THE

BUFFALO BILLION

Investment Development Plan

FEBRUARY 2013

BUFFALO BILLION

An initiative of the WNY Regional Economic Development Council

The New NY WORKS for Western NY

Contents

Letter from the Co-Chairs	1
Acknowledgements	2
Introduction: A Call To Action	4
Overview	5
I. Foundations for Economic Growth Planning and Investment	6
II. Where should Buffalo Niagara Invest to Create Growth?	9
III. Which Strategies and Initiatives can Buffalo Employ to Seize Growth Opportunities?	24
IV. Wave 1 Signature Initatives	28
V. What Will it Take to Execute This Plan?	57

A Message from the Co-Chairs

On behalf of the Western New York Regional Economic Development Council, we are proud to present the Buffalo Billion Investment Development Plan. The Plan was developed at the request of Governor Andrew Cuomo. The Plan encompasses an in depth analysis of the levers that drive Buffalo's and the region's growth within a global context, promotes strategies based upon Buffalo's unique assets, and advances early initiatives for implementation. The plan's success depends on the continued input and commitment of Buffalo's and the region's stakeholders.

Many people have contributed to the Plan's development. Whether providing leadership and direction, research and analysis, conducting interviews, providing global context , the collaboration of people and organizations have made this plan possible. We would like to acknowledge the members of our Western New York Regional Economic Development Council, as well as the members of the Buffalo Billion Advisory Group, the many hundreds of people who served on design councils and our partners at Empire State Development. We would also like to acknowledge the work done by the Brookings Institution Metropolitan Policy Program, McKinsey & Company, and University at Buffalo Regional Institute. The combined insight and work has the power to positively impact the economic growth trajectory of Buffalo and the region.

In particular, we thank Governor Cuomo for his leadership, as well as his dedication to Buffalo and the region. Governor Cuomo recognized the potential of WNY, and that recognition inspired the Plan contained within. We also thank Lieutenant Governor Robert Duffy for his vision throughout this process, and for his continuous support of our Regional Economic Development Council and of our Plan.

Thank you in advance for joining with us as we move forward.

Sincerely,

Satish K. Tripathi Howard A. Zemsky

ACKNOWLEDGEMENTS

Western New York Regional Economic Development Council

Chair
Robert J. Duffy
Lieutenant Governor, New York State

Regional Co-chairs
Satish K. Tripathi
President, University at Buffalo

Howard A. Zemsky
Managing Partner, Larkin Development Group

Members
Crystal Abers
Cattaraugus County Director of Economic Development, Planning & Tourism; designee of Cattaraugus County Legislature Chair

Aaron Bartley
Executive Director, PUSH (People United for Sustainable Housing) Buffalo

Jeff Belt
CEO, SolEpoxy

Robert T. Brady
Chairman & CEO, Moog

Deanna Alterio Brennen
President & CEO
Niagara USA Chamber

Byron W. Brown
City of Buffalo Mayor

Paul Brown
President, Buffalo Building & Construction Trades

Curtis Crandall
Chair of Allegany County Legislature

Pamela R. Henderson
Managing Partner, Henderson-Woods, LLC

John R. Koelmel
President & CEO,
First Niagara Financial Group, Inc.

Thomas A. Kucharski
President & CEO
Buffalo Niagara Enterprise

Brenda W. McDuffie
President & CEO
Buffalo Urban League, Inc.

Jennifer J. Parker
President, Jackson Parker Communications and Founder, Black Capital Network

Mark Poloncarz
Erie County Executive

David Porter
Plant Manager, Cummins, Inc.

Michael H. Ranzenhofer
State Senate, 61st District

ACKNOWLEDGEMENTS, CONTINUED

Colleen C. DiPirro
President & CEO
Amherst Chamber of Commerce

Paul A. Dyster
Mayor of Niagara Falls

Dr. Charles Edmonson
President, Alfred University

Greg Edwards
Chautauqua County Executive

Robert Gioia
President, The John R. Oishei Foundation

Dr. Rosa Gonzalez
Owner/Assistant Professor & Chair,
Emergency Management Program,
R. Gonzalez Consulting, Inc./
Erie Community College

William Ross
Chair of Niagara County Legislature

Duncan Ross
President, Arrowhead Spring Vineyards

Andrew J. Rudnick
President & CEO, Buffalo Niagara Partnership

Robin Schimminger
State Assembly, 140th District

Samuel Teresi
Mayor of Jamestown

Dr. Connie Vari
Executive Vice President & COO,
Kaleida Health

Dr. Raul Vasquez
Founder & CEO, Urban Family Practice

Buffalo Billion Advisory Group Members

Teo Balbach
Principal
Mercury Capital Partners

Martin Berardi
President
Moog Medical Devices Group

Clotilde Perez-Bode Dedecker
President/CEO
Community Foundation for Greater Buffalo

Susan McCartney
Director
Small Business Development Center

Robert Shibley
Dean, University at Buffalo
School of Architecture and Planning

Rich Tobe
Deputy County Executive
Office of Erie County Executive

INTRODUCTION: A CALL TO ACTION

Buffalo Niagara is a region in transition. The Buffalo Niagara region was a leader in America's industrial economy – a major center of heavy manufacturing and a hub for transportation and logistics. However, as the economy has changed, our strengths have not evolved to preserve growth.

Renewal will not be easy. Our population, employment, and GDP have all declined over the last 40 years – leaving a population that is closer to retirement than the average U.S. city and a persistently high unemployment rate. Like most cities in our region, our manufacturing base has substantially eroded over the last three decades, falling from 26% of regional GDP in 1980 to 9% today. As a result, the economy today produces neither the quality nor the volume of jobs necessary to sustain a renewal. In addition, Buffalo is now the sixth most segregated city in the country, and our African American and Hispanic populations are especially hard hit with unemployment rates that are more than twice that of the rest of the population.

Growth will require us to address global trends. While the U.S. holds a comparative advantage globally in knowledge economy sectors (e.g., technology, advanced manufacturing, professional services), it is faring poorly in sectors dominated by low labor costs. Economists in the U.S. now largely agree that productivity and economic growth are dependent on the quality of human capital, the penetration of technology, the degree to which an economy fosters innovation, and an economy's ability to translate basic research and development into commercial enterprises. To successfully renew the Buffalo Niagara region, we must embrace these changes, not resist them.

Fortunately, we have significant assets to grow. Our enduring capabilities in advanced manufacturing, our leading regional health and life science presence, and our world-renowned tourist assets that draw millions of visitors every year can, with investment, be anchors for our economy. Together with high quality of life, modern infrastructure, and low property prices, these assets provide the necessary underpinning for renewal.

Our moment is now. In an extraordinary recognition of our potential, Governor Andrew M. Cuomo made a historic pledge of $1 billion in New York State funds to attract complementary private investment at a 5:1 leverage ratio and ignite growth in the region. This commitment is unique in the nation. We will take full advantage of this once-in-a-lifetime opportunity, the Buffalo Billion, and have developed a plan for sustained and purposeful transformation of the region. Through Governor Cuomo's vision, our Regional Economic Development Council of community members from the public, private, and nonprofit sectors is working together with New York State to lead our return to growth. We will invest in high-growth areas and the key economic enablers – innovation/ entrepreneurship, human capital, revitalization -- required to help them succeed. We will meet the challenge to attract additional capital at a 5:1 ratio. To achieve this, we will need institutional capacity, civic will, and investment capital. Fortunately, our region has all of this, and more.

OVERVIEW

The purpose of this Buffalo Billion Investment Development Plan is to chart the Buffalo Niagara region's unique path to a thriving economy that is based on a deep understanding of where we are today and where we can go:

- *Chapter 1* summarizes the drivers of growth in tomorrow's economy, how they apply to metropolitan regions, and their implications for regional growth planning. It also identifies the key sector assets and productivity enablers, and provides the core principles for developing an Investment Development Plan for Buffalo Niagara that will promote broad-based prosperity in the 21st century.

- *Chapter 2* applies this economic and strategic framework to a market analysis of Buffalo Niagara's assets and dynamics. This chapter closely examines the identified sector assets and their underlying enablers, including human capital, innovation, built environment, and governance systems, and helps determine where Buffalo Niagara currently sits on the path to transformation, as well as its key barriers and opportunities.

- *Chapter 3* then identifies six specific Strategies tailored to Buffalo Niagara's assets and opportunities. These mutually reinforcing Strategies accelerate growth in three prioritized sectors: manufacturing, health/life science and tourism. Underpinning these specific sectors are a variety of cross cutting enablers focused on fostering entrepreneurs, improving workforce skills that are relevant to today's economic challenges, and revitalizing Buffalo to create a more vibrant and attractive city

- *Chapter 4* outlines Wave 1 Signature Initiatives, which will guide the implementation of each Strategy. Specifically, each Initiative is accompanied by a summary business plan and represents an investment opportunity for the Buffalo Billion accompanied by significant private leverage.

- *Chapter 5* provides guidance on how to implement the plan. This includes the overarching structures required to create the appropriate capacity and capabilities to implement.

I. FOUNDATIONS FOR ECONOMIC GROWTH PLANNING AND INVESTMENT[1]

A fundamental economic restructuring is now underway in Buffalo Niagara. Technological advancement, globalization, shifts in geopolitical and social structures, and other forces, all determine which economic assets are most important for growth, where they should be located, and how they become productive. To be successful, economic growth strategies must embrace these trends. The Buffalo Billion approach emphasizes partnership with the private sector and with citizens themselves; incentives to stimulate rather than prescribe behavior; a focus on long-term sustainability, not just short term results; and recognition that New York must build for tomorrow's economy, not just the economy of yesterday.

TOMORROW'S ECONOMY WILL BE KNOWLEDGE BASED, INNOVATION DRIVEN, DYNAMIC AND GLOBAL

Success in tomorrow's economy will require networks. Today, and tomorrow, our society will be increasingly reliant on entire ecosystems – a pipeline of workers trained for high-skill jobs, entrepreneurs willing to take risks, researchers and visionaries able to generate novel ideas, and a base of anchor institutions and infrastructure.

Success will also require investments in knowledge based sectors and innovation. Knowledge based service sectors comprise nearly 75% of the economic output of developed economies today.[2] Knowledge based innovations are proliferating, and entirely new sectors are emerging.[3] Companies and industries emerge, develop, and redefine themselves according to market conditions that today change more quickly than ever before.[4] This dynamic economy places a premium on deliberate, systematic and continuous innovation in products, processes, business models and markets.

Today's dynamism introduces new risks. The interconnectedness of financial markets means that recession can spread more quickly than in the past. Moreover, income inequality has increased as skilled workers command a premium in labor markets, while unskilled workers have lost income and their quality of life has declined. Seeing these trends, communities often search for short term, visible successes, and fail to invest in the foundational elements required to sustain growth. Without more holistic investment, however, efforts to restore growth will fail.

ECONOMIC ACTIVITY IS INCREASINGLY FOCUSED IN METROPOLITAN REGIONS

Today's economic assets are concentrated in metropolitan areas that play a disproportionate role in creating economic value.[5] The geographic proximity of key economic assets and actors enhances their individual and collective productivity[6] by reducing transaction costs and increasing interactions that generate innovation.[7] For these reasons, metropolitan regions are becoming the primary competitive units of the global economy.[8] Of course, regional economies are specialized, complex, and dynamic. Every metropolitan area has its own unique mix of assets that determines how productively it can drive economic performance. There is no single economic development "playbook" that can take the place of understanding local dynamics.

MARKET LEVERS FOR DRIVING TRANSFORMATIVE GROWTH

Designing investments that create growth requires an understanding of the changing drivers of prosperity. The business sector grows in a particular location by creating new companies (entrepreneurship), by growing local businesses, and by location decisions (retention and attraction). Firm creation, growth, and location depend upon increases in efficiency and productivity. Accordingly, our Regional Economic Development Council began with two fundamental questions:

(1) Which business sectors (often referred to here as sector assets) can be most competitive; and

(2) Which attributes of the region increase sector competitiveness, efficiency and productivity (referred to here as enablers), and make the region a place where existing firms thrive and new ones choose to locate?

These enablers include:

- **Human capital.** The knowledge economy places a premium on skilled talent and on efficient training, retraining, and aligning talent with changing job requirements.
- **Innovation and entrepreneurship.** Deliberate and continuous innovation is the core driver of increased economic productivity.
- **Efficient infrastructure, livable cities, and revitalized, inclusive communities.** Low-cost energy and modern transportation systems can expand effective labor markets, allow firms to locate where it makes the most economic sense, and increase the return on capital equipment – in turn improving labor productivity. By contrast, blighted neighborhoods, poorly developed or maintained community assets, and declining property values will greatly reduce the overall attractiveness of a region to businesses.

An analysis of local assets and dynamics related to each of these market levers, as well as their interactions with one another, led our Regional Economic Development Council to develop the investment Strategies in Section III.

GUIDING PRINCIPLES FOR MARKET ANALYSIS AND STRATEGY DEVELOPMENT

This Investment Development Plan builds upon the priorities laid out by the Western New York Regional Economic Development Council (WNYREDC), is fact based, follows an inclusive and collective process and finally is meant to be ongoing and dynamic.

- First, the process *builds upon the priorities that are most important to address Western New York's opportunities and challenges as laid out by the Western New York Regional Economic Development Council* (WNYREDC). These include: inclusivity, promotion of smart growth, orientation toward young adults, building upon strengths, regional in impact, and improvement upon region's image.
- Second, the process and outcomes are intensely *fact based and market disciplined.* It begins with rigorous market analysis, and then derives strategies deeply grounded in and tailored to the assets and opportunities identified in the market analysis. Most importantly, to implement the strategies, it creates mutually reinforcing initiatives which are major operating enterprises (and which reflect objective assessment, realignment and extension where appropriate, of

existing initiatives). While this Plan plays an important role in creating the "north star" around which existing and new strategies and initiatives align and are developed, the document itself is not the main point.

- Third, the process is *inclusive and collaborative*. The Plan and its implementation are pursued with the deep engagement of a diverse set of informed stakeholders and experts. This Plan has already benefited from broad engagement over the past twelve months, including four Western New York Regional Economic Development Council meetings, four Advisory Group meetings, 24 Design Council meetings across the six strategies, multiple topical roundtables and interviews with over 300 experts and potential investors. This document and the Signature Initiatives will form the basis for further and continuing engagement. Furthermore, the Strategies and Initiatives themselves should aim to be inclusive of all populations.
- Fourth, the process is an *ongoing enterprise*: this Plan embodies a living process. Market analysis and strategies must be continually updated. Initiatives must be monitored and continually improved and new Initiatives must be identified for investment in later years.

II. WHERE SHOULD BUFFALO NIAGARA INVEST TO CREATE GROWTH?

This section has three parts:

Top-line economic performance: We provide a snapshot of metrics and trends with respect to Buffalo Niagara's economic growth.

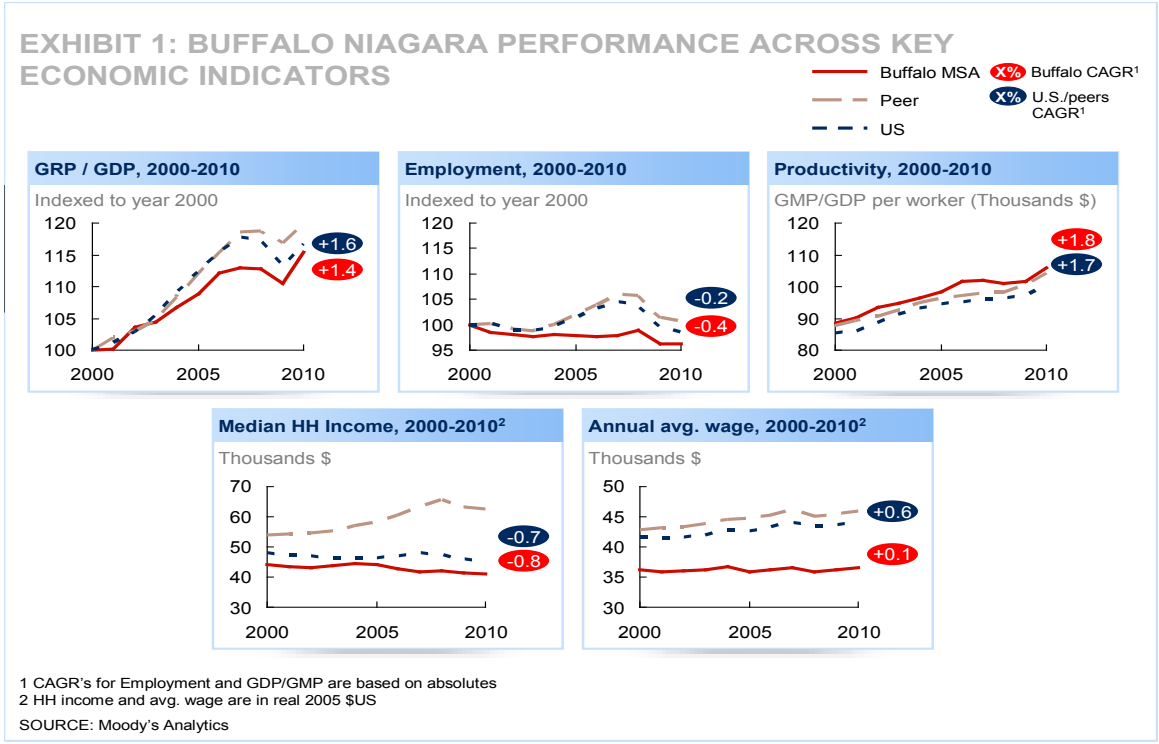
Asset sectors: We discuss high potential sectors in terms of specialization, growth opportunity, size, and relative competitiveness. We also discuss the enablers as they apply to each sector.

Enablers: We examine the enablers from a region wide perspective to identify additional opportunities for investment.

HOW WELL IS THE ECONOMY PERFORMING TODAY?[9]

The Buffalo Niagara region constitutes a substantial economy. Buffalo Niagara's $57 billion in regional output make the MSA[10] the 44th largest metropolitan economy in the country, and a population of 1.1 million and 538,000 workers also ranks in the top 50 of all U.S. metropolitan areas.[11]

In comparison to the U.S. as a whole and peer regions, Buffalo Niagara has shown historically strong productivity in the past- although the advantage is shrinking, and lags in terms of total Gross Metropolitan Product (GMP), employment, household income and average wages (Exhibit 1).[12]



Economists attribute much of this decline in the region's performance to the loss of manufacturing firms and jobs. More than 78,000 jobs have been lost since 1980[13] and employment grew at less than a quarter of the national rate (9.5% vs. 43%).[14]

Growth in the region's economy in recent years has largely been limited to sectors serving local consumption, or sectors that are "anchored" (i.e., those that are unlikely or unable to relocate, such as higher education institutions). The region's traded sectors (i.e., those that export from the region) contracted by 30% between 1980 and 2010, while the non-traded sectors grew by 32%. Whereas the traded sectors once accounted for 37% of metro's jobs, that share is now less than 24%.[15] To grow the economy further, the region must expand the traded sectors and produce goods and services for export to fast growing global markets.

