

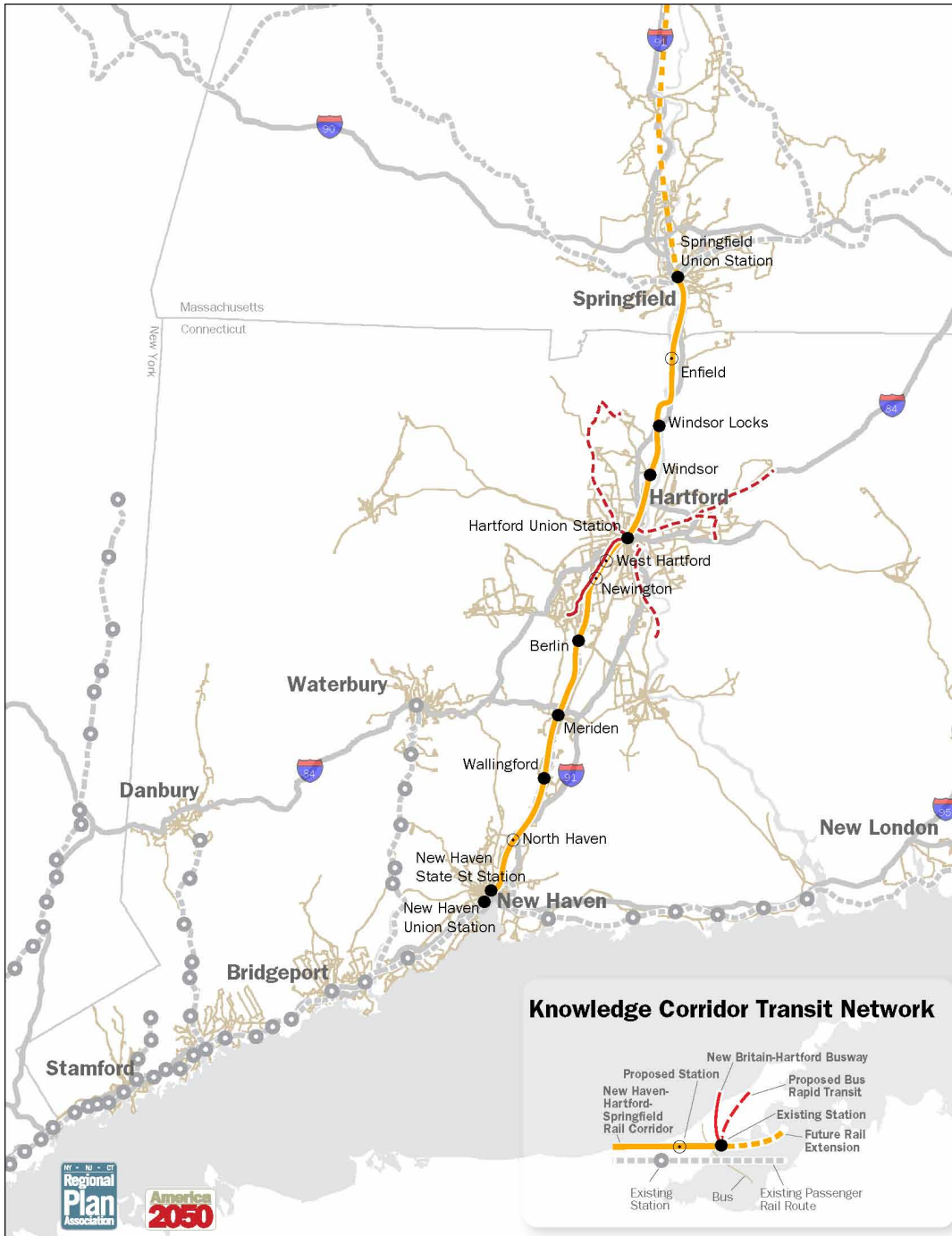
Dependable Rail in 2016

What Will It Mean for the Knowledge Corridor Region?
A Program of America 2050 and Regional Plan Association

Workshop Report

June 2-3, 2011

The Hartford Club
46 Prospect Street
Hartford, CT





America 2050

America 2050 is a national initiative to develop a framework for America's future growth and development in face of rapid population growth, demographic change and infrastructure needs in the 21st century. A major focus of America 2050 is the emergence of megaregions – large networks of metropolitan areas, where most of the projected population growth by mid-century will take place – and how to organize governance, infrastructure investments and land use planning at this new urban scale.

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Regional Plan Association

Regional Plan Association (RPA) is an independent regional planning organization that improves the quality of life and the economic competitiveness of the New York-New Jersey-Connecticut region through research, planning, and advocacy. Since 1922, RPA has been shaping transportation systems, protecting open spaces, and promoting better community design for the region's continued growth. We anticipate the challenges the region will face in the years to come, and we mobilize the region's civic, business, and government sectors to take action.

RPA's current work is aimed largely at implementing the ideas put forth in the Third Regional Plan, with efforts focused in five project areas: community design, open space, transportation, workforce and the economy, and housing.

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1. Executive Summary: Findings & Recommendations

In June 2011, Regional Plan Association and America 2050 organized a two-day workshop that convened key stakeholders in the Knowledge Corridor region. The goal of the workshop was to identify strategies to best leverage rail investments being made for greater economic growth.

Workshop Findings

Knowledge Corridor Region

Anchored by the Hartford, CT and Springfield, MA metropolitan areas, the “Knowledge Corridor” is a spatial economic framework developed in recent years to describe the Central Connecticut and Western Massachusetts region, emphasizing the concentration of colleges and universities in the region. The region also has a unique mix of knowledge-sector industries, such as insurance and financial services, health care services, aerospace and defense manufacturing, and more.

At the heart of the Knowledge Corridor runs the New Haven-Hartford-Springfield Rail Corridor, a major branch line of the Northeast Corridor, stretching from New Haven, CT through Hartford and north to Springfield, MA. This historic rail line connects a string of communities located along the Connecticut River Valley that are also linked by Interstate-91.

Knowledge Industries

Earlier economic studies of the region have emphasized the Knowledge Corridor’s concentration of higher education institutions and specialization in several knowledge-sector and related industries.

According to our analysis of employment levels, the Knowledge Corridor region has a greater share of its total employment in nine specialized knowledge-sector and related manufacturing industries when compared to the nation as whole. These industries include Firearms, Aerospace and Defense, Medical Device, Plastics, and Precision Manufacturing; Educational, Insurance and Financial, and Health Care Services; and Renewable Energy.

Rail Project

The State of Connecticut is currently pursuing the New Haven-Hartford-Springfield (NHHS) Rail Project, a major investment that will result in faster, more frequent, and more reliable rail service. The rail project entails adding a second track, upgrading

Figure A-1. The Connecticut River Bridge



Credit: Flickr - Wintergreen Connections. <http://bit.ly/nkGvGQ>

existing stations and rail infrastructure including drainage, signals and communications, and at-grade crossings. Four new stations, as well as new train equipment will also be part of later phases.

When complete, the rail project will increase service frequency from 6 to 25 daily round-trips, increase speeds, and reduce travel times. The double tracking, track and signal system improvements will provide moderate reductions in travel times. However, the introduction of express trains will result in substantial travel time reductions for some origins and destinations. For example, express service from Hartford to New York City will reduce the current travel time from 2 hours and 30 minutes to 2 hours.

The rail project is projected to take 1.5 million car trips off the road and eliminate 100 million miles of vehicle travel annually. State funding and federal grants have fully funded the first two phases and partially funded the third phase of this five-phase project.

Case Studies

Successful passenger rail services that have benefited from incremental improvements similar to the New Haven-Hartford-Springfield Rail Corridor in other regions around the country can provide useful lessons for the Knowledge Corridor region. Two speakers from other regions attended the workshop to share their case studies.

Capitol Corridor, California

Service improvements to Capitol Corridor service in California highlight the importance of managing partnerships with freight railroads, and understanding and accommodating their business

objectives, and how intermodal transit connections at stations support ridership.

The development of properties surrounding the stations, totaling hundreds of millions of dollars in value, demonstrates the ability of strong municipal planning and strong partnerships with real estate developers to create successful transit villages. Furthermore, design guidelines can ensure sensitivity to neighboring communities.

Figure A-B. Emeryville Station and Recent Development



Credit: Wikipedia Commons. <http://bit.ly/pMtScN>

Downeaster Corridor, Maine

Modest, incremental improvements to service and stations on the Downeaster Corridor in Maine, local ownership, and marketing and branding strategies have boosted ridership, created jobs, and generated other significant economic development benefits.

An important takeaway from the Downeaster case study is how a single-purpose authority, the Northern New England Passenger Rail Authority, tasked solely with managing the rail service, has dedicated all of its resources to providing a high-quality service with a unique local flavor and integrated the service with local station communities and the greater region.

Figure A-C. Downeaster Service



Credit: Flickr - d.w.davidson. <http://bit.ly/pTScPe>

Recommended Strategies

Through presentations, panels, and group discussion, workshop participants formulated several key recommended strategies in the following seven categories (see chapter 5 for more detail).

Institutions

To coordinate regional efforts to improve and manage the rail operations, create a new Knowledge Corridor Rail Authority. To encourage more local participation, create a coordinating council of municipalities in the region. To protect riders and continuously improve the service, create an advocacy coalition.

Transit & Mobility

To ensure that passengers are able to reach the service and their final destinations, promote intermodal connectivity at stations by integrating bus services, private shuttles, and bike and pedestrian infrastructure, and concentrate development of new housing and jobs within walking distance to rail stations to help reduce the need for auto trips.

Marketing & Promotion

To promote rail ridership and generate a local sense of ownership for the new service, create a unique name and brand identity that highlights the region's natural beauty, history, and culture as part of a broader regional marketing and advertising strategy.

Economic Development

To maximize economic growth in the region, integrate and align state economic development initiatives and planning, with local strategies to create a single, corridor-wide economic development plan that attracts and retains businesses and talented employees, particularly in knowledge-sector industries.

Funding & Financing Tools

To help fund critical ongoing capital improvements and local development projects, the state should consider the adoption of innovative financing mechanisms, such as value capture, and provide assistance to communities that want to use them.

Transit Villages & Downtown Revitalization

To promote mixed-use transit villages that revitalize downtowns, the state should initiate a new program that assists communities in developing infill sites in downtown areas and walkable, mixed-use, commuter-oriented housing around rail stations.

Land Use Regulations

To encourage transit-supportive development sensitive to each community, adopt a corridor-wide Transit Village Overlay district that creates a new set of regional design standards, but leaves local zoning codes intact.

2. Workshop Introduction

“Once fully completed, the New Haven-Hartford-Springfield Rail Project will permit a quadrupling of passenger rail service and create one of the best passenger rail corridors in the nation, serving the needs of Connecticut, Massachusetts and Vermont for decades to come.”

- Connecticut Department of Transportation¹

An Opportunity for Growth

A tremendous opportunity is coming to the Knowledge Corridor region. The State of Connecticut and the federal government are making capital investments of over \$400 million in the New Haven-Hartford-Springfield Rail Corridor to create faster, more frequent, and more reliable passenger rail service between the job centers of the region. The Knowledge Corridor region enjoys a tremendous opportunity to leverage these investments into a broader economic development strategy for the region. At the same time, regional leaders must address the challenge of preparing for these investments and coordinating across multiple communities, stakeholder groups and industries to achieve a successful, regional vision.

The NHHS Rail Project promises to transform passenger rail services in the NHHS Corridor. Upon completion of the project, the Connecticut Department of Transportation (ConnDOT) plans to operate trains every 30 minutes during peak hours and every 60 minutes during non-peak hours, increasing speeds up to 110 mph, enhancing existing rail stations, opening four new stations in North Haven, Newington, West Hartford, and Enfield, and connecting rail passengers to Bradley International Airport with a shuttle bus at Windsor Locks.

