High Speed Rail in the Northeast Corridor
The Next Generation

Connecticut Valley Chapter of WTS
4th Annual Transportation Mini-Series
October 14, 2010

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AVP Policy and Development
Amtrak
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

<table>
<thead>
<tr>
<th>Ownership</th>
<th>Route Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amtrak (main line, Springfield, Harrisburg, portion of Albany line)</td>
<td>548</td>
</tr>
<tr>
<td>Massachusetts (main line)</td>
<td>37</td>
</tr>
<tr>
<td>Connecticut (main line)</td>
<td>47</td>
</tr>
<tr>
<td>MTA (main line, 10; Hudson [Albany] line, 63)</td>
<td>73</td>
</tr>
<tr>
<td>CSX (Albany line, 68; Washington-Richmond, 108)</td>
<td>176</td>
</tr>
</tbody>
</table>

- 8 airports
- 12 ports

50 million people (Northeast megaregion)
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

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<tr>
<th>Route</th>
<th>Existing</th>
<th>Master Plan (2030)</th>
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<tr>
<td>NYC - DC</td>
<td>2:15</td>
<td>2:42</td>
</tr>
<tr>
<td>NYC - BOS</td>
<td>3:08</td>
<td>3:35</td>
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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**
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 compatible option beyond Master Plan
  • Prepare for up-coming PEIS
Next-Gen Potential Alignments

**Boston - New York City**

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**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.

“Analyzed Alignment’ used for costing and analysis purposes, subject to further analysis in next phase.
Next-Gen Potential Alignments

New York – Washington, DC

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

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

- Annual Ridership (Millions)

- 2010 2020 2030 2040 2050

- Next Gen (Yellow)
- Master Plan (Red)

- 12 16 21 23 25

- 25 34 38

- 2010 2020 2030 2040 2050
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)

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<tr>
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<th>Master Plan</th>
<th>Next-Gen HSR Plan</th>
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<tr>
<td>Ridership (Millions)</td>
<td>23.4</td>
<td>33.7</td>
</tr>
<tr>
<td>Passenger Fares (Blls)</td>
<td>$1.84</td>
<td>$3.29</td>
</tr>
</tbody>
</table>

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

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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
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

<table>
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<tr>
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<th>Billions of Dollars</th>
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<tr>
<td>Project Cost</td>
<td>$ 72.8</td>
</tr>
<tr>
<td>Credit for Residual Project Value</td>
<td>$ 20.3</td>
</tr>
<tr>
<td>Credit for Avoidable Master Plan Costs</td>
<td>$ 8.3</td>
</tr>
<tr>
<td><strong>Net Project Cost</strong></td>
<td>$ 44.2</td>
</tr>
<tr>
<td><strong>Benefits of Investment</strong></td>
<td></td>
</tr>
<tr>
<td>Travel Time &amp; Costs &amp; Safety</td>
<td>$ 16.1</td>
</tr>
<tr>
<td>Energy and Emissions</td>
<td>$ 1.3</td>
</tr>
<tr>
<td>Economic Productivity Benefits</td>
<td>$ 23.8</td>
</tr>
<tr>
<td>Operating Surplus</td>
<td>$ 11.0</td>
</tr>
<tr>
<td>Highway and Air System Benefits</td>
<td>$ 21.6</td>
</tr>
<tr>
<td>Commuter Systems and Use Benefits</td>
<td>$ 26.5</td>
</tr>
<tr>
<td><strong>Total Benefits of Investment</strong></td>
<td>$ 100.2</td>
</tr>
<tr>
<td><strong>Benefits / Cost Ratio</strong></td>
<td>2.27</td>
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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 – The “PEIS”

• Coordination with Stakeholders
  - NEC Commission
  - Commuter and freight railroads
  - Local and regional planning agencies, general public

• 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 Alternatives
  Master Plan
  Master Plan “Plus”
  Next Generation HSR
Sustainable, Competitive, Green
Thank you