

Presentation to:  
**PENTRANS**

AECOM



# High Speed Trains

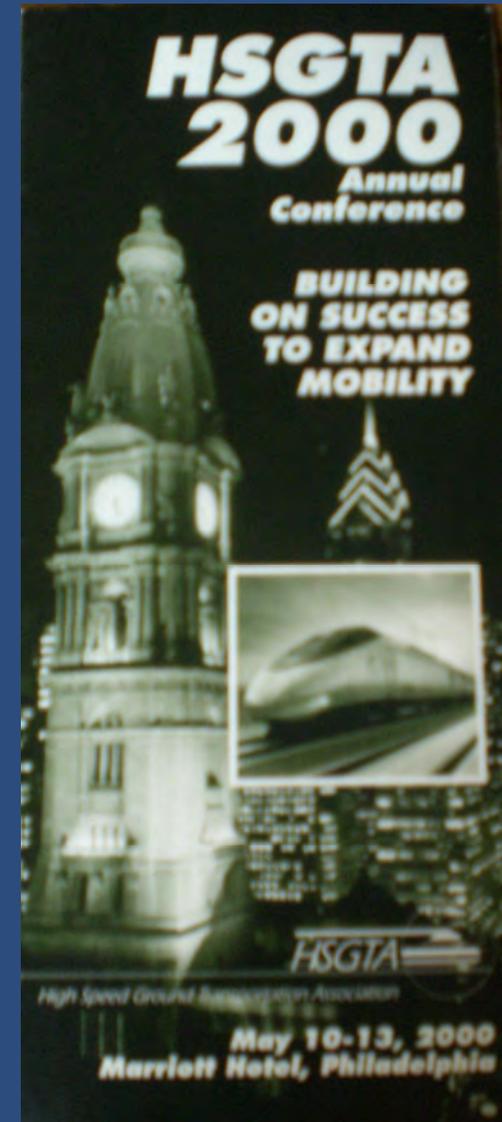
## A National Vision

Al Engel, P.E.  
*Vice President, AECOM Transportation*

Down Town Club, Philadelphia  
May 28, 2009

## Make Bold Plans

- Advocacy
- Global Context
- National Program



## US DOT's Strategic Plan

### Vision

*“Transform the nation’s transportation system by rebuilding existing rail infrastructure while launching new high speed passenger rail services in 100 – 600 mile corridors that connect US communities. Similar to how interstate highways and US aviation systems were developed in 20<sup>th</sup> Century: partnership between public sector and private industry, including strong Federal leadership that provided a national vision.”*

### Approach

*A combination of express and regional high-speed corridors, evolving from upgraded, reliable intercity passenger rail service*



## What Defines a High Speed Train?

- A new mode of transportation (not just your father's souped up train)
- Travel time competitive with air travel in 300 to 500 mile corridors, but a superior customer experience
- Half the travel time of the automobile
- Operating speeds of 150 to 220 mph
- A Totally Integrated Systems Approach
- Safest form of travel

# US DOT Definitions:

- High Speed Rail (HSR) and Intercity Rail (IPR)
  - **HSR – Express:** Top speed at least 150 mph
  - **HSR – Regional:** 110 – 150 mph, grade separated
  - **Emerging HSR:** 90 – 110 mph, shared track
  - **Conventional Rail:** 79 mph – 110 mph, shared track



**Definitions:**

**High-Speed Rail (HSR) and Intercity Passenger Rail (IPR)\***

**HSR – Express.** Frequent, express service between major population centers 200–600 miles apart, with few intermediate stops. Top speeds of at least 150 mph on completely grade-separated, dedicated rights-of-way (with the possible exception of some shared track in terminal areas). Intended to relieve air and highway capacity constraints.

**HSR – Regional.** Relatively frequent service between major and moderate population centers 100–500 miles apart, with some intermediate stops. Top speeds of 110–150 mph, grade-separated, with some dedicated and some shared track (using positive train control technology). Intended to relieve highway and, to some extent, air capacity constraints.

**Emerging HSR.** Developing corridors of 100–500 miles, with strong potential for future HSR Regional and/or Express service. Top speeds of up to 90–110 mph on primarily shared track (eventually using positive train control technology), with advanced grade crossing protection or separation. Intended to develop the passenger rail market, and provide some relief to other modes.

**Conventional Rail.** Traditional intercity passenger rail services of more than 100 miles with as little as one to as many as 7–12 daily frequencies; may or may not have strong potential for future high-speed rail service. Top speeds of up to 79 mph to as high as 90 mph generally on shared track. Intended to provide travel options and to develop the passenger rail market for further development in the future.

\* Corridor lengths are approximate; slightly shorter or longer intercity services may still help meet strategic goals in a cost-effective manner.

