DEVELOPMENT A NATIONAL RAIL NETWORK: THE ISRAELI CASE

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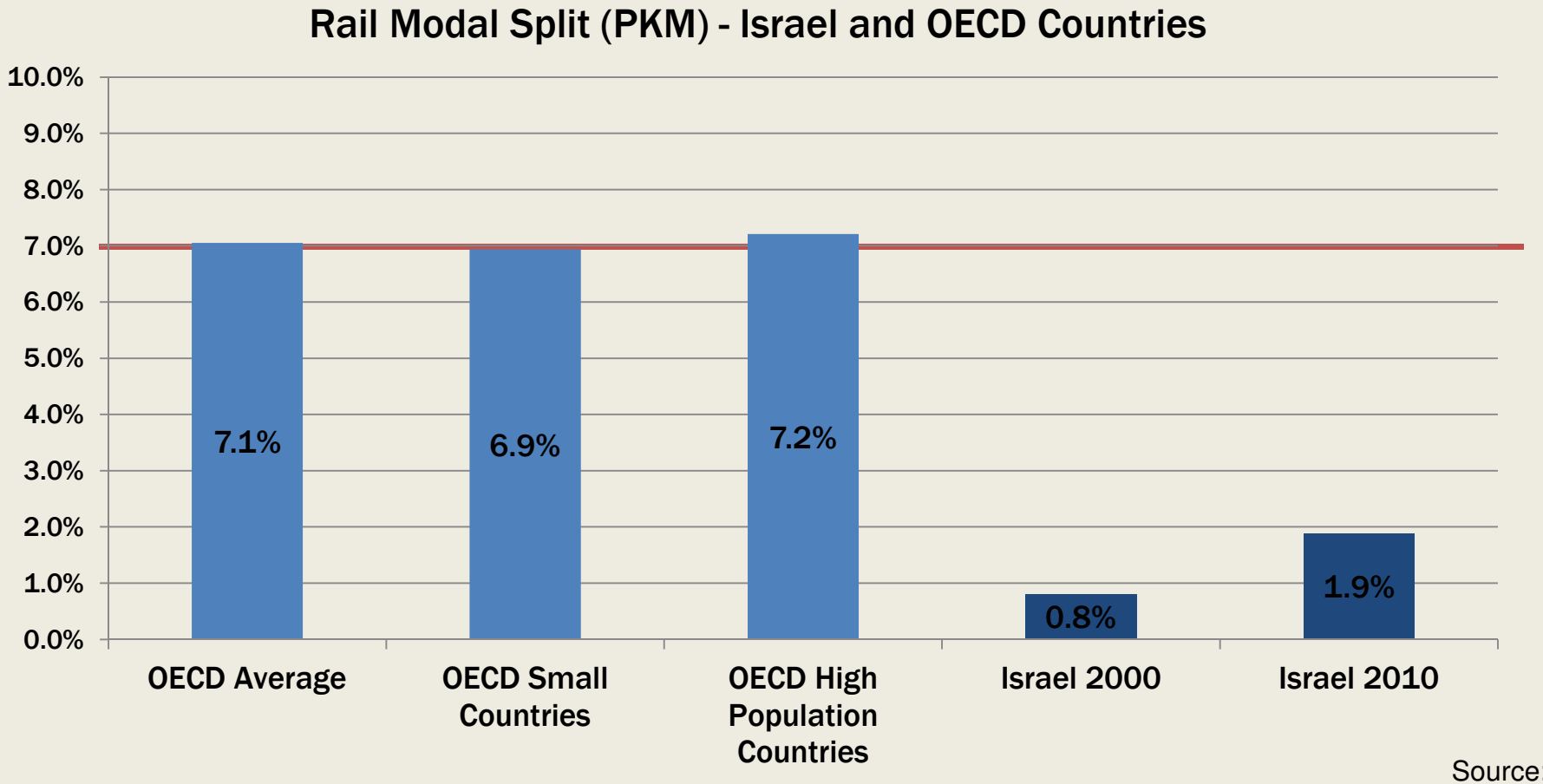
May 2015

	Israel	Switzerland
Population	7.1 M	8.1 M
Area	22,145 Sq. Km.	41,285 Sq. Km.
GDP per capita	$19,500	$ 84,815

WORLD TRENDS REVIEW

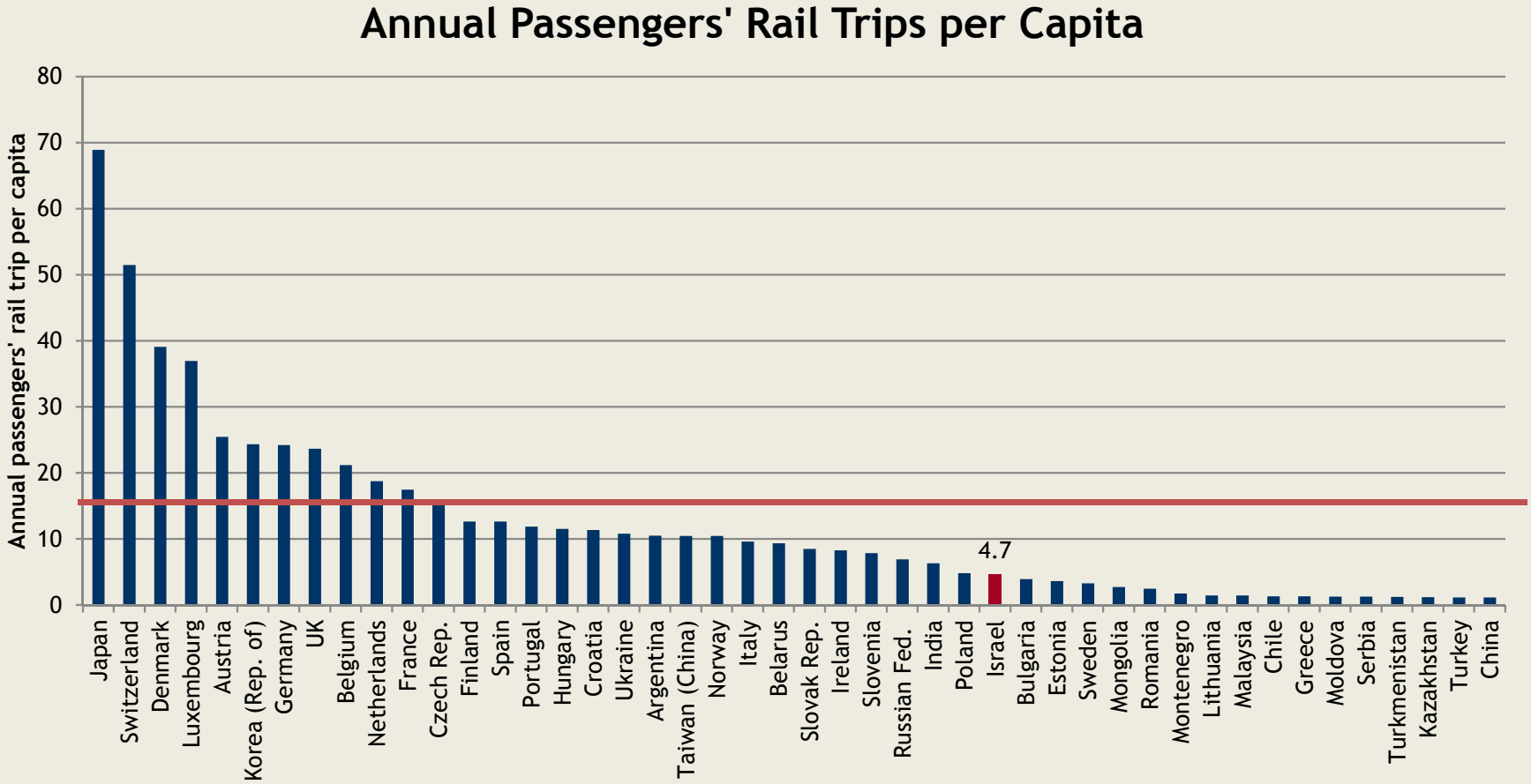
PERCENTAGE OF TRAIN TRIPS
(PASSENGER KM)

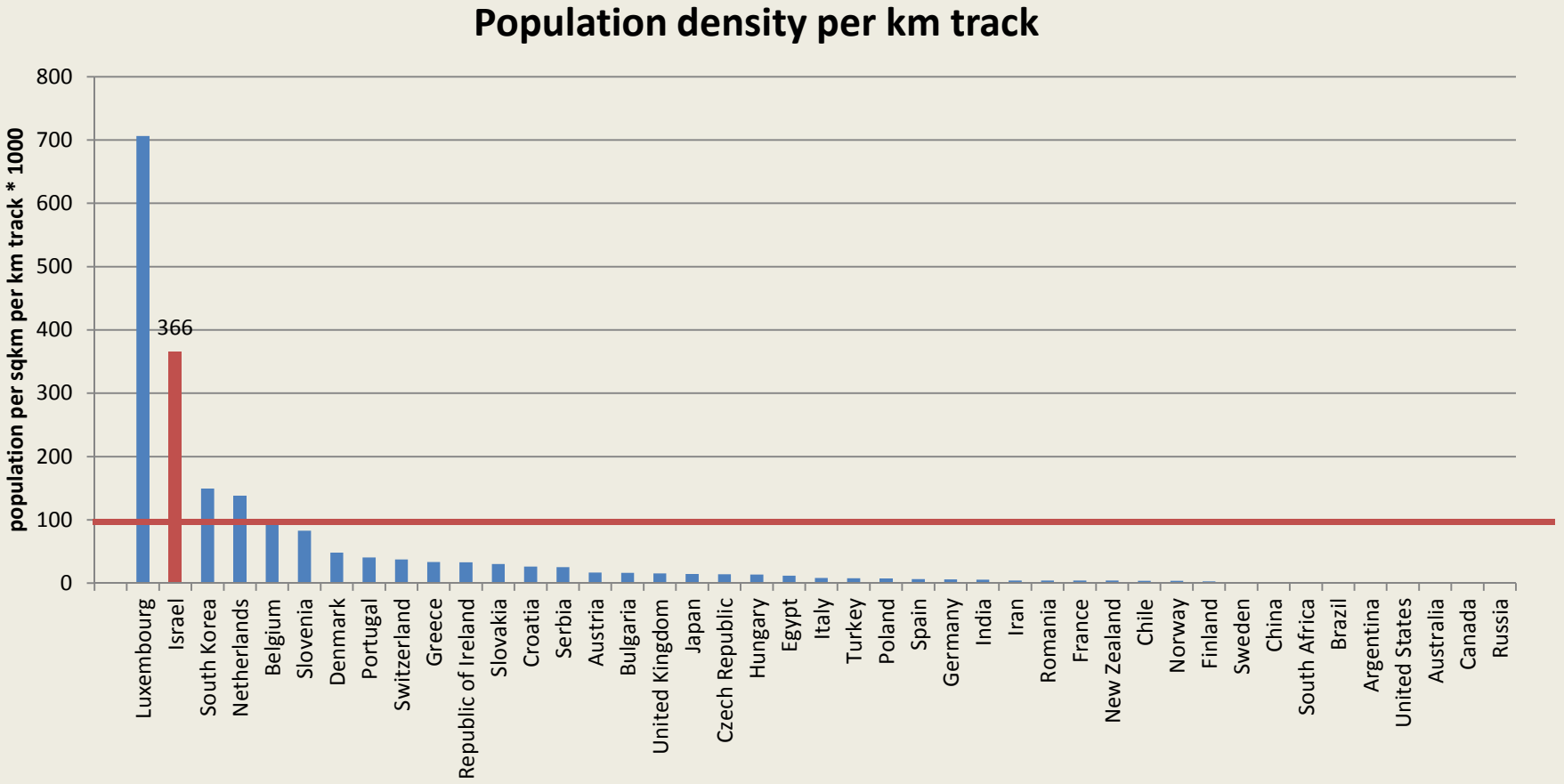


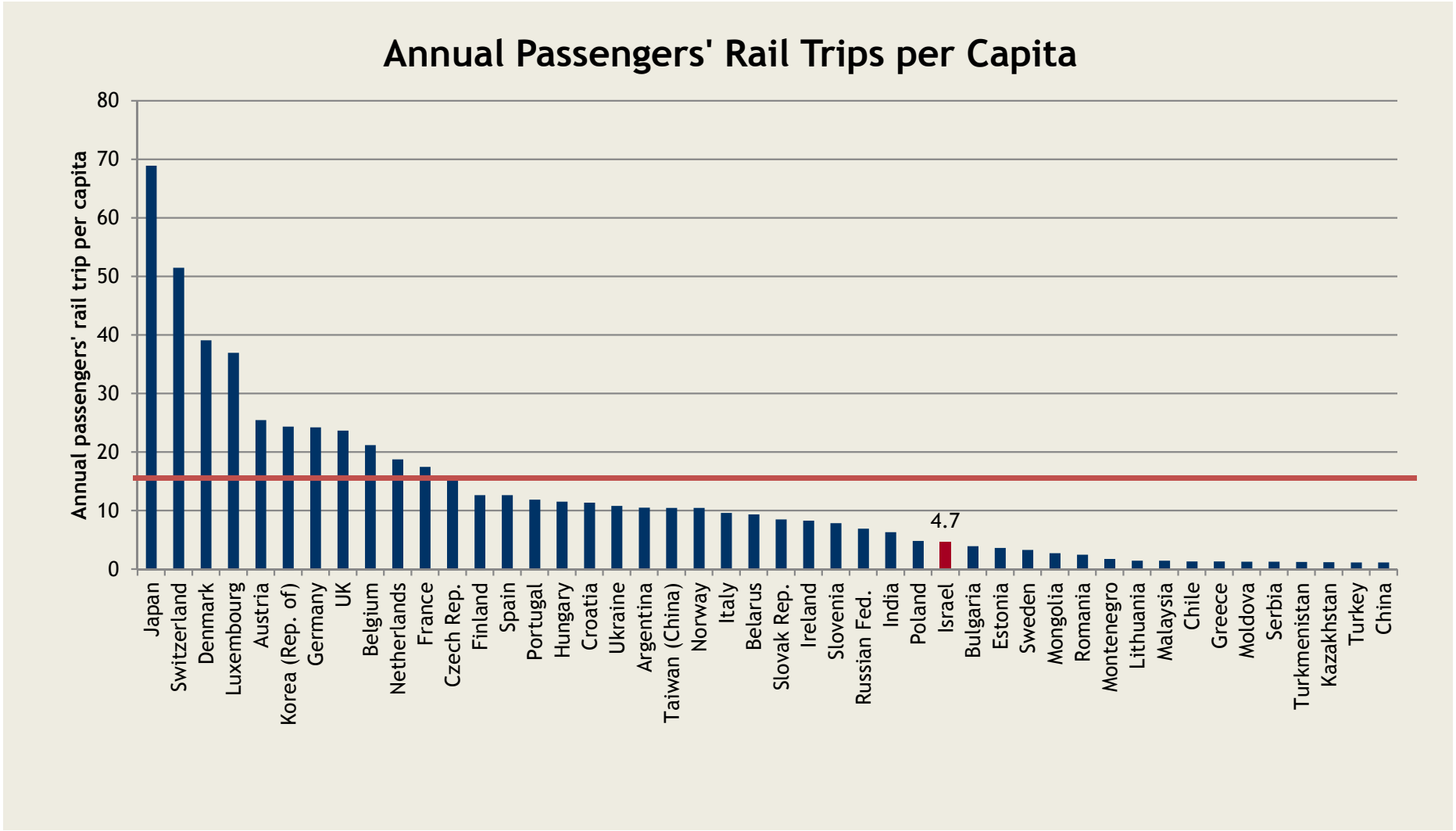
Source:

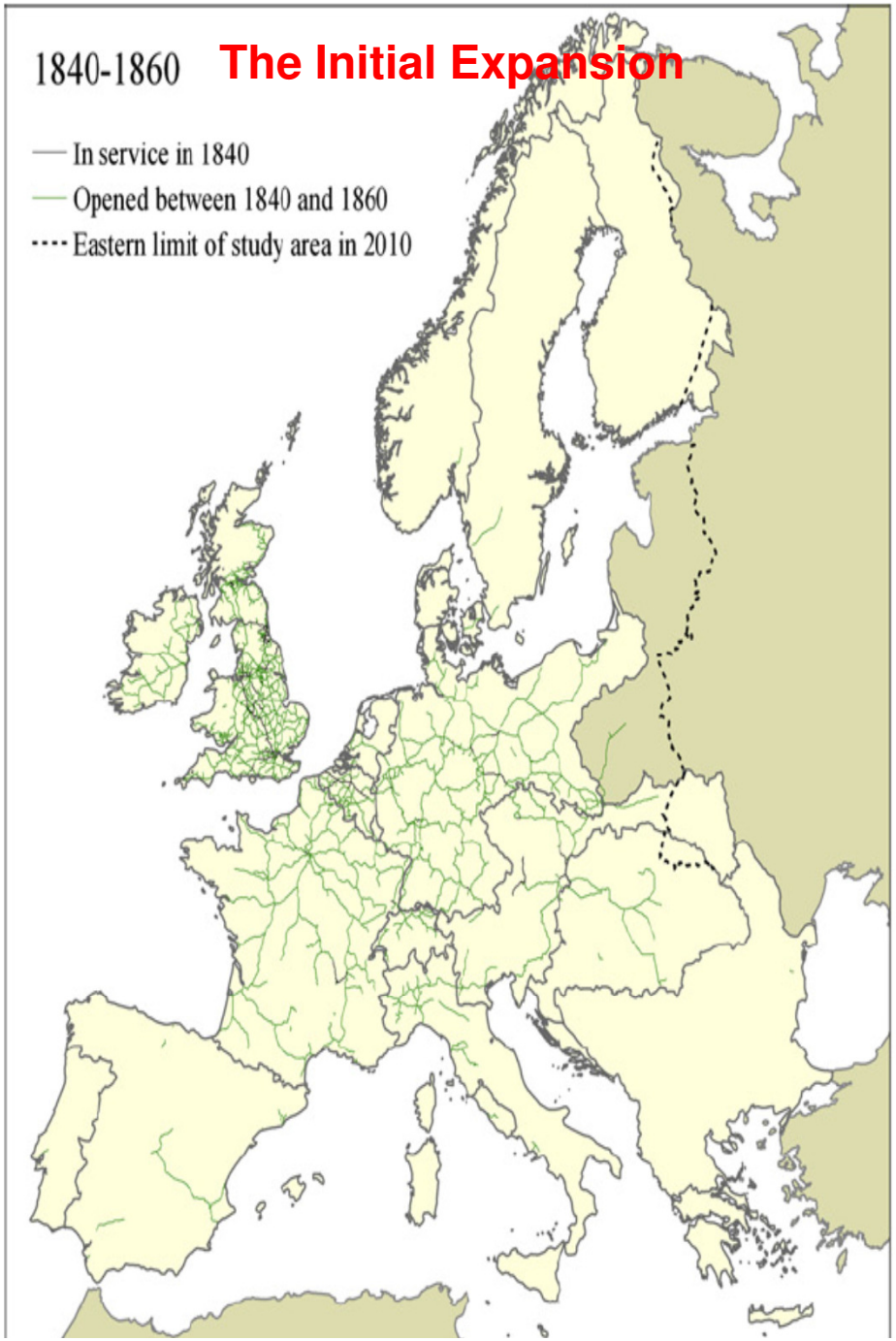
Israel estimated based on tax, census 1995, 2008 Weighted OECD 2000 Data

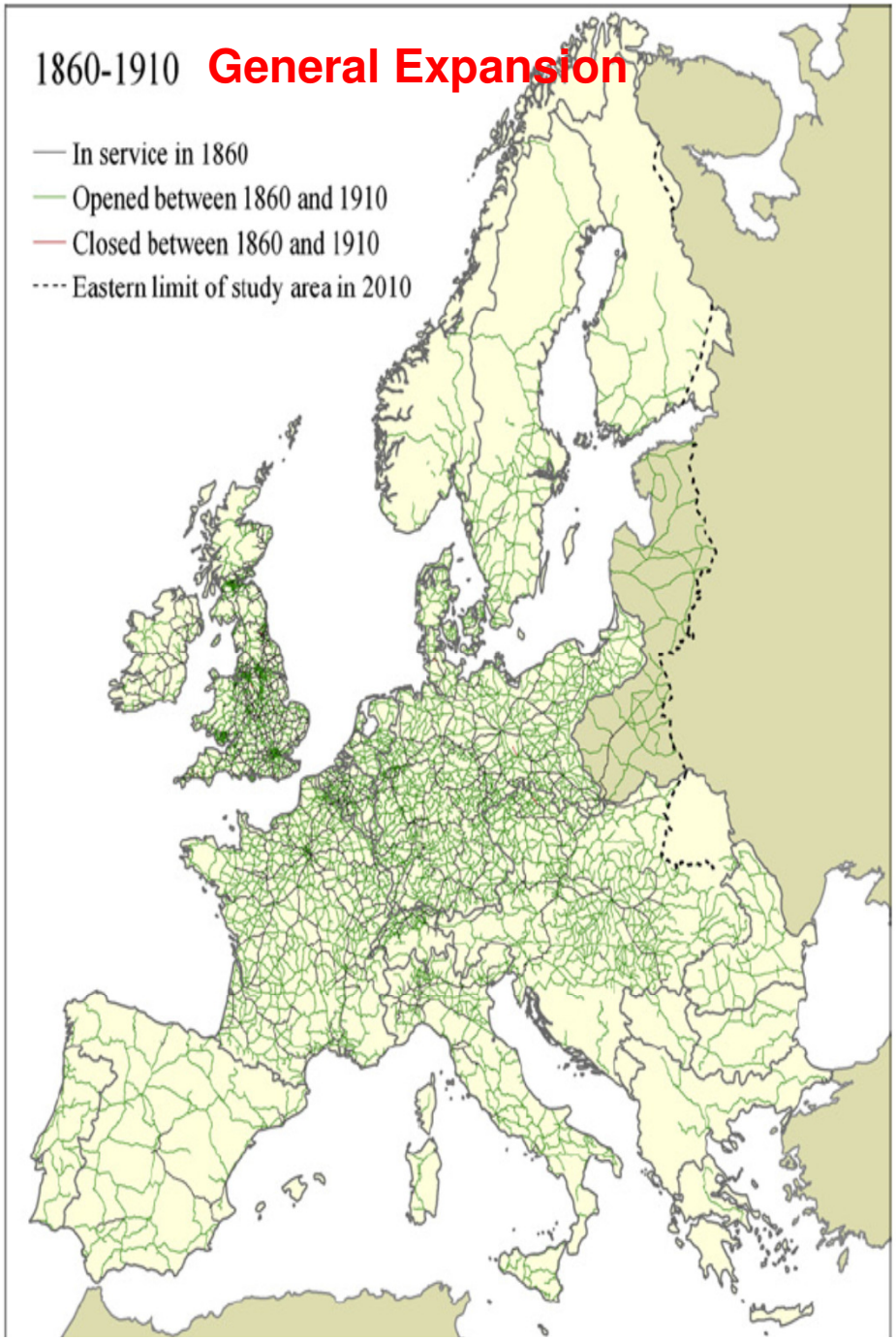
RAIL TRIPS PER CAPITA

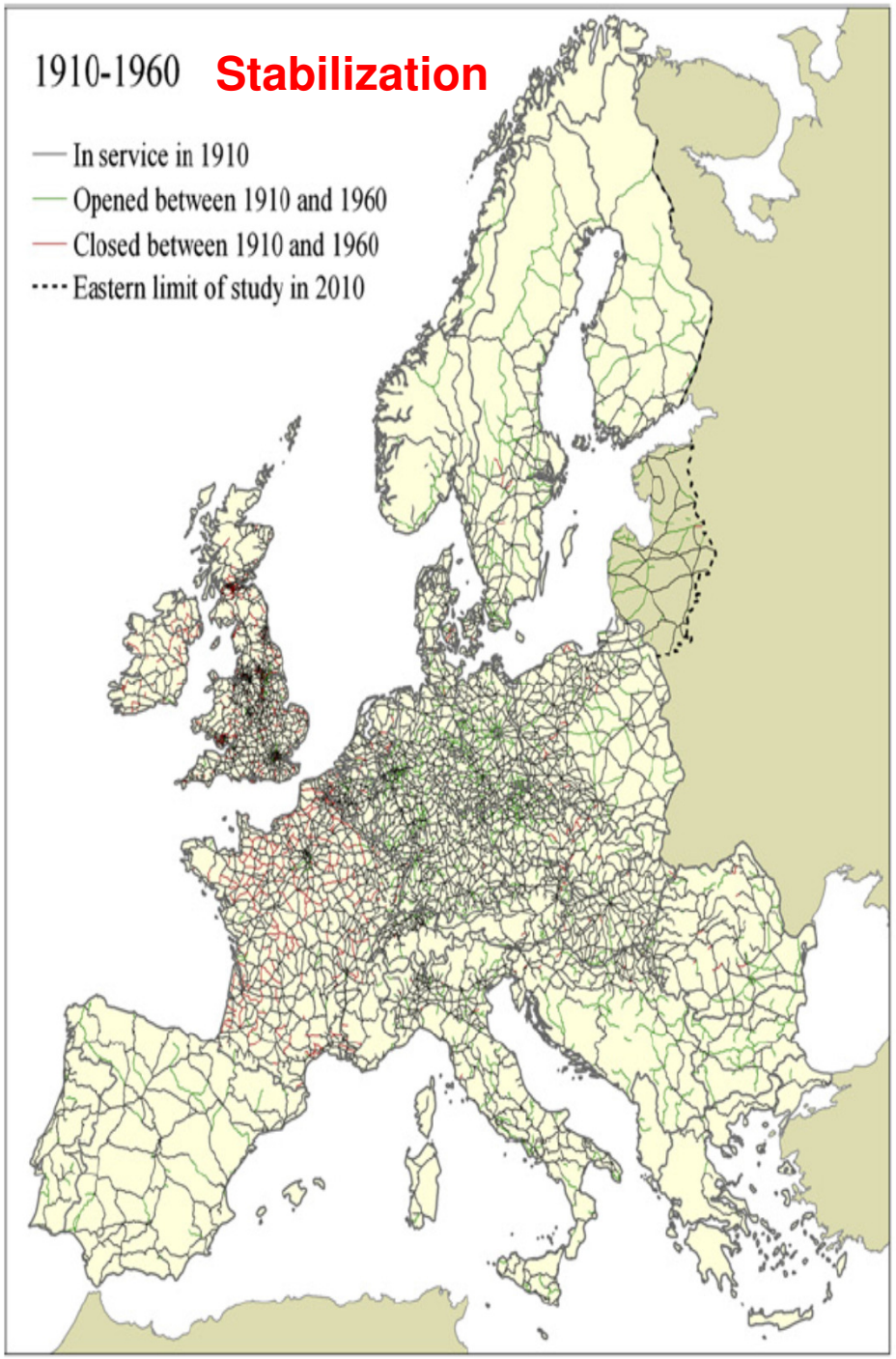



Population density per km track
population per sqkm per km track * 1000
800
700
600
500
400
300
200
100
0
366
Luxembourg
Israel
South Korea
Netherlands
Belgium
Slovenia
Denmark
Portugal
Switzerland
Greece
Republic of Ireland
Slovakia
Croatia
Serbia
Austria
Bulgaria
United Kingdom
Japan
Czech Republic
Hungary
Egypt
Italy
Turkey
Poland
Spain
Germany
India
Iran
Romania
France
New Zealand
Chile
Norway
Finland
Sweden
China
South Africa
Brazil
Argentina
United States
Australia
Canada
Russia


Annual Passengers' Rail Trips per Capita
Annual passengers' rail trip per capita
80
70
60
50
40
30
20
10
0
4.7
Japan
Switzerland
Denmark
Luxembourg
Austria
Korea (Rep. of)
Germany
UK
Belgium
Netherlands
France
Czech Rep.
Finland
Spain
Portugal
Hungary
Croatia
Ukraine
Argentina
Taiwan (China)
Norway
Italy
Belarus
Slovak Rep.
Ireland
Slovenia
Russian Fed.
India
Poland
Israel
Bulgaria
Estonia
Sweden
Mongolia
Romania
Montenegro
Lithuania
Malaysia
Chile
Greece
Moldova
Serbia
Turkmenistan
Kazakhstan
Turkey
China


1840-1860
The Initial Expansion
In service in 1840
Opened between 1840 and 1860
Eastern limit of study area in 2010


1860-1910
General Expansion
In service in 1860
Opened between 1860 and 1910
Closed between 1860 and 1910
Eastern limit of study area in 2010


1910-1960 Stabilization
In service in 1910
Opened between 1910 and 1960
Closed between 1910 and 1960
Eastern limit of study in 2010

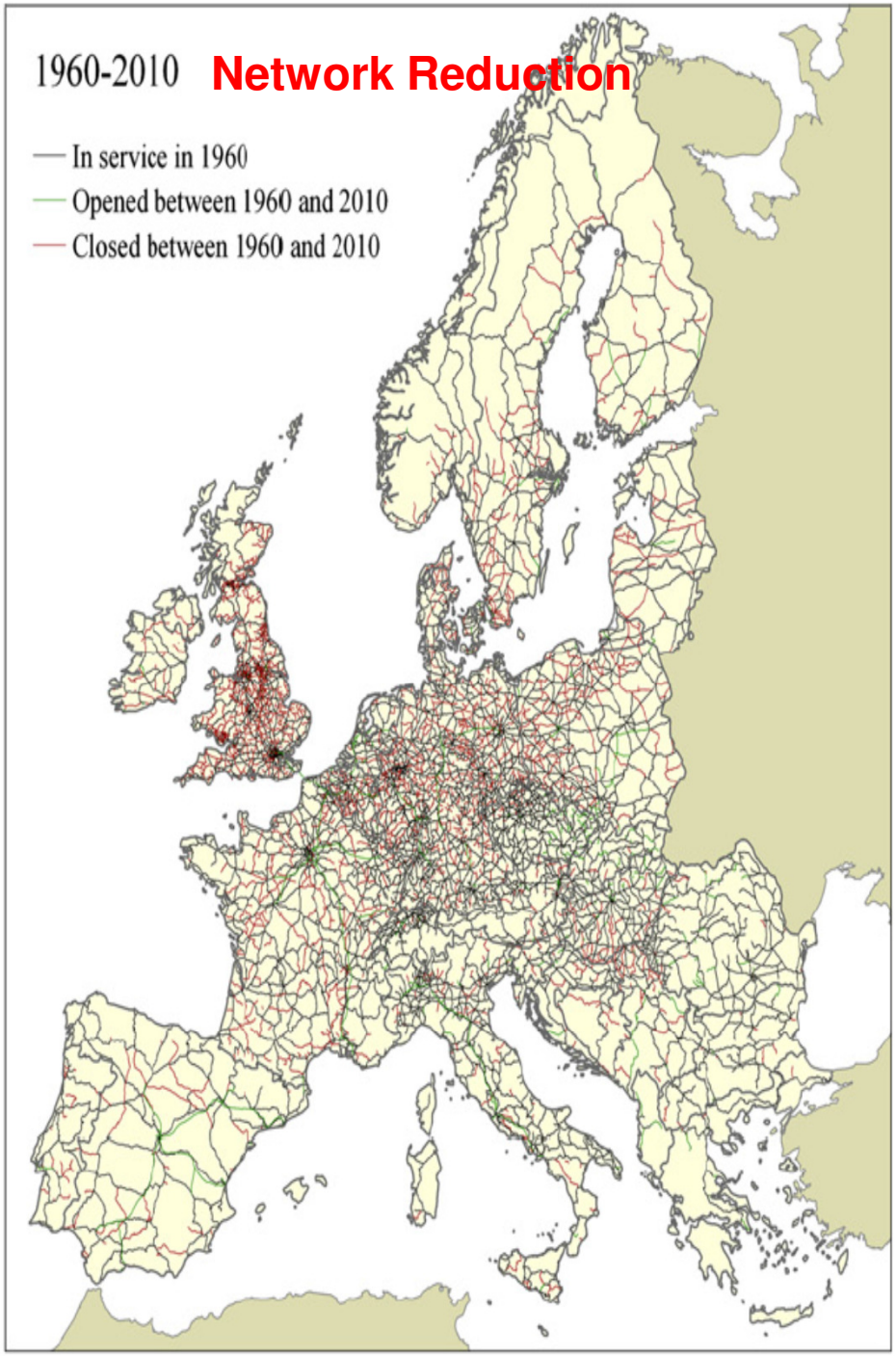
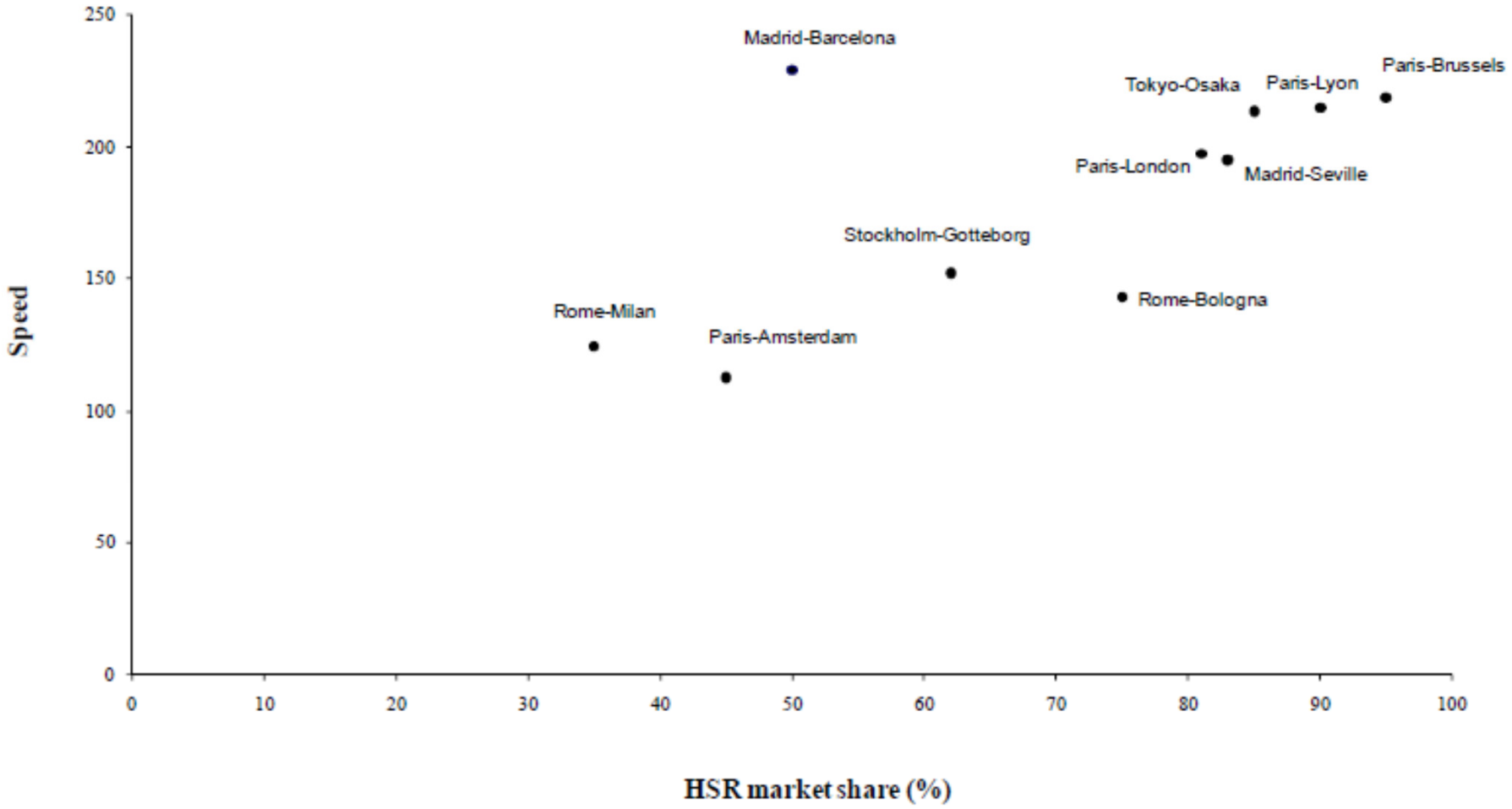

