COMMONWEALTH OF MASSACHUSETTS

Economic Development Resource Assessment

Prepared for:

Massachusetts Alliance for Economic Development

Massachusetts Executive Office of Housing and Economic Development

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Executive Summary

As part of an overall initiative to identify, develop, and ultimately market priority sites under the Massachusetts General Law Chapter 43D program, the Massachusetts Alliance for Economic Development (MAED) and the Massachusetts Executive Office of Housing and Economic Development retained Moran, Stahl & Boyer, a nationally known site selection and economic development consultant, to provide resource assessments for each economic development region within the state.

Defined as Phase I of the initiative, this effort involved gathering background information on and profiling of each region, conducting workshops with key stakeholders, and assessing the resources available to support the target industries identified in each region. The final results were presented back to each region and to the study sponsors in a workshop format. This final report is a summary of the information provided.

Discussion of Results

From an exterior vantage point, Massachusetts has economic resources that most cities and regions of the country can only dream about – world-renowned research universities, a prolific supply of knowledge workers, well-developed transportation infrastructure, an array of respected companies representing new technologies, and new ideas that are constantly producing new jobs. In fact, economic development professionals from around the country travel to Massachusetts to get a glimpse of what it would be like to have all their resources properly aligned and churning out opportunities. They also come in hopes of attracting business away from the state and to their community.

Spending time traveling the state and talking with representatives of each region, as the project team has done, provided a unique opportunity to gain a more discerning perspective. As one probes beneath the surface, there are certainly many success stories but there are also some challenges. In order for Massachusetts to continue to be successful in economic development, there are a number of resource-related issues and opportunities that need to be addressed and considered:

- **Provide facilities for companies throughout their life cycle.** A company may start as an R&D concept but as it progresses through pilot scale, initial commercialization, and market expansion, there is an evolving need for incubator space near a university, then larger multi-tenant space, and finally a stand-alone building. Communities need to develop the sites and buildings that support growth and have them available at the level of readiness required by each company.

- **Develop/redevelop sites for future business growth.** The state has extensive wetland, rock outcrop and steep slope areas that are not conducive to major building construction. To compound the issue, certain towns limit or restrict commercial and industrial growth and developers prefer to build residential and retail because it usually produces quicker returns. The end result is that there will be a very limited inventory of adequate sites (particularly sites of significant size) for future growth. Former industrial properties, or military bases that are being redeveloped, or other appropriate parcels should have a portion set aside for future office and industrial uses in order to assure an inventory of sites for high value jobs and a broad tax base.

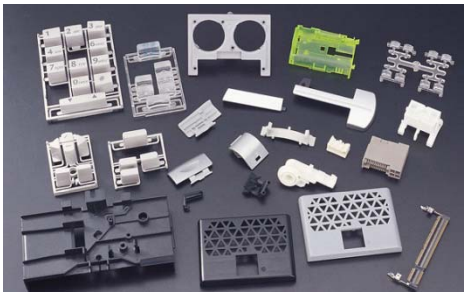
- **Utility-related issues: broadband, water and power.**
  In selected areas of the state, communities have very limited access to broadband, which inhibits their ability to attract business – whether companies or home-based businesses. In addition, certain areas in the eastern and central regions of the state have limited water resources. Either additional resources need to be provided or there will be severe limitations on industry and residential growth. The cost of electric power in areas served by major utilities is one of the highest in the U.S. Having access to low cost power and the ability to switch service providers if required needs to be addressed.



- **Retention of college graduates**.
  In many of the private colleges and universities throughout the state, the percentage of Massachusetts residents is 10% or less. These graduates have no roots in the state, and unless they have built strong local relationships through internships or co-op experiences, are offered competitive job opportunities upon graduation, and have access to affordable housing in areas that have the amenities they seek, they have a high probability of leaving the state.

- **University R&D and its potential economic impact.**
  Communities throughout the state are betting a portion of their economic future on new business that is derived from university R&D. In order to improve the odds of this actually taking place, the communities should periodically visit the universities and business incubators in the region and the state and become aware of the types of products that are being developed, their timing on commercialization, and the types of labor skills and facilities that will be needed over the life of the product. Having this information and utilizing it to build the right types of training and facility readiness will make a significant difference in attracting future opportunities.

- **Leveraging plastic molding/metal fabrication capability.**
  The state has unique capabilities in the design and production of plastic molded and metal fabricated parts that serve many different industries. There is an opportunity to better leverage this capability in support of the design and production of medical devices, medical and other instruments, and other equipment produced within the state. A formal connection should be established to bring these capabilities together and use this relationship to market the state to other firms.



- **Business climate – sending a message.**
  Business climate is measured in different ways with the end result being whether a city, region or state want to encourage the growth of certain industries. There are ways in which a business environment can be measured that includes the following:
  - Issuing rules and regulations that support or discourage certain industries and types of operations.
  - Having an administration/state legislature with a track record of making fast/supportive decisions for business and industry.
  - Demonstrating the speed in which communities process permits and support other review processes.
  - Having competitively low or no tax rates on income, real property, equipment purchases, inventory, etc.
  - Offering incentives that support business start-ups, incremental investment or relocation
  - Pursuing an overall low cost of doing business related to land, labor and energy and continuously taking actions to reduce cost.
  - Having media feedback from the general public that reflects their interest in particular industries and growth in general.
  - Supporting a high level of marketing activity that reinforces the business-friendly environment while addressing any perception issues (e.g., high unionization).

  The traditional external perspective of Massachusetts is "Taxachusetts" with large unions, high operating costs, and citizens that are very effective in blocking economic growth projects. This is what has caused many companies and site selection professionals to simply not consider Massachusetts as a viable location candidate. This reputation has been tempered with the perception that Massachusetts is a strong technology player that some companies want to be near.

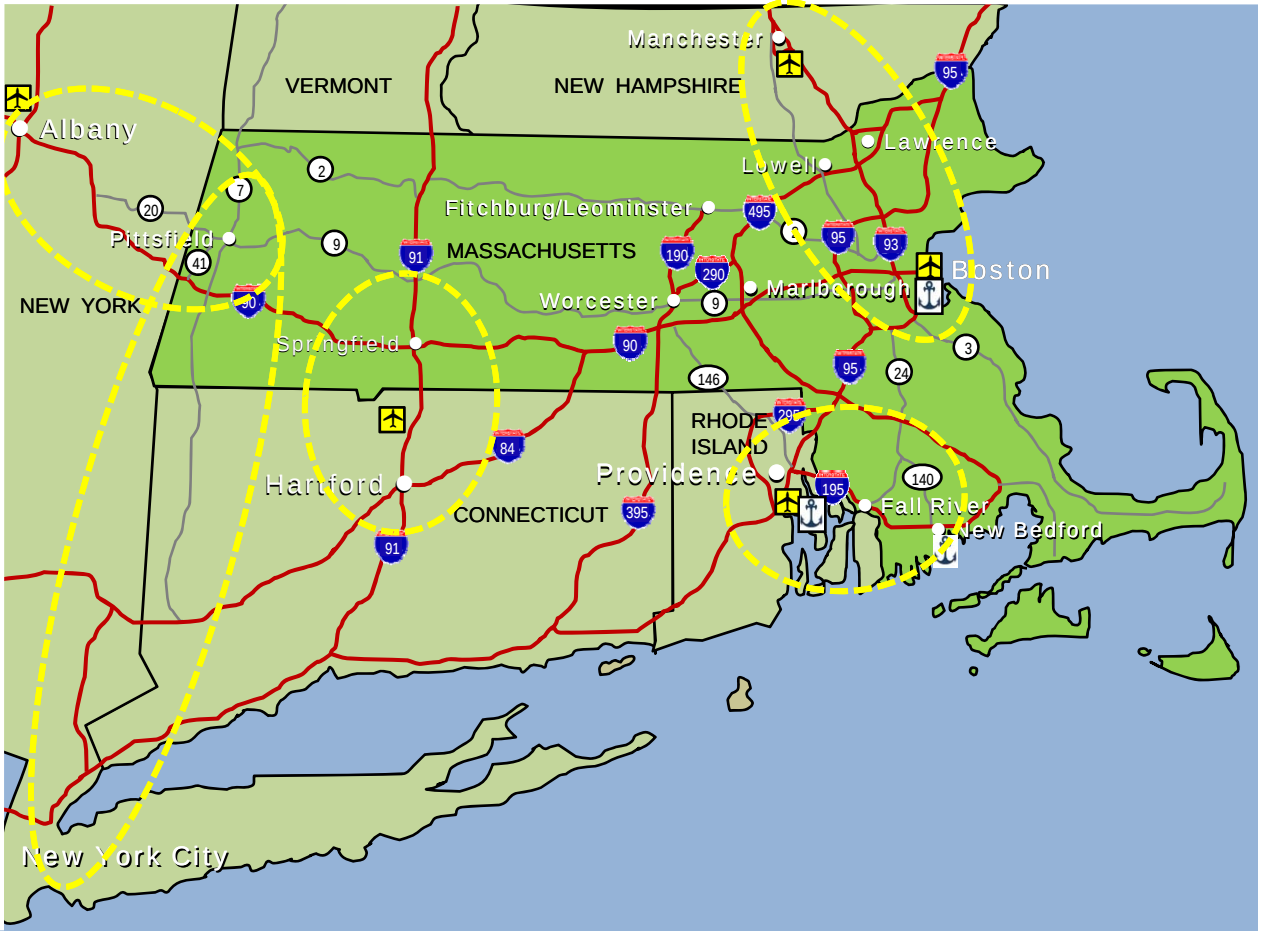
  There are several regulations that need to be reviewed and possibly restructured in order to stimulate rather than discourage certain types of office/industrial development that include:
  - The MEPA requirements trigger studies and reviews that may take years to comply with and send a signal that growth is not encouraged.
  - There are penalties for transferring from an existing high cost utility to a low cost source that impacts a company's access to low cost power.
  - Comprehensive building modification rules are meant to protect tenants, but are confusing to those attempting to redevelop a building for mixed use.

- **Lessons learned from benchmarking.**
  Based on a review of six communities with characteristics similar to Massachusetts, there are some strong messages to be learned. These communities have developed competitive strategies to expand their economies by growing and attracting industries that include life sciences, electronics and other technology-related industries. They are investing heavily and have the R&D, the facilities and the quality of life environment that will make them contenders in the technology race. They should not be taken lightly. If Massachusetts doesn't keep moving forward, it could be eclipsed by some of these communities.

- **Interstate and intrastate relationships and resources.**
  Based on discussions with each region of the state, it becomes apparent that most of them have alignments with neighboring cities from which labor is drawn and resources are shared. For example, Springfield and Hartford share an airport, university resources, labor pool , and the same interstate network. As noted in Figure 1 below, there are relationships with New York State, New Hampshire and Rhode Island as well. The conclusion from this phenomenon is that resources from adjacent states need to be included when defining the resource availability within a given region.

  There is also intrastate resource-sharing including university R&D through collaboration, and supplier-related services and skills. The state is geographically small enough for resources to transcend the state.

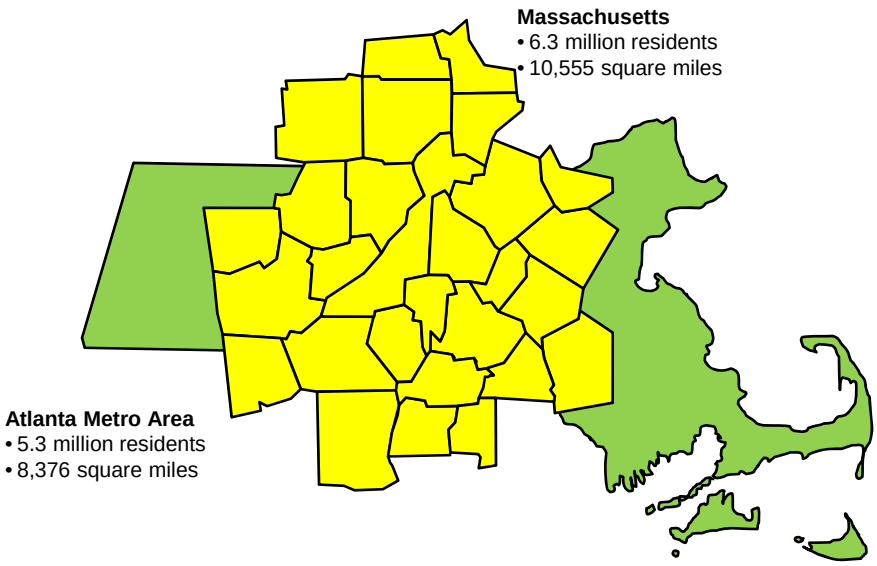
Figure 1 – Examples of Existing Interstate Regional Relationships Between Massachusetts and Neighboring States



- **Packaging and marketing Massachusetts**.
  A key consideration in the packaging and marketing of Massachusetts is that the entire state of Massachusetts is similar in size to some major metro areas – the Atlanta metro area as an example. As noted in Figure 2, the Atlanta metro area has 5.3 million residents and nearly 8,400 square miles while the entire Massachusetts population is 6.3 million and about 10,600 square miles. It takes several hours to drive from the length of the Atlanta metro area – just as it takes to drive the length of Berkshire County to Boston.

  The strongest brand Massachusetts has is *Boston* followed by *Cambridge*. This situation leads to a conclusion that the best way to market the state is to bundle the resources of the state into a package that offers multiple options and let Boston be the front door. Once the prospect is interested in *Boston*, give them other options that still provide access to Boston or Cambridge but may be more cost effective for their situation. The optimal situation is to have a Boston organization in place (as discussed previously) that works closely with the Massachusetts Alliance for Economic Development to bring in the rest of the state. Each region would focus on the development of their individual resources and capabilities.

Figure 2 – Comparison of the Atlanta Metro Area to Massachusetts



- **Economic development leadership.**
  Most of the regions in the state are represented by economic development organizations that support emerging and expanding businesses as well as new business attraction – with the exception of the Metro-Boston Region. Greater Boston is one of the few – if not the only – major metro areas in the country without an economic development leadership organization.

  This type of umbrella organization is typically either under a regional chamber of commerce, established as a public/private partnership, or as a stand-alone 501(c)(3) non-profit organization. Its mission should be to focus on business development and marketing of the area, support emerging/existing businesses as needed, and assure the timely provision of economic and community resources to support future growth. The organization should also work closely with state agencies, the Massachusetts Alliance for Economic Development, and other regions to provide a seamless interface to existing and prospective companies.

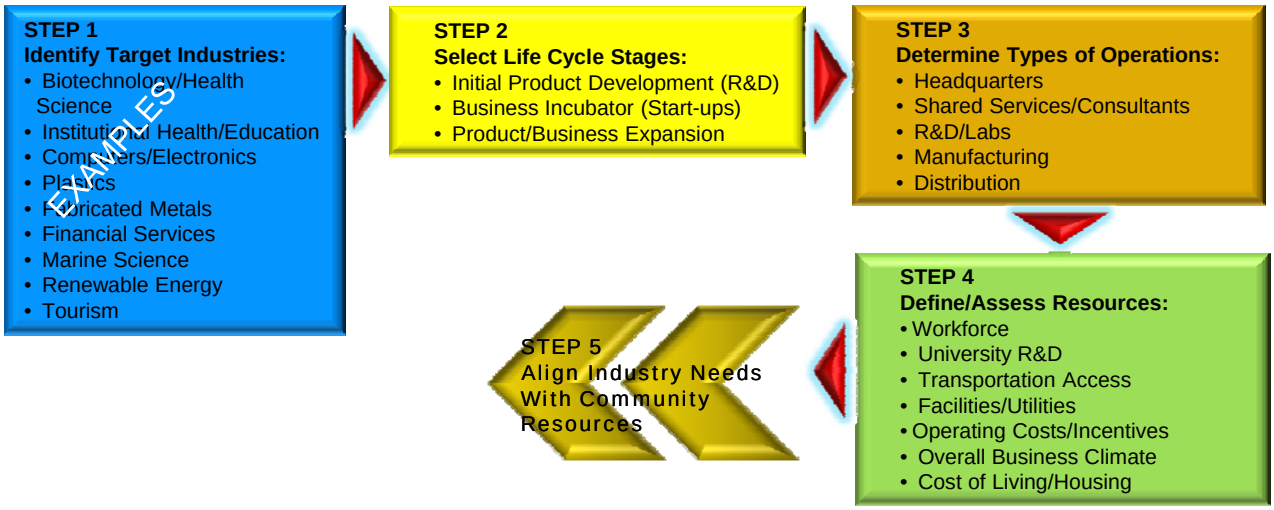
Introduction

As part of an overall initiative to identify and ultimately market priority sites under Massachusetts General Law 43D, the Massachusetts Alliance for Economic Development (MAED) and the Massachusetts Executive Office of Housing and Economic Development have retained the services of Moran, Stahl & Boyer and E.M. Pemrick and Company to assess the economic development resources of the state and its regions.

The process of assessing economic development resources is outlined in Figure 3 below. It encompasses a five-step process that begins with an identification of target industries, looks at life cycles, determines types of operations, defines resource needs, and then aligns the needs of a particular industry with a region's resources.

- *Step 1* involves the identification of target industries both at the state and region level. This allows for a comparison of state vs. region priorities as well as among regions.
- *Step 2* provides insights into the product and company life cycle and its impact on dynamics and resource needs. The key take-away on life cycle is that a company's needs change over time, and a community may or may not have the resources and environment required to support a company and its particular operation forever. In addition, every product ultimately has a finite life – some other product or company will come up with a substitute or improvement that overshadows the product unless it keeps changing to meet market conditions.
- *Step 3* identifies the different types of operations that encompass each target industry. For example, technology-driven firms rely heavily on R&D operations that may be integrated with headquarters and manufacturing on the same site. In contrast, large and mature companies have distinct headquarters, support operations and manufacturing operations that are frequently in different locations.
- *Step 4* focuses on the assessment of basic resources – labor , transportation, real estate and utilities, R&D, operating costs and incentives, overall business climate, and cost of living and housing – that support target industry growth.
- *Step 5* is the final step in which the information previously gathered is compared to the resources available in each region.

