



Target Industry Analysis

Introduction

Broome County contracted with E.M. Pemrick and Company to prepare the Economic Analysis Component of the County's Comprehensive Plan. The analysis is intended to update portions of a countywide economic development strategy, adopted in 2002, known as the *BCPlan*. Elements of the scope of work for the Economic Analysis include an economic profile of Broome County, a real estate assessment, a profile of the local workforce, a target industry analysis, and an incentive evaluation. This document is the fourth of five deliverables.

Identifying Target Industries

The project team's approach to selecting target industries incorporates the following:

1. Historic presence of any industries to indicate any residual competencies.
2. Current employment levels in and location quotients for specific industries and economic segments in the County.
3. Overall market trends that may impact the future growth of specific industries.
4. Industry focus at the state and regional levels.
5. The availability of resources required to support specific industries including:
 - Labor (availability and cost)
 - Transportation access (interstate, rail and air)
 - Utilities (availability, backup potential and cost)
 - Sites and buildings (location, cost and level of readiness)
 - Quality of life attributes to help attract talent (e.g., availability and cost of housing, property taxes, educational resources, health care, cultural and recreational options, retail)

Each of these factors was considered in the selection of target industries for Broome County. A summary of target industries and their rationale is provided below, followed by additional details that support the rationale.



Selection of Target Industries and Resource Assessment for Broome County

Target Industry: Health Care Services	
Description:	There is potentially some level of incremental growth for existing companies and organizations that will be driven by demographics (primarily the aging population).
Criteria for Evaluation	Discussion
Historic Presence of Industry	Health care has expanded significantly in Broome County over the past 130 years with the growth of both private and Catholic-affiliated hospitals and networks. The area has become a regional health care hub. The industry also includes nursing homes and long-term care facilities, physicians' offices, medical laboratories, etc.
Current Employment Levels and Major Employers	2011: 14,385 2006: 13,236 2001: 12,385 Major Employers: <ul style="list-style-type: none"> ▪ United Health Services ▪ Wilson Memorial and Binghamton General ▪ Lourdes Hospital ▪ United Health Services ▪ Willow Point Nursing Home ▪ Good Shepherd Fairview Home
Industry Trends/Outlook	The industry may be substantially impacted by reductions in fees/payments under the Affordable Care Act as well as significant investments in information technology and the way care is offered in the future.
State/Regional Strategic Industry	State: Not a strategic industry cluster Regional: Health Care 2020 Initiative
Local Potential	Moderate (following a period of relatively high growth)
Resource Assessment	Real Estate: The hospitals determine their own resource needs. A key planning/land use consideration is the long-term use of properties adjacent to existing facilities that would either allow or inhibit expansion in place. Labor: Health care providers work closely with local colleges and universities to provide training and meet workforce needs. (The medical community has made significant investments in the health sciences program at BCC, for example.) Some issues in recruiting doctors and medical specialists to upstate New York.



Target Industry: Education (K-12, College and University)	
Description:	Binghamton University has plans for expanded program offerings and additional student enrollments. This will have a significant impact on the local economy, both directly and by having additional students available for part-time work.
Criteria for Evaluation	Discussion
Historic Presence of Industry	Binghamton University was started as Harpur College in 1947 and Broome County Community College was founded in 1946. Both have continued to grow in enrollment, scope of programs and reputation for quality. They are vital resources to the regional economy.
Current Employment Levels and Major Employers	<p>Public education (for Binghamton MSA): 2011: 9,400 (local); 4,700 (state) 2006: 9,500 (local); 3,900 (state) 2001: 9,000 (local); 3,700 (state)</p> <p>Private-sector educational services (for Broome County): 2011: 520 2006: 546 2001: 648</p> <p>Major Employers:</p> <ul style="list-style-type: none"> ▪ Binghamton University ▪ Broome County Community College ▪ Public school districts (K-12) ▪ Broome-Tioga BOCES
Industry Trends/Outlook	There are plans to continue to expand programs and enrollment at Binghamton University with the backing of the SUNY system and state government. Broome Community College will expand as the market drives needs and opportunities.
State/Regional Strategic Industry	State: Not a strategic industry cluster but an enabling resource Regional: Research portion of university to support growth in other segments
Local Potential	Moderate to High
Resource Assessment	Binghamton University and Broome Community College are utilizing land on their existing campuses while looking to expand downtown for certain programs or functions. Broome County and the City of Binghamton should stay informed of plans to assure the proper support is in place to enable expansion while weighing the strategic value of having a not-for-profit (paying no local taxes) consume particular real estate assets.



Target Industry:	Manufacturing				
Description:	Diverse segment with strengths in specific areas as noted below.				
Criteria for Evaluation	Discussion				
Historic Presence of Industry	Manufacturing has been a strong base of the local economy from the earliest days of the Industrial Revolution due to local access to transportation, labor, raw materials and individuals with innovative ideas. The area has a long history in shoes with Endicott-Johnson, computers/electronics with IBM and GE (now BAE Systems), and simulation with Link Simulation.				
Current Employment Levels and Major Employers	Top Segments	2011	2006	2001	Major Employers
	Total Employment	9,678	12,282	16,487	
	Computer/Electronics	4,532	5,558	8,122	IBM, Lockheed Martin, BAE Systems, Endicott Interconnect, Endicott Research Group
	Fabricated Metal	1,148	1,162	1,524	Impress USA, Triple Cities Metal Finishing, Endicott Precision
	Machinery	692	941	1,426	Universal Instruments, Link Simulation/L3, Samscreen
	Food	847	1,029	1,127	Frito-Lay, Crowley Foods
	Electrical Equipment	795	983	1,003	Amphenol Interconnect Products
	Plastics/Rubber	347	409	543	National Pipe & Plastics
Industry Trends/Outlook	<p>Selected manufacturing segments can thrive in Broome County, but overall, high property taxes and utility costs, and New York’s reputation for high taxes, will not put the area high on the list as a prime location for manufacturing. Electronics-related business derived from university research may thrive on the Huron Campus initially. If there is substantial expansion, the business will most likely relocate to a lower-cost location.</p> <p>Food processing is expanding rapidly in the state, leveraging the market demand for Greek-style yogurts and other products. Broome County has a potential play in this segment if it can offer low energy costs, reduced taxes, significant water and sewer capacity, and sites amenable to food processing. The County’s limited sewer capacity could restrict its ability to attract food processing companies.</p> <p>Metal fabrication and machinery products are strong in Broome County and could potentially expand if the owners make overt choices to stay in the area rather than relocate to lower cost destinations.</p>				
State/Regional Strategic Industry	<p>State: Electronics/imaging, food processing, industrial machinery, materials processing and transportation equipment</p> <p>Regional: Advanced manufacturing in transportation-related equipment</p>				
Local Potential	Low to moderate				



Target Industry:	Manufacturing
Resource Assessment	<p>Real Estate: Lack of sites at a high level of readiness near interstates. Also a lack of contemporary industrial buildings with high ceilings (above 25 feet).</p> <p>Labor: Skilled and unskilled labor available, but challenges replacing older (retiring) workers and supporting incremental growth. Young people are not interested in manufacturing.</p> <p>Utilities: Some sites around the airport lack utilities; other sites have access to high cost power and limited sewer capacity.</p>

Target Industry:	Professional, Technical, and Business Services				
Description:	Legal, accounting, engineering, architecture, software, etc. for clients in the NY/PA area.				
Criteria for Evaluation	Discussion				
Historic Presence of Industry	Municipal governments, large manufacturers, educational institutions, health care providers, and other expanding businesses and organizations were major sources of demand for technical resources over the last 60+ years. Other services (legal, accounting and business consulting) were based in the Binghamton area to service the broader region.				
Current Employment Levels and Major Employers	Top Segments	2011	2006	2001	Major Employers
	Total Employment	3,180	3,754	3,666	
	Computer Systems Design	615	794	801	BlueStorm Technologies, Forward Business Solutions
	Architecture and Engineering	561	583	595	Delta Engineering, McFarland-Johnson, Innovation Associates
	Legal Services	543	620	642	Hinman Howard & Kattell LLP, Coughlin and Gerhart
	Accounting/Bookkeeping	341	555	396	Piaker & Lyons
	Management Consulting	129	199	202	Modern Marketing Concepts, Strategic Advantage Consulting
Industry Trends/Outlook	This sector took a hit with the national recession. Growth will be determined by overall business growth and economic activity (including large construction projects) within the service area. The development of high-tech businesses derived from R&D and shale gas activity may be sources of growth for legal, engineering, and other professional and technical services.				
State/Regional Strategic Industry	<p>State: Information technology services</p> <p>Regional: Not directly but technical support for other initiatives</p>				
Local Potential	Moderate (if the overall local economy grows).				
Resource Assessment	Real Estate: There is a good inventory of Class A & B space available in Broome County.				



Target Industry: Professional, Technical, and Business Services	
	Labor: Labor is available locally, supported in part by engineering, accounting, and business programs at Binghamton University and other educational institutions. Some specialized talent must be recruited to the area. Recruitment can be an issue for workers from outside NYS or Boston due to high real estate tax rates and limited familiarity with “Greater Binghamton.”

