2006 Regional Comprehensive Economic Development Strategy Update for the South Central Region of Connecticut

Final Report

Submitted To:

New Haven Regional Growth Partnership

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TABLE OF CONTENTS

Introduction

In February 2002, the South Central Regional Growth Partnership (RGP) embarked upon a strategic planning process with the goal of creating a regional Comprehensive Economic Development Strategy (CEDS). This process served two purposes. First, a CEDS is a prerequisite for assistance under the U.S. Economic Development Administration's (EDA) Public Works and Economic Adjustment Programs. Once EDA accepted the RGP's CEDS document, projects in the region would be able to access federal resources that were not previously available. The second and equally important reason for undertaking the strategic planning process was to bring together in one document all of the creative thinking and previous strategic planning that has been occurring in the South Central region. The intention was to create a common understanding of regional economic development and to bring all of the region's stakeholders together around a common set of priorities and a common vision for the future.

The CEDS was submitted to the EDA in December 2002 and accepted as the official Strategy for the RGP region in early 2003. Over a three year period, from January 2003 until January 2006, the RGP has been pursuing the implementation of many of the action steps contained in the strategy. However, RGP recognizes that any strategic plan needs to be flexible and able to adapt to changing conditions. An indication of a "learning" organization is its interest in reviewing metrics, assessing progress, and then redesigning strategies to respond to new data and new conditions.

This document, *The 2006 Regional CEDS Update*, is illustrative of the learning activity occurring at the RGP. The CEDS update looks at the changing economic conditions in the New Haven region and the progress that has been made on implementation to date. With this new understanding, some of the initial strategies have been refined and some new strategies and priority action steps were developed.

How Has the Region Changed?

In the years since the release of the CEDS report, the region has made significant progress on some economic development fronts. Yet, it continues to face significant challenges. The RGP region still faces a shrinking economy, stagnant population growth, and a large number of residents who lack the education and skills needed to prosper in the current economic environment. Yet, when one walks through downtown New Haven, improvements are also readily seen—from cleaner streets and reduced crime to a greater choice of urban amenities. One must look beyond the numbers in order to see that New Haven has improved. While there is a long road ahead, the foundations of growth are there for those who look.

Positive Trends: Enhancing the Region's Image

The image of the RGP region is closely tied to the overall image of the city of New Haven. Over the past four years there have been a number of very positive trends in the city that have led to a perception that New Haven is becoming a much more desirable place to live, to learn, and to work. From changing descriptions in college guides to a growing number of positive media stories, there is evidence that the image of the city is changing. *Insiders Guide to the Colleges 2006* notes, "Located smack in the middle of New Haven, a vibrant community that has been revamped in the last decade to become about 100 times cleaner, safer and more fun that everyone thinks." Over the past few years, the *New York Times* has also run a number of articles focusing on downtown living and dining in the city. Other evidence of positive trends includes:

- The past few years have seen significant growth in housing in downtown New Haven. According to the city, there is a total of 3,720 housing units downtown. Of those units, 1,002 were built in the last five years. In addition, there are a number of new condominium projects in process. This housing has helped to spur additional revitalization of commercial space, with a growing number of restaurants and entertainment venues.
- In April 2005, Pfizer opened a new 62,500-square-foot building in the city to be used for Phase I clinical drug trials. The new facility employs about 50 people, and is a strong signal about the region's potential in the bioscience industry.
- There has also been progress on a number of potential development projects in the New Haven. Steps have been taken to implement the Gateway Downtown Development Project, a $230 million plan to bring Gateway Community College and Long Wharf Theater downtown. The first step, the demolition of the Coliseum, is planned for early 2006. There has also been some progress on the River Street Municipal Development Plan.

Throughout the rest of the RGP region there have also been positive trends that have added new jobs to the region and are helping to revitalize some of the region's traditional urban centers. For example:

- In Milford, the downtown has undergone significant redevelopment, partially as a result of the Lisman Landing project. There has been a mix of new apartments, condos, and stores in the downtown, helping to create a more vibrant and lively environment. In addition, there have been some new commercial developments including a 400,000 sq. ft expansion of the Connecticut Post Mall, a new mall featuring a Wal-Mart as an anchor, and the redevelopment of a vacant Jai Alai site with a new Lowe's and Hilton Hotel.
- Meriden has also had a number of recent economic development success with the expansion of Thompson Brands, the development of a new call center by CDG Management, LLC, and the consolidation of Aplicare at a new site in Meriden. The city has also been successful in making Meriden a WIFI hotspot. Two additional projects that are currently in the planning phase offer further development potential. The city is utilizing federal EDA funds, along with other federal and state funding to redesign the HUB site, a 15 acre parcel in downtown Meriden. They are also

working on the remediation and reuse of the 7-acre Factory H site which has been vacant for a number of years.

Significant Economic Challenges Remain

While the positive signs and improving image of the city are critical to furthering the region's economic development goals, there remain significant economic challenges. Having a more livable and vibrant urban center is important, but not sufficient for economic development. The region still faces significant economic challenges, with job growth lagging the state and the nation, and a large number of resident's still facing significant challenges finding jobs. Recent news of layoffs and facility closings in the region add to an overall sense that in terms of jobs the trends have not been particularly favorable:

- *Since 2000, as the U.S. economy has been in recovery, the RGP region has continued to lose jobs.* The region as a whole has lost over 5,000 jobs since 2000, for a loss of about 2 percent. While above the U.S. average, this job loss mirrors trends in the state. However, some communities in the region, most notably New Haven, West Haven, and Meriden, have experienced job losses of over 5 percent since 2000.
- *Unemployment rates in the region also remain relatively high.* While economic conditions were improving in most of New England and in the country as a whole, the New Haven region saw an actual increase in unemployment. Between November 2004 and November 2005 (the most recent data available), the unemployment rate in the New Haven Metropolitan Area actually increased from 4.2 percent to 4.9 percent. This performance was of particular concern given trends elsewhere. The Department of Labor reported that the New Haven Metropolitan Area ranked 342nd out of the 367 Metro Areas in terms of change in unemployment rates during this period. Many of the regions that ranked lower were in the Gulf Coast and affected by Hurricane Katrina.

What Progress Has Been Made in Implementation?

Over the past three years, the staff of RGP, along with their regional partners, have made significant progress in implementing many of the Action Steps outlined in the initial CEDS. The following section highlights some of the more notable accomplishments under each of the five goals.

Goal One: Strengthen the Region's Economic Base

Creative Cluster

The initial CEDS for the RGP region outlined a preliminary set of recommendations for building creative enterprises in the region. However, these recommendations were premised on completing a more comprehensive analysis of the size of the creative cluster, areas of particular strength, and areas of opportunity for further development. RGP supported the completion of a report that looked at the potential of further building the region's creative economy. This study looked comprehensively at the economic activities in the creative sector and identified areas of opportunity, as well as some of the barriers that are constraining progress. A refined and more strategic set of recommendations was developed to provide guidance to the RGP as it seeks to further develop the economic potential of the creative cluster. The strategy recommendations from this report are included as part of the updated CEDS strategy in this report.

The report on the creative cluster also served to strengthen the case at the regional level and with the state of Connecticut that the creative cluster was, in fact, an area of importance for the regional economy. The findings from the creative cluster report, as well as the strategies, were presented at the RGP's annual meeting and at a meeting of the board of directors of the New Haven Regional Chamber of Commerce. RGP was also asked to participate in statewide efforts that are now looking to focus attention on the creative cluster within the state of Connecticut.

Manufacturing

RGP staff have played a critically important role in reinvigorating the New Haven Manufacturers Association (NHMA) and in working with it to develop new programs focused on legislative priorities and addressing workforce challenges.

Following recommendations in the CEDS, the RGP forged a strategic alliance with the NHMA starting in 2003. Previously, no such relationship existed. Staff worked with NHMA to develop a set of policy issues to pursue. These accomplishments laid the groundwork for further achievements in 2004 and 2005. Roger Harrison of the RGP staff played an important leadership role in the organization and was invited to become a member of the NHMA board of directors.

During this period, RGP staff have worked with NHMA on three summits that have focused on developing a legislative agenda for manufacturing. RGP staff have also worked with the NHMA and the Workforce Alliance to develop a sector training program focusing on manufacturing.

Their workforce-related activities have included:

- helping to develop a "Lean Manufacturing" pilot project with Workforce Alliance. The first customized training project involved instructing 150 employees of the Marlin Firearms;
- working with Gateway Community College to identify and resolve barriers to expanding its manufacturing training program;
- working on strategies to market manufacturing careers to youth in the region. This multi-faceted outreach effort to middle and high schools is aimed at heightening awareness of and interest in a career in manufacturing; and
- finally, RGP staff have been looking to expand training programs for incumbent workers in manufacturing by collaborating with NHMA and Empower New Haven to identify custom training needs.

Bioscience Cluster

RGP staff have met with the leader of CURE, the statewide organization with the mission of building the state's bioscience cluster. In addition, it has supported an updated review and strategic approach to this cluster as part of the updating of the CEDS. Appendix A is the result of a more recent study of the status of the bioscience cluster in the region. Strategies for further building the cluster are included in this report.

Goal Two: Sustaining a Competitive Human Capital Base and Providing Employment Opportunities to All Residents

Explore Ways to Keep College Students in the Region after Graduation

With the help of the United Way, RGP launched the *First Professional Step* program to keep college students in the region by creating job opportunities and a professional development program for them. The program offered full-time jobs as well as a leadership training program throughout the year and networking events where young professionals can meet other young people who live and work in the region. RGP has coordinated the program with the established Leadership Greater New Haven, a program run by the Greater New Haven Leadership Center, a department of the New Haven Chamber of Commerce. Five area colleges and universities were essential partners to both help recruit qualified candidates for these jobs and to feed new seniors into the program next year.

While the effort did produce a number of benefits, the project is not a major priority for the future. "*First Professional Step*" helped the RGP to develop good working relationships with career offices at more that 14 area colleges and also allowed RGP to participate in Interhere.com which helps to facilitate awareness and place young adults in internships. The focus in the future will be on better understanding why young adults are not attracted to the region and to develop new linkages between RGP and local groups involved in networking activity amongst young professionals.

Sector Skill Training

As noted above, RGP has been actively involved in developing training programs focusing on manufacturing. It has not been involved in efforts to build career ladders and training programs in others sectors such as healthcare.

Career Literacy and Lifelong Learning

The RGP and Workforce Alliance have met to discuss ways to promote the importance of lifelong learning to students in schools and colleges and to workers in virtually every industry. Several logos were designed and will be incorporated in literature, reports, and other forms of communications. Efforts were also made to expand the Schools to Career program by establishing more contacts within schools for the express purpose of improving awareness of manufacturing opportunities and the need to continue one's education after graduation. Contacts were made in the guidance offices of Hillhouse and Cross high schools.

Goal Three: Ensure that the Region has the Physical Infrastructure Required to Compete Effectively

Mitigate Congestion through Addressing Transportation Issues in the Region

The president of RGP has worked closely with the executive director of the COG and presidents of several area chambers to forge an effective alliance to address a range of transportation issues and monitor activities of the Transportation Investment Area (TIA), Transportation Strategy Board (TSB) and various state legislative committees. For example, RGP is an active participant in the I-95 and the I-91 TIA, a group that meets to set regional transportation priorities. As a result, the commuter rail line between New Haven and Springfield became the TIA's number one priority to help mitigate congestion along this corridor. On August 24, 2004, the TSB reviewed this rail implementation plan and asked DOT to prepare cost refinements. The TSB endorsed the plan. In addition, the RGP joined the Transportation Investment Coalition, a statewide group that advocates for dedicated state revenues to fund transportation improvements. Ongoing efforts are being conducted to forge legislation for this goal of funding transportation projects.

Improve Access to Air Transportation

The president of RGP has been a leader in efforts to implement a master plan for Tweed New Haven Airport and to expand air service to the region**.** Last year, $1.7 million was raised primarily from area businesses for revenue guarantees to Delta Airlines. This secured three daily regional jet services to and from Delta's major hub in Cincinnati. In addition, another $250,000 of in-kind support was raised for airport marketing. The RGP also received $250,000 in a federal grant to supplement marketing for Tweed. Working with the city of New Haven and other officials, RGP secured $600,000 in operating funding from the state. Together with a city of New Haven appropriation of $900,000, Tweed was able to continue operations. Similar efforts are in progress to protect these funding sources for the new fiscal year. With expansion of jet services at Tweed ranking as one of the highest priorities for the region, the RGP provides the speakers bureau with guests to tell the airport story to service organizations and chambers of commerce throughout the region.

The RGP has also been instrumental in developing a plan for providing incentives to a new airline at Tweed. Negotiations are taking place with Northwest, Southwest, Jet Blue, US Air, and other carriers to begin or expand flights at Tweed. Financial support for attracting new service is ongoing with state and local officials.

Goal Four: Build an Effective Civic Infrastructure

Benchmarking

RGP completed a benchmark study using 40 economic measurements in some 23 comparable regions to gauge its relative economic strength and success. This report compared available data from 2000, 2001, and 2002. It provides a baseline for future surveys. The findings were made available to community leaders and were used as a jumping off point for discussions at a December Community Forum.

Build Consensus and Support of Regional Strategy

RGP has played a leadership role in the region in building consensus around economic development goals and strategies. It held a retreat with chief elected officials and key leaders of industry, educational, and nonprofit organizations in December 2004. RGP also continued to host the monthly Regional Economic Development Forum (REDFO). Economic development professionals from most towns and cities in the region attend the sessions. Each month, RGP prepares agendas to indicate topics covered and invites guest speakers. In December 2004, RGP sponsored a Community Forum that drew 70 people to discuss growth issues. After a keynote speech, the forum was divided into three "breakout groups": business costs, government fragmentation, and workforce competitiveness.

Build Capacity of RGP through Longer-term Funding

The RGP has submitted to the board an aggressive, expansive budget that seeks additional funding for projects that need to be undertaken to implement the CEDS. It met with some success in getting both longer-term commitments as well as new sources of support. RGP also secured an agreement from its municipalities and the Regional Leadership Council (RLC) to increase base funding 10 percent a year for three years. This translates into a 25 percent increase in total operating support.

Goal Five: Enhance the Quality of Life in the Region

Brownfields Development

RGP continues to play a leadership role in the region on the clean up of polluted sites. The RGP has taken the initiative in both site assessment and remediation. Working with Eileen Buckheit, director of municipal services, RGP's program to return brownfields to greenfields has yielded results. Several sites are candidates for site assessment and remediation funds. RGP is working with local officials to make sure they are adhering to regulations so they can qualify for state and/or federal funding.

Commercial Development

RGP has helped West Haven in developing a commercial property in close proximity to a proposed new railroad station in West Haven for Amtrak trains that run along the Northeast Rail Corridor. By recommending the new rail station in West Haven, the RGP recognized the potential of the site for mixed use development and the value to regional residents to gain access to rail service without traveling into New Haven or Milford. RGP staff have also had discussions with North Haven and Hamden officials about sites that expand retail stores at selective, undeveloped properties. In Wallingford, RGP completed a report, *Town Center Study*, which resulted in a new vision of city regulations to encourage growth of its downtown area.

