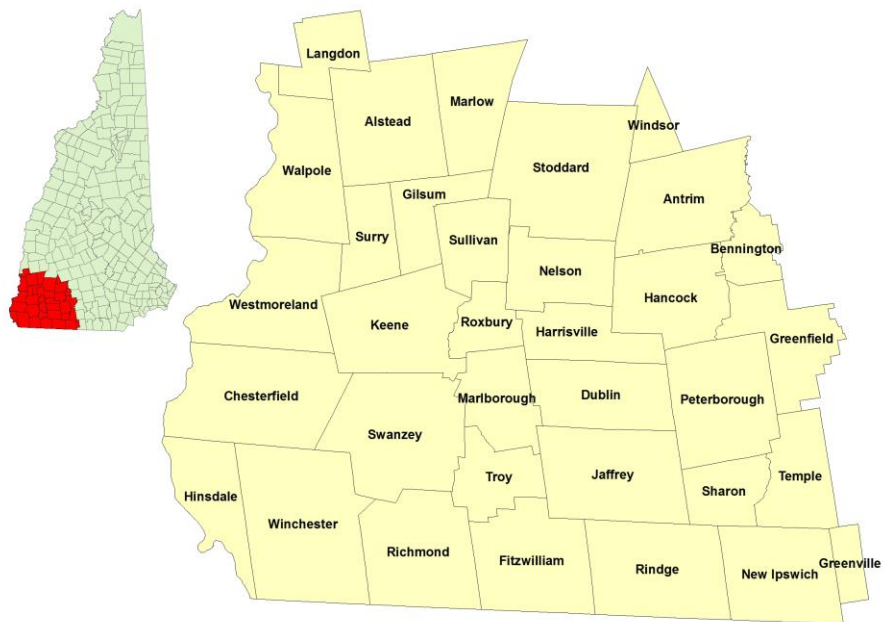


# Local Industrial Ecosystem

## Monadnock Region of Southwestern New Hampshire

March 30<sup>th</sup>, 2015



Town of Peterborough New Hampshire

1 Grove St.

Peterborough, NH 03458

# 1. Overview of KTS Top 1/3<sup>rd</sup> Requirement and Regional Geographic Boundaries

## 1.1 Key Technology or Supply Chain (KTS)

Other fabricated metal product manufacturing (3329)<sup>1</sup>, Industrial machinery manufacturing (3332), Metalworking machinery manufacturing (3335), Medical equipment and supplies manufacturing (3391). Table 1 provides a comparison of the Monadnock Region's top 1/3<sup>rd</sup> manufacturing sectors to the IMCP provided location quotient cutoffs.

Table 1. Strength Monadnock Region Manufacturing Industries				
NAICS	NAICS Code Description	Location Quotient		
		Employment LQ Cutoffs	Cheshire County	Hillsborough County
3329	Other fabricated metal product manufacturing	1.17	7.62	3.41
3332	Industrial machinery manufacturing	1.07	20.3	3.14
3335	Metalworking machinery manufacturing	1.00	4.02	1.32
3391	Medical equipment and supplies manufacturing	1.03	6.71	1.84

Source: U.S Dept. of Labor, Bureau of Labor Statistics "Quarterly Census of Employment and Wages" March 2015  
[http://www.bls.gov/cew/apps/data\\_views/data\\_views.htm#tab=Tables](http://www.bls.gov/cew/apps/data_views/data_views.htm#tab=Tables)

## 1.2 Geographic Boundaries

Monadnock Region of Southwest New Hampshire<sup>2</sup>

## 1.3 Executive Summary

The Monadnock Region of Southwest New Hampshire (MRNH) is a leading manufacturing hub in New England, with numerous high-volume metal fabrication, industrial machinery, metalworking, and medical equipment manufacturers. Dotting the rural landscape that encompasses this region are hundreds of additional small manufacturers which combine with larger area firms to employ approximately 15% of a workforce that draws from a total population of approximately 102,000 in southwestern New Hampshire.<sup>3</sup> The manufacturing sector in the MRNH region is of vital importance to the overall economic health of the region.

The number one threat to the Monadnock Region cited as part of a recent U.S Department of Commerce supported Comprehensive Economic Development Strategy was the loss of high-paying manufacturing jobs. Over the past decade, the region has experienced substantial employment losses in its manufacturing sector, with net jobs decreasing by approximately 16%.<sup>4</sup> In addition, the top opportunity cited the region's highly educated population as a potential strength relative to the need bolster the

<sup>1</sup> This industry group comprises establishments primarily engaged in manufacturing fabricated metal products (except forgings and stampings, cutlery and handtools, architectural and structural metals, boilers, tanks, shipping containers, hardware, spring and wire products, machine shop products, turned products, screws, and nuts and bolts). In the Monadnock Region the primary employer in this category falls in the 6-digit NAICS category of 332991 Ball and Roller Bearing Manufacturing.

<sup>2</sup> The Monadnock Region of Southwest NH encompasses all of Cheshire County, western towns located in Hillsborough County, and one town in Sullivan County. This coverage represents the official coverage area of the Southwest Regional Planning Commission (a consortium member organization). All cities and towns included in Monadnock Region boundaries include: Langdon, Walpole, Westmoreland, Chesterfield, Hinsdale, Winchester, Richmond, Swanzey, Keene, Surry, Alstead, Marlow, Gilsum, Sullivan, Roxbury, Marlborough, Troy, Fitzwilliam, Rindge, Jaffrey, Dublin, Harrisville, Nelson, Stoddard, Windsor, Antrim, Bennington, Hancock, Greenfield, Peterborough, Sharon, Temple, New Ipswich, and Greenville. See <http://www.swrpc.org/>

<sup>3</sup> See USED/DOC supported "2015 Comprehensive Economic Development Strategy for Southwest NH", prepared by consortium member Southwest Regional Planning Commission: <http://www.swrpc.org/files/2015%20CEDS%20Report.pdf>

<sup>4</sup> Ibid.

local workforce's education and skills to sustain current and future economic trends. As such, the catalytic priority addressed in this analysis confronts a significant gap in workforce training and development, as a large portion of manufacturing job loss is attributable to the relocation of positions as result of regional employers' inability to find skilled workers locally.