1960-2010 Network Reduction
In service in 1960
Opened between 1960 and 2010
Closed between 1960 and 2010

Figure 2. HSR market share and railway speed



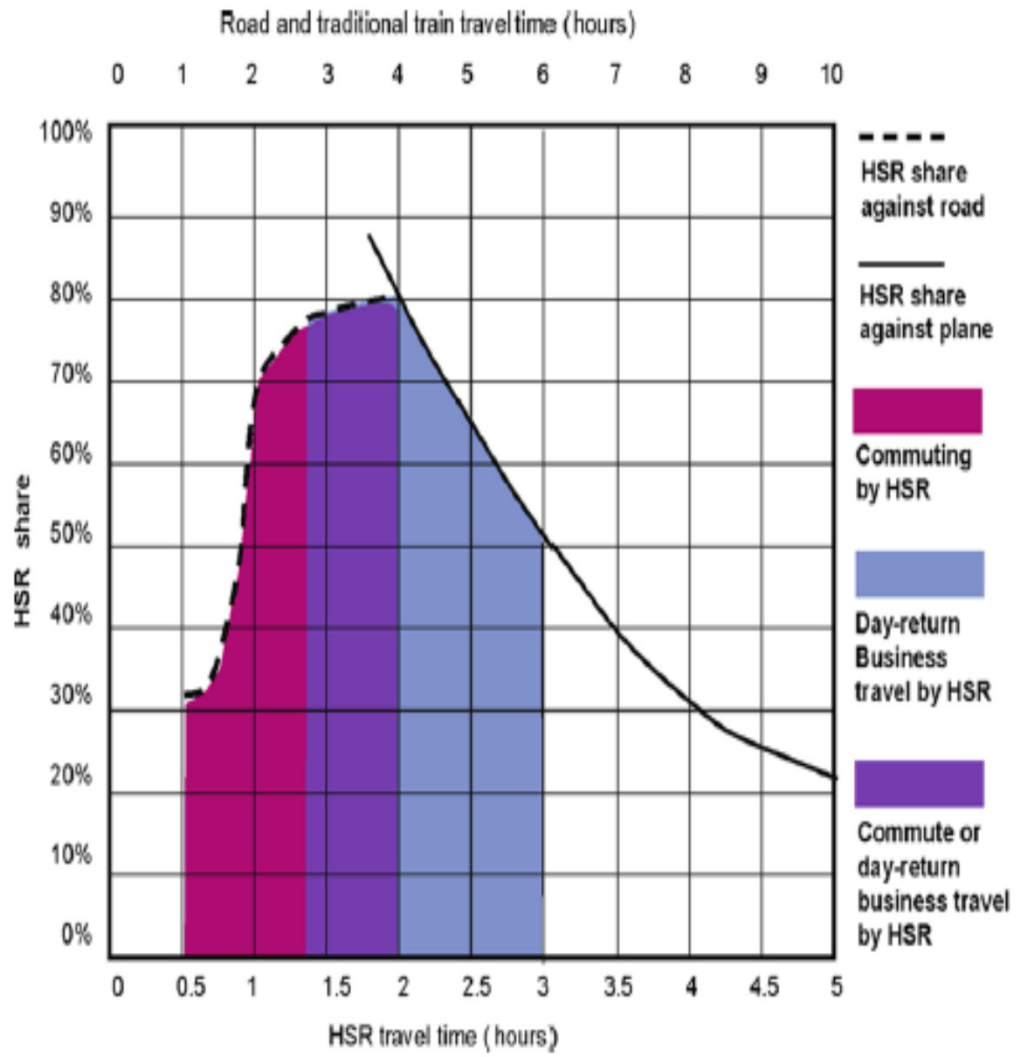


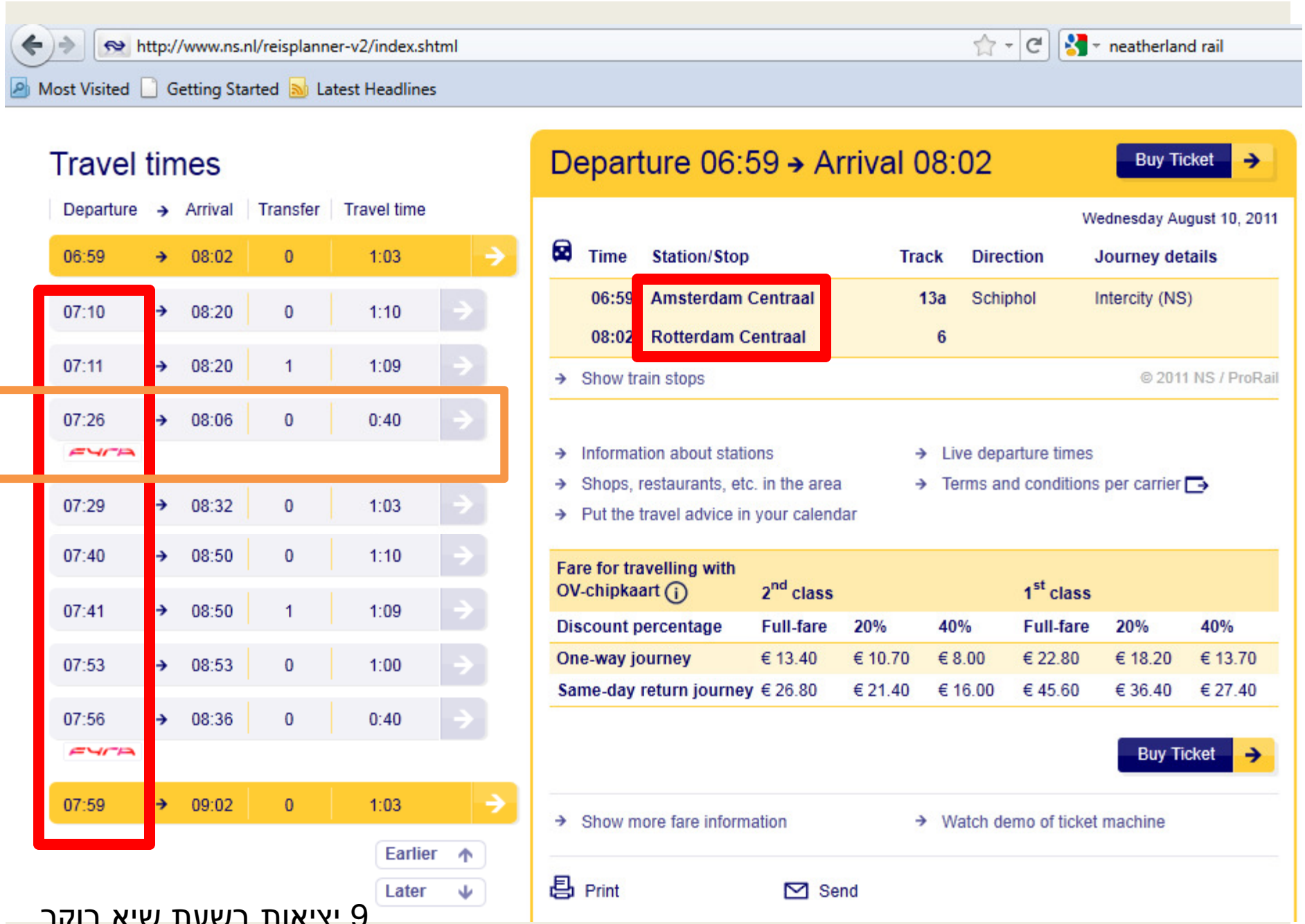
Fig. 4. HSR travel share and purpose. Travel share data have been drawn from several research projects and publications. *Sources*: Sauvant (2002) for air:HSR share, Typsa (2002) for HSR share of journeys of over 400 km, Garmendia (2008) for HSR:car share for 200 km journeys and Ureña et al. (2009) for HSR:car share for journeys of less than 100 km.

AVERAGE INTER CITY TRAVEL TIMES IN MINUTES

AMSTERDAM-ROTTERDAM
AMSTERDAM-EINDHOVEN

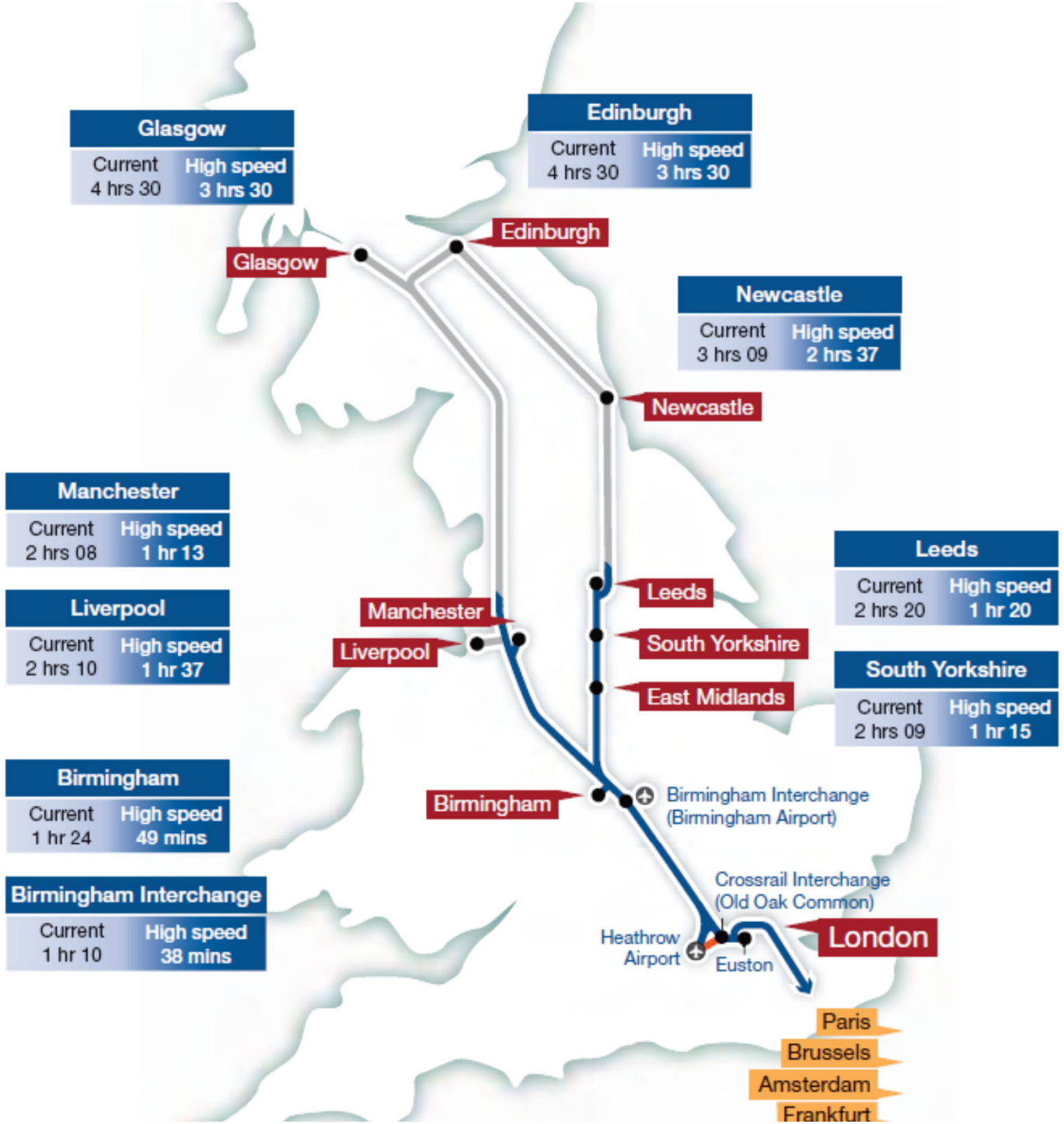
Population	City	Metropolis
Amsterdam	783,364	2,160,000
Rotterdam	603,425	1,300,000
Eindhoven	214,000	750,000

	Amsterdam	Schiphol	Utrecht	Rotterdam	The Hague	Leiden	's-Hertogenbosch	Arnhem	Eindhoven	Maastricht	Venlo	Heerlen	Groningen
Amsterdam	-												
Schiphol	16	-											
Utrecht	27	32	-										
Rotterdam	63	49	39	-									
The Hague	47	31	38	24	-								
Leiden	35	17	41	29	13	-							
's-Hertogenbosch	59	67	28	72	75	89	-						
Arnhem	70	78	39	88	84	100	50	-					
Eindhoven	80	89	49	72	97	111	21	75	-				
Maastricht	148	171	117	137	164	193	87	157	63	-			
Venlo	126	149	95	113	141	159	65	87	41	65	-		
Heerlen	151	173	121	140	167	187	92	140	69	24	67	-	
Groningen	137	155	116	163	161	164	156	122	177	261	196	263	-



9 יציאות בשעת שיא בוקר

Frequency	Amsterdam Rotterdam	Rotterdam Amsterdam	Amsterdam Eindhoven	Eindhoven Amsterdam
7-8	9	7	5	4
8-9	10	7	4	5
9-10	10	8	5	4
10-11	9	8	4	4
11-12	10	8	3	4
12-13	9	7	4	4
15-16	10	8	4	4
16-17	9	7	5	5
17-18	10	8	4	4
18-19	10	8	5	4