Develop and Maintain a Regional List of Capital Project Priorities

Using the REDFO monthly meetings as a means of keeping pace with progress of potential projects that could qualify for EDA capital funding, RGP developed a shortlist of capital projects that have advanced in their development and funding to be candidates for EDA monies. Members of REDFO voted on these projects to prioritize and reaffirm their value to the region. RGP has also worked with the city of New Haven on the completion of an application to EDA on its River Street Project. The city submitted a full application and $1.5 million was approved to help develop that site. This EDA grant was the first of its kind in the region in the past 10 years and would not have been possible without a CEDS for the region.

Responding to Changing Conditions: A Strategy Update

The following section updates the strategies and priorities for the RGP as it moves forward in the implementation of the CEDS. While most of the strategies and action steps remain the same, this update incorporates the following changes:

1. As initially stated, Goal One focused *on Strengthening the Region's Economic Base through Supporting Key Clusters*. The revised strategy discusses a couple of action steps and priorities that cut across the clusters. While keeping a cluster strategy, Goal One now also includes a more general recommendation related to innovation development, as well as a greater focus on retention and marketing across all clusters.
2. In the initial CEDS, information technology and logistics were included as potential clusters on which to focus. This update found that there was not significant enough activity in these areas to justify separate cluster initiatives. However, some of the infrastructure issues discussed under logistics (most notably the port) are now included as part of the goal related to infrastructure.
3. New research and analysis in the creative cluster and the bioscience cluster have led to more refined action steps and priorities.
4. There was some interest in developing a separate cluster strategy around healthcare. Research was done on the healthcare sector in the region. (See appendix.) This research confirmed the initial conclusion that, like almost every metropolitan area in the nation, healthcare is both one of the largest sources of employment as well as an area of job growth. Those elements of the healthcare sector that involve research and a high degree of specialization are included in the bioscience cluster. The components of the healthcare industry that primarily service residents' healthcare needs, while a critical source of employment cannot be considered a "cluster" to be targeted for growth from an economic development perspective.
5. As a result of a growing regional focus on education and workforce as a critical barrier to future economic success, new initiatives were included under the Workforce Goal.
6. As noted, the discussion related to the Port of New Haven has been updated and added to the Infrastructure Goal.

7. As part of the discussion of Civic Infrastructure, Goal Four, a more specific set of potential Memorandum of Understanding are suggested to guide implementation of the CEDS amongst key institutions in the region.
8. Finally, with increased concerns about affordable housing and growth, some new action steps and priorities have been developed under Goal Five: Quality of Life.

Goal One: Strengthen the Region's Economic Base

Creative Economy

During the past year, RGP has completed a more thorough analysis of opportunities related to the region's creative enterprises. The full strategy document with a long-term agenda is attached. Priority Action Steps over the next two years include:

✦ *Create a directory and clearinghouse of creative services and creative businesses in the region.*

While the region has a large number of individual contractors and small businesses involved in graphic design, music, and services for the architecture industry, much of this activity remains "hidden." A number of individuals interviewed noted that although there is a large level of demand for the services of graphic artists and designers in the region (partially due to the level of design work needed by Yale and the architecture industry), it is difficult to easily identify where to locate local talent. A clearinghouse of information on individuals in the RGP region who offer goods and services relevant to the design and architecture market could promote increased purchasing of local goods and services. A similar directory focused on performing arts and the music industry could help to increase awareness of the depth of activity in the region and provide significant opportunities for networking.

✦ *Explore the feasibility of establishing a significant development project in New Haven that involves artist housing, a creative business incubator, and a "theater craft" cooperative.*

RPG should take the next steps needed to explore the feasibility of initiating a major development project that creates a focal point for the region's creative economy. This project could have the following elements:

- *A "creative business incubator."* There have been a number of successful models of incubator facilities that focus on artists and creative enterprises. New Haven would clearly be ripe for such an initiative. The Arts Council, RGP, and the chamber of commerce could jointly work to identify an appropriate site, to conduct a formal feasibility study, and to identify potential sources of funding to support the business assistance and support activities of an incubator. One idea to explore would be to "warehouse" some of the creative products being developed by those in the incubator. These products could potentially serve as collateral for some creative financing of the facility. The facility could target graduates of Yale and other colleges and universities in the region. The appreciation in value of the art produced by graduates of Yale School of Art, for example, could be used to justify such an investment.

- *Artist housing.* The region still lacks adequate housing and studio space for artists. The RGP could take the lead in developing creative housing projects targeted to specific "niches" within the creative community. For example, it could target retiring baby boomers who would be interested in a retirement community that has a strong artistic component—including music rooms, studio space, and gallery space. A project could also be developed in conjunction with Yale or other educational institutions in the region.
- *A Regional Theatrical Warehouse and Distribution Center.* With significant theatrical activity in the region both through nonprofit theater companies, local colleges, and universities, as well as public k-12 schools, there exist large amounts of costumes, props, and theater-related technology in the region. A common warehouse could help address storage issues as well as create economies of scale. Moreover, it could be the first step in developing a more regional concentration of businesses involved in theatrical supply.

RGP can take on each of these projects separately, or look for a potential site, such as River Street, where these projects could be grouped together to create synergies. RGP should contact potential development partners, such as ArtSpace, a group that develops artist housing, and local theater companies including Long Wharf and Yale Rep.

✦ *Establish the New Haven Creative Network.*

Bring together all of the actors working on various related initiatives in the city. There are many different activities currently occurring that could be better coordinated around a common vision about promoting the region's creative economy. As a first step, it is critical to bring together all of the existing organizations involved in these issues. The state of Connecticut is now looking at the creative cluster as a targeted cluster in the state. Organizations in New Haven need to position the region as a leader in this area. This would mean moving beyond the current nonprofit participants and securing the involvement of owners of commercial businesses, individual artists, and others in a broader creative network.

The BioScience Cluster

While frequently industry analysts and the media use the term biotechnology, it is not uncommon for the public sector and other economic development organizations to define their targeted sector more broadly. The Battelle Institute which has completed a number of statewide and national studies of the sector uses the term "bioscience" and includes the following five major components:

- agricultural feedstock and chemicals;
- drugs and pharmaceuticals;
- medical devices and equipment;
- research and testing; and
- academic health centers, research hospitals, and research institutes.

Other states and regions are using the term "life sciences." In Pennsylvania, life sciences is defined as "those industries producing or supporting technology based bioscience products and processes, as well as related activities."

CURE, Connecticut's organization devoted to promoting biotechnology and bioscience, has a more limited definition, defining bioscience, as:

"Any activity that substantially involves research, development or manufacture of

- biologically active molecules, such as enzymes and antibodies;
- devices that employ or affect biological processes, such as DNA sequencers; or
- devices, information systems, and/or software designed specifically for biological applications, such as gene mapping or analysis or for the production or management of specific biological information."

What is common across all of these definitions is that the focus is on producing technology-related product and processes, not on delivering healthcare services. There is widespread agreement that in defining the cluster, healthcare services that are solely involved in providing medical services to local consumers at hospitals, nursing, and residential care facilities, and ambulatory healthcare services are a fundamentally different industry. However, hospitals that are engaged in significant research and development activity or offer highly specialized services serving a broader market are clearly part of the cluster.

For the purpose of the CEDS, the term "bioscience" is being used. First this terms conforms to the terminology being used by CURE and by the Battelle Institute. Moreover, the term "bioscience" reflects the diverse set of activities in the region including large pharmaceutical companies, small biotechnology companies, medical device companies, and the significant research and development activities associated with Yale-New Haven Hospital. Yale-New Haven Hospital (YNHH) is the primary teaching hospital for the Yale University School of Medicine and included a tertiary referral center which includes the Yale-New Haven Children's Hospital and the Yale-New Haven Psychiatric Hospital. The hospital also includes the Yale Cancer Center, one of the foremost Cancer treatment centers in the nation.[1]

✦ *Nurture the region's existing talent.*

Create bioscience specific initiatives under the umbrella of the recommended Innovation Networking Organization. New Haven would benefit greatly from the creation of an organization dedicated to fostering entrepreneurship. This is not unique to bioscience, although a large portion of New Haven's innovation-oriented entrepreneurs are in life sciences. Given this concentration, it would be useful to dedicate some programs specifically to life sciences. For instance, a networking organization might develop the following life sciences specific programs:

- *Targeted venture capital gathering.* The creation of a Life Sciences Financial Forum could be used to attract the attention of venture capital firms specializing

[1] A more complete analysis of the Bioscience cluster in New Haven is included in Appendix A.

in bioscience. An event to showcase the region's select, highly- promising new life science ventures to capital providers, industry professionals, and companies from the life sciences and high-tech industries could raise the regional cluster's profile and foster connections with the venture capital community.

- *Discussions of life sciences research.* The organization could develop a lunch lecture series to present innovative life sciences research that could have commercial relevance. The discussions would focus primarily, but not exclusively, on research underway at Yale. Presenters could also be invited from the University of Connecticut and potentially from New York City research institutions, such as Cornell and Columbia. This effort would need to build on the excellent work accomplished by the Yale Biotechnology & Pharmaceutical Society (YBPS). While YBPS should be commended for its efforts and should continue its programs, a networking organization requires manpower support beyond the capacity of time-constrained students.

✦ *Encourage entrepreneurship among the talented yet potentially risk-averse pool of bioscience managers in the region.*

While the vision of the budding bioscience entrepreneur may be that of the 30-something researcher with an innovative idea, given the pool of talent housed in major pharmaceutical research units in the region, perhaps that vision should be expanded to include the mid-career pharmaceutical executive or researcher who might be willing to change his or her personal risk profile and enter the world of startups. Inspiration can be found at Rib-X Pharmaceuticals where the CEO managed drug research for Pfizer until 2001 when she licensed technologies from Yale to develop new antibiotics based on proprietary knowledge of a component of protein synthesis.

- *Ensure that these pharmaceutical employees see themselves as part of this larger cluster.* A first step in accomplishing this goal is to invite these executives to any cluster networking activities. This population may not be as tapped into events occurring in the entrepreneurial bioscience community so reaching this population may require broader advertising of networking activities.
- *Promote entrepreneurial education.* The region has more scientists than entrepreneurs. Getting researchers the tools that they need to even consider starting a business is a priority. Support the development of quality entrepreneurial training workshops to be offered in locations convenient to Groton, West Haven, and Wallingford.
- *Identify and encourage serial entrepreneurs*. The experience and connections that such entrepreneurs can bring to the cluster are vital to its development. CURE's first annual excellence award in 2004 recognized such an individual, Harry Penner, head of Marinus Pharmaceuticals, former head of Neurogen, and an active participant in the start up of several bioscience firms in Connecticut.
- *Identify and connect.* The Regional Growth Partnership, in conjunction with CURE, Yale's Office of Cooperative Research (OCR), and any new bioscience networking organization, could create a database not of companies, but of people, tracking academic and company experience as well as any research specialization

to follow the growing pool of talent in the region. This could be an outreach tool as well as a business assistance resource for startups seeking talent, researchers seeking entrepreneurs, and venture capitalists searching for proven talent.

- *Promote.* In addition to the overall annual excellence award, CURE could offer some sort of recognition for the serial entrepreneur recognizing an individual's contribution to bioscience business development in the state.

✦ *Attract talent not companies to the region.*

The bioscience cluster is still in its volatile formative years. This degree of uncertainty means that spending significant public dollars to attract an existing biotechnology company to Connecticut is high risk and could easily lead to backing the "wrong horse." Companies may come and go, but by attracting a pool of talented science entrepreneurs to the region, the cluster can sustain itself beyond the fortunes or misfortunes of a single company.

- *Focus on individuals with ties to Connecticut.* Work with Yale and University of Connecticut to develop a database of alumni who might be interested in developments in New Haven's bioscience cluster. The database should include former members of Yale's Biotechnology & Pharmaceutical Society as well as graduates of masters and doctoral programs in biology and chemistry-related fields from both Yale and University of Connecticut, and relevant graduates of Yale's School of Management.
- *Update.* The database of alumni could then be used to send an electronic newsletter with updates on New Haven's bioscience cluster.
- *Connect.* Encourage the state to host an event at the national biotechnology conference BIO 2006 inviting all Connecticut alumni active in biotechnology to attend. A similar effort was employed by Pennsylvania at the BIO 2005 conference.

✦ *Use proximity of other biotech hubs to New Haven's advantage.*

When Joe Cortright completed his study of biotechnology cluster development, New Haven did not surface in the study because it was part of the New York CMSA. While the slight is frustrating to those working to build the local bioscience cluster, perhaps there is an element of inspiration that can be drawn from the statistical definition. New Haven is not an island. To grow the bioscience cluster will not only mean looking beyond city borders, it may require looking beyond state borders at times.

New York City ranks third nationally in NIH funding, but has not developed a robust bioscience cluster to date. While New Jersey has no doubt been a beneficiary of some of the research conducted at New York's universities, there is no reason that New Haven cannot seek to benefit from this research conducted in such relatively close proximity. While, obviously, Yale should continue to be a critical fountain of research flowing to New Haven's bioscience cluster, there is potential to capitalize on additional commercialization opportunities presented by volume of research underway in New

York. In addition, the talent pool in New York could also be tapped as a means of expanding New Haven's entrepreneurial base.

Activities to foster awareness and collaboration between the region's science entrepreneurs and research institutions outside of New Haven are probably best handled by the proposed Innovation Network in collaboration with CURE.

- *Broaden the pool of research.* Any lecture series that is developed to share promising research, recommended above as a bioscience-specific initiative of the proposed Innovation Network, should include research from other institutions, most likely New York, but potentially Boston as well. Also, invite representatives from Columbia University's Science and Technology Ventures Office and Cornell University's Office of Technology Development of the Weill Medical College to speak to a gathering of the region's bioscience entrepreneurs. In addition to expanding the base of research from which new businesses can develop, New Haven can look to New York as a means of attracting new entrepreneurs to the region.
- *Broaden the talent pool.* Work with Yale Biotechnology & Pharmaceutical Society, the student interest group, to sponsor a region-wide conference that could include peer organizations from New York City institutions.

✦ *Explore opportunities associated with the expansion of the Cancer Research Center*

The planned $430 million new Yale Cancer Center that is expected to open in 2009 could significantly enhance the region's potential in the biosciences. The new Center will add 112 beds and will allow Yale-New Haven to integrate all of its cancer related services that had previously been dispersed throughout the institution. As part of the plans for the new Center, Yale has already been able to recruit top clinicians and researchers to the region.

The new Cancer Center has the potential to be a catalyst for both employment and new development in the surrounding community. In addition, with enhanced research and development capacity and new faculty and researchers, adds to the bioscience capacity in the region. The RGP can play a role in developing a strategy which ensures that the full economic development potential of the new Center is realized.

Enhance the Region's Entrepreneurial Environment

✦ *Develop a New Haven Innovation Network*

The New Haven economy would be better positioned to seize new venture opportunities if it develops mechanism to support entrepreneurship in the region. The most important element in developing support for innovative entrepreneurs is to increase the flow of information among entrepreneurs, between entrepreneurs and academia, and between entrepreneurs and the venture capital community. To accomplish this, create the New Haven Innovation Network, a nonprofit organization dedicated to serving the needs of innovative entrepreneurs.