In addition to gaps in workforce training and development, the following gaps in the local industrial ecosystem were also identified as part of this comprehensive SWOT analysis, and are expanded on in greater detail in the body of this report:

- A lack of higher level strategic market assessment data relative to regional manufacturing
- Significant barriers to improving broadband infrastructure for business retention, recruitment, and effectiveness

Designation as a "Manufacturing Community" through the IMCP program would be the next needed step in building a level of regional cohesion needed to confront real challenges rooted in an inefficiency caused by political fragmentation and a lack of regional cohesion. Through this designation the Monadnock Region of Southwestern New Hampshire anticipates cultivating a competitive edge relative to accessing assistance with navigating numerous federal revenue streams specifically targeted to address the most pressing gaps in our local industrial ecosystem. Our targeted plans for each key identified weakness include the following, and are expanded upon in the body of this analysis:

- Workforce and Training: Assist established formal training programs and newly emerging community-driven "Makerspace" initiatives with capital access through priority consideration for relevant funding streams, such as: U.S Dept. of Labor grants; U.S Dept. of Housing and Urban Development grants; Small Business Administration loans; and, IPP grants.
- Supplier Network: Obtain funding for a detailed regional manufacturing market assessment to build on the U.S Department of Commerce, Economic Development Administration sponsored regional planning initiatives already in progress by multiple consortium members
- Infrastructure and Site Development: Obtain funding to aid with current efforts to expand high-speed broadband infrastructure in the region

Specific and measurable outcomes are likely to evolve over time, but in the short-term the consortium has targeted the following tangible socio-economic goals as the emphasis of our regional efforts and plans. These include:

- Increase the median wage of regional production oriented occupations to meet or exceed state and national averages in like industries, and as compared to the median average income of all occupations in the region
- Increase the total number of manufacturing production oriented jobs in the region by a level commensurate with losses in this sector over the past 10 years
- Increase regional broadband penetration by 10% over the next 10 years
- Reduce operational costs for manufacturers by expanding regional collaborative energy purchasing models

## 2. Workforce Training and Development: The Catalytic Priority of this Proposal

### 2.1 Current Workforce Capabilities

The Monadnock Region is privileged by having a highly skilled workforce for most of its industry sectors; and, numerous higher education institutions focusing on a wide range of disciplines that complement the manufacturing sector. Manufacturing specific hands-on training –aside from what is offered minimally through direct employer training programs– does exist in the region, but is relatively new and largely insufficient for many rural community residents that are less inclined or unequipped with the finances necessary to pursue costly formal training environments.

As shown in Table 2, of persons 25 years of age or older in the Monadnock Region, 32.8% possess a high school diploma or GED as their highest level of educational attainment (nationally: 28.6%), 19.2% have a Bachelor's Degree (nationally: 17.7%) and 12.0% received graduate, doctorate or professional degrees (nationally: 10.5%). These figures are skewed heavily by highly educated populations such as Keene and Peterborough that demonstrate much stronger performance relative to educational attainment than do more rural towns in the region. For example, towns such as Gilsum, Greenville, Hinsdale, Marlow, Winchester, and Windsor all report percentages of over 40% for individuals whose highest educational attainment is high-school or GED equivalency.<sup>5</sup>

**Table 2: Highest Level of Educational Attainment 2011**

	Population 25 years and Older	High school degree (includes equivalency)	Some college, no degree	Associate's degree	Bachelor's degree	Graduate or professional degree
United State	202,048,123	28.60%	21.00%	7.60%	17.70%	10.50%
New Hampshire	901,420	29.50%	19.10%	9.50%	21.00%	12.10%
<b>Southwest Region</b>	<b>68,676</b>	<b>32.80%</b>	<b>19.00%</b>	<b>8.40%</b>	<b>19.20%</b>	<b>12.00%</b>

Source: Southwest Regional Planning Commission, 2015 Comprehensive Economic Development Strategy  
<http://www.swrpc.org/files/2015%20CEDS%20Report.pdf>

Table 3 shows regional unemployment figures compared to state and national levels. As is demonstrated, the Monadnock Region, largely as a result of being endowed with a robust manufacturing sector, has enjoyed consistently lower unemployment levels when compared to both the State of New Hampshire and the nation. As with the educational attainment information provided above, more rural communities that might benefit most from better access to affordable manufacturing specific job training programs experience consistently higher levels of unemployment.

**Table 3: 2002 - 2012 Monadnock Region Unemployment Comparison**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Avg.
United States	5.8%	6.0%	5.5%	5.1%	4.6%	4.6%	5.8%	9.3%	9.6%	8.9%	8.1%	6.7%
New Hampshire	4.7%	4.4%	3.9%	3.6%	3.5%	3.5%	3.9%	6.2%	6.1%	5.5%	5.5%	4.6%
<b>Monadnock Region</b>	<b>3.7%</b>	<b>3.7%</b>	<b>3.5%</b>	<b>3.3%</b>	<b>3.3%</b>	<b>3.5%</b>	<b>3.7%</b>	<b>5.8%</b>	<b>6.0%</b>	<b>5.3%</b>	<b>5.3%</b>	<b>4.2%</b>

Source: New Hampshire Employment Security Economic and Labor Market Information Bureau

<sup>5</sup> Southwest Regional Planning Commission, "2015 Comprehensive Economic Development Strategy". p.19  
<http://www.swrpc.org/files/2015%20CEDS%20Report.pdf>

Table 4 shows key occupational analysis data for production occupations in the region. Included are total estimated employment figures for manufacturing and the median hourly wage of production occupations in the region. Excluded from this occupational code are many ancillary positions that classify under other occupational codes –such as professional manufacturing management, engineering, and sales. For comparison purposes, Table 4 also shows the median hourly wage and total estimated employment figures for all occupations in the region, and production specific occupations at the national level. Production occupations in the Monadnock Region lag behind both the median hourly wage for all occupations in the region, and behind similar production specific occupations nationwide. More research is needed to determine why this is the case, but a reasonable hypothesis suggests that this results from production oriented firms needing to absorb many costs associated with training that might otherwise be provided through better access to formal and community-driven training models.

