Business Continuity White Paper

Penn's Northeast: A Viable Option to Strengthen the Resilience of the U.S. Financial System

Released by the Office of
U.S. Representative Paul E. Kanjorski (D-PA)

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A Message from Congressman Paul E. Kanjorski (D-PA)

On April 7, 2003, the Board of Governors of the Federal Reserve System, the Office of the Comptroller of the Currency, and the Securities and Exchange Commission issued an Interagency Paper on "Sound Practices to Strengthen the Resilience of the U.S. Financial System." The Interagency Paper outlines recommendations to ensure that "key organizations in critical financial markets are able to recover clearing and settlement activities in the event of a wide-scale disruption as rapidly as possible."

Following the events of September 11, 2001, the agencies recognized the importance of preparing for a wide-scale disruption in the New York metropolitan region and set a main goal of recovering and resuming clearing and settlement activities within the business day on which the disruption occurs, with the ultimate goal of achieving recovery and resumption within two hours. Financial firms are now expected to implement sound practices to reach these goals within three years.

The Interagency Paper notes that firms need to have "an appropriate level of geographic diversity between primary and back-up sites" and warns that back-up sites "should not rely on the same infrastructure components (e.g., transportation, telecommunications, water supply, and electric power) used by the primary site."

To ensure immediate resumption of activities with no loss of data, firms rely on the use of "synchronous data transmission;" basically, data is automatically "mirrored" to a back-up site as it is processed at the primary site. Until very recently, technology limited the use of synchronous data transmission systems so that primary and back-up sites could be no further apart than approximately 50 miles. Now, however, the technology has progressed to expand that distance to 125 miles; for example, the Defense Department recently installed its data back-up site approximately 125 miles away from the Pentagon.

As a senior member of the House Committee on Financial Services, I am acutely aware of the importance of providing firms with viable clearing and settlement solutions within 125 miles of downtown Manhattan. And, as the Congressman for Northeastern Pennsylvania I know that my district is the ideal location for these back-up sites.

The driving times from Wall Street to my district range from an hour and twenty minutes to Stroudsburg, PA (78 miles) to just over two hours to Scranton and Wilkes-Barre (125 miles), yet all of these communities utilize different infrastructure components than metropolitan New York. Passenger rail service from Hoboken, New Jersey to Scranton is currently in environmental stage with engineering and design soon to follow. The line is expected to be operational within six years.

The lower cost of living and a variety of financial incentives suggest that an average 500-employee business will realize savings of more than $83 million over five years by locating in Northeastern Pennsylvania. Financial services firms which already have major operations in the region (Prudential, MetLife, Bank of America, etc.) rave about the quality of the workforce. Our local colleges are attended by more than 49,000 students, many of whom are eager to remain in the area if suitable employment can be found.

Northeastern Pennsylvania attracts outdoor enthusiasts with abundant hiking and biking trails, hunting and fishing opportunities, as well as numerous ski resorts. With its collection of small towns, Northeastern Pennsylvania still retains a strong sense of community yet is easily accessible to the major amenities of New York City and Philadelphia.

In short, my district is a superb location for back-up sites for major financial services firms. I have been working with our local economic development organizations and the Commonwealth of Pennsylvania to prepare a proposal for companies seeking a cost-effective means of complying with the goals of the Interagency Paper. Our proposal is attached and can also be found online at www.pennsnortheast.com. Please call my office at 202.225.6511 if you are interested in meeting personally with our team.

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Executive Summary

Introduction

The purpose of this white paper is to introduce Northeastern Pennsylvania ("Penn's Northeast") to financial services firms and other information technology businesses interested in relocating part of their functions out of the New York/New Jersey Metro Area (NYC/NJ) to bolster their business continuity efforts. The need for these relocation efforts has arisen from the desire of the U.S. Securities and Exchange Commission (SEC) and others (referred to as The Interagency Paper) to strengthen the resilience of the U.S. financial system after the tragic events of September 11, 2001. The Interagency Paper stresses that firms need to have "an appropriate level of geographic diversity between primary and back-up sites" and warns that back-up sites "should not rely on the same infrastructure components (e.g., transportation, telecommunications, water supply, and electric power) used by the primary site."

Penn's Northeast is located 1 ½ to 2 ½ hours west/northwest of Manhattan and is home to 765,000 people. Despite its close proximity to metro New York, Penn's Northeast is located in a different power grid, telecommunications grid, and watershed.

"Penn's Northeast is located 1 ½ to 2 ½ hours west/northwest of Manhattan."

Penn's Northeast is home to large financial services, customer service, and information technology offices for companies such as The Prudential, Metropolitan Life Insurance Company, Sallie Mae, Bank of America, CIGNA HealthCare, Alltel, and Altria Group, Inc. (formerly Nabisco).

These firms list the region's strong work ethic, low operating costs, reliable and redundant power and telecommunications systems, excellent educational infrastructure, close proximity to major east coast cities, and an attractive quality of life as the main reasons they have been so successful here.

The Business Case

This white paper explains how relocating a 500-employee business unit from The New York/New Jersey Metro Area (NYC/NJ) to Penn's Northeast will save the relocating company more than **$83 million over the first five years** in taxes, payroll, and real estate. And, **assuming a 2004 start up** and a location within a "Keystone Opportunity Expansion Zone" these savings will reach **$165 million by the end of 2013**.

Payroll

Based upon information provided by The Wadley Donovan Group, a national business consultant, it can be conservatively estimated that wage rates for office positions in Penn's Northeast average 30% less than comparable positions in NYC/NJ. A 500-employee business unit in NYC/NJ with an average annual salary of $50,000 would have an annual payroll of $25 million. A comparable office in Penn's Northeast would have an annual payroll of $17.5 million. Likewise, it can be estimated that employee benefits would cost $2.1 million less annually in Penn's Northeast. These lower wage and benefits costs will save a relocating NYC/NJ firm **$48 million over five years and $96 million through 2013.**

Real Estate

Using information gathered from numerous NYC/NJ real estate brokers and developers it can be estimated that the average cost to lease Class A office space in lower Manhattan is $51 per square foot, gross. Comparable space in Penn's Northeast averages $20.75 per square foot, gross. For a 100,000 square foot building (appropriate for a 500-employee operation) this $30.25 per square foot difference will result in a savings of **$15.1 million over five years and $30.25 million through 2013.**

Taxes

Numerous office sites within Penn's Northeast have received special tax-free status. Companies that locate in these "Keystone Opportunity Zones" (KOZs) are exempt from paying most local and state property and business taxes through 2010. Keystone Opportunity Expansion Zones (KOEZs) provide tax relief through 2013. A Big 4 accounting agency recently determined that a 500-employee trading company that moves into 100,000 square feet in a Penn's Northeast KOEZ will have its annual tax liability reduced by approximately $4 million, resulting in a savings of **$20.2 million over the first five years and $38.9 million through 2013.**

Location and Transportation

Penn's Northeast is easily accessible from NYC/NJ by the interstate system and by commercial and corporate air service. A passenger rail connection is expected to be operating by 2010.

Interstate Access

Interstate 80 West, via either the George Washington Bridge or the Lincoln Tunnel (from Route 46), is the primary roadway that would be utilized if driving from Manhattan to the Penn's Northeast region. However, Interstates 84 and 78 could be used as alternate routes should Interstate 80 be closed.

Passenger Rail Access

The "Lackawanna Cutoff" project is designed to re-establish passenger rail service from Penn's Northeast to Hoboken, New Jersey (with connections to New York's Penn Station via transfer to MidTown Direct service). A key component of this project will be connecting the existing NJ TRANSIT Montclair-Boonton and Morris & Essex lines.

The line will have eight stops – five in Pennsylvania (Scranton, Mt. Pocono, Stroudsburg, East Stroudsburg, and Delaware Water Gap) and three in New Jersey (Morristown, the Oranges, and Hoboken). A connection to Wilkes-Barre, PA may also be added. A full trip – from Hoboken to Scranton – is expected to take 2 ½ hours. However, U.S. Representative Paul Kanjorski (D-PA) is leading an effort to convert the project to high speed rail, which would cut travel time in half.

The line will connect to ferry boats, subway trains or busses in Hoboken that travelers can take into New York City (NYC). They will also be able to switch in Dover, NJ, to a train that runs directly into Penn Station in NYC.

Upon its completion, the rail line will serve one large "community" stretching from Penn's Northeast, through New Jersey, to the Hudson River. The new line will allow people who live a reasonable distance from rail stops in New Jersey to easily commute to Penn's Northeast.

Air Access

Two main airports serve the region:

The Wilkes-Barre/Scranton International Airport (www.flyavp.com) is located in Avoca, PA, just five minutes from Pittston and 15 minutes from both Scranton and Wilkes-Barre.

The Lehigh Valley Airport (www.lvia.org) is located between Allentown and Bethlehem, PA and is approximately 45 minutes from Stroudsburg, PA.

While a variety of commercial airlines serve the airports, both also offer superb general aviation services, which may prove critical in the event corporate aircraft needs to be used in the event of a wide scale disruption.

Penn's Northeast communities and their distances and drive times from Manhattan:

Community	Driving Distance From NYC	Approximate Drive Time
Milford	73 miles	1:35
Stroudsburg	78 miles	1:20
Honesdale	110 miles	2:24
Scranton	123 miles	2:06
Hazleton	127 miles	2:14
Wilkes-Barre	128 miles	2:15
Pittston	128 miles	2:16
Berwick	142 miles	2:30

Source: www.mapquest.com

Labor – Availability, Cost, and Quality

Northeastern Pennsylvania has earned a reputation for having a workforce that is well educated, readily available, easily trainable, cost competitive, and highly productive.

Labor Availability

A late 1990's study of Penn's Northeast by The Wadley Donovan Group, a national business consultant, reported:

- An excellent availability of experienced, skilled, non-exempt office personnel and entry level management and professional employees
- An ability to draw workers with specialized skills from the extensive New York City, New Jersey, and Philadelphia labor markets
- A highly rated very productive labor force, with an excellent work ethic, very good basic skills, and solid computer skills.

Penn's Northeast's business demographics have changed noticeably between the 1990 and 2000 censuses as demonstrated in the following table:

Growth in Penn's Northeast Service Employment, 1990 to 2000

Group Occupations	1990	2000
Management, Professional and Related	67,731	98,102
Service	44,056	53,692
Sales and Office	96,911	95,946
Total Employment	208,698	247,740*

* Represents an 18.7% increase since 1990

Labor Cost

Labor rates for white collar businesses in Penn's Northeast, especially those that fall into the F.I.R.E. (Finance, Insurance and Real Estate) sector, are very competitive when compared to similar operations in the New York/New Jersey metro area.

- The overall cost of clerical labor in Penn's Northeast is 22% less than the U.S. average and up to 37% less than Northern New Jersey and New York City. Professional and technical labor costs 34% less than national averages and up to 40% less than Northern New Jersey and New York City.
- Labor costs are the second lowest of all metro areas in the Northeast and are comparable to those in the Southeastern U.S.
- On average, Penn's Northeast employers report that fringe benefits are 28% of base pay.

Source: The Wadley Donovan Group

Labor Quality

The success of Penn's Northeast's employers is largely due to the region's strong work ethic. Corporate leaders cite the region's dedicated labor force as the main reason they have been successful here.

"Professional and technical labor costs 34% less than national averages and up to 40% less than Northern New Jersey and New York City"

"We have found the work ethic of the people of this area to be outstanding. The employees we have hired display a tremendous amount of pride in their work and have allowed us to achieve at a higher level than we originally expected. "

Dick Dyson,
Vice President, Alliance Capital

"One thing that strikes me every day that I come into the office is the great work ethic of the people here. People come to work extremely motivated and extremely willing to make this company succeed. They feel an ownership that I haven't seen in other places."

Jaco Smit
General Manager, VACCESSHealth
A division of Aventis Pasteur

Education and Training

One of the Penn's Northeast region's competitive advantages is its strong higher education system. More than 49,000 students are enrolled at the region's 18 college/university campuses. Many of these students are pursuing studies in fields that are critical to the success of the F.I.R.E. sector such as healthcare, communications, liberal arts, business and consumer services, education, financial services, marketing, and information technology. In fact, close to 6,000 students with degrees in these areas of study graduate annually from the higher education institutions which serve Penn's Northeast.

Real Estate

There are many office buildings and land sites within Penn's Northeast that will be of interest to NYC/NJ firms. Buildings range from well maintained properties in central business districts, to modern flex space in area business parks, to Class A buildings in the suburbs. Fully improved parcels, often served by dual power and dual telecommunications, can be purchased in dozens of local office and business parks.

Lease Rates

Office and flex space is far less expensive to lease in the Penn's Northeast region than it is in NYC/NJ. For example, modern flex/office space, fit-out to a client's exact specifications, is typically offered for lease for $8 to $12 per square foot, net, net, net. Class A office space can usually be leased in the Penn's Northeast area for $12 to $16 per square foot, net, net, net.

Operating Costs

"Add on costs" (utilities, real estate taxes, janitorial and mechanical maintenance, and insurance) typically range from $3.50 per square foot to $6.75 per square foot in Penn's Northeast, depending upon the type of operation (e.g. a multi-shift operation will consume more power than a one shift operation), the type of janitorial plan chosen, the amount of annual real estate taxes (e.g. taxes for a flex building may be $0.50 per square foot but may be $2.00 per square foot for a Class A office building), etc…

Land and Construction Costs

The cost to purchase fully-improved office sites in Penn's Northeast ranges from $40,000 to $70,000 per acre. Total cost to construct a Class A office building including land acquisition, site work, full building construction and all soft costs, ranges from $120 to $160 per square foot.

Availability

Local business, office and technology parks have been constructed by both private developers and non-profit economic development corporations. There are more than 20 fully-improved parks within the region that have land suitable for the construction of Class A office buildings. Many of these parks already have, or have the capability of having, dual power and telecommunications service.

Existing flex space and Class A and B office space opportunities are also available. Existing space is available in blocks of 10,000 square feet to 60,000 square feet with some larger spaces available. In some cases, new construction will be required for companies in need of more than 100,000 square feet.

Timing

Unlike major cities, the process to obtain building permits within Penn's Northeast is fairly quick and streamlined. In fact, a developer interested in constructing a large office building here would most likely be able to obtain all permits and approvals in **less than 120 days**. Actual construction of a large office building will take from nine to 12 months – much less if a flex building is preferred.

Utilities

Electric Power

Businesses in Penn's Northeast enjoy highly reliable electric delivery service at prices that are below the average for the nation and the Mid Atlantic region. **These customers receive their power from a different grid than do those located in Manhattan.** The two main providers of electric power in the Penn's Northeast region are PPL Electric Utilities and UGI Utilities, Inc.

Water

The Croton system, New York City's first upstate supply, provides about 10% of the city's daily consumption from 12 reservoirs and three controlled lakes in Putnam and Westchester Counties. The other 90% comes from six reservoirs in the Catskill/Delaware system, located in Delaware, Greene, Schoharie, Sullivan and Ulster Counties, west of the Hudson River.

The Penn's Northeast region is located within the Lackawanna River Watershed, the Susquehanna River-Chesapeake Bay Watershed, the Lehigh Valley Watershed and the Delaware River Watershed (western side). All Penn's Northeast communities, including those that are located on the western side of the Delaware Watershed, have their own water supplies and aquifers. Penn's Northeast's water supplies are independent of those serving Manhattan.

Telecommunications

Penn's Northeast has been working with EMC Corporation to verify that the technology required to deliver robust data redundancy at distances of up to 125 miles is viable for companies that choose Penn's Northeast as an additional off-site processing location.

EMC has recently announced a highly available enterprise business continuity solution that enables multiple data centers to act as one to help keep businesses running. In the event of a disaster, transactions are automatically routed to an alternate site with no need for manual restore or restart procedures, greatly reducing time to recovery and lowering costs. EMC has in fact already deployed this comprehensive solution to the Pentagon, allowing for the synchronous writing of data to an undisclosed remote facility 125 miles away. This business continuity solution provides a geographically dispersed, high-availability architecture for application, server, storage and transport. Additionally, this solution provides almost synchronous replication of sensitive data required to facilitate restoration of critical business services within several hours in order to comply with the Interagency White Paper.

By itself, this technology would not facilitate business continuity without a robust, bandwidth intensive fiber-optic network. Northeastern Pennsylvania has a robust array of telecommunications services including Internet, Data and Voice products and services. With respect to flexible, high speed dedicated data services, local providers offer DS-1/DS-3 services as well as up to OC-48 private local SONET ring solutions.

Northeast Pennsylvania has several major carriers, such as Verizon, Telcove, PPL Telecom and Commonwealth Telephone Company, who afford enterprises carrier diversity and redundancy.

Financial, Recruitment and Relocation Assistance

Financial services employers that have established offices in Penn's Northeast have been able to utilize a variety of incentive programs to help reduce their operating costs. The local office of Governor Rendell's Action Team works with the Department of Community and Economic Development in Harrisburg and with area economic development agencies and chambers of commerce to tailor-make incentive packages. Incentives include tax credits, training grants, and grants and low-interest loans for real estate and equipment. See www.newpa.com.

Local economic development organizations will coordinate a variety of recruitment and relocation assistance including participation in job fairs, posting jobs on web sites, family tours, executive orientations, onsite presentations, etc…

Quality of Life

Several quality of life factors make the Penn's Northeast region attractive to metro New Yorkers:

- The Penn's Northeast region has the 8th lowest crime rate in the United States.
- The average daily commute to work within the region is just 20.5 minutes *(U.S. Census Bureau)*
- There are numerous sports and recreation venues in Penn's Northeast. These include 13 ski resorts, dozens of golf courses, a AAA baseball team, an AHL hockey team, and an arena football team.
- The cost of living is significantly lower in Penn's Northeast. The following compares what a homeowner earning $75,000 in various NY/NJ/CT communities would need to earn in Penn's Northeast to maintain the same standard of living.

Salary Comparison Chart

NY/NJ/CT Community	NY/NJ/CT Salary	Comparable PNE Salary
NYC (Manhattan)	$75,000	$26,966
Stamford, CT	$75,000	$40,995
White Plains, NY	$75,000	$43,266
Hicksville, NY	$75,000	$49,724
Hoboken, NJ	$75,000	$52,853
Bridgewater, NJ	$75,000	$52,881
Rockland County, NY	$75,000	$61,072
Morristown, NJ	$75,000	$61,145

Source: www.homefair.com

Here is what one relocating executive had to say about his move to Penn's Northeast:

"When I moved here from suburban New Jersey, my biggest concerns were the quality of schools available to my son and whether we would miss the recreational and cultural activities of the NYC metro area. We've learned the schools are more than competitive and offer all the programs we had hoped they would. Moreover, because of cost and accessibility, the number and types of activities we now enjoy has increased dramatically. NEPA is a great place to live!"

Don Ryan, Principal, The Ryan Group
Former Vice President of Human Resources for NatWest Services, Inc. - Relocated from Warren Township, N.J. (near Bridgewater) in 1994.

Summing it all up

The Penn's Northeast region offers a viable solution for those financial services companies needing to relocate part of their functions out of the New York/New Jersey Metro Area (NYC/NJ).

The region is just 70 to 140 miles from Manhattan yet is located in a different power grid, telecommunications grid, and watershed. Penn's Northeast's five counties and 765,000 people can be accessed via Interstate 80, 78, and 84. Passenger rail service between NYC/NJ and Penn's Northeast is expected to be restored by 2010.

Penn's Northeast employers such as The Prudential and Bank of America cite the region's work ethic, low operating costs, strong utilities, excellent educational infrastructure, and attractive quality of life as reasons for their success.

A NYC/NJ company that moves 500 financial services jobs into a Penn's Northeast Keystone Opportunity Expansion Zone in 2004 will save approximately $165 million by the end of 2013. A breakdown of these savings is as follows: payroll - $96 million, real estate - $30.25 million, and taxes - $38.9 million.

