

The Northeast Corridor and the American Economy

April 2014





The United States Congress established the Northeast Corridor Infrastructure and Operations Advisory Commission (the Commission) to develop coordinated strategies for improving the Northeast's core rail network in recognition of the inherent challenges of planning, financing, and implementing major infrastructure improvements that cross multiple

jurisdictions. The expectation is that by coming together to take collective responsibility for the Northeast Corridor (NEC), these disparate stakeholders will achieve a level of success that far exceeds the potential reach of any individual organization.

The Commission is governed by a board comprised of one member from each of the NEC states (Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, and Maryland) and the District of Columbia; four members from Amtrak; and five members from the U.S. Department of Transportation (DOT). The Commission also includes non-voting representatives from four freight railroads, states with connecting corridors, and commuter rail operators in the Region.



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The Commission also would like to recognize the assistance of the following firms and individuals in conducting research and analysis and supporting the preparation of this report.



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NJ TRANSIT passengers wait to board at New York Penn Station



Executive Summary

Report Purpose

The Northeast Corridor and the American Economy responds to a Congressional mandate established in the Passenger Rail Investment and Improvement Act of 2008, commonly referred to as PRIIA, which calls upon the Northeast Corridor Infrastructure and Operations Advisory Commission (the NEC Commission) to submit a report to Congress on the role of the NEC in supporting economic activity and opportunities for the NEC to enhance economic development.

The Northeast Corridor Rail Network

The Northeast Corridor (NEC) rail network between Washington, D.C. and Boston, Massachusetts is an engine of economic activity for the United States in the delivery of workers to jobs, businesses to clients, goods to market, and people to their friends, family, and leisure activities. Its commuter rail and Amtrak intercity services provide 750,000 trips each day. The NEC moves a workforce that contributes more than \$50 billion annually to the national economy.

The NEC is a shared resource, used by eight commuter rail operators, Amtrak, and four freight railroads. It connects eight states and the District of Columbia, but its impacts extend across the country. An unexpected loss of the NEC for one day alone could cost the nation nearly \$100 million in transportation-related impacts and productivity losses, roughly the daily economic output of cities like Winston-Salem, North Carolina, Portland, Maine, or Boulder, Colorado.

The Northeast Corridor Region and Economy

The NEC Region is home to more than 51 million people and four of the ten largest metropolitan areas in the country. The NEC connects interdependent markets that collectively are a national and global force. Its economy is the fifth largest in the world, ahead of France and just behind Germany. The NEC Region is an international center for education, healthcare, technology, media, and finance, all industries widely expected to fuel economic growth in the 21st century. Research in this report finds that the NEC contributes to the productivity and livability of the Region in ways that increase the nation's global competitiveness.

\$3 trillion

Annual economic output of the NEC Region - larger than the GDP of France

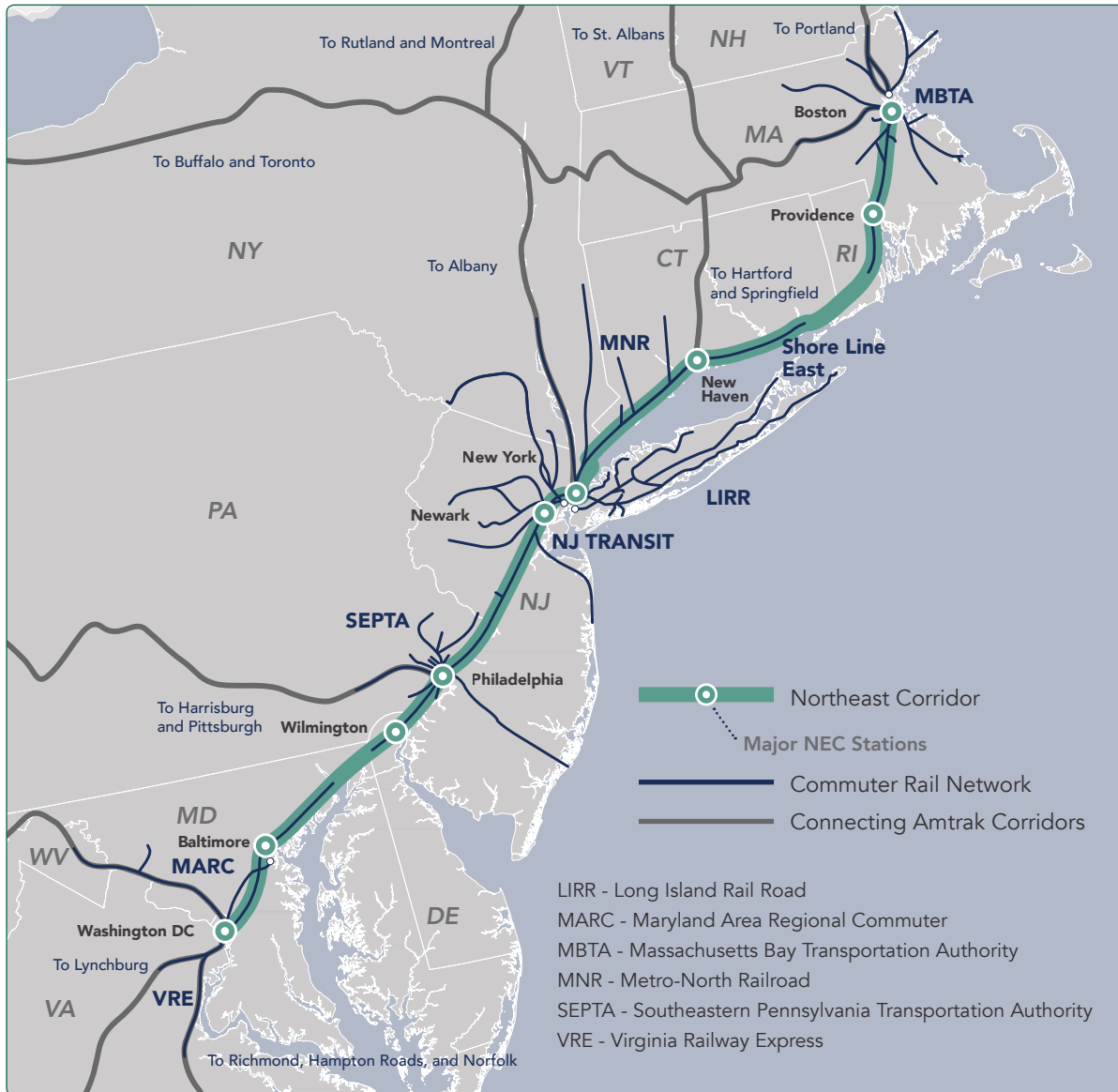
\$50 billion

Annual contribution to the country's GDP of the workforce moved by the NEC

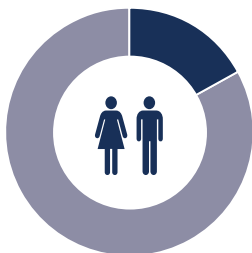
\$100 million

Potential impact on the U.S. economy in the event of a one-day unexpected loss of the NEC

Northeast Corridor Rail Network



U.S. Population



Home to 17% of the U.S. Population

Source: U.S. Census Bureau, 2010

U.S. GDP



Producing 20% of U.S. GDP

Source: Bureau of Economic Analysis, 2010

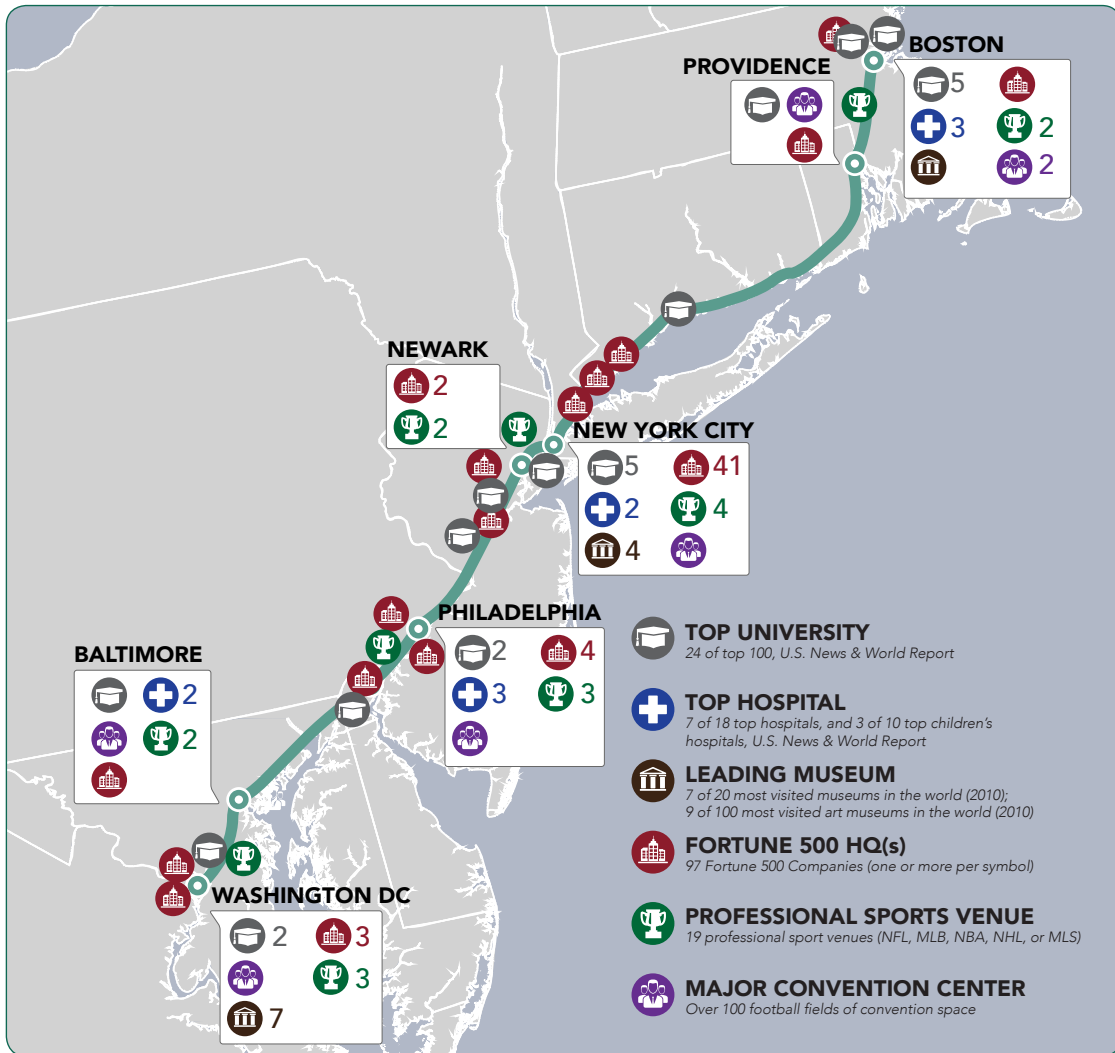
U.S. Land Area



On just 2% of U.S. Land Area

Source: U.S. Geological Survey

Economic and Cultural Resources Along the NEC



1 out of 3

Jobs in the NEC Region are within 5 miles of an NEC station



Over 100 million square feet of development

Within walking distance of the 10 largest NEC stations, equal to 50 Empire State Buildings

The Northeast Corridor – An Engine of Economic Activity

Seven million jobs are within five miles of an NEC station, about a third of all jobs in the NEC Region. The NEC expands the number of communities within reasonable commuting distance of these job centers with rail service that is often faster and more reliable over longer distances than automobile. Increased job accessibility helps businesses by growing their pool of talented workers. Increased job accessibility also allows families to choose from more communities in terms of affordability and lifestyle preferences, while maintaining access to the jobs, educational institutions, cultural attractions, and major event centers in the NEC Region's core cities.

Amtrak intercity service plays a central role in traditional business and leisure travel, but also supports job accessibility in an era when more employers are becoming supportive of arrangements that combine travel with remote work, especially in the case of dual-career households.

In addition to supporting \$50 billion in annual U.S. productivity, the NEC's impact on the American economy is felt in the national aviation system. Though more than half of flight delays nationwide originate at New York and Philadelphia area airports, Amtrak relieves this pressure by carrying more passengers for trips within the NEC Region than all airlines combined. The NEC also connects the national freight rail network to east coast ports, thereby connecting manufacturing plants in states like Illinois, Indiana, Iowa, Kansas, Michigan, Nebraska, and North Dakota to international customers.



6 of the 10

top U.S. universities are located along the NEC



10 of the 28

top U.S. adult and children's hospitals are located along the NEC



20 percent

of U.S. patents granted since 2000; more than Silicon Valley



1 out of 3

Fortune 100 headquarters are in the NEC Region



6 of the 10

largest financial institutions in the world are based in New York



31 percent

of U.S. venture capital deals in 2012; equal to Silicon Valley

Shaping Business Decisions and Driving Investment

Outreach to business and civic leaders throughout the NEC Region reveals that the NEC is a driver of business decision-making and investment. The following stories represent a sampling of the case studies presented in this report.



4,000

New jobs since 2010 at more than 200 small businesses located in the **Boston Innovation District** adjacent to Boston South Station, most in the fields of technology, life sciences, design, and green energy (page 41).

1.7 million square feet

Mixed-use development on former rail yards adjacent to Providence Station after the NEC's right-of-way was relocated in the 1980s as part of a larger successful downtown redevelopment strategy (page 44).



\$200 million

Panasonic's real estate investment, bringing 1,000 jobs to downtown Newark, New Jersey, designed to attract talented young employees with a two-minute walk to Newark Penn Station (page 54).

6.5 million square feet

Mixed-use development planned for **Drexel University's** Innovation Neighborhood at Philadelphia's 30th Street Station, building on nearly \$1 billion in recent station-area construction (page 38).



\$450 million

PBF Energy's reinvestment in an aging oil refinery in Delaware City, Delaware, including a \$52 million rail unloading facility linked to the NEC to process Midwestern crude oil (page 28).



Connecting Smaller Cities to Major Markets

NEC access is a contributing factor in business and job location decisions in Wilmington, Delaware so that employees in the New York and Washington metropolitan areas can travel to oversee operations and meet with colleagues (see page 19 for examples offered by **JP Morgan Chase**, **Capital One**, and other financial institutions).



Driving Location Decisions

Start-up technology and biotechnology firms, like **SeeClickFix** and **Trevi Therapeutics**, included NEC access to major investors in New York and Boston in their decisions to locate in New Haven, Connecticut (page 43).



Impacting How Firms Do Business

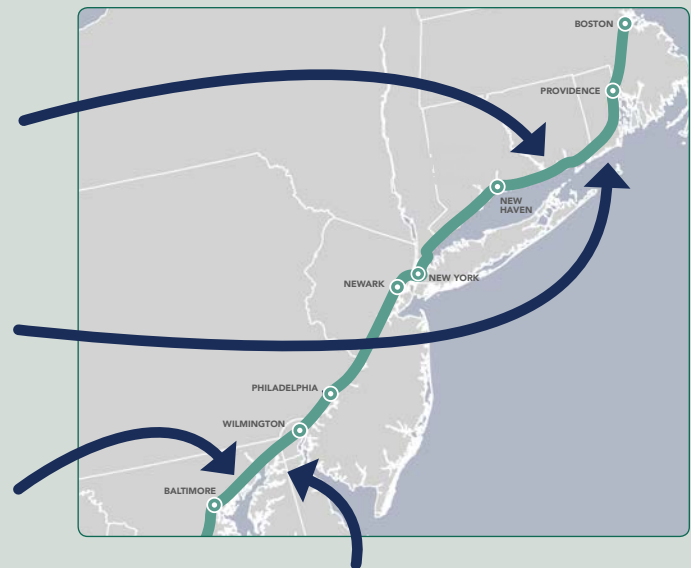
Regional offices of national companies, like **KPMG** in Baltimore (page 20), are changing the way they manage human resources across large geographies to maximize talent utilization aided by the mobility provided by the NEC.

Linking Suppliers, Manufacturers, Shippers, and Customers

The NEC helps to remove trucks from congested highways. **Tilcon Connecticut** moves crushed stone and other construction materials on the NEC between quarries and customers, transporting the equivalent of 35,000 truck loads each year (page 24).

The NEC is the only connection between seaports in Providence, Davisville, New London, and New Haven and the national freight rail network (page 47).

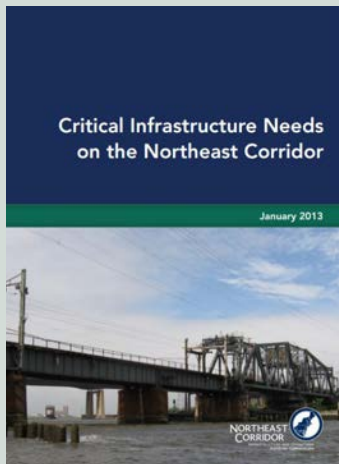
Manufacturing workers in the American Midwest working for companies like **Ford**, **John Deere**, **Mitsubishi**, and **Caterpillar** depend on the NEC when their products ship through the Port of Baltimore, where thousands more workers are employed in preparing and loading goods headed for the global marketplace (pages 25 and 48).



The NEC is the only direct connection between the Delmarva Peninsula, with thousands of agricultural, chemical, and energy industry jobs, and the national freight rail network (page 27).

What Might the Future Hold?

The economic activity described in this report relies on infrastructure largely built generations ago. The Commission released a report in January 2013 entitled *Critical Infrastructure Needs on the Northeast Corridor* (CIN) that explained the most pressing infrastructure challenges that threaten service, many of which have caused disruptions in the last year alone.



A Small Sampling of Recent Infrastructure Failures

- During the evening rush hour on Monday, June 17, 2013, two cars of a Long Island Rail Road train suffered a minor derailment in the East River Tunnels (CIN, page 47).
- On September 5, 2013, the New Haven Line's power supply system (CIN, page 55) suffered a failure that severed normal service between Connecticut and New York for 12 days. Over 60,000 daily NEC riders were affected by the outage, but impacts also spread to the highway network. The Connecticut Department of Economic and Community Development estimated that the State's economy lost at least \$60 million due to the disruption.
- On October 27, 2013, the Pelham Bay Bridge (CIN, page 48) halted Amtrak service between New York City and Boston when it became lodged in the open position.

Service disruptions have economic consequences. Analysis in this report, derived from reported impacts of Superstorm Sandy, finds that an unexpected loss of the NEC for just a single day could cost the country up to \$100 million in additional highway use and lost productivity. This report also analyzes potential highway and aviation system-related impacts of two future NEC service levels. These scenarios demonstrate how the NEC contributes to the performance of the overall transportation system, but do not capture the potential for increased productivity in the overall economy that could result from improved NEC service.

\$1.2 billion lost

per year by 2025 in potential additional costs for the highway and aviation systems if the NEC is unable to accommodate future growth

\$8.2 billion gained

per year by 2040 in potential savings for the highway and aviation systems with long-term sustained investment in the NEC

End Note

This report illustrates the value of the NEC rail network to the NEC Region and the nation. It is the hope of the Commission that the information provided in this report is helpful to Congress and other stakeholders in understanding the many facets of the NEC's role in the American economy and can inform future investment decisions.

Chapter 1
Introduction



Passengers at Washington Union Station

1.1 REPORT PURPOSE

The Passenger Rail Investment and Improvement Act of 2008, commonly referred to as PRIIA, directed the Northeast Corridor Infrastructure and Operations Advisory Commission (the NEC Commission) to develop a report to Congress on economic development associated with the Northeast Corridor (NEC) rail system. Specifically, PRIIA Section 212(e) required the following:

...the Northeast Corridor Infrastructure and Operations Advisory Commission shall transmit to the Committee on Transportation and Infrastructure of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report on the role of Amtrak's Northeast Corridor service between Washington, District of Columbia, and New York, New York, in the economic development of the Northeast Corridor region. The report shall examine how to enhance the utilization of the Northeast Corridor for greater economic development, including improving —

- (1) real estate utilization;
- (2) improved intercity, commuter, and freight services; and
- (3) optimum utility utilization.

This *Northeast Corridor and the American Economy Report* responds to the Congressional mandate in PRIIA. It provides an overview of the Northeast Corridor Region (NEC Region), an analysis of the role that Amtrak and commuter railroads play in supporting today's economy, examples of how the NEC supports jobs and economic activity in the economy of tomorrow, and an assessment of the untapped economic development potential of the NEC rail asset. The report goes beyond the Congressional charge to include the NEC Region between Washington, D.C. and Boston, Massachusetts.

This report presents both quantitative and qualitative assessments of the NEC's current role and future potential in shaping the U.S. economy. It presents economic, real estate, and transportation data – supplemented by business interviews and scenario analyses – to assess the role of the NEC in the economy of the NEC Region and the country. Business outreach included a combination of one-on-one interviews with business representatives throughout the NEC Region and focus groups in four NEC cities (New Haven, New York, Philadelphia, and Baltimore) and the participation of more than 70 individual organizations.

1.2 OVERVIEW OF THE NEC RAIL NETWORK

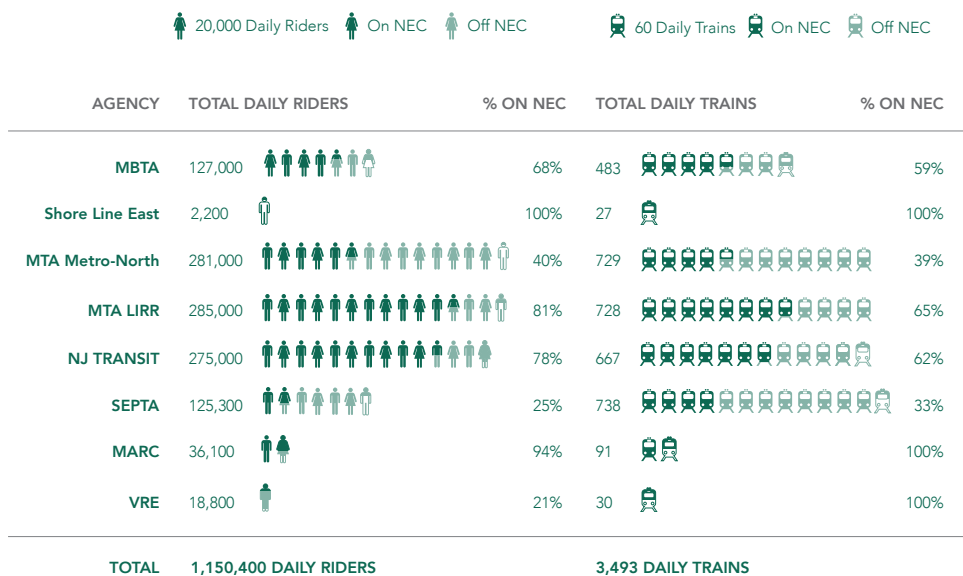
The NEC Region has one of the most extensive multi-modal transportation systems in the country – highways, airports, ports, intercity and commuter rail, and public transit – providing mobility to more than 50 million people and helping to sustain the growth and vibrancy of the NEC regional economy. A critical piece of this system is an extensive rail network that carries freight as well as more than 350 million intercity and local passengers per year, connecting major urban centers to each other and their surrounding communities. This rail network is anchored by the 457-mile NEC main line, which links Boston, New York, and Washington, D.C.

