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Finger Lakes Regional Economic Development Council
Upstate Revitalization Initiative Plan

Finger Lakes Regional Economic Development Council

September 11, 2015

This document is a draft of the Finger Lakes URI plan framework and is subject to revision. The draft will be finalized for October 5 submission.

The Finger Lakes REDC is releasing this draft to solicit input from the public. Please access the FLREDC website to submit your feedback and title suggestions. Your input will be crucial to the refinement and success of our plan.

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1 Introduction

The Finger Lakes Region Is at a Crossroads and the URI Is Essential For Realizing Its Potential

This is a **decisive moment** for the Finger Lakes region and its urban core, Rochester. The region is at a crossroads between realizing its full potential and losing its hard-fought progress. The Upstate Revitalization Initiative (URI) will be decisive for the Finger Lakes region to capitalize on its strengths and overcome barriers to growth.

After decades of industrial decline, **progress is evident** in the Finger Lakes. Recent investments, including more than \$300 million in state support through the Finger Lakes Regional Economic Development Council (FLREDC), have helped to develop the region's strengths and create 25,000 new jobs since 2011. The city of Rochester is recouping its potential through investments in real estate and restoration of historic properties and a gradual increase in jobs as more companies and residents return to the city. Confidence in the region's promise is on the rise, as Rochester was recently announced as the headquarters of a new federally-designated institute for Integrated Photonics, which will bring \$115 million in State investment to the region. The region's best-in-class higher education and health care systems and a more diverse economy than in the past are emblematic of the progress the Finger Lakes accomplished.

While progress is evident, the region continues to **struggle with fundamental challenges**. For the last five years, private sector employment and wage growth in the Finger Lakes region have lagged behind state and national averages. **Rochester is a city of sharp contrasts:** vibrant neighborhoods and business districts are juxtaposed with high concentrations of poverty, unemployment, and substandard housing. A total of **66,000 residents live below the federal poverty line** in the city of Rochester, and Rochester has the highest rate of extreme poverty and of childhood poverty of any comparably sized city in the United States. **More than half of Rochester children live in households in poverty** and nearly two-thirds receive public assistance. The Rochester City School District is the lowest performing public school district in Upstate New York, and has the lowest graduation rate among large districts in New York State, with **only 45.5 percent of high school students graduating** in 2015.

URI support is critical to take recent progress to the next level for all citizens, build regional wealth by propelling long-term industry growth, create diverse job opportunities, and further develop a dynamically skilled workforce that will transform the region and reduce poverty – a key priority for Governor Cuomo and the Finger Lakes Regional Economic Development Council. The region has a unique set of opportunities to develop, but there is fierce competition: a more connected world provides businesses with ever expanding options for investment, and **URI support is essential for attracting these investments to the Finger Lakes region**. If successful with its URI plan, the region will attract **private leverage** over the course of the next five years in innovative industries that will build on core regional strengths and benefit all of New York State.

The Finger Lakes region's aspiration is to achieve job creation and increased regional wealth by galvanizing private investment **to benefit the entire community**.

Our Strategy Builds on the Region's Strengths and Competitive Advantages

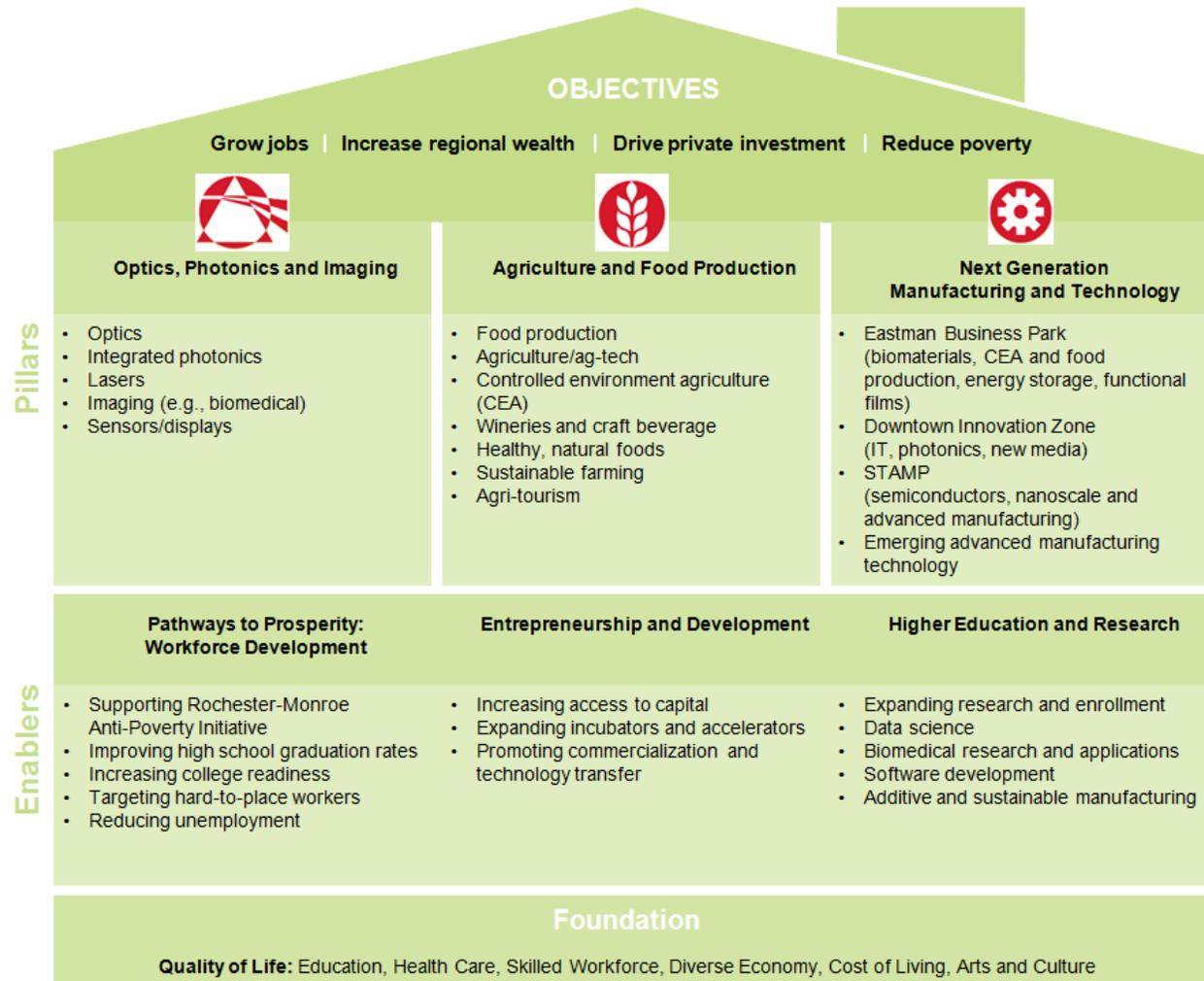
The Finger Lakes' URI plan addresses **four overarching objectives**:

- **Grow Jobs**
- **Increase Regional Wealth**
- **Drive Private Investment**
- **Reduce Poverty**

To develop a holistic URI regional strategy in which the Finger Lakes region realizes its transformative potential the plan uses the three goals required by the URI and adds a fourth – Reduce Poverty – inspired by the Rochester-Monroe Anti-Poverty Initiative which seeks to address poverty by transforming systems, programs, and policies in a coordinated, sustainable manner. Guided by the four goals, the region's URI strategy is focused on building on strengths and competitive advantages that will be further bolstered by the URI investment.

The URI plan emphasizes the capabilities that make the Finger Lakes unique within New York State and enable it to compete nationally and globally. In areas where the region is building on existing comparative advantages, the **URI funding will help position the Finger Lakes as a national and global leader**. In other areas, where the region is entering new fields, the URI funding will enable the region to further develop expertise and establish itself for future growth.

Exhibit: The URI plan for the Finger Lakes regional economy is supported by a strategic framework reflecting our objectives, priority pillars and key enablers



The URI plan has three industry clusters, or pillars, that will act as the core drivers of job and output growth. **The three pillars are:**

1. **Optics, Photonics, and Imaging (OPI):** With over 100 small and medium sized businesses driving OPI innovation and growth, advanced research at the University of Rochester and RIT, and specialized programs at Monroe Community College, the OPI sector is an innovation leader. As the headquarters of the American Institute for Manufacturing Integrated Photonics or AIM Photonics, the winning consortium in the Department of Defense National Network for Manufacturing Innovation in Integrated Photonics, Rochester and the Finger Lakes region will be the recipient of significant investment. In addition to the substantial federal and New York State financial commitments to photonics, the URI strategy primarily focuses on strengthening other specific areas of optics, imaging and laser technology, in which the region historically has been the global leader.

- Agriculture and Food Production:** The sector has been an area of strength for the region with the Finger Lakes producing about a quarter of New York's total agricultural output. The region has a robust ecosystem encompassing all parts of the food value chain, from agricultural research, to diverse farms and crops, to healthy food production, to sustainable waste management. With ongoing transformation in the industry to focus on healthy, natural, sustainably grown and produced foods, the region, with URI support, will amplify its strengths and **become a national center for innovative agriculture and food production.**
- Next Generation Manufacturing and Technology:** Significant progress has been made in three key next-generation manufacturing and technology hubs which are reinvigorating Rochester and the Finger Lakes region: Eastman Business Park (EBP), the Rochester Downtown Innovation Zone, and the Western New York Science & Technology Advanced Manufacturing Park (STAMP) in Genesee County. Within each hub, there is both existing activity and new, cutting-edge companies ready to move in. The URI will accelerate growth and help these hubs diversify into adjacent industries: energy storage, biomaterials, agriculture and food production and functional films at EBP; IT, photonics, and new media in the Downtown Innovation Zone; and semiconductors, nanoscale and advanced manufacturing at STAMP. While initially focused on these three hubs, with the right combination of private and public investment, the URI funding will support other emerging hubs in the next five years. The URI investment in next generation manufacturing and technology opportunities will be critical to **position the Finger Lakes at the forefront of the next wave of industrial growth.**

To assess whether these areas are optimal targets for state investment, the Council focused on **three primary criteria: output, jobs, and wages.** The Council compared Finger Lakes' performance and competitive advantage on these metrics against other Upstate regions and the United States:

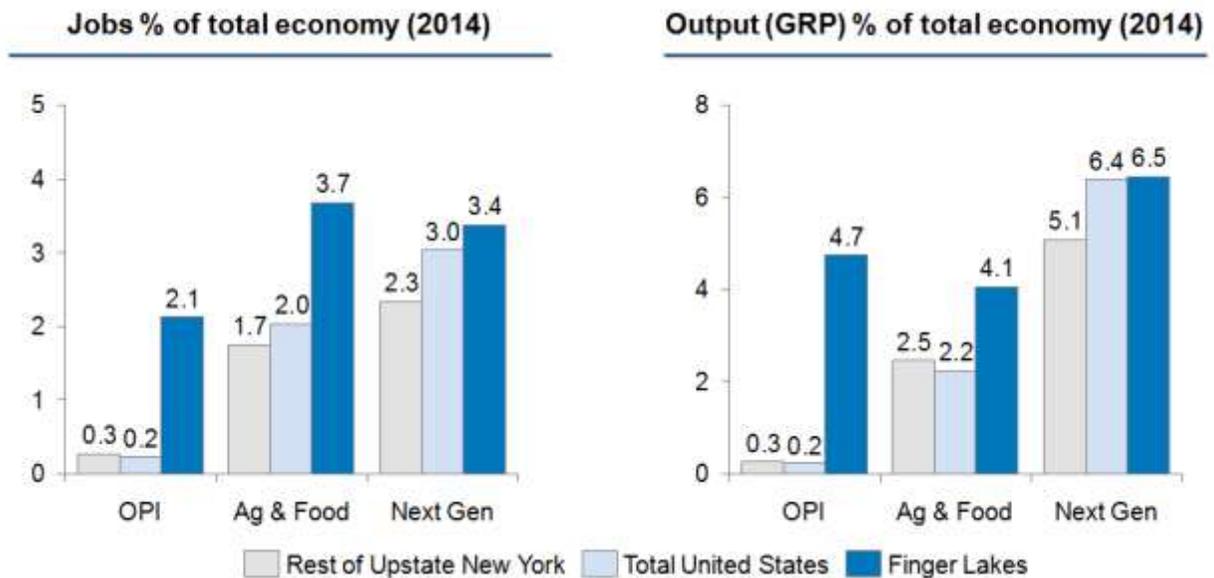


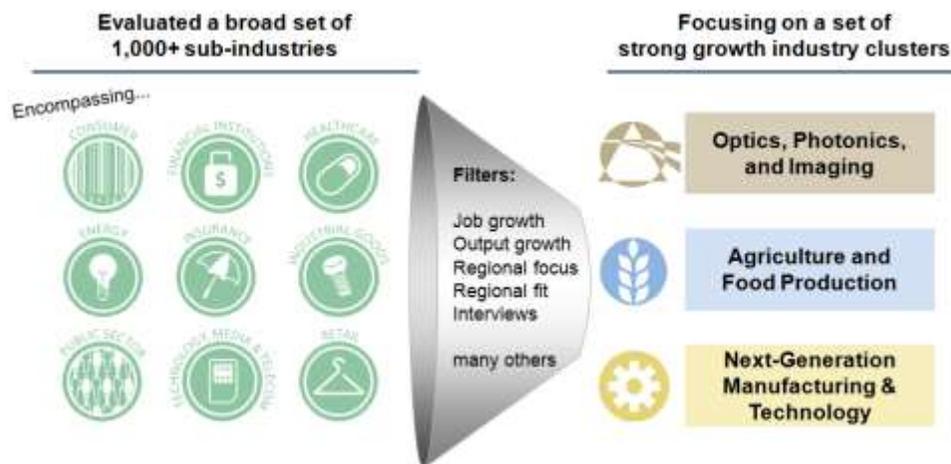
Exhibit: comparative performance of the Finger Lakes region against the rest of Upstate New York and the United States

For each metric, the focus was both historic and forward looking. The identified industry clusters are those that make the Finger Lakes unique; they are **areas in which the region outcompetes the other regions in Upstate New York** based on economic data. They also are industries in which the **Finger Lakes is positioned to succeed** against emerging competitors both domestically and abroad. The clusters also were evaluated in terms of their ability to help reduce poverty. **The process to identify these areas of focus included qualitative and quantitative components:**



Exhibit: Quantitative analysis and qualitative insights used to identify areas of focus

These inputs were used to narrow a substantial breadth of potential industries to highlight. Starting from over 1,000 industries assessed from a quantitative standpoint, the team combined qualitative and quantitative insight to identify the areas of focus:



The URI plan has three core enablers that will facilitate economic growth with the key pillar industries. They are essential to achieve the four URI objectives and were selected through the same rigorous process used to select the pillars, a combination of quantitative and qualitative analysis. **The three enablers are:**

- A. **Pathways to Prosperity: Workforce Development:** The Finger Lakes region will strengthen its commitment to reducing poverty through coordination with the Rochester-Monroe Anti-Poverty Initiative and provide opportunities for success through targeted education and training efforts that ultimately link to job placement for workers of all skill levels.
- B. **Entrepreneurship and Development:** The region will strengthen its entrepreneurship ecosystem through incubating and accelerating new startups, increasing access to capital, and growing urban and regional wealth through supporting small businesses.
- C. **Higher Education and Research:** With 19 institutions of higher education and over \$2.5 billion in research funding during the past five years, the Finger Lakes region will amplify its ability to attract world class talent and drive cutting edge research within the selected URI key pillar industries as well as regional institutional strengths including data science, biomedical research and applications, software development, and additive and sustainable manufacturing.

