

The Role of Rail in Sustainability in the Northeast Corridor



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History

1950s / 1960s

- Construction of Interstate Highway System



1970s

- Financial collapse of eastern rail systems
- Conveyance of NEC assets to Amtrak, MA, CT and NY
- Emergence of new operators – Amtrak, Commuters and Freights

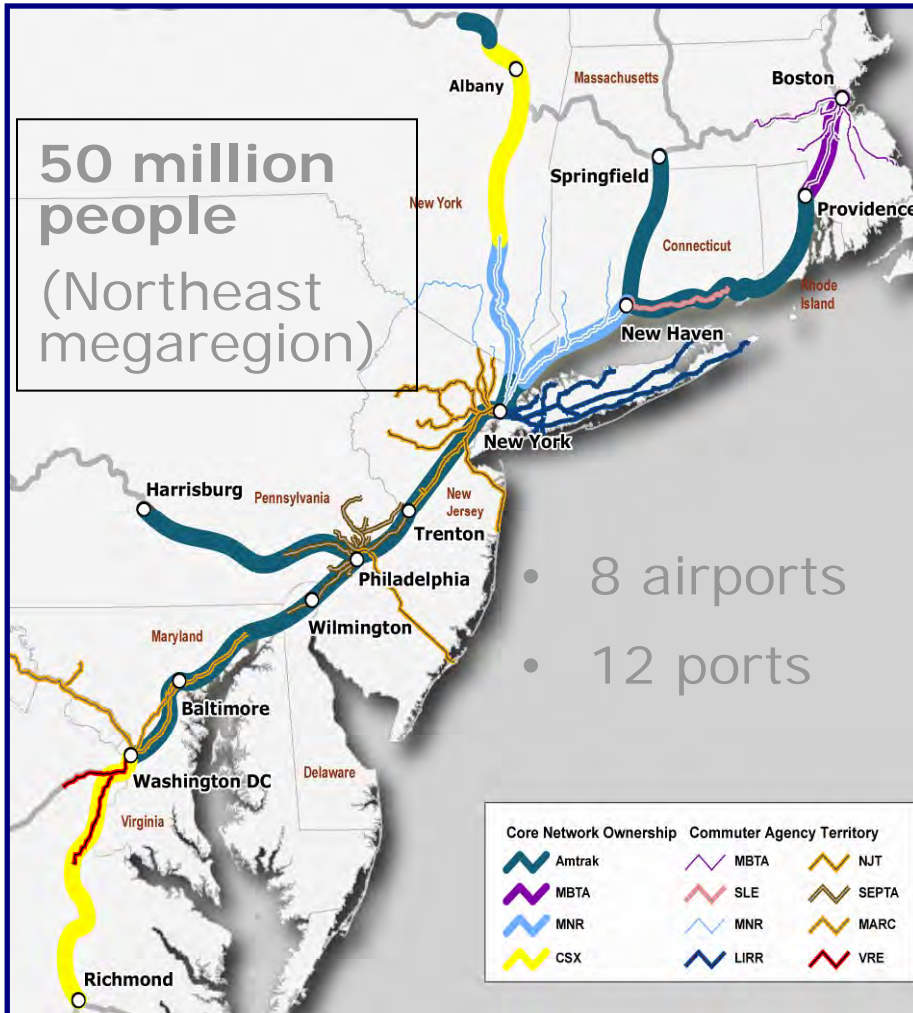


1980s / 1990s

- Operators use latent capacity; train miles double



Regional Overview



- 870 route miles (2,340 track miles; 71% electrified)
- 12 states, DC
- 8 commuter operators
- Class 1 and regional freight
- Amtrak high speed, regional, long-distance

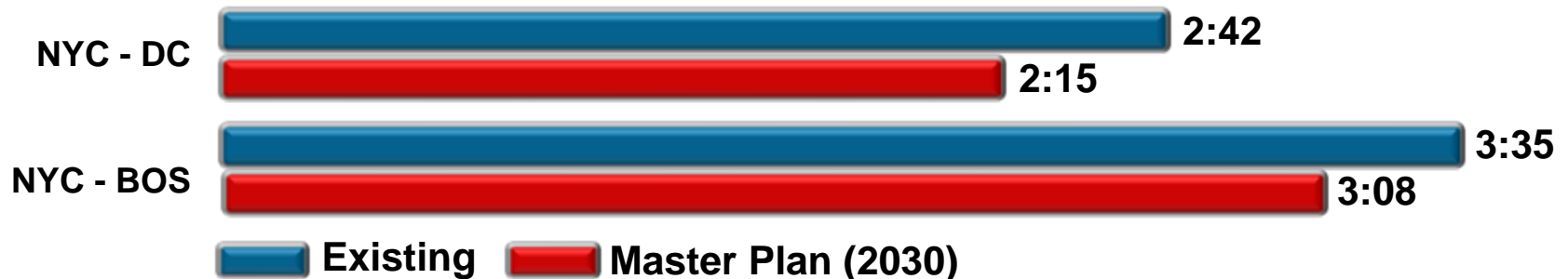
Ownership	Route Miles
Amtrak (main line, Springfield, Harrisburg, portion of Albany line)	548
Massachusetts (main line)	37
Connecticut (main line)	47
MTA (main line, 10; Hudson [Albany] line, 63)	73
CSX (Albany line, 68; Washington-Richmond, 108)	176

