



Source: Daisy Labs

# Keystone Connect Network: Coatesville's Digital Development Plan

Connecting Coatesville to PennREN:  
The Pennsylvania Education and Research Network

## **Keystone Connect Network: Coatesville’s Digital Development Plan**

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# COATESVILLE COMMUNITY EDUCATION FOUNDATION

Dear Community Leader,

The Coatesville Community Education Foundation (CCEF) is proposing a regional broadband network to increase educational opportunities and generate business growth. The proposed Keystone Connect Network: Coatesville's Digital Development Plan is critical to our region's future economic growth. The backbone of this plan is the Keystone Research and Education Network (PennREN), a next generation high speed internet network, which educational institutions can use to train their students and businesses can leverage to create new products. To take advantage of this network already lining the streets of downtown Coatesville the Education Foundation proposes a Science, Technology, Engineering, and Math Research and Development Park (STEM Research and Development Park) to house a business incubator to accelerate the growth of new businesses and train the workforce of the future.

Chester County is presented with a timely opportunity to take a bold step into the future of business and education technology. Download the report from the Educational Foundation's website and please contribute your thoughts to help shape a successful future for Coatesville and the region.

Sincerely,

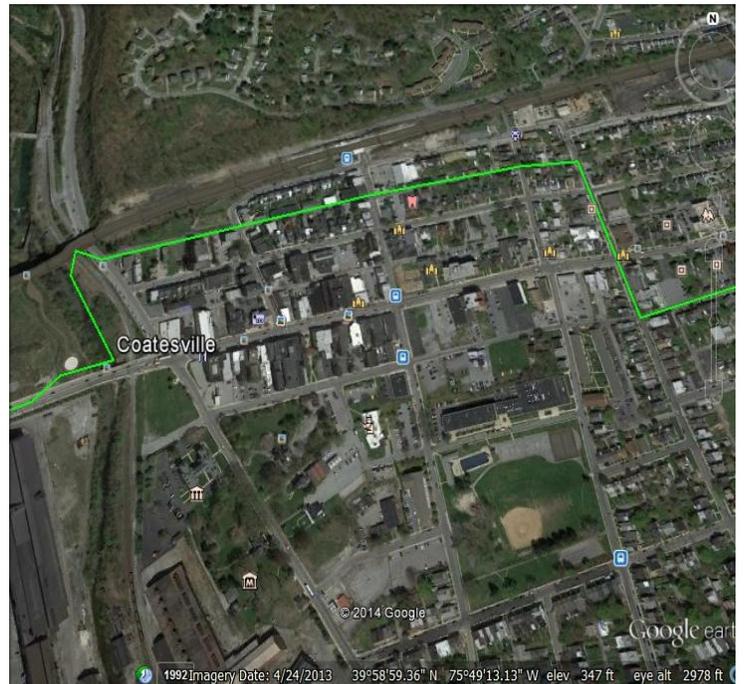
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Coatesville Community Education Foundation  
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# Keystone Network

## The Digital Promise

The Keystone Network Digital Development Plan recognizes the major potential impact of high speed broadband on the region's economy and the quality of community life. Broadband has the ability to provide enhanced opportunities for skilled workforce training and engineering education. Within the context of a STEM Research and Development Park Chester County's businesses, especially advanced manufacturing spin outs, can accelerate their success through the utilization of the next generation high speed broadband internet network

This proposed digital development plan is based on the unique routing of the Pennsylvania Research and Education Network (PennREN), a new high speed optical fiber network, through the streets of the City of Coatesville by the Keystone Initiative for Network-based Education and Research (KINBER), a statewide broadband organization .



PennREN's fiber optic pathway in green through Coatesville. Source: Google

## Chester County

Chester County is home to the most prominent high-tech financial, information technology, aerospace, pharmaceutical, healthcare management, and production software companies in the United States; and they all depend on the high speed broadband network and an IT savvy workforce for their business success. This reality drives and sustains the current and future economic growth of the Chester County, including Coatesville. The Keystone Connect Network and its accompanying STEM Research and Development Park are central components of Coatesville's digital development plan, which seeks to deliver 21st Century connectivity to the region.

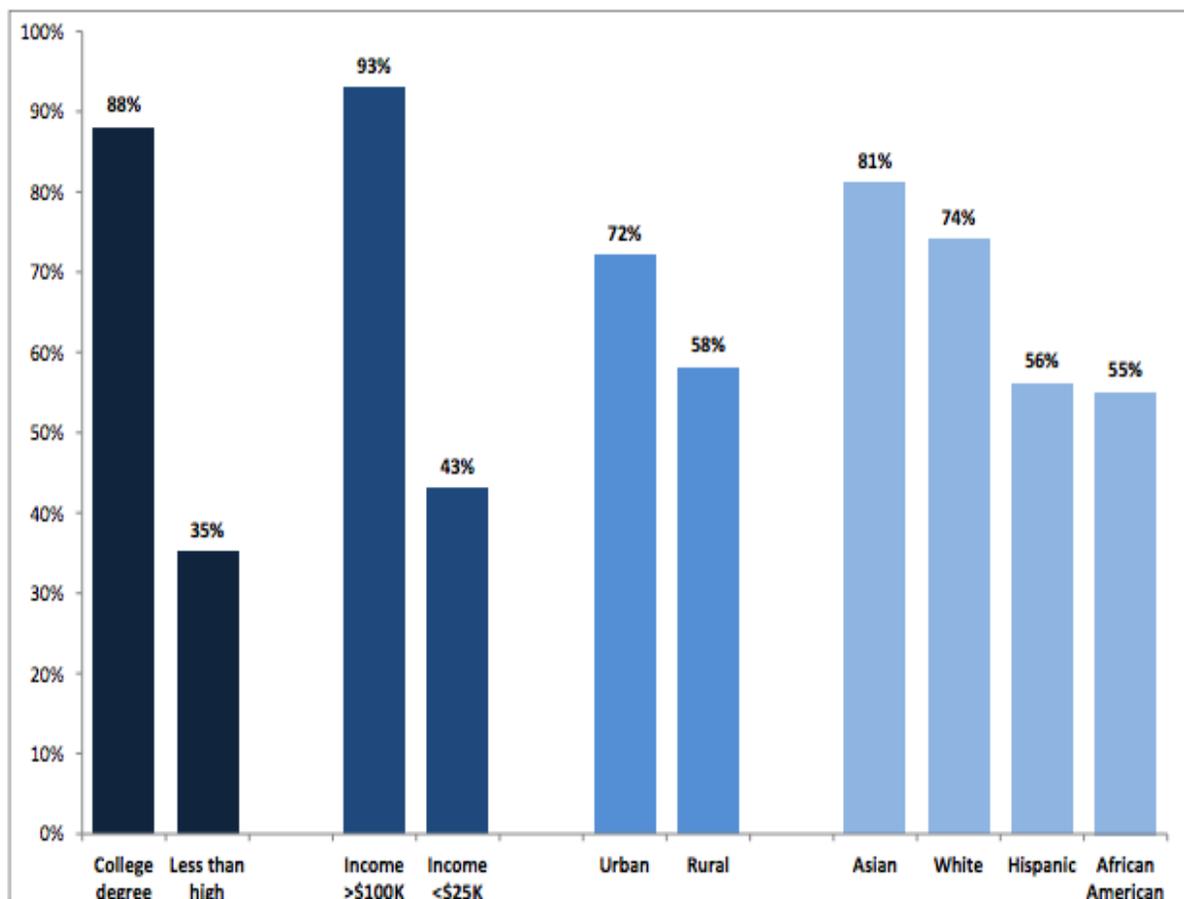
# The Digital Divide

The digital divide exists for those that are not fully linked to the internet and are experiencing a digital separation from the rest of the country and the world.