These three pillars and three enablers form the foundation for dynamic, long-term economic development in the Finger Lakes region. Together, they form the optimal portfolio for investment by directly complementing each other and creating far-reaching synergies. The selected industry clusters promote sustainable growth by placing the region at the forefront of innovation in well-established regional strengths, and preparing for future leadership in emerging new areas. This collection of industries also creates a robust regional strategy that draws on strengths in the urban core of Rochester, as well as the more rural areas throughout the nine counties of the Finger Lakes region.

The three enablers will support this focused industry growth and develop the capabilities of the region more broadly by meeting the evolving demand for people, capital, and technology. Targeted training and education will develop hard-to-place workers to provide the nimbly skilled workforce to support expansion of growing industries, while fostering entrepreneurship will support the creation of new businesses, and investing in higher education and research will drive industry innovation and provide a pipeline of highly skilled workers.

2 Readiness: The Finger Lakes Region is Ready for Transformative Progress

Record of Success

After the decline of 63,000 jobs from major employers in the early 1990s, the Finger Lakes region today is ready for growth. During the last four years, the region has created over 25,000 jobs. Since the creation of the Finger Lakes Regional Economic Development Council in 2011, New York State has awarded the region over \$300 million in REDC funding, including last year's award of \$80 million and selection as a "Top Performer." The state has supported close to 400 projects covering industries such as agriculture, tourism, transportation, and manufacturing, providing new facilities, capital, and other support to local businesses. Illustrative examples of these projects include:

- Eastman Business Park, identified by the Council as the top, unanimous priority project every year since 2011, is a success story in large part due to state support recommended by the FLREDC. Thanks to early state support to address utility system and environmental liability issues the Park is a focal point for economic revitalization, with Kodak determined to carry it forward. The Park is now home to 60 businesses across diverse industries including energy storage, biomaterials, functional films, and agriculture and food production. Non-Kodak businesses employ approximately 5,000 staff today and are projected to grow to approximately 70 companies by 2017.
- College Town is a 14-acre project which transformed a parking lot into a center for shopping, dining, business, and residential activity on the University of Rochester campus. College Town has brought more than 900 construction jobs to the City and will bring more than 320 permanent service and retail positions.
- The Genesee Valley Agri-Business Park, a 250 acre shovel ready site in Batavia, is now home to two major yogurt manufacturing facilities that located in the region with support from New York State. Thanks in large part to the concerted, strategic efforts by Governor Cuomo, New York has become the number one yogurt producer in the country and Genesee County has become the yogurt capital of New York. In a \$208 million project in 2012, Muller Quaker Dairy constructed a 350,000 square foot manufacturing plant, one of the largest in the country, which will add over 200 jobs. After a national site search, Alpina Foods constructed its first North American manufacturing facility in the region, a \$20 million 40,000 square foot facility.

Leading Indicators

The Finger Lakes region is positioned for broad economic growth based on positive leading indicators and trends applicable to its economy. These trends provide evidence that the region has begun a transformation, demonstrating the potential value realizable through additional state investment. Leading indicators that support readiness include:

- Patents are produced at a high rate and are on the rise. The Finger Lakes region produces patents at the fifth highest per capita rate in the country. With three patents per 1,000 workers, the region produces almost three times the state and national rate. Even in the wake of patent leader Kodak's downsizing, the Finger Lakes region is responsible for 26 percent of patents produced in New York State, with a growing number of non-Kodak patents significantly growing during the past decade.
- Vacancy rates are decreasing across the region, especially in the city of Rochester, where the market rate rental vacancy rate dropped to 3.4 percent, a 30 percent decrease from the 2013

rate. Property managers in downtown Rochester indicate that market demand remains strong, with 69 percent reporting that vacant units are filled in less than one month. While commercial vacancies are slightly higher, they are expected to follow the residential trends.

- Private sector donations are high and growing, and the Rochester region has the highest rate of dollars given to charity in all of New York State. The Rochester region also maintains the third highest rate of volunteer service in the United States.

Committed and Collaborative Community

The Finger Lakes region has a successful history of collaboration and has the right people in place to act on the \$500 million state commitment. The region benefits from an exceptional population who generously volunteer their time, money, and expertise. With the third highest rate of volunteer service in America, the region's tradition of giving is rooted in Kodak founder George Eastman's commitment to quality of life. George Eastman not only founded the Community Chest (now the United Way of Greater Rochester), but also contributed lasting gifts to the region including the Eastman Dental Center and the Eastman School of Music.

The region's businesses and organizations have recently driven systematic change by leading local initiatives that have received national attention. A series of community successes speaks to the power of regional cooperation throughout the Finger Lakes region:

- The FLREDC Workforce Development team has unified leaders throughout the community, bringing together dozens of executives including the CEOs of LiDestri, Paychex, Wegmans, and Excellus, the presidents of the University of Rochester, RIT, and Monroe Community College, the Mayor of Rochester and the County Executive of Monroe County. This commitment has translated into actions including the University of Rochester's recent agreement to act as superintendent of East High School to dramatically improve educational outcomes, and sponsoring the first Jobs and Career Fair targeting Rochester high school seniors that drew more than 460 students and 50 businesses.
- The Finger Lakes Health System Agency was awarded a \$26.6 million grant, the largest in the nation, from the Center for Medicare and Medicaid Innovation for *Transforming Primary Care Delivery: A Community Partnership*. The initiative strengthens the ability of regional practices to care for their patients through care managers and connections to community organizations, and leverages unparalleled collaboration between regional stakeholders including hospitals, insurers, and nonprofits.
- Rochester Regional Health partnered with RIT to lead a coalition of 28 hospitals, 3000 health care organizations, and more than 600 community-based organizations that was recently awarded \$565 million as part of the state's Delivery System Reform Incentive Payment program.

Our Foundation: Quality of Life

For over a million residents, Rochester and the greater Finger Lakes region provide an exceptional quality of life. Kiplinger named Rochester as the fifth best city in the US for families, and regional employers are continuously recognized for their commitment to their employees and the community. One of the region's largest companies, Wegmans Food Markets, is consistently ranked by Fortune as one of the best places to work in the nation, and was identified through a Harris Poll

as number one for corporate reputation among the 100 most visible companies. Through the focus on quality of life, URI strategies will continue to promote the city of Rochester and the Finger Lakes region as attractive places to invest, live, work, visit, and play.

Six key assets distinguish the Finger Lakes region: **education, health care, skilled workforce, diverse economy, low cost of living, and arts and culture.**

With 19 institutions of **higher education**, the Finger Lakes region is one of the most productive in the country, with Rochester ranking third in degrees per capita. Employers cite high quality of labor, high employee retention, low absenteeism, and short commutes as key productivity drivers. K-12 schools also are an asset for a good part of the Finger Lakes population. Eight Rochester **suburban high schools** were ranked by *US News and World Report* in the top five percent of the country, and quality of education is among the primary reasons families decide to locate to the Finger Lakes. The strength in suburban Rochester schools is in stark contrast to the challenges faced by the Rochester City School District.

Health care in the Finger Lakes is exceptional for its high quality, low cost, and community focus. The region is home to one of the world's leading academic medical centers, the University of Rochester Medical Center, which pioneers innovative research and trains the next generation of providers. Rochester also has the lowest overall Medicare spending rate in the nation and commercial insurance costs are 30 percent lower than the national average. The Community High Blood Pressure Collaborative, an effort to make Rochester the healthiest community in America, has improved the blood pressure control rate for adults by over 14 percent, compared to national rates of one percent, recognized as a "phenomenal success" by the CDC's Million Hearts Initiative. The Greater Rochester Independent Practice Association, a partnership between Rochester Regional Health and more than 1,300 regional physicians, improves quality of care and reduces costs by sharing information between hospitals, private practices, clinical labs, and payers. The Rochester Business Alliance partnered with Wegmans for the Eat Well Live Well Challenge to improve the health of the local workforce. More than 200,000 employees have participated to date, making it the largest community wide wellness program in the world.

Rochester and the Finger Lakes have an impressively **skilled workforce** and the availability of highly skilled labor is often cited by businesses as one of the top reasons to locate in Rochester. 62 percent of the population has at least some level of college education with science, technology, engineering, and mathematics among the most popular fields. A US Department of Education 2013 study ranked Greater Rochester area as first for degrees per capita in the physical sciences and mathematics and second for degrees in biological and life sciences fields. The Brookings Institution ranked Rochester among the nation's top cities for patent generation and The Atlantic magazine named it as the 7th "Brainiest City in America" in 2013.

The Finger Lakes' ability to weather the most recent economic crisis is due, in large part, to its **diverse economy**. Where the region once relied on a small number of large employers, today it is a diversified economy led by small and medium size businesses in a portfolio of industries. This is evident in the growth of the non-manufacturing sector which added 44,000 jobs since 2000 largely in the education and health care sectors. While Kodak, Xerox, and Bausch & Lomb used to be the largest employers, today the University of Rochester, Wegmans Food Markets, Inc., and Rochester Regional Health are now the region's largest employers.

Families and businesses throughout the Finger Lakes also benefit from the region's noteworthy **low cost of living**, with Rochester ranked by Forbes as the fourth most affordable city in America. With stable and affordable property values, the median home sales price of \$110,000 is 47 percent more affordable than the national average, and according to US Census data, Rochester has the second most affordable housing among the 52 major markets in the US.

The Finger Lakes region also offers a rich array of **arts and culture** attractions, including theater, museums, music, and festivals. Rochester has been ranked by the National Center for Arts Research as one of the top cities for arts vibrancy, a recognition supported by its diverse collection of museums and galleries. George Eastman House's International Museum of Photography and Film, is the number one video and photography museum in the world. From the relics of antiquity to works at the vanguard of contemporary movements, the Memorial Art Gallery's permanent collection of more than 12,000 objects has been called the best balanced in the state outside of New York City. The Strong National Museum of Play holds the world's most comprehensive collection of play-related artifacts and archives, drawing 500,000 visitors to downtown Rochester every year. In addition, there are more than 140 festivals in Rochester and the greater Finger Lakes region, covering almost every weekend from May to October. The Xerox Rochester International Jazz Festival has seen its attendance grow to 200,000, while the Rochester Lilac Festival, in partnership with the "I LOVE NY" program, brings visitors from across the world to enjoy more than 500 varieties of the flower. The Fringe Festival showcases unique culture of all types and attracted 60,000 visitors in 2014, its third year of operations. The University of Rochester Eastman School of Music has regularly been ranked as the nation's leading graduate music school.

3 Growth Pillars: Key Industry Clusters

To maximize the impact of investment, the Council has identified three industries to serve as economic growth pillars and act as the core drivers of job and output growth for the Finger Lakes region in coming years. The region's substantial assets and competitive advantages in these industries will generate growth that creates jobs not only directly within these industries, but also throughout the economy and in New York State more broadly from induced activity in supply chain fields.

The region anticipates broad-based growth. Industries identified as pillars will lead major economic growth, and represent the optimal target for URI investment to catalyze economic transformation.

Within each pillar, the region has identified initiatives that potentially can be the subjects of URI investment. These highlighted initiatives, gathered through a consensus-based process from public forums and collaboration with FLREDC workgroups, were vetted by the URI team through an analytically rigorous process. While not necessarily the specific projects that will be funded, they represent examples of the *type* of project the region would invest in with URI support. Initiatives titled *Year One* are well-defined proposals with associated private leverage that could be launched immediately after winning the URI. Initiatives titled *Full Implementation* are equally important, but will be further refined before implementation.

3.1 Optics, Photonics, and Imaging

Vision

The Optics, Photonics, and Imaging industry has been driving the Finger Lakes regional economy for over a hundred years, placing the region on the forefront of innovation while creating thousands of jobs. Strategic, targeted investments will keep this industry strong for years to come.

The Finger Lakes region has deep heritage, a large manufacturing base, a highly skilled and entrepreneurial workforce, cutting-edge research, preeminent academic institutions, and a thriving startup environment in the Optics, Photonics, and Imaging (OPI) industry. **There is momentum in the Finger Lakes region:** the recently awarded American Institute for Manufacturing Integrated Photonics (AIM Photonics), a federal research center headquartered in Rochester, will expand the economic potential for the region and New York State. The Finger Lakes region will build on this momentum, using URI investment in domains not covered by recent federal awards that fortify global leadership in OPI.

Strategic investment through the URI will enable the region to **develop the full value chain:** from growing our robust base of component and sub-system manufacturing, to developing capabilities in the integrated systems that will fundamentally change computing and communications, both industries that will be based on photonics. By investing in **nurturing startups, enabling small businesses, and attracting large enterprises**, the URI will further allow the region to strengthen its leadership in this field, developing an even more robust OPI ecosystem that connects regional assets in industries adjacent to photonics, including life sciences, data sciences, energy innovation, and other fields. Through the URI, the region will build a new generation of large, globally recognized brands that call Rochester home.