Target Industry: Back Office and Customer Service Operations																
Description:	Derived primarily from financial services, credit/collections, IT support and support functions for other industries. The function is office or in some cases home based and covers a diverse skill base (accounting, IT, customer service, HR, legal, etc.).															
Criteria for Evaluation	Discussion															
Historic Presence of Industry	Broome County has had a limited number of stand-alone back-office and customer service operations. In the past, companies like Endicott-Johnson and IBM had back-office functions as part of their operations. More recently, NCI has utilized local talent for credit and collections, and announced plans to add 300 new customer-service jobs at its service center in Vestal.															
Current Employment Levels and Major Employers	<table border="1"> <thead> <tr> <th>Segment</th> <th>2011</th> <th>2006</th> <th>2001</th> <th>Major Employers</th> </tr> </thead> <tbody> <tr> <td>Financial Services</td> <td>2,588</td> <td>3,203</td> <td>3,515</td> <td>Security Mutual Life Insurance, Columbian Mutual Life Insurance</td> </tr> <tr> <td>Administrative and Support Services</td> <td>3,828</td> <td>4,037</td> <td>6,232</td> <td>Nationwide Credit (NCI)</td> </tr> </tbody> </table>	Segment	2011	2006	2001	Major Employers	Financial Services	2,588	3,203	3,515	Security Mutual Life Insurance, Columbian Mutual Life Insurance	Administrative and Support Services	3,828	4,037	6,232	Nationwide Credit (NCI)
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Industry Trends/Outlook	<p>Nationally, the financial services industry has taken a hit in the last few years; there has been a lot of consolidation and fewer back offices are being built. However, there may be opportunities for customer service and collections that serve a range of industries (e.g., utilities/telecom).</p> <p>Having access to Binghamton University with students that want to work part-time along with the overall availability and cost of labor in Broome County is a key selection factor.</p> <p>Some operations may co-locate a computer operation and require dual-sourced power (at a competitive cost) and dual-sourced telecom.</p>															
State/Regional Strategic Industry	State: Back office operations are one of the state clusters Regional: Not directly but technical support for other initiatives															
Local Potential	Moderate															
Resource Assessment	Real Estate: There is available Class B office space in the 10,000 SF to 75,000 SF range Labor: Experienced customer-service talent and part-time student labor available. Utilities: Adequate; if there is a data center attached, the cost of power will be an issue unless the company locates on the Huron Campus.															



Target Industry:		Wholesale/Warehousing/Distribution Centers and Related Transportation				
Description:	Broome County is a strategic location to serve the New York State market and adjacent New England. Northeastern Pennsylvania (Scranton and the Lehigh Valley) and the Mohawk Valley are key competitors.					
Criteria for Evaluation	Discussion					
Historic Presence of Industry	Binghamton has been a distribution center since the early days of rail transportation; this has been reinforced by the establishment of interstate access in multiple directions. Maines Paper & Food Service has been in the area for over 90 years.					
Current Employment Levels and Major Employers	Segment	2011	2006	2001	Major Employers Maines Paper & Food Service, Willow Run Foods, FedEx, TeamWorld	
	Wholesale Trade	3,746	3,965	3,309		
	Transportation & Warehousing	1,464	1,724	2,452		
Industry Trends/Outlook	Segment relies heavily on overall economic growth (based on population and business growth) in the U.S. economy as well as within the region being served. The overall economy is slower than normal and the regional economy is also slow. If the state approves drilling of shale deposits for natural gas, it could increase this segment significantly.					
State/Regional Strategic Industry	State: Distribution is a strategic cluster Regional: These segments are not a regional priority					
Local Potential	Low to Moderate					
Resource Assessment	<p>Real Estate: Either available distribution buildings (50,000 SF and larger that can easily be expanded) with high ceilings (30+ feet) and 40+ foot column spacing or parcels of 5 to 25 acres that are shovel ready and located within 1-2 miles of an interstate. Steep slopes may limit the county's ability to compete for distribution sites, which typically require large expanses of flat land.</p> <p>Labor: Requires general laborers (e.g., freight movers, packers, office and stock clerks) and truck drivers as well as technicians for automated warehouse operations.</p>					

Target Industry:		Data Centers
Description:	Due to the R&D in data center optimization at Binghamton University, it would be a prime opportunity to site a data center in Broome County. Will need low cost/dual feed power and fiber.	
Criteria for Evaluation	Discussion	
Historic Presence of Industry	IBM maintained data centers in the area (perhaps some of the original centers). There are currently several data centers in the Huron Campus with capacity for additional operations.	
Current Employment Levels	There is no specific employment in Broome County attributed to NAICS code 518	



Target Industry: Data Centers	
and Major Employers	for data center operations. Most operations are typically part of a larger corporate, back office or R&D function.
Industry Trends/Outlook	The demand for digital data generation, management and retention continues to expand and processing speeds and storage capacities continue to be in need. Companies seek locations that help reduce the cost of operations while enhancing security.
State/Regional Strategic Industry	State: Not specifically targeted by the state Regional: Not specifically targeted by the region
Local Potential	Moderate. Will require significant marketing to build awareness of the Huron Campus as a potential site for data centers.
Resource Assessment	The Huron Campus has access to low cost power, telecom and available facilities. Research on energy efficient data center systems at Binghamton University may be a point of attraction for some businesses.



Historical Perspective on Local Economy

The economic history of Broome County is based on the vision of a handful of individuals over the years who produced innovative and market-competitive products underpinned by the area's access to transportation (originally canals, then the railroad, and eventually interstate highways). The area was also able to attract a workforce to support each industry through the development of communities that met the needs of workers

<p>Broome County founded (1806)</p>  <p>Chenango Canal completed in 1837 connecting Binghamton with the Erie Canal and provided transportation access to major markets.</p> <p>Shoe Industry began with the Lester Brothers Boot and Shoe Company in 1854. It was acquired by Henry Endicott of Massachusetts in 1890 and he later partnered with George F. Johnson in 1899. The company was known for its Square Deal where it essentially provided a company town with libraries, parks, churches and even six carousels. The company had as many as 20,000 employees.</p>  <p>Harpur College established in 1946 and later became part of the State University of New York system as Binghamton University.</p> <p>GE plant established 1948 to produce guidance instrument systems. Had as many as 4,000 employees, sold business to Martin Marietta in 1993 and later sold to BAE Aerospace.</p> <p> I-81 completed in the Binghamton area north in the early 1960's.</p> <p> I-88 completed to the New York Thruway in the late 1980's.</p>	<p>1800</p> <p>1810</p> <p>1820</p> <p>1830</p> <p>1840</p> <p>1850</p> <p>1860</p> <p>1870</p> <p>1880</p> <p>1890</p> <p>1900</p> <p>1910</p> <p>1920</p> <p>1930</p> <p>1940</p> <p>1950</p> <p>1960</p> <p>1970</p> <p>1980</p> <p>1990</p> <p>2000</p> <p>2010</p>	  <p>Erie Railroad completed in 1848 providing speed to major markets.</p> <p>Manufacturing Expansion in the area expanded during the Civil War with the production of guns and after the war with wood products and others.</p> <p>Stow Manufacturing is established in 1875 to produce the unique flexible shaft.</p> <p>Binghamton General Hospital est. 1888.</p> <p>Electronics/Computer Industry Started with the Bundy Manufacturing Company in 1889, Thomas Watson, Sr. was hired as an executive in 1914 and changed the name of the firm to International Business Machines (IBM) in 1924. The company continued to expand in the Endicott area but also placed operations throughout the world as the business became a global company.</p>  	<p>Cigar Industry becomes the second largest in New York State and draws a substantial number of workers from Europe. The industry meets its demise when cigarettes become popular in the 1930's along with automation and labor unrest.</p>  <p>Flight Simulation Industry was first developed by Edwin Link with the introduction of the first flight trainer in 1929. Link Aviation Devices, Inc. has evolved over the years utilizing the latest technologies. The company is still located in Binghamton and is now a division of L3 Communications.</p> 
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of different skills. Key industries have included shoes, cigars, wood products, computers and electronics, and aerospace products.



Current Industry Presence

Over the past 25 years, Broome County has become known as a university center as well as a regional health care hub. It has also had some growth in wholesale and distribution. The County has built on and retained its manufacturing roots, although overall employment levels have dwindled over the last several decades.

Table 1: Broome County Industry Strengths

Industry	Description
Health Care Services	Major regional health care service providers, long-term care facilities, and medical offices
Educational Services (Public Sector)	Major state university and a high quality community college
Wholesale/Distribution	Multiple companies that distribute food products, paper, plumbing supplies, commercial equipment, machinery, etc.
Finance and Insurance	Back office activity and local/regional sales offices
Professional and Technical Services	Regional firms that support multi-state activities within the Northeast
Manufacturing	<ul style="list-style-type: none"> ▪ The IBM heritage within the area has supported a very strong computer/electronics presence along with the services and products to support the industry. ▪ GE's original guidance systems business has expanded and changed hands, becoming Martin Marietta and then BAE Aerospace.

As shown in **Table 2**, location quotients for Broome County¹ indicate substantial strengths in computers and electronics as well as electrical equipment manufacturing. There is a significant presence of manufacturing overall as well as health care services. Employment in finance and insurance, professional and technical services, and company headquarters is relatively light.

Table 2: Location Quotients for Selected Industries in Broome County

NAICS Code	Industry	LQ
31-33	Manufacturing	1.28
311	Food Manufacturing	0.90
325	Plastics and Rubber Manufacturing	0.85
332	Fabricated Metal Product Manufacturing	1.32
333	Machinery Manufacturing	1.01
334	Computer and Electronic Product Manufacturing	6.35
335	Electrical Equipment and Appliance Manufacturing	3.38
42	Wholesale Trade	1.00
52	Finance and Insurance	0.73
54	Professional and Technical Services	0.60
55	Management of Companies and Enterprises	0.60
56	Administrative and Waste Services	0.80
62	Health Care and Social Assistance	1.40

Source: U.S. Bureau of Labor Statistics, QCEW, and E.M. Pemrick and Company.

¹ See Economic Profile for a full discussion of Location Quotients.