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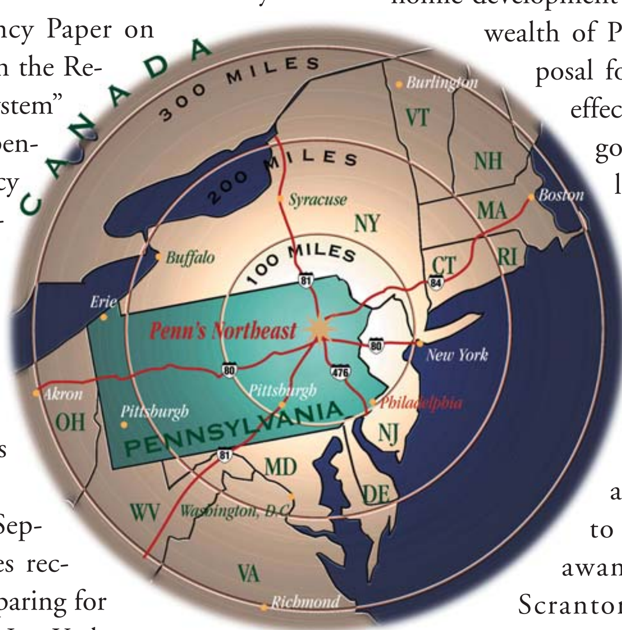
Introduction

The purpose of this white paper is to introduce Northeastern Pennsylvania (“Penn’s Northeast”) to financial services firms and other information technology businesses interested in relocating part of their functions out of the New York/New Jersey Metro Area (NYC/NJ) to bolster their business continuity efforts. The need for these relocation efforts has arisen from the desire of the U.S. Securities and Exchange Commission (SEC) and others to strengthen the resilience of the U.S. financial system after the tragic events of September 11, 2001. The SEC, the Board of Governors of the Federal Reserve System, and the Office of the Comptroller of the Currency have given guidance to the financial industry on this issue in an Interagency Paper on “Sound Practices to Strengthen the Resilience of the U.S. Financial System” issued April 7, 2003. (See Appendix page 2.) The Interagency Paper outlined recommendations to ensure that “key organizations in critical financial markets are able to recover clearing and settlement activities in the event of a wide-scale disruption as rapidly as possible.”



Following the events of September 11, 2001, the agencies recognized the importance of preparing for a wide-scale disruption in the New York metropolitan region and set the goal of recovering and resuming clearing and settlement activities within the business day on which the disruption occurs, with the ultimate goal of achieving recovery and resumption within two hours. Key firms are expected to implement sound practices to reach these goals within three years, and are to have firm plans in place to meet these goals by December 31, 2004.

The Interagency Paper stresses that firms need to have “an appropriate level of geographic diversity between primary and back-up sites” and warns that back-up sites “should not rely on the same infrastructure components (e.g., transportation, telecommunications, water supply, and electric power) used by the primary site.”

To ensure immediate resumption of activities with no loss of data, firms rely on the use of “synchronous data transmission;” basically, data is automatically “mirrored” to a back-up site as it is processed at the primary site. Until very recently, technology limited the use of synchronous data transmission systems between primary and back-up sites to no further apart than approximately 50 miles. Now, however, the technology has progressed to expand that distance to 125 miles; for example, the Defense Department recently installed its data back-up site approximately 125 miles away from the Pentagon. (See Appendix page 11)

Coincidentally, a good portion of Congressman Paul Kanjorski’s (D-PA) district in Northeastern Pennsylvania is located within 125 miles of downtown Manhattan. The Congressman has been working with local economic development organizations and the Commonwealth of Pennsylvania to prepare this proposal for financial firms seeking a cost-effective means of complying with the goals of the Interagency Paper by locating back-up sites in Northeastern Pennsylvania.

Penn’s Northeast is located 1 ½ to 2 ½ hours west/northwest of Manhattan and consists of the Pennsylvania counties of Pike, Wayne, and Monroe (home to Milford, Honesdale, and Stroudsburg and often referred to as “The Poconos”) and Lackawanna and Luzerne (home to Scranton, Pittston, Wilkes-Barre, Hazleton, and Berwick). More than 765,000 live within these five counties.

(See Appendix page 16.)

Despite its close proximity to metro New York, Penn’s Northeast is located in a different power grid, telecommunications grid, and watershed (see Utilities section).

Penn’s Northeast is also the home of large financial services, customer service, and information technology offices for numerous national corporations. These include The Prudential, The Social Security Administration, Metropolitan Life Insurance Company, Sallie Mae, Verisign, Bank of America, CIGNA HealthCare, Alltel, Guard Insurance, Altria Group, Inc. (formerly Nabisco), Diversified Information Technologies, Caremark PCS, Verizon, and Blue Cross/Blue Shield.

These firms list the region’s strong work ethic, low operating costs, reliable and redundant power and telecommunications systems, excellent educational infrastructure, close proximity to major east coast cities, and an attractive quality of life as the main reasons they have been so successful here. This white paper discusses these business and lifestyle advantages in great detail.

The Business Case

This white paper explains how relocating a 500-employee business unit from The New York/New Jersey Metro Area (NYC/NJ) to Penn's Northeast will save the relocating company more than **$83 million over the first five years and $165 million through 2013.**

Several assumptions were made when determining the cost savings to be realized by a relocating firm. First, it was assumed that the relocation would involve 500 employees and 100,000 square feet of office space. Second, it was assumed that the relocation would be **from** Class A space **to** Class A space. Third, it was assumed that the company would relocate to a Keystone Opportunity **Expansion** Zone (see definition later in this section) and begin operations in 2004. Fourth, for calculating payroll it was assumed that the office to be relocated would be a mid-level financial services/customer service center. Fifth, it was assumed that salaries in the Penn's Northeast region are 30% less than they are in NYC/NJ.

Using these assumptions, major savings will be realized in the areas of payroll, real estate, and taxes as follows:

Payroll Savings

The significant annual savings that a NYC/NJ company will realize by moving a mid-level office operation to the Penn's Northeast region can be demonstrated by the following tables. This example assumes the relocation of a 500-employee financial services/customer service office from NYC/NJ to Penn's Northeast:

Other assumptions are that the average annual salary in the NYC/NJ office is $50,000, that wage rates for a comparable office in Penn's Northeast are 30% less than in NYC/NJ, and that fringe benefits are 28% of base pay at both locations.

NYC/NJ office

Number of Employees	Average Employee Salary	Annual Payroll
500	$50,000	$25,000,000
Fringe Benefits (28% x $25,000,000)		$7,000,000
Total annual payroll + fringe benefits		**$32,000,000**

Penn's Northeast office

Number of Employees	Average Employee Salary	Annual Payroll
500	$35,000	$17,500,000
Fringe Benefits (28% x $17,500,000)		$4,900,000
Total annual payroll + fringe benefits		**$22,400,000**

Penn's Northeast Savings

Yearly Payroll Savings (salaries + fringe benefits)	**$9,600,000**
Savings over 5 years	**$48 Million**
Savings through 2013	**$96 Million**

Actual labor savings in Penn's Northeast may be greater because the example assumes that the percentage of fringe benefits will be the same at both locations (when in fact the percentage may be higher in NYC/NJ). The example also assumes that wage rates at the Penn's Northeast office will be 30% less than in NYC/NJ. This may be a conservative estimate since the national consulting firm The Wadley Donovan Group has reported that Penn's Northeast wage rates are "**up to 37% less** than Northern New Jersey and New York City and professional and technical labor costs **34% less** than national averages and **up to 40% less** than Northern New Jersey and New York City."

Also, this example is based on a mid-level financial services/customer service operation. If the relocating company takes a "vertical slice" of its NYC/NJ operation and moves it to Penn's Northeast, then the level of jobs will be more sophisticated, thus payroll costs AND savings will be significantly higher.

Productivity Gains

Additionally, while gains in productivity will be difficult to quantify in this white paper, they should not be underestimated. Many white collar executives have reported huge gains in productivity after relocating business units from major east coast cities to Penn's Northeast. Virtually all cite the area's exceptional work ethic as the prime reason for the productivity gains.

For example, NatWest Bank (now Bank of America) had originally announced that it would be relocating 1,500 positions to Penn's Northeast. However, in 1995, after its first year of operation in Penn's Northeast, NatWest realized it was completing the same amount of work with just 1,200 employees. After operating in Penn's Northeast for just one year, NatWest's new office of "rookies" was ranked first in the nation (out of 100 companies) for bank customer service by Fairmont USA, an independent national survey consultant. The new NatWest office received the highest score any bank had received in three years.

After moving its customer services offices from Long Island, lower Manhattan, and southern New Jersey to Penn's Northeast in 1994, NatWest Media Relations Manager Tim Connolly said, *"We were looking for a somewhat low-cost operating center, where we can get quality work and skilled people. Certainly the incentives and the willingness of Pennsylvania officials to attract us were factors in selecting a Northeastern Pennsylvania location. We estimate that the lower costs of doing business in Northeastern Pennsylvania will save $17 million annually after the first two years and $25 million annually after the first ten years."*

After JCPenney opened its 16th Catalog Customer Service Center in Penn's Northeast Senior Vice President Len Leininger said, *"The work ethic here is every bit as good as I thought it was going to be – even better. We have never had a center produce the numbers that this center is producing so quickly."* Within six months of its opening, JCPenney's Penn's Northeast office outperformed the company's 15 other U.S. offices on all measures of productivity and customer service.

Cliff Melberger, President and CEO of Diversified Information Technologies, had this to say: *"We just completed a project where we had people at six different locations…Los Angeles, Jacksonville, Minneapolis, Newark, the Fort Washington area outside of Philadelphia, and Scranton. This area (Penn's Northeast) had a 20% increase in productivity and they did it with less training time."*

Real Estate Savings

Based upon information gathered from prominent NYC/NJ real estate brokers/developers such as Julien J. Studley, Insignia ESG, GVA Williams, and The Rockefeller Group, the average gross lease price for Class A space in Downtown Manhattan can be conservatively estimated at $51 per square foot ($30 net, net, net, for base rent + $21 per square foot for "add-on" or operating costs).

This compares to an average gross lease price for Class A space in Penn's Northeast of $20.75 per square foot ($14 per square foot, net, net, net for base rent + $6.75 per square foot for operating costs).

For 100,000 square feet therefore, the difference between Manhattan and Penn's Northeast of $30.25 per square foot would result in an annual savings of $3,025,000 (**$15,125,000 over five years and $30.25 million through 2013**).

See Real Estate section of this white paper for more information on leasing costs in NYC/NJ and Penn's Northeast.

Tax Savings

Thanks to an initiative started in 1998, local counties, municipalities and school districts are allowed to designate certain properties within their jurisdictions as special **tax-free zones**. All three taxing bodies have to agree to **total local tax forgiveness** for a property to receive either Keystone Opportunity Zone (KOZ) or Keystone Opportunity Expansion Zone (KOEZ) status.

There are many sites in the Penn's Northeast region that have received either KOZ (expires December 31, 2010) or KOEZ (expires December 31, 2013) status.

A business relocating from outside Pennsylvania into a KOZ/KOEZ is eligible to receive the tax breaks. Such a business must simply own or lease real property in a KOZ/KOEZ from which it actively conducts a trade, profession, or business, and obtain annual certification from the Pennsylvania Department of Community and Economic Development.

Some of the local and state taxes eligible for KOZ/KOEZ exemptions are:

- **Local Real Estate Taxes**
- **Local Business Privilege or Mercantile Taxes**
- **Pennsylvania's Corporate Net Income Tax**
- **Pennsylvania's Capital Stock & Franchise Tax**
- **State Sales Tax** on the purchase of taxable property or services (excluding motor vehicles) that are used and consumed by the business within the zone.
- **State Sales Tax** on telephone and electric service used by a business in the zone.
- **State Sales Tax** on "building machinery and equipment" purchased by a contractor in conjunction with a construction contract.
- **The Bank and Trust Company Shares Tax or the Mutual Thrift Institutions Tax**, subject to certain limitations, for liabilities attributable to business activity conducted within a zone. Only banks, trust companies and mutual thrift institutions are subject to these taxes.

- **The Insurance Premiums Tax** - an insurance company that is a qualified business may take a Job Tax Credit, subject to certain limitations, against this tax liability attributable to business activity conducted within a zone.
- **Personal Income Tax** on a qualified sole proprietorship, partnership, or PA S-Corporation - income earned by a qualified business inside a zone is not subject to this tax when passed through to the resident/nonresident shareholder, partner, member, etc…

Penn's Northeast, Inc. recently asked a Big 4 accounting firm to estimate the approximate tax savings a trading company would realize by opening a 500-employee office in a 100,000 square foot KOEZ facility. The Big 4 agency made certain assumptions (See Appendix pages 17-20) but was able to determine that such a company would have its local and state tax liability reduced in Penn's Northeast by approximately **$20.2 million over the first five years and $38.9 million through 2013.**

Summary of Five Year Savings in Penn's Northeast vs NYC/NJ

Payroll (salaries + benefits)	$48,000,000
Real Estate (gross lease differential)	$15,125,000
*PA Tax Savings (via KOEZ program)	$20,186,716
Total Savings	**$83,311,716**

Summary of Ten Year Savings (through 2013) in Penn's Northeast vs NYC/NJ

Payroll (salaries + benefits)	$96,000,000
Real Estate (gross lease differential)	$30,250,000
*PA Tax Savings (via KOEZ program)	$38,942,858
Total Savings	**$165,192,858**

*Does not include local business privilege tax savings as listed in Big 4 accounting agency's KOEZ tax savings report since this tax does not apply to most sites within Penn's Northeast.

Location and Transportation

The Penn's Northeast region is a 1 ½ to 2 ½ hour drive from Manhattan but is located in a separate power grid, telecommunication grid, and watershed. This "close but not too close" location will enable relocating core clearing and settlement organizations and firms that play a significant role in critical financial markets to accomplish same day recovery and resumption in the event of a wide scale disruption.

Penn's Northeast is easily accessible from New York City by the interstate system and by commercial and corporate air service. A passenger rail connection is expected to be operating by 2006 or 2007. This timeline coincides with The Interagency Paper's requirement that financial services companies have all of the pieces of their business continuity plans in place and operating by April, 2006.

Interstate Access

Key communities in the Penn's Northeast region and their proximities to NYC are illustrated below:

Penn's Northeast communities and their distances and drive times from Manhattan:

Community	Driving Distance From NYC	Approximate Drive Time
Milford	73 miles	1:35
Stroudsburg	78 miles	1:20
Honesdale	110 miles	2:24
Scranton	123 miles	2:06
Hazleton	127 miles	2:14
Wilkes-Barre	128 miles	2:15
Pittston	128 miles	2:16
Berwick	142 miles	2:30

Source: www.mapquest.com

(See also Appendix page 16)

Many executives commute daily from homes in Northern New Jersey to offices in Manhattan. The following chart lists distances and approximate drive times from a sample community – Morristown (33 miles from NYC) - to key communities in Penn's Northeast:

Penn's Northeast communities and their distances and drive times from Morristown, NJ:

Community	Distance from Morristown, NJ	Approximate Drive Time
Milford	55 miles	1:23
Stroudsburg	55 miles	0:56
Honesdale	88 miles	2:00
Scranton	102 miles	1:41
Hazleton	107 miles	1:51
Wilkes-Barre	107 miles	1:53
Pittston	107 miles	1:48
Berwick	119 miles	2:05

Source: www.mapquest.com

For further orientation the following chart lists mileages from a variety of New Jersey municipalities to New York City and to key communities in Penn's Northeast.

	NYC	Milford	Stroudsburg	Honesdale	Scranton	Hazleton	Wilkes-Barre	Pittston	Berwick
Bloomfield	18	68	67	96	113	120	117	119	131
Paramus	25	66	71	104	116	121	121	121	132
Plainfield	29	71	71	99	117	114	121	123	135
Kinnelon	36	42	63	77	108	113	113	115	124
Dover	39	41	41	69	87	94	91	93	105
Princeton	53	92	73	114	125	122	137	131	153

The eastern edge of the Penn's Northeast region is 50 miles from Interstate 95. I-95 is the major northeast corridor highway running from Boston through New York City, Philadelphia, and Baltimore to Washington D.C.

Interstate 80 West, via either the George Washington Bridge or the Lincoln Tunnel (from Route 46), is the primary roadway that would be utilized if driving from New York City to the Penn's Northeast region. However, Interstates 84 and 78 could be used as alternate routes should Interstate 80 be closed for any reason.

Martz Trailways offers close to 30 daily bus runs from the Port Authority and from Wall Street to many stops within Penn's Northeast.

Roads within Penn's Northeast are well maintained during inclement weather. Local back office employers rave about their ability to stay operating during major snow events.

The well maintained road system has combined with careful planning by local municipalities to reduce traffic congestion on local roadways. *"For people coming from large metropolitan areas one of the things that's a great selling point here is the lack of traffic*, said Paula Ellingrud, site director of CIGNA HealthCare's Penn's Northeast office. *Now, I know that to local people six cars constitutes a 'traffic jam,' but not so to most folks who relocate here. So when I have a 10-minute commute that is a major plus because it means I can spend an hour or an hour and twenty minutes more with my family in the morning and at night."*

Passenger Rail Access

A major passenger rail project, now under development, will directly tie NYC/NJ to Penn's Northeast, making this region, in effect, a suburb of Manhattan. Those closest to the project expect the rail line to begin operating in 2010.

The "Lackawanna Cutoff" project is designed to reestablish passenger rail service from Penn's Northeast to Hoboken, New Jersey (with connections to New York's Penn Station via transfer to MidTown Direct service). A key component of this project will be connecting the existing NJ TRANSIT Montclair-Boonton and Morris & Essex lines.

The $250 million project includes the complete reconstruction of the line including track and signal improvements to approximately 60 miles of right of way, new stations, parking facilities and rail rolling stock. It is believed that NJ TRANSIT will operate the new service. The line will have eight stops – five in Pennsylvania (Scranton, Mt. Pocono, Stroudsburg, East Stroudsburg, and Delaware Water Gap) and three in New Jersey (Morristown, the Oranges, and Hoboken). A connection to Wilkes-Barre, PA may also be added. A full trip, from Hoboken to Scranton, is expected to take 2 ½ hours. However, U.S. Representative Paul Kanjorski (D-PA) is leading an effort to convert the project to high speed rail, which would cut travel time in half.

The line has been proposed due to congestion problems on Interstate 80 in northwest New Jersey and because of the westward migration of thousands of New

York/New Jersey residents into the Penn's Northeast counties of Pike, Wayne, and Monroe. Upon its completion, the rail line will serve one large "community" stretching from Penn's Northeast, through New Jersey, to the Hudson River. The new line will allow people who live a reasonable distance from the rail stops in New Jersey to easily commute to Penn's Northeast.

In October, 2002, the Pennsylvania legislature approved $40 million for the rail link. In February, 2003, Congress approved $2 million to complete the preliminary engineering for the project. Arlen Specter (R-PA) and Rick Santorum (R-PA) are supporting the project in the U.S. Senate. Congressman Kanjorski and others are championing the project in the U.S. House.

In October, 2002, NJ Transit's board of directors authorized consultant work for conceptual design, completion of the environmental assessment and preparation of the document required by the Federal Transit Administration (FTA) for new transit lines. The State of New Jersey completed the purchase of the Lackawanna Cutoff property in May, 2001.

Pennsylvania and New Jersey are negotiating a formalized operating agreement to run the service. This agreement is crucial to getting a favorable rating from the FTA and is needed for acquiring federal matching funds. The engineering firm of Edwards and Kelcey is preparing the Major Investment Study and Environmental Assessment – another key project milestone.

Air Access

Two main airports serve the region. While a variety of commercial airlines serve the airports, both also offer superb general aviation services, which may prove critical in the event corporate aircraft needs to be used in the event of a wide scale disruption.

The Wilkes-Barre/Scranton International Airport (www.flyavp.com) is located in Avoca, Pennsylvania, just five minutes from Pittston and 15 minutes from both Scranton and Wilkes-Barre. Commercial airlines that serve the airport include US Airways Express, Delta Connection, United Express and Continental Connection.

The Wilkes-Barre/Scranton International Airport (airport code AVP) is also served by Tech Aviation Services, one of the finest FBO's (Fixed Base Operators) in the Northeastern United States.

"I like it here (Penn's Northeast) because I travel around the country a lot, said Bill Abene, President of Panel Prints, Inc. *I can leave my home 40 minutes before a flight and be comfortable that I'll get on that flight. Getting into major cities to the airport is a hassle. It takes you up to two hours in Minnesota and Chicago, where I frequently travel, to get into the system. We don't have that problem here. Plus, it's easy for our customers to get in and out of this airport (Wilkes-Barre/Scranton)."*

The Lehigh Valley Airport (www.lvia.org) is located between Allentown and Bethlehem Pennsylvania and is approximately 45 minutes from Stroudsburg, PA. Commercial airlines serving this airport include Continental Connection, Continental Express, Delta Connection, Interstate Jet, Northwest Airlink, Northwest Airlines, Southeast Airlines, United Express, US Airways, and US Airways Express.

Located at Lehigh Valley International Airport (airport code ABE), Piedmont/Hawthorne offers all the amenities of a first-class corporate and general aviation center.