Activities of the New Haven Innovation Network could include:

- Facilitating Communication among Entrepreneurs:
  - Host regularly scheduled social gatherings. This allows people interested in venture formation to meet in an informal environment and exchange ideas and information.
  - Create an online database of resumes of people active in the innovation economy. This does not need to be limited to people seeking full-time jobs but could also include people available for limited consulting engagements or business plan reviews.
- Increasing Communication with the Venture Capital Community:
  - Create an advisory panel of entrepreneurs who have successfully completed venture financing to review and advise other entrepreneurs on their business plans.
  - Schedule regular venture forums where the region's most promising entrepreneurs can present their concepts to gathered venture capitalists.
- Fostering Increased Communication between the Entrepreneurial Community and Academia:
  - Organize a speaker series composed of academic researchers from Yale, UCONN, and perhaps other institutions outside the state to present their latest areas of research and highlight areas of potential for commercialization.

In addition to organizing the types of programs mentioned above, the Innovation Network could serve as a one-stop shop for entrepreneurs seeking assistance. The Network could act as a clearinghouse of information for innovation-oriented entrepreneurs on such topics as available public financing and business assistance programs. The Innovation Network could also be tasked with public relations responsibilities, enhancing the profile of the entrepreneurial community in local media through such means as regular articles in the local papers, spots on local television news, and hosting "Entrepreneur of the Year" awards to recognize excellence in the region.

Any new organization should build on the nascent efforts already underway to foster networking. For instance, Sean Glass from Higher One and a co-founder of Yale's Entrepreneurial Society has initiated an informal lunch the fourth Tuesday of every month aimed at increasing networking among the region's entrepreneurs. In addition, the Yale Entrepreneurial Society, formed in 1999, is a vibrant student organization with more than 1,000 members that could also be linked to any new broader networking organization.

PROMOTING A MORE ENTREPRENEURIAL ENVIRONMENT: MODELS

Cambridge, England

Cambridge Network provides a variety of links between the academic and private sector members for the advancement of technology enterprises in the Cambridge region. Activities include:

- Hosting events for companies based outside of Cambridge to build relationships with Cambridge-based companies.
- Hosting events for London-based venture capitalists to meet with Cambridge-based companies.
- Open membership meetings, attracting around 300 members for lecture and networking.
- Informal networking events at cafes with no speakers or agendas.
- Special interest groups bring together and facilitate groups of corporate members across all markets/technologies with shared interests in key issues for the region. Currently the following groups are active: Human Resources; USA; China; Financial; Healthcare; Intellectual Property; IT-Infrastructure; Chief Scientific Officers/Chief Technology Officers. Special Interest Groups meet between two and four times per year. Most of the SIGs have an active e-mail group to support initiatives that arise in between meetings. Participation is by invitation only.
- Virtual press room in which all member companies can post their press releases.
- On-line CV directory as a job search tool.
- An on-line "4R's Survey" enables all corporate members to benchmark themselves anonymously against their peers on Remuneration, Rent, Recruitment and Raising Money.
- The Network recently started the Learning Collaborative, an effort to improve the quality of training in the area. Courses include technical writing and coaching.

San Diego

USCD CONNECT, a university-based nonprofit organization, is dedicated to fostering entrepreneurship in the San Diego region by catalyzing, accelerating, and supporting the growth of the most promising technology and life sciences businesses. Part of the University of California at San Diego, UCSD CONNECT has a dual role in accelerating growth: it assists growth companies in the San Diego region and promotes the commercialization of technology from university-based research. CONNECT breaks its programs into four components:

1. *Business Creation*
   - Provide emerging technology companies and their executives with educational conferences, seminars, courses, and programs in conjunction with the local university business school.
   - Provide free assistance to selected life sciences & high tech companies in all stages of development. Entrepreneurs accepted into the program spend 3 to 8 weeks in coaching sessions with one of CONNECT's Entrepreneurs in Residence or Entrepreneurial Fellows. Upon completion of this process, the entrepreneur is invited to make a presentation of his business model to a select group of experts. Following the panel presentation, the entrepreneur meets with his Entrepreneur in Residence or Springboard Fellow to identify next steps, incorporate the feedback from the panel, and implement a strategic plan for the next six to 12 months.
   - Offer half-day sessions for technology entrepreneurs covering business, legal, or technical issues.
2. *Capital Formation*
   - For a modest fee, the Grant Search Program provides companies with a comprehensive list of technology-specific grants compiled in a report consisting of all the information needed to determine relevancy and suitability of each individual program.
   - The Life Sciences and High-Tech Financial Forum provides pre-screened San Diego companies an opportunity to showcase their new technologies to capital providers, industry professionals, and companies from the life sciences and high-tech industries.
   - Venture Roundtables are exclusive, private, invitation-only showcases for the most promising technology companies in the region that are ripe for investment. Select companies will have the opportunity to present themselves to a small group of premier investors. Pre-event coaching is included.
3. *Recognition.* Recognition programs highlight innovative products, hall of fame entrepreneurs, and even include a weekly spot on the local news to highlight promising life science companies in the region.
4. *Education and Outreach.* CONNECT operates two free lunch lecture series to present innovative research at area institutions that could have commercial relevance. The Frontiers in Science program focuses on life science research while the Frontiers in Technology focuses on other types of technology.

Goal Two: Sustaining a Competitive Human Capital Base and Providing Employment Opportunities to all Residents

✦ *Regional Higher Education Compact.*

The growing importance of a skilled workforce and the critical role that educational institutions play in building this workforce have been well documented. As a recent study noted:

> *Given the economic realities of the 21st Century, providing opportunities for residents to prepare for, enroll in, and succeed in postsecondary education is vital to the health of our communities, our states, and our nation.* [2]

While there is growing consensus about the importance of a postsecondary education, there is widespread concern that significant barriers get in the way of completing a college degree. To succeed, an individual must:

- aspire toward college;
- be prepared for college;
- have resources to access college; and
- have the capacity to stay in college and complete a degree.

Ensuring that all residents of the New Haven region understand the importance of postsecondary training, encouraging the youth to pursue such training, and providing both adults and youth with the resources to access postsecondary education are the responsibility of all segments of the society. The creation of a New Haven Regional Compact for Education would involve a broad segment of the region's leadership in support of efforts to ensure that residents are prepared for and able to complete a postsecondary education as well as efforts to promote higher education.

The RGP would be the facilitator of this compact, which would include leaders from key employment sectors including the cultural and educational institutions, healthcare, and manufacturing, along with school superintendents, college administrators and faculty, municipal government officials, and representatives of nonprofit organizations. These leaders would first assess the higher education and lifelong learning needs of residents in the South Central region and identify new opportunities and strategies to better meet those needs.

We have identified a critical issue that should be an important part of the assessment of educational needs. Many students who are beginning college in our region, particularly at our public colleges and universities, are not testing at a high school equivalency level. As a result, our colleges and universities are spending considerable time and resources to

[2] *The Governance Divide: A Report on a Four-State Study on Improving College Readiness and Success*, September 2005. The Institute for Educational Leadership, The National Center for Public Policy and Higher Education, The Stanford Institute for Higher Education Research

bring their students up to a high school equivalency level. Students are therefore, taking considerably longer to achieve an associates or bachelor's degree than historically. The participants in developing an Education Compact must examine this issue and develop approaches designed to resolve the problem of students coming into our colleges without appropriate preparation.

This process can be modeled after similar efforts in the state of Maine and in Berkshire County in Massachusetts. In the Berkshires, initial meetings focused on the following questions:

- What are the emerging higher education needs of residents?
- How do we forge more effective business-academic-community alliances?
- How do we enable an even greater percentage of students to access and complete degrees in higher education or pursue continuous learning?
- What new opportunities for collaboration can be found to create a more seamless offering of higher education services?
- What can we learn from models from other regions or states?

Following completion of a six-month planning period, the Compact would develop a set of very strategic recommendations focusing on:

- raising the *aspiration*s of all residents to view 16 years of education, or greater, as the accepted educational norm;
- improving *access* to education, training, and lifelong learning;
- developing a new "social contract" among employers, employees, and educational institutions that encourages and promotes learning, earning, and civic engagement.

✦ *Create a Regional Center of Excellence in urban education.*

The Regional Leadership Council has identified the achievement gap and the quality of education as one of the region's highest priorities. This focus on urban education can become not only a means of improving the urban schools in the New Haven region, but also an area of economic development potential. The region is, in fact, a national center of excellence in the area of urban education. The Yale Child Study Center is the home of the Comer School Development Program. This Center implements the "Comer Process" for system-wide school reform across the nation. It is based upon the work of Dr. James Comer, a professor of child psychiatry at the Yale University School of Medicine. In addition, Yale has recently announced a new Masters of Arts program in Urban Education Studies. This one-year program involves intensive coursework in urban education as well as a requirement to commit to teaching in the New Haven public middle or high schools for a period of three years. Finally, New Haven is also home to one of the highest profile charter schools in the country, Amistad Academy. Achievement First, the nonprofit charter school management organization that was started by the leaders of Amistad Academy, seeks to bring to scale a system of charter schools in New York and Connecticut.

Given this concentration of activity in New Haven, the region can position itself to become a national center of learning on addressing urban education issues. A regional collaboration, led by the Regional Leadership Council, could establish a regional Center of Excellence that attracts national resources focusing on experimentation in urban public schools.

Goal Three: Ensure that the Region has the Physical Infrastructure Required to Compete Effectively

✦ *Continue to support the Port of New Haven.*

Since the completion of the CEDS three years ago, there has been some progress in strengthening the economic development potential of the Port of New Haven. Appendix C provides a more complete analysis of the current challenges and opportunities related to the port. Given these findings, the following recommendations are suggested.

- *Support the development and execution of a clear master plan for land use surrounding the Port of New Haven. Encourage the land use plan to be developed in the context of the port's strategic growth opportunities.* A concern has existed for years that there is limited land on which to develop new warehouses. The port also suffers from a shortage of laydown space. These issues have been made worse with the loss of land to the I-95 project. The Port Authority recognizes the concerns about the lack of space at the port and has engaged a land use specialist to create a plan for the port. The plan is expected to be completed in the fourth quarter of 2006. It will provide a needed road map to guide the Port Authority's efforts moving forward. One topic that a land use specialist could consider would be the issue of whether to create a special port zone to prioritize land use for port-related purposes.

  The land use plan is being developed with a focus on strategic economic development. This will include a review and assessment of port lands and facilities, capital and maintenance programs, an assessment of New Haven's competitive position, and identification of the most promising growth opportunities for the port. Special attention will be given to trying to better understand the end user market.

- *Explore new short-haul opportunities at the Port of New Haven.* While the feeder service from the Port of New York and New Jersey is intended for Bridgeport, the Port of New York and New Jersey is hardly the only partner to consider. The port should explore alliances with other ports on a similar concept. This does not need to be limited to barge service; ships are an option as well. Halifax has apparently expressed some interest, but other east coast ports should be pursued such as Boston, Baltimore, Charleston, and Savannah. Such short-haul service not only represents an economic development opportunity for the port, but also an opportunity to reduce congestion on I-95. One barge can carry as many containers as 100 to 380 trucks.

- *Ensure the port's infrastructure is sufficient based on an assessment of future port growth.* New Haven is currently not well-positioned to capitalize on the two most notable trends in shipping: a sharp rise in the volume of containerized cargo and a rapid expansion in ship size. While the New Haven Terminal can handle some container cargo, there has not been a significant investment at the port in large-scale equipment dedicated to moving containers. Given the type of cargo handled at the port—liquid bulk such as petroleum and break bulk such as steel—it is not surprising that this investment has been unnecessary to date. However, the majority of growth in the sector is as a result of container cargo. Even some break bulk goods are shifting to containers. New Haven Port Authority should study the capital investments needed to meet the future demand for container shipping in the region.

Preliminary results of the land use study currently underway have confirmed the need to plan for a major dredging project. In addition to evaluating the port's position to handle container cargo, the Port Authority should consider future dredging needs and determine target depths for the harbor's shipping channel in the future. While the port will not need to support the massive post-Panamax ships that will be serviced by some east coast ports, even petroleum carrying ships may test New Haven harbor's depths. Given that the permitting process for dredging can take up to ten years to complete, the region does not have the luxury of waiting to determine what dredging will be needed. Furthermore, the region must work with and encourage the state to move forward on the dredging material dump site plan. This plan should include an effort to repeal the Ambro amendment. Without these measures, Long Island may be able to block use of necessary dumping facilities.

- *Take advantage of funding to build the ferry terminal in New Haven.* Aggressively seek a ferry operator to begin ferry service to Long Island. Take advantage of the opportunity presented by funding earmarked for construction of a New Haven ferry terminal. A recent study on the economics of expanding ferry operations in Long Island Sound was inconclusive about the economic rationale for ferry service from New Haven. Based on the study findings for Bridgeport and Stamford, it is safe to conclude that there is no economic rationale for ferry service to New York City. However, the recent Long Island Sound Waterborne Transportation Plan concluded that it is potentially feasible economically to run passenger and freight service between New Haven and Long Island. This study, sponsored by the New York Metropolitan Transportation Council, the Greater Bridgeport Regional Planning Agency and the Southwestern Regional Planning Agency should serve as a basis for serious exploration of ferry options originating from New Haven.

- *Work with the Port Authority to develop a communications strategy for the Port of New Haven.* A review of activities at other ports across the nation shows that one of the important roles of a port authority is to be a leader on public, business, and political relations. Among the items on the Port Authority's agenda this year should be a focus on building relations with the port community, key stakeholders, the media, and the general public. Enhancing the profile of the port will hopefully be helpful in attracting new business as well as in garnering more attention and support at the state level. The Port Authority should seek to publish regular articles in the *New Haven Register* regarding developments at the port. The Port Authority should also consider an electronic newsletter providing regular updates on the status of and developments at the port to be shared with business and political figures. The Port Authority can play a catalyst role in moving forward discussions regarding dredging as well.

Goal Four: Build an Effective Civic Infrastructure that Collaborates Effectively and is Driven by a Common Vision

✦ *Establish Collaboration with critical strategic partners in the Region*

There are a number of regional organizations in the South Central region that are involved in different components of this strategic plan. As efforts to move the regional agenda proceed, it is important that there is clarity about the roles and responsibilities of the different entities. One mechanism for achieving this clarity is to get regional consensus on the elements of the CEDS strategy and then seek endorsement of the plan and the implementation steps related to responsibilities for various components of the strategy.

In light of this updated strategy, RGP should seek endorsement and collaboration from the following organizations:

The South Central Regional Council of Governments

The Regional Leadership Council

The Arts Council of Greater New Haven

The Greater New Haven Region Chambers of Commerce

The Workforce Alliance

The Arts Cluster Working Group

Institutions of Higher Education

Public Schools

The United Way of Greater New Haven and other United Ways

Transportation Agencies

Cluster Groups (i.e. NHMA, CURE)

State Department of Economic and Community Development

Port Authority

Goal Five: Enhance the Quality of Life in the Region

Housing

In 2004 the Connecticut Economic Resource Center updated the benchmarking study included in our original CEDS. This study compared Greater New Haven to 21 other regions of the country on a number of competitiveness and quality of life issues. In reviewing the update, the RGP Board noted that certain negative trends were continuing, particularly on the growing gap between income of the top and bottom fifth of our population, and on housing affordability. Previously, the CEDS had not dealt at all with housing, but it is clearly apparent that housing affordability is an important economic competitiveness issue. Anecdotally we have been told of college professors and biotech scientists who have declined jobs in our region once they looked carefully at the cost of housing here. This means that at least some of the very talented workforce we need to succeed globally is opting out of our region because of these costs.