Coatesville's digital divide exists for basic as well as high speed internet services. There are many Coatesville residents who either lack access or have other barriers to broadband. When households are not connected to the internet access to job finding, educational training, and healthcare information is difficult.

Research conducted by the Pew Foundation indicates that current internet subscription levels across the U.S. averages at about 70% and that the divide is greater for specific demographic groups. At the national level government officials and business leaders have voiced concern that our nation's high speed broadband networks have less penetration and are slower than those in other countries. In the 21<sup>st</sup> Century this technological gap negatively impacts economic growth nationally and locally.

Figure 4: Percentage of Broadband Adoption by Demographic Group<sup>30</sup>



Source: The National Economic Council (June 2013)

# Digital Infrastructure

## Keystone Connect Network

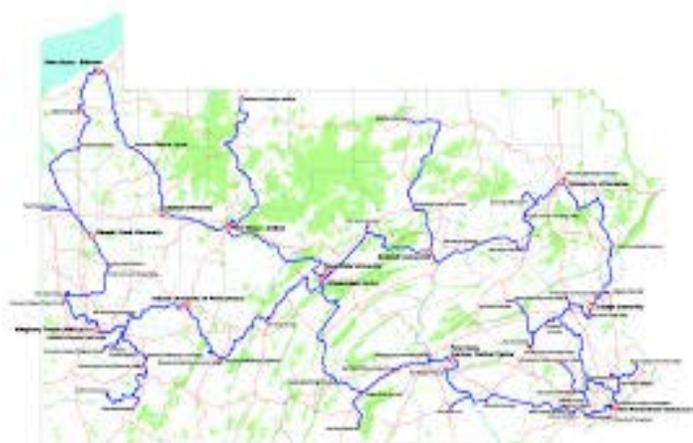
The Keystone Connect Network is part of a full spectrum economic development plan for Coatesville to attract businesses and serve residents. It can provide education and research capabilities to connect local companies and educational institutions to peers around the world. Through PennREN the Keystone Connect Network will provide up to a 100 Gigs of enhanced broadband services. Other Keystone Connect Network programs developed in collaboration with local partners can also provide community-based internet access for residents, new pathways for direct employment and advancement in



STEM occupations and to provide new businesses the opportunity to grow. The plan will address specific gaps and under-utilizations of the high growth broadband opportunities available to Coatesville through PennREN and suggest ways for Coatesville's to develop a data networking plan and to upgrade existing services.

## Keystone Initiative for Network-based Education and Research

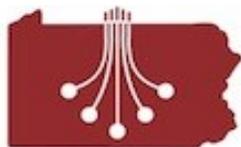
In 2010 the American Recovery and Reinvestment Act awarded \$99.6 million to KINBER to build Pennsylvania's communication infrastructure, the PennREN fiber optic system, that links education, healthcare and economic development entities across the Commonwealth of Pennsylvania.



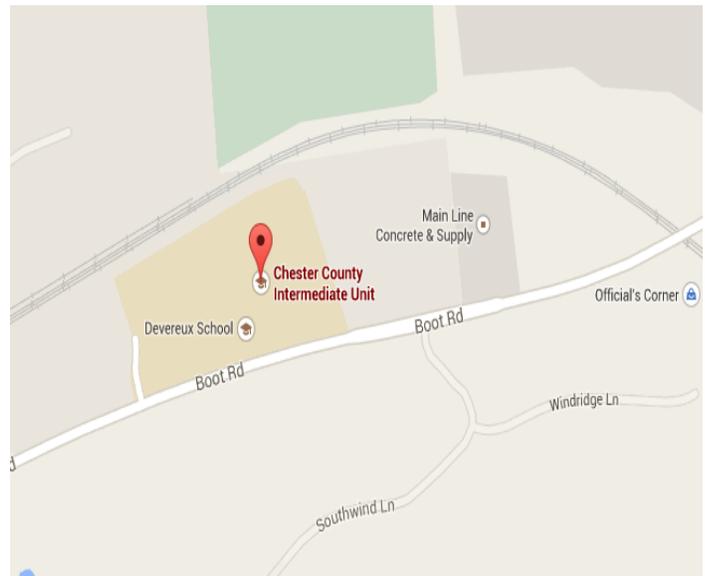
Source: KINBER

## PennREN

Completed in 2013 Pennsylvania Education Research and Education Network's (PennREN) is a 1,700 mile fiber optic cable network with capacity of four 10 gbps channels running through 39 Pennsylvania counties. PennREN's fiber optic network links its member institutions; including Penn State, Drexel, University of Pittsburgh, and the Pennsylvania's community colleges and the State System of Higher Education and advances their broadband educational initiatives. The PennREN Network Operations Center (NOC) is located at Indiana University of Pennsylvania. Running through the commonwealth the PennREN network runs directly through Coatesville, entering from the east on Walnut Street, and then south along the South 8th Avenue. Then west on Harmony, north on 5th Avenue to Lumber Street and then further west on Lancaster Pike and Valley Road to Parkesburg and beyond.



**PennREN**  
Pennsylvania Research and Education Network



ChescoNet's Network Operations Center is located at 455 Boot Road, Downingtown PA 19335 at the Chester County Intermediate Unit  
Source: Google Maps

## Chesconet

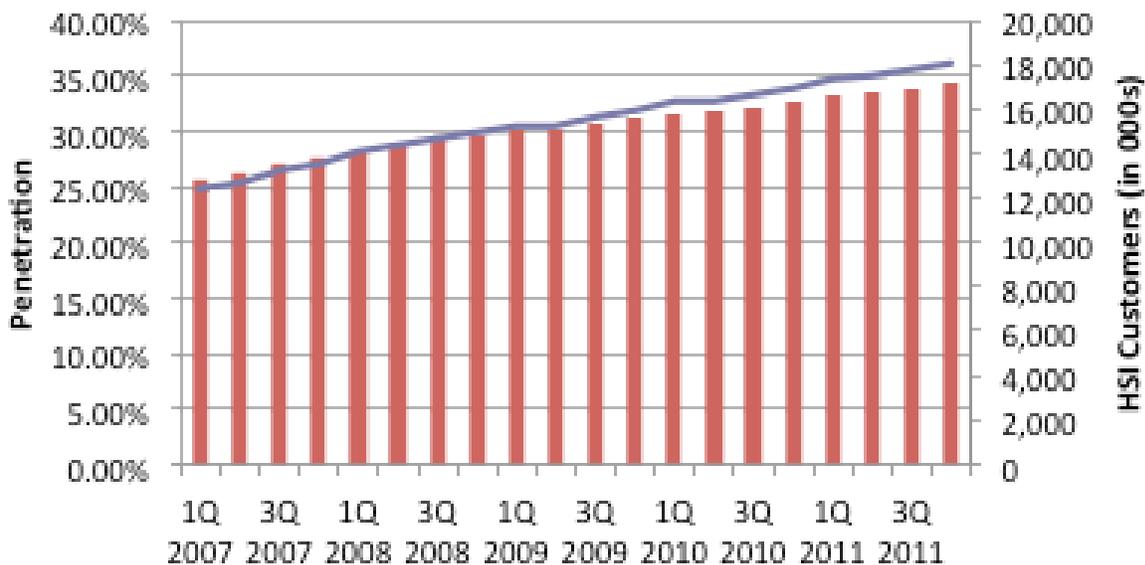
In 1999 the Chester County Intermediate Unit (CCIU) established Chesconet to provide improved connectivity and competitive rates for Chester County school districts, the Chester County Government, the Chester County Library System, the Chester County Hospital and Longwood Gardens. Chesconet uses PennREN as their fiber optic back bone. Chesconet continuously upgrades services and increases capacity for Chesconet. The system, which started with T1 and Frame Relay, now has an Ethernet on dedicated optical fiber networks for its subscribers.