NEC Master Plan

- **Three-year Cooperative Planning Effort; Report Published May 2010**
 - Twelve states, District, eight commuter and three freight railroads participated
 - Plan defines 2030 requirements – intercity, commuter and freight
- **Key Findings (all users)**
 - 60% increase in ridership by 2030
 - 40% increase in train movements
 - \$52 billion in capital investment needed



• Modest Acela Travel Times Gains

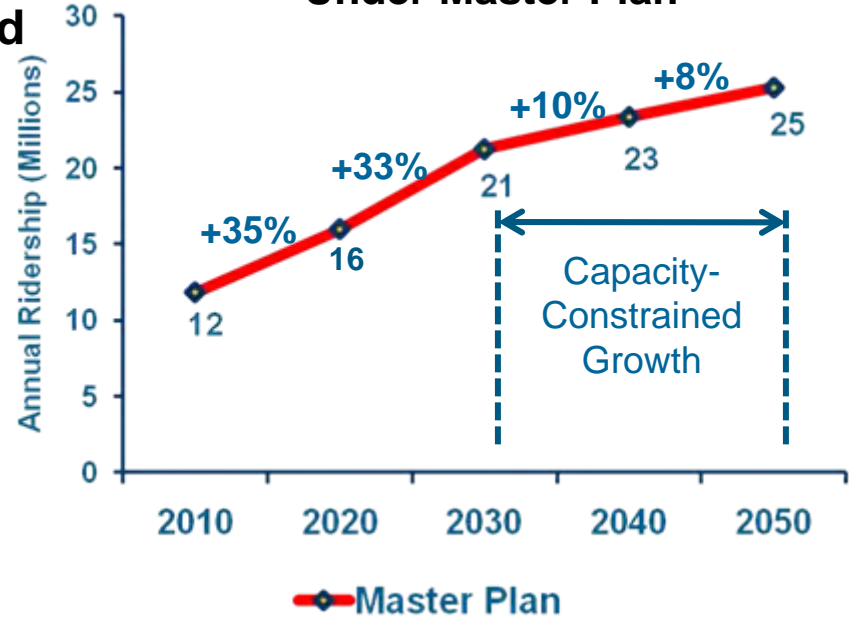


Beyond the Master Plan?

- **By 2030 Under NEC Master Plan:**
 - Corridor capacity again constrained
 - Limited ability to:
 - Increase service
 - Lower travel times
 - Attract new riders

- **NEC Intercity Travel Demand Will Double by 2050**
- **Other NEC Modes Have Limited Growth Potential**
- **Corridor Needs New Capacity to Compete in Worldwide Economy**

