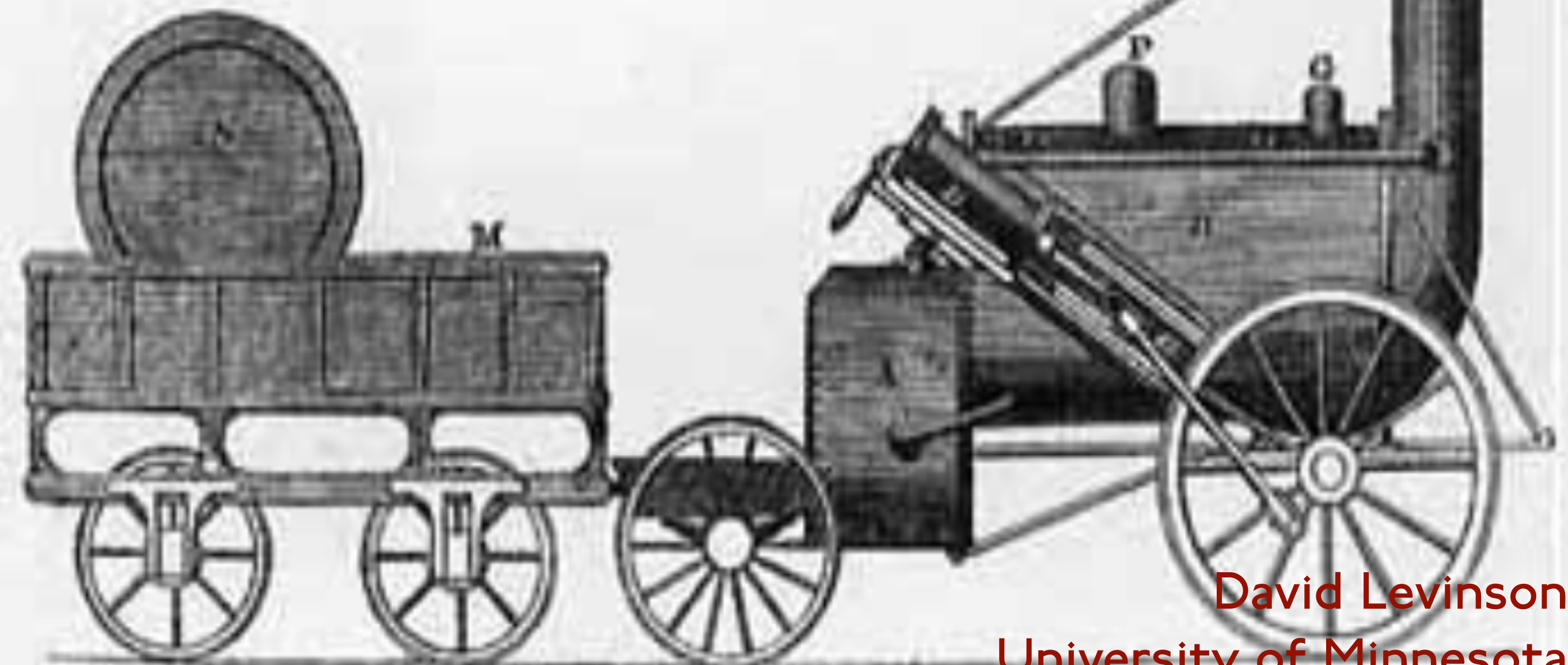


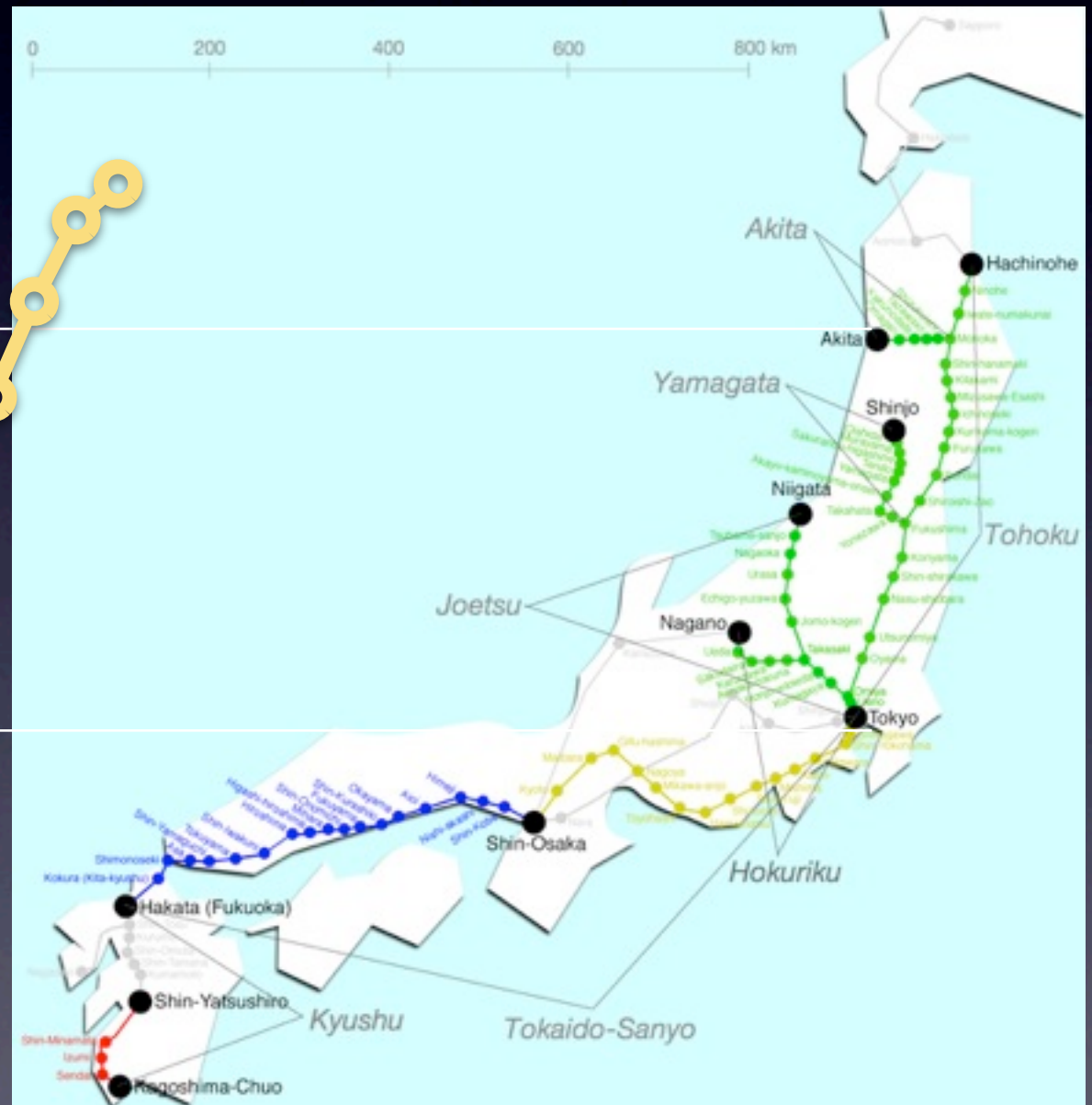
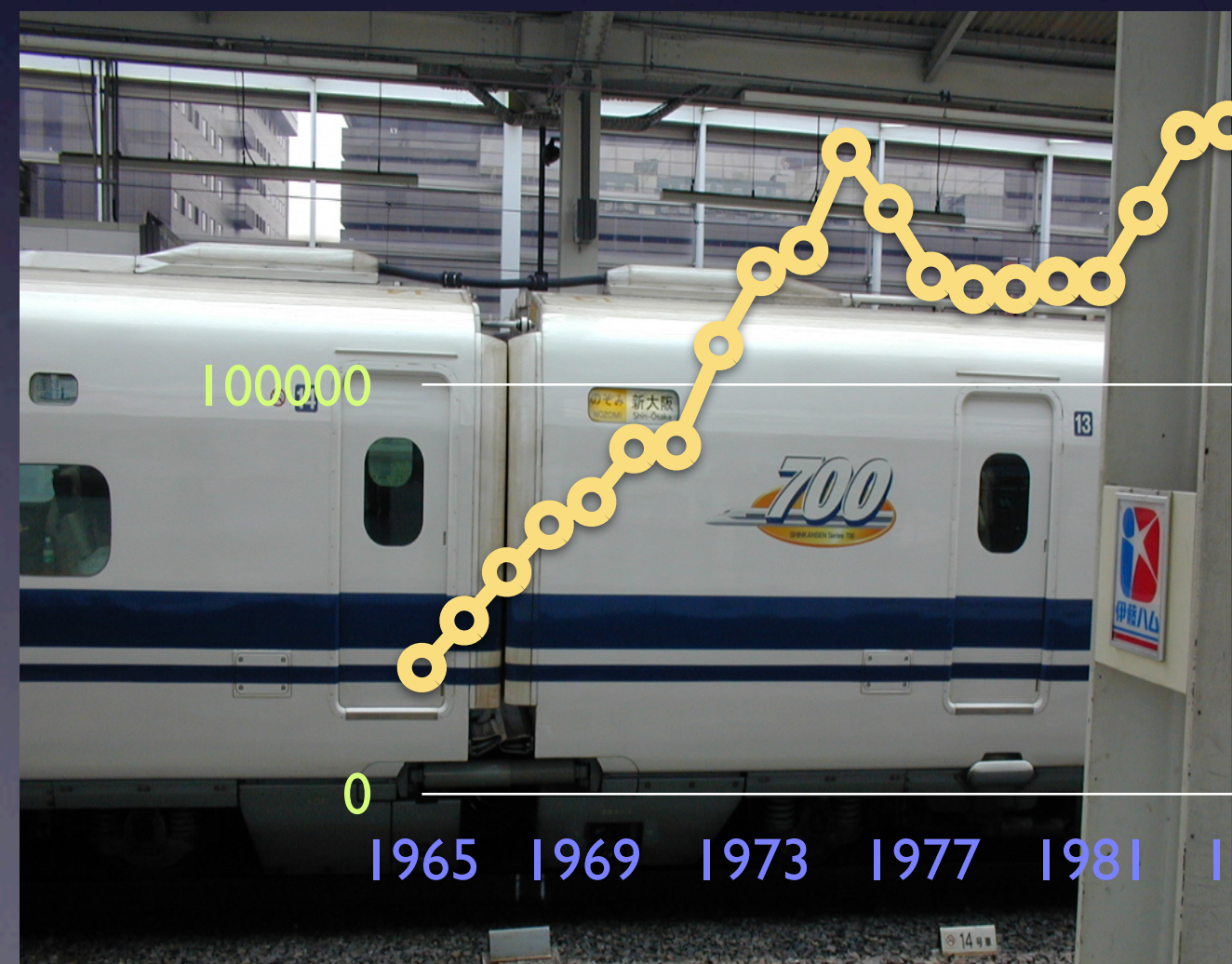
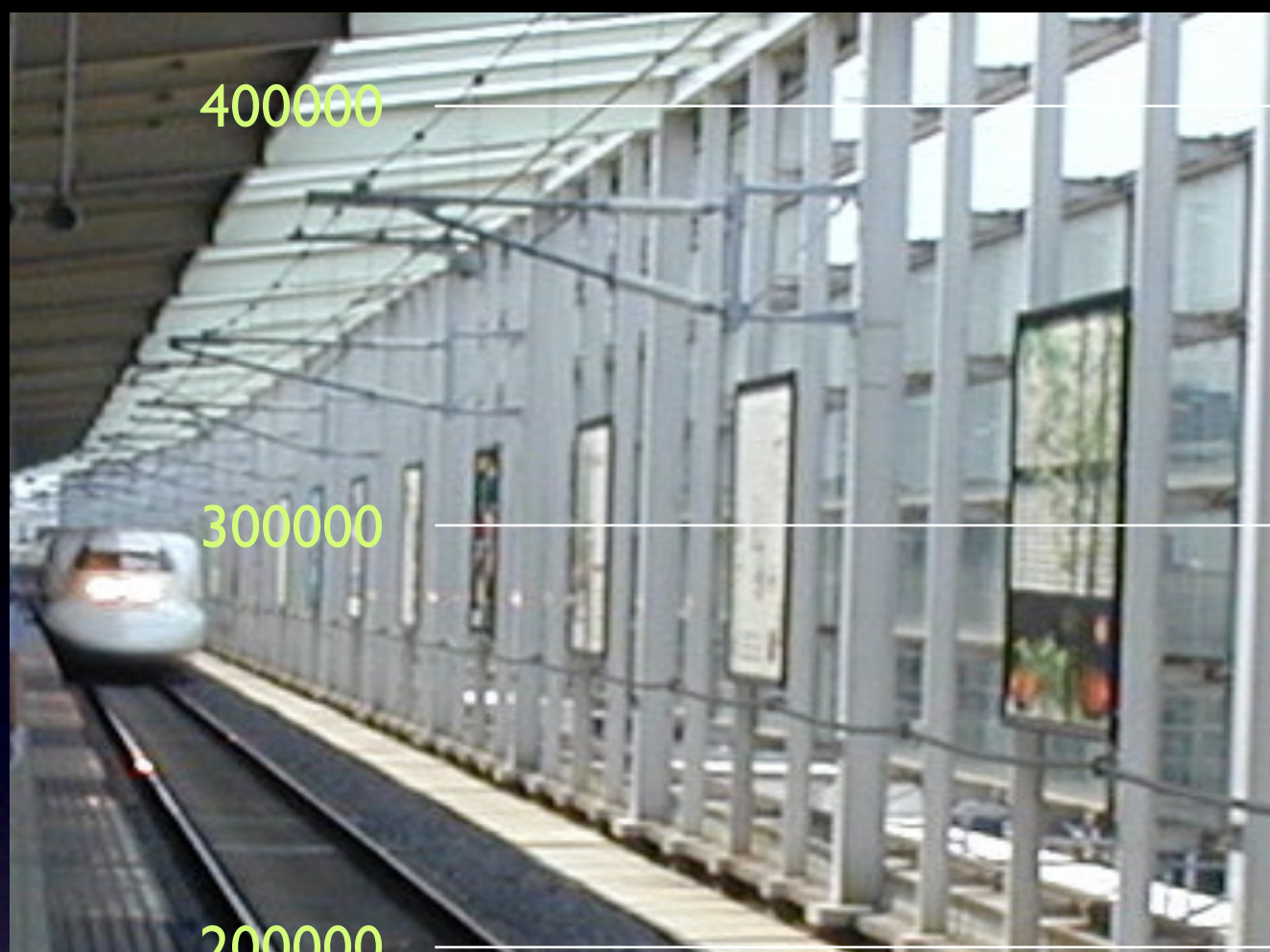
Thinking about high speed rail as an economic development strategy



