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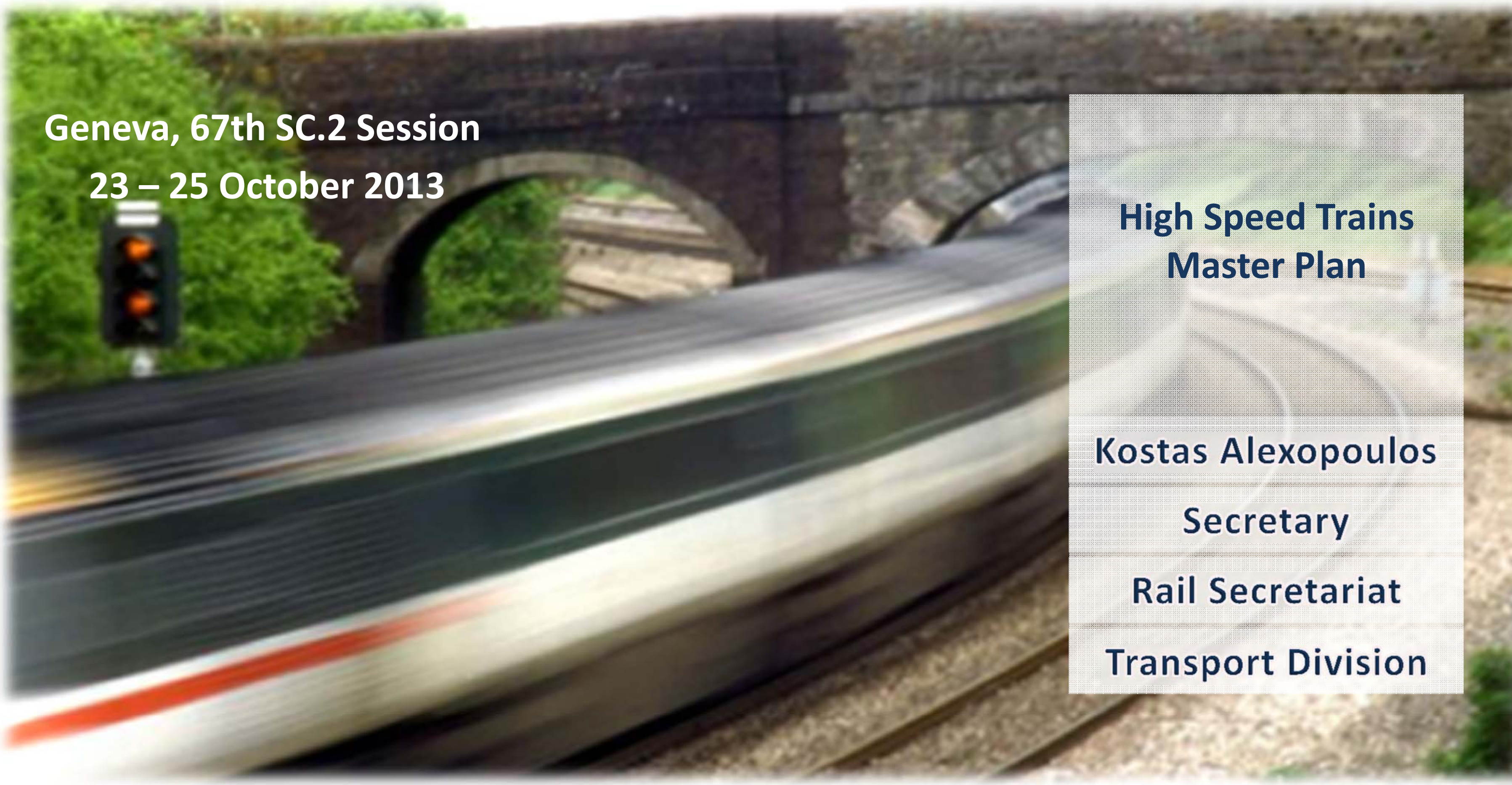