## Comcast Broadband

Comcast is the primary provider of commodity carrier for internet services in Coatesville. Comcast's XFINITY provides high-speed internet services to the public and businesses in Coatesville. There are download speeds of up to 105 Mbps using XFINITY Internet for home subscribers. The service includes a basic internet connection for emails at a cost of \$30 a month for 12 months and 30 channels of television and streaming video to external devices for an additional \$45 dollars a month.

These costs are relatively expensive and many City of Coatesville residents are unconnected to the internet. This is evidenced by the 15 -25 people waiting in line each morning to gain access to a computer at the Coatesville Library. In order to increase internet penetration in low income areas Comcast introduced a \$10-a-month Internet Essentials Program in 2011. The Internet Essentials Program provides 5 Mbps downloads and 1 Mbps upload speeds, which are enough for basic browsing.

### Comcast Corp. High Speed Internet (HSI): Increasing Subscriptions & Room for Growth



Customers in 1,00,000's (Blue), Penetration by percentage (Red)

Source: Wells Fargo Advantage Funds

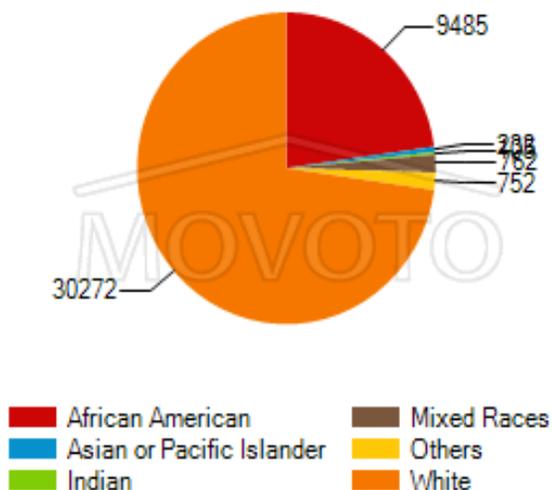
## Coatesville Area School District

The Coatesville Area School District (CASD) and the Coatesville Public Library, through the Chester County Library System, are members of Chesconet, a KINBER broadband peer network. Chesconet administers the wide area network and network operations center services for its subscribers, including the CASD, so all Chesconet subscribers are compliant with basic internet protocol standards. The network administration by Chesconet allows District staff to concentrate on its local area networks and computer services for its end users.

Chesconet's node or portal point for CASD is at the CCIU's Learning Center located at 1635 E. Lincoln Highway. According to Chesconet there is fiber optic cable going to CASD High School campus and the other 9 buildings spread through out the district. The Benner Building and the Gordon buildings have broad band fiber optic cable, but it is not activated for broadband connectivity. but the fiber cable connecting Benner and Gordon have the potential to be activated to provide network traffic over to Chesconet's Coatesville node.

Each Chesconet member pays only for the broadband services it uses. The annual fees collected from all Chesconet members in 2012 was \$1,160,308. Individual districts and libraries receive E-rate reduction grants for internet services based on the number of children in their area receiving free or reduced lunches. In 2012 the CASD received an E-Rate reduction of 70% from the Federal government which brought their internet subscription rate to about \$40,000.

Population by Race

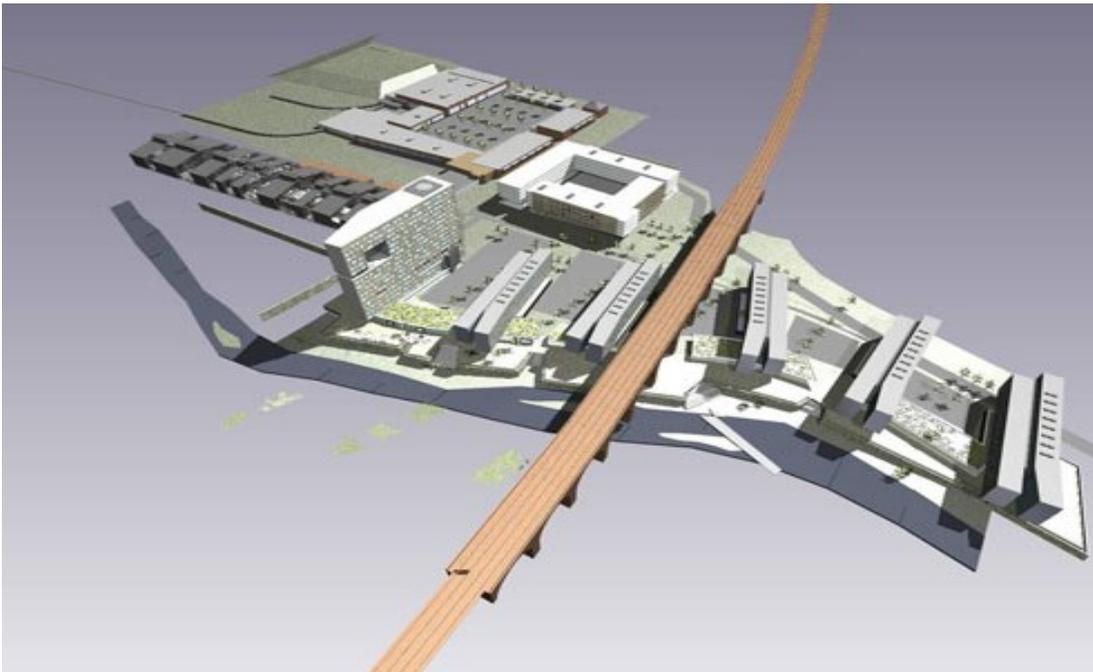


Coatesville's population (Zip 19320)  
Source: Movoto

## Lincoln University

In 2013 Lincoln University, a historically black university (HBUC), located in southern Chester County, committed to the opening of a satellite campus in Coatesville. Lincoln University has a high speed 1 Gigabit network on the Main Campus, which connects to its satellite campus in Coatesville by a dual 10 Mbps intranet broadband link. This link provides telephone services and internet for the Coatesville campus. Network connections with entities outside the system are managed by the IT Department on the Main Campus.

By accessing KINBER's network assets, Lincoln University can broaden its academic offerings and act as an economic catalyst for the Coatesville community. A relatively small amount of financial capital focused on developing broadband at Lincoln University's Coatesville campus can support job training certification and more access to advanced college degrees. Lincoln University's enhanced broadband services can also facilitate knowledge transfer to local industries and companies and support the incubation of new businesses.



Coatesville Site Plans (i.e. STEM Research and Development Center)  
Source: Erdy McHenry Architecture , Philadelphia, PA



# Coatesville's Future

## Chester County's Vision

Chester County's Comprehensive Policy Plan (CCCPP, 2009) suggests that revitalization of Coatesville will be connected to growth in the employment, housing and education sectors. The CCCPP forecasted that in the future Coatesville's downtown area along Lincoln Highway will continue to be surrounded by a "suburban landscape." The CCCPP envisioned that the downtown Coatesville's commercial and industrial spaces could be made attractive for business relocation through private and public investments by the Chester County Workforce Investment Board and the Department of Economic and Community Development.