On May 24, 2005, with the support of the Community Foundation of Greater New Haven, the RGP sponsored a housing forum, as much to broaden the community's understanding of the issue than anything else. The participants identified issues and opportunities for regional action.

Later in 2005 the Regional Growth Partnership joined with 30 other organizations statewide to form what is now known as HomeCT. Four other groups from our region have joined the coalition as well. This coalition will develop a comprehensive public policy proposal that will include recommendations in four areas of housing policy: Financing, reducing administrative roadblocks, building municipal capacity and providing municipal incentives.

Regionally we can move ahead on some areas of municipal capacity building. Education on creative land use alternatives is an important component of this effort.

As a region we need to support a diversity of housing choices in our communities. We should support and expand on the efforts of the South Central Region Council of Governments in implementing their housing plan. We should actively participate in the leadership of HomeConnecticut, the statewide coalition that is developing a public policy agenda to address the housing affordability issue in the state.

Smart Growth

The Regional *Growth* Partnership must, naturally, be concerned with economic growth in our fifteen town region. The statistics are not currently very reassuring. According to the Connecticut Economic Resource Center, Connecticut has lost half its manufacturing jobs since 1984 and continues to lag the nation in both population growth and job growth. Compared to other states, we are in the bottom 20% in growth of many factors important to growing jobs in the knowledge based economy. Amazingly, Connecticut actually has fewer businesses than we did 5 years ago. In addition, there is not a lot of activity in business births and deaths, commonly referred to as the “churn rate”.

It is our intention that implementation of the combined goals and action steps in this CEDS will enhance prospects for economic growth in the region.

At the same time, the MetroPatterns Report issued by the CenterEdge Coalition, of which the RGP was a leading member, warns that we are using land 8 times quicker than we are growing population in Connecticut. What is happening here? We are seeing little economic growth, but people are justly concerned about increased congestion and development that could negatively impact the quality of life in our communities. Obviously, our development growth has not had a highly correlated impact on the economic growth we want and need. Our goal must be to grow in a manner that sustains what is best about the state and provides incentives for job growth and economic growth.

We already have pursued smart growth principles in this region. The Plan of Conservation and Development adopted by the South Central Council of Governments in 2002 adopts growth corridors and calls for development to occur where infrastructure is already in place.

To ensure we maintain what is best about our region while we create the economic activity necessary, we will pursue the following strategies

Take a leadership role in statewide smart growth initiatives. Work to achieve the goals outlined in the mission statement and Candidates Guide of 1000 Friends of Connecticut.

Work with the Legislature to reduce reliance on the property tax to fund education in the state.

Seek alignment in state, regional and local economic development programs and with land use and transportation planning so we have a common vision of how our region and our state should develop.

Design and deliver educational programs for our towns land use and economic development panels that clearly lay out the need for economic growth. Towns need to know the role they play in encouraging economic growth in the region. Land Use and Economic Development panels should have a common vision of what their towns should look like long term.

Appendix A:

Bioscience Industry Development in New Haven

U.S. Bioscience Industry Update

Definition

Across the U.S., states and regions are focusing considerable attention and resources on biotechnology-related activities. As an emerging sector that encompasses a variety of processes, products, and markets, there is, however, no one standard definition of the industry. Communities are using a wide variety of "terms" and "definitions" to describe this sector. The most commonly used terms are: biotechnology, biosciences, biomedical, and life sciences.

Even defining the most narrow term of "biotechnology" is not so clear. The common thread in the most widely used definitions is the process involved. As you can see in the definitions quoted below, biotechnology is defined by the use of cells and biomolecular processes.

> *"Biotechnology is the application of biological knowledge and techniques pertaining to molecular, cellular, and genetic processes to develop products or services."* Joseph Cortright, *The Growth of Biotechnology Centers in the U.S.,* Brookings Institution.
>
> *"The use of cellular or biomolecular processes to solve problems or make useful products." Bio 2005-2006 Guide to Biotechnology.*

One journal tried to differentiate between traditional pharmaceuticals and biotechnology in layman's terms describing the traditional pharmaceutical companies as synthetic chemists screening chemical compounds for their effect on cells as compared to biotechnology companies that conduct biological research on recombinant DNA and proteins.

While frequently industry analysts and the media focus on biotechnology, it is not uncommon for the public sector and other economic development organizations to define their targeted sector more broadly. In theses cases, the sector is termed bioscience and encompasses a range of industries that, as Battelle Institute notes, rely on insights into the way living organisms function. The Battelle Institute lists five major components of the bioscience cluster:

- agricultural feedstock and chemicals;
- drugs and pharmaceuticals;
- medical devices and equipment;
- research and testing; and

- academic health centers, research hospitals, and research institutes.

Finally, a number of states and regions are using the term “life sciences.” In Pennsylvania, life sciences is defined as “those industries producing or supporting technology based bioscience products and processes, as well as related activities.”

CURE, Connecticut’s organization devoted to promoting biotechnology and bioscience, defines its target sector, bioscience, as:

“Any activity that substantially involves research, development or manufacture of

- biologically active molecules, such as enzymes and antibodies;
- devices that employ or affect biological processes, such as DNA sequencers; or
- devices, information systems, and/or software designed specifically for biological applications, such as gene mapping or analysis or for the production or management of specific biological information.”

In practice, CURE’s working definition of the sector is any small drug, device, or health-related software company.

What is common across all of these definitions is that the focus is on producing technology-related product and processes, not on delivering healthcare services. Thus, with very few exceptions, all of these definitions exclude healthcare-related services that serve consumers. There is widespread agreement that in defining the cluster, whether defined narrowly as biotechnology, or most broadly as life sciences, healthcare services provided at hospitals, nursing, and residential care facilities, and ambulatory healthcare services are a fundamentally different industry, with different occupational and market characteristics.

Key Characteristics

The biotechnology sector has gained tremendous publicity for both its medical promise as well as its economic potential. While the sector will no doubt have a tremendous impact on society, some characteristics of the industry, while obvious, must be noted when considering biotech’s economic development potential.

The industry is highly research intensive and those research jobs require highly advanced academic training. The industry is weighted heavily toward R&D. As an example, the top five biotech firms in 2002 spent $101,200 per employee on R&D.

As a result of this emphasis on R&D, the industry is heavily populated with PhDs, many with significant post-doctoral experience. One study, which contrasted the growth of the software industry to biotech, noted that while most software and hardware firms are founded by engineers, most biotech firms are founded by university professors or other PhDs in biology.

More than perhaps any other industry, biotechnology is highly linked to academic research. The majority of biotechnology research is supported by the National Institute of Health through grants to academic research institutions as well as other medical schools and nonprofit research institutions. The result is that biotech companies have clustered near these sources of innovation and research and have a stronger incentive to remain close to these institutions than perhaps other sectors. Even as the major pharma companies have become more involved in biotech, it is more likely that they have located satellite operations in hubs of biotechnology research rather than encouraging the location of biotech research companies to locate near existing facilities.

Biotechnology is concentrated in relatively few metropolitan areas and the level of concentration is increasing. Joe Cortright's study on biotechnology centers for the Brookings Institution (2002) found that Boston and San Francisco accounted for 20 percent of all biotech firm formation in the 1970s, but about a third of all biotech firms formed in the 1990s. San Diego, Raleigh-Durham, and Seattle accounted for 25 percent of the firms formed in the 1990s, up from 10 percent in the 1970s. Early success appears to create a virtuous cycle: successful companies tend to spawn more companies; a critical mass of companies, even in the volatile and high risk industry, creates a degree of job security attracting a quality labor force.

The biotech drug discovery process is long, taking years to reap benefits from a drug discovery. Ernst & Yong estimate it takes 16 years to develop a biotech drug and bring it to market. This, in part, accounts for why some successful biotech clusters measure their success in decades rather than years.

Biotechnology companies are generally small. According to Ernst & Young, the average firm size is 134, although it is clearly skewed by the few industry leaders. Companies ramp up in size when they move to a production phase; but given the lengthy cycle of research and clinical testing, it can take many years for a company to expand significantly.

Most biotechnology firms are *unlikely* to become large employers. Rather than invest in the massive sales and marketing infrastructure required to bring a drug to market, most biotech firms will use licensing or joint venture agreements with or be acquired by major pharmaceutical companies.

Given the risks and uncertainties for startups in the biotech industry, it is not surprising that there is high job turnover. A 2001 study of California's biotechnology industry by Cal Sate University found that biotechnology employees would experience five to seven career shifts over their lifetime. The job uncertainty increases the power of clustering, which provides some sense of job security, or at least employability, for those working in companies with a high risk of failure.

Current Statistics

The biotech sector has grown rapidly in the last five years. According to figures compiled by Ernst & Young, revenues globally have increased from $22.7 billion in 2000 to $44.3 billion in 2004 making it the fastest growing segment of the pharmaceutical industry.

Despite its growth, the biotech sector remains a relatively small proportion of the total drug market, 8 percent globally in 2004. According to Ernst & Young, as of December 2003, there were 1,473 biotechnology companies in the U.S. employing 198,300 people.

Figures for 2004 have been very difficult to come by. While some sources reference figures published in Ernst &Young's 2005 Biotechnology report, the figures have not been widely publicized. It may be due to the fact that they actually show a drop in biotech employment since 2003. A Wisconsin economic development website quotes the Ernst & Young report with a 2004 employment figure of 137,000. Another website refers to 2004 employment as 187,000, although it does not reference its source. Regardless, employment appears to have declined to some degree as biotech firms try to increase productivity and reduce net losses. An apparent drop in the number of biotech companies in 2004 (net decline of 29 companies) is likely an indication of the risk inherent in the industry as well as industry consolidation.

Biotech research has produced 230 therapeutic products already on the market. In 2005, biotech firms might contribute as many as 20 of the 35 new drug products expected to win FDA approval, with sales potential of at least $150 million each.

Future growth of biotech seems assured given that approximately 27 percent of new medicines in active development are now biotech products. However, a large proportion of these are in preclinical trials, so there is still a large risk associated with the developments of these compounds. There are currently 55 biotech drugs under FDA review and about 365 in Phase III clinical trials—the last stage before they are submitted for regulatory approval.

Given the industry's tremendous R&D expenditures and the long process before a drug can actually generate sales, it should come as no surprise that the industry continues to operate at a loss. While a few industry players like Genentech and Amgen are generating tremendous profits, most operate far in the red. The net loss among even the nation's public biotech firms stood at $4.3 billion in 2004. Ernst & Young attributes 30 to 40 percent of the net loss to costs related to complying with the new Sarbanes-Oxley Act accounting rules. Other concerns that could impact the industry's future profitability include price control pressures and drug safety concerns after the withdrawals of Vioxx, Bextra, and the biotech drug Tysabri. Those events could lead to tougher approval hurdles at the Food and Drug Administration.

Biotech companies have had particular success in developing treatments for cancer. Of the 365 drugs currently in Phase III trials, 28 percent are designed to treat cancer, followed by infections disease (16 percent), and central nervous system (12 percent).

Future Growth

Ross C. DeVol, director of regional economics at the Milken Institute in Santa Monica, California, estimates that biotech and related employment will grow 30 percent over the next 10 years.

Along with employment growth, industry analysts will closely watch profitability. Industry experts at Ernst & Young were predicting only a year ago that the U.S. biotechnology industry would score its first net profit by 2008. Its 2005 update now estimates that milestone may not be reached until 2010 or perhaps even later.

New Haven's Bioscience Sector

Current Statistics

According to Ernst & Young's Annual Biotech Industry report, Connecticut is home to 29 biotech companies, 2 percent of all biotech companies. In comparison, California represents 29 percent of all biotech companies and Massachusetts represents 13 percent. CURE, which defines the sector more broadly as bioscience, reports that Connecticut employed almost 18,000 people in bioscience (biotech, pharma, bioscience research within universities). Because of the varying definition of the sector, comparing data across information sources is virtually impossible.

Regional Industry Profile

While the region is home to a number of small innovative bioscience companies, they are not exclusively biotechnology companies. Some area companies are developing more traditional pharmaceutical products often with innovative drug discovery systems, while others are developing innovative devices. Examples of small pharmaceutical companies in the area include:

- *Neurogen.* Located in Branford, Neurogen, which recently entered a development agreement with Merck for one of its product lines, develops small molecule drugs to treat inflammation, pain, insomnia, depression, and obesity. It does not appear to use molecular, cellular, and genetic processes to develop products. Neurogen has distinguished itself through its Accelerated Intelligent Drug Discovery (AIDD™) system, its expertise in cellular functional assays, and its depth in medicinal chemistry.
- *Vion Pharmaceuticals.* Founded in 1994, the publicly-held New Haven company is another example of a small innovative firm producing a more traditional pharmaceutical product, in this case, a series of drugs in various stages of development for the treatment of cancer. The chief scientific officer and former longtime director of R&D came from Bristol-Myers Squibb.
- *Sopherion Therapeutics.* Founded in 2001 with headquarters in Princeton, New Jersey, and R&D facilities in New Haven, the biopharmaceutical company is dedicated to acquiring, designing, developing, and commercializing anti-cancer drugs and molecules. The company has an exclusive licensing agreement with Zeneus Pharma Ltd. for the future commercialization of Myocet, a drug aimed at treatment of breast cancer. In addition, the company is leveraging its Minicell Peptide Display screening technologies to identify additional therapies. Sopherion's CEO came from Pfizer and the research director came from Bristol-Myers Squibb.
- *Marinus Pharmaceuticals.* Located in Branford, the development-stage pharmaceutical company is focused on drugs to treat serious neurological and psychiatric disorders. The company is using in-licensed drug candidates from sources including Yale University and Purdue Pharma, as well as its own proprietary drug-discovery technologies. The company, which started in 2004, received $500,000 in startup capital from the Connecticut BioSeed Fund, part of Connecticut Innovations.

In late 2005, the company received its first round of venture capital worth over $26 million.

While there appears to be more activity in the arena of drug development in the region, there also appear to be some innovative medical device companies receiving venture capital attention.

- *Applied Spine Technologies.* The New Haven-based company, which recently received its first round of venture capital, makes a medical device, specifically a spinal surgical implant.
- *Spine Wave.* Located in Shelton, the company, which will go for its third round of venture financing this spring, makes a medical device for orthopedic surgeons.

The region is also notable for the presence of large pharmaceutical firms. While not all in the immediate New Haven region, a number of major global pharmaceutical companies have significant R&D operations relatively close to the city.

