



The Amtrak Vision for the Northeast Corridor

2012 Update Report

July 2012

A Letter from Joe Boardman, Amtrak President and CEO



The aging and congested multimodal transportation network of the Northeast region is facing a crisis. An expected increase in population, estimated to grow by 30% from roughly 50 million residents today to 65 million in 2050, will create additional travel demand and strain an already stressed network that routinely operates near or at capacity along key segments. While significant and necessary efforts are underway to optimize and improve the current transportation system, the future of Northeast region – America’s economic powerhouse and political capital – requires moving beyond mere preservation and rehabilitation to a new vision for expanded transportation capacity and growth.

The Amtrak Northeast Corridor (NEC) is a vital component of today’s regional transportation network and we’ve been doing our part to envision how the NEC can support the region’s growth and continued prosperity. Simply put, we believe that the

NEC must be improved to accommodate more trains, operating at faster speeds with significantly reduced trip-times, and with improved service reliability in order to meet the long-term mobility and economic development needs of the region.

This summary document, *The Amtrak Vision for the Northeast Corridor: 2012 Update Report*, outlines recent actions and initiatives taken by Amtrak and others since the release of two major planning efforts in 2010, *The Northeast Corridor Infrastructure Master Plan* and *A Vision for High-Speed Rail in the Northeast Corridor*. Specifically, the two programs have been integrated into a single coherent service and investment program, called the NEC Capital Investment Program, which would advance critically needed near-term Master Plan projects benefiting the existing NEC while developing a dedicated, next-generation NEC high-speed rail system through incremental “Stair-Step” phasing improvements to our current *Acela Express* high-speed service.

The 2012 Update Report also highlights findings from the recently completed NEC Business & Financial Plan that will help guide Amtrak thinking on how to potentially fund, finance and deliver this bold vision for the NEC. With new ridership and revenue projections affirming the excellent markets and huge opportunities for high-speed rail in the region and new concepts for managing capital expenditures to ensure a manageable and fundable program, the NEC Business & Financial Plan has given Amtrak new tools to turn conceptual plans for NEC improvements into reality.

Of the utmost importance, Amtrak will use information developed for this 2012 Update Report to contribute to, and support a, new federal environmental analysis and planning process currently under way that will help to define the development of the NEC for the next 30 years. Led by the Federal Railroad Administration, the NEC FUTURE - Passenger Rail Corridor Investment Plan is a critical step in the planning process that will determine the overall scope and approach for future rail services for the entire Corridor. Through this process, Amtrak and our federal, state and regional partners are, and must, work together toward an outcome that benefits all Corridor users and the region as whole.

Much of today’s NEC rail infrastructure was built a century ago by visionaries whose work helped move a nation and propel us into greatness. For America to be globally competitive in the coming years, we must be equal to the challenges before us, and be daring to think big, planning for future growth and making the necessary investments in the region to support the mobility needs for generations of Americans yet to come. At Amtrak, we are still in the early stages of this vital work but we are moving forward with dedication, commitment and a collaborative spirit in order to design and implement the NEC improvements that will serve the region and the nation for the century ahead.

Sincerely,



JOSEPH H. BOARDMAN
President and CEO

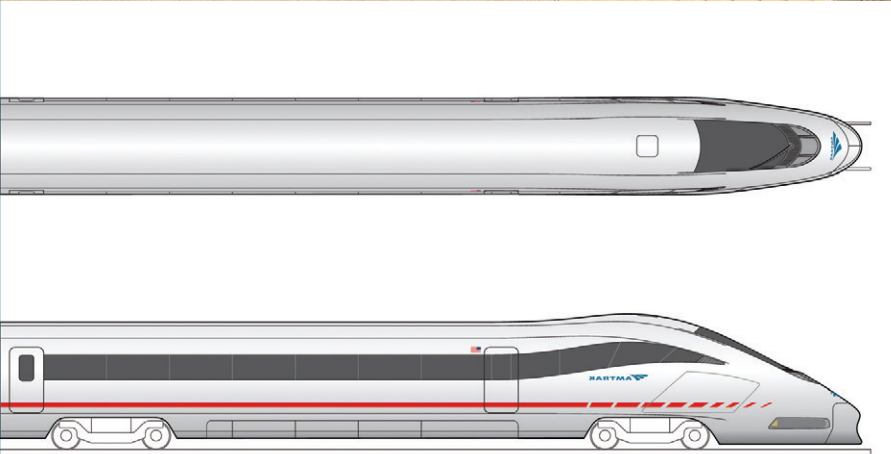


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Executive Summary

Concept Rendering of NextGen HSR Service at Existing Wilmington Station



Source: Amtrak

Background

Since the 2010 release of *The Northeast Corridor Infrastructure Master Plan* (the Master Plan) and *A Vision for High-Speed Rail in the Northeast Corridor* (the 2010 HSR Vision), Amtrak has continued to advance Northeast Corridor (NEC) program planning and stakeholder outreach along the Corridor. At the heart of this continuing effort was the creation of an integrated NEC Capital Investment Program, which brings together the comprehensive work from the Master Plan and 2010 HSR Vision into a single program focused on delivering near-term improvements while advancing long-term capacity expansion and performance upgrades for high-speed rail (HSR) and other services.

Throughout 2011, Amtrak worked together with an external team of advisors to assess the practical ability to progress the integrated NEC Capital Investment Program. The program was then used as the base case scenario in the creation of a NEC Business & Financial Plan (the B&F Plan) to explore the opportunities associated with delivering the vision for the Corridor. Concurrently, other significant initiatives, including the organization of the NEC Infrastructure & Operations Advisory Commission (the NEC Commission) and the initiation of the Federal Railroad Administration's (FRA) NEC FUTURE – Passenger Rail Corridor Investment Plan (PRCIP), have helped to further advance NEC planning and development initiatives.

This update report outlines these recent developments in NEC planning and highlights key findings related to how Amtrak can translate various strategies and concepts for the growth and improvement of the NEC into reality.

NEC Capital Investment Program

The NEC Capital Investment Program represents the summation and refinement of proceeding Amtrak long-term planning efforts for the NEC. Starting with the Master Plan and 2010 HSR Vision as the base case, the program also reflects changes brought about through stakeholder discussions regarding the proposed HSR route, establishment of new regional NEC

planning efforts, changes in commuter improvement plans set by states or transit authorities and Amtrak efforts to advance near-term improvements and increased *Acela Express* high-speed service. The revised capital cost for the total proposed NEC Capital Investment Program, including Master Plan, Gateway Program and 2010 HSR Vision elements, is estimated at \$151 billion (\$2011) between 2012 and 2040.

Stakeholder Feedback

After conducting outreach sessions along the Corridor, Amtrak received several suggestions for revision of the conceptual alignment presented in the 2010 HSR Vision. While not all such revisions could be included in the integrated program at this stage due to schedule and resource constraints, Amtrak did revise the conceptual alignment between New York, NY and Boston, MA to incorporate major elements of this feedback.

The concept of an additional station stop on the east side of Manhattan, NY, was eliminated from the Program, as there was no firm consensus that a second New York station was necessary in the initial period of full operation for HSR services and the additional station would add significant costs to the program, while increasing overall trip times and having negligible impacts on ridership and revenues.

North of New York, NY, the proposed station at White Plains Airport was removed pending future discussions with local and state officials regarding the feasibility of alternative possible locations for an additional station stop serving the White Plains, NY vicinity. In addition, the proposed route through Rhode Island was revised to pass through Providence rather than Woonsocket in order to serve the state's major population and business center. While this alteration increased the projected capital costs, it had a positive impact on ridership and revenue and strengthened connectivity between services on the new alignment and existing NEC.

Phased Implementation Strategy

Since the release of the Master Plan and 2010 HSR Vision documents, Amtrak has begun to more clearly define the steps needed to advance both planning initiatives. With a goal of developing a phasing strategy that demonstrated how such a large and complex system could be delivered in useful increments, Amtrak established a "Stair-Step" approach for NEC improvements.

The Stair-Step phasing strategy consists of two progressive and overlapping programs: the NEC Upgrade Program (NEC-UP) from 2012-2025 and the Next-Generation High-Speed Rail Program (NextGen HSR) from 2025-2040. These programs enable the strategic integration of near-term improvements under NEC-UP with the long-term development of a dedicated two-track NextGen HSR network. While the pace of the Stair-Step process will be shaped by the results of further studies by Amtrak, its Corridor partners and the FRA, phased NEC development is critical to creating new capacity while improving current services.

Gateway Program

When the Master Plan and 2010 HSR Vision documents were compiled, New Jersey's Access to the Regions Core (ARC) project to build new commuter rail tunnels under the Hudson River into Manhattan, NY and create a new station to serve New Jersey Transit (NJT) services, was active and planned to be constructed in 2018. However, in November 2010, the ARC project was cancelled by the State of New Jersey, necessitating that Amtrak accelerate the development of its Gateway Program concept.

The integrated NEC Capital Investment Program now incorporates a comprehensive set of improvements from Newark, NJ to Manhattan, NY including new tunnels under the Hudson River and station improvements in New York, collectively called the Gateway Program. This program will permit the existing NEC to be brought up to a state of good repair (SOGR) while expanding capacity for additional NJT and Amtrak services. The initial estimated cost for the Gateway Program is approximately \$14.7 billion (\$2011).

Recent Developments

NEC Infrastructure & Operations Advisory Commission

The NEC Commission was established in September 2010 pursuant to Section 212 of the Passenger Rail Investment and Improvement Act of 2008 (PRIIA), with membership from all NEC states, the FRA, Amtrak, NEC commuter railroads and freight railroads that operate on the NEC. The NEC Commission's mission is to promote mutual cooperation and planning pertaining to the rail operations and related activities of the NEC, including the development of goals and recommendations for NEC service growth and improvement. In addition, one of the NEC Commission's key roles is to develop a common methodology for allocating costs for commuter use of NEC infrastructure and services.

NEC FUTURE – Passenger Rail Corridor Investment Program

In 2012, at the request of the NEC states, the FRA began developing a NEC investment program, including a service development plan (SDP) and a programmatic environmental impact statement (PEIS), under the National Environmental Policy Act (NEPA), called the NEC FUTURE – Passenger Rail Corridor Investment Plan (PRCIP). With the last PEIS having been completed for the NEC in 1978, the PRCIP will constitute a new look at the future of rail services and supporting improvements along the Corridor and serve as a formal decisional process to align Corridor users, stakeholders, and the public around what the NEC can and should become over the decades ahead. Amtrak will continue to offer its support to the FRA's PRCIP process, drawing upon the NEC Capital Investment Program and B&F Plan initiatives.

NEC Business & Financial Plan

Beginning in 2011, Amtrak undertook the development of a NEC B&F Plan to explore strategies for funding and delivering the NEC Capital Investment Program:

- **Phasing and Integration** – Phasing and integration are vital to the feasibility and success of the NEC Capital Investment Program. Under the base case scenario of the integrated program, capital outlays would peak at roughly \$11 billion per annum and outstrip available funding, management and resources, including labor and materials, as both improvements to the existing Corridor and development of NextGen HSR network are progressed simultaneously. Consequently, the B&F Plan finds that program elements must be phased in a manner that lowers annual capital expenditures and lengthens the overall schedule for the NEC Capital Investment Program full-build to ensure that the program can be effectively and efficiently delivered. The B&F Plan also illustrates how lower capital expenditures under a modified base case could be achieved, bringing down the peaks of annual expenditure to \$3-4 billion per annum on average during peak expenditure years and the rate of capital spending to feasible levels.
- **Travel Demand and Financing Models** – Through the development of the B&F Plan, new ridership, revenue and financial models were constructed for Amtrak to assess future program development, including service and infrastructure projections. Under the analysis of these new models, ridership and revenue derived from the NEC Capital Investment Program were estimated to be over 25% more than predicted in the 2010 HSR Vision by its full build-out in 2040. While the B&F Plan noted that completion of the full program is not likely to be realized by this date, it highlights the market value and associated benefits of achieving the planned levels of service and related improvements as soon as practical. The B&F Plan also highlights that ridership levels could be changed by managed adjustments in fare levels and astute use of the yield management system, which could create greater financial returns.
- **Federal Support** – The B&F Plan highlights opportunities to generate additional revenue from expanded services and new fare policies, garner state and local financial support, and leverage private sector involvement to help fund the program. It also finds that the development of new federal funding mechanisms can provide significant, dedicated, long-term and flexible funding for NEC improvements, which are essential to the feasibility of the program and will serve as the basis for funding support of other stakeholders and the private sector.

- **State and Local Involvement** – State and local involvement is critical to defining future iterations of the NEC Capital Investment Program and enabling infrastructure and service improvements through direct and indirect financial and other support.
- **Private Sector Support** – Early private sector involvement, by utilizing design-build models and other alternative procurement approaches, can help reduce potential risks of program delivery and improve funding streams. However, significant private sector capital to directly finance major capital elements of the NEC Capital Investment Program is unlikely until after the early phases of the program are delivered and operational. The B&F Plan also mentions that as the program progresses it is possible to monetize funds from operating revenues to support early NEC capital projects.
- **User Access Fees** – The B&F Plan highlights the importance of developing new NEC user access fees that are set at appropriate levels to enable improvement projects to be funded over time by the very users that benefit from those associated improvements.
- **Organizational Structure and Resources** – The Amtrak *Strategic Plan FY2011–2015* introduced new organizational business lines, and Amtrak will need to progress these and other organizational changes to support further program definition, refinement and subsequent program implementation as well as operations. The B&F Plan finds that the potential use of a project management team and industry advisors from the international and national rail community with experience on larger infrastructure projects may be advisable.
- **Near Term Goals and Gaining Momentum** – Program momentum will be heightened by the completion of early, successful projects. The B&F Plan recommends that Amtrak immediately develop and focus on “pathway” projects, such as the Gateway Program, in order to demonstrate efficient program management and project delivery, as well as gain support from stakeholders and the public for future elements of the program.

Next Steps

The Amtrak Vision for the Northeast Corridor: 2012 Update Report is the next step in the development of the NEC Capital Investment Program to improve the NEC for all Corridor users in order to sustainably support the population and economic growth facing the Northeast region over the next 30 years. It is important to note that the program is in its early stages of development and that considerable planning work must still be undertaken by Amtrak, NEC users, and other stakeholders as needs, interests, and opportunities of all those impacted by the future Corridor evolve.

However, at this early stage of development, several conclusions are possible about the general approach toward the improvement of the Corridor and the NEC Capital Investment Program developed by Amtrak, including:

- The Stair-Step phased implementation strategy for NEC high-speed improvements represents a sound strategy of dividing large and complex capital and service improvements into manageable and fundable phases or segments. A similar phasing approach must be developed for other elements of the NEC Capital Investment Program, including the development of the proposed NEC NextGen HSR network, so that capital investments are better-matched with funding availability, revenue generation, and project management capacity; and
- The NEC Capital Investment Program creates a viable and effective system to help meet the growing transportation needs for the Northeast region. While it is likely infeasible for the full program to be realized by 2040, those elements of the program that have the biggest impacts on improving reliability, increased capacity and reduced trip-time should be strategically advanced as quickly as funding and program management resources will allow, to strengthen revenue and financial performance, thereby creating additional available capital for further program improvements.

1.0 Background

1.1. What is the Purpose of this Update Report?

In May 2010 Amtrak released *The Northeast Corridor Infrastructure Master Plan* (the Master Plan). The Master Plan resulted from a precedent-setting regional collaboration among 12 Northeast states and the District of Columbia, Amtrak, the Federal Railroad Administration (FRA), 8 commuter and 3 freight railroads.