As we have learned from case studies around the world, building a successful passenger rail system is more than just laying tracks and running trains. Passenger rail can bring businesses and people closer together and expand access to markets, but only if a mix of complementary strategies are in place. The success of passenger rail depends on a larger set of actions, including siting the station at the center of regional transportation connections, providing convenient pedestrian and public transit access, promoting and marketing the service, measuring and improving on-time performance, improving the public realm and urban design of station areas, and attracting commercial development around stations.²

¹ Connecticut Department of Transportation. 2010. HSIPR Program Supplemental FY2010 Funding Grant Request Summary. <http://bit.ly/r0ibFY>.

² Todorovich, Schned, and Lane. 2011. *High-Speed Rail: International Lessons for U.S. Policy Makers*. Cambridge: Lincoln Institute of Land Policy.

Event Summary

On June 2-3, 2011, business and community leaders, city and regional planners, and government officials convened in Hartford to identify the opportunities to leverage public investments in the NHHS Rail Corridor for economic growth and to determine the strategies necessary to achieve a complementary, regional vision.

The workshop sought to answer the following questions:

- How can faster, more frequent, and more reliable rail service connecting the Knowledge Corridor to Southwestern Connecticut and New York City benefit the region?
- What can the Knowledge Corridor learn from successful implementation of passenger rail in similar corridors?
- What strategies can Connecticut and Massachusetts adopt to best leverage federal and state investments in the New Haven-Hartford-Springfield Rail Project for economic growth?
- How can we extend the benefits of frequent rail service to a larger, more connected region?

The first day of the workshop featured an introduction to the Knowledge Corridor and an update on the plans for the NHHS Rail Project, provided by Tom Maziarz, ConnDOT Bureau Chief of Policy and Planning. Speakers shared strategies from successful corridors in other parts of the country. Patricia Quinn, Executive Director, Northern New England Rail Authority, provided an overview of the Downeaster service in Maine. The Downeaster, serving almost 500,000 passengers annually, contributes an estimated \$15 million in economic activity to the states of Maine and New Hampshire, and helps promote tourism, investments, and community pride in the small towns it serves.

Eugene Skoropowski, Director of Rail and Transit Services at HNTB, provided an overview of the Capitol Corridor in California, which is the nation's third busiest intercity rail route and boasts the highest on-time performance (93 percent) of any Amtrak service in the country. Since launching the service in 1991, they have increased daily trains from 6 to 31, tripled ridership, and reduced their need for operating subsidies. Successful station development strategies have attracted hundreds of millions in private investment dollars to northern California.

Workshop participants discussed how lessons from these case studies and others could be applied to the Knowledge Corridor and engaged in an exercise to develop strategies specifically for this region. On the second day, these strategies were presented to a primarily business audience, which provided additional feedback and suggestions for next steps, as provided in this report.



Top left: Guest speakers Eugene Skoropowski and Patricia Quinn joined the forum on June 2, 2011, to present their experiences in the development of successful corridors in California and Maine. (Photo: Dan Schned, RPA)

Top right: Forum attendees participated in a brainstorming exercise, sharing their challenges and strategies for leveraging rail investments in their communities. (Photo: Daniel Ferry, RPA)

Bottom left: On June 3, 2011, a panel discussed how to leverage rail service for economic development. (Photo: Dan Schned, RPA)

Bottom right: Attendees shared and discussed their strategies with other participants. (Photo: Daniel Ferry, RPA)

3. The New Haven-Hartford-Springfield Rail Project

Background

The Corridor

The NHHS Rail Corridor is currently a primarily single-track railway that runs from New Haven Union Station in Connecticut north to Springfield Union Station in Massachusetts, serving both intercity passenger and freight rail. The Corridor roughly parallels the route of Interstate 91. Eight passenger rail stations currently have Amtrak service while New Haven and New Haven-State Street stations also have Metro-North and Shoreline East service.

Map 3-A. The NHHS Corridor and Rail Project



Credit: Connecticut Department of Transportation. 2011. New Haven-Hartford-Springfield Rail Project. <http://www.nhhsrail.com/>

Table 3-A. Project Summary³

Length	62 miles
Project Limits	New Haven, CT – Springfield, MA
Passenger Operators (2)	Amtrak and MTA Metro-North RR
Freight Operators (4)	Connecticut Southern RR, CSX Transportation, Providence and Worcester RR, and Pan Am
Existing Passenger Rail Stations (9)	Berlin, Hartford, Meriden, New Haven Union Station and State Street, Wallingford, Windsor, Windsor Locks, and Springfield.
Future Passenger Rail Stations (4)	Enfield, Newington, North Haven, and West Hartford
Total Estimated Cost of Phases 1-3	\$647.3 million

Ownership

Amtrak owns and operates the entire NHHS Rail Corridor and controls dispatching for all passenger and freight train movements. This is an uncommon situation for Amtrak, which outside of the Northeast Corridor normally runs trains on rights-of-way owned by freight companies

Current Service

Amtrak currently operates three services between Springfield and New Haven: the Vermonter, which runs from Washington, DC through to St. Albans, VT; the Northeast Regional, which runs from Springfield to points in Virginia, and the Northeast Regional Shuttle, which connects riders on the NHHS Corridor to transfers on the Northeast Corridor at New Haven. Combined, these three services provide six trains daily in each direction. Four freight rail companies also operate on the NHHS Corridor: Connecticut Southern, CSX, Providence and Worcester, and Pan Am.

New Haven Union Station, the main pivot point between the NHHS Corridor and the Northeast Corridor, is a major station on the Northeast Corridor and the busiest station on the NHHS Corridor. In 2010, it was the tenth busiest station in Amtrak's national network. Along with the three services listed above that run along the NHHS Corridor, the station is also served by Amtrak's Acela Express and Northeast Regional trains that operate along the Northeast Corridor (Table 3-D).⁴

³ Ibid

⁴ Amtrak. 2010. Amtrak Fact Sheet, State of Connecticut, Fiscal Year 2010. <http://www.amtrak.com/>

The Springfield Station is also a stop on Amtrak's Lake Shore Limited – Boston line, which runs from Boston to Chicago. From Springfield, Amtrak's Vermonter carries riders north to St. Albans, VT, and south to New York City and Washington, DC.

Table 3-C. Distance, Travel Time, and Frequency of Current Amtrak Service between City Pairs⁵

City Pairs	Distance (miles)	Travel Time (minutes)
Springfield, MA–New Haven, CT	62	~ 1:30
Hartford, CT–New York, NY	108	~ 2:45

Table 3-D. Amtrak Boardings/Alightings in 2010, by Station⁶

Station	Boardings / Alightings
Berlin	23,196
Hartford	170,060
Meriden	35,904
New Haven	723,287
Springfield	130,790
Wallingford	15,190
Windsor	10,219
Windsor Locks	15,812
KNOWLEDGE CORRIDOR	1,124,458

The Vision

Details

The NHHS Rail Project envisions a completely double-tracked rail corridor, major upgrades to existing infrastructure, four new stations, new trains, and new connections to other transit systems. This would forever change the nature of New England's passenger rail system by providing a new, faster, frequent, and reliable service.

Full build-out will include the following elements:

- Addition of 29 miles of double tracking and passing sidings;
- Major upgrades to bridges and drainage systems;
- Improvements to 38 existing at-grade crossings;
- Improvements to existing station platforms;
- Construction of four new regional rail stations in North Haven, Newington, West Hartford, and Enfield;
- Purchase of new rolling stock for regional rail service;
- Repair and replacement of the Hartford Viaduct; and
- Repair of the Connecticut River Bridge in East Windsor.

The project will also enhance rail stations in Connecticut and Massachusetts and implement a new bus shuttle connecting the rail line to Bradley International Airport at Windsor Locks. Commuter service may begin before completion of all components of the full multi-phase project.

Phasing

The projects above will be implemented in five phases. Phases 1–3 are outlined in Table 3-E and described in more detail below. Each of the first three phases corresponds to particular funding sources and rounds of grants awarded through the FRA's HSIPR Program. While Phases 1 and 2 are fully funded, Phase 3 remains partially funded. No funding has been identified for the future Phases, 4 and 5 (Table 3-F).

Table 3-E. Phasing Plan (cost in millions of dollars)⁷

Phase	Location	Total Cost	Federal Awards	State Bonds
1	Meriden-Newington	60 (Fully Funded)	40	20
2	New Haven-Hartford	262.9 (Fully Funded)	121	141
3	Hartford-Springfield	324 (Partially Funded)	30	97.3 authorized

Phase 1 – Meriden-Newington:

Scope:

- Adds 10.2 miles of second track between Meriden and Newington.

Funding:

Phase 1 is estimated to cost \$60 million and is fully funded. In 2009, the FRA awarded the project \$40 million in ARRA funds and the state matched the award 50 percent by authorizing \$20 million in state bonds.

Phase 2 – New Haven-Hartford:

Scope:

- Adds second track and infrastructure upgrades south of Hartford (except for the Hartford Viaduct);
- Installs new crossovers and PTC signaling;
- Improves existing grade crossings and station facilities; and
- Adds capacity for up to 16 new peak morning/evening rush hour trains between New Haven and Hartford.

Funding:

Phase 2 is estimated to cost \$263 million and is also fully funded. In 2010, the FRA awarded the project \$121 million and the state matched the award 117 percent by authorizing \$142 million in state bonds.

⁵ Amtrak. 2011. Routes. <http://www.amtrak.com/>

⁶ Amtrak. 2010. Amtrak Fact Sheet, Fiscal Year 2010 (State of Connecticut & State of Massachusetts). <http://www.amtrak.com/>

⁷ Connecticut Department of Transportation. 2011. New Haven-Hartford-Springfield Rail Project. <http://www.nhhsrail.com/>

Phase 3 – Hartford-Springfield:

Scope:

- Adds second track and infrastructure upgrades north of Hartford (except for the Connecticut River Bridge);
- Completes upgrades to infrastructure; and
- Enables 110 mph service and capacity for up to 50 trains a day between New Haven and Springfield.

Funding:

Phase 3 is estimated to cost \$324 million. This phase is only partially funded and seeking additional funds. In April 2011, the state applied for \$227 million of federal funding and authorized \$97 million in state bonds. In May, the FRA awarded the project \$30 million. Even if the state uses all of its authorized bonding authority, \$97 million, there will still be a funding gap of \$197 million.

Table 3-F. Future Phases⁸

Phase	Name	Description
4	Regional Rail Upgrades and Rolling Stock	- Construct four regional stations - Purchase new train equipment
5	Ongoing State of Good Repair Program	- Repair Hartford Viaduct - Repair Connecticut River Bridge

Benefits

Transportation

Once fully completed, the NHHS Rail Project will permit a quadrupling of intercity and regional passenger rail service (from 6 to 25 daily round-trip trains with 30-min peak and 60-min off-peak headways) and an increase in train speeds to 110 mph. The project will also connect to the New Britain-Hartford Busway and create a new bus shuttle connecting the rail line to Bradley International Airport at Windsor Locks.

The project will reduce travel time from Hartford to New York Penn Station to 2 hours and 23 minutes (currently 2 hours and 45 minutes) and cut travel time from New Haven to Springfield to 73 minutes (currently 1 hour and 30 minutes). The project will also dramatically increase train frequency, from 6 to 25 daily round trips (Table 3-G).

The project will also form the foundation for an expanded regional rail network in New England. This project is necessary in order to achieve any increase in frequency on Amtrak's Vermonter service. The project will also improve capacity for Northeast Regional trains traveling from New York to Boston via Springfield on the so-called "inland route," as an alternative to the busy coastal route.