## Urban Strategic Plan

The Coatesville Urban Strategic Plan (CUSP, May 2014) published by urban planners from the University of Pennsylvania noted that some parts of the county plans are being implemented.



Recently beginning in 2009 there has been some revitalization in the city. HOPE VI Home and Housing Trust Funds from the Chester County Department of Community Development, Housing Authority of the County of Chester, Federal Home Loan Bank (FHLB), JER Hudson, Wachovia have rehabilitated apartments and stores in the downtown; and in the final phase, over 80 homes at the Oak Street HUD site are being built and sold for private ownership.



Source: Community Builders, Inc.

## Keystone Corridor

Transportation infrastructure improvements to roads and the Coatesville Amtrak Station were noted as other major areas for development. In addition to the completion of the Amtrak Train Station located at 3rd Street other stations on the Keystone Corridor between Harrisburg and Philadelphia revitalized for increased ridership.

Planning for the Amtrak Station indicates that 88% Coatesville’s workforce commutes to locations outside the City of Coatesville. The plan supported by PennDOT, Amtrak, Chester County, the City of Coatesville, the Coatesville Redevelopment Authority, and the Chester County Economic Development Council, suggests that revitalization of the train station will help to improve commuter travel both to and from Coatesville. There have been calls to build up to 45 thousand square feet of commercial space with a data center next to the train station and make Coatesville “Chester County’s First Transit Office Campus.”

### Culture Growth in Coatesville

The Coatesville Urban Strategic Plan (May 2014) points out that the Coatesville Cultural Society and the Greystone Society are the predominate cultural institutions located in downtown Coatesville . They are an important part of its revitalization. The Coatesville



Source: Plan the Keystone (2012)

Cultural Society hosts performances and events for the community. The National Iron and Steel Heritage Museum located on the former site of Lukens Steel Company has secured the columns that formed the foundation of World Trade Center and were returned to Coatesville after the 9/11 terrorist attacks. When the Iron and Steel Museum is completed it hopes to draw thousands of visitors daily.



Source: Plan the Keystone (2012)

# Cluster Development

## Science, Technology, Engineering and Math (STEM) Research and Development Park

Regional economic cluster development is the primary way of sustaining competitiveness in a globalized economy.

Through regional public-private synergies Coatesville has the opportunity to enhance regional economic development through the planning and building a STEM Research and Development Park in Coatesville. The STEM Research and Development Park can help to secure the future of a world class competitive economic clusters in our region.

The McKinsey Global Institute (2013) predicts that within 5 years there will be a 20%-30% reduction in research and development costs as well as reduction in time to market. With increased access to distant research data bases, customer information and new markets corporations residing in Chester County can develop new knowledge-based industries and profit from a multinational strategy. Start-up companies in the STEM Science and Research Development Park can participate as independent production units in world-wide advanced manufacturing networks locally and internationally through PennREN.

## Advanced Manufacturing

Chester County's manufacturing cluster possesses the industry connections, business opportunities and a skilled workforce to grow; but access to higher education research institutes can accelerate new business growth in advanced manufacturing will keep it competitive far into the future. World class processing and manufacturing companies; such as Arcelor -Mittal, Azern, Communications Test Design, AV Industries, Schramm Drilling, Victory Brewing and Sikorsky Helicopters reside in the Coatesville area. With KINBER resources Coatesville can enhance its entrepreneurial position through economic cluster development and improve the economic competitiveness of the advanced manufacturing cluster in the re-



Source: Penn State Material Research Institute

## Leveraging PennREN

In order to remain competitive manufacturers need to increase access to consumer data, supplier resources; as well as designers to create new products. With PennREN companies will be able to focus on differentiating products to meet specific customer needs. Mature businesses in the advanced manufacturing and biotechnology/medical clusters relocating in Coatesville will become more integrated with their business partners and customers to improve their products for delivery to the marketplace worldwide.

New businesses can leverage PennREN connectivity for the development of co-innovation and product design strategies that use big data and cloud computing for product development and delivery. PennREN access will greatly reduce time to market through the delivery of uniquely designed and tested products to customers using additive manufacturing. Without access to large data sets, quick iteration and delivery of designed products through PennREN new businesses will be left behind as others mine big data, create products and deliver them instantly to meet customized consumer needs.

1	 Domestic energy and energy productivity	Domestic production of shale gas and light tight oil combined with higher energy productivity in power generation, buildings, transport, and industrials
2	 Skills revolution	Increasing K-12 and post-secondary attainment and achievement, aligning skills to job demand, and providing re-employment pathways
3	 Next-generation infrastructure	Economic gains from sustainable infrastructure spending, long-term infrastructure investments to address future demand needs, and enabling trade and innovation growth through transport infrastructure
4	 Innovation in materials, biologics, biosciences	New products and processes enabled by advanced and lightweight composites, nanotechnologies, biologics, and biosciences
5	 Diffusion of Big Data, internet innovation	Productivity impact and innovation in new products and services related to big data, advanced analytics, social technologies, spectrum reallocation, and "internet of things" on large sectors of the economy
6	 Public-sector productivity gains	Productivity growth in three major public or quasi-public sectors including healthcare, education and government services delivery
7	 Restored business creation engine	Recovery from 23% drop in new business creation since 2007 and reversal of long-term decline in business creation as a share of working-age population
8	 Sustained export growth	Acceleration of US gross export growth from current trajectory (at 13% of GDP, already at highest level since 1950) in both tradable goods and services

“Game Changers” for the U.S. Economy

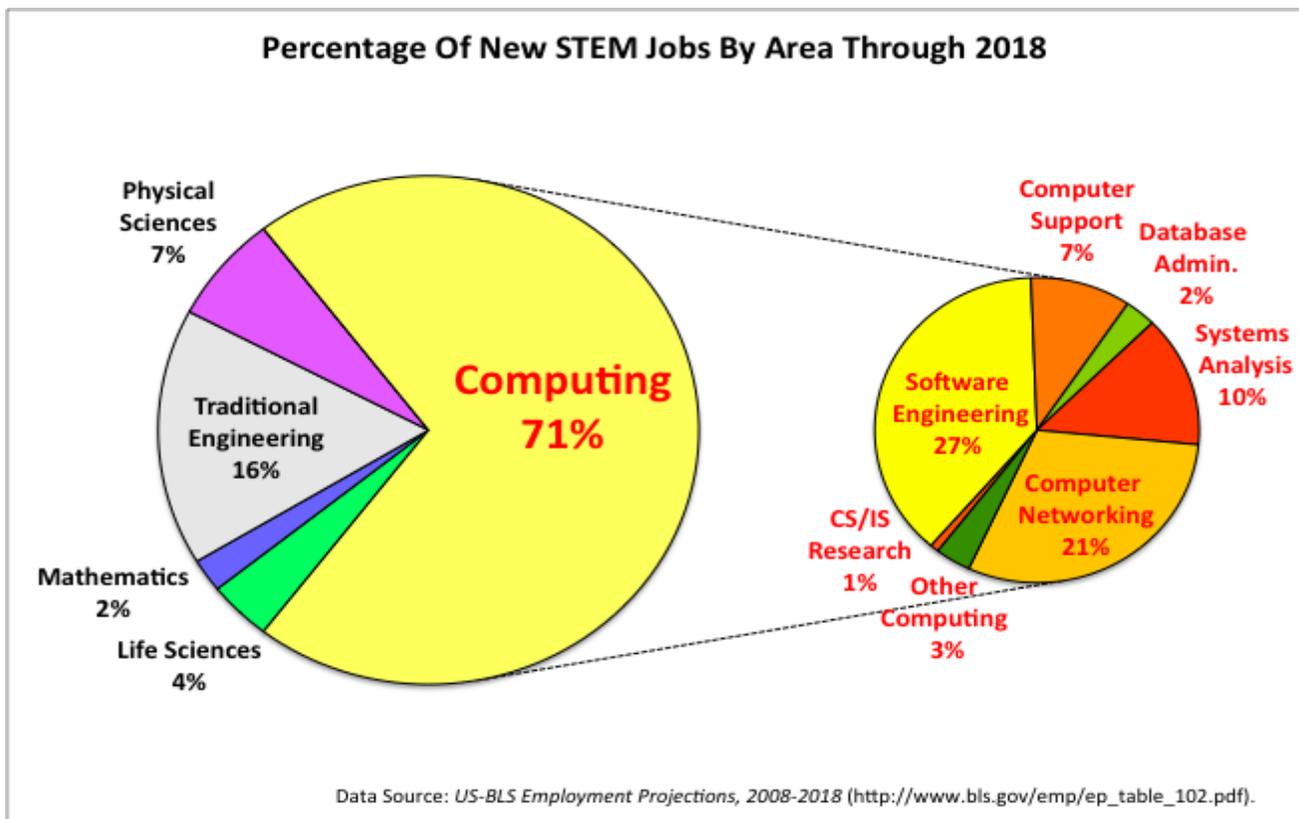
Source: McKinsey & Company (2013)