Amtrak Ridership Growth Under Master Plan

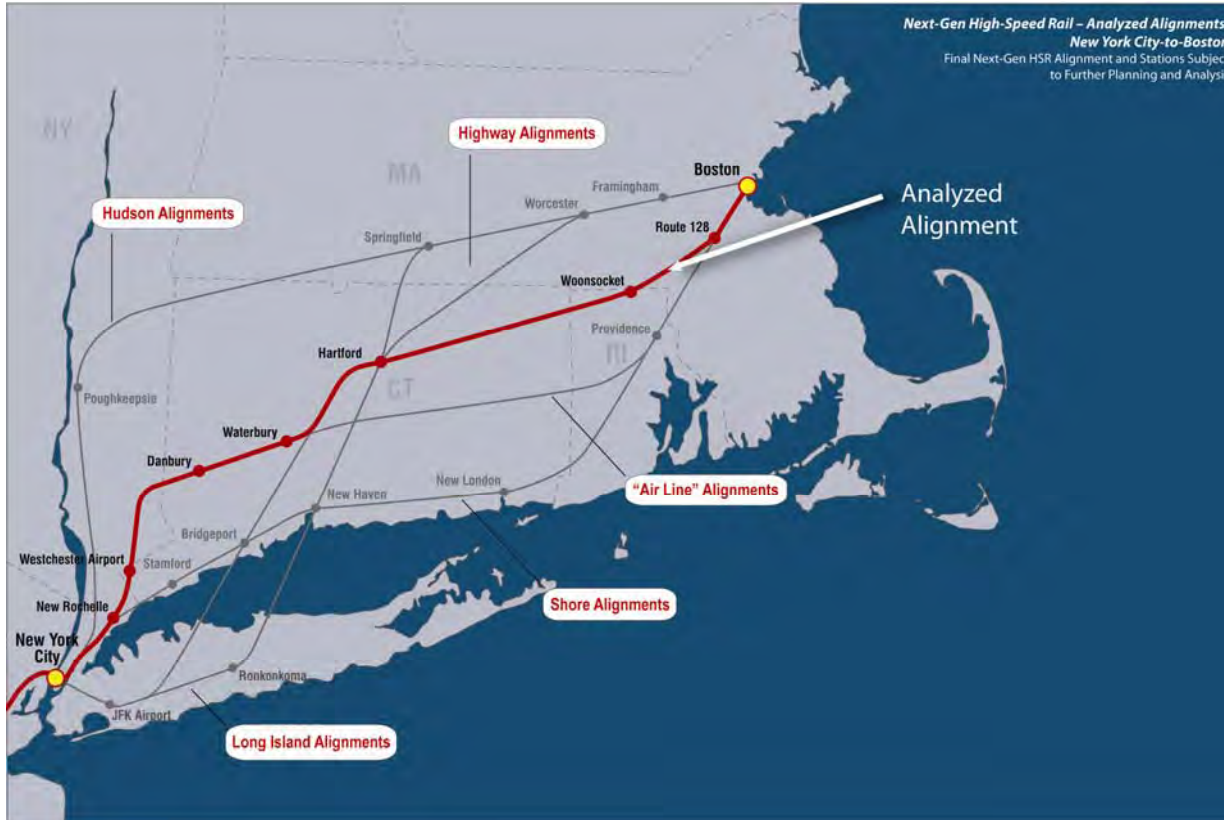


Next-Generation NEC High Speed Rail Premise

- **To meet long-term economic and mobility needs, NE region needs significantly more rail capacity than Master Plan identified**
- **World-Class high-speed network alternative**
 - 220 mph operations
 - Major travel-time reductions
 - Connectivity with existing NEC services / development
- **Next-Generation NEC HSR study undertaken to:**
 - Explore concept (ask the question)
 - Consider initial feasibility
 - Create additional option beyond Master Plan
 - Prepare for up-coming PEIS

Next-Gen Potential Alignments

Boston - New York City



“Analyzed Alignment” used for costing and analysis purposes, subject to further analysis in next phase

Challenges

- Boston to New York alignment poses difficult challenges
- Capacity limits on New Haven Line
- Curvature, capacity and environmental concerns on Shore Line (New Haven to Mass. state line)

Analyzed Alignment

- Diverges north of New Rochelle to serve CT and RI
- Converges with NEC alignment at Rt. 128 station in Mass.

Next-Gen Potential Alignments

New York – Washington, DC



“Analyzed Alignment” used for costing and analysis purposes, subject to further analysis in next phase