While the Master Plan provided for substantial and essential improvements of the NEC, it also led Amtrak to a realization that capacity needed for the long-term future of the Northeast Corridor (NEC) could not be met by improvements to the existing NEC alone. As a result, in September 2010 Amtrak released *A Vision for High-Speed Rail in the Northeast Corridor* (the 2010 HSR Vision), which presented the bold concept of a new 427-mile dedicated two-track high-speed rail (HSR) alignment from Washington, D.C. to Boston, MA.

The present document summarizes the status of these planning initiatives in 2012. It includes changes brought about by the integration of these two programs and other changes instigated by external factors, such as the NEC FUTURE – Passenger Rail Corridor Investment Program (PRCIP) led by the FRA and the work undertaken to produce the Amtrak NEC Business & Financial Plan (the B&F Plan), completed in June 2012. As will be seen, there are many more years of planning ahead, but the *The Amtrak Vision for the Northeast Corridor: 2012 Update Report* highlights key developments and recent findings that will help shape future efforts to improve the NEC.

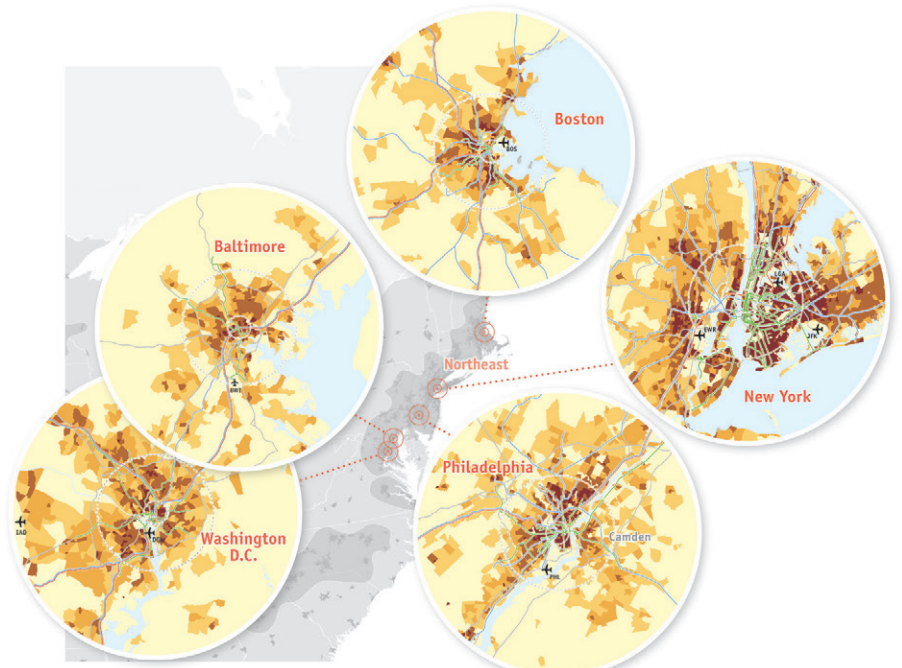
1.2. What is the Northeast (Mega) Region?

Over the last 50 years, the shifting economic landscape of the U.S. has resulted in significant growth of its core cities and surrounding suburban rings, which form the current major metropolitan areas of the nation. As these major metropolitan areas continue to expand, their boundaries with one another have begun to blur and create a new scale of geography now known as the “megaregion”.

Megaregions are defined by interlocking economic systems, shared natural resources and ecosystems, and common transportation systems that link these metropolitan population centers together.

America 2050, an infrastructure research and policy organization, has identified eleven such megaregions in the U.S., ranging from 200 to 600 miles in length, where roughly 75% of the nation’s population lives, and an even greater proportion of its Gross Domestic Product (GDP) is produced. Of these, the Northeast megaregion, which is organized around five major metropolitan regions – Boston, New York, Philadelphia, Baltimore and Washington, D.C. – is the densest and most economically productive (Figure 1). Stretching from Maine to Virginia, the Northeast megaregion only represents about 2% of the nation’s land mass, but is America’s economic powerhouse with roughly

Figure 1: Rail Transit Networks and Population Density of the Northeast Megaregion



Source: High Speed Rail in America, America 2050

50 million residents, a \$2.6 trillion economy representing 20% of US GDP, and a significant share of the nation’s knowledge-based innovation economies. Its per capita GDP, 19% above the national average in 1980, rose to 27% above the national average by 2009, and the region’s population density is roughly 12 times the national average. This compliment of high density and high productivity is no coincidence. High-value activities concentrated at major nodes – corporate headquarters, global finance and business services, biomedical facilities, world-class universities, media centers and cultural institutions – need close proximity to diverse labor and customer markets and the opportunity for vital face-to-face interactions.

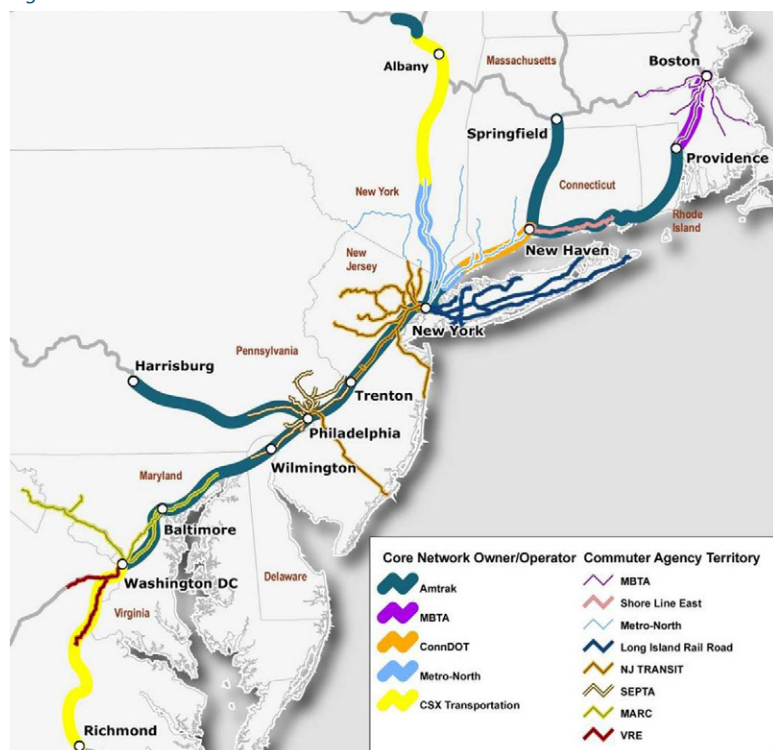
Woods and Poole’s 2011 *Complete Economic and Demographic Data Source* projects roughly 15 million additional residents will live in the Northeast by 2050, from approximately 50 million to 65 million residents – a 30% increase. Economic growth projections for the Northeast expect a 1.8% annual growth rate over the next 40 years. Baseline projections by Moody’s Economy.com from 2010 indicate that the four largest metropolitan regions – the “hub cities” of Boston, New York, Philadelphia and Washington, D.C. – presently account for over 80% of the megaregion’s employment and population, and they would account for roughly the same amount in the future. The Washington, D.C. metropolitan area is forecasted to have the highest growth rate of these four hub cities. While Washington, D.C. represents approximately 11% and 12% of the Northeast’s 2010 population and employment, respectively, it is estimated to generate 32% and 22% of the projected Northeast population and employment growth by 2040.

The Northeast is served by a mature, multimodal transportation network with a significant rail component befitting a region of such size and density. This entire network is often operating at or near capacity and routinely hampering journeys with congestion and delays. While significant efforts to optimize and improve this transportation network are under way, most of these efforts are focused on addressing rehabilitation needs and reducing existing congestion. Without a change in focus to address future capacity needs, the existing transportation network will likely present a significant constraint to future growth and economic development in the region.

1.3. What is the Northeast Corridor (NEC)?

The NEC is defined as the main rail artery between major cities in the Northeast region, connecting Washington, D.C. to Boston, MA, with branches to Harrisburg, PA, Springfield, MA, Albany, NY and Richmond, VA. The growing trend towards urbanization and the economic linkage between the various centers of the Northeast megaregion have contributed to a growing demand for intercity travel within the Corridor. Compounded by the worsening congestion on regional highways and airports, demand for rail services in the NEC is strong. As evidence, Amtrak NEC rail ridership has grown on average by approximately 5% per year for the last 5 years, and there has been similar strong growth in much of the commuter rail ridership serving the megaregion’s major cities along the NEC and its feeder lines (Figure 2).

Figure 2: NEC and Feeder Lines



Source: The Master Plan

1.4. What is the Current State of the Northeast Transportation Network?

Today, the intercity transportation network in the Northeast is approaching the limits of its capacity. Ever increasing congestion has led to highway and airport delays that are among the worst in the nation. Many major aviation, highway and rail facilities are at the end of their useful life, and beyond a state of good repair (SOGR). Urban segments of the highway and NEC rail network face unsustainable levels of demand.

The expanded use of the NEC rail network is one of many possible options to provide enhanced mobility to the Northeast. The present document continues Amtrak efforts to refine a vision for such an expanded NEC network and consider the feasibility, benefits and challenges associated with using the region's principle passenger railroad to help support the continued growth and economic vitality of the Northeast and the Nation.

Auto Travel

Increasing congestion and lack of capacity on interstate highways and other roadways threaten the continued high economic productivity in the Northeast. Urban road congestion conditions in the Northeast, already among the worst in the nation, have significantly deteriorated over the last two decades. In the five major metropolitan regions of Boston, New York, Philadelphia, Baltimore and Washington, D.C., total hours of congestion increased by 24% between 1990 and 2007, with the average commuter experiencing a 60% rise in traffic delays over that period. Aside from the impact on the quality of life for commuters, these delays result in millions of gallons of fuel consumed annually and negatively impacts regional air quality.

Due to the largely unbroken stretch of urbanized land along the region, this metro-area congestion impacts both local commuters and intercity travelers. Analyses of key north-south highways along the corridor by the Federal Highway Administration indicate that already high congestion levels measured in 2002 (Figure 3) will increase to the point of corridor gridlock by 2035 (Figure 4), creating serious local/regional mobility problems in the corridor's urban areas and similar challenges for intercity highway travel. This limited highway capacity must be available for a host of sometimes conflicting uses, including inter-state and intra-state travel; daily commuting; local freight delivery; and the provision of emergency services. The optimized use of this capacity is essential. With increasing local use of limited highway capacity, available capacity to meet intercity travel demand may conflict with the needs for local urban mobility and inter-connectivity.

Annual expenditures in the \$25 billion range will be needed to make any headway in dealing with this road congestion, according to a recently released report by the I-95 Corridor Coalition, *A 2040 Vision for the I-95 Coalition Region*, and any further expansion of highways in urban areas faces substantial challenges. While additional investment is undoubtedly necessary in the region's highway network, there is a growing understanding that more highway lanes provide limited long-term congestion relief and are thus not a sustainable transportation solution in terms of creating long-term capacity and promoting greater energy efficiency, environmental protection, and economic competitiveness.

Figure 3: Peak Period Congestion on National Highway System (2002)

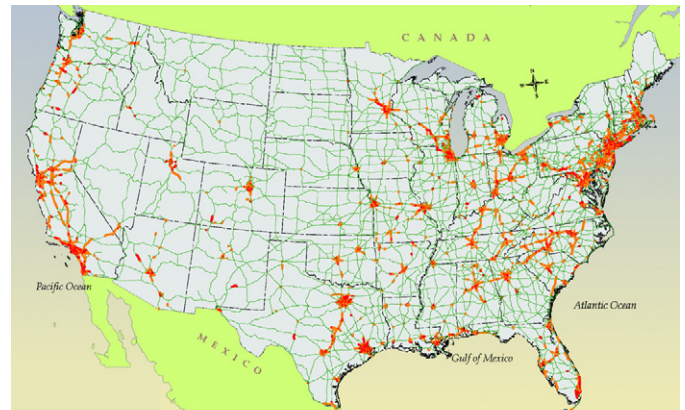
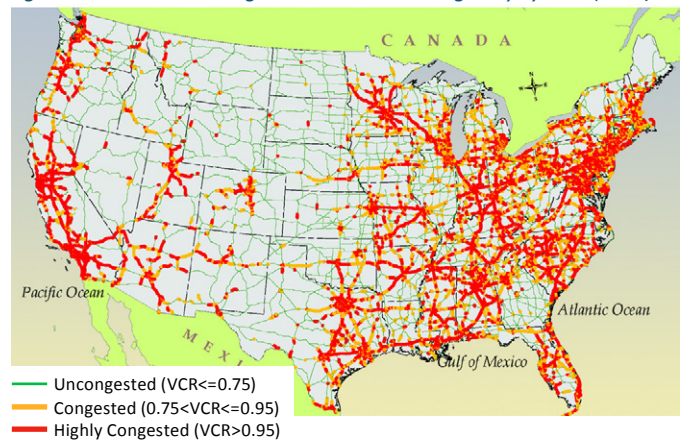


Figure 4: Peak Period Congestion on National Highway System (2035)

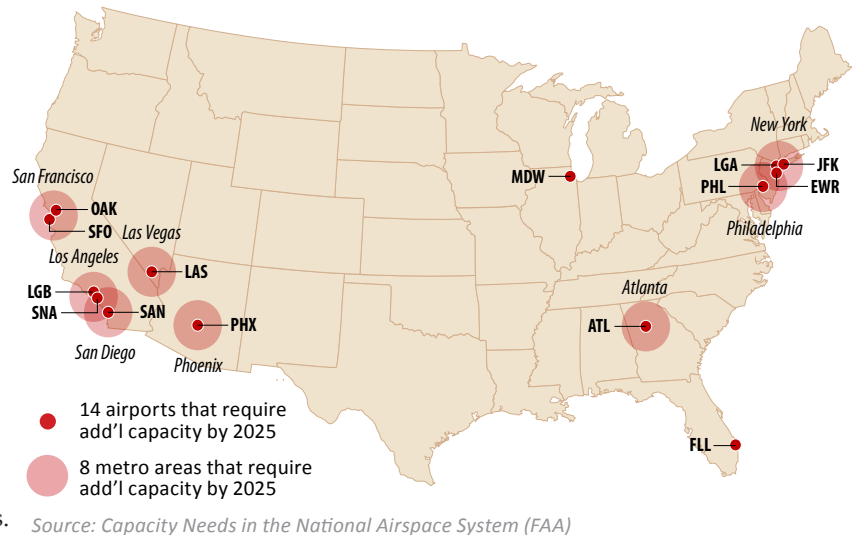


Source: Freight Facts and Figures (FHA)

Air Travel

Northeast airports are among the nation's most congested, leading to extensive delays with both regional and national consequences. The FAA estimates 4 Northeast airports and 2 metro areas will require additional air capacity by 2025, even with planned improvements (Figure 5). Although Amtrak handles a growing majority of the total air/rail travelers in the New York to Washington, D.C. and New York-to-Boston markets, intra-regional air travel in the Northeast is still prevalent. Approximately one-third of departing flights from the three New York metropolitan airports have destinations within 500 miles, including 200 daily flights heading for destinations along the NEC; and every major airport in the NEC contains at least one other Northeast city among their top 10 destinations.

Figure 5: U.S. Airports and Metro Areas that Require Additional Capacity by 2025



While the efficiency and appeal of air travel is greater for longer-distance travel (> 500 miles), a significant portion of the region's airspace capacity is now dedicated to shorter, intra-regional trips. Growing demand for longer-distance domestic and international air travel puts further pressure on these constrained aviation facilities, with limited ability to create more service "slots" in congested air spaces. A shift to other modes – especially frequent and reliable intercity rail – for shorter (100 - 500-mile) intra-corridor trips could be an essential tool to freeing up scarce air capacity for transnational and international flights.