# Workforce Needs

## Workforce Development

The future economic growth of the Philadelphia region is tied to the STEM and IT training opportunities. A job futures report by George Washington University's Center on Education and the Workforce indicates that by 2018 57% of the jobs in Pennsylvania will require post-secondary education and that there is a need to fill 1.8 million jobs in Pennsylvania due to new jobs being created

and retirements. PennREN's digital connections can support training and education of tomorrow's skilled workforce by providing access to post-secondary institutions and research centers. As education, healthcare, and business increasingly depend on high-speed broadband networks for it is no longer sufficient for Coatesville's connections to be limited to commercial internet services.



Source: O\*Net Online (2014)

## STEM Workforce Development

The centerpiece of the project is the integration of an advanced technology manufacturing with innovative training methodologies that will be developed in collaboration with local business partners. The STEM Research and Development Park will house an Educational Technology Center (ETC) and partner with CASD, CCIU, Lincoln University, Pennsylvania Technology College and Penn State to improve educational and workforce training opportunities for early college, technical college and undergraduate students seeking training or internships in advanced manufacturing. The ETC program will focus on the education of technicians for the fields of advanced manufacturing and information technology.

By partnering with post-secondary educational institutions the ETC will be able to house classes taught by technical college and university faculty that will deliver new standardized and customized curriculum targeted for industries in the Philadelphia suburban region. In support of this academic initiative the ETC will design and present educational programs in entrepreneurship, advanced manufacturing, bio-medical research and integrated computer systems that address the needs of business.

Access to technology training will provide opportunities to enhance the Information Communication and Technology (ICT) skills of all community residents. The ETC will help grow ICT skills a diverse group of individuals, particularly workers who need new credentials to be competitive in the job market. The ETC's cyber skill workshops and certifications will support ICT skill training among workers who need new credentials to be competitive in the job market. Participation in the ETC's cyber-workforce training will have a positive impact on business development since it can provide opportunities for local residents to obtain professional certifications and remain competitive in the job market. .

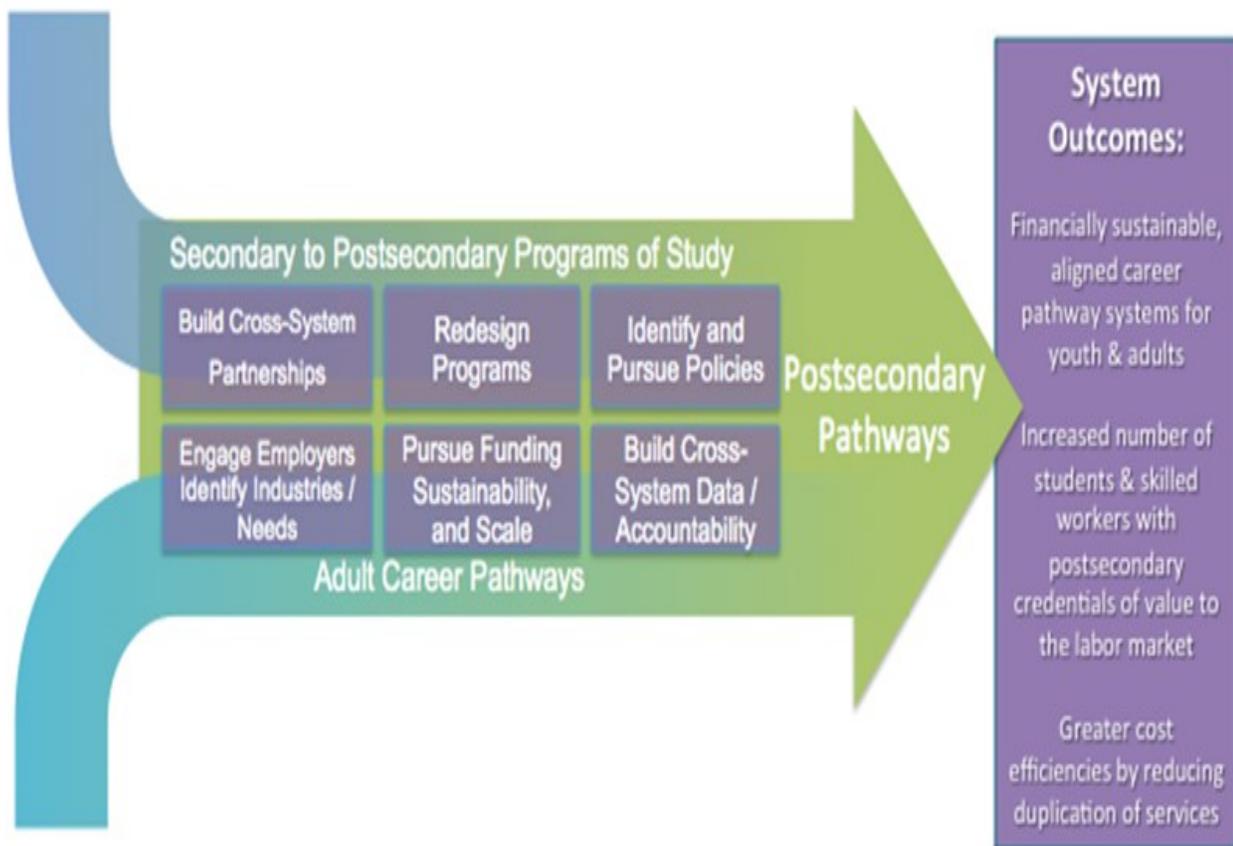


Source: e-skills UK

## Innovative Training Tracks

Educational institutions will modernize curriculum in design and process technologies, manufacturing and engineering analysis, and digital manufacturing. Through articulation agreements between Penn State and its ETC partners there are opportunities to offer certifications in advanced manufacturing integrated systems technology that lead to careers in industrial engineering and in information technology.