# A Global Rush to High Speed Trains



## Total Miles in World\*

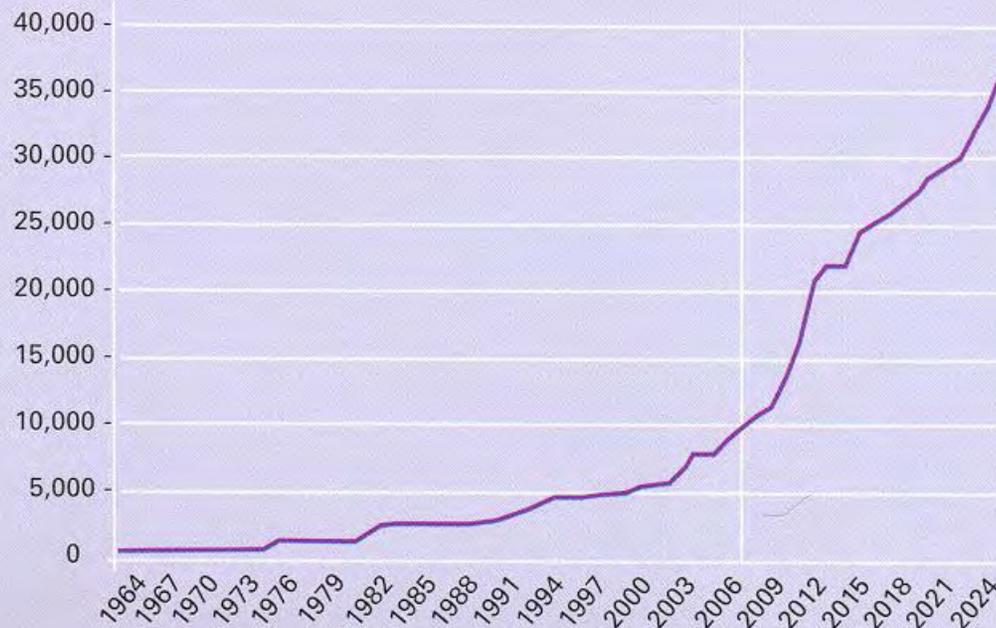
In Operation = 6,160  
 In Construction = 5,150  
 Planned = 11,650

**Total in 2025 = 22,960**

\*04 June 2008

# It All Started in Japan—Tokaido Shinkansen: Distinguishing Features

- Safety** No passenger fatalities or injuries due to train accidents since 1964 launch
- Reliability** Average annual delay: 0.1 minutes/train (FY 2003)
- Speed** 270km/hour: Tokyo-Osaka(320 Miles) in 2.5 hours (Nozomi)
- Frequency** 291 departures/day; 360,000 passengers/day



# A Global Rush to High Speed Trains

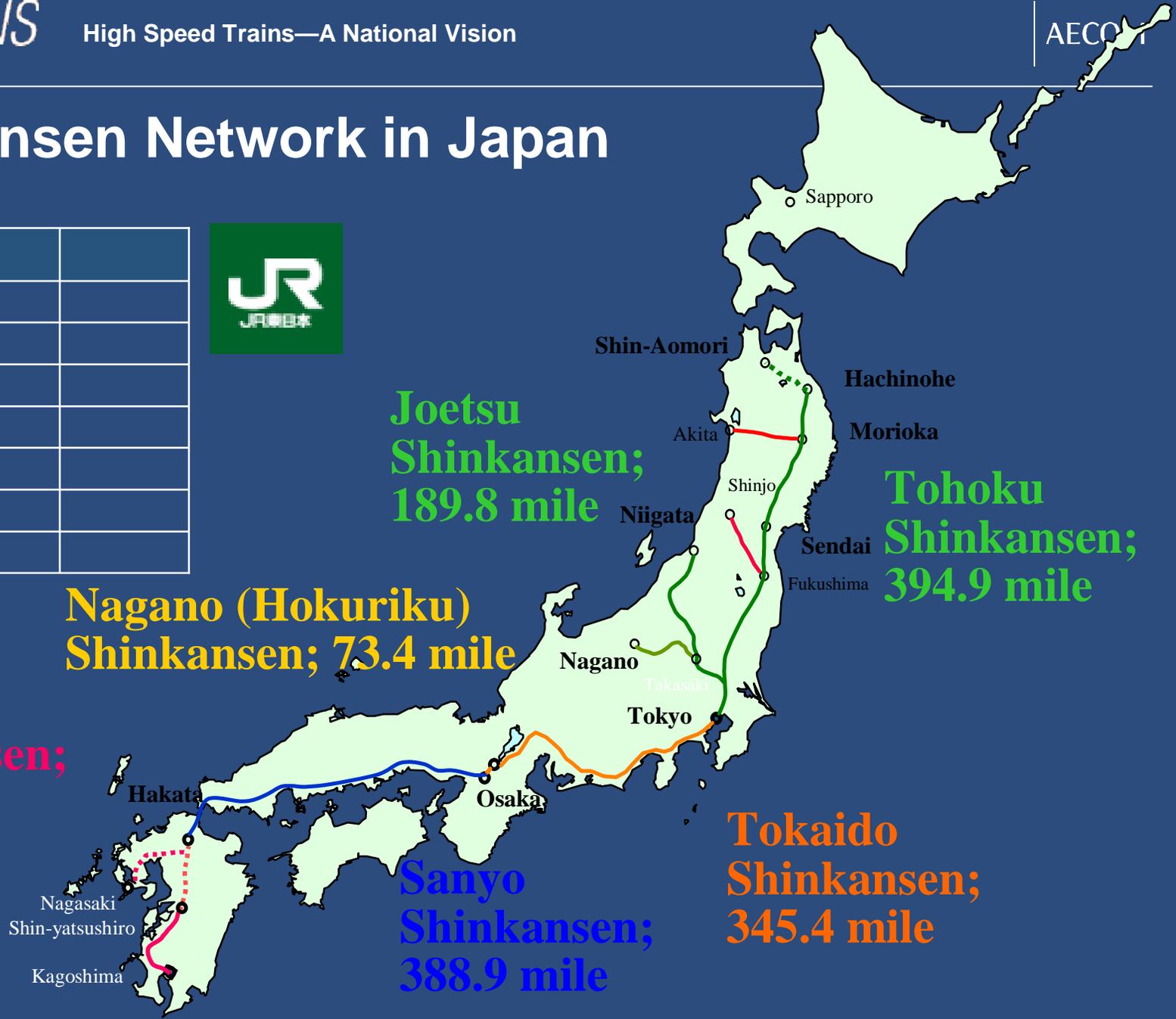
**1981 South-East TGV**  
Paris to Lyon (419 km)