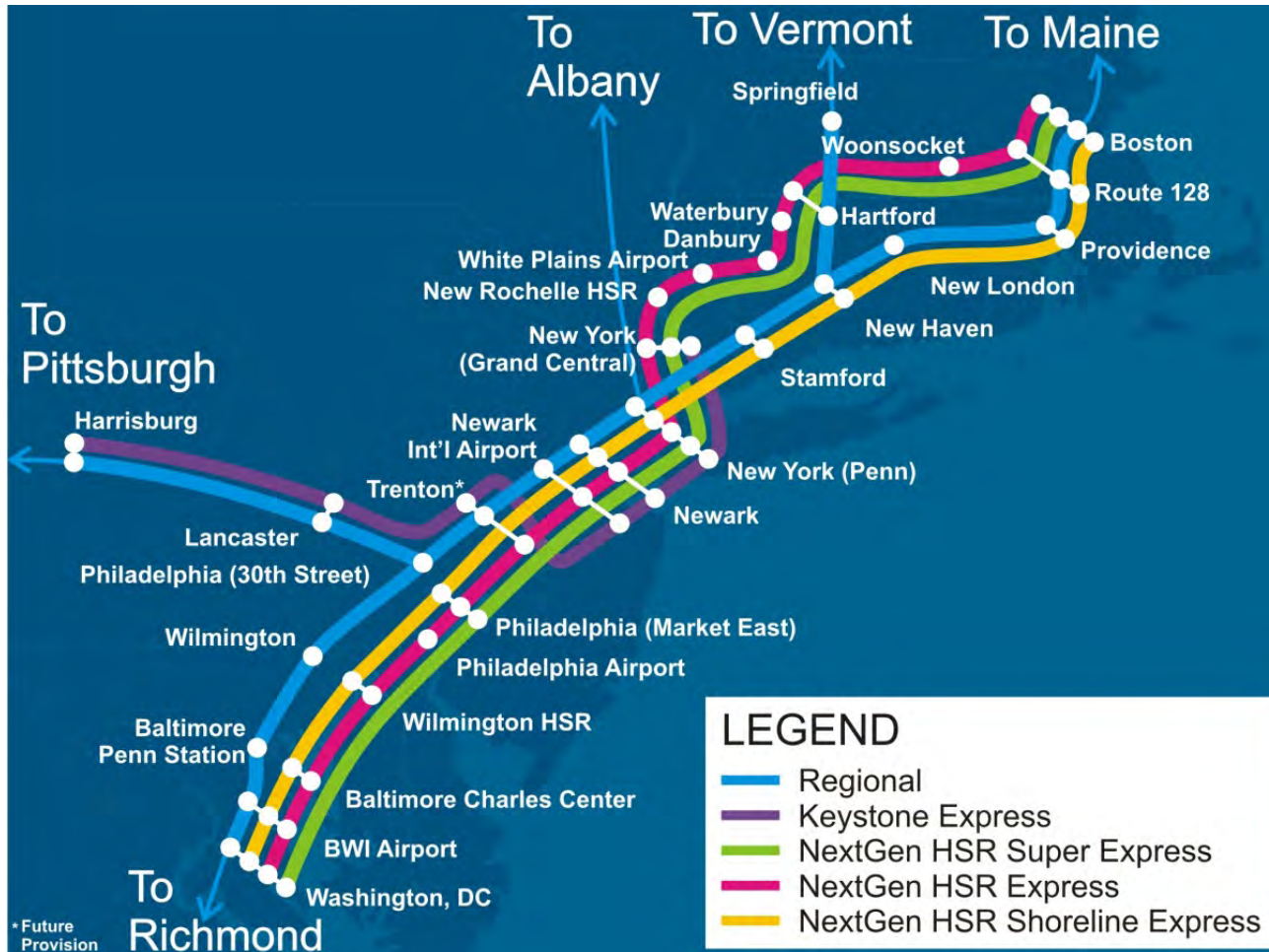
Challenges

- Utilize existing NEC corridor where possible
- Providing service to built-up downtown areas in key cities

Analyzed Alignment

- Substantially parallels NEC
- New stations in Baltimore and Philadelphia more centrally located

Routes and Service Plan



Next-Gen HSR Services

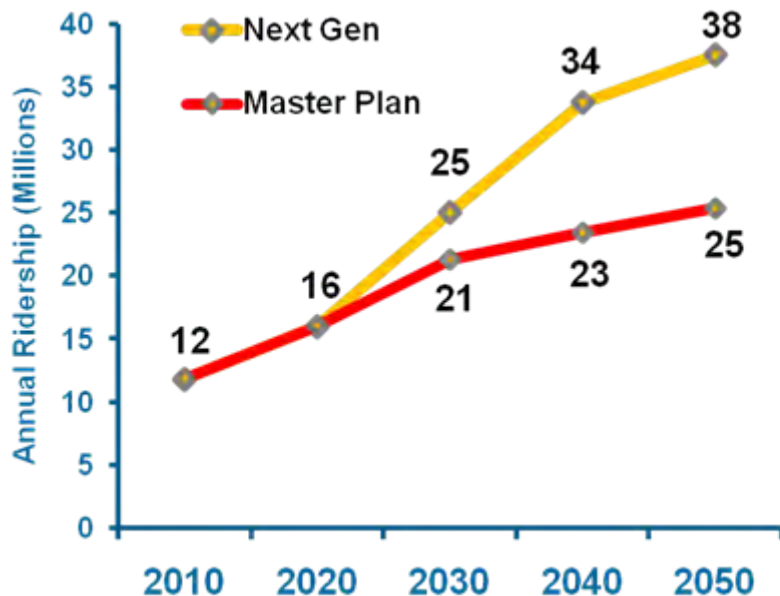
● Super-Express
 ● Express
 ● Shoreline Express
 ● Keystone Express

