



VIRGINIA INITIATIVE FOR
**GROWTH &
OPPORTUNITY**
IN EACH REGION

GO VIRGINIA REGION 5 GROWTH AND DIVERSIFICATION PLAN



Moving Hampton Roads Forward

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******The views of this report are the views of the individual authors and should not be interpreted as the views of Old Dominion University, George Mason University or any employees of either institution.***

Section I. Introduction

The purpose of this report is to provide empirically-driven recommendations to grow and diversify the economy in Region 5. The motivation for the report comes by mandate from the statewide GO Virginia Board. This report will serve as the “Economic Growth and Diversification Plan” for the region, as well as a guide for the Region 5 Regional Council as it considers future proposals for GO Virginia funding.

While the report provides a detailed overview of key data points, the consulting team also took great care to engage a broad audience in discussion of economic challenges, priority clusters and possible strategies. This was done through surveys, one-on-one interviews and open discussion at regional council meetings.

The report is organized as follows:

- Section II presents an executive summary of the full report
- Section III suggests five significant economic challenges that the region needs to overcome to change its economic future
- Section IV proposes six priority clusters for the region. Efforts to grow these clusters are paramount to stimulating economic growth in Region 5.
- Section V concludes with a detailed action framework that the regional council can use to achieve a set of regional economic goals.

It is important to say at the outset that this report does not recommend or reject any specific type of project. Instead, the report proposes a framework and a set of tested strategies that might help the region in critical areas like firm attraction and expansion, workforce development and innovation.

Section II. Executive Summary

Economic Challenges in the Hampton Roads Region

- GO Virginia Region 5 is Virginia's second largest region in both population and economic output, behind only Northern Virginia. With a GDP of 88.8 billion dollars and a population of 1.7 million, the region represents 18.4 percent of Virginia's economy and one fifth of its population.
- The region is not growing at the pace of Virginia or the US as whole.
 - Region 5's population growth since 2000 totals 7.9 percent, which is substantially lower than US (14.8 percent) or state (18.4 percent) growth rates. The region has experienced net domestic out-migration for several years.
 - The region's economy is heavily dependent on the federal government. Federal budget tightening has resulted in \$1.7 billion fewer federal dollars to the region. This has created stagnant or negative economic growth since 2013.
 - Job growth for the region has averaged 0.4 percent annually since 2010 – less than half the Virginia employment growth rate.
- Region 5 is overly reliant on a small set of large firms in its key clusters. Ship building and repair, advanced manufacturing, and food and beverage manufacturing are foundational to the regional economy, yet jobs are highly concentrated into a few firms, leaving the region vulnerable if a particular firm closes or relocates.
- Region 5 is creating small- and medium-sized enterprises (SMEs) at a pace far below its peer metro areas. The Virginia Beach-Norfolk-Newport News MSA ranks 256 out of 380 metropolitan areas in the US in change in establishment births to total establishments. Creating more SMEs in key clusters will contribute to regional job creation, innovation, and economic diversity.
- Region 5 is not creating a workforce for the next-generation knowledge-based economy at a quick enough pace. The region needs to produce and retain trained workers at all levels of the education spectrum. Almost 30 percent of adults aged 25 and older in Region 5 had at least a 4-year degree – on par with the national averages, but needs to improve to effectively compete with peer metros for advanced professional and business services. Several of the region's core industry clusters, such as advanced manufacturing and ship building and repair, rely heavily on workers that may not possess a 4-year degree, but rather are trained in some

kind of skilled trade. The recent state of the workforce and gap analysis demonstrated a clear need for greater number of skilled trade workers within the region.