Rail Travel

The 457-mile NEC mainline, running from Washington, D.C. to Boston, MA and serving Amtrak, commuter and freight trains, traverses eight states and the District of Columbia. Most of this rail line is owned by Amtrak, with Metro-North, ConnDOT and the MBTA owning parts of the northern section. The Northeast's five major hub metropolitan regions – Boston, New York, Philadelphia, Baltimore and Washington, D.C. – rely on Amtrak service for a significant and growing share of business and leisure travelers traveling both to and within the region. Amtrak NEC infrastructure also supports a large and an expanding network of commuter rail services that also support the Corridor's hub and intermediate cities.

The NEC is among the nation's most congested passenger rail corridors, and one of the highest volume, shared use rail corridors in the world, carrying over 2,000 daily trains operated by Amtrak and 8 commuter rail authorities. The NEC serves 13 million annual Amtrak passengers as well as over 200 million annual commuter rail passengers and approximately 70 freight trains per day. Service reliability, on-time performance, and options for expansion have been affected by a lack of capacity along many stretches, especially where intercity operations overlap with regional commuter traffic. In the New York vicinity, some areas are operating at 100% capacity, resulting in significant delays from even minor operating disturbances.

The NEC consists of a mix of aging infrastructure, much of it built 80-150 years ago, that will require extensive repair for safe and efficient operations at current traffic levels. Significant investments in the existing NEC are required to bring it to a SOGR and eliminate key bottlenecks that limit service frequency and negatively affect reliability and performance. One key to improving the NEC is investment in infrastructure that provides greater operational separation of high-speed, intercity, conventional, commuter, and freight services. The mix of these services and their different operating requirements on the NEC creates scheduling conflicts and a sub-optimal use of capacity. Such rail investments would be only one element of an integrated and balanced multimodal approach to provide meaningful interstate, regional and local travel capacity expansion that can complement other modal investments and support sustainable development of the region.

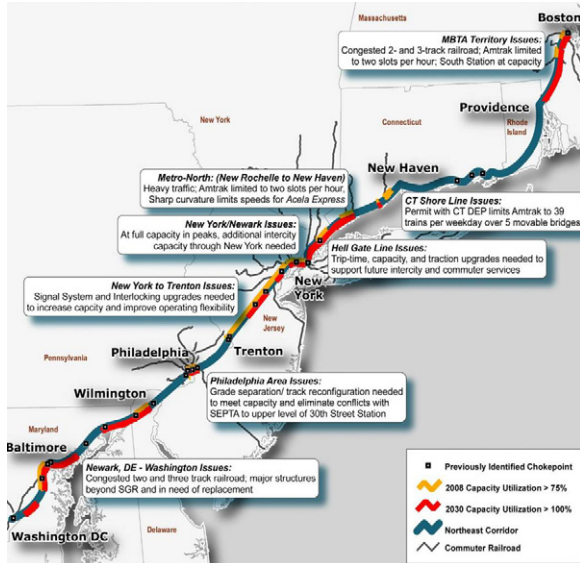
2.0 NEC Planning Initiatives

In order to meet the capacity demands brought about by the growing population along the NEC and the increasing popularity of rail as a mode of transportation, Amtrak has undertaken a number of planning initiatives to explore future NEC improvements, which are summarized below.

2.1. Northeast Corridor Infrastructure Master Plan

The Master Plan released in May 2010 resulted from a precedent-setting regional collaboration among 12 Northeast states and the District of Columbia, Amtrak, the FRA, 8 commuter and 3 freight railroads. It called for \$52 billion (\$2010) in investments to cover needed system repair and upgrades and some capacity enhancements to help handle the projected 60% increase in today’s intercity and commuter trips in the Corridor by 2030 (Figure 6).

Figure 6: NEC Capacity Constraints



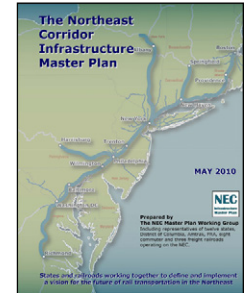
Source: The Master Plan

As part of the report, existing rail services were examined throughout the Corridor. Regional goals, future service plans and capital programs for the NEC were proposed as part of this multi-state planning effort.

The Master Plan identified an initial baseline of infrastructure investment needed in the near-term to maintain the current NEC system in a SOGR, integrate intercity, commuter and freight service plans, and move the NEC forward to provide expanded service, reliability, frequency, and trip-time improvements.

The Master Plan represents foundational corridor-wide investments that are necessary if an expanded NEC is to support future regional economic growth. It also helped begin the discussion with state and federal partners, the NEC Commission, commuter and freight agencies, and other stakeholders on how the NEC should be improved and developed.

The 2010 Master Plan



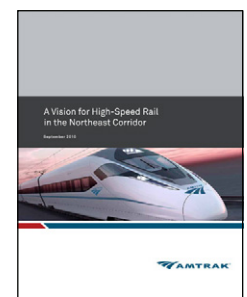
While the Master Plan includes capacity for near to mid-term growth, beyond 2030 all users will face capacity limitations that constrain additional service, especially *Acela Express* train-sets which utilize more track capacity due to their higher speeds.

2.2. Northeast Corridor Next-Generation High-Speed Rail

In September, 2010 Amtrak released *A Vision for High-Speed Rail in the Northeast Corridor* (the 2010 HSR Vision) which presented the bold concept of a new 427-mile dedicated two-track system from Washington, D.C. to Boston, MA that would bring next-generation high-speed rail (NextGen HSR) to the NEC. The 2010 HSR Vision was developed to provide the type of substantial improvements in intercity travel capacity and performance that would allow passenger rail to play a significantly expanded role in the movement of intercity travelers in the Northeast.

In an increasingly integrated and competitive international environment, HSR delivers enhanced regional mobility, while supporting economic growth, domestic job creation, improved environmental quality and sustainable regional and local development. The message from the 2010 HSR Vision was clear – expanded and enhanced HSR service in the Northeast can help provide the mobility needed to serve a growing population and support economic growth. The report also illustrated that the concept was technically feasible and worth further review.

The 2010 HSR Vision

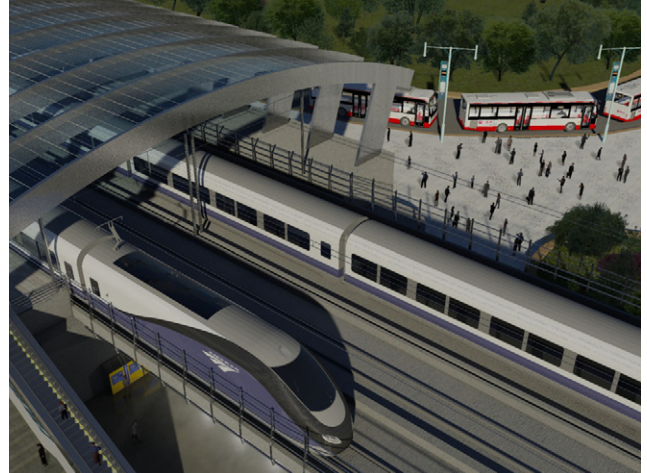


Goals and Objectives

The initial goal for the conceptual alignment and services presented in the 2010 HSR Vision was to provide greater capacity to all users on the NEC, increased reliability and the type of world-class high-performance operations already found, or being developed, in major corridors internationally. The objectives to meet this goal include:

- *Enhanced network capacity with efficient and reliable operations, enabled by a dedicated next generation high-speed system including additional infrastructure, facilities (Figure 7) and rolling stock;*
- *Greater service levels with increased reliability, especially among key city pairs, to further enhance the competitiveness and convenience of this streamlined mode; and*
- *Significant reductions in travel times, made possible by higher-capacity infrastructure and 220 mph (354 kph) - capable trains.*

Figure 7: Concept Renderings of Possible NextGen HSR Station



Source: The 2010 HSR Vision

Envisioned Network and Services

The conceptual NextGen HSR network developed for analyses in the 2010 HSR Vision report was a dedicated two-track alignment extending from Washington, D.C. to Boston, MA. The network included 5 Hub Stations, 4 City Stations and 10 regional/intermodal stations, with connections and integrated operations with the existing NEC route.

The proposed service plan for this network in the 2010 HSR Vision report included a mix of “Super Express”, “Express”, “Keystone Express” and “Shore Line Express” services. In essence, the proposed service plan would provide dramatically increased frequencies and service two-thirds faster than present levels. The costs of the proposed NextGen HSR system was estimated at approximately \$117 billion (\$2010), with the segment between New York City and Washington, D.C. completed by 2030 and the balance of the network north to Boston completed by 2040.

2.3. Northeast Corridor Capital Investment Program

While the Master Plan and 2010 HSR Vision reports focused on different levels of improvements for the NEC, both documents outlined a vision for the future of rail transportation in the Northeast. The Master Plan collected and organized feedback from regional stakeholders to address the necessary near-term infrastructure needs of the Corridor for all users, while the 2010 HSR Vision presented a concept for enhanced capacity, reliability and operations of high-speed services over the long-term.

These two programs have been integrated into a coherent service and investment program, affirming Amtrak commitment to the critically needed Master Plan projects and demonstrating how incremental improvements to current high-speed service would lay the foundation for a NextGen HSR network as proposed in the 2010 HSR Vision report. The resultant NEC Capital Investment Program introduces a new phased implementation approach, known as the “Stair-Step” strategy, to incrementally advance improvements along the Corridor. Based on recent refinement efforts that are outlined in the following chapter, the revised capital cost for the total proposed NEC Capital Investment Program, including Master Plan, Gateway Program and 2010 HSR Vision elements, is estimated at \$151 billion (\$2011).

3.0 NEC Capital Investment Program

The NEC Capital Investment Program is a visionary infrastructure program, involving rehabilitation and upgrading of the existing NEC rail network and a major investment in new infrastructure that will increase capacity, improve reliability and facilitate faster travel times. The specific Amtrak objectives for the program are summarized below:

- *Improve reliability and quality of service throughout the NEC;*
- *Improve and expand regional mobility along the NEC and the communities it serves through increased capacity and expanded rail services;*
- *Enhance intercity capacity and support the national transportation network;*
- *Improve existing NEC assets and add capacity for all users, including intercity, commuter and freight operators;*
- *Facilitate interstate commerce and regional economic development and growth;*
- *Preserve and improve current Amtrak intercity travel market share in the NEC;*
- *Ensure best possible stewardship of public funds, and develop financially sustainable passenger rail services in the NEC; and*
- *Lead national HSR proof-of-concept initiatives in the nation's premier intercity passenger rail market.*

3.1 Stakeholder Feedback

Since the integration of the Master Plan and 2010 HSR Vision reports in the NEC Capital Investment Program, Amtrak has modified its development strategy as a result of discussions with stakeholders along the Corridor. In particular, the proposed NEC NextGen HSR alignment, recent regional and commuter planning initiatives and ongoing Amtrak efforts to advance near-term *Acela Express* high-speed service have influenced and modified the development strategy.

Existing NEC between New Haven, CT and Providence, RI



Source: Amtrak

Amtrak received several suggestions for revision of the proposed high-speed network included in the 2010 HSR Vision. While not all such revisions could be included in the integrated program at this stage due to schedule and resource constraints, Amtrak did revise concepts for the proposed NextGen HSR alignment and stations to incorporate major elements of stakeholder feedback.

Alignment Revisions

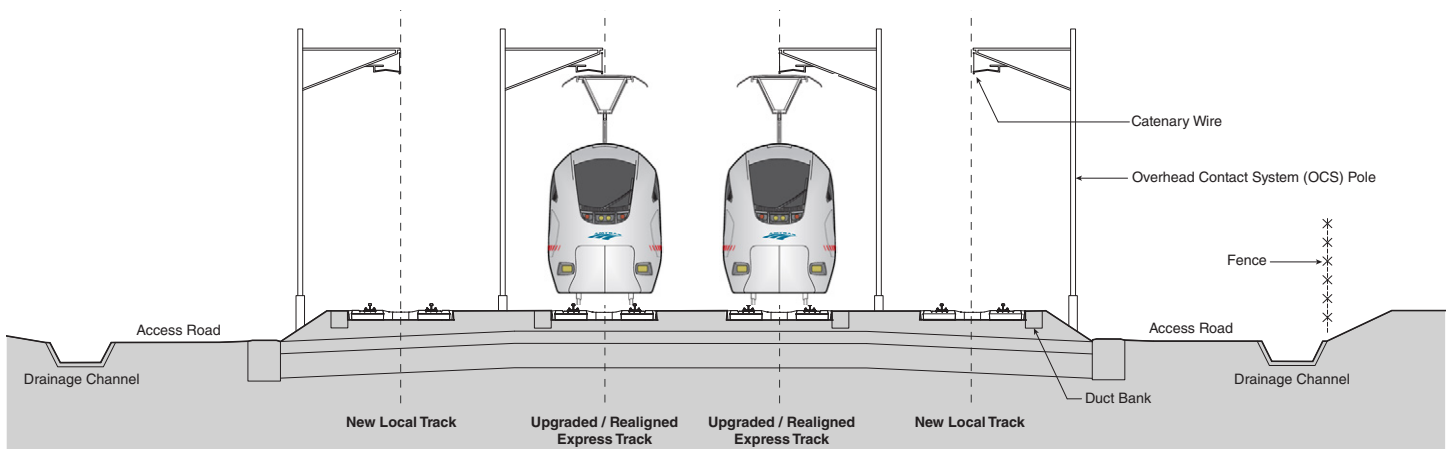
The NextGen HSR concept alignment was revised to pass through Providence, RI instead of Woonsocket, RI as proposed in the 2010 HSR Vision. A new dedicated HSR platform would be added north of the existing station, with station enhancements added to support high-speed services. Some tunneling would be required west of the existing station, given current development around Providence. The NextGen HSR alignment would then follow the higher-speed, current 150 mph (241 kph), NEC north of Providence, improved as part of the Northeast High-Speed Rail Improvement Program in the 1990s. The NEC capacity improvements planned through NextGen HSR would also benefit both intercity and commuter rail users, such as the Massachusetts Bay Transportation Authority (MBTA), which presently runs service along this section of the Corridor (Figure 8). Five existing commuter stations would need to be modified to separate local platforms from the NextGen HSR express tracks. While this alteration increased the projected capital costs, it would increase ridership and revenues and strengthen connectivity between services of the new alignment and those on the existing NEC.

Amtrak Station - Providence, RI



Source: Amtrak

Figure 8: Proposed Configuration of NEC Right-of-Way between Providence, RI and Westwood, MA (Route 128)



Source: Amtrak

Station Concept Revisions

After meeting with Corridor stakeholders and discussing the needs of future stations and their coordination with existing or planned station improvements, some of the station concepts from the 2010 HSR Vision report were revised from their originally proposed configurations to align with planned improvements and accommodate a future increase of NextGen HSR service levels.

- **New York Area Stations** – The concept of an additional station stop on the east side of Manhattan near Grand Central Terminal in New York, NY was removed from the program, as there was no firm consensus that a second station was necessary in the initial period of full operation for the NextGen HSR services. The proposed station would add a significant cost to the program and also increase NEC trip times due to added dwell times, while having negligible impacts on ridership and revenues. In addition, the concept of a station at White Plains Airport was removed from the program pending future discussions with local and state officials regarding the feasibility of potential station alternatives serving the White Plains, NY vicinity.
- **Washington Union Station** – The integrated program concept for Washington, D.C. is a new 6-track HSR station below the existing Washington Union Station, with an associated tunnel approach for more efficient HSR access, in recognition of the growing commuter and intercity demands on the existing station. This new lower-level station could allow for a potential NextGen HSR extension south to connect with the proposed Southeast HSR Corridor.