Economic decline has led underperforming, unproductive businesses to leave the region or dissolve, while productive, globally competitive firms remain. Every older industrial city has gone through, or is currently going through, a similar experience. Buffalo Niagara's remaining assets position it to prosper. For example, performance in the materials industry – an area of regional strength – has outpaced the U.S. as whole in terms of both output and employment growth over the past five years, as has chemicals over the past three years.[16] We review the assets systematically in the next two sections.

WHERE ARE THE LEADING AREAS FOR GROWTH?

Given limited resources available for investment, we used four criteria to determine the high potential sectors to transform the economic trajectory of the region.

(1) They have a strong, concentrated presence in the region as measured by Location Quotient

(LQ): Buffalo employment concentration vs. U.S. employment concentration. This measure implies a relative competitiveness based on underlying strong business processes or products demanded globally.

(2) They are high growth showing promise for demand as demonstrated by 10-year projected U.S. growth rate.

(3) They are of considerable size as measured by employment level.

(4) They have assets that exhibit competitive advantages such as product quality, process innovation, or other metrics of competitiveness such as research rankings or visitorship.

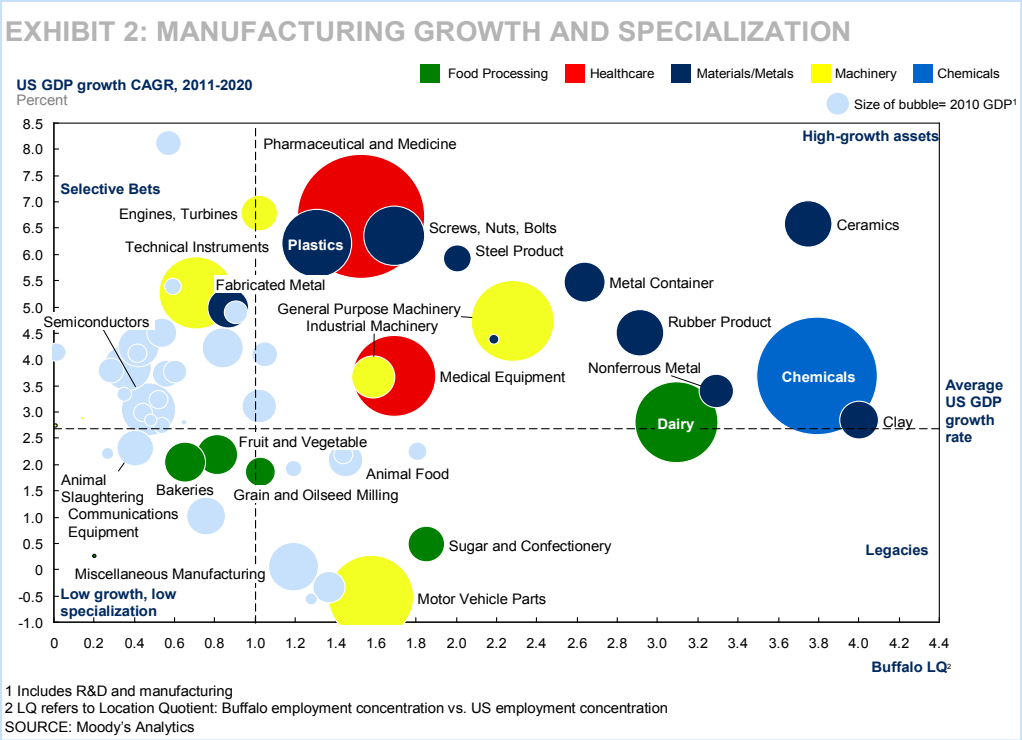
Three clusters in particular stand out: advanced manufacturing, health and life sciences, and tourism.

Advanced Manufacturing

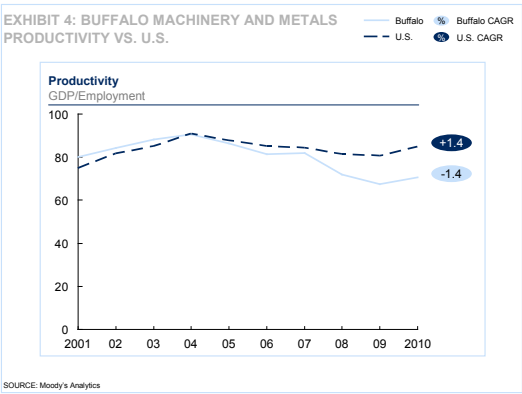
Manufacturing remains the third largest employment sector in the Buffalo Niagara economy, representing 50,000 employees, $6.3 billion in gross regional product (GRP) (11% of the total) and the two largest export industries in the region.[17] However, Buffalo Niagara's manufacturers have lost jobs at a faster rate than the U.S. average (-5% vs. -4% annually) and shown a decline in output despite gains elsewhere in the U.S. (-1.7% annually vs. +1.6%). While the sector has seen 3.6% in annual productivity gains (output per worker), it trails the U.S. on this measure as well (5.8% annually).[18]

Some specific sectors within manufacturing in our region are poised for growth; while firms and assets in these sectors are fragmented, they are becoming leaner and more productive. Creating growth will require help for these firms and assets to innovate, update their business models, redeploy assets toward newer products and emerging markets, and develop advanced manufacturing capabilities. These efforts will stem the decline in manufacturing and begin to see growth again.

Advanced manufacturing is defined manufactured products and manufacturing processes based upon innovative, cutting edge science and technology, usually executed by relatively high-skilled workers, who receive above average wages.[19] Advanced manufacturing offers high potential for growth in our region in at least four clusters: advanced materials (e.g., lightweighting), machinery and metals (aerospace and medical devices), chemicals (e.g., powder atomization), and health (outlined in health and life sciences section).[20] While these sectors at one point may have represented globally uncompetitive manufacturing sectors, given the products, processes or customers they are serving, they have strong potential for the future.

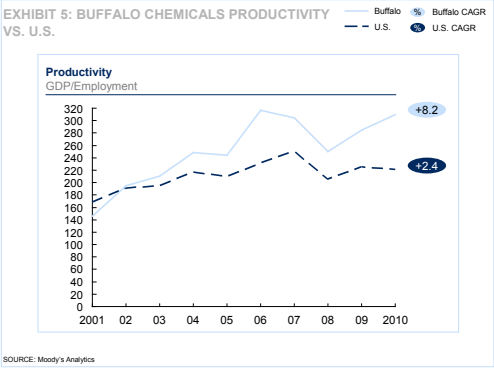


The **advanced materials** segment is concentrated and growing in the Buffalo Niagara region as demonstrated by Location Quotient: Buffalo employment concentration vs. U.S. employment concentration (LQ = 1.6).[21] Ceramics, in particular, is highly concentrated (LQ = 3.7)[22] and is projected to grow at a rate of 6.6% annually through 2020.[23] The segment's growth potential is supported by highly concentrated and productive basic chemicals suppliers, which are also projected to grow by 3.7% per year.[24] Academic materials-science research and development infrastructure at both University at Buffalo and Alfred University can facilitate innovation across materials industries such as clay, rubber, and plastics. The sector also benefits from the region's low-cost hydropower. Materials productivity lagged the U.S. both absolutely and in terms of growth over the past decade (Exhibit 3), suggesting opportunities for innovation in the sector.[25]



Machinery and metals is moderately concentrated in the region (LQ = 1.2)[26], and is the region's second-largest export sector. Machinery is among the most productive manufacturing segments ($120,000 per worker in 2011); the metals sector is significantly less productive ($76,000-78,000 per worker) (Exhibit 4) and

is now below the U.S. average.[27] A small concentration of firms in the region's machinery sector is developing expertise in aerospace. Surviving metals manufacturers have diversified their product lines and invested in small batch capabilities.



Chemicals is the region's largest export sector. It is somewhat concentrated in the region (LQ = 1.3), and largely focused on basic chemicals (LQ = 4.0).[28] The chemicals segment is highly productive (more than 50% above U.S. average) (Exhibit 5) and is an important support to the materials segment.[29]

Each of these three segments will require investment in productivity enablers, such as innovation, human capital, and export capabilities, which are also important to development in other manufacturing segments not described here.

Innovation. Several segments within Buffalo Niagara's advanced manufacturing sector are already highly productive, while others continue to lag national productivity levels.[30] Furthermore, only 25% of surveyed local manufacturers think their company is improving faster than its industry.[31] In the most productive industries outlined above (e.g., materials), we must support applied research and development and commercialization activities. In currently less productive industries that have a high potential for growth in global markets, we must deliberately focus on identifying, testing and commercializing new opportunities that enhance their competitiveness.

Human capital. Extensive interviews with regional firms indicate that the Buffalo Niagara region's under-supply of skilled manufacturing talent is impeding productivity and growth potential. Displaced workers with low- and mid- level skills (e.g., from construction, "old line" manufacturing) can be trained to fill in-demand jobs – particularly skilled production occupations – through targeted programs designed by employers.[32]

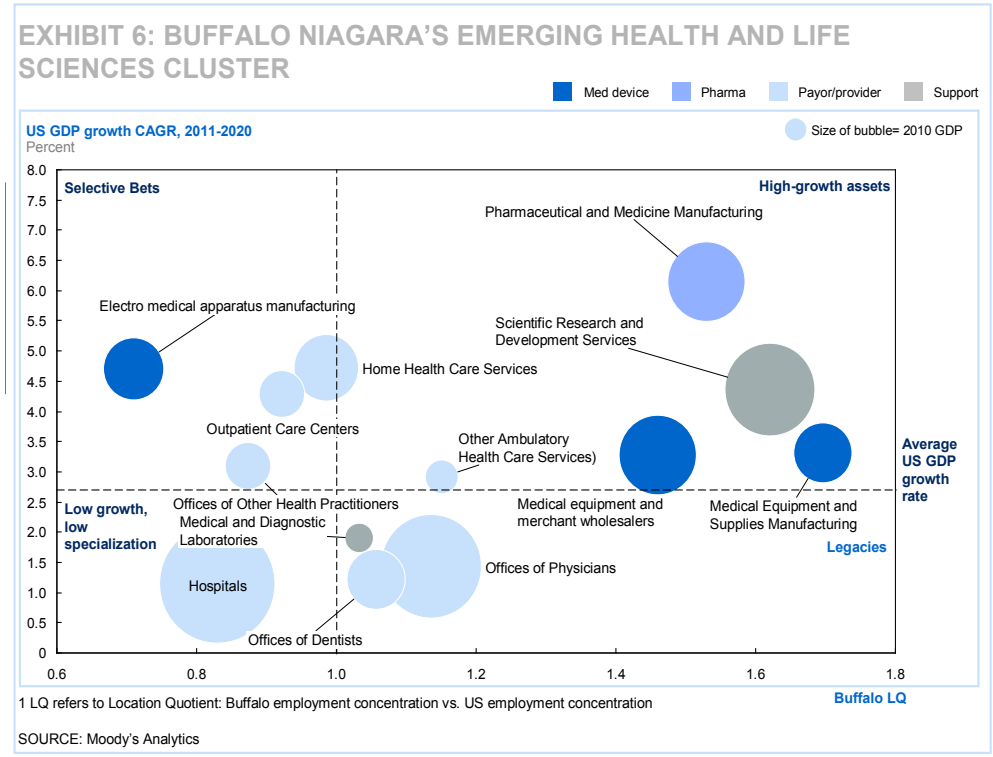
Export capabilities. Our manufacturers need to become highly export-oriented to compete globally. Buffalo Niagara's exports as a share of gross output have declined from 11.6% in 2008 to 9.9% in 2010, placing it below the U.S. average. Companies can take better advantage of the region's bi-national border location and existing export-oriented infrastructure. Buffalo Niagara is the second largest port of entry along the nation's northern border, and the adjacent Greater Golden Horseshoe region is the 4th fastest growing region in North America.

Health and Life Sciences

What we refer to as "healthcare" comprises retail care – hospitals, clinics and specialty services – as well as "health and life sciences". While the market analysis and Strategy reviews the healthcare sector as a whole, Initiatives in this Plan focus on "Health and Life Sciences" – particularly equipment, devices, medical manufacturing, pharmaceuticals, diagnostic products, and health IT innovation that can impact care delivery.

Retail care is a significant sector in the Buffalo Niagara region, with 28 hospitals and 74,000 employees in the health care and social assistance sector.[33] Since healthcare delivery (with the exception of medical travel) is not an export sector, without population growth, it has inherent growth limits. While retail care in itself is not the focus of this Plan, it is important to note that strong and growing local market demand from the region's patient population is critical to the tradable parts of health and life sciences since it supports the research and product development that in turn support medical manufacturing and life sciences.

Several tradable segments of the health and life sciences sector show particular promise for growth in our region.



- The **medical devices** segment is concentrated in the Buffalo Niagara region (LQ = 1.7),[34] and is projected to grow nationally at a rate of 3.5% per year through 2021. The medical devices and related segments make up approximately 50% of the region's 130 life science

companies[35] and employ about 2,200 workers.[36] The medical devices segment generates $141,000 of output per worker, but productivity still lags the U.S. average by 13%.

- The **pharmaceuticals** segment is also relatively concentrated in the Buffalo Niagara region (LQ = 1.6), and is projected to grow in the U.S. at a rate of 6.6% annually through 2021. The region's approximately 80 pharmaceutical companies employ approximately 5,000 workers. The pharmaceuticals segment is highly productive, exhibiting a productivity rate that is 40% above the U.S. average.

Investment in productivity enablers will further accelerate this growth.

Innovation. Given the dynamic nature of the industry, Buffalo Niagara's health and life science firms need to innovate. The region is home to a myriad of infrastructure assets and R&D institutions that support, identify and develop new technologies, treatment protocols and other advances in medical devices and pharmaceuticals.[37] As a result, life sciences R&D is strong in the Buffalo Niagara region, bringing in approximately $350 million in research funding, with two thirds dedicated to life sciences.[38] However, patent production and commercialization are not keeping pace, and instead are a barrier to achieving the full economic potential of the region's R&D. Local researchers are awarded fewer than 20 patents each year; there were only 30 life science startups arising from institutional intellectual property (IP) in the last decade; and business births and venture capital funding have long lagged peer regions, with less than $5 million in venture capital invested annually.

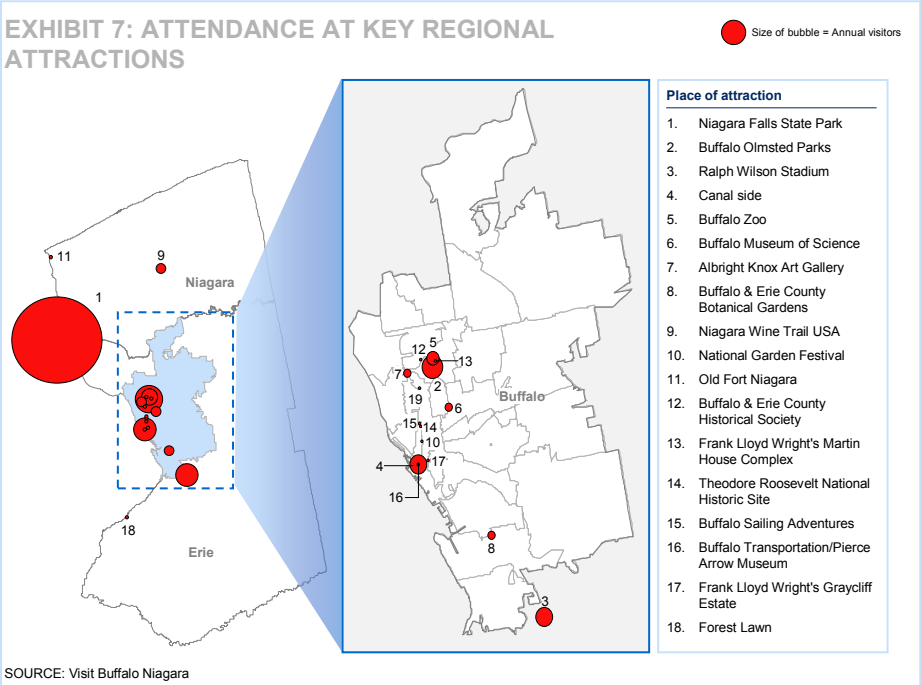
Human capital. Like other regions with growing life science sectors, Buffalo Niagara's life science firms have a critical need for highly skilled human capital to grow existing firms and spur the creation of new ones. The region performs reasonably well in producing life science workers – 15% of the degrees conferred by the region's approximately 30 institutions of higher education are in the life sciences field, ranking Buffalo Niagara 4th in the nation on a per-capita basis. However, while a number of distinguished life science researchers work and teach in the region, our capacity to attract and retain more high-caliber talent may be a challenge due to the modest national and global rankings of the region's relevant academic and research institutions.[39] Fostering a dynamic, innovative, entrepreneurial "best in class" environment for the health and life sciences sector can help Buffalo Niagara attract and retain this essential top-notch talent.

Infrastructure. Another critical component of fostering health and life sciences innovation is knowledge exchange and collaboration among organizations and people in the life sciences field. Many regions are experimenting with co-location of facilities, creating formal and informal opportunities for interaction and interdisciplinary exchange. The Buffalo Niagara region is beginning to facilitate this interaction though efforts such as the co-location of clinical and R&D functions at the Buffalo Niagara Medical Campus (BNMC). Additional life sciences infrastructure is planned or under development at the BNMC and elsewhere.

Tourism

Home to Niagara Falls, as well as a broad range of other natural, historic and cultural attractions, Buffalo Niagara boasts a sizable tourism industry that employs 52,000 workers and generated $2.2 billion in economic output in 2010.[40] Worldwide, tourism is a large and growing industry (5% annually),[41] reflecting global trends toward global connectivity and exchange.