- The region's higher education institutions have increased their capacity to produce graduates. Between 2005 and 2015, the region has seen a 92 percent increase in Associate's Degrees, 63 percent increase in Bachelor's Degrees, and 74 percent increase in the number of graduate or professional degrees awarded. However, the region is one of only two GO Virginia regions that saw a decrease in certificates awarded over this time period (-10 percent) versus an average increase of 28 percent across Virginia.
- More graduates from computer and information sciences programs will be necessary to scale up the region's data analytics and cybersecurity clusters. In 2015, 23 percent of all Virginia's computer sciences degree completers were awarded in Region 5; this figure is down from 28 percent in 2010.
- Another critical area, particularly for the region's advanced manufacturing clusters, is in engineering and engineering technologies. While the number of degrees are up overall, the total number of awards (including certifications) are down from 2013.

Potential Areas for Growth (Priority Industry Clusters)

Using previous work and new data, the report identifies nine likely clusters for Region 5:

- 1. Advanced Manufacturing**
- 2. Ship Repair and Shipbuilding**
- 3. Port Operations, Logistics and Warehousing**
- 4. Cyber Security, Data Analytics and Modeling and Simulation**
- 5. Water Technologies**
- 6. Unmanned Systems and Aerospace**
- 7. Life Sciences**
- 8. Business Services**
- 9. Tourism and Recreation**

Of these nine clusters, the report recommends particular efforts be used to grow 6 "priority clusters" in the near-term. Those 6 clusters are (in order of priority):

- 1. Port Operations, Logistics and Warehousing**
- 2. Advanced Manufacturing**
- 3. Cyber Security, Data Analytics and Mod-Sim**
- 4. Shipbuilding and Ship Repair**

5. **Water Technologies**
6. **Unmanned Systems and Aerospace**

This list of priority clusters should not be used to reject high quality initiatives that may emerge in other clusters. Instead, this list simply suggests some areas where a large set of assets, individuals and firms already exist and wages in the cluster occupations exceed the current regional median. In addition, we believe each of these six clusters present an opportunity for Region 5 to create a marketable, international brand.

Policy Directions (Goals)

Based on the technical studies, stakeholder outreach, and direction of the Region 5 Regional Council, three major goals have been established for the Region 5 GO Virginia initiative:

- Goal 1: Create a Coordinated Region Capacity for Innovation in the Region's Key Cluster Areas**
- Goal 2: Increase the Pace of SME Job Creation Through Both Expansion of Existing Firms and, in particular, the Attraction of Out-of-Region Firms in Key Cluster Areas**
- Goal 3: Close All Skills, Credentialing and Degree Gaps in the Regional Clusters' Workforce By 2022 Through Both In-Region Production and Talent Importation**

Action Plan Framework – How the Plan Will Be Implemented

Section V of this document provides a detailed Action Framework to guide implementation of the Plan. The Action Framework is a highly-focused component of a larger movement that has emerged from the GO Virginia strategic planning effort for Region 5. It provides a framework for future collaboration aimed at measurably advancing the Hampton Roads regional economy. Whereas the immediate purpose of the Action Framework is to define actionable objectives and evaluation criteria for GO Virginia grant-funded investments, the intense investigation of the region's economic development challenges and opportunities has also inspired a longer-term and more far-reaching vision for moving the region forward.

Prioritizing GO Virginia Grant Funds

The Region 5 Regional Council anticipates the submittal of proposals from Region 5 stakeholders for projects suitable for GO Virginia funding, based on the guidance provided in the Action Framework. Two critical concepts of the Action Framework are innovation and local collaboration. In this spirit, the Framework purposely avoids prescribing pre-defined action items. Instead, the Framework outlines targeted objectives for a series of

strategies, or “strategy categories.” In other words, the Framework describes *what the Regional Council expects to achieve*, but leaves the *how* to be defined by individual proposers.

It is critical to note that strategic initiatives or “interventions” supported by GO Virginia resources are expected to be saved for two very specific occasions:

First, when markets fail. To use the example of innovation: Left to the private market, innovation in the region would only occur with a double coincidence of wants (the firm wants the technology and scientist happens to be inventing that specific technology). This severely limits the amount of innovation, so subsidized innovation efforts are warranted.