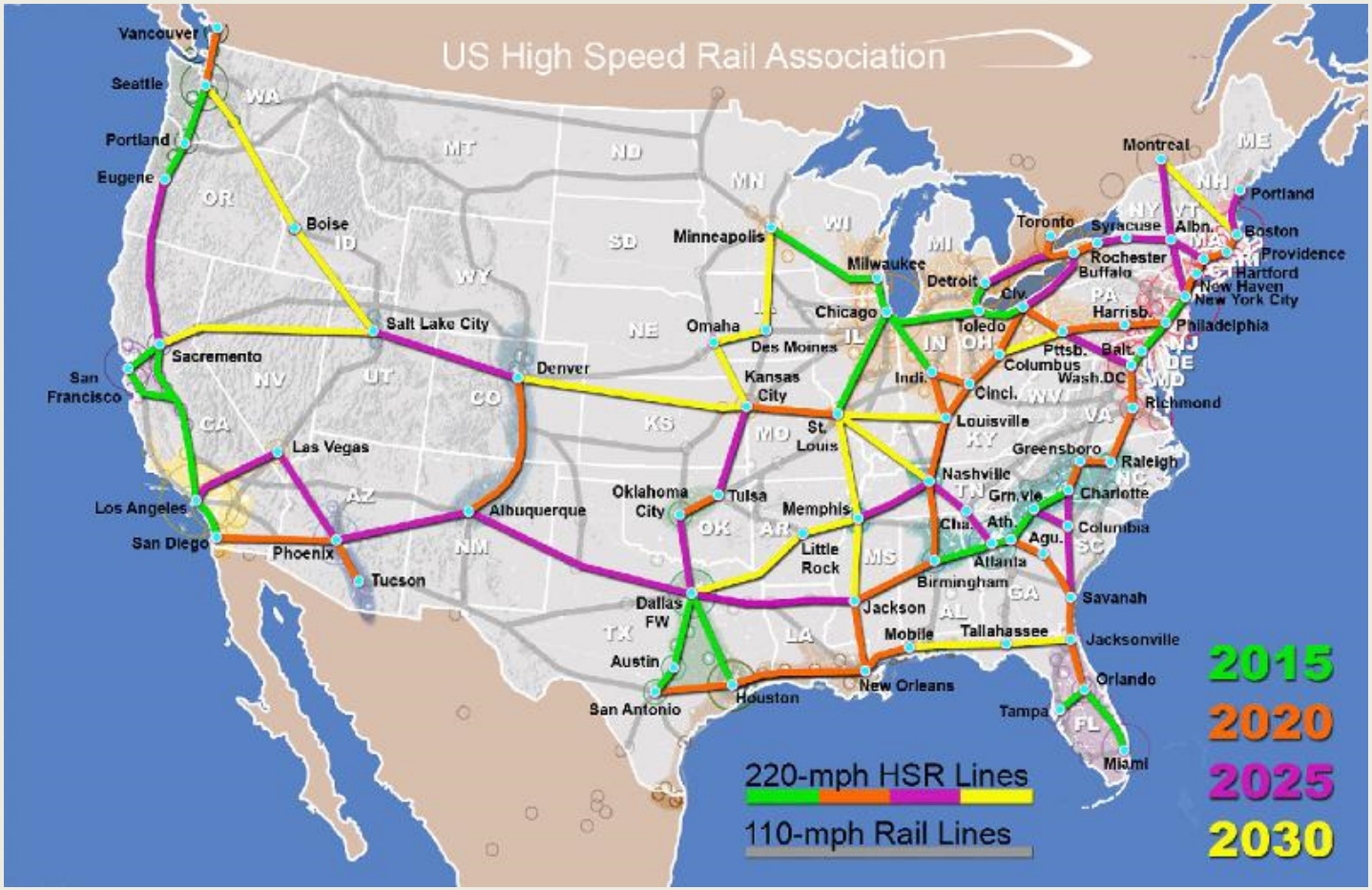

Glasgow
Current 4 hrs 30
High speed 3 hrs 30
Edinburgh
Current 4 hrs 30
High speed 3 hrs 30
Glasgow
Edinburgh
Newcastle
Current 3 hrs 09
High speed 2 hrs 37
Newcastle
Manchester
Current 2 hrs 08
High speed 1 hr 13
Liverpool
Current 2 hrs 10
High speed 1 hr 37
Manchester
Liverpool
Leeds
South Yorkshire
East Midlands
Leeds
Current 2 hrs 20
High speed 1 hr 20
South Yorkshire
Current 2 hrs 09
High speed 1 hr 15
Birmingham
Current 1 hr 24
High speed 49 mins
Birmingham
Birmingham Interchange
(Birmingham Airport)
Birmingham Interchange
Current 1 hr 10
High speed 38 mins
Crossrail Interchange
(Old Oak Common)
Heathrow Airport
Euston
London
Paris
Brussels
Amsterdam
Frankfurt

THE ITALIAN HIGH SPEED RAILWAYS (HSR) PROJECT

Current Scenario

The study area: the catchment area of the stations of the Italian HSR network

HSR PLANS - USA



CONCLUSIONS OF THE REVIEW

- Trains that do not serve major cities were closed and the tracks were dismantled
- Emphasis was directed to the development of service level: Fast trains and frequency
- There are various models for developing Fast trains system. Swiss model / British System upgrade interurban speed of 200-225 kph and combined high frequency and frequent and convenient link to all the system seems most appropriate to Israel.
- Fast trains can divert passenger car and create new trips that were made earlier, thus expanding the range of choices and individual activities.
- Reducing travel time , improved access to stations , and increasing the frequency (time from door to door) are the main factors for the success of the upgraded rail system
- High level of service can easily cause a split percentage higher than 50 % by rail and reduce private car use

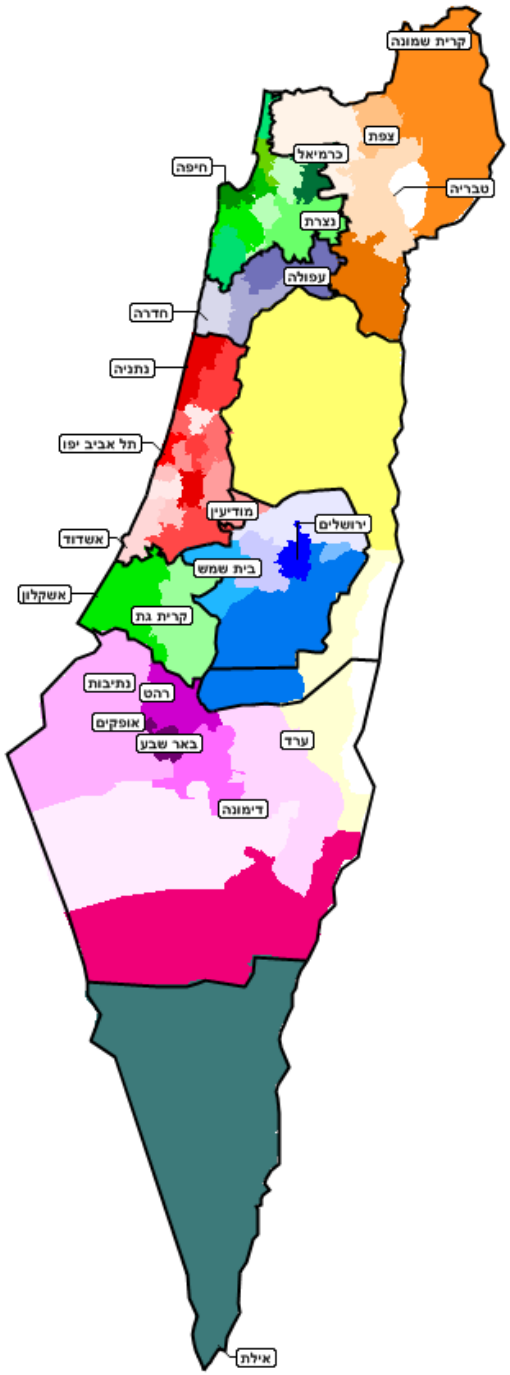
PROJECT CHALLENGES AND GOALS

CHALLENGES FOR DEVELOPING THE NATIONAL NETWORK

- Lack of investments in public transport network infrastructure in Israel compared to the developed world
- Low level of service (frequency, speed, coverage, reliability)
- Low public transport usage
- Low integration
- Low vision in current plans

STRATEGIC OBJECTIVES

National Goals	Plan Goals	Example indices
Social justice and Strengthening peripheral areas	• **Accessibility to Tel Aviv** • **Regional accessibility** • **Metropolitan accessibility**	– Population within X minutes to TA/ metropolitan center – Accessibility indices by "peripheral" levels – Accessibility Index by Socio – Economic levels
Economic Growth and efficiency	• **Operational efficiency** • **Reducing congestion** • **Impact on economic development**	- Percent of trips on rail network – Investment cost per passenger – Operating cost coverage ratio – Travel time savings, safety and network costs – Impact on employment
Quality of Life and Environment	• **Travel time savings** • **Comfort / Reliability** • **Safety / Environment**	– Average travel time – Population coverage 5 km from station – Decrease in private car usage

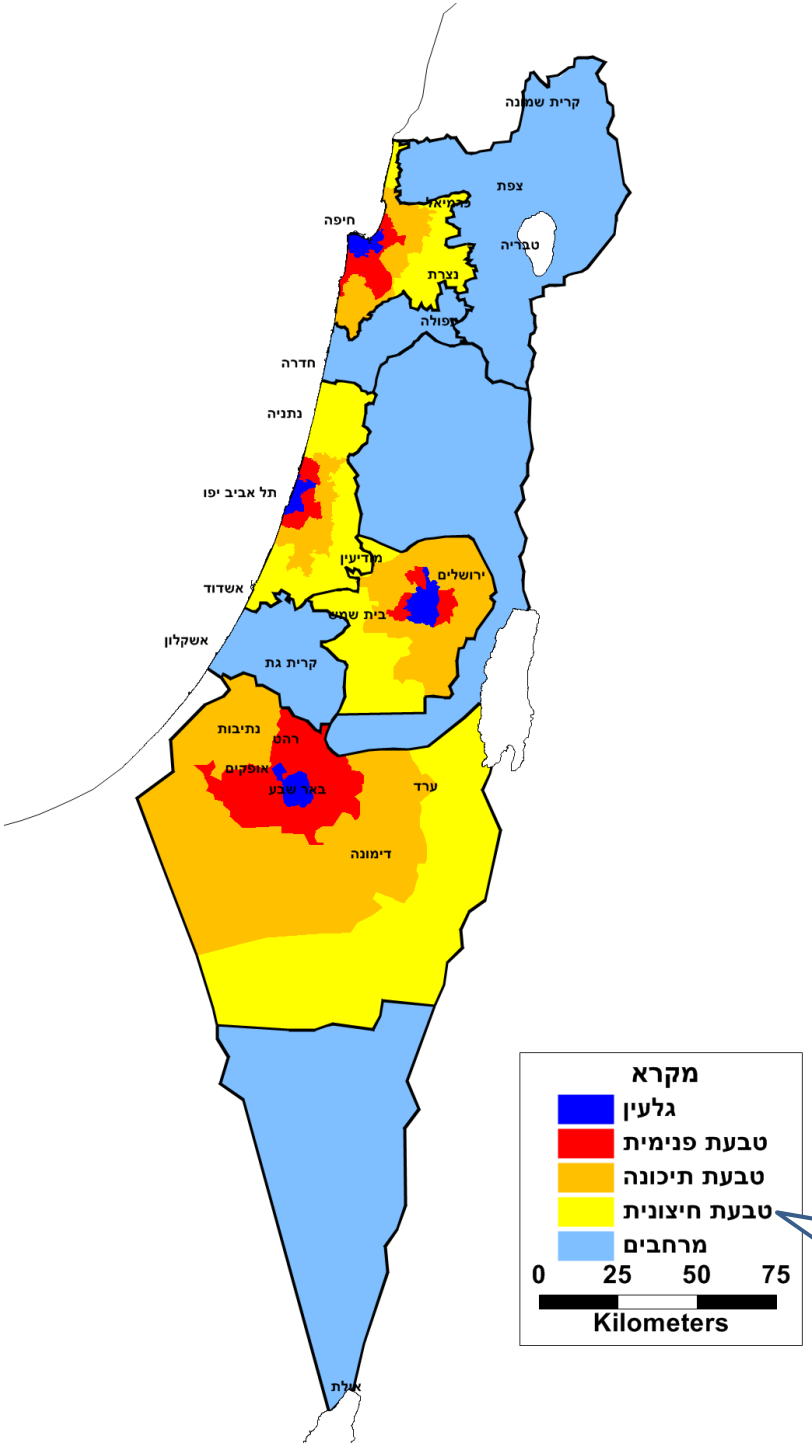


DIVISION OF THE STATE ZONES

Division to 51 zones - on the basis of spatial planning

Regions	Name of space		מס'
6	Metropolitan Jerusalem	Metropolitan Areas	1
15	Metropolitan Tel Aviv		2
10	Haifa Metropolitan		3
7	Be'er Sheva Metropolitan		4
5	North	Regional Areas	5
3	Hadera Merhav - Afula		6
2	Shfela Merhav		7
1	Eilat Merhav		8
2	Samaria		9

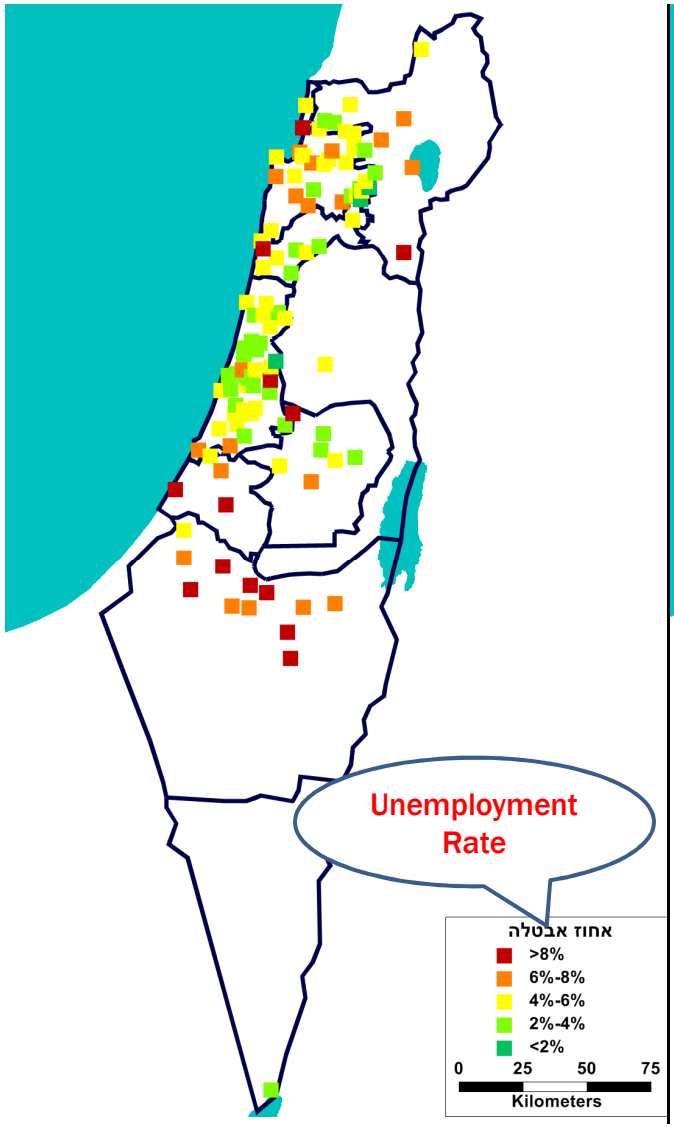
DIVISION INTO RINGS

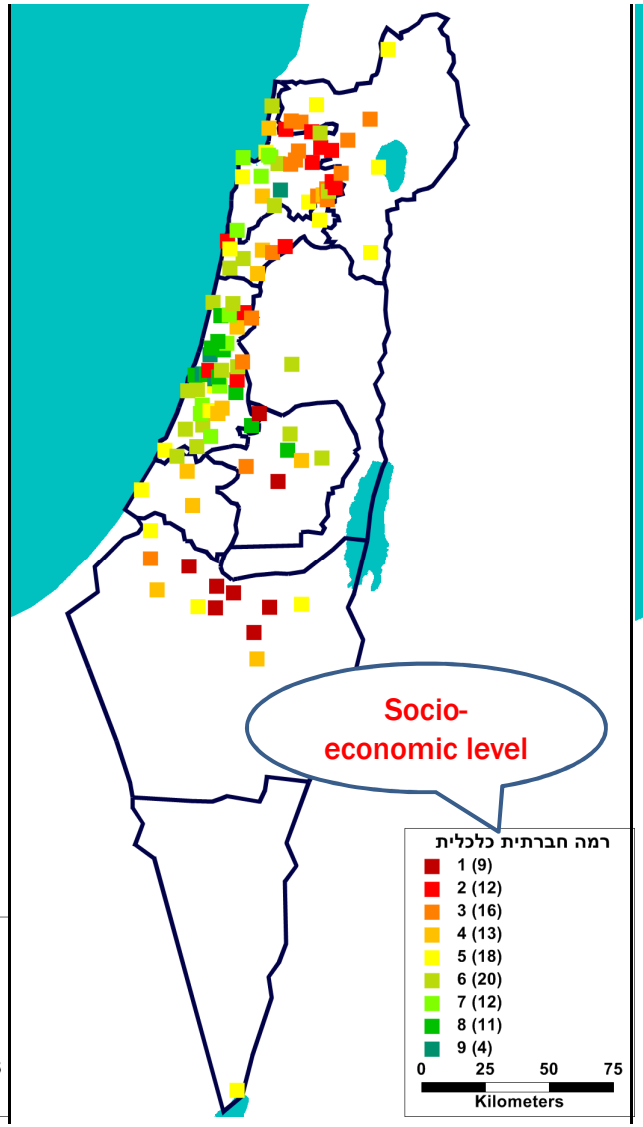


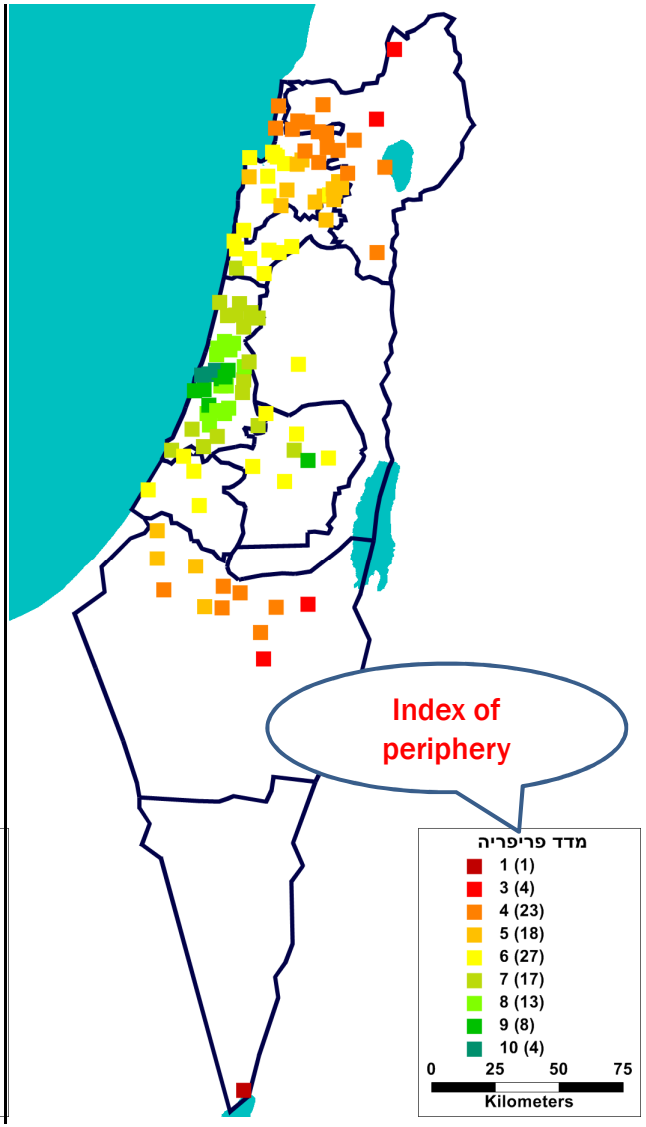
- The Metropolitan areas were divided according to four rings
- Core: the central city each what s Metropolitan
- Metropolitan Haifa Extended" in relation to the definition of the CBS