Assets and Performance

For over a century, the Finger Lakes region has been the **leading industrial center for optics and imaging**, two related industries focused on the development and manufacture of technologies to shape, focus, capture, and reproduce light. This created substantial wealth for the region, creating tens of thousands of jobs. Rochester has been recognized as the Imaging Capital of the World. The region has strong assets in Optics, Photonics, and Imaging:

- About **120 companies** forming a robust local supply chain with small business jobs growing about four percent each year
- **Assets from legacy companies** including industry-ready infrastructure at Eastman Business Park
- Federal recognition and support through **multiple funding awards**
- A strong academic community crossing the University of Rochester, RIT, and many others

All these assets combine to make the Finger Lakes region a world leader in OPI.

Global companies continue to look to Rochester to help develop new technologies, and larger local companies are expanding in the area. For example, Canadian-based IMAX established an R&D site in Rochester to help develop the newest laser-based IMAX system being rolled out this year. The regional business network includes small and large companies that create tens of thousands of jobs and form a complete supply chain. Complementing this, legacy assets such as Kodak's roll-to-roll processing equipment at Eastman Business Park mean that the business community has access to needed capital equipment and has the expertise to use it.

The federal government, too, recognizes Rochester as an evolving center for the field. Since 2012, **the region has won all four of the federal government's major advanced manufacturing jobs initiatives** related to OPI based on the region's strength in the field:

- The Advanced Manufacturing Jobs and Innovation Accelerator Challenge (AMJIAC)
- The Advanced Manufacturing Technology Program (AMTech)
- The Investing in Manufacturing Communities Partnership (IMCP) program
- The National Network for Manufacturing Innovation (NNMI) Integrated Photonics, creating the American Institute for Manufacturing Photonics or AIM Photonics

The AIM Photonics award dramatically amplifies the region's history of leadership in Optics, Photonics, and Imaging. Integrated Photonics, the focus of the institute, creates new types of devices that use light and electricity for communications and data processing. These **miniaturized photonic devices are expected to revolutionize telecommunications and computing**, just as integrated circuits have over the past 50 years, and **the Finger Lakes region is positioned to lead this revolution**. Rochester and the region will serve as the hub for the federal government and the more than 90 industry and 18 academic partners in the \$600 million consortium, receiving \$115 million of New York State's \$250 million commitment to Photonics. Components of the Institute will be at locations that are of strategic importance to the region's economic revitalization and supported by Governor Cuomo. The administrative headquarters, workforce development, education, training, and corporate and student incubator space will all be located in downtown Rochester, including the Sibley Building, which is the anchor of the downtown Innovation Zone, a FLREDC Priority Project, and home to the region's federally and state designated business

incubator. Eastman Business Park's world-class ITAR (International Traffic in Arms Regulations) compliant clean rooms and laboratory space meet Defense Department specific security requirements and will house Rochester-led manufacturing efforts in sensors, testing, assembly and packaging, and electronic and photonic design. With these coordinated and focused efforts, AIM Photonics creates the opportunity to drive economic development in the Finger Lakes region in three ways that will grow private employment: **incubating new companies, expanding existing ones, and attracting new companies** to the region.

Beyond integrated photonics, Rochester is known throughout the world for its innovations in light-based technologies including xerography, the digital camera, lasers, high-speed scanners, LEDs, and others. Fueling the region's innovation are local universities that contribute significant research, help develop expertise in the field, and catalyze new technologies and companies. **The University of Rochester** crosses a range of research, from The Institute of Optics, established in 1929 as the nation's **first optical science, engineering and design program**, which has awarded over 2,400 optics degrees to date or more than half of the United States's total, to the **Laboratory for Laser Energetics (LLE)**, a New York State Energy Research and Development Authority (NYSERDA) and U.S. Department of Energy supported facility which is home to the second most powerful ultraviolet fusion laser in the world and has attracted **almost \$2 billion in federal funding**. There have been over 220 companies started by 115 graduates, faculty, and staff of the Institute of Optics. Along with the Institute of Optics and the LLE, the Center for Emerging and Innovative Sciences, a New York State Center for Advanced Technology based at the University of Rochester, further supports the Finger Lakes region's OPI cluster through industry-university collaborative research and attracting federal support.

At **RIT**, the Chester F. Carlson Center for Imaging Science (CIS) is a highly interdisciplinary university research and education center, dedicating to **exploring imaging in all its forms and uses**. The science of imaging at CIS encompasses a wide range of subjects, from the physics of light sources to the psychology of visual perception. Imaging science research has also led to the **formation of new companies in the region**. Pictometry, a Rochester-based company, pioneered new geospatial imaging technology now used in a wide range of applications and employs 250. RIT supports advanced optical lithography through the Nanopower Research Labs, and capitalizes on the revolution in light detection technology through the Center for Detectors. The Semiconductor Microsystems and Fabrication Lab at **RIT will be expanded into integrated photonics in connection with AIM Photonics**, and the Center for Electronics Manufacturing & Assembly will contribute to the packaging element of AIM Photonics, with a new course developed in photonics packaging. These facilities tie closely to the research conducted at the RIT Nanophotonics Group and the Novel Material Photonics lab. All these strengths help lift up other strong industries in New York State: **RIT is collaborating with Cornell's agriculture experiment station** in Geneva, NY to develop real-time crop imaging that allows for **more precise agricultural management**.

These centers have resulted in Rochester leading the nation in per capita OPI patents.

Opportunities for Growth

The region's numerous assets – academic institutions, a robust supply chain, industry leadership through AIM Photonics – position the region to capture substantial share of the \$500 billion global OPI industry, a key part of almost every modern technology. Many of the companies in the Finger Lakes region's photonics cluster already compete successfully on an international level. As outlined

in greater detail in the FLREDC's Regional Economic Cluster Plan, growth opportunities in the OPI space are centered on three main areas of support that will translate regional strength into broader commercial success:

- Attract even more large companies to expand or establish operations in the region, with large companies historically a backbone of OPI jobs
- Facilitate industrial research and technology development to keep the region on the cutting edge
- Increase availability of manufacturing facilities, equipment, capital, and development support for local companies to help these companies pool costs and keep up with changing technology

By expanding its photonics and imaging industries, the Finger Lakes region will create thousands of new well-paying jobs in the near future and increase exports to other states and countries. A stronger Finger Lakes regional cluster also will drive more foreign investment into the region, as companies around the globe recognize Rochester as the center for OPI manufacturing and innovation. Large companies have expressed interest in the Finger Lakes region. The talented, innovative workforce and concentration of intellectual capital provides strong advantages to companies located here. A primary focus of the Council will be to identify and pursue large company projects in the region which require support for location in New York. One such project is currently under consideration and highlighted in Strategies to Achieve Vision.

Expanding research and development capabilities in the region would further enable economic growth. Many small businesses in the Finger Lakes region, including Lasermax, RPC Photonics, Sydor Instruments, and Lucid, were created as a result of research and innovation in the region. Continuing to invest in these capabilities will spur further development of the small business sector, and position the region to capitalize on its leadership in photonics to grow an internationally recognized international cluster in the field and in OPI more broadly.

The region also has identified several gaps in support for companies and startups. Investments in providing facilities and equipment to small businesses will help them expand and grow. In high-tech fields such as OPI, the cost of equipment makes it difficult for small companies to innovate and expand into new areas. Investment in industrial R&D resources and user facilities will help bridge this gap and unlock significant new growth. Supporting collaboration between industry and academic research institutions will help push technology from invention to commercialization. In particular, regional strengths with high need for investment include advanced optics technologies such as optics materials surface finishing, imaging systems and analytics, and laser technology. In the past few years, the region has incubated many new OPI companies including FCR, Ovitz, LighTopTech, and Clerio Vision, and **increasing the support available would help further build on this momentum.**

To remain among the best region's in the world in exploiting light-based technologies in products and services., however, the region needs to harness the science and technology necessary to fills gaps in OPI R&D, better utilize significant historical assets (e.g. Eastman Business Park), and fully leverage federal investments, like AIM Photonics. New investments in optics, lasers, and imaging, in particular, are highly synergistic and will complement the state and federal government's investments in AIM Photonics. For example, new laser manufacturing technology will allow new research initiatives and entirely processes such as additive manufacturing and surface annealing to be applied

to advanced optics manufacturing. The packaging technology developed by AIM Photonics will allow optics manufacturers to enter into new markets for integrated optical systems. Advanced displays, OLED lighting, and other light-based technologies are also areas where the region is capable of producing world-class new products. However, investments need a critical mass to have an impact, and future investments in optics, imaging, and lasers, along with the AIM Photonics investment in integrated photonics, will be potentially large enough and broad enough to develop next generation platforms and technologies that will have significant commercial applications and produce substantial economic impact.

Strategies to Achieve Vision

Highlighted Year One initiative:

Year One initiatives are specific, high-impact projects that could be launched immediately after winning the URI.

The region is competing for **Project Cataract**, a confidential project by a large OPI company to establish a new manufacturing facility. If the Finger Lakes region successfully attracts Project Cataract with the help of the URI, it will be constructed in the urban core and will provide jobs for a range of skill levels with minimal transportation barriers – targeting hard-to-place and low-income workers. The region is a prime candidate thanks to a history of innovation in the space, a talented community with strong intellectual capital, and directly related workforce development programs such as the Optical Technology degree at Monroe Community College. However, multiple sites globally are under consideration for Project Cataract, so URI support is crucial in attracting this investment to New York State, which would lead to up to \$400 million of private capital investment and 600 new direct jobs in downtown Rochester.

Highlighted Full Implementation initiatives:

Full Implementation initiatives are projects that would be further refined after winning the URI, including clarifying final investment and timing.

- The Laboratory for Laser Energetics (LLE) at the University of Rochester requires next generation laser and pulse power technology to keep New York and the U.S. at the forefront of energy research, technology, and development. LLE will develop a new, state-of-the-art facility that will create the world's most advanced pulse power system and highest peak power laser, leveraging \$135 million of private investment from the University of Rochester and the federal government. The project is estimated to attract an additional \$150 million in federal research over the next five years from the National Nuclear Security Administration, Department of Energy's Office of Science and the Department of Defense. This new strategic initiative will strengthen LLE's global leadership in fusion and high-energy-density physics research, which today annually attracts around \$70 million in federal support to New York State, involves around 400 scientists, engineers, and staff, and stimulates the region's OPI sector through technology commercialization, company creation, and local purchases. Absent New York State support, this facility could be built in another state in partnership with the federal government and national laboratories.
- Developing a **Finger Lakes Photonics Challenge** would help focus the entrepreneurship resources on the Finger Lakes region's photonics industry, creating a collaborative yet competitive environment for startups to grow and thrive. With support from the URI, and with leadership from local institutions such as High Tech Rochester, the region could provide startup acceleration support to cohorts of photonics-related startup companies.

Creating an annual conference with awards to showcase development and innovation in the photonics space would help anchor the industry in Rochester, establishing the Finger Lakes region as the global center for this new field. A URI investment would create an engine to stimulate startup activity in Photonics, ensuring that state and federal investment in the sector via AIM Photonics translates to commercial activity.

3.2 Agriculture and Food Production

Vision

The food industry is changing faster than ever before. More consumers are demanding healthy, high quality, locally sourced food. This recent development offers the Finger Lakes region and New York State an opportunity to be among the first to meet the needs of these consumers, using URI support to become the industry leader in the United States.

The Finger Lakes region is building a robust, interconnected food ecosystem across its nine counties, and offering job opportunities for workers of all skill levels. With significant private investment under consideration in the next five years, the region will continue as the **leading food producer in New York State**, the Northeast, and beyond. As the broader industry continues to transform to focus on fresh, healthy, sustainable, locally sourced, high-quality food, strategic investments in equipment, research, and infrastructure will develop new capabilities that ensure next-generation production is headquartered in the Finger Lakes region. The region has the opportunity to make its agriculture and food production the best in the world, growing the local industry into a global leader. These benefits will be spread across the food value chain, starting with research from industry and institutions of higher education, through farms and food production companies across the region to retailers and consumers. Agriculture and food production is a growing industry for the Finger Lakes region, making it a high priority target for strategic investment to grow jobs, wealth, and private investment.

Assets and Performance

The Finger Lakes region's food industry draws on its significant natural assets, 1.5 million acres of farmland (21 percent of upstate New York's total), abundant fresh water assets including the adjacent Lake Ontario, and diverse soil resources that produce a wide array of crops, to support a robust industry strong in agriculture, food production, and alcoholic beverages, creating about 19,000 jobs in the region. Consumer demand in the food industry is increasingly emphasizing **fresh, natural, and locally sourced** food. With 120 million people within 500 miles of the Finger Lakes region, the region is well positioned to serve this demand and provide food for New York State and beyond. Today, **the Finger Lakes region has the highest agricultural output of any Upstate region, in both crop production and animal production.** The region's leadership in agriculture includes high production of vegetables, apples, wheat, corn, and the Finger Lakes region has the highest output of Upstate NY regions in several specialized food production domains including wine, yogurt, and canned and frozen goods. These agricultural strengths are spread across the nine county region. For example, New York is the second highest apple producing region in the United States, with Wayne County a high contributor. The region can build off of all these tremendous strengths to continue growing jobs and regional wealth. The food industry has high jobs density, creating about 10 jobs per \$1 million of economic output, and with an average wage of about \$34,000 per year, the industry creates employment opportunities for a **broad spectrum of workers** with varying degrees of training and expertise.

The region is home to many food and beverage production companies including LiDestri Foods, Constellation Brands, Bonduelle, Seneca Foods, and Upstate Milk. There are dozens of other established companies in the Finger Lakes region creating employment and attracting investment, and these **companies plan to invest** in at least 63 documented projects across the region in the

next five years. Companies like Wegmans Food Markets, with 700 employees working in food production and several thousand more in retail, link multiple steps of the food ecosystem. These and other established companies plan to invest over the next five years. This investment **impacts the entire region**, especially more rural counties, where agriculture and food production are major job creators. Beyond this, growth and investment in the Finger Lakes region will support and complement surrounding regions, especially Central New York and the Southern Tier.