**1991 German ICE Trains**  
Hanover - Wurzberg (327 km)



# Shinkansen Network in Japan

**Kyushu  
Shinkansen;  
86 mile**

**Nagano (Hokuriku)  
Shinkansen; 73.4 mile**

**Joetsu  
Shinkansen;  
189.8 mile**

**Tohoku  
Shinkansen;  
394.9 mile**

**Sanyo  
Shinkansen;  
388.9 mile**

**Tokaido  
Shinkansen;  
345.4 mile**

# Europe HSR network - 2008

## European HS Network

Situation as at 02.2008



# Europe HSR network - 2025

## European HS Network

Forecasting 2025



# In Europe

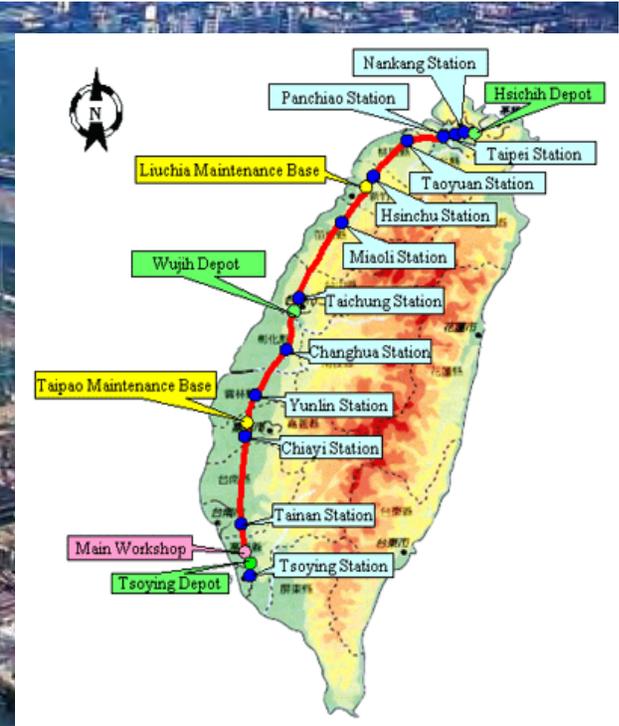
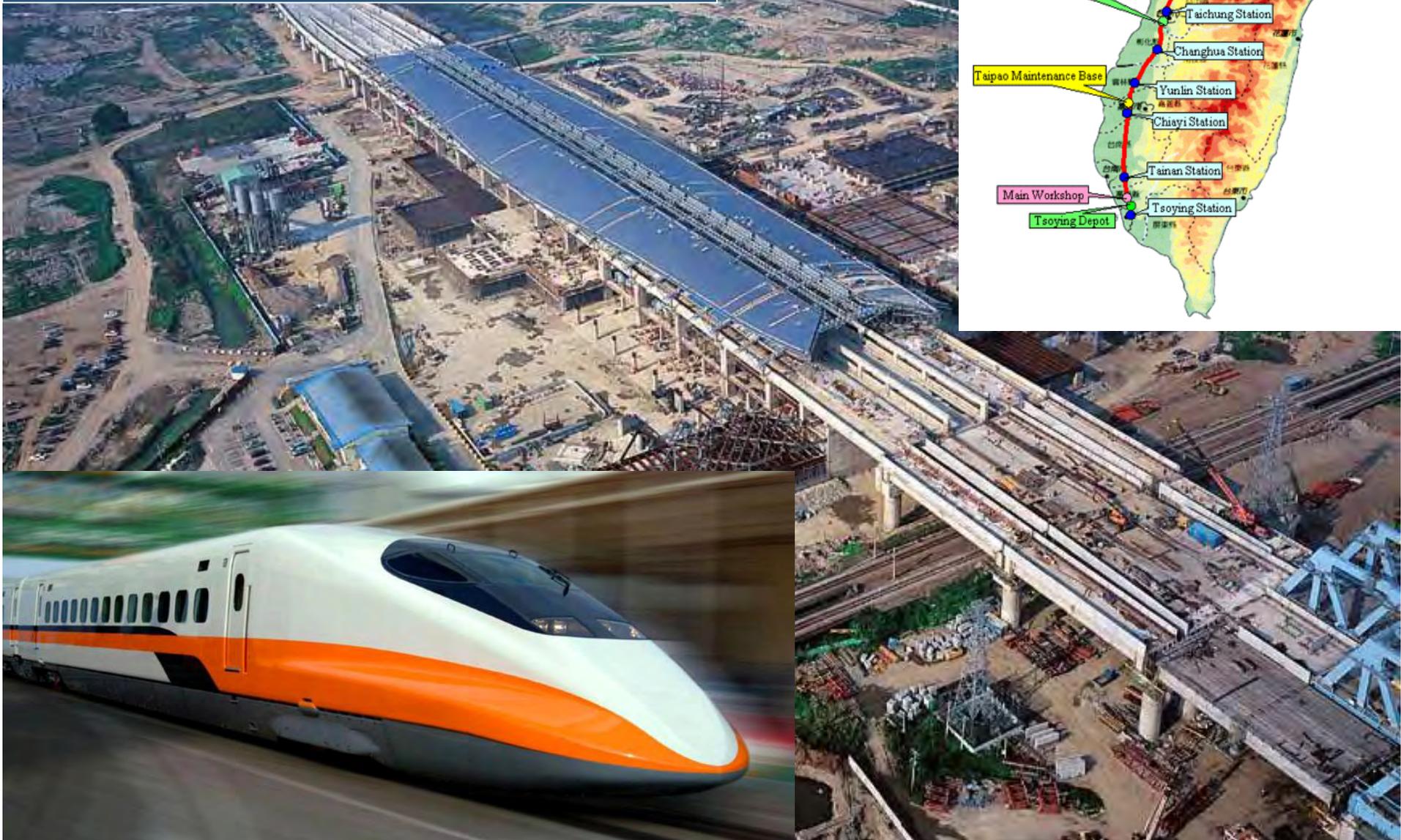