Second, when there is a clear need to build capacity that would not be developed in the absence of intervention. The Regional Council anticipates that capacity-building will be the motivation for almost all GO Virginia proposals in Region 5. Put simply, the Regional Council will be most interested in intervening in situations where there is an existing promising effort, being run on constrained resources, and the GO Virginia money can meaningfully help to “scale” the program.

Overview of Strategy Categories

The 20 strategy categories detailed in the Action Framework include two levels of strategic initiatives:

1. “Foundational” initiatives (Strategy Categories 1 through 8) that would typically be regional in scale and focused on sustained investments in improving the region’s competitiveness and capacity for economic development; and
2. A series of immediately actionable strategies (Categories 9 through 20), each aimed at specific Region 5 goals. These are the priority strategy areas for which the Region 5 Regional Council is actively soliciting innovative proposals for near-term implementation. The nature of this second level of strategies is such that funded programs/projects will typically (but not always) be sub-regional in scale and focused in terms of discrete objectives.

Consistent with the expectations of the GO Virginia program, the Action Framework proposes new and/or enhanced activities that are carefully aligned with existing local and regional economic development efforts. In this regard, the Framework seeks to maximize leverage of GO Virginia investments not only through the program’s direct matching requirements, but also based on the underlying programmatic infrastructure that will extend the effective impact of individual new initiatives.

Table II-1 on the following page summarizes the 20 strategy categories and shows their relationship to Region 5’s major goals for the GO Virginia program.

Table II-1: Strategy Categories and Goal Interrelationships

		Other Related Goals		
#	Strategy Category	Goal 1. Coordinated Capacity for Innovation in Key Clusters	Goal 2. Expand SMEs in Key Clusters	Goal 3. Close Skills and Credential Gaps in Clusters' Workforce
"Foundational" Strategy Categories Having a Regionwide Focus and that are Applicable to All Goals				
1	Enhance coordination of innovation programs	X		
2	Monitor role of major clusters in the region's economy	X		
3	Monitor major clusters' potential effects on the region's workforce	X		X
4	Maximize integration of existing cluster industries into the local economy	X	X	X
5	Implement regional marketing initiative focused on generating a Hampton Roads brand	X		
6	Facilitate conversion/diversification of firms focused on defense/federal contracting		X	X
7	Expand capacity for industrial land development	X		
8	Invest in critical Port improvements	X		
Goal 1. Create a Coordinated Region Capacity for Innovation in the Region's Key Cluster Areas				
9	Define specific innovation focus for the region			
10	Focus on advanced manufacturing as an "innovation keystone"		X	X
11	Augment the tech-oriented institutional base		X	
12	Facilitate the creation of innovation districts			
Goal 2. Increase the Pace of SME Job Creation Though Both Expansion of Existing Firms and the Attraction of Out-of-Region Firms				
13	Promote expansion of small businesses as a key element of innovation	X		X
14	Expand resources for entrepreneurs	X		X
15	Fund special-purpose websites	X		
16	Expand export assistance programs focused on region's core strengths	X		
Goal 3. Close All Skills, Credentialing and Degree Gaps in the Regional Clusters' Workforce By 2022 Through Both In-Region Production and Talent Importation				
17	Address higher-education skill gaps	X	X	
18	Pursue placemaking activities to retain and attract young technical talent	X	X	
19	Promote technical education at all practical levels	X		
20	Invest in veteran re-training		X	

Section III. Economic Challenges in the Hampton Roads Region 5

Combined, the 16 counties and independent cities that comprise the GO Virginia Region 5 form a significant part of the Virginia economy. In 2015 Region 5's GDP was \$88.6 billion¹, which represents 18.4 percent of Virginia's total economic output. This makes Region 5 Virginia's second largest economic region, behind only Northern Virginia.² It is also Virginia's second largest region in terms of population. With 1.7 million residents, roughly 1 out of every 5 Virginians lives in Region 5.

The region's economy, however, has underperformed over the course of this century. The reasons for these struggles—a dependence on the federal, and particularly, military spending, a lack of economic diversity, relatively low educational attainment levels—are widely known and well documented. Over the past few years, several key studies have been commissioned to provide better regional insight and understanding of the forces that have limited the region's economic growth.³ This section is not intended to rehash the findings of those reports, but rather it highlights a number of the challenges that Region 5's GO Virginia initiatives will need to address in or to alter the region's economic trajectory.