Labor – Availability, Cost, Quality, and Existing Employers

Northeastern Pennsylvania has earned a reputation for having a workforce that is well educated, readily available, easily trainable, cost competitive, and highly productive. Financial services firms such as The Prudential, Met Life, and Bank of America have established major offices here primarily because of the quality of the local labor supply. These and other major office employers, such as Altria Group (formerly Nabisco) and Creditek, have relocated business units from NYC/NJ and have saved millions of dollars in the process.

Labor Availability

Penn's Northeast's major office employers report good success attracting, training, and retaining quality workers. Several report receiving eight to twelve job applications for every available job posting.

A sampling of employer opinions is as follows:

We knew there was a good workforce here, but we didn't know it would be this good or this abundant. Northeast PA is a prime location to incubate an advanced technology firm.

Brad Stephens
President, Digital Freedom
(Internet Service Provider).

Northeastern Pennsylvania is a prime example of an area that has a critical mass of information technology talent.

Daniel J. Cavanaugh,
Executive Vice President,
Metropolitan Life Insurance Company

We selected Northeastern Pennsylvania for our newest location because we felt that this area has both the available talent needed for a business such as ours and the resources to be able to expand that talent pool in the future.

Joe Valenti
Managing Director, Real Media
(Internet software development firm)

A late 1990's study of Penn's Northeast by The Wadley Donovan Group, a New Jersey-based national site selection consultant reported:

- An excellent availability of experienced, skilled, non-exempt office personnel and entry level management and professional employees.
- An ability to draw workers with specialized skills from the extensive New York City, New Jersey, and Philadelphia labor markets.
- A highly rated very productive labor force, with an excellent work ethic, very good basic skills, and solid computer skills.

In 1999, PFRESOURCES, a site selection consultant from Dallas, Texas, completed a labor study of Penn's Northeast and estimated that close to 50,000 local workers were considered to be "underemployed."

The business demographics of Penn's Northeast have changed noticeably between the 1990 and 2000 censuses. As the region has transitioned from a manufacturing to a service economy the numbers of persons employed in white collar positions has increased significantly. In addition, the region's population has grown, largely due to the influx of New York and New Jersey residents into the easternmost counties of Penn's Northeast.

- Penn's Northeast's population increased by 7.7% between 1990 and 2000 growing from 710,807 to 765,256.
- The number of persons 18 to 54 increased by 9.7% over the same time period, growing from 345,000 to 378,510.
- Likewise the Penn's Northeast civilian labor force increased by 8.5%, growing from 335,500 to 364,101.
- In 1990, 208,698 were employed in the following group occupations: *Management, Professional and Related* (67,731), *Service* (44,056), and *Sales and Office* (96,911). By 2000, that number had increased by 18.7% to 247,740 with a breakdown as follows: *Management, Professional and Related* (98,102), *Service* (53,692), and *Sales and Office* (95,946).
- By 2003, 71.8% of all non-farm jobs in Penn's Northeast were in the service sector.

Despite the growth of white collar employment in recent years, Northeastern Pennsylvania, including the Penn's Northeast counties of Pike, Wayne, Monroe, Luzerne and Lackawanna, has for decades badly trailed comparable areas in the nation in employment and per capita income growth. For example, as of March 2003, the national unemployment rate was 6.5% and Pennsylvania's was 6.1%. However, the rates within Penn's Northeast were as follows: Monroe (8.8%), Luzerne (8.1%), Wayne (7.9%), Lackawanna (6.7%) and Pike (6.1%). These higher than average unemployment rates combine with the thousands of students graduating annually from the region's 18 colleges and universities to create a large number of job seekers interested in employment with local firms.

Labor Cost

Labor rates for white collar businesses in Penn's Northeast, especially those that fall into the F.I.R.E. (Finance, Insurance and Real Estate) sector, are very competitive when compared to similar operations in the New York/New Jersey metro area. In fact, two in-depth studies prepared for Penn's Northeast by the New Jersey-based Wadley Donovan Group in the late 1990's revealed that:

- The overall cost of clerical labor in Penn's Northeast is 22% less than the U.S. average and up to 37% less than Northern New Jersey and New York City. Professional and technical labor costs 34% less than national averages and up to 40% less than Northern New Jersey and New York City.
- Labor costs are the second lowest of all metro areas in the Northeast and are comparable to those in Southeastern U.S. MSAs.
- Average earnings in the F.I.R.E. sector are **64.3% of the U.S. average.**
- On average, Penn's Northeast employers report that fringe benefits are 28% of base pay.
- Most office employers in the region have a 40 hour workweek, which can translate to significant cost savings versus 35 hour and 37.5 hour workweeks typical in many parts of the Northeast.

Recent studies within Penn's Northeast have determined average white collar wage rates and the percentage of employers that offer certain types of fringe benefits. This key information will allow a NYC/NJ employer to compare labor costs and calculate the approximate savings to be realized by relocating to Penn's Northeast. The wage rates listed below were gathered via a major 2001 labor market study by the Northeast PA chapter of the Society of Human Resource Professionals (NEPA - SHRM):

Occupation	Minimum	Median	Maximum
Accountant	$23,500	$31,725	$50,000
Accountant Senior	$29,120	$41,870	$61,963
Accounting Clerk	NA	$20,140	$25,940
Accounting Supervisor	$25,000	$40,700	$66,227
Accounts Payable Supervisor	$17,000	$30,000	$60,080
Admin. Assistant to CEO	$19,240	$34,360	$62,980
Auditor	$21,350	$32,989	$44,700
Computer Operations Super.	$42,000	$52,105	$69,285
Computer Operator	$16,240	$25,380	$34,180
Customer Service Rep.	$15,880	$22,800	$48,000
Data Base Administrator	$21,258	$58,100	$71,510
Data Entry Clerk	$15,000	$19,400	$26,680
Executive Secretary	$18,000	$26,000	$35,360
Graphics Designer	$16,640	$30,641	$81,120
Human Resources Assistant	$16,702	$23,835	$36,649
Human Resources Director	$25,544	$54,208	$108,000
Human Resources Generalist	$22,850	$36,200	$74,000
Information Systems Director	$33,137	$67,995	$117,917
LAN Administration Super.	$34,320	$46,405	$76,502
Mail Clerk	$14,100	$19,800	$34,460
Marketing Manager	$24,150	$45,475	$98,533
Payroll Clerk	$17,500	$23,080	$35,240
Payroll Manager	$22,880	$41,000	$56,164
PC Support Specialist	NA	$29,189	$42,000
Programmer Analyst	$26,923	$40,000	$66,250
Programmer Analyst Senior	$42,000	$55,744	$95,000
Receptionist	$13,500	$17,740	$29,960
Sales Associate	$21,382	$26,000	$72,957
Secretary	$15,000	$22,680	$38,400
Telemarketing Supervisor	$24,000	$33,433	$38,012
Telephone Sales Rep.	$15,000	$17,760	$21,000

In 2003, more than 700 Penn's Northeast companies, collectively employing 112,000 area residents, completed a survey regarding the fringe benefits they offer. The following lists the types of benefits and the percentage of local employers offering those benefits:

Percentages of Penn's Northeast Employers Offering Fringe Benefits			
Health Insurance	93%	Optical Insurance	52%
Life Insurance	73%	Short-Term Disability Insurance	50%
Dental Insurance	73%	Pensions	42%
401K	61%	Tuition Reimbursement	42%
Long-Term Disability Insurance	52%	Subsidized Child Care	04%

Labor Quality

The success of Penn's Northeast's employers is largely due to the region's strong work ethic. The following testimonials from Penn's Northeast employers shed light on this, the region's greatest asset:

We came into Northeastern Pennsylvania and really found good industry, absolute integrity, and hardworking people with a great work ethic who were quick learners. This (move) was just about the best thing we ever did in the organization.

John Tugwell, President and C.E.O.
Natwest Bank (now Bank of America)

One thing that strikes me every day that I come into the office is the great work ethic of the people here. People come to work extremely motivated and extremely willing to make this company succeed. They feel an ownership that I haven't seen in other places.

Jaco Smit, General Manager
VACCESSHealth, A division of Aventis Pasteur

The single most important reason we are successful is the quality of our workforce. Productivity and quality of work product and service are trademarks of the center employees.

Carol M. Truskowski, Director
Social Security Data Operations Center

When Alliance Capital relocated a portion of its servicing unit to Penn's Northeast we did so based on the premise that the available work force would be of high quality. Well, almost three years have passed and we are extremely pleased with the results. We have found the work ethic of the people of this area to be outstanding. The employees we have hired display a tremendous amount of pride in their work and have allowed us to achieve at a higher level than we originally expected. We have been able to provide excellent service to our client base while becoming more efficient in our processes.

Dick Dyson, Vice President
Alliance Capital

One of the key factors that attracted Travelocity.com to Northeastern Pennsylvania was the quality of the workforce. We haven't been disappointed. Our employees in Northeastern Pennsylvania have proven to be dedicated, well-educated professionals who take great pride in their work.

Cindy Scovish, Human Resources Manager
Travelocity.com

We're able to recruit good people to this region because of the sense of community here and because it's just a great place to live.

Kent Brown
Editor, Highlights for Children Magazine

*After management experiences in the Iowa, Illinois, and Colorado markets, I feel the caliber of employees entering our Caremark PCS Hanover Township (*Penn's Northeast*) facility outshines the others. Their dedication, values, and strong work ethic are evident in the quality of the work produced and our ability to grow the business quickly."*

Carl Janssens,Vice President, General Manager

Caremark PCS

When I got here I was very pleasantly surprised by the quality of the employees. I found that the employee base here was very dedicated and better educated than in other parts of the country.

Ellis Kern, President, WEA Manufacturing

A Time Warner Company

We bring our clients here. We have them see the work. They visit the call center. They visit the computer center. They visit our operating site. They meet the client server's representatives. That has been a winning formula for us. They see the people in the Scranton area and they leave here saying we want those people to administer our 401K plan.

Gavin Cerco, Vice President

Prudential Financial

The dedication of the workforce here is phenomenal. They show up religiously for work during the training process and take advantage of all of the opportunities we give them.

Paula Ellingrud, Site Director

CIGNA HealthCare

I couldn't ask for a better labor force. They're skilled, they want to work, and they really put 60 minutes worth of work into every hour of the day. They are very motivated to make us do well.

Malcom Geffen, CEO

DSFI

In our experience, our region boasts a wealth of creativity just waiting to be challenged because of the numerous colleges and universities in the surrounding area. These individuals have a high level of commitment and make a large emotional investment in their jobs and communities, which forms the basis of a superior work ethic. People come to work to work, so our productivity has always been excellent while our expenses have been contained. As a regional company that specializes in supplying Workers' Compensation coverage and services, we consider our 300 employees to be among our strongest assets in serving 25,000 employers across an 18-state footprint.

Carl J Witkowski L.C.S.W.

Executive Vice President of Information Services & Chief Administrative Officer

GUARD Insurance Group

Our employee team is unquestionably our most valued resource. They are firmly committed to achieving corporate goals and are inspired, dedicated community leaders.

Jack L. Burke

President & CEO, The Penn Millers Group

While we considered a number of other sites, we selected Drums, Pennsylvania (Penn's Northeast) because it lets us tap into a highly motivated workforce and will enable us to provide customers with better, more responsive service.

John Donoghue

Senior Vice President, Network Solutions

This center has already helped us dramatically improve customer access to support and service. We attribute this success in large part to the employees hired at the center and to their commitment to helping and delivering a more satisfying experience to Verisign's customers.

Joe Pickett

Director, Verisign

Existing Employers

Because Penn's Northeast scores well on the three major labor related factors – availability, cost, and quality – it has been able to attract and retain many nationally known office companies, including several financial services operations. The largest office employers in Penn's Northeast are charted below:

Company	Function	Employees
U.S. Social Security Data Cener	Data Center	1,100
Commonwealth Telephone Enterprise	Telecommunication	1,000
Bank of America	Financial Services	1,000
Blue Cross/Blue Shield of NEPA	Health Insurance	1,000
Prudential Investments	Pension & Profit Sharing Plans	900
CIGNA HealthCare	Health Insurance	900
Sallie Mae	Student Loan Processing	900
PNC Bank	Financial Services	875
Thompson Education Direct	Distance Education	800
Diversified Information Technologies	Business Process Solutions	800
Metropolitan Life Insurance Co.	Computer Center	780
RCN Corporation	Telecommunications	600
Altria Group, Inc.	Financial & Data Center	500
JCPenney Catalog Customer Service	Catalog Sales (inbound calls)	448
Travelocity.com	Online Tourism and Sales	400
Emery Worldwide, Inc.	National Accounting Office	380
Telerx	Customer Service	375
Verizon	Telecommunications	339
ALLTEL	Information Services	320
Guard Insurance Group	Insurance	300
HealthNow New York, Inc.	Healthcare Claims	270
Hilton Reservations Worldwide	Call Center	225
Dial America	Outbound Telemarketing	220
Creditek	Financial Information	140
Penn Millers Insurance Co.	Insurance	140
Verisign	Domain Name Registration	110
Kemper Insurance Company	Insurance Customer Service	100

Education and Training

Education

In a national economy where educated workers are at a premium, one of the Penn's Northeast region's competitive advantages is its strong higher education system. More than 49,000 students are enrolled at the region's 18 college campuses. Many of these students are pursuing studies in fields that are critical to the success of the F.I.R.E. sector such as healthcare, communications, liberal arts, business and consumer services, education, financial services, marketing, and information technology. In fact, close to 6,000 students with degrees in these areas of study graduate annually from the higher education institutions which serve Penn's Northeast. In addition, 77.8% of all students enrolled at the 18 area higher education institutions are Pennsylvania residents. Many wish to pursue their careers within the state.

The following Table lists the region's institutions of higher education and their 2002 enrollment figures:

Northeast Pennsylvania Educational Institutions	
Baptist Bible College	920
Bloomsburg University	7,548
East Stroudsburg University	5,811
Johnson College	166
Keystone College	1,220
King's College	2,233
Lackawanna College	877
Lehigh Carbon Community College	4,958
Luzerne County Community College	5,920
Marywood University	2,859
College Misericordia	1,798
Northampton Community College	1,685
Penn State - Hazleton	1,377
Penn State Schuylkill	1,124
Penn State Worthington Scranton	1,716
Penn State - Wilkes-Barre	877
University of Scranton	4,615
Wilkes University	3,570

In 1990, 115,261 (18.35%) of the region's adult population 25 years and older (628,287) possessed an Associates, Bachelors or Graduate Degree. By 2000 however, 154,861 (22.81%) of the 678,834 who are 25 and older possessed a college degree. This 34% surge in the number of adults with degrees is in keeping with the region's shift from a manufacturing to a service economy. It should also be noted that high school dropout rates throughout Penn's Northeast are minuscule, less than 2% in most local districts. Close to 75% of the region's public high school graduates further their education, many at one of the 18 colleges, universities and technical schools located throughout Northeastern Pennsylvania. Close to 95% of the graduates from the area's private schools enroll in college.

Northeastern Pennsylvania colleges and universities have been very successful in attracting students locally and from the Northeast and Mid-Atlantic regions. Many out-of-area students decide to initiate their careers here, and several have chosen to start their own small businesses locally.

Internships, cooperative programs, and the use of industry adjunct faculty are all ways that the region encourages students to increase their interaction with local employers prior to graduation. In addition, the business and community leaders reach out to students at the K-12 level to raise their awareness of career opportunities within the region, and encourage them to pursue opportunities where the need for skilled employees is the greatest. An extensive effort is underway to make K-12 students more aware of local career opportunities, so that they enter the workforce in a trade position after high school or tailor their higher education training to fit the needs of future career opportunities.

The area's associate degree programs provide advanced skills through occupational career programs. Graduates from these programs provide the foundation for an entry level and middle management workforce.

Northeastern Pennsylvania provides advanced technical programs at various schools. For example, the University of Scranton has software engineering graduate degree programs, business administration graduate programs, and a research institute. Marywood University has 45 percent of its students enrolled in graduate programs, including Business Administration and Management Information Systems. Wilkes University and King's College both offer graduate programs in Business Administration and Finance, and Wilkes also offers an Electrical Engineering graduate degree program. East Stroudsburg University has recently added a Bachelor of Science degree program in Computer Security which gives the student a deep and broad understanding of the concepts and techniques of the computer security discipline.

Great Valley Technology Alliance

In order to respond to the needs of emerging industries, existing industries, and firms being attracted to the region, the area's economic development organizations, higher education institutions and key area business leaders have formed the Great Valley Technology Alliance (GVTA). The role of the Alliance is to facilitate the development of a technology based economy for Northeast Pennsylvania. Among Great Valley's many accomplishments are the creation of an annual High School Computer Contest, which this year engaged high school students to create a website for an existing business, the formation of the Entrepreneurship Institute and YEA (Young Entrepreneur Award), which are designed to encourage entrepreneurship among the region's young people, and the founding of the GVTA Business Plan Competition, which awards college students with cash and in-kind contributions to start a technology business in the area.

One of the Alliance's key programs is the formation of a Technology Institute, which serves as a focal point for collaboration among the area's schools, businesses and community leaders. The Institute strives to design, develop and implement quality educational programs quickly and responsively. In addition, the Institute works to insure that the core requirements and concentrations among area colleges and universities are complementary and seek to improve the level of integration and coordination over time.

The Institute also helps to develop and prepare a pool of skilled individuals that would be qualified to work for firms that start up or move their operations to Northeast Pennsylvania. As a result, the quality of the region's workforce has become a powerful marketing element, similar to the region's low cost of living and quality of life amenities.

Christopher Haran, CEO of the Great Valley Technology Institute and the former director of information technology at two of the region's premier white collar employers said, "*An educated workforce is certainly one of Northeast Pennsylvania's greatest strengths. People are the most important asset to financial services and technology firms – not bricks and mortar, equipment, or even product. Having an available labor pool that is conversant and skilled in particular fields has been critical to the success of our region. Our IT workers enjoy having access to the specialized courses, certificates, and degrees that enable them to stay abreast of changes and advance their careers. They have an insatiable demand for additional education as a life-long proposition."*

Training

Local educational institutions have tremendous experience providing continuing education and customized training to meet the specific needs of area businesses. They bring top quality programs right to an employer's office or, conduct training off-site, away from the workplace. They develop and arrange programs to meet time constraints and work schedules 24x7, whether mornings, afternoons, evenings, or weekends.

Since business needs determine optimal program length, training can be as long—or as short—as is needed, as well as specially-designed to meet company specifications. Penn's Northeast's educational institutions have experience providing turn-key pre-employment development programs. They can provide on-going training for employees at all organizational levels, including management training for certification and licensure retention.

The region's educational institutions will work with the Governor's Action Team to help companies obtain training grants and will provide assistance in the management of state funded assistance through the WedNet and Customized Job Training programs. Local schools may utilize other professional trainers or expert resources as part of the training team according to the needs of the company. When an advanced degree or specialized education is needed from educational institutions outside this region, a local college will collaborate with that institution to provide the specialized degree and training programs locally for company employees. Delivery can be tailored for the company site, the college or distance, technology driven strategies.

Real Estate

There are many office buildings and land sites within the Penn's Northeast region that will be of interest to metro New York firms interested in relocating business units. Buildings range from well maintained properties in central business districts, to modern flex space in area business parks, to Class A buildings in suburban settings. Fully improved parcels, often served by dual power and dual telecommunications, can be purchased in dozens of local office and business parks. Stand-alone lots are also available in downtowns and on main streets.

Cost of Real Estate

Lease Rates

Office and flex space is far less expensive to own and/or lease in the Penn's Northeast region than it is in metro New York. For example, modern flex/office space, fit-out to a client's exact specifications, is typically offered for lease for $8 to $12 per square foot, net, net, net. Class A office space can usually be leased in the Penn's Northeast area for $12 to $16 per square foot, net, net, net.