Ridership Growth

- Large Ridership Growth Over Master Plan (2020 - 2040)

- Master Plan:
 - 16 million to 23 million (+46%)
- Next-Gen HSR Plan:
 - 16 million to **34 million (+111%)**

Next-Gen Compared to Master Plan



Ridership Growth

Major Growth in High-Speed Service's Share of NEC Ridership

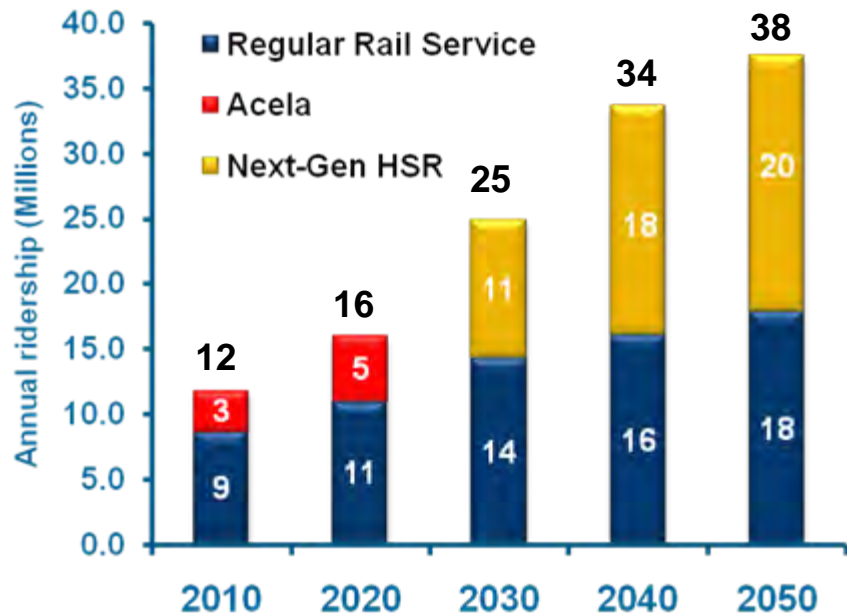
Premium Ridership Growth Comparison (2040)

- **Master Plan (Acela): 6.5 million (28%)**
- **Next-Gen HSR Plan: 18 million (52%)**

Total NEC Ridership & Revenues (2040)

	Master Plan	Next-Gen HSR Plan
Ridership (Millions)	23.4	33.7
Passenger Fares (Billions)	\$1.84	\$3.29

Ridership by Type of Service

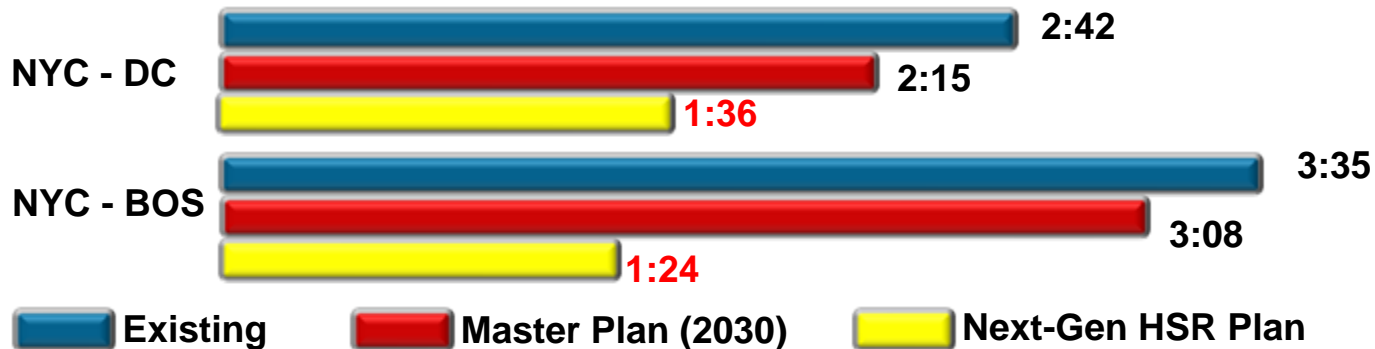


- **Fares set to attract auto and air travelers**
- **Similar to Acela on per-mile basis**
- **Fare growth: more passengers and longer average trips**