Challenge 1.

Region 5's growth is not keeping pace with the US or Virginia

Region 5 represents Virginia's second largest economic region, but an examination of its broad growth trends show a region encountering significant headwinds. Whether it is the size of the region's population, economic output, or workforce, the region is not keeping pace with national or statewide trends. Many of these trends are related and interconnected.

Throughout this century, the region's population growth has trailed the state and nation

Figure III-1 shows that the region's lagging population trends in relation to the state and nation. Region 5's population is only 7.9 percent larger than it was in 2000. By contrast, the

¹ Moody's Analytics (VEDP study)

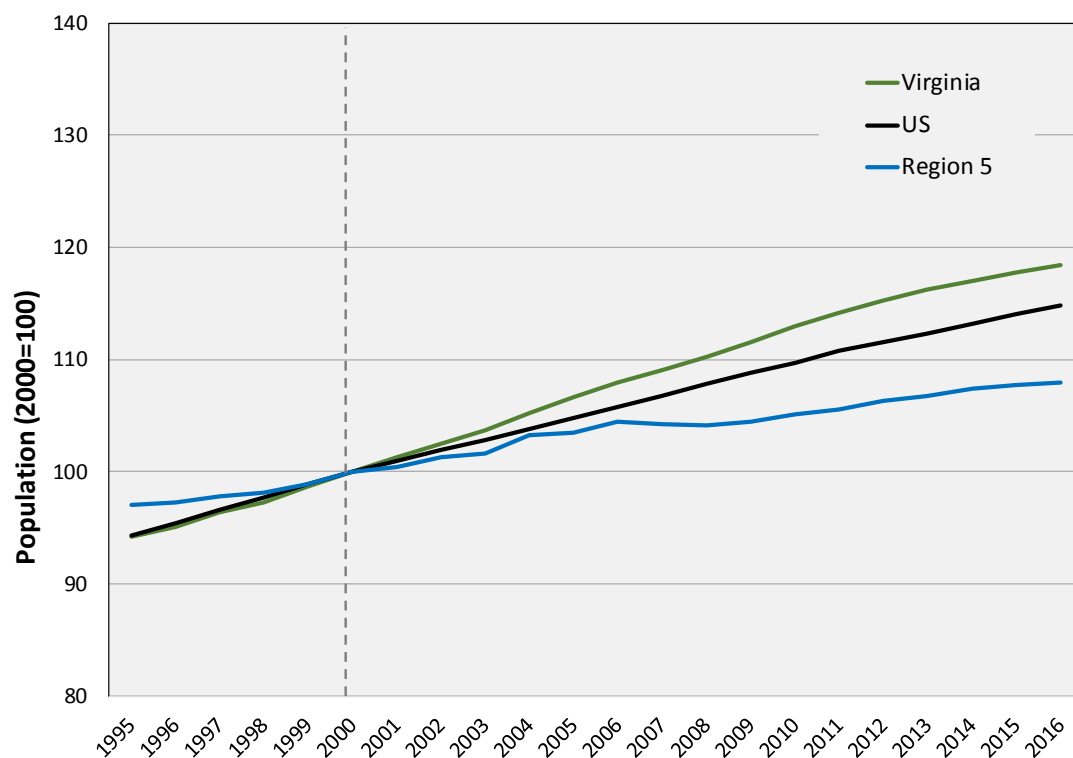
² BEA, 481,721 million VA GDP, DC MSA 491,042 million