The ETC opportunities can create internships in high demand occupations. The Park’s Educational Technology Center will support three tracks of educational training; high school pre-engineering and technical training through the CCIU, college technical training through Pennsylvania Technical College and an engineering track through Penn State

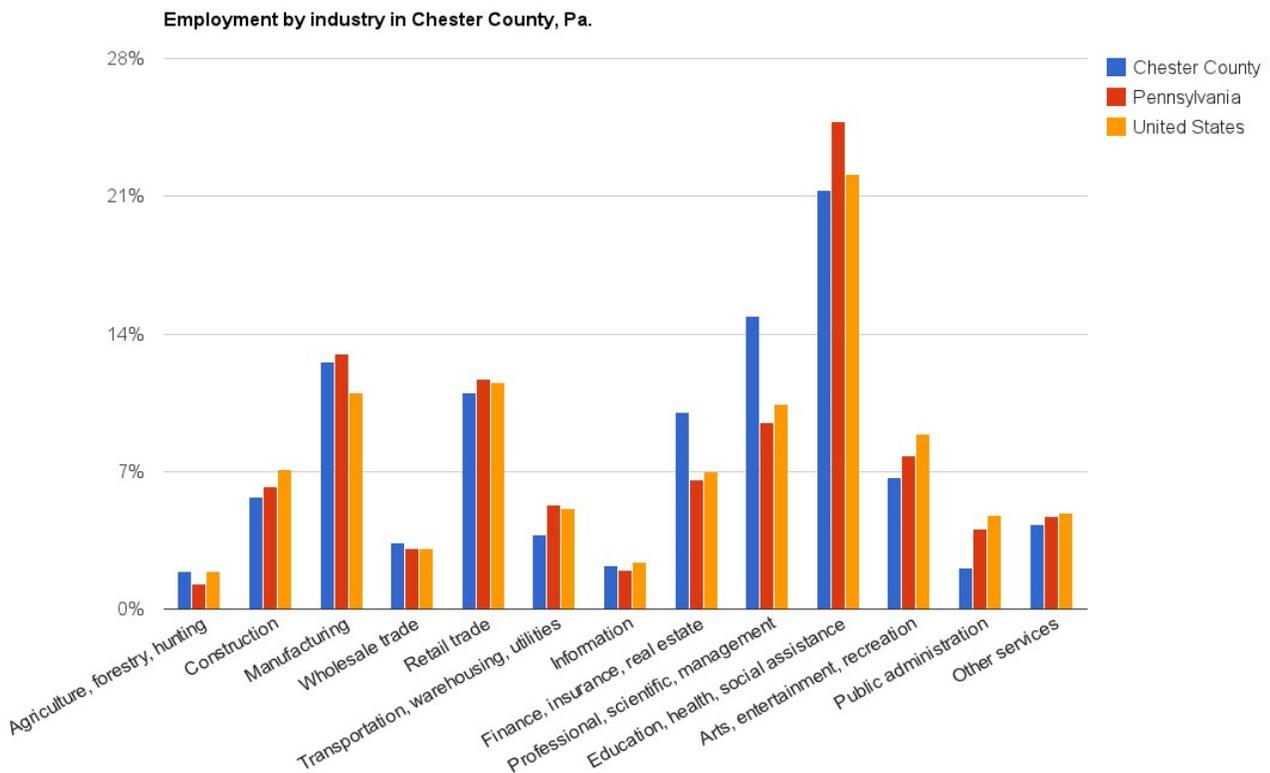


Alignment of Comprehensive Career Pathways for students and adults  
Source: Jobs for the Future

## Measurable Outcomes

Private businesses will be drawn to Coatesville’s STEM Research and Development Park because of its access to technology, human capital, and access to technology transfers from universities and the private sector. The STEM Research and Development Park will have a positive impact on business development since it can provide skilled workers for local industry. The industry-university interactions

facilitated by broadband connectivity will build a sustainable industry training programs, including engineering-based capstone projects, to support regional economic innovation clusters. Students can enter the field of advanced manufacturing at levels corresponding to their training level. Likewise success in the pre-college or technical college tracks will provide an entry point for those who wish to enroll in an Associate Degree at a local community college or go on to graduate from college.



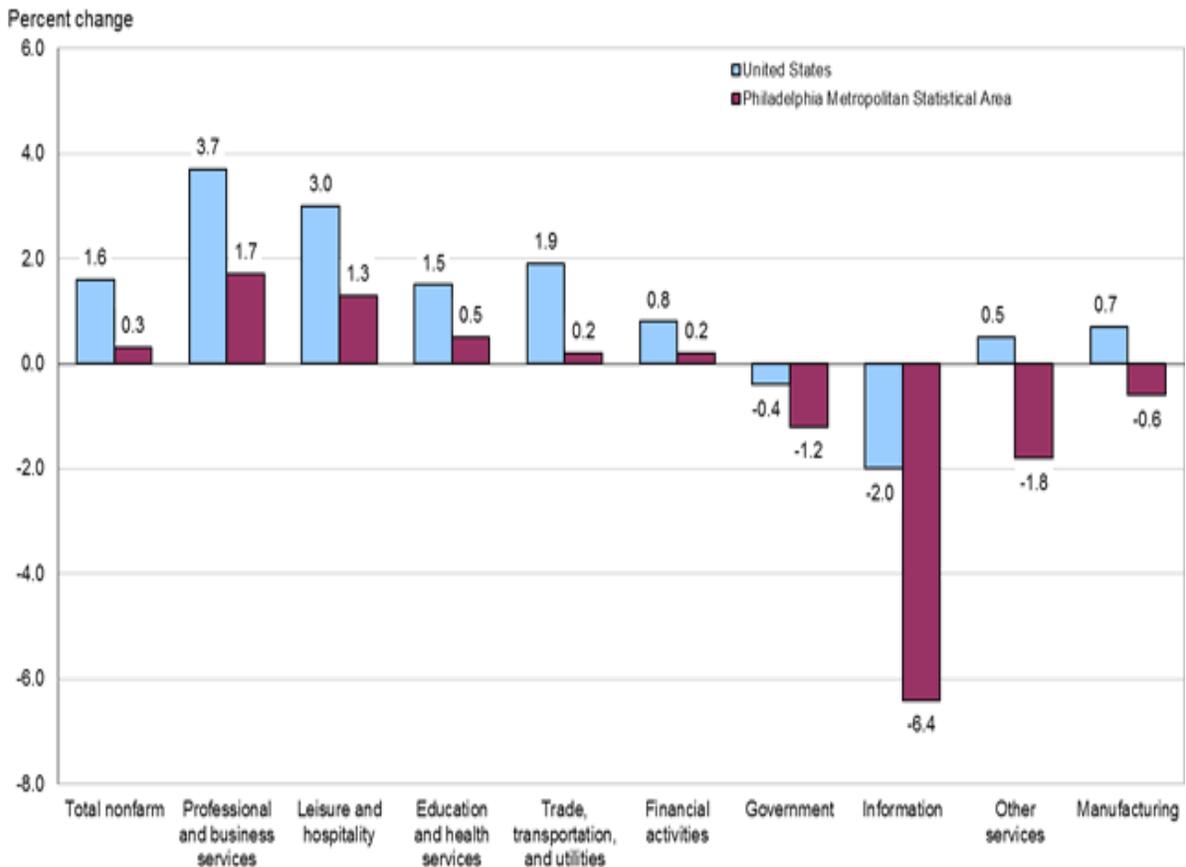
Source: U.S. Census Bureau Selected Economic Characteristics (2012)

## Keeping Pace in the 21st Century

As the recent census data shows that in the near term the Philadelphia region will have a faster rate of decline in IT jobs than the rest of the nation. The STEM Research and Development Center can reverse this decline by engaging businesses in its incubator and accelerator programs

The Center will increase the supply of the IT workforce by building a career pathways for skilled workers within the chemical, energy, pharmaceutical, and oil and gas industries; and generate new products in the region's advanced manufacturing, energy, health data, and financial and aerospace clusters.