Travel Time Reductions

• World-Class High-Speed Network

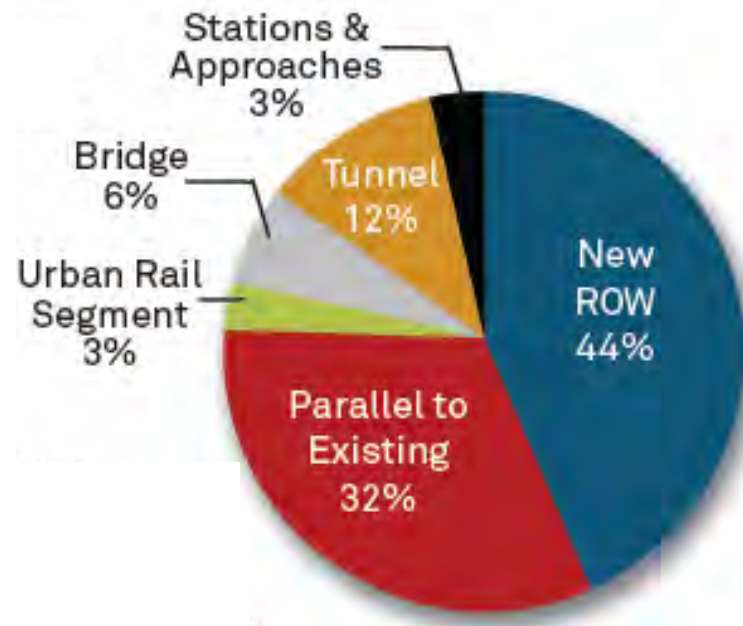
- Substantially Dedicated 2 - track alignment
- 220 - mph (BOS-NYP 148 mph avg., NYP-WAS 137 mph avg.)
- 40% - 60% travel-time reductions in key markets
- Boston – Washington DC: **from 6:30 to 3:20**



Infrastructure and Rolling Stock

Infrastructure

- 2-track main line system
- Minimum 4 tracks at stations (allows passing moves)
- Heavy use of tunnels & structures to meet alignment requirements, minimize impacts



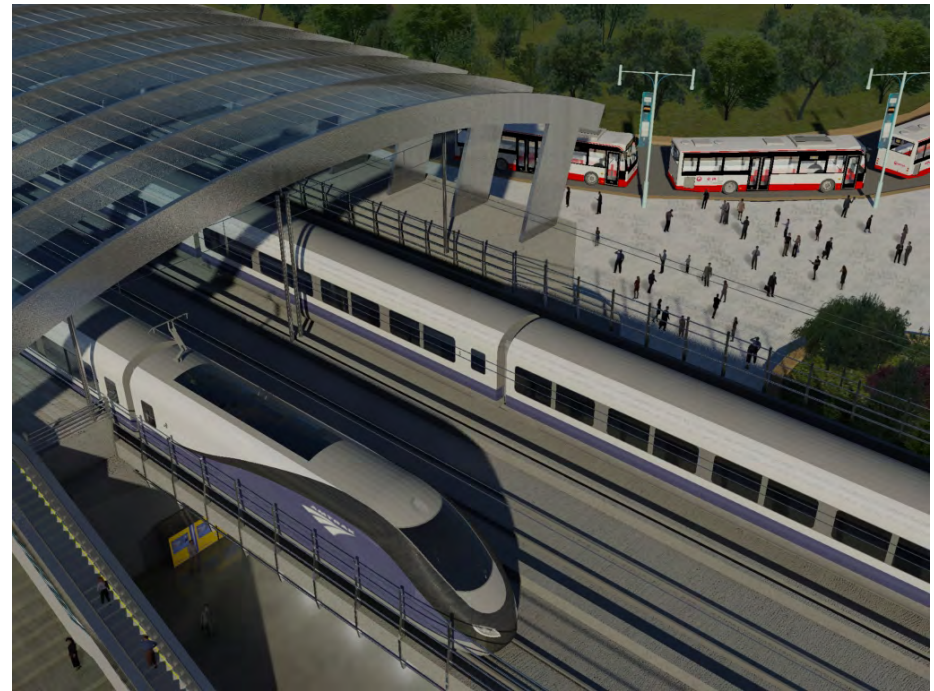
Rolling Stock

- Similar to Acela but 8 v. 6 cars
- 400-passenger capacity
- Speeds up to 220 mph (350 kph)
- EMU-Style distributed power, bi-level consists also possible

Stations and Facilities

Stations

- Modern, spacious designs
- Safety and security features
- Convenient multi-modal connections
- Energy-efficient, green buildings
- Design coordinated with local community context & plans
- Public /private partnerships, commercial and residential development possibilities



Facilities

- Maintenance / crew base facilities in Boston and Washington
- Four infrastructure maintenance facilities
- State-of-the-art design to enhance working conditions and productivity