Figure 3 - Economic Development Resource Assessment Approach



Target Industries at State and Regional Levels

For the purposes of the assessment, the state was divided into nine regions (see Figure 4), each of which, with the exception of MetroBoston, are represented by an economic development organization.

Target industries were identified (see Table 1) to determine alignments between the state, each region, and between regions. The most frequently identified target industries included biotech/life sciences, medical and other instruments, alternative energy, professional/technical/creative services, regional healthcare, aerospace and defense, as well as hospitality/culture/tourism.

Figure 4 - Economic Development Regions

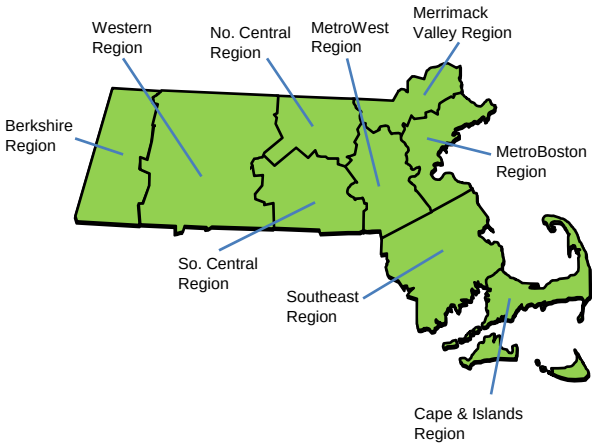


Table 1 – Target Industries/Segments for Massachusetts and Individual Regions

Industry/Segment	Berkshire	Western	Central No.	Central So.	Metro West	Merrimack Valley	Metro Boston	Southeast	Cape & Islands
Biotech/Pharmaceuticals		■	■	■	■	■	■	■	
Medical/Other Instruments		■	■	■	■	■	■	■	
Marine Science								■	■
Computers/Electronics					■	■	■		
Food Processing			■					■	
Fabricated Metals		■		■		■			
Plastics	■	■	■						
Alternative Energy	■	■	■		■	■	■	■	■
Aerospace/Defense/Security	■		■		■	■	■	■	
Regional Healthcare		■	■	■	■		■	■	
Education Services	■			■			■		■
University R&D		■		■			■		
Financial Services		■			■		■		
Prof/Tech/Creative/IT Serv.	■	■			■	■	■		■
Transportation/Distribution		■						■	
Hosp./Rec./Culture/Tourism	■	■	■				■	■	■
Mgmt. of Companies/HQ					■		■		

State target industry

Product and Company Life Cycles

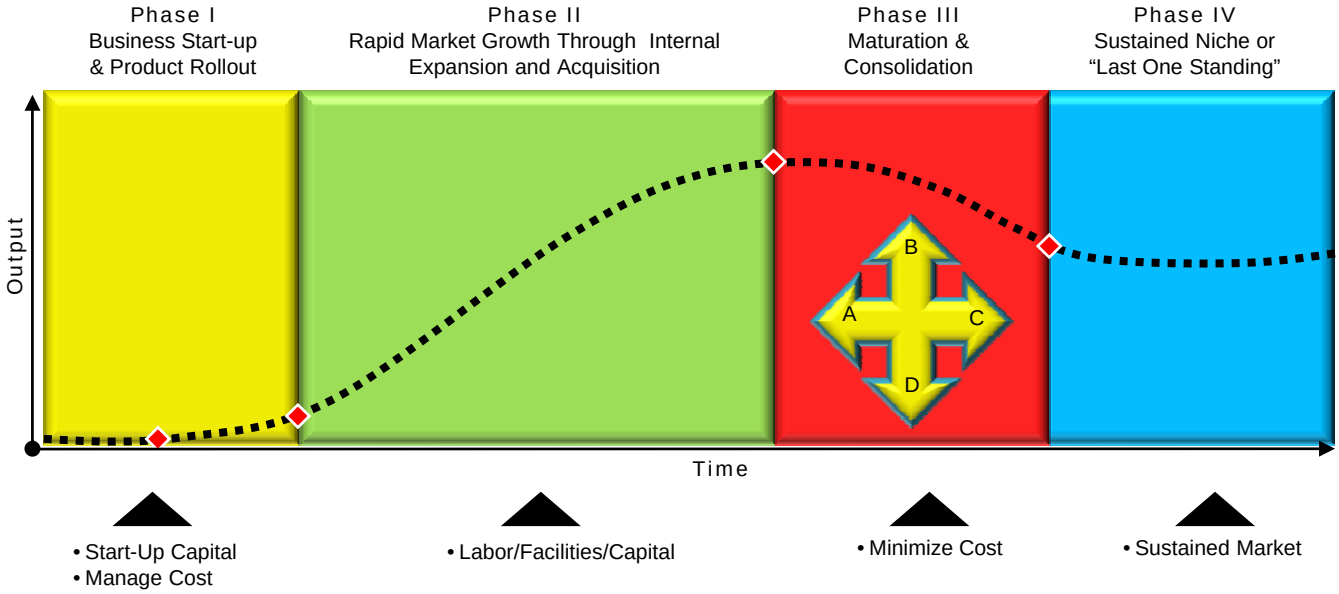
Every product and ultimately every company goes through a life cycle (see Figure 5), beginning with a start-up phase and progressing through growth/expansion, ultimately reaching some level of maturity. At this point, the product and company typically experience competition, either from similar products that are of a lower cost or higher quality or have some technological improvement. The company must then make one or more of the following decisions to sustain a viable market presence:

- Attempt to seek out new markets or make product improvements
- Consolidate with the competition to grow share in a shrinking market
- Become a privately held company to avoid the annual growth required by shareholders of publicly held companies
- Continue to sustain margins through production improvements and cost takeouts.

As companies and their product lines evolve, their location-related needs change. For example, in the early development stage, there is a need to be located near R&D activity, which may require co-location with a major university. When the product line needs expanded production capacity, there is a need to be in a location that has the available real estate, labor, training resources, utilities and logistics necessary to produce and distribute the product. During the later maturation stages, the company often must locate in a low cost area to sustain market competitiveness and profit margins.

Communities should be aware of the resources and conditions that they can offer to companies and set appropriate expectations on the types of industries and life cycle stages that they can effectively support.

Figure 5 – Company/Product Life Cycle: Key to Understanding Opportunities



Critical Decisions Made in Phase III

A: Attempt to go back to Phase II (new market expansion/product improvements)
B: Consolidate with competition to grow share in a shrinking market
C: Go/stay private with niche operation and proceed to Phase IV
D: Continue to enhance productivity to sustain margins (production improvements/cost takeouts)

A critical resource that supports each phase of the life cycle is access to facilities. The specific facility needs change significantly as the business and its product lines expand as noted in Figure 6 below. A community must adapt and provide different types of facility options in order to keep the business and its operations within the community throughout the business life cycle.

Figure 6 - Facility Requirements at Each Life Cycle Stage

Phase I Business Start-up and Product Rollout	Phase II Rapid Market Growth Through Internal Expansion and Acquisition	Phase III Consolidation of Business and Product Lines
Initially: Full service incubator Transition to: Multi-tenant building with some shared facilities, for example: • Parking • Conference rooms • Café • Locker/exercise room	As Business Expands: HQ, R&D, back office and manufacturing operations are frequently uncoupled and placed in the most optimum locations for cost and market access	At Maturity: Cost of facilities and labor become an overriding issue for most operations

Life Cycle Stages By Industry

In reflecting on life cycles, each of the target industries was reviewed to determine which life stages are most prevalent within each industry (see Table 2). The product R&D stage will apply mainly to technology-related products that are rapidly evolving.

The start-up mode reflects both new product start-ups as well as new company start-ups within established product areas.

Each of the industries is engaged in some type of expansion, although that scale will vary among industries.

Table 2 – Life Cycle Stages by Industry

Target Industry	Product R&D	Start-Up	Expansion
Biotech/Pharmaceuticals	■	■	■
Medical Equipment	■	■	■
Marine Science	■	■	■
Computers/Electronics	■	■	■
Food Processing			■
Fabricated Metals		■	■
Plastics (Resin/Parts/Products)		■	■
Renewable/Alternative Energy	■	■	■
Aerospace/Defense/Security			■
Institutional Healthcare Services			■
Institutional Education Services			■
University R&D	■		■
Financial Services			■
Prof/Tech/Creative/IT Services		■	■
Transportation/Distribution			■
Hospitality/Rec./Culture/Tourism		■	■
Mgmt. of Companies/Headquarters			■

Life Cycle Status By Industry

Each of the target industries identified by the state and selected regions is in different life cycle stages. For example, biotech/pharmaceuticals and medical/other instruments are in continuous development. Some products are maturing while others are constantly being developed. This results not only in an expanding array of product offerings, but also in the potential for new advances in evolving innovations that constantly eclipsing older products.

Within industries such as plastics and metals, there has been a significant maturation of existing materials that have become commodities, but novel new materials are soon to make quantum changes. Marine science has substantial potential but has not been a major national focus and has received only limited R&D support. In contrast, alternative energy was in that status, but has finally been thrust to center stage with the energy cost escalation. Financial services is a mature industry that is undergoing consolidation and rationalization.

Table 3 – Life Cycle Status by Industry

Industry/Segment	Life Cycle Status
Biotech/Pharmaceuticals	Continuous development of new products along with some maturing pharmaceutical products
Medical/Other Instruments	Continuous development of new products along with some maturing products
Marine Science	Huge potential with modest support from government and private sector
Computers/Electronics	Maturing overall but at the threshold of quantum changes . . . major focus on Asian markets
Food Processing	Mature overall with on-going opportunities for niche products
Fabricated Metals	Mature support industry but nano materials will provide niche opportunities
Plastics	Mature support industry with potential new developments from novel materials/processes
Alternative Energy	High growth potential but lots of entries into the market
Aerospace/Defense/Security	Opportunities for new technologies driven by government and aerospace industry needs
University R&D	Not high growth overall but individual universities can expand share of finite funding "pie"
Financial Services	Rapidly maturing industry with substantial consolidations and rationalization of operations
Prof/Tech/Creative/IT Serv.	High growth of niche consultant and technology service companies

Types of Operations By Target Industry

Types of operations were identified based on the type of industry and typical size of business that is encountered within Massachusetts. For the smaller firms, multiple functions will frequently be co-located within the same site, while larger firms will frequently uncouple headquarters from back office and manufacturing operations. It is important to differentiate each operation because site requirements and conditions will vary. For example, large companies seek stand-alone sites for their headquarters, while smaller firms may require upscale business parks with Class A facilities. Back office operations may be co-located with certain manufacturing and distribution operations if the covenants are tight.

Table 4 – Types of Operations by Target Industry

Industry/Segment	Headquarters	Back Office Shared Services	R&D	Manufacturing	Distribution
Biotech/Pharmaceuticals	■	■	■	■	■
Medical Equipment	■	■	■	■	■
Marine Science	■	■	■	■	
Computers/Electronics	■	■	■	■	■
Food Processing				■	■
Fabricated Metals				■	
Plastics (Resin/Parts/Products)	■		■	■	■
Renewable/Alternative Energy	■		■	■	
Aerospace/Defense/Security	■	■		■	
Institutional Healthcare Services					
Institutional Education Services					
University R&D			■		
Financial Services	■	■			
Prof/Tech/Creative/IT Services	■	■			
Hospitality/Rec./Culture/Tourism					
Mgmt. of Companies/HQ	■				

Economic Development Resources

Each type of industry, operation and life cycle stage varies in its needs for resources. To address this breadth of need, the resource assessment covers a range:

- Workforce
- Transportation Access
- Facilities/Utilities
- R&D Resources
- Operating Costs/Incentives
- Overall Business Climate
- Cost of Living/Housing
- Industry Organizations

In this report, some resources, such as transportation, university R&D, and incentives are covered at the state level while others, such as demographics, cost of living and operating costs, focus on a region or commuting distance from a defined location. The intention of the assessment is to identify both opportunities and challenges that may exist in the startup, expansion and attraction of business in Massachusetts.

- **Workforce Resources**

General indicators of workforce resources were derived from population dynamics, demographics and unemployment rates for selected locations within each region as noted in Table 4 below. The comments below are provided from the perspective of a site selection consultant viewing data during a site selection search:

Average Annual Growth Rate: Negative growth rates are always a flag and stimulate concern with the shrinking workforce and the sustained ability to recruit an adequate supply of qualified talent. Local employers are usually interviewed to gain an understanding of labor dynamics and the impact of addition jobs to population loss.

Adult Population Education Levels: Depending on the need for high school or college level talent, the differential in education levels from national average is considered. If there is a significant negative variance, it requires more detailed review or the location is just dropped from the screening process.

Median Age: General indication of whether the population is aging. This number is typically viewed in context with other indicators to determine the viability of a workforce for a particular slate of jobs.

Percent of Population in the 25 to 34 Year Old Age Cohort : Population within a given age cohort helps to confirm the dynamics behind the average age of the population.

Unemployment Rate: This provides a general indication of a tight a labor market. Other considerations are the level of *underemployment* that may exist and the presence of particular industries from which to draw specific labor skills.

Table 5 - Demographic Data for 30-Minute Commute Zone Around Selected Region Locations

Criteria	U.S. Avg.	Berkshire	West	Central North	Central South	Metro West	Merrimack Valley	Metro Boston	Southeast
Location		Pittsfield	Springfield	Fitchburg	Worcester	Marlborough	Lowell	Boston	Dartmouth
Estimated Population (2006)	-	117,900	626,500	269,900	423,600	366,800	1,272,800	2,107,500	1,359,000
Growth Rate (%) (2000 – 2006)	6.4	-15.7	1.1	3.8	3.4	1.6	0.9	-2.8	-1.3
Adult Population With HS Only Education (%)	30.2	33.4	32.1	30.4	27.8	19.9	28.8	24.8	26.3
Adult Population With 4-Year+ Education (%)	27.0	26.9	22.5	26.6	29.7	49.9	31.5	39.3	13.8
Median Age of Population (Years)	36.4	42.8	36.4	35.7	33.3	38.2	34.5	33.5	33.6
Population in 25-34 Year Old Age Cohort (%)	13.3	10.4	12.8	11.9	13.1	10.3	11.6	15.8	13.5
% Unemployment Rate (2007 Avg.)	4.6	3.8	4.6	5.3	4.4	3.8	4.8	4.1	6.1

Potential issue Potential positive for certain situations

Source: Claritas /U.S. Census Bureau (2006) and U.S. Department of Labor (2007)

Another indication of labor resources is college enrollment and annual graduates within specific programs. As noted in Table 6 below, the MetroBoston region has the largest number of enrolled four-year college students, followed by the Western, South Central and the Southeast regions.

An important consideration in evaluating college enrollment numbers is the level of retention of graduates. Although Massachusetts has a very high enrollment of four-year and graduate-level college students, a significant portion of students – particularly in the Greater Boston area – are not from Massachusetts, and have no compelling basis for staying in the state after graduation outside of a job offer. For example, only about 8% of MIT undergraduates and 10% of its graduate students were originally from Massachusetts. At Northeastern University, only about 35% of students are state residents.

Most of the major universities in the Boston area are private and seek out the best students from a national and global applicant pool; they have no obligation to recruit Massachusetts residents. In contrast, locations with major state universities have a high percentage of their students coming from the host state. For example, at the University of Georgia in Athens, GA, and the University of North Carolina in Chapel Hill, NC, have over 80% of their students are from in-state. UMass Amherst has about 75% of its students coming from Massachusetts. State schools in smaller cities such as UMass Lowell and UMass Dartmouth have a high percentage of local and state residents, as do the community colleges.

Table 6 - Total Four-Year/Graduate Student Enrollment and Number of Graduates Within Selected Programs by Region

		Bio-Related		Business		Computer & IT		Engineering	
Region	Total Enrollment	BS	MS/PhD	BS	Masters	BS	MS/PhD	BS	MS/PhD
Berkshire	3,879	76	0	45	0	15	0	0	0
Western	52,615	460	53	1,096	371	137	78	308	106
North Central	5,508	5	4	107	47	17	21	0	0
South Central	24,265	204	52	637	279	140	56	401	136
Merrimack Valley	13,489	38	30	400	54	160	44	180	120
Metro West	6,100	25	0	135	49	26	0	0	0
MetroBoston	209,934	1,192	720	5,489	5,265	627	638	1,293	1,377
Southeast	23,393	148	9	637	80	74	25	164	52

Table 7 - Total Two Year Student Enrollment and Number of Graduates Within Selected Programs by Region

Region	Total Enrollment	Bio-Related	Business	Computer/IT	Engineering	Health-Related
Berkshire	2,329	0	43	3	10	85
Western	14,497	4	301	50	142	309
North Central	3,937	37	11	14	5	112
South Central	6,022	0	114	38	60	155
Merrimack Valley	6,361	0	115	27	24	122
Metro West	8,336	0	149	10	227	148
MetroBoston	28,120	18	421	193	141	847
Southeast	13,995	147	174	37	83	271
Cape Cod/Islands	4,212	0	14	15	4	99

Source: U.S. Department of Education, Center for Education Statistics (2006)

The need to retain college students will become critical over the next ten years, not only as knowledge-based jobs expand but also as Baby Boomers retire. An important aspect of college graduate retention is derived from a better understanding of the needs and desires of the emerging generation. There have definitely been some generational shifts in priorities that are the basis for which young knowledge workers make location decisions. In particular, there is a stronger balance between career and lifestyle opportunities. There is also a limited desire to work at any given job or for a specific company for an extended time period – only for as long as there is value. Some of the criteria that are utilized by the emerging workforce in making a location decision are noted in Figure 7 below.

Some important job-related needs relate to familiarity with the company and office situation (even if they don't plan on staying long term), the job content, and the options for other companies and jobs if the job doesn't work out. Young workers also prefer a fairly close live/work option if possible. Some will live in the city and reverse commute to the suburbs to gain the city lifestyle. Lifestyle needs focus on relationships with family and friends as well as access to recreational venues of choice. Career is important but there is a distinct balance with lifestyle.