Niagara Falls is the definitive center of the Buffalo Niagara tourism sector. The Falls attract 8 million visitors annually – more than most U.S. national parks, nearly double the draw of the Grand Canyon (4.4 million annually), and much more than other regional attractions. Furthermore, the proximity of the Buffalo Niagara region to Canada provides an opportunity to attract millions tourists from across the border to the cultural, natural and commercial assets of the region. We intend to draw upon this extraordinary pipeline of visitors to create opportunities for other regional tourist attractions (see map, below).[42]



Given the region's array of natural and cultural assets, two segments of the global tourism market show early promise for growth in the Buffalo Niagara region: the culture/heritage segment (e.g., historic sites, museums) and the "soft" outdoor adventure segment (e.g., biking, hiking/backpacking, nature tours). Both segments are large and exhibit high growth.[43]

We must overcome two challenges to achieve this growth. First, the region's tourism "product" must improve through more innovative programming and attractions that direct visitors to the cultural, natural, and commercial assets in the region. This programming might include additional events, tours, and other activities at existing tourist attractions, as well as new venues and experiences (e.g., waterfront activities). Enhancing the quality of the visitor experience, and tailoring it to high-growth segments of the travel market, should be the region's top tourism priority.

Second, tourism amenities, particularly near Niagara Falls, are limited in both quantity and quality. Tourist products in dining and lodging hamper the region's attractiveness. As a result, tourists stay overnight less here than at similar destination attractions (e.g., 21% of visitors vs. 28% at the Grand Canyon and 44% at Yosemite National Park). Tourists spend less at the U.S. Falls than in Canada ($159 in the U.S. vs. $225 in Ontario); and visits by foreign travelers (18% of the total) are low.[44]

As the tourism sector grows, jobs follow: each additional $1 million spent by visitors can create 15 jobs.[45] This provides one of the single largest opportunities for employment growth in the region. Some of these jobs – particularly those in food service and retail – are low-skilled and low-wage. While this may seem like a disadvantage, they do, however, provide short-term opportunities for unemployed and under-employed workers (a strong need among Buffalo Niagara's low-skilled and minority populations) and additional entry points into the workforce for segments of the population that have historically lacked access to employment opportunities.

The Buffalo Niagara region is relatively accessible from outside the region due to high-quality infrastructure for ground and air travel. However, connectivity within the region needs improvement. Light rail and bus access to and connections between tourist attractions are underdeveloped and act as a barrier to longer stays and higher spending by visitors. Few visitors to the U.S. side of Niagara Falls add other attractions to their itineraries, which is reflected in significant drop-offs in visitor counts at non-Falls attractions (the next-largest regional attraction draws 250,000 visitors, compared to the Falls' 8 million). Additionally, congestion at the Canada-U.S. border crossing and a lack of appropriate signage to local tourist assets may be inhibiting international travelers.[46]

From a governance perspective, the tourism sector suffers from a high degree of fragmentation and a low level of financial resources. Oversight of Buffalo Niagara's tourism assets is fragmented across a variety of tourism and agencies, public sector agencies/authorities, and non-profit organizations, which leads to inconsistent and uncoordinated messaging around the region's assets. In addition, the region's outreach efforts are constrained by its $3.25 million annual marketing expenditure – half that of Cincinnati ($6.7 million) and a third of Pittsburgh's ($11.1 million), neither of which offers a significant natural tourism asset of the Falls' caliber.[47]

Other Significant Industries/Concentrations

Other industry segments also have significant size and future job creation potential for the region. Some opportunities in these industries will flow from productivity investments to support the manufacturing, health and life sciences and tourism sectors that will have spillover effects – such as an increasing need for transportation and logistics to support a growing manufacturing sector. They may create economic impact by offering entry level employment opportunities and career ladders for upward mobility, enhancing opportunity in the region.

Sectors that may grow, and that may deserve further attention in future years, include transportation and warehousing necessitated by growth in manufacturing and exports; education that offers targeted training for high growth sectors; back-office services for the financial

services and insurance industries (e.g., call centers, data processing); agriculture; and energy. Additionally, growth in the traded sectors will spur additional growth in the non-traded sectors such as retail, real estate and construction.

WHAT WILL BE REQUIRED TO SUPPORT GROWTH?

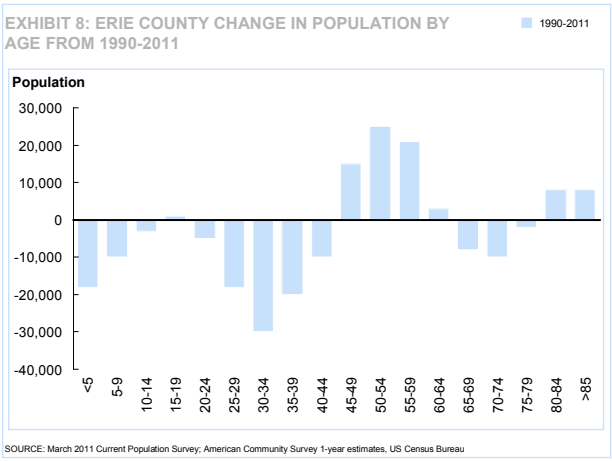
While the prior section discussed enablers applicable to targeted high potential asset sectors, these enablers are also foundational to the productivity of the economy as a whole. This section assesses the region's current performance and trajectory for each enabler from this cross-cutting perspective.

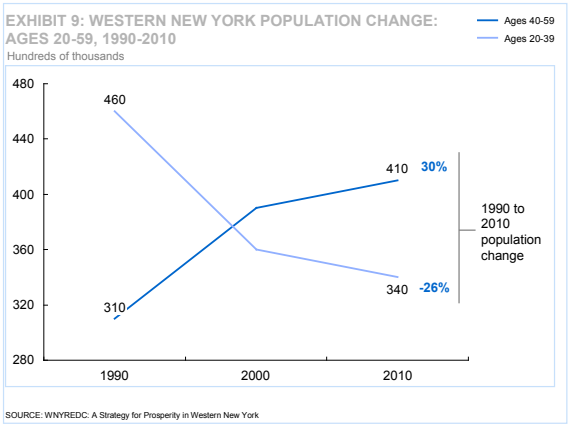
Human capital

Several aspects of human capital as an enabler are particularly important to transforming the Buffalo Niagara region for the next economy.

- **High human capital levels and rich job pools.** Increased emphasis on knowledge and on the application of technology is driving demand for higher levels of human capital across all sectors. In addition, the global nature of labor market has intensified competition for top talent, and compelled regions to focus on creating rich job pools that attract and retain the most highly skilled workers. Today, about 28% of the region's adults hold a bachelor's degree or higher, which is on par with the U.S. average, however, the region has higher unemployment than its peer metropolitan regions.[48] This is likely due to a combination of the oversupply of skill sets of certain grads coming out of 4-year and graduate schools (e.g., education majors) and the lack of job creation among high-skilled positions. The region boasts a large mid-level skilled segment (28% of adults have an associate's degree or some college coursework), but also has a larger than average segment of adult workers with a high school diploma or less. This poses a looming problem in an economy with growth industries that need higher levels of educational attainment.[49]

  Buffalo Niagara's supply of human capital is also affected by three additional demographic realities: (a) the workforce is aging (Exhibit 8)[50], creating a downward trend in supply in the coming years; (b) while the region exhibits an average level of out-migration compared to other metros, it experiences below-average level of in-migration among educated workers; (c) there is a decline in the young population (Exhibit 9).[51]

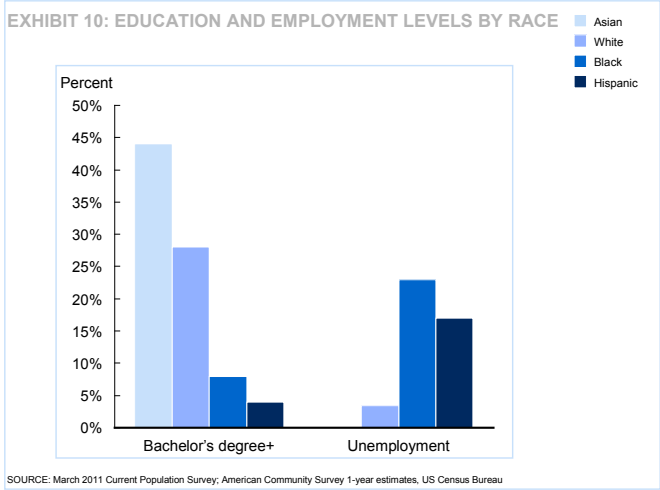




To better align the region's educational attainment levels with the future demands of the regional economy, we must encourage the low skilled population to get post-secondary school training in fields and occupations that are in high demand by the region's asset sectors. For the most highly skilled workers, Buffalo Niagara can also emphasize sector-specific Strategies to retain local talent and attract additional high-end workers from beyond the region.

- **Firm-worker matching and worker mobility.** In a dynamic and rapidly innovating economy, workers change jobs more often, and job and skill requirements are changing more quickly and becoming more specialized. As a result, workers are often required to move efficiently from one role to another, either in the same company or another, and upgrade their skills through employer-recognized programs (e.g., skills certifications). The training and education system must nimbly modify programs to meet these demands and to reflect the mobility of workers among occupations, industries and firms.

- **Matching skill sets.** In Buffalo Niagara, the degree to which workers are able to transfer their skills to appropriately matched jobs varies by skill level. Because they account for a relatively small share of the region's unemployed, mid-level skilled workers appear to be relatively well equipped for existing jobs, whereas the opposite is true for low-skilled workers, who are disproportionately unemployed compared to the national average. Nationally, the most highly skilled segment of workers tend to experience lower unemployment than other workers, but in Buffalo Niagara, this segment experiences an above-average rate of unemployment (29% unemployed vs. 20% nationally).[52] The unequal levels of employment at the low and high-skill ends of the spectrum indicate a mismatch in the types of skills possessed by workers. Better matching and redeployment of the region's workers can be enabled through efforts that include improved access to real-time labor market data; targeted, employer-driven training and up-skilling of workers; and increasing the number of skills certification programs that validate knowledge gained through non-traditional education and training.



- **Inclusiveness and opportunity.** The most productive regions ensure that all workers of all skill levels, socioeconomic groups and geographies have opportunities to participate and progress in the labor force. An inclusive economy has a variety of entry-level job opportunities, a mix of jobs that is relevant to a range of skill levels, and opportunities for workers to gain additional skills that increase their career and earning potential. The Buffalo Niagara region faces challenges in deploying all segments of its workforce population, especially minority populations with lower educational attainment (Exhibit 10),[53] and geographic and transportation barriers to accessing employment opportunities (discussed in more detail as it relates to the infrastructure enabler).

Buffalo Niagara can grow inclusively through targeted, employer driven training aimed at underemployed segments; by improving skills certifications and industry job ladders; by reducing geographic isolation from jobs; and other strategies discussed below.

Innovation and Entrepreneurship

A knowledge based economy, heightened competition in globalized markets and the quickening pace of change make continual innovation imperative for economic success. Innovation often occurs along an iterative process as ideas are developed and tested, and products are developed and commercialized through new and existing businesses (and particularly clusters).[54] An ecosystem that fosters this activity is characterized by cross-sector (public, private, institutional)

and multi-disciplinary networks that facilitate knowledge exchange and collaborative problem-solving. The Buffalo Niagara region is progressing, and has opportunities to accelerate its success along two key dimensions of commercialization and business creation:

- **Commercialization.** To generate economic value, the new products and processes created through applied R&D must be introduced into the marketplace. At this stage of the innovation process, networks linking innovators, entrepreneurs, investors and other business development and support services are increasingly important to ensure that the innovation reflects market demand, and to create a viable strategy for roll-out.

  The Buffalo Niagara region has significant investment in academic research that could provide an opportunity for applied innovation. The Buffalo Niagara region boasts $350 million worth of NSF academic R&D activity, housed primarily at the University at Buffalo campuses, which places it among the top third of the 100 largest U.S. metros in academic research expenditures. The majority of the region's academic R&D is in the life sciences (66%) and engineering (17%), fields that offer ample opportunity for new discoveries and applications, and are well-aligned with the region's asset sectors. [55] However, anecdotal evidence suggests that connections between private industry and research institutions have eroded in recent years.

  The Buffalo Niagara region has struggled to commercialize its innovations. Both public- and private-sector institutions apply for and receive fewer patents than most other U.S. regions, generating 14 patents per 1,000 people – far less than top performers, which are able to generate an average of 26 per 1,000. Local companies cite difficulties in transferring Intellectual Property when doing facility based research, limiting the incentives for technology transfer. The level of venture investing is far below peers (the region ranks 3rd from the bottom on nationwide comparisons),[56] and the limited venture capital community that does exist is largely focused on funding expansions rather than startups (only 23% funded startups in Q2 2012). To commercialize more of its innovations, the Buffalo Niagara region needs to simplify the movement of technology from the lab into the marketplace, and strengthen connections between innovators and mentors, funders and other supports that can help them navigate the path from idea to market.

- **Entrepreneurship.** Entrepreneurs take commercial ready innovations to market through new business formation. This is especially important as many technology-enabled fields offer low barriers to entry, and the agility of small enterprises makes them more able to adapt and redeploy their assets to keep pace with changing market dynamics. The Ewing Marion Kauffman Foundation released a study showing that newly created and young companies are a primary driver of job creation in the U.S.

In the Buffalo Niagara region, entrepreneurial activity has tended to lag the nation and peers, on measures ranging from small business births (declining)[57], business churn (below the rate of other large metros)[58], startups arising from institutional IP and venture capital funding (0.29% of all Q2 2012 VC deals).[59] The region is in the very early stages of transforming toward a next-economy entrepreneurial environment. Efforts to progress along this path can be facilitated

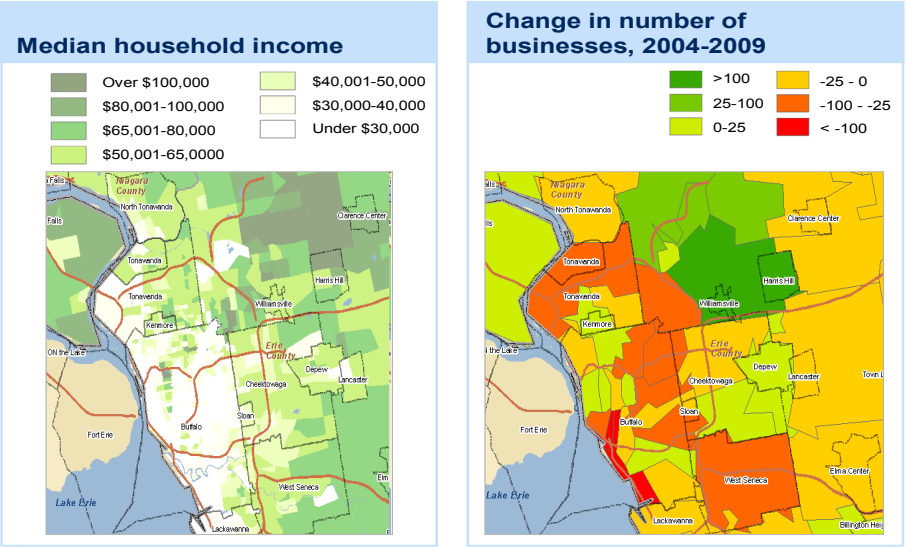
through cluster- or technology focused business incubators, engagement of serial entrepreneurs as expert mentors and guides, and improved access to stage-specific financing.

Efficient Infrastructure and Livable Cities

The physical infrastructure that supports ongoing success is one that provides employers and workers with timely and reliable access to each other and to other regions around the world. Dense, mixed-use, mixed-income communities with excellent transportation and virtual connections are best positioned to support the transition to a productive, sustainable and inclusive economy.

Throughout the 20th century, the Buffalo Niagara region – like regions across the U.S. – sprawled and developed a large and fragmented footprint. Decades of losses in heavy industry and population have created a deteriorating urban core with dying businesses and lower levels of income (Exhibit 11). But, while the region's population decreased in recent decades,[60] its physical area grew very fast,[61] and today vacant, underutilized brownfield sites abound.[62]

EXHIBIT 11: MEDIAN HOUSEHOLD INCOME AND NUMBER OF BUSINESSES



SOURCE: ESRI; 2009 and 2010 American Community Survey ACS 1 year estimates

Fortunately, Buffalo Niagara also benefits from several core strengths in this regard. Buffalo Niagara is among the easiest cities in America to navigate and, according to the Texas Transportation Institute, has the least congested automobile commute time of any peer city in the U.S. This provides substantial quality of life benefits, particularly for younger families. In addition, legacy features of the region's early city planning efforts – such as the radial and grid street system and parks – provide an ideal canvas for revitalizing and reconnecting dense, mixed-use, walkable neighborhoods. Much of the region's excess land supply is located along industrial corridors.[63] The region has already made progress creating well connected neighborhoods for commercial and residential activity, including plans for waterfront redevelopment, a land bank, and the Buffalo Comprehensive Plan, which contemplates about $300 million annually in capital investments and other economic development projects through 2020.

The mismatch between jobs and housing, however, is a particular issue for workers reliant on public transit, which provides inadequate access to job centers, including those with entry-level/low-skilled opportunities. Buffalo Niagara can reduce its jobs-housing mismatch by revitalizing the central city neighborhoods with commercial, residential and public development and finding more efficient means to transport workers to job opportunities that may not be in their immediate proximity.