While this report is focused on the NEC main line, it should be noted that there is a broader network of connecting corridors (Figure 1.2) that feed additional commuter rail and Amtrak lines onto the NEC. All eight Northeastern commuter railroads rely on the NEC for a significant portion of their operations. Of the approximately 1.5 million daily commuter rail trips in the nation, about 50 percent use the NEC for a portion of their trip (Figure 1.1). About half of the nation’s intercity rail trips use the NEC.

- Every day over 710,000 trips travel over portions of the NEC on one of eight commuter rail services.¹
- Amtrak carries over 40,000 intercity rail trips on the NEC every day.²
- Ridership on Amtrak’s NEC services has grown 37 percent since 2000.³
- New York Penn Station, Washington Union Station, and Philadelphia 30th Street Station are the three highest volume intercity rail stations in the country.⁴
- Four private freight railroads utilize some portion of the NEC, moving approximately 350,000 carloads along it every year and supporting the country’s global competitiveness.⁵

About 50 percent of commuter rail trips in the nation rely on the NEC.

Figure 1.1: 2012 Commuter Rail Ridership and Traffic Volume on the NEC



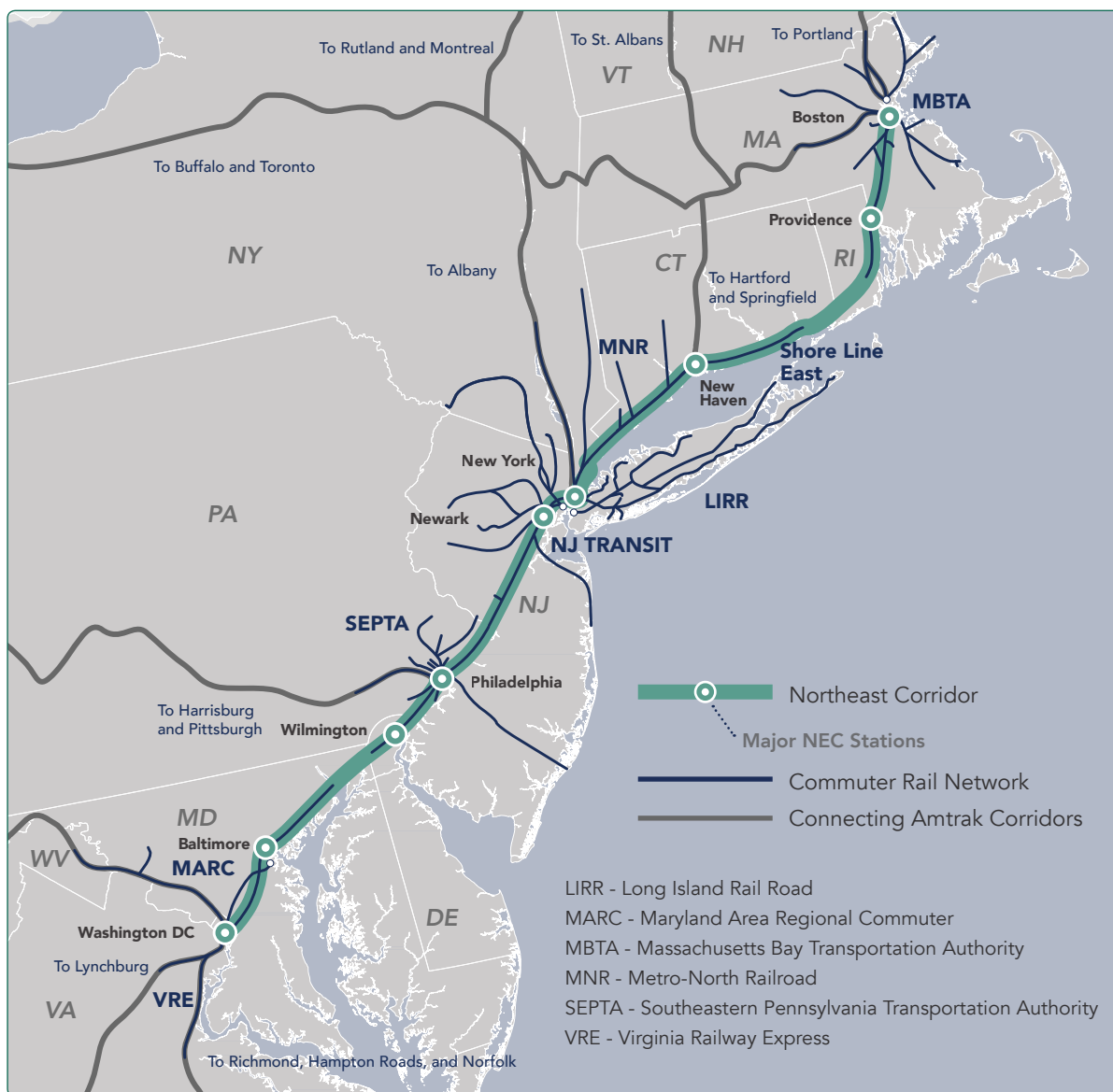
Data Source: National Transit Database

1.3 REPORT ORGANIZATION

This report is organized into six chapters:

1. **Introduction:** Presents the report purpose and an overview of the NEC rail network.
2. **The Northeast Corridor Region:** Provides a brief overview of the NEC Region’s population growth, transportation demand, and economic parameters.
3. **Critical Asset in Today’s Economy:** Presents case studies as well as quantitative information to illustrate the role of the NEC rail network in today’s economy, including a scenario that analyzes the economic impacts of an unexpected one-day loss of the NEC.

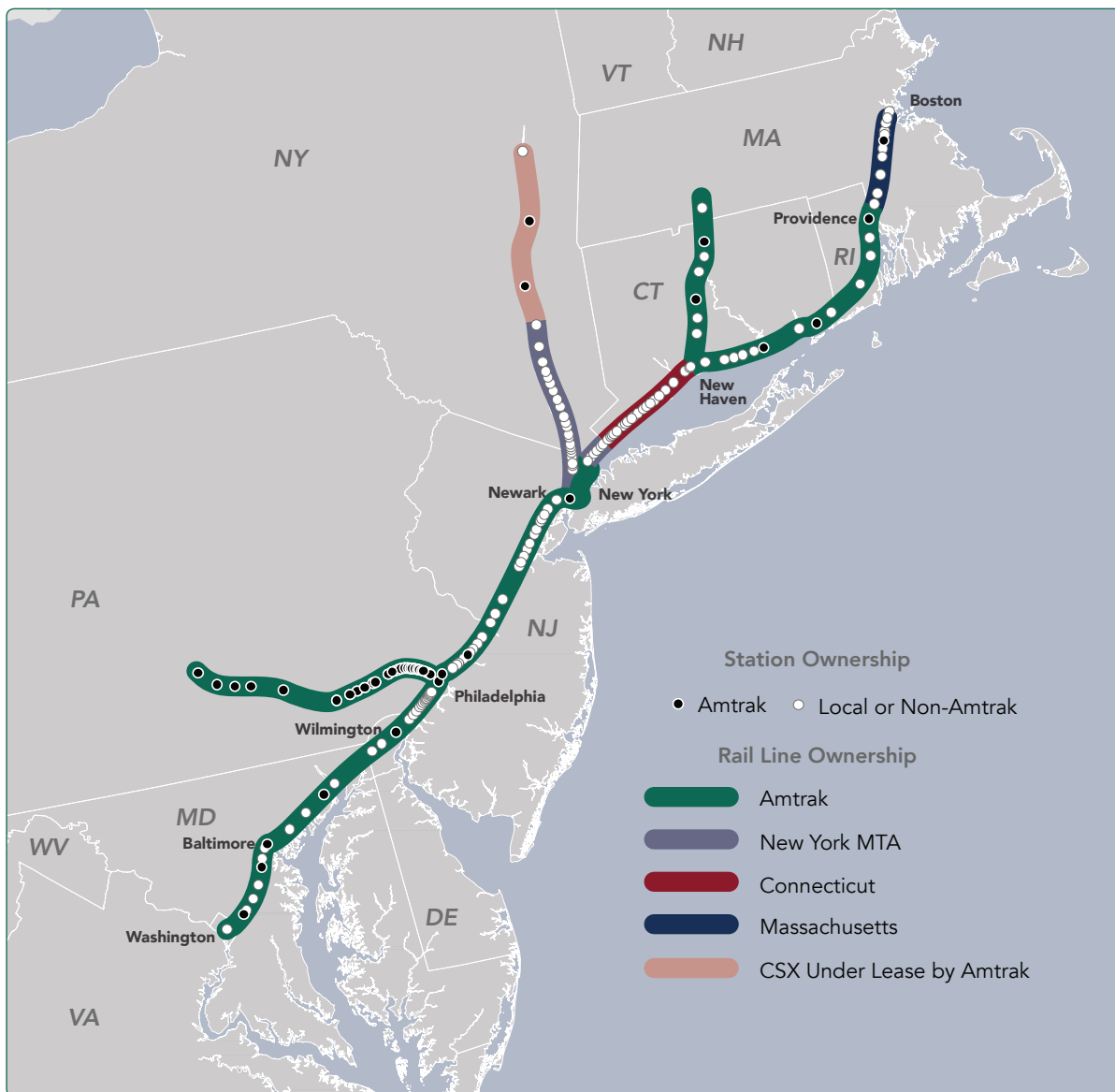
Figure 1.2: NEC Rail Network



Data Source: National Transportation Atlas Database

4. **Connections for Tomorrow's Economy:** Presents case studies and quantitative information on the role of the NEC in supporting 21st century knowledge industries, as well as the role NEC freight rail plays in connecting businesses across the U.S. with the global marketplace.
5. **Real Estate and Utilities:** Provides information on current and potential real estate value associated with proximity to NEC stations and service, describes current development plans throughout the corridor, and reviews the economic value of NEC right-of-way, real estate, and utilities.
6. **Future Investment Scenarios:** Offers information on the potential transportation system-related economic impacts of future NEC service levels.

Figure 1.3: Ownership of NEC Main Line, Connecting Corridors, and Stations



Data Source: National Transportation Atlas Database, Amtrak, Commuter Railroads.



Downtown Boston and the Charles River

CHAPTER ONE NOTES AND CITATIONS

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Chapter 2
The Northeast Corridor Region



Midtown Manhattan, the nation's largest business district

2.1 JOBS, DEMOGRAPHICS, AND THE ECONOMY

The gross domestic product (GDP) of the NEC Region is \$3 trillion per year - equivalent to 21 percent of the total national GDP.⁶ If the NEC Region were an autonomous country, its economy would be the fifth largest in the world, ahead of France and just behind Germany. The four major metropolitan areas in the NEC Region (Boston, New York, Philadelphia, and Washington, D.C.) are among the top 25 largest metropolitan areas (ranked by GDP) in the world.⁷ The density of cultural and economic resources in the NEC Region is unrivaled in the U.S. (Figure 2.1).

Northeast Corridor Regional Statistics at a Glance*

EMPLOYMENT

- 24 million jobs, accounting for 1 out of 5 jobs in the U.S.
- 7 million jobs within 5 miles of an NEC Amtrak station
- Job density within 1 mile of NEC stations 680 times higher than national average

TECHNOLOGY & INNOVATION

- 3.7 million knowledge industry jobs in 10 core NEC cities
- 39% of U.S. patents since 2000

FINANCE & BANKING

- 6 of top 10 U.S. financial institutions
- 31% of U.S. venture capital deals, as many as Silicon Valley

EDUCATION & HEALTHCARE

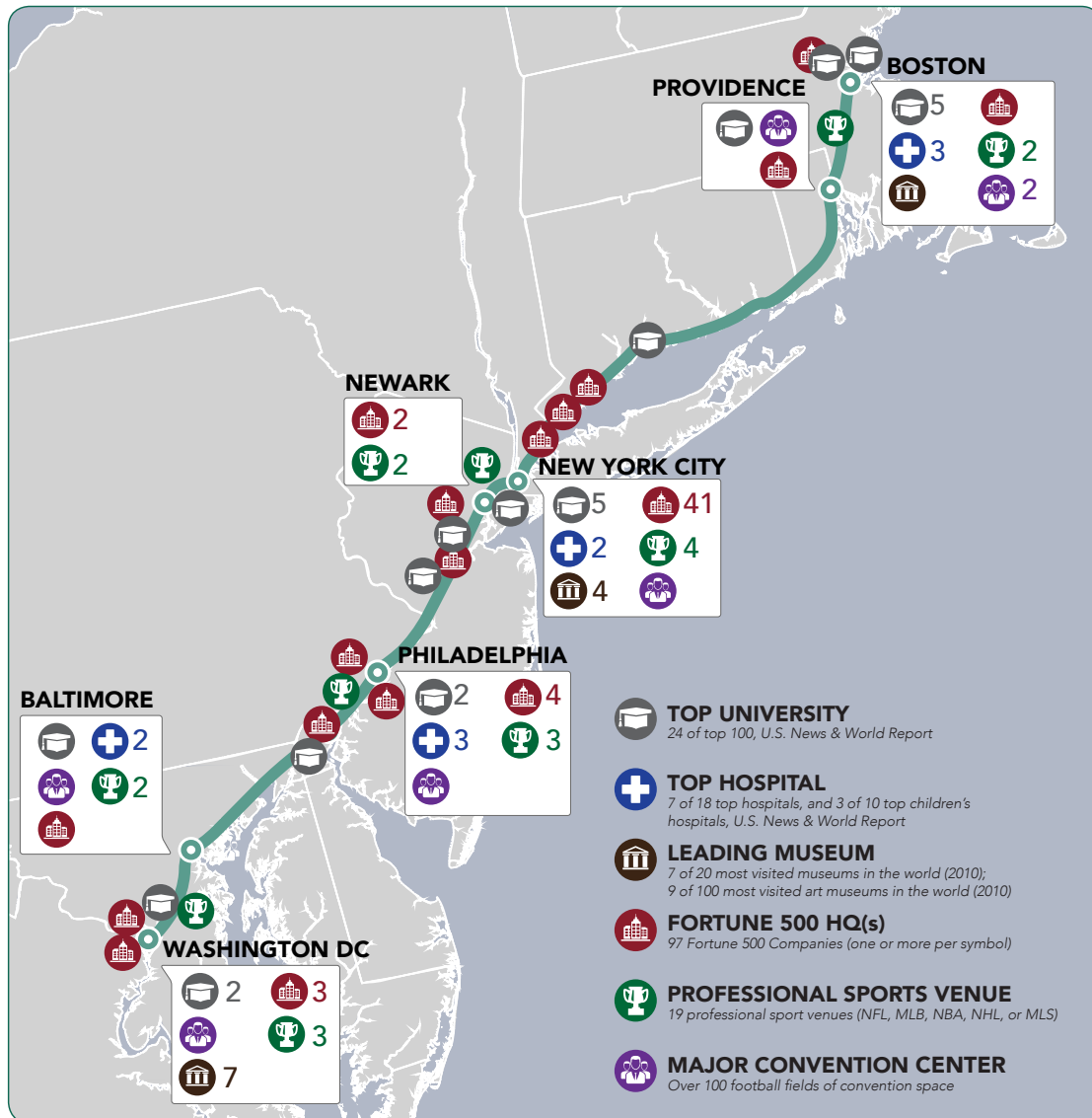
- 6 of top 10 ranked U.S. universities
- 263 colleges and universities within 5 miles of NEC stations
- 7 of top 18 nationally ranked hospitals

TOURISM & ENTERTAINMENT

- 7 of top 20 most visited museums in the world
- 4.7 million tickets purchased by visitors for a Broadway show
- 4 of top 15 U.S. cities for international visitors
- More than 6 million square feet (100 football fields) of convention space
- 19 professional sports stadiums and arenas

**Statistics cited elsewhere throughout report*

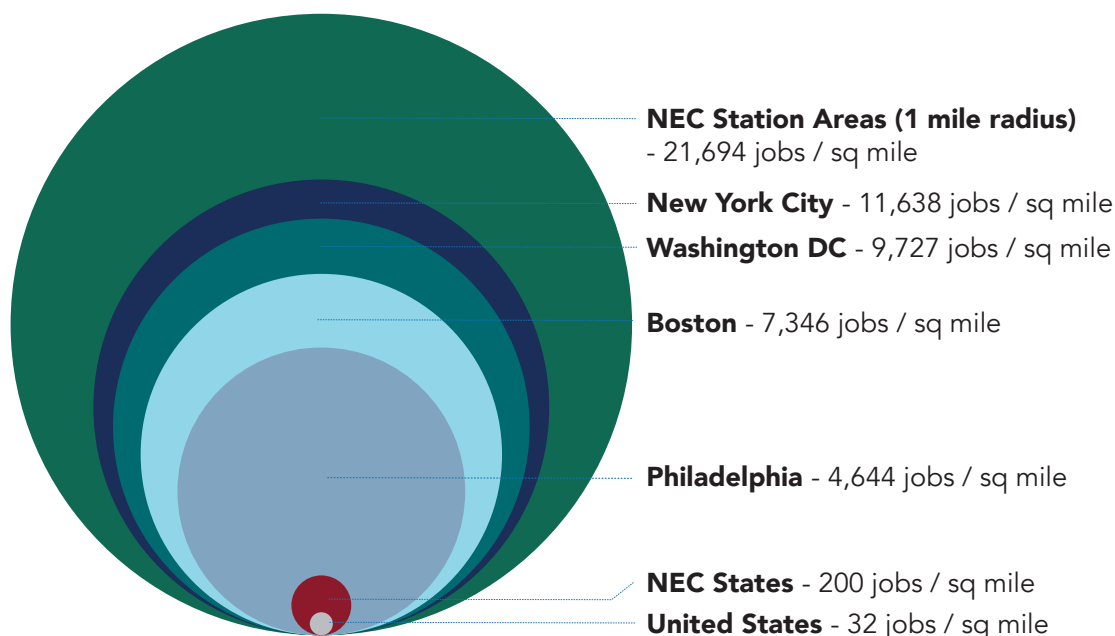
Figure 2.1: Cultural and Economic Resources along the NEC



There are over 24 million jobs in the NEC Region, accounting for approximately one out of every five jobs in the United States.⁸ One out of every three Fortune 100 companies is based in the Region.

The NEC Region has high densities of population and jobs. Rail and density have a mutually reinforcing relationship. Rail efficiently moves high volumes of people to busy places and busy places provide rail with high ridership. At the broadest level, the four major metropolitan areas - Boston, New York, Philadelphia, and Washington, D.C. - account for over 75 percent of NEC Region employment.⁹ Jobs are further concentrated within the metropolitan areas, as 30 percent of jobs are in the top 10 counties that represent just two percent of the Region's land area.¹⁰ Job density is even greater around the NEC's rail stations. Within one mile of the NEC stations, the average employment density is 21,700 jobs per square mile (Figure 2.2). Stated another way, job density within one mile of the NEC stations is 680 times higher than the U.S. average. This density not only supports the recruiting needs of employers in the Region but also facilitates business collaboration, particularly in high tech fields that require incubation.

Figure 2.2: Job Density of NEC Stations



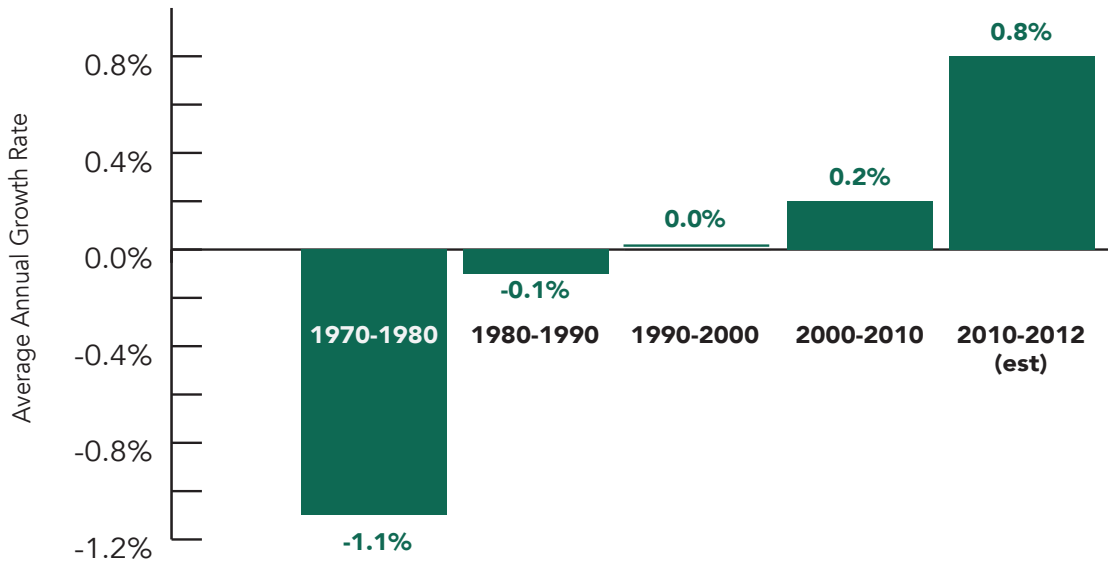
Data Sources: U.S. Census Longitudinal Employer-Household Dynamics (LEHD) and Massachusetts Southeastern Massachusetts MPO 2011 Employment by Sector

Fifty-one million people live in the NEC Region today.¹¹ Many of the core cities in the NEC Region shrank in the decades following World War II, but in the last few years, population is growing again in all ten of the NEC cities served by most Acela trains (Figure 2.3).¹² Overall average annual population growth in core cities along the corridor was faster since 2010 than during any other decade within the last 40 years.

2.2 TRANSPORTATION OVERVIEW

Much of the NEC Region's economic activity occurs within the four major metropolitan areas, where commerce is facilitated by roadway and transit (including commuter rail) networks. Economic activity, however, does not stop at city boundaries or state lines. Each of these metropolitan areas encompasses multiple states, and the metropolitan economies are linked to each other by economic activity among them. The intercity transportation network - comprised of the air, highway, and rail systems - serves as the backbone of the NEC Region's economy, providing physical linkages to connect the metropolitan areas and facilitate interstate commerce. Transit systems such as Philadelphia's Southeastern Pennsylvania Transportation Authority (SEPTA), New York's Metropolitan Transportation Authority (MTA), and Boston's Massachusetts Bay Transportation Authority (MBTA) are integral parts of the transportation network, as they connect NEC passengers with destinations throughout their respective metropolitan areas. While home to extensive roadway networks like much of the nation, residents of the NEC Region exhibit a more diversified set of travel behaviors based on their available travel options. For instance, the share of NEC Region residents who use public transportation to commute is over three times higher than the national average and is growing. The eight commuter rail systems in the Northeast carry 75 percent of commuter rail riders nationally.

Figure 2.3: Annual Population Growth Rates by Decade for Core NEC Cities Served by Acela



Data Source: U.S. Census. Core Cities include: Washington, D.C., Baltimore, Wilmington, Philadelphia, Newark, New York, Stamford, New Haven, Providence and Boston

As population grows, the transportation network may become an increasing constraint on economic growth and productivity. By 2040, the NEC Region is expected to add seven million new residents.¹³ Underlying demand for all modes of transportation is expected to grow, and no mode has sufficient new capacity planned to accommodate this growth.