- *Pfizer Pharmaceuticals* has its largest global research and development facility in Groton, additional offices for senior research management in New London, and a new small clinical facility in New Haven employing in total over 6,000 people in the area. The new clinical research unit in New Haven, with 50 beds and 50 staff, is an important addition to the region because of a historical lack of clinical testing facilities in the region. The facility will conduct Phase I clinical trials on site.
- *Bayer* employs more than 2,200 people at its West Haven facility. The facility is the hub of Bayer's U.S. research and development operations and focuses on medicines for the treatment of diabetes, obesity, and cancer. Bayer is conducting biotechnology research at the facility in addition to traditional small molecule drug development.
- *Bristol-Myers Squibb* has over 1,000 employees at its Wallingford facility, which is dedicated to drug discovery and drug development. The Bristol-Myers Squibb facility focuses on infectious diseases, applied biotechnology, cancer, neuroscience, chemistry, metabolism, and clinical research.

While not all of the region's innovative bioscience firms fall within the biotechnology sector, there is quite a healthy contingent comprising the biotechnology component of the bioscience cluster. While not an exhaustive list, the companies below are important examples of the region's biotechnology sector:

- *Alexion Pharmaceuticals.* A publicly-traded company founded in 1992, the biotechnology firm is dedicated to development of novel antibody therapeutics targeting a wide range of diseases, including cardiovascular and autoimmune disorders, inflammation, and cancer. The company is currently in Phase III clinical trials of a drug meant to treat a rare blood disorder. The company moved out of New Haven, 20 miles away to Cheshire, in 2000.
- *Achillion Pharmaceuticals*. Founded in 2000, the New Haven company produces small molecule drugs to treat infectious diseases using a combination of conventional drug discovery methods as well as some biotech approaches to developing therapeutics. The company has placed emphasis on treat antiviral drugs to treat diseases caused by hepatitis B and C, herpes, and HIV.

- *CuraGen*. A publicly held genomics-based pharmaceutical company headquartered in Branford, CuraGen focuses on the development of a pipeline of protein, antibody, and small molecule therapeutics related primarily to cancer and diabetes. CuraGen has a partnership with Bayer for the development of drugs aimed at diabetes treatment.
- *CGI Pharmaceuticals, Inc.* Formerly known as Cellular Genomics, the Branford company founded in 2000, focuses on drug discovery and development for kinase inhibitor therapeutics. CGI is advancing its drug development programs in oncology and autoimmune/inflammatory disease as well as partnering with several other pharmaceutical companies: Serono, Pfizer, Schering, Lilly, and Affymetrix.
- *Protein Sciences Corporation.* Protein Sciences Corporation is a vaccine developer and a biopharmaceutical service company headquartered in Meriden. The company has two distinct lines of business. First it produces proteins for research and pharmaceutical clients. In addition, the company is developing a series of biotechnology-based vaccines including a flu vaccine that is in Phase III trials. Management, development, and production all occur at the Meriden facility.

Several area companies are not directly involved in the process of drug discovery but have developed bio-related technologies to improve drug discovery. Examples of these companies are:

- *Agilix Corporation.* Located in New Haven, Agilix develops functional genomics and proteomics platform technologies for the systematic discovery and analysis of genes, their protein products, and related biological functions, reducing the risk, cost, and time to market for new pharmaceutical, biotechnology, and agricultural products. Founded in 1999, Agilix Corporation licensed numerous technologies from Yale University.
- *Genaissance Pharmaceuticals, Inc.* Headquartered in New Haven with offices in North Carolina and Texas, Genaissance develops and markets proprietary genomics and informatics technologies designed to improve the productivity of drug discovery and development. The company markets its HAP™ Technology, clinical development skills, and services to the pharmaceutical, biotechnology, and diagnostic industry. Genaissance's core competency is predicting drug response. Genaissance was acquired in 2005 by Massachusetts firm Clinical Data Inc., one of a number of mergers designed to bolster the acquirer's presence in the emerging pharmacogenomics market.
- *HistoRx.* Located in New Haven, HistoRx has developed the first tissue-based quantitative molecular assessment tool for pathology. Based on a technology developed at Yale, HistoRx's platform improves the accuracy and speed of analysis while reducing error through objective, rigorous measurement of protein expression with relevance to molecular-based drug discovery, disease detection and diagnosis, clinical pathology, and patient care. In October 2005, the company announced that it would collaborate with pharmaceutical giant Eli Lilly that would use the tissue analysis tools to design more accurate drug therapies.

- *Invitrogen-Protometrix.* The Branford-located company is developing and commercializing the protein microarrays aimed at enhancing drug discovery and development. Protometrix was acquired by San Diego-based Invitrogen Corporation in 2004 and now operates as a division of that company.

Cross-fertilization among companies is quite evident. A review of management profiles at several area companies reveals that many managers and researchers have moved among area companies. This has occurred among the startups as well as from big pharma research facilities to startups. For example:

- the founder of Rib-X came from Pfizer;
- the CEO of CGI came from Alexion;
- Harry Penner has founded or helped to found five bioscience companies in Connecticut including Neurogen and Marinus;
- Neurogen's head of research came from Pfizer;
- Vion and Sopherion have drawn on researchers from Bristol-Myers Squibb.

Role of Yale University

Yale University's strong research position in the life sciences explains, in large part, the existence of bioscience firms in area. In 2003, Yale ranked 11th of all institutions in the U.S. in the amount of funding received by NIH, 10th among academic institutions. It received $303 million in NIH funding. Yale's Office of Cooperative Research has helped more than 30 bioscience firms get off the ground in the greater New Haven region.

Through its Office of Cooperative Research (OCR), Yale has taken an active role in new venture development to see its research commercialized. This has included recruiting management talent, attracting investors, and assisting in the development of the business concept. Its efforts have been quite successful. In the past five years, over 25 new businesses that rely on technology developed at Yale were started in the New Haven region. Yale is a catalyst of entrepreneurial activity in the region sponsoring an entrepreneurship seminar series featuring founders of some of the region's startups discussing their experience.

Yale OCR is also examining activities at peer institutions seeking models for expansion of the university's commercialization/business development activities. Some of the programs noted at other universities include "Entrepreneurship in Residence" programs, extension of entrepreneurial business education programs beyond the business school and into other schools on campus, and the investment of royalty income into "gap funds" that could take initial research ideas and further test their commercialization potential.

Students are a component to Yale's contribution to the bioscience cluster as well. The Yale Biotechnology & Pharmaceutical Society (YBPS), formerly the Biotechnology Student Interest Group is a nonprofit organization managed by Yale students, committed to bringing together people and groups in the Yale-New Haven community and beyond with an interest in biotechnology and pharmaceuticals. The group represents one of the few formal attempts to set up a networking structure for the region's cluster.

Approximately 20 percent of the organization's 800 members are from industry. The organization sponsors a symposium, career fair, entrepreneurial biotechnology competition, pharmaceutical case competition, and frequent chats, lectures, and lunches.

While Yale has an impressive amount of research underway related to biotechnology, relative to other regions successfully competing as biotech hubs, New Haven does not appear particularly strong. Joe Cortright, author of the 2002 Brookings study on state efforts to stimulate biotech development, has been quoted saying that successful biotech centers to date have multiple research institutions competing and collaborating. New Haven only has Yale.

Eight of the nine biotech centers also had more than $500 million in NIH funding. New Haven only had $315 million in 2003. The table below lists the top 20 metropolitan regions ranked by their receipt of NIH funding in 2003:

Rank	Metropolitan Region	Total 2003 NIH Awards (in Millions)
1	Boston/Cambridge	$1,883
2	Baltimore/Rockville/Washington	$1,233
3	New York	$1,218
4	San Diego/La Jolla	$1,133
5	San Francisco/Stanford/Berkley	$910
6	Philadelphia	$804
7	Research Triangle/Durham/Chapel Hill	$752
8	Seattle	$730
9	Houston/Galveston	$709
10	Los Angeles	$606
11	Chicago	$544
12	St. Louis	$441
13	Pittsburgh	$425
14	Ann Arbor	$371
15	**New Haven**	**$315**
16	Birmingham	$279
17	Nashville	$261
18	Cleveland	$260
19	Atlanta	$260
20	Madison	$259

Cluster Infrastructure

Given the relative size of New Haven's cluster, it is not surprising the cluster has yet to develop some of the support network that would deepen the ties to the region. In particular, the lack of contract research facilities has been mentioned as a hole in the state's infrastructure. Contract research organizations assist biotechnology companies in the research, testing, and approval processes of products or technologies. Contract research has increased as companies seek out firms to conduct high throughput testing. While some companies such as Amgen have invested in their own such robotic testing facilities, smaller companies need to rely on contract manufacturers to conduct such research. The only contract research organization that we were able to identify in Connecticut is ARVYS Proteins in Stamford, which specializes in genetic engineering and protein expression, raw materials production, protein purification, protein characterization, and assay development. As mentioned earlier, Pfizer has recently opened a clinical research facility in the city but that most likely will serve its own drug development needs.

While contract research facilities would be a helpful tool in developing a robust cluster, one should not overplay its importance. A review of successful biotechnology clusters across the nation proves that clusters develop where a critical mass of innovative research and an entrepreneurial spirit coincide. New contract research facilities will not grow new bioscience firms; innovative research and savvy entrepreneurs will.

One concern of many growing biotechnology clusters across the nation is access to capital. Many regions bemoan the lack of indigenous venture capital. This, however, does not appear to be a barrier for the New Haven region. While New Haven does not have a significant local venture capital base, some companies have received funding from Connecticut venture firms while other bioscience firms have attracted investments out of New York and New Jersey.

In addition to venture capital, relevant legal expertise is helpful to the development of the cluster. New Haven is fortunate to be home to a leading law firm with significant life sciences expertise, Wiggins and Dana.

Bioscience-related Economic Development

Connecticut Efforts

In mid-2005, the governor signed a bill into law that establishes a research fund for stem cell research and clarifies state laws regarding the controversial, but promising, avenue of biotech research. Perhaps more important than the research dollars attached was the symbolic gesture signaling the state's commitment to growing the bioscience cluster in the state.

Connecticut offers startup bioscience companies an R&D tax credit exchange that enables companies with no income to exchange unused R&D tax credits to the state of Connecticut for 65 percent of their face value. CURE noted that yielded state firms approximately $9.7 million for the years 2002 and 2003.

Through the state-sponsored Connecticut Innovations, some public early-stage financing is available. In 2001, the state established the Connecticut BioSeed Fund, to help accelerate the growth of early-stage biotech enterprises in Connecticut. Connecticut Innovations manages this $5 million fund. Initial investments will range up to $500,000. Marinus Pharmaceuticals received capital from this fund.

In addition to BioSeed, Connecticut Innovations has developed NextGen, a joint venture between The Phoenix Companies, Inc. and Connecticut Innovations, which has invested over $20 million of seed-stage venture capital and provided management support to entrepreneurial, high-tech companies in the state. It does not appear the biotech companies have received investments from this fund to date, however.

In addition, Connecticut Innovations operates the BioScience Facilities Fund. Through this $55 million fund, Connecticut Innovations provides financial solutions to qualified biotechnology companies for the construction of wet laboratory and related space. Companies already in Connecticut, or those wishing to move to the state, may apply for this funding. This fund supported the construction of 10,600 square feet of transitional wet laboratory space in New Haven's Science Park, located adjacent to Yale University. Protometrix (now owned by Invitrogen) benefited from this fund.

In addition to the financing available through Connecticut Innovations, the other statewide body that is actively supporting bioscience is CURE. Headquartered in New Haven, the nonprofit member coalition is charged with the promotion of biomedical research. CURE, in partnership with Connecticut Innovations, has been very active in promoting BioBus, a mobile life sciences laboratory aimed at promoting life science education for K-12 students. In addition, CURE has placed heavy emphasis on advocating for bioscience interests in the state legislature and has played an active role in the passage of the stem cell research legislation and in the R&D tax credit exchange program. CURE started a networking group called BIOCONNECT in 2004, but that effort did not seem to gain momentum. CURE also supports industry seminars and programs with partners including the Connecticut Business and Industry Association, Connecticut Technology Council, Connecticut Venture Group, MIT Enterprise Forum of Connecticut, and the Yale Office of Cooperative Research. CURE is also working to increase the visibility of the sector's success stories through its annual excellence award, which started in 2004.

Connecticut Relative to Other States

Biotechnology has become the buzz word of economic development organizations nationally and even globally. At the national biotech conference in June, 47 states were represented. In fact, 41 states have economic development plans that target biotechnology. In order to gain a foothold in what is perceived as a high growth sector, states are pouring tremendous resources to attract research and build biotechnology startups. The scale of investment makes it difficult for Connecticut to compete on a dollar for dollar basis. Below are just a couple of examples of the spending to develop biotechnology:

- Arizona is investing $440 million in university research and development facilities. It also recently recruited the Translational Genomics Research Institute.
- Florida assembled $770 million in incentives to recruit the San Diego-based Scripps Institute to locate an east coast facility in the state.
- In 2004, California voters passed Proposition 71, which pledges to spend $3 billion over 10 years on stem cell research
- State funding of new biotech startups via state pension funds or other sources of state-controlled money. For example, CalPERS, the California state pension fund,

dedicates $500 million to invest in biotechnology through the local venture capital community.

- Florida also is making its own venture capital investments from its $102 billion pension fund. The state plans to allocate $350 million to four venture capitalist firms that will make investments on its behalf.
- North Carolina's Golden LEAF, Inc. Foundation, which is responsible for investing the state's tobacco-settlement money, has committed $42 million to expand biomanufacturing, with potential for an additional $108 million over the next six years.

Given the deep pockets of some states, Connecticut will need to be more strategic in its spending than its competitors in pursing sector growth.

New Haven Compared to other Regions

Mt. Auburn has recently completed a study of best practices in regional bioscience development and technology development as part of an evaluation of technology-related investments by foundations in both the Cleveland region and the Pittsburgh region. This overview found that competitive regions have a long-term focus on establishing a self-sustaining biomedical industry "ecosystem." Other key elements of a competitive region include strong networks and interrelationships, a critical mass of human capital, highly functioning tech transfer mechanisms, availability of a full range of risk financing from pre-seed to venture capital, and very strong support from regional foundations and the state. While most of the regions are significantly larger than New Haven, the following summaries provide an overview of what some of the more aggressive regions are doing to build their bioscience/'life sciences cluster.

BioEnterprise Cleveland

Cleveland has developed a very strategic approach to building its bioscience sector through an alliance of a number of research institutions and support from foundations and the public sector. The organization began operation in July 2002. Its founders include Case Western Reserve University, The Cleveland Clinic Foundation, and University Hospitals Health System, with additional support from NorTech, NASA-Glenn Research Center, and Cleveland State University. The organization is targeting medical devices and equipment; drug discovery, diagnostics, and delivery; and healthcare information technology and services.

The organization is trying to increase the regional pipeline of world-class business ideas (through regional companies and entrepreneurs, institutional tech transfer offices, and foreign opportunities); establish access to national funding sources; provide professional and management support (e.g., market access, operations, strategic alliances, financing, executive recruitment); and a business infrastructure to support company development (referral to a network of industry contacts, access to regional research and clinical institutions, facilities for short-term occupancy); and achieve national recognition—develop a reputation for Northeast Ohio as a hotspot for bioscience industry growth through a regional/national public relations effort.

A recent evaluation of BioEnterprise by Mt. Auburn found that the organization has played a critical role in overcoming longstanding competitive schisms among the region's premier biomedical research institutions and strengthening collaborative efforts to accelerate technology commercialization and new enterprise development. Rather than duplicate existing technology transfer capacity, the organization focuses on supporting enterprise creation. Finally, the organization has played a critical role in reaching out to entrepreneurs in the larger Cleveland region, developing relationships with national and international companies with related products, and creating relationships with key research institutions outside of the Cleveland region.