State Strategic Industries

The Empire State Development Corporation has identified 16 key industry clusters in New York State:

- Back Office & Outsourcing
- Biomedical
- Communications, Software & Media Services
- Distribution
- Electronics & Imaging
- Fashion, Apparel & Textiles
- Financial Services
- Food Processing
- Forest Products
- Front Office & Producer Services
- Industrial Machinery & Services
- Information Technology Services
- Materials Processing
- Miscellaneous Manufacturing
- Transportation Equipment
- Travel & Tourism

These are not defined as "target industries," but as industry clusters prevalent in many regions of the state. A key characteristic of these industry clusters is that they are export-oriented, selling products and services outside the regional market, generating income and employment. Top industry clusters in the Southern Tier with respect to employment, wages, and/or location quotients include Industrial Machinery & Services, Electronics & Imaging, Front Office & Producer Services, and Transportation Equipment.

New York State's economic strengths are primarily derived from agriculture, financial services, educational services, information (media), health care, and the manufacture of industrial equipment, selected electronics, and optics-related equipment. Goods produced in the state are typically high value to overcome the high cost of taxes and energy.

The State of New York has established regional *Centers of Excellence* at leading universities to support high technology ventures and encourage the commercialization of scientific breakthroughs. The Centers use a collaborative approach involving the public and private sectors. A listing of the Centers of Excellence is provided in **Table 3** below.



Table 3: New York State Centers of Excellence

Center	Location
Small Scale Systems Integration and Packaging (S3IP)	Binghamton
Bioinformatics & Life Sciences	Buffalo
Infotonics (Photonics and Micro Systems)	Rochester
Nanoelectronics	Albany
Environmental Systems (Renewable Energy and Indoor Environments)	Syracuse
Information Technology	Long Island

Located at Binghamton University, the Small Scale Systems Integration and Packaging (S3IP) Center is a research and development organization that addresses challenges in small scale system design, process development, prototyping, and manufacturing for academia and the microelectronics industry. Current research areas include:



- Small Scale Systems Integration and Packaging;
- Materials and Sensors;
- Flexible Electronics;
- Analytical and Experimental Models;
- Flexible, Large Area Autonomous Solar Power; and
- Energy-Smart Electronic Materials.

These research areas have been selected for their technical importance to the field, and their demand for interdisciplinary research in fundamental engineering, physical and life sciences. Each theme also provides opportunities for meaningful industrial partnerships, has the potential for societal impact and innovation, and will attract developing engineers and scientists to the field. The activities at this Center of Excellence can also be integrated with outcomes from the other Centers of Excellence to deliver an ultimate solution/product. This strengthens Broome County from an access to technology perspective.



Regional Strategic Industries

The Strategic Economic Development Plan developed by the Southern Tier Regional Economic Development Council in 2011 identifies four "principal growth sectors and industry clusters [that] have the potential to drive the economy and leverage its core strengths." These are shown in **Table 4**.

Table 4: Southern Tier Growth Sectors

Industry	Description
Renewable Energy	<ul style="list-style-type: none"> Includes wind, biomass, solar, and natural gas. Productization [sic] of energy technologies and energy efficiency activities that reduce costs
Advanced Manufacturing	<ul style="list-style-type: none"> Next-generation transportation development based on regional expertise in avionics/vehtronics, simulation, logistics, hybrid transportation power development, etc.
Agriculture	<ul style="list-style-type: none"> Sustainable agriculture and forestry
Health Care	<ul style="list-style-type: none"> Focus on increasing rural access, strengthening the industry through technology development and university-industry collaboration, and workforce development

The vision for the Southern Tier is aimed at capitalizing on the region's assets and looking forward towards the future: "Building on a strong foundation of existing businesses and higher education institutions the Southern Tier region uses a collaborative approach to leverage its globally competitive advantages to attract talent and investment for the development of industry clusters. Our focus will be on increasing the size and prosperity of the region's workforce through new business creation based on high-technology discoveries and other entrepreneurship activities, while ensuring healthy communities and protecting the natural beauty and resources of the region."

The plan contains five major strategic objectives, four of which focus on the industry clusters identified above.

Strategy 1: Leader in Energy Efficiency & Renewable Energy Technology

Objective: Optimize use of the region's abundant natural resources, research and technology transfer, academic and business innovation and training programs to build a thriving energy sector for the benefit of residents, institutions, businesses and major industrial centers.

Strategy 2: Transportation Industry ... The Next Generation Technology and Advanced Manufacturing

Objective: Build the region's existing transportation industry into a global leader and technological hub for next generation transportation development.

Strategy 3: Health Care 2020

Objective: Develop and expand the use of sophisticated diagnostic tools and care methods, together with training of health care providers and technical personnel, to strengthen the healthcare industry while creating a healthier population and workforce region-wide.



Strategy 4: Revitalize the Rural Farm and Forest-Based Economy

Objective: Expand and increase the sustainability of agricultural and forestry ventures through product development and promotion, business infrastructure development and utilization of new technology.

Trends and Factors That Impact Economic Activity

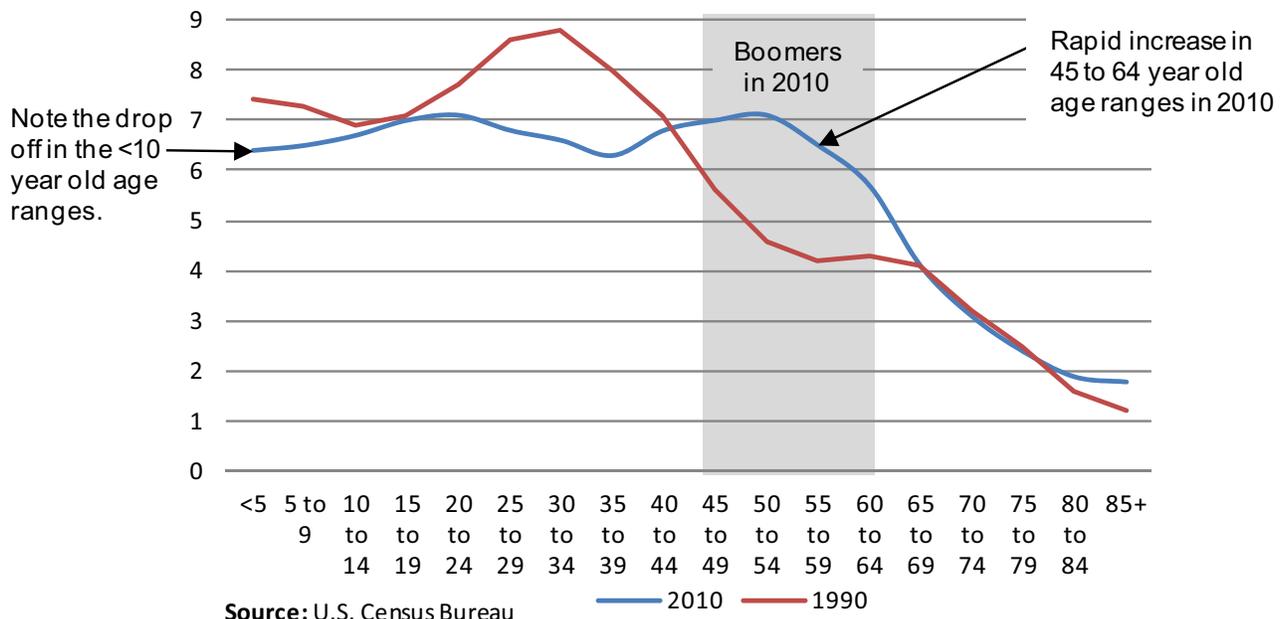
As a means of both verifying and identifying market opportunities for target industries, specific industries and technologies were studied in depth.

Health Care Industry Dynamics

The health care industry is undergoing some significant changes. These are derived from a confluence of an aging population that requires more care, changes in technology, and the escalating cost of delivering health care services utilizing traditional approaches.

Demographic Shifts - World War II and the Depression impacted birth rates and the rapid economic expansion after WWII of the baby boomers who are now reaching retirement. Also note the lower birth rate with young adults having fewer children, none at all or later in life compared to the baby boomers. The result is a rapid expansion of the population entering retirement and older age that impacts both the labor force and the number of potential Medicare patients.

Comparison of Age Ranges and The Impact of Baby Boomers in the U.S. (1990 vs. 2010)





Computer-Based Records and Direct Data Entry - An important advance in cutting health care costs is the use of electronic records. Electronic records have the potential not only to improve efficiency but also to enhance the quality of care through better communication. The management of these systems will require additional IT staff and large data centers to retain records. Health information technology systems will require substantial up-front costs, but are expected to bring a significant return over time.

The federal Affordable Care Act (discussed further below) is supportive of investments in health IT to encourage the use of digital medical records. The Act also provides funding for training in fields such as health informatics² to address specific health care workforce needs.

New Remote Diagnostic Technology - Integrating both sensor and cell phone technology, doctors can remotely evaluate a patient's heart rate and other conditions. This means that patients located in rural communities can still receive quality care and assessment.

Affordable Care Act - The federal Affordable Care Act (ACA) is expected to have significant impacts on the health care industry as provisions aimed at cost containment begin to take effect.