At the eight major airports in the NEC Region,¹⁴ underlying demand is expected to grow 94 percent between 2012 and 2040.¹⁵ Without significant investment in these airports, however, they may not be able to accommodate this growth without increasing aviation network delays. A 2007 study led by the Federal Aviation Administration concluded that even with planned capacity improvements taken into account, the three major New York area airports and Philadelphia

International Airport will have insufficient capacity to respond to projected growth by 2025.¹⁶ Delays at these four airports have consequences across the country. A 2010 Government Accountability Office report found that nearly one-half of flight delays nationally were attributed to these airports.¹⁷

61 percent of globally mobile professionals believe better transportation is important to their city's international competitiveness.

Growing demands on the Region's highways are expected to increase congestion on an already stressed system. Analysis using the I-95 Corridor Coalition's Integrated Corridor Analysis Tool (ICAT) indicates vehicle miles traveled on the Region's highways could grow by as much as 22 percent from 2010 to 2040.¹⁸ With much of the highway infrastructure reaching the end of its original life expectancy, state departments of transportation are directing a significant share of their investments to renewal projects; very few are constructing or planning new "greenfield" facilities.

Significant investment in rail is also necessary to rebuild century old bridges and tunnels, replace antiquated power supply and signal systems, and keep pace with anticipated growth. In the Northeast Corridor Infrastructure Master

Plan, Amtrak and the eight commuter railroads found that with slightly over \$50 billion of investments in modernizing existing infrastructure and increasing capacity, intercity ridership could increase by 76 percent and commuter ridership by 58 percent by 2030.¹⁹ That same study, however, also concluded that the rail system would still be operating at capacity in 2030 even with those improvements. Subsequent studies have estimated that with additional investment in parallel infrastructure, rail demand could grow by more than 200 percent by 2040.²⁰

Transportation investments are critical to the future of competitiveness in the global economy. In its 2013-2014 Global Competitiveness Report, the World Economic Forum identifies infrastructure quality as the second of twelve pillars to global competitiveness, stating that “extensive and efficient infrastructure is critical for ensuring the effective functioning of the economy.”²¹ Unfortunately, the report ranks the U.S. 15th in the quality of overall infrastructure (Figure 2.4) - a ranking that holds back the country’s 5th place rating in overall global competitiveness. For example, when a recent survey asked 575 urban professionals living and working in metropolitan areas around the world what should be the main priority for making their city more competitive, 61 percent of respondents put transportation issues at the top of their list - far ahead of education, security, healthcare, and sporting/cultural events.²²

Figure 2.4: World Economic Forum Infrastructure Ranking

Ranking	Country	Score
1	Hong Kong	6.74
2	Singapore	6.41
3	Germany	6.24
4	France	6.21
5	United Arab Emirates	6.20
6	Switzerland	6.20
7	Netherlands	6.13
8	United Kingdom	6.12
9	Japan	6.03
10	Spain	5.97
11	South Korea	5.85
12	Canada	5.80
13	Luxembourg	5.79
14	Taiwan	5.77
15	United States	5.77
16	Austria	5.72
17	Iceland	5.61
18	Australia	5.60
19	Belgium	5.60
20	Sweden	5.60

Data Source: World Economic Forum Global Competitiveness Report 2013-2014

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Chapter 3

Critical Asset in Today's Economy



3.1 INTRODUCTION

The NEC is a critical asset that supports economic activity across a wide swath of communities, businesses, and industries, from professional services and technology companies to entertainment venues, Midwest-based manufacturers of automobiles and heavy equipment, industrial and agricultural suppliers, and major educational institutions. These businesses are located in rural, suburban, and urban communities in the Northeast and beyond. The NEC moves a workforce that contributes more than \$50 billion to the American economy annually.

If this vital asset were lost, for even a day, the impacts would be - and have been - staggering. Interpolating from survey results associated with Superstorm Sandy, and combining the impacts associated with commuter and intercity service, this report finds that the economic cost of an unexpected one-day loss of the NEC could be nearly \$100 million.

3.2 COMMUTING TO WORK

Commuter rail systems allow central city businesses to recruit and retain talented employees from large geographies throughout a metropolitan area by offering a reliable alternative to driving long distances on congested highways. In the NEC Region, central cities remain the dominant employment centers. In the New York metropolitan area, 31 percent of all jobs are located within three miles of Manhattan's center; in the Boston metropolitan area, it is 29 percent; and in New Haven, it is 45 percent.²³ The economic success of New York City is particularly dependent on access to commuter rail, as 11 percent of those working in Manhattan - approximately 255,000 people - use commuter rail to get to work.

While the NEC Region represents 17 percent of the U.S. population, its eight commuter railroads move 75 percent of the nation's commuter rail passengers.

Relative to other parts of the country, commuter rail plays a disproportionately large role in supporting mobility in the NEC Region. While the NEC Region represents 17 percent of the U.S. population,²⁴ its eight commuter railroads move 75 percent of the nation's commuter rail passengers.²⁵ The modal share for commuter rail in the NEC Region's urban areas is ten times the national average. Most trips on the Region's eight commuter railroads are from outlying communities to the heart of a metropolitan area (Table 3.1). While many rail commuters are destined for central station areas, all of the major NEC stations connect with extensive transit networks, effectively extending the reach of

Table 3.1: Daily Rail Commuters by Place of Work for Five Largest NEC Metro Areas

Metropolitan Statistical Area (MSA)	MSA Rail Commuters	Central City	Central City Rail Commuters	Central City Share of MSA Rail Commuters
Boston-Cambridge-Quincy, MA-NH	53,825	Boston, MA	44,295	82%
New York-Northern New Jersey-Long Island, NY-NJ-PA	345,315	Manhattan, NY	254,779	74%
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	54,665	Philadelphia, PA	47,915	88%
Baltimore-Towson, MD	2,305	Baltimore, MD	1,531	66%
Washington-Arlington-Alexandria, DC-VA-MD-WV	30,514	District of Columbia	21,523	71%

Data Source: U.S. Census American Community Survey, 2007-2011, 5-year estimates

the commuter rail systems. In the District of Columbia, for example, more people enter or exit the Metrorail system at Union Station than any other Washington Metropolitan Area Transportation Authority (WMATA) station.²⁶ Many of these users are NEC commuter rail and Amtrak passengers using the local transit system to reach their final destination. With good connections and links to outlying cities, the commuter rail systems help central city businesses recruit talent from throughout a metropolitan area, including workers who may not be willing or able to drive long distances.

While commuter rail systems are important for central city employers, they also have a positive economic impact on areas outside the central cities. For residents of these outlying communities, commuter rail offers access to a larger number of employment opportunities. The connection helps workers live in areas that are attractive to them in terms of affordability, lifestyle, and quality of life preferences, while still having access to the millions of jobs in central cities.

The highway system in the NEC Region experiences some of the highest levels of congestion in the nation, with 170 of the nation's top 328 bottlenecks.²⁷ Given this, commuter rail connections not only provide residents of outlying communities with access to a broader range of jobs, but it also provides them with access to better paying jobs. NEC

The NEC moves a workforce that contributes more than \$50 billion per year to the U.S. gross domestic product.

commuter rail riders on average earn approximately twice the national average.²⁸ These workers make purchases and investments in the communities where they live, buying homes and paying local taxes that support local public services. For example, residents of Connecticut who commute to New York City on rail collectively earn (before taxes) approximately \$3.3 billion in wages per year.²⁹ This benefits the local communities in which these commuters live - in real estate values, commercial activities, and tax revenues to support schools and other public services.

Figures 3.1 and 3.2 use Boston and Manhattan to illustrate how the geographic reach of core job markets relies on commuter rail. They graphically depict the importance of commuter rail as a transportation mode connecting outlying communities with central city employment. In many of the New York area's suburban counties (including all counties of Long Island and parts of the Hudson Valley, New Jersey, and Connecticut), more than half of all individuals working in Manhattan use commuter rail to get to their jobs.

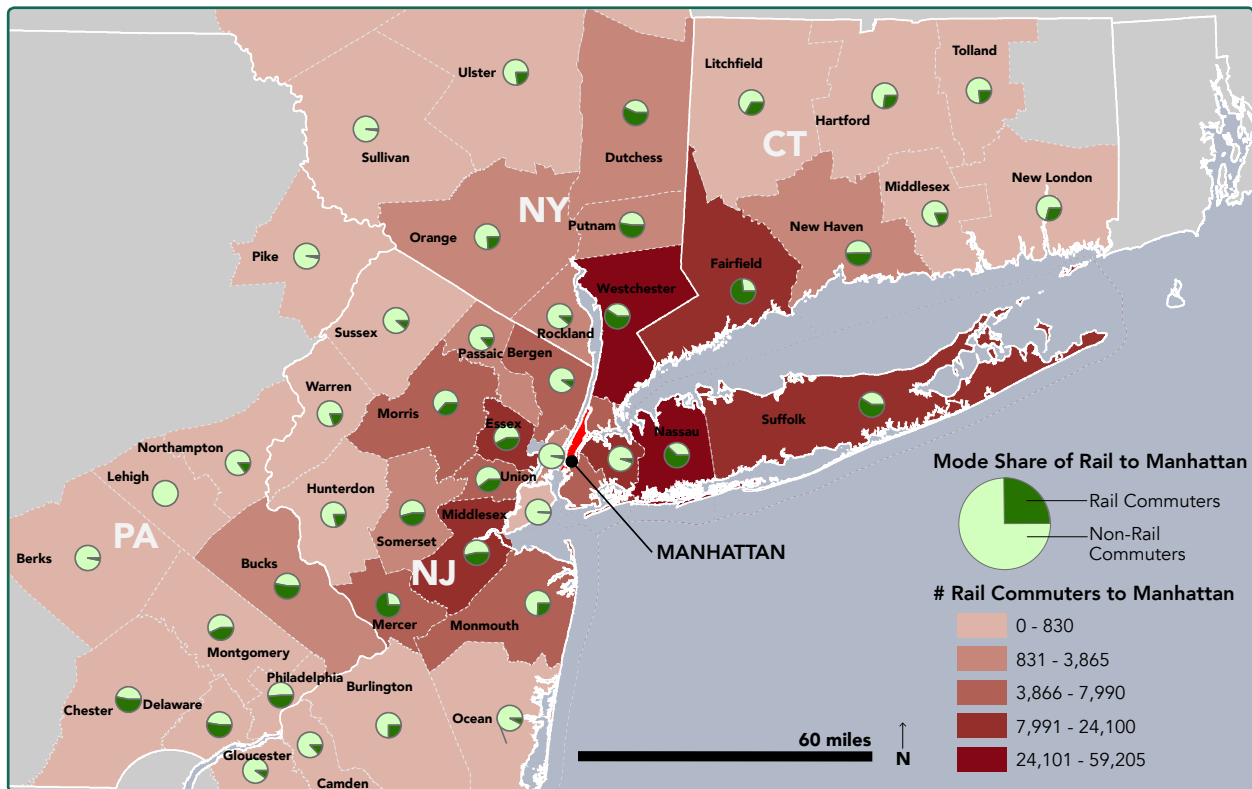
Value to Recruitment

To recruit employees to work in high-cost urban locations, companies need access to commuter rail systems that provide access to more affordable outlying communities. **M&T Bank** has more than 13,000 employees predominately located in NEC states. M&T Bank's Regional President in Greater New York City, Peter D'Arcy, says that many of its employees cannot find affordable, adequate housing options in the City. To stay in New York City, they depend upon commuter rail and other transportation options. If commuting into New York City became too difficult, inefficient, or unpredictable, Mr. D'Arcy believes that companies would need to assess other potential business locations.



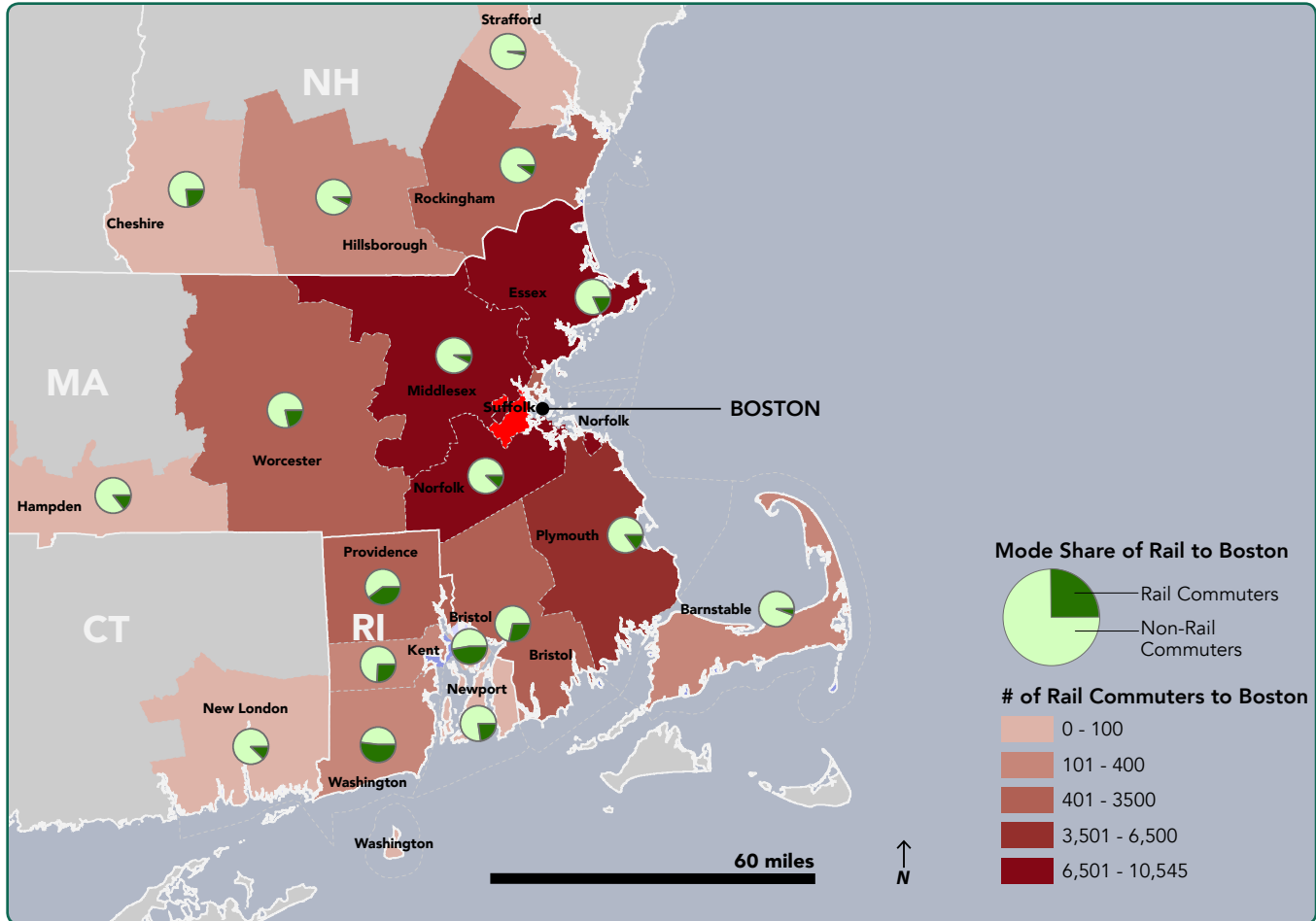
Commuter rail helps connect M&T Bank to its workforce

Figure 3.1: Percent of Manhattan Workers Commuting by Rail, by County of Residence



Data Source: U.S. Census Bureau, American Community Survey, 2006-2008 3-year estimates. Special tabulation from the Census Transportation Planning Package

Figure 3.2: Percent of Boston Workers Commuting by Rail, by County of Residence



Data Source: U.S. Census Bureau, American Community Survey, 2006-2008 3-year estimates. Special tabulation from the Census Transportation Planning Package

A measure of the NEC’s overall economic importance is the contribution to regional output and productivity made by regular riders: by that metric, the NEC moves a workforce that contributes more than \$50 billion per year to the country’s gross domestic product.³⁰

3.3 TRAVELING FOR BUSINESS

Each day, more than 22,000 business trips are made on Amtrak’s NEC services.³¹ Over three-quarters of all Acela passengers are business travelers, while over 40 percent of travelers on Amtrak’s Northeast Regional and other services using the NEC are making business trips. Surveys indicate that business travel generates significant returns on investment, leveraging as much as \$15-\$20 in sales for every dollar spent on business travel.³² Using this metric, business travel on the NEC contributes more than \$7 billion in increased sales and output for NEC Region businesses and organizations each year.³³

Business travel is a critical component of success for companies large and small in many industries. It helps companies retain existing customers and develop new ones, convert sales leads into finalized agreements, build new client relationships, and contribute to other marketing objectives. In-person, face-to-face contact also helps firms with internal organization, management, and research and development.

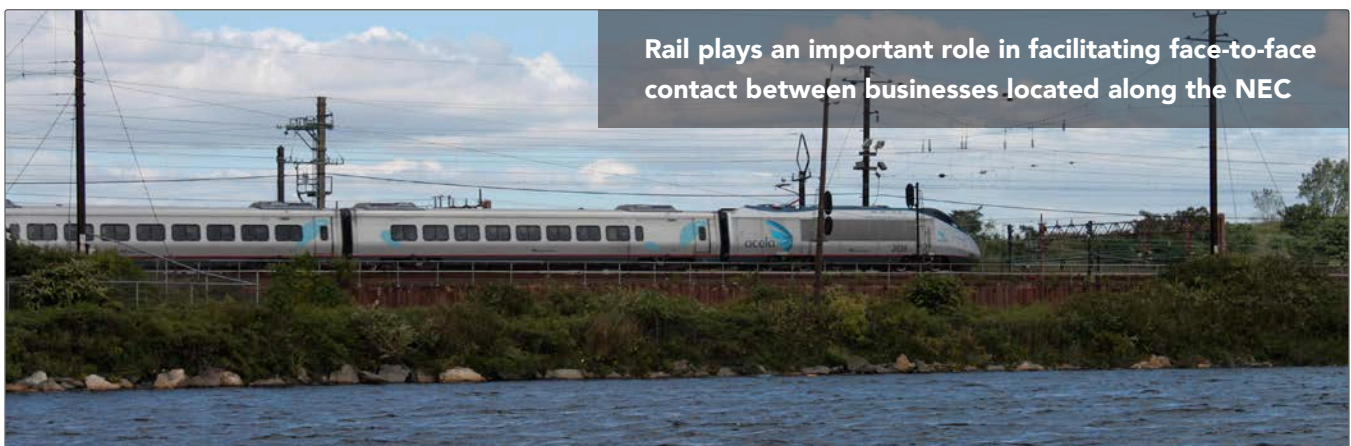
Despite the availability of electronic communication technologies - ranging from e-mail to web-conferencing - surveys of business executives indicate a strong preference still exists for face-to-face meetings in many business contexts. A Forbes Insight survey of more than 750 business executives on their travel and meeting preferences found that 84 percent of respondents preferred in-person business meetings for their effectiveness in achieving desired business outcomes such as understanding a complex analysis, strategic planning, participant engagement and attention, decision making, and sales. Also cited by the survey respondents was the ability to form closer interpersonal relationships with business partners and co-workers through face-to-face meetings, and the role these relationships play in providing intangible business advantages. While the use of electronic communication saves businesses time and money, 87 percent of respondents felt the benefits of in-person meetings outweighed the costs.³⁴ In another survey of 500 corporate executives across five countries, including the United States, 70 percent of respondents indicated that business travel is important to the ability of their companies to grow. Sixty percent of American companies responding (60 of 100 companies surveyed) indicated they would lose existing customers to competing firms without the ability to meet in person.³⁵ The findings of these surveys are supported by research that in-person meetings allow for more interaction and exchange of ideas in a given period of time than can be accomplished via electronic communications which supports the survey findings that face-to-face meetings are more conducive to working on complex problems that require creative solutions.³⁶ Businesses interviewed for this report expressed similar attitudes and added that they place a high value on the travel time reliability and ability to be productive during travel provided by rail.

“The company sees the value in the premium price of Acela for the increased productivity of its employees and the travel time savings.”

— Kainne Hansbury, Principal Consultant,
WinterWyman Search, Waltham, MA

“My primary motivation for using the train is productivity. It is an easier and smoother process when compared to flying and provides easy access to WiFi, food, and beverages. It gives me the ability to be productive when traveling without the hassle of air travel, and to date, without any significant delays.”

— Rick Gessner, VP, Delaware Market Liaison,
Capital One



A Unique Asset for Wilmington

The city of Wilmington, Delaware is a significant destination for business travel, yet the closest major airport is in Philadelphia, over 20 miles away. Wilmington's downtown train station, within walking distance of the headquarters and regional offices of a number of credit card and financial services firms, is the most convenient link to Philadelphia, New York, and Washington, D.C.

One Wilmington-based credit card industry executive who participated in his company's decision to open the Wilmington office cited access to credit card industry cluster talent in Wilmington, followed by convenient access to the company's headquarters in New York City via Amtrak, as two of the most important factors that led his firm to locate there. This executive personally used Amtrak daily for five years to travel between Wilmington and the firm's New York City headquarters.

Business representatives from firms such as **JP Morgan Chase** and **Capital One** also noted frequent use of Amtrak to attend meetings in New York City, with some individuals traveling to New York on a weekly basis. Capital One employees also noted their use of Amtrak to travel to Richmond and the firm's corporate headquarters in Northern Virginia. All of these companies value the access to rail because it allows their staff with frequent travel demands to maintain their productivity while traveling, as they work online and can make phone calls from the train.

Rail's travel time reliability is also highly valued by these businesses. Capital One's internal travel booking system defaults to Acela as a company policy. In the absence of rail, or should the quality of rail service degrade, several business representatives noted that Wilmington's attractiveness as a business location would be adversely affected. Even though these companies all make use of existing conference calling and web meeting technology, these options are not seen as substitutes for many face-to-face meetings.



Supporting New Ways of Doing Business in the Mid-Atlantic

“The corridor is a vital infrastructure for us to shuttle knowledge workers back and forth to key markets.”

— Augie Chiasera, Senior Vice President,
M&T Bank, Baltimore

Professional services firms are heavy users of the NEC. **Global Strategy Group**, a public affairs and communications company with offices in New York City and Washington, D.C., has staff traveling between the firm’s business locations and to pitch to new clients. If rail service were unavailable for a period of time, it would present a significant challenge for the company.

Some companies in the Northeast are improving the way they manage their businesses based on the availability of the NEC. **M&T Bank** senior executives cover larger geographies in the Mid-Atlantic. Executives based in Washington, D.C. or Baltimore are responsible for aspects of M&T’s operations in New Jersey and New York. If travel times on the NEC were to improve, M&T Bank indicated it could expand this approach. M&T Bank uses Philadelphia, Baltimore, and Wilmington as central meeting points for the organization more frequently, because of the convenience of NEC access.



“We move resources all the time around the region and don’t even think about it today, and that is a total sea change for us as compared to 10 years ago.”

