



Workshop

Future TEN-T for Economy and Society

25th February 2014, Instytut Kolejnictwa, ul Chłopickiego 50



European HS experiences. **Spain**

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1992 - Madrid-Sevilla: 471 km





HS line Córdoba-Antequera 2006



HS line Lleida - Tarragona 2006



HS Line Camp de Tarragona – Barcelona Sants 2008



HS line Cuenca, Albacete, Requena-Utiel y Valencia. 2010



HS Lines. Overview

HS Iberian Gauge

New connection
Barcelona -
French Border
February 2013
131 km

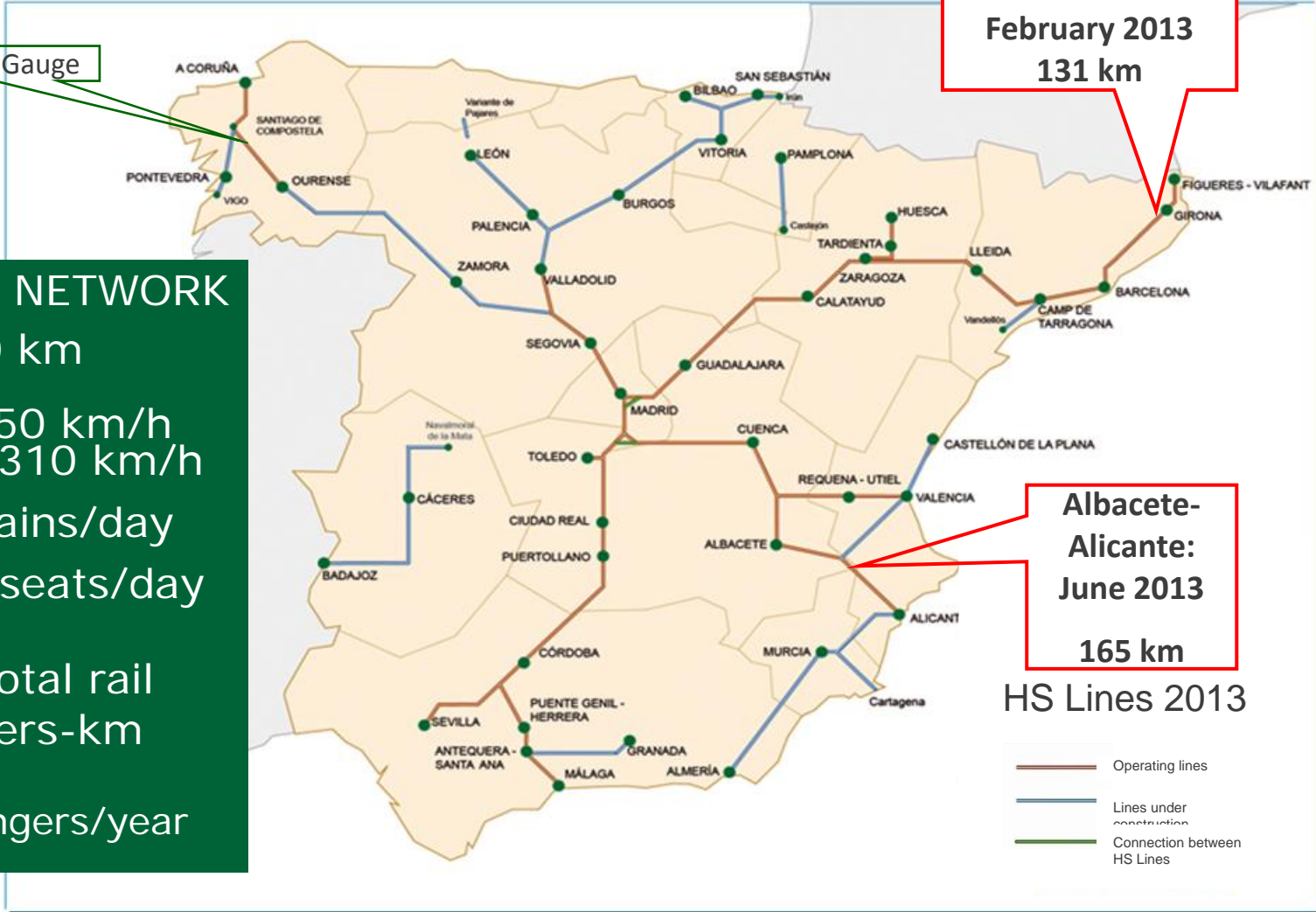
SPANISH HS NETWORK
3.080 km

Design 350 km/h
Operation 310 km/h

324 HS trains/day
+ 100.000 seats/day

23% of total rail
passengers-km

25 M Passengers/year



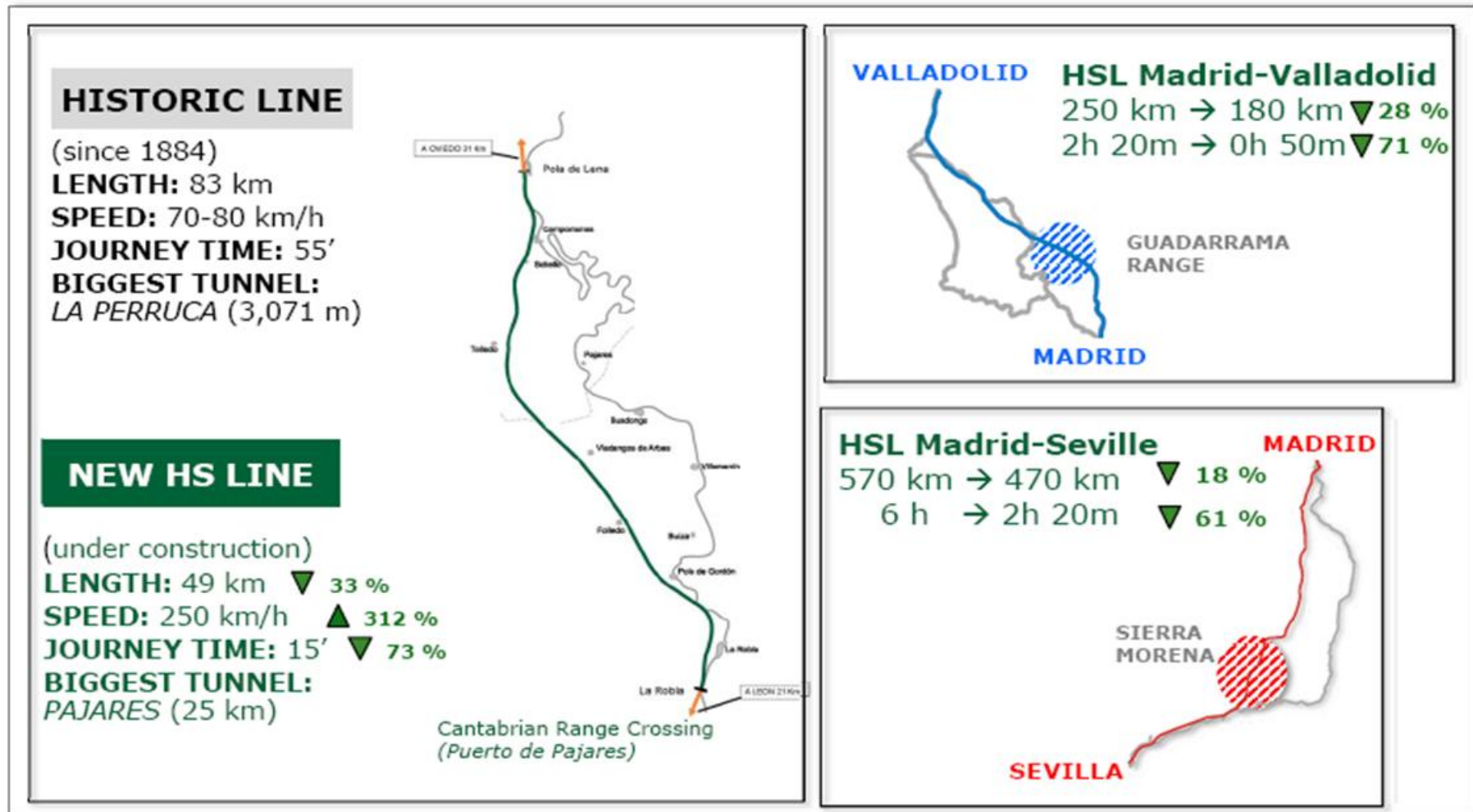