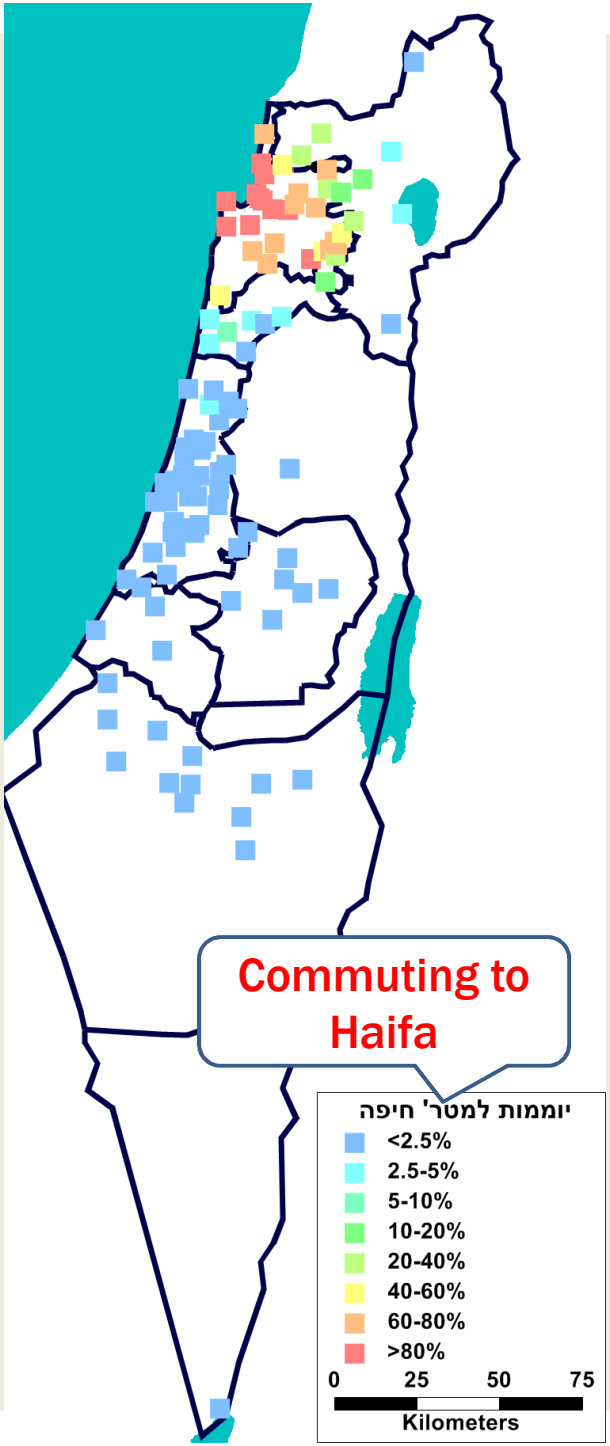
Core
Inner ring
Middle Ring
Outer ring
Merhavim

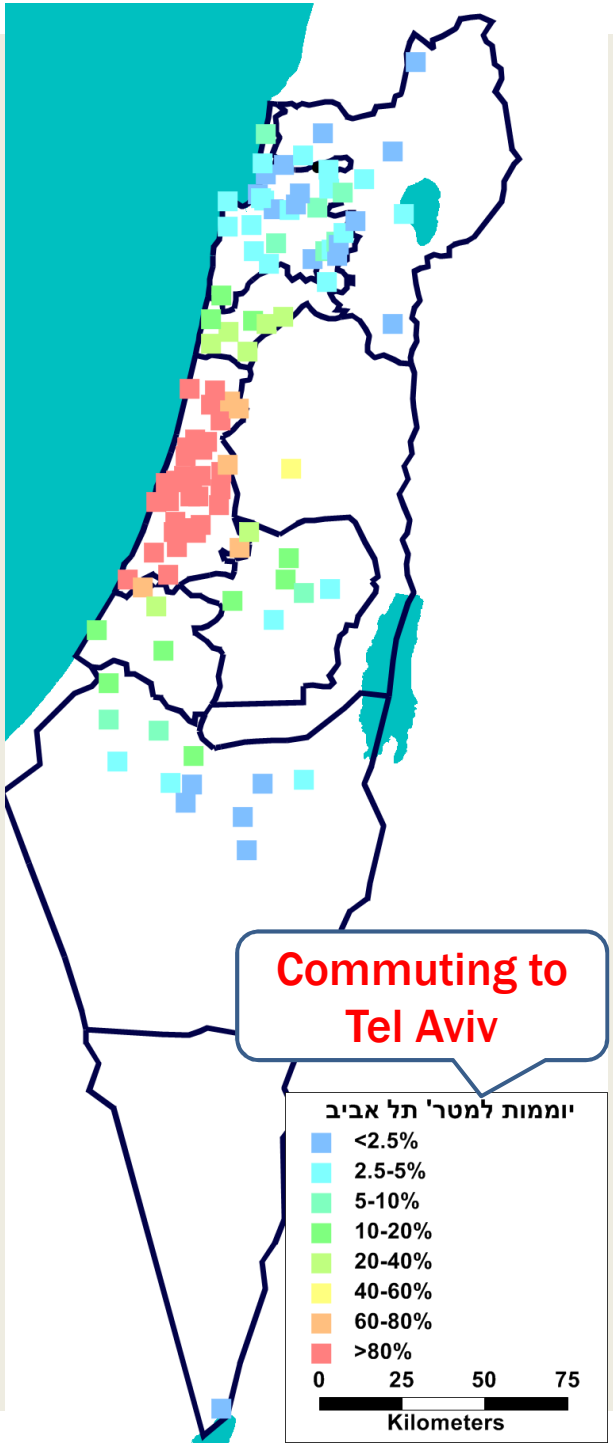
PERIPHERY AND SOCIO-ECONOMIC LEVEL

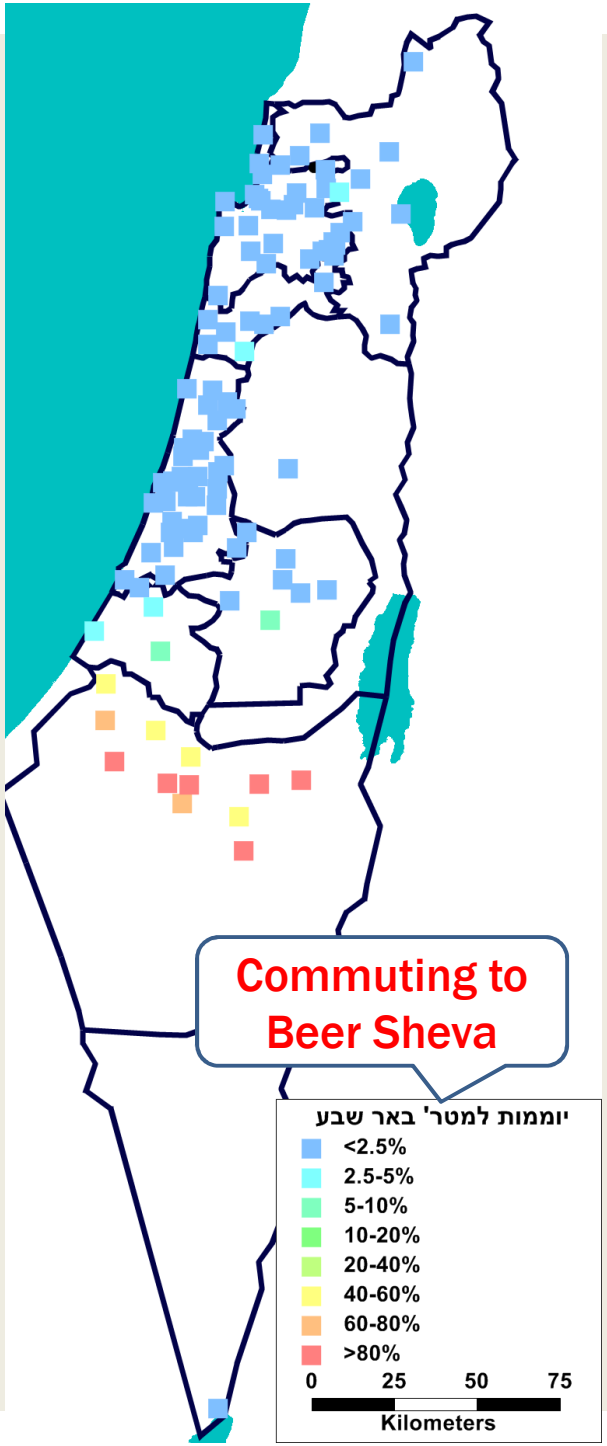


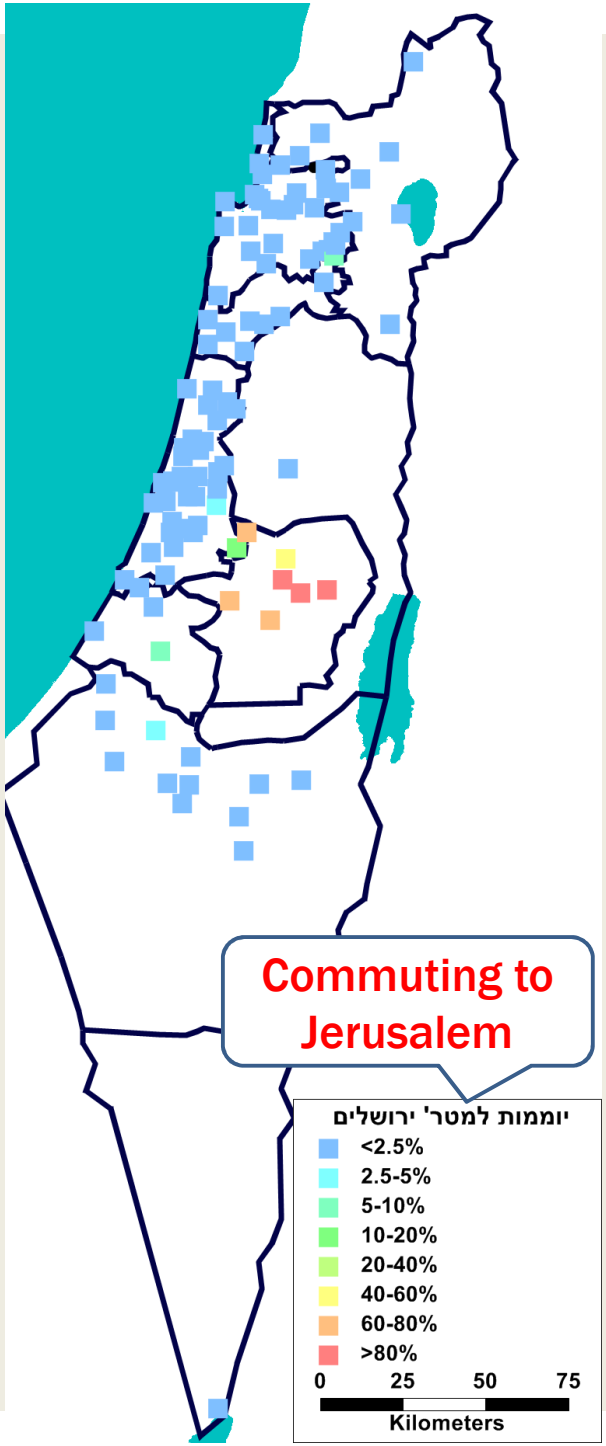




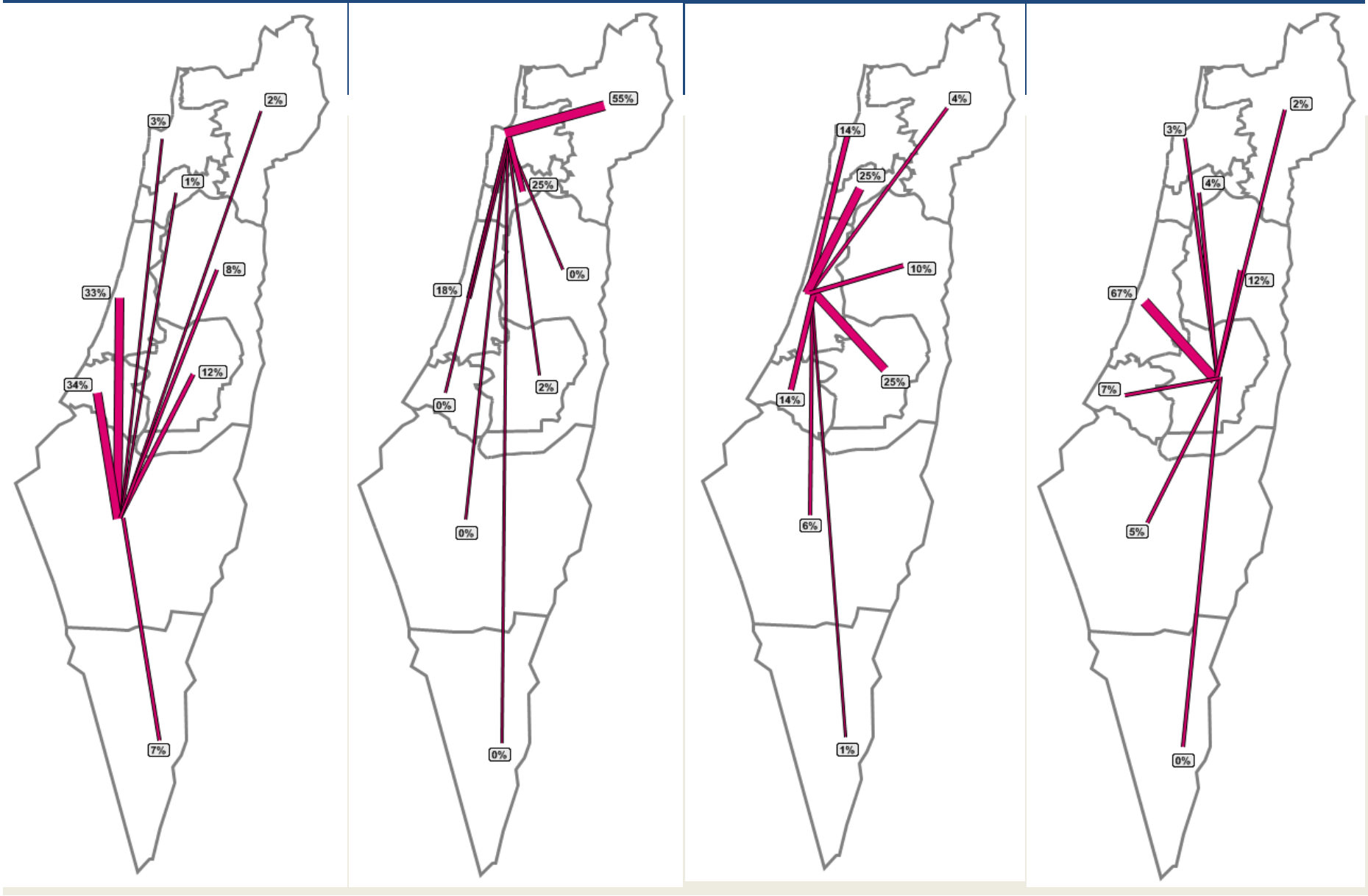

Commuting to Haifa
יוממות למטר' חיפה
<2.5%
2.5-5%
5-10%
10-20%
20-40%
40-60%
60-80%
>80%
0 25 50 75
Kilometers


Commuting to Tel Aviv
יוממות למטר' תל אביב
<2.5%
2.5-5%
5-10%
10-20%
20-40%
40-60%
60-80%
>80%
0 25 50 75
Kilometers