Concept Rendering of NextGen HSR Service at Existing Boston South Station



Source: Amtrak

The station would be completed by 2030 in line with the proposed Stair-Step phased implementation strategy (Section 3.2), would be consistent with near-term track and platform improvements in 2020 and 2025, and would complement current Amtrak Washington Union Station Master Plan efforts (Figure 9).

- **Boston South Station** – The concept for Boston, MA is a new 6-track HSR station adjacent to the existing South Station complex, with a configuration that is anticipated to be consistent with MassDOT’s ongoing South Station Expansion Project. Newly acquired HSR train-sets would serve the existing South Station by 2020 with a new adjacent HSR station operational by 2040, as per the proposed Stair-Step phased implementation strategy.
- **Stations and their Communities** – Amtrak has begun discussions with transportation and economic development officials in principal cities along the Corridor to further review how new and existing stations within their communities would merge into and strengthen the existing urban fabric. Some of these meetings have occurred under the NEC B&F Plan development effort and have generated significant feedback. The presence of new and existing stations would strongly support local development efforts, while new levels of connectivity to major centers along the Corridor (e.g., NextGen HSR service at a new central station in Baltimore, Figure 10) could help drive the region’s economy. Amtrak will continue to have discussions with city and state officials along the NEC to discuss enhancement of Corridor stations and station area development planning.

Figure 9: Concept Renderings for Washington Union Station Improvements

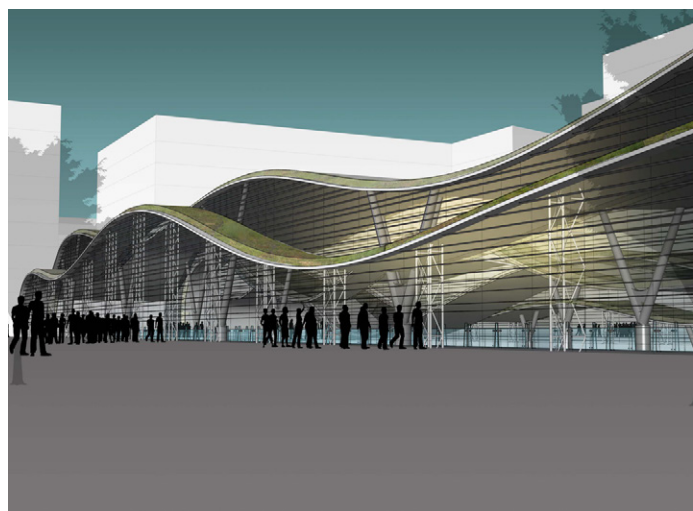
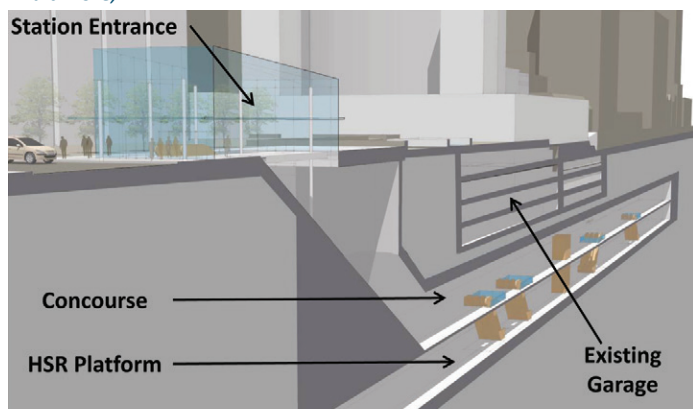
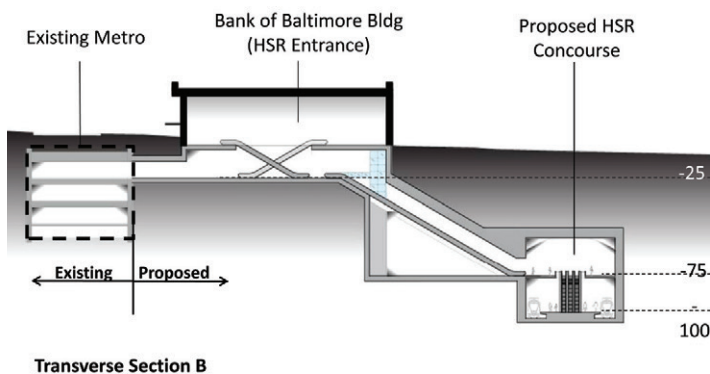


Figure 10: Concept Renderings for a NextGen HSR Station at the Charles Center in Baltimore, MD



Source: Amtrak

3.2. Phased Implementation Strategy

Since the integration of the Master Plan and 2010 HSR Vision reports, Amtrak has been working on ways to make improvements to the existing Corridor and advance the implementation of a NextGen HSR network in the NEC. A key part of these efforts was to find ways to achieve meaningful near-term improvements in existing high-speed NEC service. High-speed *Acela Express* trains presently run hourly weekday service between Washington, D.C. and Boston, MA (a 457-mile trip) with an average speed of 84 mph (135 kph). By comparison, a minimum of 6 non-stop Shinkansen high-speed trains run hourly weekday service between Tokyo and Kyoto, Japan (a 320-mile trip) at an impressive average speed of 137 mph (220 kph). However, even with these speed and service limitations, *Acela Express* ridership has increased steadily in recent years with peak period trains often sold out.

Over the past year, Amtrak has begun to more clearly define the steps needed to advance the NextGen HSR network as proposed in the 2010 HSR Vision report. In addition to further refinements of the NextGen HSR concept, the goal was to establish a Stair-Step phasing strategy that demonstrated how this large and complex system could be developed over the next 30 years (Figure 13). These phasing efforts also looked at ways to achieve meaningful incremental improvements to existing NEC high-speed rail operations over the next 5-15 years – gains achieved by improved travel time, reliability and passenger amenities (including new trains), increased service frequency, train seating capacity and advance ticketing procedures. The combined effects of these actions would generate new ridership and revenues, expose more of the public to the benefits of improved rail service, and provide near-term mobility and economic benefits to Corridor residents and businesses. In turn, these benefits could help build the solid financial performance and public support necessary to generate the required levels of public and private investment to further improve NEC service.

NEC-UP and NextGen HSR Programs

The Stair-Step phasing strategy consists of two progressive and overlapping programs: the NEC Upgrade (NEC-UP) and NEC Next-Generation High-Speed Rail (NEC NextGen HSR) programs. These programs are designed to enable the strategic integration of near-term improvements with the phased development of a dedicated two-track NextGen HSR network. The NEC-UP and NEC NextGen HSR programs include the following components:

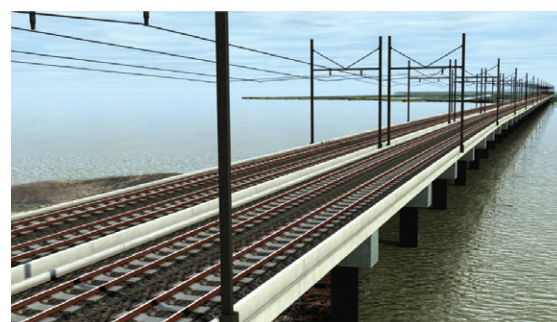
Figure 11: Concept Rendering of the New North Portal Bridge over the Hackensack River (NJ); A Major Capital Project under the NEC-UP Program



Source: NJ Transit

- **NEC Upgrade Program (NEC-UP)** – Projects completed from 2015 to 2025 that provide a maximum authorized speed (MAS) of 160 mph (257 kph) and capacity improvements by upgrading constrained areas along the Corridor and achieving a SOGR.
- **NEC Next-Generation High-Speed Rail (NEC NextGen HSR)** – Projects completed from 2025 to 2040 that accommodate a MAS of 220 mph (354 kph) on new and existing alignment and built on the foundation of NEC-UP service levels.

Figure 12: Concept Renderings of Susquehanna, Bush, Gunpowder River Bridge Replacements (MD), Respectively



Source: Amtrak

The Stair-Step concept reflects Amtrak commitment to critically needed projects on the existing NEC and demonstrates that early improvements to existing services can support and be integrated with a long-term vision for a new dedicated HSR system that could serve a growing need for intercity, high-speed service. Completion of these near-term initial steps and other planned NEC improvements by 2025 would have independent utility, improving existing Corridor operations and bringing the NEC to a SOGR, as well as provide for a future full NextGen HSR build-out. When the new network is complete, most high-speed service would operate on its own dedicated network with today’s NEC alignment handling commuter, freight and other intercity passenger services, including some high-speed services that would use both the new and existing systems, such as the Keystone Express route.

NEC Capital Investment Program Components

Since the NEC Capital Investment Program integrates Master Plan and 2010 HSR Vision initiatives, it was necessary to sort the expansive list of individual projects into unique components. The individual projects were incorporated into the latest Stair-Step strategy, and include the following major components:

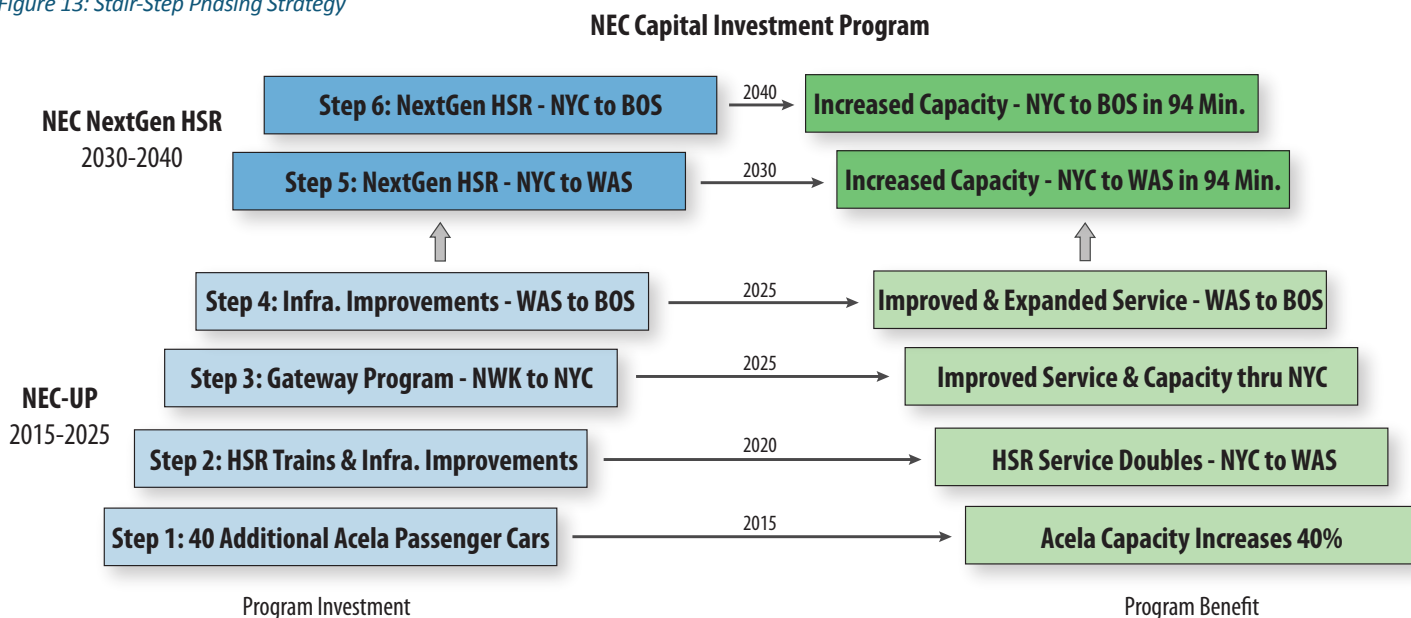
- **State-of-Good-Repair (SOGR) Projects** – Long-deferred “backlog” projects and other minor projects identified during the Master Plan process to repair and improve the reliability of existing Corridor infrastructure.
- **NEC Major Capital Projects** – Projects presented in the Master Plan (i.e. new Maryland Bridges, Figure 12) or already in advanced planning stages (i.e. Portal Bridge, Figure 11), along with the proposed Gateway Program.
- **NEC Capacity, Speed and Reliability Projects** – Projects such as the recently funded NEC NJ Section Improvement Project that will repair or replace key infrastructure components (e.g., catenary, signals, tracks) along the entire Corridor, assuring safe and efficient operation and providing additional capacity and faster, more reliable NEC service.
- **NEC NextGen High-Speed Rail Network** – The NextGen HSR network, as presented in the 2010 HSR Vision, with minor alignment and service changes as discussed in Section 3.6, closely integrated with early NEC improvements.
- **NEC High-Speed Fleet Evolution** – Improvements to the existing *Acela Express* fleet, including longer train sets to increase near-term capacity and introduction of NextGen high-speed train-sets to increase frequencies and speeds.

3.3. Stair-Step Service Milestones

The forecasted success of Corridor improvements in the NEC Capital Investment Program over the next 30 years were measured by detailed assessments of conditions in five milestone years. The results provide a snapshot of how service, ridership, operating costs and revenues would change over time. The first three milestone years – 2015, 2020 and 2025 – match the service improvements that result from completion of various infrastructure improvements under NEC-UP, including Master Plan projects. The last two milestone years – 2030 and 2040 – are tied to the completion dates for major segments of the high-speed network and the phased start of NextGen HSR services. It is important to note that the planning of NextGen HSR infrastructure will advance alongside near-term milestone years due to detailed environmental review times and planning phases. The following provides a summary of the proposed milestone years, as well as the infrastructure and service improvements, that are a part of the Stair-Step strategy:

- **2015 (Stair-Step 1)** – Acquire 40 additional *Acela Express* passenger cars to increase seating capacity on existing train-sets, and lengthen current high-speed service and inspection (S&I) facilities to accommodate longer train-sets.
- **2020 (Stair-Step 2)** – Acquire new high-speed train-sets to permit doubling of *Acela Express* frequencies between New York and Washington, expand existing high-speed S&I and layover facilities, and complete the necessary infrastructure improvements to support increased capacity.
- **2025 (Stair-Step 3 & 4)** – Increase tunnel/terminal capacity and expand infrastructure between Newark, NJ and an enlarged Moynihan/Penn Station complex as part of the Gateway Program (Section 3.5). Improve trip-times through section improvements, acquire new additional high-speed train-sets to permit tripling of *Acela Express* frequencies in peak periods between New York and Washington, and hourly *Acela Express* service between New York and Boston.
- **2030 (Stair-Step 5)** – Complete NEC NextGen HSR infrastructure (new track, stations and systems) between New York and Washington and begin operation of NextGen services, including Keystone Express and Shoreline Express.
- **2040 (Stair-Step 6)** – Complete NEC NextGen HSR infrastructure (new track, stations and systems) between New York and Boston and begin operation of the full NextGen system.

Figure 13: Stair-Step Phasing Strategy



Source: Amtrak

The Stair-Step phasing concept demonstrates how NEC improvements now in various stages of the planning, design and funding processes would be integrated to support overall Corridor operations and infrastructure improvements over the next 5-30 years (Figure 13).

Given the urgency of the region’s transportation challenges, relatively aggressive schedules were assumed for a number of complex large-scale projects that will require extensive planning, engineering and stakeholder engagement efforts and often equally complex construction. Similar assumptions were made about the funding and financing for these projects and for the overall NEC Capital Investment Program. As program planning advances, Amtrak will continue to coordinate with Corridor stakeholders and other planning initiatives to refine these assumptions.