David Levinson
University of Minnesota

International Networks

Shinkansen (2459 km)



400000

300000

200000

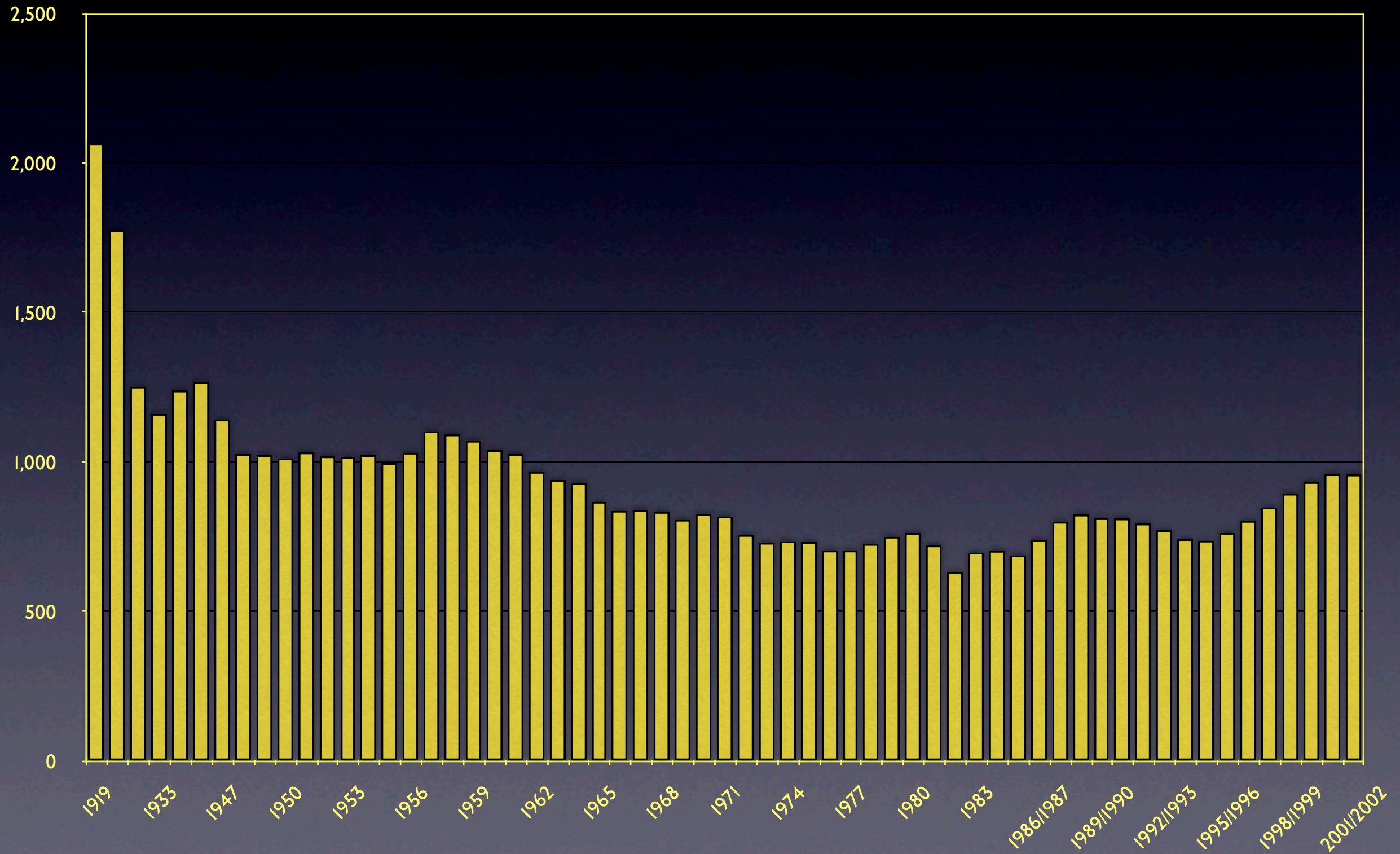
100000

0

1965 1969 1973 1977 1981 1985 1989 1993 1997 2001 2005

○ Shinkansen Riders ('000)

UK Railway Passenger Trips (Millions)



Rail Abandonments

System	Initial Route km	Percent Reduction
British Railways	29562	36.5
Swedish State Railways	14460	20.4
Jugoslav Railways	10332	13.0
German State Railways	14100	12.6
French National Railways	38856	8.3
German Federal Railways	30608	4.4

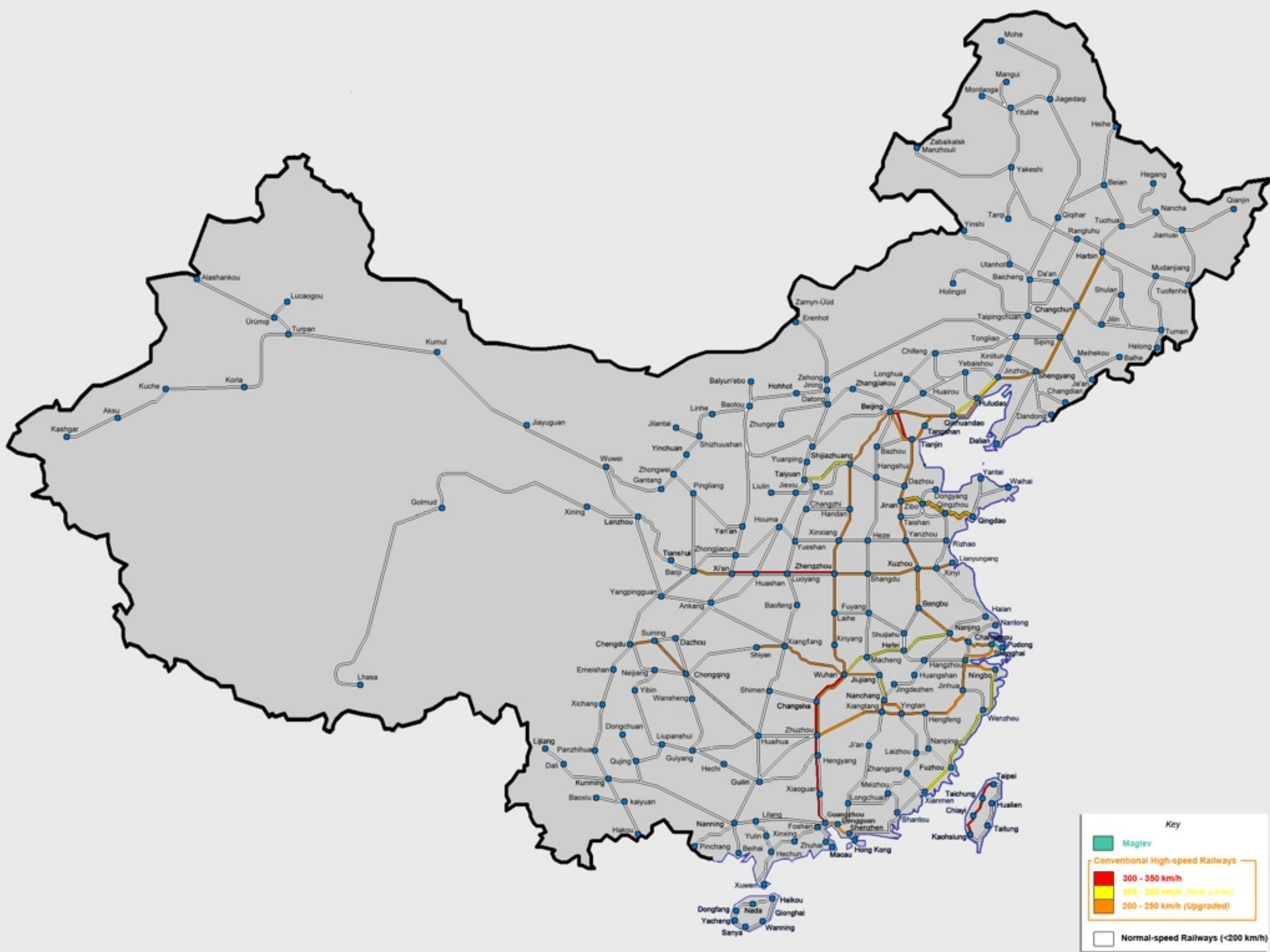
Legend: (Dec-2009)

- 320 - 350 km/h
- 300 km/h
- 250 km/h
- 200 - 230 km/h
- < 200 km/h
- Under construction