The strengths of the Finger Lakes region's food industries **span the food value chain**, beginning with research strengths tied to food, including Cornell's New York State Agricultural Experiment Station (NYSAES) in Geneva, Cornell Cooperative Extension, RIT's Food Processing Industry Cluster Initiative, RIT's Center for Sustainable Packaging, the New York State Pollution Prevention Institute at RIT, and the Wegmans Organic Farm, which form the knowledge-based foundation of the industry. NYSAES translates innovation into economic growth that benefits growers and consumers alike by developing safe, nutritious fruits and vegetables. Through a combination of cutting-edge research and hands-on provision of expertise to local farmers, NYSAES is responsible for new planting systems and increased production throughout New York State. In 2014, the Food Venture Center at NYSAES helped entrepreneurs develop and approve 836 new products, creating 397 new jobs. State investments at NYSAES at facilities including the Fruit and Vegetable Processing Pilot Plant that aids large and small scale processors, a 30,000 square foot greenhouse, 600 acres devoted to fruit and vegetable facilities, a wine analytical lab, and a hops research facility have helped keep the Finger Lakes region's agriculture at the forefront of the changing food industry, and future investment will attract the next generation of food and agriculture researchers.

Customer preferences are shifting in favor of organic products, with national sales growing by more than 20 percent per year. The Finger Lakes region's position as a **center for sustainable, natural agriculture** will help capture significant market share by building on momentum in several areas including Yates County, which leads New York State in organic product sales. With increasing emphasis on sustainable waste management – growing thanks to commercial pressures and state programs such as Cleaner Greener Communities – the biomaterials cluster at Eastman Business Park will grow in parallel with the local food industry. Industrial food production, including technologies like Controlled Environment Agriculture, will continue to flourish in the region as well.

In the dairy industry, a combination of private and state investment has led to significant impact in New York State. New York is the third largest dairy producing state and the largest yogurt producing state, with the **Finger Lakes region producing the most yogurt of any region in the state**. As a most recent example of the region's leadership in yogurt manufacturing, \$10 million in state investment at the Genesee Valley Agri-Business Park attracted new companies including Alpina Foods and Müller Quaker Dairy to the region, spurring \$237 million of private spending, 236 direct jobs, and 456 indirect and induced new jobs anchored in the healthy food revolution.

The Finger Lakes region is a national leader in wine, beer, and distilleries. New York State produces more than half of all East Coast wine, and the Finger Lakes region is responsible for the majority of state production. The **alcoholic beverages industry** supports 2,000 regional jobs, and has **grown nine percent per year** over the past five years. This production involves all nine counties of the Finger Lakes region and continues into the neighboring Southern Tier, helping to link the region with the rest of the state. Wine is a unique asset and a significant growth driver and has the potential to be a signature export industry for the Finger Lakes region.

The wine, beer, and spirits industry also attracts **tourism to the region**. The region has already been recognized for its unique wine assets: *Wine Enthusiast* magazine named it the **top wine destination in the world** this year, and Governor Cuomo hosted his Wine, Beer, Spirits, and Cider summit in the Finger Lakes region in 2014. New York wines are internationally recognized, having won over 700 Gold and above medals in international competitions over the past year. Strong potential exists for the Finger Lakes region to take the lead in wine tourism and attract travelers from cities along the eastern seaboard. The region also has a strong and growing craft brewing cluster. With proper focus, the Finger Lakes region could establish itself as the **center for craft brewing**, a growing and profitable niche industry that would also support the tourism industry.

Connected to expansions in wine and agri-tourism, the **hotel industry is growing** in the Finger Lakes region. Supported by state investment in 2013 and 2014, the \$120 million Canandaigua Lakefront Redevelopment includes two hotel and resort complexes under construction at Canandaigua Lake. Another planned resort and attached casino in Seneca County, the Lago resort, could potentially draw \$420 million of private investment and attract significant tourism to the region. At Keuka Lake, a \$30 million project supported by the CFA process is building a hotel, high-end housing units, and a marina.

Growth in the Agriculture and Food sector drives significant job creation for the broader community. The **Foodlink Food Hub Production Center** provides a model for coordinating employment efforts with investment in the agriculture and food production industry. Foodlink distributes food to a network of human service agencies, helping to provide healthy food in underserved communities. In partnership with local colleges, the project trains workers and prepares them for job placement in the food industry.

Opportunities for Growth

There are critical opportunities to maintain the region's competitive advantage and further strengthen the agricultural food production ecosystem with both targeted strategies specific to the industry and broader strategies aligned to economic enablers. These strategies include **investing in food production sites, increasing availability of capital, fostering further collaboration within the industry, and growing the workforce pipeline**.

Investment to support creation of **agriculture and food business parks** has effectively drawn business to the area. At the Genesee Valley Agri-Business Park, site readiness, site control and capability to move in quickly were essential in securing Müller Quaker's decision to build a \$200 million, 350,000 square foot facility. Investing to create similar shovel-ready sites in other counties could have similar impact (e.g., fruit production in Wayne and Ontario counties, vegetables in Yates county, and other sites in the remaining counties).

Significant growth in demand for natural and organic food products is profoundly changing farming and manufacturing practices, and a shift towards sustainable and locally sourced food is impacting operations and distribution. As next-generation technologies become necessary across agriculture and food production, the cost of capital equipment has increased. Industry leaders have emphasized **challenges accessing capital** to purchase equipment needed to enhance production capability, improve output, and remain competitive.

To help solve this challenge, **larger regional companies** have stepped in, using the strong local ecosystem to **help smaller companies** grow. In 2015, through the Regional Council process, LiDestri acquired High-Pressure Processing (HPP) equipment, the first in New York State, and will operate it at Eastman Business Park. LiDestri has committed about \$10 million of capital, and will make HPP accessible to local food producers, broadly increasing regional productivity by providing access to capital equipment. A broader capital program would amplify the significant positive effects seen so far, and work to further increase collaboration within the ecosystem and improve productivity.

The involvement of LiDestri and Wegmans in helping smaller companies procure capital is part of a broader trend: the **increasing connectivity of the food sector** within the region. Links between the Finger Lakes region's food companies are still developing. The success stories of LiDestri and others point to the significant benefits of increasing these connections: by maintaining a local value chain, companies can work together to align production, decrease costs, and mitigate risk.

Today, the **wine industry** draws tourists to its three wine trails spread across the Finger Lakes region, but could further benefit from increasing connectivity within the sector, such as creating a region-wide marketing campaign. The industry has grown and will continue to do so—but a more uniform strategy crossing marketing and local operations would help make that growth even more pronounced.

Having the right workforce available is a critical element of the food industry and with increasing retirements (an estimated 33 percent of the 15,000 regional agriculture employees will retire in the next 10 years), some risks exist. To preempt these challenges, regional stakeholders have developed policies and programs to continue to foster a healthy workforce pipeline. Monroe Community College offers programs in Agriculture and Food Studies and in Food Management, and Finger Lakes Community College offers a Viticulture and Wine Technology program, the only one of its kind in the Northeast. The College's Viticulture and Wine Center, a fully functioning teaching winery, opened in 2015 with \$3.25 Million in support from New York State. Genesee Community College's Food Processing Technology program is the only one of its kind offered at any of SUNY's 30 community colleges. RIT is leading a workforce development initiative to help bridge the gaps between worker skills sets and job requirements, having trained 418 individuals for jobs and created 73 new jobs with a \$2 million federal investment. Further investments in **training** and efforts to **better connect workers to jobs across the region** (e.g., improving connections between where people live and work) would fill gaps in this resource for companies, and help create viable career opportunities across the community. These issues and proposed solutions are addressed in detail in the Pathways to Prosperity chapter.

Strategies to Achieve Vision

Highlighted Year One initiative:

Year One initiatives are specific, high-impact projects that could be launched immediately after winning the URI.

FLX Foods, an existing consortium of key stakeholders across the agricultural and food production supply chain, helps agricultural and food production companies expand operations and keep on the forefront of innovation. Further investment in the Finger Lakes region's food ecosystem will help spur growth and create jobs. Examples of potential upcoming projects include:

- AquaTerRen, a controlled environment agriculture startup, is planning to build a hydroponic/ recirculating aquaculture facility at Eastman Business Park. The facility will produce fish, organic vegetables, and organic fertilizer using renewable energy from anaerobic biodigestion. This sustainable system would use shared utilities at EBP and would leverage URI funding with a \$250 million private investment, creating 400 jobs.
- NYSAES plans to add a high-pressure processing (HPP) safety testing machine at their facility in Geneva, NY. HPP is a rapidly expanding technology and the machine would be the only Hiperbaric testing machine in the United States – currently, testing is conducted in Canada. This collaboration between New York State, Cornell, LiDestri, Wegmans and others will enhance the ability of NYSAES to be the hub for product safety testing in the US, and will attract food startups and entrepreneurs.
- An Organic Grain Farming Conversion Initiative to help farmers convert to organic grain growing will help position the Finger Lakes region as the organic food capital of the east and will spur further investments by food manufacturers. Organic breads from heritage grains and organic meat using organic grain for feed will be produced from the grain grown in the Finger Lakes region.
- A cross-region wine marketing strategy and campaign, expanding and coalescing existing efforts into a unified plan, would substantially increase tourism to the region.

Highlighted Full Implementation initiatives:

Full Implementation initiatives are projects that would be further refined after winning the URI.

- North American Breweries is proposing an **Eco-Brewery District** that would create a destination for marketing and enhancing the quality and perception of New York State beer. The project entails expanding the Genesee Brew House concept and creating a brewery incubator, beer education center and museum. Working in collaboration with Monroe County Community College, the district would also support workforce development for the beer industry. In addition, the district would be marketed as a tourist attraction that aligns with Greentopia’s EcoDistrict plans for the High Falls district. The project is situated in the El Camino neighborhood and would contribute to its revitalization.
- A **Sustainable Food Production Initiative** will strengthen and expand the food production industry through an applied research strategy around the development of new technology, tools, skill sets, innovations, and information necessary to address the most critical and industry-wide sustainability challenges: those associated with energy, water usage, waste, and overall resilience. A focused effort on sustainable food production will require collaboration between food production companies, research institutions including the New York State Agriculture Experiment Station & Technology Farm (Cornell NYSEAS), the community colleges, and economic development organizations. The initiative would be led by RIT’s Golisano Institute for Sustainability and builds upon its existing Finger Lakes Food Production Cluster Initiative to further increase job and revenue growth in regional food cluster companies. Investments would focus on high-promise, applied research and development opportunities with the potential to drive innovation across large numbers of existing food production firms in the region. For example, the development and deployment of anaerobic digestion, fermentation, and gasification technologies throughout the food production chain offers significant productivity and commercial activity benefits and could lead to substantial private leverage through contributions from private companies that both use and develop these technologies.

3.3 Next Generation Manufacturing and Technology

The two growth pillars described so far, Optics, Photonics, and Imaging, and Agriculture and Food Production were selected from over 1,000 potential industries as the region's most well-established economic strengths. Strategic investments will preserve the region's leadership and keep the Finger Lakes region at the forefront of innovation in these fields.

The third pillar, Next Generation Manufacturing and Technology, follows a focused approach to initially support industries that are great drivers of future growth. Today, these industries are concentrated in the Finger Lakes region within three key innovation hubs: Eastman Business Park (EBP), the Rochester Downtown Innovation Zone, and the Science and Technology Advanced Manufacturing Park (STAMP). Each hub will act as a nexus for growth in industries such as energy innovation, life sciences, nanotechnology, semiconductors, and sustainable manufacturing. As the five year URI investment occurs, these industries will grow in other emerging hotspots, and the Council anticipates URI investment in those evolving areas. The hubs capitalize on a strong track record of growth over the past four years and unify the next generation manufacturing and technology assets throughout the region, including companies, academic institutes, and shared expertise. At Eastman Business Park, the investments will be deployed to attract new tenants within the energy innovation, biomaterials, and agriculture and food production spaces, stimulating further job growth. Within the Downtown Innovation Zone, investments will focus on job creation within IT, photonics, software and new media, and help accelerate the residential, retail and commercial activity already taking place downtown; and within STAMP, URI funding would help attract new tenants and build on \$44 million of committed state support to date.

3.3.1 Eastman Business Park

Thanks to well-timed, targeted state investment recommended by the Finger Lakes REDC, Eastman Business Park is one of the largest, most diverse advanced manufacturing and technology parks in the United States. There are thousands of non-Kodak employees at the Park today, and continuing to invest in attracting businesses will create even more jobs and grow the park into an economic engine for the region.

Vision

Eastman Business Park (EBP), today one of the Finger Lakes region's most important industrial development sites, will be the centerpiece of a broader network of advanced manufacturing cutting across industries such as biomaterials, energy storage, agriculture and next-generation food production, and touch screen applications (functional films). Through this strength, New York State will be a global leader in these fields. Through investments in user facilities and private capital assistance, portions of the 1,200 acres and 2.5 million square feet of industrial space originally built for Kodak will be repurposed to support a large, diverse set of innovative companies.

Assets and Performance

EBP was originally constructed by the Eastman Kodak Company to support research and production of still and motion picture film. The park's abundant space is complemented by physical infrastructure designed to facilitate advanced manufacturing, including a 120-megawatt power plant, water processing and supply, waste treatment, on-site fire and safety, and rail services. For the past four years, Eastman Business Park has been the highest priority project for the Finger Lakes REDC, and this investment has come to fruition. New York State has made substantial investment in EBP's utilities and legacy environment issues, enabling Kodak to continue operating the Park as a landlord to new companies, as well as maintain its film, components, and chemistry operations on-site. Today, there are about sixty tenants and owners at the Park (with the count more than doubling since 2011) employing approximately 5,000 staff including:

- Natcore Technology, a thin-film solar cell manufacturer
- American Fuel Cell, an energy storage manufacturing
- Cerion, an industrial biochemicals and nanomaterials manufacturing company

To support these companies and attract new ones, the site includes facilities and employs experts covering a range of fields:

- Biomaterials: EBP offers the ready access to power, water, treatment, and disposal facilities required to support biomaterials work, with chemicals and testing services available. Companies like Novomer, ATRP, and FermCo are currently on-site with [xx] jobs. The Biosciences Manufacturing Center, a New York State-supported \$30 million project which will open in EBP in 2016, is another new facility expected to add 600 direct jobs to the region.
- Energy storage and innovation: EBP is home of the NY-BEST battery commercialization center, a \$23 million center that opened in 2014 thanks to a \$7 million state investment in battery manufacturing equipment and is supported by a consortium of 150 industry, academic, and government partners. Battery companies including Graphenex and NOHMs are on-site today.