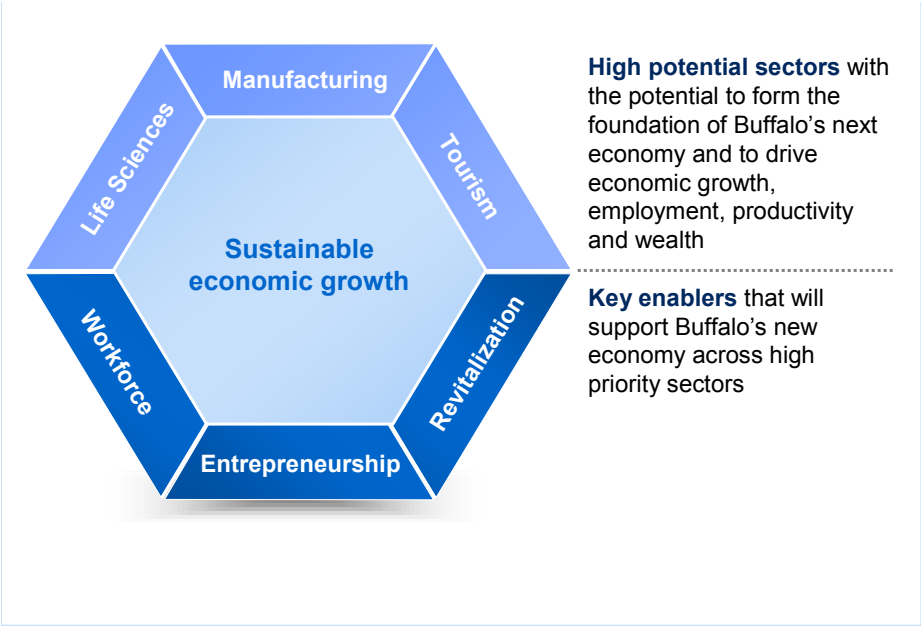
Governance

Government shapes and enables market activity, and provides critical public goods and services that enhance firms' productivity and efficiency, ranging from roads to education. Along with civic, private-sector, and cross-sector institutions, it also creates the environment and culture that informs regional economies. Public and civic institutions that work collaboratively, embrace transparency, and provide public services efficiently can enhance regional competitiveness by making it easier for businesses to thrive.[29] Public and civic institutional actors need to (i) coordinate and cooperate with streamlined services and efficient operations; (ii) embrace transparency in a welcoming climate that encourages business and labor engagement in civic institutions and networks; (iii) provide a strong tax value proposition that gives businesses and households high value public goods and services in return for their tax dollars, such as infrastructure, education, and public safety; and (iv) continually adapt to changing economic conditions to best support the growth.

Government in the Buffalo Niagara region is highly fragmented, resulting in costly and often duplicative service provision. While less fragmented than the nationwide average, the region ranks 61st among the 100 largest U.S. metros in terms of fragmentation. No regional planning authority exists, and each of the region's 64 municipalities wields independent planning powers, which leads to inefficient and piecemeal physical development. Several special-purpose districts have been created to provide services at the regional scale, but their limited functional scope has further fragmented planning in areas such as housing, transportation and industrial development. Opportunities exist to adapt the Buffalo Niagara region's government structure and operations to become more efficient by employing new technologies to reduce costs and improve service delivery, and by engaging in greater inter-governmental cooperation and consolidation, particularly around region-wide issues.

III. WHICH STRATEGIES AND INITIATIVES CAN BUFFALO EMPLOY TO SEIZE GROWTH OPPORTUNITIES?

SIX STRATEGIES FOR SUSTAINABLE ECONOMIC GROWTH



The assessment of Buffalo Niagara's sector assets and cross-sector enablers leads to six high-level Strategies specifically designed to leverage the region's unique assets and move the region forward on the path to next-economy growth. The Strategies are mutually reinforcing, and together provide a framework that encompasses, contextualizes and aligns existing efforts, and guides future economic growth Initiatives.

STRATEGY 1: Buffalo Niagara will accelerate the growth of the specialized subsectors that are well positioned for high growth in a globally competitive manufacturing sector by supporting R&D activities, while improving the competitiveness of the broader regional manufacturing industry by enabling cross-cutting productivity and export interventions.

- **Innovate:** Increase access to applied research and scaled testing facilities for new product/process development
- **Improve productivity:** Enable adoption of more effective operational processes to drive greater resource efficiency
- **Grow market expansion:** Provide export assistance to small-medium manufacturers
- **Support workforce readiness:** Prepare an appropriately skilled workforce to meet manufacturer labor needs

STRATEGY 2: Buffalo Niagara will accelerate health and life sciences commercialization in the region by leveraging its unique areas of excellence. This new level of commercialization will be achieved by creating an environment conducive for small, medium, and large health and life sciences companies to start, grow, and invest in Buffalo Niagara.

- **Commercialize:** Support and enable innovation, translation and commercialization of research in high impact and growth areas
- **Attract and retain:** Create a positive ecosystem and platform to attract and retain medium and large health and life sciences companies to grow alongside research and individuals of Western New York
- **Develop human and physical assets:** Continue to develop the physical infrastructure and human capital needed to accelerate innovation and a thriving ecosystem

STRATEGY 3: Buffalo Niagara will generate significant near-term economic growth by enticing tourists to stay longer and spend more while experiencing the natural, cultural, heritage, architectural, and retail offerings throughout the entire region in addition to the natural wonder of Niagara Falls.

- **Invest in a cohesive regional strategy:** Invest in market research and a regional marketing program to enhance tourist awareness of the entire region's tourist sites and improve connectivity; based on market research, invest in Buffalo assets that appeal to Buffalo Niagara visitors
- **Enhance the experience at the State Park:** Upgrade tourist programming at the State Park in way that is authentic to the strengths and heritage of the region
- **Invest in the tourist experience in the City of Niagara Falls:** Invest in re-developing the 3-block radius in the City of Niagara Falls adjacent to the State Park

STRATEGY 4: Buffalo will become a place where entrepreneurs from a multitude of backgrounds are eager to start a business, are ready to grow it aggressively because it is easier here than elsewhere, and are strongly attracted by investment opportunities. The region's high-profile new business plan competitions will attract talent and capital, make doing business easier and change public perceptions about the city – regionally, nationally, and globally.

- **Help more businesses start:** Attract more ideas, more support and better links to venture funding
- **Make Buffalo Niagara an easy place to grow a business:** Provide better support, stronger sector networks for collaboration, and regulations that are smarter and easier to navigate
- **Attract more investment:** Attract venture capital through structures and incentives that reduce risks and make it easier for funders to connect with good ideas
- **Encourage inclusive opportunity through MWBE entrepreneurship:** Provide training and support to ensure entrepreneurship opportunities extend to all

STRATEGY 5: Align the skills of all of Buffalo Niagara's workers regardless of skill level, geography or race, to the career paths, certificates and degrees required for growth in core industries, such as manufacturing, healthcare, and tourism, and beyond by creating the most flexible, industry-demand-driven training environment.

- **Rapidly up-skill existing workers:** Expand programs that rapidly train workers with the skills needed today
- **Align skills to industry demand:** Align education and training programs with the skills and career paths required for jobs
- **Grow the skills pipeline:** Increase attainment of employer-demanded skills at all stages in the skills pipeline by encouraging and providing support to students and workers to develop these skills

STRATEGY 6: The Buffalo Niagara region will combine State, local and private sector resources to make targeted capital investments in priority "turn around" areas with a specific focus on disadvantaged neighborhoods, areas where the presence of anchor tenants reduce development risks and community-owned assets that enhance attractiveness and livability of Buffalo.

- **Invest in housing:** Focus investments on pools of single family homes or multi-family complexes that build off of other investments being made in the target neighborhoods
- **Build or enhance infrastructure:** Build or enhance functionality of supporting infrastructure, including through the use of technology or environmentally sustainable approaches, materials or products
- **Support common assets:** Ensure that high potential quality of life impact assets (e.g. waterfront; public parks) are improved
- **Encourage public private partnerships:** Utilize creative approaches to financing, operating and maintaining assets

These Strategies are designed to guide investment and effort from the private, non-profit and public sectors. The Buffalo Billion can support them through launching the Signature Initiatives throughout the next five years. Each Signature Initiative is a concrete enterprise that provides specific products and services to meet needs or leverage opportunities identified through the assessment of the region's economic performance. Signature Initiatives represent the most compelling and high-impact opportunities identified through the assessment of the region's assets, challenges and opportunities. Note that Signature Initiatives should not supplant efforts already underway in the region, but rather augment ongoing work.

Six Wave 1 Signature Initiatives have been identified to begin the plan's implementation through launch in Year 1.

The six Wave 1 Signature Initiatives are:

(1) Buffalo Niagara Institute for Advanced Manufacturing Competitiveness

(2) Buffalo Science Productivity and Research Catalyzer (SPaRC)

(3) Buffalo Niagara Tourism Program

(4) Buffalo Niagara Skills Partnership

(5) Buffalo Breakthrough Business Challenge (B3C)

(6) Better Buffalo Fund

Each year, new Signature Initiatives can be supported based on a refresh of the market analysis and Strategies. Initial ideas for future investment have been identified but not chosen.

IV. WAVE ONE SIGNATURE INITATIVES

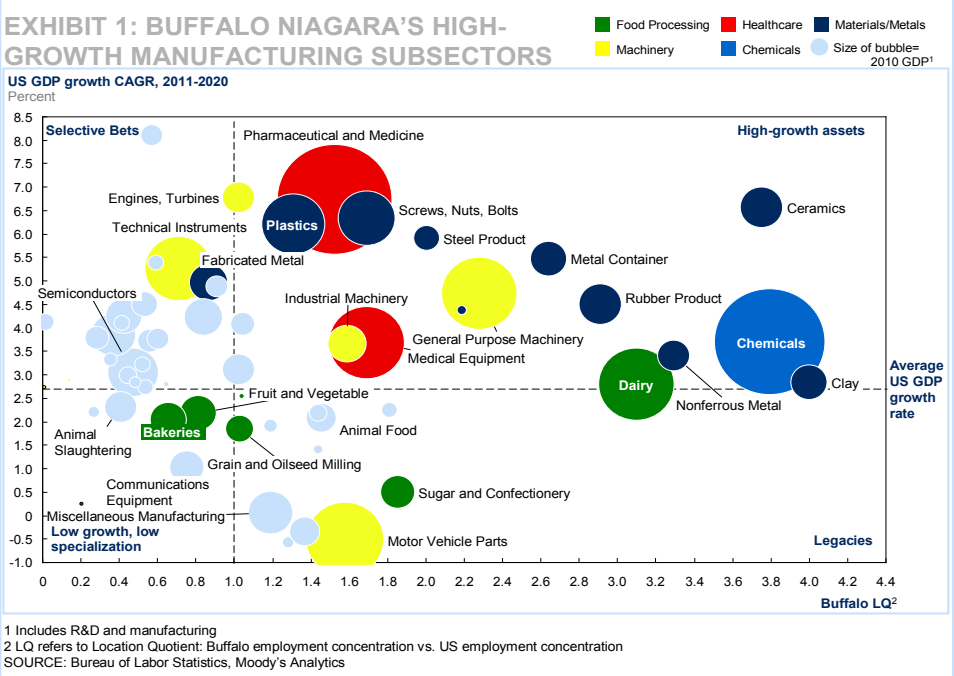
Advanced Manufacturing: Buffalo Niagara Institute for Advanced Manufacturing Competitiveness

VISION

Buffalo Niagara will be a nationally recognized hub of advanced manufacturing innovation, with particular emphasis on competitive areas such as advanced materials (e.g., applications in green tech and medical tech), machinery (e.g., aerospace and medical devices), and chemicals (e.g., powder atomization).

CONTEXT

The manufacturing sector in Buffalo Niagara continues to be an important component of the region's economy. The industry has significant scale, with 50,000 manufacturing workers in Buffalo Niagara providing the third largest GDP output among industries in the region.[1] The city's manufacturing is further differentiated by its specialties in several growing subsectors such as materials, machinery, medical devices and chemicals (Exhibit 1), and by its access to low-cost hydropower from Niagara Falls.



[1] Moody's Analytics

But manufacturing in Buffalo Niagara has declined over the last three decades. Both GDP and employment have decreased faster than the U.S. manufacturing average during that time. Low productivity (9% lower than the U.S. average)[2], slipping exports (exports fell from 11.6% to 9.9% as a percentage of GDP in the last three years and are below the U.S. average of 10.7%)[3], and stagnant innovation (only 25% of surveyed local manufacturers felt their company improves faster than its industry) [4] all hamper Buffalo.

STRATEGY

Buffalo Niagara can accelerate the growth of the specialized subsectors that are well positioned for high growth in a globally competitive manufacturing sector by supporting R&D activities, while improving the competitiveness of the broader regional manufacturing industry by enabling cross-cutting productivity and export interventions.

- **Innovate**: Increase access to applied research and scaled testing facilities for new product/process development
- **Improve productivity**: Enable adoption of more effective operational processes to drive greater resource efficiency
- **Grow market expansion**: Provide export assistance (domestic and international) to small-medium manufacturers
- **Support workforce readiness**: Prepare an appropriately skilled workforce to meet manufacturer labor needs

WAVE 1 SIGNATURE INITIATIVE: BUFFALO NIAGARA INSTITUTE FOR ADVANCED MANUFACTURING COMPETITIVENESS

The Buffalo Niagara Institute for Advanced Manufacturing Competitiveness ("Institute") would be a commercially viable facility that conducts applied R&D to spur the growth of Buffalo Niagara's manufacturers. It can also be a co-location facility for strategic industry partners. This entity would be especially helpful to the region's 1,500 small- and medium-sized manufacturers[5], and can attract forward-thinking manufacturers from across the country. The Institute's greatest assets, expert research engineers and state of the art equipment, would be carefully selected. A high-profile talent search can recruit researchers both at the local and national levels, while the manufacturing consortiums and an expert advisory panel would select relevant equipment. The Institute would provide four

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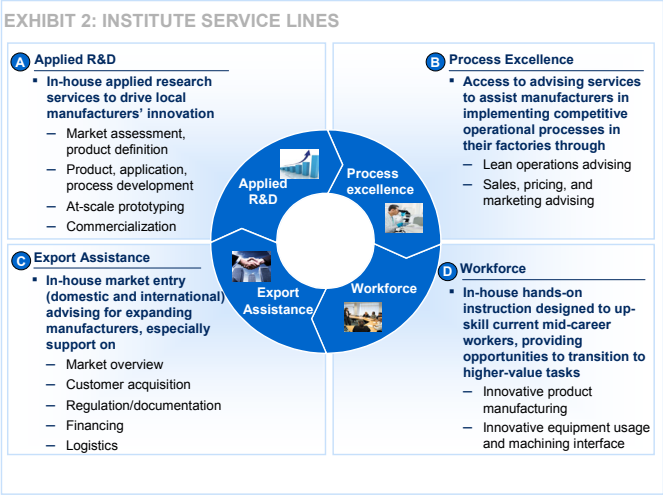
[2] Moody's Analytics

[3] Brookings analysis of data from BEA, USITC, Moody's Economy.com, IIE, IRS

[4] Survey of 60 regional manufacturers

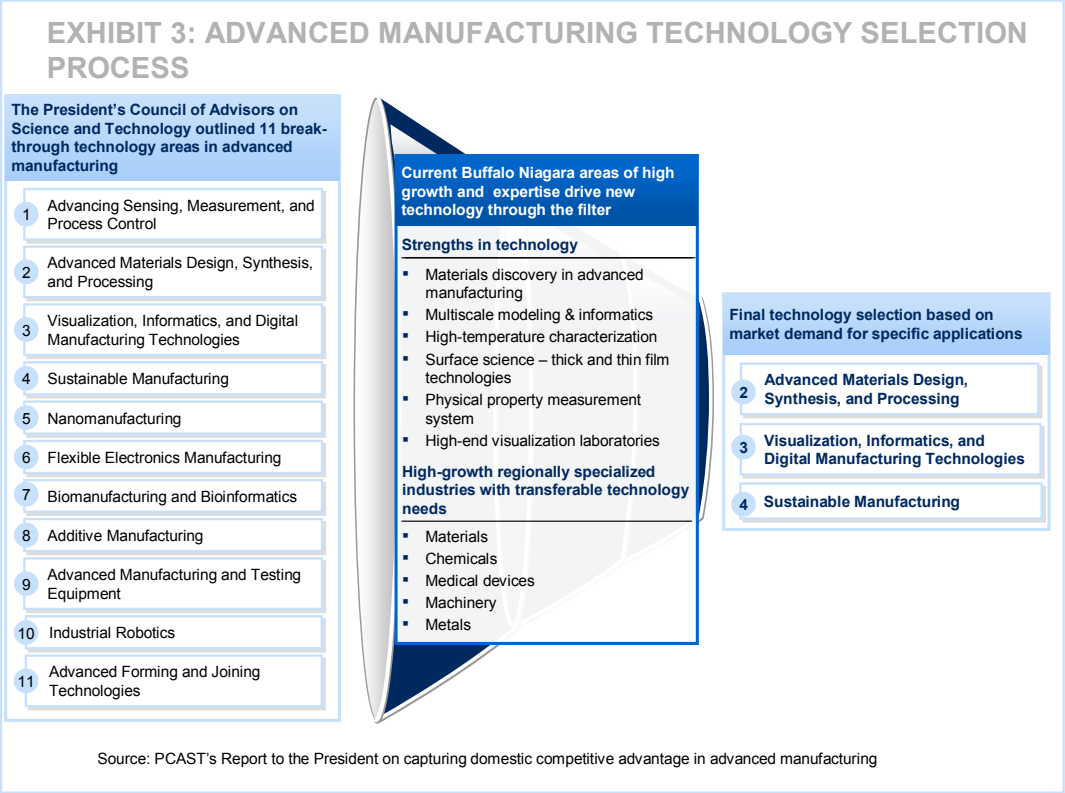
[5] Census Data

primary services (Exhibit 2).



The four services are described in more detail below.

Applied Research and Development: The Institute's most important service would be to conduct applied research and development in its shared facility, focusing on leading-edge manufacturing technologies[6] (Exhibit 3). An expert advisory panel, comprised of leaders from anchor members of the Institute, local universities, and national experts would select the Institute's technology focus and research agenda and align it with the region's highest-potential subsectors (Exhibit 4) and Buffalo



Niagara's existing research assets and SPaRC (see health and life sciences Initiative)**.** After this research agenda is set, manufacturers contract with researchers for applied R&D services to design and commercialize competitive products, applications and processes. Members can either

[6] These reflect the 11 technologies recommended by the President's Council of Advisors on Science and Technology

enter into a fee-for-service arrangement, in which the Institute delivers a tailored R&D solution, or join a consortium where they co-invest with fellow manufacturers, academic institutions, and government bodies to purchase equipment and researchers to carry out cost-intensive projects.

EXHIBIT 4: APPLIED R&D VALUE CHAIN

	Market overview	Customer acquisition	Regulation/ documentation	Financing	Logistics
What falls into each component of the value chain?	**Business cases for entering new market** (e.g., southern Ontario, new U.S. commercial markets, and public sector contracts) are based on regional market size, trends, and competitive landscape	**View of landscape of distributors / customers,** is developed and a branding strategy, facilitating introductions is put in place	**Legal hurdles** (e.g., meeting international shipping specifications) are navigated and assistance in filing paperwork requirements for export market entry is provided	Institute helps navigate **existing financing opportunities** (e.g., loans, public incentives, venture capital) to ramp up operational capacity and enter markets	**Efficient transportation/ distribution network** are identified and optimized around cost, reliability, and operational complexity
How would a manufac-turer use this service line?	Institute's internal **markets team reviews current and prospective product portfolio** and matches it to market entry/ strengthening opportunities both in the U.S. and abroad	Institute leverages **partnerships in key local markets** to build customer profiles, works with manufacturers to build key customer relationships	Manufacturers access **simplified playbooks** of navigating legal steps to export goods and are directed towards local experts in the field	Institute introduces manufacturers to **universe of financing opportunities** (e.g., Ex-Im Bank)	Institute leverages partnerships with ports, **introduces portfolio of T&L options**, connects with T&L advisors where appropriate

Process Excellence: The Institute would facilitate access to external advisors who can help members improve their operational productivity (e.g., through lean operations) and boost revenue (e.g., through improved sales, marketing, and pricing).