Amtrak and its Corridor partners are, or will soon be, initiating or carrying out environmental planning studies for many of the major capital projects (e.g., the Gateway Program and Baltimore Tunnels). The FRA PRCIP, that is currently under way will serve as the overarching process to define, assess and eventually recommend a preferred alternative for NEC development. Amtrak will continue to support the development of concepts and alternatives for the NEC as part of this FRA planning effort.

NEC Improvements Assumed by Milestone Year

Figure 14 shows important infrastructure and rolling stock improvements assumed to be completed by each milestone year under the NEC Capital Investment Program. Projects shaded in gray support fleet development over the next 30 years. Other important projects would also occur during these periods, but those shown are the ones upon which goals and objectives set by the Master Plan and 2010 HSR Vision reports would most directly depend. The timing and eventual design of various major projects, including the Gateway Program and the new NextGen HSR alignment, will affect travel time and service level achievements assumed for each milestone in this report. The exact nature and phasing of other improvements (such as corridor-wide curve modifications and signals, catenary and other infrastructure upgrades) will define the eventual pace at which projected travel time reductions within the NEC would be achieved.

The pace of the Stair-Step process will be shaped by the results of further studies by Amtrak, its Corridor partners and the FRA, as well as other factors. One goal of this report is to demonstrate how a carefully integrated NEC Capital Investment Program could successfully advance Corridor goals, including improvements to the existing NEC and phased introduction of NextGen HSR services.

Figure 14: Key Projects Assumed by Milestone Year

2015 : Acquire 40 Additional Acela Express Passenger Cars
Acquisition and deployment of 40 <i>Acela Express</i> passenger cars
Extension of HSR S&I facilities (BOS, NYC, WAS)
2020 : Double High-Speed Service - New York to Washington, and Regional Capacity Improvements
Acquisition and deployment of new HSR train-sets
Expansion of HSR S&I and layover facilities (NYC, WAS)
Kingston Siding Track and Freight Improvements (RI)
Pelham Bay Bridge Replacement (NY)
“Harold” Interlocking Flyover - Bypass Track (NY)
Sunnyside Yard Reconfiguration following East Side Access (NY)
Moynihan Station - Phase 1 and 2 (NY)
North Portal Bridge over Hackensack River (NJ)
NEC NJ Section Improvements - Track, Catenary, Signals (NJ)
Delaware 3rd Track - “Ragan” to “Yard” Interlockings (DE)
BWI Station - Center Platform and 4th Track (MD)
Washington Terminal - Track and Platform Improvements (DC)
2025 : Gateway Program, and Trip-Time / Frequency Improvements - Washington to New York to Boston
Acquisition and deployment of additional HSR train-sets
3rd Track - “Palmer’s Cove” to “Groton” Interlockings (CT)
Connecticut River Bridge Replacement - Old Saybrook (CT)
Gateway Program: New Hudson River Tunnels (NY-NJ), New Infrastructure from New York to Newark (NY-NJ), Moynihan/Penn Station Expansion (NY), South Portal Bridge (NJ)
“Hunter” Interlocking Flyover - Bypass Track (NJ)
Elizabeth Area Improvements - Curve Modifications (NJ)
North Brunswick Loop, Trenton Capacity Improvements (NJ)
“Morris” to “Frankford” Interlockings - 160 mph MAS (PA)
“Phil” to “Holly” Interlockings - 160 mph MAS (PA-DE)
Bellevue Flyover - Bypass Track (DE)
“Ragan” to “Bacon” Interlockings - 160 mph MAS (DE-MD)
Susquehanna, Bush, Gunpowder Bridge Replacements (MD)
Aberdeen to Martin Airport - 160 mph MAS (MD)
B&P Tunnel Rehabilitation and Replacement (MD)
“Grove” to “Piney” - 4th Track, New Carrollton 3rd Platform (MD)
Washington Union Terminal Station Area Improvements (DC)
2030 : NextGen HSR - New York to Washington Segment
New HSR Infrastructure (Track, Stations, Systems) NYC - WAS
2040 : NextGen HSR - New York to Boston Segment
Deployment of remaining HSR train-sets
New HSR Infrastructure (Track, Stations, Systems) NYC - BOS

Source: Amtrak

3.4. NEC-UP (2015-2025) – Existing Corridor Improvements

Corridor users rely on existing NEC infrastructure to support a large and growing network of rail services. In addition to intercity services, commuter and freight operations will also benefit from investment in the Corridor’s aging infrastructure. The program proposes multiple system enhancements from 2015 to 2020 (Figure 15) and 2020 to 2025 (Figure 16) under NEC-UP to improve existing NEC infrastructure and strengthen regional mobility for all Corridor users.

New York, NY to Washington, D.C. – A range of system enhancements between New York and Washington will increase capacity, reduce travel times and improve reliability as the program advances over the next 15 years. System enhancements will not only improve high-speed and regional services, but also state-supported, long distance, commuter services and freight operations along this section of the existing NEC. These enhancements include:

- Catenary renewal and replacement with constant tension to increase reliability and allow higher-speed operations of up to 160 mph, from the current maximum speed of 135 mph between New York and Washington;
- Signal, power supply and track upgrades to reduce failure rates, increase reliability for Corridor operators and permit growth in Amtrak intercity, local commuter and freight services; and
- Additional track infrastructure to improve system throughput and allow increased frequencies for all Corridor users, as well as alignment changes in selected areas to provide for sustained high-speed operations.

On the Keystone Corridor from Philadelphia, PA to Harrisburg, PA, track, signaling and station improvements have also been identified. Some of these improvements will be required to enable higher-speed operations.

New York, NY to Boston, MA – System enhancements on the New York to Boston segment will improve regional rail operations and permit additional services on NEC and its feeder corridors. Between New York and Boston, several improvements have been identified to deliver capacity, travel time, reliability and station improvements for intercity, long distance, commuter services and freight operations within the NEC.

On the corridor from New Haven, CT to Springfield, CT, track, signaling, electrification and station improvements are planned as part of the program. With conversion of individual route sections from single to double track, available train capacity will increase greatly.

Acela Express High-Speed Train-set on Existing NEC in Bristol, PA



Photo: Gary Pancavage, Amtrak

Figure 15: NEC-UP - Improvements to Support Stair-Step 1 by 2015) and Stair-Step 2 by 2020

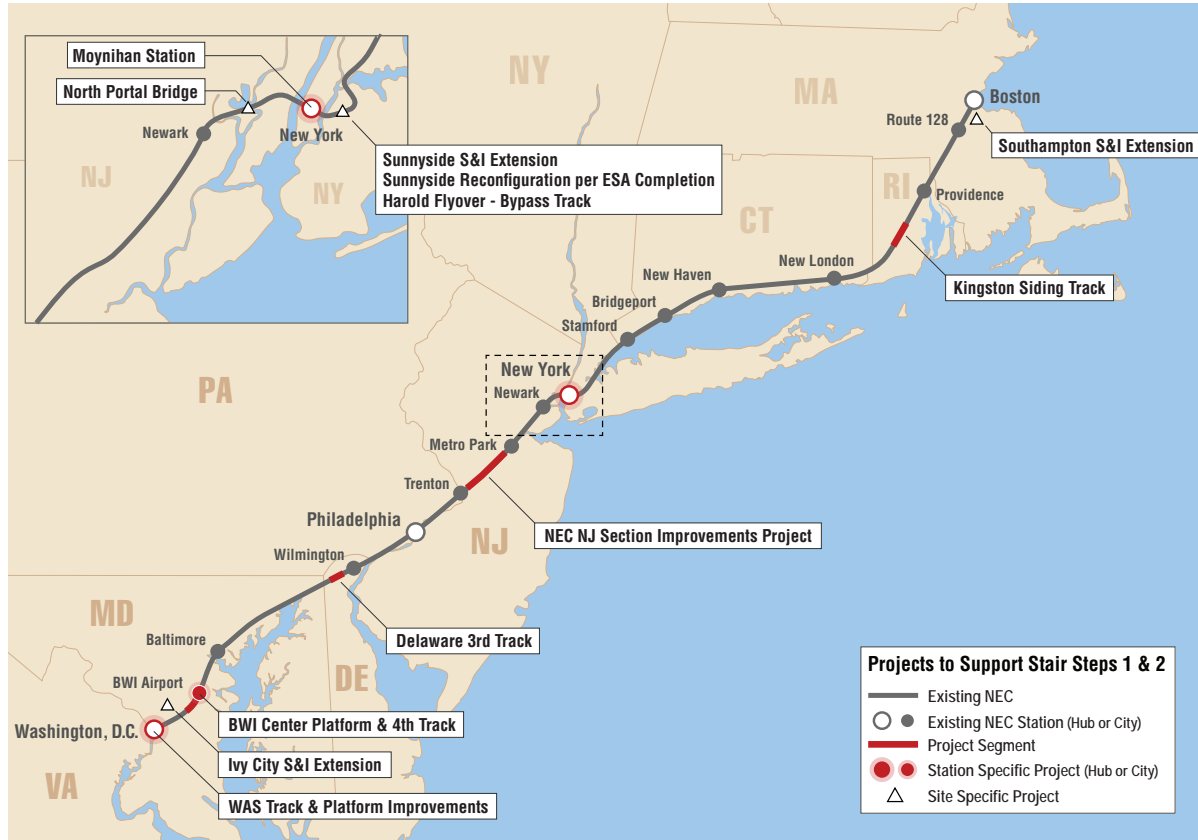
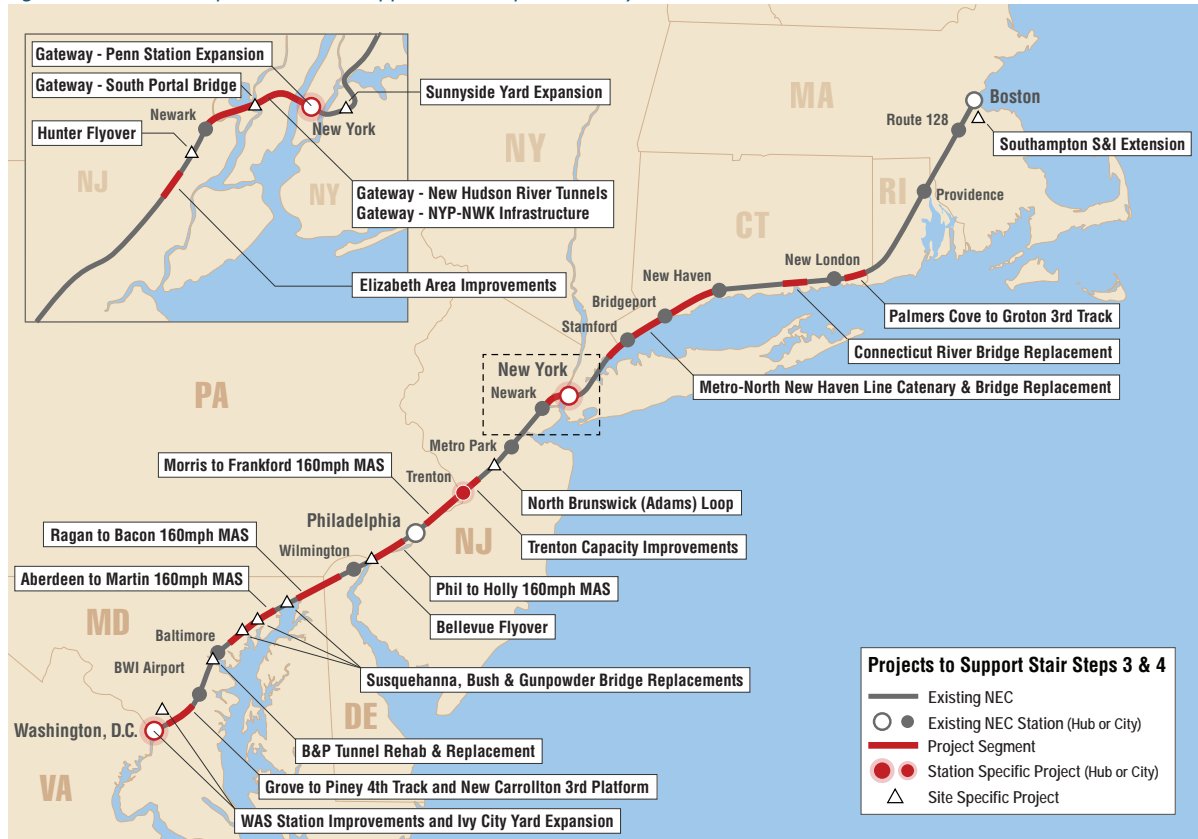


Figure 16: NEC-UP - Improvements to Support Stair-Steps 3 and 4 by 2025



Source: Amtrak

3.5. Gateway Program (2025) - Relieved Corridor Congestion

Subsequent to the release of the Master Plan and 2010 HSR Vision, the State of New Jersey announced the cancellation of the Access to the Region’s Core (ARC) project in November, 2010. The ARC Project would have constructed two new trans-Hudson River commuter rail tunnels and a new station under West 34th Street adjacent to the existing Penn Station New York (PSNY), doubling NJ Transit (NJT) capacity into midtown Manhattan. In response to the cancellation, Amtrak accelerated development of its Gateway Program concept, announced in February, 2011, that would address similar capacity issues as the ARC project while also supporting the long-term needs of NextGen HSR in New York City, the critical hub for the Corridor.

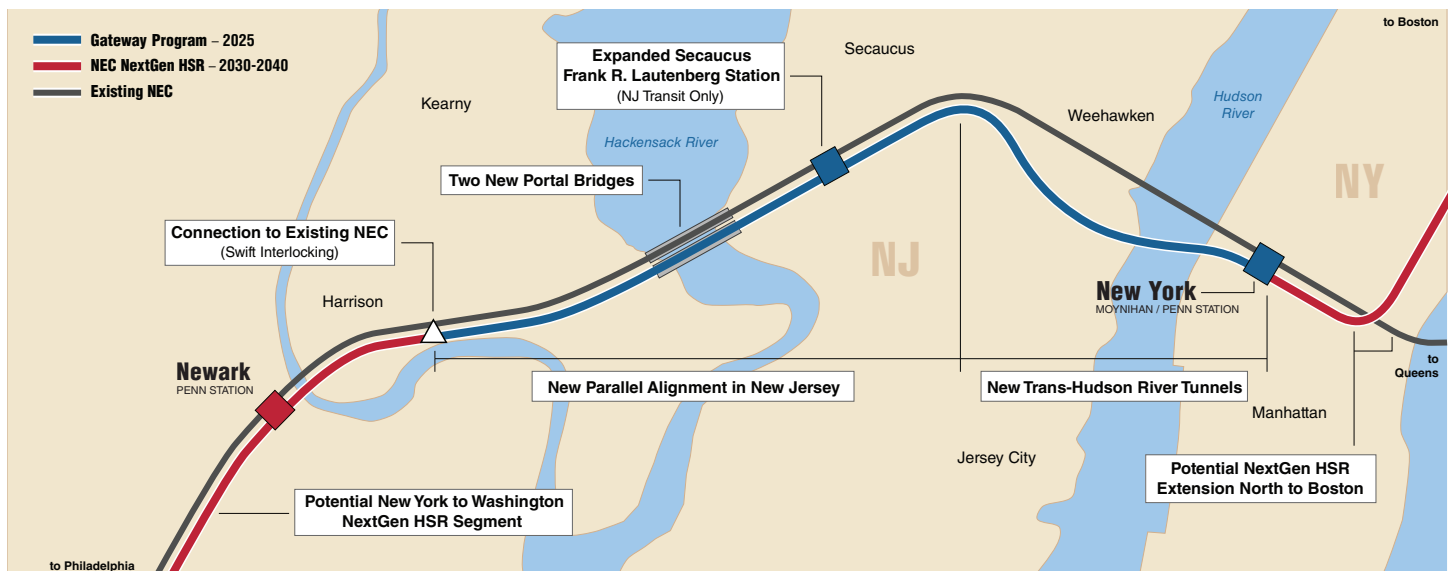
Gateway Components

The Gateway Program (Figure 17) is a critical component of the future NEC that will include provision for planned HSR access into New York while addressing the need for trans-Hudson tunnel redundancy and added capacity for commuter, regional and long distance intercity services. As currently envisioned, the Gateway Program would address a broad range of critical capacity, safety and operational needs in this congested segment of the NEC stretching from Newark, NJ to the west side of Manhattan, NY with a proposed completion date of 2025. The total estimated cost for the Gateway Program is approximately \$14.7 billion (\$2011).