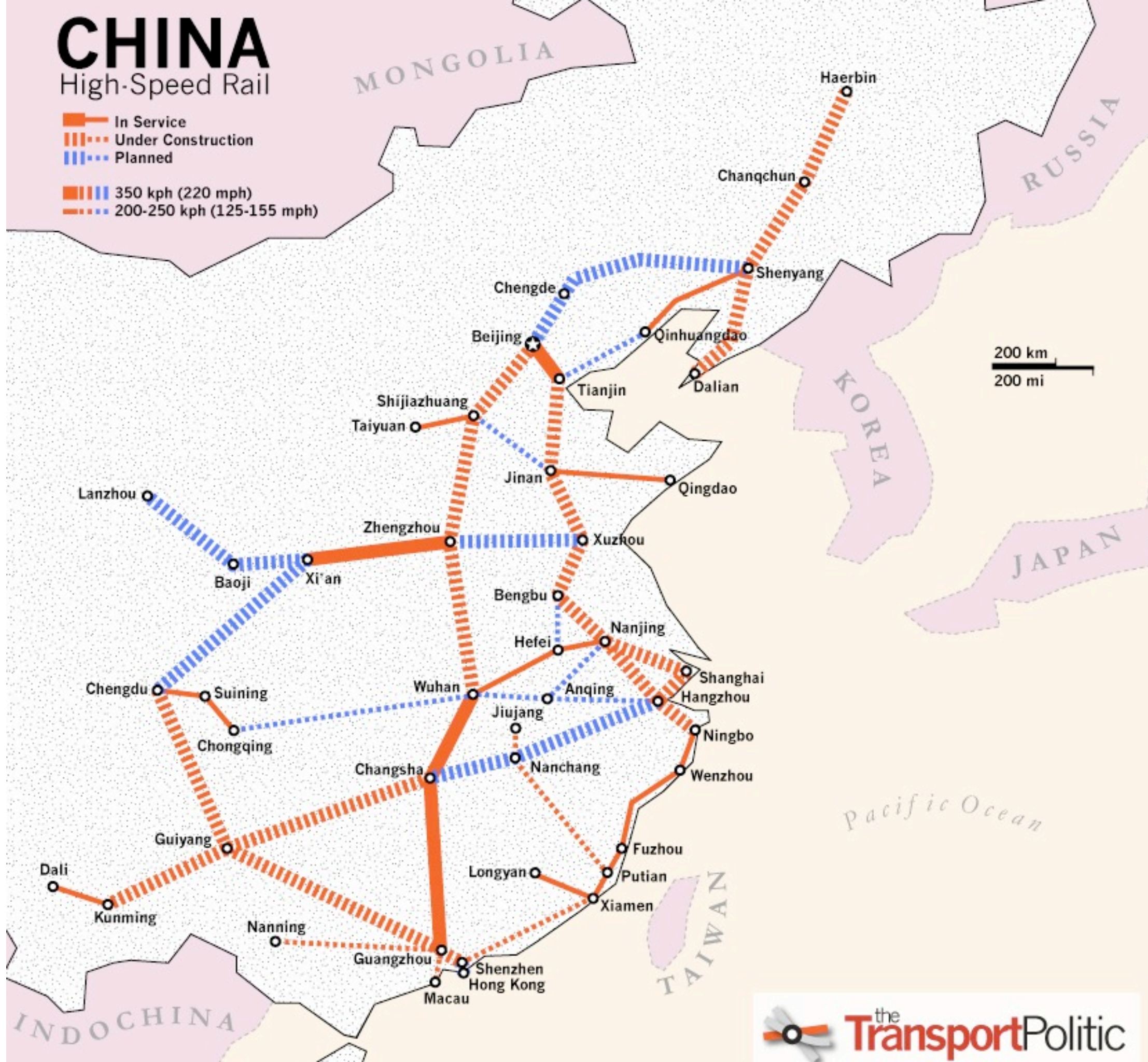




CHINA

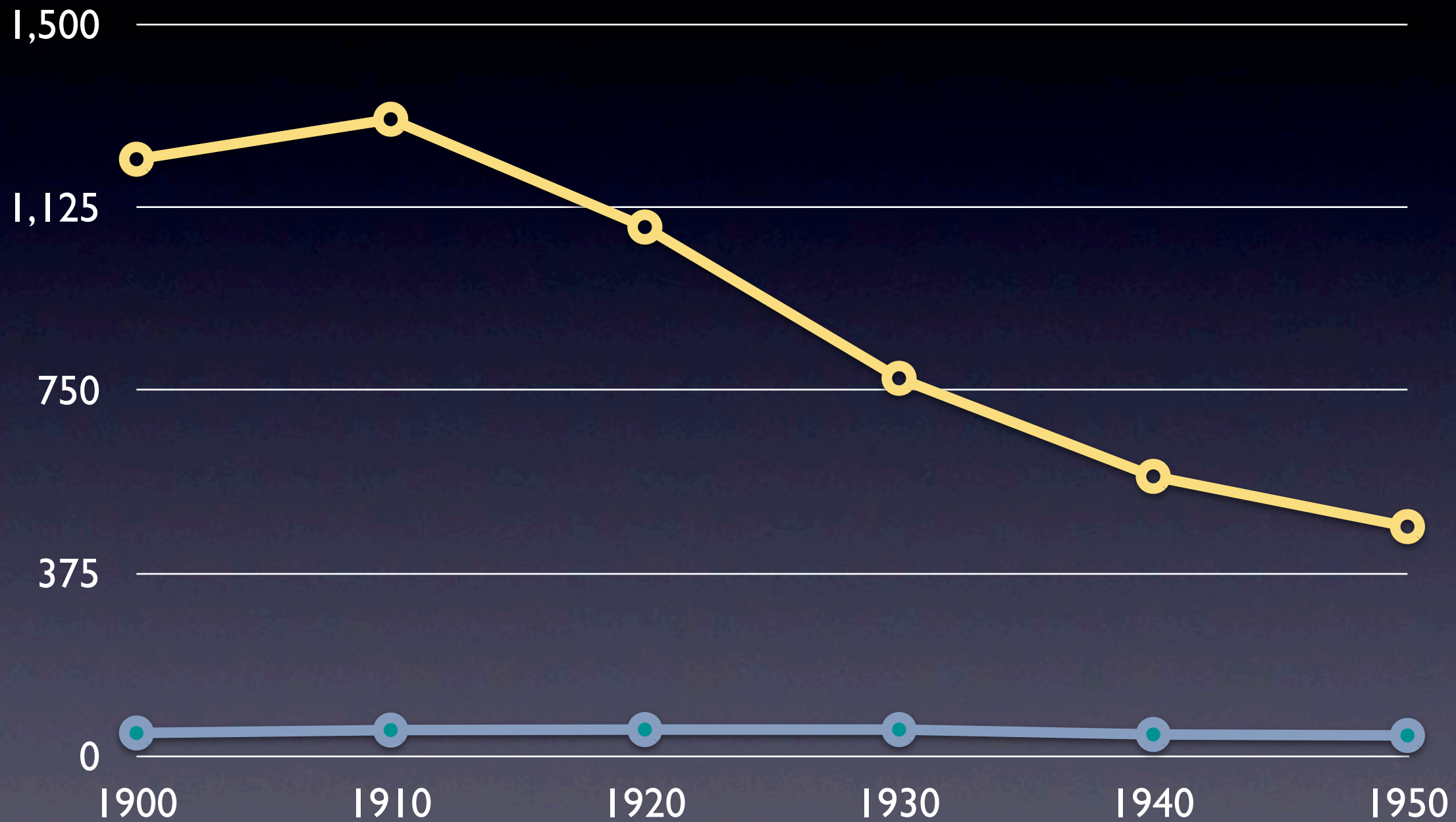
High-Speed Rail

-  In Service
-  Under Construction
-  Planned
-  350 kph (220 mph)
-  200-250 kph (125-155 mph)



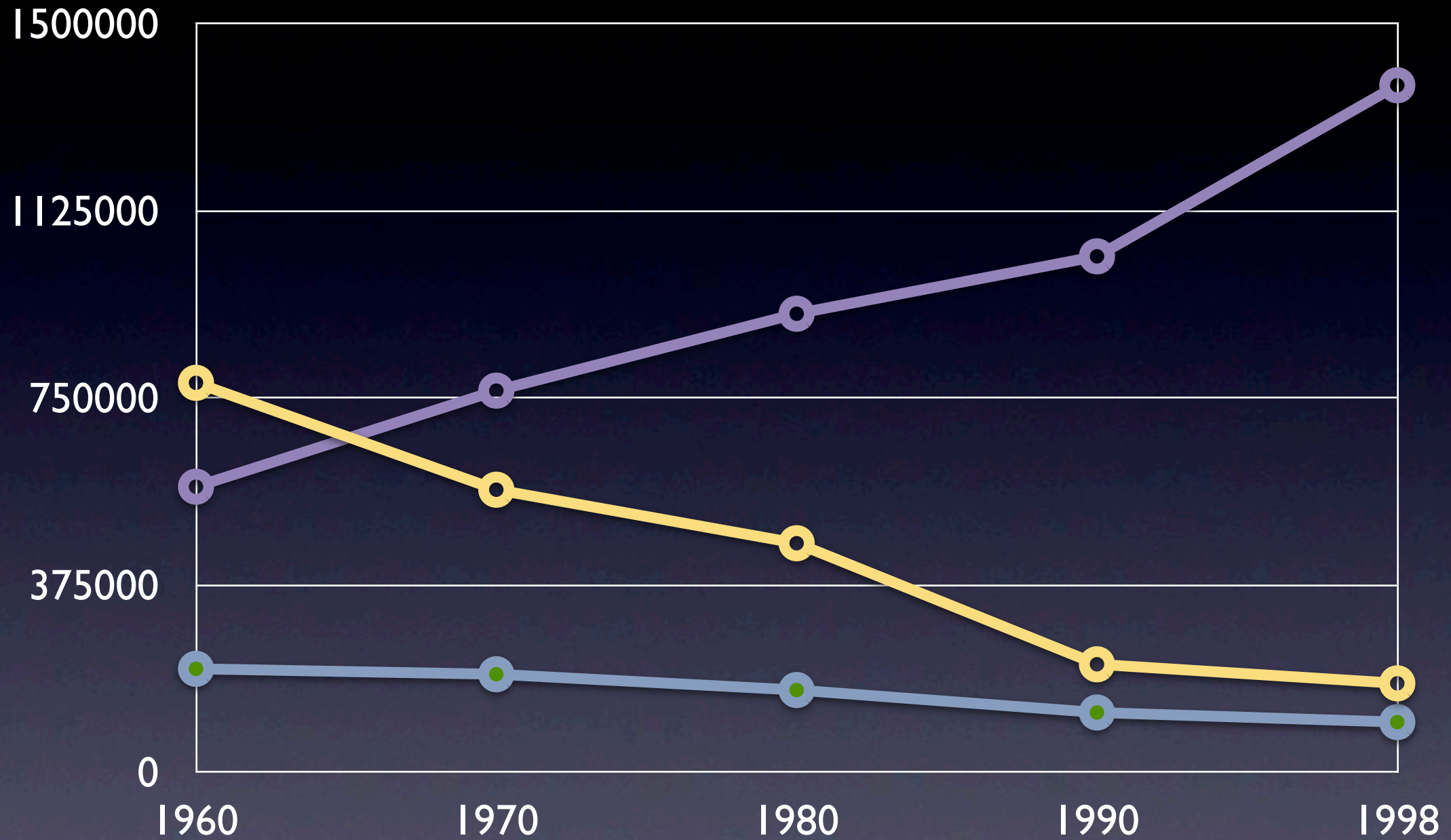
US Networks

Railroads by Mileage



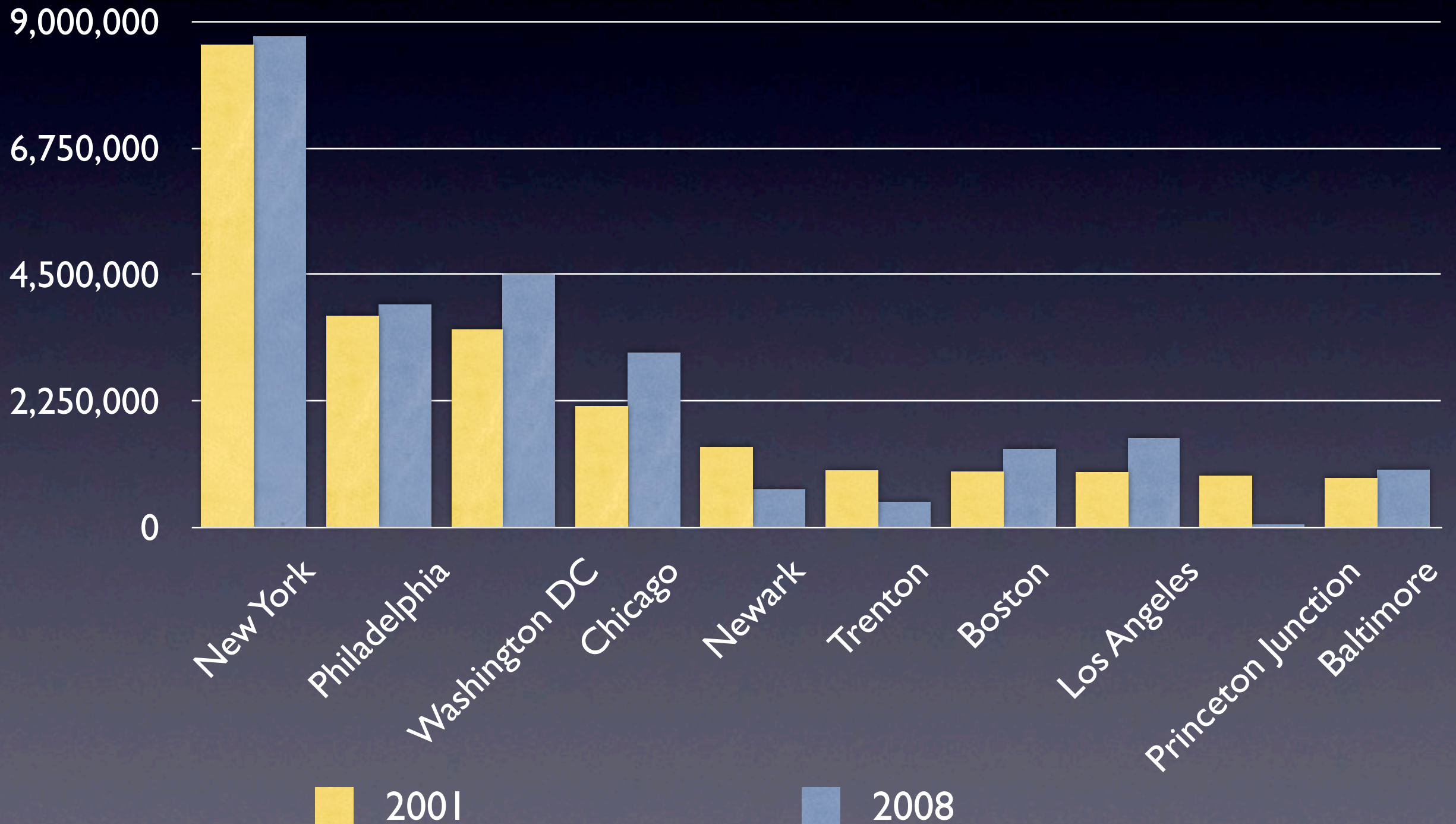
- Number of Railroads
- Number of RR Operating More than 1000 Miles of Route