Geneva, 67th SC.2 Session

23 – 25 October 2013

High Speed Trains Master Plan

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Secretary

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Transport Division

UNECE - Transport Division

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Methodology approved

Work Package I

Project Management

Work Package II

Review of related Work

Work Package III

Socio-economic framework of the ECE countries

Work Package IV

Methodology and main assumptions for the work

Work Package V

Priority infrastructure needs in ECE countries

Work Package VI

Elaboration of Master Plans

Work Package VII

Addressing funding questions

Work Package VIII

Addressing Border crossing questions

Work Package IX

conclusions and recommendations

operational models

Four different operational models of high-speed rail have emerged:

(a) Dedicated: The world's first operational high-speed rail model is Japan's Shinkansen ("new trunk line"), which has separate high-speed tracks that serve high-speed trains exclusively. The system was developed because the existing rail network was heavily congested with conventional passenger and freight trains and the track gauge did not support the new high-speed trains.

(b) Mixed high-speed: Exemplified by France's TGV (Train à Grande Vitesse), this model includes both dedicated, high-speed tracks that serve only high-speed trains and upgraded, conventional tracks that serve both high-speed and conventional trains.

(c) Mixed conventional: Spain's AVE (Alta Velocidad Espanola) has dedicated high-speed, standard-gauge tracks that serve both high-speed and conventional trains equipped with a gauge-changing system, and conventional, nonstandard gauge tracks that serve only conventional trains.

(d) Fully mixed: In this model, exemplified by Germany's ICE (Inter-City Express), most of the tracks are compatible with all high-speed, conventional passenger, and freight trains.

High Speed Trains Master Plan

The case of United States of America

Definitions of High-speed Rail and Intercity Passenger Rail

	Corridor Length (miles)	*Top Speeds (mph)*	*Dedicated tracks*	*Population Served*	*Level of Service*
Core Express Corridors	Up to 500	125–250	Yes, except in terminal areas	Major population centers	Frequent express, electrified
Regional Corridors	100–500	90–125	Dedicated and shared tracks	Mid-sized urban areas and smaller communities	Frequent
Emerging/ Feeder Routes	100–500	Up to 90	Shared tracks	Moderate population centers, with smaller, more distant areas	Less frequent