According to figures compiled by **Julien J. Studley,** a brokerage firm that represents tenants, the average asking rent for **prime** buildings in Midtown Manhattan has fallen to $67.55 per square foot compared with $75.48 per square foot before Sept. 11, 2001. However, because of better terms being offered by landlords, deals can be made with effective rents of about $60 per square foot annually. Effective rents Downtown are about half of those in Midtown, the company said. *Source: New York Times article, September 15, 2002.*

According to figures compiled by **Insignia/ESG**, a real estate brokerage and services company, the overall asking rental rate in Manhattan had fallen to $44.66 per square foot annually by the third quarter of 2002 from $50.75 a square foot a year earlier and $52.67 in 2000. Source: *Insignia/ESG web site.*

Operating Costs

"Add on costs" (utilities, real estate taxes, janitorial and mechanical maintenance, and insurance) typically range from $3.50 per square foot to $6.75 per square foot in Penn's Northeast, depending upon the type of operation (e.g. a multi-shift operation will consume more power than a one shift operation), the type of janitorial plan chosen, the amount of annual real estate taxes (e.g. taxes for a flex building may be $0.50 per square foot but may be $2.00 per square foot for a Class A office building), etc… In addition, tenants in an office building located in a Keystone Opportunity Zone (KOZ) or Keystone Opportunity Expansion Zone (KOEZ) will not have to pay any annual real estate taxes during the life of the zone (KOZs expire in 2010, KOEZs in 2013).

While taxes for a Class A office building in Penn's Northeast approach $2 per square foot per year, taxes for comparable space in Manhattan are much higher. Consider the following, which appeared in the ***GVA Williams Report for New York City*** in the 4th quarter of 2002: *As 2002 waned, an 18.49 percent real estate tax rate increase for the City of New York quietly rang in the new year. It will be borne by landlords and tenants with half of the increase due in January, 2003. The balance will be due July 1, 2003. While both landlords and tenants were expecting some kind of tax increase, after all it's the second certainty in life, neither group was prepared for such a large – and immediate – jump in expenses. And if you examine how taxes are billed in New York City, the impact – and the percentage – is even greater than an eighteen percent hike.*

The GVA article noted the rise in real estate taxes at numerous Manhattan office properties and indicated a range in annual taxes in the city by 2003 of $6.50 per square foot to $11 per square foot.

The Rockefeller Group, a major New York City developer, estimates add on costs for Class A office space in the city to be in the $21 to $22.50 per square foot per year range with a breakdown as follows: Operating Costs - $9 to $10, Real Estate Taxes - $10, Tenant Electric - $2.00 to $2.50.

Land and Construction Costs

The cost to purchase fully-improved office sites in Penn's Northeast ranges from $40,000 to $70,000 per acre. Total cost to construct a Class A office building locally, including land acquisition, site work, full building construction and all soft costs, ranges from $120 to $160 per square foot. Grants and low interest loans are available to help companies reduce their real estate costs in Penn's Northeast.

Availability

Local business, office and technology parks have been constructed by both private developers and non-profit economic development corporations. There are more than 20, fully-improved parks within the region that have land suitable for the construction of Class A office buildings. Many of these parks already have, or have the capability of having, power from two or more substations and telecommunications service from two or more central offices. Many of these parks have sites within KOZ's or KOEZs, which will provide significant tax savings to office companies that locate there. In addition, there are numerous stand alone sites and sites within central business districts that are available for developers interested in constructing office buildings.

Existing flex space and Class A and B office space opportunities are also available throughout the region. Existing space is typically available in blocks of 10,000 square feet to 60,000 square feet with some larger spaces available. In some cases, new construction would be required for companies in need of more than 100,000 square feet of Class A office space.

Companies interested in sites and buildings can conduct a free, anonymous search by going to www.pennsnortheast.com and clicking on Real Estate.

See Appendix page 21 for a map showing the location of Penn's Northeast's business parks.

Timing

Unlike major cities, the process to obtain building permits within Penn's Northeast is fairly quick and streamlined. In fact, a developer interested in constructing a large office building here would most likely be able to obtain all permits and approvals in **less than 120 days.** Actual construction of a large office building will take from nine to 12 months – much less if a flex building is preferred. The role local non-profit economic development agencies play in land development is a huge plus to a relocating office company. Because these agencies have developed thousands of acres into business parks they have built very good working relationships with municipal officials, utility companies and local and state permitting agencies. These economic development agencies often serve as a for profit developer's "community partner," essentially walking the developer through the entire permitting and construction process. In some cases, the non-profit agencies even serve as the building developer. Major firms such as Verisign, JCPenney, Bank of America and Prudential for example, lease large blocks of Class A office space from non-profit economic development groups.

"A developer interested in constructing a large office building here would most likely be able to obtain all permits and approvals in less than 120 days"

In addition, the fact that numerous full-service architectural and engineering firms and well regarded general contractors and sub-contractors are based within Penn's Northeast, will speed the development process along. The vast majority of major office buildings in the Penn's Northeast region were designed by local A&E firms and built (on time and on budget) by local tradesmen. Many were fast tracked by such local firms. The fact that these firms have completed many projects in the market means that they are familiar with the permitting and approval process thus reducing the risk that the start of construction will be delayed.

Utilities – Electric Power, Water, and Telecommunications

Electric Power

Businesses in northeastern Pennsylvania enjoy highly reliable electric delivery service at prices that are below the average for the nation and the Mid Atlantic region. **These customers receive their power from a different grid than do those located in Manhattan.** (See Appendix page 22)

The two main providers of electric power in the Penn's Northeast Region are PPL Electric Utilities and UGI Utilities, Inc.

PPL Electric Utilities

Customers of PPL Electric Utilities have given the company some of the highest marks in the country for power quality and reliability. Customers have electric service an average of **99.98 percent** of the time during the year, excluding catastrophic storms, based on reports filed with the Pennsylvania Public Utility Commission.

PPL Electric Utilities has multiple locations within the Penn's Northeast region where it can deliver service from two sources of supply for added reliability, and can work with customers to determine their specific power quality needs such as uninterruptible power supply and protection from voltage surges and sags.

PPL Electric Utilities is a founding member of PJM Interconnection, the world's first power pool, which is responsible for the reliability of electric service to 25.1 million people in seven states - Pennsylvania, New Jersey, Delaware, Maryland, Virginia, West Virginia and Ohio - and administers the largest wholesale electricity market in the world.

Electric service in northeastern Pennsylvania is very affordable as well. PPL Electric Utilities has a contract in place through 2009 for its electricity supply in the competitive market. That assures PPL Electric Utilities' customers a reliable electricity supply at stable prices.

Utility choice is state law in Pennsylvania, which means customers may choose an electric generation supplier based on price and other criteria. Whether customers choose an electricity supplier or not, they receive reliable delivery service from PPL Electric Utilities.

Customers who do not choose a supplier receive default service from PPL Electric Utilities, **which costs 19% less than the average for business customers in New York and New Jersey** (based on electricity use of 400,000 kilowatt-hours a month with maximum demand of 1,000 kilowatts).

UGI Utilities, Inc.

UGI's Electric Division provides electric service to approximately 62,000 customers in a portion of Luzerne County in the Penn's Northeast region. UGI customers are served power through its transmission system. The transmission system consists of approximately 33 miles of 230kV transmission line that provide power to a single 230kV to 66kV transformation substation. This substation is fully redundant, with two MVA transformers supplied from separate 230kV sources that in turn supply power into a double 66kV bus scheme. A third 150 MVA transformer can be added to this substation if needed. Eight 66kV lines emanate from this transmission substation that take power over approximately 100 miles of 66kV transmission lines to the Division's twelve 66kV to 13kV area supply substations.

The UGI electric transmission is also part of the PJM interconnected transmissions system. **It is monitored on a 7 x 24 basis by both the UGI and PJM transmission control centers to ensure reliable operation.** Customers can be served directly from the Division's 66kV system if their demand warrants it.

UGI manages its transmission and distribution facilities with the objective of providing reliable service to its customers over the long term. Ongoing maintenance and replacement programs are in place to address all aspects of its facilities. **Average service availability to UGI customers for the year 2002 was 99.98 percent.**

Water

The New York City water supply system provides approximately 1.3 billion gallons of high quality drinking water to almost nine million New Yorkers every day — eight million City residents and a million more people in Westchester, Putnam, Orange and Ulster Counties — plus the millions of tourists and commuters who visit the City throughout the year. The source of this superior water supply is a network of 19 reservoirs in a 1,969 square-mile watershed that extends 125 miles north and west of New York City. The Croton system, the City's first upstate supply, provides about 10% of the daily consumption from 12 reservoirs and three controlled lakes in Putnam and Westchester Counties. The other 90% comes from six reservoirs in the Catskill/Delaware system, located in Delaware, Greene, Schoharie, Sullivan and Ulster Counties, west of the Hudson River. *Source: http://www.ci.nyc.ny.us/html/dep/home.html*

The Penn's Northeast region is located within the Lackawanna River Watershed, the Susquehanna River-Chesapeake Bay Watershed, the Lehigh Valley Watershed and the Delaware River Watershed (western side). All Penn's Northeast communities, including those that are located on the western side of the Delaware Watershed, have their own water supplies and aquifers. Penn's Northeast's water supplies are independent of those serving Manhattan. (See Appendix page 23)

The largest provider of water within Penn's Northeast is Pennsylvania American Water Company (PAWC). The company's northeastern area distribution systems serve an estimated population of 550,000 in 66 communities in eight counties. Cities served include Scranton, Wilkes-Barre, Nanticoke, Pittston and Carbondale as well as the Poconos. The regional office is located in Wilkes-Barre.

Most of the region's business parks are served by PAWC.

PAWC operates under rules and regulations established by the state Public Utility Commission (PUC), Department of Environmental Protection (DEP), and the U.S. Environmental Protection Agency (EPA).

PAWC Supplies and Facilities – Key Info:

- **Water Supply**

The company's water supply is provided principally from surface water supplies such as rivers, streams and lakes through allocation permits from the Pennsylvania Department of Environmental Protection and several river basin commissions. Water is also supplied from wells and through purchase contracts and interconnections with other water providers.

- **Purification Facilities**

Transforming water from the source to a consumable product requires purification and processing to remove natural and manmade contaminants. All surface water is filtered and all water supplies are chemically treated with chlorine.

The company owns and operates 38 surface water purification plants with a combined operating capacity of 332 million gallons of water per day. Water from well sources generally requires purification by means of chlorination and pH adjustment. In some cases, naturally-occurring iron and manganese is removed by filtration and air stripping.

■ **Transmission and Distribution Facilities**
Pennsylvania-American supplies water to its customers through separate water transmission and distribution systems located throughout each service area. These systems consist of water mains, pumping stations and distribution system reservoirs. The company owns more than 8,000 miles of water transmission and distribution mains across the state.

■ **Water Quality**
To ensure that the water provided to its customers is of the highest quality, PAWC operates 40 quality control laboratories across the state staffed by 30 water quality specialists and more than 150 analyst/operators. The laboratories are equipped with advanced equipment to enable these specialists to continually monitor water quality at every stage.

Monitoring begins at the water source, continues through the purification process and through the thousands of miles of pipelines supplying service to customers. Typically, more than 100 water quality tests are performed daily at each plant. That is the equivalent of 1.2 million water quality tests annually.

Telecommunications

The recent terrorist attacks in Manhattan and Washington, D.C. coupled with the increased automation in the financial services industry has necessitated a shift in the way the executives of these firms view business continuity planning (BCP). More resources are being devoted to the automation and centralization of data, operations and support infrastructure. At the same time, these firms are leveraging mirroring technology for their most critical data, simultaneously posting transactions on their primary and backup systems (synchronous). Those firms that establish long-distance back-up facilities will be well established as a contingency in the event of a wide-scale disaster.

Penn's Northeast, Great Valley Technology Alliance, and Congressman Paul Kanjorski (D-PA) have been working with EMC Corporation to verify that the technology required to deliver robust data redundancy at distances of up to 125 miles is viable for companies that choose Northeastern Pennsylvania as an additional off-site processing location.

EMC, Legato, and Nortel have recently announced a highly available enterprise business continuity solution that enables multiple data centers to act as one to help keep businesses running. In the event of a disaster, transactions are automatically routed to an alternate site with no need for manual restore or restart procedures, greatly reducing time to recovery and lowering costs. EMC has in fact already deployed this comprehensive solution to the Pentagon, allowing for the synchronous writing of data to an undisclosed remote facility 125 miles away.

This business continuity solution provides a geographically dispersed, high-availability architecture for application, server, storage and transport. Enterprises benefit from synchronous replication over extended distances with minimal impact on overall application performance. EMC reports that the Pentagon (the largest data store on the planet) is using this technology to synchronously replicate "very write intensive data" over a fiber optic network. Additionally, this solution complies with the SEC recommendations for synchronous replication of sensitive data required to facilitate restoration of critical business services within several hours (same day settlement).

By itself, this technology would not facilitate business continuity without a robust, bandwidth intensive fiber-optic network. Northeastern Pennsylvania has a robust array of telecommunications services including Internet, Data and Voice products and services. With respect to flexible, high speed dedicated data services, local providers offer DS-1/DS-3 services as well as up to OC-48 private local SONET ring solutions.

Northeast Pennsylvania has several major carriers who afford enterprises carrier diversity and redundancy:

Verizon-PA

■ Verizon-PA is one of the premier providers of telecommunication services in the Northeast and the Mid Atlantic Region, offering local, long distance, data and wireless services, through its 100% digital switching offices and the most extensive fiber optic network in Northeastern Pennsylvania.

- Some of the Data Services available through Verizon are: T1/T3, OC3, Frame Relay, Dedicated Internet, Intellilight and SONET.
- Voice Services include: ISDN-PRI, Custoflex, and Flexgrow.
- Verizon has invested nearly $8 billion in infrastructure improvements in Pennsylvania in the past eight years.

Telcove

(formerly Adelphia Business Solutions)

- Local Private Line SONET-based intra-city point-to-point connectivity offered in bandwidths ranging from DS-1 to OC-48.
- Private Local SONET Ring offers network redundancy and connectivity in OC-3, OC-12, and OC-48 bandwidths, addressing those enterprises that need reliable, secure, high speed communications between multiple locations in a metropolitan area.
- Local Point-to-Point 1-Gigabyte Ethernet provides a fast connection between two locations utilizing layer 2 equipment or intelligent bridges
- Frame Relay provides a cost effective data communications solution which allows enterprises to send large amounts of data without reserving large amounts of bandwidth or paying for more capacity than you need.
- ATM allows for scalability and flexibility in distance, number of users and bandwidth.

PPL Telcom

- PPL Telcom, a wholly owned subsidiary of PPL Corporation, provides a full range of telecommunications services to enterprises located throughout the Mid-Atlantic region. The PPL Telcom network consists of more than 2,500 route miles of fiber. A 1,300 mile route diverse long haul backbone connects extensive metropolitan networks in Washington DC, Baltimore, Baltimore County, Wilmington, Philadelphia, Newark, NJ, New York City, Allentown, Bethlehem, Harrisburg, Lancaster, Williamsport, the Penn's Northeast region and the International Cable Landings in New Jersey.
- In the Penn's Northeast market PPL Telcom has more than 70 route miles of metro fiber, the most extensive fiber network of any service provider. This network was designed with maximum business connectivity in mind. It is 100% route diverse and electronically redundant. Self-healing matched-node architecture ensures service restoral times of fewer than 50 milliseconds in the unlikely event of a fiber cut. The network is less than a mile from the vast majority of Penn's Northeast business locations.
- PPL Telcom offers a full range of telecommunications services - T1, DS-3, and OC-3 to OC-192, and Ethernet from 10 Mbps to 1 Gbps, 2.5 Gbps and 10 Gbps Optical Wavelengths, as well as secure, conditioned co-location facilities available throughout the region.
- PPL Telcom is positioned to provide disaster recovery and business continuity telecommunications services to corporations located in the Mid-Atlantic markets it serves. They offer an end-to-end diverse solution to connect the major financial centers and business districts of NYC, Philadelphia, and Wilmington to the Penn's Northeast metropolitan area.

Commonwealth Telephone (CTE)

- CTE, operates the nation's eighth largest publicly held independent rural local exchange carrier which has provided premier telecommunications services in Northeast PA since 1897. CTE serves a growing base of business and residential customers with the full array of technologically advanced data and voice telecommunications services, including broadband data and high speed Internet access, delivered over its 100% digitally switched, fiber rich network.
- CTE has deployed over 2,000 route miles of fiber optic cable throughout its network, serving areas between the New York and Maryland bounders in eastern Pennsylvania. The single mode fiber is "lit" using combinations of DWDM and SONET technologies, producing highly survivable ring architectures that provide customers with the ultimate protection of telecommunication services. Transport services include: Private lines (DS-0 through OC-48), Optical wavelengths, and Ethernet based services.

- CTE's switched voice network is based upon 100% digital, yielding the most current residential and business features. (Centrex, CLASS, CNAM, LNP, PRI, Voice Mail, ISDN, Switched 56 Kbps, Call Waiting, Conference, etc.)
- CTE's data network architectures utilize integrated routing (IP) and switching technologies (ATM) that provide extremely high availability and rich features across its portfolio of data services. These services include: DSL, broadband Internet access (dedicated and remote dial), ATM, Frame Relay, VPN, Ethernet and transparent LAN.
- CTE's NOCC (Network Operations Center) monitors the performance of its network elements 7 days a week and 24 hours a day.

Financial, Recruitment, and Relocation Assistance

Financial Assistance

Financial services employers that have established offices in Penn's Northeast have been able to utilize a variety of grant, tax credit, and low interest loan programs to help reduce their operating costs. The local office of Governor Rendell's Action Team works with the Department of Community and Economic Development in Harrisburg and with area economic development agencies and chambers of commerce to tailor-make incentive packages. While there are dozens of funding programs, those that follow are the state, federal, and local incentive programs most often used by relocating companies.

Keystone Innovation Zones (KIZ)

This new program has been proposed by Pennsylvania Governor Ed Rendell. The program is designed to provide the capital, workforce and facilities needed to start and grow new companies in and around the state's world-class research and education institutions.

Keystone Innovation Zones (KIZs) are geographically designated zones of opportunity and innovation designed to harness resources made available through partnerships formed by a combination of institutions of higher education, private businesses, business support organizations, commercial lending institutions, venture capital networks including angel investors, and foundations. Local economic development officials have constructed business incubators within areas that are expected to receive KIZ status. Companies relocating from metro New York may find it advantageous to located within an incubator and utilize KIZ funding sources.

Opportunity Grant

This Pennsylvania Department of Community and Economic Development (DCED) program provides competitive grant funding to employers that create a substantial number of new jobs. Grant funds can be used for a variety of standard business expenses including job training, construction, the purchase of machinery and equipment, and working capital.

A company that receives an Opportunity Grant Program award must, within three years, meet certain job creation requirements. The company's new hires must receive a base pay of at least 150% ($7.73/hr.) of the federal minimum wage, excluding benefits, in order to be counted towards the employment requirement.

Job Creation Tax Credit Program

This state program offers employers a $1,000 tax credit per full-time job, per year. A business may claim credits only after a job has been created. Jobs must be created within three years from the start date and all tax credits must be claimed within five years from receipt of the tax credit certificate.

To be counted as new full-time employees under the JCTC program, new employees must earn an average hourly rate of at least 150% of the federal minimum wage, excluding benefits.

Customized Job Training Program (CJT)

This grant program reimburses Pennsylvania employers up to 100% for certain **trainer** expenses. CJT funds can be used for consumable materials and supplies, approved contracted services, instructional costs, and relevant travel costs for instructors.

Workforce & Economic Development Network of PA (WEDnetPA)

Qualified companies can receive free "basic skills" and "information technology" training through this innovative state program. An alliance of 35 partnering educational institutions including major technology centers makes the training available.

Also known as ***Guaranteed Free Training,*** the program provides grant assistance for classroom, on-line, and blended learning for industry specific Basic Training (up to $450 per trainee and $100,000 per company) and Information Technology Training (up to $700 per trainee and $50,000 per company). Trainees must be Pennsylvania residents, earn more than 150% of the current minimum wage, and receive full-time benefits.

Funding for this program is provided by the PA Department of Community and Economic Development.

Workforce Investment Act (WIA)

Through WIA's On-the-Job-Training (OJT) component, an employer can be reimbursed for 50% of wages paid to eligible trainees. The amount of time included in the training period varies with the difficulty of the job, which is usually determined through the assessment of skill levels found in the Dictionary of Occupational Titles.

Program eligible employees include, but are not limited to, those who are economically disadvantaged and those who have been dislocated due to a plant closing or mass lay-off. Local Workforce Investment Boards (WIBs) determine the amount of WIA funding offered to an employer.

Pennsylvania Industrial Development Authority (PIDA)

This state program processed through Industrial Development Corporations provides low interest loans for land and building acquisition, construction and renovation, which result in the creation or retention of jobs. PIDA rates can be as low as 3% interest and are fixed for the entire term of the loan, which can not exceed 15 years. PIDA will finance up to 40% of the total real estate project cost (up to 50% in certain circumstances) with a maximum loan amount of $1,250,000. PIDA will lend up to $1,750,000 to companies located in certain distressed communities or special development zones. A company that benefits from a PIDA loan must create one full-time job for every $25,000 borrowed. Eligible companies include manufacturers, distributors, most other industrial companies and certain large office companies. Retail and most commercial businesses are ineligible.