US Freight RR

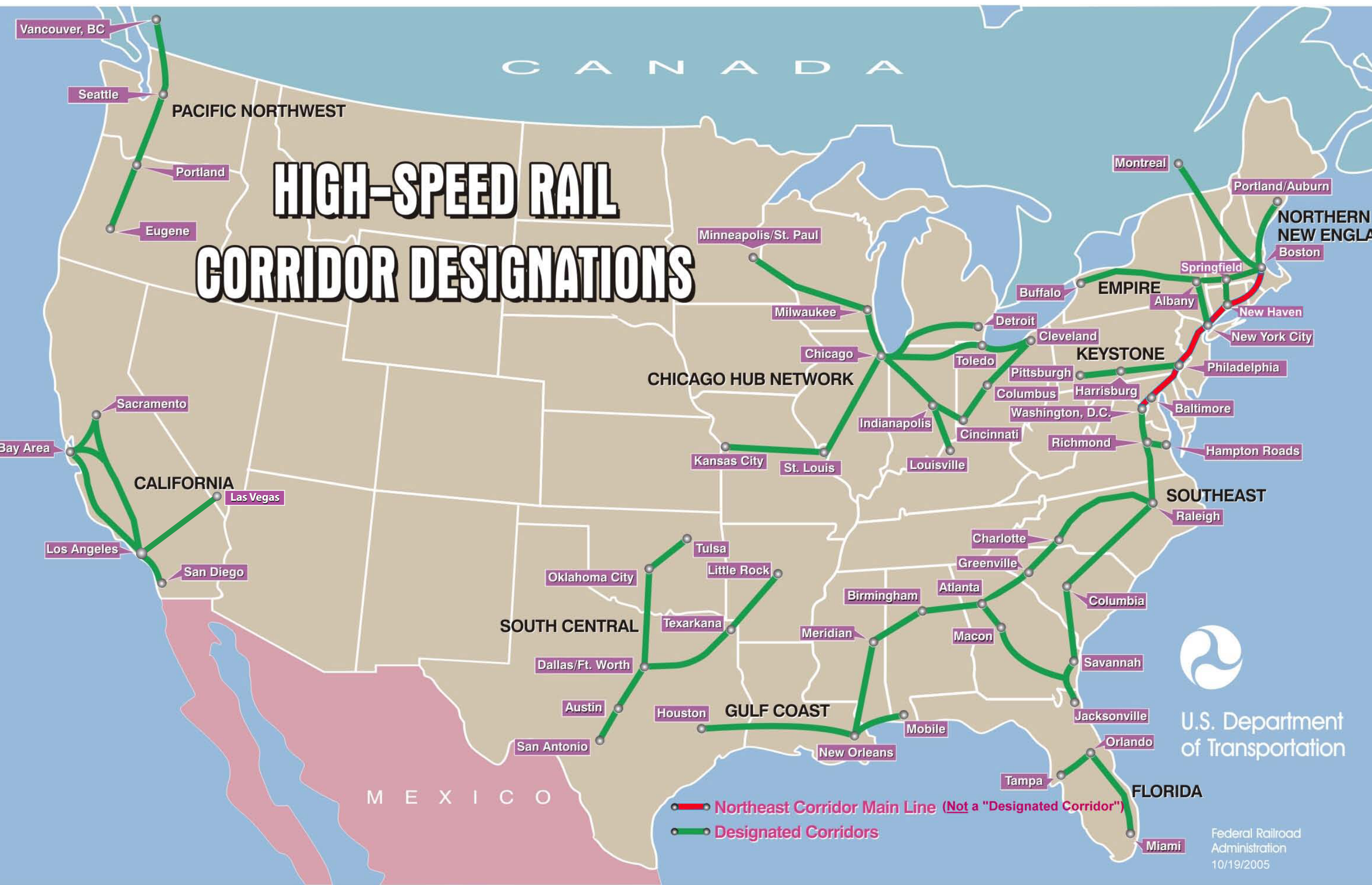


- Number of employees
- Revenue ton-miles of freight (millions)
- Miles of road owned

Amtrak Boardings and Alightings (2001, 2008)



HIGH-SPEED RAIL CORRIDOR DESIGNATIONS



U.S. Department of Transportation

Federal Railroad Administration
10/19/2005

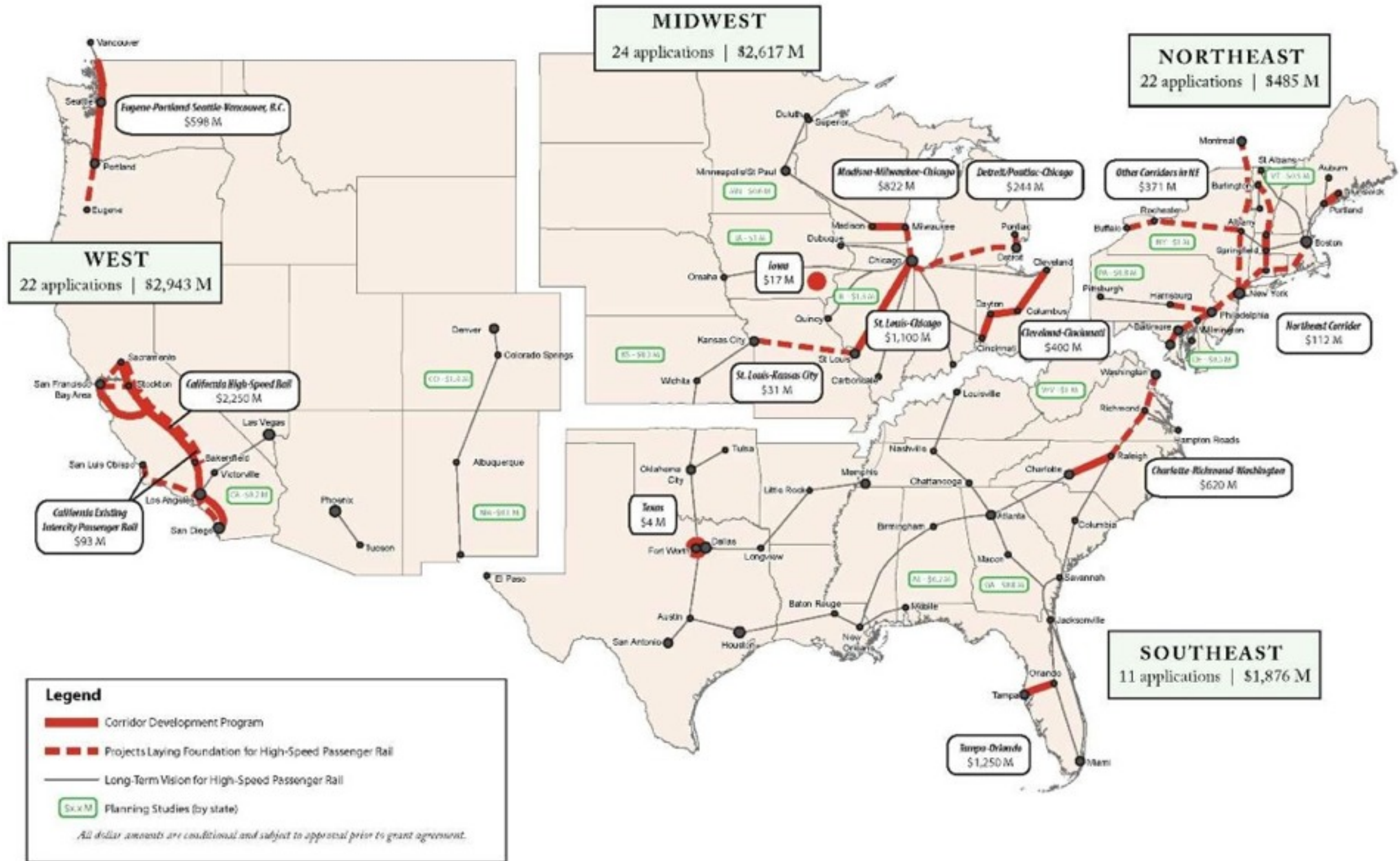
VISION *for* HIGH-SPEED RAIL *in* AMERICA



High-Speed Intercity Passenger Rail Program



National Summary of Selected Projects



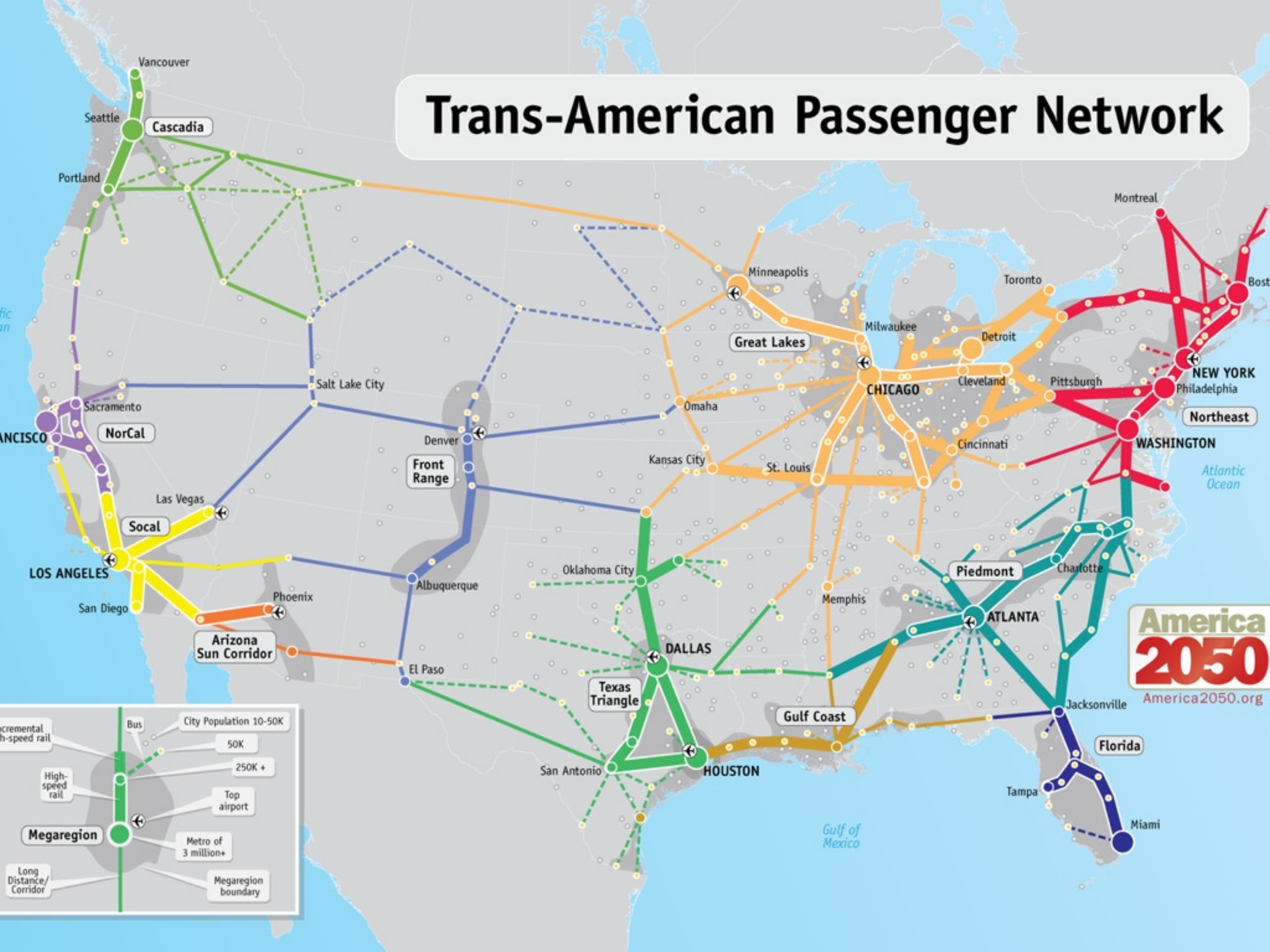
US High Speed Rail Association: Hub to Grid