— Hugh Mohler, Partner, KPMG LLC, Baltimore

3.4 TRAVELING FOR TOURISM AND ENTERTAINMENT

Over 150 million tourists per year visit New York City,³⁷ Philadelphia,³⁸ Baltimore,³⁹ Washington, D.C.,⁴⁰ and Boston.⁴¹ Washington, D.C. and New York City are home to seven of the 20 most visited museums in the world.⁴² Broadway is a celebrated component of New York City’s tourism economy, with 4.7 million tickets purchased by visitors who considered Broadway a very important reason for their trip to the City.⁴³

While the Northeast is a popular destination for U.S. visitors, it also is popular with international tourists. New York, Washington, D.C., Boston, and Philadelphia are four of the top 15 U.S. cities for international tourists (Table 3.2). New York City, receives more than twice the number of international visitors as any other city in the country. Six of the NEC Region’s states (New York, Massachusetts, New Jersey, Pennsylvania, Virginia and Maryland) are in the top 20 states for international visitors.⁴⁴

Table 3.2: International Visitation in the NEC Region, 2011⁴⁷

City	International Visitors (Millions)	U.S. City Rank
New York City	9.3 M	1
Washington, D.C.	1.8 M	7
Boston	1.3 M	9
Philadelphia	0.6 M	12

Many international visitors come from countries with strong rail systems, where some travelers have a preference for rail travel. The Greater Boston Convention and Visitors Bureau is currently running a joint marketing package with Japan Airlines that includes a “Charlie Card” MBTA ticket, and its marketing efforts to European and Asian travelers emphasize that one does not need a car to visit Boston. International tourists often stay for two to three weeks visiting multiple cities, bringing international dollars into the U.S. economy.

NEC Increases the Attractiveness of Region’s Airports



Baltimore-Washington Thurgood Marshall International Airport (BWI) leverages its NEC access to attract international carriers.

Condor Airlines, a German airline primarily serving leisure travelers, began offering service from Frankfurt, Germany to BWI in 2012. Condor sought out information about Amtrak and MARC commuter rail service as they considered locating service at BWI. Tourists landing at BWI from overseas use the NEC to visit Baltimore, Washington, D.C., Philadelphia, and other cities as part of extended vacations.



The Phanatic cheers fans of the Philadelphia Phillies — regular users of the NEC — at Citizens Bank Park against their rival New York Mets

NEC and Professional Sports

Individuals attending sporting and cultural events are not the only ones that use rail to travel in the Northeast; several major sports teams use the service as well. The NEC connects to 19 professional sports venues in the Northeast. The **Philadelphia Phillies** regularly use Amtrak to travel to games in Washington, D.C. and New York City, and for senior management to travel to Major League Baseball’s headquarters in New York City. When the Phillies are traveling via Amtrak for games, they often see many fans traveling with them.

The NEC also supports tourism and entertainment within the NEC Region. One example is the Prudential Center, located 2 ½ blocks from Newark Penn Station in New Jersey. More than a third of its two million annual patrons arrive by rail, with some events seeing more than 50 percent rail usage. New Jersey Transit commuter rail service connects patrons from as far as 40 miles away, while Amtrak also provides access for fans from other NEC cities such as Philadelphia and Washington, D.C. to attend hockey games and watch their teams play the New Jersey Devils.

The NEC Region is home to some of the nation’s largest and most well utilized convention centers. There is over 6 million square feet of convention center floor space — enough to fill over 100 football fields — within walking distance or a short transit ride from NEC stations.

NJ TRANSIT and Amtrak provided service to the host venue of the 2014 Super Bowl, MetLife Stadium, with the game billed as the first mass transit Super Bowl. NEC rail service along with other public transportation played a major role for both the game and surrounding activities.

Visitors spend billions of dollars every year in the cities of the NEC Region, and rail plays a vital role in supporting this spending. Annual retail visitor spending by individuals using the NEC is estimated to be \$5.5 billion per year.⁴⁵ While not all of this spending can be regarded as “net new” spending (some of the spending would be made elsewhere or at

other times), it promotes additional economic activity and provides users with an expanded access to opportunities that may be less available in home communities (e.g., specific cultural and theater visits).

While the majority of NEC travel occurs between major metropolitan centers, rail also plays a role in connecting smaller communities on and off the NEC into the Region’s economy. These connections not only help facilitate business travel but also provide a means for non-driving tourism and leisure trips to and from these communities. Amtrak’s Vermonter

provides daily rail service to 12 smaller communities in Massachusetts, New Hampshire, and Vermont. Ridership on this service was over 82,000 passengers in fiscal year 2012.⁴⁶ Other corridor services, including the Ethan Allen, Adirondack, and Downeaster, offer similar connections to smaller communities in upstate New York, Vermont, New Hampshire, and Maine. Virginia state-sponsored services to Newport News, Norfolk, Richmond, and Lynchburg, and the Carolinian, offer connections south of Washington Union Station to smaller communities and metropolitan areas in Virginia and North Carolina. The Keystone Service, serving 11 communities between Harrisburg and Philadelphia, offers a one seat ride to several NEC destinations (including New York Penn Station) and served over 1.4 million passengers in fiscal year 2012.

3.5 MOVEMENT OF GOODS

The NEC supports the operation of several freight rail carriers: CSX, Norfolk Southern, Conrail, and Providence and Worcester (P&W). The Class I freight railroads, CSX and Norfolk Southern, jointly own the Conrail Shared Assets rail lines in the New York City/Northern New Jersey area and the Philadelphia region, providing freight rail service to ports, shippers and distribution centers in those metropolitan areas. Dozens of regional and short line railroad operators also move freight in the NEC Region, often providing local connections to the Class I carriers and terminals, manufacturing centers, and distribution hubs.

While freight rail carries just two percent of the overall freight tonnage in the NEC Region (compared with 12 percent of freight tonnage nationally),⁴⁷ freight rail still plays an important role in the Region's economy. Each year, the NEC carries 14 million annual car-miles of freight movements,⁴⁸ serving more than 250 businesses that ship or receive freight over the NEC rail system. Freight railroads move nearly 400 million tons of freight in the NEC Region each year.⁴⁹

NEC'S ROLE IN FACILITATING EXPORTS

The role of the Northeast's sea ports in supporting local employment and economies has received considerable attention from researchers and from the ports themselves. For example, estimates made for the Port of New York and New Jersey in 2010 found that the port supports about 280,000 permanent jobs across many industries; studies for the Port of Baltimore indicate that 108,000 permanent jobs are directly or indirectly supported by port activities.⁵⁰

Less widely publicized is that the NEC also plays an important role in supporting American exports bound for these ports. The NEC is a critical connection between Midwest manufacturing plants and global markets via the Port of Baltimore and the Port of Wilmington. While many of the nation's ports are oriented towards serving containerized shipments, the Port of Baltimore's specialization in handling large equipment and automobiles and its proximity to the Midwest provide convenient and cost-effective access to export opportunities for Midwest manufactures. Without this access via the NEC, manufacturers in the Midwest would face higher transportation costs, increasing their overall cost of doing business. Several ports in New England, including Davisville and Providence in Rhode Island and New London and New Haven in Connecticut, would completely lose access to the national freight rail network if they could not access the NEC.

Freight railroads move nearly 400 million tons of freight in the NEC Region each year.



For Tilcon Connecticut, NEC access allows the firm to transport the equivalent of 35,000 truck loads of freight each year, easing the traffic burden on one of the most congested highway corridors in the nation, like this one in the Bronx, NY

Reducing the Impact of Trucking on the Region's Highways

Tilcon Connecticut is one of the largest producers of crushed stone, sand and gravel (construction aggregate), hot mix asphalt (bituminous concrete), and ready-mix concrete in the Northeast. Tilcon provides stone and materials for public works projects as well as local customers, including the general public. The company uses rail to transport materials between many of its quarries and customer locations in Connecticut, New York, and New England. Tilcon relies heavily on rail, given the company's supply chain and bulk nature of its products. The company transports approximately half a million tons of material per year via the NEC on P&W Railroad — the equivalent of more than 35,000 truck loads.

Were the NEC not available, the company would have to rely on moving material by truck, which would have a “huge impact” on the company as well as the millions of drivers on the NEC Region's highways. As Jim Laske, Superintendent of Marine & Rail, describes it, “Where a train might be able to get to its location in a couple of hours, one tie-up on I-95 and everyone is stuck in traffic and your product is not moving...you can't get the volume that you can by rail.” Mr. Laske said “we'd probably be able to limp along, but we would be extremely limited on what we'd be able to do on our sales end. The availability of trucks is a significant issue...They are costly to operate and there are relatively few of them out there when you look at the number necessary to replace railroad transport. For the amount of volume that we move it would be extremely difficult to maintain business functionality.”

“Where a train might be able to get to its location in a couple of hours, one tie-up on I-95 and everyone is stuck in traffic and your product is not moving”

— Jim Laske, Superintendent of Marine and Rail, Tilcon Connecticut

Supporting Midwest Manufacturing Jobs and American Exports at the Port of Baltimore

Manufacturers of automobiles, heavy machinery, and farm equipment move goods on the NEC to the Port of Baltimore for export. These companies include manufacturers such as **John Deere**, **Caterpillar**, and **Case New Holland**. Their products travel on rail via a 30-mile segment of the NEC between Perryville, Maryland and Baltimore.

Multiple automobile manufacturers, including **Ford**, **Toyota**, and **Mitsubishi**, utilize the NEC to bring their products to market. For one major automobile manufacturer, approximately 60 percent of its total exports use the NEC, bound for the Port of Baltimore or the Port of Newark, New Jersey. This manufacturer also uses the NEC to transport automobiles to dealerships throughout the Northeast, representing approximately 30 percent of the domestic market. If this manufacturer were no longer able to utilize the NEC, it would have to transport automobiles via car haulers to reach Northeast dealerships, which this manufacturer estimates would result in an addition \$150 to \$200 increase in per vehicle freight costs.



Midwest Communities and Firms that Depend on NEC Access to the Port of Baltimore



Aiding Redevelopment and Job Creation

Access to the NEC for freight rail customers supports job creation and new business attraction at Quonset Business Park, a 3,207 acre industrial park in Rhode Island with 175 tenants and 9,500 jobs. Over a dozen companies, including local major employers **BB&S Lumber**, **Toray Plastics**, and **North Atlantic Distribution**, rely on daily freight rail access to ship and receive goods on the NEC. In 2013, over 5,000 railcars were processed at the park.

BB&S Lumber brings in over 700 railcars of lumber from the southeastern United States each year. The firm's production facility at Quonset has the capacity to receive up to 1 million boards of lumber each year.

Toray Plastics relies on shipments of plastic resin raw materials, via rail from Houston, to manufacture plastic packing, foams, and industrial application goods. Toray operates twenty-four hours a day and employs 600 people. Any disruption in their supply of materials via rail would impede the company's ability to operate at Quonset; it would not be economical to bring in raw materials via truck.

Quonset is an intermodal hub, with easy access to I-95, as well as its own airport and the Port of Davisville located within the park. The Port of Davisville is one of the top ten ports in the country for automobile imports, processing more than 200,000 vehicles each year. One of the park's largest employers, **North Atlantic Distribution**, is a vehicle processor that is dependent upon the import of vehicles. Automobiles imported at Quonset can reach eastern Canada more quickly via rail than those imported at ports in Canada, and Davisville hopes that by marketing the time savings presented by rail service to automobile manufacturers that they can continue to grow their automobile import business. While the majority of the park's automobile shipments come in on an oceangoing vessel and leave the park via truck, automobiles manufactured in the Midwest bound for locations in New England are also processed at Quonset and arrive via rail.

The NEC forms the western edge of the park and significant public investments have been made to improve freight rail access to the NEC and intermodal goods movement. The State of Rhode Island created dedicated sections of a third track along Amtrak's northeast corridor to allow freight rail to operate alongside Amtrak's passenger service. As a part of this project, the clearance on the rail line was increased to allow automobile carriers with stacked vehicles access to the park. In addition, a \$22.3 million federal Transportation Investment Generating Economic Recovery (TIGER) grant funded port infrastructure and a mobile harbor crane that moves goods directly from ship to railcar and, as a result, the port has seen a 5 percent to 10 percent increase in ship calls that require a crane. The park, with 15 miles of track and numerous sidings connecting to the NEC, also continually reinvests to maintain and improve their NEC connection.

Quonset Business Park has 350 acres of developable land remaining and is currently about two-thirds leased. Businesses in the park that rely on freight rail are growing and Quonset is in the process of attracting new companies – from heavy manufacturers to fishing companies – that require access to the NEC. Maintaining and increasing access to the NEC is an important component of growing jobs at Quonset and in Rhode Island.

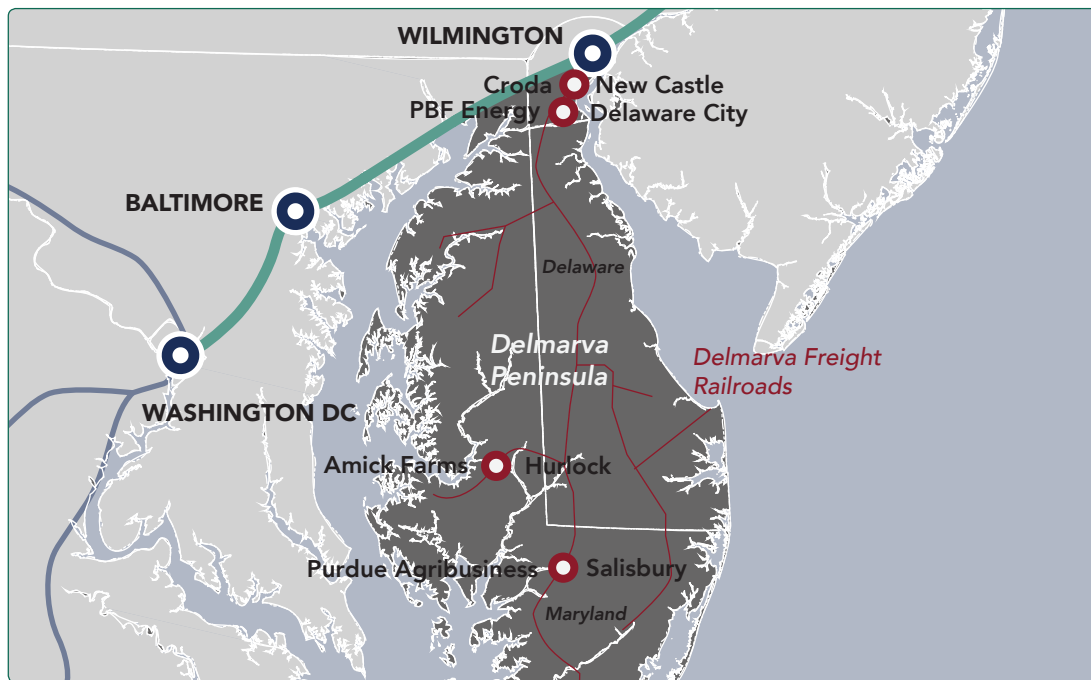


Over a dozen firms rely on daily freight rail access via the NEC at Rhode Island's Quonset Business Park

NEC SUPPORT TO RURAL COMMUNITY INDUSTRY AND BUSINESS

The NEC supports agriculture and industrial activity in the rural communities across the Northeast. The Delmarva Peninsula, split between the states of Delaware, Maryland, and Virginia, is a prime example of the NEC's importance to rural communities in the Northeast because its only rail connection to the national freight network is via the NEC. All rail freight traffic to or from Delmarva has to pass through the NEC to connect to the national rail network. Thousands of Delmarva workers on farms and at factories depend on this access to keep business moving (Figure 3.3).

Figure 3.3: Delmarva Freight Rail Network & Case Studies on Following Pages



The Delmarva economy, based around the major industries of energy, chemical manufacturing, and agriculture, is highly dependent on exports to drive job growth; between 2006 and 2010, exports from Delmarva grew at nearly twice the national average.⁵¹ Businesses in the Peninsula export commodities such as chemicals, electronics, and transportation equipment to major markets in North America, Asia, and Europe. Commodities like grain, petroleum, manufactured chemicals, and stone (which must be brought in because of the lack of quarries on the Peninsula) cannot be transported by trucks economically and largely rely on rail.

The Delmarva Secondary line runs from the NEC south through the heart of Delaware, connecting to a number of branch lines operated by Norfolk Southern and a handful of short line railroads. Norfolk Southern plans to invest \$20 million in upgrades to its Delmarva freight rail facilities and operations between now and 2015. Another approximately \$50 million is being spent by freight rail customers in the region on transportation facilities.⁵²

The NEC and the Chemical Industry

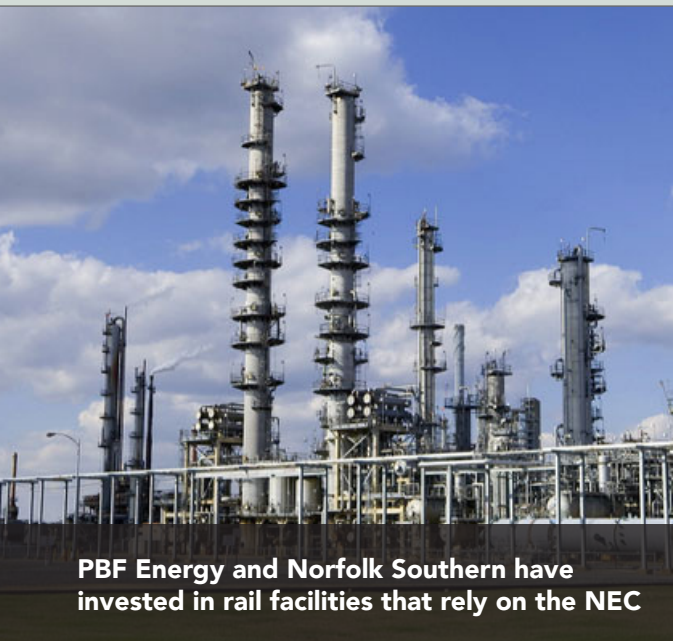
“Due to the quantity of materials we receive by rail and the fact that we can only receive oxides by rail, access to rail is very important for our operations.”

— Robert Stewart, Site Director, Croda, Delaware

Delmarva has attracted chemical manufacturing for over a century due to its proximity to ports along the Delaware River. Freight rail is critical for the chemical supply chain; imports like ethanol are too corrosive to be transported by pipeline, while processed liquids and plastics are most economically exported by rail. The importance of Delmarva’s chemical industry may grow as the expansion of domestic energy production is making local chemical manufacturers more competitive compared to operators in Europe and Asia.⁵³

Croda is a specialty chemical company focused on developing and producing surfactants (chemical agents used to combine two materials that in their natural state do not readily mix). Croda has a production facility on 150 acres adjacent to the Delaware River in New Castle, Delaware. The company produces chemicals that are used in millions of applications from hair care to industrial lubricants. Croda’s New Castle production facility has been operating since 1937, with over 200 full-time staff and more than 50 contractors working at the site today.

Freight rail is used to deliver several different raw materials onto the site every work day. One of the primary ingredients used at the facility is oxides that can only be shipped by rail as it presents both inhalation and explosive hazards.



Rail and the Oil Refinery Business

Delmarva refineries now process Midwestern crude oil, which is transported to the facilities via rail. **PBF Energy’s** Delaware City refinery relies on the NEC for rail access. Norfolk Southern has made an investment of \$20 million in new rail upgrades (to be completed in 2015) that depends on continued NEC access. More substantially, PBF Energy has put more than \$450 million of capital into the oil refinery in Delaware City, Delaware,⁵⁴ including \$52 million for a new crude oil rail unloading facility linked to the NEC.

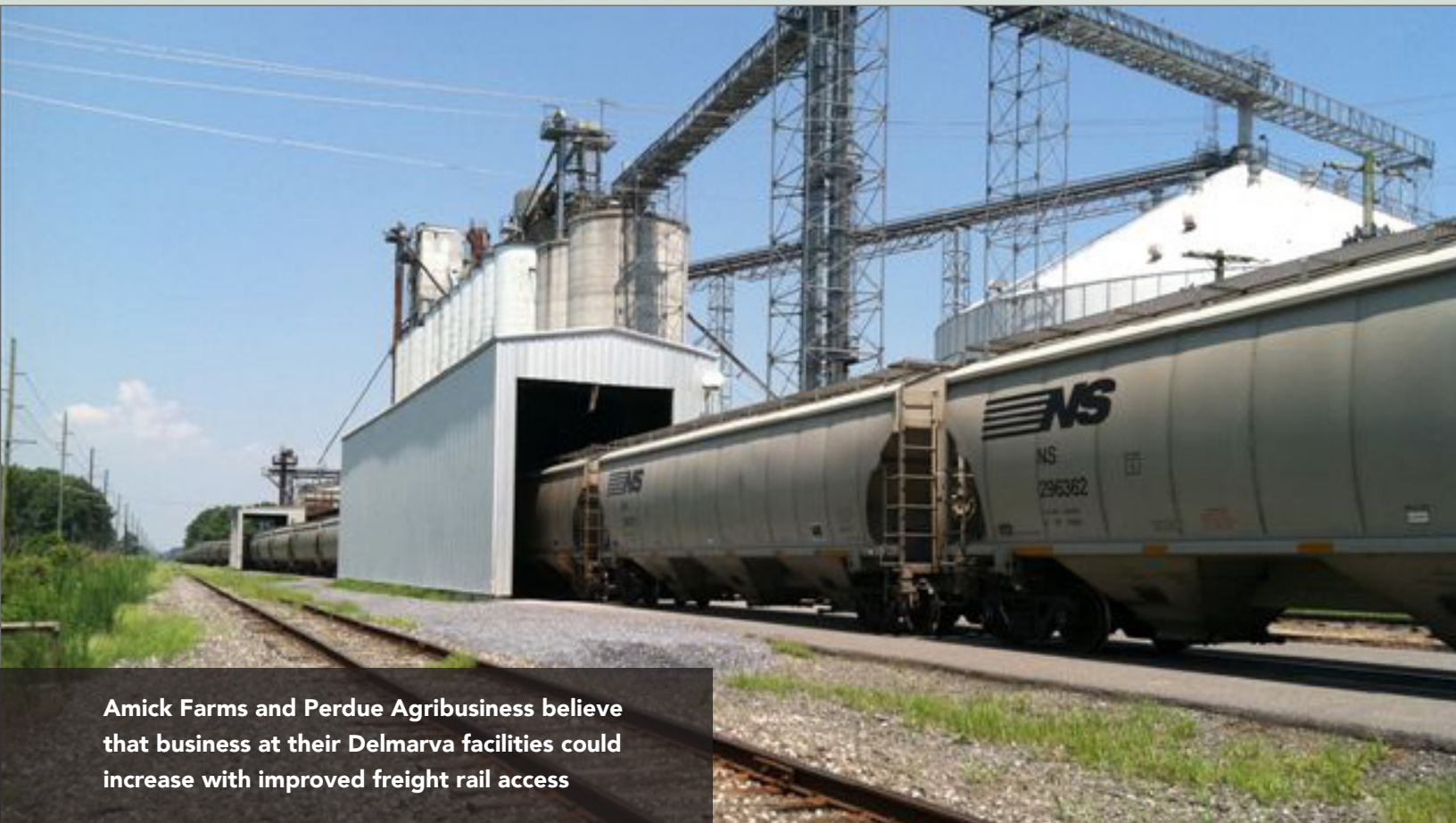
PBF’s investments are part of a larger resurgence in the Region’s refining industry. Over the last few years a number of refineries along the Delaware River and Bay have closed due largely to uncompetitive business costs. Today these facilities have reopened, and the NEC plays a role in the financial viability of these businesses.