Figure 7 – Young Knowledge Worker's Basis for Location-Related Decisions

Job and Career-Related	Lifestyle-Related
• Familiarity with company (based on friends input, reputation or internship) • Job content (challenging and interesting) • Employment options if current job is lost or doesn't meet needs • Ability to pursue further education • Spouse/significant other employment options • Minimize commute distance • Compensation can be a factor but not necessarily an over-riding one for first-job decisions	• Access to other young adults (size of cohort locally and places to meet people) • Access to family and friends (local and travel time/cost) • Recreational/cultural venues and events . . . "cool" place to live • Affordability (particularly housing) • The weather: impact on outside activities and culture

Location needs shift with life stage:

Unmarried ▶ Married Without Children ▶ Married With children

- **University R&D**

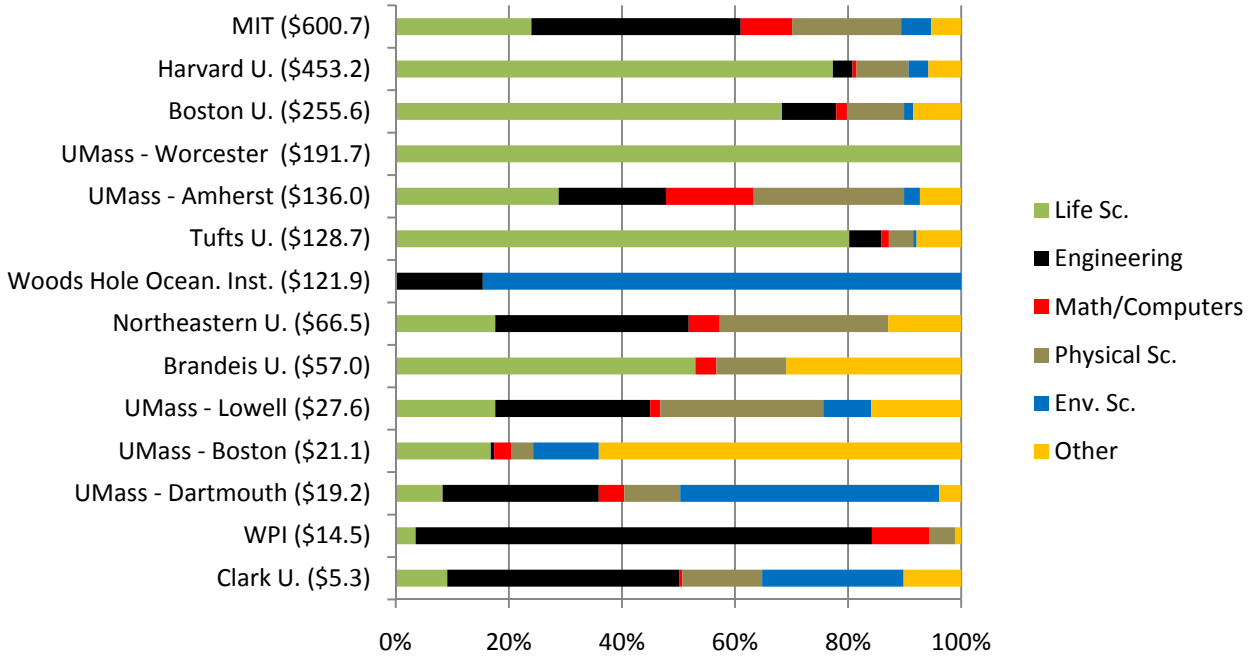
University research activity can have an impact on economic development either by supporting an existing company or by developing new innovations that lead to new business ventures. Based on National Science Foundation data, Massachusetts had $2.16 billion in research expenditures in 2006, ranking sixth behind California, New York, Texas, Maryland and Pennsylvania.

Within Massachusetts, basic and applied research is performed at a variety of public and private institutions with a board focus of activities as shown in Figure 8 below. As a point of note, the UMass system collectively has a budget of over $400 million for R&D activities.

From an economic development perspective, it is important to be aware not only of basic and applied research but also of engineering-related research. It is though this effort that many products are synthesized and processes optimized. For example, UMass Amherst may focus on the next-generation high performance polymer material, while UMass Lowell develops a process to more effectively produce a polymer-based product.

It is critical to the overall economic development success of Massachusetts that the value and utilization of R&D activities transcends geography. Traditionally, R&D was performed in a closed environment and the community that gained the most value was located fairly close to the source. Today, R&D is conducted more collaboratively, and broad-band communications allow the project team to be more dispersed. On one hand more communities in Massachusetts can be engaged, but it also means communities throughout the world can participate and benefit. This results in both opportunities and challenges for local economic development.

Figure 8 – Massachusetts Universities/Institutions With Largest R&D Expenditures (R&D Program Focus Areas Noted)



Source: National Science Foundation (2006)

Further details on R&D programs that relate to target industries within the state are identified in Table 8 below. Some of the universities listed are collaborating on certain program areas while others are performing complementary research.

Table 8 – University/Institutional R&D by Research Area

R&D Program Area	MIT	Harvard	Boston Univ.	UMass Worcester	UMass Amherst	Tufts Univ.	Woods Hole Ocean. Inst.	Northeastern Univ.
Life Sciences: Disease Dynamics	■	■	■	■	■	■		■
Life Sciences: Pharmaceuticals	■	■				■		■
Life Sciences: Medical Devices	■	■						
Life Sciences: Tissue/Skin/Bone Syn.	■	■		■		■		■
Life Sciences: Bioinformatics	■	■	■	■	■			
Marine Sciences	■						■	■
Food and Nutrition		■			■	■		
Computers/Electronics	■		■		■			■
Material Sciences: Polymers	■		■		■			
Material Science: Metals								
Material Science: Nanomaterials	■		■		■			■
Alternative Energy	■				■			
Aerospace/Defense/Security	■							■

R&D Program Area	Brandeis Univ.	UMass Lowell	UMass Boston	UMass Dartmouth	WPI	Clark Univ.
Life Sciences: Disease Dynamics		■			■	
Life Sciences: Pharmaceuticals					■	
Life Sciences: Medical Devices		■		■	■	
Life Sciences: Tissue/Skin/Bone Syn.			■		■	■
Life Sciences: Bioinformatics	■	■		■		
Marine Sciences			■	■		
Food and Nutrition				■		
Computers/Electronics		■		■		
Material Sciences: Polymers		■				
Material Science: Metals					■	
Material Science: Nanomaterials		■		■	■	
Alternative Energy		■			■	
Aerospace/Defense/Security					■	

Source: Based on review of university web sites and other published materials.

- **Transportation**

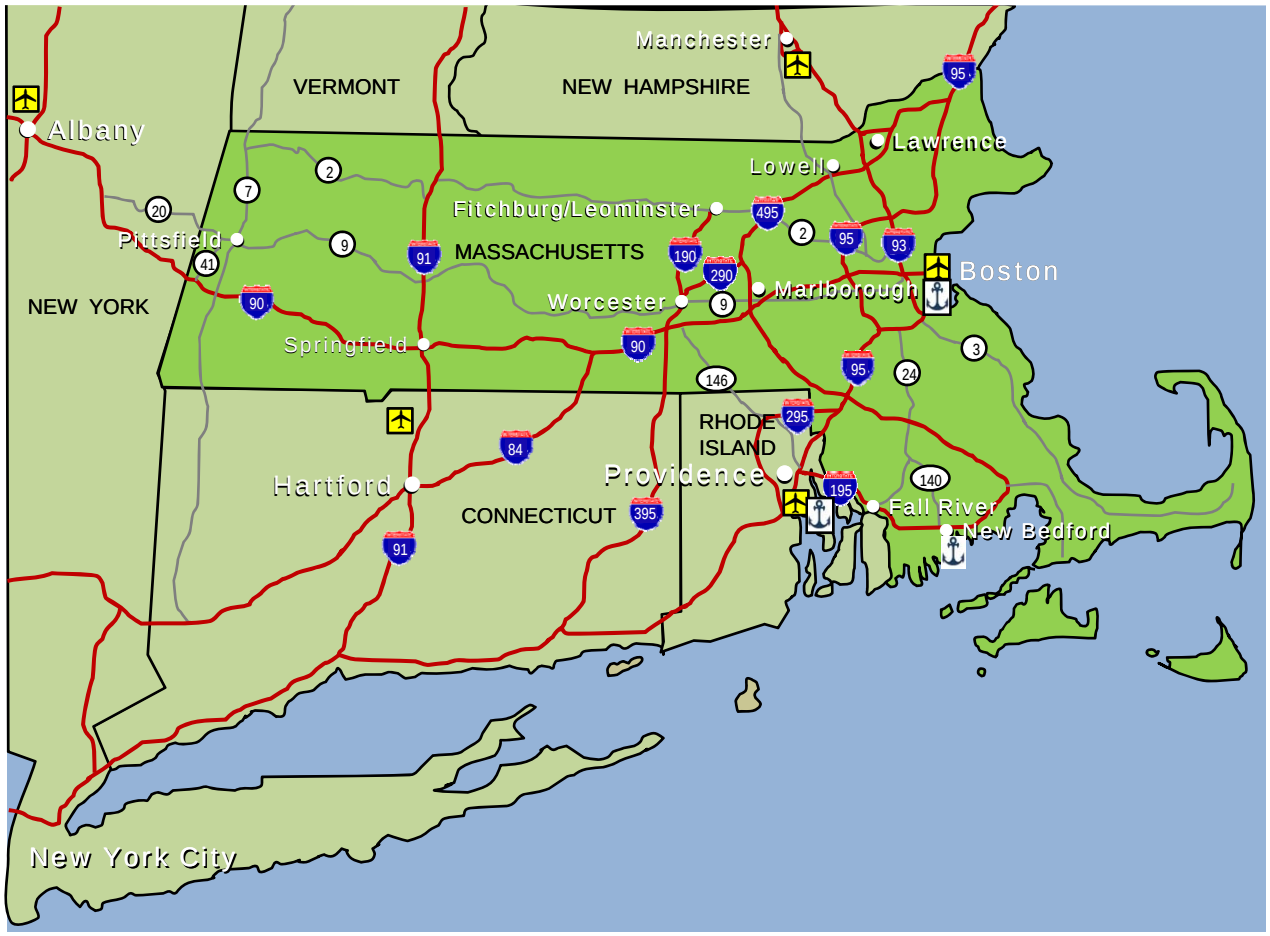
Massachusetts is served by five major commercial airports, only one of which is located within the state:

- Logan International Airport (Boston, MA)
- TF Green State Airport (Warwick, RI)
- Manchester International Airport (Manchester, NH)
- Bradley International Airport (Windsor, CT)
- Albany International Airport (Albany, NY)

Logan International Airport has the most direct domestic and international flights followed by Bradley International with a direct flight to Amsterdam. Most populated areas in the state are within 45 minutes of one of the listed airports. There are also a number of local airports in the state that have 5,000+ foot runways that are, or could be, utilized by corporate jets or small commuter jet service companies in the future.

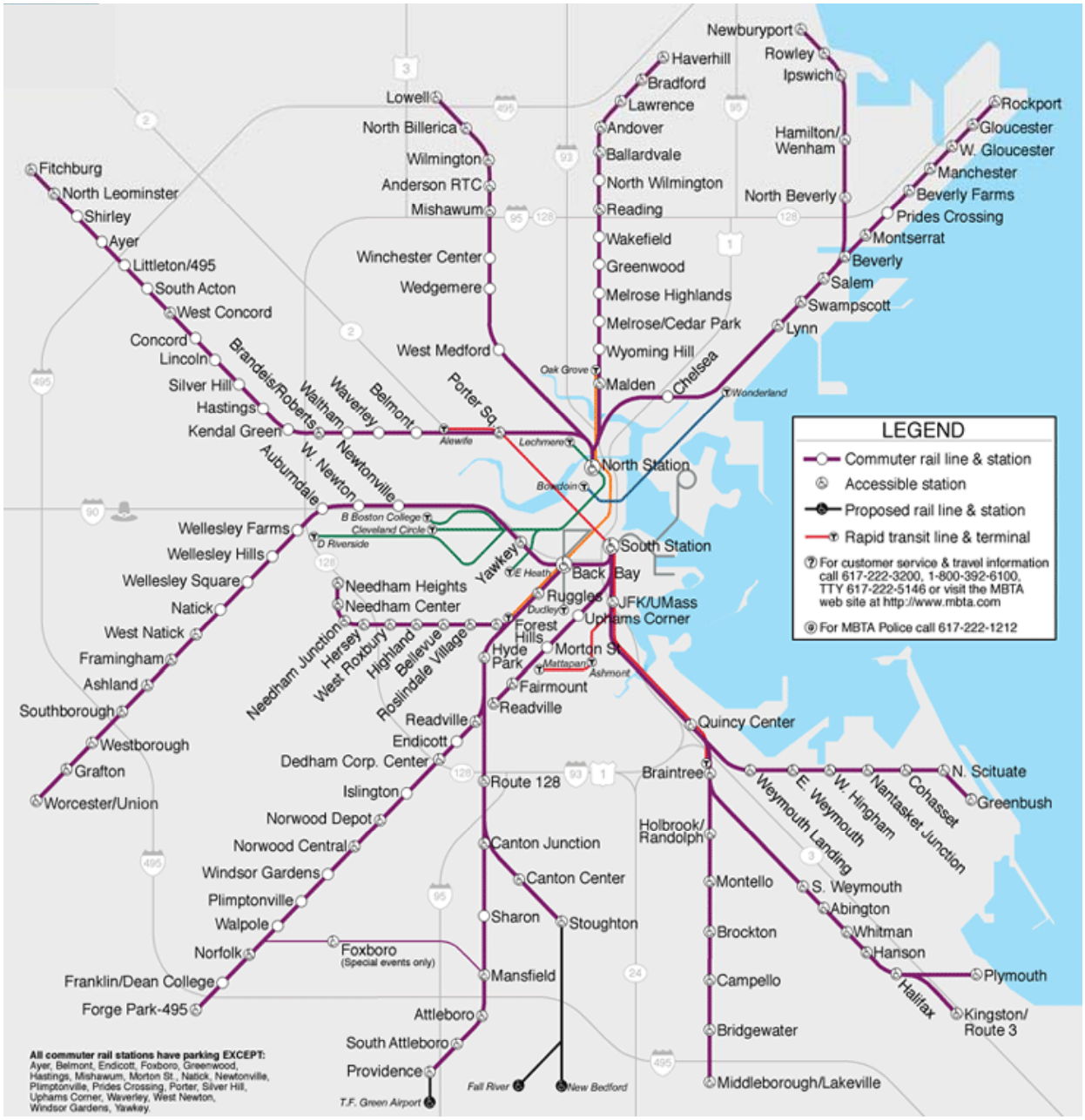
The interstate and limited access highway system is in very good condition and for the most part is not overly taxed. There are specific problematic locations that include the I-495 and I-90 (Mass Turnpike) interchange that is slated to be upgraded while the eastern section of SR 2 as well as portions of SR9 are experiencing increasing traffic congestion.

Figure 9 – Transportation Resources Serving Massachusetts



As this report is written, the wild card is the unknown impact of high ($5+/gallon) fuel prices on commute patterns and affordable commute distances. There will be a point where commuters may take more drastic measures to avoid the significant cost of automobile transportation. Communities with public transportation are well positioned but the MBTA system is built as a hub-and-spoke collection system between outlying communities and downtown Boston. There are no lateral or radial lines to move people between suburban locations. This may impact growth patterns and development locations for business.

Figure 10 – MBTA Commuter Rail and Rapid Transit System Serving Eastern Massachusetts



- **Facilities and Utilities**

Below are several points to consider when developing a facility strategy to promote economic development:

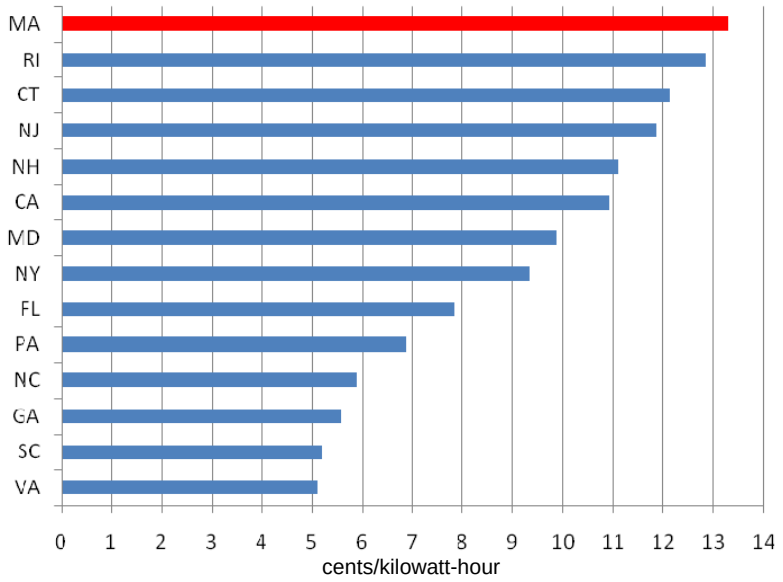
Level of Facility Readiness: The level of readiness of facilities must match the type of facility and the life stage of the organization it supports. For example, a small start-up business or a back office operation may want readily available space, while an established company may want to build a stand-alone headquarters that requires over twelve months to construct. Facility readiness for urban and suburban situations is detailed in Tables 9 and 10, respectively.

Evolution of Facility Needs: Using the example of a technology-based product (see Table 11), it is evident that facility needs change throughout the product life cycle – from modest incubator space to larger multi-tenant space and finally, to stand-alone space. The larger multi-tenant full service space is a type of real estate offering that is relatively scarce in Massachusetts, but is critical to the progression of a product in its early stages of development.

Facility Reuse Potential: From an economic development perspective, it is important to have the ability to have some control of building design and layout to assure the reuse of a facility as companies cycle through a location.