- Agriculture and food production: The easily accessible utilities, waste management, and logistics resources at EBP make it an ideal site for next-generation food production. Several companies, including LiDestri, already operate advanced food production facilities on-site, and EBP has the potential to add many more. AquaTerRen, a salmon farming company, plans to install a fishery at EBP to grow organic salmon, and the waste from AquaTerRen can then be processed and reclaimed by biofermentation facilities at EBP, enabling a sustainable, profitable network of businesses at the Park.
- Functional films: A legacy of the innovation that occurred at Kodak, EBP has multiple roll-to-roll processing, printing, and deposition facilities on site, with Kodak-employed experts to enable facility usage. These technologies are used in applications ranging from displays to solar panels to chemical sensors.

The Park's capabilities, including a \$100M suite of pilot and testing equipment, low-cost lab and office space, and on-site utilities make it highly attractive to companies. EBP is also the proposed home to a new Monroe Community College workforce development initiative that will help provide the skilled workforce required by companies growing at the Park, while contributing to the revitalization of the Rochester community.

These assets link strongly to resources across the community. RIT's Golisano Institute for Sustainability, which houses the NYS Center of Excellence in Sustainable Manufacturing, provides complementary resources for local manufacturing companies by developing innovative technologies for more efficient and sustainable products. Additionally, the New York State-supported Battery Prototyping Center at RIT, a \$1.5 million facility which opened in 2015, gives companies a resource for building prototype pouch-cell batteries – similar to the technology found in cell phones – and testing the batteries in environmental chambers. Once prototyped, the technology can be transferred to the NY-BEST commercialization center at EBP.

The assets at EBP and across the community are already attracting new companies and startups. NOHMs Technologies, a recipient of a \$2 million CFA award in 2012, relocated into Eastman Business Park in 2013 and is expected to create about 100 jobs. NOHMs cited "testing facilities where we can get world class equipment ... that represent millions and millions of dollars that have already been invested by Eastman Kodak" as well as "the availability of a highly skilled and talented workforce."

Opportunities for Growth

The Finger Lakes region's key strengths in the cutting-edge manufacturing industries supported by Eastman Business Park focus on new technology development and prototyping driven primarily by small businesses and innovative startups. As such, for small companies, high capital costs required for prototyping and testing often stand in the way of commercialization efforts. Shared production and testing facilities would help resolve this issue if further deployed within EBP.

The NY-BEST Test and Commercialization Center at EBP makes resources available to companies that help prepare energy storage technologies for commercialization and mass production, including battery testing and performance validation. To continue to build on its success, NY-BEST has identified additional capabilities that would attract additional business to the region. For example, critical safety tests (e.g., battery stability at extreme heat ranges) to comprehensively evaluate

batteries is identified as a need by the battery industry that the BEST test center could help meet. In addition, NY-BEST and Kodak are working to repurpose Kodak production equipment for battery production, and upgrading these equipment could better serve the market. Upgrades would help local companies expand and enhance production.

While enabling startups helps keep the Finger Lakes on the leading edge of technology, attracting large companies would serve as a major driver of new jobs. The assets available at Eastman Business Park make the region very competitive for many chemicals and manufacturing companies, but making capital available to further incentivize companies to move could spur significant economic growth.

Many private companies moving into Eastman Business Park, including Sweetwater, have **committed to hiring at least 10% of their employees from hard-to-place worker populations**, delivering the benefits of economic growth directly to the local community. This commitment and other investments in workforce development, including a partnership with Monroe Community College, will allow community members to take the industrial jobs created by growth at EBP, connecting key industry growth with URI objectives to create private jobs, grow regional wealth, and reduce poverty.

Strategies to Achieve Vision

Highlighted Year One initiative:

Year One initiatives are specific, high-impact projects that could be launched immediately after winning the URI.

With URI support, **Sweetwater Energy's Integrated Biorefinery Project** would invest \$211 million of private capital for a facility at Eastman Business Park to produce concentrated sugars for biofuels and chemicals using the company's patented technology. The project will fund 150 direct jobs and purchase up \$40 million of agriculture product by the fifth year – spending that will stay in the New York State agriculture economy and help develop the agricultural sector's sustainable waste management practices. URI support is critical to ensure that Sweetwater selects Eastman Business Park and New York State as the location for this investment.

Highlighted Full Implementation initiatives:

Full Implementation initiatives are projects that would be further refined after winning the URI.

- Investing in **technology commercialization** in partnership with private companies, following a proven model where the FLREDC facilitates and supports private company-initiated projects with both shared resources and direct support, is expected to be a significant area of funding. Past state support of companies such as NOHMs and the related NY-BEST battery test site have led to substantial economic activity at the park. The Council will continue to pursue these opportunities:
 - Rochester-based nanotechnology company Cerion, the largest independent developer and manufacturer of high performance metal nanoparticles in North America, is in early discussions with several of the world's leading chemical companies to construct the Nanomaterials Commercialization Center (NCC) at EBP. The NCC will focus on solving commercialization and manufacturing challenges where there is existing demand for new and innovative nanomaterials. This would be achieved by recruiting a consortium of global chemical companies and physically

connecting them to the leading nano-manufacturing companies to develop scalable, disruptive nanomaterials. By taking advantage of the current infrastructure at EBP along with Cerion's network of multi-national chemical companies, the NCC will create a state-of-the art, shared R&D facility, sited at EBP, to pool capital costs and allow for a collaborative approach to commercializing nanomaterials that will power over \$3 trillion in global products by 2020. Such a facility would attract significant private investment and would position Rochester as a global leader in nanomaterials commercialization and manufacturing. This facility could create an estimated 100 to 200 direct jobs, with private investment between \$75-125 million.

- Expanding **battery production and testing facilities** at Eastman Business Park. Thanks to capabilities at the Park today, several energy storage innovation companies are expanding operations. The Council is working closely with these companies and with Kodak to determine future avenues to expand operations and attract more companies, such as upgrading EBP's pilot coating facility, adding additional testing capabilities to the NY-BEST test site, and other investments that would include substantial private investment.
- The establishment of the **AIM Photonics Manufacturing Center** at Eastman Business Park's will satisfy the Department of Defense's requirement for security-compliant clean rooms and laboratory space, while simultaneously providing access to the assets and capabilities of EBP. Rochester-led AIM Photonics manufacturing will include sensors, testing, assembly and packaging, and electronic and photonic design. If the facility is sited at EBP, it will occupy approximately 30,000 square feet of space with ample space for expansion, as well as adjacent room for supply chain manufacturers and photonics companies. Providing URI support for these companies would help grow a true photonics industry cluster at EBP, with co-located companies helping each other grow and making Rochester even more attractive for the photonics industry.

3.3.2 Downtown Innovation Zone

Vision

Downtown Rochester is the heart of the Finger Lakes region. URI investments will connect the bright spots in the urban landscape with the rapidly growing downtown area – the thriving Neighborhood of the Arts, historic properties such as the Sibley Building, the expanded Public Market, and many others – into a vibrant core that attracts people to live, work, and play.

The continued development of a Downtown Innovation Zone will catalyze the broader revitalization of the city of Rochester. Over the next five years, the region will initially focus on investing in the revitalization of the Midtown area, beginning with Main Street. The primary goal will be to attract new businesses, create jobs, and spur retail activity thereby increasing the number of people that not only work but also reside downtown. By leveraging assets including research universities, incubation facilities, and recent investments in AIM Photonics which will be headquartered in Rochester, the region will make significant progress over the course of the URI support. The region's investments in downtown will link closely with incentives provided by START-UP NY to focus on sustainable growth. Through helping create new jobs primarily in the IT, photonics, software and new media industries, the URI investment will serve as a vehicle for a longer term transformation that will integrate the Innovation Zone into a broader commercial, retail, and residential ecosystem downtown. Over time, the Innovation Zone will help connect areas along East Avenue towards Alexander Street, linking newer development to existing retail and residential activity and in parallel expanding westward toward the convention and arena facilities, attracting not only new residents, but also new visitors to Rochester.

Assets and Performance

The city of Rochester already has notable assets in place to build upon through the URI support. These include new real estate and mixed-use developments, historic properties, and projects that will further integrate the activity downtown.

More than **\$840 million in real estate development** is currently being invested in downtown Rochester, and approximately 100 growing companies classified as “innovative” or “creative class” have recently located downtown. This number is growing, in part, because of the START-UP NY locations, entrepreneurial and technology commercialization activity driven by the Rochester Institute of Technology and the University of Rochester, and a number of business incubation and entrepreneurial support facilities. With more than \$72 million in state and county support and 250,000 square feet dedicated to START-UP NY activity, Monroe Community College is creating a new campus in the heart of downtown Rochester to foster a collaborative, innovative learning environment that matches the aspirations of students with the needs of the local community.

New mixed-use developments have already begun transforming downtown Rochester: Forty-four downtown commercial buildings are being or have been converted to residential and mixed-use properties and nine new residential projects have been constructed. Residential vacancy rates have fallen to under three percent as downtown’s residential population has nearly doubled to about 6,100 residents since 2000. The population is expected to increase by an additional 40 percent over the next few years. While 48,000 people are working downtown, the health of the office market does not reflect the growing residential market momentum. Price per square foot is especially attractive in

comparison to nearby cities, and office asking rates that remain around \$12 per square foot make Rochester significantly more affordable than either large cities, such as New York at \$47, and mid-sized peer cities, such as Pittsburgh at \$20. A number of keystone real estate projects are already underway, including:

- Tower280: \$59 million redevelopment into nearly 200 residential units with office and retail space in a formerly vacant 17-story office building
- Chase Tower: \$35 million renovation of a former conventional office tower to a mix of 140 residential units, office and retail space
- Alexander Park North: \$25 million construction of over 200 residential units along with first floor retail and commercial office space surrounding an interior court yard

Historic Midtown properties including the Sibley Building and 40 Franklin Street will provide a cornerstone for the Innovation Zone, anchoring a critical mass of businesses and residents. Covering a full block and containing more than one million square feet, the Sibley Building is undergoing a comprehensive \$200 million restoration, with over \$23 million committed from New York State, that will transform the largest building in Monroe County into a mix of office and retail space, affordable and market-rate apartments, an outdoor roof terrace, an urban farmers' market, and underground parking. The renovated Sibley Building will house the High Tech Rochester's Finger Lakes Business Accelerator Cooperative, a comprehensive incubation and business support facility that is expected to foster 100 new tech startups and create 1,000 new direct jobs over the next five years. RIT's downtown facility at 40 Franklin Street, a 47,000 square foot building that formerly housed the Rochester Savings Bank, is the new home of RIT's Center for Urban Entrepreneurship, which builds community wealth by facilitating growth for local businesses. RIT also is renovating 40 Franklin Street facilities to house startups, and Rochester's first START-UP NY company, Datto, has already moved into the site. Midtown Rising is a redevelopment partnership of a nine acre site in Rochester's city center that will provide amenities to attract a critical mass of residents. Once completed, the site will accommodate approximately one million square feet of office, residential, hotel, and retail space. Private developers are transforming the area through partnership with Empire State Development, which has invested \$55 million, and the City of Rochester, which has invested \$20 million.

The development of the **Inner Loop** is connecting vibrant activity in Rochester's East End with the rest of the city. With nearly \$25 million in investment from New York State along with the US Department of Transportation and the City of Rochester, the development is filling in eight lanes of below-grade and underutilized beltway, creating a boulevard with wide sidewalks and dedicated bicycle lanes, making Rochester a more walkable, livable city. In addition to improving traffic safety, the Inner Loop is promoting further development by opening approximately six acres of developable land with the potential for 800,000 square feet of commercial and residential development adjacent to an area that offers lively dining, entertainment, and nightlife.

Opportunities for Growth

Leading urban transformation examples from cities including Los Angeles, St. Louis, Philadelphia, and Pittsburgh serve as best practice models for Rochester. These examples point to a set of common prerequisites that help spur job creation within the urban core. These prerequisites include improving safety and security in order to draw in more businesses and real estate investments,

incentivizing and attracting further commercial and retail activity, and improving common and neighborhood infrastructure.

Developers and businesses cite safety and parking availability as common barriers to locating to downtown Rochester. Increasing safety efforts as well as developing amenities such as well-lit streets, revitalized abandoned properties, and improved parking facilities, would serve as a starting point for more businesses to locate within the Innovation Zone. Expanding programs such as START-UP NY to include broader parts of the Sibley Building and other key developments in the area as well as developing similar incentive structures for sales tax abatement would attract new tenants. Downtown currently has a few large anchor tenants including Xerox and Windstream, but has room to attract more. Attracting a critical mass to target properties will be crucial for driving demand for services and attracting more new businesses to the area.

Leading examples also point to the need to concentrate revitalization efforts in a narrowly focused geographic and industry area. Cortex Innovation Community in St. Louis, a bioscience and technology innovation district with close parallels to Rochester, is the result of a focused and carefully managed effort over more than 15 years to attract new businesses and large anchor tenants. Maintaining the focus on the Sibley Building and its immediate surroundings, exploring brownfield developments when possible and integrating new tenants and developments into a coherent strategy will not only yield positive results in a short time frame but also be critical to the long term success of the Innovation Zone.

Strategies to Achieve Vision

Highlighted Year One initiative:

Year One initiatives are specific, high-impact projects that could be launched immediately after winning the URI.