Capital Investment Costs

- **\$117 Billion (in \$2010)**

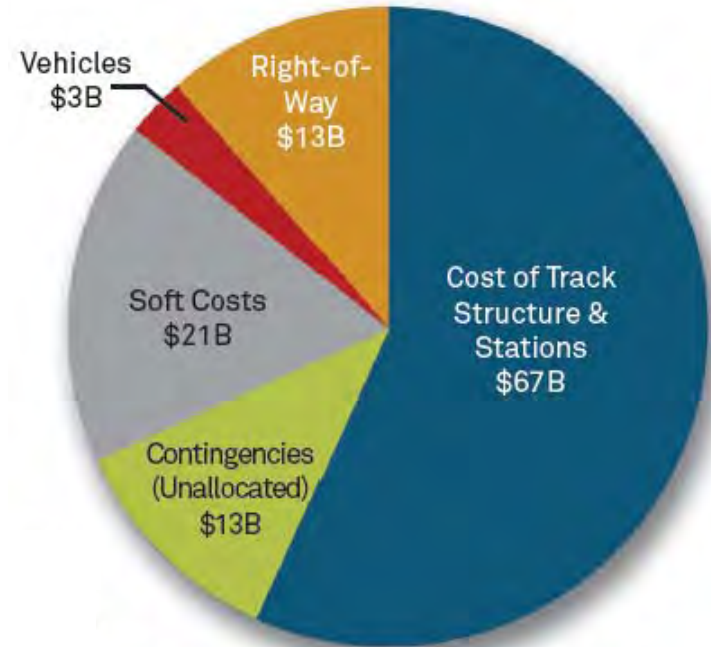
- Equivalent of \$4.7 billion annually over 25 years of construction
- \$275 million/mile for infrastructure, stations, facilities
- 55 train sets @ \$51 million each

- **Integration with Master Plan**

- \$161 billion total after deducts for common elements

- **Phasing of Construction**

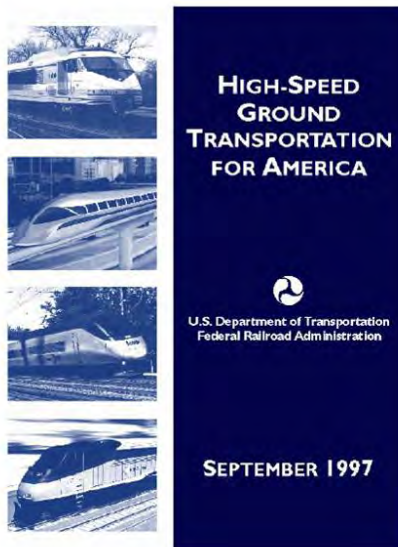
- Four phases over the 2015 to 2040 period
- \$5.4 billion annually for improvements



Projected Capital Construction Costs: \$117 Billion (\$2010)

Return On Investment

- Next-Gen HSR System Benefits (financial, economic, social) Exceed Costs by 2-to-1
- Even at Conservative 7% Discount Rate Reaches 1.1 B/C
- Similar to 1.03 B/C Value for NEC HSR in FRA 1997 Study



Benefit / Cost Ratio of Next-Gen HSR Investment

	Billions of Dollars
Project Cost	\$ 72.8
Credit for Residual Project Value	\$ 20.3
Credit for Avoidable Master Plan Costs	\$ 8.3
<i>Net Project Cost</i>	<i>\$ 44.2</i>
Benefits of Investment	
Travel Time & Costs & Safety	\$ 16.1
Energy and Emissions	\$ 1.3
Economic Productivity Benefits	\$ 23.8
Operating Surplus	\$ 11.0
Highway and Air System Benefits	\$ 21.6
Commuter Systems and Use Benefits	\$ 26.5
<i>Total Benefits of Investment</i>	<i>\$ 100.2</i>
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Benefits / Cost Ratio	2.27

Next-Gen HSR and Amtrak's Corporate Goals

•Safer

- Fast, safe and secure rail travel
- Fewer highway accidents

•Greener

- Reduces energy use, emissions
- Supports dense, smart urban development patterns
- Strengthens existing commuter and transit systems and riders

•Healthier

- Comfortable, convenient travel
- Supports affordable, livable & sustainable communities
- Minimize land area needed to meet future travel demand