The Gateway Program components include:

- **New Trans-Hudson River Tunnels** – Two new shared trans-Hudson River rail tunnels to provide redundancy for the two existing Hudson River tunnels, a direct connection to the Moynihan/Penn Station complex, operational benefits for existing PSNY and increased capacity for NextGen HSR;
- **Expanded Moynihan/Penn Station** – A two-level expansion of existing PSNY tracks and platforms to the south with direct connection to the future Moynihan Station. The new Moynihan intercity passenger rail station will extend the present terminal across 8th Avenue into the historic Farley Post Office Building to create a new signature station in New York (Figure 18). The Moynihan/Penn Station complex will create a consolidated Amtrak operation on Manhattan’s west side and the high level of service and connectivity required for NextGen HSR;

Figure 17: Proposed Gateway Program from Newark, NJ to New York, NY



Source: Amtrak

- **New Portal Bridges** – Two new high-level bridges, known as North and South Portal Bridges, replacing the existing 100-year-old moveable Portal Bridge over the Hackensack River and doubling corridor capacity;
- **Newark to Secaucus Improvements** – An improved NEC between Newark and Secaucus, including a four-track segment between “Hudson” and “Swift” interlockings, better connections to the NJT Morris and Essex Lines, various bridge upgrades and other SOGR improvements; and
- **Newark and Secaucus Station Improvements** – Station capacity, access and circulation improvements at Newark, Penn Station and Secaucus, Frank R. Lautenberg Station, including track modifications to support proposed operations.

The Gateway Program presents an integrated plan to meet critical infrastructure and station capacity needs within the New Jersey to New York segment of the NEC, which benefits both the immediate tri-state area and the entire Northeast region. At its current phase of development, the program is sufficiently flexible so as to not preclude a wide range of design and operational options that might arise as the project’s planning advances. These could include provision for additional trans-Hudson tunnels (beyond 2040), further PSNY capacity improvements for commuter service growth, or other capacity solutions.

Following the Gateway Program in 2025, the Stair-Step phasing strategy proposes to extend the new trans-Hudson River tunnels to the north, which would ultimately connect with a new potential NextGen HSR alignment to Boston, MA by 2040.

Figure 18: Concept Rendering of the Amtrak Moynihan Station in the James Farley Post Office Building - New York, NY



Source: Moynihan Station Development

3.6. NEC NextGen HSR (2030-2040) – New Corridor Capacity

Since the release of the 2010 HSR Vision report, the NextGen HSR alignment has been refined to:

- Further develop NEC connections required during phased implementation of the system;
- Coordinate with other planned and proposed rail projects along the Corridor; and
- Address feasibility issues and respond to feedback from stakeholders and Corridor partners.

The potential NextGen HSR alignment begins in Washington, D.C. and ends in Boston, MA for a total length of 438 miles (Figure 19). The new configuration would consist of two dedicated tracks that would be entirely grade-separated. New or expanded right-of-way would be required along most of the potential corridor, although tracks would follow the existing NEC and existing transportation networks whenever possible to minimize potential impacts. The potential alignment and station locations are based on local transit connectivity. Connections to regional rail, light rail, bus and auto facilities have an important impact on the ridership and the eventual success of the program. The selection of a potential alignment and stations will continue to evolve and ultimately be based on coordination with federal, state and local stakeholders.

Figure 19: Potential NEC NextGen HSR Alignment



Source: Amtrak

Phased Implementation and Network Segments

Phased implementation of the NextGen HSR network will require strategic connections to the existing NEC to incrementally offer new NextGen high-speed operations as the new network evolves. The future network will also provide options for local connectivity to other modes, since a crucial component of intercity passenger rail is an interconnected transportation network to shorten door-to-door trip times and add convenience to other destinations.

Eleven such connections from the existing NEC to the proposed NextGen HSR network were developed to support the possible thirteen-phase concept, as shown in Figure 20. This concept includes the Gateway Program, which would advance as part of NEC-UP, but would ultimately support the NextGen HSR services entering into New York, NY from the south. Under the integrated program, the first proposed major section from New York, NY to Washington, D.C. would be completed by 2030, addressing capacity constraints, reducing trip times and creating opportunities for new ridership. Major infrastructure such as track, stations and systems along this proposed section could be constructed in phased segments between key rail interlockings and other strategic NEC connections. The second proposed major section from New York, NY to Boston, MA would be completed by 2040, including a new dedicated HSR alignment through portions of New York, Connecticut and Rhode Island.

Figure 20: Potential NEC NextGen HSR Phasing Segments



Source: Amtrak

3.7. Service Plan, Rolling Stock and Travel Times

Service Plan

Amtrak NEC operating plans were developed for each of the five Stair-Step milestone years, reflecting increased capacity on existing *Acela Express* train-sets by 2015, speed and capacity improvements by 2020, major infrastructure improvements and Gateway Program elements by 2025, the first NextGen HSR segment from New York to Washington, D.C. by 2030, and completion of the NextGen HSR network and full service between Washington, D.C. and Boston by 2040.

The NextGen HSR infrastructure, rolling stock, ridership forecasts and service strategies will continue to evolve as future NEC high-speed service becomes better defined. The following NextGen HSR services would be provided assuming a full-build out (Figure 21):

- **Super Express** service to Hub Stations in Washington, D.C., Philadelphia, New York and Boston.
- **Express** service to Hub Stations and a combination of City Stations (e.g., Baltimore, Hartford), Regional Stations (e.g., Danbury, Route 128) and Intermodal Stations (e.g., BWI Airport, Newark Airport) on alternating trains.



Source: Amtrak

- **Shoreline Express** service between New York and Washington, D.C. to meet higher demand on the southern portion of the NEC, with service extending along the existing Corridor between New Rochelle and Providence to Boston along the “Shore Line” route.
- **Keystone Express** service following the Keystone Corridor from Harrisburg, PA to Philadelphia, PA and connecting to the new alignment just north of Philadelphia to New York City.

Under the proposed NextGen HSR service plan, high-speed train frequencies would increase dramatically – over three times more daily service in the Boston to New York market and five times more service in the key Washington, D.C. to New York market. The specific details of the proposed services on the NEC will evolve as planning progresses in coordination with the FRA’s ongoing PRCIP process. The planning effort will further analyze new service levels and evaluate these for their ability to meet transportation needs of the NEC and the financial goals of the program.

High-Speed Rolling Stock Plan

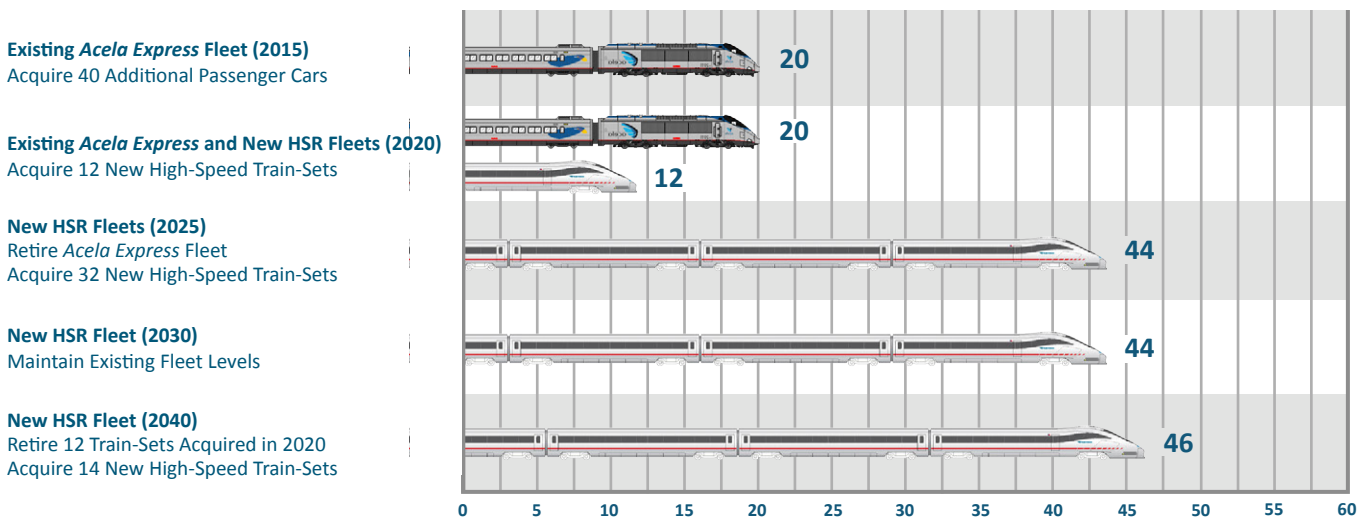
The 2010 HSR Vision report assumed that 220 mph (354 kph) capable, 435-seat high-speed train-sets would be used on the existing and proposed high-speed network. The performance characteristics of these trains were based on those of several leading equipment manufacturers currently being constructed and used around the world. However, future high-speed rolling stock in the United States would be significantly influenced by the FRA’s regulatory requirements. The FRA is currently evaluating performance and safety requirements of an “off-the-shelf” HSR fleet and developing national requirements for rolling stock and operating guidelines.

Under the current Stair-Step strategy, two phases plan to significantly increase high-speed passenger capacity. The following phases and data in Figure 22 were used for evaluation of the program and will be incorporated into the latest fleet strategy.

- **Additional Passenger Cars on Acela Express Train-sets** – By adding two passenger cars to the present “1-6-1” (two power cars and six passenger cars) *Acela Express* train-sets to create a “1-8-1” configuration, the seating capacity per train will increase by approximately 40%. This increase will begin in 2015; and
- **Future HSR Train-Sets** – Purchase of additional high-speed train sets to meet the planned high-speed frequencies for most milestone years and for replacement of the current *Acela Express* fleet.

¹ Figure does not include regional intercity rolling stock on the NEC and feeder lines.

Figure 22: Total Number of High-Speed Train-Sets in Service by Milestone Year ¹



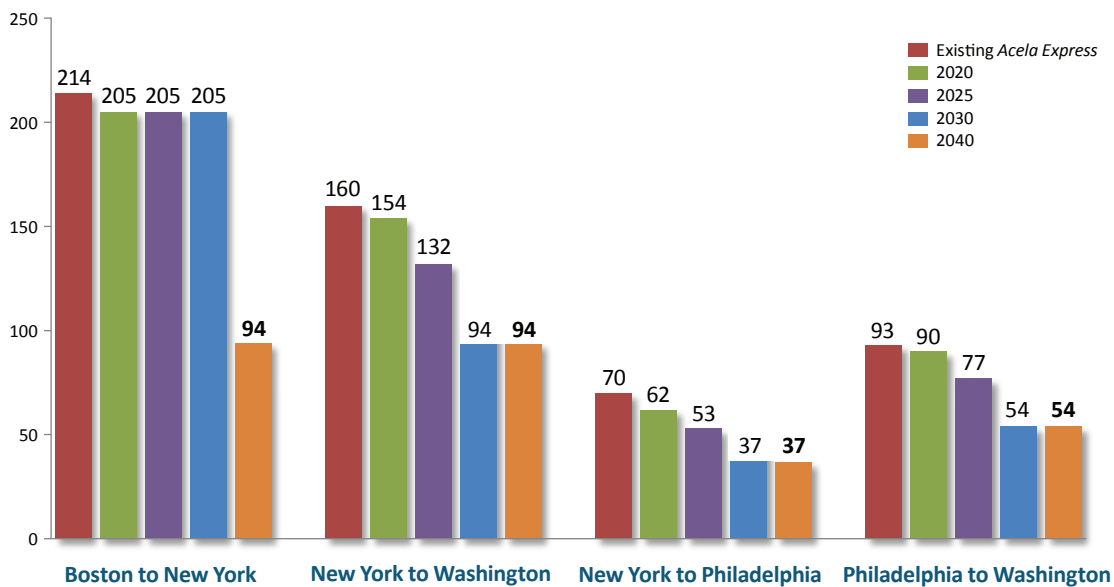
Source: Amtrak

The specific NEC high-speed service fleet requirements will continue to be refined as proposed increases in service levels and forecasted ridership demands are further defined through ongoing studies, such as the FRA's PRCIP. As the NextGen HSR network is developed, future equipment options will be explored to create the optimal fleet, considering technologies such as tilt-capable train sets and electric multiple units (EMU) with power distributed through each car on the train rather than in leading and trailing power cars, or other variations. The recent peer reviews of the 2010 HSR Vision report by leading high-speed train operators and manufacturers, as well as input from the NEC B&F Plan, provided important information regarding equipment advances and actual results under commercial operation that will be considered in specification of NextGen HSR equipment requirements.

Travel Times

Operations analyses and simulations of the revised NextGen HSR network achieved maximum operating speeds approaching 220 mph (354 kph) and average speeds and “commercial” operating speeds (including station stops) roughly the same as those reported in the 2010 HSR Vision report. Early improvements in the existing NEC from 2015 through 2025 would provide travel time and capacity gains to substantially boost high-speed service quality (Figure 23). Such travel times in 2030 as 37 minutes from New York to Philadelphia and 94 minutes between New York City and Washington, D.C., as well as 94 minutes to Boston in 2040, would transform the travel landscape in the Northeast. Near-term gains would also be significant (e.g., 8 minutes faster from New York City to Philadelphia by 2020 and 28 minutes faster from New York to Washington D.C. by 2025). With substantially increased frequencies, shorter travel times and convenient and comfortable stations and trains, the NextGen HSR service becomes an increasingly attractive alternative to auto and air service modes.

Figure 23: Travel Times: Existing and Projected Stair-Step Milestone Years (in Minutes)



Source: Amtrak

3.8. Capital Costs

The 2010 Master Plan estimated \$38 billion (\$2010) in capital investment to help accommodate a projected 60% increase in NEC intercity and commuter trips by 2030 for Amtrak-owned and operated infrastructure between Boston and Washington, including the Springfield and Harrisburg Branches. The overall Master Plan total of \$52 billion (\$2010) included annual capital renewals and investment costs on non-Amtrak right-of-way. In addition, the 2010 HSR Vision report estimated \$117 billion (\$2010) in projected capital costs for the 427-mile proposed NextGen HSR alignment that would deliver increased capacity, improved reliability and reduced travel times in the NEC by 2040.

As part of the integrated NEC Capital Investment Program, these two initial cost estimates were reviewed and refined to reflect the following:

- Changes in project phasing based on the Stair-Step implementation strategy;
- Changes to the NextGen HSR alignment, stations, or other project segments due to major alignment modifications (e.g., the modified alignment through Providence, RI instead of Woonsocket, RI);
- Changes in fleet requirements, as part of the revised Amtrak Fleet Strategy, Version 3; and
- Detailed refinement of all unit-cost assumptions where warranted, based on new data sources, resulting in refined cost factors, and comprehensive review of right-of-way requirements and cost calculations.