Commuting to
Beer Sheva
יוממות למטר' באר שבע
<2.5%
2.5-5%
5-10%
10-20%
20-40%
40-60%
60-80%
>80%
0
25
50
75
Kilometers

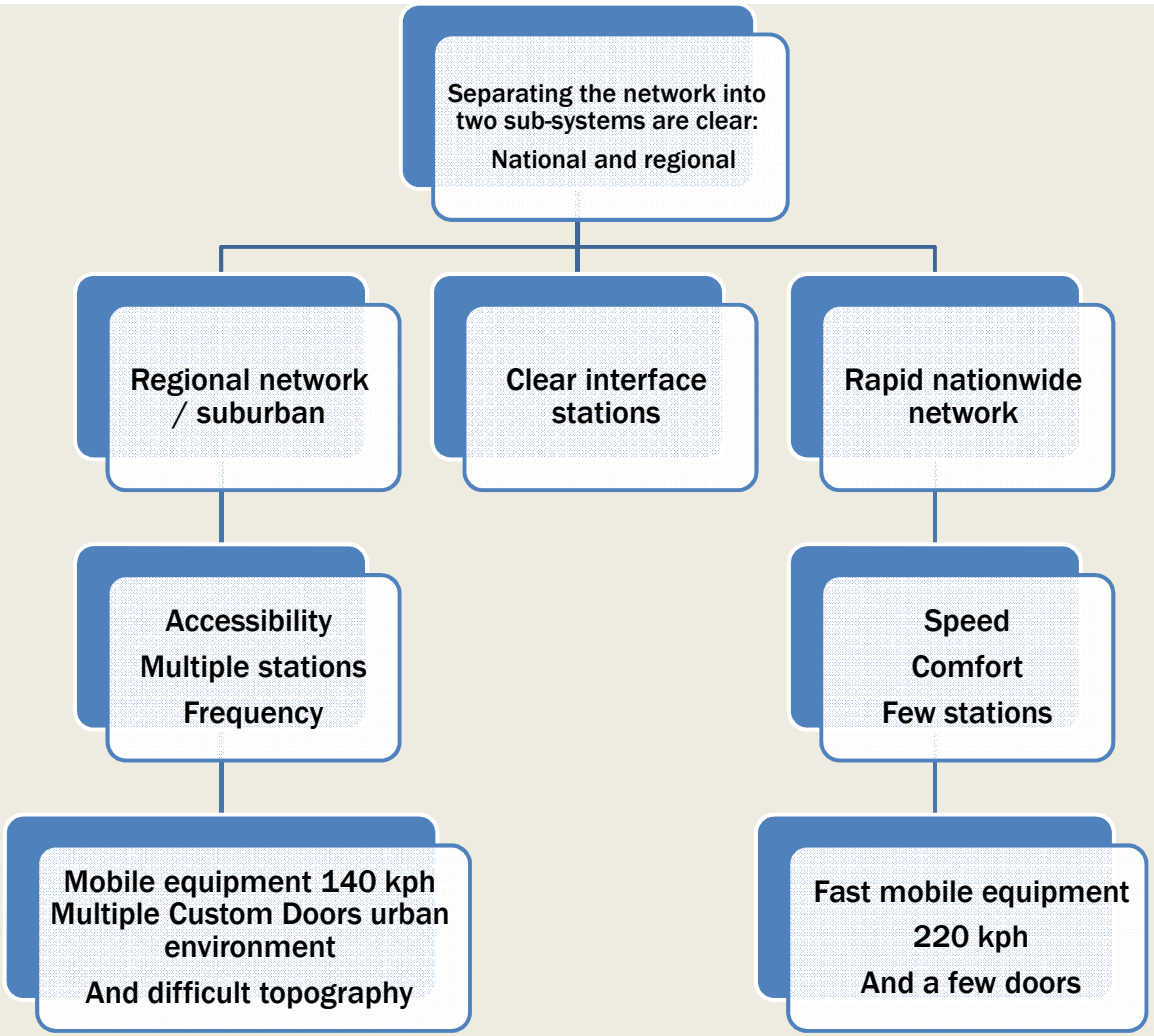

Commuting to
Jerusalem
יוממות למטר' ירושלים
<2.5%
2.5-5%
5-10%
10-20%
20-40%
40-60%
60-80%
>80%
0
25
50
75
Kilometers