Export Assistance: The Institute would help members improve exports and other market entry strategies, especially through fee-for-service support that helps analyze potential markets, acquire customers, understand regulations, obtain financing and manage logistics. Advisors from the Institute can help manufacturers develop tailored export strategies and leverage the Institute's relationships wherever relevant, either at the local (e.g., Export Assistance Center) national (e.g., Export-Import Bank) or state level.

Workforce: The Institute can engage manufacturers that need to upskill their workforce to perform operations that are more complex. It would leverage the equipment in the Institute to provide hands-on instruction to help mid-career workers learn the tasks demanded by advanced manufacturing processes.

Elements of the Institute could operate virtually to improve ease of access. The Institute could be developed and operated by an already established innovation enterprise (e.g., Fraunhofer, EWI – selected by competition). Such a partner would contribute not only a strong brand, but also valuable institutional knowledge, industry contacts and operational experience.

SOURCES OF INSPIRATION

Fraunhofer Institutes are a network of 70+ research institutes co-located with universities in Germany and the U.S. These institutes perform applied research that develops competitive innovations for manufacturers; each institute has a specific technology focus (e.g., manufacturing

automation) that adapts constantly to manufacturers' demands. These Institutes serve all sizes of manufacturers, from startups to Fortune 100's, and are dedicated in helping customers navigate all potential federal and private financing opportunities in order to cover the Applied R&D costs. They rely on 30% government grants; public/private contract research covers the rest of their $1.9 billion budget. The average operating budget for an Institute is ~$27 million. Fraunhofer Institutes become more sustainable and contribute to their regional manufacturing ecosystem by regularly developing intellectual property and spinning out startup companies from the Institute.[7]

The **Edison Welding Institute** (EWI) is a research commercialization institute in Columbus, Ohio. EWI serves its 1,300 member companies by providing innovation solutions through individual fee-for-service projects and cross-sector co-investment consortiums. The Applied R&D projects draw on 20 breakthrough material-joining technologies (e.g., additive manufacturing, laser-arc welding) on $20 million worth of in-house equipment. EWI is a 100% self-sustainable non-profit enterprise, achieving its self-sufficiency by drawing in a broad base of customers, small and large, regional and non-regional. Beyond driving their customers' greater competitiveness through innovation, EWI also leverages their in-house machinery to host training workshops for manufacturers on advanced welding processes.[8]

CNSE's Albany NanoTech Complex is a fully-integrated research, development, prototyping, and educational facility that provides strategic support through outreach, technology acceleration, business incubation, pilot prototyping, and test-based integration support for onsite corporate partners. CNSE is located within a 800,000 square foot complex that houses the most advanced 200mm/300mm wafer facilities in the academic world, including over 80,000 square feet of Class 1 capable cleanrooms equipped with 300mm wafer processing tools. The complex incorporates state-of-the-art, R&D and prototype manufacturing infrastructure for nano/microelectronics, nanophotonics and optoelectronics, nano/micro systems (MEMS) and nanopower science and technology. Faculty and students have access to leading edge tools in metrology, lithography including EUV lithography, front-end-of-line and back-end-of-line processing. Qualified instructors and trained technicians help students and faculty master the tools and equipment and carry out their own experiments. Companies worldwide are drawn to CNSE by its single business paradigm that allows them to tap into technology, tools, and intellectual capital specific to the needs of their organization.

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[7] Fraunhofer interviews, Fraunhofer Annual Report, 2011

[8] EWI website, EWI IRS Form 990

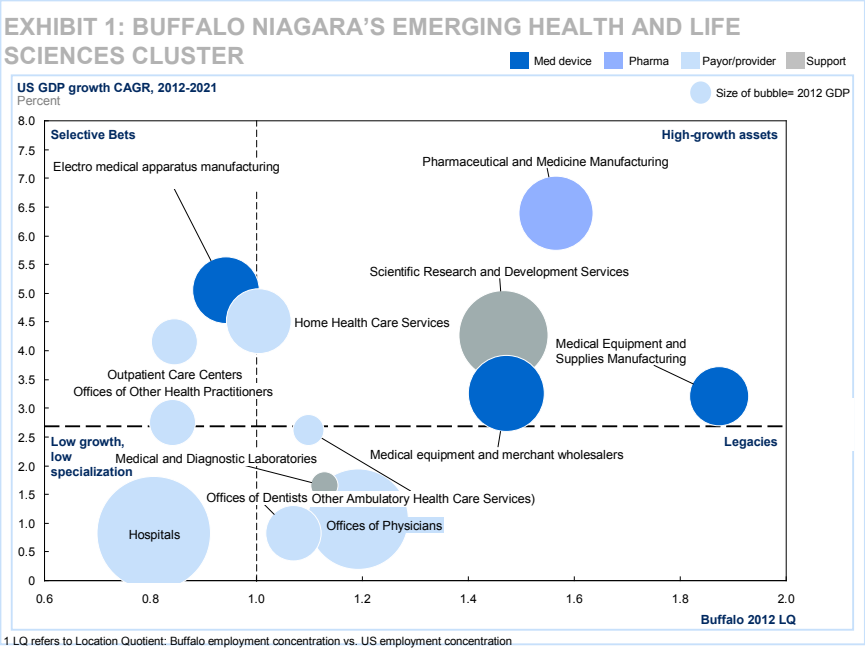
Health and Life Sciences: SPaRC

VISION

Buffalo Niagara will be one of the ten fastest growing regions for health and life science companies in the U.S., with a world-class research translation and commercialization process emulated worldwide.

CONTEXT

Healthcare makes up 18% of the national economy, has grown 2.4% faster than GDP since 1970, and is projected to grow 1.1% faster than GDP through at least 2020. It employs over 74,000 people in Buffalo Niagara – nearly 20% of the region's population. Three primary areas of the life sciences industry are particularly important and show specialization in Buffalo: pharmaceutical manufacturing, medical devices and scientific research (Exhibit 1). The life sciences community also has a strong base for growth: ~260 life sciences companies, that plan to invest more than $300 million in health and life science infrastructure over the next 4 to 5 years, are based in Buffalo Niagara. In addition, more than two-thirds of the $350 million that Buffalo Niagara's institutions (such as UB and Roswell Park) receive in research funding is for life sciences.[9]



However, opportunity exists to grow the private sector by better leveraging investments in health and life sciences infrastructure, whether in patent production and translation or company creation, attraction and retention.

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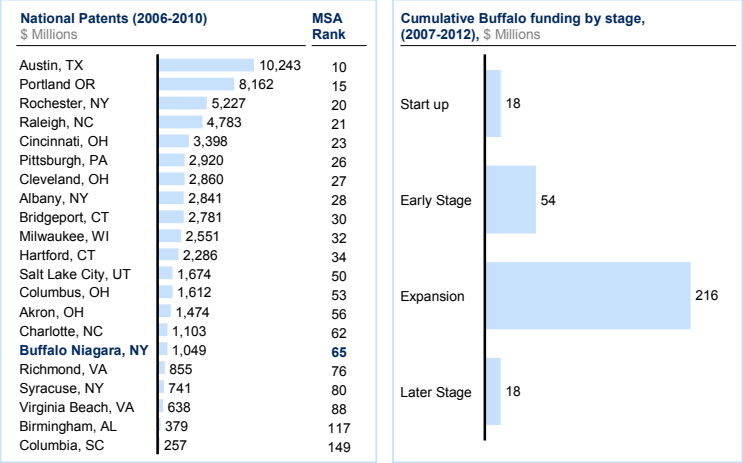
[9] Buffalo Niagara Enterprise. 'Life Sciences: Opportunities and Advantages.'; Cleveland State University. 'Upstate New York Regional Analysis: Demographics, Economy, Entrepreneurship, and Innovation'; US Patent office; Bureau of Economic Analysis

The Buffalo Niagara region ranks 87th in overall patent production for companies and institutions (Exhibit 2). Buffalo Niagara's rate of translating its significant research into new opportunities for companies or jobs is below the rates of its peer cities. Disclosures slightly lag peers and patent filings and approvals (8-20 patents/year for $300-$350 million in research from 2007 to 2011) are significantly lower than peer institutions (e.g., Arizona State, University of Cincinnati).[10]

EXHIBIT 2: BUFFALO NIAGARA PATENTS AND FUNDING PERFORMANCE



SOURCE: PWC MoneyTree

The number of life sciences startups from institutional research is low. Only 30 life science startups exist from institutional Intellectual Property (IP) in the last decade and a fair number of the companies still around remain at 4 to 5 employees. Part of the issue is that VC funding is not flowing in the region (less than $5 million VC investment annually).[11]

The region has relatively few medium and large life science anchor companies – despite its size as a health and life science cluster. These institutions fuel cluster growth by providing experienced managerial and specialist talent to small and medium companies as well as a level of security that encourages life science professionals to stay in the region.

STRATEGY

Buffalo Niagara can accelerate health and life sciences commercialization in the region by leveraging its unique areas of excellence. This new level of commercialization will be achieved by creating an environment conducive for small, medium, and large health and life sciences companies to start, grow, and invest in Buffalo Niagara.

- **Commercialize:** Support and enable innovation, translation and commercialization of research in high impact and growth areas

[10] University at Buffalo, STOR data. Association of University Technology Managers; National Science Foundation data

[11] Cleveland State University. 'Upstate New York Regional Analysis: Demographics, Economy, Entrepreneurship, and Innovation'

- **Attract and retain:** Create a positive ecosystem and platform to attract and retain medium and large health and life sciences companies to grow alongside research and individuals of Western New York
- **Develop human and physical assets:** Continue to develop the physical infrastructure and human capital needed to accelerate innovation and a thriving ecosystem

WAVE ONE SIGNATURE INITIATIVE: SPaRC (SCIENCE PRODUCTIVITY AND RESEARCH CATALYZER)

The Buffalo SPaRC enables and facilitates the translation and commercialization of current health and life sciences research in Buffalo Niagara.

It pursues three core actions:

- **Improve the IP process and transparency:** Buffalo SPaRC identifies and recommends key IP policies and regulations that are barriers to innovation and company partnership formation. This would begin with an in-depth assessment of the current pain points and their sources. SPaRC would also develop a central database to enable fast and open sharing of research portfolio with potential partners.
- **Generate and capture the value of the highly commercializable research:** SPaRC would create a 'Launch pad' fund that helps: a) currently unfunded translational research, b) provide proof of concept and prototype funds, and c) business formation support (in exchange for up to 10% equity). This builds upon existing research undertaken at institutions such as UB and Roswell Park, and helps to improve the culture of entrepreneurship. Entrepreneurs use local infrastructure for research development (e.g., lab tools, UB's super computer, and datasets) via facility-use agreements to decrease startup costs.
- **Increase the quality and quantity of research and idea generation in the Buffalo Niagara region:** Buffalo SPaRC can influence research agendas to become more commercially viable by facilitating connections between academia and industry through existing and new relationships.

SOURCES OF INSPIRATION

- ***MaRS***, a research commercialization center in Toronto, offers end-to-end services. These include: mentorship, incubation facilities, market intelligence and consulting, educational programs, commercialization grants and talent management. MaRS Innovation provides commercialization services for members. Participants include four universities, nine teaching and research hospitals and two specialized research institutions. Working directly with local technology transfer offices, MaRS Innovation has produced over 700 novel disclosures, 20 licensable technologies and 22 spin-off companies. It works with a $10 million annual budget, and has averaged $15 million of outside invested capital annually. MaRS also

allocates over $10 million in seed funding and IP strategy support to participating companies.[12]

- ***Houston Technology Center (HTC)*** is an independent technology incubator that works with over 300 companies and institutions in the Houston region (e.g., Texas Medical Center, corporations, NASA, the City of Houston). It has a budget of $100 million and has helped over 250 companies create over 3,000 jobs. HTC clients generated over $146 million in revenues and raised almost $90 million in funding in 2010. Companies (e.g., AT&T, Verizon, Chevron, Comcast, and Shell), as well as sponsors, donors and government, support the budget.[13]
- ***BioEnterprise*** in Cleveland provides business formation, recruitment and acceleration support to grow health care companies and commercialize bioscience technologies. Companies include emerging medical devices, biotechnology, and health care services firms. 83% of the center is funded by grants and it has a budget of $5.4 million. Founded in 2002, it has created over 150 companies and generated $1.3 billion in new funding to the region. It raised technology office revenues by $210 million leading to more than 520 tech transfer deals.[14]

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[12] World Bank Group. "Venture Acceleration Network: A Review of Existing Models", Company website and interviews

[13] Company website and interviews, press search

[14] National Center for Charitable Statistics, Company website and interviews

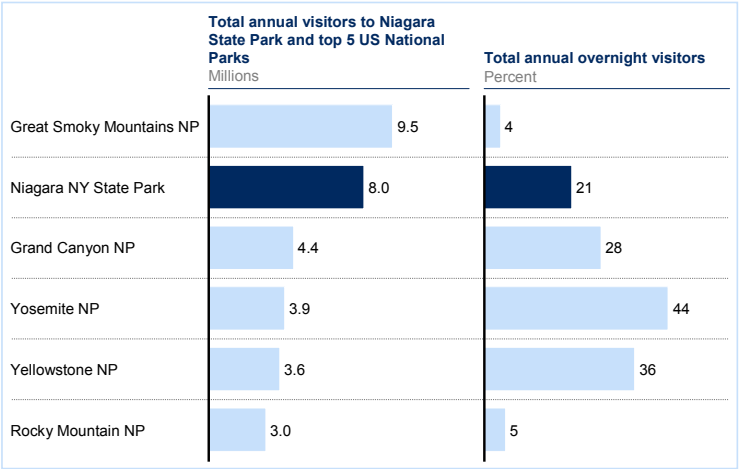
Tourism: Buffalo Niagara Regional Tourism Program

VISION

The Buffalo Niagara region will realize its potential as a top U.S. tourist destination by leveraging an unparalleled base of natural and cultural assets in a more systematic, creative and collaborative manner.

CONTEXT

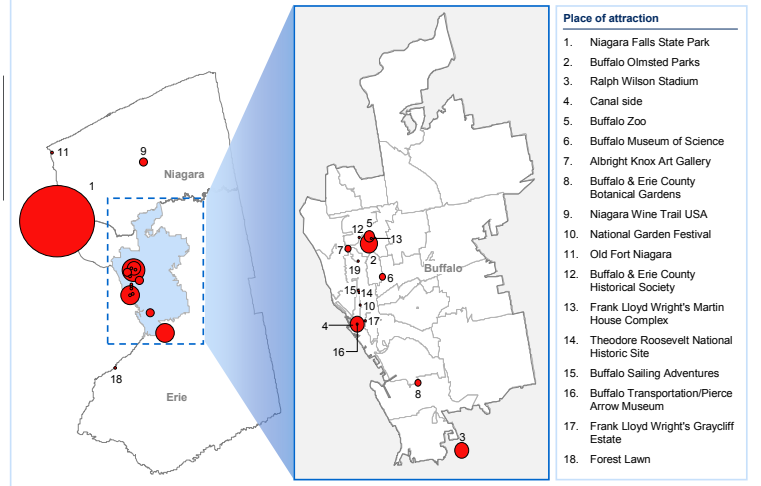
EXHIBIT 1: NIAGARA FALLS ATTENDANCE VS. TOP NATIONAL PARKS



SOURCE: Economic Impact Assessment, Niagara Falls, NY, USA Niagara, 2011; Economic Benefits to Local Communities from National Park Visitation and Payroll, 2010, NPS/US Department of Interior

Most economists agree that increased tourism is a powerful driver of near-term economic growth. In the U.S., tourism makes up nearly 4% of GDP and is projected to grow by 4% annually over the next ten years.[15] As a result, many regions include a tourism strategy as a central component of their overall economic growth agenda. However, not all regions have the same level of potential; those with significant strategic assets are at a clear advantage in terms of the potential return on efforts to increase tourism. The Buffalo Niagara region stands out in this respect with its cultural and historical assets (such as the museum corridor, Michigan corridor, and architectural sites such as Martin House), as well as unique natural assets that offer dramatic near-term potential.

EXHIBIT 2: ATTENDANCE AT KEY REGIONAL ATTRACTIONS



SOURCE: Visit Buffalo Niagara

[15] World Travel and Tourism Council, 2012 World Tourism Report

EXHIBIT 3: TOURISM SPEND IN BUFFALO NIAGARA REGION VS. PEER REGIONS

State Tourism Office Budget, 2009-10	
NY	$8 million
MO	$16.7 million
MI	$18.7 million
IL	$48.9 million

Select Metro Area Tourism Budget, 2008	Millions
Buffalo Niagara	$3.25
Lexington, KY	$4.9
Cincinnati, OH	$6.7
Milwaukee, WI	$7.1
Pittsburgh, PA	$11.1

SOURCE: U.S. Travel Association

Most notably, Niagara Falls is one of the most important tourist sites in the U.S., attracting over eight million visitors annually – nearly twice as many as the Grand Canyon. However, there have been no major investments in the State Park in a decade. Visitors to the Canadian side of the Falls spend 40% more than visitors to the U.S. side, on average.[16] In addition, only 21% of U.S. visitors spend a night at the Falls (compared, for example, to 44% of those who visit Yosemite National Park)[17] (Exhibit 1). Buffalo is also home to many arts, architectural and cultural assets, which are unknown to many visitors to the Falls (Exhibit 2). Furthermore, Buffalo Niagara doesn't share the tourism opportunities available at the level of peers as evidenced by a low marketing spend (Exhibit 3).