⁸ Connecticut Department of Transportation. 2011. New Haven-Hartford-Springfield Rail Project. <http://www.nhhsrail.com/>

Table 3-G. Frequency of Future Amtrak and Regional Service⁹

City Pairs	Round Trip Trains/Day (Current)	Round Trip Trains/Day (Phase 2)	Round Trip Trains/Day (Phase 3)
Springfield – New Haven	4	4	14
Hartford – New Haven	-	8	-
Springfield – DC	1	1	1
St. Albans – DC	1	1	1
White River Junction – New Haven	0	0	5
Boston – Springfield – DC	0	0	3
Boston – Springfield – New Haven	0	0	1
TOTAL	6	14	25

Commuters travelling from the Knowledge Corridor to and from jobs in Stamford or New York City currently have only one one-seat option in the mornings, which leaves Springfield at 6:00 AM or they can take Shuttle at 7:10 or 10:20 AM and transfer at New Haven. The corridor's expanded rail service will offer riders new connections to existing services, including Amtrak, Metro North, and Shore Line East. The new service will also provide a seamless experience across multiple operators. Commuters will be able to pay the same fare structure regardless of the kind of train they board, including commuter and regional trains.

Environmental

According to ConnDOT, this new and improved rail service would attract 1.26 million new passengers by 2030. These new rail passengers would divert cars from the region's highways, saving fuel and reducing vehicle emissions (Table 3-G).

Table 3-H. Environmental Benefits¹⁰

Car trips diverted to rail	1.5 million
Reduction in number of vehicles	3.2 million
Reduction in vehicle miles driven	100+ million
Gallons of fuel saved	3.5+ million

Economic

Construction of the project will create a total of 8,090 new jobs, including 4,710 short- and long-term jobs in the construction industry and thousands of jobs in manufacturing and service-sector industries. ConnDOT also envisions stations as catalysts for transit-oriented development in station communities, providing an additional source of new jobs and government revenue.

⁹ Ibid

¹⁰ Ibid

4. Successful Strategies from Other Corridors

Capitol Corridor, California

Figure 4-A Northern California's Capitol Corridor



Credit: Flickr - todd510

San Jose, CA – Auburn, CA (170 miles)

The Capitol Corridor is an intercity passenger rail corridor operated by Amtrak that provides fast, reliable, and affordable service to 16 stations in the Northern California Megaregion. The service began in 1991 with six daily trains between San Jose and Sacramento and by 2010 was operating 32 weekday trains between Sacramento and Oakland, and 14 daily trains to San Jose (Map 4-A, Table 4-A).

In 1998, Caltrans Division of Rail transferred responsibility of the route to the Capitol Corridor Joint Powers Authority, who has managed the Capitol Corridor ever since. In the first two years, the Authority was able to expand train service by 50 percent and achieve substantial gains in ridership, revenues, and operating efficiency. In the full 12 years since taking over the Capitol Corridor service, frequency has quadrupled, ridership and revenue have more than tripled, and the revenue-to-cost ratio has improved by 56 percent (Table 4-A).

In 2010, the Corridor maintained its exceptional 93 percent on-time performance for the second year in a row, holding on to its standing as the most dependable Amtrak-operated service in the country. It also remained the nation's 3rd busiest rail corridor in 2010, behind the Northeast Corridor and the Pacific Surfliner, attracting nearly 1.6 million riders.

Map 4-A. Capitol Corridor Route Map



Credit: Capitol Corridor Joint Powers Authority. 2011. <http://bit.ly/nurFco>

Table 4-A. 12-Year Performance Enhancements¹¹

	1998	2010	12-Year Improvement
Frequency	8 daily trains	32 daily trains	+300%
Ridership	463,000	1.58 million	+242%
Revenue	\$6.25 million	\$23.5 million	+290%
Revenue to Cost Ratio	30%	46%	+56%

Successful Strategies

One of the most challenging aspects of the Capitol Corridor is that it operates on rights-of-way that belong to the freight railroad Union Pacific (UP). The Authority has built and maintains a strong working relationship with UP in order to achieve reliability of service while accommodating freight movements. Building a successful working relationship with the freight railroad required the Authority to strike business deals that respect and promote UP's business interests.

The Authority also uses a set of "Good Neighbor" guidelines to ensure that the corridor's design complements freight activity and is sensitive to communities along the corridor. For example, the

¹¹ Ibid

Authority uses island platforms that accommodate bi-directional tracks (for simultaneous passenger and freight operations). Following state specifications, sound barriers line the right-of-way and are covered with vines to discourage graffiti. In addition, a 30-foot linear park along the outer edge creates an attractive buffer between the right-of-way and the adjacent communities.

The Authority has also successfully cultivated riders from the four universities located on the corridor: San Jose State, Sacramento State, University of California-Berkeley, and University of California-Davis.

Promoting Transit Villages

The 16 station communities along the Capitol Corridor have harnessed the service's success to promote downtown revitalization as well as greenfield developments in rural areas.

Some communities along the Capitol Corridor have been proactive in creating and promoting a vision, and attracting developers with tools like zoning incentives, while other communities have worked with developers who have proposed their own visions. Examples from two of these cities are described below.

Sacramento Railyards Project

One of the largest urban infill sites in the nation is underway in Sacramento on a 240 acre brownfield that is roughly equivalent in size to Sacramento's existing downtown central business district.¹²

The site is being redeveloped into a dynamic urban environment with a comprehensive transit system. The project also involves the construction of a new intermodal transit hub with connections between the Capitol Corridor, San Joaquin Corridor intercity rail services, intercity bus services, local light rail and bus services, and other local public transit systems.

Figure 4-B. Proposed Transit Village in Sacramento



Credit: The Railyards. 2011. Project Facts. <http://bit.ly/qKRQ7D>

An economic impact analysis of the Railyards project was conducted by the City of Sacramento, which calculated that the project will generate an annual \$2.7 billion in positive economic impact and 19,200 permanent jobs.

Emeryville/Richfield Project

The Emeryville train station serves as the main transfer point for Amtrak travelers to get to San Francisco. After Oakland's original Beaux Arts 16th Street Station was damaged in the Loma Prieta Earthquake of 1989, private developers in the area built a new train station, which opened in 1994. In 2010, nearly 530,000 passengers traveled through the station.

Since opening in 1994, large retail, residential, and commercial development has flourished around the station in a concentrated, transit-oriented form, and has attracted major employers, such as Pixar Animation Studios.

The city's successful development can be largely credited to the long-term partnerships that have been fostered between private developers and the municipal government, which has provided strong leadership and a clear vision of the city's growth.

Figure 4-C. Emeryville Station and Recent Development.



Credit: Wikipedia Commons. <http://bit.ly/pMtScN>

Lessons Learned

- Managing successful passenger operations on freight railroads requires mutual understanding and accommodation of each party's business objectives.
- Intermodal connections at stations support ridership.
- Strong municipal visions and partnerships with developers encourage successful transit villages.
- Design guidelines can ensure sensitivity to neighboring communities and other railroad operators.

¹² The Railyards. 2011. *Project Facts*. <http://bit.ly/qKRQ7D>

Downeaster Corridor, Maine

Figure 4-D. Downeaster Train



Credit: New England Futures. 2011. <http://bit.ly/p4vaUp>

Boston, MA – Portland, ME (116 miles)

The Downeaster service operates on a 116-mile corridor between Boston, MA and Portland, ME and has become a national model for the successful introduction of new intercity passenger rail service. The service connects the metropolitan area of Boston to important cities and resources to the north. In 1995, the Maine State Legislature created the Northern New England Passenger Rail Authority (NNEPRA) as a public transportation authority to introduce rail service between Portland and Boston. NNEPRA manages the budget, contracts, promotion, and customer services associated with the Downeaster passenger rail service, while Amtrak operates the service.

Map 4-B. Downeaster Service



Credit: Amtrak. Route Map. www.amtrakdowneaster.com

The Downeaster began operations in December of 2001, restoring passenger service between Boston and Portland after a hiatus of 37 years. The tracks utilized by the Downeaster have multiple owners: the Massachusetts Bay Transportation Authority, Pan Am Railways, and Boston Maine Railway. Investments worth \$54 million were made to upgrade the freight lines for passenger service capable of reaching speeds of 79 mph.

Successful Strategies

Since the service began, continuous investments have enabled a reduction in trip times and more frequent trains. The inaugural run between Portland and Boston took 2 hours 45 minutes, which has since been reduced 20 minutes to 2 hours 25 minutes. Ridership has also grown 67 percent from 291,794 in 2002 to 487,463 in 2010. In 2008 ridership grew 28 percent from the previous year with the addition of a fifth round trip per day.

In addition to these improvements, NNEPRA also credits on-time performance, amenities, and friendly service as contributing to the Downeaster's popularity. NNEPRA has worked closely with PanAm Railways to improve on-time performance and with Amtrak to ensure high service standards among personnel. In fact, the Downeaster is consistently ranked the highest in overall service and customer satisfaction of any Amtrak line.

The Downeaster has benefited from heavy promotion and a strong brand identity. NNEPRA dedicates a significant portion of its annual budget (approximately \$480,000) to marketing and promotion. The Downeaster is also the only Amtrak service with its own, contracted food service, which provides unique options like clam chowder, lobster rolls, and Whoopie pies, which link the service with the Maine experience.

NNEPRA also provides strong support to help each station community improve the station facilities and take advantage of the service. Since each community is responsible for managing its own station, community residents and leaders have a vested interest in the service's success. NNEPRA provides assistance and facilitates collaboration by convening bi-monthly meetings with leaders from all station communities. Thanks to local efforts, many stations have become gathering spaces, improving the quality of life for the local community.

Figure 4-E. NNEPRA Logo



Credit: Northern New England Passenger Rail Authority. 2011. Education Piece. <http://bit.ly/qyslBy>

Economic Impact of the Downeaster Service

A 2005 study completed for the Maine Department of Transportation calculated that in the first three years of operation the Downeaster contributed to \$15 million of annual economic activities in Maine and New Hampshire by attracting tourism, triggering real estate investment around station areas, reducing transportation costs for residents, who are then free to spend that money discretionally, and generating state and local revenues via property taxes, visitor spending, and employment creation. The study estimated that by 2015 the rail service will contribute over \$100 million to the economy and will create over 1,500 jobs.

In 2008, the Center for Neighborhood Technology published a study highlighting the projects created or planned in response to the Downeaster service between 2005 and 2008, including:

- In Old Orchard Beach, two hotels and a \$20 million residential-retail complex built two blocks from station;
- In Saco, an old mill was renovated into a \$110 million retail-office-residential development; and
- In Brunswick, developers were planning a \$30 million hotel-retail-office-residential development.

Figure 4-F. New Development in Old Orchard Beach, ME



Credit: HomeAway.com. 2011. Luxurious Ocean Front Condo in Old Orchard Beach, Maine. <http://bit.ly/nG6vMT>

Then, in 2011, developers in Portland announced plans to transform a 30-acre site adjacent to the rail station into a \$100 million hotel-office-convention center-arena development. These projects highlight the success and continuing trend of new rail-oriented investment around the station areas of the Downeaster. The report went on to predict that with \$255 million in investments planned through 2030, the Downeaster would yield a 160 percent return on investment and produce:

- \$7.2 billion in construction;
 - 42,000 housing units, 6.8 million sq. ft. of commercial space, and 17,800 jobs;
- \$244 million a year in transport cost savings;
- \$2.4 billion a year in purchasing power; and
- \$75 million a year in state and local taxes.

Expansion of Service

In the future, the Downeaster will benefit from two expansion projects. First, the states along the Corridor have received federal and state funding to improve track infrastructure with the goal of reducing travel time between Boston and Portland to two hours and increasing capacity to support seven daily round trips.