**Table 4: Occupational Analysis - Monadnock Region of Southwest NH Production Occupations**

Occupation code	Occupation title	Level	Employment	Median hourly wage
00-0000	All Occupations (Monadnock Region)	total	39,910	\$16.89
51-0000	Production Occupations (Monadnock Region)	major	3,600	\$15.60
51-0000	Production Occupations (National)	total	8,934,050	\$17.06

Source: US Dept. of Labor, Bureau of Labor Statistics, "May 2014 Metropolitan and for Nonmetropolitan Area Occupational Employment and Wage Statistics" Southwestern NH. [http://www.bls.gov/oes/current/oes\\_3300004.htm#51-0000](http://www.bls.gov/oes/current/oes_3300004.htm#51-0000)

## 2.2 Current Institutional Capabilities

The region has four higher education institutions: Keene State College, Franklin Pierce University, Antioch New England University, and River Valley Community College. Of these institutions, Keene State and River Valley provide technical skills programs geared toward providing students with opportunities to develop skills relative to manufacturing. In addition to formal educational paths, the region has one emerging community-driven Makerspace initiative, Monadnock Art X Tech, which has teamed in a public/private partnership with the Town of Peterborough.

**Keene State College's Regional Center for Advanced Manufacturing (RCAM)** is a collaboration of Keene State College, River Valley Community College, the Greater Keene Chamber of Commerce, the Keene School District through its Keene Community Education program, and regional employers. Key to this collaborative is the machine laboratory, located in the state-of-the-art TDS Building at Keene State College. All RCAM classes aim to provide competency in one or more of the following subjects: Blueprint Reading, CNC Applications, Manual Machining, Manufacturing Science, Math Essentials, Metrology and Inspection, Safety, and Software Applications.



*Keene State College TDS Center*

The RCAM program offers multiple opportunities for manufacturing skills enhancement, such as employer subsidized apprenticeship program, and direct core course offerings through Keene State's Office of Continuing Education. Machining Apprenticeship is a two-year program calling for 310 instructional hours and 4,000 to 4,800 on-the-job hours. Apprentices completing both the related instruction and on-the-job training earn certificates from the State of New Hampshire Department of Education and US Department of Labor. Completers are qualified in manual and CNC machining, to complete machine set-ups and perform troubleshooting operations.

**River Valley Community College**, in collaboration with the RCAM program, offers a 2 year program in advanced machine tool technology leading to a certificate. This certificate program is designed to offer students comprehensive technical training that provides an in-depth knowledge and understanding of the machine tool trade. Students of the program receive training in CNC, blueprint reading, machine related mathematics, inspection processes, and machining processes.



**Monadnock Art X Tech** is a community-driven non-profit initiative aimed at creating a vibrant community makerspace that leverages the region's rich artistic and entrepreneurial heritage to address the region's current economic challenges. Having brought together a talented, diverse management team, built a community through regular meetings and workshops, secured the fiscal sponsorship, and teamed with the Town of Peterborough to secure space to begin its operation, Monadnock Art X Tech is ready to start building in Spring, 2015. This initiative aims to provide a hands-on environment whereby people in the region can build skills in manufacturing in a mentored environment. One of the primary motivations of this organization is to address a widely known regional skills gap relative to manufacturing, specifically targeting individuals lacking the skills or finances needed to be successful in a formal educational setting.



### **2.3 Gaps: Access to Regionally Relevant Training for the Underserved Population**

The well-known manufacturing skills-gap –whereby an aging baby-boomer population is exiting the manufacturing sector and taking their knowledge with them, and resulting from a mismatch between the evolving needs of the modern manufacturing sector and outdated training programs– is a real challenge across the nation and in the Monadnock Region. While the formal college system of NH actively coordinates with manufacturers in the state to address this challenge, many residents in the Monadnock Region lack the skills and finances needed for success in formal educational settings. Outside of the City of Keene, thanks in large part to the presence of Keene State College, the entire southwest region of New Hampshire struggles to retain youth and young adults. In the most recent national census, the largest age group in the Southwest Region of New Hampshire was the 50-59 year age group, followed by the 40-49 year and the 10-19 year age groups.<sup>6</sup> This means that additional pressures will be placed on the manufacturers in the region as qualified workers exit the labor force for retirement in the next decade.

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<sup>6</sup> U.S Census Bureau, 2010 National Census. <http://www.census.gov/2010census/>

## **2.4 Plans: Strengthen Public/Private Partnerships aimed at Formal and Community-Driven Workforce Development and Training**

The region is laying the foundation for decreasing the burden on area manufacturers to train workers and build workforce competencies through new formal and community-driven training programs. However, the availability of funding streams and a lack of regional cohesion needed to support such programs present serious short and long term challenges to the success of these programs. In addition, many residents in the region lack available resources of time and money to participate in formal training programs, and increased program demand in such formal settings may limit availability for such individuals as well.

To address these considerations, the consortium intends to pursue the following grant opportunities and/or agencies to support the ongoing development of newly emerging community-driven training programs:

- Department of Labor funding streams that target education and training providers
- Department of Housing and Urban Development funding streams that help to seed local community-driven training and workforce development programs in rural areas
- Small Business Administration loan programs

Designation as a Manufacturing Community would exponentially increase the Monadnock Region's chance of success relative to all of the above IMCP participating grant opportunities, as well as help to strengthen emerging ties within the manufacturing community.

## **3. Supplier Network**

### **3.1 Current Capabilities: Advanced Medical and Precision Bearing Manufacturing**

The Monadnock Region is a national leader in medical equipment manufacturing and the production of precision ball bearings. The region has a diverse manufacturing base with many high-volume metal fabrication, industrial machinery, metalworking, and medical equipment manufacturers. In addition, the Monadnock Region is home to a wide variety of smaller manufacturers, some of whom provide the majority of jobs for the small towns in which they are situated. Hillsborough County has 17 4-digit NAIC manufacturing sectors above an LQ of 1, while Cheshire County has 8 sectors that meet this criteria. As of the first quarter of 2013, 41.1% of Cheshire County employment was in a firm with fewer than 50 employees. In Hillsborough County, which has a number of very larger employers, 34.7% of workers were employed at a firm with fewer than 50 employees. All told, production oriented manufacturing firms in the region account for nearly 8,000 jobs, representing 15% of the total workforce. Space and resource constraints limit this reports ability to account the wide variety of smaller manufacturers in the region.