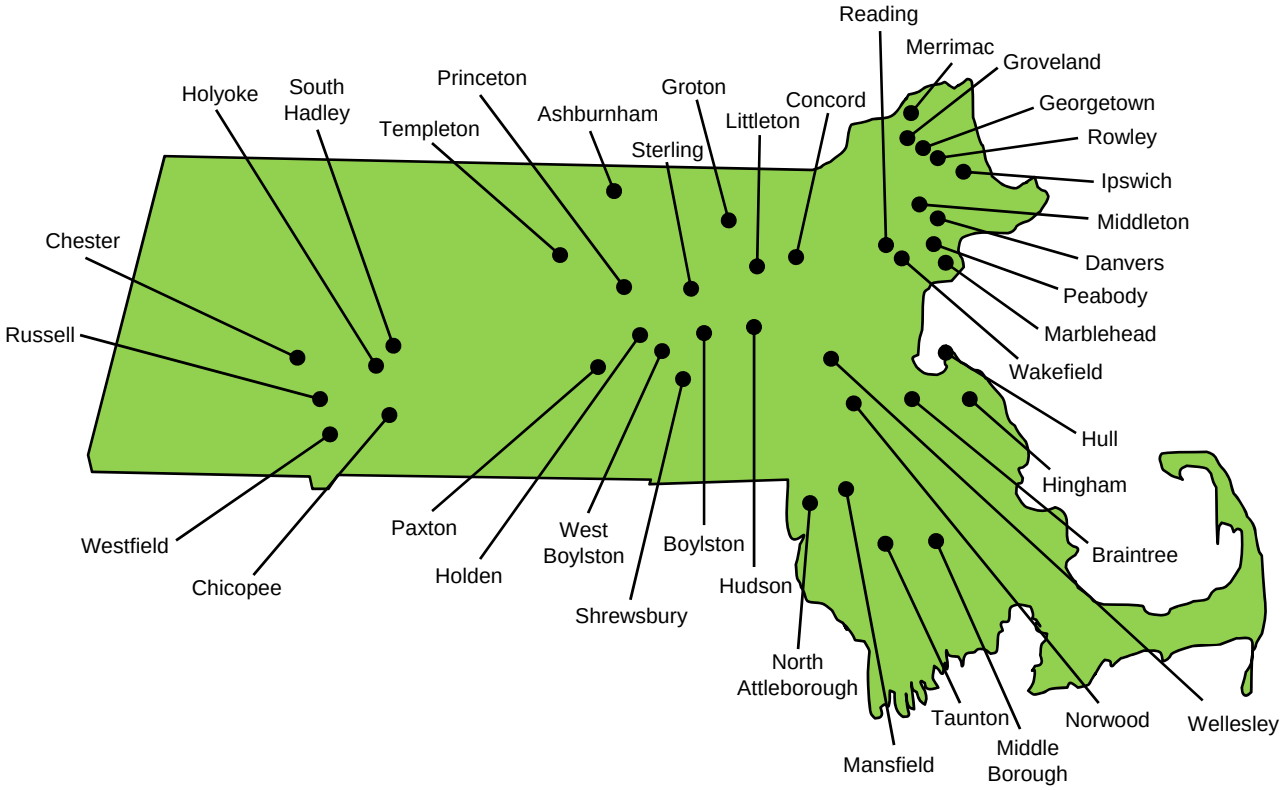
Cost of Electric Power: Massachusetts has one of the highest average electric power costs in the U.S. (see Figure 11). In some areas that area served by major public utilities the cost is ~18 cents per kWh. This places the state at a disadvantage when attracting industrial firms with significant power use requirements, such as pharmaceutical and biotech companies. However, there are 40 municipal utilities (see Figure 12) that provide local electric power at lower rates (many less than 10 cents per kWh) and may be communities available for industrial sites if they have capacity and the local community has an interest as well as available land.

Figure 11 – Comparison of Average Electric Power Cost for Selected States



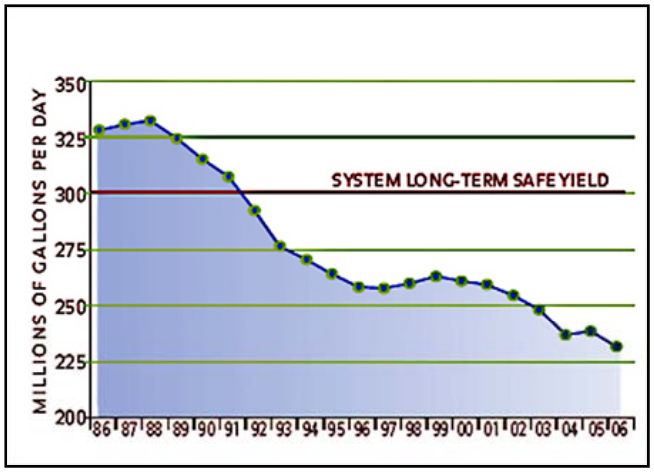
Source: Energy Information Administration (2007)

Figure 12 – Location and Listing of Municipal Utilities in Massachusetts



Water Resources: The availability of water resources varies across the state. The most challenged areas are in eastern portions of the state (see Figure 14) where there are a number of areas with voluntary and mandatory restrictions on water use. Many communities have very old water distribution systems, some of which have significant losses due to leaks. The Massachusetts Water Resources Authority operates a system that conveys water from the Quabbin Reservoir (capacity over 400 billion gallons) through a series of reservoirs and tunnels east to the Greater Boston area. Although the resources are large, the conveyance system has finite capacity. However, due to significant water use reduction measures the available capacity has actually been expanded over the past few years (see Figure 13)

Figure 13 – MWRA Water System Demand (1986-2006)



A brackish water desalinization facility has been constructed in the Southeast Region to increase the long term water resource capacity. Currently, the City of Brockton is a major customer of the recently completed desalinization project.

Figure 14 – Current Municipal Water Use Restrictions (6/1/08)

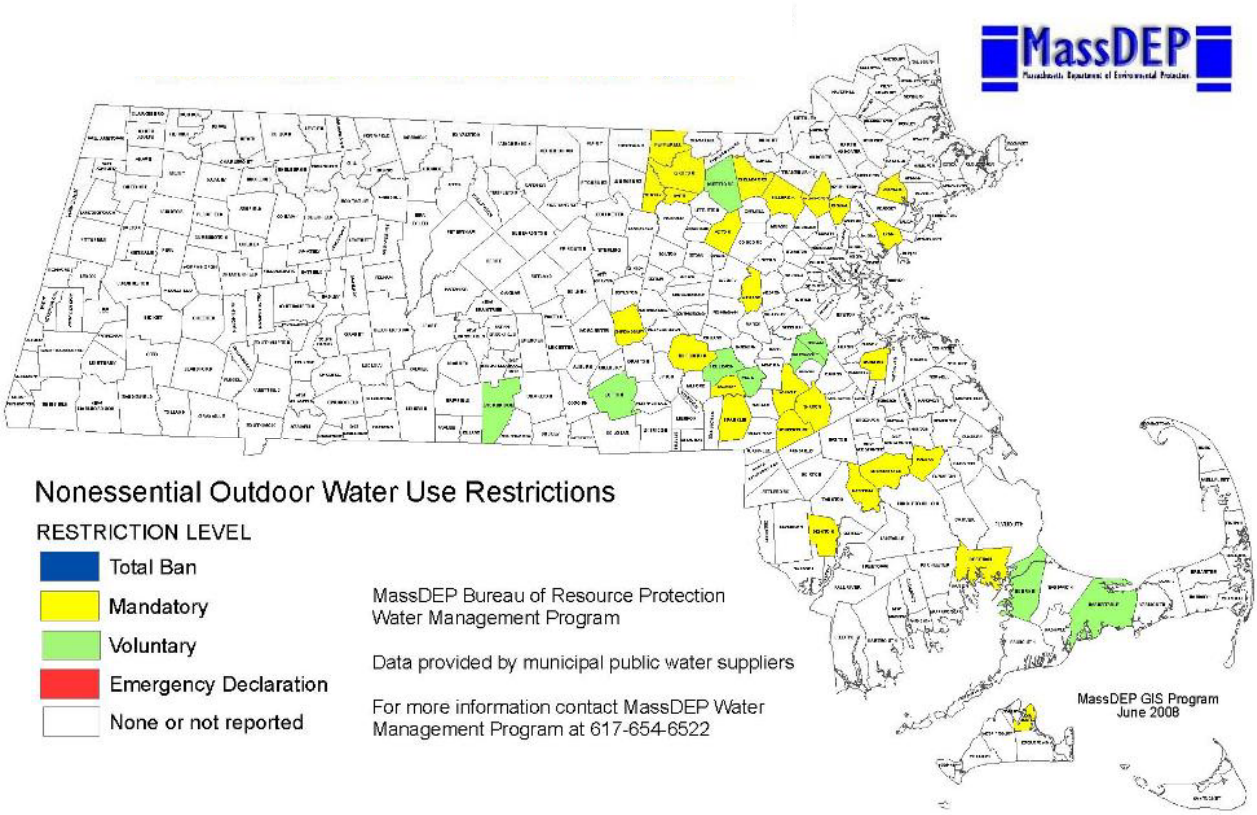


Table 9 – Levels of Facility Readiness for Urban Situations

Description of Readiness Levels	Time to Move-In
1. Completed building ready for painting and carpeting	2 to 3 months
2. Walls in place and finished as well as utilities installed	6 to 9 months
3. Upgrade/development of building • Rough out floor plans by functional use • Remove any hazardous materials • Upgrade/replace all utilities/services • Address structural and facade issues	18 to 24 months
4. Development-ready building • Ownership/title cleared and ready for sale • Proper zoning in place for office/R&D • Assessment of building to meet code and provide adequate parking • Permitting agencies poised for approvals • Infrastructure within reasonable access • Compatible adjacent land use	24 to 30 months
5. Older building or old mill complex needing substantial upgrade	> 30 months

Table 10 – Levels of Facility Readiness for Suburban Situations

Description of Readiness Levels	Time to Move-In
1. Completed building ready for painting and carpeting	2 to 3 months
2. Building shell in place or existing building needing modest renovation	4 to 6 months
3. Developed site with virtual permitted building	9 to 15 months
4. Developed site ready for building construction • Lots defined and graded • Roads and utilities in place with service to lots • Some permits secured and covenants defined	15 to18 months
5. Undeveloped site (“Shovel Ready”) • Ownership/title cleared and ready for sale • Proper zoning in place • Surveys/studies completed • Permitting agencies poised for approvals • Infrastructure within reasonable access • Compatible adjacent land use • Conceptual site plan and covenants	18 to 24 months
6. Zoned land in hands of original owner	> 24 months

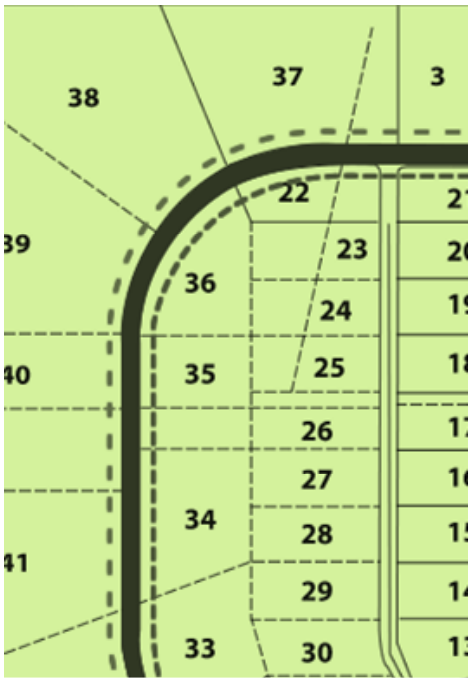


Table 11 – Resource Requirements That Support the Life Cycle of a Technology-Based Product

Development Stage	Facility Requirements	Skill Requirements	Financial Support	Location Factors
Basic and Applied Research	Research Facility • Wet/dry Labs • Offices • Access to meeting rooms • Access to cafeteria • Access to locker rooms	• Scientists • Technicians	• Initial grants	• University setting
Initial Product Development	Incubator/Greenhouse • Wet/dry labs • Offices • Access to meeting rooms • Access to cafeteria • Access to locker rooms	• Scientists • Product engineers • Process engineers • Technicians	• Angel capital	• Access to angel capital sources • Co-locate with R&D source • Affordable operating cost with full but flexible services
Product Commercialization	Larger Multi-Tenant Facility • Production area • Storage areas • Offices • Wet/dry labs • Access to conference/board rooms • Access to cafeteria • Access to locker rooms	• Entrepreneur • Process engineers • Product engineers • Marketers • Technicians	• Venture capital	• Access to venture capitalists • Transportation access • Low cost facilities and utilities • Quality of life to attract top talent
Production Roll-Out	Stand-Alone Building Within Industrial/Office Park • Production area • Product/raw material storage • Product/QC lab • Offices • Conference/board room	• Entrepreneur • Process engineers • Product engineers • Production labor and specialists • Marketers • Technicians • Business support team (HR, IT , accounting, etc.)	• Venture capital and other sources • Incentives to support start-up	• Transportation access • Low cost utilities with high reliability and adequate capacity • Access to production labor • Quality of life to attract top talent

The next stage is functional separation where headquarters and typically R&D are in one location, manufacturing is deployed to meet the needs of the marketplace, back office/shared services operations are placed in low cost labor locations and sales/customer are distributed to access the marketplace.

- **Operating Costs**

Mean annual salaries for selected positions and annual lease rates by type of real estate were evaluated and compared to other technology locations. Labor rates and real estate are highest in the Greater Boston area.

Table 12 – Mean Annual Wage Rate for Selected Positions and Locations

Location	Accountant	Customer Serv. Representative	Mechanical Engineer	Software Engineer	Computerized Machine Operator	Machinist
U.S. Average	$60,670	$30,400	$72,580	$82,000	$32,820	$35,810
Pittsfield Area	$59,010	$30,080	$70,400	$89,770	$33,610	$39,480
Springfield Area	$57,990	$33,120	$72,580	$75,780	$34,210	$38,870
Worcester Area	$62,990	$34,130	$74,050	$85,070	$40,100	$41,100
Framingham	$61,270	$35,580	$91,170	$102,580	$42,890	$41,060
Fitchburg Area	$52,900	$30,790	$83,250	$76,540	$45,920	$39,250
Lowell	$65,820	$36,890	$83,410	$95,470	$40,220	$41,790
Boston Area	$63,290	$39,290	$86,660	$90,700	$38,360	$41,410
New Bedford	$63,860	$27,060	$82,510	$76,320	$40,610	$42,100
Manchester	$55,310	$33,740	$65,580	$79,120	$32,230	$45,540
Albany Area	$61,430	$31,610	$82,430	$73,060	$35,830	$47,630
Allentown/Bethlehem	$68,580	$29,300	$83,150	$85,140	$34,950	$38,580
Richmond	$64,000	$31,220	$78,140	$84,320	$28,760	$37,790
Raleigh	$59,270	$30,330	$68,350	$84,970	$29,790	$32,440
Charlotte	$61,330	$32,810	$68,740	$84,260	$34,600	$32,890
Austin	$63,130	$29,770	$75,530	$92,340	$35,050	$34,650
San Diego	$63,790	$33,390	$79,050	$85,820	$33,470	$40,000

<90% of U.S. mean wage rate >110% of U.S. mean wage rate >115% of U.S. mean wage rate

Source: U.S. Department of Labor (2006)

Table 13 – Average Annual Lease Rate by Category for Selected Locations

Location	Class A Office	Class B Office	% Vacancy	R&D/Flex Space	Warehouse Space	% Vacancy
Boston	$60.80/sf	$32.70/sf	8%	$10.00/sf	$5.70/sf	14.2%
Cambridge	$47.80/sf	$28.20/sf	10%			
Inner Suburbs	$25.10/sf	$22.10/sf	10.7%			
Rt. 128 Area	$28.50/sf	$19.80/sf	13.7%			
I-495 Area	$21.10/sf	$18.25/sf	20.8%			
Springfield Suburbs	$18.50/sf	$13.00/sf	11%	$7.50/sf	$3.00/sf	7%
Raleigh Area	$21.25/sf	$18.00/sf	14%	$9.15/sf	$4.60/sf	15%
Richmond Area	$21.20/sf	$15.95/sf	12%	$8.00sf	$3.30/sf	7.4%
Austin Area	$28.10/sf	$22.50/sf	16%	$9.70/sf	$6.40/sf	10.3%
San Diego Area	$39.60/sf	$30.00/sf	15%	$16.60/sf	$7.90/sf	7.3%

Note: Boston numbers for R&D/Flex Space and Warehouse space are for the greater Boston area.

Note: Very limited real estate statistics are available for the tertiary markets in Massachusetts. However, lease rates are similar to Springfield while supply is highly variable.

Sources: Grubb & Ellis market report (1Q 2008) and NAI Global for Springfield (2008)

- **Overall Business Climate**

Business climate is measured in different ways with the end result being whether a city, region or state want to encourage the growth of certain industries. There are ways in which a positive business environment is demonstrated, such as:

- Issuing rules and regulations that support or discourage certain industries and types of operations.
- Having an administration/state legislature with a track record of making fast/supportive decisions for business and industry.
- Demonstrating the speed in which communities process permits and support other review processes.
- Having media feedback from the general public that reflects their interest in particular industries and growth in general.
- Having competitively low or no tax rates on income, real property, purchases of equipment, inventory, etc.
- Pursuing an overall low cost of doing business related to land, labor and energy and continuously taking actions to reduce cost.
- Supporting a high level of marketing activity that reinforces the business-friendly environment while addressing any perception issues (e.g., high unionization).

In essence, is a particular state, its region or city aggressively pursuing and supporting business ,or do issues and reservations exist in the minds of prospective companies? Do the citizens pull together to "do what it takes" to attract and retain business, or is there an attitude of complacency, or worse yet, is there a large contingent trying to inhibit economic growth?