Second, the Downeaster Extension Project is currently underway to extend service to Brunswick, ME. This extension project will create an important connection that will increase passenger rail access from Boston to the mid-coast region, via a Maine-owned Rockland Branch, and reduce congestion along I-295 and Route 1. As of May 2011, construction of the extension is on schedule and service to Brunswick is expected to begin in the fall of 2012.

Figure 4-G. Construction of the Downeaster Extension



Patricia Quinn, NNEPRA. 2011. PowerPoint presentation, 6/2/2011

Lessons Learned

- Local community ownership of each rail station has facilitated a strong constituency for improving the service and cooperation along the entire corridor.
- NNEPRA, as a single purpose rail authority, can bring all its resources to bear on providing best service possible. NNEPRA is essentially Amtrak's client, and holds Amtrak accountable to a high level of service.
- Strong Maine-oriented branding and marketing has attracted ridership, promoted tourism, and created a positive passenger experience with unique amenities, like lobster rolls and clam chowder.
- Coordination with freight railroads improves on-time performance.

5. Strategies for Leveraging Public Investments in the Knowledge Corridor Region

The following strategies were developed by attendees at the Knowledge Corridor workshop on June 2nd. Participants were engaged in a participatory exercise led by RPA staff to help distill the most effective ideas for leveraging public investments in the Knowledge Corridor region. RPA staff then organized all of the strategies into categories or groups of strategic initiatives.

The key strategies from this exercise are summarized into the following seven categories: Institutions, Transit & Mobility, Marketing & Promotion, Economic Development, Funding & Financing Tools, Transit Villages & Downtown Revitalization, and Land Use Regulations.

Institutions

Challenge

The NHHS Rail Project does not yet have a strong champion or a well-established public identity. Currently, managed from within ConnDOT, the project is progressing with the aid of state and federal funds and is still in development. The lead agency will need to develop a detailed service plan, brand identity, and marketing strategy. It is unclear whether it will be ConnDOT that continues to manage the enhanced rail service once improved or a new spin-off rail authority dedicated to managing the corridor and the relationship with the rail operator.

Leadership is required not just for promoting, managing, and operating the rail service, but for the regional and local planning considerations of stations and station areas. These considerations are likely to require the participation of state and municipal officials and urban planning expertise beyond that of the transportation planners and engineers at ConnDOT.

Finally, continued support for the expansion and improvement of passenger rail service in the Knowledge Corridor will surely benefit from an engaged constituency of rail passengers, interest groups, and local communities.

Suggested Strategies

- Create a single-purpose authority for planning and operating the new passenger rail service, such as the “Knowledge Corridor Rail Authority.”
- Create a council of municipalities that can coordinate with each other, the rail authority, and state agencies on station and station area planning issues.

- Form a coalition to advocate for continued investment and improvements to the NHHS Rail Corridor.

Implementation

The success of a passenger rail service can be greatly influenced by engaged, active leadership in the form of a single purpose rail authority that manages the service and the rail operator. In Maine and California, strong leadership at the Northern New England Passenger Rail Authority (NNEPRA) and the Capitol Corridor Joint Powers Authority established clear lines of responsibility to riders for the quality of the service, as well as created a brand identity and marketing strategy for the rail service. These rail authorities acted as a client of Amtrak, the rail operator, by holding Amtrak accountable to on-time performance and other service goals. This allowed these state-sponsored corridors to become known not just as any typical Amtrak service, but specially branded state services with unique identities, the Downeaster and Capitol Corridor. As a result of the active leadership of these rail authorities, these two services also developed reputations for their reliability, friendly customer service, good community relations, and quality, locally-oriented food and beverage services on board the trains. The State of Connecticut should strongly consider creating a rail authority modeled after these two examples in Maine and Northern California.

Another lesson gleaned from the case of the Downeaster service in Maine is the role of local communities along the rail corridor in owning and managing their own rail stations along the corridor. NNEPRA convened bimonthly meetings with the station communities to coordinate with each to improve their stations and ensure continuity in access to the rail service. The Knowledge Corridor rail authority, if established could create a similar council of municipalities to collaborate together and with the state on station and station area planning issues, ensuring that economic development activities complement one another.

Finally, area business groups, advocacy organizations, and rail passengers, should consider forming a coalition to promote better service and continued capital improvements to the corridor. An active constituency of rail service supporters would advocate for greater funding and help elected officials prioritize improvement projects and direct state and federal funds. This coalition would also help establish service goals and hold the rail authority accountable to these goals and other standards.

Transit & Mobility

Challenge

A rail passenger's trip typically does not begin or end at the train station. Most rail trips are an intermediate step on a longer journey to or from home or work. A comprehensive, regional approach to transit and mobility must take into account how travelers get to and from each station, and examine how the train can meet the needs of those living within walking distance of stations as well as those living in suburbs and areas further afield.

Suggested Strategies

- Promote intermodal connectivity of stations by integrating bus and shuttle services, cross-accepting fares and transfers with other transit systems, and installing bike and pedestrian facilities.
- Support accessibility by concentrating housing and jobs within walking distance to rail stations.
- Prevent parking from impeding future development in the areas surrounding the stations or detracting from station area walkability.
- Provide clean, safe, and inviting stations.

Implementation

The NHHS Corridor should be considered the main artery of a regional network of transit services. Other supportive transit and mobility services, such as public buses and shuttles or private vans and car-sharing should be developed to provide access to housing and job sites dispersed throughout the region. The local feeder services should be coordinated with the rail service to facilitate convenient transfers between modes.

In California's Capitol Corridor, rail passengers receive free vouchers to use connecting transit services. The Knowledge Corridor Rail Authority should partner with MTA Metro-North, CT Transit (the ConnDOT-owned local bus service), Pioneer Valley Transit Authority, and other local bus transit districts to develop a similar voucher for making transfers between local buses and regional trains, providing a powerful incentive to use both systems. At the center of the corridor, ConnDOT should continue to develop the New Britain-Hartford Busway, which will connect to the NHHS Corridor rail service in both Newington and Hartford, and pursue other bus rapid transit (BRT) corridors and express bus routes to the north, east, and south of Hartford.

The most successful and efficient rail stations are located within walking distance of housing and jobs. Commuters are particularly discouraged from using rail if workplaces are not easily accessible to station locations. To create accessible stations, communities should maximize activity within station areas by concentrating new commercial development within ¼ mile of the station and residential development within ½ mile. Quality bicycle and

pedestrian facilities should be installed at the rail stations to further increase their multi-modal accessibility.

If the private automobile is the only means of station access, it limits the number of people who can access the rail service, and requires tremendous amounts of valuable land surrounding the stations for parking. While some parking is necessary, it should be designed in such a way that it does not impede the potential for future development that would support the rail service. Every parking space avoided is land that can otherwise be utilized for more productive land uses.

In Maine, local communities manage their own rail station, which gives them the incentive to maintain and upgrade the facilities, and take advantage of the rail service by coordinating transit connections and demanding high-quality rail service from Amtrak. The Knowledge Corridor Rail Authority should encourage local control of NHHS rail stations to ensure that they become clean, safe, and inviting gathering spaces in the communities.

Marketing & Promotion

Challenge

Many people have never had a chance to ride passenger rail in the Knowledge Corridor region and will have difficulties visualizing the future service. Others may have ridden rail and had a negative experience. Improved, more frequent and reliable rail service could attract new customers, including business travelers; however, new rail passengers will not materialize on word of mouth alone. A marketing and promotion strategy is critical to getting people out of their cars and beginning to consider passenger rail as an option for a variety of trip types, from business travel to cultural and tourism excursions.

Suggested Strategies

- Create a unique name and brand identity for the new passenger rail service that highlights the region's natural beauty, quality-of-life, and shared history and culture.
- Develop a regional marketing and advertising strategy to attract new and lasting customers.
- Establish a tiered fare policy and promotional campaigns that incentivize student groups, seniors, and recreational travelers to use the rail and help fill trains in off-peak hours.

Implementation

Successful branding, marketing, and promotion strategies for a new passenger rail service should begin before the service has opened and evolve as the service develops. Before the launch of the Knowledge Corridor service in 2016, the Knowledge Corridor Rail Authority should develop a distinctive name and brand identity for the rail service that reflects the Knowledge Corridor region's unique natural beauty, overall quality-of-life, and shared history and culture. The name and brand should capitalize on the

region's existing Knowledge Corridor brand. In Maine, NNEPRA successfully branded the Downeaster service as "Maine's train" by highlighting the state's culture identity and providing dining choices that are drawn from local cuisine, like lobster rolls and clam chowder.

The rail authority should also work to develop a powerful marketing and advertising strategy to attract customers. An essential foundation of this strategy should be to clearly articulate the benefits of the new rail service for the region and its inhabitants, and what kind of experience customers can expect, such as reliable on-time performance and outstanding customer service. An effective advertising strategy should also seek to encourage communities' sense of ownership over the stations and the service itself.

The rail authority should offer a range of fare policies to attract low-income passengers, seniors, students, and others, to help fill seats during off-peak hours and attract those who cannot afford full price, peak fare. Promotional campaigns can also be used to target discrete user groups, such as students and school faculty, drawing from the large number of educational institutions in the region. Recreational travelers can be targeted by coupling rail fares with entry fees to the region's various natural and cultural amenities.

Economic Development

Challenge

The Knowledge Corridor region has already developed a specialty in several, niche, knowledge-sector industries, such as precision and medical device manufacturing, educational and health care services, and renewable energy. By creating enhanced connections to major markets, such as New York, Philadelphia, Washington, DC, and Boston, improvements to the NHHS Rail Corridor will offer the opportunity to attract jobs at firms in these industries that are looking to relocate or expand in the Knowledge Corridor region, and retain jobs at firms that are considering a move elsewhere.

However, if each local community with an enhanced or new rail station pursues its own vision of economic prosperity, which may seek to achieve similar or contradictory objectives, then none will be effectively realized. Industry clusters and labor markets are not limited to political boundaries and a regional strategy to enhance the Knowledge Corridor must respond to this reality. The region must pursue a coordinated, regional strategy to maximize the economic benefits of the rail investments.

Suggested Strategies

- Perform market research to better understand the needs of employers, and attract and retain businesses.

- Encourage municipalities to pursue economic development strategies that reflect local economic conditions and achieve positive, local outcomes, while also advancing a shared, regional vision.
- Create mechanisms to integrate and align state economic development planning with regional growth strategies and local development programs at the corridor scale.

Implementation

In order to best leverage rail investments for economic growth, public sector actors at all levels along the Knowledge Corridor should coordinate strategies to attract and retain jobs, particularly those that will make use of enhanced rail service in the Knowledge Corridor. The strategies should be informed by market research, in order to better understand the needs of existing employers and support regional business attraction and retention initiatives. The goal should be to develop a bi-state, corridor-wide, regional vision for economic growth, in which improved rail service plays a starring role.

An official bi-state partnership between Connecticut and Massachusetts should be established that works in coordination with local communities to implement complementary activities, land uses, and investments to attract jobs along the corridor. This corridor-wide economic development plan should result in a range of options for each station area, policies for business retention and attraction, and site locations for each target activity/land use, offering municipalities flexibility while working towards the shared, regional vision. The states and municipalities in partnership can then develop the suite of investments and incentives to best implement each station area's economic development strategy.

While some strategies will be targeted investments to leverage private investment or incentives to attract particular industries, others will be mechanisms geared to municipalities to mitigate short-term revenue losses that may result from a station area's unique, local land use mix. For example, some land uses, such as parking, educational institutions, business incubators, job training centers, and community facilities provide great long-term value for cities, but do not generate much short-term tax revenues. Land uses that generate more short-term revenues, such as housing and commercial development compete for physical space in station areas.