Industrial Development Corporations

There are eight non-profit industrial development corporations (IDCs) located in the Penn's Northeast region. These IDCs have won numerous state and national awards for their innovative job creation efforts. Most have developed industrial, office, and/or technology parks in their respective territories and several have completed build-to-suit projects, including large office buildings, for major corporations. The IDCs have built excellent, long term working relationships with local governments and permitting agencies and will serve as project ombudsmen for any NYC/NJ firm that relocates to Penn's Northeast. The IDCs will help companies fast track their construction projects (building permits will be obtained in less than 90 days) and will provide key guidance to ensure that projects are completed on time and on budget.

Recruitment Assistance

An announcement that a major NYC/NJ financial services firm will be opening an office in Penn's Northeast will be front page news. The excitement generated by the local media coverage of the announcement will by itself produce hundreds, perhaps thousands of job applicants. However, to build upon this excitement the following additional assistance will be offered:

Career Link Offices

Companies receive tremendous recruiting and screening assistance from the Pennsylvania Career Link offices located throughout Northeastern Pennsylvania. Local Career Link offices will join forces to recruit and screen applicants based upon a company's specifications. These services will be provided at **no cost to the company.**

Employment Ads

Penn's Northeast, Inc. will work with local economic development agencies to design help-wanted ads to a company's specifications. Penn's Northeast, Inc. will even contribute the first $1,000 towards the overall cost of placing a relocating company's employment ads in regional newspapers/publications.

Job Fairs

Each spring, several area chambers of commerce form a partnership and host one of the nation's largest job fairs. With more than 100 employers participating, the Job Fair usually attracts more than 11,000 people and is believed to be the largest job fair in Pennsylvania. In the past, this partnership of chambers of commerce has offered one free complimentary booth to relocating companies.

Special Job Fair Advertising

Should a relocating company make a firm commitment to attend the Job Fair the chambers will announce the company's attendance in a **full-page, full-color** newspaper ad. The ad will appear on two consecutive days in local newspapers and will list all of the companies that will be participating in the Fair. The relocating company's attendance at the Fair will be **prominently featured** in the ad.

Relocation Assistance

The community and the Penn's Northeast, Inc. staff and volunteers are prepared to assist relocating families with a wide variety of resources. These include:

■ *Private Tours*

Local community leaders will "adopt" relocating families and conduct private tours of the area. Relocating families will be shown various neighborhoods, school facilities, shopping districts, medical facilities, culture and recreation spots and various other points of interest. Per the request of the company, these individual tours can be conducted on weekends.

■ *Bus Tours/Community Expo*

Penn's Northeast, Inc. will arrange group bus tours for transferees and their families. The tours will be held on weekends (or on weekdays if preferred) and will begin with a community presentation in the boardroom of Penn's Northeast. The itinerary of the tour will be designed to the relocating company's exact specifications (housing, schools, etc…). The tour will end with a luncheon sponsored by Penn's Northeast and will be followed (assuming at least 25 families are involved) by a Community Expo. At the Expo, company families will be able to meet home builders, real estate brokers, daycare providers, school representatives, bankers, etc…

■ *Executive Orientation*

Area chambers have excellent Leadership Programs and will design an Executive Orientation Program specifically for relocating employees and their spouses. The multi-session program is designed to introduce relocating executives to key business and civic leaders and provide them with an extensive overview of the region's history, economic and political structures, and cultural and leisure amenities.

■ *Relocation Packages*

Penn's Northeast, Inc. will provide, free of charge, a complete relocation portfolio including community videotape to all families considering relocation.

■ *On-Site Presentations*

Penn's Northeast staff will travel, by request, to NYC/NJ offices to make customized community presentations to relocating employees and their families.

Quality of Life

Several quality of life factors make the Penn's Northeast region attractive to metro New Yorkers:

■ According to FBI Uniform Crime Reports the Penn's Northeast region has the 8th lowest crime rate in the United States.

■ On average, the cost to rent an apartment in Penn's Northeast is just 2/3rds of the cost of a comparable apartment in the New York metro area *(U.S. Census Bureau)*

■ The average daily commute to work within the region is just 20.5 minutes *(U.S. Census Bureau)*

■ There are 18 higher education institutions located within Penn's Northeast. The public school system is considered strong with test scores and graduation rates at or above state and national averages.

■ There are numerous sports and recreation venues in Penn's Northeast. These include 13 ski resorts, dozens of golf courses, a AAA baseball team, an AHL hockey team, and an arena football team. Lakes and camping areas are also plentiful.

■ The cost of living is significantly lower in Penn's Northeast. The chart on the following page compares what a homeowner earning $75,000 in various NY/NJ/CT communities would need to earn in Penn's Northeast to maintain the same standard of living.

The easternmost counties of the Penn's Northeast region enjoyed steady population growth between the 1990 and 2000 U.S. Census. The vast majority of this growth has come from a westward migration of New York/New Jersey residents in search of more affordable housing, lower crime rates, and stronger public school systems. In fact, 18.5% of all workers who live in Monroe County in Penn's Northeast commute daily to jobs in the New York/New Jersey metropolitan area *(Monroe County Workforce and Commuter Survey 2001-2002).*

The cost of living is significantly lower in Penn's Northeast. The chart below compares what a homeowner earning $75,000 in various NY/NJ/CT communities would need to earn in Penn's Northeast to maintain the same standard of living.

Salary Comparison Chart			
NYC (Manhattan)	$75,000	Penn's Northeast	$26.966
Greenwich, CT	$75,000	Penn's Northeast	$38,898
Stamford, CT	$75,000	Penn's Northeast	$40,995
White Plains, NY	$75,000	Penn's Northeast	$43,266
Princeton, NJ	$75,000	Penn's Northeast	$43,743
NYC (Staten Island)	$75,000	Penn's Northeast	$43,825
Parsippany, NJ	$75,000	Penn's Northeast	$49,516
Hicksville, NY	$75,000	Penn's Northeast	$49,724
Hoboken, NJ	$75,000	Penn's Northeast	$52,853
Bridgewater, NJ	$75,000	Penn's Northeast	$52,881
Brooklyn, NY	$75,000	Penn's Northeast	$57,408
Rockland County	$75,000	Penn's Northeast	$61,072
Morristown, NJ	$75,000	Penn's Northeast	$61,145
Cherry Hill, NJ	$75,000	Penn's Northeast	$61,146
New Haven, CT	$75,000	Penn's Northeast	$63,677

Here is what a few relocating executives had to say about their move to Penn's Northeast:

I am very happy with the move. The people in northeastern PA are very friendly, it's less crowded, and the work ethic of the people in this area is excellent. Overall, the move has been very positive for my family and me.

Ed Lemke, Director
Prudential Financial
Relocated from Verona, NJ in 1989.

After selling our home in New Jersey we were able to purchase a larger home in Clarks Summit, as well as a second home in Florida. Also, we have enjoyed going to the Scranton Cultural Center on numerous occasions to attend the Broadway Theater as well as various concerts. We have attended many Red Barons baseball games, outdoor concerts at Montage Mountain, and played golf at several excellent courses. There is something for everyone to do in this area. The most satisfying part of the relocation has been the people. Everyone has been pleasant, helpful and genuine.

Dick Dyson, Vice President
Alliance Capital
Relocated in 2000 from Princeton, NJ.

My husband and I were impressed with the area, cost of real estate, taxes, etc. and thought it would be a wonderful place to raise a family. We still feel that way. The area has an excellent school system and has many recreational activities available for both adults and children.

Marion Campbell, Vice President of Information Systems
Prudential Financial
Relocated from West Orange, New Jersey in 1989.

After having lived my whole life in the New York metropolitan area, my family and I consider ourselves lucky to have moved to a wonderful part of the country. There have been many positives including great schools, lower cost of living and great recreational and cultural activities. Since New York and Philadelphia are only two hours away, we can visit family and friends and be back home within a day's drive. My family and I have now lived in Northeastern Pennsylvania for almost nine years and consider it home. We would not move from here by choice.

Philip T. Mortell, Financial Operations Manager

Cigna Healthcare

Relocated from North Babylon, Suffolk County, New York in 1994.

When I moved here from suburban New Jersey, my biggest concerns were the quality of schools available to my son and whether we would miss the recreational and cultural activities of the NYC metro area. We've learned the schools are more than competitive and offer all the programs we had hoped they would. Moreover, because of cost and accessibility, the number and types of activities we now enjoy has increased dramatically. NEPA is a great place to live!

Don Ryan, Principal

The Ryan Group, Former Vice President of Human Resources for NatWest Services, Inc.

Relocated from Warren Township, N.J., (near Bridgewater) in 1994.

We've got all these events. We've got skiing. We've got baseball. We've got theaters and plays and all of the things that big cities have yet you don't have to stand in line for three hours to get there. You've got ready access.

Jaco Smit, General Manager, VACCESSHealth (division of Aventis Pasteur)

Relocated from Lyon, France in 1999.

My family and I moved to Northeast PA from Long Island nearly nine years ago and have never looked back. The family oriented amenities, the lack of rush hour traffic, the low crime rate, and the affordable housing, all make this area a much more amenable area to raise a family than the NY Metropolitan area.

Chris Haran, CEO

Great Valley Technology Institute

Relocated from Massapequa, Nassau County, NY in 1994.

I've got baseball during the summer. I've got a nice hockey facility during the winter. There's skiing, the cultural centers, there's just a lot of different things that make it attractive for a person like me, for my wife, and for my young child, to move into this area.

Jim Luisi, Vice President

Alliance Capital

Relocated from Northern New Jersey in 2000.

With five young children all under the age of 10, we were concerned about the educational systems and the cost of housing. In terms of housing, we were able to obtain a new four bedroom Tudor for an extremely reasonable price. Regarding schools, we selected the Abington Heights School District, which is one of the finest in the region. Looking back, we are very pleased with our relocation to Northeast PA. The region either met or exceeded our expectations as related to the cost of housing, good schools, an excellent area to raise a family, and taxes. Another great aspect of the area is the lack of congestion or traffic jams. In 14 years, I don't think I have experienced a rush hour traffic jam. This provides for a less stressful employee on both ends of the commute.

Gavin Cerco, Vice President, Prudential Financial

Relocated from Flanders, NJ in 1988.

My affiliation with Northeast PA goes back to 1983 when I chose to leave my hometown of Somerset, NJ and attend college at the University of Scranton. Upon graduation, I returned to New Jersey for a short stint before relocating, with my wife, back to the Scranton area in 1989. Why the attraction? Northeast PA offers a beautiful landscape, high quality school systems, small town charm, low crime, diverse cultural and recreational facilities, affordable housing opportunities for all levels, close proximity to the larger cities, and most of all, an abundance of truly, genuine people. Northeast PA is a place where acquired friendships last a lifetime.

Gregg Loboda,Vice President of Information Systems
Prudential Financial
Relocated from Somerset, NJ in 1989.

Relocating from New York was a very conscious decision. Having worked in Manhattan for almost 20 years, when I purchased a weekend home in Pike County, I always dreamed of living there full time. Last year that dream became a reality. I went to work for Altec Lansing, in Milford, PA, living in Shohola, a short 20 minute ride away. All of us work very hard, and inside the office is like being in New York; but when you walk outside, and breath clean air, drive home, with little or no traffic, park with no hassle, and don't have to climb three flights of stairs, your quality of life improves without much effort. The seasons in Pike County have their own beauty. They help bring order to my life.

Louise Briscoe,Vice President, Human Resources
Altec Lansing
Relocated in 2002 from Manhattan.

I have been a resident of Lackawanna County (Penn's Northeast) for six years, and am continually impressed by the quality of life in Northeastern Pennsylvania. The schools are excellent, and there are always plenty of community activities scheduled throughout the year, which keep my entire family engaged and excited. I have lived in several cities, including New York, however, it is Lackawanna County that I am happy to call home.

Tim Cleary, Vice President, Regulatory and Corporate Compliance
Aventis Pasteur
Relocated from New York City in 1997.

Summing it all up

The Penn's Northeast region offers a viable solution for those financial services companies needing to relocate part of their functions out of the New York/New Jersey Metro Area (NYC/NJ).

The region is just 70 to 140 miles from Manhattan yet is located in a different power grid, telecommunications grid, and watershed. Penn's Northeast's five counties and 765,000 people can be accessed via Interstate 80, 78, and 84. Passenger rail service between NYC/NJ and Penn's Northeast is expected to be restored by 2010.

Penn's Northeast employers such as The Prudential, Bank of America, and Met Life cite the region's work ethic, low operating costs, strong utilities, excellent educational infrastructure, and attractive quality of life as reasons for their success.

A NYC/NJ company that moves 500 financial services jobs into a Penn's Northeast Keystone Opportunity Expansion Zone in 2004 will save approximately $165 million by the end of 2013. A breakdown of these savings is as follows: payroll - $96 million, real estate - $30.25 million, and taxes - $38.9 million.

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APPENDIX

Interagency Paper on Sound Practices to Strengthen the Resilience of the U.S. Financial System
Federal Reserve System
[Docket No. R-1128]

Department of the Treasury
Office of the Comptroller of the Currency
[Docket No. 03-05]

Securities and Exchange Commission
[Release No. 34-47638; File No. S7-32-02]
Agencies: Board of Governors of the Federal Reserve System; Office of the Comptroller of the Currency; and Securities and Exchange Commission.

Action: Issuance of Interagency Paper.

Summary: The Federal Reserve Board (Board), the Office of the Comptroller of the Currency (OCC) and the Securities and Exchange Commission (SEC) are publishing an Interagency Paper on Sound Practices to Strengthen the Resilience of the U.S. Financial System. The Federal Reserve Bank of New York also participated in drafting the paper. The paper identifies three new business continuity objectives that have special importance in the post-September 11 risk environment for all financial firms. The paper also identifies four sound practices to ensure the resilience of the U.S. financial system, which focus on minimizing the immediate systemic effects of a wide-scale disruption on critical financial markets. The agencies expect organizations that fall within the scope of this paper to adopt the sound practices within the specified implementation timeframes, as described in more detail in the paper.

For Further Information Contact:
Board: Jeffrey Marquardt, Associate Director, Division of Reserve Bank Operations and Payment Systems (202) 452-2360; or Angela Desmond, Assistant Director, Division of Banking Supervision and Regulation (202) 452-3497.

OCC: Ralph Sharpe, Deputy Comptroller for Bank Technology (202) 874-4572; or Aida Plaza Carter, Director, Bank Information Technology Operations (202) 874-4740.

SEC: Robert Colby, Deputy Director, Division of Market Regulation (202) 942-0094; David Shillman, Counsel to the Director, Division of Market Regulation (202) 942-0072; or Peter Chepucavage, Attorney Fellow, Division of Market Regulation (202) 942-0163.

Supplementary Information: On September 5, 2002, the Board of Governors of the Federal Reserve System, Office of the Comptroller of the Currency, and the Securities and Exchange Commission published for comment a Draft Interagency White Paper on Sound Practices to Strengthen the Resilience of the U.S. Financial System.[1] The draft white paper emphasized the criticality of protecting the financial system from serious new risks posed in the post-September 11 environment and described a series of sound practices that were identified by industry participants during a series of interviews and meetings with the agencies. Approximately 90 comment letters were submitted to one or more of the agencies by clearing and settlement system operators; banking organizations; investment banking firms; industry associations; technology companies; federal, state and local officials; and other interested parties and are summarized below. After reviewing the comments and continuing their dialogue with interested persons, the agencies are issuing this revised final interagency paper.

The sound practices identified in the paper are intended to supplement the agencies' respective policies and other guidance on business continuity planning by financial institutions. The sound practices focus on establishing robust back-up facilities for those back-office activities necessary to recover clearance and settlement activities for the wholesale financial system in times of serious disruption and therefore do not address issues relating to trading operations or to retail financial services. The agencies are not recommending that firms move their primary offices, primary operating sites, or primary data centers out of metropolitan locations. The agencies expect organizations that fall within the scope of this paper to adopt the sound practices within the specified implementation timeframes, as described in more detail in the paper.

Summary of Comments

The commenters generally support the agencies' efforts to improve the resilience of the financial markets and agree with the goals outlined in the draft white paper. Most commenters agree with the sound practices in principle, but propose a number of modifications and clarifying changes to the document. In general, the commenters prefer that the agencies retain a "sound practices paper format" rather than adopt a regulatory approach that could be susceptible to a "one size fits all" application. They also ask that the agencies coordinate supervisory expectations with each other and with other regulatory authorities as necessary to assure a consistent approach.

There was broad consensus with the goal of ensuring that key organizations in critical financial markets are able to recover clearing and settlement activities in the event of a wide-scale disruption as rapidly as possible. Commenters agree with the definitions of critical financial markets and critical activities, but ask that the agencies make clear that the sound practices apply to back-office operations and not to trading activities or retail products. They also believe that the description of core clearing and settlement organizations is sufficient. Commenters ask for additional guidance to assist in identifying firms that play significant roles in critical financial markets and generally agree that a market share benchmark should be established; a few commenters recommend adopting a dollar volume benchmark. A few commenters suggest that benchmarks should vary by market based on the amount of concentration of key participants in the critical financial markets. Some commenters note the importance of firms being able to self-determine whether they fall into a particular category for a critical financial market, while others ask that the agencies contact organizations that appear to meet the definition for core clearing and settlement organizations or firms that play significant roles in critical markets. Several commenters acknowledge that the sound practices would effectively raise market expectations with respect to the resilience of all financial firms.

A number of commenters state that the description of a wide-scale, regional disruption should include parameters for a range of probable events (e.g., power disruption, natural disaster) and include the expected duration of the outage (e.g., 5, 10, or 30 days). Other commenters note that such specification is unnecessary.

The commenters agree that a within-the-business-day recovery and resumption objective for core clearing and settlement organizations is appropriate and acknowledge that a two-hour recovery time objective is an achievable goal, although somewhat aggressive for some because of the volume and complexity of transaction data involved. There is general consensus that the end-of-business-day recovery objective is achievable for firms that play significant roles in critical markets, although many state that this is possible only if firms are able to utilize synchronous data storage technologies, which can limit the extent of geographic separation between primary and back-up sites. A number of commenters note that a recovery time objective of four hours is unrealistic unless core clearing and settlement organizations and the telecommunications infrastructure are operating.[2] Some commenters suggest that recovery and resumption time objectives should vary by type of market. Other commenters note that further guidance on the definitions of an "event" and "end-of-business day" is needed to help ensure meaningful recovery and resumption time objectives.

A number of commenters support the concept of establishing back-up sites for operations and data centers that do not rely on the same infrastructure and other risk elements as primary sites and note that such diversification of risk is a long-standing principle of business continuity planning for financial firms. Most commenters oppose establishing any minimum distance requirement between primary and back-up facilities, citing the need for sufficient flexibility to manage costs effectively and allow for technological improvements. A few commenters believe that establishing minimum separation is appropriate and achievable. A number of commenters express concern that out-of-region back-up sites, including those of third-party service providers, often are geographically concentrated, creating additional risk in the event of a targeted attack or wide-scale disruption affecting those areas. Some commenters ask for additional guidance on how to address various infrastructure components, such as water supply sources. A few commenters indicate that they are exploring overseas locations as part of their recovery and resumption solutions and ask for some assurances that domestic and foreign financial authorities will permit such arrangements.

Commenters note that firms should be permitted to address critical staffing needs sufficient to recover from a wide-scale disruption, but should not be required to maintain a separate redundant staff at their back-up locations, which would be costly and inefficient. Others advocate maintaining a back-up site with staff able to perform critical clearing and settlement activities routinely (through two or more active production sites) or on an emergency basis (e.g., through cross-training staff). Commenters state that permitting firms to adopt a risk-based approach to planning geographically dispersed back-up arrangements would allow institutions to focus on those scenarios that pose the greatest threat and manage labor needs more effectively.

Most commenters agree that routine use or testing of back-up facilities is necessary and beneficial to ensure financial system viability. They also suggest that testing should be "end-to-end" involving telecommunication firms, third-party service providers, and securities exchanges.