Agricultural Businesses' Reliance on the NEC

Disruptions and restrictions on the NEC affect key agribusinesses in the Delmarva region. The capacity and time restrictions on the NEC effectively limit the amount of freight traffic that can access the Delmarva Peninsula. If these constraints were to increase significantly, some of these facilities might be forced to reduce operations or shut down entirely. Constraints in the freight rail system that lead to increased rail rates have a direct impact - as the cost of freight increases so does the cost of production for agribusiness.

If there were increased restrictions on freight rail, preventing soybeans from being shipped by rail, **Perdue Agribusiness's** Sharon Clark, the firm's Senior Vice President of Trucking and Regulatory Affairs, believes that business flight would be a possibility and that any disruption to the rail corridor would "severely impact" Perdue Agribusiness's competitiveness.

Alternatively, if access to freight rail were to increase in such a way that caused rail rates to drop, both **Amick Farms** and Perdue Agribusiness believe there is potential to increase the volume of business performed at their Delmarva facilities.



Amick Farms and Perdue Agribusiness believe that business at their Delmarva facilities could increase with improved freight rail access



The economic impact of losing the NEC for a day could be nearly \$100 million, roughly the daily economic output of cities like Winston-Salem, North Carolina or Portland, Maine

3.6 IMPACT OF NEC SERVICE DISRUPTIONS

One measure of the importance of an asset is the cost of life without it. While there is little value in hypothesizing about a dismantling of the NEC, large-scale service disruptions are all too common. This report finds the economic impact of losing the NEC for a day could be nearly \$100 million in added highway travel and lost productivity. Though a complete shutdown of the NEC is unlikely, the past several years have provided several examples of how vulnerable large swaths of the system can be to outages resulting from deferred maintenance or lack of redundancy and resiliency to recover from major weather events.

A power supply failure cut most service along the New Haven Line portion of the NEC for nearly two weeks in September and October 2013. Superstorm Sandy devastated a large swath of the NEC Region in October 2012. Destruction was especially harsh in the New York metropolitan area, where key routes into and out of Manhattan were severed for days.

This report used survey results regarding travel behavior responses to Superstorm Sandy to estimate the economic impact of a one-day loss of the entire NEC rail system. These potential impacts were identified by estimating the economic value of different trip types (i.e., travel for client meetings, other business travel, or non-business travel), and then estimating the portion of value that might be lost if a trip had to be canceled or rescheduled. Business travel for client meetings was assumed to lose 60-80 percent of the total trip value; business travel for meetings without clients was assumed to lose 30-50 percent; and non-business trips were assumed to lose 20-40 percent. For commuters, the total economic loss would depend on how commuters react.⁵⁵ Early survey results of travel behavior immediately following Superstorm Sandy suggested there was a mix of behavior from commuters faced with an unexpected outage of rail service. Approximately two-thirds of regular commuter rail passengers found alternative means to work, likely resulting in increased congestion on the roadway networks in the major metropolitan areas in the Northeast. Of the approximately one-third who stayed home as a result of this outage, 60 percent were able to telecommute and retain some productivity while 40 percent lost all productivity.⁵⁶ Applying the response associated with Superstorm Sandy, the estimated one day economic loss of NEC commuter services is approximately \$83 million. Most of the commuter costs would be concentrated in the New York metropolitan area, as it accounts for approximately 80 percent of the total commuters on the NEC.

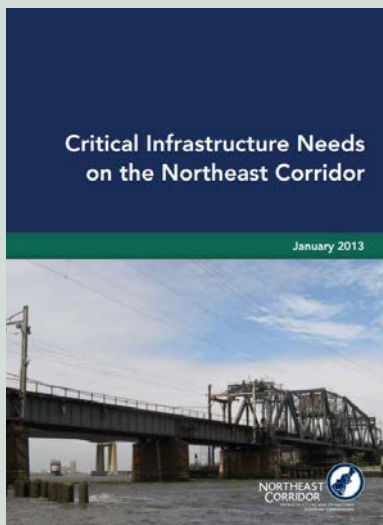
“The derailment of Long Island Rail Road pulled a bunch of people out of the office. You tell people don’t even try, because by the time you cobble together another way of getting into the City the day is already over.”

— Lynne Brown, Senior Vice President for University Relations, New York University

If the NEC were shut down for a significant period of time, “It would be Armageddon, it would be devastating. When we had the earthquake we had New York clients here and they couldn’t get out of town for a day, so we need to have essential security. It is the lifeblood from D.C. to Boston.”

— Paul Tiburzi, Managing Partner, Baltimore Office, DLA Piper

There also would be an economic cost associated with the loss of Amtrak service. In this one-day outage scenario, the estimated cost would be in the range of \$9 million to \$13 million.⁵⁷ Together, an unexpected system-wide shutdown of the NEC could cost the country up to \$100 million in productivity and transportation-related costs, roughly the daily economic output of cities like Winston-Salem, North Carolina, Portland, Maine, or Boulder, Colorado.



A Small Sampling of Recent Infrastructure Failures

- During the evening rush hour on Monday, June 17, 2013, two cars of a Long Island Rail Road train suffered a minor derailment in the East River Tunnels (CIN, page 47).
- On September 5, 2013, the New Haven Line’s power supply system (CIN, page 55) suffered a failure that severed normal service between Connecticut and New York for 12 days. Over 60,000 daily NEC riders were affected by the outage, but impacts also spread to the highway network. The Connecticut Department of Economic and Community Development estimated that the State’s economy lost at least \$60 million due to the disruption.
- On October 27, 2013, the Pelham Bay Bridge (CIN, page 48) halted Amtrak service between New York City and Boston when it became lodged in the open position.

Although not quantified in this analysis, NEC disruptions also have an economic impact on freight traffic. Freight increasingly travels on multiple modes of transportation from supplier to manufacturer and manufacturer to customer. Interruptions on one mode of transportation can have ripple effects throughout the supply chain. One example is when oceangoing ships await delayed rail shipments. This type of situation occurs on the 30-mile segment of the NEC that connects Norfolk Southern’s Port Road branch from Harrisburg, Pennsylvania to the NEC in Perryville, Maryland

and the Port of Baltimore. This portion of the NEC is generally open to freight traffic only between the hours of 10:00 p.m. and 6:00 a.m. each day.⁵⁸ During normal operating conditions, freight trains line up on the Port Road just off the NEC, then operate near continuously throughout the eight hour window. However, disruptions because of infrastructure failures or for infrastructure repairs can shorten or even eliminate that window. Such closures have ripple effects on the economy by increasing shipping costs (e.g., longshoremen standing idle, additional storage if a shipment misses an oceangoing vessel, delayed delivery of entire shipments to customers if the shipment is incomplete) and affect the international competitiveness of both American manufacturers and the port.

The loss of the NEC for a day has been experienced by Thompson Reuters's New York office several times in recent years. While Thompson Reuters has a continuity plan that prevents the loss of the NEC from being a "showstopper," it is still a major inconvenience to their business, according to Tom Eisele, Director of Facilities at Thomas Reuters.

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Chapter 4

Connections for Tomorrow's Economy



For NEC cities like Newark, rail provides a critical link to talent, ideas, and capital

4.1 INTRODUCTION

The NEC supports key industries that are thriving today in the NEC Region, and that many economists forecast will be critical in keeping the United States competitive in an increasingly globalized economy. The NEC connects firms, institutions, and individuals in fields like technology and healthcare, where there are strong collaborative relationships between researchers and students at universities and innovators in the private sector. The NEC also connects talented workers and new ideas with the capital needed to accelerate research and development, and bring new products to market. The NEC plays an important role in the nation’s modern manufacturing industry as well, carrying technologically advanced products to the global marketplace.

As noted by the World Economic Forum, international competitiveness is increasingly based on knowledge, information, and innovation.⁵⁹ This *knowledge economy*, with its greater reliance on intellectual capabilities than on physical inputs or natural resources, is now recognized as the driver of productivity and economic growth in the modern global economy. In the ten core NEC cities served by most Acela trains, there are 3.7 million knowledge industry jobs today.⁶⁰ Within one mile of all NEC stations, 59 percent of jobs are in the knowledge industries - far higher than the U.S. average of 42 percent.⁶¹

Within one mile of NEC stations, 59 percent of all jobs are in knowledge industries—far higher than the U.S. average of 42 percent.

Many measures of innovative activity, including patenting and new firm formation, are highly geographically concentrated. As a result, many knowledge-focused companies find that it is increasingly necessary to cluster in metropolitan areas, despite improved communication technology capabilities, because it is the most effective way to access knowledge and resources.⁶² Many knowledge workers, such as software designers, engineers and researchers, are increasingly attracted to urban areas as they provide both greater employment opportunities due to firm concentration and quality-of-life amenities that are increasingly valued by younger workers.⁶³

4.2 CONNECTING FIRMS TO TALENT

The NEC effectively expands the labor pool for firms by making travel within and between metropolitan areas in the NEC Region easier. NEC access allows firms to connect the most qualified workers to specialized jobs, increasing the overall efficiency and productivity of the Region's economy. The NEC also contributes to the overall livability of large and small cities in the Northeast, helping these communities compete with regions across the world for entrepreneurial firms and people. Quality of life is an important factor when people choose where to start a business or take a job.

In today's knowledge economy, the ability to access talent is central to businesses' ability to be competitive in the international marketplace. A recent survey of 575 global professionals identified access to talent as the most important benefit for their companies in being located in their cities - far ahead of other factors such as cost of living, safety and security, beneficial tax/regulatory regimes, or good healthcare. Transportation links to other cities was identified as the third most important benefit.⁶⁴

Commuting options provided by access to the NEC expand the scope of both housing and job location opportunities for workers in many fields. Rail allows firms to recruit from larger geographic areas and families to choose from more residential locations that fit budgetary needs and lifestyle preferences while maintaining access to central city employment opportunities.

Access to intercity rail can even more dramatically increase the geography from which businesses can pull talented workers. The combination of communications technology and a reliable intercity rail network allows people to work from home possibly hundreds of miles from their employer, with weekly or monthly trips to the office for meetings. The availability of this type of arrangement can help employers in smaller job markets recruit talented workers in dual career households.

Companies have relocated their businesses to benefit from the increased ability to attract talent provided by rail. One of the prime reasons Panasonic decided to move nearly 1,000 employees and build a new \$200 million North American headquarters just a two-minute walk from Newark's Penn Station was to increase the firm's access to young talent that is now concentrating in urban areas like Newark and New York City. The availability of New Jersey Transit will also assist the company in being able to retain its existing workforce in suburban New Jersey.

"If commuter rail service were improved it would make it easier for talent to commute, and thus make jobs with access to commuter rail more attractive. Recruits often turn down job offers because of a lack of viable commute options. Any time you can improve commuting options you improve companies' ability to attract, hire, and retain employees."

— Kainne Hansbury, WinterWyman, a technology staffing firm serving the New England and metropolitan New York markets

"One of the challenges when you recruit someone to Baltimore is that you are often times dealing with two professional family members, and there may be limited opportunities here in Baltimore for the spouse...that is a stumbling block for many high-level executives we're trying to bring to Baltimore... what is the opportunity for my spouse? It is tough to find an executive person one job, much less find two of them...it certainly is a benefit to say we have reliable, efficient, fast opportunities for your spouse to find employment in different urban areas nearby."

— Don Fry, President and CEO,
Greater Baltimore Committee

"It is also making the employee piece a lot easier, because folks now have a choice about where they want to live; they can choose an urban environment like a Washington or Baltimore, or they could choose something more rural and still have access to those city centers where economic activity is concentrated."

— Augie Chiasera, Senior Vice President,
M&T Bank, Baltimore

Rendering of Alexion's offices in New Haven, Connecticut



Attracting Talent Key to Success

Alexion Pharmaceuticals moved its offices from suburban Cheshire, Connecticut to New Haven, Connecticut because of the firm's challenges in attracting and retaining talent.

Alexion Executive Vice President Steve Squinto indicated that Alexion lost a number of people, and was not able to attract other talented scientists it had offered jobs to, because of the lack of transportation options in Cheshire. In Alexion's experience, it needed to be in an area that provided transportation options for the people it wanted to recruit, but that also allowed the spouses of recruits to find jobs.

In a smaller job market like New Haven, the spouses of Alexion's employees often work in other cities in the Northeast Corridor and use local commuter rail to travel to jobs. If the spouse can't find a job within commuting distance, Alexion is not able to recruit the talent it needs to be a successful company.

4.3 CONNECTING RESEARCH UNIVERSITIES TO THE PRIVATE SECTOR

The NEC provides critical connections among research universities and between those universities and private firms in the fields of science and technology. A highly educated workforce and research-led technological innovation benefit from a dense infrastructure of academic research institutions of the highest quality, and the ability to link higher education and research to the global economy.⁶⁵ The NEC helps to provide the needed connections to facilitate in-person collaboration, sharing of research staffs and students, and convenience for two-income couples needing to work in different institutions within the corridor.

Many economists and social scientists believe that U.S. economic growth in the future will be increasingly led by technological innovation and a highly educated workforce, particularly in science, technology, engineering, and mathematics (STEM) occupations.⁶⁶ The importance of higher education in the NEC Region is evidenced by the following U.S. News & World Report rankings:

- The NEC Region is home to six of the top 10 ranked universities in the country.⁶⁷
- The NEC Region is home to nine of the top 25 academic institutions in the country.⁶⁸
- In total, 23 of the top 100 universities in the country are based along the NEC, with a combined enrollment of 435,000 students in 2012.⁶⁹
- There are 263 colleges and universities within five miles of NEC stations.⁷⁰



The NEC connects several of the world's leading educational institutions, including six of the top ten ranked research universities in the nation, such as Princeton University shown above

In addition to universities, numerous teaching hospitals, often affiliated with universities, are in the NEC Region; these institutions are central to research and product innovation in numerous fields of medicine and biotechnology, pharmacology, and genetic research. A prime example is the **Johns Hopkins Hospital**, a preeminent teaching hospital and biomedical research facility of Johns Hopkins School of Medicine in Baltimore. For most of the past two decades, it has been ranked by U.S. News & World Report as the best overall hospital in America.⁷¹

There are 263 colleges and universities within five miles of NEC stations.

Among the new paradigms arising in higher education is the research consortium. In this model, groups of universities combine to bring together key research leaders, technical resources and equipment, information technologies and databases, and other resources. A number of such consortia have developed in the Northeast, in part because of the research institution density and access to industry. By linking research institutions with each other as well as with business leaders from major Northeast cities, the NEC helps facilitate educational research and the application of research to industry. **Drexel University's Innovation Neighborhood** is one example of how this will work in a highly integrated form. The **University of Delaware's STAR Campus** offers another example in development.

Science, Technology, Engineering and Mathematics (STEM) Jobs in Washington, D.C., Boston, and Baltimore

Washington, D.C. has diversified its knowledge industry base in recent years. A recent Brookings Report identified San Jose, California, and Washington, D.C. as the two largest STEM-based economies among large metropolitan areas in 2011.⁷² These jobs offer wages significantly higher than average and now make up 27 percent of the Washington, D.C. economy. Boston and Baltimore also rank high in this sub-category, with 24 and 23 percent of the economy in STEM jobs, ranking 6th and 8th in the country, respectively.



Renderings of Drexel's Innovation Neighborhood by Philadelphia's 30th Street Station

Drexel University's Innovation Neighborhood

Drexel University's Innovation Neighborhood is an ambitious initiative to redevelop a 12.5 acre area directly west of Philadelphia's 30th Street Station into a vibrant, mixed-use neighborhood that incorporates commercial, residential, research laboratory, and educational space. This area of West Philadelphia consists largely of surface parking today, but it could potentially support up to 6.5 million square feet of new development. The graphic above provides a view of the proposed Innovation Neighborhood development sites in relation to 30th Street Station. Also located in proximity to the Innovation Neighborhood are Drexel's ExCITe Center incubator space and the University City Science Center research park (two existing examples of university/industry synergy), as well as Cira Centre (the first office tower in West Philadelphia), which has a direct connection to 30th Street Station.

A study of the economic and fiscal impact of the Innovation Neighborhood commissioned by the University estimated that over 9,500 new jobs directly related to Innovation Neighborhood will be generated by the development. These investments will allow the private sector to capitalize on research-based innovation and may bring new products and create new companies, and new jobs, in the city of Philadelphia.

Access to the NEC is an integral element of making the Innovation Neighborhood work. **Drexel's Vice President for Corporate Relations and Economic Development, Keith Orris, said that he couldn't envision the Innovation Neighborhood project moving forward the same way without 30th Street Station.** He says 30th Street Station is an "incredible asset" that is key in attracting the private sector tenants needed to make the initiative a success.

"Imagine the impact for Philadelphia when visitors arrive at the city's most convenient transportation hub and disembark right into a brand-new neighborhood dedicated to learning, to innovation, and to entrepreneurship."

— Drexel President John Fry, Testimony on the Importance of the Northeast Corridor, Field Hearing of the U.S. House of Representatives Transportation and Infrastructure Committee

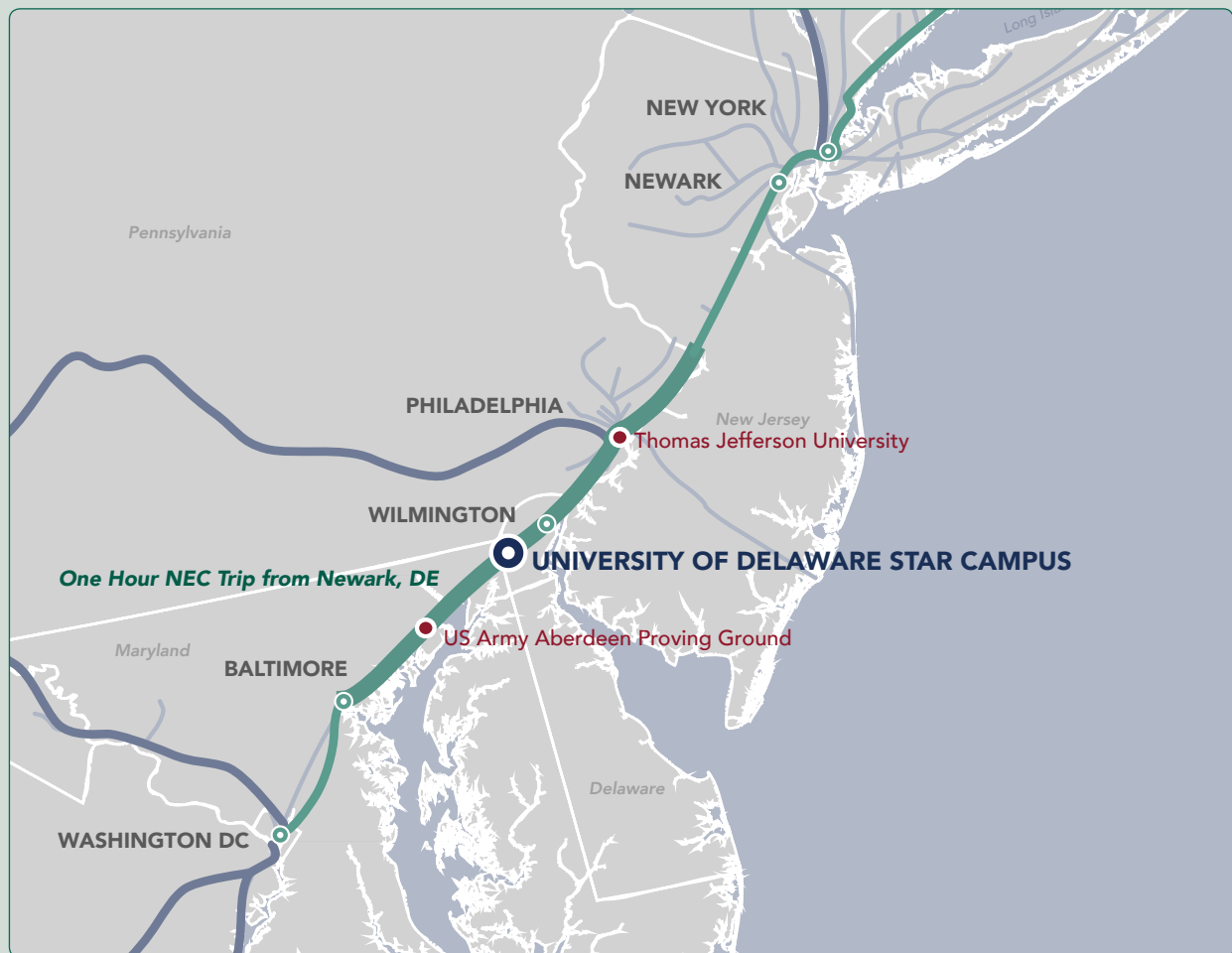
University of Delaware's STAR Campus

The **University of Delaware** is seeking to capitalize on its proximity to the NEC to catalyze regional economic development through partnerships between Delaware's flagship university and the private sector. Its new Science Technology and Advanced Research (STAR) Campus is being built on a 272-acre site directly adjacent to the Newark, Delaware Amtrak and SEPTA commuter rail station. The master plan for the campus includes a new transit center that will enhance access between the station, the STAR campus, and the existing campus, which is located one mile away.

Rail was central to connecting the STAR campus to corporate and institutional partners in Delaware, Maryland, and Pennsylvania. Committed STAR campus partners include Thomas Jefferson University Hospital, near the NEC in Philadelphia, and the U.S. Army's Aberdeen Proving Ground in Maryland. The University considers rail service a critical part of its strategy to attract additional corporate partners based in Baltimore, Philadelphia, and elsewhere.

“Rail access is a very important factor to the success of the new campus due to the intense level of interaction with outside parties anticipated...the economic development of northeast Maryland would be enhanced by improved access to the University.”

— David Weir, Director of Economic Innovation and Partnerships,
University of Delaware



4.4 CONNECTING NEW IDEAS TO CAPITAL

The NEC connects innovation with the funding and financing it needs to bring new products to market. The Northeast Region is a national leader in technology and entrepreneurship, with as much venture capital activity as Silicon Valley. Business leaders report that this talent and innovation is also assisted by proximity to Washington, D.C., home to agencies that regulate products such as pharmaceuticals.

The NEC Region has several technology industry clusters, ranging from large corporations to small start-ups. Twenty percent of all U.S. patents from the last decade are from the NEC Region's metropolitan areas.⁷³ This patent activity further highlights the strong growth in the technology and other innovation sectors in the NEC Region.

When it comes to proximity to capital, NEC station areas are some of the best locations in the country. New York, home to the New York Stock Exchange and NASDAQ, is the center of world finance. Six of the world's top ten financial institutions, for example, are based in the New York area. Access to capital, however, is more than traditional banking; five of the top 10 private equity firms are located in New York and 18 of the top 50 private equity firms in the world are

based in New York City or Boston⁷⁴. These 18 firms represent 45 percent of all private equity capital raised between January 2008 and April 2013 worldwide.⁷⁵

Twenty percent of all U.S. patents from the last decade are from the NEC Region's metropolitan areas, more than Silicon Valley and the rest of the Bay Area.