Albacete-
Alicante:
June 2013
165 km

HS Lines 2013

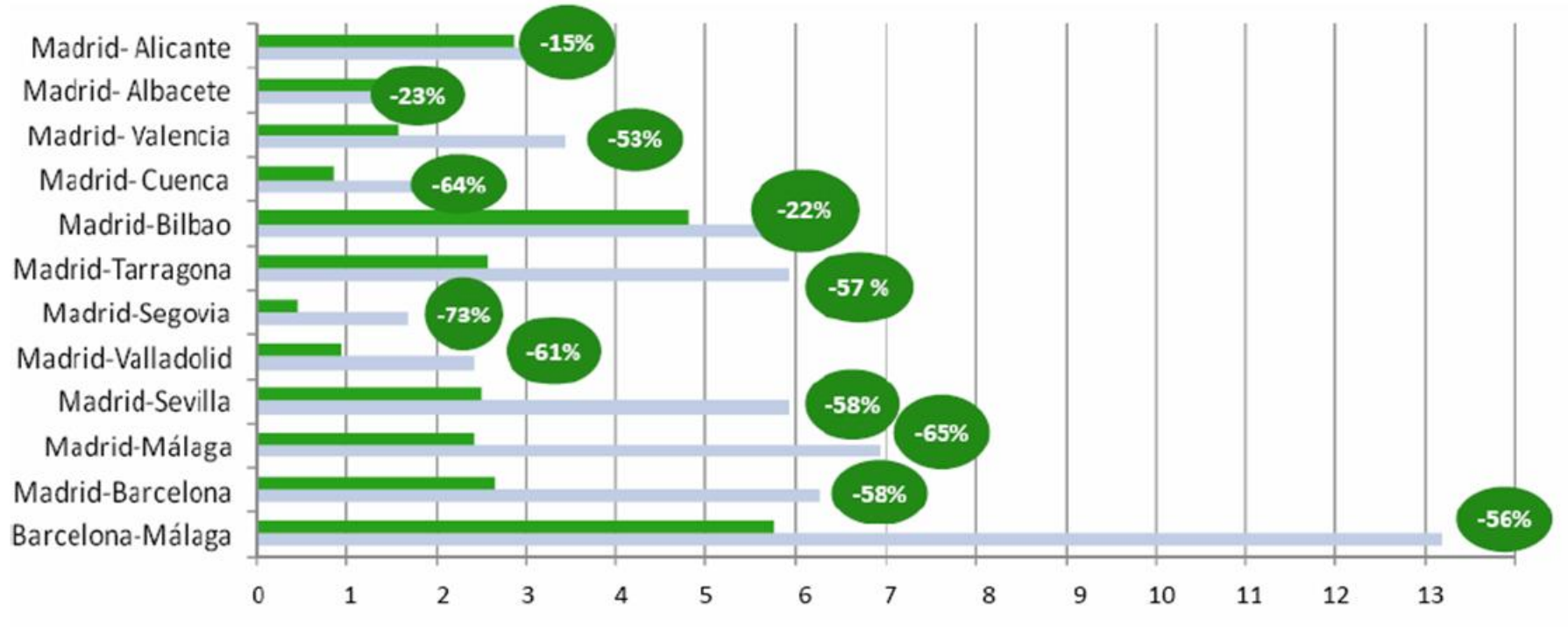
- Operating lines
- Lines under construction
- Connection between HS Lines

Improvements with respect to historic lines

Reducing lengths, and



Reducing Journey times!!!!



Investment

High Speed Network: more than 45.000 M€

Adif. Major investor company in Spain.