Source: America 2050

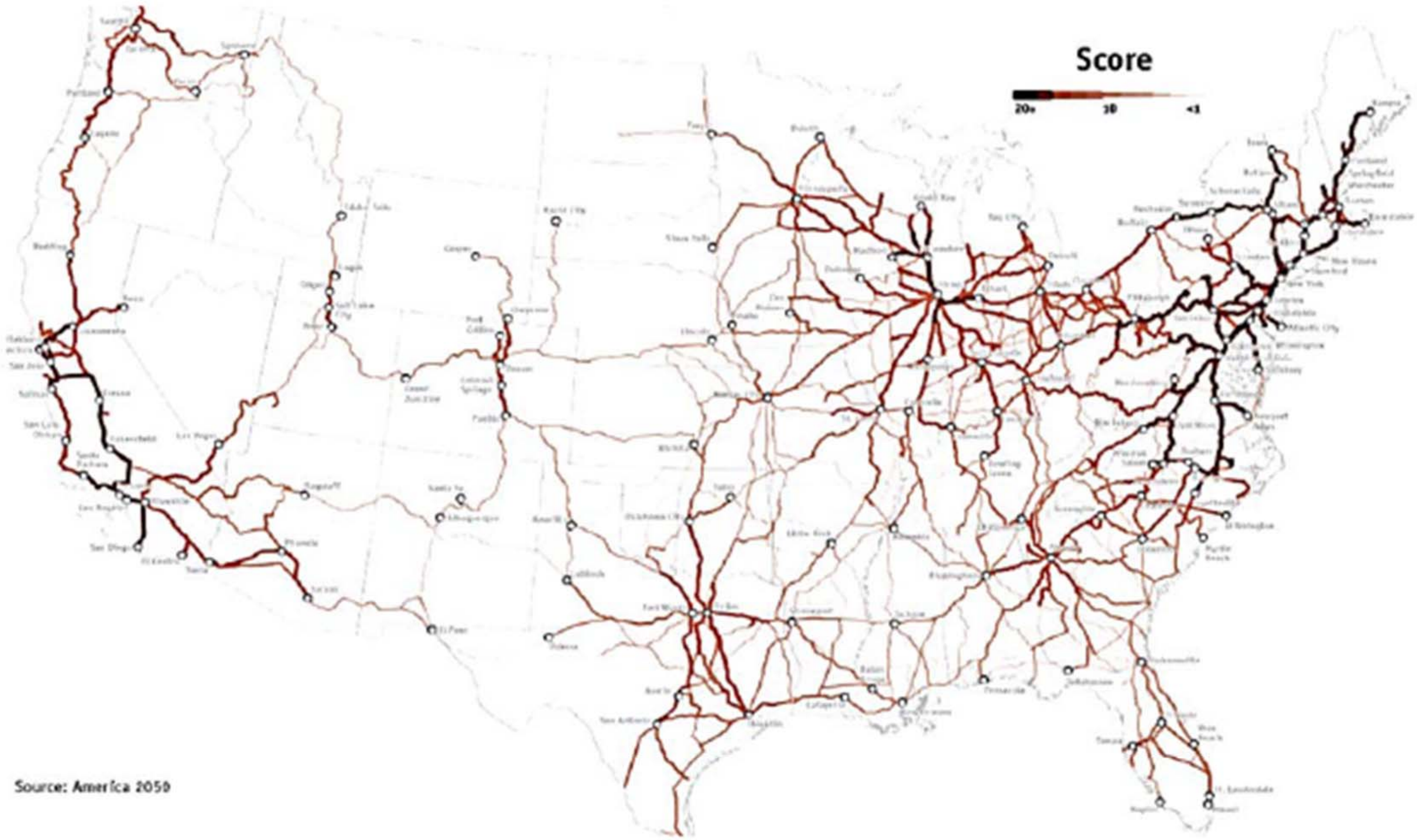
The case of United States of America

Criteria Used to Develop Corridor Score

Primary Factors: Weighted 3X	
Regional Population (25 Mile)	(RP)
Employment CBD (2 Mile)	(ECBD)
Secondary Factors: Weighted 2X	
Transit Connectivity Employment	(TCE)
Transit Connectivity Population	(TCP)
City Population (10 Mile)	(CP)
City Employment (10 Mile)	(CE)
Regional Population Growth Factor	(RPGF)
Regional Air Market	(RAM)
Tertiary Factors: Weighted 1X	
Commuter Rail Connectivity Population	(CRP)
Corridor Traffic Congestion	(CTC)
Share of Financial Workers	(SF)
Share of Workers in Tourism Industry	(ST)

Source: High-speed Rail in America.

The case of United States of America



Source: America 2050

The case of United States of America

First, each criterion was divided by the total length (in miles) of the corridor. This step results in the data being on a per mile basis, which allows for comparison between corridors of varying lengths. Without this step, longer corridors with more data points would have had an advantage over shorter corridors.

$$\textbf{Value}_n\textbf{/Length of Corridor}_n$$

For each criterion, the corridor was given a rank from zero to 7,870, based on their relative value.

$$\textbf{Rank (Value}_n\textbf{/Length}_n\textbf{)}$$

These ranks were then converted to a value between 0 and 1 by dividing the rank by the maximum rank in each category and subtracting that result from 1. This yielded a number between 0 and 1 for each entry with the highest value 1 and lowest 0.

$$\textbf{1 – (Rank}_n\textbf{ / Maximum Rank)}$$

The final equation was then applied to these adjusted corridor ranks.

