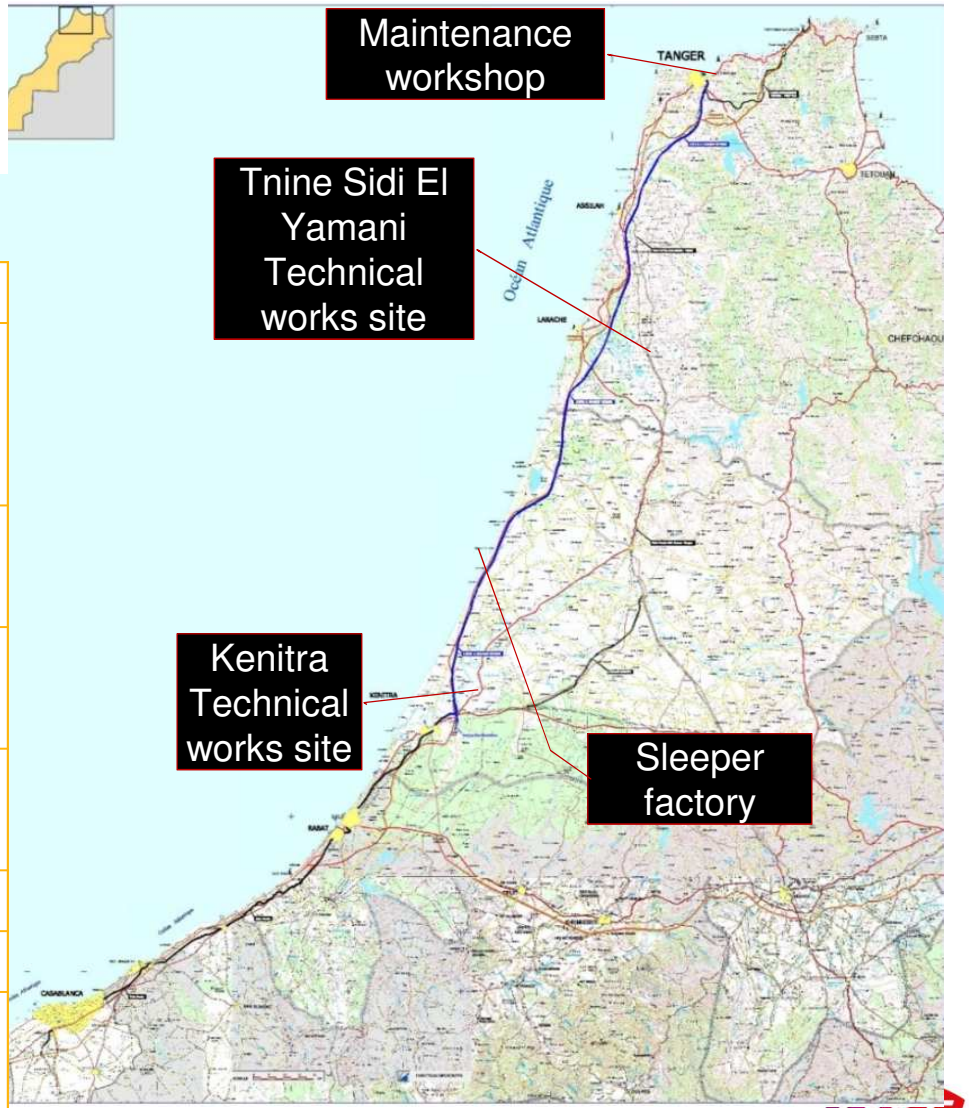


# III - ONCF'S NETWORK

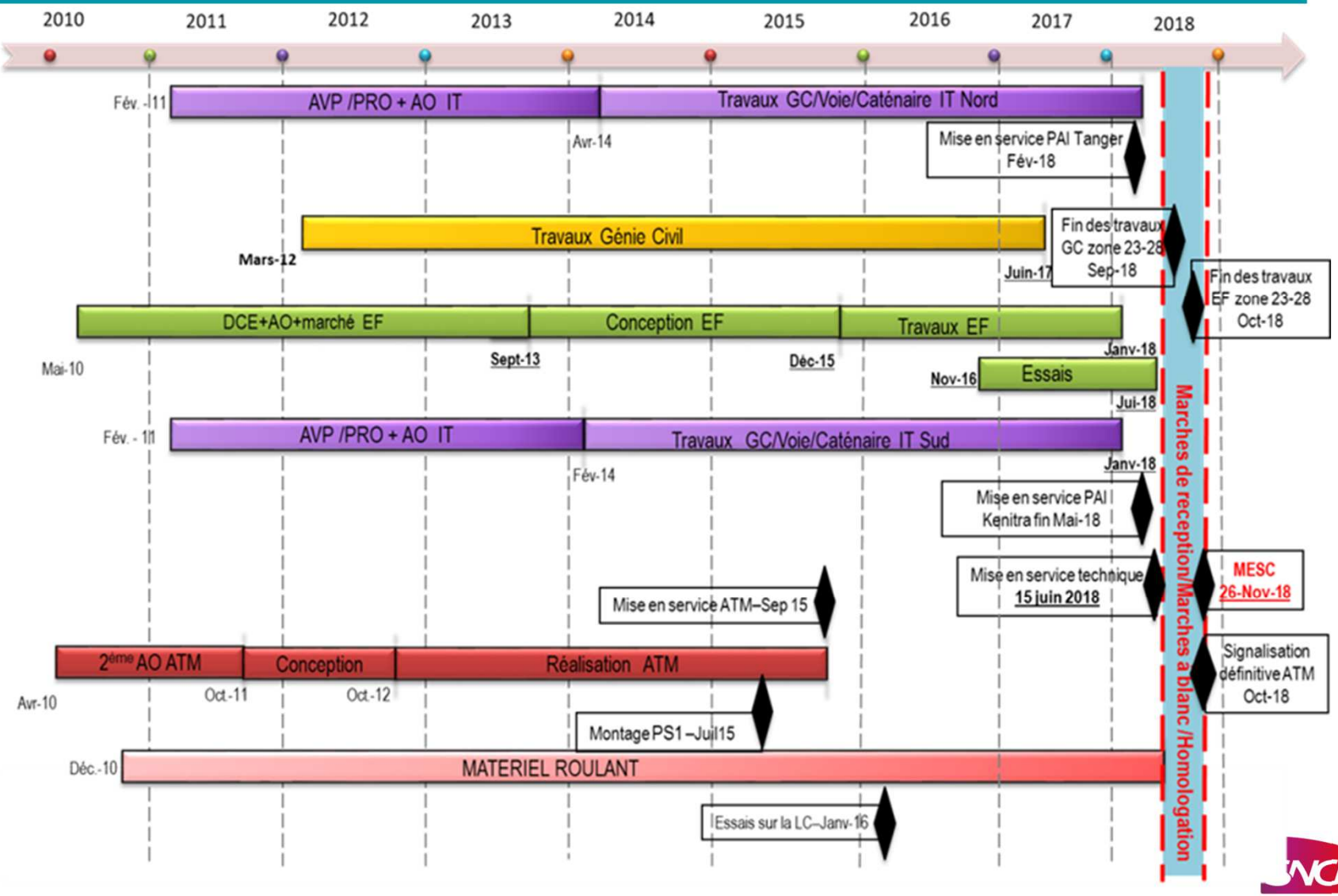
# III - HSL TANGIER KENITRA

**Application of the Technical Specification for Interoperability**
**A reference system: The East-European HSL**

| | |
|---|---|
| Lands | 1 800 Ha |
| Cuttings and embankments (earthwork) | 67 Millions $m^3$ |
| Viaducts | 13 units (9800 ml) |
| Railway and road bridges | 169 units |
| Hydraulic structure | 117 units |
| Tracks | 800km of rail |
| 25KV catenaries | 400 km |
| Switches and crossings | 100 units |
| Reinforced | 700 000 units |



# III - A 8 YEARS PROJECT



# III – TECHNICAL CHALLENGES

### Seismic constraints

The Moroccan HSL is entirely located in a zone of high seismic risk

The necessity of creating a regulatory framework

### No regulatory framework

Necessity of establishing a close collaboration between the Moroccan and French experts in order to adapt the measures to be taken in the case of Morocco (choice of risk hedging, spectrum to be taken into account, measure to be taken)

### Hydraulic constraints

The line crosses many floodable areas.

### Major geotechnical constraints

+ Poor quality of the ground on most of the route
+ Many very compressive strength zones
+ Setting standards criteria targets for HSL (less than 1 cm of soil compaction during the first year and less than 10 cm during 25 years)

# III - A PARTNERSHIP TO SHARE KNOW-HOW

A training railway institute

A company for maintaining the high-speed trainsets

# III - A PARTNERSHIP ORGANIZATION

Ad-Hoc Expertises
Studies done in France

| Project Management Assistance SNCF | HSL Direction ONCF |
|---|---|
| Project Management | Project Management |
| Civil Works | Civil Works |
| Railway equipment's | Railway equipment's |
| Rolling Stock | Rolling Stock |
| Operation | Operation |
| Commercial Offer | Commercial Offer |
| Safety - System | Safety - System |
| GSMR - ERTMS | GSMR - ERTMS |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# THANK YOU !