Municipalities' reliance on local property taxes ensures that the default decision-making will result in cities choosing those uses that provide the greatest local, short-term benefits, potentially crowding out other uses to the detriment of the long-term success of the region. A new, bi-state economic partnership that works with local municipalities could create tools such as tax-increment financing to promote cooperation among cities and states on attracting uses that result in stronger regional outcomes.

Funding & Financing Tools

Challenge

Despite significant state and federal funding commitments to the NHHS rail project, additional funding and financing mechanisms are still needed for the remaining capital, operations of commuter and local transit services, and development of transit villages. However, in the absence of a federal transportation reauthorization bill and a political climate of growing concern over government spending, continued federal support for transportation is uncertain.

Traditional private financing tools for may not be sufficient, as many lenders are unfamiliar and uncomfortable with financing unconventional projects like mixed-use development and transit villages. Current housing and commercial markets in the station areas will make development challenging over the short-term without gap financing support.

Innovative financing mechanisms to build transit systems and transit villages are being employed elsewhere in the country, such as using value capture financing and parking fees. However, these tools may be less viable in the Knowledge Corridor region due to state laws or because they face public perception hurdles. For example, because abundant surface parking exists in the region, drivers may be unwilling and unlikely to pay more for parking.

Suggested Strategies

- Provide assistance to communities that want to make use of creative financing mechanisms, such as value capture, to fund their local economic development strategies.
- Organize seminars aimed at educating banks on the benefits of transit villages to make them more comfortable providing loans for innovative development projects.

Implementation

Currently, the level of future federal funding is uncertain due to the expiration of the transportation authorizing legislation and the lack of a viable transportation reauthorization bill on the horizon. In its absence, states and local governments across the country are experimenting with innovative financing mechanisms to invest in transportation alternatives and housing options that unlock previously untapped resources.

Some governments have established new, dedicated revenue streams for major transportation projects through property or sales taxes, which can be used to leverage federal support from existing financing tools, such as the Federal Highway Administration's Transportation Infrastructure Finance and Innovation Act and the Build America Bond program created under the American Recovery and Reinvestment Act, which has expired, but could be renewed. The Denver metropolitan region has enacted a regional supplemental sales tax to fund transit capital projects and the New York State Legislature enacted a regional payroll/mobility tax to

fund Metropolitan Transportation Authority operations. Legislative action in the State of Connecticut would be required to authorize comparable innovative financing strategies.

Other less conventional financing tools, such as value capture, should be explored in the region. A renovated or new rail station along the Corridor with significantly enhanced service to Fairfield County and New York City will add measurable and pronounced value to surrounding properties. Value capture financing involves the public sector capturing a portion of that added value through property taxes, special assessments, or revenue sharing, thereby creating a new revenue source. Some communities have used the new revenues to repay a portion of the initial capital expenditure by the state or transit agency. Others have used them to fund ongoing operations of the transit service, or improvements to the local station area public realm.

The Knowledge Corridor region could use additional revenues from value capture financing to improve local roads, sidewalks, and greenways in the station areas, or support transit services that link station areas to surrounding neighborhoods and communities. Or, revenues could be used (and have been used in other communities) to create resources shared by other localities in the region, such as parking garages, which facilitate the construction of mixed use buildings in the station area by removing that financial burden from private development. They could even be used to provide gap financing from a revolving fund or as grants to private developers as a catalyst to station area regeneration.

Additionally, the local development and financing community should be exposed to case studies from other communities that faced similar hurdles of creating mixed use, transit villages and overcame them using conventional and innovative financing tools. Regional partnerships and state agencies should organize a series of seminars aimed at educating banks on the components and benefits of transit villages to make them more comfortable financing innovative mixed-used and transit villages.

Transit Villages & Downtown Revitalization

Challenge

Improvements to the NHHS Corridor offer the opportunity to leverage public investment in transportation to encourage transit villages in station areas and leverage development for the economic revitalization of cities' central business districts. While transit villages have an established track record for encouraging the revitalization of downtowns, this relationship has its limitations.

Transit villages alone cannot lead to downtown revitalization. Stimulating development in downtown areas is often a difficult and complex enterprise with multiple dimensions, many of which are supported by transit villages, but not all to the same degree. A suite

of land use, urban design, and development strategies, along with the reform of land use regulations (see the next section), must be adopted to successfully revitalize a stagnant downtown area.

Suggested Strategies

- Use state policies to promote transit villages around stations in Connecticut and Massachusetts.
- Capitalize on the potential of stations to create a place-based experience and celebrate the downtown experience that differentiate transit villages from commercial strip malls.
- Promote commuter-oriented housing, flexible spaces, and infill development in station areas.

Implementation

Experience with transit villages in the Knowledge Corridor region and across the country has shown that housing located in these types of developments attracts few children and results in net-positive fiscal impacts for their communities. Communities throughout the Knowledge Corridor region should continue to pursue mixed-use housing and commercial development around their train stations.

At the state level, the Connecticut Department of Economic and Community Development, in cooperation with ConnDOT, and the Massachusetts Department of Housing and Community Development should work together to promote transit villages in the Knowledge Corridor region. Over the past ten years, the State of Massachusetts has enacted several innovative policies that proactively incentivize transit villages in station areas, which have been consolidated into the MassWorks Infrastructure Program and the Commercial Area Transit Node Housing Program.

Communities should work to create a sense of place at the train stations by exploiting their unique characteristics. Train stations are capable of being the centerpiece of a unique branding strategy because they are a singular and relatively scarce resource. The general activities associated with train stations – the constant comings and goings of travelers and the pulse of movement as the trains pull in and out – make them an exceptional asset for creating identity. Furthermore, most of the communities in the Knowledge Corridor region grew up around their stations and improving them provides the opportunity to celebrate their history and heritage.

Cities should work to create a dynamic mix of uses around the stations that reflect the local context of the station and its role in the larger downtown area. Striking the appropriate balance of land uses in transit villages can be difficult to accomplish. Housing is a vital component of the right land use mix. While most housing is not usually considered a revenue positive use, a strong residential presence is essential to support healthy downtown areas and village centers. In addition to direct spending on goods and services, downtown residents provide levels of activity and passive security that help make them destinations for a larger geography and for extended hours. Mixed-use transit villages can be particularly

effective at attracting residents because transit services have their greatest impact on the journey to work. Improved transit access and regional connectivity can also be used to grow businesses and industries that are already present, but can benefit by being part of an agglomeration of economic activities in a larger geography.

Chambers of commerce, merchants associations and business improvement districts should focus on celebrating those aspects of the downtown experience that differentiate them from the typical suburban shopping malls or large-lot, low-density developments, which will always be more convenient for single-purpose, auto-oriented shopping and work trips. For example, transit villages are walkable, have a fine-grained mix of land uses, and provide visitors a diversity of experiences, all of which contrast sharply with the banality of a suburban, commercial strip mall.

Redevelopment plans should not be built around a single business, industry, or land use. Long-term station area plans must anticipate future conditions, by planning for more flexible building types and adopting land use regulations that allow for multiple uses in the same structure. Cities should take care not to develop structures in their downtown areas for only one business or industry without consideration of future uses in the event that the business or industry eventually leaves the community.

Redevelopment plans should initially focus on abandoned and underutilized sites, as they artificially depress the development values of adjacent properties, stymieing downtown revitalization. Access to train stations often provides the marginal, increased value necessary to reclaim sites that are otherwise encumbered by environmental or ownership challenges. And, because station area development can be framed as a public investment, it is often possible to attract other public monies that are available for remediation and infrastructure.

To achieve the potential benefits of transit villages in the Knowledge Corridor region, municipalities must be prepared to put into place a complete set of other complementary initiatives. Improved transit access inherent to transit villages is not in itself sufficient to entice developers and revitalize downtowns. Complementary initiatives include corridor-wide economic redevelopment strategies, urban design interventions beyond the station areas, increased connectivity from the stations to the larger landscapes, and smart growth policies that promote development in built, transit-accessible areas and inhibit growth in farmland and natural landscapes, as well as land use and zoning regulations that allow desired mixed-use development to take place, as discussed below.

Land Use Regulations

Challenge

Land use planning and zoning in station areas should encourage mixed-use and mixed-income development that is at transit-supportive densities appropriate for each community, but also that fits into a corridor-wide plan that fosters positive development outcomes for the entire Knowledge Corridor region.

Some communities do not have experience working with the complex zoning and regulatory tools that help encourage transit villages. As a result, they are vulnerable to the common pitfalls and must be careful to avoid the unintentional consequences of zoning decisions, such as precluding certain types of development that will support transit and make these areas more livable. Communities must be able to cooperate to develop growth plans that complement, rather than compete with, each other.

Suggested Strategies

- Better utilize tools in the basic zoning toolbox to guide development around station areas.
- Utilize tools from the advanced zoning toolbox, such as design- and form-based zoning, to control the shape of station area development without prescribing specific uses.
- Create a model zoning code as an educational tool that different towns can adapt to their own needs.
- Adopt a corridor-wide Transit Village Overlay district that leaves the underlying municipal zoning codes in place and imposes a new set of transit village standards.

Implementation

Zoning for transit villages is distinguished from standard zoning by its promotion of compact, mixed-use development patterns and by the need to control design not just at the scale of individual sites, but at the scale of the larger station area district.

A lot can be accomplished through the basic zoning toolbox:

- Mixed-use sites and buildings can be explicitly allowed.
- Buildings can be sited in ways that help define streets and public spaces through height and setback regulations.
- Minimum levels of development can help ensure that valuable land within the station area is not consumed by low-intensity, auto-oriented uses.
- Off-street parking requirements can be reduced to reflect increased access to transit and the opportunities to share parking in mixed-use environments.
- Affordable housing can be built through set-aside requirements for developments above a certain scale.

The advanced zoning toolbox contains additional tools that can also be useful for helping implement transit villages. Form-based zoning establishes the envelope in which development must take

place, describing the form of buildings in relationship to the public spaces they support, such as the immediate station area. This is often used in conjunction with performance-based zoning that does not prescribe particular uses, but instead evaluates the performance of the uses. For example, does the use contribute to the overall character of the transit district? Or, does the use negatively impact the adjacent uses?

Planners and regional advocacy groups should propose a model zoning code with tools from the basic and advanced toolboxes, as an educational tool. Each community could then calibrate the template to the particular circumstances of each station.

However, wholesale changes to the existing zoning in every municipality in the corridor will be difficult. For this reason, communities of the Knowledge Corridor region may see a great opportunity to take on the challenge of zoning for transit villages collectively. A preferred tool may be an overlay district that leaves the underlying zoning in place, but imposes a new set of transit village standards on top of them that creates the desired changes incrementally over time.

There are many precedents for Transit Village Overlay districts around the country to draw upon for experience and best practices. In 2004, the State of Massachusetts passed the Smart Growth Zoning Act, which encourages municipalities to establish new overlay zoning districts that promote smart growth, particularly housing, by providing financial incentives to communities that adopt dense residential or mixed-use zoning districts in station areas or existing urban centers. Communities in the Knowledge Corridor should pool their resources to launch a shared, regional initiative, such as the Massachusetts state initiative, which would educate local stakeholders and land use officials, and work towards the implementation of a transit village overlay district in the Knowledge Corridor region.

It is also essential to understand the limits of zoning. Zoning is not place-making and therefore is not the best tool for dealing with situations where development must be coordinated over time among multiple property owners, or situations where the design of a larger area requires careful coordination between private development and public investments, such as streetscape or public space design. And as the land use regulatory tools become more complex, so too does the administrative burden they apply on the communities. At the end of the day, creating great places around these stations will be an incremental process, and will require on-going administrative massaging and advocacy.