Massachusetts has traditionally been a state that generates its own economic opportunities and has not had to pursue aggressive marketing as has been done in the South for the past fifty years. However, more recently the state has seen many of its old line companies reach the later stages of their life cycles and become acquired or eclipsed by competition. The state now faces the need to be more aggressive, but there are many regulations that are (or are perceived as) against growth and competitiveness, for example:

- The MEPA requirements trigger studies and reviews that may take years to comply with and send a signal that growth is not encouraged.
- There are penalties for transferring from an existing high cost utility to a low cost source that impacts a company's access to low cost power.
- Comprehensive building modification rules are meant to protect tenants, but are confusing to those attempting to redevelop a building for mixed use.
- There is a very tight control on water resource usage in certain parts of the state that limits the types of industries that can be located within a given region. Some of the controls are well founded and based on water shortages experienced in recent years.

The ultimate litmus test for regulations should be whether they exist primarily to inhibit any type of economic growth, or whether there is a rational basis and the means to expeditiously comply with the spirit of the law.

- **Cost of Living**

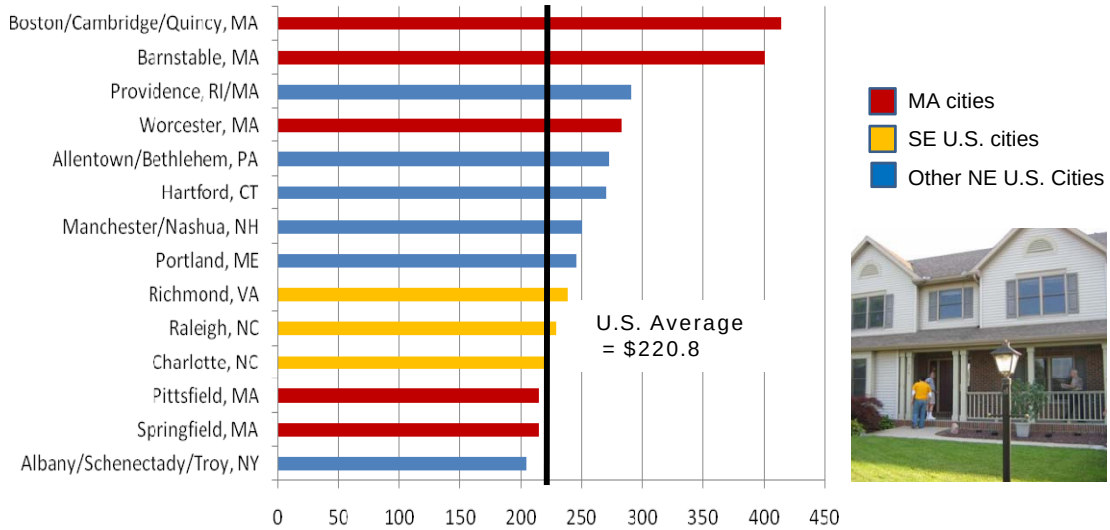
Within Massachusetts, the cost of living is high in the Greater Boston area and on the Cape and Islands. The cost of living in other regions is closer to the national average but is still higher than the Southeast U.S. The major components of high cost in Massachusetts are housing, energy and health care.

Table 14 – Comparison of Cost of Living For Selected Locations

Location	COL Index	Grocery	Health Care	Housing	Utilities	Transportation	Misc.
Pittsfield	101	120.6	131	68	130	113	116
Springfield	88	117.5	117	48	103	112	105
Worcester	100	113.1	126	81	110	110	107
Framingham	114	108	125	118	121	113	108
Fitchburg	97	111.9	126	73	110	109	107
Lowell	103	109.3	127	85	121	112	109
Boston	128	112.2	130	148	132	115	111
Taunton	109	112.1	132	98	122	116	110
Brockton	107	113	129	87	131	116	113
Fall River	105	113.2	133	85	122	116	110
New Bedford	102	112	131	79	124	117	109
Barnstable	122	111.8	129	132	128	115	112
Manchester	97	103.4	111	77	133	104	106
Albany	105	121.1	146	66	150	113	124
Philadelphia	92	106.2	102	56	130	117	112
Richmond	87	94	89	70	107	100	94
Raleigh	106	101.9	106	111	94	100	107
Charlotte	91	98.6	103	78	90	99	98
Austin	96	86.8	107	97	90	95	102
Charlotte	91	98.6	103	78	90	99	98
San Diego	147	114.7	130	206	126	112	104

Source: Sperling's Best Places COL calculator

Figure 15 – Median Home Sales Price ($000) for 3rd Quarter 2007



Source: National Association of Realtors

- **Incentives**

Incentives have become an important tool for stimulating certain economic development activity. Although the terms of a given incentive package are short-term, they play a critical role in supporting the growth of a business or a product line at key points of their life cycle. In addition, incentives can help target certain industries and locations within a state.

Typically, incentives focus around two major categories – tax credits and financial assistance as outlined in Table 15 below. Some incentives are offered to both existing and prospective companies that meet certain criteria. Others are offered only to external companies within target industries and employment levels. Incentives offered by Massachusetts were compared to other benchmark states that included New Hampshire, New York State, Pennsylvania, Virginia and North Carolina.

Table 15 – Summary of Typical Incentive Offerings

Tax Credits	Financial/Other Assistance
Typically are available based on the number of incremental jobs created (over some threshold), pay levels above average local levels plus medical benefits, the level of investment in real and personal property, or relocation/set-up costs for headquarters. They typically have a upper bound of a percent of the income tax obligation. • Job Tax Credits • Investment Tax Credits • R&D Expenditures Tax Credits • Headquarters Relocation Tax Credits • Sales Tax Exemption on Selected Equipment • Worker Training Tax Credit Typically, a tax credit of $500 - $1,000 for existing worker upgrades and new worker training programs. There are some thresholds for number of jobs involved.	• Small Business Assistance Focus around local delivery of Federal Small Business Administration (SBA) funds with some local added value (such as support with developing a business plan) along with access to loan funds. • Major Project Infrastructure Funds Support for road access, sewer and utility connections and other site prep work from both state and local sources. • Industrial Revenue Bonds There are both taxable and tax exempt sources that are typically for larger manufacturing projects needing up to $10 million. • State and Local Discretionary Funds State and local sources fund certain projects that represent a target industry, strategic company, types and number of jobs, etc. • Access to Low Cost Loans or Investment Sources • Impact Fee Waiver or Mitigation • Support Locating in a Brownfield Site • Low/No Cost Land Not formally offered but may be available on a case-by-case basis • Workforce Services Offered through state and local agencies to recruit, screen, staff and train workers for existing and new companies. • Relocation and Expansion Services Support relocation of company as well as to expedite permits.

As a basis for comparison, the current tax rates were initially compared for corporate and personal income as well as state/local sales taxes.

Table 16 – Comparison of Tax Rates for Selected States

State	Corporate Income Tax	Personal Income Tax*	Sales Tax
MA	Up to 9.5% (10.5% for financial institutions)	5.3%	5%
NH	Up to 8.5%	0%	0%
NY	7.5%	4.0 up to 6.85%	4% state and 3 to 5% levied locally
PA	9.99%	3.07%	6% state and up to 1% levied locally
VA	6.0%	2.0 up to 5.75%	4% state and up to 1% levied locally
NC	6.9%	6.0 up to 8.0%	4.25% and 2.5% levied locally

Note: Other states with 0% personal income tax include: AK, FL, NV, TN, TX, WA and WY.

Comparison of State-Level Incentive Offerings

Table 17 – Comparison of Tax Credits for Selected States

Description	MA	NH	NY	PA	VA	NC
Job Tax Credit	■			■		■
Investment Tax Credit	■		■			■
R&D Expenditure Tax Credit	■		■		■	■
Sales and Use Tax Exemption	■				■	■
Worker Training Tax Credit			■		■	■
Tax Incremental Financing (TIF)	■					
Brownfield Redevelopment Tax Credit			■			
Tax Credits for Locating in an Economic Development Zone			Empire Zone	Keystone Innovation Zone	Technology Zone	
Property Tax Credit					■	
Headquarters Tax Credit						■

Comments:

- **Massachusetts** – Job Tax Credit is for companies within biotechnology, medical devices or marine science technology with at least 10 new full-time jobs
- **Pennsylvania** – a significant amount of incentives focus on locating within a Keystone Innovation Zone

Comparison of State-Level Incentive Offerings

Table 18 – Comparison of Financial and Other Assistance for Selected States

Description	MA	NH	NY	PA	VA	NC
Project Infrastructure Funds	■		■	■	■	■
Bond Financing	■		■			■
State Discretionary Funds					■	■
Low Cost Loans	■		■	■		
Tax Exempt Financing	■					
Brownfield Redevelopment Fund	■		■			
Technology Fund	■	■	■		■	
Small Business Loans	■		■		■	
Workforce Training Fund	■		■	■		■
Term Working Capital Loans	■					
Utility Cost Rebate Program			■			

- **Organizations That Support Industry**

Massachusetts has a well developed network of organizations focused on supporting different industries as well as technology development. A listing of organizations is provided below.

Table 19 – Organizations That Support Target Industry Activity

Multiple Industries		
Massachusetts Technology Collaborative	Boston	The state's development agency for renewable energy and the innovation economy; administers the John Adams Innovation Institute and the Renewable Energy Trust and works to stimulate economic activity in partnership with industry, academia and government leaders.
Massachusetts High Technology Council	Boston	Represents the interests of technology industries within Massachusetts through the development of policy and political support at the state and federal levels.
Associated Industries of Massachusetts	Boston	7,600 member organization focused on providing a voice in the development of public policy to promote a positive economic climate and support members in their interaction with government agencies.
Computers/Electronics		
American Electronics Association – New England Council	Woburn	The regional council of a national trade association that serves as the voice of the high-tech industry in federal, state and local public policy initiatives; offers industry events, conferences and roundtables.
Massachusetts Technology Leadership Council	Boston	Addresses the leadership issues of software and other technology-based companies by hosting educational programs, sponsoring industry research, and advocating for policies that promote innovation and entrepreneurship.
Computers/Electronics		
American Electronics Association – New England Council	Woburn	The regional council of a national trade association that serves as the voice of the high-tech industry in federal, state and local public policy initiatives; offers industry events, conferences and roundtables.
Massachusetts Technology Leadership Council	Boston	Addresses the leadership issues of software and other technology-based companies by hosting educational programs, sponsoring industry research, and advocating for policies that promote innovation and entrepreneurship.
Massachusetts Network Communications Council	--	Supports voice and data communication companies; serves as an advocate to the state and federal government and fosters entrepreneurship and growth in the telecom sector in Massachusetts.
Life Sciences/Biotech		
Massachusetts Medical Device Industry Council (MassMEDIC)	Boston	Supports all aspects of the medical device industry.
Massachusetts Biotechnology Council	Cambridge	Supports biotech industry through advancing policy and promoting education, while providing member programs and events, industry information, and services.
Massachusetts Biomedical Initiatives	Worcester	Promotes start-up and growth of biotech, medical device, diagnostics and medical information by operating lab and incubator space and providing support services.

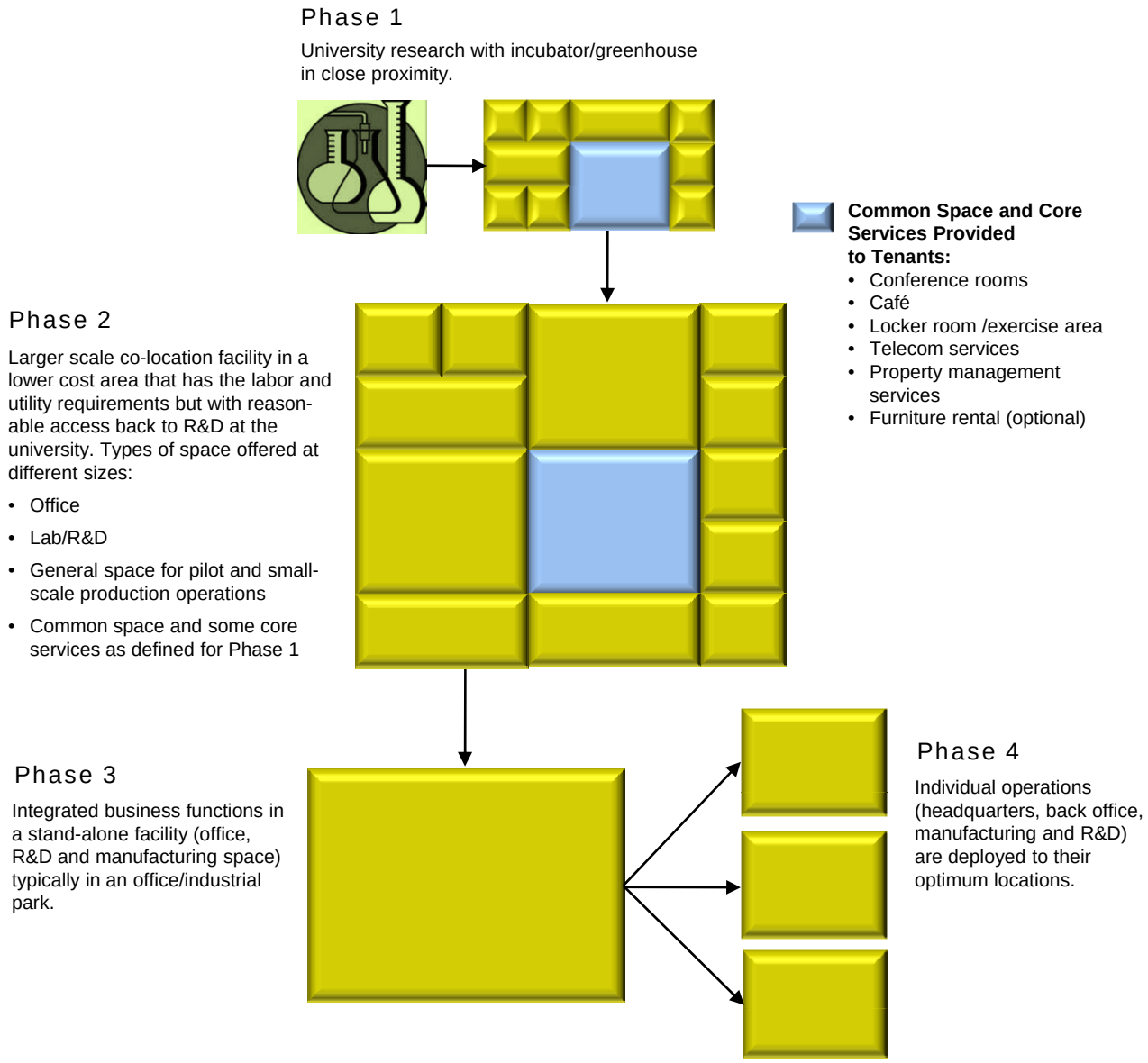
Table 19 – Organizations That Support Target Industry Activity (cont'd)

Marine Research and Technology		
The Marine and Oceanographic Technology Network	No. Falmouth	Committed to expanding the business opportunities of its members by building marketing presence, advocating local and regional economic development related to the development of new products for the marine and oceanographic product industry, and enhancing member business practices.
Food Processing		
Massachusetts Food Association	Boston	Trade association that addresses the issues of all aspects of the food industry from manufacturing and distribution to retail operations.
Massachusetts Specialty Foods Association	Groton	Assists its members in obtaining marketing, promotional, management, technical, scientific and financial assistance, and promotes and preserves the rich heritage of food production in Massachusetts. Also aims to increase public awareness and support of the Massachusetts specialty food industry and the wide variety of foods produced by its members.
Metal Fabrication and Machinery		
Boston Tooling & Machining Association	Ward Hill	New England chapter of the National Tooling & Machining Association; promotes the precision custom manufacturing industry in the region (defined as eastern MA, NH, and ME). Other chapters include Western MA and Rhode Island / Southeastern MA.
Plastics and Rubber		
massPlastics Medical Device Connection	Fitchburg	Program of the North Central Massachusetts Chamber of Commerce to link the region's plastics industry cluster with medical device companies.
The Plastics Institute of America	Lowell	Located at UMass-Lowell and dedicated to education and research related to the plastics industry.
Berkshire Plastics Network (being reinstated)	Pittsfield	Supports plastics industry in Berkshire County.
Renewable Energy		
New England Clean Energy Council	Cambridge	Mission is to accelerate New England's clean energy economy to global leadership by creating jobs, spurring innovation, and increasing market demand. Diverse membership includes clean energy companies, investors, industry associations, utilities, professional service firms, local universities, large end-users, government agencies and non-profits.
Massachusetts Technology Collaborative – Renewable Energy Trust	Boston	Aims to pioneer and promote clean energy technologies and foster the emergence of sustainable markets for electricity generated from renewable sources. Offers financial assistance to businesses for solar panels and wind turbines at their facilities and helps emerging clean energy businesses flourish in the Commonwealth.
Aerospace & Defense		
Massachusetts Aerospace Council	Boston	Promotes, supports and fosters the development and growth of Massachusetts aerospace companies through seminars, networking events, workforce development programs, educational initiatives, public outreach and legislative efforts.
Defense Technology Initiative (part of Massachusetts High Technology Council)	Boston	Promotes job creation and competitive growth opportunities for businesses and universities in the Massachusetts defense sector.

Inter-Regional Facility Strategy

In order for Massachusetts to facilitate the transition of R&D into economic opportunities, it is critical to assure the existence of facilities for each stage of a company's life cycle. Traditionally, businesses are transitioned from an incubator/greenhouse environment to a stand-alone facility. However, there is now a need to provide the interim step of a larger scale co-location facility (see Figure 16). This allows the emerging company to stay focused on its business growth and not on facility management issues, while maintaining an environment that stimulates the cross-pollination of ideas and potential access to on-site venture capitalists.