Best present travel times from Paris

Best future travel times from Paris

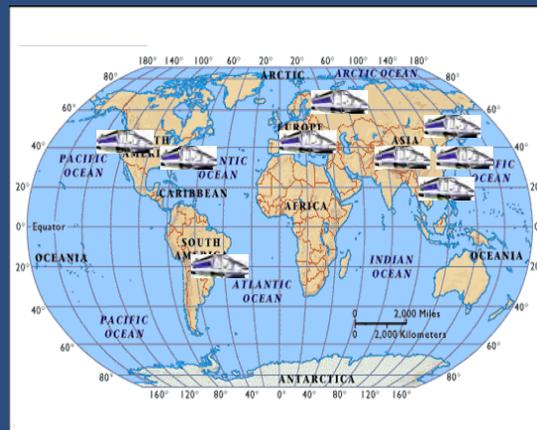


- 220 mile Dedicated Railway, Dual Track
- A 35-year franchise to
- 186mph, ~980 seats/trainset
- Taipei to Kaohsiung – 90 min.



# So What's the Global Attraction? In a word, SUSTAINABILITY

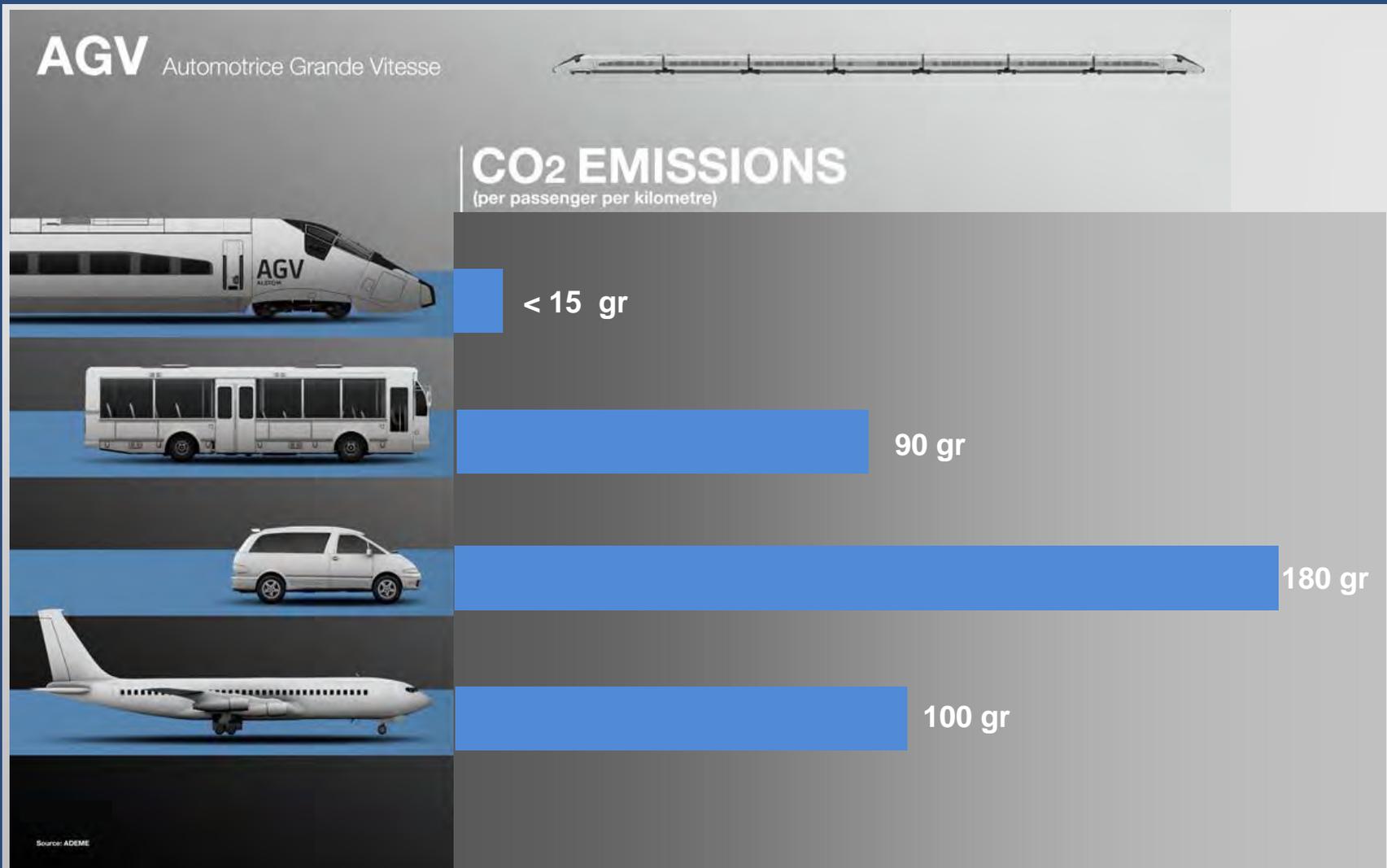
- “We must begin to make fundamental reforms by 2012 or watch the climate system spin out of control”
- Rajendra Pachauri, Economist ; 2007 Nobel Peace Prize alongside Al Gore