**Perspective: Matt Nemerson, President and CEO,
Connecticut Technology Council**

As a leader in the knowledge industries that the Knowledge Corridor region wishes to attract, Mr. Nemerson spoke to workshop participants about the characteristics of a region and community that growing tech companies look for when making decisions about where to locate. Mr. Nemerson's organization surveyed over 50 growing firms on the choices they face and the factors that influenced their decisions, particularly regarding expansion or relocation, finding that the region faces several challenges in convincing such industries to choose the Knowledge Corridor and needs a strategic vision to address them.

Successful businesses within a given industry prefer to locate near their competitors. This proximity creates a larger labor market for firms with specialized employment needs, allows each company to keep current with their peers, and facilitates the exchange of best practices that keep firms competitive. Locating near competitors also adds credibility with customers because the firm is seen as occupying a first-class ecosystem, much as a software company may seem more legitimate if it is in Silicon Valley. The benefits a firm accrues from locating near competitors can drive a virtuous cycle of development known as an agglomeration economy.

Connecticut is seen to have a critical mass problem, in which firms contemplating a move face uncertainty over whether the region will be able to attract enough other firms and workers to drive agglomeration economies. The question for the future of the region is whether Connecticut can bring about either the influx or the organic growth of knowledge industries to overcome this problem and foster a dynamic, innovative economy.

Transportation is a critical part of solving the critical mass problem. Industry leaders have a vision of rail systems uniting suburbs and urban areas, allowing a firm's employees to choose from a variety of lifestyle options and still commute conveniently. Suburban or rural firms favored light rail and street car options that would allow them to recruit from the cities. However, urban employers were skeptical of how the public investment in intercity rail would benefit the major cities. Addressing this credibility gap is a part of a bigger challenge the region must rise to in order to compete for knowledge-industry jobs.

Nemerson concludes that the region needs a strategic vision. Rather than focus on projects, regional leaders should pursue critical mass by setting a population goal, identifying areas to accommodate new growth, and enacting strategies to induce it. Knowledge-industry businesses have many options on where to locate; Knowledge Corridor leaders must create, articulate, and promote a long-term strategy for the region's success that will resonate with business leaders. The region must create a global, competitive brand that will recast its image from being on the periphery of the Northeast Corridor region to being in its center.



6. Briefing Materials on the Knowledge Corridor

This section updates the economic analysis of the Knowledge Corridor that was provided to participants in advance of the workshop as part of the briefing materials.

Regional Profile

The Northeast Megaregion

The New Haven-Hartford Springfield Rail Corridor is a major north-south branch line of the Northeast Corridor that runs 62 miles from New Haven, Connecticut north to Springfield, Massachusetts. The area developed as a network of communities linked by the Connecticut River and the 19th century rail network. Today, the Corridor is primarily linked by Interstate-91, which runs parallel to the Amtrak passenger rail right-of-way.

The corridor is in between Boston and New York, two of the great metropolitan areas of the “Northeast Megaregion” (Map 6-A).

Map 6-A: Northeast Megaregion¹³



The Northeast Megaregion is composed of the 142 contiguous counties that stretch from the northernmost suburbs of Boston to the southernmost commuter shed of Washington, DC. The Megaregion is framed by five great cities along the eastern seaboard and the metropolitan regions that have grown up around them,

including (north to south) Boston, New York, Philadelphia, Baltimore, and Washington, DC. Together, these five metro areas constitute the largest continuously urbanized area in the nation. The urban centers at the core of these close-knit metropolitan regions play a vital role in shaping the identity of the Northeast. They are the Megaregion's economic engines, bringing together concentrations of capital, institutional expertise, entrepreneurial talent, and skilled, ambitious people from all over the country and the world. The Megaregion is currently home to 52 million people and is projected to add an additional 18 million people by the year 2050, which is the equivalent of adding a second New York state to this already heavily and densely populated part of the country.

These five cities are also major intellectual and cultural centers, attracting and focusing creative energies that enrich local life while resonating around the globe. Most fundamentally, the five great cities of the Northeast Megaregion are icons, the epitomes of urban life for the rest of the nation and powerful symbols of America to the world.¹⁴

This dense concentration of economic and cultural activity generates a wide variety of benefits for the Megaregion, but also creates capacity constraints on its unbalanced transportation system. For example, six of the nation's top ten most delay-prone airports are in the Northeast and the top four are JFK, Newark, LaGuardia, and Philadelphia. Amtrak's Northeast Corridor, a defining feature of the Northeast Megaregion running 450 miles from Washington, DC to Boston, is the nation's most congested rail corridor and one of the most heavily used corridors in the world. Every year, roughly 13 million Amtrak and 250 commuter rail passengers use the Corridor, along with approximately 50 freight trains per day.

As a major branch line of the Northeast Corridor serving Central Connecticut and Western Massachusetts, and an important link to Greater New England, the NHHS Rail Corridor is a crucial piece of the Megaregion's transportation network. New Haven is already a key station on Amtrak's Northeast Corridor, and the NHHS Rail Project will quadruple existing train service. The Corridor will play an even more significant role in the future as population and employment in the region's cities continue to develop, inter- and intra-city traffic grow, and other existing transportation modes become increasingly congested.

In the long-term, the Federal Railroad Administration (FRA) contemplates that the NHHS Corridor could serve as an inland route connecting New York City and Boston with true, dedicated high-speed rail service. Also, upgraded conventional rail service

¹³ Regional Plan Association. 2007. *Northeast Megaregion 2050: A Common Future*. <http://www.rpa.org/publications.html>

¹⁴ Ibid

connecting New Hampshire, Vermont, and perhaps Montreal to New York City has been conceptualized for several years.¹⁵

Corridor Profile

A Shared History

The economies of Hartford and Springfield have long been linked by geography and transportation networks. Original settlement of the area began in the 17th century, when the settlers of Western Massachusetts' Pioneer Valley migrated south towards Hartford and Wethersfield, expanding the region often referred to as the Connecticut River Valley. For more than a century, people and goods navigated the Connecticut River by boat. Goods from northern New England were traded in Hartford, spurring the development of Hartford's insurance industries, which began by insuring these shipments.

In the 19th century, new railroads were constructed that linked New Haven more strongly to Hartford. The Corridor remained a center of manufacturing and industrial innovation throughout the first half of the 20th century. Construction of Interstate-91 and Bradley International Airport has reinforced these historic connections along the Corridor, even as the region continues to adjust to the economic challenges of the last several decades.

The Knowledge Corridor

The Knowledge Corridor is a spatial and economic framework that has been developed in recent years to describe the Central Connecticut and Western Massachusetts region, emphasizing the Corridor's concentration of colleges and universities, and unique mix of knowledge industries, such as insurance and financial services, health care and aerospace and defense manufacturing.

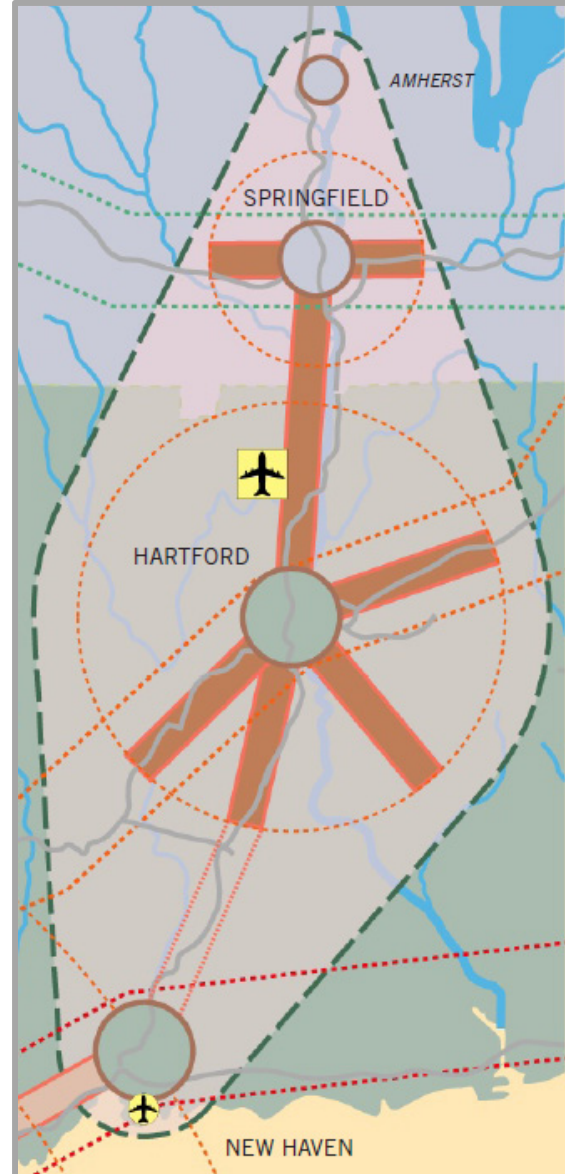
A 1999 report prepared by Michael Gallis & Associates for the Connecticut Regional Institute for the 21st Century, studied the Connecticut region and developed a new spatial framework for thinking about how the state fits into the national and greater megaregional economy. It recognized the important role of the Knowledge Corridor, defining it as "a bi-state metro extending from New Haven, which functions as its southern gateway, to Amherst and Northampton, which together form the northern terminus."¹⁶ (Map 6-B)

The Knowledge Corridor concept was further developed by the Hartford-Springfield Economic Partnership (The Partnership), a bi-state collaborative effort between Hartford and Springfield to promote regional economic growth, business development, talent retention, advocacy, and research. The Partnership was initiated by Northeast Utilities, the parent company of Connecticut Light &

Power, Yankee Gas and Western Massachusetts Electric, and launched in 2000.¹⁷

Branding Hartford and Springfield under a single regional identity emphasizes the proximity, size, and connectedness of the two cities in a way similar to the Dallas-Fort Worth relationship in Texas or the Twin Cities of Minneapolis and St. Paul in Minnesota. This regional identity is also consistent with the two cities' historical connections within the Connecticut River Valley.

Map 6-B. New England's Knowledge Corridor¹⁸



¹⁵ Vermont Agency of Transportation. 2003. *Boston to Montreal High-Speed Rail Planning and Feasibility Study: Phase 1*.

<http://www.aot.state.vt.us/planning/BostonRail.htm>

¹⁶ Connecticut Regional Institute for the 21st Century. 1999. *Connecticut: Strategic Economic Framework*.

¹⁷ The Hartford-Springfield Economic Partnership. 2011. *About Us Overview*. http://www.hartfordspringfield.com/about_us/overview

¹⁸ Connecticut Regional Institute for the 21st Century. 1999. *Connecticut: Strategic Economic Framework*.

Although New Haven is often left out of Knowledge Corridor promotional materials, the Michael Gallis report clearly recognized its importance as a pivot point in the state, contributing to Central Connecticut's economy, as well as the economies in the New York-Southwestern Connecticut region. Two of the three major ports in the region are located in New Haven, the Port of New Haven and Tweed New Haven Regional Airport.¹⁹

Adopting the 1999 Gallis report's definition of the Knowledge Corridor (which also includes all of the cities with passenger rail stations on the NHHS Corridor south of Hartford that are in the New Haven metro area) would allow the Knowledge Corridor region to market the full assets of the NHHS Rail Corridor.

Demographic & Economic Indicators

Cities with train stations along the Knowledge Corridor have nearly three quarters of a million residents as of 2010. The largest city is Springfield followed by Hartford and New Haven, which have virtually identical populations of nearly 125,000 (Table 6-A).