Corridor Score = 3*(RP+ECBD) +2*(TCE+TCP+CP+CE+RPGF+RAM) + (CRP+CTC+SF+ST)

The case of United States of America

Scoring of a Sample of Short, Medium, and Long Corridors

Short Corridors – 150 Miles or Less

Origin	*Destination*	*Length*	*Score*
New York NY	Philadelphia PA	91	19.86
Los Angeles CA	San Diego CA	150	19.62
Chicago IL	Milwaukee WI	86	19.38
Washington, D.C.	Richmond VA	110	18.31
Sacramento CA	San Francisco CA	139	18.21
Tampa FL	Orlando FL	84	13.63

The case of United States of America

Mid-Length Corridors – 150–300 Miles or Less

Origin	*Destination*	*Length*	*Score*
Washington, D.C.	New York NY	224	20.15
Boston MA	New York NY	231	19.87
Portland OR	Seattle WA	185	17.37
Chicago IL	Saint Louis MO	282	16.19
Birmingham AL	Atlanta GA	164	15.93
Atlanta GA	Charlotte NC	257	15.68
Dallas TX	Houston TX	243	16.12

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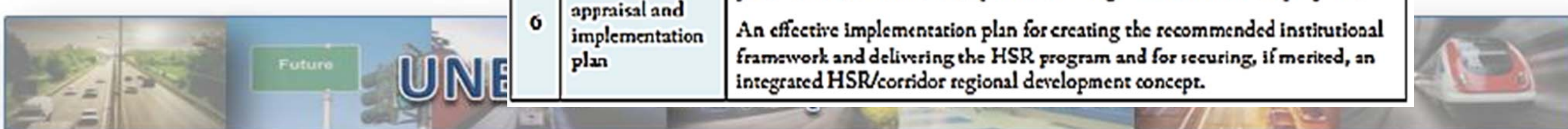
High Speed Trains Master Plan