A majority of commenters state that plans to meet sound practices could be developed within a year after the agencies issue their final views. There is general consensus that sound practices can be implemented over a relatively short (two to three year) time period, if the agencies provide sufficient flexibility to accommodate the unique risk profile and planning and investment cycles of each institution. Commenters note that extending implementation schedules would help to mitigate the costs of building greater resilience into business continuity arrangements, although there was also recognition that the post-September 11 risk environment requires that achievement of the sound practices needs to be accomplished within a reasonably short time frame by peer firms. Some commenters warn that strict application of the sound practices or establishment of minimum distance and staffing requirements could require firms to bear excessive costs with the result that some might exit particular markets, leading to further concentration, decreased liquidity, and higher overall costs for participants in those markets. Several commenters expressed concern that the sound practices might result in significant employment losses and other negative impacts on the economy and tax base of the New York City metropolitan area. Virtually all commenters state that the core clearing and settlement organizations should establish more aggressive implementation timetables than other firms. Commenters also recognize that firms should set implementation benchmarks in their plans to assess progress. Some commenters assert that the incremental cost of achieving the sound practices should be subsidized, all or in part, by the government.

The agencies have incorporated many of the suggestions that were made by the commenters. The revised paper is more succinct, and generally provides more flexibility to firms in managing geographic diversity of back-up facilities, staffing arrangements, and cost-benefit considerations. It also provides more specificity as to the scope of application of the sound practices as well as the implementation guidelines. No specific mileage requirements or technology solutions are mandated. Accordingly, the agencies are issuing this final version of the interagency paper on sound practices to strengthen the resilience of the U.S. financial system.

Interagency Paper on Sound Practices to Strengthen the Resilience of the U. S. Financial System

Introduction and Background

The Federal Reserve, the Office of the Comptroller of the Currency, and the Securities and Exchange Commission (the agencies) are issuing this Interagency Paper on Sound Practices to Strengthen the Resilience of the U. S. Financial System to advise financial institutions on steps necessary to protect the financial system in light of the new risks posed by the post-September 11 environment. The sound practices build upon long-standing principles of business continuity planning and reflect actions identified by industry members that will strengthen the overall resilience of the U.S. financial system in the event of a wide-scale disruption.

The agencies have identified broad industry consensus on three business continuity objectives that have special importance after September 11 for all financial firms. The agencies also have identified sound practices that focus on minimizing the immediate systemic effects of a wide-scale disruption on critical financial markets. The sound practices focus on the appropriate back-up capacity necessary for recovery and resumption of clearance and settlement activities for material open transactions in wholesale financial markets. They do not address the recovery or resumption of trading operations or retail financial services. The agencies are not recommending that firms move their primary offices, primary operating sites, or primary data centers out of metropolitan locations, and understand that there are important business and internal control reasons for financial firms to maintain processing sites near financial markets and their own headquarters. The agencies also recognize that achieving the sound practices could be a multi-year endeavor for some firms and that it is not necessary or appropriate to prescribe any specific technology solution or limit a firm's flexibility to implement the sound practices in a manner that reflects its own risk profile. The sound practices discussed in this paper supplement the agencies' respective policies and other guidance on business continuity planning.

Post-September 11 Business Continuity Objectives

During discussions about the lessons learned from September 11, industry participants and others agreed that three business continuity objectives have special importance for all financial firms and the U.S. financial system as a whole:

- Rapid recovery and timely resumption of critical operations following a wide-scale disruption;

- Rapid recovery and timely resumption of critical operations following the loss or inaccessibility of staff in at least one major operating location; and

- A high level of confidence, through ongoing use or robust testing, that critical internal and external continuity arrangements are effective and compatible.

The events of September 11 underscored the fact that the financial system operates as a network of interrelated markets and participants. The ability of an individual participant to function can have wide-ranging effects beyond its immediate counterparties. Because of the interdependent nature of the U.S. financial markets, all financial firms have a role in improving the overall resilience of the financial system. It therefore is appropriate for all financial firms to review their business continuity plans and incorporate these three broad business continuity objectives to the fullest extent practicable. In striking an appropriate balance between the new set of risks posed in the post-September 11 environment and the costs involved in planning for wide-scale disruptions, financial firms should incorporate these new and continuing risks into their assessment of their unique characteristics and risk profiles. Firms also should continue to improve upon short-term measures that have been instituted since September 11 and develop longer-term business recovery plans where gaps are identified.

Definitions

The resilience of the U.S. financial system in the event of a "wide-scale disruption" rests on the rapid "recovery" and "resumption" of the "clearing and settlement activities" that support "critical financial markets." Some organizations, namely "core clearing and settlement organizations" and "firms that play a significant role in critical financial markets," present a type of "systemic risk" to the U.S. financial system should they be unable to recover or, in some instances, resume clearing and settlement activities that support those markets. These terms and organizations are defined below.

Wide-Scale Disruption. A wide-scale disruption is an event that causes a severe disruption or destruction of transportation, telecommunications, power, or other critical infrastructure components across a metropolitan or other geographic area and the adjacent communities that are economically integrated with it; or that results in a wide-scale evacuation or inaccessibility of the population within normal commuting range of the disruption's origin.

Systemic Risk. Systemic risk includes the risk that the failure of one participant in a transfer system or financial market to meet its required obligations will cause other participants to be unable to meet their obligations when due, causing significant liquidity or credit problems or threatening the stability of financial markets.[3] Given the complex interdependencies of markets and among participants, thorough preparations by key market participants will reduce the potential that a sudden disruption experienced by one or a few firms will cascade into market-wide liquidity dislocations, solvency problems, and severe operational inefficiencies.[4]

Critical Financial Markets. Critical financial markets provide the means for banks, securities firms, and other financial institutions to adjust their cash and securities positions and those of their customers in order to manage liquidity, market, and other risks to their organizations. Critical financial markets also provide support for the provision of a wide range of financial services to businesses and consumers in the United States. Certain markets, such as the federal funds and government securities markets, also support the implementation of monetary policy. For purposes of this paper, "critical financial markets" are defined as the markets for:

- Federal funds, foreign exchange, and commercial paper

- U.S. Government and agency securities

- Corporate debt and equity securities

Core Clearing and Settlement Organizations. Core clearing and settlement organizations consist of two groups of organizations that provide clearing and settlement services for critical financial markets or act as large-value payment system operators and present systemic risk should they be unable to perform. The first group consists of market utilities (government-sponsored services or industry-owned organizations) whose primary purpose is to clear and settle transactions for critical markets or transfer large- value wholesale payments. The second group of core clearing and settlement organizations consists of those private-sector firms that provide clearing and settlement services that are integral to a critical market (i.e. their aggregate market share is significant enough to present systemic risk in the event of their sudden failure to carry on those activities because there are no viable immediate substitutes).

Firms that Play Significant Roles in Critical Financial Markets. Firms that play significant roles in critical financial markets are those that participate (on behalf of themselves or their customers) with sufficient market share in one or more critical financial markets such that their failure to settle their own or their customers' material pending transactions by the end of the business day could present systemic risk. While there are different ways to gauge the significance of such firms in critical markets, as a guideline, the agencies consider a firm significant in a particular critical market if it consistently clears or settles at least five percent of the value of transactions in that critical market.

Recovery and Resumption of Clearing and Settlement Activities. The rapid recovery and resumption of critical financial markets, and the avoidance of potential systemic risk, requires the rapid recovery of clearing and settlement activities for the purpose of completing material pending transactions on their scheduled settlement dates. These clearing and settlement activities include

a) Completing pending large-value payments;

b) Clearing and settling material pending transactions; [5]

c) Meeting material end-of-day funding and collateral obligations necessary to ensure the performance of items a) and b) above;

d) Managing material open firm and customer risk positions, as appropriate and necessary to ensure the performance of items a) through c) above;

e) Communicating firm and customer positions and reconciling the day's records, and safeguarding firm and customer assets as necessary to ensure the performance of items a) through d) above; and

f) Carrying out all support and related functions that are integral to performing the above critical activities.

For purposes of this paper, the terms recovery (or recover) refers to the restoration of clearing and settlement activities after a wide-scale disruption; [6] resumption (or resume) refers to the capacity to accept and process new transactions and payments after a wide-scale disruption.

Sound Practices

The agencies have identified four broad sound practices for core clearing and settlement organizations and firms that play significant roles in critical financial markets. The sound practices are based on long-standing principles of business continuity planning in which critical activities are identified, a business impact analysis is conducted, and plans are developed, implemented, and tested. Adoption of the sound practices will help protect the financial system from the risks of a wide-scale disruption and reduce the potential that key market participants will present systemic risk to one or more critical markets because primary and back-up processing facilities and staffs are located within the same geographic region.

1. Identify clearing and settlement activities in support of critical financial markets. An organization should identify all clearing and settlement activities in each critical financial market in which it is a core clearing and settlement organization or plays a significant role. This assessment should include identification of activities or systems that support or are integrally related to the performance of clearing and settlement activities in those markets.

2. Determine appropriate recovery and resumption objectives for clearing and settlement activities in support of critical markets. For purposes of the sound practices, a recovery-time objective is the amount of time in which a firm aims to recover clearing and settlement activities after a wide-scale disruption with the overall goal of completing material pending transactions on the scheduled settlement date. Recovery-time objectives for clearing and settlement activities should be relatively consistent across critical financial markets. This promotes the compatibility of recovery plans and helps ensure that core clearing and settlement organizations and firms that play significant roles in critical financial markets will be able to participate in the financial system in times of wide-scale disruptions. Recovery-time objectives provide concrete goals to plan for and test against. They should not be regarded as hard and fast deadlines that must be met in every emergency situation. Indeed, the agencies recognize that various external factors surrounding a disruption such as time of day, scope of disruption, and status of critical infrastructure — particularly telecommunications — can affect actual recovery times. [7] Furthermore, recovery time objectives might not be achievable following a late-day disruption without an extension of normal business hours.

Market participants agree that core clearing and settlement organizations must meet more aggressive recovery-time objectives than firms that play significant roles in critical financial markets. This is because core clearing and settlement organizations are necessary to the completion of most transactions in critical markets; accordingly, they must recover and resume their critical functions in order for other market participants to process pending transactions and complete large-value payments. It also is reasonable to assume that there will be firms that play significant roles and other market participants in locations not affected by a particular disruption that will need to clear and settle pending transactions in critical markets. Therefore, core clearing and settlement organizations should plan both to recover and resume their processing and other activities that support critical markets. In light of the large volume and value of transactions/payments that are cleared and settled on a daily basis, failure to complete the clearing and settlement of pending transactions within the business day could create systemic liquidity dislocations, as well as exacerbate credit and market risk for critical markets. Therefore, core clearing and settlement organizations should develop the capacity to recover and resume clearing and settlement activities within the business day on which the disruption occurs with the overall goal of achieving recovery and resumption within two hours after an event.[8] Core clearing and settlement organizations also should develop plans for communicating with participants during a disruption to facilitate their rapid recovery.

The ability of firms that play significant roles in critical financial markets to recover clearing and settlement activities depends on the timing of the recovery of core clearing and settlement organizations for those markets. For planning purposes, firms should assume that core clearing and settlement organizations will recover and resume clearance and settlement activities within the business day of the disruption. Accordingly, firms that play significant roles in critical financial markets should plan to recover clearing and settlement activities for those markets as soon as possible after the core clearing and settlement organizations have recovered and resumed their operations and within the business day on which a disruption occurs. In some markets, such as wholesale payments, the banking industry has had long-established recovery benchmarks of four hours and the largest participants in the wholesale payments market have actively discussed the need for a two-hour recovery standard by such organizations. Firms that play significant roles in the other critical financial markets should strive to achieve a four-hour recovery time capability for clearing and settlement activities in order to ensure that they will be able to meet a within the business day recovery target.[9]

3. Maintain sufficient geographically dispersed resources to meet recovery and resumption objectives. Recovery of clearing and settlement activities within target times during a wide-scale disruption generally requires an appropriate level of geographic diversity between primary and back-up sites for back-office operations and data centers. The agencies do not believe it is necessary or appropriate to prescribe specific mileage requirements for geographically dispersed back-up sites. It is important for firms to retain flexibility in considering various approaches to establishing back-up arrangements that could be effective given a firm's particular risk profile. However, long-standing principles of business continuity planning suggest that back-up arrangements should be as far away from the primary site as necessary to avoid being subject to the same set of risks as the primary location. Back-up sites should not rely on the same infrastructure components (e.g., transportation, telecommunications, water supply, and electric power) used by the primary site. Moreover, the operation of such sites should not be impaired by a wide-scale evacuation at or the inaccessibility of staff that service the primary site. The effectiveness of back-up arrangements in recovering from a wide-scale disruption should be confirmed through testing.

Core clearing and settlement organizations have the highest responsibility to develop resources that permit the recovery and resumption of clearing and settlement activities within the business day. Accordingly, these organizations should establish back-up facilities a significant distance away from their primary sites. Core clearing and settlement organizations that use synchronous back-up facilities or whose back-up sites depend primarily on the same labor pool as the primary site should address the risk that a wide-scale disruption could impact either or both of the sites and their labor pool. Such organizations should establish even more distant back-up arrangements that can recover and resume critical operations within the business day on which the disruption occurs.

Firms that play significant roles in critical financial markets should maintain sufficient geographically dispersed resources, including staff, equipment and data to recover clearing and settlement activities within the business day on which a disruption occurs. Firms may consider the costs and benefits of a variety of approaches that ensure rapid recovery from a wide-scale disruption.[10] However, if a back-up site relies largely on staff from the primary site, it is critical for the firm to determine how staffing needs at the back-up site would be met if a disruption results in loss or inaccessibility of staff at the primary site. Moreover, firms that use synchronous back-up facilities or whose back-up sites depend primarily on the same labor pool as the primary site should address the risk that a wide-scale disruption could impact either or both of the sites and their labor pools. As part of their ongoing planning process, firms with such back-up arrangements should strive to develop even more distant data back-up and operational resources that prove sufficient to recover clearing and settlement activities within the business day on which the disruption occurs. The business continuity planning process should take into consideration improvements in technology and business processes supporting back-up arrangements and the need to ensure greater resilience in the event of a wide-scale disruption. Interim steps a firm may take should be compatible with the objective of establishing even more distant back-up arrangements. The agencies expect that, as technology and business processes supporting back-up arrangements continue to improve and become increasingly cost effective, firms will take advantage of these developments to increase the geographic diversification of their back-up sites.

4. Routinely use or test recovery and resumption arrangements. One of the lessons learned from September 11 is that testing of business recovery arrangements should be expanded. It is critical for firms to test back-up facilities with the primary and back-up facilities of markets, core clearing and settlement organizations, and third-party service providers to ensure connectivity, capacity, and the integrity of data transmission. It also is important to test back-up arrangements with major counterparties and customers, as appropriate. Such testing ensures that recovery objectives are achievable and that staff and necessary external parties are sufficiently informed.

Core clearing and settlement organizations should periodically test recovery and resumption plans at all of their back-up sites. Test scenarios should include wide-scale disruptions that affect the accessibility of key staff; demonstrate the ability to recover and resume within the business day; and aim for a two-hour recovery time. Core clearing and settlement organizations should require participants to test connectivity between their primary and back-up sites and those of the core clearing and settlement organizations. They also may wish to consider organizing a broader industry stress test to ensure that recovery systems are consistently robust across critical market participants.

Firms that play significant roles in critical financial markets should routinely use or test their individual internal recovery and resumption arrangements for connectivity, functionality, and volume capacity. Firms that establish back-up sites within the current perimeter of synchronous back-up technology or that rely primarily on staff at the primary site should confirm that their plans would be effective if a wide-scale disaster affects both sites. Firms also are encouraged to take advantage of testing opportunities offered by markets, core clearing and settlement organizations and third-party service providers to ensure connectivity, capacity and the integrity of data transmission. Firms are encouraged to continue to work cooperatively with their core clearing and settlement organizations and trade associations to design and schedule appropriate industry tests to ensure the compatibility of individual recovery and resumption strategies across critical markets.

Implementation of Sound Practices

Cost-Benefit Considerations. The agencies recognize the importance of cost-effective business continuity planning. The costs associated with implementing the sound practices can vary substantially depending on the extent to which incremental improvements may be needed to address the risks of a wide-scale disruption. Some firms that play significant roles in critical markets may find that they need to implement only relatively minor improvements to their back-up arrangements. Other firms may find it necessary to adopt a more robust technology or upgrade software applications in order to achieve recovery objectives identified by the sound practices. To mitigate the costs of these enhancements, firms may wish to integrate them into the strategic planning process (e.g., coordinate with planned enhancements to facilities, information system components and architecture, and business processes).

Firms should recognize that adoption of the sound practices will help to reassure their counterparties and customers that they can rapidly regain their ability to clear and settle transactions in critical markets. Similarly, firms participating in the financial system would enjoy greater assurance that critical market participants will be able to withstand a wide-scale disruption and meet their payment and settlement obligations, thereby minimizing the potential for cascading fails and resulting systemic risk. Firms report that market forces clearly recognize the interdependent nature of the financial system, and customers and counterparties increasingly expect firms to demonstrate their ability to continue operations should a wide-scale disruption occur.

Implementation by core clearing and settlement organizations. Core clearing and settlement organizations should continue their accelerated efforts to develop, approve, and implement plans that substantially achieve the sound practices by the end of 2004. Plans should provide for back-up facilities that are well outside of the current synchronous range that can meet within-the-business-day recovery targets. On a case-by-case basis, core clearing and settlement organizations can be given additional time to complete implementation of back-up facilities that are well outside the current synchronous range, so long as they take concrete, near-term steps that result in substantially improved resilience by the end of 2004. The amount of flexibility will be measured against factors such as board of directors and senior management's commitment to approved budgets, and adherence to aggressive timetables and interim milestones. Plans should include measurable milestones to assess progress in achieving the sound practices.

Implementation by firms that play significant roles in critical markets. Firms that play significant roles in critical financial markets should develop, approve and implement plans that call for substantial achievement of the sound practices as soon as practicable, but generally within three years of publication of this paper.[11] In some cases, a firm may find it in necessary to provide for a longer implementation period in light of its respective risk profile, level of resilience, and unique business circumstances. All plans should incorporate interim milestones against which progress can be measured and should provide for ongoing consideration of the costs and benefits of achieving greater geographic diversification of back-up facilities.

Role of Senior Management and Boards of Directors. The agencies believe, and industry participants confirm, that incorporation of the post-September 11 business continuity objectives and sound practices discussed in this paper raises numerous short- and long-term strategic issues that require continuing leadership and involvement by the most senior levels of management. These issues must be considered in light of a firm's dependencies on other market participants and the need to achieve a consistent level of resilience across firms. Boards of directors should review business continuity strategies to ensure that plans are consistent with the firm's overall business objectives, risk management strategies, and financial resources. Decisions about overall business continuity objectives should not be left to the discretion of individual business units.

Conclusion

After September 11, financial industry participants initiated a significant review of lessons learned with a view towards strengthening their business continuity plans. The agencies believe that it is important for financial firms to improve recovery capabilities to address the continuing, serious risks to the U.S. financial system posed by the post-September 11 environment. Financial industry participants have demonstrated a keen commitment to ensuring the continued viability of the U.S. financial system by strengthening their own business continuity plans to address the risk of a wide-scale disruption. Over the past year, significant short- and longer-term improvements have been made to business recovery plans. Financial industry participants recognize the importance of continuing senior management involvement in achieving the sound practices discussed in this paper. Firms also are participating in industry initiatives aimed at improving private-sector coordination and ensuring that business recovery plans are compatible and that an appropriate level of robustness is achieved among peers.

The agencies recognize that achievement of the sound practices could be a multi-year endeavor for some organizations and that it is not necessary or appropriate to prescribe any specific technology solution for implementing the sound practices. The agencies urge all financial system participants to continue efforts over the long term to ensure that critical U.S. financial markets have appropriately robust recovery capabilities and can respond to a wide-scale disruption by adopting the sound practices to the fullest extent practicable. Finally, the agencies encourage financial firms that are not deemed to be a core clearing and settlement organization or a firm that plays a significant role in critical markets to review and consider implementation of the sound practices, particularly if a firm's transactions levels approach those deemed to be significant.

By order of the Board of Governors of the Federal Reserve System, April 7, 2003.

Jennifer J. Johnson
Secretary of the Board

Dated: April 7, 2003

John D. Hawke, Jr.,
Comptroller of the Currency

By the Securities and Exchange Commission.

Margaret H. McFarland
Deputy Secretary

Date: April 7, 2003

Endnotes

[1] 67 FR 56835, September 5, 2002.

[2] Many commenters state that the recovery of financial systems can only be achieved if the telecommunications infrastructure is up and running across the nation. Firms identify a number of industry efforts to explore common infrastructure issues and possible solutions to ensure diversity of circuit routing and other reliability issues. Commenters raising this issue ask the agencies to continue to raise the issue of telecommunications infrastructure resilience with federal and state agencies, including the Federal Communications Commission, the National Security Telecommunications Advisory Committee and the Department of Homeland Security. The agencies are taking numerous actions to help direct attention to improving the resilience of the telecommunications infrastructure.