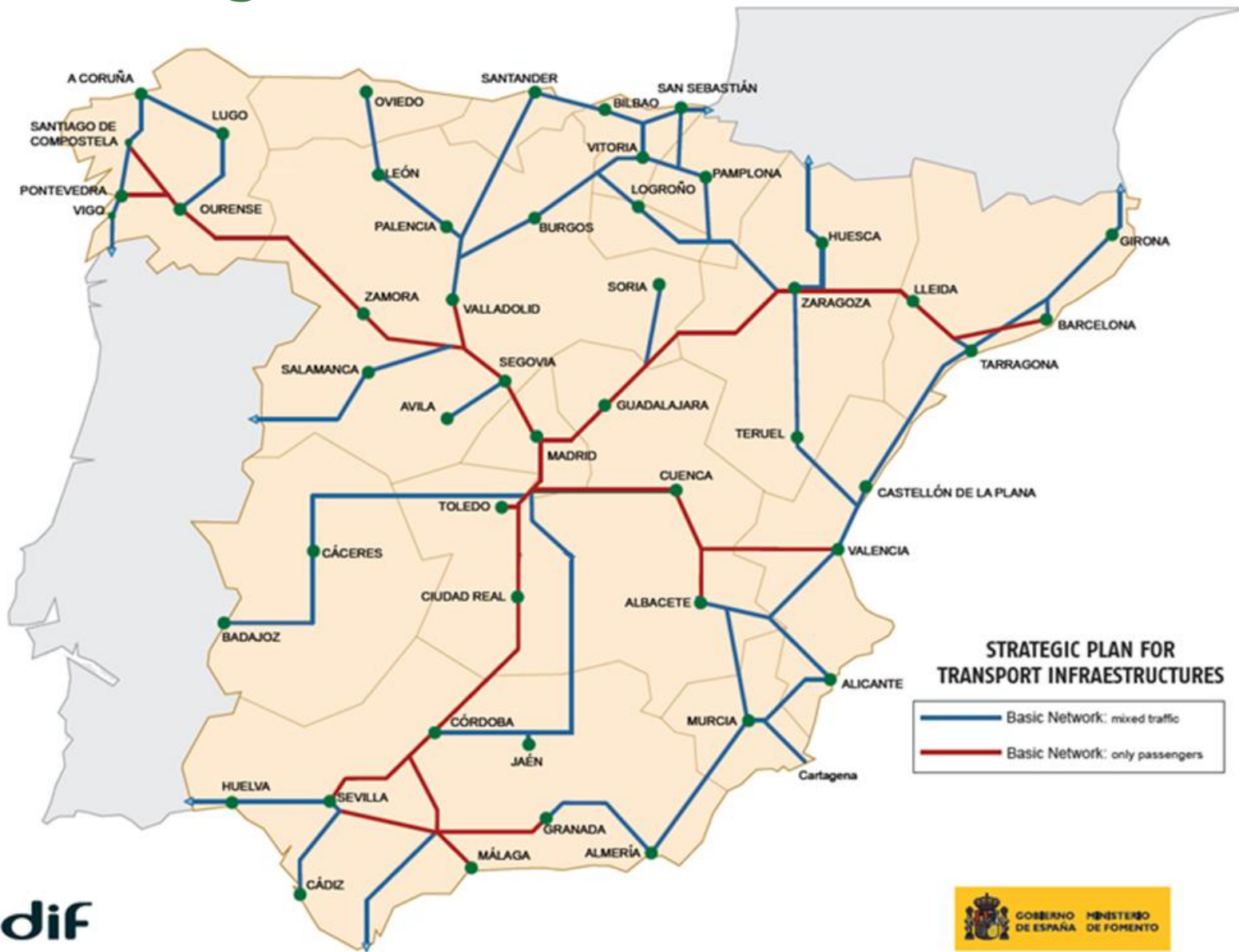
37.900 M€ in 8 years 2005/2012:

High Speed: 32.100 M€

Conventional Rail: 5.800 M€



Future High Performance network (2020)