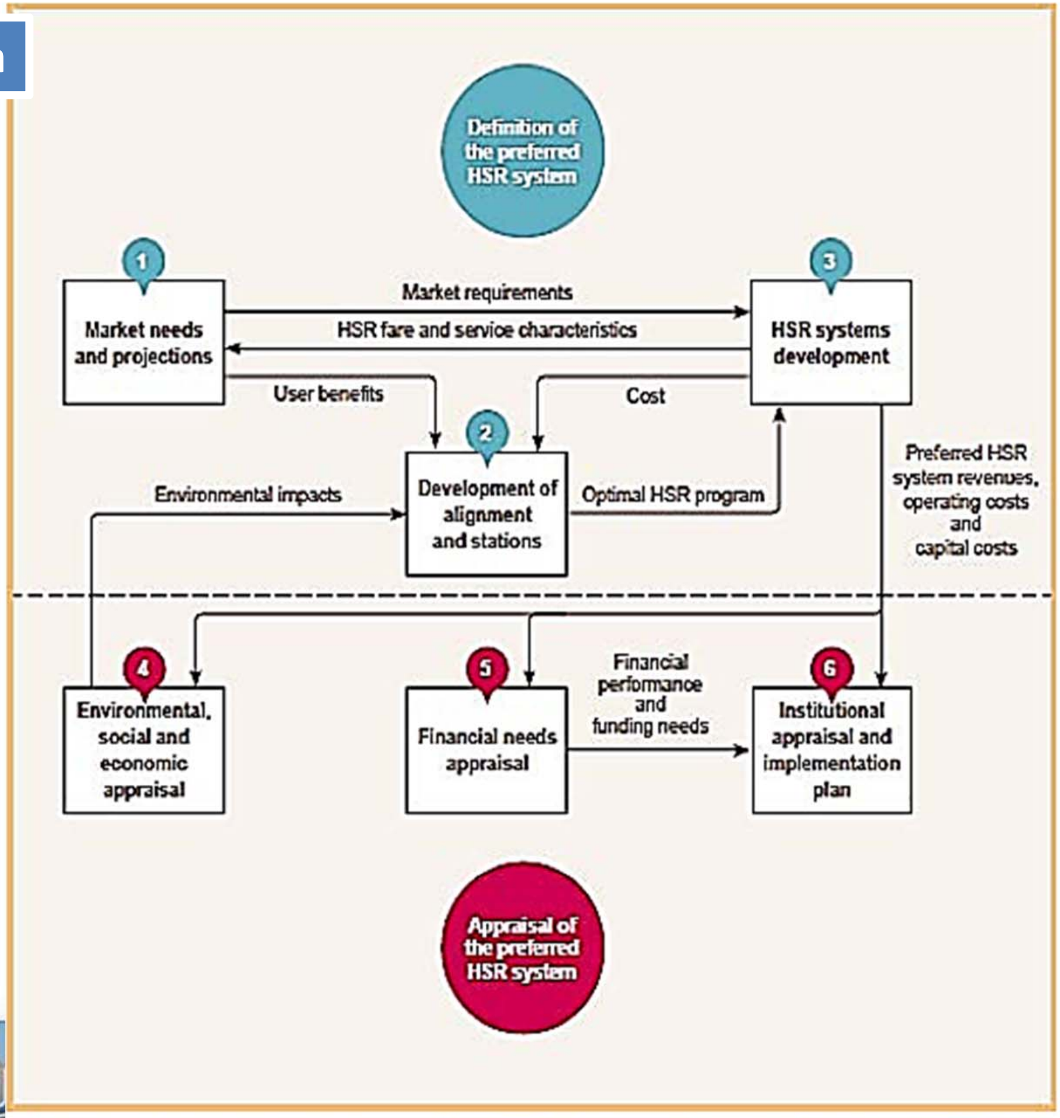
The case of Australia

Module		Study objectives
System definition		
1	Market needs and projections	Projected travel demand in the east coast corridor.
2	Development of alignment and stations	The preferred HSR system, including corridor, alignment, transport products and system specifications. The optimal HSR program for staging the physical construction and provision of services on the preferred HSR system.
3	HSR systems development	HSR system alternatives that could best serve the projected travel market effectively, and the aggregate and segmented travel demand and market shares that could be served by each.
System appraisal		
4	Environmental, social and economic appraisal	The specific environmental, social and economic impacts of the recommended HSR program, their effect on community groups, and the overall net cost or benefit of those impacts to Australia. The nature, extent and value of any opportunity created for an integrated HSR/corridor regional development concept. The nature and cost of any complementary access projects and their contribution to achieving the assessed performance of the HSR program.
5	Financial needs appraisal	The financing needs, financial performance and commercial viability of the HSR program. Any commercial financing gap and ways of funding and financing such a gap, including through public-private financing and funding partnerships. The key risks to the HSR program and its successful performance, the implications of these risks and possible mitigation measures, if any.
6	Institutional appraisal and implementation plan	The most appropriate institutional framework for governance, planning, procurement, construction, operation and regulation of the HSR program. An effective implementation plan for creating the recommended institutional framework and delivering the HSR program and for securing, if merited, an integrated HSR/corridor regional development concept.