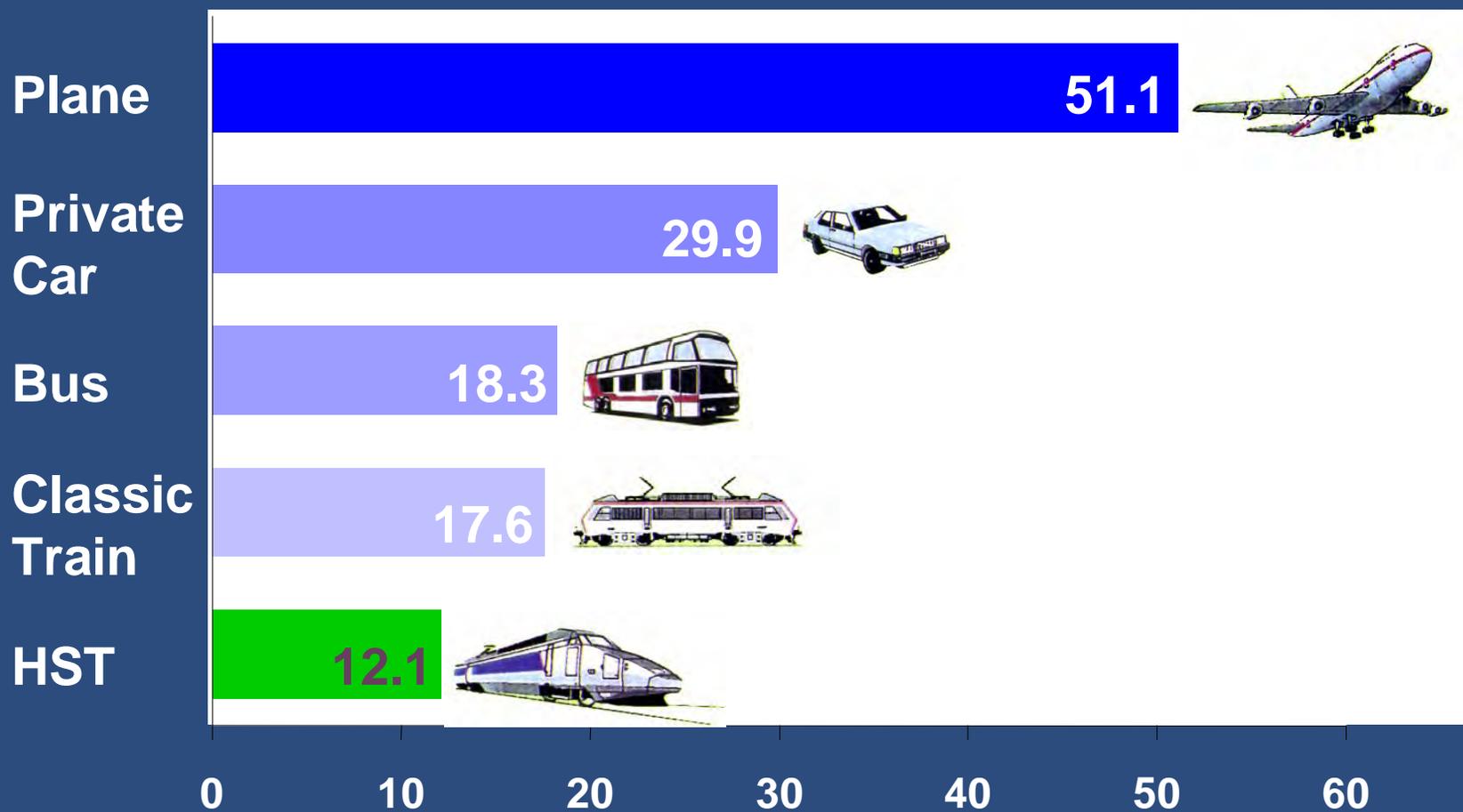
*“There is no Magic Bullet for this problem, but Bullet Trains can help”*