Life Sciences Greenhouse, Pittsburgh

The Life Sciences Greenhouse was formed in 2003 to jump start the creation of a competitive life science employment cluster in the Pittsburgh region. The organization received significant support from regional foundations and the state, and has raised over $100 million. Partners in the project include the University of Pittsburgh, Carnegie Mellon University, the University of Pittsburgh Health Center, regional funders, and the Commonwealth of Pennsylvania. Targets include drug discovery tools and targets; tissue/organ engineering; medical devices; and therapeutic strategies for neurological and psychiatric disorders. This strategic focus was based upon a study of core competencies in the region. The Greenhouse provides a broad range of funding and financing programs from directly supporting new research, to product development, pre-seed funding, and seed capital. In addition the Greenhouse provides incubator space that is highly subsidized and with very short leases. (It consists of approximately 40 percent modern, wet laboratories and 60 percent office space.) This space is fully occupied. Finally, the organization supports numerous networking and mentoring activities, including an Executive in Residence program. The Life Sciences Greenhouse is just one of an extensive network of technology development organizations in the Pittsburgh region.

St. Louis

This region has had a well established focus on clusters and has identified bioscience as an emerging cluster in its region. A focus of regional efforts has been on the formation of a technology commercialization vehicle, BioGenerator, a virtual commercialization and technology transfer center designed to harness the world-class research being done within the St. Louis region and to channel it into a steady flow of startup companies. The Danforth Foundation, the Monsanto Fund, the McDonnell Family Foundation, and Bunge North America provide funding. This organization includes an executive-in-residence program as a way of attracting the "serial entrepreneur." The nonprofit Center of Research, Technology & Entrepreneurial Exchange (CORTEX), is working with Washington University, Saint Louis University, the Barnes-Jewish Hospital Foundation, the University of Missouri-St. Louis, the Missouri Botanical Garden, the city of St. Louis, the state of Missouri (the Missouri Development Finance Board), Civic Progress, the St. Louis Regional Chamber & Growth Association, and the Coalition for Plant and Life Sciences on the construction of a $36 million,170,000-square-foot initial phase of R&D space. There are also two life sciences incubators that are now at capacity (NIDUS and CET) and the region has created a brand name for the region—"Biobelt." The St. Louis biotech industry is attracting the interest of venture capitalists from around the world. The area has become home to 13 funds with nearly $1 billion under management, half of that dedicated to biotech.

BuffLink: Buffalo, New York

Buffalo is an example of a smaller sized region that has also developed a strong strategic focus on life sciences. BuffLink, Inc. is a private, nonprofit corporation founded in 2001 by private sector and university leaders to catalyze Buffalo Niagara's life sciences economy. This strategy engages a wide range of leaders from the region's universities, research institutions, and economic development organizations in enterprise development, marketing, technology transfer, and human resource development through recruitment and workforce training.

APPENDIX B:

CREATIVE ECONOMY OF THE NEW HAVEN REGION

Purpose of the Report

"Creativity is no longer an incidental miracle that happens occasionally in exceptionally favored cities; in a globalized economy where no place can rest on its laurels for long, it is now a central part of the business of being a successful city" Sir Peter Hall

The New Haven region has been increasingly recognized as the "creative capital" of Connecticut. And, the city of New Haven is undergoing a renaissance that is partially attributable to the strength of its cultural assets. Housing is being developed downtown, entertainment venues are being developed, and new restaurants seem to open daily. However, the full potential of the region's creative assets has not been fully realized.

This report looks at the potential of further building the region's creative economy. It looks comprehensively at the economic activities in the creative sector and identifies areas of opportunity, as well as some of the barriers that are constraining progress. It is essentially a strategy document, meant to provide guidance to the RGP as it seeks to further develop the economic potential of the region.

What this report is not

1. *This is not an economic impact study:* The nonprofit arts and cultural community has completed a number of studies that attempt to show the economic importance of the arts. These studies focus primarily on the nonprofit arts community and use economic modeling to identify the dollars circulated in the economy due to art. This report looks at the creative enterprises as it would any other key sector of the economy. Its approach follows standard "cluster" analysis and looks at the creation and distribution of creative goods and services and the employment generated as a result.

2. *The focus is not on the nonprofit cultural institutions:* While nonprofit cultural institutions are an important component of any creative economy, this study looks in more depth at the "originators" of content—the individual artists and designers as well as commercial enterprises involved in the production and distribution of creative products.

3. *It is not meant to be the magic bullet:* The RGP has a set of clusters that it is targeting as part of its long-term economic development strategy. It is also involved in a wide range of regional infrastructure and development issues. The Creative Cluster is just one of those areas that provides an opportunity for economic growth and development.

4. *It is not a cultural tourism or downtown development strategy:* Often, the focus of any strategy related to arts and cultural development quickly becomes centered on

either cultural tourism or downtown redevelopment. While these are important components of any creative economy strategy, they should not be the sole focus. The areas of innovation in this sector involve strategies to increase the sale of products and services produced in the New Haven region to those outside of the region.

5. *It does not consider arts and cultural development to be primarily an amenity strategy:* The work of Richard Florida has brought widespread attention to the importance of arts and culture in terms of talent attraction. This theory looks at arts and culture as more of a means to an end. Develop a vibrant arts and cultural environment and you will be able to attract knowledge workers and jobs will follow. While acknowledging the importance of quality of life and talent attraction, this strategy goes beyond looking at the creative sector in terms of quality of life. Moreover, its definition of "creativity" is more limited than that used by Richard Florida.

If that is what this effort is not, what it is?

As noted, in some ways what we are talking about is broader than what is usually considered in typical arts impact studies, but more limited than what Florida refers to as the "creative class." Basically, while acknowledging that creativity and innovation are found in every industry, the focus here is on three components of the creative economy that are particularly relevant to the New Haven region:

- ***Growing the creative industries:*** These include a wide range of economic activities in which the creative element is central to both the cultural and economic values of what is being produced. These industries are built around individuals, businesses, and institutions that are principally engaged in the origination, production, distribution, and support of products that are defined primarily by the creative or cultural content.
- ***Developing linkages between creativity and economic competitiveness:*** This includes using the talents of creative workers and businesses to increase the ability of other sectors, such as manufacturing, to prosper in the global economy.
- ***Looking at the city itself as a work of art***: With New Haven's rich architectural and urban design history and the creative talent that lives and works within the city, it could distinguish itself further by promoting the highest quality in planning and design as the city revitalizes.

At the core of each of these components is the creative talent pool. These are the individuals working within the creative industries, within the region's educational institutions, and throughout the economy who are involved in design, the visual arts, music, theater, dance, and other pursuits that are focused on creative content and processes.

Why focus on and target the Creative Economy in New Haven?

While a creative economy strategy should not be perceived as a "magic bullet," transforming the entire regional economy overnight and providing high quality jobs for all residents, there is sufficient evidence of the economic potential of targeting creativity in light of global economic trends and regional assets:

- the global market for creative goods and services is growing rapidly;
- quality of place is an increasingly important competitiveness factor in economic development;
- individuals trained in arts and culture are increasingly seen as important in the corporate environment;
- design is an increasingly important element in the competitiveness of all types of companies;
- creative industries provide a range of jobs and offer significant opportunities for individuals along a broad income and skill spectrum; and
- the creative industries value diversity and often inspire youth to pursue their talents and skills.

Even with all of this justification, a creative economy strategy does not make sense for all cities or all regions. Critical to justifying such a strategy is understanding the particular assets of your region in this creative economy. This report provides strong evidence that the RGP region has considerable strengths in many components of the creative economy and the full economic potential of its creative talent, creative businesses, and creative institutions has not been realized.

What Do We Know about the Region's Creative Cluster

Standard economic data and analysis techniques do not provide evidence of a strong sector

An analysis of standard economic data does not provide strong evidence that creative industries are an area of particular strength in New Haven County. If looked at solely in terms of "wage" employment, the number of jobs in organizations or businesses that have employees, the size of the sector is relatively small, accounting for only about 8,000 jobs, or about 2.3 percent of the region's overall job base. (See attached table.) However, in the creative industries, many individuals receive their income not through wages, but through self-employment income. The U.S. Census data on "non employers" provides information on individuals who report income through self-employment to the IRS. Based upon this data, there are another 3,600 individuals who receive some form of income related to the creation and distribution of creative products and services. While this brings the total number of employment up to close to 12,000 for New Haven County, this is still only about 3 percent of total employment as compared to 3.2 percent in the U.S. as a whole.

The traditional data do provide evidence that there are certain segments of the creative industries in which the New Haven region does have a relatively high concentration relative to the US. While small in numbers, the region has a high concentration of music groups, private libraries, architecture firms, private fine arts schools, newspaper publishers, book publishers, independent artists, writers, and performers, and promoters.

CREATIVE CORE: CONCENTRATION OF EMPLOYMENT IN NEW HAVEN COUNTY

	Employment in Firms	Self Employment	Total Employment	Location Quotient
Other performing arts companies	60		60	305.6%
Musical groups & artists	416		416	288.9%
Fine arts schools	381		381	225.8%
Libraries & archives	207		207	209.4%
Newspaper publishers	1400	248	1648	144.4%
Book publishers	346		346	130.7%
Book stores & news dealers	559	79	638	126.0%
Architectural services	624	181	805	118.9%
Independent artists, writers & performers	213	1811	2024	116.1%
Promoters of entertainment events	300	68	368	114.4%
Prerecorded tape, CD & record stores	210	19	229	109.3%
Motion picture & video industries	377	119	496	104.5%
Musical instrument & supplies stores	92	20	112	96.1%
Photographic services	422		422	94.9%
Theater companies & dinner theaters	106	76	182	92.5%
Specialized design services	200	491	691	84.6%
Landscape architectural services	68	104	172	82.1%
Camera & photographic supplies stores	47		47	75.3%
Agents	10	80	90	67.8%
Television broadcasting	225		225	62.0%
Advertising & related services	667	271	938	61.4%
Radio broadcasting	225		225	58.5%
Museums, historical sites & like institutions	172	15	187	52.8%
Art dealers	60		60	50.3%
Cable networks & program distribution	350		350	39.7%
Periodical publishers	148		148	39.6%
Dance companies	10		10	34.1%
Other publishers	33		33	20.1%
Sound recording industries	16		16	14.0%
Total Creative Core	**7944**	**3582**	**11526**	**95.3%**
TOTAL EMPLOYMENT	333360	49074	382434	100.0%

Source: U.S. Department of Commerce County of Business Patterns and Non Employer Statistics

Occupational data from the 2000 Census do provide some evidence that within the city and the larger region there is a fairly high concentration of residents working in creative occupations. (See below.) However, more recent data on occupations from the Connecticut Department of Labor show relatively low numbers of individuals in creative occupations.

Occupational Concentrations in New Haven Region

Occupation	Percent of Total Employment: City of New Haven	Percent of Total Employment: RGP Region	Percent of Total Employment: US	Location Quotients: City of New Haven	Location Quotients: RGP Region
Management, professional, and related occupations:	37.3%	37.8%	33.6%	1.11	1.12
Management, business, and financial operations occupations:	8.4%	13.1%	13.5%	0.62	0.97
Management occupations, except farmers and farm managers	5.8%	8.7%	8.6%	0.68	1.01
Business and financial operations occupations:	2.5%	4.4%	4.3%	0.58	1.02
Professional and related occupations:	28.9%	24.7%	20.2%	1.43	1.22
Computer and mathematical occupations	2.3%	2.6%	2.4%	0.96	1.07
Architecture and engineering occupations:	1.5%	2.2%	2.1%	0.72	1.07
Architects, surveyors, cartographers, and engineers	1.0%	1.7%	1.5%	0.64	1.11
Drafters, engineering, and mapping technicians	0.5%	0.5%	0.6%	0.94	0.96
Life, physical, and social science occupations	3.1%	1.7%	0.9%	3.32	1.81
Community and social services occupations	3.0%	1.9%	1.5%	2.02	1.29
Legal occupations	1.3%	1.4%	1.1%	1.15	1.26
Education, training, and library occupations	10.7%	7.4%	5.7%	1.89	1.31
Arts, design, entertainment, sports, and media occupations	2.6%	1.9%	1.9%	1.37	1.01
Healthcare practitioners and technical occupations:	4.5%	5.5%	4.6%	0.97	1.20
Health diagnosing and treating practitioners and technical occupations	2.9%	3.9%	3.2%	0.91	1.22
Health technologists and technicians	1.6%	1.6%	1.4%	1.10	1.15
Service occupations:	18.8%	14.4%	14.9%	1.26	0.97
Healthcare support occupations	4.9%	2.9%	2.0%	2.43	1.46
Protective service occupations:	2.2%	2.1%	2.0%	1.13	1.06
Fire fighting, prevention, and law enforcement workers	0.9%	1.2%	1.2%	0.78	1.02
Other protective service workers, including supervisors	1.3%	0.9%	0.8%	1.66	1.13
Food preparation and serving related occupations	5.0%	4.3%	4.8%	1.04	0.89
Building and grounds cleaning and maintenance occupations	3.7%	2.6%	3.3%	1.14	0.78
Personal care and service occupations	2.9%	2.5%	2.8%	1.05	0.91
Sales and office occupations:	23.5%	27.5%	26.7%	0.88	1.03
Sales and related occupations	8.4%	11.0%	11.2%	0.74	0.98
Office and administrative support occupations	15.2%	16.5%	15.4%	0.98	1.07
Construction, extraction, and maintenance occupations:	5.9%	7.8%	9.4%	0.63	0.82
Construction and extraction occupations:	3.5%	4.3%	5.5%	0.64	0.77
Supervisors, construction and extraction workers	0.2%	0.5%	0.7%	0.31	0.68
Construction trades workers	3.2%	3.8%	4.7%	0.69	0.80
Installation, maintenance, and repair occupations	2.4%	3.5%	3.9%	0.61	0.89
Production, transportation, and material moving occupations:	14.2%	12.4%	14.6%	0.97	0.85
Production occupations	9.1%	7.9%	8.5%	1.07	0.93
Transportation and material moving occupations:	5.1%	4.5%	6.1%	0.83	0.73
Supervisors, transportation and material moving workers	0.1%	0.2%	0.2%	0.30	0.82
Aircraft and traffic control occupations	0.0%	0.1%	0.1%	0.00	0.59
Motor vehicle operators	2.4%	2.3%	3.0%	0.81	0.78
Rail, water and other transportation occupations	0.1%	0.3%	0.3%	0.32	0.96
Material moving workers	2.5%	1.6%	2.6%	0.99	0.64

Source: 2000 US Census

Recent Occupational Data: New Haven Labor Market Area

	Number	Median Wage
Actors	70	$ 45,941
Art Directors	20	$ 45,612
Audio and Video Equipment Technicians	250	$ 32,214
Commercial and Industrial Designers	60	$ 49,560
Editors	270	$ 54,660
Fine Artists	NA	$ 40,861
Graphic Designers	330	$ 37,777
Interior Designers	70	$ 44,563
Media and Communication Workers	80	$ 30,538
Musicians and Singers	NA	$ 35,731
Photographers	110	$ 37,797
Producers and Directors	100	$ 39,967
Architects	260	$ 69,888
Landscape Architects	30	$ 57,930
Writers and Authors	80	$ 65,004
Total Creative	1,730	

Source: Ct. Dept of Labor 3rd Quarter 2004 OES

But …. these databases and methodologies seriously miss a lot of what is occurring in the economy

✦ *A lot of the cultural activity in the region is based within the educational sector, and jobs are counted as part of the educational sector.*

Much of the traditional cluster analysis completed for New Haven has focused on the so-called "knowledge cluster"—composed primarily of educational institutions. In fact, a large number of those jobs would be better classified in the "creative cluster." Most notably, while New Haven has a very strong set of museums, galleries, and performing arts companies and venues, much of this is captured in employment in educational institutions. For example, all of the employment at the Yale Art Gallery and the Yale Center for British Art are included under "education" not museums. The employment related to the Yale Repertory Theater is also included under "education" not "performing arts." Add to this all of the other significant arts and culture-related activities at Yale, as well as at the other higher education institutions, and one realizes why the employment numbers are relatively small.