The largest production oriented employers in the Monadnock Region include: New Hampshire Ball Bearings (Peterborough); Markem-Imaje (Keene); TimKen Super Precision (Keene); EMD-Millipore Corporation (Jaffrey); Smith Industrial Medical Systems (Keene); TFX Medical Inc. (Jaffrey).



**New Hampshire Ball Bearings, Inc. (NHBB)** is a leading manufacturer of precision bearings and complex bearing assemblies for the aerospace, defense, medical, dental, and high technology markets.

NHBB's diverse product mix includes precision miniature and instrument ball bearings, large ball and roller bearings for aircraft engines, and specialized rod end and spherical bearings for diverse aircraft applications. The company operates three manufacturing facilities in the US and employs over 1,500 workers. Founded in Peterborough, NH in 1946, NHBB was purchased in 1985 by the global manufacturing conglomerate, Minebea. NHBB's Monadnock region facility in Peterborough employs approximately 600 employees locally.



New Hampshire Ball Bearings, Inc.  
— A Minebea Company —

**Markem-Imaje** is a global manufacturer and distributor of specialized traceability, variable data and product identification equipment, for customers in the packaging industry. The company is headquartered in Geneva, Switzerland. Markem-

Imaje is a wholly owned subsidiary of Illinois-based Dover Corporation. Markem-Imaje's Keene, NH based operation employees approximately 500 individuals in support of manufacturing product coding, case coding, pallet coding, supplies (such as printer inks), and software solutions. Markem-Imaje's products achieve market penetration in the food, beverage, cosmetics, electrical equipment and electronics, cables, tubes and profiles, and postal industries.



**TimKen Super Precision** engineers, manufactures and markets bearings, transmissions, motors, gearboxes, chain and related products, and offers a spectrum of powertrain rebuild and repair services. The leading authority on tapered roller bearings, Timken today applies its deep knowledge of metallurgy, tribology and mechanical power transmission across a variety of bearings and related systems to improve reliability and efficiency of machinery and equipment all around the world. TimKen employs approximately 16,000 worldwide, with approximately 500 engaged in production oriented manufacturing at their Keene, NH location.



**TIMKEN®**

**EMD Millipore**, also known as Merck Millipore outside the United States and Canada, was founded in 1954, and listed among the S&P 500 since the early 1990s, is an international biosciences company known widely for its micrometer pore-size filters and tests. Divided into three business units — Bioscience, Lab Solutions, and Process Solutions — EMD Millipore is a supplier to the life science industry. Headquartered in Billerica, Massachusetts, EMD Millipore has around 10,000 employees in 68 countries. Its Jaffrey, NH production facility employees approximately 750 employees engaged in a wide variety of production oriented positions.



**Smiths Medical** is a leading global provider of medical devices for the hospital, emergency, home and specialist environments. Smith's products are used during critical and intensive care, surgery, post-operative care during recovery, and in a series of high-end home infusion therapies. Smiths Medical employs some 7,500 people, with manufacturing concentrated in the US, the UK, Mexico and Italy. Smith's Keene, NH facility employs approximately 750 individuals, many of whom are directly engaged in the manufacturing of export-oriented goods.





**Teleflex Incorporated** is a leading global provider of specialty medical devices for a range of procedures in critical care and surgery. Teleflex provides solutions that enable healthcare providers to improve outcomes and enhance patient and provider safety. Teleflex has annual revenues of \$1.7 billion, operations in 40 countries, and more than 11,000 employees. Teleflex's Jaffrey, NH operation employees approximately 400 individuals engaged directly in the production of medical tubing products.



The Monadnock Region is also home to many other leading precision and specialty manufacturers. Some of these companies include: Corning Optics (makers of specialty Gorilla Glass, ceramics, and optical physics); Monadnock Paper Mill (makers of technical and specialty papers); Filtrine (makers of liquid chilling, dispensing, and water purification systems); and many, many more.

### **3.2 Current Institutions for Improving Capability**

**New Hampshire Manufacturing Extension Partnership (NHMEP)**, located in Concord, NH, has for 18 years provided affordable, innovative solutions to the problems encountered by today's manufacturing enterprise by facilitating interaction between industry, government and academia. NHMEP services include systematic continuous improvement, workforce strategies, lean and green energy solutions, technology acceleration, and supplier development. NHMEP has a team work directly with NH based manufacturers to identify conditions which may be hindering growth and/or innovation. Numerous manufacturing firms in the Monadnock Region have utilized their services in recent years, such as Graphicast in Jaffrey and Markem-Imaje in Keene.

In 2015, NHMEP, received a \$628,176 grant from the U.S Commerce Department's National Institute of Standards and Technology (NIST) to enable it to continue its work as a Hollings Manufacturing Extension Partnership helping small and medium sized manufacturers expand and retain jobs in NH.

### **3.3 Gaps: The Monadnock Region Lacks a Comprehensive Inventory of the Supplier Network**

A principle gap in understanding the needs of the manufacturing community in the Monadnock Region deals with the lack of a comprehensive inventory of the smaller production oriented firms that exist all across this rural landscape. Without this understanding, current regional capabilities for enhancing the efficiency of the supplier network lack the necessary information needed to find and map overlaps between many production-oriented firms and the skills, resources, and support they require for continued success.

### **3.4 Plans: Build a Comprehensive Regional Supplier Network Assessment**

Building on U.S Department of Commerce funding for the Monadnock Region's Comprehensive Economic Development Strategy, and on recent funding provided to NHMEPS, the consortium's intent is to continue building regional cohesion and seek additional funding streams to build a comprehensive regional supplier network assessment. Designation as a "Manufacturing Community" would help with this important goal by providing stream-lined access to the following funding streams that could be used for this purpose:

- U.S Department of Agriculture Rural Business Development Grants (RBEG);
- U.S Department of Commerce, National Institute of Standards and Technology (NIST) funding for a detailed regional manufacturing market assessment.