Spain runs a top quality HSR network with the most advanced technology



SPAIN. Leading railway engineering



Viaducto Arroyo de las Piedras



SPAIN. Leading railway engineering

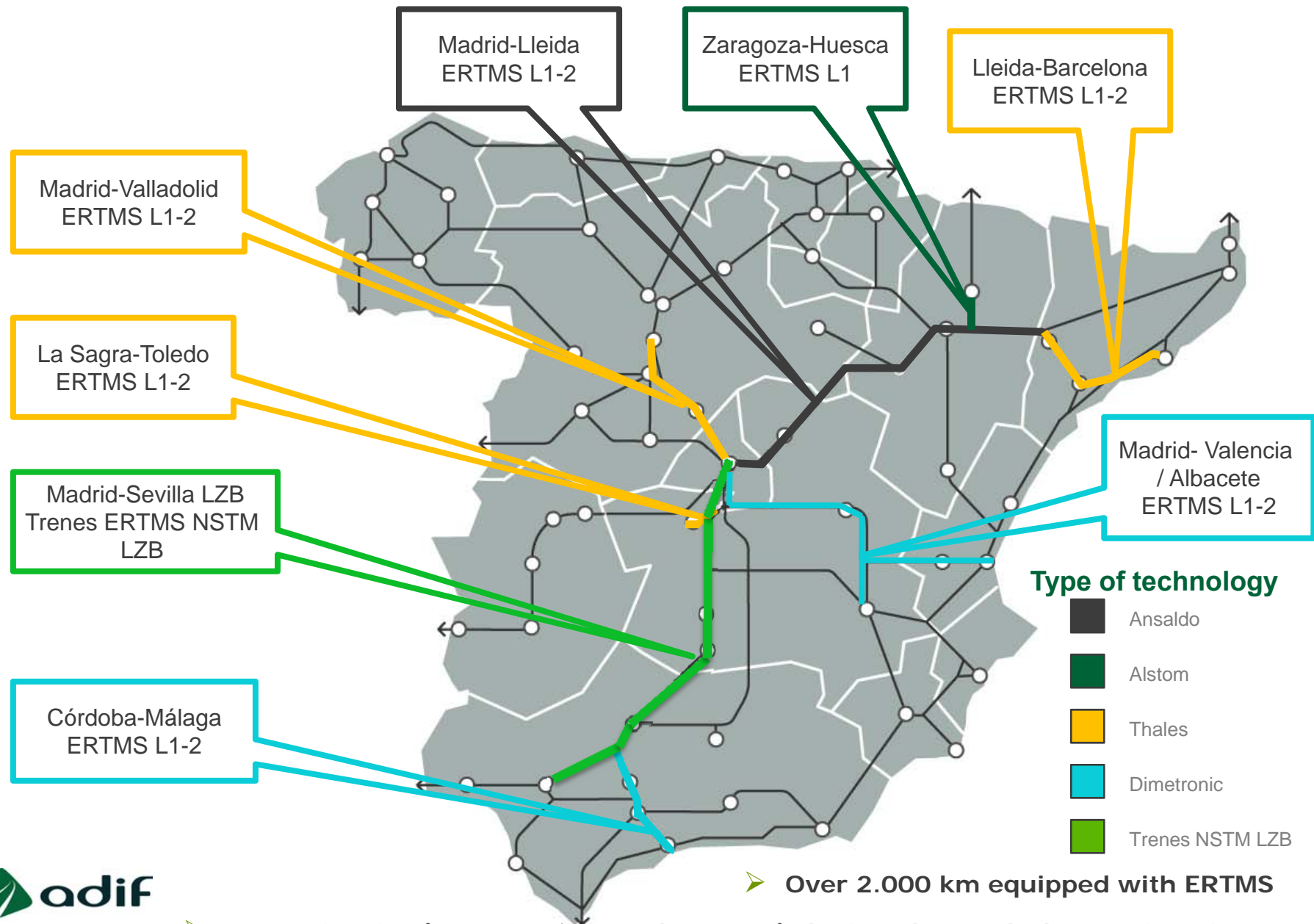


Spanish strengths in railways technology

- Tunnels:
 - Guadarrama Tunnel (28km) 5th worldwide.
 - Pajares Tunnel (25km). 6th longest in Europe
 - Drilling with TBM world record: 90 meters/day at La Cabrera Tunnel. (Madrid-Valencia HSL)
- Viaducts:
 - Ulla Viaduct* (Galicia Line), the tallest viaduct in Spain (higher pylons, 117 m; tallest central arch , 105 m)
 - Deza Viaduct* (Galicia Line), built by employing a very accurate and complex constructing procedure, by lowering 2 half arches.
 - Contreras Viaduct (Levante HSL)*: one of the longest concrete arch spans in Europe (261 m)
- Track: automatic track gauge switches for different gauge performed at 30 km/h
- Switches: 350 km/h switches, to be crossed at 220 km/h through a deviation
- 2 km/day track laying over ballast
- Catenary: Spanish HS catenary (350 km/h + 10%) interoperable TSI
- Sub-stations: own design 2 x 25 kv
- Maintenance technologies: laboratory and track examination trains
- R+D+i: energy efficiency, raising ballast, track models...