The **Rochester Regional Fund** will bring together public and private stakeholders in an effort to provide resources for development and capital improvements for key downtown assets. A group of elected officials including the Mayor and the County Executive, along with key real estate developers, and representatives of community development, planning, and municipal organizations, would facilitate the application and scoring process. Eligible projects would primarily facilitate job creation, business development and attraction, and revitalization of common and neighborhood infrastructure. Projects could potentially include:

- Developing an **Innovation Zone Master Plan**, potentially including hiring a leading urban planner and marketing the Innovation Zone to prospective tenants
- **Light up Rochester**, an initiative to create a greater sense of security in downtown Rochester and increase foot traffic in and around the Innovation Zone through investments in additional inexpensive parking, improved street lighting, and accelerating building and approval processes
- Improving speed of broadband internet for businesses downtown, and ensuring access to broadband internet throughout the community, especially in lower incomes areas, by providing additional resources and support for New NY Broadband
- Incentives for new or expanding businesses to locate downtown alongside key enterprises, potentially including tax abatements, START-UP NY status, or other incentive packages
- Revitalization of common and neighborhood infrastructure within and around the Innovation Zone, potentially including removing abandoned buildings, developing green

space, installing public art, and updating municipal infrastructure including the Broad Street Aqueduct and the Joseph A. Floreano Rochester Riverside Convention Center

Highlighted Full Implementation initiatives:

Full Implementation initiatives are projects that would be further refined after winning the URI, including clarifying final investment and timing.

- The redevelopment of the **Inner Loop** roadway, which will help reconnect communities previously split by traffic, will create substantial land downtown available for renovation. The City of Rochester is soliciting proposals for eastside land use, which include potential office construction, living spaces, and parks. URI funding could be used to attract high-impact private investment for development in this new space as well as create future opportunities for inner loop development on the north side.

3.3.3 Science and Technology Advanced Manufacturing Park (STAMP)

Vision

Thanks to state investment, STAMP has been developed into a site ready to attract large, high-investment tenants. Further investment will build on and go beyond the current level of development. Specifically, strategic, targeted URI investment will make the site ready for more, larger tenants, unlocking thousands of jobs and driving growth in the Finger Lakes region and the Western New York region.

The Finger Lakes region will host a large, commercially successful semiconductor and nanoscale production mega-site as the centerpiece of a broader, cross-regional nanotechnology and advanced manufacturing cluster. A growing semiconductor/nano network is developing across New York State along the I-90 corridor, and STAMP is well-positioned to capture significant market share from the massive private investment available – winning against global competitors – in these new, advanced manufacturing industries.

Assets and Performance

STAMP, the Science and Technology Advanced Manufacturing Park, in Genesee County is a 1,250-acre greenfield production site designed to attract multiple, large manufacturing facilities.

The site's location was designed from the ground up to maximize attractiveness to companies:

- Direct access to high-capacity utilities, including low-cost power via the New York Hydro-Power zone, connections to the Empire gas pipeline, and planned installation of high-capacity water and sewer facilities
- Connection to Buffalo and Rochester workforces, with a combined population of 2.1 million
- Access to a well-trained workforce from the 57 nearby colleges with 17,500 enrolled engineering students such as RIT's Microsystems engineering degree, and complementary degrees (e.g., AAS in Nanotechnology) at local community colleges
- Very large, nearly shovel-ready mega-site (1,250 acres) able to attract a diverse portfolio of large companies including nano, semiconductors, displays/imaging, photovoltaics, bio-manufacturing, and others.

STAMP's attractiveness to developers has been validated by industry, with multiple potential tenants in discussions to relocate there. The transformative STAMP project is among the highest priorities for the Finger Lakes Regional Economic Development Council.

The Finger Lakes region and New York State have made a substantial investment in developing the STAMP mega-site, with \$11.4 million spent to date. An additional \$33 million was allocated in the 2014-15 State budget and re-appropriated in the 2015-16 State budget. State support is critical to ensure this site has the right infrastructure in place to compete with regions across the world vying for multi-billion dollar projects. The site is not yet shovel-ready for additional projects, and further investment would enable new companies to quickly move in.

This strong asset serves as the center of a broader semiconductor and nanoscale manufacturing network. The RIT Microelectronics Engineering program was the country's first undergraduate

program specializing in semiconductor fabrication, and now graduates about 30 students per year. Complementary research at labs such as the Semiconductor and Microsystems Fabrication Lab and the Center for Electronics Manufacturing Assembly at RIT, along with URnano at the University of Rochester, makes the region a center for development and innovation. All these programs link with related workforce development degree programs at Monroe and Genesee Community College.

Opportunities for Growth

STAMP is in discussions with potential anchor tenants, but the site requires additional investment to attract this private capital and allow companies to move into the site. At the Genesee Valley Agri-Business Park, support from New York State was instrumental to attracting Müller Quaker Dairy, which indicated that a major driver of their decision to locate in the region was state support that enabled a short turn-around time to becoming operational. The Ag Park is now at full capacity. A similar achievement at STAMP, bringing the site to full capacity, would draw 8,500 to 26,500 jobs to the area depending on industry.

Strategies to Achieve Vision

Highlighted Year One initiative:

Year One initiatives are specific, high-impact projects that could be launched immediately after winning the URI.

Project Eagle is an upcoming major project in STAMP that will leverage committed state support to induce \$705 million in private investment, creating 1,000 direct jobs. Specific details are confidential, but Project Eagle is a photovoltaics manufacturing site that will leverage the capabilities available at STAMP and the talented workforce in the region, and will be the first of many major manufacturers at STAMP.

Highlighted Full Implementation initiatives:

Full Implementation initiatives are projects that would be further refined after winning the URI, including identifying private sector partners and clarifying investment and timing.

- Active discussions are underway at STAMP with four additional companies that may locate at the site. These nanoscale manufacturing companies have the potential to attract substantial private investment and create thousands of jobs, but require support from the URI to ensure that STAMP is the most attractive site among global competitors. Projects in the pipeline include private investments ranging from \$100 million to \$3 billion. Based on expected success rate among these projects, the Council expects to attract at least \$1.5 billion in private investment, creating 1,460 direct jobs in the next five years.

3.3.4 Emerging Advanced Manufacturing Technology

Eastman Business Park, the Downtown Innovation Zone, and STAMP have become nexuses for emerging industries in the Finger Lakes region. As these hubs represent locations where the region is most poised for growth, they will be the initial focus of the URI investment. However, as the region's economy continues to transform and grow, new industries will emerge, with strengths spread across the region. Industries including sustainable technologies, additive manufacturing, and life sciences are becoming increasingly important to the region thanks to local strengths and state support. As these industries continue to evolve, the Council will identify potential new technologies for innovation across the entire Finger Lakes region where URI investment could have the greatest impact. For example, the City of Batavia and the City of Geneva are working with stakeholders involved in planning the Rochester Downtown Innovation Zone to create similar areas in their cities focused on the entrepreneurial activities in agriculture and food production industries. Areas like these will be considered for future URI investments if appropriate.

4 Key Enablers

In order to achieve transformative economic development, the region must have the right set of talent and processes in place to support growth in key industries. Rapidly changing industries also require many powerful community assets, including a dynamic workforce pipeline, support for business expansion, and institutions driving industry innovation. Rochester and the Finger Lakes region already have people and organizations working tirelessly to advance economic development. The Council has identified a set of further enablers that, through URI investment, will allow the region to achieve transformative growth both through targeted support for key industries and broader efforts to robustly develop the economy.

4.1 Pathways to Prosperity: Workforce Development

The URI is a once-in-a-lifetime opportunity to transform the economy of the Finger Lakes region and establish leadership in several key industries. By investing in workforce development, the region can supply the job demand from growing pillar industries and ensure all members of the community share in this success, fulfilling the challenge of Governor Cuomo's Anti-Poverty Initiative to make the promise of economic mobility a reality.

Vision

Guided by the efforts of the Rochester-Monroe Anti-Poverty Initiative (RMAPI), the Finger Lakes region is committed to reducing poverty and providing opportunities for success through targeted education and training efforts that directly link to employment. At the core of this approach is the relationship between education, employment, and poverty. The unemployment rate in Rochester for those without a high school diploma is 23 percent, over five times higher than for college graduates. The consequences of this lack of educational attainment follow residents into adulthood, magnifying their economic and community impact.

For achievable, sustainable impact through the URI, the region will focus on efforts that will make a step change in **improving high school graduation rates, increasing college and employment readiness, reducing unemployment, and reducing poverty**. These efforts will be critical in facilitating key regional industries including food production and advanced manufacturing by providing the region's employers with the dynamically skilled workforce they need to support growth.

To maximize impact, the region will take a **results-based portfolio approach by scaling successful efforts and conditionally supporting new ideas** based on results, participants, and funding. The URI presents an opportunity to catalyze these efforts by providing a portion of the resources needed to create partnerships and coordinate efforts among key stakeholders. RMAPI, a partner whose efforts the Finger Lakes Regional Economic Development Council endorses and supports, will be critical in this process.

To focus these efforts where they are needed most, the Finger Lakes region will target distinct hard-to-place populations. For **high school students at risk of not graduating**, efforts will scale successful early intervention programs that improve graduation rates, increase readiness, and expand

access to employment opportunities by providing mentorship and connections to first jobs. For **the working poor and the unemployed**, efforts will provide industry demand driven skills training and direct job placement, further removing barriers to maintaining employment through coordination with RMAPI. For **veterans**, efforts will support integration into the community, including targeted job training and placement.

Assets and Performance

The Finger Lakes region has a strong legacy of collaboration and a key set of assets on which to build, including organizations that specifically serve hard-to-place populations, the commitment of employers, and the involvement of community members.

To **improve high school graduation rates as well as college and employment readiness**, the Finger Lakes region will build upon initiatives that have already demonstrated success, and have the potential to scale up throughout the region with targeted support, including **Hillside Work-Scholarship Connection**. Hillside currently enrolls over 2,300 students and its partners have employed over 400 high school graduates so far this year. In its 28-year history, Hillside has successfully improved retention and graduation rates for high-risk students enrolled in the Rochester City School District through the provision of social and academic support systems, including school-based professional youth advocates, job training and placement, and job site mentoring. The region also will conditionally support the development of newer programs including the **Educational Partnership Organization** established at East High School by the University of Rochester, which aims to double the graduation rate from 42 percent to 84 percent over a seven year period. Another innovative high school program, **P-TECH Rochester**, is a six year "9-14" program where students are matched with a business mentor, take college classes, and gain professional work experience. Launched in Rochester in the fall of 2014 and serving approximately 600 students at full enrollment, graduates earn both a New York State Regents diploma and an associate's degree from Monroe Community College. The model has received both state and national attention through President Obama's 2013 State of the Union Address and Governor Cuomo's commitments to expand the program across New York State. Regional universities are also making commitments to improve college enrollment from the city of Rochester through programs including RIT's City Scholars and the University of Rochester's Rochester Promise, programs which provide free tuition to qualified graduates of the Rochester City School District.

The **FLREDC Workforce Development Work Group** has demonstrated remarkable success in implementing advances in **reducing unemployment** through education, training, and placement. The work group has been meeting on a weekly basis for the past two years with 54 members representing 39 different organizations including high schools, colleges, employers, charitable foundations, non-profits, organized labor, veterans, and government. Its results-oriented approach has focused on creating access to meaningful long-term employment for both student populations and adult learners. The work group exceeded their annual job placement goal last year by placing over 350 individuals including veterans and Hillside students with jobs in high demand areas such as advanced manufacturing.

The Finger Lakes region is committed to providing specialized education and training opportunities for hard-to-place worker populations, including the **deaf and hard-of-hearing**. There are an estimated 43,000 deaf and hard-of-hearing individuals in the greater Rochester area, and at 3.7 percent of residents, Rochester has the largest deaf and hard-of-hearing per capita population in the

country among those ages 18 to 64. However, the percentage of deaf and hard-of-hearing 18- to 25-year-olds attending postsecondary education, 61 percent, is almost double the national average, and the region has seen tremendous success in **reducing poverty and unemployment** for this population. This is in large part due to RIT's National Technical Institute for the Deaf (NTID), which is among the leading research and training institutions of its kind. With more than 1,200 students and 100 faculty and staff who are deaf or hard-of-hearing, RIT has the largest staff of professional sign language interpreters of any college program in the world. NTID also is exceptional for its commitment to job placement, making the Institute a valuable resource for the hard-to-place worker community.

In its efforts to **reduce unemployment** through targeted job training, the Finger Lakes region works with a robust network of **community colleges**: Monroe Community College (MCC), Finger Lakes Community College, and Genesee Community College. A nationally recognized leader in workforce training, MCC is ranked in the top two percent of US community colleges for most associate degrees awarded, and the MCC-educated workforce adds approximately \$510 million in income to Monroe County each year. In 2014, MCC worked with more than 170 employers and organizations in the public and private sectors to provide targeted workforce training throughout the Finger Lakes region. MCC's **SkillBuild** educates young adults about in-demand careers in advanced manufacturing, health care and the skilled trade. With investment to expand capacity, the program could annually serve over 2,000 students in the region. MCC's **Bridges** program is an innovative educational outreach effort to extend a skill-based career pathway to disadvantaged and underrepresented populations within Rochester's urban center. The program will establish a network of accelerated college remediation programs in partnership with the City of Rochester, Veterans Outreach Center, Ibero-American Action League, and other community colleges and organizations.

Box 1: A Unique Asset: Rochester-Monroe Anti-Poverty Initiative

The Finger Lakes region URI application has the advantage of incorporating the efforts of the Rochester-Monroe Anti-Poverty Initiative (RMAPI), an initiative unique to Rochester and spearheaded by Governor Cuomo, which seeks to **reduce poverty** by transforming systems, programs, and policies in a coordinated, sustainable manner. RMAPI is collaborating with several members of the URI Steering Committee and the FLREDC Workforce Development Workgroup to ensure clear channels of communication and synergy. Success in Rochester is of particular importance as it has the potential to be replicated elsewhere, providing a scalable model for implementation in other cities throughout New York State.

RMAPI seeks to reduce poverty, and is unique among other initiatives for its practical, collaborative approach: aiming for a coordinated system overhaul, following a data-driven approach, and leveraging participation from community members in poverty. While many poverty alleviation efforts focus on isolated, downstream solutions, RMAPI presents a novel approach by bringing together service providers with the populations they serve. In addition to RMAPI's integrated systems and community approach, two critical factors, structural racism and the effects of past and present trauma, have been explicitly called out to be included in the design principles. All recommendations and implementation plans will be assessed against these two factors to ensure that they are deliberately addressed.