Additionally, Buffalo is home to exceptional architecture and cultural attractions that are draws for visitors seeking a distinctive heritage experience. For example, the Frank Lloyd Wright's Martin House Complex is the finest example of his Prairie Style, and his Graycliff is his most important summer estate. Buffalo and Erie historical society, Theodore Roosevelt national historical site, the museum corridor, and Michigan Street Baptist Church (and other Underground Railroad sties) are a few of the many rich cultural and historical attractions Buffalo has to offer tourists**.**

STRATEGY

Buffalo Niagara can generate significant near-term economic growth by enticing tourists to stay longer and spend more while experiencing the natural, cultural, heritage, architectural, and retail offerings throughout the entire region in addition to the natural wonder of Niagara Falls.

- **Invest in a cohesive regional strategy:** Invest in market research and a regional marketing program to enhance tourist awareness of the entire region's tourist sites and improve connectivity; based on market research, invest in Buffalo assets that appeal to Buffalo Niagara visitors
- **Enhance the experience at the State Park:** Upgrade tourist programming at the State Park in way that is authentic to the strengths and heritage of the region
- **Invest in the tourist experience in the City of Niagara Falls:** Invest in re-developing the 3-block radius in the City of Niagara Falls adjacent to the State Park

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[16] Economic Impact Assessment, Niagara Falls, NY, USA Niagara, 2011

[17] US Department of Interior, National Park Service, Economic Benefits to Local Communities from National Park Visitation and Payroll, 2010

WAVE 1 SIGNATURE INITIATIVES

A series of investments can be made in Wave 1 as aligned with the strategic goals.

(1) **Enhancing the Region's Marketing Efforts and Investing in Buffalo Assets.** The State can support the region's primary tourist agencies to get marketing spend on par with peer cities that spend $3 million more per year. The effort would be a two-part process. First, it would supplement current market research to further define the profiles and interests of current visitors (particularly the 8 million visitors at Niagara) by launching a detailed survey to define customer segments including programming interests (importantly including the region's cultural assets that currently exist) and willingness to spend. Second, based on the results of the market research, a new campaign can be launched to enhance current promotion efforts toward known high-value tourist segments and highlighting the rich tourist experience that currently exists in the region. It can develop a sophisticated marketing strategy that more aggressively leverages social media – Twitter, Facebook and LinkedIn among others. This will inform consumers, shape their perceptions and increase overall demand. These efforts can be launched immediately.

(2) **Niagara Falls State Park Investments**: The State can upgrade the Park with site improvements and additional programming. It can be done in a way that is authentic to the strengths and heritage of the region and provides new activities and experiences for tourists to enjoy while visiting the Falls. For example, new programming options could include bicycling, fishing, trekking, horseback riding, zip lining, rock climbing and rappelling, cross-country skiing, bird watching, and heritage and industrial-based tours with topics from hydropower to the Underground Railroad. Site improvements could include upgrades to trail paths and signage, the reuse and refurbishment of underutilized or vacant park facilities and the development of onsite lodging accommodations. These efforts can begin immediately.

(3) **The Downtown Niagara Falls Challenge:** Currently, the three-block radius in the City of Niagara Falls near the entrance to the State Park contains few tourist amenities. The State can make a series of investments over the next 5 years to support private sector development of this area. The Downtown Niagara Falls Challenge would be a competition to select a team of designers, developers and operators to execute the development of signature parcels in the downtown area adjacent to the main entrance to Niagara Falls State Park. It would invite bids from teams that could include world-renowned architects such as Gehry Partners, OMA, Diller Scofidio and Renfro, Weiss Manfredi, and Heller Manus alongside their chosen team of developers and operators. An RFQ process would narrow the field of bidders to three teams based on meeting specific development capability criteria, and generating initial architectural renditions for the downtown blocks immediately adjacent to the Park entrance. Qualifying teams would then go through an RFP process to generate the design concept for the signature parcel on which they would build and operate a mixed use facility that incorporates specific tourist-focused cultural amenities and activities. In addition, as part of this competition, teams would be asked to submit a broader conceptual vision for complementary development of surrounding blocks in the downtown area. A panel of judges including architectural experts (potentially including recognizable names from the field), a local development expert, a tourism operations expert, and a project development expert – would select the winner. The Challenge can launch

within 90 days of the State acquiring title to the first parcel for development, with the objective of naming a winning team within 12 months and completing the development of the parcel within three years. The State can fund the cost of the competition, parcel acquisition, and a subsidy for development.

An RFP process can seek private partners and their ideas for the most appropriate, impactful and highest return means of providing additional programming and site improvements at the Park. Private sector concessioners are entering into creative partnerships with an array of National and State Parks and agreeing to provide up to 5:1 matching for investments in programming and site upgrades in exchange for longer contracts. In later years, the State can invest to study the economic impact of reconfiguring the Robert Moses Parkway to open up additional acreage for programming and to reconnect the city with the Park. The State can make further investments if the resulting facts and data illustrate that such action would further enhance the tourist experience and drive additional economic development.

The results of the research also can inform the development of a regional brand and drive further site upgrades and investments across the region and in the City of Buffalo to increase tourist stay and spend. These would include targeted investments in tourist sites in the City of Buffalo and contracting with a sophisticated marketing firm to create a unified brand for the Buffalo Niagara region. The incremental increase in bed and sales tax (above current levels) could approach the State's investment, making this effort financially sustainable beyond the support of the Buffalo Billion. Further evaluations could be made to determine whether specific policy changes are needed to ensure the sustainability of these funds (i.e., share of taxes going toward tourism marketing).

SOURCES OF INSPIRATION

- ***One World Trade Center Design Competition****:* With citizen input, the City of New York launched an international search for innovative designers to reinvent the site. It led to the release of nine plans followed by an extensive public outreach campaign that included exhibits and public hearings. The City solicited input from the public at each stage of the planning process and conducted a town hall forum engaging nearly 5,000 members of the public. The Lower Manhattan Development Corporation and Port Authority of NY & NJ managed the competition.[18]
- ***Redevelopment of Chicago's Millennium Park****:* In the late 1990's, Chicago initiated a transformative project and established a partnership with the City's philanthropic community to produce a revitalized cultural venue adjacent to the central business district. Its goal was to improve quality of life and drive economic growth. The projected resulted in an estimated impact on the adjacent real estate market of $1.4 billion.[19]

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[18] SOM Freedom Tower Fact Sheet, 2005; Articles of Incorporation, World Trade Center Memorial Foundation, Inc.; New York Times; Wall Street Journal; New York Post

[19] Urban Land Institute Millennium Park Case Study

- ***City of Amsterdam Marketing****:* Amsterdam had 60+ logos and campaigns for the city, resulting in a very incoherent picture. It launched the "I amsterdam" campaign in 2004, resulting in a 6% increase in the number of investment projects in the Netherlands and the establishment of 122 new ventures.[20]

[20] www.iamsterdam.com

Entrepreneurship: Buffalo Breakthrough Business Challenge (B3C)

VISION

Buffalo Niagara will be one of the ten most entrepreneurial cities in the U.S., serving as a place where innovation and new company startups flourish.

CONTEXT

Entrepreneurship and innovation are key drivers of employment and economic growth in the U.S.[21] Buffalo Niagara has an entrepreneurial history dating back to the turn of the last century, however the region has witnessed challenging times in recent decades. The region experienced poor business growth from 2003 to 2008, when net small business starts averaged below 3% p.a. This places Buffalo Niagara 16th of 23 peer regions[22] (Exhibit 1), below comparable cities like Rochester (9%) and well below aspirational cities like Portland, Austin and Charlotte (25-30%). Issues with both business formation and idea generation contribute to the problem. For example, 60% fewer individuals and businesses in Buffalo Niagara obtained patents than elsewhere in the region: 2,300 in Buffalo Niagara vs. 8,500 in Rochester from 2004 –2010.[23]

EXHIBIT 1: BUFFALO NIAGARA'S PERFORMANCE AGAINST PEERS ON ENTREPRENEURIAL MEASURES

A low number of patents …

National Patents (2006-2010) $ Millions		MSA Rank
Austin, TX	10,243	10
Portland OR	8,162	15
Rochester, NY	5,227	20
Raleigh, NC	4,783	21
Cincinnati, OH	3,398	23
Pittsburgh, PA	2,920	26
Cleveland, OH	2,860	27
Albany, NY	2,841	28
Bridgeport, CT	2,781	30
Milwaukee, WI	2,551	32
Hartford, CT	2,286	34
Salt Lake City, UT	1,674	50
Columbus, OH	1,612	53
Akron, OH	1,474	56
Charlotte, NC	1,103	62
Buffalo Niagara, NY	1,049	**65**
Richmond, VA	855	76
Syracuse, NY	741	80
Virginia Beach, VA	638	88
Birmingham, AL	379	117
Columbia, SC	257	149

A thin VC market …

US Venture Capital funding (Q2, 2012) $ Millions	
Silicon Valley	3,230
New England	843
NY Metro	568
LA/Orange county	533
San Diego	305
Midwest	298
Northwest	247
DC	207
Southeast	200
Texas	179
Colorado	164
Sth West	96
North Central	80
Philadelphia	58
Upstate NY	**20**
Sacramento	11
South central	5

Contributes to low net start ups

Average annual net start ups (births/deaths) 2003-2008 %	
Raleigh, NC	31
Austin, TX	31
Salt Lake City, UT	29
Portland, Or	25
Charlotte, NC	25
Richmond, VA	20
Virginia Beach, VA	19
Albany, NY	16
Columbia, SC	14
Birmingham AL	13
Rochester, NY	9
Hartford, CT	5
Bridgeport, CT	4
Syracuse, NY	4
Milwaukee, WI	3
Columbus, OH	3
Buffalo Niagara, NY	3
Cincinnati, OH	2
Pittsburgh, PA	-1
Cleveland, OH	-4
Akron, OH	-6

SOURCE: US Patent Office, PWC MoneyTree, Small Business Authority

STRATEGY

Buffalo Niagara is aiming to become a place where entrepreneurs from a multitude of backgrounds are eager to start a business, are ready to grow it aggressively because it is easier here than elsewhere, and are strongly attracted by investment opportunities. The region's high-

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[21] Kauffman Foundation, 2011

[22] Akron, OH; Albany, NY; Austin, TX; Birmingham AL; Bridgeport, CT; Buffalo, NY; Charlotte, NC; Cincinnati, OH; Cleveland, OH; Columbia, SC; Columbus, OH; Hartford, CT; Milwaukee, WI; Pittsburgh, PA; Portland, OR; Raleigh, NC; Richmond, VA; Rochester, NY; Salt Lake City, UT; Syracuse, NY; and Virginia Beach, VA

[23] Statistics of U.S. Businesses (SUSB), US Census Bureau, US Patent Office, PWC MoneyTree

profile new business plan competitions aim to attract talent and capital, make doing business easier and change public perceptions about the city – regionally, nationally, and globally.

- **Help more businesses start:** Attract more ideas, more support and better links to venture funding
- **Make Buffalo Niagara an easy place to grow a business:** Provide better support, stronger sector networks for collaboration, and regulations that are smarter and easier to navigate
- **Attract more investment:** Attract venture capital through structures and incentives that reduce risks and make it easier for funders to connect with good ideas
- **Encourage inclusive opportunity through MWBE entrepreneurship:** Provide training and support to ensure entrepreneurship opportunities extend to all

WAVE 1 SIGNATURE INITIATIVE: BUFFALO BREAKTHROUGH BUSINESS CHALLENGE (B3C)

B3C is planned to be the most ambitious annual business plan competition ever launched in the U.S. It aims to attract entrepreneurs and investors from around the world to compete for prizes that would turn ideas into enterprises, accelerate growth and attract appropriate financing. Sponsorship(s) from internationally recognized early-stage venture capital firms (e.g., Sequoia, Andreessen Horowitz, Lightspeed Venture Partners) would lend credibility, financial support and key contacts for winners. Internationally recognized media sponsorships (e.g., The Wall Street Journal, Dow Jones, Fast Company, Inc.com, Forbes, BusinessWeek and MWBE-specific publications such as Black Enterprize) would promote the competition, raise the winner's profile and create buzz about the region.

The B3C would have three features: a business plan competition, an incubator and venture capital investment.

- *Establish an innovative competition:* From an anticipated pool 1,000 applicants, judges would select 200 competitors to present in-person to a panel of judges from leading VCs, media outlets and industry. After a general presentation round, up to 100 finalists would duel in an innovative format that pits business plans against one another in a tournament-style competition. The judges would select ten winners from the best plans in healthcare, manufacturing, technology, social entrepreneurship, and MWBE categories as well as the top undergraduate and "hometown" submission. Winners would receive up to $500,000 in a grant of startup capital (not an equity investment), international promotion from the media sponsor and access to the incubator (described below). Winners would be required to locate in Buffalo Niagara. The most popular idea, chosen by public vote (online and in person), would receive a $20,000 bonus.
- *Provide incubation space for winners each year:* Free for the first year to winners, the incubator would provide working space alongside other winners, cutting-edge training, volunteer mentorship from experienced entrepreneurs, world-class networks, and in-kind professional services such as legal and accounting.

- *Create attractive investment opportunities:* Winners would have access to three funding opportunities in addition to the prize money. They are: (1) introductions to leading venture capital firms who are supporting the competition through judging and mentorships in exchange for a first view of the winners; (2) the chance to receive venture funding from the Buffalo Niagara venture capital inventive fund– a fund that matches VC funds invested in Buffalo Niagara with state dollars and an equity stake; (3) Investment from the "Buffalo Crowd-Sourced Fund", which grants micro-investments from enthusiastic Buffalonians throughout the world and which is promoted through wide-spread social media campaigns.

The B3C would rely upon a full-time, committed, experienced team for this effort. The staff would need strong relationships across the country – from leading venture capital firms to the national media and with local businesses, mentors and competitors as they negotiate partnerships and investment.

SOURCES OF INSPIRATION

- ***MassChallenge****:* MassChallenge is a business plan competition that, in its third year, received over 1,200 applications annually. It accepts 111 finalist companies into a 3-month accelerator (co-working space, mentors from in-town and across the country, and rigorous training sessions) and then announces a set of winners who share in $1 million cash and $10 million in in-kind services. Since inception it helped create over 1,000 jobs. It is the largest competition and has the highest in-kind prize in the U.S.
- ***Start2Grow****:* This business plan competition held in Dortmund, Germany regularly attracts 700+ applicants. The competition commenced in 2000, has over 600 mentors, and has been responsible for over 700 companies and almost 4,000 jobs. It is a great example of using a competition to spur entrepreneurship.
- ***InvestMaryland****:* Recently launched, this is a combined business startup competition and funding source for early, mid and late-stage companies. Maryland raised $84 million that will be invested in three ways: 67% in Venture Capital Firms; 25% into the Maryland Venture Fund which injects money directly into companies; and 8% into an equity participation investment program for socially or economically disadvantaged entrepreneurs.

Workforce Development: Buffalo Niagara Skills Partnership

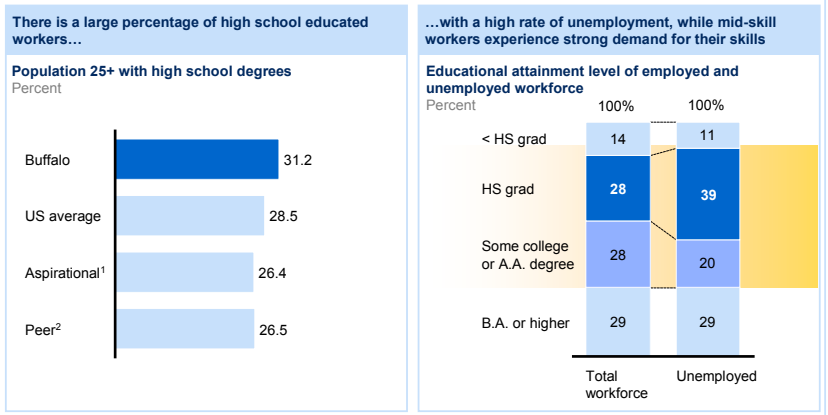
VISION

Buffalo Niagara will create the most flexible, inclusive and industry-driven workforce training environment to prepare workers for success and allow employers to grow.

CONTEXT

Buffalo Niagara has an opportunity to increase business investment and expand employment by up-skilling its workforce with the skills required in growing and hiring industries. For Buffalo Niagara's workers, 28% of which only have a high school degree, gaining the skills to meet the needs of these industries presents a significant opportunity for employment. These people make up 39% of the unemployed – a disproportionate share (Exhibit 1). By contrast, workers with slightly more skills and a certificate or Associate's degree, face strong employment demand and much less unemployment – making up 28% of workers but only 20% of the unemployed.

EXHIBIT 1: BUFFALO NIAGARA WORKFORCE DEMOGRAPHICS



1 Aspirational MSAs: Austin, Charlotte, Milwaukee, Pittsburgh, Portland
2 Peer MSAs: Birmingham, Stamford, Columbia, Columbus, Hartford-West Hartford, Raleigh-Cary, Richmond, Salt Lake City, Syracuse, Virginia Beach-Norfolk
SOURCE: 2010 American Community Survey, US Census Bureau; Current Population Survey, U.S. Census, U.S. BLS, Moody's Analytics

In addition, Buffalo Niagara can work with the minority populations to increase the share with Associates degrees or certificates. Only 8.3% of the African American population and 3.8% of the Hispanic population have Bachelor's degree or higher, compared to 27% of the white population.[24] Because the African American population is highly concentrated in the city center, training programs could concentrate their efforts on specific geographic areas to target minority populations.

The manufacturing industry is an example of an industry particularly affected by the skill shortage and the lack of regional institutions to help employers navigate the training system. Overall the region's manufacturing workforce has an educational attainment that is twice that of its national peers. However, 62% of Buffalo Niagara's manufacturers report that the workforce skills gap prevents them from filling positions coming available through retirements or from

[24] March 2011 Current Population Survey; American Community Survey 1-year estimates, US Census Bureau

expanding into new opportunities that require even more skills.[25] Furthermore, they find it difficult to navigate existing training resources; 50% of manufacturers say they are unaware of workforce programs in the region.[26]

Training programs in the Buffalo Niagara region that address these skills gaps (e.g., machining basics, advanced electronic systems, qualified welders) have jobs placement rates approaching 100%.[27] However, the programs – some as short as 15 weeks – need to expand to keep pace with growth in manufacturing positions (potentially up to 1, 400 a year)[28] and rapidly advancing technology. In addition, employers need institutions that can help them rapidly identify pools of skilled workers and training programs that meet their needs, and over the long-term influence the skills pipeline to better align with their needs.