Among the most important provisions of the ACA is a focus on preventive care and a shift from the current "fee for services" model to a patient-centered approach that aims to reduce unnecessary hospital admissions and rewards health care providers for quality and efficiency. In central New York, for example, the adoption of the "medical home" concept by Bassett Healthcare Network is changing the way services are delivered at its 23 primary care centers. Under Bassett's program, general and family practitioners lead teams of nurses, medical specialists, and even front-office staff to plan and coordinate patient care. In addition, electronic medical records are centralized, allowing physicians to check and follow up on patients' referrals to specialists.³

Experts disagree on how the ACA will impact employment in the health care industry. An analysis by researchers at the Urban Institute, for example, asserts that the ACA is "unlikely to have major aggregate effects," because positive and negative impacts will offset each other: while the expansion of coverage and increased federal spending on health care will probably *increase* the demand for labor, "including increasing use of medical equipment, new technologies and pharmaceuticals" in the health care sector, spending reductions in Medicare and other government programs will have the opposite effect.⁴

The law also places a 2.5% tax on the revenues of medical device and pharmaceutical manufacturers. This could impact the growth and development of the industry, particularly among smaller/emerging companies that have very thin margins. It could also drive up the costs of drugs and medical devices.

The Future of Health Care?

A recent article in *Modern Healthcare*, a trade publication, questions whether the significant job growth in the health care sector is sustainable – especially in older cities with slow-growing or declining populations.

² Health informatics is a discipline at the intersection of health care, computer science, and information science.

³ "Bassett's 'Medical Home' System Scores High Marks," *The (Oneonta) Daily Star*, April 26, 2013.

⁴ John Holahan and Bowen Garrett, "How Will the Affordable Care Act Affect Jobs?" The Urban Institute, March 2011.

Accessed at www.urban.org/UploadedPDF/412319-Affordable-Care-Act-Affect-Jobs.pdf.



Cities like Detroit, which have lost thousands of manufacturing jobs over the last several decades, tend to view health care as a catalyst for economic growth; it provides stable employment and relatively high-paying jobs. As the article notes, these cities “could be vulnerable could be vulnerable to sharp job reversals as Medicare, Medicaid and private insurers escalate their efforts to ratchet down costs.” Other analysts are not so sure, pointing out that higher median ages and poverty in economically stressed communities continue to drive rising demand for health care services. With no clear picture emerging, hospital executives are being cautious about hiring, focusing on making processes more efficient while they evaluate whether to add labor.⁵

Another article in *Modern Healthcare* notes that the ACA and “the shifting economics of medicine” are already impacting how medical students are trained. Many solo practitioners have gone to larger group practices, driven by increasing costs and declining insurance reimbursements. In addition, hospitals have been purchasing private practices to bolster declining revenue from in-patient stays; hospitals now employ about 20% of U.S. physicians. With teamwork at a premium under the ACA, medical students are learning how to work effectively with other professionals, whether they are doctors, nurses, nurse-practitioners, social workers, or home health aides. Many universities have established new programs: joint degrees in public health, business, and public administration; MD-MBA programs; and masters-level programs in health care management.⁶

Locally, Binghamton University’s Decker School of Nursing recently established a doctoral program focused on providing health care in rural communities, and its School of Management has created an Executive MBA program with a health care concentration that allows people with clinical backgrounds to enhance their managerial skills. Broome Community College, which has many programs in the health sciences, also offers a Health Information Technology degree, preparing graduates for the increasing number of IT jobs driven by the use of electronic medical records.

All considered, although the health care industry has undergone substantial growth both locally and nationally over the past 20 years, continued growth at the same pace is not necessarily a given. Employment may actually be reduced as practices consolidate and data entry positions are replaced with fewer but higher level IT jobs.

⁵ “On the Bubble? With Healthcare Job Growth Outstripping Population in Aging Rust Belt Cities, Some Question the Trend's Durability,” *Modern Healthcare*, March 2, 2013.

⁶ “Obamacare Transforms Med School,” *Modern Healthcare*, February 4, 2013.

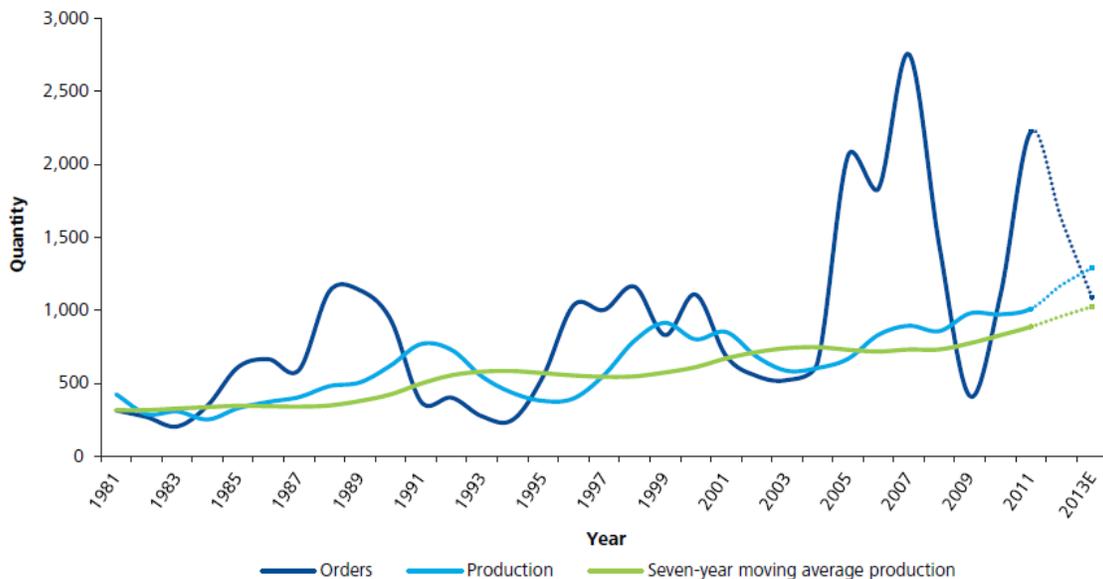


Commercial and Military Aerospace Markets

Several of Broome County’s major employers rely on commercial and military aerospace markets to sustain them. The information below examines the current state of these markets.

According to a recent report by Deloitte Touche Tohmatsu LLC, orders for military-related projects have seen a three-year decline primarily due to decreased spending by the U.S. and European countries. In contrast, orders for commercial aircraft hit record levels in 2012 and are projected to do so again in 2013. Aircraft production in 2013 may hit 1,000 aircraft on a world-wide basis.

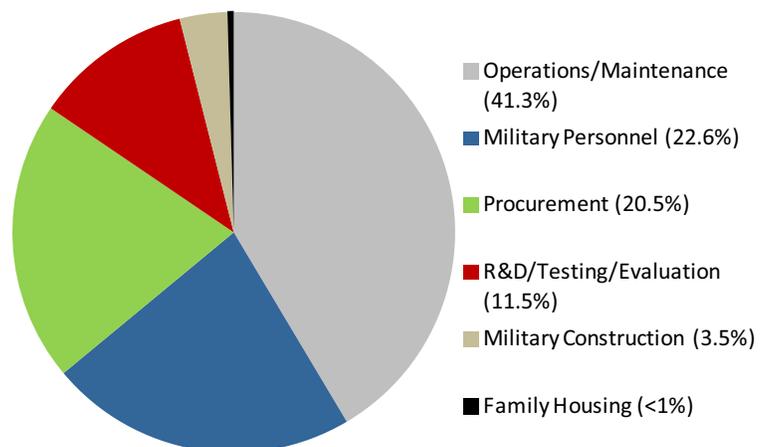
Historic and Projected Orders vs. Production for Global Commercial Aircraft



The globalization of production (components and final assembly) is occurring as emerging countries like China are seeing an increased demand for air travel that is driving interest in production of aircraft. There will be pressure to keep production in the “home” country but also to have some presence in countries placing the orders to comply with purchasing requirements and reduce costs.

The U.S. military spending in 2011 was over \$710 billion which was 41% of the global military spending, followed by China at \$142.9 billion, Russia at \$71.9 billion and France/UK at \$63 billion. U.S. military spending by category is shown at right.

Military Spending by Category





Data Centers

The accumulation, storage and retrieval of information continues to expand at an exponential rate, driving an increased demand for data centers. Industries that will have a definite need for substantial growth in data centers will be finance and insurance, health care and retail. The demand for additional capacity is further enhanced by the trend of cloud computing – a technique of accessing information from anywhere via the Internet.

There are different types of data center ownership and operational arrangements that support the needs of customers with various requirements:

- A dedicated data center at a company headquarters, back office or R&D center.
- A dedicated/remote data center that has one user but is located away from other operations. This may be company or third party operated.
- A co-located/third-party operated data center. As the cost of operations and constant replacement of equipment escalates, companies look for creative alternatives to owning and operated data centers themselves.

Data centers are also classified by levels of reliability and availability (defined as “tiers”) that determine facility design features and utility requirements. The four tier levels are outlined in **Table 5** below.

Table 5: Data Center Requirements	
Tier Level	Requirements
1	<ul style="list-style-type: none"> ▪ Single non-redundant distribution path serving the IT equipment ▪ Non-redundant capacity components ▪ Basic site infrastructure with expected availability of 99.671% uptime
2	<ul style="list-style-type: none"> ▪ Meets or exceeds all Tier 1 requirements ▪ Redundant site infrastructure capacity components with expected availability of 99.741% uptime
3	<ul style="list-style-type: none"> ▪ Meets or exceeds all Tier 1 and Tier 2 requirements ▪ Multiple independent distribution paths serving the IT equipment ▪ All IT equipment must be dual-powered and fully compatible with the topology of a site's architecture ▪ Concurrently maintainable site infrastructure with expected availability of 99.982% uptime
4	<ul style="list-style-type: none"> ▪ Meets or exceeds all Tier 1, Tier 2 and Tier 3 requirements ▪ All cooling equipment is independently dual-powered, including chillers and heating, ventilating and air-conditioning (HVAC) systems ▪ Fault-tolerant site infrastructure with electrical power storage and distribution facilities with expected availability of 99.995% uptime



The operation of a data center exists between the tension of two key drivers: efficiency (cost) and reliability from a perspective of 99.99+ % uptime and the swings in capacity (depending on the use and access). The operating challenges are different from a fairly predictable and controllable inhouse center vs. a Google center that gets hit with a web site that goes viral.