Figure 16 – Facility Requirements for Each Life Cycle Stage of a Company/Product



Benchmarking Selected Competitor Locations

Locations were selected for benchmarking based on the following criteria:

- Proximity to Massachusetts
- Industry presence and focus
- Size of metro area
- Growth and economic development activity

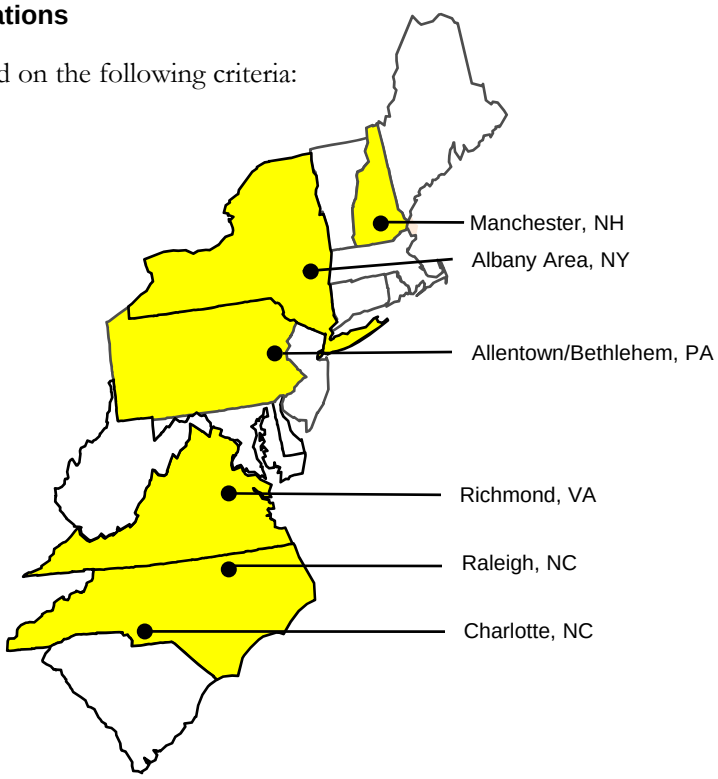


Table 20 – Comparison of Benchmark Communities

Criteria	Manchester	Albany	Allen/Beth	Richmond	Raleigh	Charlotte
Population	402,800	851,000	800,300	1,194,000	994,600	1,583,000
5-Yr. Growth	5.3%	2.9%	7.9%	8.5%	23.7%	18.1%
% 4-Yr.+ College Att.	34.8%	29.3%	23.1%	27.8%	37.8%	28.6%
Target Industries	• Bio/Life Sc. • Info. Tech • Fin. Services • Instruments • Electronics • Metal Fab. • Aerospace • Machinery	• Bio/Life Sc. • Info. Tech • Semi/Nano • Adv. Mat'ls • Energy • Security/Def .	• Bio/Life Sc. • Info. Tech. • Fin. Services • Electronics • Medical Eq. • Metal Fabr. • Plastics	• Bio/Life Sc. • Fin. Services • Semiconductors • Headquarters • Distribution	• Bio/Life Sc. • Info. Tech. • Comp/Elec. • Healthcare • Educ. Serv. • R&D • Headquarters	• Bio/Life Sc. • Fin. Services • Medical Eq. • Machinery • Motor Sports • Plastics
Major Universities	• UNH	• SUNY-ALB • RPI	• Lehigh Univ.	• VCU • Univ. Richmond	• Duke Univ. • NC State • UNC - Ch. Hill	• UNC - Char.

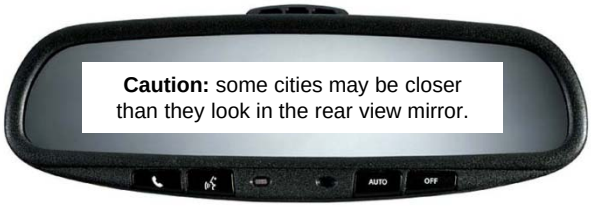
Massachusetts Average Values
5-Year Growth Rate: 0.56%
4-Year+ College Attainment: 37%

Reflections of Benchmarked Communities

Target Industries

The communities are targeting a number of industries that are similar to Massachusetts:

- Life Sciences/Biotechnology
- Medical Equipment/Instruments
- Electronics/Semiconductors
- Metal Fabrication
- Plastics
- Financial Services
- Headquarters Operations



Marketing Approaches: It's All About Labor

Each community is acutely aware that their future hinges on the access to qualified labor – whether it is retaining existing residents and college students or attracting talent from other communities. To this end, they are aggressively investing in community development and marketing the quality of life attributes of their communities that include:

- Affordable housing with substantial amenities (new homes, condos, lofts)
- Neighborhoods with full amenities such as trails, access to water, unique restaurants/meeting places, WiFi access, exercise facilities, access to universities for further education/recreation, etc.
- Enhancing the quality of the K-12 education in local schools

They also are targeting the needs of companies by marketing the following attributes:

- Competitive cost of facilities that are well-designed for R&D and business roll-out activities (meet the needs for each business life cycle stage)
- Provide low cost utilities (energy costs in the Southeast are 5-6 cents/kWh)
- Building/upgrading airports and pushing for expanded services (although the energy issues will slow down this process)

Development and R&D Activity

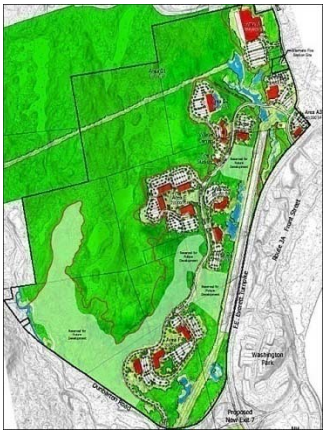
- Each location is expanding the R&D capability within targeted programs at the local university. They may not have the budgets that the Greater Boston area has but they are becoming successful in niche areas.
- The locations are also investing in the sites and parks to serve technology-based companies throughout each life cycle stage – from incubators to multi-tenant buildings to stand-alone company facilities.

Community Profile: Manchester/Nashua, NH

Marketing Approach

- Affordability: office and industrial lease rates are low compared to the Boston metro area
- Access via commuter rail and interstate/major highway
- Higher education: 11 area colleges, plus proximity to Boston
- High concentration of engineering talent
- Entrepreneurial culture: "a small business laboratory for the region"
- Family-friendly: investment in K-12 public schools, recreational and entertainment resources, downtown amenities

Development and R&D Activity



- Northwest Business Park at Hackett Hill: 150 acres off I-93. . . future opportunity for light manufacturing, R&D, and office uses
- Tech-North: Manchester's first-ever technology summit (Sept 2007) to explore links between higher education and technology firms
- Center for High-Rate Nanomanufacturing: Initiative of UNH, Northeastern and UMass Lowell
- Multiple downtown redevelopment projects

Community Profile: Albany/Capital Region, NY

Marketing Approach

- Part of NY's Tech Valley. . . outstanding educational opportunities, a highly qualified workforce, and excellent quality of life
- Comprehensive NYS marketing strategies for the biotech, "clean tech"/ alternative energy, and semiconductor and nanoelectronics industries

Development and R&D Activity

- A variety of affordable properties: shovel-ready sites, business incubators, tech parks, research facilities, and office space
- Luther Forest Technology Park: selected by AMD for the construction & operation of a semiconductor mfg facility to create 1,200 jobs
- College of Nanoscale Science & Engineering at UAlbany: First college in the world devoted exclusively to nanoscale science. . . a recognized leader in nanotechnology education, research and development. . . Also serves as an acceleration facility for onsite corporate partners including IBM, Applied Materials, Tokyo Electron, and International SEMATECH
- UAlbany East Campus Business Incubator: home to bioscience, chemical, and nanotech companies, with fee-for-service access to research services of the Center for Functional Genomics
- Center for Future Energy Systems at RPI: R&D facility promoting technology transfer in the energy industry, from start-ups to established businesses

Community Profile: Allentown/Bethlehem, PA

Marketing Approach

- Aggressive marketing campaign targeting the pharmaceutical industry… the Lehigh Valley is now home to ~65 biotech companies
- Extensive support services available for manufacturing, esp. "technology intensive" industries (e.g., electronics, medical equipment, metal fabrication, specialty printing and packaging)
- A network of incubator and post-incubator facilities
- Affordable energy rates, strategic location and transportation access

Development and R&D Activity

- Ben Franklin Technology Partners: links early-stage, technology-oriented companies with university and other resources; provides financial support to established manufacturers in developing and using new technology; operates a technology incubator at Lehigh University's Mountaintop campus
- Keystone Innovation Zones: designed to foster innovation and create entrepreneurial opportunities in targeted areas by utilizing the resources of businesses, educational institutions, commercial lenders, venture capital networks, and others. . . KIZ companies have access to facilities, incubator space, and university research expertise as well as tax credits and priority financing from the state
- The South Bethlehem KIZ targets life sciences, opto/micro-electronics, IT, financial services, and advanced materials/ nanotechnology

Community Profile: Richmond, VA

Marketing Approach

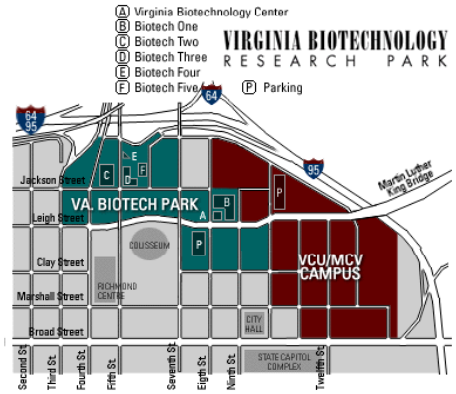
- Greater Richmond Partnership: economic development team for Chesterfield, Hanover, and Henrico Counties & the City of Richmond. . . regional focus
- Diverse economy includes state and federal government centers, higher education, financial services, and "21st century manufacturing" (biotech, pharmaceuticals, semiconductors)
- Abundant labor resources and growing regional population
- Fast track "ready to go" sites for semiconductor & life sciences industries

Development and R&D Activity

- 130+ foreign companies with facilities in the region… support for internationals includes bilingual programs in K-12 schools, cultural and business support organizations, orientation programs, and special weekend and evening schools with classes in language and culture
- Successful office/loft apartment conversions from former mill buildings in downtown Richmond
- Community college-based Semiconductor Manufacturing Technology program
- New $50 million School of Engineering at Virginia Commonwealth University (VCU) offers degrees in biomedical, mechanical, electrical, chemical and computer engineering

Virginia Biotechnology Research Park

- Began in the early 1990's when the Richmond area defined their economic development vision to include adding an engineering school to Virginia Commonwealth University (VCU) and develop a biotechnology/life sciences research park
- Formed 501(c)(3) corporation back by the Commonwealth of VA, VCU and the City of Richmond
- A 34-acre parcel was acquired adjacent to the VCU and Virginia Medical College (VMC) campus – Designated Enterprise Zone
- The VCU/VCM life science, health science and engineering departments and hospitals . . . $100+ million in funding
- 40 biotech/bioscience-related companies (800+ employees) in the park leveraging research capabilities at VCU and VCM.
- Incubator with lab/office space , fee-based business services
- Other area office parks have been targeted for future expansion as the companies out-grow the Biotech Park



Community Profile: Raleigh, NC

Marketing Approach

- Consistently rated as one of the top places to live/work
- Thriving life sciences, biotechnology, information technology, and software development industries, thanks in part to the world-renowned Research Triangle Park
- Highly educated and diverse workforce
- Low cost of living

Development and R&D Activity

- Research Triangle Park: hugely successful R&D park with nearly 140 companies and 39,000 employees
- NC Certified Sites Program: pre-qualification process to ensure that industrial site ready for development
- North Carolina Biotechnology Center: private, non-profit corporation created by the state; assists NC biotech companies with services ranging from business planning to networking to marketing strategies. . . also sponsors grant programs and workforce training activities to prepare students for job opportunities in the industry

Centennial Campus

- A 1,334-acre fast-growing research park adjacent to North Carolina State University's main campus
- NCSU owns the campus and retains control of the property, preventing land speculation, inappropriate development, etc.
- Unique environmentally-sensitive master plan consists of R&D "neighborhoods" with university, corporate, and government facilities intertwined within the park
- $620 million invested in facilities and infrastructure to date.
- Centennial Campus Magnet Middle School: a collaboration between NCSU and Wake County School System to create a model mathematics, science and technology school
- New 82,000 sf Biomanufacturing Training & Education Center (BTEC) opened 2007. . . will train ~2,000 students/year and help attract bio companies to NC
- New, upscale residential development will feature town-homes/condos with extensive recreational amenities
- Proposed executive conference center, hotel , golf course

Community Profile: Charlotte, NC

Marketing Approach

- Regionalism is "the driving force behind everything we do," even crossing state lines (the Charlotte region includes 12 counties in NC and 2 in SC)
- A major center for foreign investment: 750+ foreign-owned companies, 22% of which are German-owned; the region has extensive experience with foreign companies and understands the culture
- Growing, talented workforce; competitive business costs and regional research programs
- Relatively low utility rates and extensive workforce development resources for manufacturing (metalworking, plastics)

Development and R&D Activity

- Polymers Center of Excellence at UNC Charlotte: offers a variety of services to the plastics industry, including testing, workforce development, process problem solving, and R&D
- Charlotte Research Institute: a portal for business-university partnerships, located at UNC Charlotte's Millennial Campus; research areas include precision metrology, optoelectronics and optical communications, bioinformatics, and technology applications for financial services

Life Sciences R&D Campus in Nearby Kannapolis, NC

- Bringing together multiple universities on one 350+ acre campus to study biotechnology related to nutrition (to preempt disease) through a major grant (over $1 billion) from private donor (the Chairman of Dole Foods). Schools include:
  - University of NC - Chapel Hill
  - University of NC - Charlotte
  - NC State University
  - Duke University
  - Wake Forest University
- Also providing a 150+ acre industrial park within Cabarrus County for expanding businesses.

Project Profile: The Scripps Research Institute in Palm Beach, FL

- Scripps selected Palm Beach County (Jupiter) based on:
  - Quality of life for attracting scientists (housing , life style, attractive community etc.)
  - Land available (500+ acres)
  - Energetic philanthropic community (extremely wealthy area)
  - County financial package for land and facilities of $600M+
  - Access to major university (Florida Atlantic University)
- Value to community
  - 900+ highly skilled positions
  - Ability to attract many other top life science organizations (e.g., Max Planck Institute)
- Facility has automated robotic analytical process that greatly reduces cost and time

Regional Resource Assessments

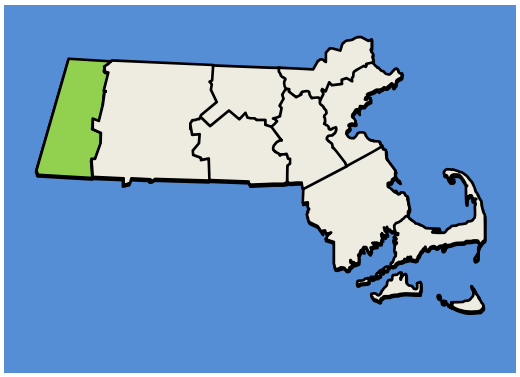
An economic development resource assessment was conducted on a regional basis and is comprised of three modules of information:

1. A strengths/weaknesses/opportunities/threats (SWOT) analysis for the region based on input gathered from the workshop sessions within the region and input from the project team
2. Evaluation of potential opportunities by target industry as defined by the region
3. General comments and recommendations for achieving economic growth provided by the project team

Based on a review of each regional assessment, there are a number of conclusions that surfaced:

- Although from a size comparison the state is relatively small, the level of geographic diversity is significant. The topography varies from coast line to rolling hills to small mountains. This resulting in communities seeking different aspects of their economy to survive – from sea ports to mill towns specializing in textiles, paper, furniture and machining operations.
- There is a significant amount of wetlands throughout the state derived from glacial scour and deposition from past geological ages. The scour also created deep sand banks and exposed rock outcrops. The result of the glacial action is very limited amount of acreage throughout the state for large sites and future economic development. This places the state at a disadvantage against states with substantial open land resources.
- The state has a substantial amount of wetlands that are closely protected but there are also locations where water is limited. Both of these circumstances can have an impact of certain industrial growth that needs larger sites and substantial water resources.
- The high cost of electric power (can be as much as 18 cents/kWh) from the major utilities in the state make many locations unattractive for industrial operations (eg,. biotech and pharmaceuticals) that require significant power. There are 40 municipal utilities in the state that can provide electric power at a much lower rate (~8-10 cents/kWh)
- Due to the low growth and sometimes negative growth of population in many of the locations throughout the state, this will have a very severe, long-term affect on the size and availability of the labor force – compounded by the retirement of Baby Boomers.
- Industry organizations are relatively prolific and strong in Massachusetts – particularly in the Boston area. This type of activity is very healthy and assures constant growth and innovations among the supported industries.
- Economic development organizations are in various stages of maturity throughout the state with the weakest area served being the MetroBoston region. This region needs an umbrella organization to support the challenges of existing companies while acting as the front door for attracting new companies to the region.