High Speed Trains Master Plan

The case of Australia



The case of Australia

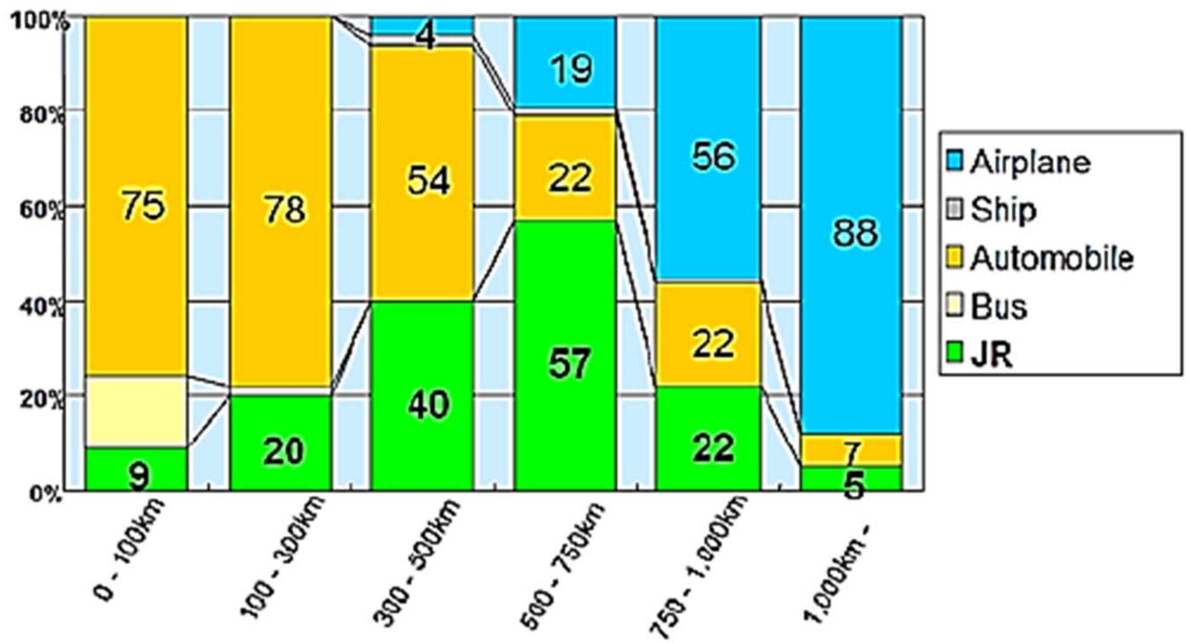
For example, the reference case assumes the average HSR single (one-way in $2012) economy fare between Sydney and Melbourne in 2065 would be $A141 for a business passenger and $A86 for a leisure passenger. This variation reflects the tendency for passengers travelling for business to pay more for a ticket than those travelling for leisure (a result of the booking methods used, the higher tendency of business travellers to purchase flexible tickets, and the tendency to travel at peak times). The corresponding average air fares (one-way in $2012) in 2065 were estimated as $A137 and $A69 respectively. In practice, a range of fares would be offered, targeted to market segments and influenced by seat utilisation patterns and competitive pressures, as is currently the case with the airlines, where current air fares paid for inter-city business travel can vary from the overall average by as much as 65 per cent. Sensitivity tests also considered average fares up to 30 per cent and 50 per cent higher, as well as 50 per cent lower in the context of a price war with the airlines.

The case of UK

The HS2 Y network (so named due to its shape) will provide direct high capacity,high-speed links between London, Birmingham, Leeds and Manchester, with intermediate stations in the East Midlands and South Yorkshire. The network will be able to accommodate high capacity trains running initially at speeds of up to 225 mph, with the potential to rise to 250 mph in the future. It will also carry high-speed trains designed to run onto the existing rail network, continuing at conventional speed to a wide range of additional destinations in the United Kingdom, without the need to change trains, via links to the West Coast and East Coast main lines. HS2 is being designed to accommodate the wider and taller trains used elsewhere in Europe. It would, therefore, be possible to run double-deck trains on HS2.