Selecting a site for a data center requires an evaluation of specific criteria that maximize performance while minimizing risks. Key parameters include:

- Low incidence of natural disasters from tornados, floods, earthquakes, hurricanes, etc.
- Adequate capacity and high reliability and low cost of telecom and electric power sources. There is a new strategy to address electric power issues by installing a stand-alone power source that can utilize natural gas or another highly reliable energy source to generate electricity.
- A site that does not have a lot of exposure to traffic and the public – i.e., not a high-visibility location.
- Access to IT, operations, and maintenance talent to support the facility.

The physical size of the facility can vary and the amount of buffer and expansion land that a prospective company requires varies by application. The land requirements may range from 5 to 50 acres and should be in a location that has clean ambient air.

Large Scale Traditional Data Center Complex





Food Processing

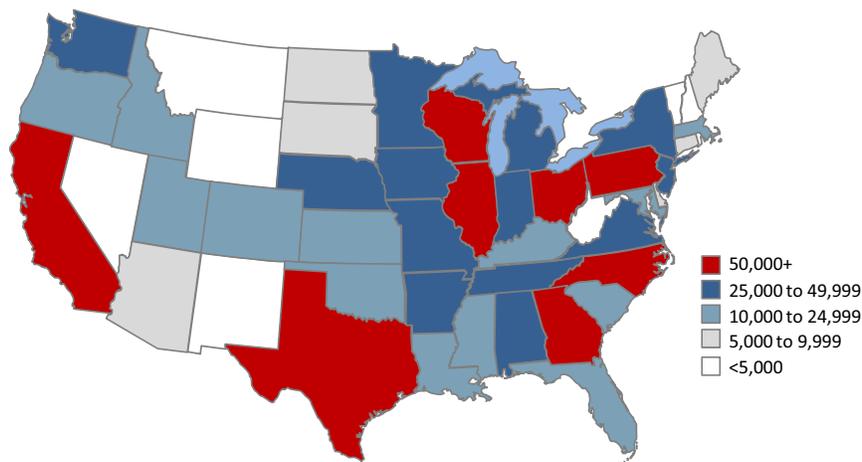
New York State is in the top ten food processing states with a fairly broad industry presence. Companies locate in the state for two primary reasons: 1) to gain access to bulk milk and field crops, and 2) to be in close proximity to major markets (e.g., the New York City metro area and New England). Currently, the fastest growing economic segment in the state is dairy, with rising demand resulting in rapid expansion of yogurt production. Broome County could support additional food production facilities.

Top Ten Food Production States										
Segment	CA	TX	IL	PA	WI	GA	NC	OH	NY	IA
Animal/Pet Food	C	D	E	D	E	E	E	E	E	D
Grain/Milling	D	E	C	E		E	E	E	E	C
Sugar/Confectionary	C	D	C	C	E	E		E	E	
Fruits/Vegetables	A	C	C	C	C		E	B	C	E
Dairy	B	C	D	C	B	E	E	C	C	D
Meat/Seafood	B	A	B	B	B	A	A	C	D	A
Baked Goods	D	B	B	B	D	B	C	B	B	E
Other Foods	A	C	B	B	C	C	D	C	C	D
Beverages	A	C	B	B	C	C	D	C	C	D

New York's food production industry employment has been just below 50,000 and in 2013 may exceed that level.

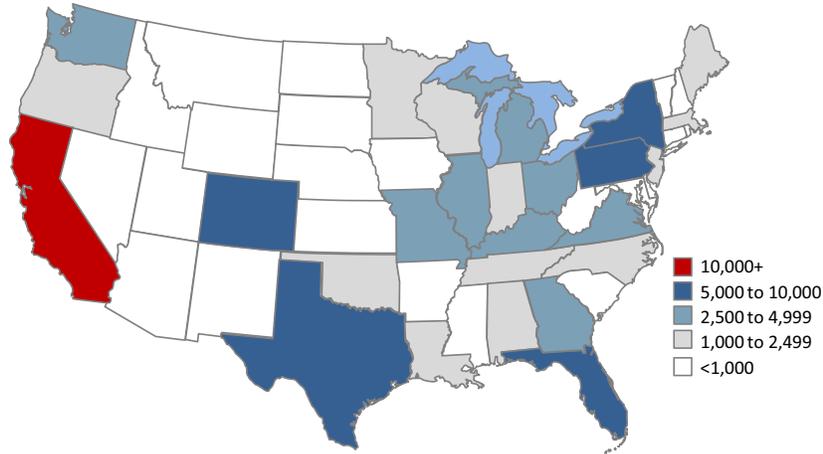
A	25,000+
B	10,000 – 24,999
C	5,000 – 9,999
D	2,500 – 4,999
E	1,000 – 2,499

Food Processing Employment by State



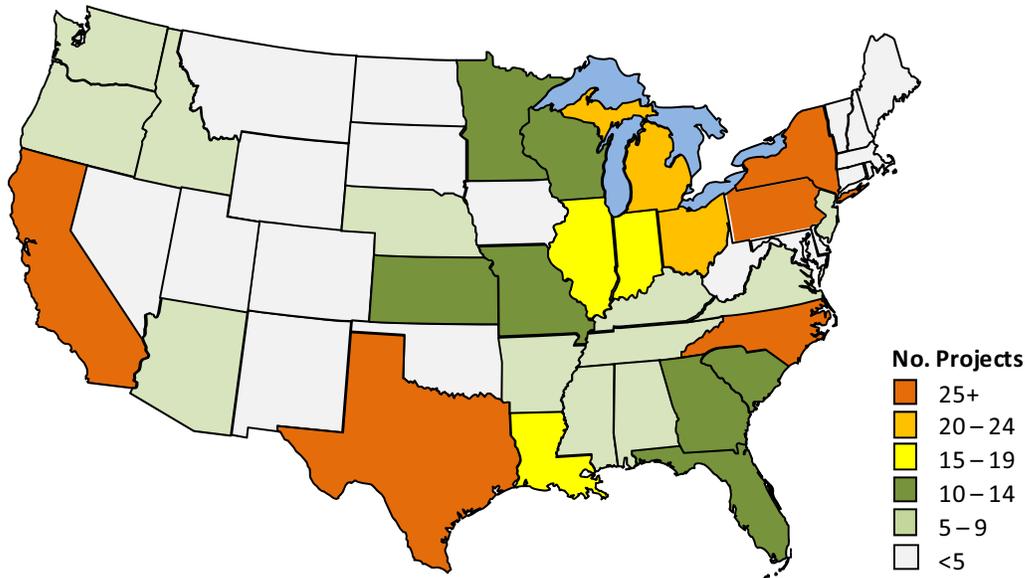


Beverage Processing Employment by State



Based on industry data, between 2007 and 2011, there were over 550 major project announcements in the U.S. food and beverage industry, of which 84% were manufacturing related. These included four manufacturing projects in Genesee County and one each in the counties of Chenango, Chemung, Monroe, Onondaga, and Oswego. New York ranks third in food industry headquarters, so the state has access to top-ranked companies within the industry.

Food and Beverage Manufacturing Projects by State: 2007-2011



For Broome County, the challenge will be whether it can offer clean uncontaminated or greenfield sites with interstate access and substantial water and sewer capacity. Food processing facilities also need to be located well away from residential neighborhoods due to the odors involved, and away from companies that generate potential contaminants (e.g., cement plants, metal processing facilities).



Table 6 below shows various segments of the food and beverage industry and their national growth potential. The top growth segments in New York State include dairy, baked goods, and prepared foods and beverages.

Table 6: Food Segments and Growth Potential		
Segment	Growth Potential	Comments
Pet Food	Low to Moderate	Over the next three years, projections are 2-3% per year vs. 5%, the growth rate sustained over the last decade. Growth in the pet population is beginning to stabilize.
Grain Milling/Cereal	Low to Moderate	Pressed oils and grains for cereal substitutes (breakfast bars and snack foods) have highest growth potential.
Sugar/Confectionary	Moderate	America has a “sweet tooth” that will not disappear quickly.
Fruits/Vegetables Fruits Vegetables	Moderate Moderate	With new processes and packaging to enhance taste and flavors along with the understanding of their nutritional value, the demand for fruits and vegetables should continue to grow.
Dairy Products Milk Cheese Yogurt	Decreasing Moderate High	<ul style="list-style-type: none"> ▪ Demand for milk is mainly for dairy products. ▪ Cheese demand continues to climb. ▪ Yogurt is climbing fast and has not yet hit a saturation point.
Fresh Meats/Fish Beef Pork Chicken Fish/Salmon	Decreasing Steady Moderate to High Moderate	<ul style="list-style-type: none"> ▪ Fresh beef (“red meat”) has been on a slight downward trend. ▪ Pork needs “rediscovery” to build demand. ▪ Chicken has steady growth with no saturation point in sight. ▪ Demand for salmon is strong but is tempered by price.
Baked Goods	Moderate	Specialty breads (gluten free), unique crackers and cupcakes have a moderate growth potential. Sandwich shops (like Panera Bread) are helping to introduce new breads.
Snack Foods	Moderate to High	This market has expanded rapidly beyond the traditional chips, pop corn and pretzels to energy bars and other nutrition/performance based offerings.
Prepared Foods	Moderate to High	This is the most dynamic segment in the industry with new concepts constantly coming on the market. There is both high growth and high volatility. New meals with meat (beef, pork, chicken and fish) or non-meat entrees that have great taste and favorable nutrition are gaining momentum.