Based on these efforts, the revised capital cost for the total proposed NEC Capital Investment Program, including Master Plan, Gateway Program and 2010 HSR Vision elements, is estimated at \$151 billion (\$2011) as shown in Figure 24.

The proposed NEC Capital Investment Program would involve extensive improvements within the existing NEC, from SOGR work to major capital projects, fully integrated with the Stair-Step strategy phasing of the NextGen HSR network over the approximate 2012-2040 time period. The NextGen HSR network construction costs, at approximately \$110 billion (\$2011), would be the largest overall component (roughly 72% of total program capital costs).

Figure 24: Projected Capital Costs (in Billions - \$2011)

Program Element	Total
Master Plan South - New York to Washington and Harrisburg Branch	\$14.9
Master Plan North - New York to Boston and New Haven-Springfield Branch	\$3.9
Gateway Program - Newark to New York	\$14.7
NextGen HSR Phase 1 - New York to Washington	\$51.4
NextGen HSR Phase 2 - New York to Boston	\$58.0
High-Speed Rolling Stock	\$5.2
High-Speed Rolling Stock Servicing Facilities	\$2.4
Total	\$150.5

Source: Amtrak

Over the next 13 years, a significant portion of the NEC Capital Investment Program would consist of improvements to the existing Corridor. Along with the Gateway Program, these improvements include a number of major projects, each of which have independent utility along various segments on the existing NEC, and provide substantial overall benefits to all Corridor users while supporting the phased implementation of the entire program. The integrated program also includes improvements to the Philadelphia, PA to Harrisburg, PA and New Haven, CT to Springfield, MA branches, which will add approximately \$1 billion and \$2 billion, respectively, to the total projected capital cost.

Just as capital costs will continue to be refined as the program advances, operating and maintenance costs, as well as ridership and revenue projections, were updated as part of the recent B&F Plan efforts. These projections are summarized in Chapter 5.

4.0 Recent Developments

4.1. NEC Business & Financial Plan

In 2011, Amtrak launched work on a B&F Plan to consider ways of turning the integrated plan for the NEC into reality. KPMG, Steer Davies Gleave, DWH Strategic Advisors, TranSystems and Sharon Greene & Associates worked with Amtrak to develop different elements of the B&F Plan. The NEC Capital Investment Program was used as the base case for this evaluation, which included the following goals and objectives:

- Identify all possible sources of public and private funding;
- Develop ridership demand and revenue projections for Amtrak operations on the Corridor;
- Identify operating and capital components that are most likely to attract private investment;
- Estimate the amount of non-federal funds that can be attracted to the Corridor;
- Derive the timing and nature of potential funding and revenue streams, as well as challenges of the program;
- Develop a ridership, revenue and financial model that incorporates data from the NEC Capital Investment Program;
- Define institutional structures that would be necessary to implement the program;
- Assess the impact of the proposed plan on overall financial position of Amtrak; and
- Define role of Amtrak in the future implementation of the program.

Outcomes from the B&F Plan will be used by Amtrak to further refine and improve the program and contribute FRA's NEC FUTURE – PRCIP process over the coming years. Key findings of the B&F Plan are summarized in Chapter 5.

4.2. NEC Infrastructure Operations and Advisory Commission

The Northeast Corridor Infrastructure Operations and Advisory Commission (NEC Commission) was established by the USDOT in September 2010 under the Passenger Rail Investment and Improvement Act (PRIIA) of 2008. The NEC Commission is responsible for setting goals and developing funding plans and cost allocation methodologies for operation of the NEC, resulting in a more active role for the states in NEC governance, planning and funding. The primary responsibilities of the NEC Commission include:

- Leading regional planning efforts;
- Establishing guidelines for improving coordination among operators;
- Implement equitable financing mechanisms and cost sharing formulas; and
- Developing recommendations for potential funding and financing mechanisms for projects of corridor-wide significance.

Members of the NEC Commission include:

- NEC States: Connecticut, Delaware, Maryland, Massachusetts, New Jersey, New York, Pennsylvania and Rhode Island;
- Washington, District of Columbia;
- U.S. Department of Transportation;
- Amtrak; and
- Non-voting members of commuter and freight railroads operating on the NEC.

MARC Commuter Train



Source: Amtrak

A key responsibility of the NEC Commission is to develop and implement new NEC cost allocations methodologies, as required under PRIIA Section 212 by October 2014. Reaching agreement on such policies and methodologies is a high priority as it will establish the basis for an important recurring funding stream for NEC improvements.

The NEC Commission's work over the next several years along with the FRA's ongoing PRCIP, in accordance with the National Environmental Policy Act (NEPA), provides an opportunity for Amtrak, the FRA and NEC Commission to better coordinate NEC passenger rail service and funding planning, as well as help establish a NEC governance framework that will facilitate program funding and implementation.

4.3. NEC FUTURE – FRA Passenger Rail Corridor Investment Plan

Federal law requires that major federal transportation investments follow a detailed planning process that objectively evaluates service and alignment alternatives based on a consistent set of comparative criteria, including environmental, transportation, economic, job-creation, land use and cost. It also requires that this process involve and engage the public and stakeholders. For passenger rail, this planning process is set forth in the PRIIA and various Federal statutes relating to Amtrak and the FRA.

In 1978, the FRA completed a NEC Programmatic Impact Statement (PEIS), pursuant to NEPA, that evaluated alternatives for investment in the Corridor after the NEC was transferred to Amtrak in 1976. This document laid the foundation for major investments in what today is the most heavily trafficked passenger rail corridor in the U.S. In order to maintain and improve rail service along the NEC, the NEC FUTURE – PRCIP will develop a new environmental analysis to create a corridor investment plan for the next 30 years.

The PRCIP is an important early step in defining and realizing future improvements to the NEC. It will provide significant information to support FRA decisions to fund and support increased investments in passenger rail for the Corridor. The program is comprised of two primary components:

- **Service Development Plan (SDP)** that articulates the overall scope and approach for future intercity passenger rail service along the NEC; and
- **National Environmental Policy Act (NEPA)** - Programmatic environmental impact statement that addresses the broad environmental impacts for the entire Corridor along the route of proposed service, which is also known as a "Service" NEPA review.

For large-scale intercity passenger rail development programs, such as the proposed Amtrak NEC Capital Investment Program, the process begins with studies and documentation that address the broad social, economic, financial and environmental effects for the entire Corridor along the route of proposed service. This "Service" NEPA environmental review will include rail service planning, conceptual engineering and a programmatic, or Tier I, Environmental Impact Statement (EIS). After the 38-month Tier 1 EIS period, site-specific environmental reviews are also necessary before a decision can be made to proceed with the final design and construction of the various projects involved in implementing the overall plan for the NEC.

Over the duration of the program, Amtrak will continue to offer its support to the PRCIP process and coordinate with the FRA, as well as other stakeholders and operators along the NEC, to properly deliver a plan that will benefit all Corridor users.

5.0 NEC Business & Financial Plan

The B&F Plan team recognized that the Amtrak Vision for the NEC is a visionary and unprecedented infrastructure program, involving the rehabilitation and upgrading of the entire NEC, that will improve reliability, enhance rail capacity and dramatically reduce travel times. As part of the B&F Plan, the proposed NEC Capital Investment Program functioned as the base case for feasibility, benefit, cost, and impact analyses, as described in the following sections.

5.1. Key Findings and Recommendations

Phasing and Integration

The B&F Plan identified options to phase NEC Capital Investment Program elements in order to support a realistic construction expenditure profile that reduces annual expenditure rates from the current base case. The base case included an average annual expenditure rate of \$5-11 billion during peak years, which was deemed too high to feasibly achieve, and provided most of the system’s revenue growth in later years well after most capital expenditures had occurred (Figure 25). Therefore an analysis was performed to find

Figure 25: Base Case - Total Capital Expenditures by Segment and Total Net Operating Revenue (in Billions - \$2011)

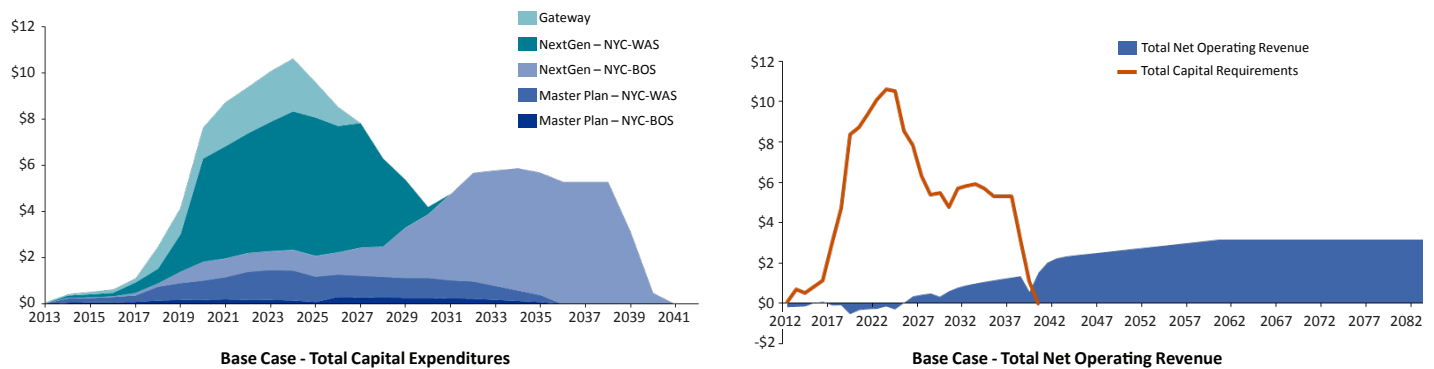
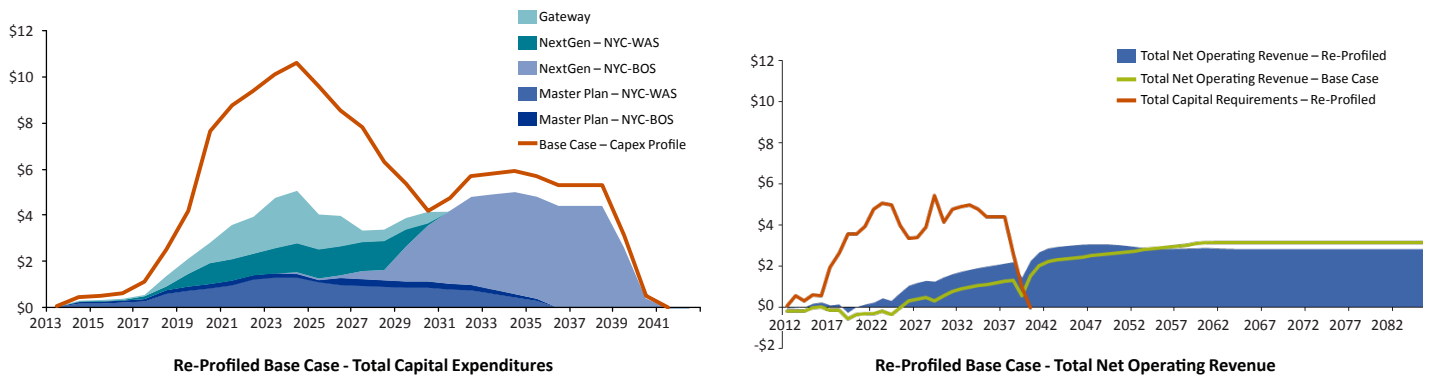


Figure 26: Re-Profiled Base Case - Total Capital Expenditures by Segment and Total Net Operating Revenue (in Billions - \$2011)



Source: NEC Business & Financial Plan

opportunities to reduce capital expenditures while supporting service growth and improvements that would lead to ridership service gains. One such illustrative alteration to the base case is shown in Figure 26, as a re-profiled base case, which reduced the capital expenditure rate to \$3-4 billion per annum on average during peak years of expenditure. The re-profiling demonstrated a deferment of \$57 billion in capital expenditures by 2040, by delaying some segments of the NextGen HSR alignment and construction of new NextGen HSR stations until subsequent phases while anticipated revenues through 2040 were largely preserved. In the re-profiled option, the question of further expenditure beyond 2040 to complete the full investment program is intentionally left open. Whether the full expenditure on new HSR stations is made in this scenario, for example, depends on the views and commitments of federal, state and local stakeholders. Phasing alternatives such as these will allow Amtrak and other stakeholders to consider various development approaches that could reduce expenditures, while achieving capacity improvements and ridership gains.

Access Fees

The use of access fees as a funding strategy builds upon the provisions of PRIIA Section 212, which requires the NEC Commission to develop a standardized formula for NEC access fees based on allocating costs, revenues and compensation for commuter rail usage of NEC assets. These new access fees could act as a source of funding for program capital costs and improvements. The B&F Plan draws on experience from international rail operators that have generated revenue from access fees and monetized them to fund future expansion to benefit those users. International experience also showed that asset base value is used to calculate fees that can cover the cost of all future maintenance expenditures.

State and Local Involvement

The B&F Plan recommended involving cities and states along the NEC as key participants for future investment decisions regarding future services, shared-use infrastructure and individual stations along the Corridor. The B&F Plan also discussed the possibility of raising dedicated taxes locally to support NEC improvements. These could come from a number of different sources, including sales tax, gas tax, vehicle registration fees, all of which could become a dedicated source for funding of the program. Tax Increment Financing (TIF) was also recommended as a potential means of generating revenue from localities along the Corridor and noted it could provide important seed money for the program.

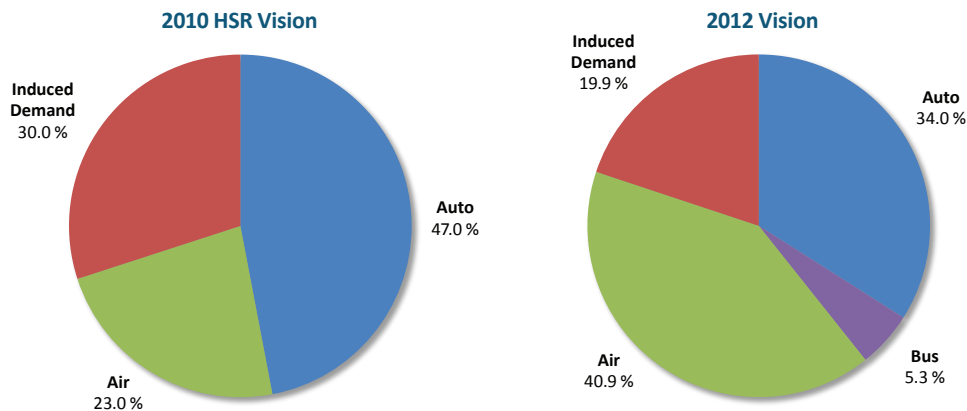
Federal Support

The B&F Plan concluded that federal funding is a crucial component and necessary to deliver major NEC improvements. It is clear that existing federal funding for rail and other relevant transportation programs are insufficient for Amtrak to develop the full program. International experience shows that dedicated support from federal governments has been required to fund significant proportions of HSR and other major passenger rail projects in the early stages. Historically, the federal government has provided 50% to 80% of the total investment costs for highway, transit and aviation projects. Similar levels of support will be necessary to advance significant NEC improvements. The B&F Plan also identified that federal funding sources need to have a sustainable structure, that is not subject to the uncertain annual appropriations process, and provide consistent support over the long-term. In addition, the B&F Plan identified the need for federal funding guarantees as a “backstop” to enable Amtrak to raise private funds at preferential rates and suggested that various tax credit strategies might be applicable to help fund the program.