The need for a robust skills pipeline is not limited to manufacturing. Other critical industries like healthcare and tourism present similar opportunities to increase employment and industry investment by up-skilling Buffalo Niagara's workforce. These needs are likely to expand as the economy continues to recover, retirements accelerate, and employers seek to expand in Buffalo Niagara.

STRATEGY

Align the skills of Buffalo Niagara's workers behind the career paths, certificates and degrees required for growth in core industries, such as manufacturing, healthcare, and tourism, and beyond by creating the most flexible, industry-demand-driven, and inclusive training environment.

- **Rapidly up-skill existing workers:** Expand programs that rapidly train workers with the skills needed today
- **Align skills to industry demand:** Align education and training programs with the skills and career paths required for jobs
- **Grow the skills pipeline:** Increase attainment of employer-demanded skills at all stages in the skills pipeline by encouraging and providing support to students and workers to develop these skills

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[25] McKinsey, Buffalo Manufacturer Survey, August 2012; results of a survey with 60+ manufacturers in the Buffalo region

[26] Ibid.

[27] Impact statements of Right Skills Now in at Dunwoody College in Milwaukee; Impact statements and outcome data from Erie Community College's Advanced Manufacturing Alliance

[28] Analyst estimated current job openings rate for manufacturing in the Buffalo region based on size of existing workforce and regional turnover rates; as retirements approach these openings will be filled increasingly with new rather than existing workers

WAVE 1 SIGNATURE INITIATIVES: 1) BUFFALO NIAGARA SKILLS PARTNERSHIP, 2) RAPID RIGHT SKILLING FOR BUFFALO NIAGARA, 3) SAY YES

(1) **The Buffalo Niagara Skills Partnership**

The Buffalo Niagara Skills Partnership, a "skills broker", can be an entry point for employers into Buffalo Niagara's education and workforce development system. It would coordinate and facilitate employers' experiences with the educational system for incumbent and new workers (Exhibit 2).

EXHIBIT 2: WAVE 1 WORKFORCE SIGNATURE INITIATIVES

In Year One, this would translate into three workforce development Signature Initiatives:

A. Stand up the Buffalo Skills Partnership and design initial career pathways: Incubate Skills Broker within Empire State Development (e.g., initial staff, etc.) and convene industry, education, and workforce system leaders to design initial career pathways (e.g., advanced manufacturing, life sciences, etc.)

B. Expand rapid right-skilling efforts in manufacturing (e.g., ECC 15-week program): Through the Skills Partnership, provide grants to fund additional facilities, faculty, and equipment to expand existing rapid right-skilling manufacturing training programs

C. Provide an in initial investment in Say Yes to Education: Make an initial operating investment in the introduction of Say Yes to Education (or Say Yes to Jobs) in Buffalo's public schools, including both operating and capital support

The Buffalo Niagara Skills Partnership would undertake three key activities:

EXHIBIT 3: BUFFALO NIAGARA SKILLS PARTNERSHIP SKILLED WORKER MATCHING

The core functions of the Buffalo Skills Partnership are:

1. **Matching skilled workers:** Guiding employers through the training system to find the skilled workers they need and connecting them with tailored educational programs to train those workers
2. **Catalyzing grants:** Providing targeted investments to scale and align education programs to industry-demanded skills
3. **Designing career pathways:** Through catalyzing grants, will work with educators and employers to create career pathways stretching from high school out into the workforce

The Skills Partnership would match employers with skilled workers and training programs

Employers – Looking for workers with the skills they need to grow or retain jobs

Skills Broker – Makes the match between the employer and . . .

Skilled individuals – Already in possession of the required skills and available for hire (including through WIB and workforce systems)

Training programs – Existing or rapidly customized programs capable of producing the skilled workers needed

- *Training alignment:* The Buffalo Niagara Skills Partnership can help individual industry members meet their needs by navigating Buffalo Niagara's education and training systems. It would help locate skilled workers (Exhibit 3), connect employers with existing programs, tailor new programs and advise on curriculum design across multiple educational institutions for training new and incumbent workers. As interest arises, The Buffalo Niagara Skills Partnership could also engage industry through surveys, forums and robust employer advisory boards to influence large-scale change.
- *Catalyzing grants:* Through incentive grants to the education/training community and targeted investments with clear performance metrics in scaling training programs (e.g.,

investments in curriculum design, initial faculty costs, new facilities). The Buffalo Niagara Skills Partnership could influence the flow of workforce investments (e.g., WIA, Pell, and Perkins funds) to align behind training programs that align with career and skill pathways that meet the needs of employers.

- *Career pathways:* Through the catalyzing grants, The Buffalo Niagara Skills Partnership can work with educators to develop career pathways stretching from secondary school to post-secondary, leading to industry-recognized credentials in high-need areas. An example might include a competitive grant to educational institutions to create new curricula aligned to a pathway.

(2) **Rapid Right Skilling for Buffalo Niagara**

Rapid Right Skilling is a condensed (~24 weeks) vocational, credential and internship program. It includes in-class training and internship components in critical industries and builds on existing successful programs. The program could expand programs in manufacturing, consisting of:

- *Industry partnerships*: Partnerships with industry to meet hiring needs for skilled workers by delivering applicable curricula, such as training in machining, fabrication, and industrial repair to meet manufacturers' skills needs
- *Nationally portable credentials*: Use of stackable, national credentials, like NIMS in manufacturing, to ensure rigor and increase marketability of graduates' skills
- *Community colleges*: Partner with Buffalo Niagara's community college system to deliver the program, including space, equipment, and instruction; ensure delivery in areas accessible to the region's underserved populations
- *National leadership*: Promote Buffalo Niagara's skills innovations as a national model for replication through partnerships with high-profile organizations such as Right Skills Now, the President's Council on Jobs and Competitiveness, Skills for America's Future, the Department of Labor, the Business Round Table, the National Governor's Association, and the Manufacturing Institute (which can provide additional funding opportunities); achieve national recognition for the high-skilled, competitive workforce being developed; and encourage businesses looking to relocate to consider Buffalo Niagara's talent base

(3) **Say Yes to Education**

Say Yes to Education ("Say Yes") has a 25-year track record of improving high school graduation and post-secondary education achievement through aligned academic, social, and health support coupled with a college scholarship promise. Say Yes brings together community leaders who commit to provide college scholarships for all graduates of Buffalo Public Schools who attend area colleges and to support the students so more of them graduate from high school and enroll in college.

In addition to these Signature Initiatives, in the future the Partnership could pursue several other long-term initiatives to strengthen Buffalo Niagara's workforce and attract employers. First, the Partnership could provide incumbent worker training and re-training so it can attract and/or retain employers that are expanding. They can create workforce data systems that link to education outcomes, making it easier for individuals and employers to up-skill workers. By supporting a career academy and revamping CTE models in high schools, middle schools and secondary programs, the Partnership can improve graduation and college/employment success rates. This last can go hand-in-hand with expanding career pathways to industries beyond the traditional ones of manufacturing, healthcare and tourism.

SOURCES OF INSPIRATION

Skills Brokers

- *Partnership for a Competitive Workforce*: This partnership spans Ohio, Kentucky and Indiana and focuses on meeting the current and future skills needs of employers. It has three major initiatives, including job-matching for employers, designing training programs for workers and working with education institutions on career pathways. The United Way manages the organization in partnership with businesses and workforce investment boards, while the National Fund for Workforce Solutions funds it. It currently matches between 1,000 and 1,500 individuals a year with jobs and has leveraged its initial foundation support 4:1 with other sources of workforce funding.
- *Skills for Chicagoland's Future*: This entity provides matching services to employers in the Chicago area who are looking for skilled workers, helps employers navigate the education system to find training programs that meet their needs, and works with local education and training institutions to design new training programs where there is need for new programs that meet employer needs. It has leveraged over $5 million of workforce funding from multiple sources in training the individuals it matches to employers.

Rapid Right Skilling Programs[29]

- Right Skills Now: This program is an 18-week training program in machining coupled with an eight-week internship which equips participants with a nationally recognized NIMS certificate. Participants have a 94% job placement rate with local manufacturers in the Minnesota region.
- Advanced Manufacturing Alliance: This program is a local machining training program offered by Erie Community College. It couples a 15-week training program in basic machining with internships offered by industry partners and has a ~100% job placement rate.

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[29] Impact documentation of Right Skills Now and Erie Community College Advanced Manufacturing Alliance

Say Yes to Education

- Say Yes to Education Syracuse: Syracuse is the first instance of Say Yes to Education applying a citywide model where all students graduating in the district were eligible for scholarships to area colleges, it was made possible through a public-private collaboration of the school district and city leaders. It led to a 7-percentage point increase in graduation rates, a 44% reduction in the 9th grade discontinuation (dropout rate) and a 31% increase in the 9th grade pass rate in algebra.[30]
- Kalamazoo Promise: The Kalamazoo Promise, where students receive up to 100% scholarship to public universities in Michigan, has had a significant impact in reducing the number of days of suspension and has increased African American male high school GPAs by more than half a standard deviation. Eligibility for scholarships in this program varies depending on how long the student has been enrolled in Kalamazoo schools.[31]

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[30] Say Yes Syracuse impact documentation on website; Say Yes impact documentation materials

[31] Upjohn Institute for Employment Research, *The Short Term Effects of the Kalamazoo Promise Scholarship on Student Outcomes.* August 2012

Revitalization: Better Buffalo Fund

VISION

Buffalo Niagara will build on its reputation as one of the top 10 cities in America to raise a family and become a vibrant, thriving city with modern amenities and infrastructure, convenient transportation, robust communication, high-quality services, and well-designed neighborhoods.

CONTEXT

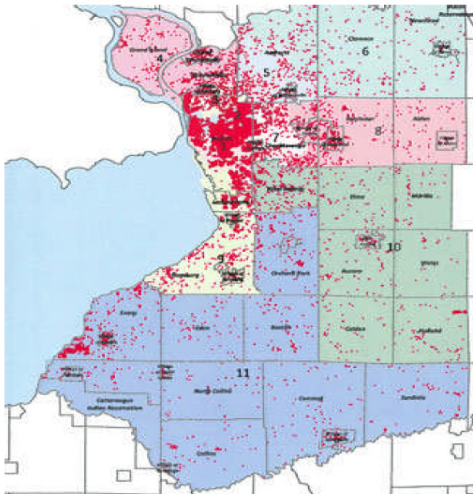
After many decades of population decline, Buffalo has the opportunity to reinvigorate the downtown area, and the region has the opportunity to redevelop potentially valuable brownfield assets. Today, 1 in 10 homes in the region are vacant, Erie County has unpaid taxes on roughly 73,000 properties and Buffalo and Niagara Falls have nearly 4,500 acres of vacant land (Exhibit 1).[32]

EXHIBIT 1: BUFFALO VACANT AND TAX DELINQUENT PROPERTIES

Overview of vacant land situation

- Buffalo and Niagara Falls have 4,467 acres of vacant land, about half of which are former residential properties
- Most of the vacancy exists in the city's urban center, where, in some areas, there are up to 500 vacant residential units per square mile
- 1 in 10 homes in the region is vacant
- Within Erie County, there are more than 73,000 liens against properties with unpaid property taxes, amounting to more than $53 million in revenue owed to the city

Buffalo tax delinquent properties



SOURCE: U.S. Census Bureau; U.S. Postal Service; University at Buffalo Region Institute and Brookings analysis; Buffalo News; Erie County Legislator

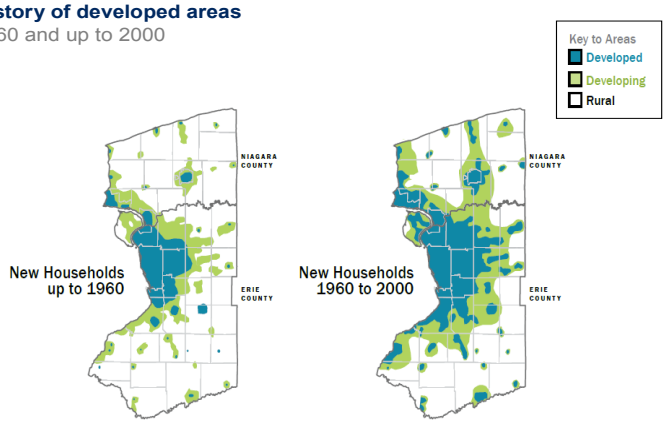
[32] U.S. Census Bureau; U.S. Postal Service; University at Buffalo Region Institute and Brookings analysis; Buffalo News; Erie County Legislator

Population decline and brownfield sites have also contributed to this problem, making it difficult for Buffalo to take steps that have lasting effects. Despite an increasingly developed region, Buffalo's population has fallen by almost 50% since 1950 (Exhibit 2). Brownfield sites pose another challenge in terms of expensive cleanup (Exhibit 3).

EXHIBIT 2: BUFFALO POPULATION DECLINE AND DEVELOPMENT PROGRESSION

Even as the population declined, the developed footprint of the region has been expanding

History of developed areas
1960 and up to 2000



SOURCE: U.S. Census Bureau/OSP Information & Data Analysis; WNY Regional Economic Development Plan

EXHIBIT 3: BROWNFIELD OPPORTUNITY AREAS

Brownfield Opportunity Areas (BOA): The New York State Department of State's BOA program helps municipalities and community-based organizations financially and technically as they create revitalization plans and implementation strategies for areas affected by Brownfield sites. The program has three steps:

- **Pre-Nomination Study:** A preliminary assessment of existing conditions, Brownfields, and the potential for revitalization. This sets the stage for detailed work
- **Nomination:** an in-depth evaluation of economic, market trends analysis and review of assets to determine the reuse potential for strategic sites
- **Implementation Strategy:** Funds a range of actions to achieve revitalization objectives by advancing redevelopment on strategic sites, improving supporting infrastructure, and promoting overall neighborhood revitalization through investment in public amenities and environmental quality

Brownfield Opportunity Area	Acres	City	Step
South Buffalo	2,000	Buffalo	3
First Ward	2,000	Lackawanna	2
Buffalo Avenue Industrial Corridor	1,800	Niagara Falls	2
Buffalo Harbor	1,040	Buffalo	2
Buffalo River Corridor	980	Buffalo	2
Highland Community	560	Niagara Falls	2
Tonawanda Street Corridor	500	Buffalo	2
Tourism Focus Area	385	Lockport	2
River Road	1,000	Town of Tonawanda	1
Sheridan Drive Commercial Strip	108	Amherst	1
Tonawanda Island	103	Tonawanda	1
Total	**10,476**		

BOAs are expensive to develop; BOA clean up can cost 3x the value of the land

SOURCE: New York State Department of State; Erie Canal Harbor Development Corporation

In recent years, several initiatives have tried to establish a framework for lasting improvement, e.g., the Buffalo Comprehensive Plan, Land Bank authorization, the Buffalo Niagara Medical Campus Master Plan and the Local Waterfront Revitalization Program.

The Buffalo Comprehensive Plan focuses on neighborhood redevelopment projects, brownfield redevelopment and smart infrastructure by supporting economic development projects of approximately $300 million per year through 2020.[33] It tries to ensure that Buffalo remains one of North America's most livable cities (ranked in the top 5 in terms of best commute and lowest cost of living). Additional financial support would help it obtain the attention and investment needed to complete its mission.

STRATEGY

The Buffalo Niagara region would combine State, local and private sector resources to make targeted capital investments in priority "turn around" areas with a specific focus on disadvantaged neighborhoods, areas where the presence of anchor tenants reduce development risks and community-owned assets that enhance attractiveness and livability of Buffalo.

- **Invest in housing:** Focus investments on pools of single family homes or multi-family complexes that build off of other investments being made in the target neighborhoods
- **Build or enhance infrastructure:** Build or enhance functionality of supporting infrastructure, including through the use of technology or environmentally sustainable approaches, materials or products
- **Support common assets:** Ensure that high potential quality of life impact assets (e.g. waterfront; public parks) are improved
- **Encourage public private partnerships:** Utilize creative approaches to financing, operating and maintaining assets

YEAR 1 SIGNATURE INITIATIVE: THE BETTER BUFFALO FUND

The Better Buffalo Fund would be a public-private financing vehicle focused on capital investments that improve disadvantaged areas in the city of Buffalo and/or develop community-wide assets. Projects can receive funding through a competitive process. In general, the fund would support actionable, high impact infrastructure, housing and other development projects that have additional committed funding from other sources. Projects would also be consistent with the existing vision for growth and sustainability laid out in the Buffalo Comprehensive Plan and other complementary plans, and build upon existing corridors (e.g., Larkinville). First year (and potentially future years) investment could focus on dedicated neighborhoods.

Organizations such as the City, County, private entities and non-governmental organizations could apply at regularly defined intervals to the Fund for grants and credit assistance to support and accelerate transformational capital projects. Empire State Development Corporation could

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[33] City of Buffalo Comprehensive Plan

oversee this program and evaluate applications with the support of an advisory board made up of key stakeholders.

Essential elements of the fund include:

- Funding:

  Approximately $20 million/year worth of assistance would be provided over a five year period under this program. The budget impact of projects funded with credit support will depend on the default risk assumed by the government in connection with the projects.

- Prior to review by the selection board, projects would be screened for:

  Readiness to ensure they demonstrate sufficient planning, approvals and capacity to implement

  Financial sustainability to demonstrate the financial capability to return some or all of the investment so it can fund future investments (this criteria does not apply for those projects receiving grants)

- Projects that pass this screen would be judged based on the following weighted **investment criteria**:

  Additional financing: Additional financial support from alternative sources sufficient to demonstrate viability and support

  Impact: Demonstration of how and to what extent the project will achieve its net benefits, including benefits to the surrounding community and the City of Buffalo overall

  Use of innovative and green technologies: Utilization of innovative new technologies or materials to improve performance, reduce operating costs and minimize the environmental impact of infrastructure

  Building on strengths: Demonstration of how the project will encourage development close to anchor institutions and employment centers and increase access to public transportation nodes, consistent with regional planning documents for growth and sustainability

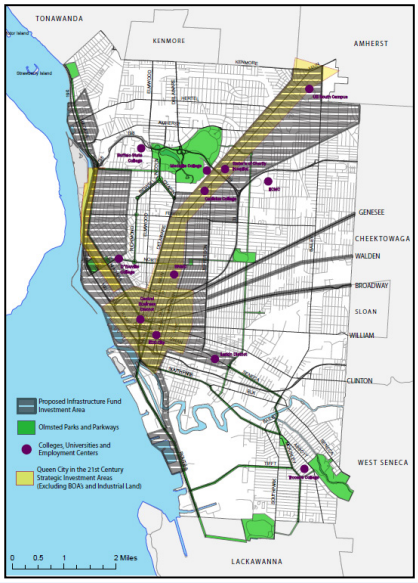
- The Better Buffalo Fund would provide startup capital for new projects that have no funding and would accelerate projects currently on locally approved capital plans. For example, it could support the waterfront development, corridor improvements such as the Buffalo Niagara Sustainable Corridor and Community Integration Project, and street improvement projects such as Cars on Main Street, Genesee Street Gateway, Ellicott Street Improvements and Fillmore Avenue Streetscape among others.