In 2012, the NEC Region attracted 31 percent of all venture capital deals nationally,

equal to Silicon Valley. New York City's technology industry has grown through entrepreneurship, and so has its venture capital activity in recent years. From 2007 to 2012, while other regions experienced a decline in the number of venture capital deals, activity in the New York metropolitan area grew 34 percent, and this growth continues.⁷⁶ New York City had more start-ups founded last year than any other city in the world.

Rail service operated on the NEC connects new businesses throughout the Northeast to the capital investments they need to grow. Rail plays a particularly key role in facilitating access to capital in mid-sized cities throughout the corridor. Capital markets in the Northeast are highly concentrated in the Boston area and New York City, and jump-starting innovative companies in the technology, biotechnology, and service sectors outside of these large hubs can be a challenge. Businesses interviewed for this report noted that the NEC contributed to their ability to access investors. Others also noted that the NEC was a livability factor that helped convince potential investors that their business location decision would attract a talented workforce.

"I used Amtrak prior to this past year for five years every day traveling between Wilmington and New York City. We have quite a few employees that do leverage the Amtrak, and we have quite a bit of video conferencing as well because we find that efficient, but there is always a need for people to attend meetings face to face."

Credit Card Industry Executive, Wilmington, DE



Boston Innovation District

“Connectivity within the cluster is critically important: human interaction face to face... You have different pieces of each cluster in close proximity; someone is making the biotech product, someone doing the research, someone applying it... because the cluster feeds off itself... high speed rail would allow Boston to become the epicenter of related investment... and intellectual capital.”

— Rick Dimino, A Better City, Boston

In Boston, efforts to attract and grow life sciences companies, technology, and business services start-ups center around the City's Innovation District, an initiative to revitalize 1,000 acres of land on the South Boston waterfront by creating a new community that attracts and supports innovative and entrepreneurial companies. Located near Boston's South Station, and a short transit ride from neighboring Cambridge, the Innovation District has been successful in recent years due in part to increased interest in the ability to have consistent face-to-face interaction with related companies and major universities (including Harvard, MIT, and Boston University).

Since the Innovation District was launched in 2010, more than 200 new companies and 4,000 new jobs have located in the neighborhood. Companies currently located in the Innovation District range from technology companies (30 percent of new jobs), to the creative firms in design and advertising (21 percent of new jobs), and life science and green technology (16 percent of new jobs).⁷⁸ Among the innovative companies growing in the Innovation District are online video platform **Brightcove**, customized jewelry manufacturer **Gemvara**, multi-media advertising and marketing firm **allen & gerritsen**, and online consumer market research firm **Communispace**.⁷⁹

Public transit, commuter rail, and intercity rail are important in supporting the continued development of the life science and technology sectors in Boston, among others, according to Rick Dimino, President and CEO of A Better City, an organization dedicated to improving the economic competitiveness and quality of life of the Boston metropolitan area. He sees the transit connectivity both within the Boston region and intercity connectivity (particularly to access New York based capital, talent, and other resources only available in New York), as critical components of the growth of the life sciences and technology sectors in the Boston metropolitan area.

Access to Venture Capital

New Atlantic Ventures is a Massachusetts-based venture capital firm. The company reports that it concentrates projects in NEC markets because it allows them to play a hands-on role in their investments. Eight of their last 28 deal were in New York City alone.

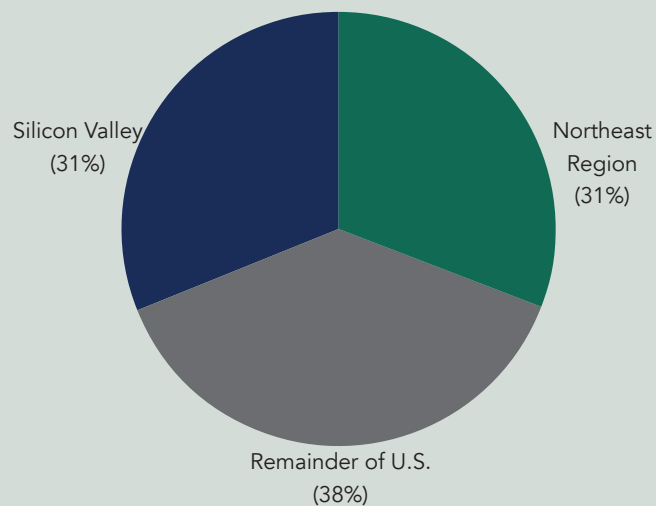
An attorney working with the venture capital and private equity markets underscored the role of location and access in decisions made by investors. Many venture capitalists limit their investments to particular regions for a variety of reasons, including ease of transportation access. This attorney describes location as a “very big deal” in emerging markets, with the trend in the venture industry to go so far as to incubate companies on-site so that the venture capitalists can have unlimited access to the start-up’s executives.

Both investors and recipients of venture capital report that the NEC facilitates the growth of their businesses. Making new business connections while riding the train is also commonplace, especially on Acela. Nearly all business leaders interviewed for this report emphasized that virtual communication does not replace the face-to-face interaction required in complex investment relationships.

“The interconnectedness of the two cities is the most measurable aspect of the venture interplay. Boston venture capitalists invest heavily in the New York area, and vice versa.”

— Tim Rowe, Founder and CEO, Cambridge Innovation Center and Venture Partner, New Atlantic Ventures, *Cambridge Innovation Center is co-working space focused on serving the needs of start-ups. New Atlantic Ventures is an early stage information technology venture capital firm.*

Figure 4.1: Percent of Venture Capital Deals in 2012⁸⁰



Corporate Location Decisions and the Growth of Mid-Size Cities

“Anything that we can do to encourage investors not to think about New Haven as a barrier to their investment drive would be really fundamental about how we connect this business corridor from Stamford into New Haven, and blow out this opportunity... so this is really important.”

— Susan Froshauer, CEO and President,
Connecticut United for Research Excellence



New Haven Union Station

In New Haven, Connecticut, city and local business leaders have identified NEC rail access as key to the continued growth of the city’s emerging technology and biotech companies.

Jennifer Good, President & CEO and co-founder of **Trevi Therapeutics**, recently relocated her company from Danbury, Connecticut to New Haven. Her company’s investors are out of Boston, New York, and San Francisco; her corporate board is based in Boston and New York; and her co-founder is in Boston. Her decision to relocate the firm to New Haven was based in large part on transportation issues – the access to Boston is critical for Trevi. She calls Trevi’s relocation a “test case” of New Haven as a business location, and she negotiated a five-year lease with a three-year option to leave. She describes her experience working in New Haven to date as positive. She does wish there was better access to Boston, with better on-time performance and faster service.

Susan Froshauer co-founded the biotech firm **Rib-X Pharmaceuticals** in New Haven in 2000, and built the company into a 60-person business. Today, she is the CEO and President of **Connecticut United for Research Excellence (CURE)**, an association of Connecticut-based bioscience companies and professionals. Ms. Froshauer reported that to attract “top-shelf, blue chip” investors to New Haven from New York City it needs to be relatively easy for them to travel between the two cities, so as to not consider the time to travel to New Haven as prohibitive. There is a need for face-to-face interaction between investors and their companies. Ms. Froshauer said that investors want to see the community, they want to understand what the building looks like, and to see how they will travel to it. Meeting times are scheduled around Amtrak’s schedule.

Proximity to rail was also one of the deciding factors for **SeeClickFix**, a technology start-up with 18 employees based in New Haven, to locate and remain in New Haven. SeeClickFix has created a web tool that allows citizens to report non-emergency neighborhood issues to local government. The ability for many of SeeClickFix’s investors to use Amtrak to travel from New York City to New Haven was a factor in the firm’s decision to continue to grow the business in New Haven. SeeClickFix employees also frequently use Amtrak for business travel to Philadelphia, Washington, D.C., and Boston, and New York MTA’s commuter rail service, Metro-North, for commuting.



Co-working space in Providence, Rhode Island serving design professionals

Facilitating the Exchange of Ideas

“Having the NEC connect Providence to New York and Boston is a competitive advantage when attracting, young talented workers. The ability to move up and down the East Coast with ease is wonderful for business and for cultural exchange between cities.”

—Aidan Petrie, Chief Innovation Officer for Ximedica
Ximedica is a medical device company located in Providence, Rhode Island

The City of Providence, Rhode Island has transitioned over the past 20 years from a historically manufacturing-based economy to one that has its foundation in technology, the creative industries, and higher education. Access to the NEC has played a role in Providence’s resurgence by enabling local companies to recruit employees that live in Boston, providing access to jobs in Boston for Providence residents, providing access to investors in the New York area, enabling business collaboration with companies located in other cities, and by facilitating cultural exchanges between Providence and Boston and New York.

With millions of dollars in federal investment, the city of Providence uncovered rivers, relocated its downtown train station, served by Amtrak and MBTA, -- and moved I-195. This infrastructure improvement, coupled with the presence of major universities, particularly Brown University and the Rhode Island School of Design, gives Providence an advantage in the world of creative capital. The NEC has helped position Providence, not only as a thriving bedroom community to Boston, but as center of idea exchange and innovation.

Charlie Kroll, CEO of **Andera**, a 70-employee technology company, and his senior management team, take Acela to travel between the company’s headquarters in Providence and their New York City office on a weekly basis. Frequent travel between the offices is necessary as Mr. Kroll feels strongly that he and his senior management team need “face time” in both offices to maintain a cohesive corporate culture and to collaborate successfully. Without access to New York City via rail, Mr. Kroll believes that it would be hard to maintain offices in separate locations. Andera executives rely upon Amtrak’s travel time predictability to make having offices in both New York and Providence possible. Andera’s investors located in New Jersey also use Amtrak and New Jersey Transit to visit their headquarters in Providence.

Commuter rail and Amtrak access also is a factor in how Andera recruits its high-tech talent. While the company has a few employees that commute from Boston today, in general the lack of fast and affordable rail service between Boston and Providence is a stumbling block in their ability to attract talent.

4.5 CONNECTING PREMIER MEDICAL INSTITUTIONS AND THE HEALTHCARE INDUSTRY

The NEC plays a role supporting the medical industry by providing convenient transportation for doctors, researchers, and students traveling between medical firms, institutions, and facilities. In this way, the NEC facilitates collaboration and increased consultation within the medical community and healthcare industry. Healthcare and pharmaceutical industry professionals also cited the benefits of access to regulatory agencies in Washington, D.C. via the NEC.

The NEC Region is headquarters for many large and small pharmaceutical and biotechnology companies, and home to many laboratory and research facilities. The NEC Region is also home to a concentration of some of the nation's top hospitals and medical research institutions. The Region has a top three hospital in 14 of 15 specialties ranked by U.S. News & World Report, and, according to the publication, seven of 18 top-ranked hospitals overall. U.S. News & World Report ranks the ten best children's hospitals separately; the Children's Hospital of Philadelphia, Boston Children's Hospital, and Johns Hopkins Children's Center were ranked number one, two, and eight respectively by the magazine in 2013.⁸¹

Access to Rail Key in the Healthcare Industry

Connecticut's **Yale-New Haven Hospital**, the top-ranked Level 1 Trauma Center in the nation and consistently ranked one of the nation's best hospitals by U.S. News & World Report, is the largest healthcare provider in Connecticut, attracting patients from throughout the NEC Region. With more than 18,000 employees, Yale-New Haven Hospital is also the largest employer in New Haven County. According to the hospital, many of its patients and employees rely upon Amtrak, Shore Line East, and Metro-North Railroad to access the hospital. The availability of parking is constrained on the hospital's campus, and hospital representatives view the ability to access the campus via rail as critically important for the hospital's continued success. In addition to the NEC's role in facilitating patient access, Yale-New Haven Hospital employees travel for work to New York City, Boston, and Washington, D.C., often traveling via Amtrak.

Bridgeport Hospital and **Greenwich Hospital** – also served by NEC commuter rail and Amtrak – are both in the Yale-New Haven Health System and served by the NEC.

Top Hospitals

Seven of 18 hospitals on U.S. News & World Report's Honor Roll of best hospitals in the country are located along the NEC:⁸²

- Johns Hopkins Hospital (Baltimore)
- Massachusetts General Hospital (Boston)
- Brigham and Women's Hospital (Boston)
- New York - Presbyterian University Hospital of Columbia and Cornell (New York City)
- New York University Langone Medical Center (New York City)
- University of Pennsylvania Hospital (Philadelphia)
- Thomas Jefferson University Hospital (Philadelphia)

NEC Facilitating Cooperation Between Medical and Research Institutions

Thomas Jefferson University (TJU), a health science university that provides patient care through its hospital, conducts medical research, and trains healthcare professionals, is just a little over two miles and a short transit ride away from Philadelphia's 30th Street Station. Rail already plays a key role in connecting TJU to its suburban workforce and student body and by facilitating access to research partners in other parts of the Northeast Corridor, but improved rail access on the NEC would provide direct and tangible benefits for TJU. In addition to TJU's partnership with the University of Delaware and its STAR Campus, the institution is starting several new educational, research, and clinical collaborations with partners located in the Northeast, but outside of Philadelphia, within the next three years. The University is seeking to create joint faculty positions across campuses and improved rail service would support individual faculty working in multiple locations. Students already rotate between sites for their clinical rotations and use rail where it is practical.

“One thing that restricts our collaboration is a lack of transportation choices as I-95 is very difficult for us to use. An efficient connection between our location and campuses and clinical locations in Delaware would be a real plus for a lot of us...If rail's service quality increased our planning for collaboration would expand. Researchers working at different locations could easily move back and forth between locations and this would be a big help because there is only so much you can do with technology (phone and video). They could be in each other's labs and meet each other's staff. We would share faculty between sites as well. It would also be a tremendous bonanza for the region economically.”

— Dr. Michael J. Vergare, MD, Sr. VP, Academic Affairs, Thomas Jefferson University



Rail connects Thomas Jefferson University with its partner institutions along the NEC

4.6 CONNECTING MODERN MANUFACTURERS TO THE GLOBAL MARKETPLACE

The NEC's freight rail services support economic activity in logistics and exports. Freight rail – especially where it is a key link in international trade – is important to the country's economic competitiveness within a global marketplace.

Efficient supply chains have become an increasingly central strategy employed by firms to compete in both domestic and global marketplaces. Supply chain innovations center around reducing expensive warehouse inventory by responding to customers' needs as soon as possible. Production is often global – manufacturing a car might involve making individual parts anywhere in the world, with final assembly at a point close to customers, and rapid distribution to domestic retailers or ports for export. This process requires very efficient intermodal transport at every stage, with as little delay as possible. Experts interviewed for this report from the Norfolk Southern Railway and the Port of Baltimore referred to this web of intermodal connections as a “delicate choreography.” To be successful, goods must be shipped “just-in-time.”

The time it takes for goods to be manufactured and travel to their final destination is timed in some cases down to the hour. Any delay in goods reaching their final market can be costly for companies producing and handling these goods throughout the supply chain. For U.S. exports, the differences in time and cost to transport to overseas markets can be critical to competitiveness.

Supply chains today are extensively globalized thanks to the increasing efficiency of transport and logistics, the globalization of manufacturing and consumption as well as large investments in new infrastructure in emerging markets ... Logistics and supply chains are essential to any company's competitive strategy and indeed its very survival. In the 21st century, logistics touches every aspect of every organization's daily operations.⁸³

— World Economic Forum, *Global Agenda Council on Logistics & Supply Chain Systems*

Information technology advances over the past few decades have revolutionized how firms manage the location and movement of their goods. However, these digital investments do little to reduce overall logistics costs in the absence of investment in the physical infrastructure required to keep goods moving efficiently. Freight railroads and ports along the NEC have been partnering to invest their own capital in rail facilities adjacent to the NEC that depend on continued or increased NEC access in the future. Rail investments include those made by the P&W Railway in New England and the CSX and Norfolk Southern railroads in the Mid-Atlantic states. The P&W has invested between \$3 million and \$4 million annually in the lines that feed into the NEC, including projects to allow larger freight movements and reopen the Willimantic, Connecticut branch line.

Because of the NEC's location along the shore in many areas, ports in New Haven, New London, Providence, and Davisville are only connected to the national freight rail network via the NEC. For example, the Port of New Haven, Connecticut has invested \$7 million in recent rail upgrades in addition to the \$120 million Tomlinson Lift Bridge project with an accommodation for rail service for the port.

Freight rail is often a cost-effective way to ship very large volumes of goods, although reliability is becoming more important for the shipment of high-value manufactured goods. If rail service became less reliable, manufacturers and the processors, shipping companies, and other related firms, might reevaluate their business locations and practices.

A Critical Link in Mitsubishi's Supply Chain

Mitsubishi Motors manufactures Outlander Sport vehicles in Normal, Illinois and uses freight rail via the NEC to transport vehicles to the Port of Baltimore for export to various countries in South America, Africa, and Eastern Europe. This year, approximately 30,000 vehicles manufactured in Normal will travel on the NEC to be exported via the Port of Baltimore.

As part of this process, Mitsubishi reserves space for vehicle exports on oceangoing vessels based on the time they are scheduled to arrive at the Port. Mitsubishi calculates production in terms of units per day, and the time it takes them to travel on rail to port. Since Mitsubishi cannot send a partial shipment, a delay in part of a vessel-bound shipment of automobiles arriving may cause hundreds of automobiles to be held at the port, increasing the time to market and resulting in additional costs. Occasionally an entire shipment of cars is held for weeks for a single delayed unit.

As noted by Curt Parrish, Manager of Baltimore Port Operations for Mitsubishi, access to the NEC is an important factor for the future growth of Mitsubishi's operations in the United States. The Normal plant has been very successful for Mitsubishi, and an expansion of the plant (including the introduction of a second vehicle model) is under consideration. The competition for future manufacturing activity, however, is intense. Mitsubishi is transitioning to a single manufacturing plant layout that will allow any vehicle model to be produced at any plant worldwide, meaning the Normal plant will have greater global competition. Every cost, including the cost of transporting automobiles to market, is factored into the decision making. Mr. Parrish described the operations at the Port of Baltimore as a "lifeline" for the plant in Normal. Mitsubishi also uses the NEC to transport automobiles for domestic consumption in the Northeast to Wilmington.

The Role of the NEC in Mitsubishi's Supply Chain





The Port of Baltimore connects manufacturers like Ford, Case New Holland, and John Deere to global markets with a direct rail connection via the NEC

Moving Goods to Market

Wallenius Wilhelmsen Logistics (WWL), which specializes in shipping and logistics solutions for manufacturers of cars, trucks, heavy equipment, and specialized “roll-on/roll-off” cargo, has had a significant presence at the Port of Baltimore since 2000. The Port of Baltimore is WWL’s second largest operation worldwide, and by far their largest in the United States. In 2012, at the Port of Baltimore, WWL processed 8,000 railcars of “high and heavy” freight (e.g., combines, tractors, other farm equipment, construction equipment) manufactured at five plants across the Midwest.

Rail is a vital link for WWL, and the predictability of rail service is critical. The impact of a shipment missing a vessel, or arriving late to the port, goes beyond the cost of storing equipment. In some cases, final manufacturing is done at the port by skilled labor, and longshoremen are needed to move the cargo from rail to ship. WWL orders union labor to move freight onto their vessels the night before a train is scheduled to arrive. WWL has to pay for labor hours, even if a train is late and the longshoremen cannot begin working until the train arrives.



Passengers wait to depart New York Penn Station

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Chapter 5
Real Estate and Utilities



5.1 INTRODUCTION

The NEC rail network has helped shape the Northeast Region's real estate development for almost two centuries. Many opportunities have already been realized; but there is 30 million to 75 million square feet of active or planned development within walking distance of the ten NEC station areas with the highest Amtrak ridership. Without floor area ratio (FAR) zoning constraints, the potential fair market value of property within walking distance of these stations could be as much as \$63 billion (2010 dollars) - a significant increase from the current fair market value of approximately \$35 billion.⁸⁴ With supportive public policies and investments to improve the NEC, evidence from international rail corridors suggests the NEC would have an even larger impact moving forward.

There are many current plans for real estate development directly at NEC stations. Although there are significant constraints and competing demands for NEC right-of-way, untapped opportunities also remain for greater real estate utilization and utility development along the NEC.

5.2 STATION-AREA REAL ESTATE

Railroads were the dominant mode of transportation when the largest NEC cities experienced rapid growth during the 19th and early 20th century. They shaped development patterns by connecting land outside major cities to their core markets, as well as by connecting core markets to each other. They facilitated the density of economic activity that characterizes these centers by efficiently bringing large numbers of people to small geographic areas. Proximity to railroads added value to land because of the fast and reliable access they provided to jobs and markets.

Railroads in the NEC Region continue to influence land development patterns and affect property values today despite the powerful role the automobile has played in reshaping and growing major metropolitan areas over the past half century. Development has not been limited to the largest cities; places like Stamford, Connecticut, Newark, New Jersey,

and Wilmington, Delaware have attracted major employers and new development in part due to excellent accessibility through the NEC. New Jersey Transit's "Midtown Direct" service, which provided a one-seat ride to New York Penn Station and vastly reduced travel time for many riders, has spurred substantial commercial and residential real estate development around new rail stations in several New Jersey communities.

A recent study by Econsult Solutions found that property values are higher for suburban homes with better SEPTA commuter rail access.⁸⁵ Station proximity, service frequency, and the presence of commuter parking all support higher home values. Premiums are as high as 10 percent for homes within one half-mile of a station that provides sufficient parking and frequent service. The study estimated SEPTA generates approximately \$6 billion in aggregate property value impacts across Bucks, Chester, Delaware, and Montgomery counties.

The Effect of New Midtown Direct Service

In 1996, New Jersey Transit introduced "Midtown Direct" service, a one-seat ride to New York Penn Station on the Morris & Essex Lines. Before Midtown Direct, the Morris & Essex trains terminated in Hoboken, where Manhattan-bound commuters had to transfer to PATH trains to cross the Hudson River. In 1996, some Morris & Essex Line trains were rerouted to terminate in New York Penn Station, cutting commute times by approximately twenty minutes in each direction. The \$70 million state-funded project included five miles of new track, a 350-foot long bridge, and modifications to the track system. Ridership increased by more than 20 percent during the first year of new service to more than 9 million riders. After ten years of the new service, total ridership on the Morris & Essex Lines had increased to 13.5 million riders, more than half of which was related to Midtown Direct service.

The expanded service led directly to an increase in commercial and residential real estate development around many of the affected stations in New Jersey. For instance, new developments within two to three blocks of South Orange Station have included a 200-unit multifamily development, redevelopment of a 65-unit multifamily building, and 119 new condominium units. An additional 20 new condominiums are approved and 48 are proposed for the area. The station itself also underwent substantial redevelopment, with six underutilized storefronts under the station viaduct renovated into commuter-oriented retail shops and restaurants.