Al Engel, P.E., Transportation Consultant

# More Than 10X Lower Emissions vs Automobile

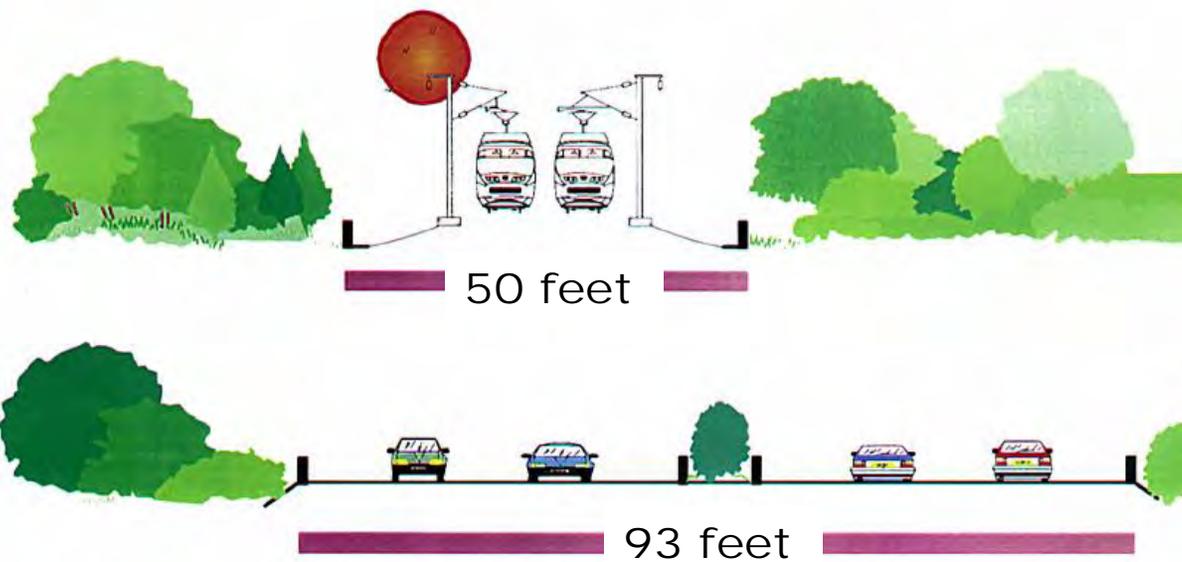


# HSR saves Energy and Reduces Greenhouse Gases



Source : SNCF-I "Petroleum equivalent gramme" per passenger-kilometre

# Land requirement is smaller



HSL

Highway

Source :  
SNCF-I

# High Speed Rail is Environmentally Friendly in any Landscape



# Flexibility of Design



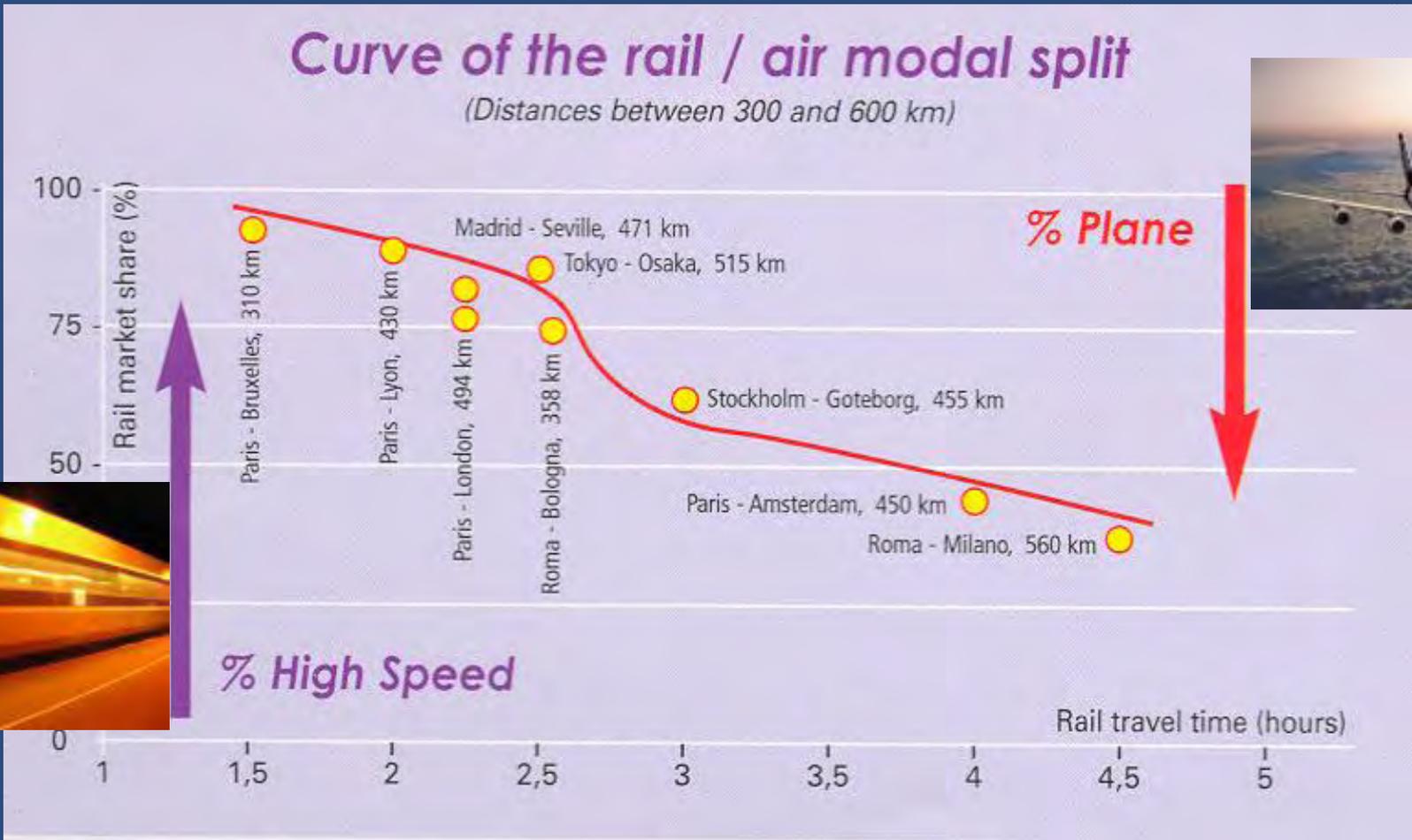
# Flexibility of Design



# Airport Connections and Economic Growth



# HST an Economic and Ecologic Alternative to Air Transport



# Available Products on the Market / V > 170 MPH

Siemens: 257 trains sold



**Velaro**  
Spain



**ICE**  
Germany, Netherlands

Talgo: 46 trains sold



**Talgo 350**  
Spain

Daily operating  
speed:  
**175-180 MPH**

# Available Products on the Market / V > 170 MPH

Consortium of Japanese Industries: 307 trains sold



**E2**  
Japan

**E4**

**Shinkansen**  
Japan

Daily operating  
speed:  
170 MPH

Duplex  
16 Car Trains  
1634 seats

Daily operating  
speed:  
180 MPH

# Available Products on the Market / V > 170 MPH

Alstom: 650 TGV trains sold (speed record at 574.8kmh - 357.16mph)