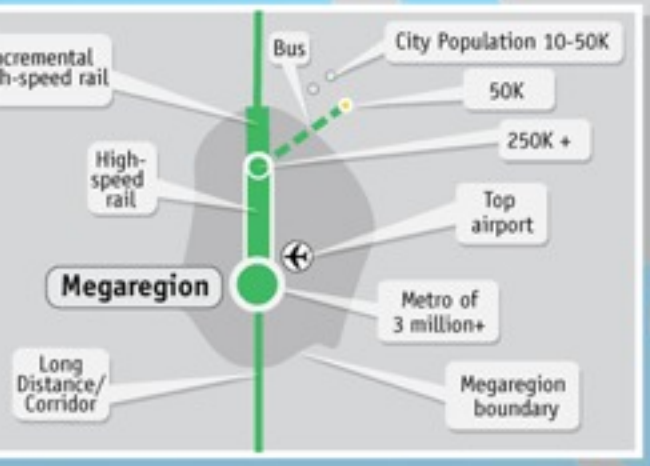


US Public Interest Research Group

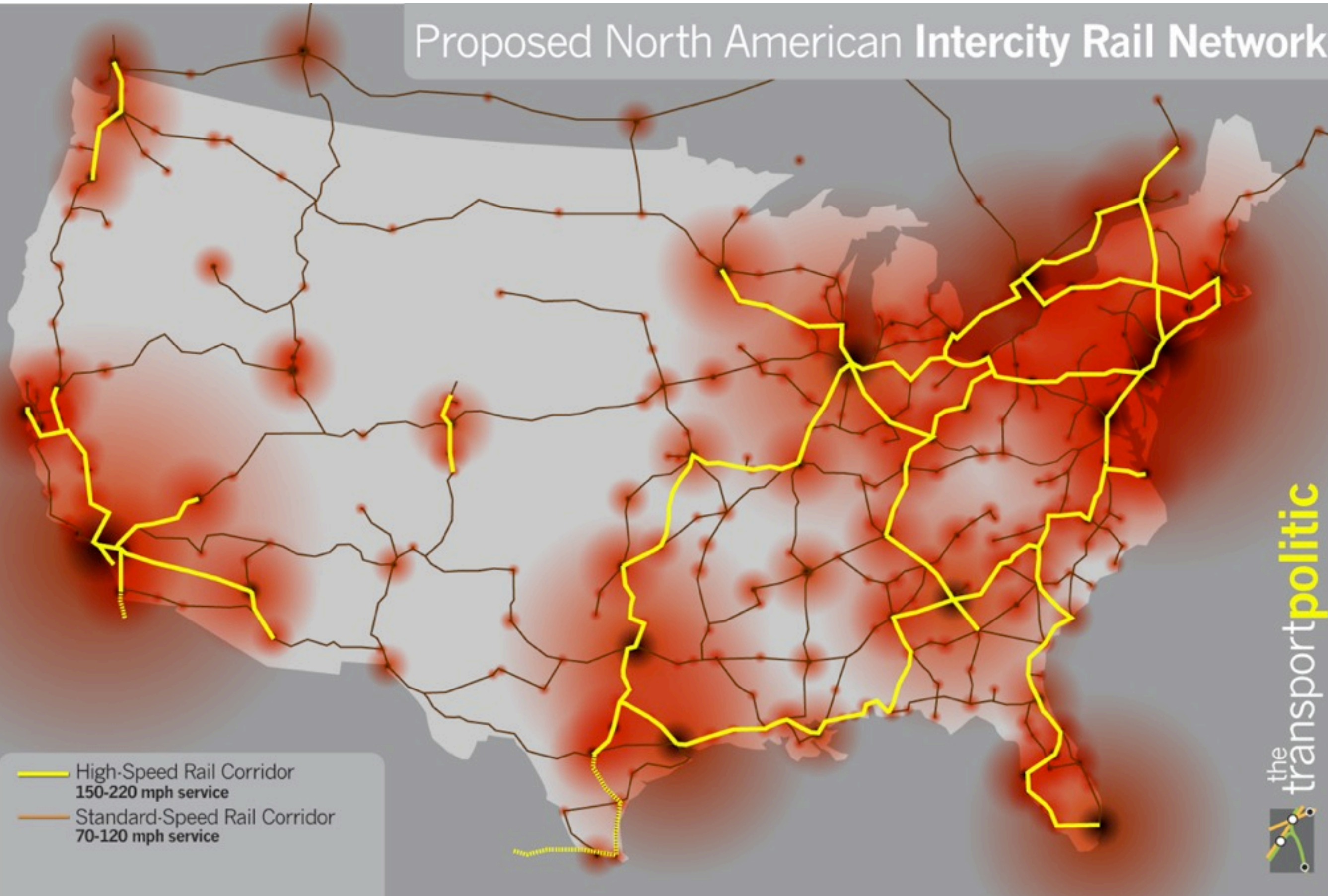
Trans-American Passenger Network



**America
2050**
America2050.org



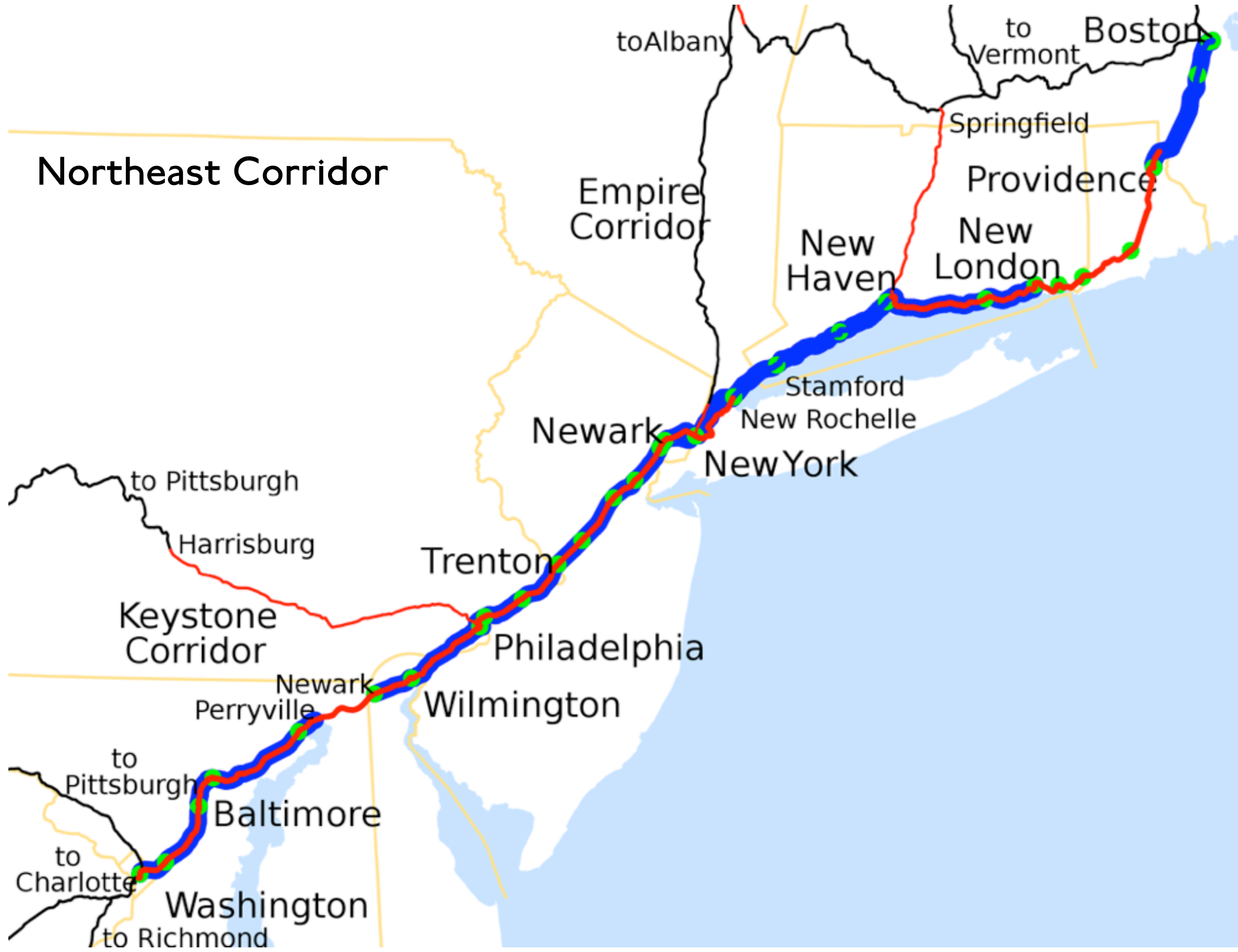
Proposed North American Intercity Rail Network



In short

No one has a clue

Regional Networks



Northeast Corridor

Empire Corridor

New Haven

New London

Newark

New York

Keystone Corridor

Trenton

Philadelphia

Newark
Perryville

Wilmington

Baltimore

Washington

Boston

to Vermont

to Albany

to Pittsburgh

Harrisburg

to Pittsburgh

to Charlotte

to Richmond

Springfield

Providence

Stamford

New Rochelle

California HSR: The Los Angeles Hub



Las Vegas



Santa Barbara



Travel from Sacramento to San Francisco or San Jose?
San Diego to LA?

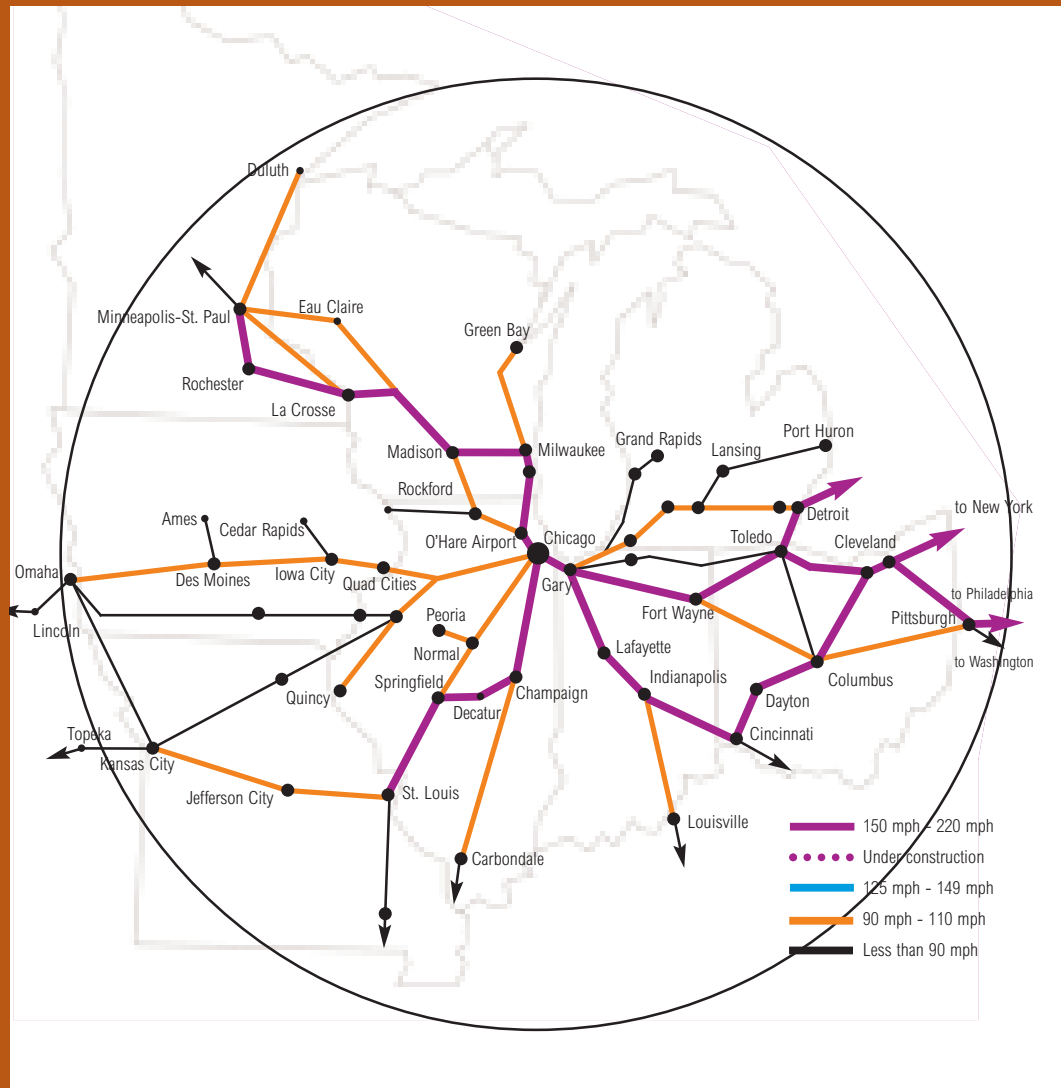
Florida HSR

“Orlando Hub”