**Chart 2. Total nonfarm and selected industry supersector employment, over-the-year percent change, United States and the Philadelphia metropolitan area, February 2014**



Source: U.S. Bureau of Labor Statistics.

# KINBER Opportunities

Locally, through the digital connections supplied by PennREN the Keystone Connect Network can help to provide inexpensive and reliable internet services for the whole community

## Public Wireless Network

Wireless Local Area Networks (WLAN) can be implemented with widespread hot spots very hundred feet to develop a wireless infrastructure for Coatesville. This WLAN network will enable use in multiple parts of the city. Public WLANs can provide wireless internet access in Coatesville's parks, train station, cafes, libraries, proposed convention center, and health center. An advanced Wi-Fi wireless technology can also provide internet connections for small businesses and home users at a competitive cost. It can provide an alternative to digital subscriber lines (DSL) and cable modems for homes and business broadband internet access and to provide connectivity for the last mile connection for PennREN.



MAGPI



## Internet2

KINBER provides its members the opportunity to connect to the Internet2 through the Mid-Atlantic Gigapop for Internet 2 (MAGPI) at the University of Pennsylvania.

Through an agreement announced in July 2014 KINBER can provide advanced network technologies for large-scale networking tools, internet security management, and extremely fast and high quality internet connections for scheduling live performances.

Through MAGPI connection KINBER can connect Keystone Connect Network users with over 60,000 U.S. educational, research, government, community colleges and universities, public libraries, museums, and health care organizations. Artistic performances and master classes being broadcast on high speed internet; engagement in real-time interactions between students at distant can also be achieved.

# PENNSSTATE



## University Connections

By accessing KINBER's network assets, post-secondary institutions can broaden their academic offerings and act as an economic catalyst for the Coatesville community. Financial capital focused on research development and economic innovation can support job training certification, access to advanced college degrees, and training for undergraduate engineering students.

Enhanced broadband services can facilitate knowledge transfer to local industries and companies and support the incubation of new businesses. The industry-university interactions will facilitate broadband connectivity to build a sustainable industry training and economic innovation system.

As part of their capstone project undergraduate engineering students can use the acceleration tools of visualization, analytics and immersive technology to collaborate with data creators and downstream users across the lifecycle of products created by companies residing in the STEM Research and Development Park.

## Business Opportunities

Potential new services that can be delivered at the STEM Science and Research Development Park could provide opportunities for collaborations for new business start-ups. New businesses could become more competitive through sharing data among researchers; high-speed access to large video and data archives; geospatial data for Pennsylvania (i.e. aerial photographs, maps, and other geospatial data); remote scientific instrumentation (i.e. telescopes and high speed

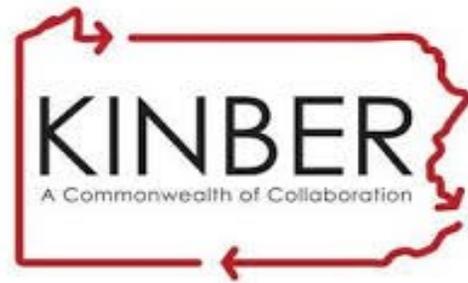


## KINBER Stakeholders

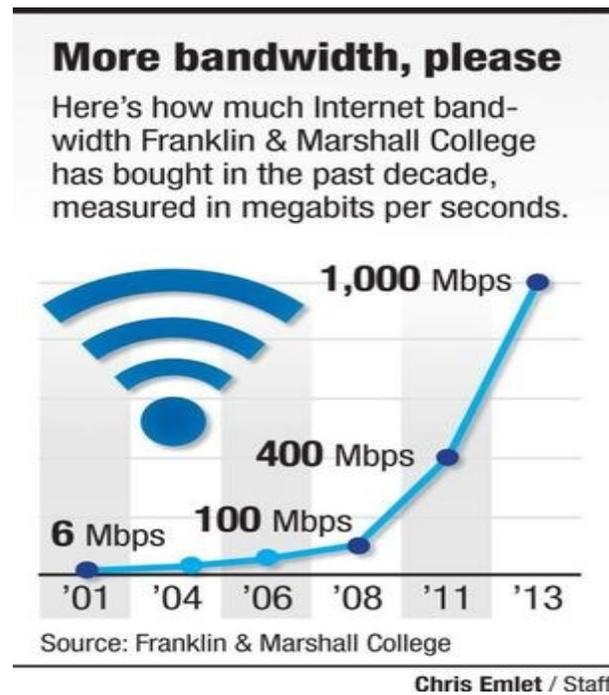
Communities in Pennsylvania are banding together to connect KINBER's information super highway. Lewisburg and Lancaster, leading KINBER stakeholders, are realizing the potential of KINBER to fulfill the needs of their local economies.



Lewisburg community leaders and Bucknell University staff are devising a plan to implement a next generation broadband network to help businesses and non-profits become part of the KINBER Community. The plan will integrate healthcare, medical research, educational, economic development, and improve library and governmental services. As part of its sustained broadband commitment Bucknell University and its Small Business Development Center have created an entrepreneurial incubator program that is helping new local businesses to succeed.



Franklin & Marshall College, Lancaster General Hospital, County of Lancaster, City of Lancaster, Lancaster School District, Lancaster County Library System, Pennsylvania College of Art and Design; Penn Manor School District; Intermediate Unit 13; Harrisburg Area Community College, Ware Center, and Millersville University have also joined together to bring KINBER to their community.



# Implementation

The Keystone Connect Network will provide a managed fiber attachment service, which includes the design, construction and implementation of broadband service to Coatesville, including the following tasks:

- The development of an extensive network design process to engage all stakeholders; including educational institutions, the business community, non-profit organizations, governmental departments and agencies, and KINBER members.
- Recovery mechanisms must be considered as part of the Keystone Connect Network's design process. The system's design needs to be simple and highly structured for effective troubleshooting and repair.
- To achieve the desired interconnectivity the Keystone Connect Network will maintain a set of minimum interoperability standards based on KINBER membership agreements.
- The Keystone Connect Network must be designed to achieve maximum internal and external security allowing its users access to only approved content and applications.
- Scalability of the Keystone Connect Network is an important issue for growth and change without significant redesign or change in fundamental network configuration.
- The Keystone Connect Network should be designed to meet the needs of academic networking. Service availability should be based on the most cost effective method.
- The Keystone Connect Network will provide continuous service to its users through reliable and robust networks.
- The design of the system should take into account requirements of all layers of the network system, the potential for hardware and path failures through redundancy of equipment and networks.



## Keystone Connect Operations

The purpose of Keystone Connect Network Plan is to design a network infrastructure; with high Quality of Service (QoS) services, human resources, management policy to support regional economic growth. Governance will provide the decision-making body for the sharing of high speed networks and the hosting of broadband applications for advanced collaborative education and research.