## 4. Infrastructure and Site Development

### 4.1 Current Capabilities

#### 4.1.1 Water and Sewer

The municipal water and sewer infrastructure in the Region reflects its rural nature. Parts of 17 of the 35 towns are served by municipal water suppliers. Twelve municipalities have sewer systems, ten of which also have a wastewater treatment plant. The major manufacturing cities and towns that comprise the bulk of regional manufacturing employment in the region have adequate access to water and sewer utilities.

#### 4.1.2 Electric Supplier

All but two towns, Walpole and Langdon, are served by Public Service of New Hampshire (PSNH). Other electric utility suppliers include Granite State, NE Power, NH Electric Coop, and Liberty Utilities, who operated in 5 Southwest Region municipalities.

The Monadnock Power Purchasing Collaborative, a consortium of regional towns and businesses led by the Town of Peterborough, is pioneering a new approach to power purchasing which could serve as a new model in the state for area manufacturers. Peterborough, on behalf of this collaboration, was one of nine organizations nationally to receive an EPA Green Power Purchasing award for its leadership in the procurement of green energy sources.<sup>7</sup>

#### 4.1.3 Transportation

Many roads are simply “dirt roads that got paved,” and in some cases colonial log roads and dry-masonry stone bridges persist under modern pavement and steel. Major State highways serve as Main Streets for twelve of the Southwest Region’s 35 towns. The Southwest Region Transportation Plan 2007 update, produced by consortium member organization Southwest Region Planning Commission, reports 513 miles of state roads (Classes I, II and III) and 1,349 miles of municipal roads (Classes IV and V) in the Southwest Region.

In the Southwest Region, NH 9, NH 101 and NH 12 south of Keene to the Massachusetts border are designated as part of the National Highway System and constitute approximately 85 of the 794 miles of National Highway System in New Hampshire. The Southwest Region roadway network includes 477 bridges (structure greater than ten feet in length) of which 209 are state-owned, 262 are municipally-owned, three are owned by the US Army Corps of Engineers, and three are owned by railroad companies.

Although the Southwest Region lacks high capacity arterial highways, the Region has reasonable access to Boston, Connecticut, and even New York City through nearby interstate highways. Interstates 89, 91 and 93 can be reached from most parts of the Region via Routes 9, 10, 12, 101 or 119 within an hour.

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<sup>7</sup> See Union Leader: <http://www.unionleader.com/apps/pbcs.dll/article?AID=/20141121/NEWS05/141129803&source=RSS&template=printart>; and Environmental Protection Agency “Green Power Leadership Awards” <http://www.epa.gov/greenpower/awards/>

Three international airports are also within convenient driving range: Manchester International Airport (55 miles), Logan International Airport in Boston (95 miles), and Bradley International Airport in Hartford, CT (95 miles).

Public transportation in the Southwest Region consists of private bus companies, private taxi and charter transportation companies, airport shuttle services, community service shuttle providers and fixed route public bus services in the City of Keene, Hinsdale and Walpole. Of the three public transit systems in the Region, only the Hinsdale system is designed for commuting to work. Although other community service transportation options are available throughout the Region, many of these services are designed for specific human service clientele and provide very limited service.

Private transportation provider Greyhound Bus Lines offers service to White River Junction, VT and Springfield, MA where bus transfers may be made to Montreal, New York and Boston. One northbound and one southbound bus pass through the Keene Transportation Center in downtown Keene each day. There are several other transportation services that offer intra-city, inter-city, hospital and airport service from Keene for the general public, seniors and the handicapped.

#### 4.1.4 Communications Network

Fairpoint Communications has a DS presence in nearly every Southwest Region community, while cable internet broadband providers such as Comcast and Time Warner provide services in many areas in Keene and Peterborough. Smaller providers that also provide telecommunications solutions include TDS Telecom, Granite State Telephone, Sovernet, and others.

Made possible by modern internet protocols, telephone service is offered through a cable or other telecommunications companies that have not traditionally offered this service. Cellular phone signals are received in 34 towns, 10 of which experience partial or limited reception. Franconia does not have cellular phone access. High speed internet access is available in every town, but depends on customer location and the provider technology serving the area. Customers can receive high speed internet service from a telephone company, cable-company, fixed wireless, mobile wireless, and satellite providers.

## 4.2 Current Institutions for Improving Capabilities

**New Hampshire FastRoads** has built an open access middle mile and last mile network that aggregates demand for the entire region, including community anchor institutions, large and small businesses, government offices and agencies, and residents. The routes built with stimulus funds are currently providing middle mile fiber to 22 communities and 220 community anchor institutions in the Fast Roads region, and two last mile projects have been providing support for fiber connections to approximately 1300 businesses and residents in Rindge and Enfield, where many residents have been limited to slow DSL or dial up Internet access.



**The New Hampshire Broadband Mapping and Planning Program (NHBMPP)** is a comprehensive program that seeks to understand where broadband is currently available in NH, how it can be made more widely available in the future, and how to encourage increased levels of broadband adoption and usage. We recognize that a vibrant local and state economy requires



broadband infrastructure to support economic development, energy efficiency, advances in health care, and improved educational opportunities, as well as the knowledge base and resources to effectively utilize that infrastructure. Funded by the American Recovery and Reinvestment Act through the National Telecommunications and Information Administration (NTIA: grant # 33-50-M09048), the NHBMPPP comprises two main components: a broadband availability inventory and mapping effort, and a suite of planning and technical assistance initiatives. Both components are part of a national effort to expand broadband access and adoption through improved data collection and broadband planning.

**The Southwest Regional Planning Commission**, a core consortium member, is one of New Hampshire's nine regional planning agencies established by NH RSA 36. The Commission covers a planning district made up of 35 towns and covering approximately 1,000 square miles comprising the Southwest Region of the State. The agency has a diverse work program made up of six major program areas: Local planning assistance; natural resource planning; community and economic development; transportation planning; hazard mitigation; regional and geographic information systems. In addition, SWRPC has worked extensively on the expansion of broadband penetration in the region.