Midwest HSR

Turning a journey into a commute

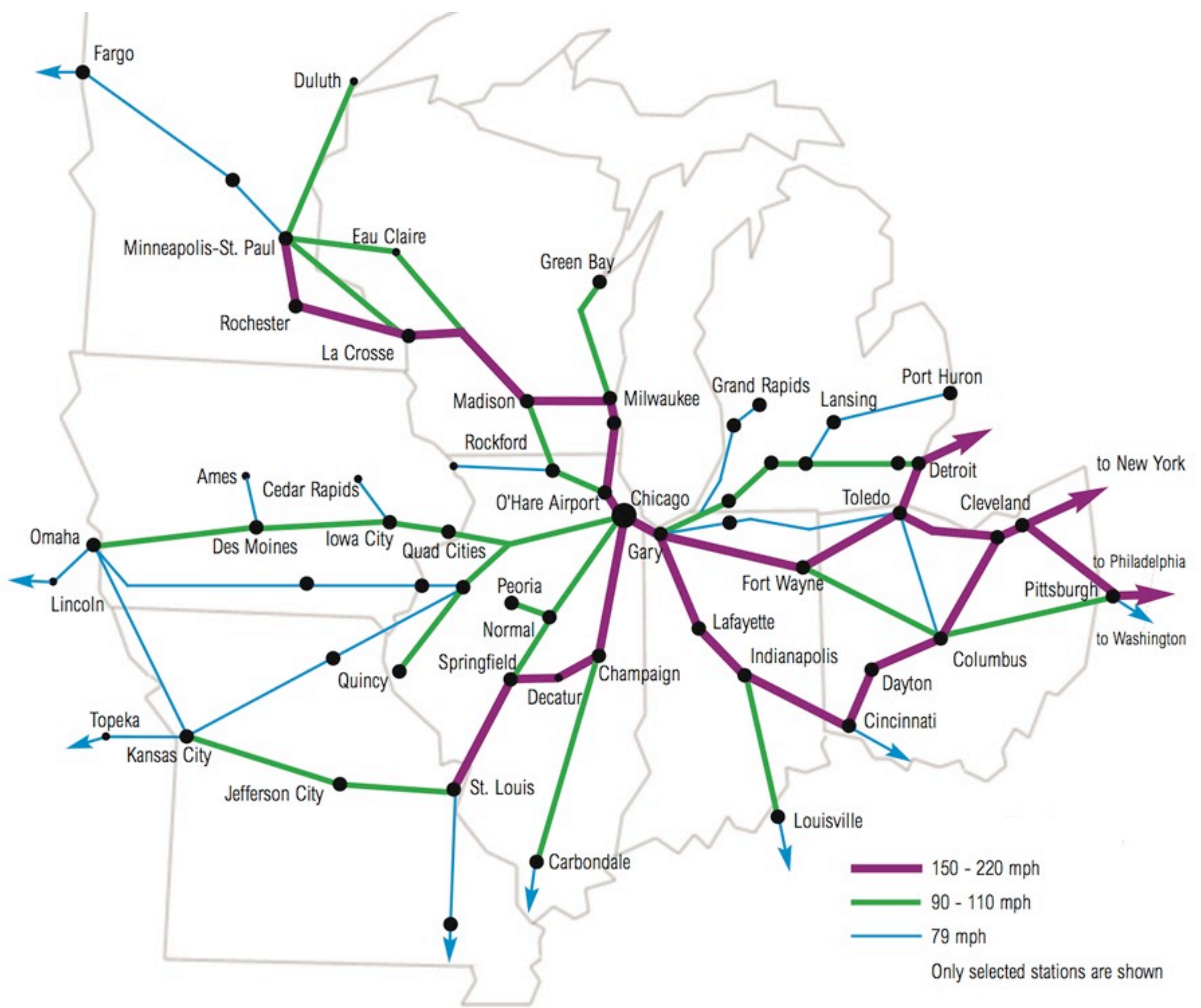


Our Vision for the Midwest



Reality in France

The above maps are approximately to scale. The existing Amtrak route from St. Louis to Chicago and Chicago to St. Paul is 701 miles, taking 16 hours by train. London to Paris and Paris to Marseille is 716 miles and only 6 hours by high-speed train.



Fargo

Duluth

Minneapolis-St. Paul

Eau Claire

Green Bay

Rochester

La Crosse

Madison

Milwaukee

Grand Rapids

Lansing

Port Huron

Rockford

O'Hare Airport

Chicago

Gary

Toledo

Detroit

to New York

Ames

Cedar Rapids

Des Moines

Iowa City

Quad Cities

Omaha

Lincoln

Peoria

Normal

Springfield

Decatur

Champaign

Fort Wayne

Lafayette

Indianapolis

Dayton

Columbus

Pittsburgh

to Philadelphia

to Washington

Topeka

Kansas City

Jefferson City

St. Louis

Louisville

Carbondale

150 - 220 mph

90 - 110 mph

79 mph

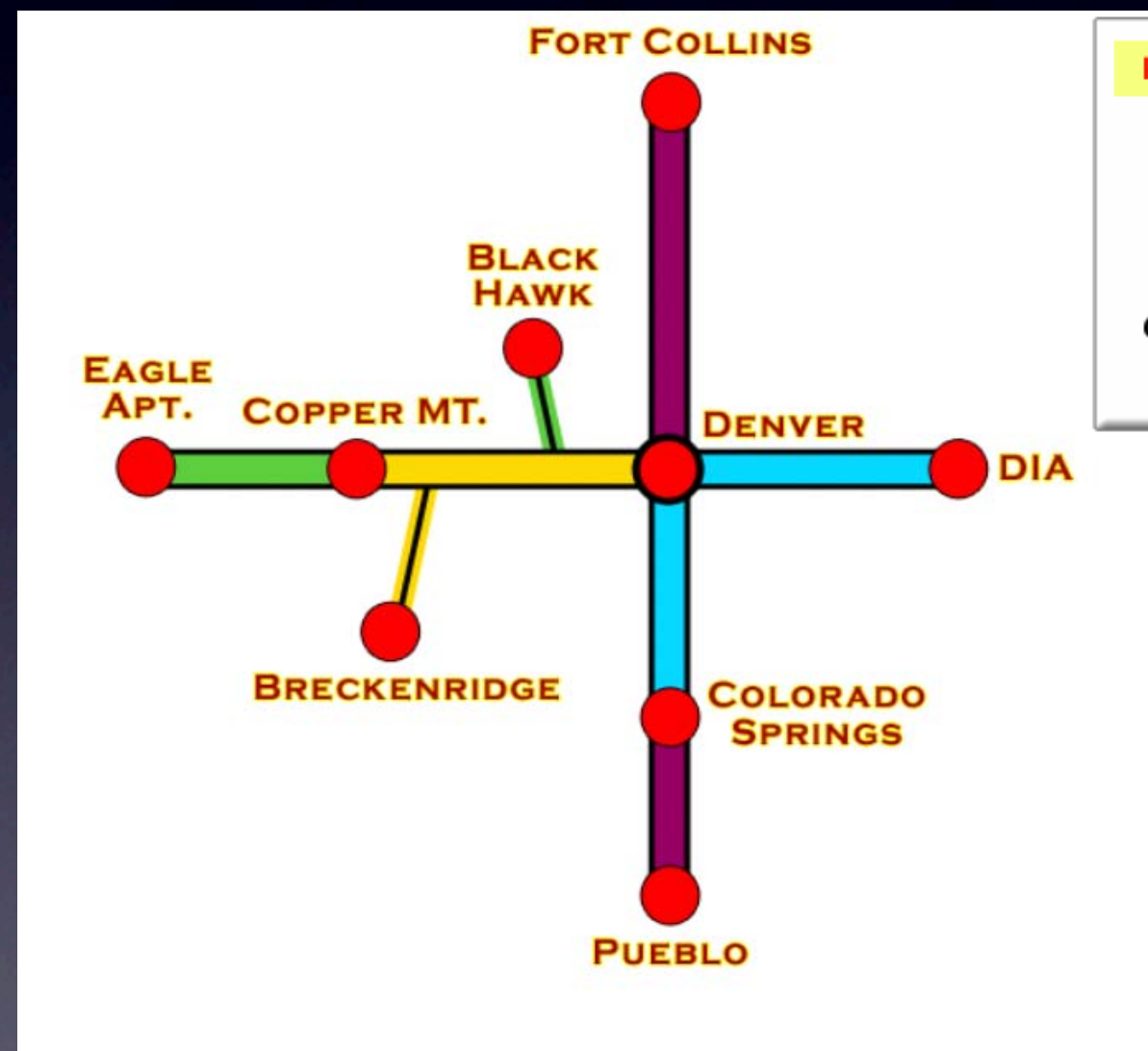
Only selected stations are shown

Ohio Hub

“Columbus Hub” “Cleveland Hub”



Rocky Mountain Rail Authority "Denver Hub"



PHASE 4: Capital Costs

I-25:	5.96	Billion
I-70:	12.97	Billion
Vehicle:	2.20	Billion
TOTAL:	21.13	Billion

Capital Needed for Phase 4:
\$4.15 Billion

Southeast HSR "Raleigh Hub" Best Case

Evaluation of High-Speed Rail Options in the Macon-Atlanta-Greenville-Charlotte Rail Corridor Executive Summary (Volpe - USDOT)

Best Case

The "best case" scenario is either the 125 mph or 150 mph Diesel HSR technology with 14 station stops in the corridor and good connections to improved rail service North of Charlotte. This case balances passenger demand and revenues, operating costs and initial capital requirements.

Technology	125 mph	150 mph (Diesel)
Travel time	4:05	3:36
Capital costs	\$2,060 M	\$2,520 M
Passengers (2025)	1,077,000	1,142,000
Revenues (2025)	\$27.0 M	\$29.1 M
O&M costs (2025)	\$32.0 M	\$33.1 M
Profit/loss (2025)	(\$5.0 M)	(\$4.0 M)
Break even year	2032	2031



(1) Loses money on Operating Costs

(2) Capital Costs are about 67x greater than annual revenue. Never recovers.

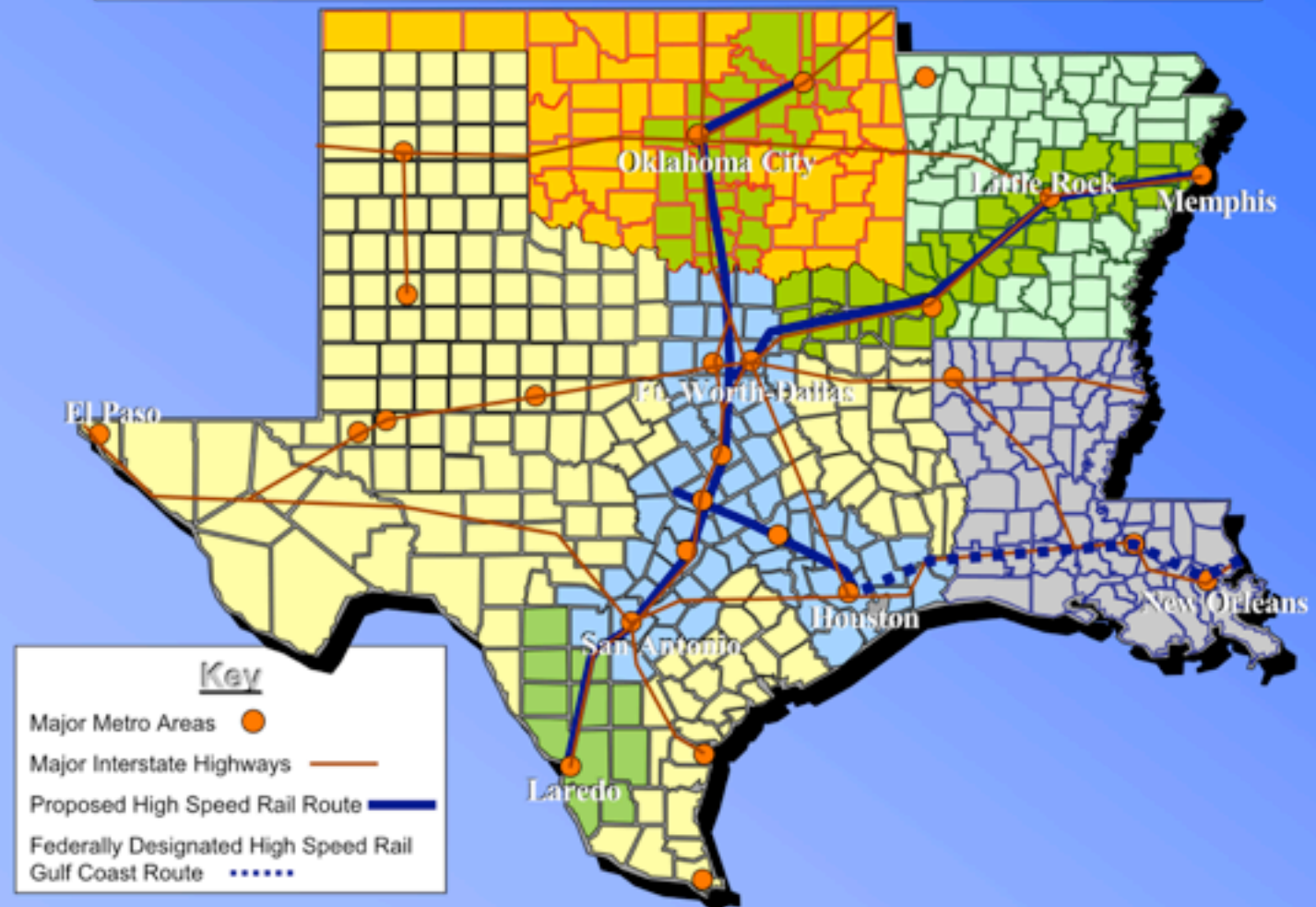
(3) Never breaks even.