Table 6-A: Population of the Knowledge Corridor²⁰

Station/City	City Population
Springfield, MA	155,580
Enfield, CT	45,259
Windsor Locks, CT	12,517
Windsor, CT	29,014
Hartford, CT	124,060
West Hartford, CT	60,852
Newington, CT	29,818
Berlin, CT	20,467
Meriden, CT	59,186
Wallingford, CT	44,881
North Haven, CT	23,916
New Haven, CT (2 stations)	123,330
KNOWLEDGE CORRIDOR (Three Metro Areas)	728,880
Boston, MA	645,169
New York City, NY	8,391,881

The three metropolitan areas of New Haven, Hartford, and Springfield had a total of approximately 2.8 million residents in the 2010 Census, which together makes this area the second most populous region in New England, following Greater Boston with approximately 4.6 million people (Table 6-B).

The Knowledge Corridor also has a large and diverse work force. With nearly 1.3 million employees, it is the second largest labor pool in New England, following Greater Boston. Unfortunately,

the unemployment rate in the region remains high, slightly above the national average (Table 6-B). This is evidence of the region's ongoing shift from a manufacturing-based economy towards a service- and knowledge-sector economy.

Table 6-B: Civilian Labor Force and Unemployment, by MSA (March 2011)²¹

Metropolitan Statistical Area	Population	Civilian Employees*	Unemployment Rate
Springfield, MA	692,942	350,300	9.4
Hartford-West Hartford-East Hartford, CT	1,212,381	601,100	9.3
New Haven-Milford, CT	862,477	314,100	9.6
KNOWLEDGE CORRIDOR	2,767,800	1,265,500	9.4
UNITED STATES	308,745,538	153,022,000	9.2
Boston, MA	4,552,402	2,454,200	7.1
New York City, NY	18,897,109	9,418,100	8.4

* Not seasonally adjusted.

In 2009, the region's Gross Domestic Product was roughly \$140 billion, approximately one percent of the nation's total output and roughly half the GDP of Greater Boston and one-tenth the GDP of New York City.

The large population and employment pool are both highly educated and well paid compared to the national average. Per capita income in the Knowledge Corridor is roughly 114 percent of the national average, and since 1999 all three of the metro areas have improved their U.S. ranking of metro areas with the wealthiest population.

Employment Distribution

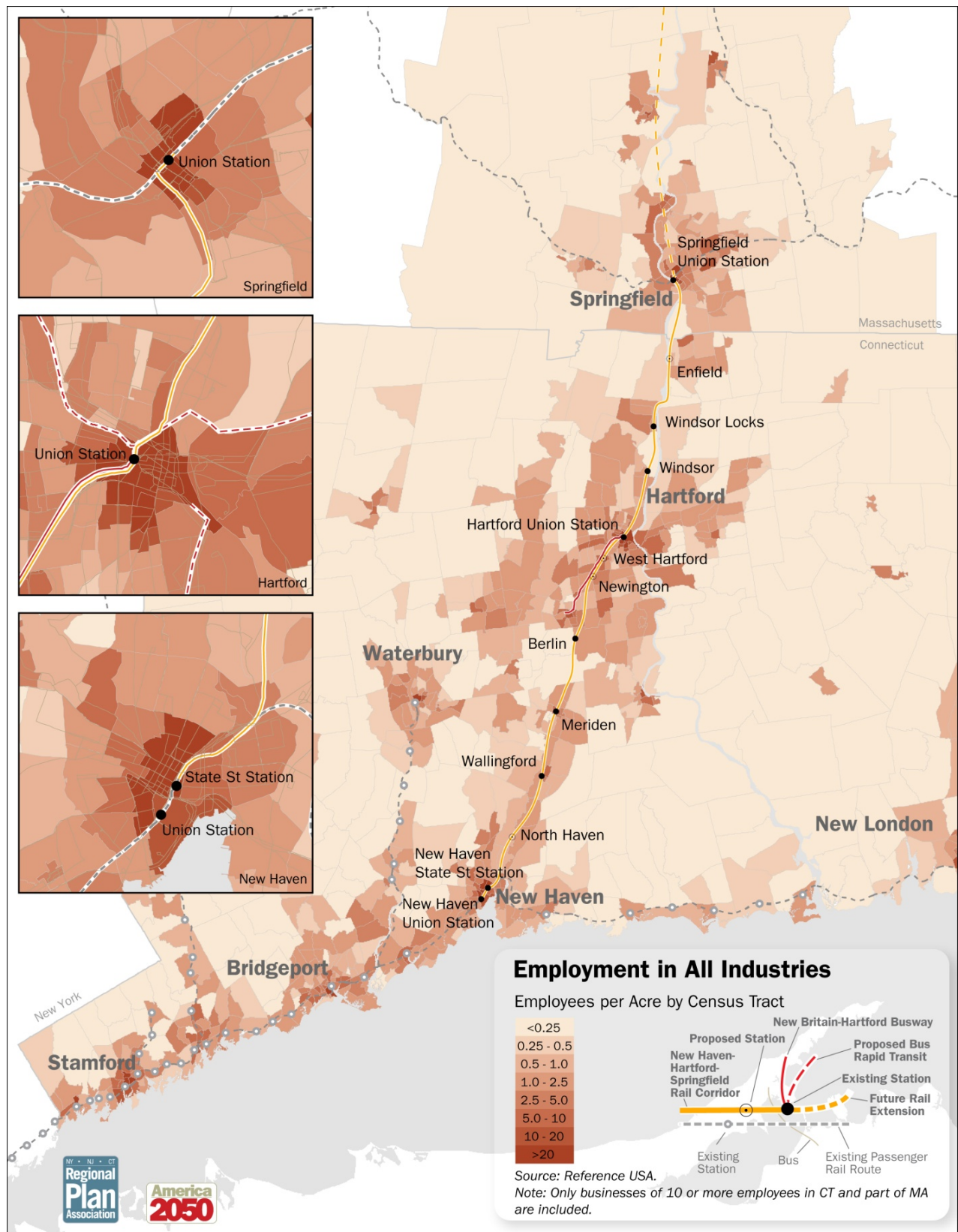
As shown in the following maps (Map 6-C and Map 6-D), the distribution of employment in all industries and knowledge-sector industries is very similar. Throughout the region, employment is clustered around train stations. This pattern is particularly apparent in the three major cities of New Haven, Hartford, and Springfield, which are shown in the inset maps, where all of the surrounding census tracts contain the highest concentrations of employment in all industries and knowledge-sector industries.

¹⁹ Ibid

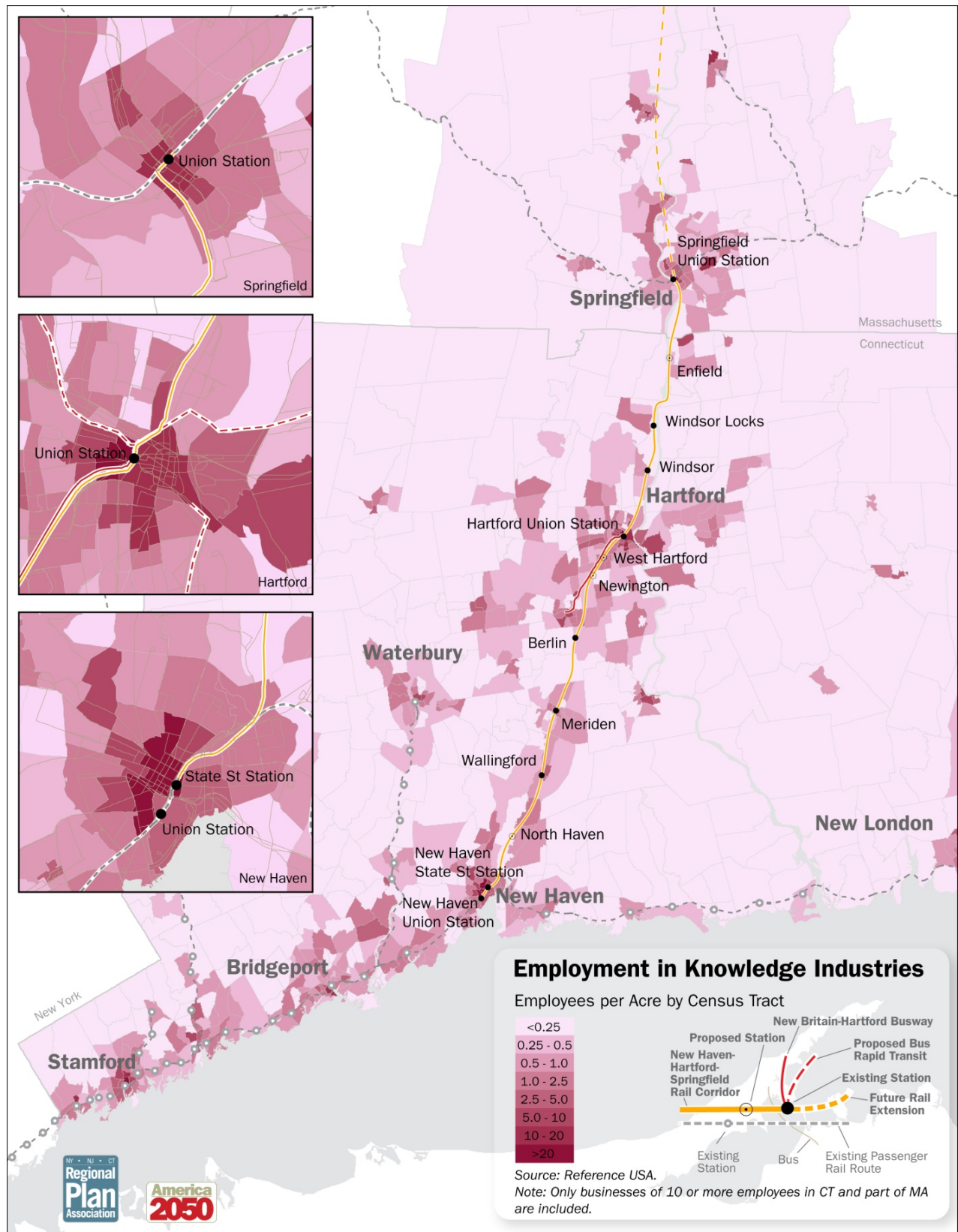
²⁰ U.S. Department of Commerce, Bureau of the Census. 2010. *2010 Decennial Census, American FactFinder*. <http://factfinder2.census.gov>.

²¹ Population – Ibid. Civilian Employees and Unemployment Rate – U.S. Department of Labor, Bureau of Labor Statistics. 2011. *Civilian labor force and unemployment by state and metropolitan area*. <http://www.bls.gov/news.release/metro.t01.htm>

Map 6-C. Distribution of Employment in All Industries



Map 6-D. Distribution of Employment in Knowledge Industries



Knowledge Industries Analysis

The Hartford-Springfield Economic Partnership (the Partnership) has identified several key employment industries that are either currently specialized or are growing in the Knowledge Corridor region. These industries include: finance and insurance, precision manufacturing, health care, information technology, educational services, and medical device manufacturing.²²

In order to further investigate which industries make up the core of the Knowledge Corridor region's economy and which represent unique growth opportunities for the region's future, America 2050 conducted a location quotient analysis and a comparison of the national and regional growth rates of the 13 knowledge industries identified by the Partnership, listed in Table 6-C.

Location Quotient (Economic Base) Analysis

A strong base of export industries is critical for the continued growth of the Knowledge Corridor's regional economy. A location quotient (economic base) analysis can help identify in which industries a region specializes (i.e. the region's export industries). America 2050 completed economic base calculations that compare employment in the three metropolitan areas and an aggregated Knowledge Corridor region to national employment figures.

Table 6C shows the results of the location quotient analysis using employment data gathered from the U.S. Economic Census. Location quotients were calculated for all of the 13 knowledge industries to determine whether or not the three metropolitan areas' and the region's economy as a whole have a greater share of employment in each knowledge industry when compared to the nation, indicated by a value greater than "1." If an industry in a given area has a greater share than the nation, then there are more jobs in that industry than the local economy needs to have in order to serve local needs. This suggests firms are using these additional jobs to export their goods and services to other areas of the region or nation. Economists define this as, "basic sector employment."