**EUROSTAR**  
France, England



**THALYS**  
Belgium, France, Holland & Germany



**TGV Duplex**  
France



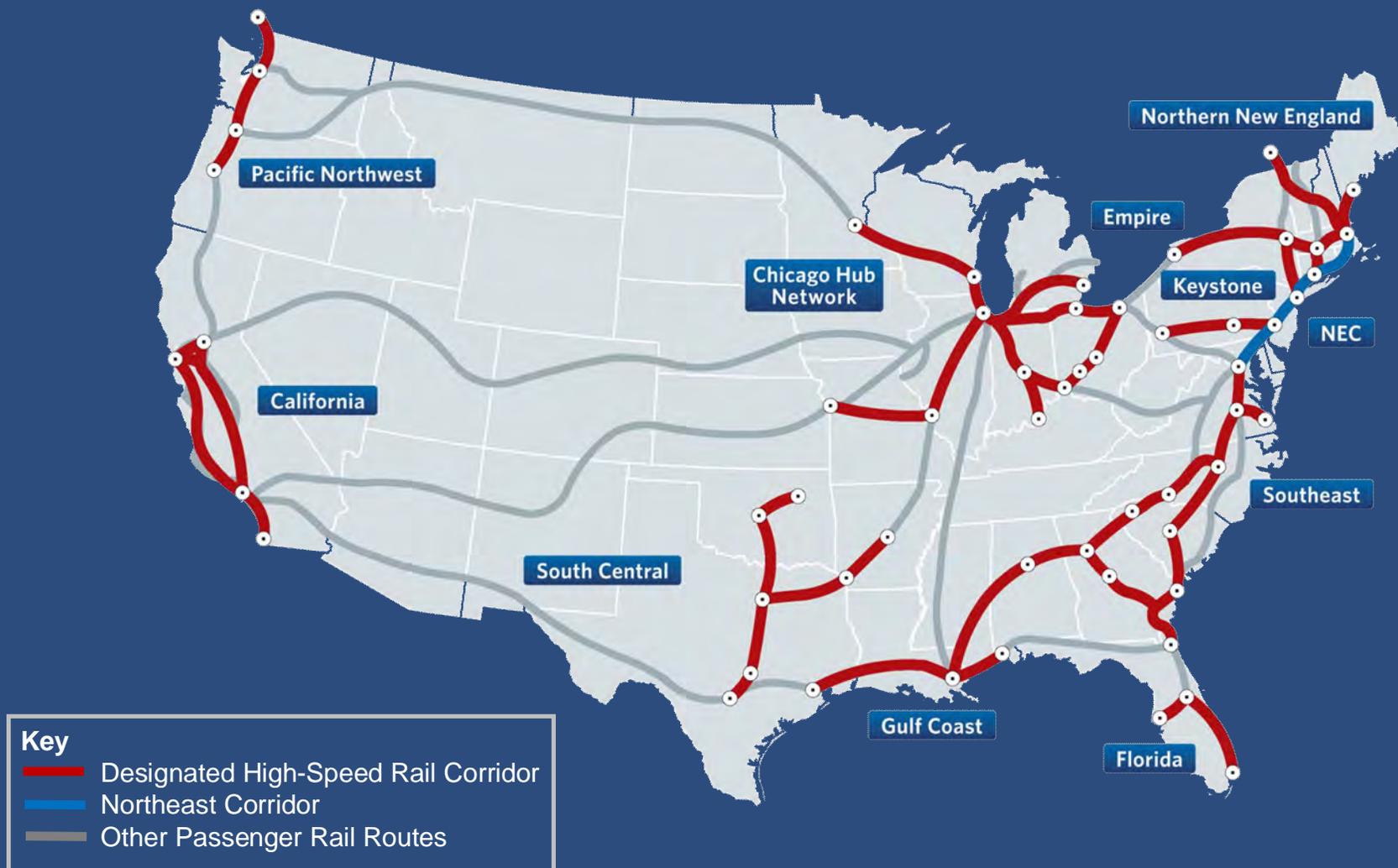
**TGV KTX**  
Korea



**TGV East**  
France, Germany, Luxembourg,  
Switzerland

Daily operating  
speed:  
**187-200 mph**

# Vision for High-Speed Rail in America



## First USA HSR Service



- AMTRAK Launches ACELA Express in 2001: Boston – New York – Washington D.C.



## Cause for Optimism – Actions and Advocacy

- Oct. 16, 2008 - President Signs 2008 Rail Safety and Amtrak Funding Authorization Bill - \$13.1 Billion for Amtrak and HSR
- High Speed Rail in California has passed major hurdle with passage of Prop. 1A, Nov. 4, 2008: \$9.95 Billion GO Bonding
- The American Recovery and Reinvestment Act of 2009 (Pub.L. 111-5) enacted by the 111th United States Congress and signed into law by President Barack Obama on February 17, 2009 provides \$8 Billion for High Speed Rail. A \$1.3 billion capital program for Amtrak is also included.