Berkshire Region



- Berkshire Region: SWOT Analysis

Strengths/Primary Assets
Overall Brand and Culture of Area • Berkshire brand is well known – particularly in cultural circles and hospitality • Unique convergence of culture, recreation and the environment (lakes, rivers, mountains) • Relatively small area that can be agile and resilient along with creative and innovative **Cities and Communities** • Well maintained cities (Great Barrington, Stockbridge, Lee, Pittsfield, Williamstown, Adams and North Adams) • Strong sense of community throughout the region and acceptance of diverse groups of people **Quality of Life** • Cost of living reasonable (low cost of housing) • Significant recreational and cultural opportunities, access to regional healthcare **Business Environment and College/University Support** • Good/supportive business community (e.g., banking institutions) • There is collaboration with universities outside the region (e.g., plastics engineering at UMass Amherst) • Strong community college and Williams College in the region • Restarting incubator "without walls"
Weaknesses/Challenges
Labor Force • Rapidly shrinking and aging population (-2.5% per year) • Quickly losing the younger segment of the work force • Rising cost of gasoline may reduce commute distances and size of available labor force in a given location • Challenges in recruiting younger workers from major metro areas to the region **Business Resources** • High cost of power • Very limited office and industrial real estate product available for new business • Portions of the region are a significant distance from an interstate • Access to broadband very limited **Quality of Life** • Availability of low cost housing but quite old . . . some high-end housing recently built
Opportunities for Economic Growth
• Small to medium sized businesses • Possible start-ups • "Creative economy" businesses – design, arts, architecture, software, etc. that represent individuals and small companies • Local expansion of plastics industry as overall economy expands • There is an effort to bring green/lower cost energy to the region but there are some regulatory issues inhibiting companies converting from major utilities
Threats/Competition
• High energy cost will not be attractive to new industry • Shrinking /aging workforce also an issue • Lack of real estate options will be a detraction for some • Unless a business owner has a personal desire to live in the Berkshires, there are many challenges to placing a manufacturing-related business here

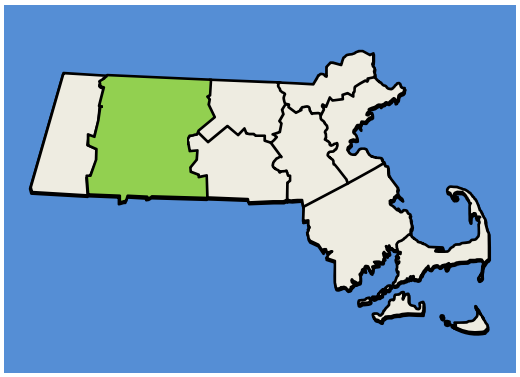
- Berkshire Region: Target Industry Evaluation

Industry/Segment	Comments of Types of Operations and Potential Opportunities
Plastics	Highest potential is the expansion of existing companies or the start-up of new local firms, not the attraction of companies to the area. Key resources include low cost facilities (with manufacturing and office space), low cost skilled labor, and low energy costs. Some larger operations may need rail access.
Alternative Energy	There is an opportunity for both alternative energy (wind and biomass-wood) generation plants that need industrial sites as well as energy consultants that require office space (2,500 to 10,000 sf).
Aerospace, Defense and Security	The most probable potential for growth is the expansion of General Dynamics operations. Expansion would most likely take place within its existing site (manufacturing and office space) or possibly a satellite office in the William Stanley Business Park of the Berkshires.
Educational Services	Growth will take place on the campus of Berkshire Community College and other colleges within the region.
Professional, Technical and Creative Services	Encompasses a variety of professional, technical and creative businesses that will require office space (1,000 to 50,000 sf) from low to moderate cost ($10 to $25 per sf).
Hospitality, Recreation, Culture and Tourism	Includes recreational and cultural venues as well as restaurants and hotels. Growth is this segment will be derived from continued promotion and packaging of the area to selected geographies. Niche in alternative health and wellness.

- Berkshire Region: Recommendations

Recommendations/Comments
• What has built and sustained the region in the past has been several large employers forming the base of the economy (GE, Sprague Electric, Crane & Co., Mead, other paper companies) . . . other than medical facilities, the return of this phenomenon will most likely not occur in this generation. • From an industrial perspective, there are three critical issues to address: ▪ Reduce the cost of energy through alternative energy generation in the region ▪ Maintain an inventory of industrial space for local company expansions ▪ Sustain a labor force that supports industry job opportunities • Stay connected with local companies and their evolving needs . . . they change over time • Continue to expand high speed internet coverage in selected areas • Continue to market the area's high quality of life for the cultural/arts segment • Support a business incubator to stimulate local business growth • Leverage the technical support available from UMass Amherst and Lowell as well as other universities across the state as well as adjacent New York State (RPI, University at Albany) • Continue to develop networking opportunities for college students, young professionals and entrepreneurs.

Western Region



- Western Region: SWOT Analysis

Strengths/Primary Assets
Transportation • Excellent interstate access (north/south and east/west) • Access to Bradley International Airport south of Springfield • Easy access to both Boston and NYC **Labor Force** • Substantial presence of college students in the region (>50,000) • Major universities within the Pioneer Valley and extending south to Hartford, CT (UMass, UConn, University of Hartford, etc.) • Efforts to engage young workers (Internhere.com and Springfield Young Professionals Society) **Quality of Life** • Broad diversity of living environments: rural communities, small towns (Northampton, Amherst, Deerfield, etc.), suburbs and some urban areas • Comparatively low cost of living **Business Environment and College/University Support** • Significant medical facilities to leverage growth in some aspects of life science • Entrepreneurial culture supported through STCC Technology Park, the Scibelli Enterprise Center, the Springfield Business Incubator, the Entrepreneurial Institute, the Young Entrepreneurial Scholars Program, the Student Venture Program, and the Student Business Incubator, Hidden Tech, etc. • Good inventory of industrial *sites* (not modern buildings) • A highly collaborative business community striving to expand the economic base of the region • Excellent economic and business development organizational resources
Weaknesses/Challenges
• Low inventory of modern (relatively new) office and industrial buildings • Massachusetts regulations (e.g., MEPA) provide a disadvantage for business to locate in MA vs. CT • Electric power cost in certain areas of region is very high • Low critical mass of biotech/life science provides a current staffing challenge for existing companies • Outside perception of region . . . mixture of old industrial towns with college/university towns • Gaps in the availability of broadband internet access (more rural areas), but improving
Opportunities for Economic Growth
• Ideal location for a back office and college-trained customer service center but will need more office product inventory at a high level of readiness with parking and amenities in order to attract employers • Leverage industrial base for high value manufacturing . . . particularly components • Possible destination for European companies seeking U.S./New England presence
Threats/Competition
• Distance from Boston may reduce external interest • Generally a limited awareness of area and its attributes by Boston companies and external prospects

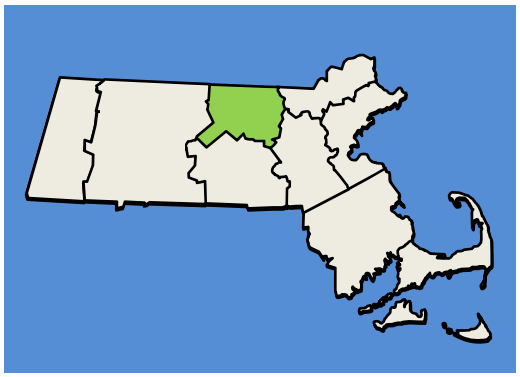
- Western Region: Target Industry Evaluation

Industry/Segment	Comments of Types of Operations and Potential Opportunities
Biotech/Pharmaceuticals	There is a potential for moderate-size production operations due to the presence of both land/industrial parks and water.
Medical/Other Instruments	Small presence in conjunction with Baystate Health and UMass Amherst. Currently below the critical mass for growth but has the potential for growth.
Fabricated Metals	Long-standing industry that supports other industries with component parts. Potential to expand local business as well as spin-offs from existing companies.
Plastics	Focused on expansion of existing companies or potential spin-offs.
Alternative Energy	The region needs alternative energy sources to reduce electric power costs and there may be a potential for energy consultants to locate in the area as well as energy-related equipment and components to be produced in the area.
Regional Healthcare	Expansion at Baystate Health Systems and other regional facilities.
University R&D	Potential growth primarily at UMass Amherst.
Financial Services	The Pioneer Valley is a likely candidate for back office operations.
Professional, Technical and Creative Services	Small to mid-size professional and technical service companies that would expand with the local economy.
Hospitality, Recreation, Culture and Tourism	Variety of museums and other destination venues within the region as well as expanded use of Connecticut River for water-related activities.
Transportation and Warehousing	There is potential for expansion of services at area airports (Westover and Barnes) as the economy expands. There is some warehousing opportunities available that are critical for serving the rest of New England. Most regions do not want warehousing due to the large land consumption for few incremental jobs.

- Western Region: Recommendations/Comments

Recommendations/Comments
• The region has a number of very strong assets: second largest student population in the state and New England, strategic location to serve the rest of New England, water, transportation resources, etc. • Another important asset is the drive and energy of the community to mobilize and move forward. • It is critical for the region to be very much aware of who they are competing with on any particular day and project . . . the competition can change rapidly. • From a manufacturing perspective, a significant amount of new growth may come primary from internal (within the state) sources and getting companies to come into the region (particularly from other U.S. destinations) may be difficult. Some European firms may have an interest if there is a strategic fit. • Wherever the cost of energy exceeds ~10 cents/kWh, consider the location off limits to manufacturers that have moderate to high energy use. • Having facilities at the right level of readiness will not guarantee growth, but without them, there is little chance for attracting and expanding business in the region. For example, back office operations want/need a nearly "move – in-at-signing" situation while industrial firms also need to reduce start-up time. • The environment around a building (the image, access to amenities, etc.) is far more important now than it was a generation ago. Just putting up a building in a former industrial area may not work for the high tech businesses – they want a quality image and the efficiency of a LEED "green" building. • Keep the business incubator infrastructure in place and build on past successes in order to stimulate local business growth. • Continue to support the growth and development of entrepreneurial businesses. • Leverage the technical support available from UMass Amherst and UMass Lowell as well as other universities across the state and in Connecticut.

North Central Region



- North Central Region: SWOT Analysis

Strengths/Primary Assets
• Strong diversified industrial base of employers • Trained workforce to support industry presence underpinned by community college • Affordable area (land and labor) • Developable land available • Quality of life . . . access to mountains and ocean
Weaknesses/Challenges
• Outside perception of area: either unknown or potentially negative (old mill/industrial area) • Energy costs are high • Sites lack utility infrastructure . . . low level of readiness • Natural gas not widely available . . . may be issue for some industrial operations • Limited modern industrial space
Opportunities for Economic Growth
• Expand existing diverse industrial base • Leverage IBM and Bristol-Myers Squibb presence and other business activities at Devens • New opportunities in medical devices and other instruments as well as renewable energy equipment/component manufacturing
Threats/Competition
• Communities are limited by their size and foot print • Cost of energy will impact manufacturing and other significant energy users • Perception that area is remote from Boston/Cambridge • Local communities reject economic growth and land development

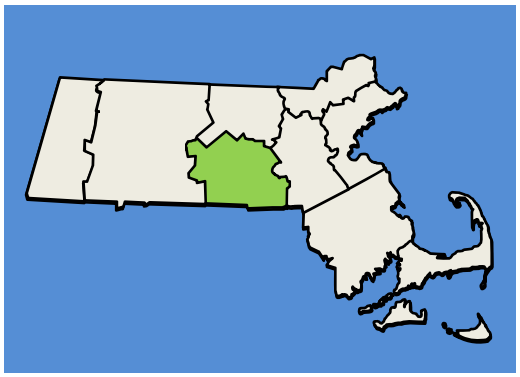
- North Central Region: Target Industry Evaluation

Industry/Segment	Comments of Types of Operations and Potential Opportunities
Biotech/Pharmaceuticals	Some manufacturing and manufacturing support opportunities. Potential to leverage Bristol-Meyers Squibb at Devens.
Medical/Other Instruments	Leverage manufacturing activity to the east and southeast of region.
Food Processing	Traditional industry presence with some niche opportunities in the future. Need to be in location with moderate to low cost electric power and water resources.
Plastics	Expand existing companies and potential spin-offs while enhancing supplier relationships with medical device, instrument and other businesses within the state.
Alternative Energy	Area needs lower cost energy sources but specific opportunities not identified. Opportunity to expand manufacturing of alternative energy products (e.g., Evergreen Solar)
Aerospace, Defense and Security	Leverage activity to the east and southeast of region.
Regional Healthcare	Potential for growth as region population expands.
Hospitality, Recreation, Culture and Tourism	Some destination venues including museums and Johnny Appleseed theme.

- North Central Region: Recommendations/Comments

Recommendations/Comments
• The region still has a strong industrial base representing a variety of industries. Position this strength for businesses that are expanding in the Greater Boston area and need lower cost resources in their general proximity. However, most of the incremental growth will probably come from the expansion of existing companies within the region. • Most of the region is located too far (in comparison to the Merrimack Valley and other communities around the 128/I-95 and I-495 perimeters) from Boston/Cambridge to consider it a close-in alternative for second stage growth companies seeking small to mid-size space in a multi-tenant facility. • When technology-based companies decide to expand, they will be looking not only within Massachusetts but in other New England States, the Southeast, Mid-Atlantic, etc. for options. It is important to know who you are competing with and what they offer. • The region has a lot of industrial sites/buildings, many of which need significant development/renovation to be market ready. Having facilities at the right level of readiness will not guarantee growth but without them there is little chance for attracting and expanding business in the region. • The primary cities of the region need to define their primary “front doors” and seek to improve the appearances from SR 2 to the city centers. • Wherever the cost of energy exceeds ~10 cents/kWh, consider the location off limits to manufacturers that have moderate to high energy use. Limited water use restrictions also dictate types of companies that can be placed within the region. • Develop a business incubator infrastructure in order to stimulate local business growth. • Leverage the technical support available from UMass Amherst and Lowell, and WPI, as well as other universities across the state.

South Central Region



- South Central Region: SWOT Analysis

Strengths/Primary Assets
R&D Assets • Development of Gateway Park and WPI's commitment to bioresearch • WPI's engineering capabilities and research in niche areas (although overall funding relatively low) • Access to UMass Worcester medical research activity **Transportation** • Access to TF Green Airport (easy access but fairly good direct flight options) • Interstate network that serves region • As the cost of fuel continues to rise, the rail access through Worcester's Inland Port may represent additional opportunities for the region **Quality of Life** • Cost of living at about national average (although housing stock is old) **Facilities** • Business/R&D site develop and permitting activity in selected areas of region
Weaknesses/Challenges
Labor • Attracting young R&D labor to relocate in Worcester area • Need a young professionals group in the area **Utilities and Funding** • Ability to secure funding to expand incubator space at Gateway Park and other projects • Access to high volumes of water is a challenge in certain areas of the region . . . partially due to pumping capacity limitations set by the state • High energy costs **Perception of Area** • Perception of Worcester as an old tired mill/industrial city without the charm of Boston
Opportunities for Economic Growth
• Potential to expand area as a rail transportation center • The area may also serve as a distribution center but land available for large operations will be limited • Continue to leverage the R&D activities at WPI and UMass Worcester • Downtown potential if planned projects are successfully implemented
Threats/Competition
• Growth moving toward Rhode Island to the south • On-going competition with Greater Boston area • Cost of energy and limited water resources will minimize biotech/pharmaceutical processing growth

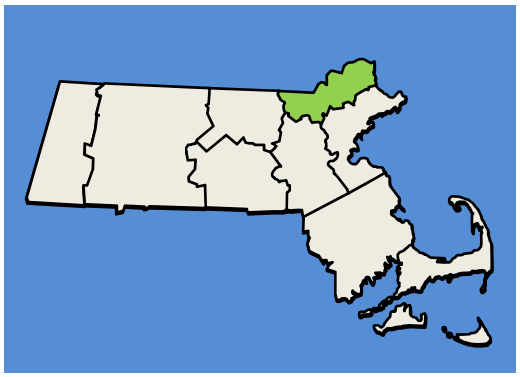
- South Central Region: Target Industry Evaluation

Industry/Segment	Comments of Types of Operations and Potential Opportunities
Biotech/Pharmaceuticals	Derived from UMass Medical Center and WPI activity. Primarily start-up related opportunities. Limited water resources, high electric power costs and lack of large sites will restrict growth of major production operations.
Medical/Other Instruments	Derived from UMass Worcester and WPI activity and industry presence in eastern portion of state. Tufts University Veterinary school may also contribute to this sector.
Fabricated Metals	Historical business that supports other technology businesses. Opportunities may exist with expansion of existing businesses or spin-offs. Not likely to attract companies relocating into the area.
Educational Services	Local college/university expansions.
Regional Healthcare	Key focus on UMass Medical Center incremental growth.
University R&D	Primarily UMass Medical Center and WPI.

• South Central Region: Recommendations

Recommendations/Comments
• The region is certainly in a transition from a traditional broad industrial-based economy to one with selected manufacturing and significant services. Although the center city of Worcester has and will continue to undergo revitalization, there are still substantial efforts that will need to be accomplished before young professionals can be attracted to relocate from Greater Boston. • The health sciences/biotech industry will require a broad range of facilities and price points in order to gain in strength throughout the region. It is important to be aware of the change in needs by industry segment, life stage of company, and type of operation. • Most of the region is located too far (in comparison to the Merrimack Valley and other communities around the 128/I-95 and I-495 perimeters) from Boston/Cambridge to consider it a close-in alternative for second stage growth companies seeking small to mid-size space in a multi-tenant facility. • If the region is hanging much of its future on R&D-derived businesses, it is critical for the economic development community to be very much aware of R&D activities, facility needs and timing, and how companies form and evolve over their life cycles. Otherwise, the region may produce good ideas that ultimately land elsewhere. • Wherever the cost of energy exceeds ~10 cents/kWh, consider the location off limits to manufacturers that have moderate to high energy use. Limited water use areas will also dictate types of companies that can be located within the region. • Continue to maintain/expand business incubator infrastructure in order to stimulate local business growth. • It is very healthy for the region to focus on the strengths of WPI and UMass-Worcester as the R&D core but also leverage the resources of the entire state when supporting growth businesses. MIT, UMass Amherst and Lowell as well as Northeastern University and others can complement the strengths of WPI in a particular area of process technology. • Reinforce cultural, recreational and educational resources of the region to prospective companies.