Cost reduction and ease of administrative interconnectivity between members and outside institutional research and educational community will be core attribute of the system. Linkage to PennREN and then to the Internet 2 through MAGPI will require collaboration between local stakeholders, access to PennREN, the sharing of KINBER's applications and other network resources.

## Open Architecture

The Keystone Connect Network will have an open architecture to allow full integration into the PennREN network. Using web and grid services the proposed data framework will allow for data back-up, open access, interoperability, and data movement. Basic protocols and interfaces for the use will allow members to address authentication and authorization; and data loading, mining, integration, analysis and visualization.

## Governance

To assist in the development of critical pathways and remove barriers for member institutions the Keystone Connect Network will establish an advisory board consisting of representation from Penn State, other post secondary institutions, ChescoNet, KINBER, CASD, CCIU, and Chester County Government.

The advisory board's goals will be to: 1) achieve comprehensive and sustainable implementation of the proposed network and the STEM Research and Development Park 2) to form alliances with state, regional and local industry and education communities; 3) to support professional practices; and 4) communicate outcomes with the public and policymakers.



## Phased Task Time Line

Phase	Task	Time Line: yr/m
1	Organize the Keystone Connect Network Governing Body	1/1
2	Develop structure for technical and programmatic committee	1/3
3	Define a simple and consistent QoS policy	1/4
4	Provide support for guaranteed QoS	1/6
5	Design for full compatibility with KINBER and other broadband services	1/9
6	Design comprehensive physical and logical topology and peering	1/10
7	Design a unified configuration model	2/0
8	Establish link to PennREN	2/4
9	Establish data center and network operations center	2/6
10	Connect with hospitals, libraries, universities through PennREN	3/0
11	Establish link to schools and community colleges	3/1
12	Establish links to Keystone Connect Network stakeholders	3/6
13	Establish link to Keystone Connect Incubator	3/9

# Broadband E-Rates

## High Speed Internet

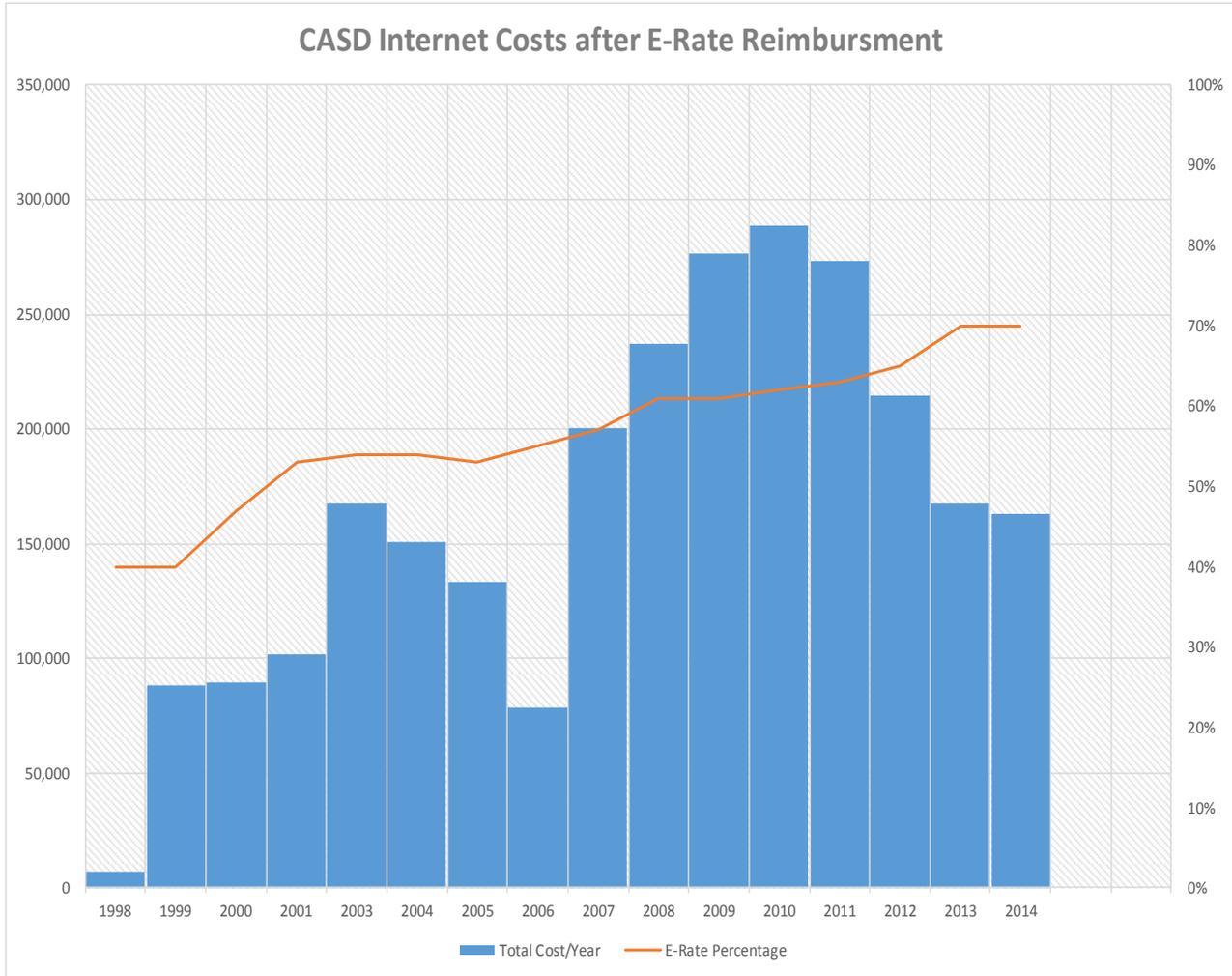
Federal Communication Commission website indicates that 100% of CASD's 8,648 students have access to fiber optic cable. This fiber optic cable connection through ChescoNet provides the District cabled intranet. During the last several years the CASD recently installed WiFi networks. The latest FCC E-rate Modernization Order in June 2014 will permit CASD use of the Wide Area Network (WAN)-Last Mile order to scale student internet access to 10 Gigs per 1000 students and provide for the E-rate reduction of connectivity costs for the CASD of up to 70%.



## FCC E-Rate Program

Authorized by Congress as part of the Telecommunications Act of 1996 the E-rate reduction program enhances access to advanced telecommunications and information services for all public and nonprofit elementary and secondary schools and libraries. The E-rate program was formed by the FCC in 1997 has helped to control rising internet costs for schools, which are challenged to meet the need for more bandwidth to connect teachers and students to interactive learning.

When E-Rate reduction program was first established in 1996 only 14 percent of the nation's K-12 classrooms had access to the Internet. Today almost every U.S. school and library has internet access. Now there is even more need than ever for innovative digital learning technologies to connect students, teachers and consumers to jobs, life-long learning and information. These needs are creating increasing demand for bandwidth in schools and libraries, which results in greater costs.



Source: Universal Service Fund (2014)

### CASD Internet Costs

Since 1999 CASD’s E-rate discount percentage has increased from 40% for a relatively small total cost of about \$30,000 to 70%. As demands for connectivity increased and more services like telephone, record keeping, and telephones were transferred to the intranet costs increased exponentially.

At the same time the E-rate discounts help the District to meet these cost increases for digital learning and on-line content. In 2014 CASD received an E-rate discount equal to \$543,301.44, which is 70% of its total annual internet costs of \$923,612.45. Exploration of E-rate Modernization program with CASD’s E-rate consultant may lead to significant savings.

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