Next-Gen HSR and Highway Capacities

- **NEC HSR System Capacity**

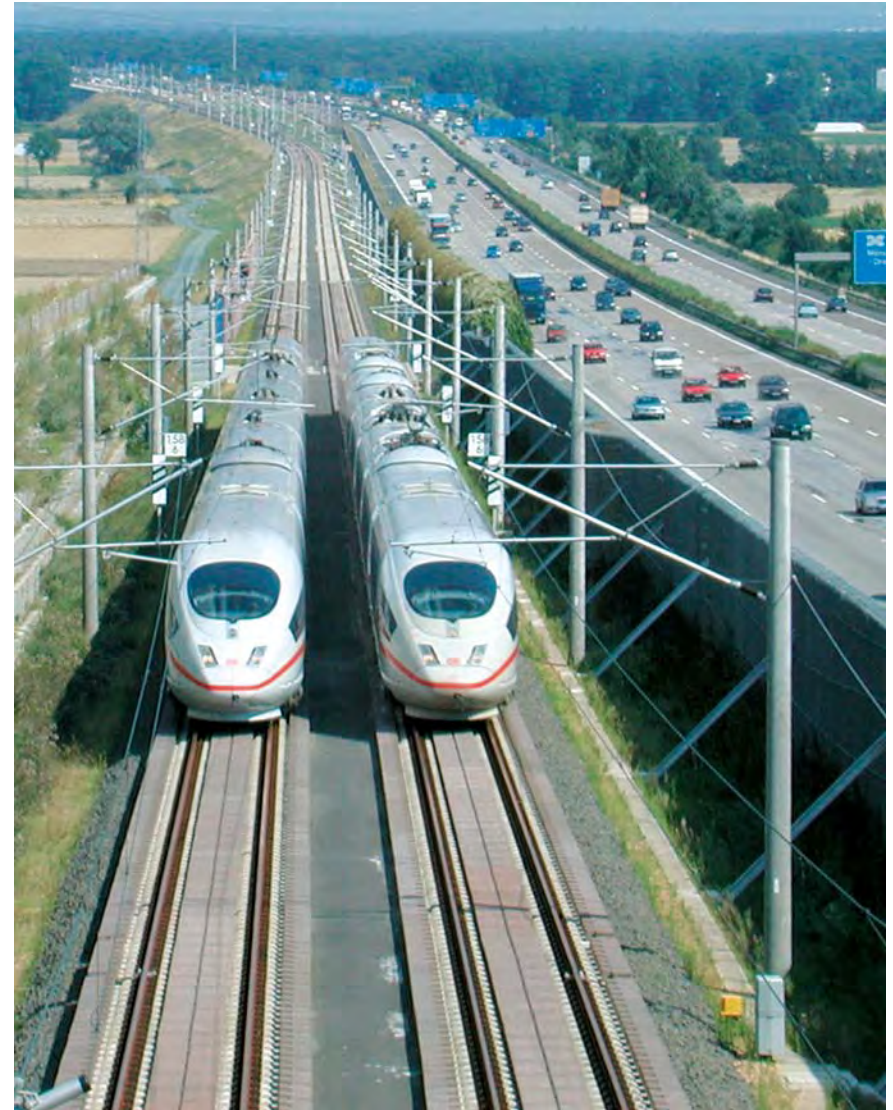
- More than 80 million annual passengers
- Up to 8,000 passengers/hr. in each direction
- 2040 service plan uses less than 25% of system capacity

- **Highway Equivalent**

- 8,000 travelers/hr. = 5,300 cars
- Requires 3 highway lanes in each direction

- **Difference**

- Speed
- Direct downtown-to-downtown connection
- Less energy and emissions



Next-Gen HSR: Energy & Environmental Gains

- **Reduced Highway Travel**
 - 1.4 million miles of highway travel avoided annually
 - 38 million gallons of gas saved annually
- **Reduced Emissions**
 - 97,000 metric ton annual reduction in greenhouse gas
- **Supports Sustainable, Energy Efficient Growth**
 - Downtown station locations
 - Tie-in to regional and local transit systems
 - Frees capacity for commuter rail operations and increased ridership



Moving Forward

- **Coordination with Stakeholders**
 - NEC Commission
 - Commuter and freight railroads
 - Local and regional planning agencies, general public
- **Next Phase – More Detailed Analysis**
 - Detail alignment options, station concepts, and connectivity improvements with other modes and rail services
 - Refine ridership estimates, capital, operating costs and project phasing
- **Define Potential Funding & Project Delivery Mechanisms**
- **Advanced Planning, Engineering and Environmental Studies**
 - Alignment alternatives
 - Environmental analyses and documentation (PEIS)
 - Continued agency and public outreach
- **Design and Construction**

Sustainable, Competitive, Green

Thank you