Spanish experience in ERTMS



➤ ERTMS level 2 (>300 km/h. October 2011) deployed in Madrid- Barcelona line .

DaVinci System

- Integration of all telecommands in the HSL allowing centralized real time operation
 - Centralized Train Control CTC
 - ERMTS central post
 - Energy Supply
 - Communications Supervision (Fixed and communications)
 - Auxiliary supervision systems
 - Video surveillance
- DaVinci also includes the following environments.
 - Simulation and Training
 - Integrated reconstruction of events
 - Validation and testing environments



The DaVinci experience

Adif lines
London & Medellín Underground
Morocco lines
Lithuanian lines

Haramain Project. HSL in Saudi Arabia

- ❖ Contract: EUR 6.74 bn. Participation of 12 Spanish companies
- ❖ Construction and 12 years operation and maintenance
- ❖ Mecca-Medina: 449 km, 5 stations
- ❖ Phase II :
 - Design and installation of track, signaling, telecommunications, electrification, rail systems
 - Procurement of rolling stock
 - Operations & integral maintenance for 12 years





Automatic track gauge exchanges performed at 30 km/h







Mediterranean Corridor HSR + Conventional Lines

- Mixed traffic. Speed 220 km/h between Valencia and Tarragona
- Link to the main ports: Barcelona, Tarragona, Valencia, Alicante, Cartagena
- Line UIC gauge between Barcelona and Tarragona (HSL) and interim link Barcelona – French Border



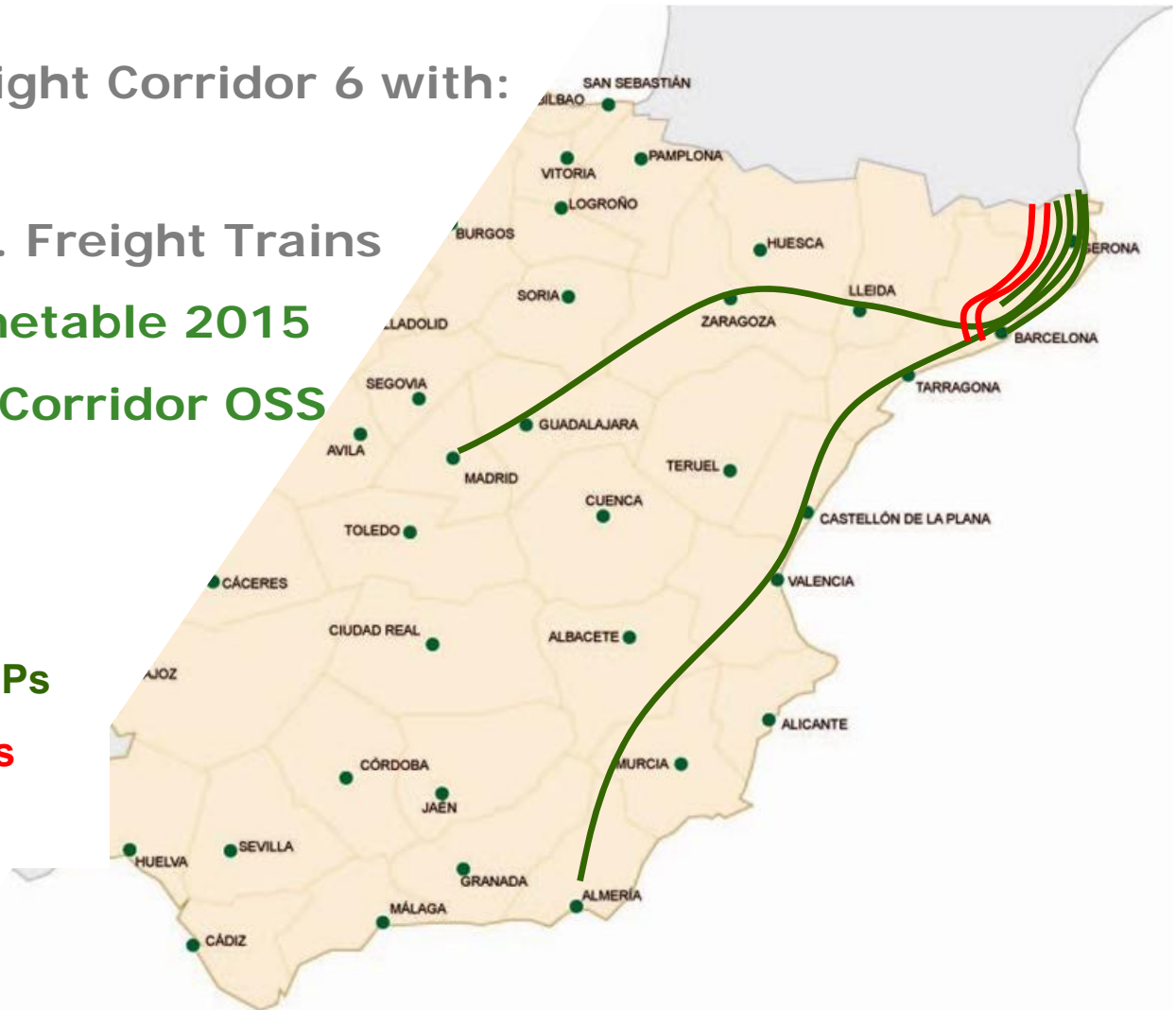
Mediterranean Corridor – RFC 6 Ready to use!!!