Table 6: Food Segments and Growth Potential

Table 6: Food Segments and Growth Potential		
Beverages		
Tea	Moderate	<ul style="list-style-type: none"> Green and specialty teas are in demand.
Coffee	Low to Moderate	<ul style="list-style-type: none"> Home brewed and take-out coffees have their niches.
Soft Drinks	Decreasing	
Bottled Water	Moderate to High	<ul style="list-style-type: none"> Recent high growth but saturation point is in sight.
Fruit Juices	Low	<ul style="list-style-type: none"> High cost... companies are promoting the health benefits.
Sports Drinks	Moderate	<ul style="list-style-type: none"> Market is beginning to mature.
Other Drinks	High	<ul style="list-style-type: none"> High potential; heavy caffeine energy drinks getting push-back.
Beer	Moderate	<ul style="list-style-type: none"> Overall consumption down but craft brew market is expanding.
Wine	Moderate	<ul style="list-style-type: none"> Local/regional wines are expanding.
Distilled Spirits	Low	<ul style="list-style-type: none"> Trying to expand into mixed drinks.



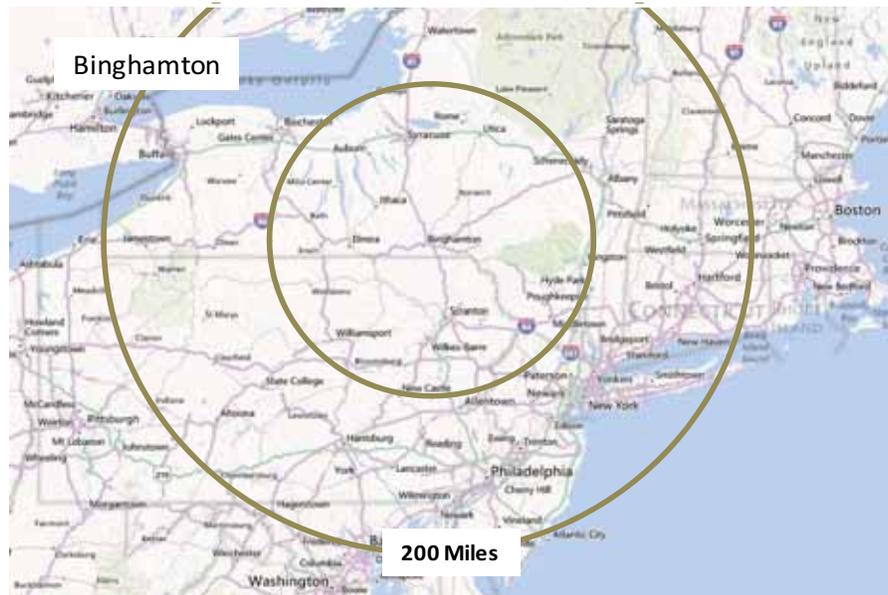
Distribution

Distribution and logistics are all about location vs. cost, time of travel and backhaul utilization when possible. Broome County is a logical choice for facilities to serve upstate New York and portions of New England. One consideration is that for the most part, upstate New York and New England are not high population growth areas, so the national emphasis on the region is not as strong as other areas in the southern and western U.S. Primary opportunities may come from the distribution of food and household goods.

Target and WalMart have already selected the Mohawk Valley as a destination for their distribution centers to serve upstate New York and New England. The Broome County area allows products coming from the Midwest to reach the New York City metropolitan area without having to travel through congested roadways in New Jersey.

Pennsylvania's Lehigh Valley has become one of the largest areas on the east coast for the location of warehouses and distribution centers. In 2012, state economic development officials announced two distribution projects in the region: an 870,000 square foot PetSmart facility and a 909,919 square foot Dollar General facility. The companies are building their regional distribution centers on a combined 197 acres in a fully-approved, pre-permitted industrial park near the intersection of Interstates 78 and 81.

From the Allentown, Pennsylvania area, products can come from the south and Midwest for transport to New York City through New Jersey, to upstate New York via I-81 or I-95 and to New England on I-81 and then I-84.





Other R&D and Technology Support Activities in the Region

Center for Energy-Smart Electronic Systems (ES₂) - The Center for Energy-Smart Electronic Systems, a National Science Foundation Industry/University Cooperative Research Center (I/UCRC), works in partnership with government, industry and academia to develop systematic methodologies for efficiently operating electronic systems, including data centers, by controlling resources and managing workloads to achieve optimal energy consumption.



Binghamton University has amassed a vast infrastructure for conducting energy efficient systems research by academic and industrial partners. Growth in this area will be enabled by a new \$30 million building, opening in 2013. This building will have a 6,000 square foot data center laboratory with different types of cooling facilities, supplemental solar power and an in-ground water battery. A 4,000 square foot fully instrumented data center lab, supported in part by a NSF MRI award, is currently available for use by the center. This facility is equipped with 24 racks of IBM and Dell servers and will eventually be relocated to the new building.

Technical expertise and infrastructure at the Integrated Electronics Engineering Center (IEEC) and Analytical and Diagnostics Laboratory (ADL) are maintained by Ph.D. level professional staff. Electronics packaging facilities at the (IEEC), a New York State Center of Advanced Technology, include an on-site demonstration facility that allows for rigorous and replicable testing of new technologies. Laboratories are equipped for analyzing electronics packaging technology products and are useful for performing physical, chemical, surface and electronic analysis of products and materials.



Cornell University Food Processing and Development Laboratory – Further investments are being made in this lab that supports the development of optimum food processes for a variety of products. The FPDL currently has, or is developing, research and development or technical assistance projects for the following Southern Tier companies: Chobani Yogurt (Chenango), HP Hood (Steuben), Fingerlakes Farmstead Cheese (Schuyler), Indian Milk and Honey (Tompkins), Agave Biosystems (Tompkins), E2E Materials (Tompkins), International Food Network (Tompkins).



Alliance of Manufacturing & Technology – This organization is comprised of consultants and trainers who work with manufacturers and technology companies to help them succeed and remain, grow, and prosper in the Southern Tier. It is a resource that can help small and emerging technology companies achieve success in the local economy. It uses a comprehensive approach to facilitate significant operational improvements.



Labor Requirements

The tables below list the top occupations in each of the target industries with relevant education and training requirements. Additional information on the existing and potential Broome County labor force is provided in the Workforce Profile.

Source for all tables: Staffing Patterns, Occupational Employment by Industry, New York State, unless otherwise noted. Education and training requirements from the U.S. Bureau of Labor Statistics.

Health Care Services				
Occupation	Pct of Industry Emp't	Entry-Level Education Required	Experience Required	OJT Required
Registered Nurses	10.4%	Associate's degree	None	None
Home Health Aides	8.2%	Less than HS	None	Short-term OJT
Personal Care Aides	7.9%	Less than HS	None	Short-term OJT
Nursing Aides and Orderlies	6.4%	Postsecondary cert.	None	None
Receptionists and Information Clerks	3.1%	HS diploma	None	Short-term OJT
Secretaries and Administrative Assts.	3.0%	HS diploma	None	Short-term OJT
Physicians and Surgeons, All Other	3.0%	Doctoral or professional degree	None	Internship/residency
Licensed Practical Nurses	2.9%	Postsecondary cert.	None	None
General Office Clerks	2.1%	HS diploma	None	Short-term OJT
Office Supervisors	1.8%	HS diploma	1-5 years	None

Educational Services				
Occupation	Pct of Industry Emp't	Entry-Level Education Required	Experience Required	OJT Required
Postsecondary Teachers	12.7%	Doctoral or professional degree	None	None
Elementary School Teachers (excl. Special Education)	10.7%	Bachelor's degree	None	Internship
Secondary School Teachers	8.2%	Bachelor's degree	None	Internship
Teacher Assistants	7.8%	HS diploma	None	Short-term OJT
Other Teachers and Instructors	5.9%	N/A	N/A	N/A
Middle School Teachers (excl. Special and Career/Technical Education)	4.7%	Bachelor's degree	None	Internship



Janitors and Cleaners	3.4%	Less than HS	None	Short-term OJT
Special Education Teachers	3.3%	Bachelor's degree	None	Internship
General Office Clerks	2.9%	HS diploma	None	Short-term OJT
Secretaries and Administrative Assts.	2.8%	HS diploma	None	Short-term OJT

Source: Industry-Occupation Matrix Data for "Educational services: state, local, and private," U.S. Bureau of Labor Statistics.