#### **4.2 Gaps: Impediments to Broadband Infrastructure Expansion**

Despite the fact that most areas in the region have some access to internet connections, many areas, especially those of a more rural character, are unable to connect to networks that offer truly modern downstream and upstream connections (at least 768 kbps downstream, 256kbps upstream). In a recent study conducted by the University of New Hampshire, 64% of respondents in the state indicated that internet connections are too slow. These results are unsurprising, as almost 40% of the western portion of the state of New Hampshire is relegated to dial-up and satellite internet services, with another high percentage of the region utilizing DSL (roughly 3x the speed of conventional dial-up).<sup>8</sup>

Enhancing broadband infrastructure to underserved areas in the region is a real challenge. This is a result of a variety of factors, including; the unwillingness or inability of private broadband providers to “buy-in” to the Fast Roads open source network, the fact that NH town’s lack the authority to regulate private companies beyond the narrow scope allowed through the FCC franchise process, and current legislation<sup>9</sup> that prevents many municipal organizations from borrowing money to improve Internet related infrastructure.

#### **4.3 Plans: Seek Funding to Build on Current Broadband Initiatives and Assist in Funding Broadband Infrastructure Improvements**

With many preliminary mapping and infrastructure improvements in place, the Monadnock Region is poised to take broadband expansion to the next level. As recent data from the Brookings Institute indicates, such focus is of crucial importance to the region if it hopes to better support its strong base of manufacturers, the wider local economy, and in attracting and retaining a strong local workforce. Broadband expansion in the Monadnock Region directly supports many of the key outcomes projected

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<sup>8</sup> See NTIA, U.S Department of Commerce supported New Hampshire Broadband Mapping and Planning Program at <http://www.iwantbroadbandnh.org/>; and, “Leveraging Broadband Infrastructure to Grow New Hampshire’s Economy” [http://www.iwantbroadbandnh.org/sites/default/files/Broadband\\_Why\\_Care\\_July2013.pdf](http://www.iwantbroadbandnh.org/sites/default/files/Broadband_Why_Care_July2013.pdf)

<sup>9</sup> See NH RSA 33:3 relative to bonding for broadband infrastructure: <http://www.gencourt.state.nh.us/rsa/html/iii/33/33-3.htm>  
Current FCC definitions of “broadband” mean that DSL coverage in the region disqualifies most communities from bonding under the provisions of NH RSA 33:3.

as part of this analysis. For instance, for 1% increase in broadband penetration regional employment is expected to increase by .2 - .3% per year. This is especially true with the manufacturing sector, where employment directly correlates to broadband access.<sup>10</sup> Moreover, a wide range of economic development implications are expected through increased broadband access in the region, including:

- Improved ability to recruit and retain manufacturing businesses
- Increased business profitability through increased business efficiency
- Greater ability to attract the “creative class” of manufacturing minds
- Improved efficiency of municipal services in support of residents and the business community
- Stronger educational attainment levels

To this aim, and aided through official IMCP designation, the Monadnock Region of Southwest New Hampshire expects to pursue numerous grant opportunities in support of broadband expansion. Two of the preliminary targets of priority include:

- U.S Department of Agriculture Rural Economic Development Loan Program (REDLG) to pursue opportunities to circumvent state regulations relative to municipal level support of broadband expansion for area manufacturers
- U.S Department of Commerce, National Advanced Manufacturing Technology (AMTech) for research plans relative to broadband infrastructure improvements for area manufacturers

## **5. Research and Innovation**

### **5.1 Current Capabilities: New Hampshire Innovation and Research**

With approximately 15% of regional employment based in manufacturing, research and innovation in support of this base is a vital component to the short and long term success of the region’s economy. R&D in the region is significantly limited as these functions exist almost exclusively within the confines of private manufacturing companies. As previously discussed, substantial efforts are underway to help bolster the region’s workforce capabilities through emerging formal and community-driven education and training programs; however, research and development in support of cultivating and nurturing new products and innovations is limited.

### **5.2 Current Institutions for Improving Regional Capability**

**The New Hampshire Innovation Research Center (NHIRC)** was established in 1991 by the NH legislature to provide a mechanism to increase collaboration between New Hampshire businesses and university-based research. The purpose of the NHIRC is to promote applied and basic scientific research, engineering, and associated marketing research and technology transfer to support the New Hampshire industrial and business community with the goal of creating high quality jobs through technology development and innovation.<sup>11</sup> NHIRC has awarded over \$20 million in grants to 129 New Hampshire companies over the last two decades, leading to the successful discovery of new products, significant improvements to many manufacturing processes, and improvements to existing regionally produced products. One example is Warwick Mills in New Ipswich, where NHIRC



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<sup>10</sup> See Brookings Institution, “The Effects of Broadband Deployment on Output and Employment: A Cross-sectional Analysis of U.S Data”. 2007. <http://www.brookings.edu/views/papers/crandall/200706litan.pdf>

<sup>11</sup> For more information, see New Hampshire Innovation Research Center official website: <http://www.nhirc.unh.edu/index.html>

support lead directly to development of enhanced fiber and weaving technology to develop artificial graft scaffolds to temporarily perform the functions of human tissue.

**The NH EPSCoR** program, based at the University of New Hampshire, works to improve the research, cyberinfrastructure, and human resources required for New Hampshire to achieve its economic potential through a strong competitive innovation system. The National Science Foundation established EPSCoR, the Experimental Program to Stimulate Competitive Research, to strengthen science and engineering infrastructure in states that historically have received less in federal research grants. In the last 10 years, since NH became an EPSCoR state, more than \$118 million in competitive federal grants have been awarded to the University of New Hampshire, Dartmouth College, and several academic and industry partners to support basic research in environmental and space science, biomedicine and health sciences, energy, and nanotechnologies.



### **5.3 Gaps: Regionally Focused and Collaborative R&D is Lacking**

As previously mentioned, in the absence of a regional center for R&D these functions fall almost exclusively to area employers. While NHIRC funding has aided regional manufacturers, there still exists a significant gap that may be aided through better collaboration with NHIRC and NH EPSCoR.

### **5.4 Plans: Engage with Statewide R&D Focused Agencies and Educational Institutions to Bolster Regional Efficiency**

The Monadnock Region consortium intends to engage directly with NHIRC, university level research institutions, regional educational institutions, and NH EPSCoR to explore ways to increase R&D opportunities and collaboration among regional manufacturers.