RMAPI has **formed a work group for each of the eight key drivers of poverty**, tasked with the following objectives:

- Identifying and prioritizing key barriers and challenges that keep people in poverty
- Creating recommendations to counter the highest impact barriers for each driver
- Identifying current assets and initiatives that can be leveraged in support of the recommendations
- Identifying the resources required and obstacles that need to be removed at the state and local level in order to implement these recommendations
- Establishing key measures for determining success

RMAPI's commitment to participation is reflected in the structure of the work groups: each group has 25 members, including local providers, subject experts, and at least five community members who are currently affected by poverty. RMAPI also gains insight from members of the community and affected families, through one-on-one interviews, focus group discussions, neighborhood meetings, community input forums, and a survey (with nearly 800 responses, more than 300 of which were determined to come from respondents currently in poverty) as well as engaging community members to help determine the criteria used to rank and prioritize recommendations.

RMAPI has used a data-driven approach to identify and target the population affected by poverty, particularly the working poor. The demographic profile of significant sub-populations will be a key determinant in terms of which recommendations are critical for the first phase of this initiative. RMAPI is further committed to measuring and being accountable for improved outcomes by setting and tracking success metrics for solutions coming from the work groups.

To coordinate the solutions emerging from the work groups and provide a sustainable framework for eliminating poverty in the long term, RMAPI has established a systems design team that brings together community stakeholders from the business, government, education, and non-profit sectors to address how to affect the major program and policy shifts that will enable broadly implementable solutions. The support and coordination of the State will be critical to the success of this work. The State Task Force, appointed by the Governor, will leverage State resources for Rochester's work, while local efforts will be led by Assembly Majority Leader Joseph Morelle, Mayor Lovely Warren, County Executive Maggie Brooks, and convened by the United Way of Greater Rochester. In addition to other community members who sit on the board, RMAPI has hired three full time staff members to drive the initiative.

Preliminary Recommendations

The **eight work groups developed 32 recommendations** that are now being assessed across the agreed criteria to build a phased implementation plan. The first phase of the plan will address the needs of the working poor to help them move from and stay out of poverty. These recommendations are coalescing into several overarching objectives and recognize the need to address the two critical underlying issues that keep many individuals and families on the poverty treadmill; specifically structural racism and the effects of past and present trauma.

Given the complexity and breadth of these issues, the final report will take an 'and/both' approach to contain specific recommendations on each one, as well as a design principle that all recommendations be screened for their efficacy in addressing both issues.

Another common issue across all work groups is the lack of coordination, integration or alignment across the system of social supports (including infrastructure, policies and regulations). Silos across government agencies, non-profit providers and community support structures (e.g., faith and neighborhood communities) inhibit awareness, accessibility, eligibility and participation in the patchwork of services and programs needed to enable economic mobility and the move out of poverty. One of the first barriers to overcome is the lack of a central data repository able to present a 360 degree view of both the services/support received and the results and outcomes of those services.

Phase 1 recommendations will include several components to address this barrier:

- Single point of access and consistent professional mentoring / ability to link persons affected by poverty to needed or expert resources.
- Centralized data-base to enable 360 degree view of needs, services and results for persons impacted by poverty/moving out of poverty.
- Prioritized plan of attack for most critical areas of alignment and coordination (e.g. childcare and other benefit reduction versus salary increase).
- Flexibility and localized decision ability to make existing and additional future benefits/funds responsive to individual and unique circumstances.

Although the work to develop the interim report and definitive recommendations for the RMAPI plan is still in progress, it shares some overlapping objectives with URI, especially the Pathways to Prosperity enabler. These overlaps are:

- Ensuring effective pipelines are in place between training/credentialing programs for living wage jobs (both in secondary education and adult educational opportunities).
- Connecting the working poor with effective mentoring services to successfully navigate the continuous barriers to stable employment that arise for persons emerging from poverty
- Improving the accessibility and affordability of childcare and transportation – two of the critical enablers to stable employment
- Improving accessibility and cultural relevance of many social and health supports by locating them in ‘Neighborhood Centers’ and employing neighborhood residents

Preliminary Proposed Funding Model and Coordination with the Upstate Revitalization Initiative

A critical element of success for the RMAPI recommendations is having a sustainable funding mechanism. While the funding model is still a work in progress, the proposed approach relies on a combination of state and private support. Given the strong intersections with the Pathways to Prosperity enabler, select RMAPI recommendations could be funded through URI investment, while others will rely on funding specific to RMAPI. In both instances, and across the initiatives, efforts will be made to galvanize private funding in support of proposed recommendations. Private funding is expected to come in the form of donations, private foundation matches, and other sources.

As RMAPI continues to refine and update its recommendations, leadership will ensure that initiatives closely aligned with URI efforts are well coordinated to ensure implementation and avoid duplication. To facilitate this collaboration, the proposed governance of the URI Pathways to Prosperity enabler includes dedicated representation from RMAPI.

Opportunities for Growth

The URI presents a significant opportunity to build on existing assets, and targeted investment will follow a portfolio approach by scaling successful efforts and conditionally supporting new initiatives. Rochester has long endured some of the lowest **high school graduation rates** in the country and only five percent of Rochester City School District graduates are deemed ready for college or employment upon graduation. Substantially lower employment and earnings lead to greater poverty levels, greater reliance on public services, and poorer health outcomes. Most adults affected by poverty with limited education are concentrated in high poverty areas across the region, many of which are in and around Rochester. Because the employment opportunity set is highly limited for those without a high school diploma, it is critical to provide early interventions to improve high school graduation rates. Scaling successful initiatives to provide mentorship and connections to first jobs will make a significant outside-in impact on improving graduation rates.

Reducing unemployment will require **closing the growing skills gap**, as employers in growing industries increasingly look for workers with specialized training. Of the region's more than 10,000 yearly job openings that pay a minimum of \$30,000, 87 percent require training or a degree beyond high school. Half of these jobs require mid level skills and an associate's degree, post-secondary education, or commensurate training, rather than a bachelor's degree. To maximize benefit to the regional economy and reduce unemployment, workforce development efforts must be **connected to key industry growth**. New programs will focus on industries identified as growth pillars for the URI. To sustainably close the skills gap, the region requires URI support to scale successful training programs and develop infrastructure for matching workers directly with relevant employment. Growth in the agricultural and food industries will require greater numbers of workers throughout the Finger Lakes region, and many occupations in these industries provide ideal entry level employment opportunities for those with limited training, and enable workers to create value on their first day. An aging population also is contributing to gaps between industry demand and the available workforce in key industries. Notably, manufacturing is expected to lose almost a quarter of its workforce, more than 8,500 workers, to retirement in the next decade. Targeting training programs to younger workers provides an opportunity to make growth in these industries more sustainable. Training institutions are working to better match skills supply and demand by improving ties to industry through efforts such as co-designing training, establishing apprenticeship programs, and developing feeder models between community colleges and employers. Developed in partnership with local businesses, Finger Lakes Community College's Accelerated Mechatronics Technology Program is a 12-week program that bridges the skills gap by teaching students technical math, mechanical fundamentals, electrical schematics, and other skills needed to fill open positions in regional advanced manufacturing companies. MCC, in partnership with the Rochester Technology and Manufacturing Association, launched a 22-week, accelerated precision machining program that has successfully completed three cohorts averaging over 90% job placement. MCC is further leading a \$14.6 million SUNY grant through the United States Department of Labor to optimize the advanced manufacturing and workforce readiness curriculum to accelerate even more programs throughout the region.

Strategies to Achieve Vision

The FLREDC has identified a set of initiatives below that speak to the capacity of Rochester and the Finger Lakes region to provide support to its residents and move those in need on the pathways to prosperity. The funding and implementation of these initiatives will be coordinated between the FLREDC and RMAPI as RMAPI continues its work and finalizes its recommendations to reduce poverty.

Highlighted Year One initiative:

Year One initiatives are specific, high-impact projects that could be launched immediately after winning the URI.

Finger Lakes Workforce Development Center (FWD Center), a partnership between MCC and Eastman Business Park, will design a comprehensive training complex that serves as a regional industrial training facility to local businesses in high-growth industries. MCC will partner with employers to offer short-cycle non-credit industry training for skilled production workers in basic manufacturing skills. The Center will also serve veterans who require support for reintegration into the workforce. Over five years, FWD Center is expected to train over 2,300 workers and add \$90 million in economic impact, mostly from worker salaries and increased supply chain value.

Highlighted Full Implementation initiatives:

Full Implementation initiatives are projects that would be further refined after winning the URI, including clarifying final investment and timing.

RMAPI Coordinated System

- As described earlier, the URI will include initiatives to directly address poverty by developing a coordinated, integrated system of support services for those in need.

Improving High School Graduation Rates

- **Hillside Work-Scholarship Connection** has seen great success in Rochester, where 77 percent of Hillside students who stay in the program graduated from high school, and 93 percent employed with job partners graduated, compared with the average graduation rate of 45.5 percent. By age 30, the difference in the earned income of program participants compared to nonparticipants exceeds program costs by 40 percent. Hillside currently operates in 21 sites within the Rochester City School District and Greece Central School District, and an investment would enable Hillside to expand annual enrollment from 2300 to 4300 students.

Targeting Hard-to-Place Workers

- **The Ex-Offender Job Training and Placement and Support Services Program** led by the City of Rochester Innovation team, and building on programs that have succeeded at increasing placement in other states, will fund workforce development for ex-offenders: job training and placement services for hard-to-place workers. The program also will focus on support services that address potential obstacles for successful job training and placement such as transportation, housing, childcare, and mental health. Rochester employs only 25%

of the post-incarcerated population with 5,000 annually released from Monroe County Jail. An estimated 21,000 city residents will go to state or federal prison in their lifetime. Services will be provided evenly over the five years of operation to at least 200 ex-offenders per year, anticipating at least 5 percentage point increase in employment and 10 percent reduction in recidivism.

- **Helping Local Employers Hire from the Working Poor** will assist local employers to commit at least 10% of their hiring to the working poor. The program complements a similar initiative proposed for Eastman Business Park, which is already achieving results with proposed investments from companies such as Sweetwater. Helping Local Employers Hire from the Working Poor will assist employers to claim state incentives and provide HR services to assist hiring for jobs that do not require background checks. The solution will evaluate and fund two services:
 - Provide local businesses with an HR service to simplify receiving state reimbursements for hiring people living in poverty sourced through designated training organizations without screening or background checks
 - Select and fund consulting services with experience in “no screen” hiring and business administration to assist with on boarding and retaining non-screened employees.

Initial funding would allow testing both program services. The expected outcome is to enable at least 200 jobs and create economic leverage of 1:12 (\$18.5 million of wages reinvested into the community and \$5.5 million saved on state and local services).

4.2 Entrepreneurship and Development

Vision

Small businesses are increasingly fundamental to the Finger Lakes region's economy. Through strategic investments ensuring access to capital, facilities, and support, the region will catalyze growth across sectors targeted by the URI.

The Finger Lakes region will develop a robust entrepreneurship ecosystem that captures the region's entrepreneurial potential and supports the growth of key pillar industries. With a legacy of innovation and a collection of university assets including research commercialization and incubation facilities, the region will foster the growth of new businesses and promote expansion of existing ones. More specifically, the region will help accelerate growth and expansion within priority industries including photonics, agriculture, food production, energy, and additive and sustainable manufacturing. For these industries, efforts will focus on improving access to capital, equipment, and testing and commercialization facilities in order to offset cost and capital barriers for smaller businesses. In parallel, and through the development of the Downtown Innovation Zone, efforts also will focus on growing entrepreneurial activity, retaining the region's university graduates, and focusing on startup growth in the City of Rochester as well as the outlying counties.

Assets and Performance

Despite the downsizing of Kodak, the region's patent leader for decades, the Finger Lakes region has greatly increased its **patent development**, outpacing state and national benchmarks: for every 10,000 workers, the Finger Lakes region produces 30 patents, exceeding the upstate New York average of 19 and national average of 12.

Embedded within its universities and startup community, Rochester has a wealth of assets to support the region's **business incubation and acceleration** efforts. Organizations including RIT Venture Creations, the High Tech Rochester incubator, RIT's Center for Urban Entrepreneurship, Excell Partners, and others play a pivotal role not only in incubating and supporting regional businesses, but also in driving the development of the downtown Innovation Zone. These entities have a track record of success in targeting, incubating, and funding emerging businesses that either go on to be acquired by leading national companies or continue to grow and expand their footprint in the Finger Lakes region.

RIT Venture Creations, part of RIT's START-UP NY campus plan, is an incubator for mid-seed stage companies, providing them with experienced mentors and connections with investors. Entrepreneurial students and faculty have access to RIT's world class research and testing facilities. Venture Creations has graduated five to seven companies per year since 2010. As of June 2015, over 400 people are employed in current tenants and graduate companies, including Vnomics, recognized in 2014 by the Rochester Business Alliance as the second-fastest growing privately held company.

High Tech Rochester (HTR), an affiliate of the University of Rochester, is a nonprofit whose mission is to be a catalyst for entrepreneurship and innovation-based economic development by applying business expertise and network connections to aid in the formation and profitable growth of companies in the Finger Lakes region. HTR is sponsoring the Business Accelerator Cooperative located in the Sibley Building that is expected to create 1,000 new jobs in the first five years of

operation. The University of Rochester operates a student incubator based at HTR that advances student-run businesses through a collaborative, interdisciplinary environment and interaction with mentors and local entrepreneurs. The incubator will be moving to the Sibley Building in downtown Rochester along with HTR when it relocates in 2016. UR's Kauffman Entrepreneurial Year also provides a fifth tuition-free year for selected students to pursue an entrepreneurial endeavor.

RIT's Center for Urban Entrepreneurship (CUE) is helping reshape the regional economy and build wealth within the urban community by ensuring anyone with the passion to create a business or social venture has the opportunity to reach his or her entrepreneurial goals. CUE aims to empower urban entrepreneurs and develop a pipeline of local businesses that can further grow and support the development of the regional economy. Through the Capacity Building program, CUE has stimulated growth in 10 local businesses by providing mentors and workshops for a nominal fee to urban entrepreneurs who have been in business for at least a year.