³ These studies include: 1) Fuller, Stephen S. (2016). The Action Plan for Future Economic Growth in the Hampton Roads Region. http://reinventhr.org/documents/FullerReport-FINAL_000.pdf, 2) Filer, Larry. (2016). The Hampton Roads Industry Cluster Mapping Project. <http://reinventhr.org/documents/HRclustertechnicalreport.pdf>, 3) Filer, Larry., Vandecar-Burdin, Tancy., & Wilson-John, Wendi. (2016). Growing and Diversifying the Economic Base of Hampton Roads: Identifying Requirements and Restrictions for Growth from Interviews with Corporate Executives. <http://reinventhr.org/documents/HRInterviewreport-final.pdf>, and 4) Emsi. (2017) Hampton Roads State of the Workforce and Gap Analysis 2017. *Opportunity Inc. of Hampton Roads, the Peninsula Council for Workforce Development, the Greater Peninsula Workforce Development Consortium, the Hampton Roads Economic Development Alliance, and ReInvent Hampton Roads.* <http://opp-inc.org/wp-content/uploads/2015/06/Hampton-Roads-Executive-Summary.pdf>, among others.

US and Virginia populations were 14.8 percent and 18.4 percent larger, respectively. The region's population growth has been consistently sluggish. Between 2000 and 2010 it grew 0.5 percent annually, and since 2010 it has slowed to 0.4 percent. This decade's growth rate is half the US and Virginia annual growth rate of 0.8 percent.

Within the region there are some relatively faster growing jurisdictions, particularly on the peninsula as Williamsburg City and James City County grew 1.8 percent and 1.6 percent annually, respectively, between 2010 and 2016. Chesapeake (1.0 percent) also had above average growth during this period. The region's two largest jurisdictions—Virginia Beach (0.5 percent annual growth) and Norfolk (0.2 percent annual growth)—experienced much slower growth between 2010 and 2016. Combined, these two jurisdictions account for 40

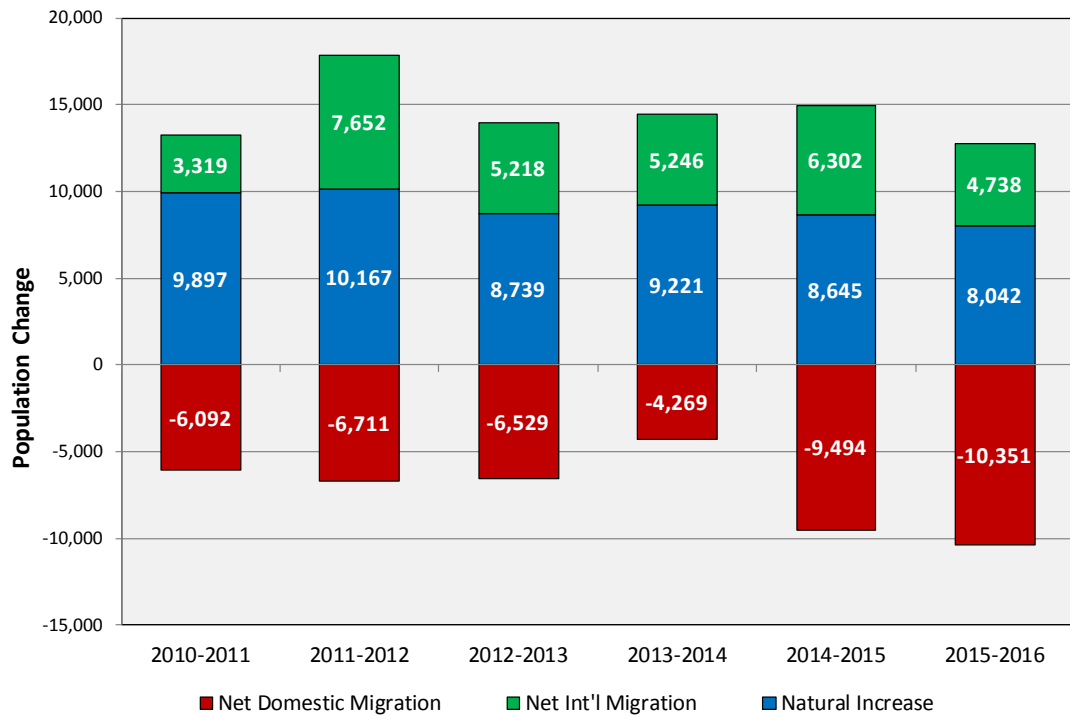
Figure III-1: Index of Population Growth (2000 Population=100)



percent of the region's total population. Other jurisdictions—both large (Hampton) and small (Accomack, Northampton, Poquoson, Franklin, Southampton)—experienced loss of net population since 2010.