ADIF provides Rail Freight Corridor 6 with:

- 42 PaPs weekly
- Dedicated to Int. Freight Trains
- Available for **Timetable 2015**
- Managed by the **Corridor OSS**

Daily PaPs per direction

- Conventional Network PaPs
- International Gauge PaPs



Madrid-Zaragoza-Tarragona/Lleida-Barcelona-France. Freight Rail – Main Projects

International Gauge Implementation – Tarragona-Barcelona-France



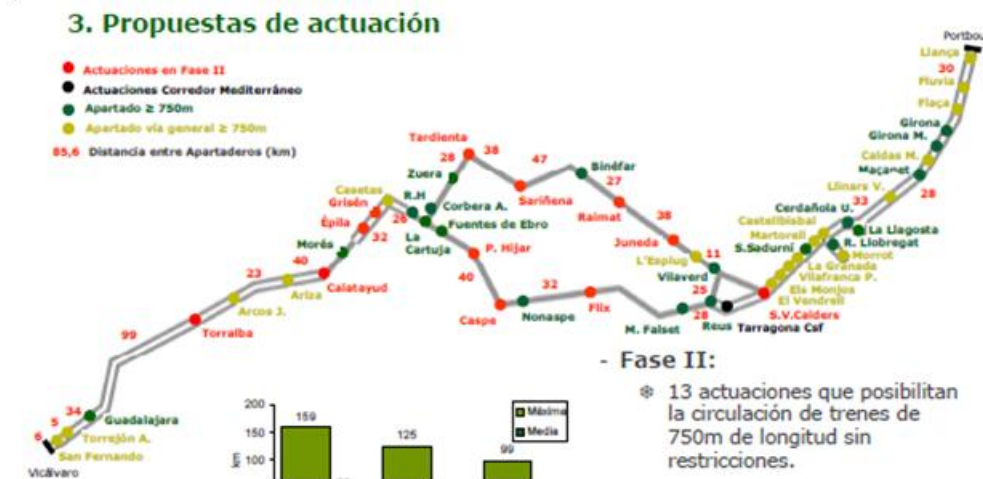
- **In operation – 159 km**
 - Figueres-French Border – *2 x UIC*
 - Mollet-Girona-Figueres – *2 x UIC*
 - Castellbisbal-Mollet – *3rails-track*
 - PortBCN-Castellbisbal – *3rails-track*
- **Under construction – 97 km**
 - Castellbisbal-Tarragona
 - *Double 3rails-track*
 - 5 sidings -750m-
 - 417 M€