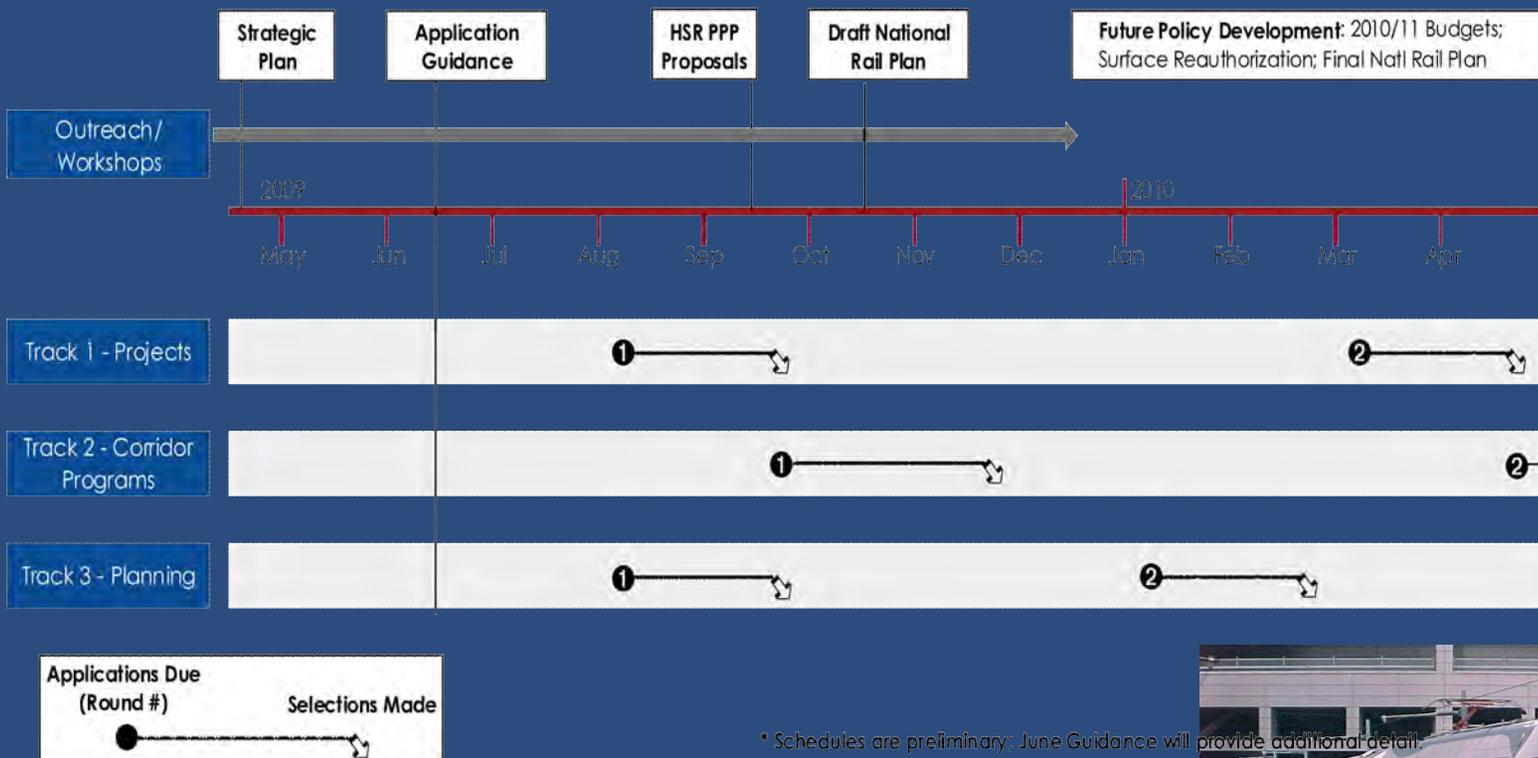
## Cause for Optimism – Actions and Advocacy continued

- The President's budget also includes \$1 billion/year for next five years
- The Advocacy Builds:
  - PenTrans: Pennsylvanians for Transportation Solutions
  - APTA: American Public Transportation Association – Intercity Rail Dev. Committee
  - NARP: National Association for Rail Passengers
  - ARTBA: American Road and Transportation Builders Association
  - AASHTO: American Association of State Highway and Transportation Officials
  - RSA: Railway Supply Association
  - NCI: The National Corridor Initiative, Inc.
  - Indiana High Speed Rail Association
  - ACHST: Association for California High Speed Trains

## Three Funding Tracks - \$13 Billion Program

- Track 1 - Individual Projects
  - Provide grants for individual projects that are “ready to go” with completed environmental and preliminary engineering work; with an emphasis on near term job creation
- Track 2 - Corridor Programs
  - Develop entire phases or geographic sections of high speed rail corridors that have completed corridor plans, environmental documentation, and have a prioritized list of project elements to help meet the corridor objectives
- Track 3 – Planning
  - Establish a structured mechanism and funding stream for future corridor development activities to develop a “pipeline” of projects
- Overall Result
  - Provides flexibility to DOT and allows for incremental approaches to “higher speed rail” as well as “advanced” high speed rail

# US DOT Program Implementation Timeline



\* Schedules are preliminary; June Guidance will provide additional detail.



## Credits

The organizations who generously provided Information and Illustrations used for this presentation include but are not limited to the following organizations:

**California High Speed Rail Authority**  
**Association for California High Speed Trains**  
**The Union of International Railways (UIC)**  
**American Public Transportation Association**  
**Alstom Corporation**  
**Siemens Corporation**  
**Japan East Railway**  
**Central Japan Railway**  
**Taiwan High Speed Rail Corporation**

## Thank you

Al.Engel@aecom.com

### Useful Sites:

<http://www.fra.dot.gov/>

[http://www.uic.asso.fr/gv/article.php3?id\\_article=54](http://www.uic.asso.fr/gv/article.php3?id_article=54)

<http://www.cahighspeedrail.ca.gov/>

<http://www.highspeedtrainsforca.com/>