(4) Capital per passenger trip = \$63

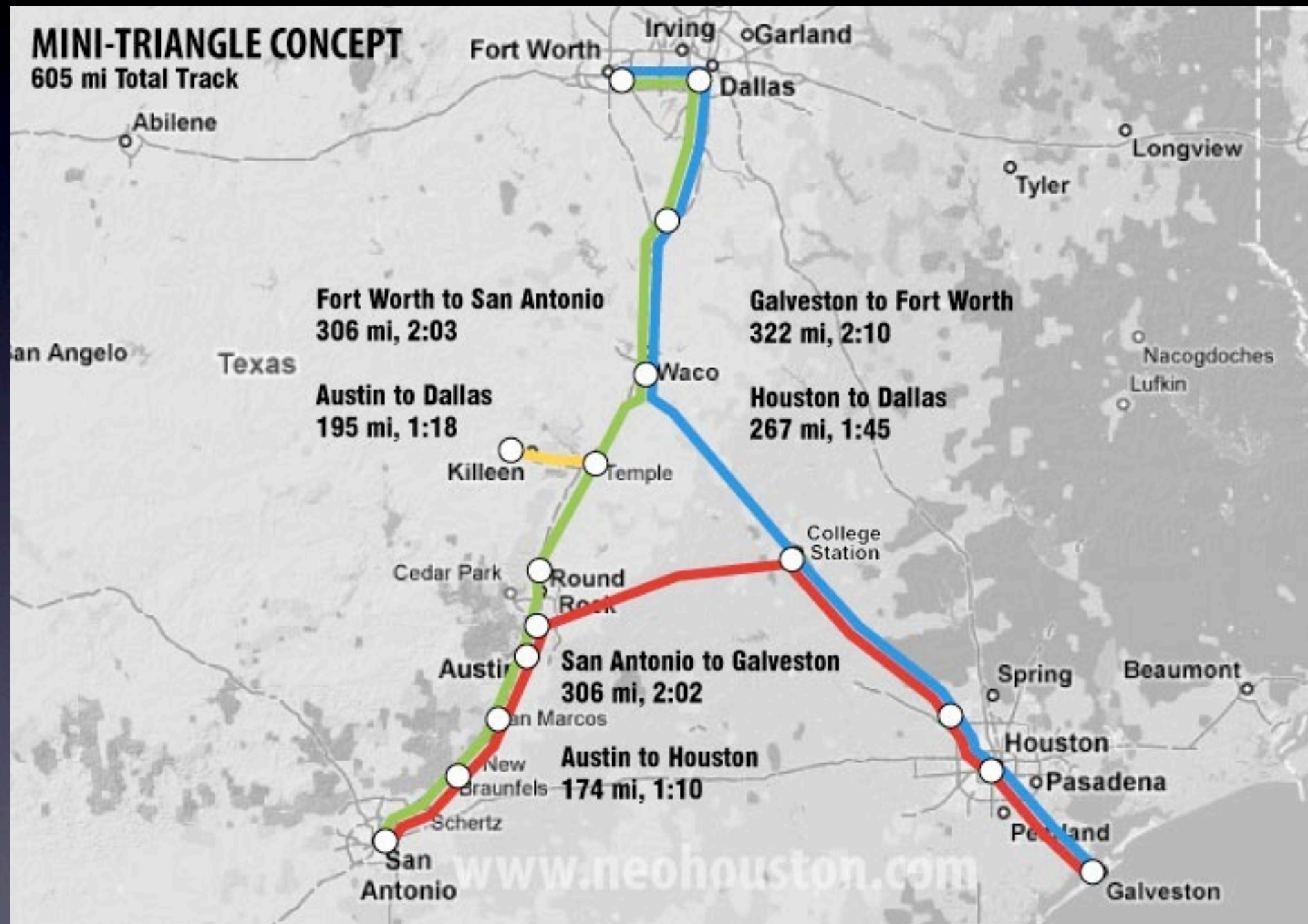
Texas T-Bone Bone "Dallas Hub"



T-Bone Corridor and Extensions



A mini-triangle



Western High Speed Rail Alliance

“Salt Lake City Hub”



Northwest HSR “Seattle Hub”



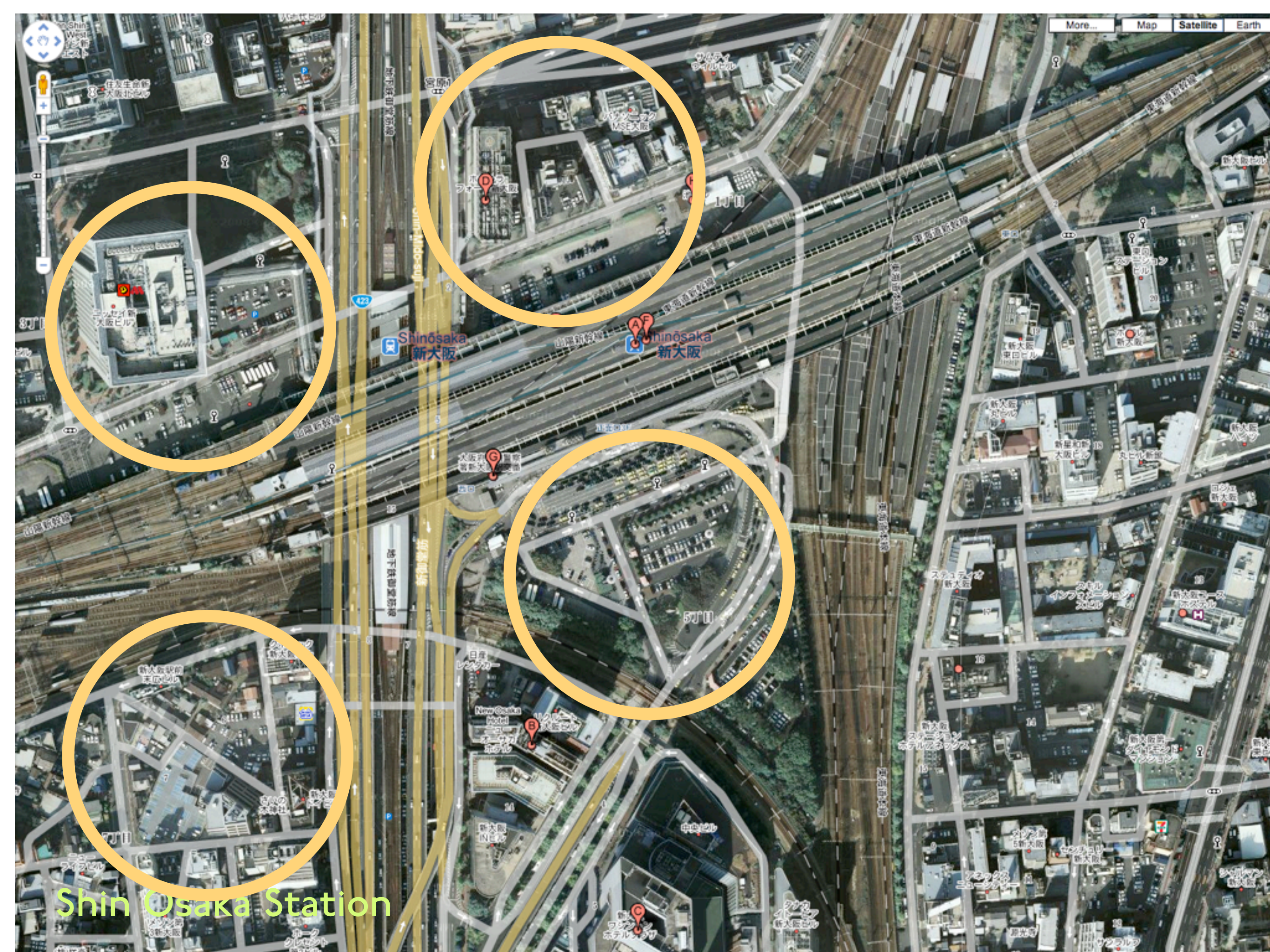
Comparison to Interstate Highway System

- “A similar proposal [to the Midwest HSR] by SNCF estimated the cost to be \$68.5 B (in comparison the Interstate Highway System cost more than \$450 billion in 2008 dollars).”
- The Interstate was national, not just regional.
- The Interstate was built everywhere, it was a bundle, so everyone would benefit, not a series of piecemeal projects.
- The Interstate served passengers, freight, and defense.
- The Interstate was roughly a grid, not a hub-and-spoke system, not disproportionately benefitting those in the Hub cities.

Why Topology Matters to Economic Development

- Hub networks serve the Hub, do little for the spokes
- This affects the resultant development patterns
- Non-hub cities see little effect

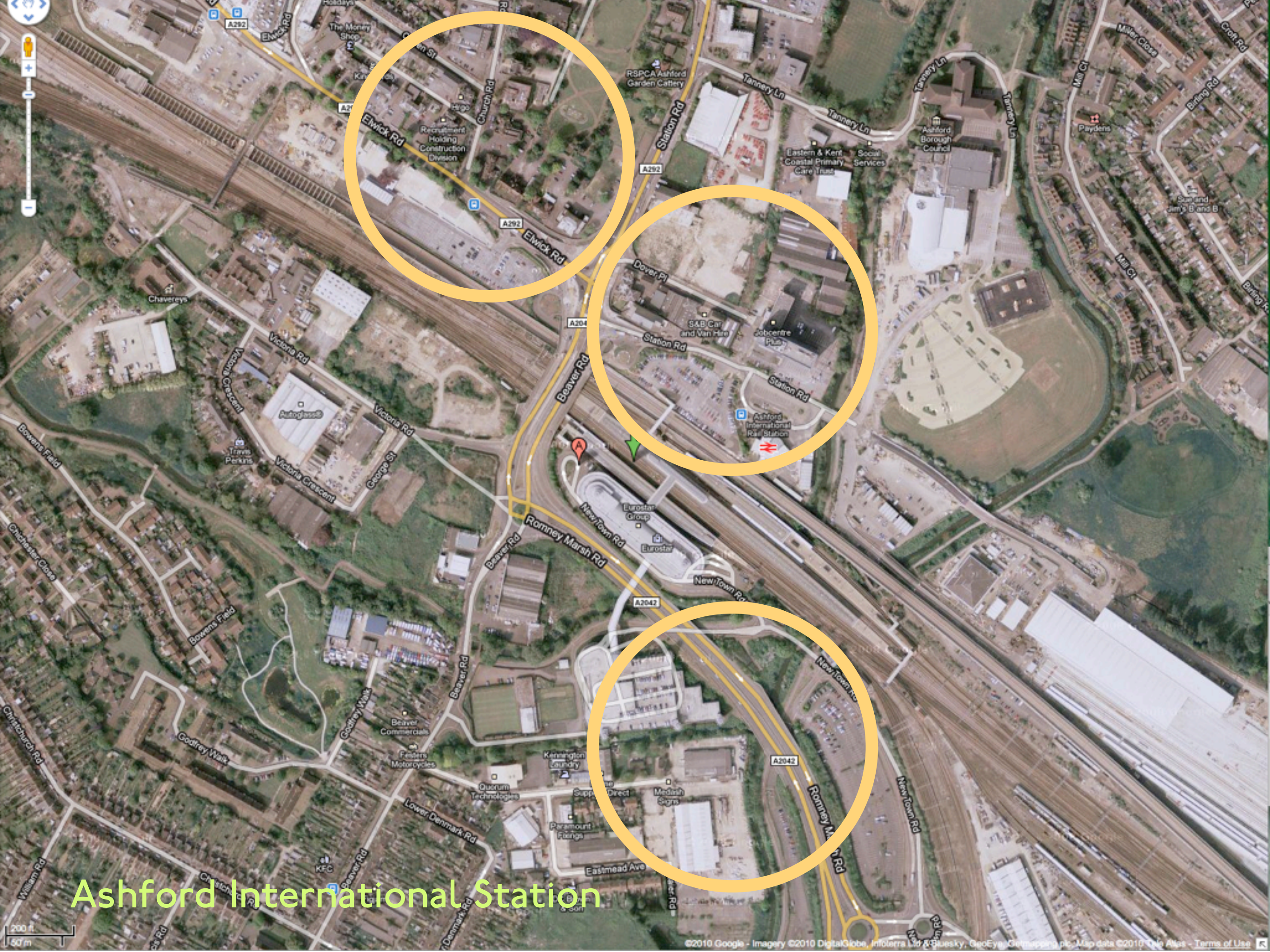
Local land use effects



Shinjuku
新大阪

Shinjuku
新大阪

Shin Osaka Station



Ashford International Station

No advantage to
adjacency ... unlike
transit

Quotes

“The spatial impacts of the new lines will be complex. They will favour the large central cities they connect, especially their urban cores, and this may threaten the position of more peripheral cities.” (Hall, 2009)

“[T]he wider economic benefits of high-speed rail are difficult to detect, as they are swamped by external factors”, but are likely to be larger in more central locations than more peripheral locations.”(Preston and Wall, 2008)

More Quotes

- ‘The estimated functions show that HSR accessibility has at most a minor effect on house prices” in Taiwan. (Andersson et al., 2010)

Still More Quotes

- “High-speed trains did not have a significant impact on the location choice of any of the firms” because the advantages over conventional trains were small and connections required transfers anyway (Willigers, 2003).

Yet More Quotes

- In Spain: “Hence, [High Speed Train] lines do not seem to increase inter-territorial cohesion, but rather they promote **territorial polarization.**”
Albalade and Bel (2010)
- “[T]he high investment in HST infrastructure could not be justified based on its economic development benefits since these are not certain” (Givoni, 2006).