Manufacturing				
Occupation	Pct of Industry Emp't	Entry-Level Education Required	Experience Required	OJT Required
Manufacturing (General)				
Team Assemblers	5.3%	HS diploma	None	Moderate-term OJT
Production Supervisors	3.3%	Postsecondary cert.	1-5 years	None
Inspectors and Testers	2.8%	HS diploma	None	Moderate-term OJT
Sales Representatives, Wholesale/Mfg., Non-Tech	2.7%	HS diploma	None	Moderate-term OJT
Electrical and Electronic Equipment Assemblers	2.5%	HS diploma	None	Short-term OJT
Machinists	2.3%	HS diploma	None	Long-term OJT
Packaging and Filling Machine Operators	2.3%	HS diploma	None	Moderate-term OJT
General and Operations Managers	2.0%	Associate's degree	1-5 years	None
Mixing & Blending Machine Setters, Operators	1.9%	HS diploma	None	Moderate-term OJT
Packers and Packagers, Hand	1.8%	Less than HS	None	Short-term OJT
Other top occupations - Computer & Electronics				
Electrical and Electronic Engineering Technicians	5.3%	Associate's degree	None	None
Software Developers, Systems Software	4.8%	Bachelor's degree	None	None
Electrical Engineers	4.6%	Bachelor's degree	None	None
Computer Hardware Engineers	3.8%	Bachelor's degree	None	None
Inspectors and Testers	2.8%	HS diploma	None	Moderate-term OJT
Accountants and Auditors	2.7%	Bachelor's degree	None	None
Industrial Engineers	2.4%	Bachelor's degree	None	None
Other top occupations - Fabricated Metal Products				
Welders, Cutters, Solderers	5.2%	HS diploma	<1 year	Moderate-term OJT
Computer-Controlled Machine Tool Operators	4.1%	HS diploma	None	Moderate-term OJT
Cutting, Punching, and Press Machine Setters	3.5%	HS diploma	None	Moderate-term OJT
Structural Metal Fabricators and Fitters	2.9%	HS diploma	None	Moderate-term OJT
Sheet Metal Workers	2.7%	HS diploma	None	Apprenticeship
Other top occupations - Machinery				
Mechanical Engineers	3.8%	Bachelor's degree	None	None
Welders, Cutters, Solderers	2.6%	HS diploma	<1 year	Moderate-term OJT



Manufacturing				
Occupation	Pct of Industry Emp't	Entry-Level Education Required	Experience Required	OJT Required
Engine and Other Machine Assemblers	2.4%	HS diploma	None	Short-term OJT
Shipping and Receiving Clerks	2.0%	HS diploma	None	Short-term OJT
Grinding/Polishing Machine Tool Operators	2.0%	HS diploma	None	Moderate-term OJT
Other top occupations - Food Products				
Bakers	8.6%	Less than HS	None	Long-term OJT
Food Batchmakers	7.2%	HS diploma	<1 year	Short-term OJT
Counter Attendants, Cafeteria Or Food Concession	3.2%	Less than HS	None	Short-term OJT
Cashiers	2.6%	Less than HS	None	Short-term OJT
Food Cooking Machine Operators and Tenders	2.6%	HS diploma	<1 year	Short-term OJT
Industrial Truck and Tractor Operators	2.5%	Less than HS	<1 year	Short-term OJT
Other top occupations - Electrical Equipment				
Computer-Controlled Machine Tool Operators	3.8%	HS diploma	None	Moderate-term OJT
Electromechanical Equipment Assemblers	2.5%	HS diploma	None	Short-term OJT
Electrical and Electronic Engineering Technicians	2.4%	Associate's degree	None	None
Electrical Engineers	2.1%	Bachelor's degree	None	None

Professional & Technical Services				
Occupation	Pct of Industry Emp't	Entry-Level Education Required	Experience Required	OJT Required
Professional & Technical Services (General)				
Lawyers	8.0%	Doctoral or professional degree	None	None
Accountants and Auditors	5.6%	Bachelor's degree	None	None
Secretaries and Administrative Assts.	3.7%	HS diploma	None	Short-term OJT
General Office Clerks	3.7%	HS diploma	None	Short-term OJT
Legal Secretaries	3.1%	HS diploma	None	Moderate OJT
Paralegals and Legal Assistants	3.1%	Associate's degree	None	None
Bookkeeping, Accounting, and Auditing Clerks	2.9%	HS diploma	None	Moderate OJT
Management Analysts	2.6%	Bachelor's degree	1-5 years	None
Computer Programmers	2.2%	Bachelor's degree	None	None
General and Operations Managers	2.1%	Associate's degree	1-5 years	None



Back-Office/Customer Service Operations

Occupation	Pct of Industry Emp't	Entry-Level Education Required	Experience Required	OJT Required
Bill and Account Collectors	17.1%	HS diploma	None	Moderate-term OJT
Customer Service Representatives	13.5%	HS diploma	None	Short-term OJT
Telemarketers	12.4%	Less than HS	None	Short-term OJT
Office Machine Operators, Except Computers	5.2%	HS diploma	None	Short-term OJT
General Office Clerks	4.8%	HS diploma	None	Short-term OJT
Office Supervisors	4.0%	HS diploma	1-5 years	None
Mail Clerks, Except Postal Service	3.7%	HS diploma	None	Short-term OJT
Switchboard Operators	2.6%	HS diploma	None	Short-term OJT
Medical Transcriptionists	2.6%	Postsecondary cert.	None	None
Sales Representatives, Services, All Other	2.0%	HS diploma	None	Short-term OJT

Wholesale/Warehousing/Distribution

Occupation	Pct of Industry Emp't	Entry-Level Education Required	Experience Required	OJT Required
Wholesale Trade				
Sales Representatives, Wholesale/Mfg., Non-Tech	21.0%	HS diploma	None	Moderate-term OJT
Laborers and Freight Movers	5.6%	Less than HS	None	Short-term OJT
General Office Clerks	3.9%	HS diploma	None	Short-term OJT
Shipping and Receiving Clerks	3.9%	HS diploma	None	Short-term OJT
Customer Service Representatives	3.8%	HS diploma	None	Short-term OJT
Bookkeeping, Accounting, and Auditing Clerks	3.4%	HS diploma	None	Moderate-term OJT
Stock Clerks and Order Fillers	3.0%	Less than HS	None	Short-term OJT
Heavy/Tractor-Trailer Truck Drivers	2.8%	HS diploma	1-5 years	Short-term OJT
Light Truck or Delivery Services Drivers	2.8%	HS diploma	None	Short-term OJT
Secretaries and Administrative Assistants	2.6%	HS diploma	None	Short-term OJT
Warehousing and Storage				
Laborers and Freight Movers	26.4%	Less than HS	None	Short-term OJT
Packers and Packagers, Hand	14.0%	Less than HS	None	Short-term OJT
Stock Clerks and Order Fillers	6.5%	Less than HS	None	Short-term OJT
Industrial Truck and Tractor Operators	5.8%	Less than HS	<1 year	Short-term OJT
Heavy/Tractor-Trailer Truck Drivers	4.6%	HS diploma	1-5 years	Short-term OJT
Shipping and Receiving Clerks	3.3%	HS diploma	None	Short-term OJT
Supervisors of Laborers and Material Movers	2.6%	HS diploma	1-5 years	None



Wholesale/Warehousing/Distribution				
Occupation	Pct of Industry Emp't	Entry-Level Education Required	Experience Required	OJT Required
General Office Clerks	1.9%	HS diploma	None	Short-term OJT
General Maintenance and Repair Workers	1.7%	HS diploma	None	Moderate-term OJT
Packaging and Filling Machine Operators	1.6%	HS diploma	None	Moderate-term OJT

Data Centers

Because data centers are often part of or colocated with corporate headquarters or back office facilities, staffing patterns are not available. Data centers rely on information technology professionals such as software developers and programmers, systems analysts, computer programmers, and network administrators (all of which require a bachelor’s degree) as well as operations managers and electrical and electronic equipment mechanics.



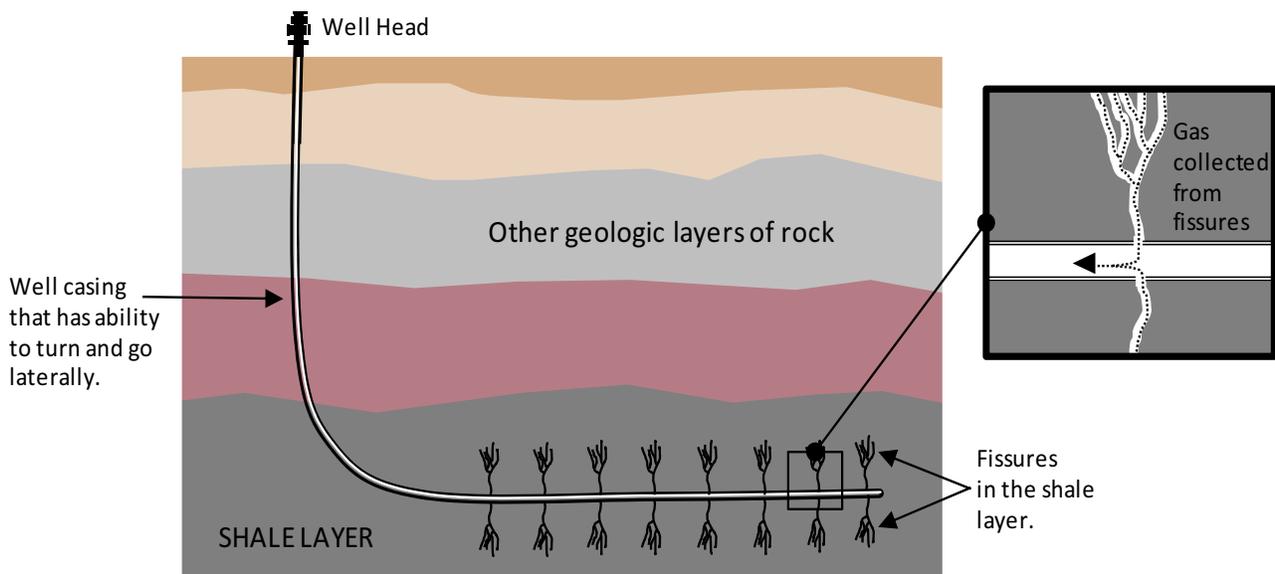
Supplemental Information - Target Industry Analysis

If Marcellus shale gas extraction through high-volume hydrofracking is approved by the State of New York, Broome County could serve as a center for business operations that support the natural gas industry. The discussion below focuses on the practice of hydrofracking, related industries, and labor requirements.