## **6. Trade and International Investment**

### **6.1 Current Capabilities**

Due to data sources not built for regional level assessment of trade and international investment in the Monadnock region, information pertaining to this section of the local industrial ecosystem is not currently available. Paid services through the US Census Bureau and other private companies that offer this level of detail may be utilized in the future, but at the time of this application the resources needed to conduct this level analysis are not available to the consortium. It is anticipated that through strengthening regional cohesion and building on previous economic development studies conducted in the region, that the consortium will focus efforts in this area to better support regional manufacturing.

### **6.2 Current Institutions for Improving Regional Capability**

Numerous institutions exist in New Hampshire that could help the Monadnock Region better understand trade and international investment. These include:

**New Hampshire Department of Resources and Economic Development** is the official arm of state government related to economic development. They provide business assistance programs, information related to the NH economy and doing business in the state, and have an



International Trade Advisory Committee committed to state level support of trade and international investment.

**The International Trade Resource Center (ITRC)** works closely with the U.S. Export-Import Bank, the U.S. Small Business Administration, Southern New Hampshire University, USDA's Food Export program, the United States Department of Commerce and the New Hampshire International Trade Association on local, state, federal, national, and international levels to establish a network of programs, services, and contacts to benefit and enhance the efforts of the New Hampshire business community to perform competitively in the global marketplace.



### 6.3 Gaps: Regional Level Data Relative to International Trade and Investment

Understanding the Monadnock region's impact on international trade and investment –locally, at the state level, and nationally– presents a significant weakness for the region. Currently, no regionally based organization exists to examine and report on this data, and resources within the consortium and affiliated communities make collating this information internally an impossibility, especially in light of competing demands for limited resources.

### 6.4 Plans: Fund and Develop a Comprehensive Market Assessment to Better Understand Regional Impacts on Trade and International Development

The consortium recognizes the value in better understanding the impacts of trade and international investment in our region. To this aim, a priority of the aforementioned market analysis discussed in section three of this analysis will be to include trade and international development data as part of this assessment. Designation through the IMCP program will greatly enhance our ability to seek relevant funding and additional resources, such as those provided through:

- U.S Department of Commerce, National Institute of Standards and Technology (NIST) funding for a detailed regional manufacturing market assessment.

## 7. Operational Improvements and Capital Access

### 7.1 Current Capabilities/Gaps

As a state, New Hampshire has a competitive disadvantage across most indicators relative to energy costs compared to national averages (see Table 5). Natural gas prices per thousand cubic foot are nearly double the national average, while residential, commercial, and industrial electricity prices are substantially higher than national average as well.

Table 5: Energy Comparison	New Hampshire	U.S. Average	Period
Natural Gas	\$ 9.97 /thousand cu ft	\$ 5.16 /thousand cu ft	14-Dec
Residential Electricity	18.52 cents/kWh	12.15 cents/kWh	14-Dec
Commercial Electricity	14.68 cents/kWh	10.34 cents/kWh	14-Dec
Industrial Electricity	11.79 cents/kWh	6.65 cents/kWh	14-Dec
Delivered to Electric Power Sector	\$ 4.06 /million Btu	\$ 2.50 /million Btu	14-Dec

Source: U.S Energy Information Administration, New Hampshire State Energy Profile  
<http://www.eia.gov/state>



## 7.2 Current Institutions for Improving Access to Capital

A variety of community partners exist to aid in operational improvement and capital access, some of whom are either direct members of the Monadnock consortium or have provided letters of support. These include:

**New Hampshire Community Development Finance Authority** helps municipalities, businesses, and non-profits obtain the resources needed to create thriving, vibrant communities. Created in 1983, CDFA supports affordable housing and economic development activities that benefit low and moderate income citizens in New Hampshire. CDFA administers nearly \$30 million in funding resources, which includes a combination of the New Hampshire Investment Tax Credits, federal Community Development Block Grant program, and energy reduction funds.



**Monadnock Economic Development Corporation**, a consortium member, is a primary engine for economic development in the greater Monadnock Region of Southwestern New Hampshire. MEDC is charged with helping regional businesses achieve their growth objectives by assisting with relocation; serving as a link to government and regulatory resources; working with private and public sources to arrange creative financing options; developing real estate to meet business needs and creating new jobs.



## 7.3 Plans: Leverage Regional Success in Energy Purchasing Collaboration and Green Energy Alternatives

Given new strides related to creative collaborative purchasing models and the emergence of virtual net-metering to distribute energy credits, the Monadnock region is beginning to form a competitive advantage relative to energy costs. The consortium intends to leverage this new model as a way for regional manufacturers to purchase energy at a discounted rate.

In 2009, under the Town of Peterborough's example and leadership, a coalition of regional towns and businesses was formed to purchase wind power for a portion of members' facilities at a lower cost than could be achieved by individual member purchases. As of 2014, Peterborough and the energy purchasing coalition<sup>12</sup> members used 100 percent renewable electricity for all of their public facilities at a fraction of the cost of conventional distributed energy prices in the state. This first-in-the-state model of collaborative purchasing led to the Town of Peterborough being one of nine organizations nationwide to earn an EPA Green Power Purchasing Award.<sup>13</sup> Moreover, the collaborative purchasing group that led to the 2014 EPA award has a current application pending with the New Hampshire Public Utilities Commission to replicate the solar array model being constructed in Peterborough, and deliver green energy cost savings to all members of the energy collaborative through a shared brown-field redevelopment solar array.

Table 6 shows a comparison energy rates for Peterborough's wastewater facility –the town's largest energy consuming facility– compared to the state, and includes the contractually agreed upon rate that

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<sup>12</sup> The energy purchasing coalition includes: Town of Dublin NH, Town of Jaffrey NH, SAU 47, Town of Francistown NH, Town of Temple NH, Town of Swanzy NH, Town of Rindge NH, and the Monadnock Development Corporation.

