The sustainability of high speed

11th UIC Sustainability Conference
Madrid, 17 June 2010

Iñaki Barrón de Angoiti
Director of the Passengers and High Speed Department, UIC
Some facts & figures on high speed
High speed rail systems in the world

In operation:
- France
- Germany
- Italy
- Spain
- Belgium
- The Netherlands
- United Kingdom
- Japan
- Korea
- China
- Taiwan, China
- Turkey
- USA

Planned:
- Argentina
- Brazil
- Canada
- India
- Indonesia
- Iran
- Mexico
- Morocco
- Poland
- Portugal
- Russia
- Saudi Arabia...
High speed rail systems around the world

- Red: \( V \geq 250 \text{ km/h} \) in operation
- Green: \( V \leq 200 \text{ km/h} \) in operation
- Yellow: High speed in project

I Barrón – 11th UIC Sustainability Conference – The sustainability of high speed – Madrid, 17 June 2010
High speed world network

World network (V > 250 km):

13.414 km of lines in operation
10.781 km of lines under construction
17.579 km of lines planned

May 2010
Expected evolution of the world HS network
Expected evolution of the world HS network

km


Total

Asia

Europe

Others
High speed train sets* in operation in the world:

- Maximum speed 200 km/h or more: 2,228
- Maximum speed 250 km/h or more: 1,667

* and trains operating on dedicated high speed lines

April 2010
Ratio rolling stock / infrastructure

Number of train sets per 100 miles of HS line
Possible evolution of world fleet

Total number of train sets

Europe

2010

2025

World fleet
Evolution of maximum speed on rails

Maximum speed in tests

Maximum speed in operation

Km/h

0 100 200 300 400 500 600 700

Maximum speed in operation: 350 km/h – China
World rail speed record: 574,6 km/h – France, April 2007
European HS Network

Situation as at 05.2010

- $v > 250$ km/h
- $v \geq 250$ km/h Planned
- $180 \leq v < 250$ km/h
- Other lines

Information given by the Railways

UIC - High-Speed
Updated 05.2010
European HS Network

Forecasting 2025

Information given by the Railways

UIC - High-Speed
Updated 05.2010
Korea

---

In operation (29/03/2004)

Under construction

---

SEOUL

Chonan

Taejon

Taegu

Kyongju

Pusan
High speed and the environment
High speed advantages for Society

- **Capacity** of transport
  (400,000 passengers per day, Tokyo – Osaka)
  - Permits reducing traffic congestion
  - Helps economic development
  - Shapes land-use
- **Respects the Environment**
- **Is Safe**
High speed advantages for Society

- **Capacity**
- **Environment**
- **Safe**
Land occupancy

Some ratios on land occupancy:

- Average: 3.2 ha/km
- Average motorways: 9.3 ha/km

Parallel layout with a motorway:

- Paris – Lyons (1981 – 1983): 60 km (14 %)
- Paris – Lille (1993): 135 km (41 %)
- Cologne – Frankfurt (2002): 140 km (71 %)
- Milan – Bologna (2008): 130 km (72 %)
Parallel layouts

High speed line Paris – Lille (TGV Nord)
Parallel layouts

High speed line Cologne – Frankfurt
Energy efficiency comparison

Traffic units carried (number of passengers * km) for one unit of energy (kilo-equivalent of petrol, kep)

(1 kWh = 0.086 kep)

Source: SNCF, ADEME, 1997
Comparison of carbon emissions

Magnitude of CO2 emissions per person (in a 600 km trip):

- 80 kg if travelling by plane (the weight of the passenger)
- 13 kg if travelling by high speed train (the weight of his/her suitcase)
External costs (average)

External costs = Part of the ticket paid by society

Magnitude of external costs in a medium-distance corridor, non-rush hour and without considering congestion (€ per 1000 passenger km)
UIC activities on High Speed
Technical assistance based on the main principles:

• **High speed** is a complex system
• **High speed** is different in each country and in each case
• **UIC** is the forum for cooperation of high speed members
UIC study on high speed and Sustainability

Aims of the study

- Supply strong and credible arguments in favour of passenger’s high speed rail development
- Enable members to convince governments to support High Speed projects
- Demonstrate the advantages of High Speed to society, in terms of:
  - Energy Efficiency, CO² emissions, land use, external costs, urban development and other social aspects
UIC study on high speed and Sustainability

**Cooperation Partners**
- UIC High Speed
- UIC Environment & Sustainability Dept.
- SYSTRA (Paris based consultant)

**Time frame**
- Study finalised by 2010
- To be continued (possibly)
UIC study on high speed and Energy
UIC study on high speed and Energy

Cooperation Partners

- UIC High Speed
- UIC Environment & Sustainability Dept.
- Fundación de los Ferrocarriles Españoles (FFE)

Time frame

- Study finalised by 2010
- To be continued (possibly)
Dissemination on high speed studies

UIC – High speed is finalising 4 important studies on:

- High speed and the City
- High speed and Territory Management
- High speed and Sustainable Mobility
- High speed and Energy

They will be presented at the World Congress on High Speed (Beijing, Dec. 2010)

A large dissemination of these studies should be done during 2011
Training on UIC High Speed Systems

One week (5 days) Training Seminar, in which all the elements involved in a high speed system are analysed

7th THSS: 28 June – 3 July 2010, in Paris, UIC-HQ
7th World Congress on High Speed Rail

7 – 9 December 2010, CNCC – Beijing

High speed rail spearheading greener transport

Organized by UIC & MOR - CARS

Thank you very much for your kind attention

Iñaki Barrón de Angoiti
Director of the Passengers and High Speed Department, UIC
barron@uic.org
www.uic.org