- **Geographic areas of focus**: The fund will not exclude project applications from any geographic area, but would give additional consideration to projects that are either in or that touch on major neighborhoods and corridors within the geographic areas of focus (Exhibit 4), including:

  Major neighborhoods: Central Park; Fruit Belt; West Side; Hamlin Park; Lower West Side; Buffalo Promise Neighborhood; Black Rock; Cold Springs; Perry Choice Neighborhood; Northern Downtown; and Downtown Business District

  Corridors: Niagara Street (Western); Main Street (Central); Broadway, Genesee, Sycamore and Walden (Eastern); and Seneca Street (South)

EXHIBIT 4: MAP OF BETTER BUFFALO FUND GEOGRAPHIC AREA OF FOCUS



SOURCES OF INSPIRATION

Rochester Housing Development Fund Corporation (RHDFC)*:* Created under Section 11 of the NY State Housing Finance Law, RHDFC takes title to Rochester properties and facilitates the financing needed to purchase and renovate the properties. The program increases home ownership opportunities and reduces housing costs for low-income minority families. In addition, every 20 properties rehabilitated through this process generate more than $1.8 million in broad economic benefits.[34]

New Brunswick Development Corporation (DEVCO)*:* This is a private, nonprofit urban real estate development company founded in the mid-1970's to help catalyze the revitalization of the City of New Brunswick, NJ. DEVCO has overseen nearly $1.6 billion of investment since its inception and supervised construction of public buildings, mixed-use developments, schools, apartment towers and theaters.[35]

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[34] Rochester Housing Development Fund Corporation website

[35] New Brunswick Development Corporation website; New York Times

***Ohio Community Development Finance Fund**:* This is statewide, nonprofit intermediary dedicated to creating possibilities and providing opportunities for a better quality of life. Since its founding in 1987, the Finance Fund has invested ~$200 million in housing, economic development and community facilities projects. It leveraged over $1 billion, granted over 2,500 awards to community-based organizations, redeveloped over 15,000 units of affordable housing, and created over 16,00 direct jobs.[36]

***Clean Ohio Fund**:* A public fund that restores, protects and connects Ohio's important natural and urban places by preserving green space and farmland, improving outdoor recreation and cleaning up brownfields. In doing so, it encourages redevelopment and revitalizes communities. The fund has leveraged over $10 million of investment/grant dollar by developing more than 300 former commercial and industrial properties.[37]

***Transportation Infrastructure Finance and Innovation Act (TIFIA)**:* A U.S. Department of Transportation Program that provides loans, lines of credit and loan guarantees for qualified projects of regional and national significance (e.g., highway, transit, railroad, intermodal freight and port access). TIFIA complements other financing by supporting up to 33% of the total eligible project costs and can become a junior lender; in this case, if a shortfall occurs the TIFIA loan will be repaid last. Each dollar put into TIFIA can provide approximately $10 in loans and support up to $30 in infrastructure investment.[38]

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[36] Financefund.org

[37] Clean Ohio Fund website

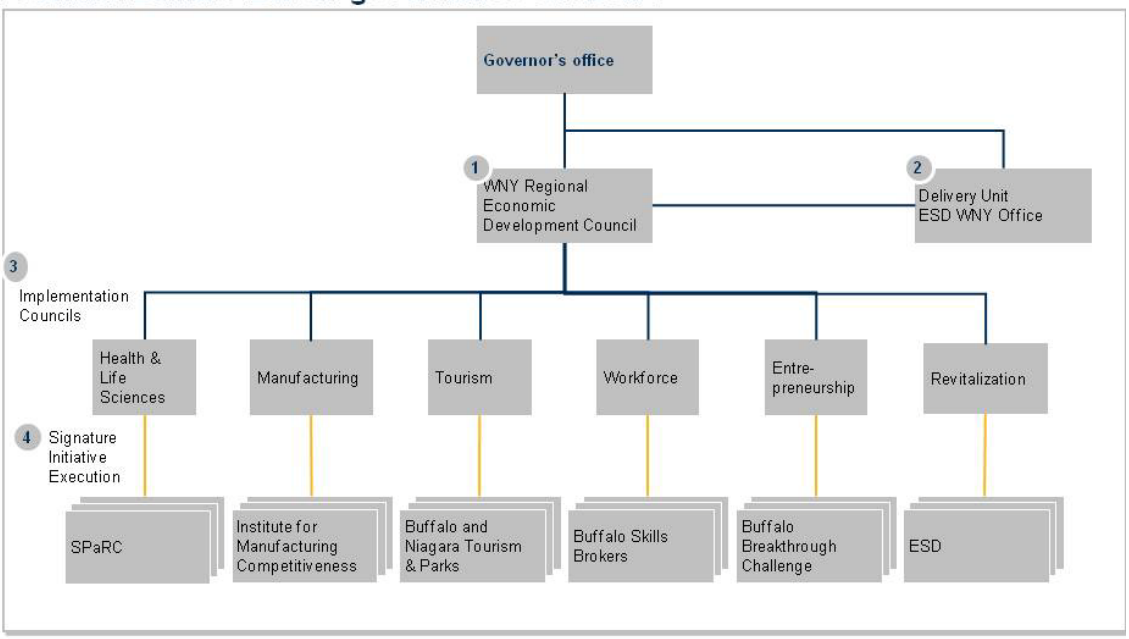
[38] U.S. Department of Transportation Federal Highway Administration

V. WHAT WILL IT TAKE TO EXECUTE THIS PLAN?

This Plan is the first step in an ongoing approach to help the Buffalo Niagara economy grow. Its continued evolution requires new institutional capacity to carry this array of activities forward. The process undertaken to develop the Plan itself, and the Western New York Regional Economic Development Council process that preceded it, have set a good example for how the community can come together to support growth.

Executing the Plan requires significant stakeholder commitment, accountability and coordination across Strategies and Initiatives. The implementation structure needs to ensure an effective balance of high-level coordination across the Plan's many components and on-the-ground development, implementation and tracking of specific Initiatives. The structure's four primary components are described below (Exhibit 30).

Potential Buffalo Billion governance structure



(1) **Governance and Funding.** The WNYREDC provides overarching governance for implementing the Plan to investing the Buffalo Billion. The Western New York Regional Economic Development Council will work to ensure that synergies are realized across the Plan's Strategies; implementation barriers are resolved quickly and escalated appropriately;

and the estimated Plan impacts and the ultimate goal of transforming the region's economy are achieved. Its key activities include creating the requisite infrastructure and securing sufficient funding sources to implement the Plan's Initiatives.

(2) **Delivery Unit- ESD WNY Office.** The Delivery Unit is the hub for the Plan's implementation activities. It provides Initiative project managers with problem-solving, planning support and guidance, and deliver upward feedback on Initiative performance. It is also be responsible for managing budget requests, Initiative design and planning for subsequent Initiatives; and communicating key information about the Strategies, Initiatives and implementation status to the broader public.

(3) **Implementation Councils.** Each of the councils is responsible for assisting and guiding the implementation of Initiatives within its assigned Strategy area; providing the Delivery Unit with progress updates; assisting with design, issue resolution and implementation; generating ideas for subsequent Initiatives for proposal to the Delivery Unit; and assisting in attraction and retention activities, including firm identification and engagement. The composition of the sub-committees vary by Strategy, but generally include business leaders and other public and civic stakeholders with expertise and networks relevant to the particular council focus, as appropriate.

(4) **Initiative Ownership:** Each Initiative has a unique ownership, legal and governance structure. Some can be stand-alone non-profits and others can be executed through an existing group. Initiative executive directors and their teams are responsible for ensuring on-time, on-budget delivery of their assigned Initiatives; augmenting Initiative designs to achieve desired impacts on or ahead of schedule; anticipating and resolving barriers to implementation; and providing input on future Initiative design and scale.

To monitor progress and make appropriate adjustments, major milestones and metrics will be created for each initiative by year. They can be monitored through tracking tools, such as progress reports. A series of regular meetings can be scheduled with WNYREDC, Delivery Unit, Strategy Sub-Committees, Implementation Councils, and Initative Owners to monitor success. The Delivery Unit provides human capital resources to assist Initiatives in course correction. Subsequent years' funding can be allocated accordingly based on meeting appropriate milestones and metrics.

ENDNOTES

1 This section provides a very high-level summary of the economics which inform the Plan, by excerpting and drawing heavily on the following sources (which provide an extensive review of relevant research and practice):

Mark Muro and Robert Weissbourd, "Metropolitan Business Plans: A New Approach to Economic Growth" (Brookings Institution, 2011); Kosarko and Weissbourd, "Economic Impacts of GO TO 2040," (Chicago Community Trust, 2011); Kosarko, Weissbourd, Wolman, Sarzynski, Levy and Hincapie, "Implementing Regionalism: Connecting Emerging Theory and Practice to Inform Economic Development" (Surdna Foundation, publication pending); "A Plan for Economic Growth and Jobs" (World Business Chicago, 2012).

2 McKinsey Global Institute, analysis of Global Insight and Economist data. U.S. GNP quintupled in 50 years, while its physical weight barely increased. "Greenspan Weighs Evidence and Finds a Lighter Economy," *The Wall Street Journal*, <http://anasazi.umsl.edu/FIN455/NonLinear/GreenspanWeighs.htm>).

3 See, "Big Data: The Next Frontier for Innovation, Competition, and Productivity," McKinsey Global Institute, 2011.

4 Consider, for example, that the companies that made up the S&P index in the 1920s would remain on the list for an average of 65 years; by the late 1990s, the average firm spent only 10 years on the S&P 500. Manyika, Lund, and Auguste, "From the Ashes: The Most Dynamic Economies Rely on Creative Destruction to Grow," *Newsweek* (August 16, 2010).

5 See Alan Berube, "MetroNation: How U.S. Metropolitan Areas Fuel American Prosperity" (Brookings Institution, 2007).

6 See Clark, Feldman, and Gertler, eds., *The Oxford Handbook of Economic Geography* (OUP, 2000).

7 From an economist's point of view, the reason for the very existence of cities, and their surrounding economic regions, is to reduce the transportation costs of goods, people and ideas. See Edward L. Glaeser, "Are Cities Dying?" (*Journal of Economic Perspectives* 12 (Spring 1998): 140). Skilled people and firms located in metropolitan areas have higher productivity and outputs than their peers located outside them. See Christopher Wheeler, "Cities and the Growth of Wages Among Young Workers: Evidence from the NLSY" (Working Paper 2005-055A, Federal Reserve Bank of St. Louis, 2005).

8 In the context of the global economy, regions are large enough to compete in international markets and small enough to provide the agglomeration benefits that flow from the geographic proximity of human capital, firms and related institutions. See, Manuel Pastor Jr. et al., *Regions That Work: How Cities and Suburbs Can Grow Together* (University of Minnesota Press, 2000); Pierre-Paul Proulx, "Cities, Regions, and Economic Integration in North America," in *North American Linkages: Opportunities and Challenges for Canada*, ed. Richard Harris (University of Calgary Press, 2003); and Peter Calthorpe and William Fulton, *The Regional City* (Washington, D.C.: Island Press, 2001).

9 2010 data unless otherwise noted.

10 Erie and Niagara Counties, as defined by the federal Office of Management and Budget

11 Analysis of Moody's economy.com data, 1980-2010

12 Peer cities: Akron, Albany, Birmingham-Hoover, Bridgeport-Stamford, Cincinnati, Cleveland, Columbia, Columbus, Hartford, Raleigh-Cary, Richmond, Rochester, Salt Lake City, Syracuse, Virginia Beach. Household income and average wage figures are in chained 2005 dollars. Analysis of Moody's economy.com data, 1980-2010

13 Analysis of Moody's Analytics data, 1980-2010

14 Analysis of Moody's Analytics data, 1980-2010

15 Analysis of Moody's Analytics data

16 Moody's Analytics data, compound annual growth rates for 2006-2011 (materials) and 2008-2011 (chemicals)

17 Chemicals and machinery account for 33% of total exports. Brookings analysis of data from BEA, USITC, Moody's Analytics, IIE, IRS

18 Moody's economy.com 2011

19 Definition synthesized from: June 2011 White House Report on Advanced Manufacturing; June 2009 Deloitte/New England Council Report on Re-Examining Advanced Manufacturing; July 2010 Michigan University Research Corridor Report on Advanced Manufacturing; July 2011 Battelle Technology Report on Advanced

Manufacturing Cluster for Iowa. Skill level and wage is relative to average manufacturing industry worker skill and wage.

20 Note that opportunities in health and life sciences manufacturing, an additional strong asset sector, are described separately, in the section that follows.

21 Moody's Analytics 2011 employment; nonmetallic mineral products, plastic and rubber

22 Moody's Analytics employment

23 Moody's Analytics 2011

24 Moody's Analytics 2011

25 Moody's Analytics 2011; nonmetallic mineral products, plastic and rubber

26 Moody's Analytics 2011 employment; includes machinery, fabricated metal and primary metal

27 Moody's Analytics 2011

28 Moody's Analytics, 2011

29 Moody's Analytics, 2011

30 Industries within materials, machinery and chemicals that are at least 10% more productive than the US average as of 2010 include basic chemicals; resins and synthetic rubber and fiber; pesticides, fertilizers and agricultural chemicals; pharmaceuticals; clay products (ceramics); other nonmetallic mineral products; and other general purpose machinery. More than 20 other industries within these same sectors lag national productivity levels by at least 10%.

31 McKinsey survey of regional manufacturers

32 See, e.g., McKinsey survey of regional manufacturers

33 Moody's economy.com, 2010

34 All medical device and pharmaceutical LQs (based on employment) and productivity figures are 2011; growth rates are 2011-2021.

35 Buffalo Niagara Enterprise Economic Guide

36 Moody's Analytics, 2011

37 These include more than 30 academic and research organizations, such as the Hauptman-Woodward Medical Research Institute, the Roswell Park Cancer Institute and the University at Buffalo's Center of Excellence in Bioinformatics & Life Sciences; specialized clinical care providers including the Jacobs Neurological Institute, the Gates Vascular Institute and the Buffalo Hearing and Speech Center; nearly 70 private-sector research and development firms; the 400,000-plus-patient HEALTHeLINK database, the Roswell Biobank's 10,000-plus sample repository of tissue specimens; and UB's supercomputing capacity, ranked among the top 10 universities for speed.

38 National Science Foundation, FY, 2009

39 E.g., UB School of Bioinformatics ranks 57th for medical research; Roswell Park is ranked 47th among US cancer hospitals.

40 Moody's Analytics, 2010 for Arts, Entertainment & Recreation and Accommodation & Food Services

41 "Travel & Tourism Economic Impact Report 2012," by the World Travel & Tourism Council

42 Visit Buffalo Niagara

43 "U.S. Heritage Tourism Enthusiasts – A Special Analysis of the Travel Activities and Motivation Survey (TAMS)," Canadian Tourism Commission, 2004.

44 "Economic & Market Assessment, Niagara Falls, NY," HVS Consulting and Valuation Services, 2011.

45 Estimate based on multiple sources, including George Washington University Tourism study (~8 jobs per $1 million); US Dept. of Transportation study (~13 jobs per $1 million); MGM2impact (~15 jobs per $1 million); State of Vermont tourism study (38 jobs per $1 million); World Travel & Tourism Council (50 jobs per $1 million)

46 “Economic & Market Assessment, Niagara Falls, NY,” HVS Consulting and Valuation Services, 2011.

47 “A Strategy for Prosperity in Western New York -- WNY Regional Economic Development Strategic Plan,” November 2011.

48 High-skilled labor comprises an average of 33% of the workforce in peer metros that include Peer MSAs: Birmingham, Stamford, Columbia, Columbus, Hartford-West Hartford, Raleigh-Cary, Richmond, Salt Lake City, Syracuse and Virginia Beach-Norfolk.

49 31.2% of workers in the Buffalo Niagara MSA have a high school diploma or less, compared to 28.5% nationally; 2010 American Community Survey, US Census Bureau

50 NYS Department of Labor analyst assessment

51 Deitz, Richard, “A Brain Drain or Insufficient Brain Gain?” in Upstate New York at a Glance (Federal Reserve Bank of New York, Buffalo Branch, August 2007).

52 Current Population Survey, 2010

53 March 2011 Current Population Survey; American Community Survey 1-year estimates, US Census Bureau

54 See, e.g., *Between Invention and Innovation: An Analysis of Funding for Early-Stage Technology Development* (Gaithersburg, MD: Economic Assessment Office, Advanced Technology Program, National Institute of Standards and Technology, November 2002); Philip Cook and Olga Memedovic, *Strategies for Regional Innovation Systems: Learning Transfer and Applications* (Vienna: United Nations Industrial Development Organization, 2003).

55 National Science Foundation, 2009

56 PWC Moneytree, Q2 2012

57 -0.1% per year from 2003-2008 Small Business Authority

58 Ratio of establishment births to deaths of 1.03 vs. 1.2 Small Business Authority

59 PWC Moneytree, Q2 2012

60 One in ten homes in the region is vacant; UBRI

61 In the last 50 years (1960-2010), Greater Buffalo lost 10.5% of its population, but the region’s urbanized footprint more than doubled. “A Strategy for Prosperity in Western New York,” Western New York Regional Economic Development Council, November 2011.

62 This includes 4,467 vacant acres in Buffalo and Niagara Falls; UBRI

63 Approximately 30 percent (972 acres) of vacant land in the city of Buffalo and 40 percent (511 acres) of the vacant land in the city of Niagara Falls are along old industrial corridors

Implementing the Vision

Western New Yorkers aspire to create a sustainable prosperity by utilizing and enhancing the strengths of our people, by continuing our rich tradition of human innovation; by leveraging our region's natural beauty and abundant natural resources; and by taking full advantage of our unique and strategic location in the world. We will create a region that is admired worldwide, that attracts more people to live, learn, work and visit; where entrepreneurs and businesses want to invest their time and capital, and where all our institutions reflect a culture of inclusion, continuous improvement, adaptation and excellence.