[3] The use of the term "systemic risk" in this paper is based on the international definition of systemic risk in payments and settlement systems contained in "A glossary of terms in payment and settlement systems," Committee on Payment and Settlement Systems, Bank for International Settlements (2001).

[4] Under adverse market conditions or in the event of credit concerns about institutions, liquidity dislocations of the type experienced immediately after September 11 could be seriously compounded.

[5] Transactions in government securities include the purchase and sale of U.S. government bills, notes, bonds and agency securities (including mortgage-backed securities issued by Government Sponsored Enterprises), as well as repurchase and reverse repurchase agreements and triparty repurchase agreements involving U.S. government and agency securities.

[6] The goal of business recovery plans is the recovery of a particular activity or function and not the recovery of a disabled facility or system.

[7] A number of firms have expressed concerns about the resilience of telecommunications and other critical infrastructure, and the current limitations on an individual firm's ability to obtain verifiable redundancy of service from such carriers. Firms that establish geographically dispersed facilities can achieve additional diversity in their telecommunications and other infrastructure services, which will provide additional resilience in ensuring recovery of critical operations. A number of financial firms are sponsoring industry-wide efforts to explore common infrastructure issues and approaches.

[8] This includes recovery of clearance and settlement activities that would normally be performed by core clearing and settlement organizations and significant firms within a particular market's business hours on the day of the disruption. These activities include inputting material transaction data or payment instructions, and performing all steps necessary to clear and complete material transactions on their regular value or settlement dates.

[9] As markets and clearance and settlement systems move toward longer operating hours, there may be less flexibility to extend processing hours. This underscores the importance of achieving recovery time objectives within the business day's normal processing periods to the fullest extent possible. It also underscores the importance of ensuring that internal processes can be performed in the event that business hours are extended beyond midnight.

[10] Examples of such arrangements range from maintaining a fully operational geographically dispersed back-up facility for data and operations to utilizing outsourced facilities in which equipment, software, and data are stored for staff to activate. Firms are addressing critical staffing issues in various ways, such as cross training, utilizing staff at underused systems to share or shift loads, rotating employees off-site, and establishing work shifts. A number of firms use outsourced back-up solutions for recovering clearing and settlement activities and data storage. However, numerous commenters expressed concern about the small number of recovery facilities, their lack of geographic diversity and the cost of ensuring availability of facilities during a wide-scale disruption. Firms that use outsourced back-up solutions should take into consideration any heightened risks that could affect access to those facilities during a wide-scale disruption.

[11] The agencies will contact each firm that appears to meet the market share thresholds and, if they conclude that the firm plays a significant role in one or more critical markets, will review the firm's plans for implementing the sound practices. The agencies also will monitor implementation of those plans.

Advanced Solutions Engineering:
Technology update for Synchronous SRDF

Bob Smith, Consulting Corporate System Engineer for SRDF Connectivity/Performance
June 20, 2003

Audience and Expectations

This technical note is designed for technically oriented customers interested in learning about the capabilities and functionality of new Symmetrix and SRDF technologies for synchronous mirroring of storage subsystems for DR applications. The solutions for achieving real-time synchronous mirroring (RAID 1) at 200 Km distances will be discussed in recommended order:

- **DMX SRDF/FC extended over DWDM and dark fiber.**
- **DMX SRDF/FC into Nishan 3000/4000 FCIP extenders (w/ Fast Write option to eliminate extra round trip on FC) over DWDM and dark fiber.**
- **Mainframe enhancements include use of PAVs (parallel access volumes) to lessen impact of SRDF serialization for multiple queued I/O to same logical volume and direct extension of host FICON channels via DWDM and dark fiber to improve response time for high write I/O volumes, such as DB2 logs and IMS WADS volumes. PAVs is currently supported and the DMX Fast Mirror feature will be supported in Q3, 2003.**
- **DMX SRDF/GigE over DWDM and dark fiber, or SONET rings. The tradeoff will be initial higher latency of GigE vs. one round trip, when compared to FC at 200Km. DMX Gie performance data will not be available until end of July, but discussion will also include speculation on impact on response time of on-board h/w compression in DMX native GigE. The wide spread availability of SONET multiservice platforms in carrier networks supports seamless, flexible transport of GigE over DWDM and SONET networks.**
- **For applications that can't support 200Km latencies, there are alternatives and tradeoffs between asynchronous remote copy options: SRDF-A and XRC w/ some data loss compared to the zero data loss solution using SRDF/SAR multi-hop configuration. This will be discussed in separate documents.**

1. <u>DMX SRDF/FC over DWDM</u>: DMX provides best response time for native SRDF using 2 Gb fibre channel ports and FC switches to provide sufficient BB credits for link distance.

Requirements

- DMX storage subsystems, running 5670 code: SRDF/FC (2 Gb ports), FICON and SRDF native GigE support. Best performance requires Open Systems fibre channel connectivity and MainFrame FICON channels.
- Cisco MDS9000 Fibre channel switches (16 port modules) to take advantage of adaptive pooling of BB credits (up to 255 credits/port) to support long distances for 2 Gb FC.
- DWDM (normal point-to-point limitation of 40-80Km; additional nodes required to regenerate signals for 200Km distances)

How it works…

DMX w/ SRDF/FC connections into extended fabric: FC switches (providing the necessary BB credits for performance over extended distances) on local and remote sites interconnected via E ports (2 Gb ISLs) and DWDMs. DWDMs will require multiple nodes for 200 Km distance.

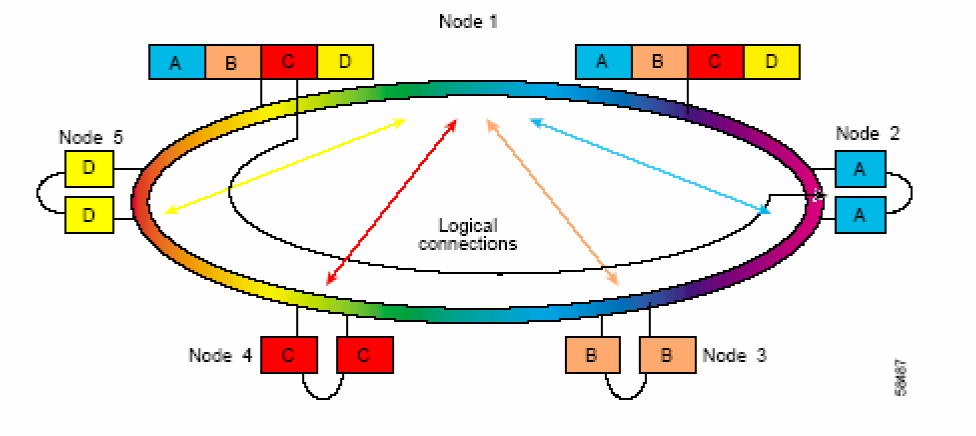


Figure 1 DWDM multi-node ring

DMX SRDF/FC performance over extended fiber distances is significantly improved from Symmetrix 8000 series. Best configuration requires host connectivity to Fibre Channel and/or FICON. If mainframe host connectivity is ESCON, rather than FICON, then SRDF performance may be degraded by 25-50%, due to higher protocol overhead and lesser bandwidth of ESCON channels. The DMX will maintain 2-6ms (for 4-32KB average block sizes) over 200Km distances for 1000 writes /sec per SRDF link. Important to configure enough SRDF links to maintain I/O rates on flat part of the response time performance curves, as specified bty the above limit of 1000 wr/sec.

BB credit requirements (provided by the FC switches) for 200Km distance depends on speed of FC link (1Gb/2Gb) and % utilization of the link. For current SRDF/FC technology on DMX platform, max utilization is 50% for 1Gb and 35% for 2Gb links.

- Assuming use of FC switch ISLs to aggregate multiple SRDF/FC links onto a DWDM 2.5Gb port, then Fan-in (# RF's per ISL) should be 3:1.
- .For 1 Gb FC links, 60-64 BB credits is enough to sustain SRDF performance at 200 Km The 2 Gb ISL ports on the FC switches will require approximately 100 BB credits per ISL to support full performance at 200Km.
- Currently this limits qualified switches for 2 Gb SRDF over FC to the Cisco MDS 9016, which supports up to 255 credits using the 16 port switch modules.

2. <u>DMX SRDF/FC into Nishan 3000/4000 FCIP extenders :</u> Replacement of FC switches with Nishan FCIP 3000 extenders takes advantage of Fast Write option to eliminate extra round trip on FC.

Requirements

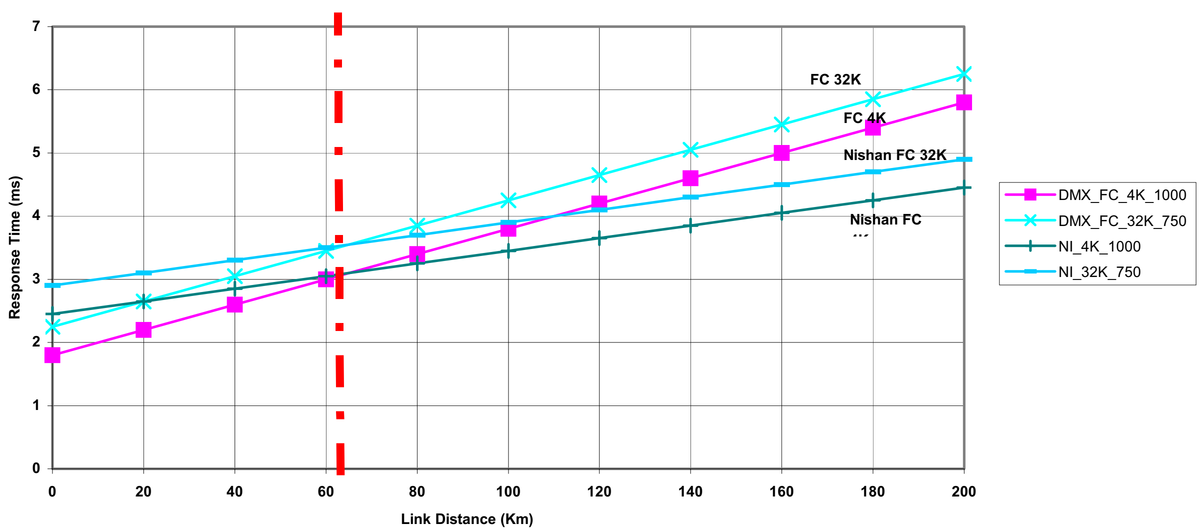
- DMX storage subsystems, running 5670 code: SRDF/FC (2 Gb ports), FICON and SRDF native GigE support. Best performance requires Open Systems fibre channel connectivity and MainFrame FICON channels.
- Nishan IP3300 storage switches providing iFCP and integrated FC switch for extending FC over IP (1 Gb GigE ports)
- DWDM (normal point-to-point limitation of 40-80Km; additional nodes required to regenerate signals for 200Km distances)

How it works…

The Nishan IP3300 is an 8-port FC switch that supports extension of SRDF/FC over GigE. The Fast Write feature eliminates one of the two round trips per SRDF/FC write improving response time performance over distance. The extenders add little latency and support fiber-optic GigE connection into DWDM network.

This decreases DMX SRDF/FC response times by 1.5ms at 200Km distance to maintain under 5ms response time for small and large blocks. The cost of the Nishan extenders is offset by elimination of FC switches that are normally dedicated for SRDF extension.

Estimated DMX SRDF/FC Write Response Time w/ Nishan Fast Write



3. <u>MainFrame enhancements:</u> Synchronous SRDF (realtime remote mirroring) serializes all I/O to a logical volume, since the source volume is busy until the write to the secondary volume (R2) completes over the extended SRDF link. This means that while a write is in progress for that volume, further reads and writes are queued in the host I/O subsystem. Mainframe PAVs feature allows multiple alias addresses to be defined for each volume, so that reads and writes to different extents (data sets) may be executed in parallel to the extended SRDF write operation. This willdecrease the average response time in the storage network.

Due to SRDF overhead and distance impact on write I/O service times, heavy write I/O volumes will be throttled by SRDF latancies, limiting the extended distance of certain applications. FICON host channels minimize the I/O penalty due to distance. EMC has architected a mainframe solution using dual writes to write to the source DMX and (via extended FICON channels) to the target DMX R2 volumes, circumventing the SRDF write overhead penalty. This is the Fast Mirror feature to be available later this year.

Requirements

- DMX storage subsystems, running 5670 code: SRDF/FC (2 Gb ports), FICON and SRDF native GigE. Availability of Fast Mirror feature.
- Mainframe environment (Z/OS) with FICON channels
- DWDM network

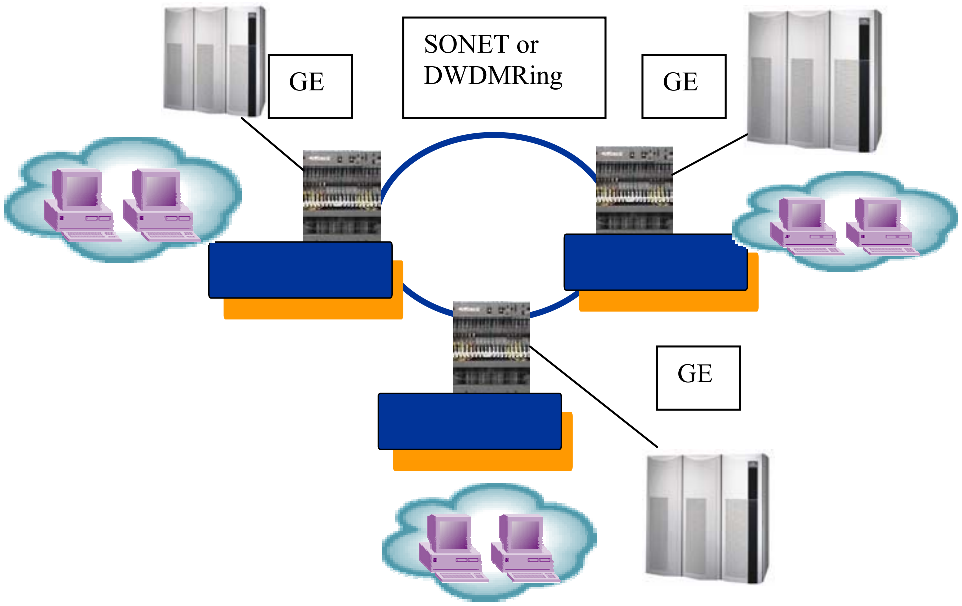
DMX SRDF/GigE DMX will provide native SRDF/GigE support, including onboard hardware compression, in Q3,2003. This will simplify synchronous SRDF DWDM configurations, because it eliminates need for FC switches, and only requires one round trip per write at 1 Gb link speeds. It also allows utilization of existing SONET fiber networks and carrier-class SONET multi-service platforms to transport the SRDF traffic, rather than requiring dark fiber/DWDM-specific networks. Currently, DMX GigE performance data is not available, but though the throughput will be similar to DMX SRDF/FC, the latency willl be somewhat higher. This means that there will be a cross-over point, based on distance, before GigE will offer a response time benefit.

Requirements

- DMX storage subsystems, running 5670 code: SRDF/FC (2 Gb ports), FICON and SRDF native GigE.
- Option of GigE switches to provide more TCP logical paths per DMX GigE port.
- DMX network and/or SONET network w/ SONET multi-service platforms to provide GigE to SONET conversion.

How it works…

DMX native SRDF/GigE connects via optional GigE switches/routers into DWDM for transport over dark fiber. Also provides optional connectivity directly into SONET ring using SONET equipment for transport of IP packets over SONET frames. This provides flexible solution for site to site connectivity when dark fiber is not a viable option, but will not have GigE performance data until late July, '03. We don't know what the latency and performance curves for DMX GigE will be, but I expect that SRDF/FC will have lower latency out to at least 150 Km



Shared Disaster
Recovery Bunker

Map of Penn's Northeast Region

Relative to NYC Metro Area

Shaded green area represents Penn's Northeast region.

Hypothetical KOEZ Anaysis
Large Trading Company: 500 employees; 100,000 square foot office building - *For Discussion Purposes Only*

KOEZ Eligible Tax	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	TOTAL TAX
	Base Year	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Corporate Net Income Tax Before Credit	2,840,906	2,982,952	3,132,099	3,288,704	3,453,139	3,625,796	3,807,086	3,997,440	4,197,312	4,407,178	35,732,612
Capital Stock Tax Before Credit	1,667,056	1,588,978	1,463,812	1,287,918	1,057,412	768,154	404,892	0	0	0	8,238,222
"Penn's Northeast" Business Privilege Tax Before Credit	897,750	942,638	989,769	1,039,258	1,091,221	1,145,782	1,203,071	1,263,224	1,326,386	1,392,705	11,291,803
"Penn's Northeast" Real Property Tax Before Credit	285,451	285,451	285,451	285,451	285,451	285,451	285,451	285,451	285,451	285,451	2,854,510
Sales and Use Tax Before Credit	259,000	72,520	72,520	72,520	72,520	72,520	72,520	72,520	72,520	72,520	911,680
TOTAL TAX BEFORE CREDITS	5,950,163	5,872,539	5,943,651	5,973,851	5,959,743	5,897,703	5,773,020	5,618,635	5,881,669	6,157,854	59,028,827
Corporate Net Income Tax KOEZ Credit	2,272,725	2,386,362	2,505,679	2,630,963	2,762,511	2,900,637	3,045,669	3,197,952	3,357,850	3,525,742	28,586,090
Capital Stock Tax KOEZ Credit	1,333,645	1,271,182	1,171,050	1,030,334	845,930	614,523	323,914	0	0	0	6,590,578
"Penn's Northeast" Business Privilege Tax KOEZ Credit	897,750	942,638	989,769	1,039,258	1,091,221	1,145,782	1,203,071	1,263,224	1,326,386	1,392,705	11,291,803
"Penn's Northeast" Real Property Tax KOEZ Credit	285,451	285,451	285,451	285,451	285,451	285,451	285,451	285,451	285,451	285,451	2,854,510
Sales and Use Tax KOEZ Credit	259,000	72,520	72,520	72,520	72,520	72,520	72,520	72,520	72,520	72,520	911,680
TOTAL KOEZ CREDITS	5,048,571	4,958,153	5,024,469	5,058,526	5,057,633	5,018,913	4,930,625	4,819,147	5,042,207	5,276,418	**50,234,661**
NET TAX DUE	901,592	914,386	919,182	915,325	902,110	878,790	842,395	799,488	839,462	881,436	8,794,166

ASSUMPTIONS - This analysis does not reflect actual tax liabilities, it is a broad estimation based on publicly available information of existing trading companies intended for use by Penn's Northeast in understanding the potential benefit in the KOZ and KOZ programs.