Morristown Station also experienced a surge in real estate development, with over \$200 million of private development occurring in the vicinity since 1996. Subsequently, the town converted its 300-space surface parking lot situated next to the train station into 228 apartments, 8,000 square feet of retail space, and a three-level 700-space parking garage. A 200-unit luxury apartment building near the rail station was 100-percent leased as of 2011.

Studies have shown that improvements like Midtown Direct can have a large-scale positive impact on home values. The Regional Plan Association performed an economic analysis (hedonic modeling) of 45,000 home sales within two miles of a New Jersey Transit station affected by one of three major corridor improvements (the Midtown Direct, the Montclair Connection, and Secaucus Junction projects). This analysis found that the value of homes near affected stations increased by an average of approximately \$23,000 per home after these investments. Property values are linked to the distance from stations, where homes within a half mile had average increases of almost \$34,000 per home. In total, the value appreciation of residential properties associated with the commuter rail improvements of these three projects totaled nearly \$11 billion, representing additional property tax revenue of approximately \$250 million annually.⁸⁶



Panasonic's new North American headquarters in Newark

The Link between Rail and Newark's Revitalization

The Prudential Center, which hosts over 200 sports and entertainment events per year, opened in October 2007. At \$375 million, it is the largest private investment in the history of downtown Newark. It is located just 2 ½ blocks from Newark Penn Station, and attracts over two million visitors per year.

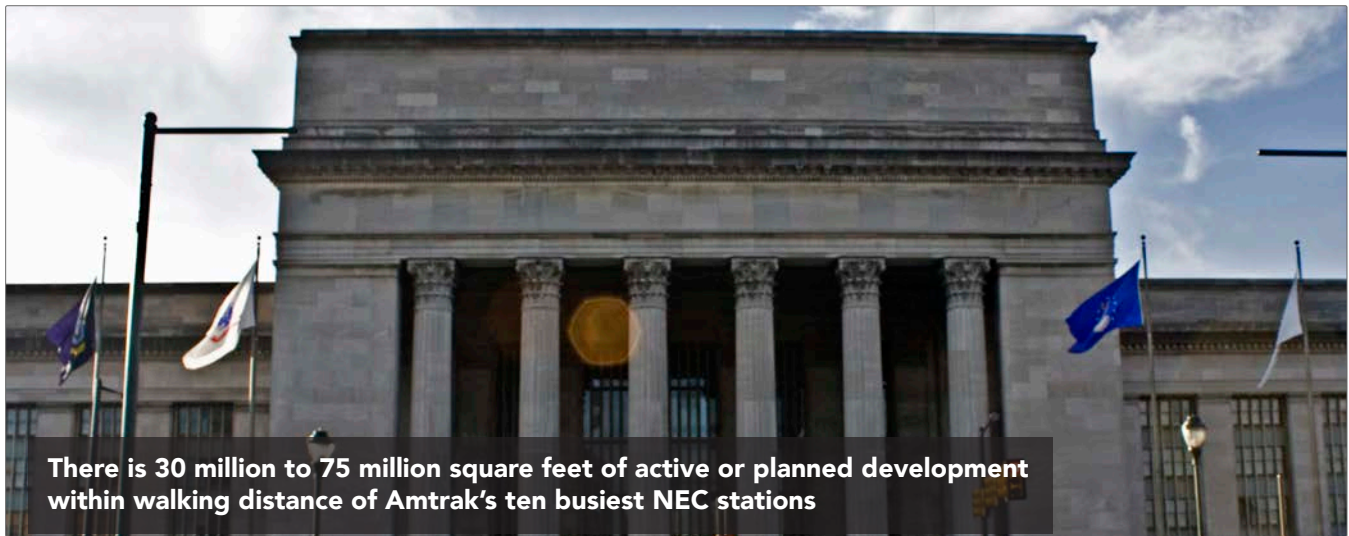
Just a 20-minute commuter rail ride from New York's Penn Station, **rail access was one of the prime reasons Newark was chosen for the Prudential Center.** Today, more than a third of Prudential Center patrons choose rail, with some events seeing more than 50 percent of patrons choose rail.

In the decade prior to the Prudential Center's construction, no residential development occurred in downtown Newark. Following its opening, an additional \$2 billion in development has been completed or planned, including two downtown hotels (the first new downtown hotels constructed in 40 years), several thousand apartment units, and dozens of small restaurants and businesses serving residents, workers, and Prudential Center patrons. In fact, in the 2000s, Newark's population grew for the first time in 50 years, adding nearly 3,600 new residents between 2000 and 2010. A Newark real estate developer, **The Hanini Group, LLC**, notes that its new residential developments near the rail station are in very high demand, with approximately 50 percent of residents relying on rail for their commutes. The Hanini Group also notes that most of the tenants near the station are new residents who did not previously live in Newark.

One of the key commercial developments is the relocation of **Panasonic North America's** headquarters from Secaucus, New Jersey to downtown Newark in 2013. Approximately 1,000 Panasonic employees and contractors are now located in the new headquarters, just a few-minute all-enclosed walk from Newark Penn Station.

In Panasonic's selection of Newark as its new North America headquarters location, access to rail was one of the most important factors the firm considered. Panasonic focused its search on urban hubs with easy access to transit, in large part because it is seeking enhanced rail access for its existing workers as well as to attract and retain young talent from the cities. Rail also plays a role in supporting the company's goal of becoming the top "green innovation" electronics company by 2018. As a Japanese company with frequent visitors from Japan, quick access to Newark Liberty International Airport via rail also was a key driver of the firm's site selection.

Based on internal surveys, Panasonic expects 50 percent of its workforce will use rail or other forms of transit. Panasonic has an internal goal of 80 percent transit usage, and it is encouraging staff to work while traveling on commuter rail as a way to reduce hours in the office.



There is 30 million to 75 million square feet of active or planned development within walking distance of Amtrak's ten busiest NEC stations

STATION-AREA REAL ESTATE PLANS AND DEVELOPMENT POTENTIAL

The areas surrounding NEC stations are some of the most valuable real estate in the United States. Analysis conducted in support of this report analyzed real estate markets within one-half mile of nine of the busiest NEC stations and within one-quarter mile of New York Penn Station, based on data collected for Amtrak's NEC Business and Financial Plan. Real estate property within these station areas (7.3 square miles in total) is currently valued at more than \$35 billion (2010 dollars). That is equivalent to roughly one-third of the total real estate value of the city of Philadelphia, which covers 142 square miles. These 10 station areas include more than 105 million gross square feet of existing development, the equivalent of nearly 50 Empire State Buildings, and generate more than \$600 million in property taxes per year.⁸⁷

Because the NEC has played a role in development patterns for almost two centuries, many development opportunities have already been realized. In a number of instances, however, additional potential remains. The prospects for future real estate development activity in these station areas is difficult to project because they are impacted by so many variables, including the strength of each real estate market, the remaining availability of undeveloped land, the size and ownership of undeveloped lots, the susceptibility of existing developed land for redevelopment, and local government zoning regulations regarding allowable density and use of land. In station areas, land value can also be impacted by the quality and quantity of rail service provided. All of these key variables are subject to change over time with impacts on what future development might occur.

Considering only recent trends in the strength of each real estate market and the availability of undeveloped land, analysis for this report estimates that the potential fair market value of property within walking distance of these 10 Amtrak stations could be up to \$63 billion (2010 dollars) by 2030, nearly double the value in 2010.⁸⁸ However, that analysis does not take into account additional increases in real estate value that might be derived from future improvements to the quality and quantity of rail service.

In the near term, nearly every major station along the NEC has major real estate developments planned or underway. In the 10 NEC station areas analyzed, there is 30 million to 75 million square feet of active or planned development.⁸⁹ The following sections describe recent trends and assess development potential at each of the 10 major station areas based on work completed by the real estate consulting firm DWH Strategic Advisors, LLC.

WASHINGTON UNION STATION

The real estate market surrounding Washington Union Station has been particularly strong over the past decade. Spurred in part by access to Union Station and investments in a new Metro station north of Union Station, a neighborhood named NoMa (north of Massachusetts Avenue) has emerged with extensive commercial and residential development, a portion of which has been within the half-mile catchment area of Union Station. In 2010, existing development in the catchment area was valued at \$11.9 billion, with approximately 73 percent of that value in commercial development and 27 percent in residential.

Market trends alone suggest that by 2030 the value of real estate in the catchment area could grow to as much as \$188 billion. However, many vacant parcels that contributed to the recent building boom have already been developed. In addition, the District of Columbia has strict zoning regulations regarding height and density. A more conservative estimate of development by 2030 would be an increase in value to \$26 billion (2010 dollars) in the station area based on available space and zoning constraints. Of the remaining development parcels, a number of them are in the northern section (New York Avenue) of NoMa.

The largest single remaining opportunity for additional development in the station area actually resides above the station itself. A proposed project to utilize that space is entitled Burnham Place and described below. At this time, between 5.6 million and 11.2 million square feet of new real estate development is planned or under construction in the Union Station catchment area.

Burnham Place

Burnham Place is a 3+ million square foot development proposed by Akridge for the air rights over Union Station. The project is a major component of the Union Station Master Plan, a 20+ year vision for redeveloping Union Station's transportation facilities and rail yards. The project is currently in the planning stages but the initial proposal includes:

- 1.5 million square feet of office space
- 100,000 square feet of retail space
- More than 1,300 residential units and 500 hotel rooms



As undeveloped land becomes increasingly scarce in Washington D.C., the air rights over Union Station are one of the few remaining opportunities for large scale development in downtown D.C.

BWI AIRPORT STATION

Given its multimodal access, the BWI Airport Station appears to offer great opportunity for “aerotropolis” type (airport-related) development. The BWI Airport station area is roughly bounded by I-195 to the east, the Northrup Grumman facility parking lot to the south, Corporate Center Drive to the west, and the Baltimore Washington Parkway to the north. The Baltimore-Washington Corridor industrial real estate market has experienced long-term growth that has surpassed national averages, fueled by distribution and government users. Those trends are expected to continue. However, aside from some low- to mid-rise office structures along Corporate Center Drive and single-story flex space east of I-195, the station catchment area has no development beyond the station complex. The site has considerable constraints to new development, including wetlands, remains of a Native American settlement, and proximity to the final approach flight path of BWI Airport runway 15R.

The Maryland Department of Transportation (MDOT), whose headquarters is within walking distance of the station on Corporate Center Drive, plans a 190-room hotel at the station at some future date. There is also potential for a second hotel development pad of the same size. The station area has between 210,000 and 400,000 square feet of development planned (based on the MDOT project). Given the significant development constraints of the station area, these plans may be the maximum potential development at the site.

BALTIMORE PENN STATION

The real estate market around Baltimore Penn Station, known as the Charles North District, is bisected by the NEC right-of-way and I-83. North of the station is a mid-rise development with a blend of an adaptive reuse arts district and public housing. South of station is dense mid-rise residential and University of Baltimore facilities. To the west are historic row house and single-family residential neighborhoods and Maryland Institute College of Art facilities. Amtrak owns parcels that line the north side of the NEC right-of-way.

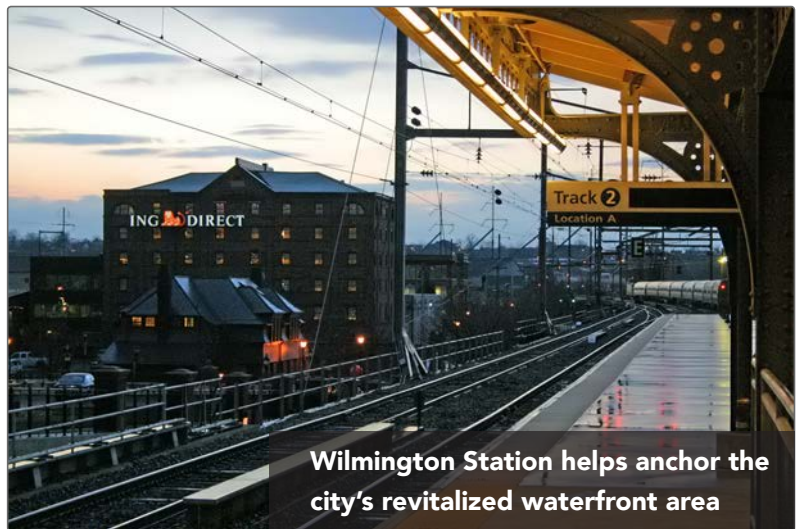


Baltimore Master Plan

Amtrak has partnered with Beatty Development to create a master plan for the unused properties adjacent to Baltimore Penn Station. The Redevelopment Plan, still at the concept stage, envisions 1.5 million square feet of office and residential development alongside the station. Amtrak is also considering redevelopment of the station building as a hotel.

WILMINGTON BIDEN STATION

The Wilmington station area is located south of the traditional central business district and north and east of a newly developing riverfront district along the Christiana River. The central business district is a mixture of dense mid- and high-rise mixed use commercial along Walnut and King Streets and the low-rise Compton Village public housing development to the northeast. The riverfront district contains low- and mid-rise commercial, industrial, and retail development with a cluster of mid- and high-rise residential along the southern bank of the river. In 2010, existing station area development was valued at \$1.8 billion.



Based on historic Delaware submarket development trends (a robust 5.84 percent per year), the total development could increase in value to \$5.2 billion (2010 dollars) by 2030. Within the Riverfront Development Corporation development district, three mixed-use development pads remain on the northern side of the Christiana River. On the other side of the river, a large portion of South Wilmington lies within the floodplain and is prone to serious flooding. Although this district is zoned for development, no other residential projects are yet planned. The station catchment area has between 350,000 and 500,000 square feet of planned or active development, including a hotel. Long-term trends would indicate a transition to more mixed-use development and away from commercial office as a lower cost alternative via the NEC to Philadelphia.

PHILADELPHIA 30TH STREET STATION

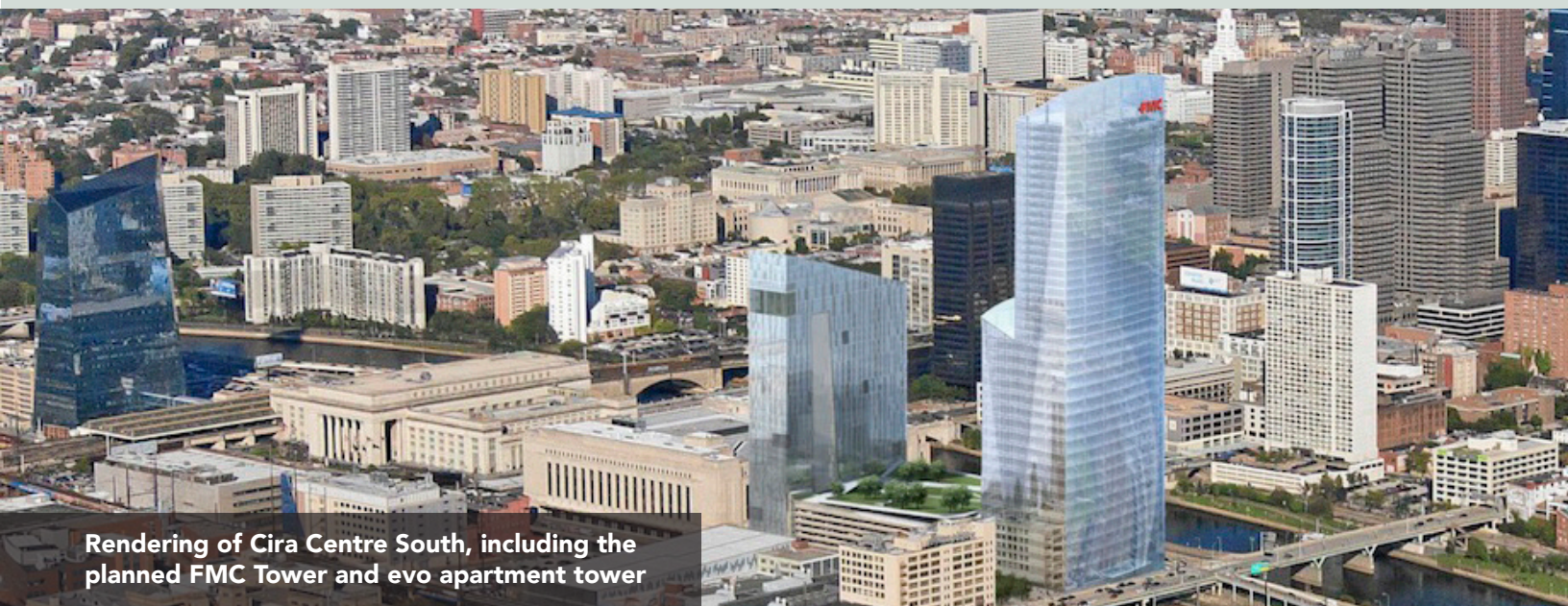
Philadelphia 30th Street Station's immediate real estate market has historically been rather weak, despite being located between two of the city's strongest commercial real estate markets, University City to the west and Center City to the east. However, recent activity suggests that the station area itself may be the subject of more intense development activity in the future.

Brandywine Realty Trust's Cira Centre, a \$180 million commercial development connected to the station, opened in 2005 and a \$340 million redevelopment of the adjacent post office into office space housing the Internal Revenue Service (IRS) was completed in 2010. In that year, existing station area development was valued at \$916 million, with 88 percent of that value in commercial development and 12 percent in residential. At this time, a \$158 million residential tower is under construction south of the old post office and a \$341 million office and residential tower is expected to break ground in 2014. Further, both Drexel University and the University of Pennsylvania have in place master plans that contemplate nearly 10 million square feet of development in the University City district. Also of note is Comcast's recent announcement of a second Comcast Tower in the Market West submarket, which will house 1,500

Cira Centre South / Postal Lands Redevelopment

The University of Pennsylvania partnered with Brandywine Realty Trust to redevelop the former Central Post Office site south of 30th Street Station. The project is a major component of Penn's 2006 Master Plan, Penn Connects, and will help reconnect Center City to University City. When completed, the project will have approximately 1.8 million square feet devoted to university, commercial, and residential uses, including:

- Historical rehabilitation of the Central Post Office building into the new regional headquarters of the IRS (This project was completed in 2010).
- An 850-bed graduate student housing tower (This project is currently under construction).
- A mixed-use office and residential tower anchored by chemical firm FMC Corporation and the University of Pennsylvania.



NBC employees relocated from higher cost Rockefeller Center in New York. This relocation represents a significant development in NEC access-based corporate location decisions.

Based on analysis from 2010, market trends suggested that the total development value could increase to \$1.4 billion (2010 dollars) by 2030. This value is constrained by the relatively low historical Market West office submarket construction trends at that time. Though hemmed in by Interstate 76 and the Schuylkill River to the east and Amtrak's Penn Coach Yards to the north, significant opportunities remain for additional development. One such opportunity could be the redevelopment of the Penn Coach Yards, including SEPTA's Powelton Yards parcel. Amtrak, in partnership with Drexel University, Brandywine Realty Trust, and other stakeholders, is beginning a master planning process for 30th Street Station, including the possibility of one day developing the rail yards. The demand for that type of development may be many years into the future, however, because Drexel, the main driver of development has a 6.5 million square foot pipeline of development on parcels it already owns. Additionally, development of the rail yards will require investment in infrastructure prior to development, posing a significant hurdle to development. In total, the station area currently has between 6.8 million and 10.8 million square feet of development planned or under construction.

NEWARK STATION

The Newark Penn Station area has experienced an uptick in development, reemerging as an urban NEC-accessible alternative to suburban office parks. Prudential Financial and Panasonic (relocating from Secaucus) constructed new corporate headquarters buildings and numerous mixed-use developments are underway. These developments and others have benefited from the New Jersey Urban Transit Hub Tax Credit Program. The station area features Midtown Manhattan access via the NEC, as well as Lower Manhattan access via PATH rail service. In 2010, existing station area development was valued at \$1.8 billion, with approximately 83 percent of that value in commercial development, 13 percent in residential, and 4 percent as vacant. Based on recent trends, the total development could increase in value to \$3.0 billion (2010 dollars) by 2030.

Though the station area is bounded by the Passaic River to the northeast, the dense residential and retail Ironbound District to the east, and the Newark central business district to the west, significant parcels remain available for development with between 2.7 million and 12.8 million square feet planned or under construction.

“From my point of view as a real estate buyer... now I largely look around rail stations. It is a phenomenal change in the years I’ve been doing this.”

— Edison Properties executive

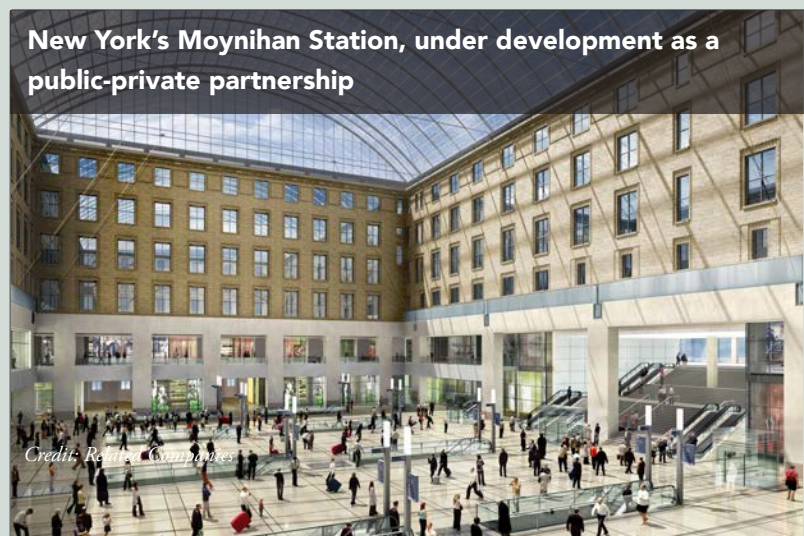
NEW YORK PENN STATION

New York Penn Station has the densest high-rise entertainment, retail, office, and residential development among all NEC station areas. As the busiest rail hub in the country, it has some of the highest office and residential rents and lowest vacancies in the U.S. and sits amid significant development under construction. For the purposes of the analysis from which real estate data in this report was originally collected, the New York Penn Station catchment area was defined as one-quarter mile from the station rather than one-half mile based on the assumption that given the overall density of development in Manhattan, the station alone has less of an immediate impact on real estate farther from the station. In

Moynihan Station (West)

The Moynihan Station redevelopment project will repurpose the James A. Farley Post Office Building as the new home of Amtrak in Manhattan. The building sits across the street from Madison Square Garden over the platforms of New York Penn Station. When complete, the former post office will become a new concourse to the station, creating a landmark entrance into Penn Station. Construction is underway on the \$148 million Phase 1 of the project. Phase 2 is currently in planning.

New York’s Moynihan Station, under development as a public-private partnership



Credit: Real Estate Companies



A variety of proposals to redevelop the existing New York Penn Station complex are under consideration

New York Penn Station Redevelopment

Although these plans are currently less developed than those for a new Moynihan Station concourse, there are also complementary proposals to redevelop the existing New York Penn Station complex. One of those proposals is the Amtrak Gateway program, which is considering the expansion of Penn Station southward to create additional platforms and tracks underground. Depending on the details of Gateway implementation and how historic property issues are addressed, this project may yield potential real estate development opportunities immediately south of the existing Penn Station complex on property such as Block 780, between 30th and 31st Streets and Seventh and Eight Avenues.