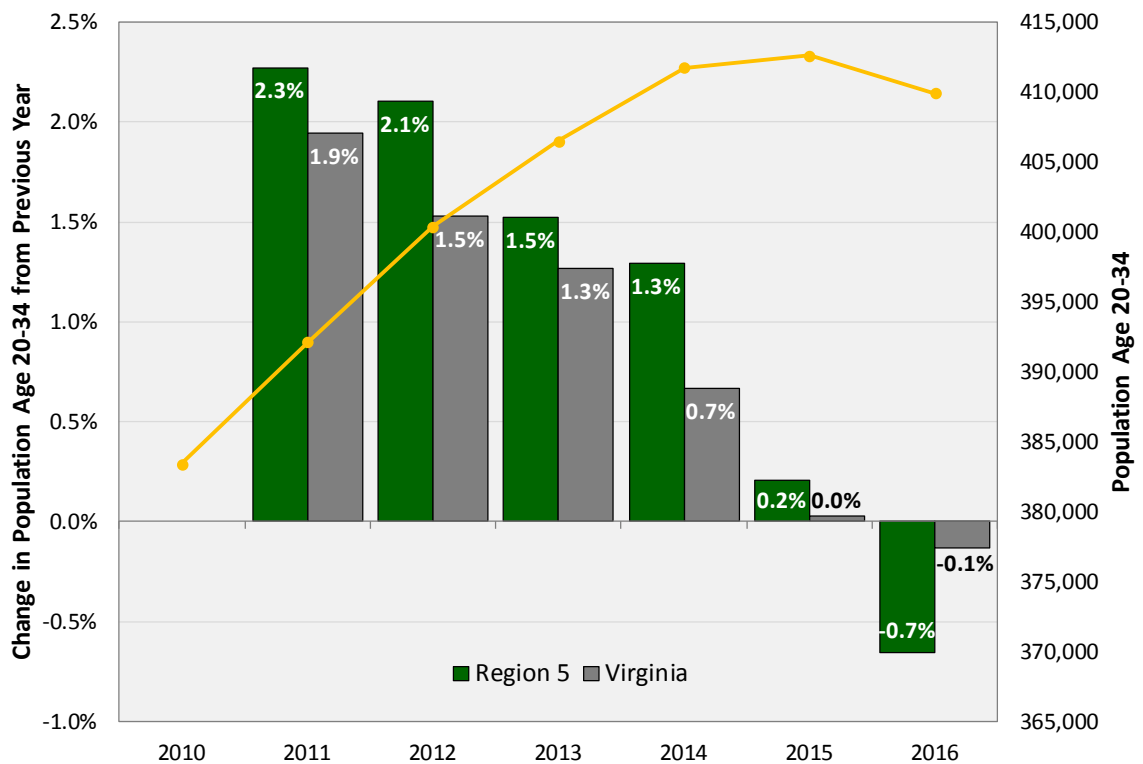
The population growth that has occurred this decade has been the result of natural increase and net international in-migration, but net domestic out-migration has been one of the driving factors contributing to the region's sluggish population growth. Figure III-2 shows that more domestic residents have been moving out of the region than moving into the region. Over the past two years, roughly 10,000 more domestic residents have left the region than have moved to the region. This has been a statewide trend since 2013, but in Region 5 this has occurred every year this decade.