1. Numbers based on moving 16% of property and payroll to a "Penn's Northeast" KOEZ, and therefore the cost of the service performance in "Penn's Northeast" will be 16%
2. Income generated per person is $350,000 (based on average Sales/Employees for three large trading companies)
3. Assumes **total** of 3125 employees, all currently located in New York
4. Assumes 500 employees moving into Pennsylvania
5. Assumes taxable income is 14% of sales (based on average Pre Tax Income/Sales for three large trading companies)
6. Assumes only business conducted in NY and PA
7. Assumes no existing Net Operating Losses
8. Assumes other operations in Pennsylvania, therefore 20% of total apportionment in PA but only 80% of that in the KOEZ
9. Assumes 100,000 square feet of real estate in "Penn's Northeast" KOEZ, with a Fair Market Value of $10,000,000

Hypothetical KOEZ Anaysis
Small Trading Company: 300 employees; 60,000 square foot office building - *For Discussion Purposes Only*

KOEZ Eligible Tax	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	TOTAL TAX
	Base Year	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Corporate Net Income Tax Before Credit	407,592	427,972	449,370	471,839	495,431	520,202	546,212	573,523	602,199	632,309	5,126,649
Capital Stock Tax Before Credit	197,290	192,081	180,115	160,872	133,793	98,284	52,158	0	0	0	1,014,593
"Penn's Northeast" Business Privilege Tax Before Credit	209,304	219,769	230,758	242,296	254,410	267,131	280,487	294,512	309,237	324,699	2,632,603
"Penn's Northeast" Real Property Tax Before Credit	171,270	171,270	171,270	171,270	171,270	171,270	171,270	171,270	171,270	171,270	1,712,700
Sales and Use Tax Before Credit	253,400	66,920	66,920	66,920	66,920	66,920	66,920	66,920	66,920	66,920	855,680
TOTAL TAX BEFORE CREDITS	1,238,856	1,078,012	1,098,433	1,113,197	1,121,824	1,123,807	1,117,047	1,106,225	1,149,626	1,195,198	11,342,225
Corporate Net Income Tax KOEZ Credit	326,074	342,378	359,496	377,471	396,345	416,162	436,970	458,818	481,759	505,847	4,101,320
Capital Stock Tax KOEZ Credit	157,832	153,665	144,092	128,698	107,034	78,627	41,726	0	0	0	811,674
"Penn's Northeast" Business Privilege Tax KOEZ Credit	209,304	219,769	230,758	242,296	254,410	267,131	280,487	294,512	309,237	324,699	2,632,603
"Penn's Northeast" Real Property Tax KOEZ Credit	171,270	171,270	171,270	171,270	171,270	171,270	171,270	171,270	171,270	171,270	1,712,700
Sales and Use Tax KOEZ Credit	253,400	66,920	66,920	66,920	66,920	66,920	66,920	66,920	66,920	66,920	855,680
TOTAL KOEZ CREDITS	1,117,880	954,002	972,536	986,655	995,979	1,000,110	997,373	991,520	1,029,186	1,068,736	**10,113,977**
NET TAX DUE	120,976	124,010	125,897	126,542	125,845	123,697	119,674	114,705	120,440	126,462	1,228,248

ASSUMPTIONS - This analysis does not reflect actual tax liabilities, it is a broad estimation based on publicly available information of existing trading companies intended for use by Penn's Northeast in understanding the potential benefit in the KOZ and KOZ programs.

1. Numbers based on moving 16% of property & payroll to a “Penn’s Northeast” KOEZ, therefore the cost of the service performance in “Penn’s Northeast” will be 16%.
2. Income generated per person is $136,000 (based on Sales/Employees for sample trading company)
3. Assumes **total** of 1875 employees, all currently located in New York
4. Assumes 300 employees moving into Pennsylvania
5. Assumes taxable income is 13% of sales (based Pre Tax Income/Sales for sample trading company)
6. Assumes only business conducted in NY and PA
7. Assumes no existing Net Operating Losses
8. Assumes other operations in Pennsylvania, therefore 20% of total apportionment in PA but only 80% of that in the KOEZ
9. Assumes 60,000 square feet of real estate in “Penn’s Northeast” KOEZ, with a Fair Market Value of $6,000,000
10. Assumes 5% annual growth percentage on both receipts and income
11. Assumes $3,000,000 in start up purchases used solely within the KOZ/KOEZ
12. Assumes $500,000 in annual purchases used solely within the KOZ/KOEZ
13. Assumes utility costs of $2 per square foot

Hypothetical KOZ Analysis
Large Trading Company: 500 employees; 100,000 square foot office building - *For Discussion Purposes Only*

KOZ Eligible Tax	2004	2005	2006	2007	2008	2009	2010	TOTAL TAX
	Base Year	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	
Corporate Net Income Tax Before Credit	2,840,906	2,982,952	3,132,099	3,288,704	3,453,139	3,625,796	3,807,086	23,130,682
Capital Stock Tax Before Credit	1,667,056	1,588,978	1,463,812	1,287,918	1,057,412	768,154	404,892	8,238,222
"Penn's Northeast" Business Privilege Tax Before Credit	897,750	942,638	989,769	1,039,258	1,091,221	1,145,782	1,203,071	7,309,488
"Penn's Northeast" Real Property Tax Before Credit	285,451	285,451	285,451	285,451	285,451	285,451	285,451	1,998,157
Sales and Use Tax Before Credit	259,000	72,520	72,520	72,520	72,520	72,520	72,520	694,120
TOTAL TAX BEFORE CREDITS	5,950,163	5,872,539	5,943,651	5,973,851	5,959,743	5,897,703	5,773,020	41,370,669
Corporate Net Income Tax KOZ Credit	2,272,725	2,386,362	2,505,679	2,630,963	2,762,511	2,900,637	3,045,669	18,504,546
Capital Stock Tax KOZ Credit	1,333,645	1,271,182	1,171,050	1,030,334	845,930	614,523	323,914	6,590,578
"Penn's Northeast" Business Privilege Tax KOZ Credit	897,750	942,638	989,769	1,039,258	1,091,221	1,145,782	1,203,071	7,309,488
"Penn's Northeast" Real Property Tax KOZ Credit	285,451	285,451	285,451	285,451	285,451	285,451	285,451	1,998,157
Sales and Use Tax KOZ Credit	259,000	72,520	72,520	72,520	72,520	72,520	72,520	694,120
TOTAL KOZ CREDITS	5,048,571	4,958,153	5,024,469	5,058,526	5,057,633	5,018,913	4,930,625	**35,096,889**
NET TAX DUE	901,592	914,386	919,182	915,325	902,110	878,790	842,395	6,273,780

ASSUMPTIONS - This analysis does not reflect actual tax liabilities, it is a broad estimation based on publicly available information of existing trading companies intended for use by Penn's Northeast in understanding the potential benefit in the KOZ and KOZ programs.

1. Numbers based on moving 16% of property and payroll to a "Penn's Northeast" KOZ, and therefore the cost of the service performance in "Penn's Northeast" will be 16%
2. Income generated per person is $350,000 (based on average Sales/Employees for three large trading companies)
3. Assumes **total** of 3125 employees, all currently located in New York
4. Assumes 500 employees moving into Pennsylvania
5. Assumes taxable income is 14% of sales (based average Pre Tax Income/Sales for three large trading companies)
6. Assumes only business conducted in NY and PA
7. Assumes no existing Net Operating Losses
8. Assumes other operations in Pennsylvania, therefore 20% of total apportionment in PA but only 80% of that in the KOZ
9. Assumes 100,000 square feet of real estate in "Penn's Northeast" KOEZ, with a Fair Market Value of $10,000,000
10. Assumes 5% annual growth percentage on both receipts and income
11. Assumes $3,000,000 in start up purchases used solely within the KOZ/KOEZ
12. Assumes $500,000 in annual purchases used solely within the KOZ/KOEZ
13. Assumes utility costs of $2 per square foot

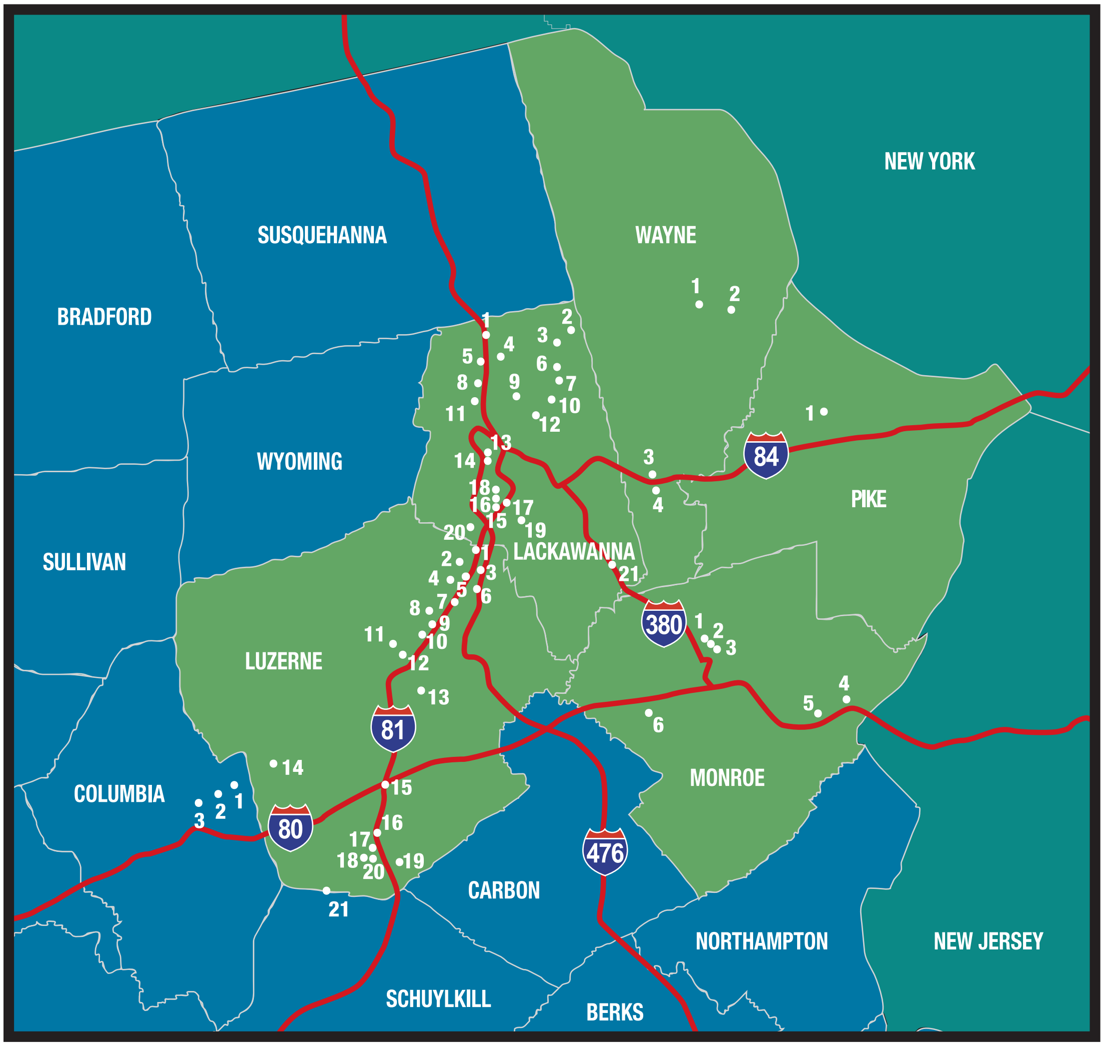
Hypothetical KOZ Analysis
Small Trading Company: 300 employees; 60,000 square foot office building - *For Discussion Purposes Only*

KOZ Eligible Tax	2004	2005	2006	2007	2008	2009	2010	TOTAL TAX
	Base Year	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	
Corporate Net Income Tax Before Credit	407,592	427,972	449,370	471,839	495,431	520,202	546,212	3,318,618
Capital Stock Tax Before Credit	197,290	192,081	180,115	160,872	133,793	98,284	52,158	1,014,593
"Penn's Northeast" Business Privilege Tax Before Credit	209,304	219,769	230,758	242,296	254,410	267,131	280,487	1,704,155
"Penn's Northeast" Real Property Tax Before Credit	171,270	171,270	171,270	171,270	171,270	171,270	171,270	1,198,890
Sales and Use Tax Before Credit	253,400	66,920	66,920	66,920	66,920	66,920	66,920	654,920
TOTAL TAX BEFORE CREDITS	1,238,856	1,078,012	1,098,433	1,113,197	1,121,824	1,123,807	1,117,047	7,891,176
Corporate Net Income Tax KOZ Credit	326,074	342,378	359,496	377,471	396,345	416,162	436,970	2,654,896
Capital Stock Tax KOZ Credit	157,832	153,665	144,092	128,698	107,034	78,627	41,726	811,674
"Penn's Northeast" Business Privilege Tax KOZ Credit	209,304	219,769	230,758	242,296	254,410	267,131	280,487	1,704,155
"Penn's Northeast" Real Property Tax KOZ Credit	171,270	171,270	171,270	171,270	171,270	171,270	171,270	1,198,890
Sales and Use Tax KOZ Credit	253,400	66,920	66,920	66,920	66,920	66,920	66,920	654,920
TOTAL KOZ CREDITS	1,117,880	954,002	972,536	986,655	995,979	1,000,110	997,373	**7,024,535**
NET TAX DUE	120,976	124,010	125,897	126,542	125,845	123,697	119,674	866,641

ASSUMPTIONS - This analysis does not reflect actual tax liabilities, it is a broad estimation based on publicly available information of existing trading companies intended for use by Penn's Northeast in understanding the potential benefit in the KOZ and KOZ programs.

1. Numbers based on moving 16% of property and payroll to a "Penn's Northeast" KOZ, therefore the cost of the service performance in "Penn's Northeast" will be 16%
2. Income generated per person is $136,000 (based on Sales/Employees for sample trading company)
3. Assumes **total** of 1875 employees, all currently located in New York
4. Assumes 300 employees moving into Pennsylvania
5. Assumes taxable income is 13% of sales (based Pre Tax Income/Sales for sample trading company)
6. Assumes only business conducted in NY and PA
7. Assumes no existing Net Operating Losses
8. Assumes other operations in Pennsylvania, therefore 20% of total apportionment in PA but only 80% of that in the KOZ
9. Assumes 60,000 square feet of real estate in "Penn's Northeast" KOZ, with a Fair Market Value of $6,000,000
10. Assumes 5% annual growth percentage on both receipts and income
11. Assumes $3,000,000 in start up purchases used solely within the KOZ/KOEZ
12. Assumes $500,000 in annual purchases used solely within the KOZ/KOEZ
13. Assumes utility costs of $2 per square foot

Penn's Northeast Business Parks



Berwick Region:
1. BIDA Industrial Complex
2. Briar Creek Business Park
3. Columbia County Industrial Park

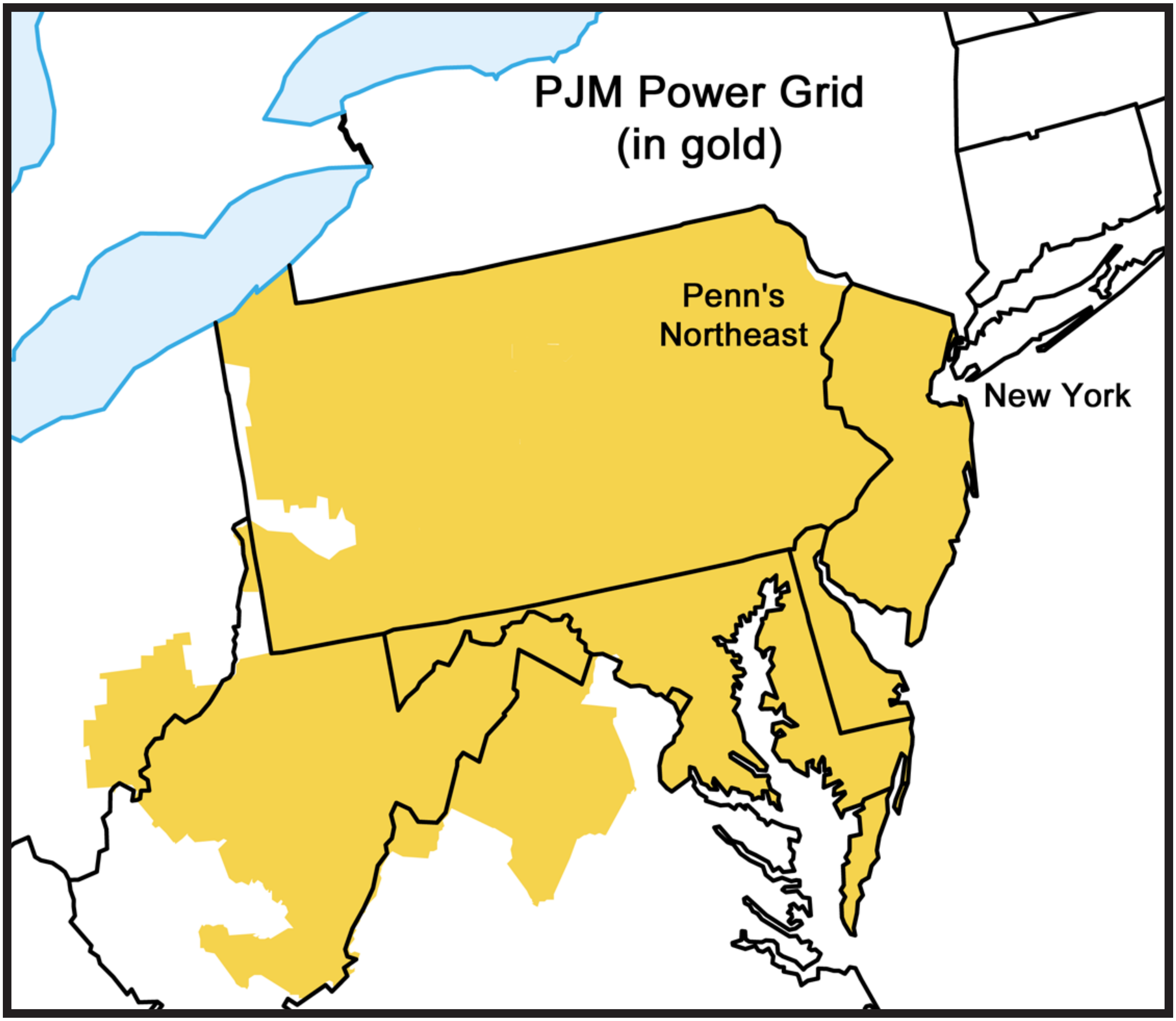
Lackawanna County:
1. Benton Park
2. Business Park at Carbondale Yards
3. CLIDCO Industrial Park
4. Scott Technology Park
5. Ivy Industrial Park
6. PEI Power Park
7. Jessup Small Business Center/ Valley View Business Park
8. Shady Lane Business Park
9. Dickson City Industrial Park
10. Mid-Valley Industrial Park
11. Abington Executive Park
12. Keystone Industrial Park
13. Keyser Valley Industrial Park
14. Stauffer Industrial Park
15. Rocky Glen Industrial Park
16. South Scranton Industrial Park
17. Office Park at Montage
18. Stafford Avenue Business Park
19. Glenmaura Corporate Center
20. Old Forge Industrial Park
21. Covington Industrial Park

Luzerne County:
1. York Avenue Industrial Park
2. Barnum Industrial Park
3. Grimes Industrial Park/Eastern Distribution Center
4. Quackenbush Industrial Park
5. O'Hara Industrial Park
6. Grimes Industrial Park/Vogelbacher Industrial Park
7. The Corporate Center at East Mountain
8. Diamond Corporate Park
9. Highland Business Park
10. Hanover Industrial Estates
11. Hanover Crossings
12. Hanover II
13. Crestwood Industrial Park
14. Salem Industrial Estates
15. CAN DO Corporate Center
16. Valmont Industrial Park
17. Humboldt Industrial Park North
18. Humboldt Industrial Park
19. Hazleton Commerce Center
20. Humboldt Industrial Park East
21. Humboldt Industrial Park West

Monroe County:
1. Pocono Mountains Business Park
2. Pocono Mountains Corporate Center W.
3. Pocono Mountains Corporate Center E.
4. Crowe Industrial Park
5. Butler Industrial Park
6. New Ventures Industrial Park

Pike County:
1. Pike County Business Park

Wayne County:
1. 191 Industrial/Commercial Park
2. White Mills Business Park
3. Howe Industrial Park
4. Springhill Air Park



Area in gold is served by PJM Power Grid.
New York City Metro Area is not served by this grid.


OTSEGO COUNTY
CHENANGO COUNTY
SCHOHARIE COUNTY
ALBANY COUNTY
RENSSELAER COUNTY
Oneonta
Catskill/Delaware Watershed
Delhi
Schoharie Reservoir
GREENE COUNTY
COLUMBIA COUNTY
MASSACHUSETTS
125 Miles
Cannonsville Reservoir
Walton
Pepacton Reservoir
Ashokan Reservoir
Hudson River
West Branch Delaware
West Delaware Aqueduct
East Delaware Aqueduct
East Branch Delaware
DUTCHESS COUNTY
Neversink Reservoir
ULSTER COUNTY
Poughkeepsie
CONNECTICUT
100 Miles
Delaware River
SULLIVAN COUNTY
Penn's Northeast Region
Croton Watershed Area
75 Miles
PUTNAM COUNTY
ORANGE COUNTY
Pennsylvania
50 Miles
NEW YORK
NEW JERSEY
WESTCHESTER COUNTY
ROCKLAND COUNTY
Hudson River
White Plains
25 Miles to City Hall
Long Island Sound
Bronx
Manhattan
Queens
Brooklyn
Staten Island
NASSAU COUNTY
New York Bay
Atlantic Ocean
New York City Watershed Map
Catskill/Delaware Watershed Area
Croton Watershed Area
Rivers and Reservoirs
Catskill Aqueduct and Tunnels
Croton Aqueduct
Delaware Aqueduct and Tunnels
County Borders
State Borders
Source: www.nyc.gov/dep

penn's northeast

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