Merrimack Valley Region



Moran, Stahl & Boyer ● E. M. Pemrick and Company

- Merrimack Valley Region: SWOT Analysis

Strengths/Primary Assets
Transportation • Access to Manchester International Airport and Logan International Airports • Good interstate system . . . although building in congestion at peak of commute periods **Labor Force** • Diverse workforce for skills . . . immigrants also coming to the area • Broad manufacturing employment base **Quality of Life** • Good public schools • Resurgence of vibrant downtowns, waterfront access, open areas, bike trails and access to both the mountains and ocean • Opportunities for live-work-play situations • Housing base is affordable and has "character" . . . provides opportunities for renovations to provide current amenities and compliance with codes **Business Environment and College/University Support** • Access to UMass – Lowell and its technology programs • Available water and sewer capacity (former paper industry created high demands) . . . capacity an issue for some communities • Access to Boston and Cambridge
Weaknesses/Challenges
• Communities vary in desire to support economic development • Cost of energy varies but overall is high (electricity and gas) • Have some mega buildings left by former employers (Lucent Technology in No. Andover) • Commuter rail from Boston/Cambridge is very limited and no bus transportation from train to office areas • Not many build-to-suit sites with water/sewer access • Significant supply of vacant mill buildings available for redevelopment
Opportunities for Economic Growth
• Leverage Cambridge R&D activities and place manufacturing/back office operations in the Merrimack Valley • Expand existing industry employers as economy expands • Opportunity at the Golden Triangle to intercept local and NH/ME commuters traveling to SR128/I-95 businesses as the cost of fuel escalates (some Boston commuters want to stay connected to Boston for future job opportunities)
Threats/Competition
• Over time all the headquarters have left the area . . . primarily from companies going through mature life cycle phases . . . this will be an ongoing issue • Dealing with any negative perceptions that Cambridge companies may have with the Merrimack Valley • Competition with Metro West for migrating business from Boston/Cambridge

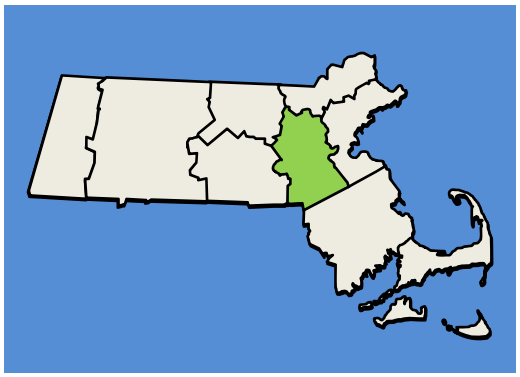
- Merrimack Valley Region: Target Industry Evaluation

Industry/Segment	Comments of Types of Operations and Potential Opportunities
Biotech/Pharmaceuticals	Siting certain processing plants may be an issue due to water constraints, cost of energy, and towns not wanting process firms "in their backyard."
Medical/Other Instruments	Opportunities of expand existing companies and attract second stage growth companies coming from Cambridge into to larger/lower cost space.
Computers/Electronics	Some expansion of existing companies. New opportunities as the industry transitions to next quantum technology.
Fabricated Metals	Expansion and spin-offs of existing companies.
Alternative Energy	Opportunity for related consulting, component manufacturing and possible sites for alternative energy generation to reduce high cost of electric power in the region.
Aerospace, Defense and Security	High potential for internal expansion of existing companies as well as small company spin-offs.
Professional, Technical and Creative Services	Will consist of home-based and small offices supporting a client base located predominantly in the region, the Greater Boston area, and New England.

- Merrimack Valley Region: Recommendations

Recommendations/Comments
• The region is well positioned to accept expanding businesses coming from Cambridge and Route 128 to lower cost situations and still have a reasonable access back to the R&D sources in Cambridge and Boston. But it is going to take some serious marketing to convince some companies to be that far away. • There are residential areas within the region (Andover/North Andover) that have some fairly high residential real estate costs . . . need to anticipate this situation to avoid sticker shock for some tire-kicker companies and individuals sold on the low cost of the area. • The 1600 Osgood facility in North Andover (former Lucent Technologies/Western Electric building) is a potential resource for second stage companies seeking larger space in a multi-tenant and collaborative environment. • The health sciences/biotech industry will require a broad range of facilities and price points in order to gain in strength throughout the region. It is important to be aware of the change in needs by industry segment, life stage of company, and type of operation. • The Golden Triangle land parcels at the I-495 and I-95 interchange definitely have potential in the future . . . growth out from Boston/Cambridge and Route 128 has taken some time and the current energy issue for commuters coming from northeastern Massachusetts as well as Maine and southern New Hampshire may have created a window of opportunity. • Wherever the cost of energy exceeds ~10 cents/kWh, consider the location off limits to manufacturers that have moderate to high energy use. Limited water use areas will also dictate types of companies that can be located within the region. • Continue efforts to facilitate new business growth in tech-related sectors. • The region can take advantage of the resources of UMass Lowell as well as other universities across the state. • Continue urban revitalization projects that enhance the live-work potential in downtown areas.

MetroWest Region



- MetroWest Region: SWOT Analysis

Strengths/Primary Assets
• Highly skilled workforce and very high college-level education attainment • Strategic location . . . proximity to Boston and other parts of New England • Strength of existing company base (name recognition and types of technology-based industries) • Good public (depending on location) and private schools • Access to university research (UMass Medical Center) as well as Boston and Cambridge • Framingham State adding an MBA program • Significant inventory of commercial real estate
Weaknesses/Challenges
• Cost of housing is high . . . older homes lack contemporary amenities (for the price offered compared to other areas of the country such as Atlanta, Austin, Raleigh, Charlotte, etc.) • Water resources are limited and may have impact on placement of biotech and other water-intensive operations • Presence of NIMBY/no growth activists that have been effective in impacting growth potential for the area • Need for some incubator infrastructure • Ability to retain the college students that are within the area
Opportunities for Economic Growth
• Clean technology . . . green jobs (Leverage R&D efforts from around the state for related technologies) • Expand substantial existing employer base • Hospitality that supports the business community has growth potential (meetings, trade shows, conferences, etc.) • Back office operations (partner with Framingham State University)
Threats/Competition
• Cost of gasoline and traffic congestion will tighten commute zone for the area • Limited access to water and cost of power will limit growth of certain industries (e.g., biotech materials and electronics) • Substantial competition from Atlanta, Austin and Raleigh . . . some from New York's Capital Region • Getting some companies and venture capitalists to look beyond Route 128 • Desire to maintain quality of life and severely restrict consumption of greenfield land for development projects

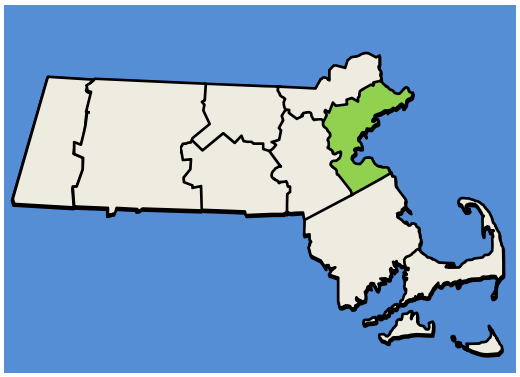
- MetroWest Region: Target Industry Evaluation

Industry/Segment	Comments of Types of Operations and Potential Opportunities
Biotech/Pharmaceuticals	Headquarters and other office-based operations as well as in-house R&D. Expansion of existing employers in addition to the relocation of emerging businesses as they outgrow their limited space in Cambridge/Boston or the real estate cost is too high. Water limitations and high energy costs will impact the placement of certain process manufacturing operations here.
Medical/Other Instruments	Headquarters, other office-based operations as well as in-house R&D and light manufacturing.
Computers/Electronics	Headquarters, other office-based operations as well as in-house R&D and light manufacturing. Operations requiring heavy water use may have issues in the region.
Alternative Energy	Energy equipment manufacturing companies, tech centers and light manufacturing of equipment and components.
Aerospace, Defense and Security	Potential expansion of existing employers requiring additional office and light manufacturing space.
Regional Healthcare	Potential expansion of existing employers.
Financial Services	Predominantly a back office location for Boston companies or those serving Massachusetts and New England.
Professional, Technical and Creative Services	Small to mid-size firms (up to 250 employees) that serve local, regional and national clients.
Corporate Headquarters	Headquarters of technology companies as noted above.

- MetroWest Region: Recommendations/Comments

Recommendations/Comments
• One of the challenges of the MetroWest real estate environment is that its product offerings are predominantly large box offices on big campuses. This is best suited for fairly mature companies, while emerging companies would rather co-locate in a multi-tenant *village* with significant amenities. The complex may also have some university research activity in residence as well as angel and venture capital firms. This is similar to the formats being developed in NJ and NC to support growth in the life sciences/biotech fields. Essentially, the region offers third stage growth options but may also need to offer the second stage multi-tenant options. • In general, the health sciences/biotech industry will require a broad range of facilities and price points in order to gain in strength throughout the region. It is important to be aware of the change in needs by industry segment, life stage of company, and type of operation. • In order to sustain a broad age range in available talent within the region's commute zone, it is important to monitor and address issues related to affordable housing for new recruits and young families. In general, the new recruits would rather live in Boston and not in a suburban environment and have a reverse commute to the I-495 area via the MBTA or other public transportation. • Wherever the cost of energy exceeds ~10 cents/kWh, consider the location off limits to manufacturers that have moderate to high energy use. Limited water use areas will also dictate types of companies that can be located within the region. • Develop/expand a business incubator infrastructure in order to stimulate local business growth. • Although the region does not have a major resident research university, the resources of UMass, WPI and the Greater Boston universities should be considered quite accessible.

MetroWest Region



- MetroBoston Region: SWOT Analysis

Strengths/Primary Assets
• Substantial college and university presence (mainly private institutions) • Significant R&D efforts supported by grants to universities and private sector activities • Size and presence of workforce • Significant financial services, medical and other technology industry presence • Substantial water conservation in region has improved available water quantity • Good public and interstate transportation networks • Diversity of living environments . . . an attractive city with a strong brand and image • Access to angel and venture capital sources
Weaknesses/Challenges
• Running out of developable land and R&D/office/industrial real estate costs are escalating • Overall cost of living is high (housing costs a critical issue) . . . particularly for younger workers • Home rule places decisions in the hands of many individual communities . . . hard to develop uniform approaches and consistent levels of interest in economic development • There has always been business and a stable economy; therefore communities are not adept at addressing economic development issues and residents not aware of the negative ramifications of an anti-growth strategy • The ability to retain non-resident college graduates from local universities . . . there is no compelling desire to stay in the area unless there is a significant job offer with compensation that overcomes the high cost of living
Opportunities for Economic Growth
• Take full advantage of the life science and other R&D activities at all the universities in the region through the provision of low to moderate cost incubator and post incubator business growth. • Support the existing business base of the region by assuring they have the facilities and labor to expand and that they are located in an area with costs in line with their needs. • The region's proximity and access to Western Europe makes it the likely candidate to attract European business to the region as well as other regions in the state.
Threats/Competition
• Other life science and technology centers (Raleigh, Atlanta, Austin, San Diego, San Francisco/San Jose area, Chicago, Minneapolis, Denver, etc.). Some have lower costs and very compelling R&D activities supported by major mixed use campuses to take advantage of for commercialization. • The inability for the communities to work together effectively can be a very serious threat to the region. • The cost of electric power and real estate may prove to make the area/state very unattractive for technology-related businesses that have production-related operations. • Redevelopment of former industrial land being converted to residential/retail use.

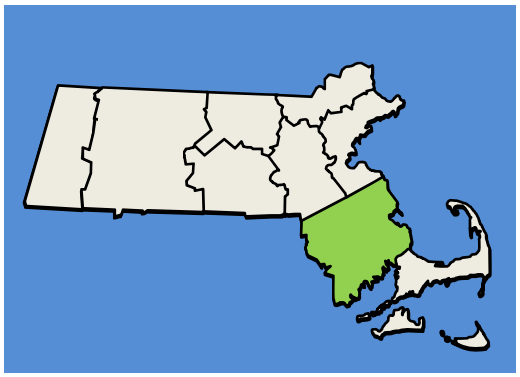
- MetroBoston Region: Target Industry Evaluation

Industry/Segment	Comments of Types of Operations and Potential Opportunities
Biotech/Pharmaceuticals	R&D and headquarters for emerging companies, expansion of existing companies.
Medical/Other Instruments	R&D and headquarters for emerging companies, expansion of existing companies.
Computers/Electronics	R&D and headquarters for emerging companies, expansion of existing companies.
Alternative Energy	Technical offices for companies serving the region and New England.
Aerospace, Defense and Security	Expansion of existing companies and operations.
Regional Healthcare	Expansion of existing companies and operations.
Educational Services	Expansion of existing institutions.
University R&D	Expansion of existing public and private university R&D.
Financial Services	Optimization of downtown vs. suburbs for back office operations to lower operating costs.
Professional, Technical and Creative Services	Growth of existing companies but also start-up of niche businesses.
Hospitality/Tourism	Leverage and creatively package existing venues. Creating centers of technology and applied science that become destinations.
Corporate Headquarters	Retention of existing operations and attract technology-related and other headquarters that would find Boston to be strategic (e.g., U.S. headquarters for European firms).

- MetroBoston Region: Recommendations/Comments

Recommendations/Comments
• The region has enjoyed a relatively stable economy for a long period due to the underpinning of state and local government, educational institutions, healthcare institutions, long term financial institutions, and professional services companies (law and engineering consulting firms) . These segments are not fast growth segments but stable. This stability has caused the general public to have little concern for growth and actually develop a position that economic growth may not be necessary. • The technology sector in MetroBoston and adjacent regions has had both phenomenal growth and well publicized losses from companies such as Wang, DEC, Lucent Technologies/Western Electric and other major employers. This has left a general feeling of mistrust of whether technology can hold up as a long-term economic engine. • There is a need for the general public to understand business life cycles and when DEC, Gillette and John Hancock were acquired by outside interests, it is not a betrayal of public trust but a natural and eventual step in a normal business life cycle. • The collective communities of the Greater Boston area should identify, inventory and evaluate sites available to support tech-related businesses and other key segments of the economy. Need to develop long-term growth partners with outlying regions to assure available real estate options. • In order for the MetroBoston area to take full advantage of the R&D activities within the region it must: ▪ Provide real estate in the type/functionality, size and price range that is commensurate with the life stage of each company ▪ Provide housing for the younger educated work force that is affordable, has access to the types of amenities they seek, and located in safe environments ▪ Provide utilities that are of the capacity, reliability and cost that meets the needs of the companies • The region should to be viewed externally as a cohesive unit that provides different options, not a collection of independent entities that refuse to work together as a team to meet the needs of the region. The global economy has created substantial competition and just “being Boston or Cambridge” may not ultimately be enough. • Because the majority of students in Boston area universities are not originally Massachusetts residents, efforts should be taken to assure students engage in co-op or intern assignments with area companies, find locations to live that are affordable, and build relationships in the area while in school. Otherwise, students will either return home or to other locations that meet their needs. • Wherever the cost of energy exceeds ~10 cents/kWh, consider the location off limits to manufacturers that have moderate to high energy use. Limited water use areas will also dictate types of companies that can be located within the region. • Continue to expand business incubator infrastructure throughout the region to stimulate local business growth. • This region needs an umbrella organization to support the challenges of existing companies while acting as the front door for attracting new companies to the region.

Southeast Region



- Southeast Region: SWOT Analysis

Strengths/Primary Assets
• Low cost of living/housing, coastal living, low traffic • Good transportation infrastructure (interstate, rail and ports) • Available workforce with broad manufacturing background • Research partnerships (Woods Hole Oceanographic Institute, UMass Dartmouth, MIT, URI, etc.) • Reasonable overall business costs (some cities have their own electric power companies with reduced rates) • Access to TF Green and Logan International Airports • Some sites available for development
Weaknesses/Challenges
• Low levels of educational attainment (four-year college degrees and above) among the adult population . . . this is a manufacturing-based culture and there are a lot of high school grads with specific skills • Somewhat negative external image . . . need to communicate successes • No commuter rail service available to Boston or Providence • Crime levels relatively high • Negotiating with each community (under home rule structure) is very time-consuming • Perceived lack of support from state to showcase this area • High energy costs in some areas • Gaps in high speed Internet coverage in the area
Opportunities for Economic Growth
• Short run/high value plastic and metal components for medical devices, instruments and other tech-related items • Marine science-related activities (renewable energy systems and other marine applications) • Shipping from New Bedford/Fall River ports • Growth of new local businesses via local incubator facilities and support • Opportunities to partner with Providence and other RI communities
Threats/Competition
• Loss of younger workers . . . particularly the college educated • Competition from other major projects/sites (e.g., Devens) • No competitive tax and policy incentives • Lack of understanding of the area and its attributes by internal/external prospects may keep the region from being on the list of top location candidates

- Southeast Region: Target Industry Evaluation

Industry/Segment	Comments of Types of Operations and Potential Opportunities
Biotech/Pharmaceuticals	Manufacturing operations where there is land, low energy costs and good water resources (and community support) within the region
Medical/Other Instruments	Manufacturing operations that leverage existing manufacturing-related skills
Marine Science	Manufacturing in region industrial parks. R&D near UMass Dartmouth
Food Processing	Manufacturing operations where there is land, low energy costs and good water resources within the region
Alternative Energy	Experimental operations as well as manufacturing of components and equipment
Aerospace, Defense and Security	Expansion of existing employers within the region and in nearby Rhode Island
Regional Healthcare	Expansion of existing operations
Transportation/Distribution	Some sites available in Fall River area and local interest in distribution operations
Hospitality/Tourism	Continue to expand leveraging access to coast and existing destination venues

• Southeast Region: Recommendations/Comments

Recommendations/Comments
• The region (particularly in the SR 24 corridor) has a significant and diverse manufacturing base that can be leveraged for additional opportunities. Gathering feedback from local employers as to the quality of the labor force and the business environment would be valuable. • Although the adult population education levels for four-year college graduates is low, the supply of manufacturing labor as well as the diversity of skills is high. This characteristic should be emphasized. • Wherever the cost of energy exceeds ~10 cents/kWh, consider the location off limits to manufacturers that have moderate to high energy use. Limited water use areas will also dictate types of companies that can be located within the region. • With the limited locations in Massachusetts for warehousing and distribution operations, a portion of the industrial parks in the region should be allocated for this activity. • There is an opportunity to expand the back office/customer service presence in the region with an emphasis around the resources at UMass Dartmouth. • Maintain/expand a business incubator infrastructure in order to stimulate local business growth. • Continue to leverage the R&D activities at UMass Dartmouth and at the Woods Hole Oceanographic Institute in Falmouth, as well as the activities in nearby Rhode Island.