✦ *A lot of creative firms are classified for data purposes in other sectors.*

One of the more difficult aspects of trying to quantify jobs in the creative sector is that design intensive manufacturers and artisans are not captured in the typical NAICS code classification system. Examples of firms in the New Haven region that are clearly "creative," but that are classified in manufacturing or other sectors include:

- Kent Bloomer Studio and Gar Waterman/ornamental work;
- glass and pottery studios throughout the region;
- Fair Haven Woodworks;
- Lesley Roy Home Couture;

✦ *A lot of the recent growth and development is not captured in the data; for example:*

- new recording studio at Firehouse 12;
- new architecture firms;
- new galleries (the 2002 Economic Census reports only one art gallery in the city).

✦ *A lot is simply missed as a result of misclassifications.*

While we were not able to undertake a complete analysis of each of the components of the creative sector, we did create a database of companies and artists in New Haven based upon multiple sources. These included a proprietary business database provided through the Connecticut Economic Research Center, the database of the New Haven Arts Council, the database developed by the New England Foundation for the Arts, as well as other industry specific data sources. We have assembled a list of close to 1,500 artists, creative businesses, and nonprofit organizations involved in the creation, production, distribution, and support of creative goods and services. The traditional data sources clearly do not capture the breadth of this activity in the region.

✦ *The quality of the creative asset is not captured in the numbers.*

What differentiates New Haven is not necessarily the number of creative enterprises and creative talent, but the quality of the products produced in the city. Standard economic analysis is not able to capture this element of the region's creative economy.

Strengths of the Region's Creative Economy

New Haven nurtures and develops creative talent

Perhaps the greatest strength of the New Haven region is in its educational resources devoted to creative activities. The commitment to nurturing creative talent is found in its public education system, its private secondary schools, its public higher education institutions, as well as its private colleges and universities. While we have not completed a comparative analysis, we are convinced that the New Haven region has one of the strongest educational infrastructures in the arts in the country. Its resources range from institutions that focus on youth including arts educational programs within all of the schools, as well as through the development of magnet schools and specialized art schools. It has such nationally recognized institutions as the Neighborhood Music School, one of the largest nonprofit music schools in the country. At the community college level, Gateway Community College, under the leadership of its president, has made a strong commitment to education and training in the arts. This continues at Southern Connecticut State University, as well as the many private colleges and institution in the region. The region is also home to the Paier College of Art, a private college that offers degrees in fine arts, graphic design, illustration, interior design, and photography.

Clearly, the culmination of this "system" is Yale University. Yale plays a fundamental role in this system. First, its Arts, Architecture, Drama and Music schools are ranked in the top in the world. As a result, they attract the best talent in these areas worldwide. Many of the faculty lives in the region, where they use their talents and contribute to the community in many ways. Some are practicing artists, have started businesses, or volunteer and participate in the creative section in the region.

(Attachment I is a more detailed description of the depth of the arts and cultural educational resources in the region.)

The region has some "centers of excellence" that provide opportunities for the region

In economic development there is recognition that "centers of excellence" can provide a region with a source of entrepreneurial energy and commercialization opportunities. Usually, we think about these centers in terms of technology. However, in New Haven, some of the more critical areas of overall excellence are found in the creative industries.

✦ *Yale is an incubator for the architecture industry.*

It is clearly in the area of architecture that the New Haven region has built its strongest center of excellence and the activities in architecture can all be linked back to the Yale School of Architecture. As a result of developing one of the foremost architectural schools in the world, New Haven has attracted some of the most important architects in the modern era. And, a number of these architects have made New Haven their home, starting architecture firms that employ hundreds of people Once the firms are established, graduating architecture students now see New Haven as a city with significant career opportunities. Unlike many other graduates of Yale who stay for a few years and then leave, many architectural student stay in New Haven and end up starting their own firms. Just like the spin-offs found in the biotech and computer industries, the architecture industry in New Haven has followed a similar course.

While standard data sources only report 81 architecture firms in the region employing about 800 individuals, our own research has identified over 150 firms in the RGP region. Again, this number does not include the employment and activity related to architecture that is found at Yale.

The architecture firms in the New Haven region have also developed important linkages to other industries. The best example of this is *KMCA.* This company works internationally making architectural models for architects throughout the world. In addition to making models for the architecture field, the firm has developed rapid prototyping capability that it now uses to create prototypes for manufacturing firms.

Hull's Art Supply & Framing, a comprehensive supplier of products for the architectural and set design modeling industry, is another example of a local firm that started as a supplier to the local industry, but has the potential to become a national supplier in the industries. It has become an institution as the most comprehensive and complete location to purchase supplies for architectural and set design model making.

Other economic activities related to the region's strong architectural industry include: construction, engineering, landscape architecture, interior design, urban planning, and graphic design. Often, the architecture firms will contract out for these services or partner with other local individuals or firms in these areas.

A final economic benefit associated with the architectural industry in New Haven has been urban revitalization. A walk through any of the revitalizing commercial districts in New Haven would probably find architectural firms looking for office space at the root.

✦ *A vibrant and strong visual arts and crafts industry.*

A recent study by a University of Chicago economist analyzed the international art market and found that the greatest predictor of appreciation in value was whether the artist graduated from the Yale School of Art. In addition to having the Yale School of Art, one of the best schools of visual arts in the nation, the New Haven region is home to many other schools and centers that have led to the development of a high concentration of visual artists and artisans in the region. Other assets include the Paier School of Art, Anni Albers Research and Study Center in Bethany, which houses visiting artists from around the world, and the Guilford Arts Center. In addition the region has a rich infrastructure of support organizations in the visual arts, the Sculpture Mile in Madison, and a high concentration of craftspeople living in the surrounding communities, particularly in the Shoreline area. Looking at the list of artists participating in the Open Studios is just a small indication of the breadth of the talent in the region.

✦ *An unusual concentration in theater-related activities.*

It is unusual for a city the size of New Haven to have one nationally recognized theater. New Haven has two—Long Wharf and Yale Rep. In addition, New Haven has a long history as an innovator in the theatrical field, with both the Shubert and Palace theaters playing a strong role in the history of American Theater. The region is also home to other strong regional theater groups including the Actor's Ensemble, the Elm Shakespeare Company, the New England Academy of Theater, the Yale Cabaret, Eastbound Theater in Milford, Nutmeg Players in Guilford, Orange Players, Castle Craig Players in Meriden, and Red Conception Theater in New Haven. In addition to these organizations, as noted, the colleges and universities in the region provide training in the theatrical arts and sponsor productions. Some of these institutions have developed relationships with the professional theater companies. For example, Long Wharf provides its facilities and support to the Southern Connecticut State University Theater Department.

The city itself is a work of creativity

The city of New Haven is known as an "open-air museum of post-war American architecture." For a city its size, it has an unusual concentration of buildings designed by world renowned architects. In addition, the actual plan of the city is of creative and historic significance. In 2001, the American Institute of Certified Planners honored the city's "nine square plan" laid out in 1639 as a "National Planning Landmark." New Haven also has supported the development of public art through its 1% Public Art fund. Together, the result is that for many in the architectural and urban planning fields, the city of New Haven is considered itself an important creative asset.

The region has a growing progressive and "edgy" creative group

In addition to the larger and more established arts organizations, businesses, and artists, the region has an increasing number of arts activities that are in the more alternative or "edgy" category. These include such groups as the multi-media events of Projects for a New Millennium (which has the potential to be for New Haven what Firewater is for Providence); a growing and vibrant rock, blues, jazz, hip hop, and folk music scene; innovative theater; and spoken word events and poetry slams. The Alternative Media Library and Resource Center at Yale is a media collective and creative venue that seeks to bring underground media, experimental art, and new forms of creative expression to students and the New Haven community as a whole. Many of these types of creative activities and organizations are important to attracting and retaining young talent in the region.

New projects and revitalization activities are creating momentum

There are a number of new development projects in process that have created a significant sense of momentum in the city and the region. Projects such as the new hotels, the development of new housing, retail, and dining venues in the downtown, as well as the planned move of Gateway Community College and Long Wharf Theater downtown are all positive signs of renewed interest in the region's urban core. These developments are all important links in any creative economy strategy.

There is a large pool of "pass-through" talent

There is probably no city of the size of New Haven that has seen more creative talent pass through it. From the students who have gone on to fame from the Yale School of Drama, to the famous alumni of the School of Art, music, and architecture, many of the most important creative talents in the world have lived at one point in their lives in New Haven. This pool of talented alumni is an incredible, untapped resource.

Support organizations are strong and collaborative activities exist

The New Haven region has a very strong infrastructure of cultural support organizations and nonprofit arts organizations. This includes the Cultural Affairs Department in the city, the Arts Council of Greater New Haven, ArtSpace, and many, many others. There have also been a number of efforts to create and support collaborative activities related to the arts. This includes the chamber's ICIC group, the collaborative activities related to marketing being undertaken by Market New Haven, the effort by the president of Gateway Community College to bring together educational institutions involved in the arts, and the industry groups such as the Alliance for Architecture and the Photo Arts Collective that have been convened by the Arts Council.

Barriers Constraining Progress

While its assets and opportunities are enormous, there are many barriers that constrain the New Haven region from the full economic benefits associated with its creative economy.

Lack of awareness and knowledge about the talent that is out there

While evidence from the database and from interviews reveals a large talent pool in the region in many areas (including visual artists, graphic designers, craftspeople, and musicians), the individual artists remain somewhat isolated. Many individuals work out of their homes and have minimal interactions with others working in the cultural arena. Moreover, businesses that are seeking talent often have difficulty in finding information about local individuals or companies that could serve their needs. An example that was cited a number of times is that while there is a lot of demand for graphic artists, in particular from Yale University, there is no source of information or directory of graphic artists in the New Haven region.

Lack of market recognition for changes in the city and region

The city of New Haven has changed significantly in the last decade. The city has developed a stronger arts and cultural environment, as well as a more vibrant urban environment. While there have been recent efforts at new "branding" and marketing to capture this transformation, more work needs to be done. Thousands of cars pass through the New York–New England Corridor unaware of the cultural amenities in New Haven or some of its surrounding communities. Thousands more will travel to spend a day shopping at IKEA, but not venture into the city. Increased cooperation around marketing amongst the many different organizations in the region could address this challenge.

Implementation of good ideas and projects remains limited

The New Haven region has never suffered from a lack of good ideas. And, the arts and cultural community in particular has undertaken a number of very impressive studies of areas of opportunity for strengthening the arts and cultural sector in the region. This includes the September 2000 *Greater New Haven Arts and Entertainment Facilities Study*. This study, along with other reports on arts and culture and tourism development, provided a critical base of strategies and potential projects that could strengthen the region's creative economy. However, many good potential projects have stagnated. These include efforts to develop artist housing, the proposed Center for American Music, and various efforts to develop a museum related to the region's theatrical history. In addition, the International Festival is at a crossroads. There is a sense that the Festival needs some new strategic thinking related to its future and the niche that it seeks to serve.

Lack of coordination amongst the many organizations that have some potential involvement in supporting the creative economy

As noted, the region has a very strong infrastructure in terms of support organizations involved in arts and culture. The problem is that there are many different players, often not working on a coordinated strategy to promote the creative economy. Players include the many activities at Yale (which are not even coordinated internally within Yale); Market New Haven, the Convention and Visitors Bureau, the ICIC group under the chamber of commerce, the many arts organizations outside of the city of New Haven, the RGP, the Arts Council, the Cultural Affairs Department in the city of New Haven, and the staff involved in different festivals. In all, while there are considerable staff time and financial resources being spent on the region's creative economy, the impact of these efforts has been constrained by a lack of a common strategic direction and plan.

Yale has not developed a specific strategy to use its arts and cultural capacity as a further catalyst to economic development in the region

Yale University plays an incredibly important role in the overall regional economy. Its efforts to support the development of the biotech industry in the region, as well as its investments in the revitalization of downtown and the city's neighborhoods, have had a huge impact on the economic base of the region, as well as the vitality of the city. It has yet to apply this approach to its arts and cultural resources.

Strategic Initiatives

Develop, Retain, and Attract Creative and Technical Talent

- *Support the development of a "Creative Education Collaborative" to further build connections between educational institutions in the region.* The president of Gateway Community College has already convened an informal group to begin to discuss areas of collaboration. This effort should be formalized and continued.
- *Develop collaborative efforts focused on working with graduates of arts and design programs to remain in the region.* The new Education Collaborative should work to develop internship opportunities for recent graduates, to provide guidance on career development, and to link graduates to potential housing and studio space.
- *Provide education and training opportunities for technical occupations in the creative sector*. Not all of the jobs in the creative sector require a four-year college or graduate degree. There are technical jobs in set design and building, model building, and sound and audio engineering. There used to be a Center for Theater Techniques and Education and an "Arts at Work" program in which kids from the region were trained in technical theater with the Yale School of Drama. This type of activity should be continued.

Generate New Jobs and Income for Local Residents through Business Development Activities in the Creative Sector

- *Work to attract companies that provide products and services in the areas of regional strength: theater, architecture and the built environment, and the visual arts.* Examples of the types of businesses associated with creative industries could include branches of national theater supply companies (these companies serve the booming market for theatrical supplies in regional theater as well as theatrical productions in the k-12 school systems), architectural model makers, building engineering companies, design shops, art galleries and auction houses, art supply retailers, and e-commerce companies, etc.
- *Create new markets for creative goods and services produced in the New Haven region.* While open studios are a great way for local artists and craftspeople to increase awareness of their products and sell them to the public, a once a year event is often not sufficient for sustaining an arts-related business. The region should consider developing more frequent "art markets" that allow local artists and artisans to market their products. Models of such markets exist elsewhere. For example, New Orleans has the Mid-City Art Market that operates on the fourth Saturday of the month. This market is very diverse in terms of quality and product. In addition, the city has the Bywater Art Market, which was founded by the New Orleans Conservation Guild. This market is held the third Saturday of every month and showcases the work of local artists. This market's purpose is to promote the work of local visual artists and is focused on higher quality art, not crafts.