Excell Partners, a Rochester-based fund that invests in seed and early stage high-tech startups, has successfully funded 43 companies that have created more than 200 jobs with average salaries over \$60,000. Earlier this year, Governor Cuomo announced that Excell was selected to manage a \$2 million Minority and Women Owned Business Enterprises (MWBE) Investment Fund that will make seed and pre-seed investments in startups with a focus on the fields of advanced materials, clean technology, life sciences and medical devices, increasing opportunities for minority and women owned businesses throughout New York State. Excell also was selected as a participant in the New York State Innovation Venture Capital Fund and Innovate NY Fund investment programs.

Finally, while much of this entrepreneurship activity is tied to downtown Rochester and the two large university players, efforts are underway to **incorporate the entire nine county region** into the broader ecosystem that links closely with these programs and with state initiatives like START-UP NY. HTR's Hub and Node Network with partner node facilities throughout all nine counties will create an entrepreneur ecosystem that shares support services among members and the entrepreneurship community. This program would provide services to new startup growth companies housed within the HTR Accelerator facility and services to hundreds of companies that interact with the Accelerator Cooperative. At the moment, the Accelerator offers video conferencing connectivity to all nine counties, allowing the region to tap into and share best practices.

Opportunities for Growth

Despite the abundance of intellectual capital generated throughout the Finger Lakes region, lack of **access to capital** prevents the development of a burgeoning startup scene, as entrepreneurs and businesses struggle to expand business in the region. The Finger Lakes region annually receives over \$350 million in research and development expenditures, 22 percent of total Upstate New York expenditures, but receives only a small fraction of its venture capital. In Rochester, Excell has leveraged over \$120 million from \$3.6 million in investment, demonstrating the promise of regional investment and the necessity of scaling up funding operations. While Excell's success is notable, access to capital at the later revenue stage often poses a challenge for companies. Creating a funding support model that acts as a funnel and ensures access to capital throughout the startup life cycle would ensure that more entrepreneurial activity is both generated and retained within the region. This model will connect both startups and entrepreneurs to private capital, and to supporting programs like the newly created New York Ventures initiative.

Strategies to Achieve Vision

Highlighted Year One initiative:

Year One initiatives are specific, high-impact projects that could be launched immediately after winning the URI.

The Finger Lakes Venture Fund will provide critically necessary capital to startups and small businesses. Current venture fund entities see hundreds of funding applications per year, and lack the capacity to fund all high-potential projects, leaving innovation and economic growth on the table. By leveraging URI funding to raise a \$35 million total venture fund, the new entity will have the capacity to fund 10-12 high potential Series A investments of \$2-3 million and 10-15 seed investments of \$200-300 thousand per company. The fund will take advantage of existing community expertise, including Excell Partners' nine year history successfully managing a seed stage venture fund in the region.

Highlighted Full Implementation initiatives:

Full Implementation initiatives are projects that would be further refined after winning the URI, including clarifying final investment and timing.

- Building out an **Urban Entrepreneurship Ecosystem** will catalyze job growth and community wealth building by providing urban entrepreneurs with the support services they need to create and sustain successful business ventures. The revitalization of Rochester's urban core will increase demand for "main street services" for new residents and institutions including food service, landscaping, and printing operations. Fostering the creation of small, local businesses will both meet this demand and support upward mobility for many Rochester residents. To provide a comprehensive network of entrepreneurial resources, RIT's Center for Urban Entrepreneurship will coordinate partnerships among regional institutions including Pathstone, which provides microloans to small businesses, and the Urban League, which assists local entrepreneurs in developing business plans. RIT has committed \$2 million over five years to CUE, and CUE is planning to expand existing successful programs and add offerings including a mentor/coach system where experienced entrepreneurs will provide advice and support to new startups.
- The **Center for Entrepreneurship, Innovation, and Economic Development (CEIED)** at SUNY Geneseo will establish a centralized location to house SUNY Geneseo's VentureWorks entrepreneurship program, the Geneseo Small Business Development Center (SBDC), a makerspace, and a business incubator. Via a partnership with High Tech Rochester, this will link to START-UP NY-designated space for businesses. An investment will create a one-stop shop that will enable business owners and entrepreneurs in Livingston County and the Finger Lakes region to access technology, faculty expertise, student interns, and SBDC services, promoting innovation and ultimately business and workforce development.

4.3 Higher Education and Research

Vision

With 19 institutions of higher education, the industry is a major economic driver, drawing students and researchers to the region. Investing in the region's flourishing research facilities at leading institutions will attract federal research dollars, create jobs, promote commercial activity at startups, and help retain students.

The Finger Lakes region will leverage its higher education assets to continue to attract and retain world class talent, driving innovation and economic activity in key regional strengths including life sciences, software development, and data science. Through growth and collaboration, our network of institutions of higher learning will establish the Finger Lakes region as a leader in research and innovation. **Expanding research activity** will not only propel innovation in the region, but also attract investment and create jobs from sponsored research funding. **Growing student enrollment**, with particular focus on successful programs in key science, technology, engineering, and mathematics (STEM) fields, will continue to draw top talent to the region and create significant economic impact through tuition revenue and the creation of new employment opportunities.

Assets and Performance

The Finger Lakes region is home to **19 institutions of higher education**, including leading research universities, private liberal arts colleges, SUNY campuses, and community colleges. These institutions serve a variety of economic and community development roles and serve as drivers of employment, research, and industry innovation. The sheer number of institutions makes higher education a powerful force in the regional economy: the 19 institutions of higher education are spread geographically throughout the region, and many colleges and universities serve as major county employers. Independent colleges and universities contribute over \$5.5 billion in economic impact, and \$3.1 billion in payroll. The University of Rochester and its affiliates employ nearly 27,000 full or part-time employees, making it the largest employer in the Finger Lakes region, the largest private employer based in Upstate New York, and the eighth largest private employer in all of New York State.

Rochester has attracted more **external research funding** than any other city in upstate New York, and the Finger Lakes spends \$277 of research and development expenditures per capita, far exceeding benchmark comparisons of \$182 for upstate New York and \$170 for the United States.

Finger Lakes higher education institutions enroll more than **86,000 students** every year. The region's universities are particularly strong in the STEM fields, with 26 percent of degrees awarded in these fields, compared to 20 percent for upstate New York and 18 percent for the United States. The CFA process has supported the expansion of STEM programs and facilities throughout the region that has helped build a strong workforce pipeline, with funded projects including the NextGen Sciences Initiative at Roberts Wesleyan College, which will allow increasing science and nursing enrollment by over 50 percent, and the Integrated Science and Health Sciences Building at St. John Fisher College, where nearly 80 percent of science and nursing graduates continue on to work in New York State. The Rochester Institute of Technology (RIT) is the second largest producer of STEM degrees among private universities in the nation, and enrollment has grown over 10 percent in last five years. This STEM specialization supports growing regional industries

including computing and software development, for which RIT awards nearly 800 degrees every year. RIT also leads innovative research efforts in key STEM fields, and has produced over \$70 million in engineering research and over \$50 million in physical sciences research over the last five years.

The University of Rochester received more than **\$350 million in research funding** in 2014 and has received more than \$1.9 billion in research funding over the last five years from the National Institutes of Health (NIH), contributing to its recognition as one of the top 10 universities in the nation for the impact of its **life sciences** research based on the number of licenses, licensing/royalty revenue, the number of startups, and the number of awards received. The University of Rochester Medical Center produces cutting edge research across a breadth of topics, with particular strengths in neuroscience, orthopedics, and immunology and vaccines. Notable technologies include the world's first cancer vaccine, Prevnar, Gardasil, Ceravix, and advancements in LASIK surgery that have improved the vision of tens of thousands of people. In 2014, the University of Rochester received \$25 million in licensing revenue and 155 invention disclosures, more than a 10 percent increase over 2013. These disclosures were received from 250 university inventors, as well as 51 external collaborators from 28 institutions, agencies, and corporations. Since 1996, 56 companies have been created using University of Rochester licensed technologies, including iCardiac Technologies, Vaccinex, Lucid, Inc., and QED Technologies.

Thanks to support from Governor Cuomo and the New York State Legislature, the University of Rochester is among the top 15 most powerful university-based supercomputing sites in North America and home to the most advanced computer system dedicated to health research in the nation, the Health Sciences Center for Computation Innovation, developed in partnership with IBM. The University of Rochester also is home to New York State's Center of Excellence in Data Science, and these unique **data science** capabilities have already generated more than \$330 million in research funding over the last six years and involve more than 650 faculty, students, and research staff from more than 40 departments. Annual research awards associated with the University of Rochester's super computing technology and infrastructure have tripled in the last three years. Grant funding awarded is projected to exceed \$1 billion for University faculty who utilized the Goergen Institute for Data Science's core competencies and facilities, which includes the Center for Integrated Research Computing and the HSCCI.

Universities play a pivotal role in **driving industry innovation**. Companies in the Finger Lakes region have the benefit of access to unique academic assets such as RIT's Golisano Institute for Sustainability (GIS), one of the transformational projects previously designated by the Finger Lakes Regional Economic Development Council. GIS has received \$15 million in NYS capital funding, along with significant private sector and industry support to advance cutting edge research in sustainable production technologies. These investments enabled GIS and RIT to be invited as a Tier One partner in one of the first NNMI's to be designated by the Federal Government in Digital Design and Manufacturing (DMDII). In its first year of operation, the DMDII has awarded four research projects to GIS, leveraging federal and corporate funding and enabling GIS to transition new technologies to several NYS companies. GIS houses five research centers, including the NYS Center of Excellence in Sustainable Manufacturing and the NYS Pollution Prevention Institute (NYSP2I), and works with local manufacturing firms to increase their global competitiveness by helping them develop and implement more sustainable products and environmentally efficient manufacturing processes. Its industry outreach arm, the Center for Integrated Manufacturing Studies, has a long track record of applied research and technology transfer dating back to 1992.

One of the companies spun out of CIMS, Vnomics, was recognized in 2014 as the second fastest growing company in the greater Rochester region, and is poised to add at least 100 employees over the next two years.

RIT's Center for Media, Arts, Games, Interaction, and Creativity (MAGIC) is establishing the Finger Lakes region as a leader in the rapidly growing **software and digital media** industry. The Center provides a dedicated environment for the construction, experimentation, and design of digital media, and MAGIC Spell Studios is linking RIT's internationally ranked academic programs with the high-tech facilities needed to commercialize computer gaming, film and animation, and imaging sciences projects. The Studio has received a \$13.5 million in funding from New York State, \$3 million from Dell and \$12.4 million from Cisco Systems Inc. MAGIC is projected to graduate one company per year from its incubator, creating an estimated 50 new jobs over the next five years.

Opportunities for Growth

This broad base of assets means that the region's universities will further grow enrollment in keystone STEM programs and attract research funding and top tier faculty. The proportion of STEM degrees awarded each year in the Finger Lakes has increased over 60 percent from the year 2000. This trend is supported by regional strengths in research and development, and the expansion of such research programs provides room to grow the number of students who come to study at the region's 19 colleges and universities. Focusing student recruitment efforts on hallmark STEM programs also provides a talent pipeline for growing regional industries. Surveys and interviews reveal that many recent college graduates are leaving the region, in part, because they are unable to find relevant long-term career opportunities, a challenge which URI support will address by creating new employment opportunities throughout the region and supporting student-led startups through incubator and accelerator programs. Internships with local businesses help create direct career pathways for students, and RIT's cooperative education program places 2,500 students per year in co-op positions. About 40 percent of the resulting permanent job offerings are in the Finger Lakes region, providing a scalable model for systematically embedding talent into the regional economy.

Universities are agents for change through their ability to translate academic discoveries into applications that spur economic growth. Rochester's universities are particularly strong in research and development, and there is significant room to grow translation efforts into economic activity. Expanding sponsored research activity through URI support will create jobs as the activity of sponsored research alone creates a number of employment opportunities, including expanded teaching positions and full time research positions, and further drives the creation of jobs in related industries.

Strategies to Achieve Vision

Highlighted Year One initiative:

Year One initiatives are specific, high-impact projects that could be launched immediately after winning the URI.

Expanding **The Goergen Institute for Data Science** at the University of Rochester will meet a growing national need for skilled data scientists and establish the Finger Lakes as a leader in this field through a recently established series of Data Science degree programs, including a Master of Science, Bachelor of Arts and a Bachelor of Science. Harnessing cutting-edge computational power and data analytics, the Institute is accelerating research and development in fields including

medicine, engineering, physics, optics, and finance. The Institute promotes the expansion of industry and government partnerships, and is building on existing data science collaborations with Xerox, IBM, the National Institutes of Health, Food and Drug Administration, Department of Defense, and state-based, university-sponsored economic incentives such as STARTUP-NY. The Institute is projected to attract over \$530 million in research funding and create 270 direct jobs. Further investment through the URI would likely induce similar leverage ratios.

Highlighted Full Implementation initiatives:

Full Implementation initiatives are projects that would be further refined after winning the URI, including clarifying final investment and timing.

Investing in research facilities at the region's pre-eminent universities has a strong history of success: advanced research capabilities draw substantial federal research funding to the region, creating a high degree of leverage. A URI investment could allocate funds to specific research facilities at local institutions. Examples of potential projects include:

- Implementing the **Center for Advanced Technology in Additive Manufacturing and Multifunctional Printing** will focus on developing next-generation technologies for 3D printing commercialization, including new materials and new products. The Center will collaborate with industry partners, addressing the needs of small businesses through consultation, product design, and testing services. A URI investment would leverage at least \$1.7 million in approved private funding from RIT and industry partners to purchase 3D printing equipment and fund product development that would place it among the top three laboratories in the country. This center could attract \$17.5 million of research funding in the first five years of operation, and would lead to related startup activity and growth at regional corporate partners. Further funding for the center could result from RIT's membership in the FlexTech Alliance, the awarded consortium in the Flexible Electronics NNMI, and from an \$8 million America Makes grant opportunity.
- **The University of Rochester Neurorestoration Institute** will expand Rochester's preeminence in a growing field, neurorestorative care. Investment in this Institute would position Rochester as a national destination for the rehabilitation of people with chronic neurologic conditions, and a center for excellence in research on restoration of cognitive, motor, and sensory function. With state investment to help build the center leveraged by a \$30 million University of Rochester investment, the UR Medical Center could attract additional federal funding and patient revenues. Beyond this, technology developed and talent retained at the center would help grow activity across the cluster, including medical devices (e.g., robotics technologies) and imaging (e.g., sensory devices).