Travel Demand and Financing Models

The base case results reflect new travel demand and financing models developed through the B&F Plan. These resources will allow Amtrak and its partners to explore different service and capital investment scenarios and forecast future operating costs and net revenues. The new ridership model projected a ridership improvement of 28% over levels shown in the 2010 HSR Vision report (Figure 27 and 30). The two models will provide Amtrak with flexible tools that can be used to assess options for NEC phasing and development, and allow Amtrak to provide projections as input to the FRA's PRCIP process.

Figure 27: Sources of Additional Rail Ridership in 2040



Source: NEC Business & Financial Plan

Private Sector Support

The B&F Plan acknowledged that Amtrak will require significant external resources to deliver the program and that the involvement of the private sector is vital. Early introduction of the private sector is most likely through the use of “design-build” arrangements where some of the delivery risk is transferred to the private sector. After these early phases, opportunities for involving the private sector are likely to grow. Monetization methods have been used in many international infrastructure projects, including rail, to fund large-scale projects. This type of funding is difficult to arrange at affordable rates until sufficient confidence has been obtained that a revenue stream is secure. Therefore, a significant amount of such funding is not likely to be available until the first HSR segment is completed by 2030.

Organizational Structure and Resources

The introduction of business lines as outlined in the Amtrak *Strategic Plan FY2011-2015* will create a clearer accountability and transparency to successfully deliver the program. Amtrak will need a highly skilled and experienced team dedicated to the development and delivery of the program. It was also recommended that Amtrak create a program management function with strategic advisors who can draw from international and industry experience to help guide its development and delivery.

Near-Term Goals and Gaining Momentum

The ability to deliver the overall program will be heightened by some early successes. Amtrak should develop “pathway” projects, such as elements of the Gateway Program or NEC NJ Section Improvements Project, to gain support and demonstrate the ability to implement major improvement programs. In addition, the B&F Plan found that NextGen HSR program elements have the ability to deliver crucial benefits that could help foster early support.

5.2. Ridership and Revenue

The 2010 HSR Vision report originally predicted NEC ridership growth from 11.8 million riders in 2010 to 33.7 million in 2040 and annual ticket revenues from \$0.89 billion in 2010 to \$3.29 billion (\$2010) in 2040.

A new assessment was undertaken as part of the B&F Plan to determine ridership and revenue estimates for the integrated program and independently verify the results developed in the 2010 HSR Vision report. In this new assessment, elements that impacted ridership levels were broken down into different categories, including journey time, relative cost, and service frequencies. New NEC estimates under the base case predicted a total ridership level of 43.5 million riders (Figure 28) and annual ticket revenues of \$4.86 billion (\$2011) by 2040 (Figure 29).

Figure 28: Base Case - Ridership Forecasts (in Millions)

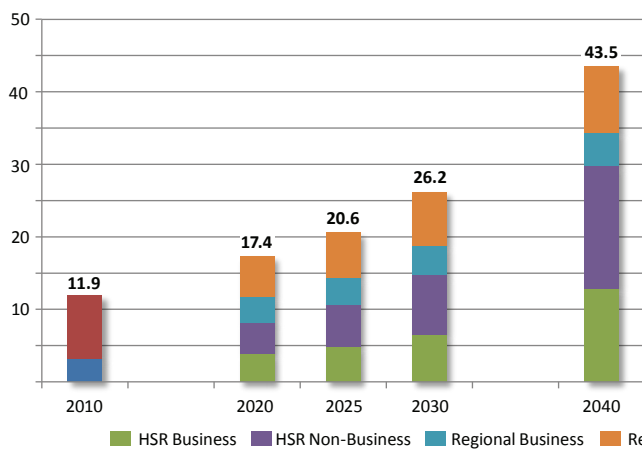
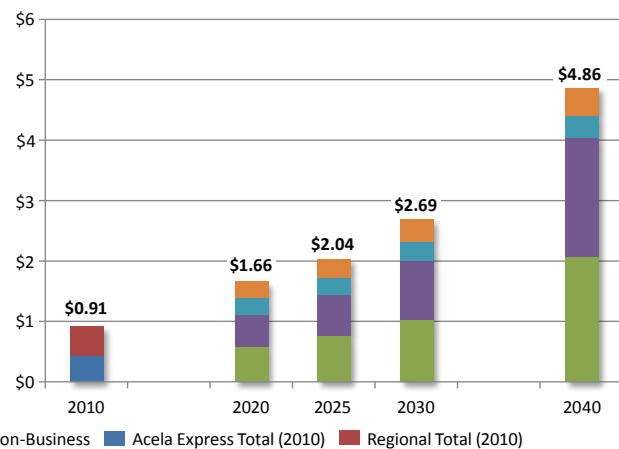


Figure 29: Base Case - Revenue Forecasts (in \$ Billions)



Source: NEC Business & Financial Plan

Overall NEC ridership would increase approximately 269% by 2040 under the B&F Plan, as compared to 186% under the 2010 HSR Vision and 98% under the Master Plan (Figure 30). In addition, HSR ridership would increase a significant 828% by 2040 under the B&F Plan, from the current 3.2 million *Acela Express* riders to 29.7 million high-speed riders. NEC ticket revenues would also increase 446% by 2040.

The new projections are significantly higher than earlier estimates and show an even greater increase of riders on HSR services compared to regional services, which consists of regional and long distance routes. As a result of dramatically reduced trip times, HSR services would become more attractive along the NEC. The benefit of HSR services over regional services becomes much greater and worth the cost of existing fare structures. The projections from the B&F Plan also highlight that the level of ridership could be changed by managed adjustments in fare levels and astute use of the yield management system, which could create greater financial returns.

Figure 30: Projected Ridership (in Millions) and Revenue (in \$ Billions) by Service in 2040

Category	Master Plan			2010 HSR Vision			2012 Vision		
	Acela Express	Regional	Total	NextGen HSR	Regional	Total	NextGen HSR	Regional	Total
Ridership	6.5	16.9	23.4	17.7	16.1	33.7	29.7	13.8	43.5
Revenue	\$0.89	\$0.95	\$1.84	\$2.39	\$0.90	\$3.29	\$4.05	\$0.81	\$4.86

Source: NEC Business & Financial Plan

5.3. Operating and Maintenance Costs

The 2010 HSR Vision identified that a critical benefit of the proposed service would be its ability to cover its overall operating and maintenance (O&M) costs, including long-term SOGR investments, and generate an estimated annual operating surplus of \$928 million by 2040. O&M cost projections are an important element of the program planning process, along with ridership and revenue projections they provide the basis for any business plan. Given the critical importance of O&M cost projections, the NEC Capital Investment Program incorporated cost estimates for the following elements:

- Maintenance of all Amtrak owned infrastructure;
- Provision of essential services for train operations using associated infrastructure, including train movements, security and station operations;
- Operation of Amtrak *Acela Express* and Regional services on the NEC;
- Maintenance of Amtrak rolling stock; and
- Associated overhead expenses and contingencies.

Over the last year, these costs were further refined into appropriate categories and differentiated into fixed, semi-fixed, and variable elements, with unit rates derived from historic data for the base year of 2011, to estimate future O&M costs.

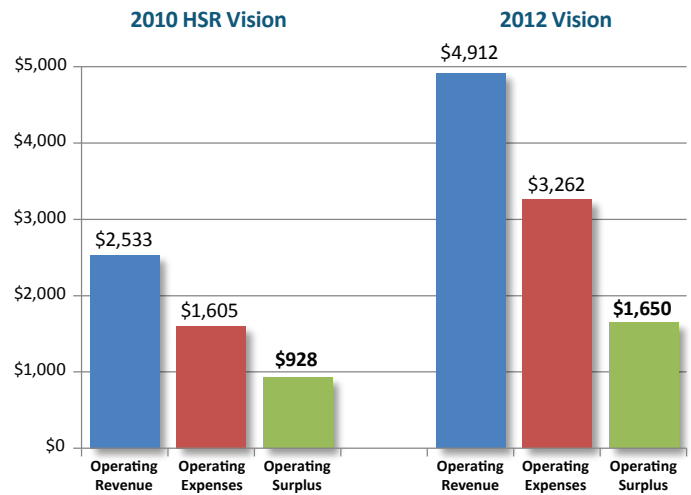
Amtrak services were assumed to increase at staged intervals over the Stair-Step milestone years of 2015, 2020, 2025, 2030 and 2040. These Stair-Step milestone years reflect the opportunity for Amtrak to utilize the additional capacity created through program implementation, with service between these milestone years assumed to remain constant. In each of these years, the increase in O&M costs under the base case was projected to be in line with the expansion of service and higher utilization of NEC infrastructure.

The key driver for O&M costs over the planning period was train-miles, which are directly related to the level of train service provided by each operator. Full operating plans were developed for Amtrak HSR and Regional services, but commuter service levels were assumed to increase linearly between the base year of 2011 and 2030. Beyond 2030 it was assumed that commuter service levels would remain constant, which is a conservative assumption given that capacity would be freed on the existing NEC for significant expansion of commuter services as HSR services operate on the new NextGen infrastructure.

Operating revenues for future cost projections include:

- Fare and on-board concession revenues;
- Access revenue fees;
- Real estate revenues; and
- Federal and state funding.

Figure 31: Projected Operating Costs in 2040 (in Millions - \$2011)²



Source: NEC Business & Financial Plan

² Figure under the 2010 HSR Vision includes HSR trains and figure under the 2012 Vision includes HSR and Regional trains

5.4. Financial, Economic and Environmental Benefits

Financial Benefits

The 2010 HSR Vision report explained that a significant financial benefit of the proposed NextGen HSR service at full build-out was its ability to cover more than its overall O&M costs. These surplus funds would be available to support direct capital investment in further improvements and/or be leveraged with other potential investment opportunities.

Projected ridership, revenues and O&M costs were estimated as part of the B&F Plan, as shown in Figures 28, 29 and 31. The results of these estimates confirmed that the NEC Capital Investment Program would generate an annual operating surplus of \$1.65 billion (\$2011) by 2040, approximately 78% higher than the 2010 HSR Vision report estimate.

Economic Benefits

The analyses undertaken as part of the NEC Capital Investment Program identified positive economic impacts of the construction and operation of the proposed investment program, including:

- **NEC Construction Jobs** – With the implementation of NextGen HSR, construction would generate approximately 40,000 annual jobs and \$33 billion (\$2011) in wages over a 25-year construction period.
- **Permanent NEC Jobs** – The program would support approximately 7,000 new permanent jobs within Amtrak, which along with indirect and induced employment result in an overall total of approximately 22,000 jobs and \$1.4 billion (\$2011) in annual wages. Other jobs would be created by enhanced mobility benefits, such as improved connectivity.
- **Shorter Travel Times** – Reduced journey times introduced by HSR positively impact the leisure time of passengers. Business travelers on HSR services will experience shorter travel times and be able to use their time more efficiently.
- **Improved Productivity** – Improved rail service offers an environment where work can be performed easily en route, thereby raising employee productivity levels. In addition, frequent and fast travel between major business and employment centers will enhance labor markets and reduce time in transit for workers conducting business throughout the region.
- **Safety** – In 2009, 33,808 deaths were reported in U.S. roadway accidents. The additional NEC capacity developed under the integrated program will permit significant numbers of travelers to switch from auto to rail for certain trips, thereby helping to potentially reduce auto accidents on the region's highways.

Environmental Benefits

- **Air Quality** – NEC states are charged with aggressive targets to reduce emissions and improve air quality but with predicted growth in population and associated pollution these targets are becoming increasingly difficult to achieve. Improved service and added capacity on the NEC can help lower the amount of vehicle miles travelled (VMT).
- **Land Use** – Rail uses significantly less land than is used for both auto and air infrastructure and has the ability to create less sustained noise, vibration and visual intrusion. All these factors impact the quality of life of residents on the Corridor. Additionally, expanded rail service can support further development of high density communities, which maximizes the efficient and sustainable use of available land.
- **Reduced Energy Use and Emissions** – Based on energy and emissions factors and evaluation methods from the U.S. EPA and DOE, energy savings along the NEC were estimated at an annual \$0.4 billion, due to a shift from other modes to rail, as rail is more energy-efficient and less-polluting.

6.0 Next Steps

The Amtrak Master Plan and 2010 HSR Vision were important planning documents that led to the development of a new vision for the improvement and expansion of the NEC over the coming decades. Through a Stair-Step phased implementation strategy for near-term and long-term aspects of the integrated NEC Capital Investment Program, Amtrak is committed to bringing the NEC into the 21st Century, with substantial service improvements over the next 5-15 years, as the dedicated NextGen HSR network is phased in over a later period.

While initial NextGen HSR studies have been completed, the specific phasing plan, schedule, alignment, stations and other details that have been analyzed by Amtrak represent only an initial range of alternatives and service configurations that could be developed. These concepts and others will undergo considerable scrutiny as program alternatives are considered under the FRA's NEC PRCIP process and extensive future planning and engineering studies. This document summarizes Amtrak efforts to develop some initial alternatives for consideration under the PRCIP effort, but much work remains for the future.

Amtrak will pursue the following program-wide goals and objectives in the continued development of the NEC Capital Investment Program:

Short-Term (6 - 12 Months)

- Further refine and develop program alternatives as part of the capital expenditure re-profiling efforts explained in Chapter 5;
- Coordinate with the FRA's PRCIP team and present key findings and evaluate options for the PEIS process;
- Coordinate with the FRA's PRCIP team on the upcoming Service Development Plan;
- Explore opportunities with the FRA for expediting the PRCIP process and present options for parallel program work;
- Support NEC Commission development of the PRIIA Section 212 cost sharing methodology with NEC states and commuter authorities;
- Devise future market strategies and coordinate with rail industry experts and potential investors;
- Begin discussions on developing potential funding sources for major NEC improvements; and
- Communicate the contents of this 2012 Update Report and conduct outreach sessions with partners and stakeholders along the NEC.

Concept Rendering of NextGen High-Speed Train-Set



Source: Amtrak

Medium-Term (1 - 3 Years)

- Gain regional political support for NEC improvement efforts, such as those described in this report, and foster support from Corridor partners;
- Demonstrate the ability of Amtrak to deliver major programs by advancing current capital programs and providing open communication with NEC stakeholders;
- Develop appropriate program management capabilities and undertake staffing and resource assessments;
- Define and advance “pathway” projects to gain early support and momentum;
- Coordinate with the NEC Commission to develop appropriate funding mechanisms for NEC improvements and other policy issues; and
- Initiate funding solutions, as identified in the NEC B&F Plan.

Long-Term (3 - 10 Years)

- Continue to work with Congress, the FRA, the NEC Commission and other Corridor stakeholders to support a robust, dedicated and recurring funding source for the program;
- Develop long-term relationships with private sector partners. These relationships will evolve from the early years of design-build discussions to greater private sector financing; and
- Review ongoing changes that may be needed in the structure of Amtrak and the current phased implementation strategy to effectively deliver the program.

Amtrak believes that NEC improvements are vital to the future of the region. These improvements will consist of two related but distinct programs. NEC-UP will improve and renew existing infrastructure, while parallel planning efforts under NEC NextGen HSR will advance the new, dedicated, high-capacity system.

The B&F Plan highlighted the value of the Amtrak vision for the NEC and that significant infrastructure and service improvements can be phased and implemented over an incremental period and deliver significant benefits to Amtrak, Corridor users, the region and the nation. As the principal owner of the NEC, Amtrak is committed to developing and advancing a bold yet realistic vision for the future of the NEC and will continue to further its planning efforts to turn this vision into reality.