The Entergy Arts Business Program

The Arts Council of New Orleans has developed an incubator created to provide a centralized source of easy, practical business assistance for artists and profit and nonprofit creative enterprises in the greater New Orleans region. The incubator has three major components: a Workshop Series, the Louisiana Volunteer Lawyers for the Arts, and a Tenant Program. The Tenant Program provides affordable office space to emerging arts businesses. This incubator has been operating successfully since 1991 and has received the "Business Incubator of the Year" award from the National Business Incubation Association.

- *Develop a "creative business incubator."* There have been a number of successful models of incubator facilities that focus on artists and creative enterprises. New Haven would clearly be ripe for such an initiative. The Arts Council, RGP, and the chamber of commerce could jointly work to identify an appropriate facility and to identify potential sources of funding to support the business assistance and support activities of an incubator. One idea to explore would be to "warehouse" some of the creative products being developed by those in the incubator. These products could potentially serve as collateral for some creative financing of the facility. The facility could target graduates of Yale and other colleges and universities in the region. The appreciation in value of the art produced by graduates of Yale School of Art, for example, could be used to justify such an investment.

- *Create a directory and clearinghouse in various creative areas including graphic design, music, and services for the architecture industry.* A number of individuals interviewed noted that although there is a large level of demand for the services of graphic artists and designers in the region (partially due to the level of design work needed by Yale and the architecture industry), it is difficult to easily identify where to locate local talent. A clearinghouse of information on individuals in the RGP region who have goods and services that are related to servicing the design and architecture market could promote increased purchasing of local goods and services.

Improve the Competitiveness of Companies in the New Haven Region through Enhancing Linkages with Design and Creativity

- *Use design to differentiate New Haven companies.* ArtSpace, the creator of the "Factory Direct" exhibit, is planning an exhibition entitled "New Haven Designs!" that will be a juried survey of the best design being done in the Greater New Haven region. It will take place in October 2005. The scope will be broad, to include packaging, product design, and transportation, as well as architecture and graphic design. ArtSpace is speaking to prominent designers about serving on the jury and will be seeking sponsors. This effort could be the beginning of an overall initiative focusing on design in New Haven. RGP could take the lead in helping to identify companies in the region that would have interest in participating in some type of design effort. Working with ArtSpace and the Arts Council, RGP could put together "design audit" teams that would visit other companies in the region to assess how improved design could be utilized to advance their competitiveness. Given IKEA's interest in design, it could be approached as one of the potential sponsors of this effort.
- *Create a Creativity + Competitiveness Program that applies creative thinking and processes to other industries*. "The Factory Direct" project that was undertaken by ArtSpace was an extremely successful effort to link artists with local manufacturers. This effort created well received artwork, good relationships with manufacturers, as well as very positive publicity for New Haven. The RGP should see this effort as the first of many similar experiments with linking artists and local companies. RGP should explore developing similar efforts in other disciplines. Unlike the design initiative, this effort would be more generally focused on the creative process. RGP could explore creating a more formal program, in conjunction with local cultural institutions or colleges and universities. As a first step, Long Wharf Theater has expressed some

Institute for the Creative Process: Alberta College of Art and Design

A number of private corporations, including Arcis, EPCOR, Nexen, and Xerox Canada, have partnered with the college to create a new institute that focuses on the "cultivation of dialogue, research, and special undertakings that directly address the nature of the creative process and design thinking." The first initiative of the Institute will feature internationally renowned artists and cultural specialists who will lead discussion on the relationships between cultural development and community advancement. In supporting the project, Xerox acknowledged that encouraging creative thinking is important not only to its competitiveness but also to further strengthening the Alberta economy.

interest in replicating the work of Factory Direct in the theater area. As a model, it noted the work of Cornerstone Theater Company in Los Angeles, which has developed innovative theater pieces in collaboration with employers and workers. Working with local manufacturers, the Theater could inspire creative thinking and creative processes that could lead to creative works, as well as new thinking within the business.

- *Encourage more backward linkages with New Haven firms as suppliers to the creative industry.* Architecture firms and sculptors are examples of creative enterprises that utilize traditional manufacturing capacity as part of their work. For example, while no longer operational, the Lippincott Foundry, located in the region, was one of the leading foundries used by sculptors. The CAD/CAM capacity found in many small machine shops could be utilized in the model making and set design industry. Local construction and engineering companies could benefit from potential projects with architecture firms. These are just some of the potential backward linkages that could be further explored and developed.

Promote the Next Stage of "City as Art" by Developing New Haven as a Model in the Built Environment

- *Creative District Planning.* The city of New Haven already has developed a design and planning orientation. To enhance the focus on the creative sector and the quality of the built environment, it should develop more explicit plans for incorporating the creative sector in the redevelopment of the city. As part of this effort, it could link up with potential developers interested in pursuing new investment in creative district development. Creative districts could include:
    1. Entertainment District/Theater District Downtown and Gateway Master Plan
    2. Educational and Cultural Organizations at Audubon
    3. Commercial Creative District—Westville and River Street
- *Further showcase the city as a creative "work."* The concept of the city as a work of art should be incorporated into regional marketing materials. Additional activities and events that highlight the built environment should be developed.

A $40 Million Equity Fund for CoolTowns

CoolTown Studios is an investment agent for a $40 million equity fund committed to contributing $2-$7 million in development costs per CoolTown project. This typically translates to $10-$20 million developments. It wants to set a new standard for quality real estate development.

The basic CoolTown project criteria includes:
- Urban/small city infill/rehab (as in the image), not suburban or greenfield.
- Target market consisting of, but not limited to, the creative class, gen xers/yers, urban boomers, entrepreneurs, women, urbanists, early adopters.
- No "luxury" adjectives—as this essentially rules out the target market.
- Urban new urbanist/smart growth design principles.

Financial criteria includes:
- The fund will invest in a local developer who will maintain primary control.
- The target cities must be east of Denver.
- 2nd and 3rd-tier cities preferred.
- An area with strong population growth.

Build a More Coordinated and Comprehensive Creative Economy Initiative in the Region

- *Bring together all of the actors working on various related initiatives in the city.* There are many different activities currently occurring that could be better coordinated around a common vision about promoting the region's creative economy. RGP could facilitate a process that presents the findings of this report and that works with local organizations to set clear priorities and responsibilities in the implementation of some of the recommendations.
- *Create new regional industry networks.* The Arts Council has taken the first step of pulling together some industry networks. It has recently pulled together a group of architects in the region. This could be the first of a number of industry networks in the creative sector. Similar groups could be convened in graphic design, theater, crafts, and music.
- *Reach consensus on some immediate actions to create momentum for this initiative.* As a first step in moving the region's creative economy forward, those involved in arts and cultural development in the region should focus on a couple of initiatives. Possible actions could include:
  - Work collaboratively on a new vision for the International Festival, which makes it more focused on the creative strengths of the region and differentiates it nationally.
  - Organize a "Come Back to New Haven" event that invites esteemed individuals in the creative sector to spend a weekend back in New Haven to celebrate the region's creative economy.

APPENDIX C:
PORT OF NEW HAVEN

Description

The Port of New Haven ranks 55th nationally in overall tonnage, handling more than 10 million short tons a year, and is the largest of Connecticut's three ports handling more than double the tonnage of Bridgeport and more than five times the tonnage of New London. The Port of New Haven is a niche port that handles bulk and break bulk cargo consisting of petroleum products, steel, chemicals, scrap-metal, lumber, metallic products, cement, sand, stone, and salt, although its specialty is in steel and petroleum products. Liquid bulk products, mainly petroleum, comprise nearly 90 percent of tonnage. The port handled more than three-quarters of all petroleum movements in Connecticut ports.

Logistec Connecticut, Inc. and Gateway Terminal operate the largest multipurpose terminals with each operator having multiple berths. Logistec Connecticut specializes in the handling of general and "breakbulk" cargo such as steel, copper, zinc, aluminum, tin, forest products, recyclables, containers, project cargo, and heavy lifts. Gateway Terminal specializes in the handling of both dry and liquid bulk cargo such as petroleum products, scrap metal, pumice, cement, salt, and aggregates. Substantial warehouse and tank facilities are available at the Port for storing both bulk and breakbulk cargo ships with drafts ranging around 35 feet Mean Low Water (MLW). New Haven Harbor is also the jet fuel pipeline terminal that serves Bradley International Airport, and Westover Air Force Base located in Chicopee, Massachusetts.

In terms of land use, the city's planning department reports that 48 percent of the port district's 366 acres is occupied by terminal operations and that 38.5 percent is occupied by utility facilities. Industrial, non-marine activity predominates in the North Yard and Kendall Avenue areas. About eight to ten housing units are located on the perimeter of the district.

Recent Developments

✦ *A major development for the Port of New Haven was the creation of a Port Authority.*

Until its creation, New Haven was the largest port in the United States operating without a port authority. The lack of a port authority has historically been an impediment to growth since no single body had authority for the economic development of the port and no single body could represent port interests politically with a unified voice.

Established in 2003, the Port Authority is charged with creating a land use plan for the Port District, identifying a location for a Harbor Trail either within or outside of the district, and serving as an advocate for the port and as a liaison among port area and related businesses and organizations. Over time, the Port Authority will acquire land surrounding the port and lease the land to port-related tenants. Future revenue streams from these lease payments can pay for some facility improvements.

Although the Port Authority is still relatively new, it has already begun to mature. In 2006, the Port Authority adopted a Work Plan that will guide its actions in the coming years. Working in connection with the City of New Haven, the Port Authority has developed a small revenue stream that has funded the land use study currently being performed. The Authority can point to several recent noteworthy accomplishments:

- *Approved the acquisition of East Shore Parkway.* The Port Authority will take ownership of the land parcel in 2006. The parcel is of strategic importance because it offers expansion potential for Gateway and New Haven Terminals. This is particularly important given the space constraints under which the port operates.
- *Engaged a contractor to conduct a land use study of the port district.* A comprehensive land use study for the port is expected by the fourth quarter of 2006. Development of a land use plan is critical given that growth of the sector is impeded by the lack of adequate warehousing space.
- *Preserved existing transportation access*. The Port Authority successfully negotiated with the state Department of Transportation to keep roadways around the port open during construction on I-95.

✦ *A historical weakness of the port has been addressed. Infrastructure improvements are underway to improve the port's rail access making the port truly intermodal.*

While the port always enjoyed easy highway access, the lack of a functional rail spur to the port area has long been a weakness. Particularly with the rise of containerized cargo, ports across the world stress their ability to be fully intermodal, seamlessly moving cargo from ship to truck or rail. With the completion of the first phase of construction of the rail extension to the port, New Haven can now claim to be fully intermodal. Two additional phases of construction on the rail extension will be complete by 2008.

✦ *Bridgeport was selected over New Haven as the site for an extension of the Port of New York and New Jersey's Inland Distribution Network.*

A topic of great discussion in recent years has been the proposed Port Inland Distribution Network (PIDN). An initiative of the Port of New York and New Jersey, the plan would be to move container goods via barge to a series of feeder ports. The barge plan was initiated first between New York and Albany but extensions to the service have been discussed as far north as Boston. Both New Haven and Bridgeport were eager to become Connecticut's chosen port for this service; however, the state chose Bridgeport and has funded the facility improvements necessary to handle barge service at that location.

It is unclear what will come of the barge service. The barge operator running the leg to Albany just discontinued service because it was not proving economically viable. No regular service has been established for Bridgeport yet. Bridgeport, with state support, selected a type of technology for moving the containers that is not easily compatible with that used at the ports of New York and New Jersey. While New Haven has the container-moving equipment that is compatible with New York, it is now written into state law that Bridgeport must have a successful feeder operation with the Port of New York before anything can be pursued in New Haven.

✦ *Funding for a ferry terminal in New Haven presents an opportunity to develop new port-related activities.*

An earmark in transportation funding for a ferry terminal in New Haven is spurring activity in pursuit of a ferry operation to Long Island. Passed in the summer of 2005, the transportation bill supports six years of transportation investments in Connecticut including $10 million to build high-speed ferry terminals in New Haven, along with Bridgeport and Stamford. The bill earmarked $5 million for construction of a terminal at the intersection of I-91 and I-95. Local interest exists to make the ferry an intermodal ferry service that would bring not only passengers but freight to Long Island. It could be operational in about two years. One port-related company – Magellan - has expressed concern about the potential impact of this service on its business.

Despite the earmark, the future of the ferry service is unclear. Additional funding would be needed for construction and a ferry operator would likely need to sign on before construction would begin.

✦ *The Port is experiencing some business growth.*

Two new businesses will open in the port in early 2006. RoadLink USA, a national intermodal trucking company, will open facilities in the first quarter of 2006 eventually supporting 50 new jobs. The opening of this business is of strategic importance to the port because it plans to develop capabilities to remove containers from ships. There has been a dramatic increase in the proportion of freight being shipped in containers in the last decade, especially lumber. Developing additional container capacity in New Haven, which is primarily known as a bulk and breakbulk port, is important given these industry trends. The other business to locate on the waterfront is a self-storage facility and does not directly support the shipping and distribution industry.

Barriers to Growth

While creating the Port Authority was a significant step in preparing New Haven's port for the future, the hardest work is only beginning. The Port Authority must grapple with a challenging set of issues. In interviews conducted by the Port Authority with operators of port businesses the following major issues were identified:

- *Depth of the shipping channel.* While the depth of the channel has not been a major obstacle to date, this is likely to be an issue in the future for two reasons. First, the Port of New Haven requires dredging to maintain an adequate depth for ships to pass. The permitting process required to dredge the harbor is a lengthy. It will likely become even more challenging in the future given the controversy regarding where to dump the contaminated dredge material. Historically, it has been dumped in Long Island Sound. However, as a result of strong protests from environmentalists and Long Island residents, an agreement was reached in 2005, which involved negotiations between the state of New York, the federal Environmental Protection Agency and Army Corps of Engineers, and the state of Connecticut, to protect and restore Long Island Sound. The agreement imposes 14 specific restrictions designed to ensure that alternatives to dumping are sought and, only if absolutely necessary, allow for the safe disposal of dredging materials in two sites. If any of the restrictions are not met, the EPA has agreed to rescind the disposal site designations and cease dumping altogether. The state will need to develop a Dredge Material Dump Site Management Plan in a timely manner or future dredging of New Haven Harbor will be hampered.

The issue is compounded by the fact additional dredging may be needed to deepen the shipping channel beyond its current draft of roughly 35 feet. Trends in shipping are pushing for ever larger capacity that pushes the necessary draft of shipping channels deeper and deeper. Some ports are looking to reach depths of 50 feet. "Peer" ports such as Providence, Rhode Island, have completed dredging projects to reach a 40-foot depth and have announced plans to deepen further. While New Haven does not need to prepare to service the massive post-Panamax ships under construction currently, it is not outside of the realm of possibility that channel depth will need to be increased to at least 40 feet to accommodate the trend in ship size.

- *Lack of space.* Land use continues to be a problem for the port and is a barrier to further growth. The port area is extremely limited in its expansion opportunities. While some progress has been made in restricting future use of space around the port, such as new zoning that restricts the location of new scrap metal dealers and junk yards, nothing has been done to relocate such existing businesses. While the new businesses locating in the US Steel facility is a first step in tapping that site's potential, a plan is needed to capitalize on the 1 million square feet of space available in the facility.