<sup>13</sup> United States Protection Agency, Green Power Leadership Awards 2014 Award Winners  
<http://www.epa.gov/greenpower/awards/winners.htm>

will be in place once the facility's solar array is operation in Spring, 2015. As shown, through the collaboration of area town's and businesses to pool purchasing power, powering the town's highest energy consumer has become more operationally competitive.

<b>Table 6: Comparison of Commercial Energy Rates to Monadnock Energy Collaborative</b>				
	14-Dec		14-Nov	15-May
	New Hampshire	U.S Average	Peterbough WWTF	Peterborough WWTF
Commercial Electricity	11.79 cents/kWh	6.65 cents/kWh	11.00 cents/kWh	8.00 cents/kWh*
<p>* Contractually agreed upon rate for Spring, 2015</p> <p>Source: U.S Energy Administration, New Hampshire State Energy Profile: <a href="http://eia.gov/state">http://eia.gov/state</a></p> <p>Peterborough specific data sourced through PSNH utility bills</p>				

Table 6 also shows the impact that the town's largest-in-the-state solar array will have on commercial utility rates for the facility compared against state and national averages. Once completed, the array, through substantial cost savings per kWh, is expected save the town between \$400,000 and \$800,000 in electricity costs over a 20-year period.

It is expected that such operational efficiency and energy cost savings projects can be replicated throughout the region, especially as relates to the needs of the region's manufacturing base through enhanced collaboration stemming from efforts related to IMCP designation and new models of regional interconnection.

## 8. Implementation Strategy Description

The Monadnock Region of Southwestern New Hampshire has proposed a regional manufacturing strategy that builds on regional strengths to address gaps in the industrial manufacturing ecosystem. The plan, as proposed, addressed fundamental weaknesses relative to workforce development, the collection and coalition of higher-level market assessment data, and pressing broadband infrastructure needs. All of the plans outlined to address ecosystem gaps have been specifically chosen by the consortium based on high-impact feasibility, including: ease of implementation in a resource scarce environment; with consideration of political fragmentation; and, ability to build on existing regional initiatives.

## 9. Performance Metrics

Metrics that the Monadnock Region of Southwestern New Hampshire will use to measure the performance of the strategy are listed in Table 7.

Table 7: Performance Metrics

Metric Description	Metric Data Source(s) / Key Evaluative Question
Job Creation	Employment level data provided through U.S Census Bureau, American Community Survey, County Business Patterns, U.S Bureau of Labor and Statistics - Are middle to high paying positions being created in KTS manufacturing sectors of the regional economy?
Investment in Community-driven education programs	Quarterly reports from community-driven educational programs relative to targeted investments - Are total investment dollars in community-driven educational programs increasing via public funding, grants, and private investments?
Utilization Rate for Community-driven education/training programs	Quarterly reports from community-driven educational programs relative to community utilization rates, corporate utilization rates of these bridge programs, and job-placement for those utilizing such programs. Are residents and KTS manufacturers utilizing community-driven educational programs at higher rates?
Average Wages	U.S Bureau of Labor and Statistics relative to average occupational wages in KTS manufacturing sectors - Are the average wages in KTS manufacturing sectors increasing so as to match those found in other sectors in the region, and similar NAICS categories at the national level?
Consortium Membership Totals	Total number of participating communities and businesses - Is official membership in the consortium growing?
Regional Energy Prices	U.S Energy Administration - Are energy collaborations at the regional level helping to drive down delivered energy costs to the industrial sector in the region?
Broadband Coverage	N.H Broadband Mapping and Planning - Is total regional broadband coverage increasing as a result?

## 10. Leadership Capacity

The Town of Peterborough is the lead applicant, and provides overall leadership for the consortium, including, but not limited to, grant writing and research. Recently, Peterborough managed federal funds for a new wastewater treatment facility infrastructure project, total value \$12,674,000, funded by USDA Rural Development. The project included ARRA funds and the related requirements. Other recent projects utilizing federal funds have included:

- Biomass Heat System for the Peterborough Town House, Total project \$245,000, US Dept. of Energy through the NH Office of Energy and Planning grant in the amount of \$206,000. (2011)
- Art Center Feasibility Study for Peterborough, total project \$50,000, National Endowment for the Arts grant \$25,000 (2012)

**Southwest Regional Planning Commission** is a key consortium member, responsible for assisting communities with a full range of issues including environment, transportation, economic development, emergency preparedness, and broadband. SWRPC has extensive experience working with all regional towns and many regional employers, and was the lead organization using U.S Department of Commerce funds to develop the region's Comprehensive Economic Development Strategy that provided a wide range of information contained in this report. SWRPC also has extensive experience administering federal grants over the years. Some examples include:

- CDBG (through U.S. HUD): Administered a multitude of grants on behalf of municipal/county government averaging approximately \$1 million per year over the past 20+ years.

- Brownfield (through U.S. EPA): Administered several Brownfields Assessment grant awards totaling \$1.6 million for program established in 2003 and on-going since.
- RBEG (through USDA RD): Feasibility study for business start-up activities, approximately \$20,000.
- EDA Technical Assistance and Planning grants (through DOC) to develop and maintain Comprehensive Economic Development Strategy, approximately \$110,000.
- NTIA (through U.S. DOC and in partnership with the University of NH): Administered involvement of NH's 9 regional planning commissions in participating in NH Broadband Mapping & Planning Program over the 5-year period 2010-2014, approximately \$1.9 million.

Monadnock Economic Development Corporation is a consortium member with extensive experience relative to a wide range of federal investment streams. MEDC, as an official financial partner through the NH Department of Resource and Economic Development, will provide financial oversight and administration for the consortium. Some of their experience relative to federal funds include:

- Recipient of three Rural Business Enterprise Grants (RBEG), four Intermediary Re-lending Program (IRP) awards, a Community Facilities Loan, and several Business and Industry loan guarantees from USDA Rural Development. In total these awards total approximately \$12 million
- Received approximately \$18 million of CDBG funding through the State of New Hampshire from the HUD Small Cities Program
- Developed and owned two New Markets Tax Credit projects totaling \$15 million
- Partnered on projects that have been awarded Historic Tax Credits and Low Income Housing Tax Credits.
- Worked with several businesses to assemble financing packages that have included USDA Rural Development loans and guarantees as well as SBA loans and guarantees