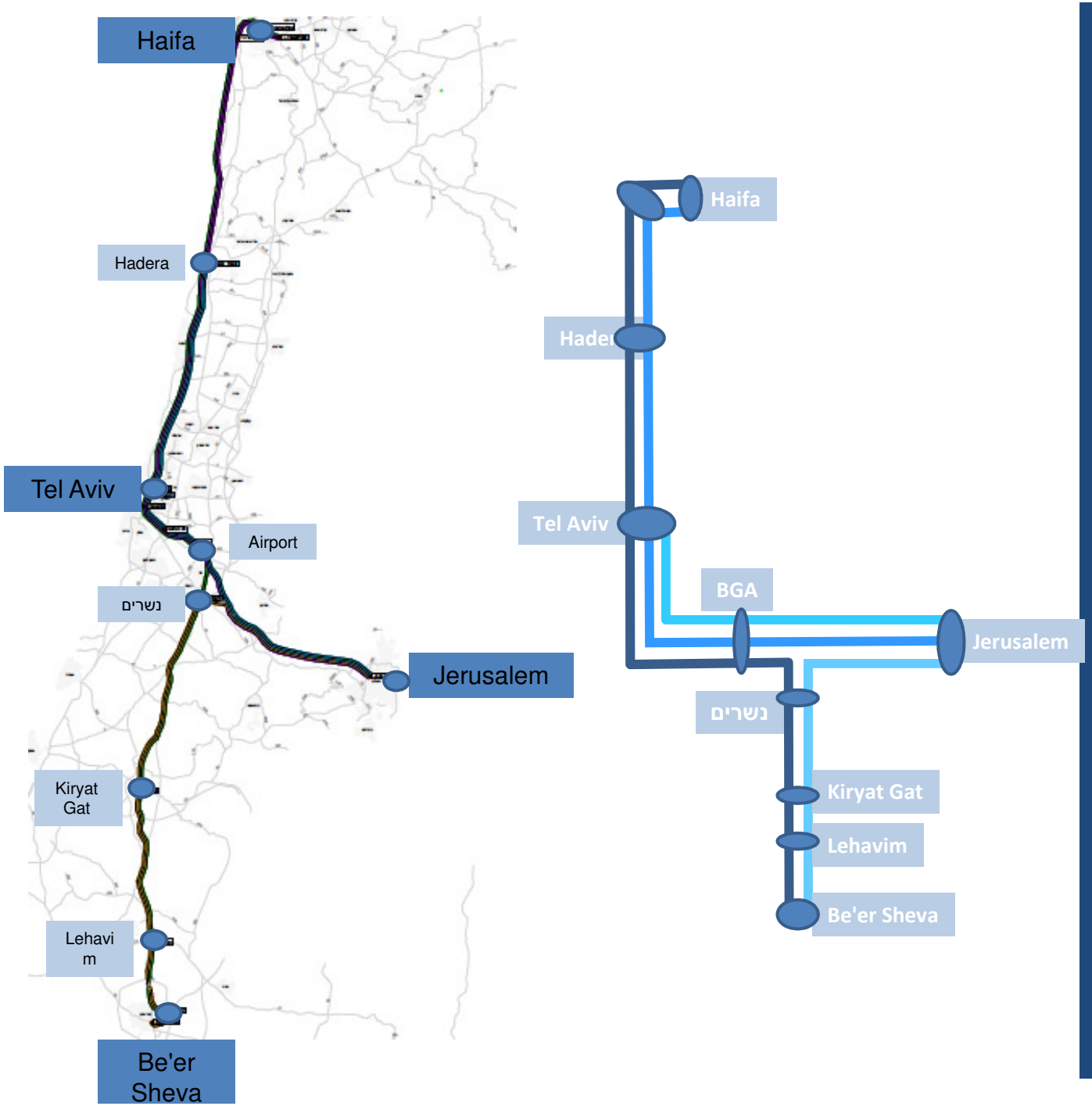
Trips Attracting Distribution 2040



THE PLAN

OPERATIONAL CONCEPT OF THE NETWORK - SPECIALIZED SERVICE



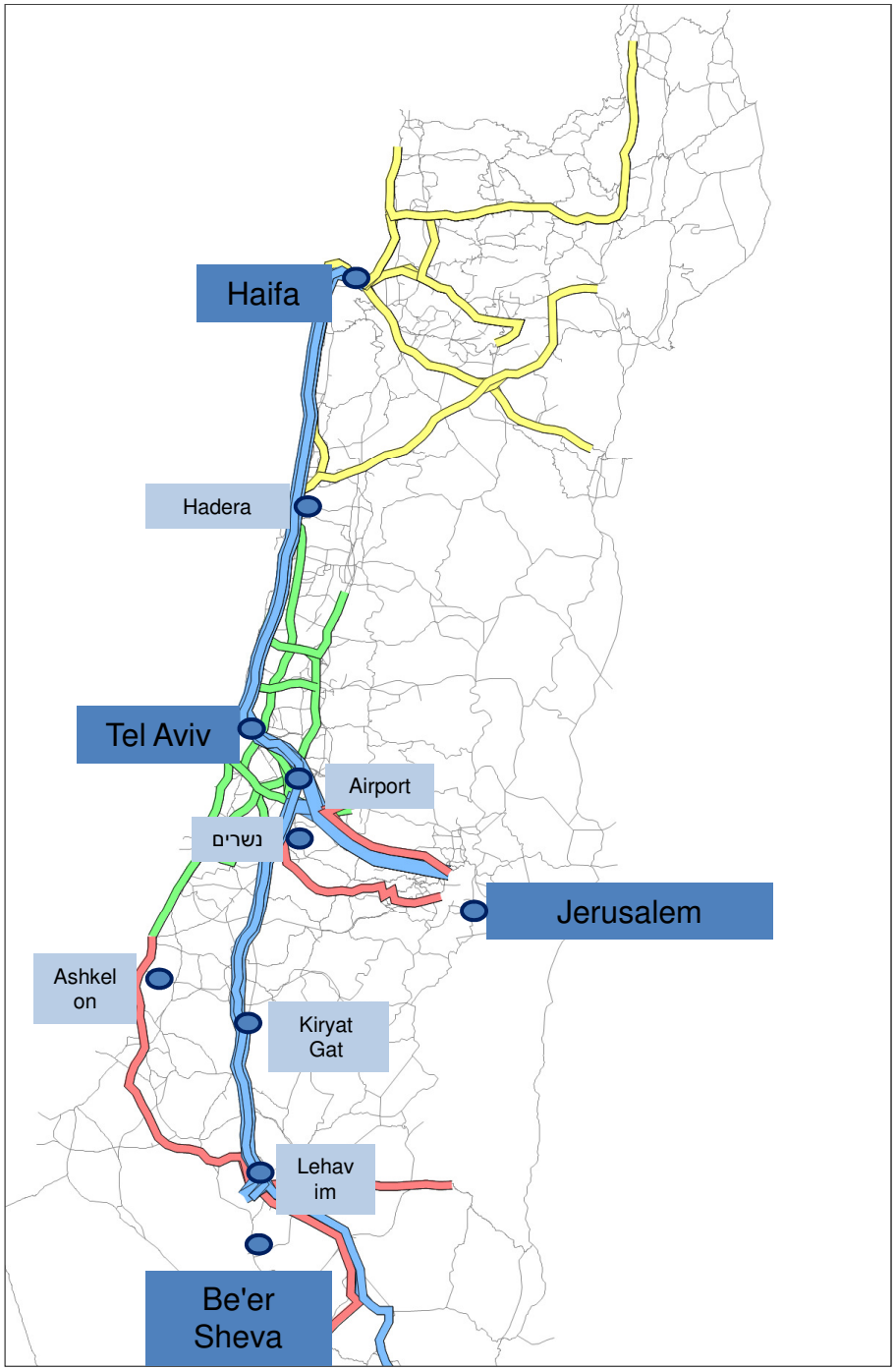


HIGH SPEED NETWORK

kph 220

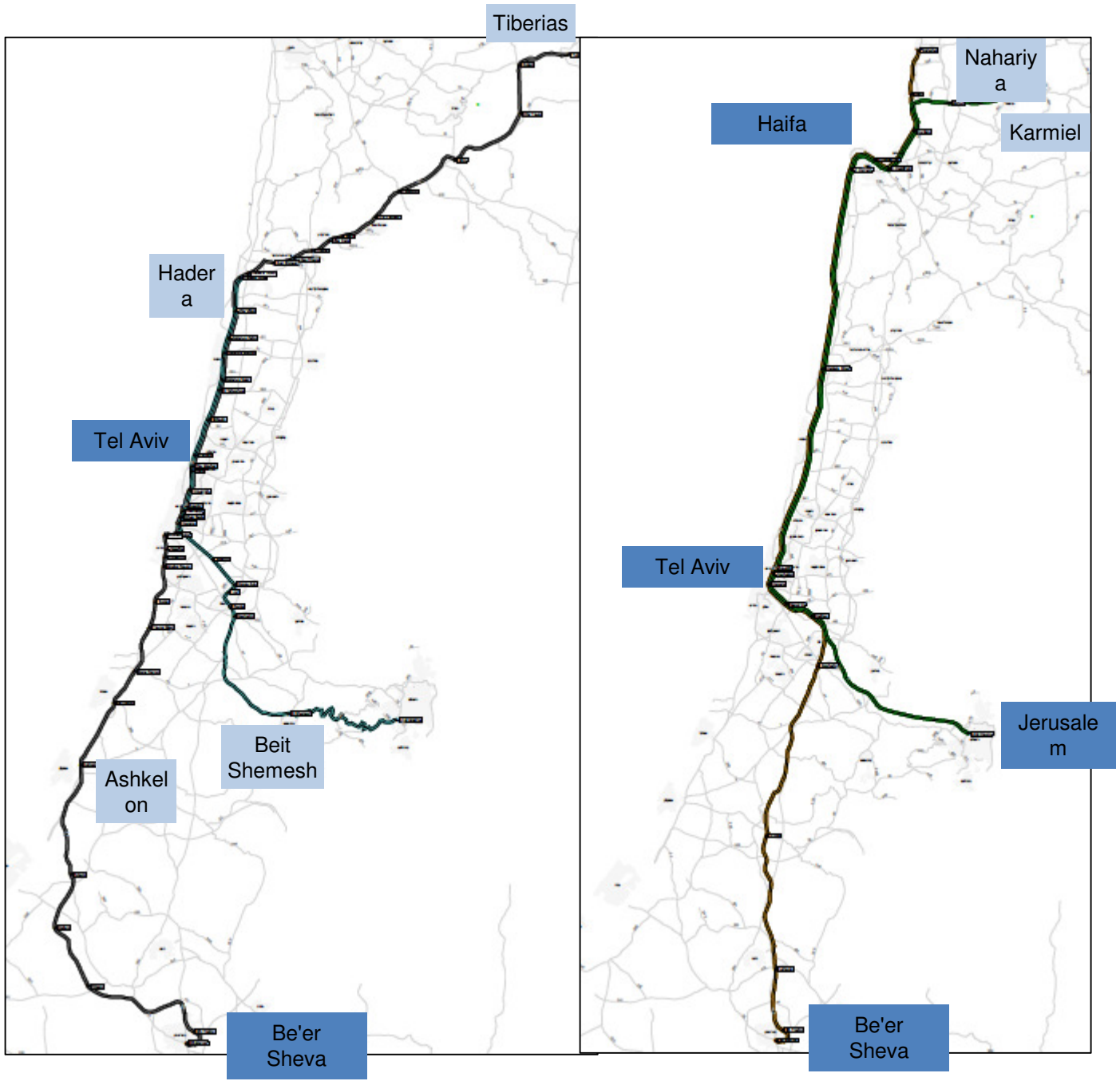
Few stations

High Frequency

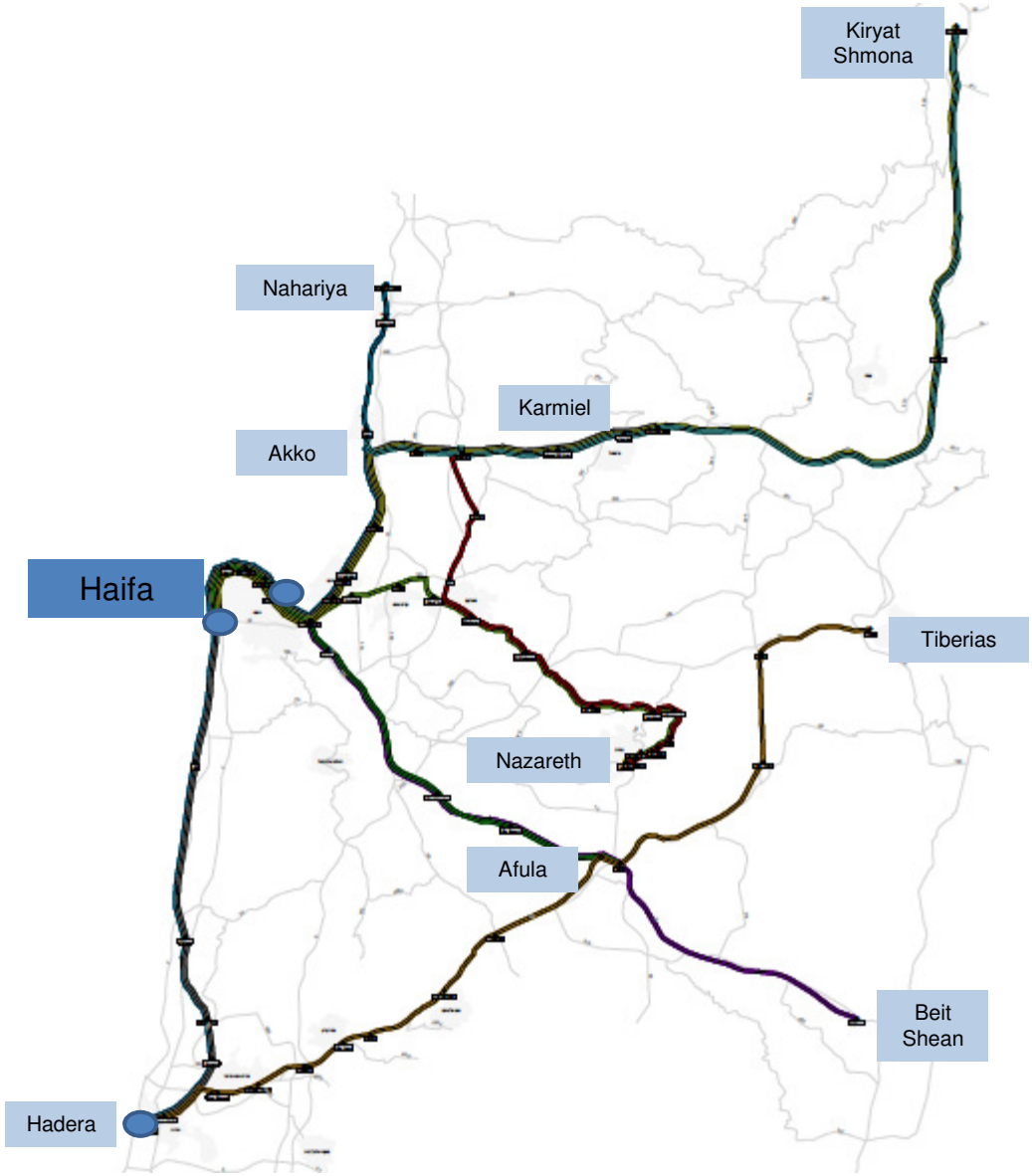


HIGH SPEED AND LOCAL NETWORK

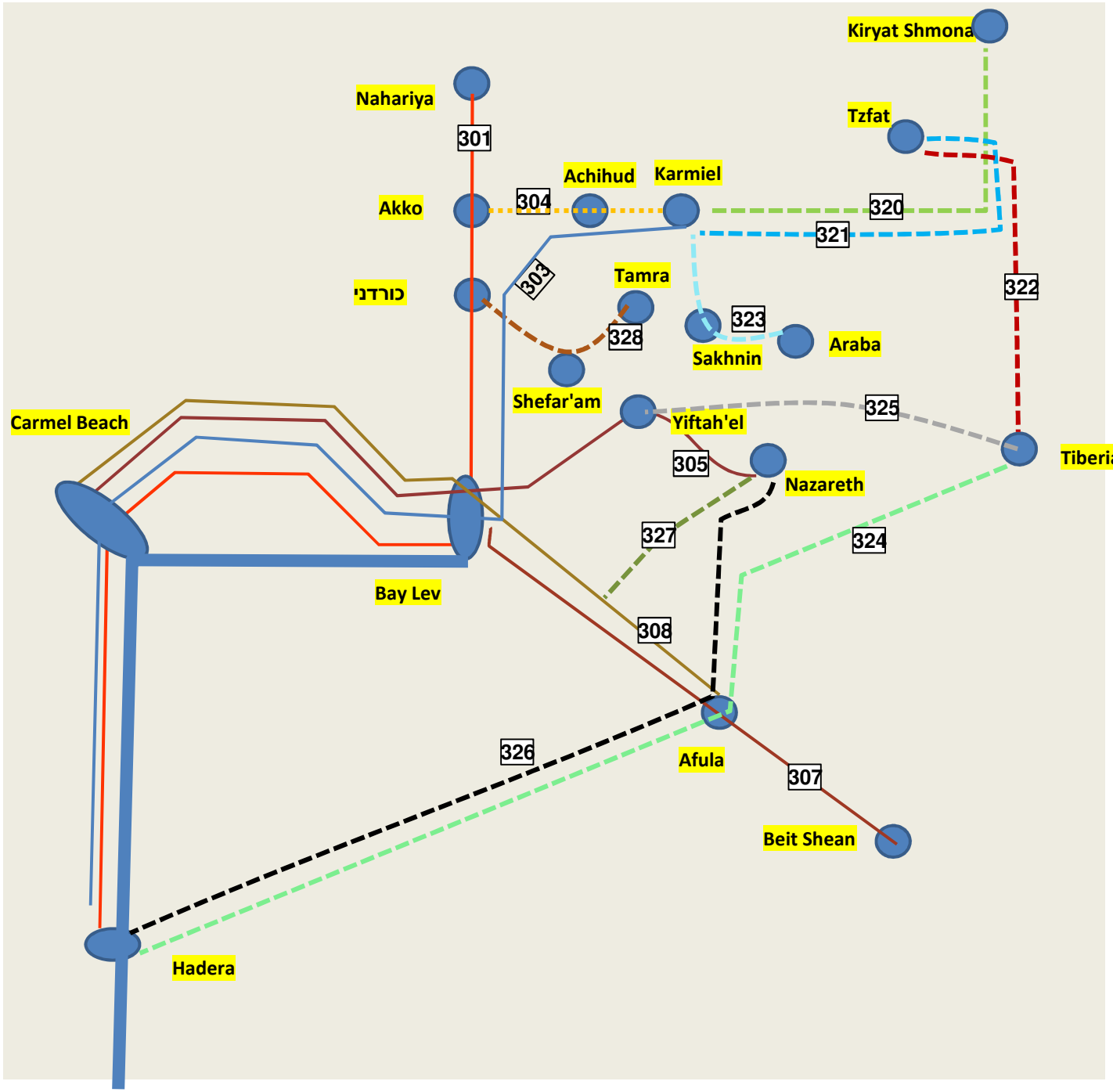
HIERARCHY OF SERVICE



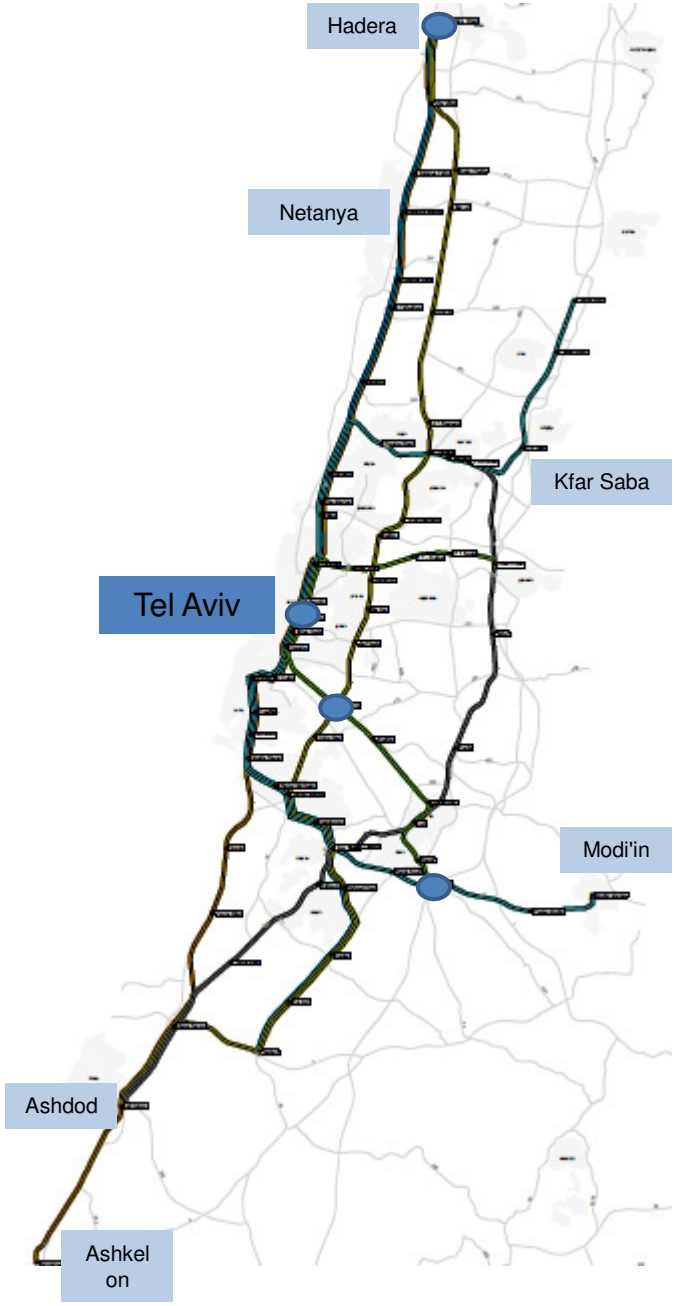
DIRECT COMMUTER LINES



NATIONAL PLAN REGIONAL NETWORK NORTH

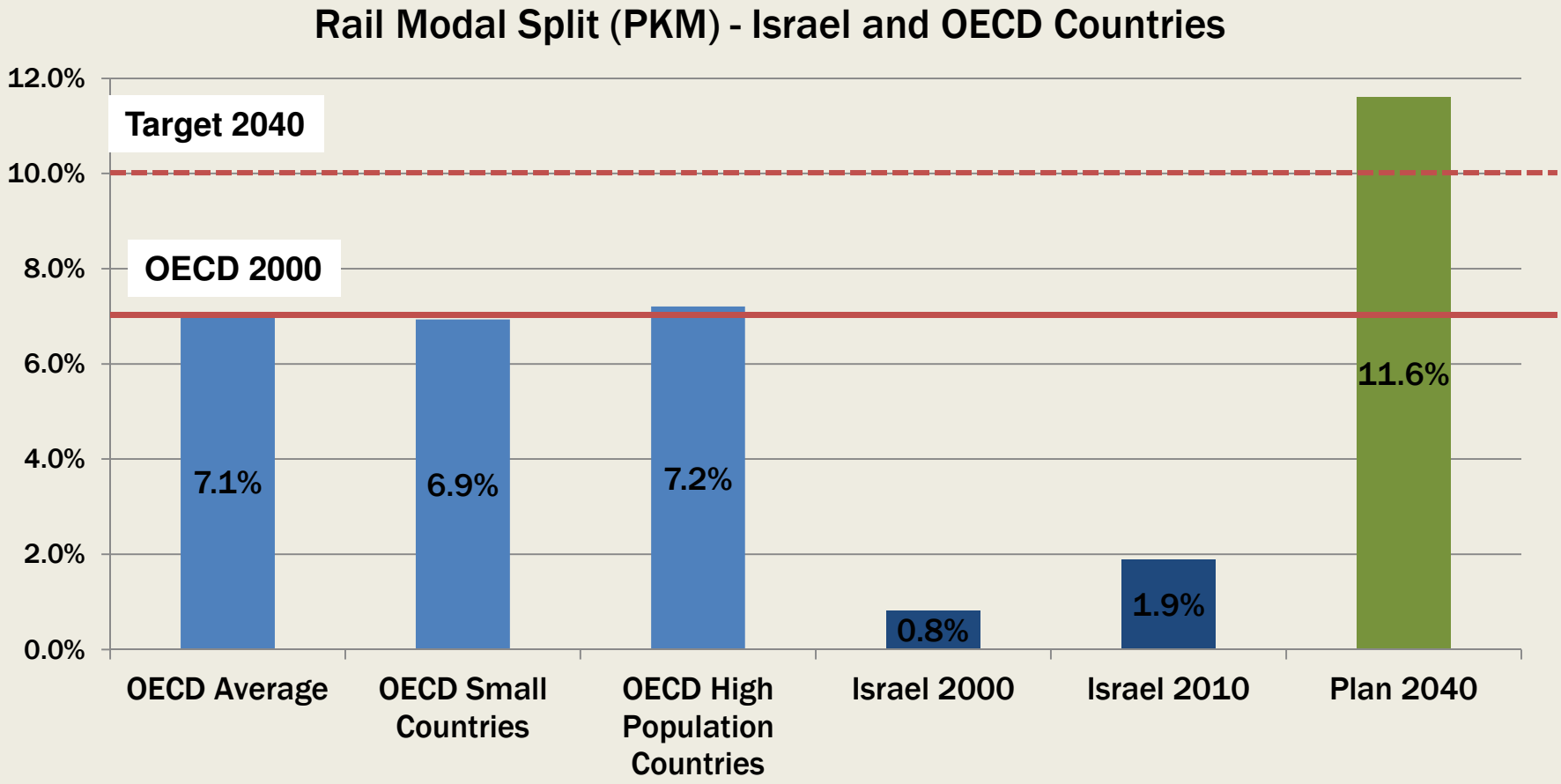


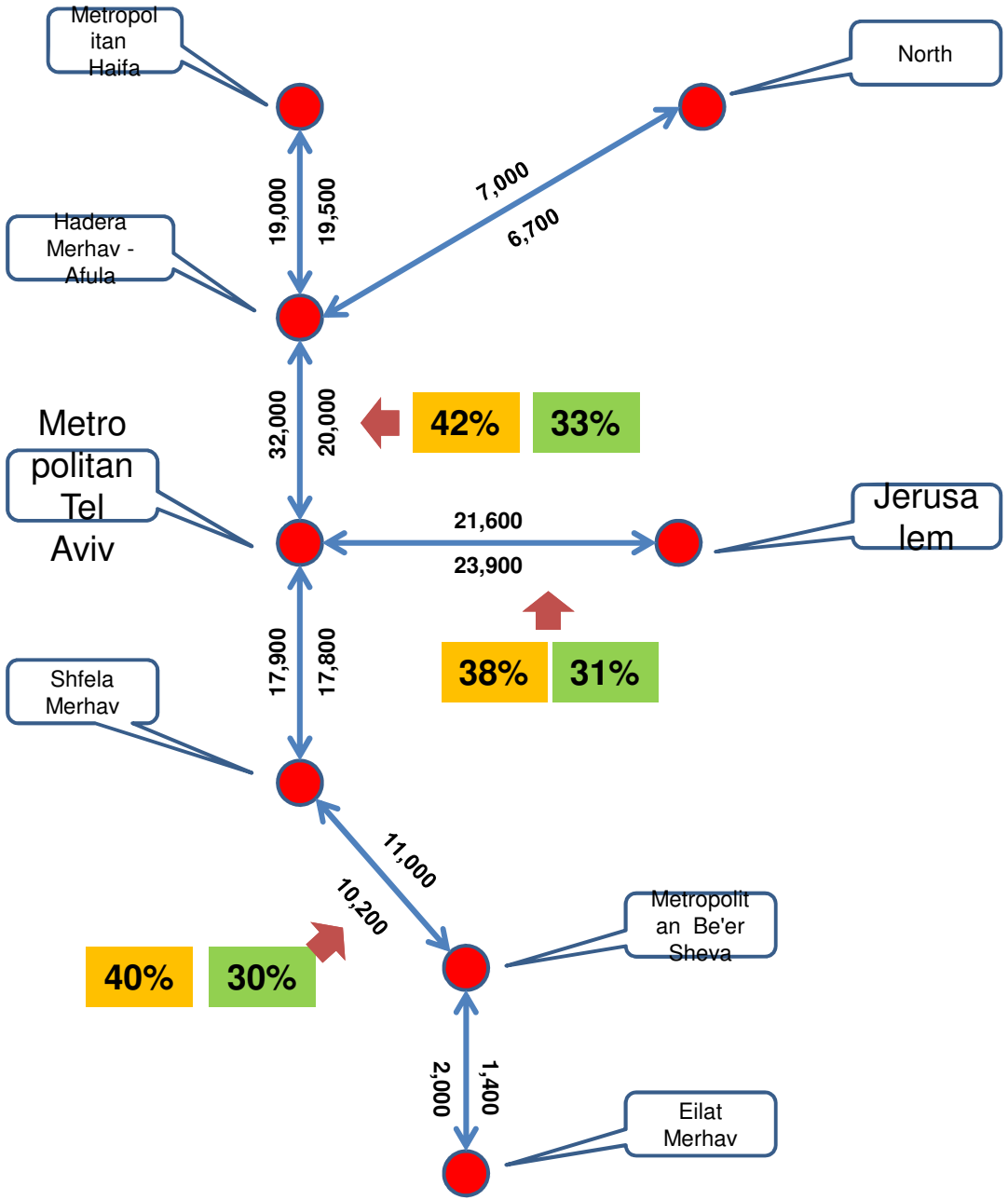
NETWORK INTERCITY BRT LINES



NATIONAL PLAN SUBURBAN CENTER NETWORK

RAIL MODAL SPLIT





2040 : Average hour 6-9 by all modes

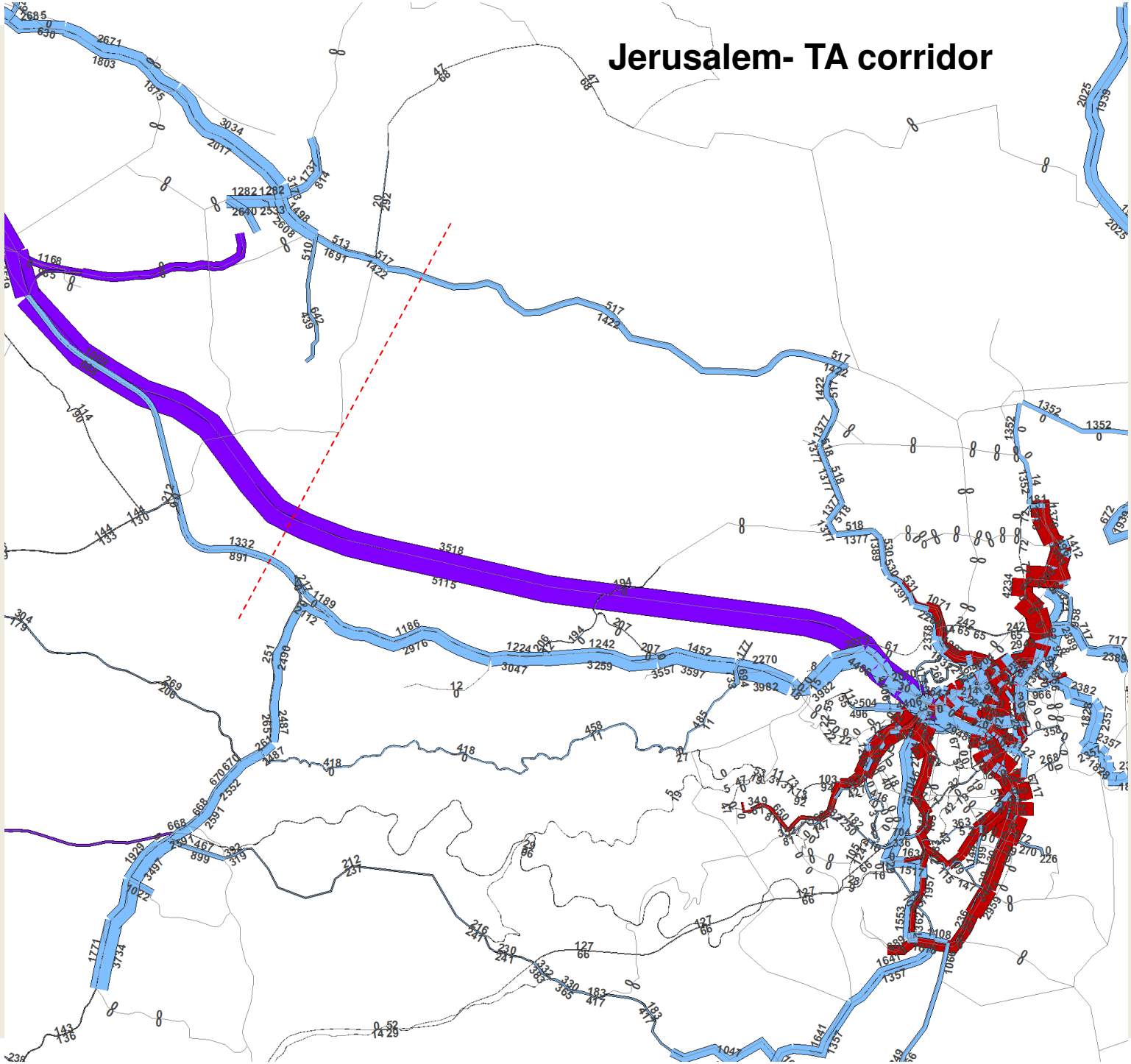
TRAIN MODAL SPLIT ON CORRIDORS

Plan **BASE**

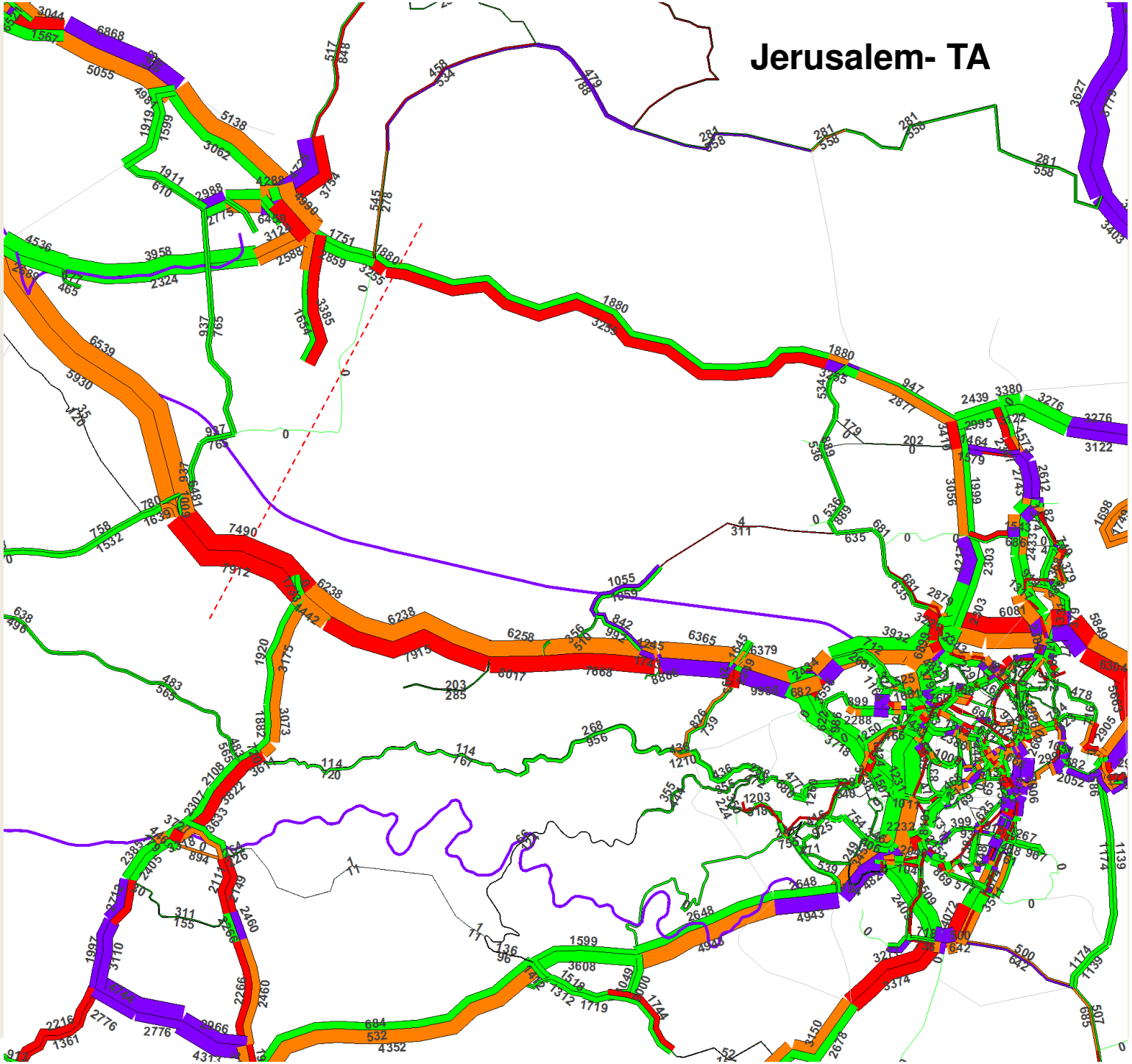
* Numbers are rounded to hundreds

Jerusalem- TA corridor

Public Transport Passengers 2040



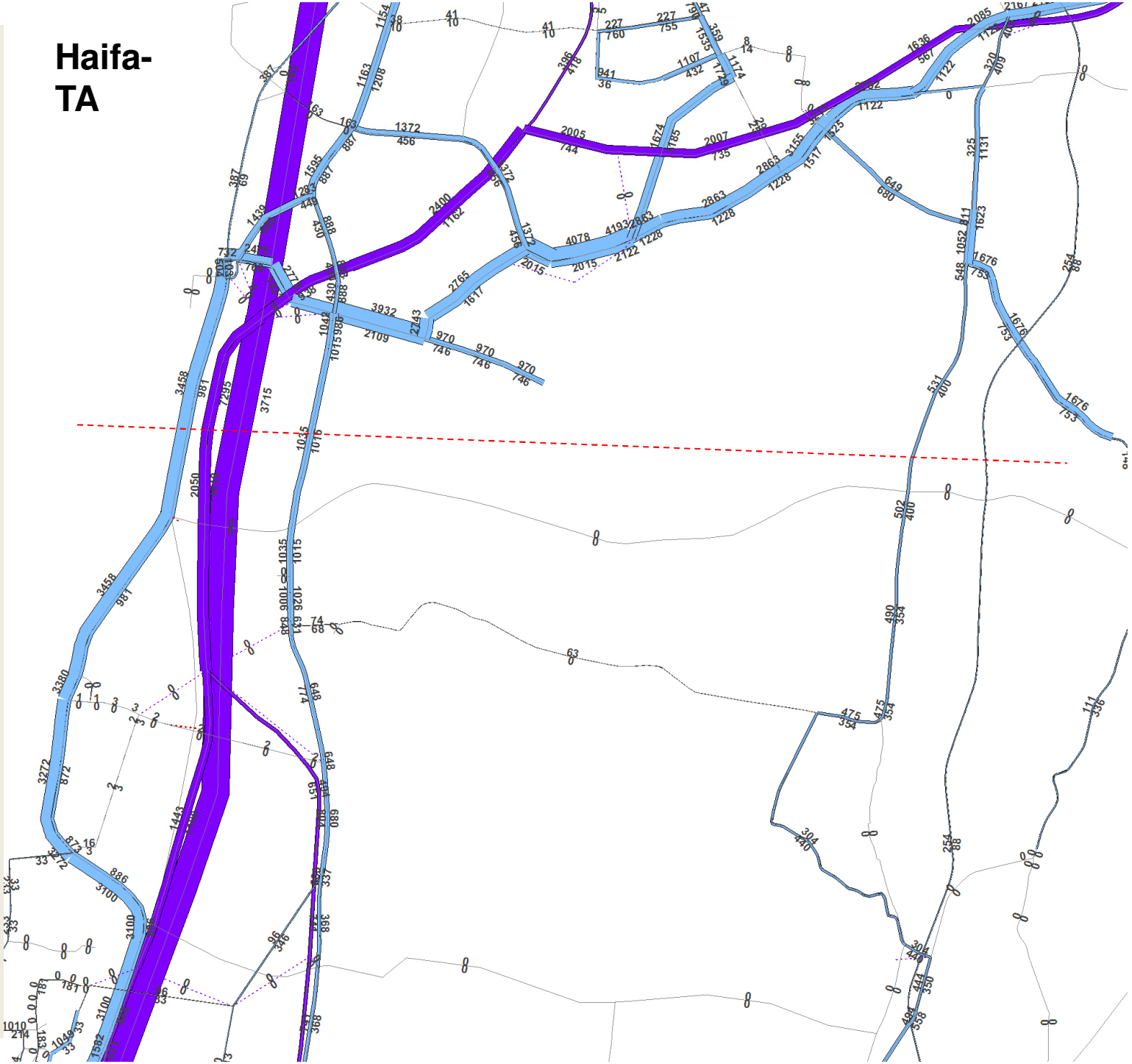
Volume Car



Train Passengers
Northern Region

2040 – 6-9 Avg.

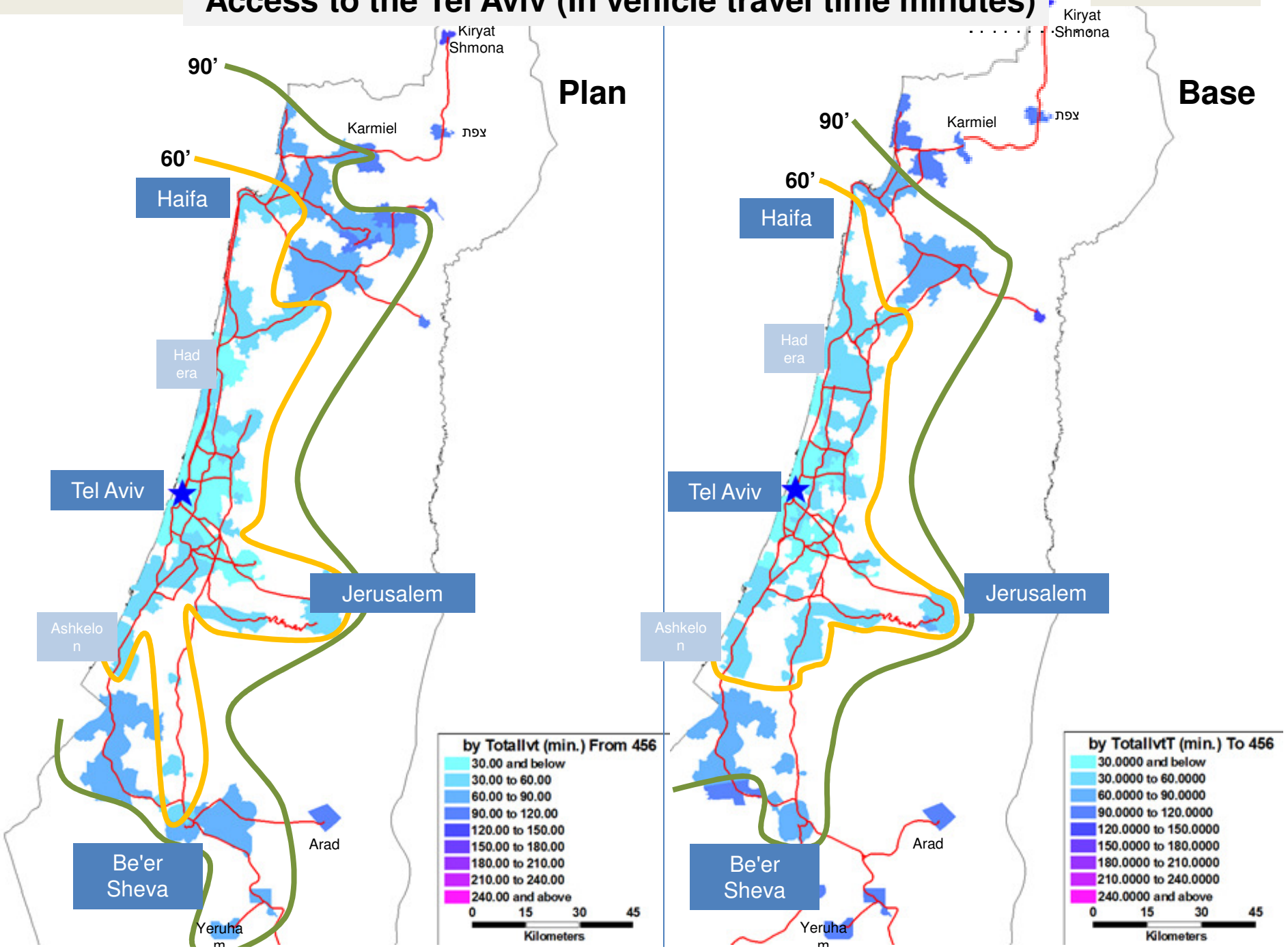
Public transport passenger volume



Volume Passengers train Central

2040 – 6-9 Avg.

Access to the Tel Aviv (In vehicle travel time minutes)