The Knowledge Corridor

The Knowledge Corridor region—defined here as the combined New Haven, Hartford, and Springfield metropolitan areas—has a greater share of its total employment in nine out of the 13 specialized manufacturing and knowledge-sector industries that were analyzed. These include (beginning with the highest degree of specialization): Firearms Manufacturing, Renewable Energy, Precision Manufacturing, Aerospace & Defense Manufacturing, Educational Services, Medical Devices Manufacturing, Insurance & Financial Services, Health Care, and Plastics Manufacturing. The share of Firearms Manufacturing in the region is significantly higher than that of the nation, driven mainly by businesses in the Springfield metropolitan area, along with basic sector employment in the other two metropolitan areas. Precision Manufacturing and

Health Care are the only other two industries that have basic sector employment in all three metropolitan areas in the Knowledge Corridor region.

However, the results of this analysis showed that four of the industries that the Partnership identified as knowledge industries do not exhibit basic sector employment, including Advanced Security, Life Sciences / Biotechnology, Tourism, and Information Technology. We will look more closely at those four industries below to determine whether or not those industries are growing, but first we discuss the results for each of the three metropolitan statistical areas that together make up the Knowledge Corridor region.

New Haven-Milford, CT (MSA)

The New Haven metropolitan area has more of its total employment in the sectors of Educational Services, Medical Devices Manufacturing, Precision Manufacturing, Firearms Manufacturing, Health Care, and Life Sciences / Biotechnology than the nation as a whole, with a particular emphasis on the Educational Services industry. Much of the specialization in New Haven's Education, Medical Devices Manufacturing, Health Care, Life Sciences / Biotechnology industries is driven by high rates of employment in the metropolitan area's fine academic and research institutions, and hospitals.

Hartford-West Hartford-East Hartford, CT (MSA)

Employment in Renewable Energy, Aerospace & Defense Manufacturing, Firearms Manufacturing, and Precision Manufacturing is much more prevalent in the Hartford metropolitan area than it is nationwide. Additionally, Hartford has a greater share of its total employment in Insurance & Financial Services, Health Care, and Educational Services than is the case for the nation. United Technologies, which has a large base of employment near the Bradley International Airport in the region, is the main driver of the region's specialization in the Aerospace & Defense Manufacturing industry. The Hartford metropolitan area's abundance of insurance company headquarters drives the basic sector employment in the Insurance & Financial Services industry.

Springfield, MA (MSA)

In the Springfield metropolitan area, employment in Firearms Manufacturing is far more prevalent than it is for the nation. To a far lesser degree, Springfield has a greater share of its total employment in Precision Manufacturing, Educational Services, Plastics Manufacturing, Health Care, and Medical Devices Manufacturing than is the case for the nation.

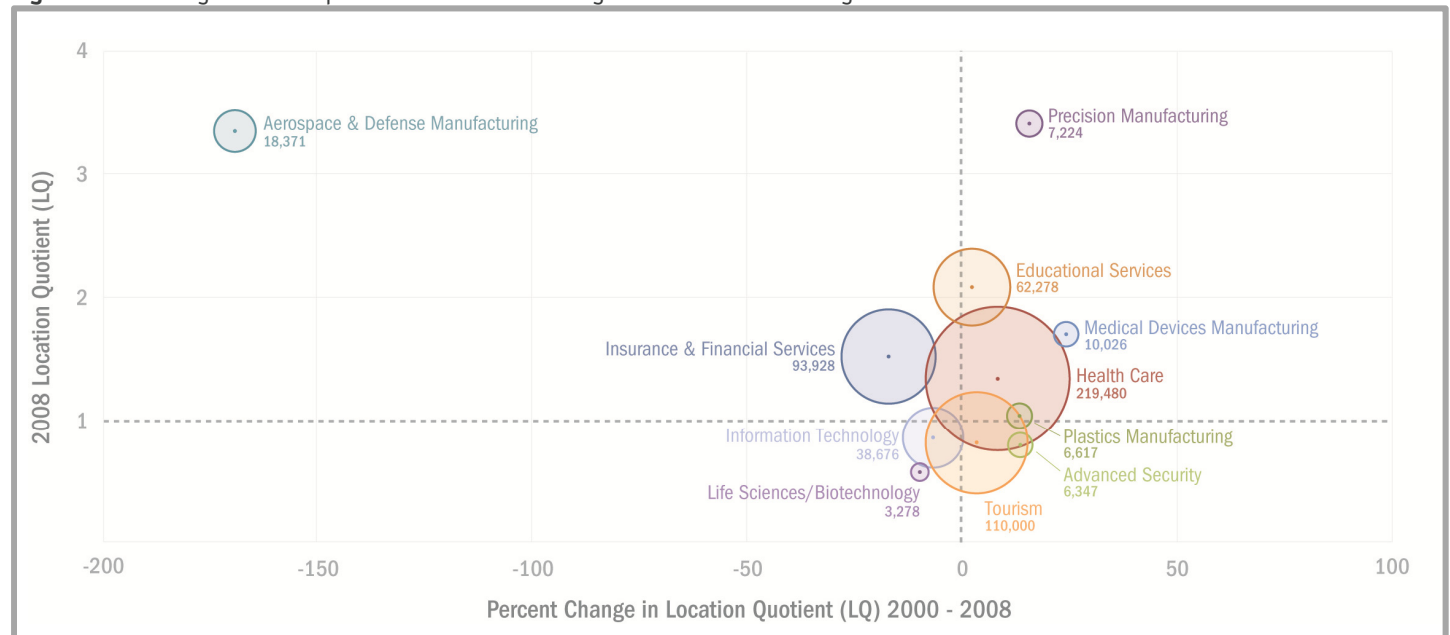
²² The Hartford-Springfield Economic Partnership. 2011. *Welcome to New England's Knowledge Corridor*.
<http://www.hartfordspringfield.com/sites/default/files/HSEP%20Brochure.pdf>

Table 6-C. Location Quotient Analysis of Knowledge Industries in Local Metro Areas

Industries	New Haven	Hartford	Springfield	Knowledge Corridor Region (NHHS)
Firearms Manufacturing	1.98	5.28	27.57	9.04
Renewable Energy	0.63	8.31	0.88	4.46
Precision Manufacturing	2.42	4.32	2.71	3.41
Aerospace & Defense Manufacturing	0.75	6.12	0.59	3.36
Educational Services	3.28	1.11	2.66	2.08
Medical Devices Manufacturing	3.64	0.66	1.37	1.69
Insurance & Financial Services	0.70	2.25	0.93	1.51
Health Care	1.43	1.18	1.56	1.34
Plastics Manufacturing	0.77	0.55	2.48	1.03
Information Technology	0.95	0.96	0.47	0.85
Tourism	0.76	0.77	0.95	0.80
Advanced Security	0.94	0.78	0.58	0.78
Life Sciences / Biotechnology	1.30	0.12	0.63	0.58

Source: America 2050 analysis of: U.S. Census Bureau. 2008. *Metro Business Patterns*. <http://www.census.gov/econ/cbp/index.html>

Figure 6-A. Changes in the Specialization of Knowledge Industries in the Region



Source: America 2050 graphic and analysis of: U.S. Census Bureau. 2008. *Metro Business Patterns*; and U.S. Census Bureau. 2000. *Metro Business Patterns*. <http://www.census.gov/econ/cbp/index.html>.

Figure 6-A graphically depicts the Knowledge Corridor's current specialization, growth or decline in specialization, and absolute number of jobs in the 13 knowledge-sector employment industries. The y-axis shows the industries' 2008 location quotient (current industry specialization), the x-axis shows the percentage change in the industries' location quotient from 2000 to 2008 on (growth or decline in industry specialization), and the size of each bubble depicts the relative size of that industry in 2008 (total number of jobs). So, bubbles in the upper-right quadrant represent industries that are currently specialized and becoming more specialized. For example, health care is a large industry, employing over 200,000 people in the Knowledge Corridor at a higher rate than that of the nation, and the region is becoming more specialized in the health care industry. Figure 6-A shows that of all of the knowledge-sector industries that are not currently specialized in the region, only the Tourism and Advanced Security industries represent growth opportunities because their location quotients are increasing.

Comparison of National and Regional Growth Rates

In addition to looking at the change in location quotients from 2000 to 2008, the national and regional growth rates of these 13 knowledge-sector industries were examined over this same time period, in order to determine how the composition of the region's knowledge-sector industries are shifting (Table 6-D).

Table 6-D. National and Regional Growth Rates for Knowledge Industries between 2000 and 2008²³

Industries	National Growth Rate	Regional Growth Rate
Life Sciences / Biotechnology	86%	50%
Firearms Manufacturing	25%	61%
Educational Services	24%	18%
Health Care	22%	22%
Tourism	20%	17%
Advanced Security	16%	31%
Precision Manufacturing	14%	13%
Insurance & Financial Services	9%	-8%
Medical Devices Manufacturing	6%	16%
Information Technology	-8%	-20%
Aerospace & Defense Manufacturing	-9%	-43%
Plastics Manufacturing	-20%	-14%
Renewable Energy	-54%	-17%

Table 6-D shows the growth rates (from 2000 to 2008) of the 13 knowledge industries at the scale of the nation and the Knowledge Corridor. Of the four knowledge-sector industries that do not have basic sector employment, the region is outperforming the nation in only one of those industries in terms of relative growth. When compared to national growth rates, Advanced Security in the region is growing nearly twice as fast as the nation. This confirms the location quotient change analysis above, which

showed Advanced Security to be an opportunity for growth. Although the region's Life Sciences / Biotechnology industry is only growing about half as fast as the nation, it is still growing at a very high rate. These signs of ongoing growth suggest that the region should look to capitalize on these two industries in the future by continuing to attract firms working in those fields.

Conversely, the Information Technology industry is not currently specialized in the region and is shrinking twice as fast as the nation. While the Aerospace & Defense Manufacturing industry is highly specialized in the region as of now, it is shrinking at a rate over four times as fast as the nation. As a result, these two industries may provide a smaller opportunity for future growth.

Among other basic sector employment industries, where the region currently has specialization, we observe that the Insurance & Financial Services industry is growing nationwide, however the Knowledge Corridor region is actually losing jobs in that industry. If this pattern continues the region's modest specialization in that industry may not exist much longer, disrupting the balance of the region's current economic framework.

The Educational Services, Health Care, Tourism, Precision Manufacturing, Medical Devices Manufacturing, and Plastics Manufacturing industries are changing at virtually the same rate as the nation. The Knowledge Corridor region's Renewable Energy industry is shrinking, but at a much slower rate than the nation.

Suggested Strategies

Overall, the location quotient, change in specialization, and growth rate analyses indicate that Health Care is a major employer in the region, it is currently specialized, and over time getting more specialized. Educational Services is a highly specialized and stable industry in the Knowledge Corridor region, employing well over 60,000 people. Precision and Medical Devices Manufacturing firms employ fewer people in the region, but they are specialized industries and becoming even more so over time. The Firearms Manufacturing industry only employs about 2,700 people, but it is highly specialized, becoming more so, and growing twice as fast as the nation. The region should look to continue building on these five industries in particular. The Plastics Manufacturing industry is small, but slowly becoming more specialized in the region, so it could represent another growth industry in the future.

Aerospace and Defense Manufacturing are currently very specialized, but rapidly losing specialization. Finally, the Insurance & Financial Services industry employs nearly 100,000 people, but is losing specialization in the region while it is growing overall around the nation. These industries have long been pillars of the regional economy, and Connecticut and Massachusetts should seek to stem the decline in the region's specialization.

²³ U.S. Census Bureau. 2000/2008. *Metro Business Patterns*.

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