The case of Japan

Shinkansen share versus other transport modes by distance



High Speed Trains Master Plan

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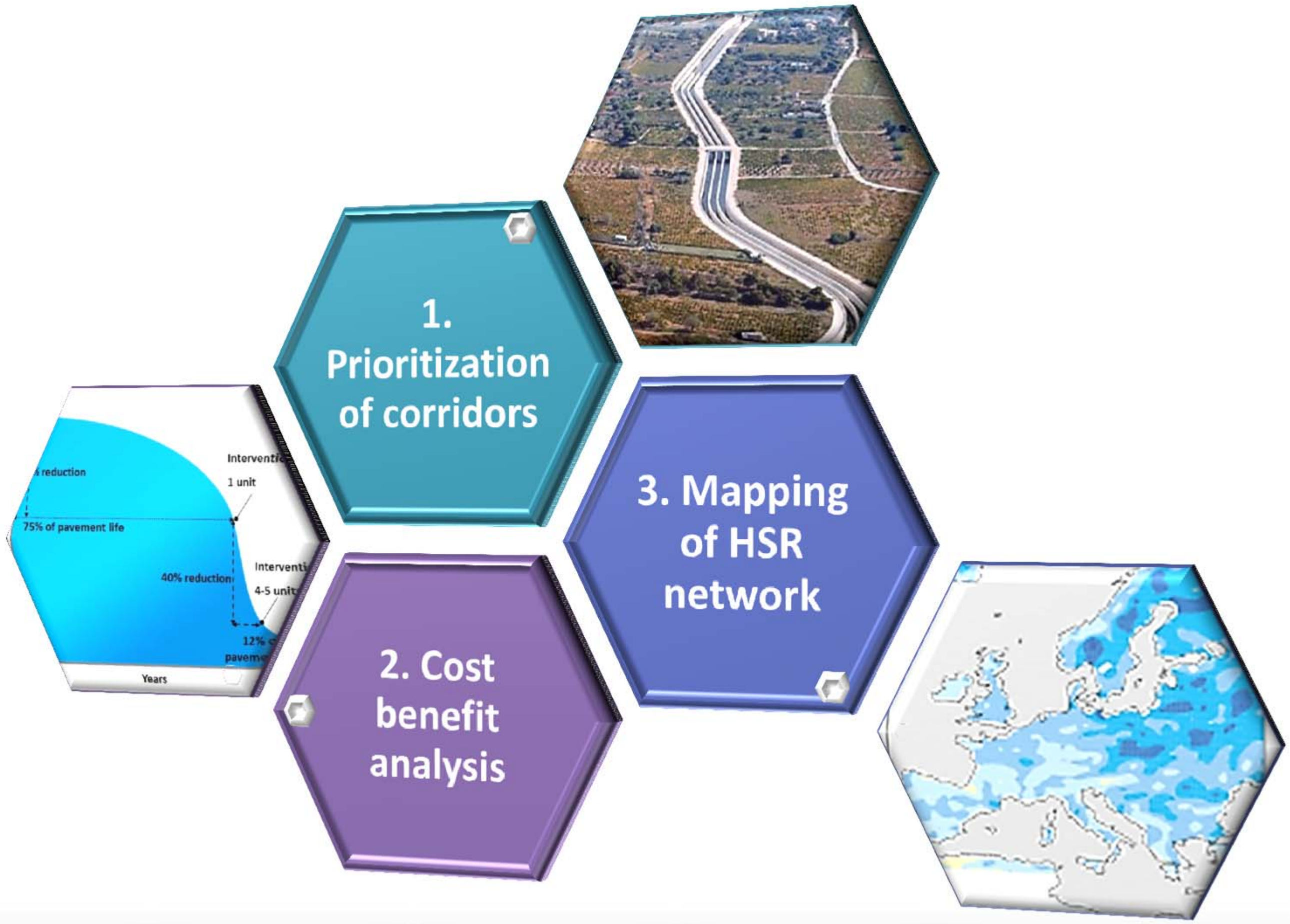
Methodology for the development of High Speed Trains



Proposal to amend our Methodology for High Speed Trains Master Plan

- Preparation of a toolkit for the future development of high speed lines and evaluation of existing ones;
- The toolkit will include analysis and prioritization of corridors based one socio-economic criteria, difficulties regarding infrastructure development criteria etc;
- The toolkit will include cost benefit analysis for each of the prioritized corridors based on tickets prices, inhabitants purchasing power and cost for constructing and operating high speed lines.