Madrid-Zaragoza-Tarragona/Lleida-Barcelona-France. Freight Rail – Main Projects

Siding Enhancement 750 m



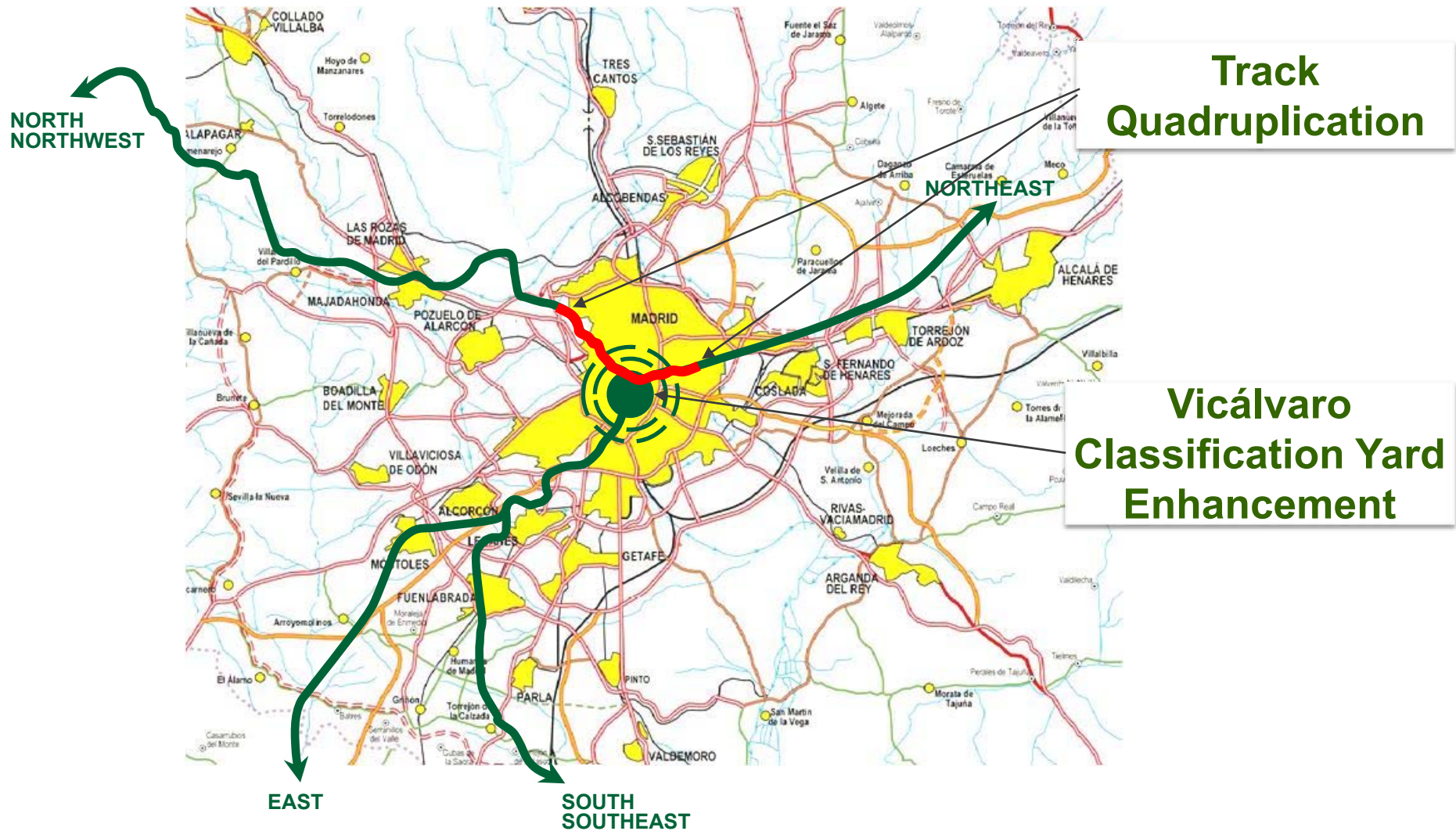
Phase I
8 new 750m sidings



Phase II
13 new 750m sidings

Madrid-Zaragoza-Tarragona/Lleida-Barcelona-France. Freight Rail – Main Projects

Madrid Rail Beltway Quadruplication –NE section



Madrid-Zaragoza-Tarragona/Lleida-Barcelona-France. Freight Rail – Port of Barcelona – New Rail Access







■ ■ ■ Thank you for your kind attention

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