US Congressional Research Service

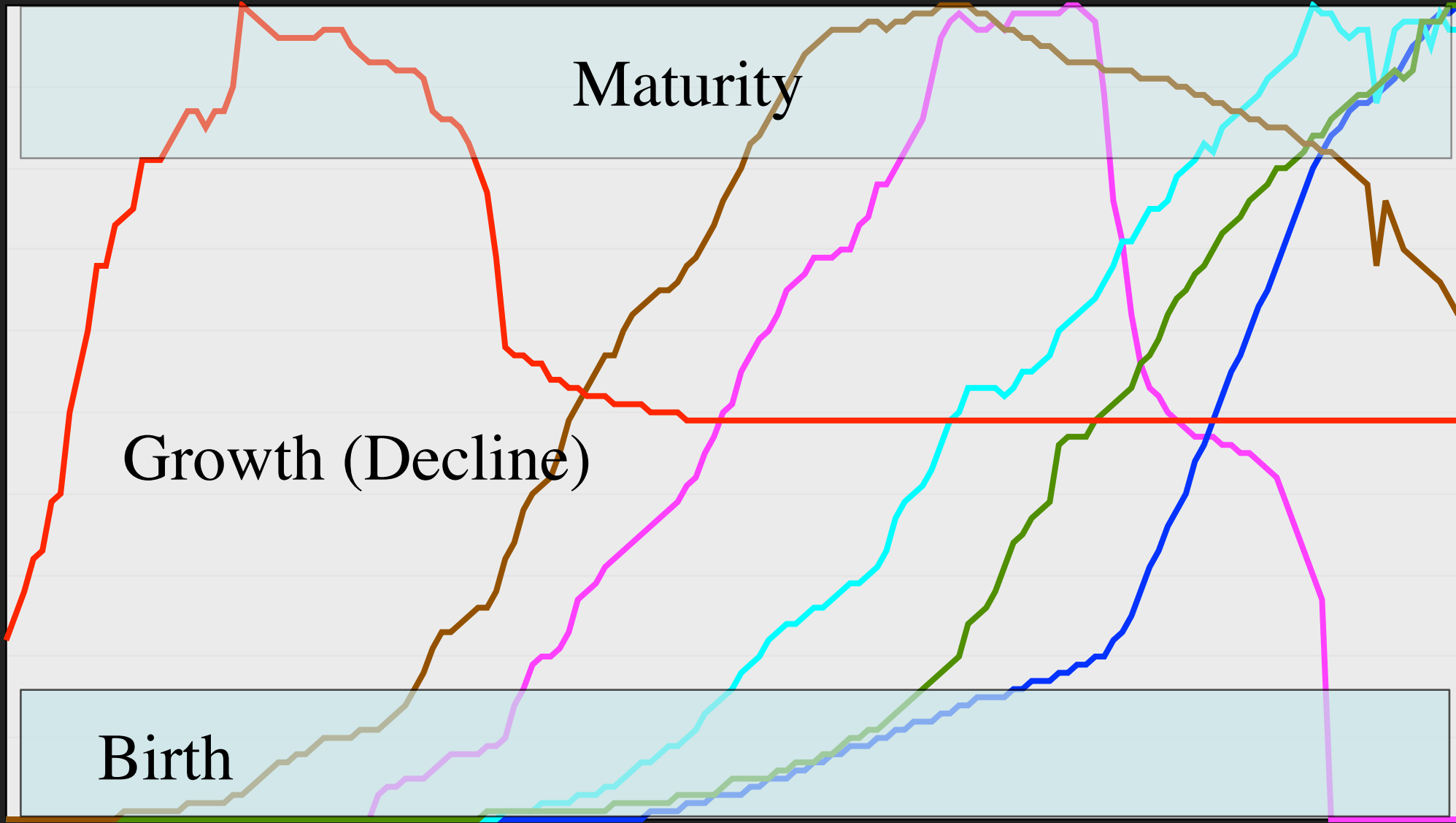
- “In terms of longer-term benefits, however, the U.S. Government Accountability Office (GAO) notes that quantifying these benefits can be difficult, and “while benefits such as improvements in economic development and employment may represent real benefits for the jurisdiction in which a new high-speed rail service is located, from another jurisdiction’s perspective **or from a national view they may represent a transfer or relocation of benefits.**” On the question of whether HSR can provide economic benefits for the national economy as a whole by increasing depth of labor markets and improving business travel, the UK transportation policy study discussed earlier notes that “**such effects are quite limited in mature economies with well developed infrastructure.**” This study notes that building a HSR line between London and Scotland would probably provide modest economic benefits at best because **air carriers already provide fast and frequent service at a reasonable cost** for business and other travelers.”(Peterman et al., 2009)

Context US Networks
are Mature

Proportion of
Maximum Extent

- Canals
- Surfaced Roads
- Gas Pipelines
- Railways
- Crude Oil Pipelines
- Telegraph

1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0



Maturity

Growth (Decline)

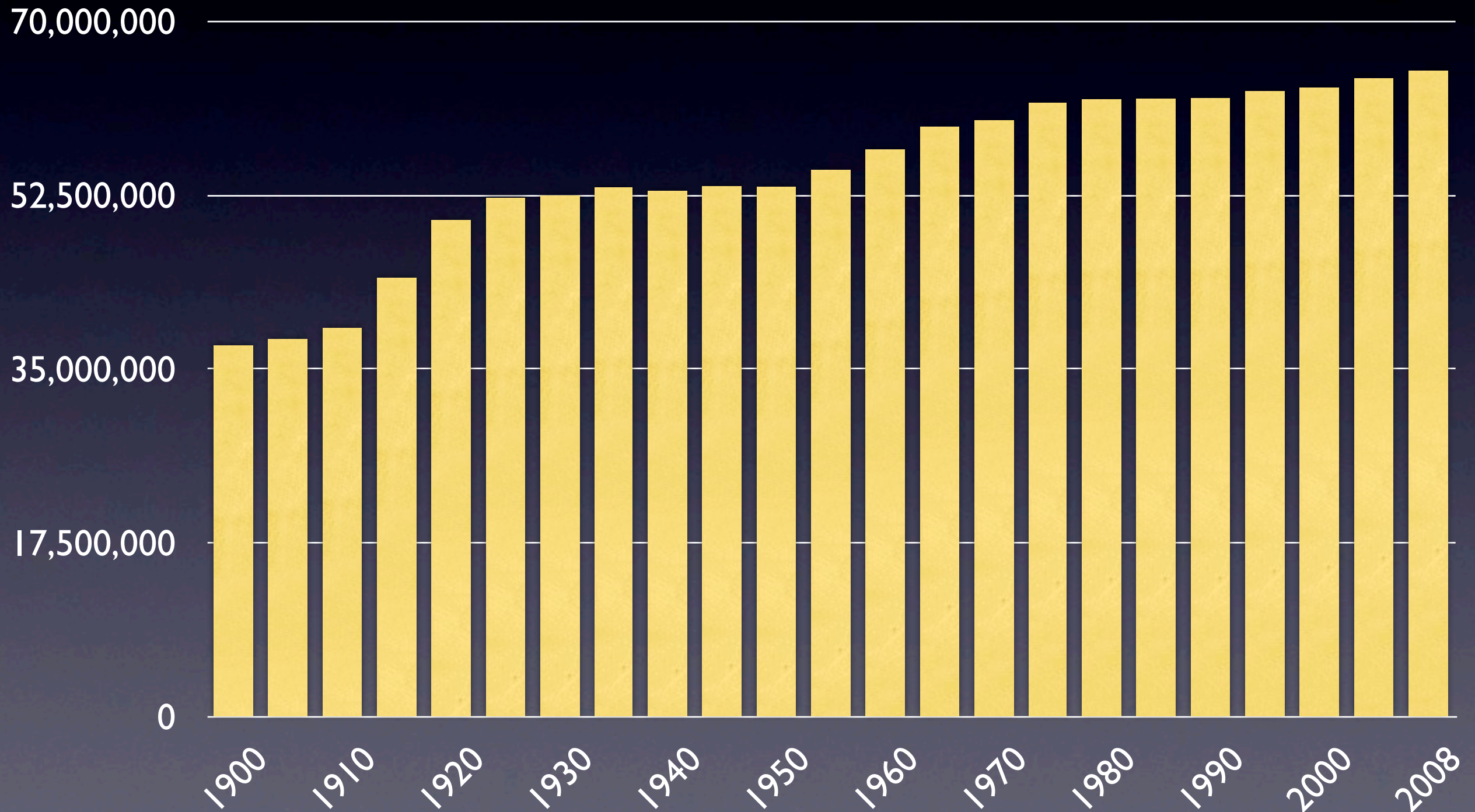
Birth

1825

1985

Trends in Roads

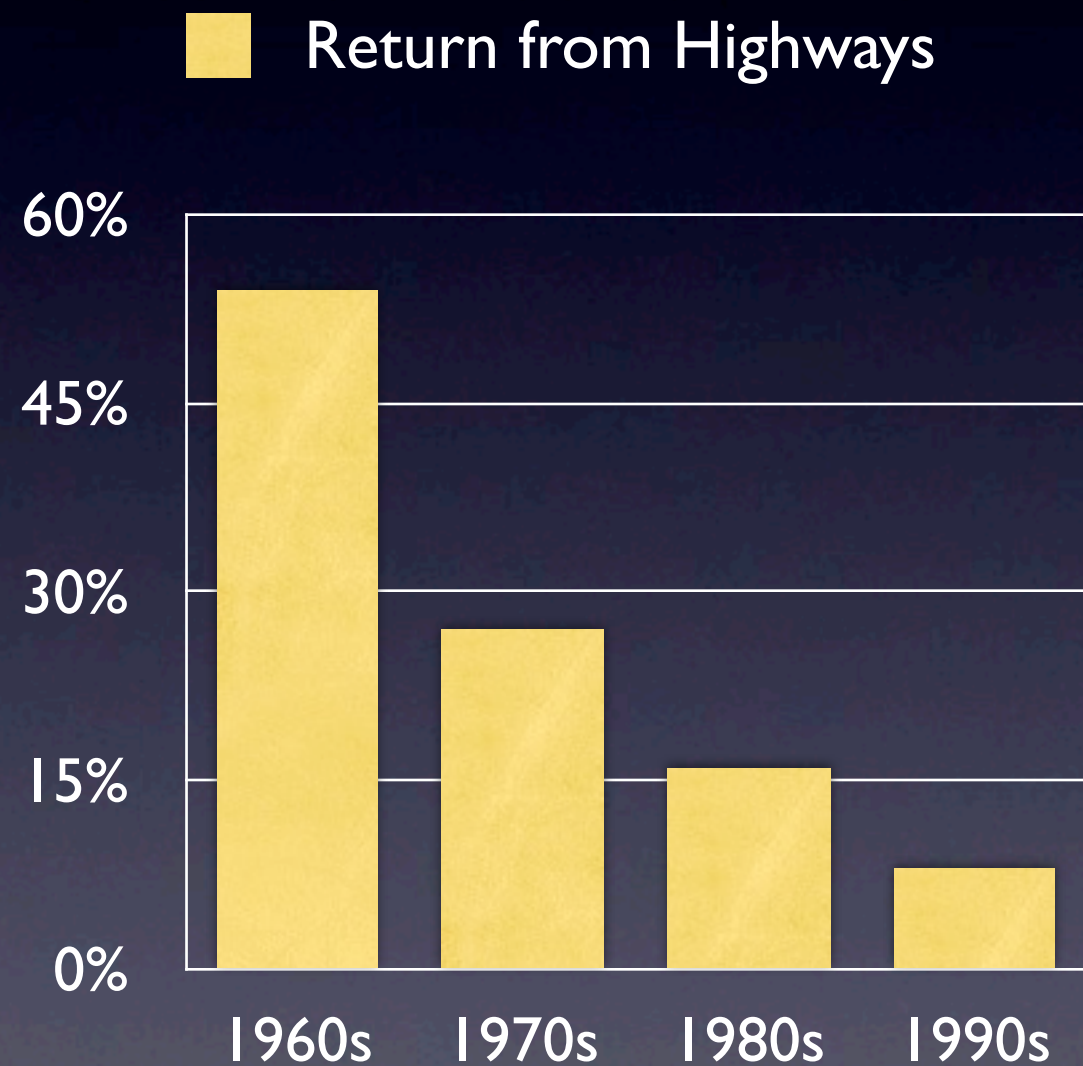
■ Meters of Highway (100s)



Source BTS Table I-IM National Transportation Statistics

Macroscopic Productivity

Nadiri's research claims that "the average cost elasticity with respect to total highway capital for the U.S. economy during the period 1950- to 1991 is about -0.08. " That is increasing highway investment by 1% will reduce costs by -0.08%. The average net rate of return from highway capital fell from 54% in the 1960s to 27% in the 1970s to 16% in the 1980s, the last number is close to the private rate of return, indicating a near optimal level of highway investment.



The Alternative

- “I skate to where the puck is going to be, not where it has been.” Wayne Gretzky

Alternative visions

- DARPA
Urban
Challenge



Google's Driverless car. 140,000 miles in traffic



Conclusions

- There is sometimes a danger of a planner falling in love with his map. There is no danger here, even the same agencies have random maps. It seems as no one cares where the lines actually go, so long as they are high-speed rail.
- The US carries a greater share of freight by rail than Europe. Converting rights-of-way into passenger only (which is required for HSR) may cost some of that freight share.
- Any money spent on inter-city HSR cannot be spent on something else (better technologies, urban transportation, etc.). The issue of **opportunity costs** is seldom mentioned.

Thank you

¿Questions?

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David Levinson

dlevinson@umn.edu

<http://nexus.umn.edu>