Another proposal would redevelop the actual Penn Station complex superblock. Madison Square Garden currently sits directly above New York Penn Station, constraining opportunities to enhance the busiest rail facility in North America. A concept developed by a joint venture of the Related Companies and Vornado Realty Trust (the real estate developers for Moynihan Station) would relocate Madison Square Garden away from Penn Station in order to construct an improved train station while yielding considerable real estate development opportunities. This proposal is currently on hold, although in July 2013 the New York City Council voted to limit Madison Square Garden's permit to an additional 10 years in order to preserve the opportunity to redevelop the existing Penn Station complex in the future.

2010, existing station area development in the quarter-mile catchment area was valued at \$5.5 billion with approximately 74 percent of that value in commercial space and 26 percent in residential. Based on historic Midtown Manhattan real estate trends but without considering space or regulatory constraints, the total development could increase in value to \$6.2 billion (2010 dollars) by 2030.

The area surrounding Penn Station is already home to some of the densest development in the country. Madison Square Garden, one of the busiest sporting and entertainment venues in the country, is directly above the existing station. To the east is the 34th Street/Herald Square shopping district and the Macy's flagship store. To the north is the Garment District. To the south is the dense residential neighborhood of Chelsea and the Fashion Institute of Technology. To the west is the Farley Post Office, part of which is to become an expansion of passenger rail facilities known as Moynihan Station.

Despite these constraints, two of the largest real estate developments in the U.S. are under construction in or near the Penn Station catchment area. Brookfield's Manhattan West, on Ninth Avenue directly west of the Farley Post Office Annex, will contain five million square feet in two towers straddling the NEC right-of-way. It will be a mixed-use development, including office, residential, and retail. Related's Hudson Yards Development, two blocks west of Penn Station on top of a LIRR yard, will total 12 million square feet of mixed use development, including the corporate headquarters of Time Warner and Coach. In total, over six million square feet of new development, primarily office space, is planned in the station area. If the station area were expanded to one-half mile, approximately 15.8 million square feet is planned or under construction.

NEW HAVEN STATION

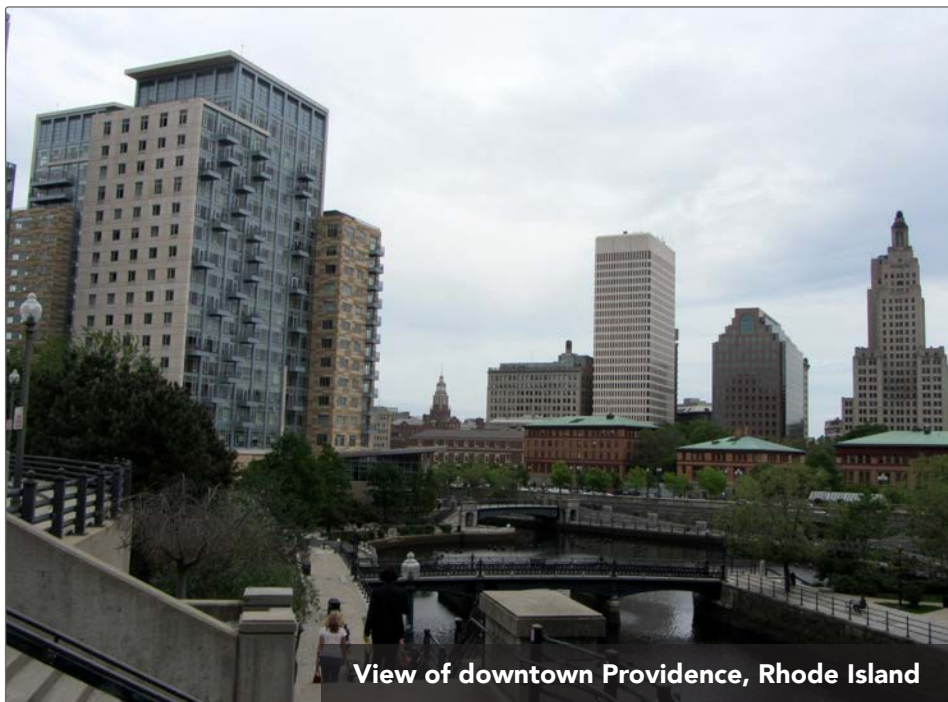
The New Haven station area is currently hemmed in by Metro-North and Amtrak rail facilities and yards to the east and south of the station, as well as the Long Wharf district that includes big box retail, and industrial and postal facilities. Immediately across Union Avenue from the station are a large public housing development and a mid-rise city government complex. To the north, Yale University and its hospital own several multi-story medical buildings and many parking facilities. In 2010, the existing station area development was valued at \$1.3 billion, primarily from the Long Wharf big box retail and industrial district, with 83 percent of that value in commercial development and 17 percent in residential.

Based on historic trends in this real estate catchment area alone, the total development could increase in value to \$1.6 billion (2010 dollars) by 2030. However, there are several much more ambitious real estate development plans for the station area that would dramatically change the historic dynamic. In September 2008, the City of New Haven presented a Future Framework Plan that contemplated several urban infill developments in or adjacent to the station catchment area. These include additional developments associated with Yale University and the Downtown Crossing/Route 34 East project which received federal Transportation Investment Generating Economic Recovery (TIGER) funding in 2010 to replace a section of limited access highway with a multimodal boulevard and 10 acres of land for new development. The City projected that the infill development potential could total 16.2 million square feet. Though this development would spread across downtown New Haven, it would still represent a significant increase over the existing 3.6 million square feet of development within a half-mile of the station.

PROVIDENCE STATION

The Providence station area is undergoing change from a primarily office district to a more mixed-use environment, as older former Class A office buildings are converted to apartments. The NEC's right-of-way and the station itself were relocated in the 1980s as part of a larger redevelopment strategy for downtown. Subsequently, there has been approximately 1.7

million square feet of mixed-use development adjacent to the station on former rail yards. More recently, the overall Providence office market have seen a reduction in vacancy rates and some former industrial buildings have been converted to creative and back office space. In 2010, the total station area development around Providence Station was valued at \$3.4 billion. Based on historic development trends, that total value could increase to \$5.3 billion (2010 dollars) by 2030.



View of downtown Providence, Rhode Island

One significant property owner holds parcels totaling 909,000 square feet within the station area. Improvements on these parcels could include 884,000 square feet of office space, 881,000 square feet of residential space, and a 330 space parking garage. The balance of new development in the station area is likely to be adaptive reuse of existing structures. New development could equal 4.5 to 9.1 million square feet, depending on total buildout. Given recent market trends, it is most likely that this will be residential development as a lower cost NEC accessible alternative to Boston.

BOSTON SOUTH STATION

Office rents in Boston, especially in the submarket adjacent to South Station, are second only to New York of NEC cities. In 2010, existing station area development was valued at \$7.9 billion, with approximately 93 percent of that value in commercial space and the balance residential and industrial. Based on historic office development trends and without accounting for space and local zoning constraints, the total development value could increase to \$12.3 billion (2010 dollars) by 2030.

However, again like New York, vacancy is below 10 percent due to limited supply and the difficulty of site assembly and construction in the central business district. Immediately south of the station is a tangle of rail lines and highways. To the west are dense mid-rise buildings in Chinatown and the former Leather District. To the north and west is the high-rise core of the central business district. These areas contain numerous constraints to additional development.

Development opportunities continue to exist, however, to the east. An adjacent postal facility has been slated for inclusion in South Station expansion plans. The Seaport District, across the Fort Point Channel, includes large parking lots and adaptive reuse industrial buildings with relatively low hurdles to future development. With approximately 10 percent of its area within a half mile of South Station, the Seaport District has about 30 million square feet of development built or permitted, including two hotels now under construction. In addition, Hines received approval in 2009 for a tower above South Station (see below), which is awaiting further advancement. Total development currently planned for the station area is between 5.1 million and 9.8 million square feet.

South Station Tower

In 2006, Hines proposed the development of a 1+ million square foot mixed use tower atop Boston's South Station. The project would include a residential tower, offices, and a hotel. While the project has been approved, it is currently on hold until a more robust plan of finance can be developed.



Platforms at Boston South Station

5.3 UTILITY AND REAL ESTATE UTILIZATION

The NEC currently generates approximately \$50 million per year from assets along the right-of-way, deriving revenue from utilities and real estate. DWH Strategic Advisors conducted analysis of data collected for Amtrak's NEC Business and Financial Plan to evaluate and identify opportunities for revenue growth in utility and station real estate utilization, including retail rental revenue, advertising/sponsorships, and real property sales. The greatest opportunities are at three locations: New York Penn Station, Philadelphia 30th Street Station, and Baltimore Penn Station.

UTILITIES

PIPE AND WIRE REVENUE

In 2011, the NEC generated \$6.9 million in pipe and wire (e.g., gas and electric power) revenue. This revenue is generated by leases/easements for gas lines and power transmission lines along 172 of the 548 miles of Amtrak-owned NEC and Keystone (Philadelphia to Harrisburg) right-of-way (equating to approximately \$40,000 per mile). DWH estimates that up to 375 additional miles of existing NEC right-of-way could be utilized in a similar manner for generating pipe and wire revenue. There are several challenges and constraints, however, including the following:

- **On any given segment there are competing uses of the right-of-way.** Gas lines are buried and can be placed only where the right-of-way provides sufficient clearance for operations and neighboring uses. Power lines can affect maintenance outages, and utility maintenance requires track usage by the utility (affecting operations).
- **Utilities consider alternative routes.** Two prior assessments (by ENRON in the mid-1990s and National Grid in the early 2000s) determined that use of the NEC tunnels into Manhattan would be cost prohibitive and uneconomical.
- **Power transmission regulations provide some restrictions.** A legal precedent inhibits Amtrak from entering the wholesale power wheeling business. Amtrak would need to change its power wheeling status in order to maximize its transmission fees (only wheelers of power can construct and own transmission facilities).
- **The presence of pipes and power wires can add costs and impacts to new construction along the right-of-way.**

Considering potential user and generation densities along the existing NEC, an additional 125 miles of transmission lease/easements could generate an additional \$5.0 million (2010 dollars) at current rates. Similarly, if Amtrak's rates were used, the New York and Connecticut controlled 56 miles of NEC right-of-way between New Rochelle and New Haven could potentially generate an additional \$2.2 million.

Amtrak currently leases from MBTA approximately 36 miles of the NEC from the Massachusetts state line north to Boston for its catenary for approximately \$145,000 per mile per year. However, it is more likely that a utility easement could generate \$40,000 per mile per year which potentially would generate an additional \$1.4 million annually.

TELECOMMUNICATIONS

In 2011, the NEC generated \$16.2 million in telecommunications lease revenue. Current telecommunication leases generate an average of \$10,000 per mile. There are multiple users over the same right-of-way and leases on virtually all of NEC right-of-way.

Telecommunications may provide the greatest opportunity for expanded utility revenue, as the NEC right-of-way runs between urban hubs with large data transmission needs and the continuous right-of-way offers relative ease of installation. However, the status of the telecommunications industry is highly dynamic, with a strong trend toward wireless transmission. In addition, many of the challenges identified above related to pipe and wire apply here as well.

For the Amtrak-controlled right-of-way, telecommunication lease revenue equates to \$3.8 million annually. For the 56 miles controlled by New York and Connecticut, the potential revenue could total approximately \$0.6 million annually (at \$10,000 per mile). MBTA's NEC telecommunications leases currently generate approximately \$20,000 per mile. At that rate, each additional user would generate \$0.7 million in annual revenue.

POWER GENERATION

Power is not currently generated on the NEC; however, there are over 1,000 acres of properties adjacent to the NEC right-of-way. It is estimated that approximately 10 percent of that acreage might be suitable for solar power (considering orientation and shadow constraints). At \$2,000 annual rent per acre, approximately \$200,000 in annual rent might be realized from solar power generation on this real estate.



Amtrak generated \$16.2 million in telecommunications lease revenue in 2011

OTHER SOURCES

STATION RETAIL LEASE INCOME

In 2011, major stations generated \$12.8 million in retail lease revenue, primarily from New York Penn Station (\$9.0 million) and 30th Street Station (\$3.0 million). Although retailers view train riders as a favorable and underserved demographic, a challenge of expanding and repositioning station retail is the balance of dynamic tension between transportation considerations (i.e., circulation and track access) and real estate opportunities.

Based on the ridership demographic using stations and recent trends in retail lease rates, retail rental income potential is estimated to be \$56 million by 2019. Both New York Penn Station and 30th Street Station contain vast underutilized areas. Conservatively, 50,000 square feet in Penn Station and 35,000 square feet in 30th Street Station could be converted from non-revenue to revenue producing space. Further, with a coordinated approach, retail lease rates will rise to track current market rates reflecting the appropriate retail mix for the highly underserved user demographic categories for each facility.

PARKING

In 2011, key stations generated \$4.1 million in parking revenue, primarily from 30th Street Station (\$3.0 million) and Baltimore Penn Station (\$0.7 million). Most structures at NEC station locations are owned by third party operators. New parking development would compete with other potential development uses in urban infill locations, and structured parking construction typically costs \$25,000 or more per space. Given that new parking facilities typically rely on parking revenue finance construction and operation, new parking deck construction is a challenge. Potential parking structures at station locations will most likely be owned by third party operators and, therefore, provide limited revenue potential for NEC owners and operators.



REAL PROPERTY LEASES AND SALES

In 2011, the NEC generated \$3.1 million in real property leases and sales for Amtrak, primarily from leases (\$2.9 million). Most leases are to adjacent property owners for long, narrow strips of land along the NEC. Unlike WMATA (Washington, D.C.) or Metrolinx/GO Transit (Toronto), which have large station area holdings to enable system expansion, NEC owners have limited real estate assets as a result of previous divestment initiatives by Amtrak, Penn Central, and the Pennsylvania Railroad (New York Penn Station air rights). What remain are often slivers of land alongside the right-of-way.

While non-station real property leasing revenue is assumed to remain flat, there are three stations with land value capture opportunities: New York Penn Station, Philadelphia 30th Street Station, and Baltimore Penn Station. Other existing stations are limited by third party ownership or encumbrances (i.e., Washington Union Station). Some New York Penn Station opportunities might coordinate with the Moynihan Station Development Corporation for Farley air rights contribution. 30th Street Station could capitalize on the market trend-based build out of the 4.0 million square foot Penn Coach Yard Master Plan and two hotels. Baltimore Penn Station could implement the planned station building hotel and 1,000 units of residential building on the Lanvale and other sites.

ADVERTISING / SPONSORSHIP

In 2011, Amtrak generated \$7.4 million in advertising and sponsorship revenue, including onboard, station, and outdoor advertising. Station advertising totaled \$2.9 million. Advertisement revenue is limited by Amtrak and commuter railroad policies that constrain placement of advertising panels, dynamic display screens, and billboards. Sponsorship revenue is also limited by policies resistant to approaches such as naming rights and corporate partner selection. Based on experiences with other transit properties and public assembly facilities, it is estimated that NEC sponsorships could generate an additional \$1 million per deal.





Stamford Station in downtown Stamford, Connecticut

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Chapter 6
Future Investment Scenarios

6.1 INTRODUCTION

Analysis conducted in support of this study examined two forward-looking scenarios to assess the potential economic impacts of different NEC investment levels. With a limited focus, this analysis did *not* quantify potential benefits to NEC passengers or freight rail users, induced demand that may result from better rail service, property value changes, or wider economic benefits such as agglomeration impacts. It also did not estimate the amount of investment needed to achieve these outcomes. **Just considering the potential transportation impacts to the aviation and highway networks**, the analysis found the following:

- If the NEC were not able to accommodate any future growth, it could cost the highway and aviation systems an additional \$1.2 billion per year by 2025.
- Alternatively, with long-term sustained investment in the NEC, the highway and aviation system could avoid as much as \$8.2 billion in costs per year by 2040.



6.2 FUTURE SCENARIOS

Over the past several decades, the NEC has been characterized by a lack of sustained investment to address state of good repair needs. As noted in the NEC Commission's 2013 report on Critical Infrastructure Needs on the Northeast Corridor, current funding levels for the NEC are inadequate, resulting in a critical backlog of necessary repairs on aging infrastructure.⁹⁰

In spite of limited investment, ridership has continued to grow on Amtrak and the commuter railroads over the last decade. With the corridor nearing the limit of its practical capacity,⁹¹ the Federal Railroad Administration (FRA) (in cooperation with the Commission, the Northeast states, Amtrak, commuter rail agencies, and other stakeholders) is currently leading a study, NEC FUTURE, to identify recommended future investments in the Northeast Corridor.⁹² FRA's study is considering a wide range of investment alternatives, including major investments that could significantly alter the NEC from the service provided today.

With future long-term investment uncertain, this report analyzes two future scenarios. In the first scenario, year 2025 rail ridership is assumed to be constrained to today's levels, with all future growth in travel shifted to the highway and aviation networks. The second scenario considers significant investments in the NEC by 2040 to yield transformational increases in rail capacity and reduced trip times between major urban centers.

It should be noted that the scenarios do not identify the cost of building the infrastructure needed to achieve these outcomes, as this study is not a cost-benefit analysis (FRA's NEC FUTURE study will perform a cost-benefit analysis for potential NEC investment). As noted earlier, these scenarios only focus on potential economic impacts to the highway and aviation networks, using the following metrics:⁹³

- Highway traffic delay
- Highway environmental emissions
- Automobile operating costs
- Highway accident costs
- Oil import costs of automobile travel
- Parking costs
- Costs to airlines
- Costs to air passengers

SCENARIO 1: INSUFFICIENT INVESTMENT IN THE NEC THROUGH 2025

With insufficient capital investment, a potential scenario for the NEC is the degradation of aging assets, leading to longer trip times, less reliable service, and a lower effective corridor capacity. These conditions ultimately might result in the commuter and intercity railroads losing market share to other modes.

To assess the potential consequences of underinvestment, this scenario analyzes the potential impacts of constraining both commuter and intercity rail ridership to current levels for the year 2025. This constrained ridership is compared against a case where ridership grows at the same rate as population through 2025. The difference is assumed to be reflected as a shift to alternative modes of travel (highway and aviation), generating additional costs associated with that travel. The relationship between hours of delay and volume of travel, developed from three decades of empirical data, is used to estimate the additional hours of delay that can be expected to result.

In this underinvestment scenario, **the costs to the highway and aviation systems of constrained NEC ridership could total \$1.2 billion (in 2012 dollars) per year by 2025.** These costs are driven largely by congestion on the urban highways as a result of the NEC's inability to keep up with the increasing commuter demand (Table 6.1). There are also costs associated with the additional intercity automobile and air volumes, although these are relatively modest by comparison.

"[If] I could no longer be confident in the reliability of Amtrak to do those tight turns [on business trips], I would be concerned, and actually it would increase my cost of doing business because I would therefore have to get in the night before, stay in a hotel, now you are talking about an extra \$300 per night."

— Peter Corbett, CEO, iStrategyLabs

Table 6.1: Additional Costs from Constraining NEC Ridership

Zero Growth in Rail Trips by 2025	
Additional Cost of Highway Commuters	\$ 1,100,000,000
Additional Cost of Highway Intercity Travel	\$ 98,000,000
Additional Cost to the Aviation System	\$ 38,000,000
Total Per Year	\$ 1,200,000,000

SCENARIO 2: TRANSFORMATIONAL INVESTMENTS BY 2040

“The idea of High Speed Rail would completely open up the potential for different workflows, and dramatically improve our ability to share human resources along that corridor.”

— Peter D’Arcy, Regional President, M&T Bank, New York

One long-term scenario was analyzed to examine the potential economic impact of a significant NEC investment. This increased investment would provide for a major increase in the frequency, quality, and variety of service offered on the NEC, including reduced trip times and higher capacity for both commuter and intercity services. For the purposes of this scenario, NEC investment was assumed to support 37 percent growth in commuter rail ridership by 2040 (37 percent is an average across the metropolitan areas, based on anticipated population growth for each metropolitan area plus an additional 15 percent). Commuter impacts were compared against a case where ridership is constrained to today’s levels. The impacts of transformational intercity passenger rail improvements were assessed by estimating the mode shift to rail from air and intercity auto trips using FRA’s CONNECT Beta tool.

In this scenario, it is estimated that **\$8.2 billion per year of positive impacts would be generated for the aviation and highway systems** (Table 6.2). Unlike the 2025 scenario, more than half of these impacts would be generated by intercity rail service. Because of improvements to rail capacity and trip times, growth in intercity rail travel could help relieve congestion pressure on the region’s airports and contribute to congestion relief on the urban highway network.



Acela train pulling into Wilmington Station, a recent beneficiary of investment through federal grants

Table 6.2: Estimated Savings from Significant Increase in Rail Investment

37 Percent Increase In Commuter Rail Trips, Plus Significant Increase In Intercity Passenger Rail Service And Performance	
Savings of Commuter Rail to the Highway System	\$ 5,100,000,000
Savings of Intercity Rail to the Highway System	\$ 1,600,000,000
Savings of Intercity Rail to the Aviation System	\$ 1,500,000,000
Total Per Year	\$ 8,200,000,000

Although these scenarios did not estimate the potential benefits for freight, it should be noted that a transformative investment in the NEC also could yield benefits for the freight railroads and shippers. With new potential service offerings, the NEC freight railroads could market new services that would require capacity not available today. The existing access of many commercial properties along the NEC might be leveraged to initiate or restore freight rail service to new facilities or uses of these properties. This new service may either supplant truck freight as the alternative or add economic activity without adding truck vehicle miles to the highway network, by keeping the freight on the rail system instead of highways. New business activity could bring employment, tax revenues, and income to the NEC Region.



Workers put the finishing touches on the new West Haven Station in Connecticut, as a train of new M-8 Metro-North railcars rolls by



Signage at Newark Airport Station

CHAPTER SIX NOTES AND CITATIONS

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92. This study is known as NEC FUTURE. More information is available at www.necfuture.com.

93. While this analysis was not a benefit-cost analysis, the metrics and values used in this analysis are generally considered appropriate for inclusion in a benefit-cost analysis.

END NOTE

This report illustrates the value of the NEC rail network to the NEC Region and the country, and should help to inform decisions about investment in this national asset. As shown in this report, the NEC rail network plays a vital role in the American economy. It supports a wide range of beneficiaries and economic functions – from knowledge-based employers and workers in urban centers, to small companies in mid-sized cities, to rural communities on the Delmarva Peninsula, and beyond the NEC Region, to manufacturing plants and jobs in the Midwest. The NEC also generates important benefits to the U.S. transportation network by helping to improve the functionality and reliability of the highway and aviation systems, as illustrated by the analysis of potential NEC service-level scenarios. These benefits to the transportation network not only support individual travelers but also the movement of U.S. goods domestically and to overseas markets. It is the hope of the NEC Commission that the information provided in this report is helpful to Congress and other stakeholders in understanding the many facets of the NEC’s role in the American economy.



CREDITS

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Front Cover: Cira Centre office tower rises above Philadelphia 30th Street Station

Back Cover: Early construction of the Hudson Yards development project over rail yards adjacent to New York Penn Station



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