Natural Gas Derived From Shale Fracturing

Gas extraction from shale is facilitated through hydraulic fracturing known as “fracking.” In this technology that was initially developed in the 1940s, wells are drilled up to 10,000 feet vertically to the shale layer and then horizontally through the shale. A mixture of water and special chemicals is charged into the well under high pressure to further fracture the small cracks (fissures) in the shale to make it more permeable. It is then filled with sand to hold the fissures open. Gas migrates to the fissures and then into the well, and is brought to the surface for collection and storage. The process has been optimized over the past 20 years and is technically effective. However, environmentalists are concerned about the potential toxicity of the proprietary fracking chemicals and the disposal of the large quantities of wastewater.

HYDRAULIC FRACTURING FOR ENHANCING NATURAL GAS EXTRACTION



The Marcellus Shale gas field in parts of New York, Pennsylvania, West Virginia and Ohio may have as much as 50 trillion cubic feet of natural gas that is recoverable from the region. Even at a much lower estimate, the emerging shale gas resources could represent a drastic shift in the cost of energy in North America. Drilling could also provide a substantial number of direct and indirect jobs within the region.

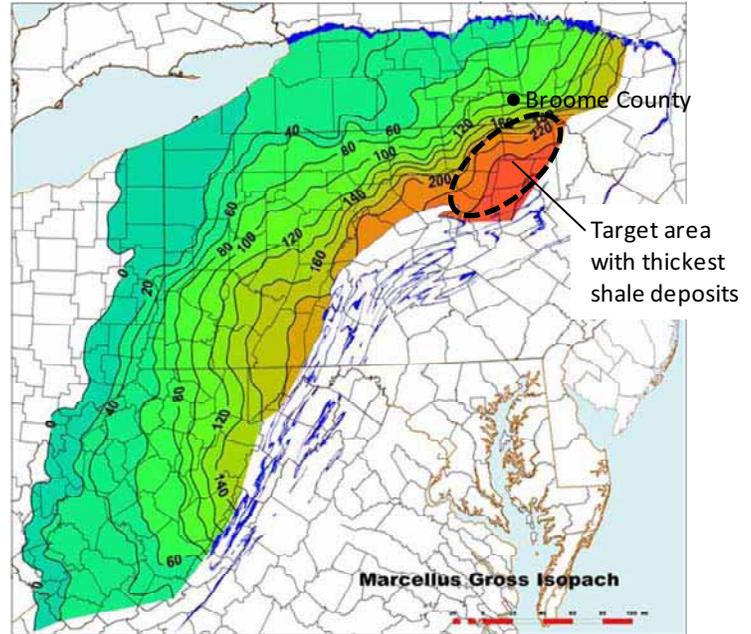


Broome County Comprehensive Plan Building our Future

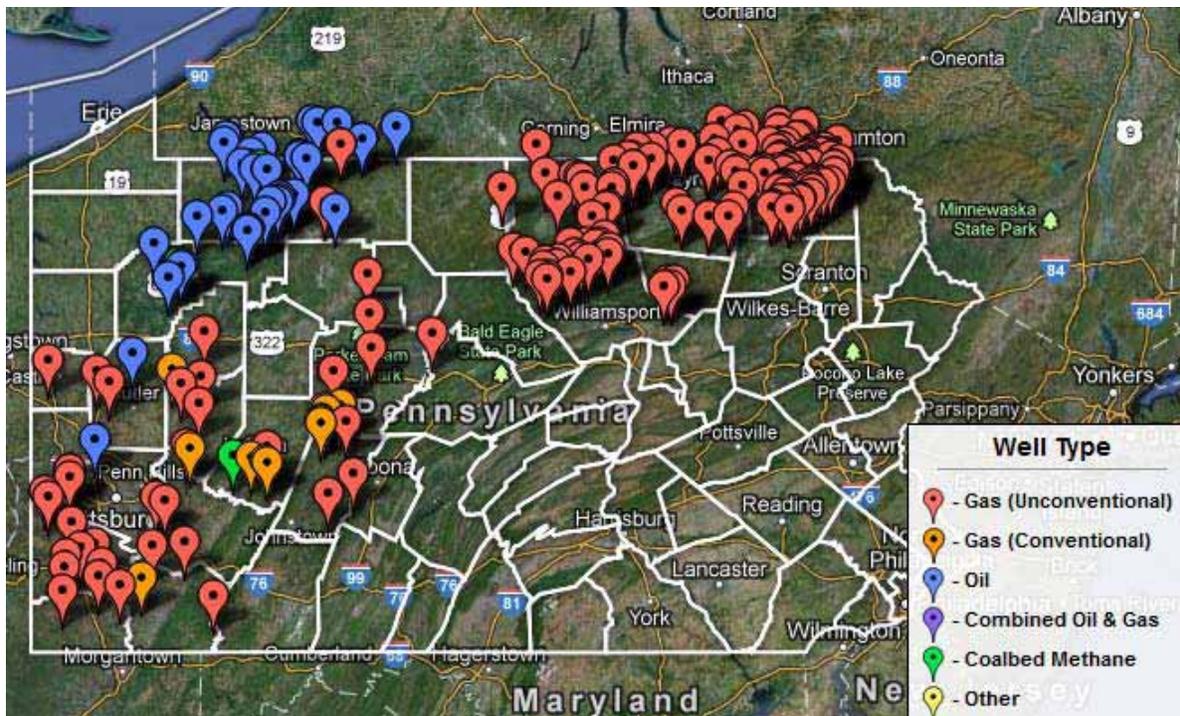
Specific businesses that can be directly derived from the drilling activity include:

- Water treatment equipment/systems sales and maintenance.
- Tanks, pumps and other equipment rental, sales and service.
- Water quality analysis services.
- Chemical storage and transportation.
- Fracturing tank heating services.

Since 2005, more than 2,300 well permits have been secured in Pennsylvania, with the majority in the northeastern and central section of the state as shown on the map below. Much of the support activity in this region has been focused around Williamsport, PA.



Extent and Depth (Isopach) of Marcellus Shale Deposits



Location of Wells In Pennsylvania

Marcellus Shale-Related Industries in Pennsylvania



An analysis of Pennsylvania’s “Marcellus Shale-related industries and related economic activity” is produced by the Center for Workforce Information & Analysis (CWIA) at the state’s Department of Labor and Industry. Most of the information in the document relates to a group of six industries referred to as “core”⁷ and a group of 30 industries identified as “ancillary.” Industries in the latter group were selected based on factors that included significant employment gains in an industry in a Marcellus Shale geographic region.

Based on data from the Quarterly Census of Employment and Wages (QCEW), approximately 31,000 workers statewide were employed in Marcellus Shale core industries as of the 3rd quarter of 2012. This reflects an increase of nearly 164% since the same period in 2009. Meanwhile, employment in the ancillary industries totaled 214,300, or 8% more than the 3rd quarter of 2012. With respect to employment, the largest industries identified as ancillary included:

- Engineering Services (NAICS 541330)
- Highway, Street, and Bridge Construction (237310)
- Iron and Steel Mills and Ferroalloy Manufacturing (331110)
- Specialized Freight Trucking, Local (484220)
- Industrial Machinery & Equipment Wholesalers (423830)
- General Freight Trucking, Local (484110)
- Nonresidential Site Preparation Contractors (238912)
- Testing Laboratories (541380)
- Commercial & Industrial Machinery and Equipment Repair (811310)
- Water Supply & Irrigation Systems (221310)

This list may provide an indication of the types of industries likely to be directly affected by hydrofracking activity should it be approved in the State of New York. Wages in Marcellus Shale core and ancillary industries in Pennsylvania tend to be above-average; according to the CWIA, the average wage in the core industries was \$34,721 higher than the average across all industries, while in the ancillary industries, it was \$16,637 higher.⁸

⁷ Core industries by NAICS: Crude Petroleum & Natural Gas Extraction (211111); Natural Gas Liquid Extraction (211112); Drilling Oil & Gas Wells (213111); Support Activities for Oil & Gas Operations (213112); Oil & Gas Pipeline & Related Structures Construction (237120); and Pipeline Transportation of Natural Gas (486210).

⁸ Center for Workforce Information & Analysis, PA Department of Labor and Industry, *Marcellus Shale Fast Facts*, May 2013 Edition. www.paworkstats.pa.gov



Labor Requirements for High-Volume Hydrofracking

The table below lists the top occupations in this industry with relevant education and training requirements. As noted in the Workforce Profile, the Broome-Tioga Workforce Investment Board has received funding to train individuals for employment in the gas extraction industry.

High-Volume Hydrofracking / Activities for Oil & Gas Operations			
Occupation	Entry-Level Education Required	Experience Required	OJT Required
Rotary Drill Operators – Oil and Gas	Less than HS	None	Moderate-term OJT
Roustabouts - Oil and Gas	Less than HS	None	Moderate-term OJT
Operating Engineers and Equipment Operators	HS diploma	None	Moderate-term OJT
Service-Unit Operators, Oil, Gas and Mining	Less than HS	None	Moderate-term OJT
Helpers-Extraction Workers	HS diploma	None	Short-term OJT
General Office Clerks	HS diploma	None	Short-term OJT
Supervisors - Trades and Extraction Workers	HS diploma	> 5 years	None
Heavy/Tractor-Trailer Truck Drivers	HS diploma	1-5 years	Short-term OJT
Construction Laborers	Less than HS	None	Short-term OJT
Secretaries and Administrative Assistants	HS diploma	None	Short-term OJT

Source: PA Department of Labor and Industry, with education and training requirements from the U.S. Bureau of Labor Statistics.