SOCIAL JUSTICE AND STRENGTHENING THE PERIPHERY

Plan 2040	Continuing Trends	Target	Index
54%	42%	50%	% of Population within 60 minutes of Tel Aviv
45%	23%	50%	% In the periphery within 90 minutes ride to the Tel Aviv
52%	34%	50%	% of low income population within 60 minutes ride to Tel Aviv
36%	22%	40%	% of jobs within 90 minutes ride from low income population
21%	9%		% of jobs within 90 minutes ride from the periphery
44%	26%	50%	% of population within 45 minutes ride from the nearest metropolitan

EFFICIENCY AND ECONOMIC GROWTH

Plan 2040	Continuing Trends	Target	Index
11%	6%	10%	Percentage of passenger trips on rail network
255	120	180-240	Number of passengers on train network (million per year)
40%	32%	40%-50%	Percentage of public transport usage on main corridors
		50-60%	Operating costs cover ratio
			Travel time savings
80	130	50-70	Infrastructure cost per passenger (NIS)
25%	17%	25%	% Of jobs within 60 minutes drive to the entire population

QUALITY OF LIFE AND THE ENVIRONMENT

Plan 2040	Continuing Trends	Target	Index
33.0	37.0	-	Average travel time on network (min)
5.2	7.8	<7.5	Average waiting time on network (min)
71%	61%	60-70%	Population coverage up to 5 km from rail station
49.0	51.7	-10%	Decrease in private car usage (Billions Veh-km)

THANKS YOU FOR YOUR ATTENTION…