Figure III-2: Components of Population Change



Source: US Census Bureau, Population Estimates Program, V2016

Figure III-3: Year over Year Change in Population Age 20-34



Source: U.S. Census Bureau, County Characteristics Resident Population Estimates V2016

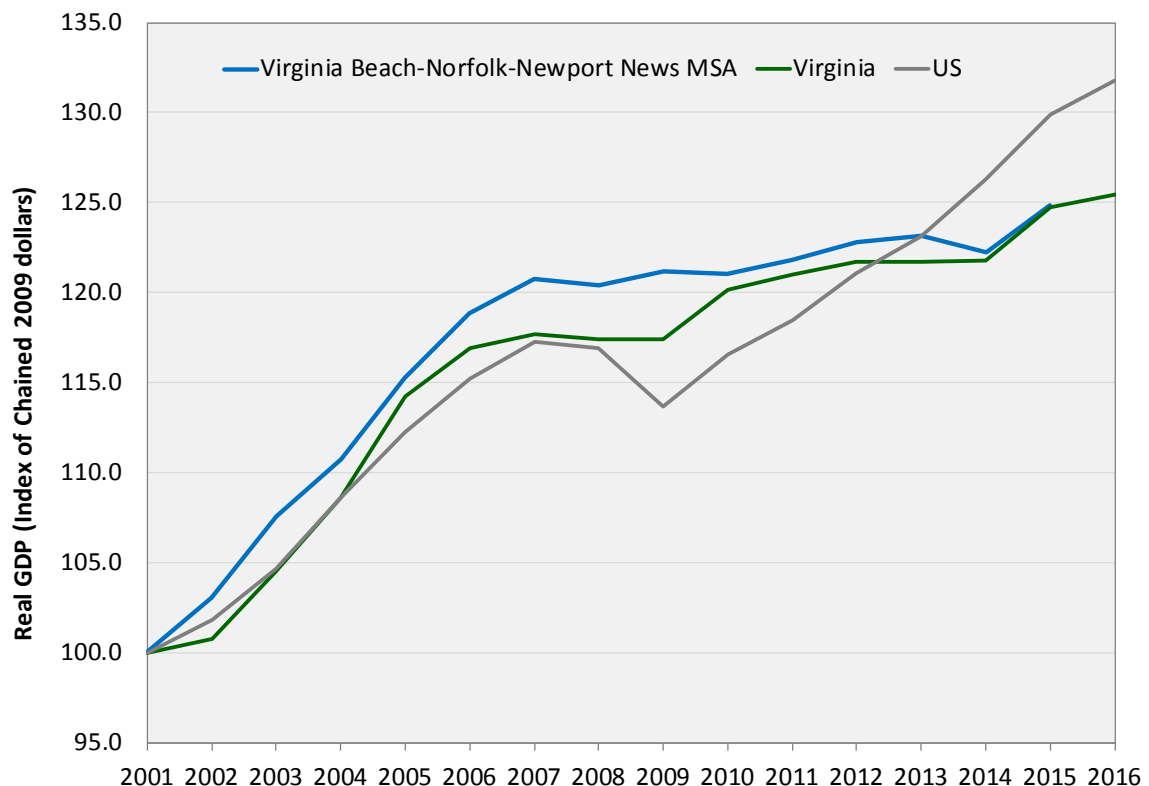
Another factor influencing the region's population growth is the slowing growth of 'millennial' aged workers who will represent a growing share of the workforce as the baby boomer generation retires. Figure III-3 shows the change in the age 20 to 34 population from the previous year. Through the first part of this decade, Region 5 has done reasonably well relative to Virginia in terms of the growth in this demographic. However, the most recent year of available data shows that growth in this group declined by 0.7 percent from the previous year – greater than the 0.1 percent decline experienced statewide. The extent to which this recent trend continues will shape an important part of the region's future workforce.

While the nation's economy recovered, the Hampton Roads economy stalled

The region's economy performed relatively well during the first decade of the 2000s. Figure III-4 shows that the Virginia Beach-Norfolk-Newport News MSA outperformed both the Virginia and US economy between 2001 and 2007. This is due in part to higher levels of federal spending, and particularly defense spending in support of the Afghan and Iraq wars. Since the recession, however, the region's economy has stalled while the national economy recovered.

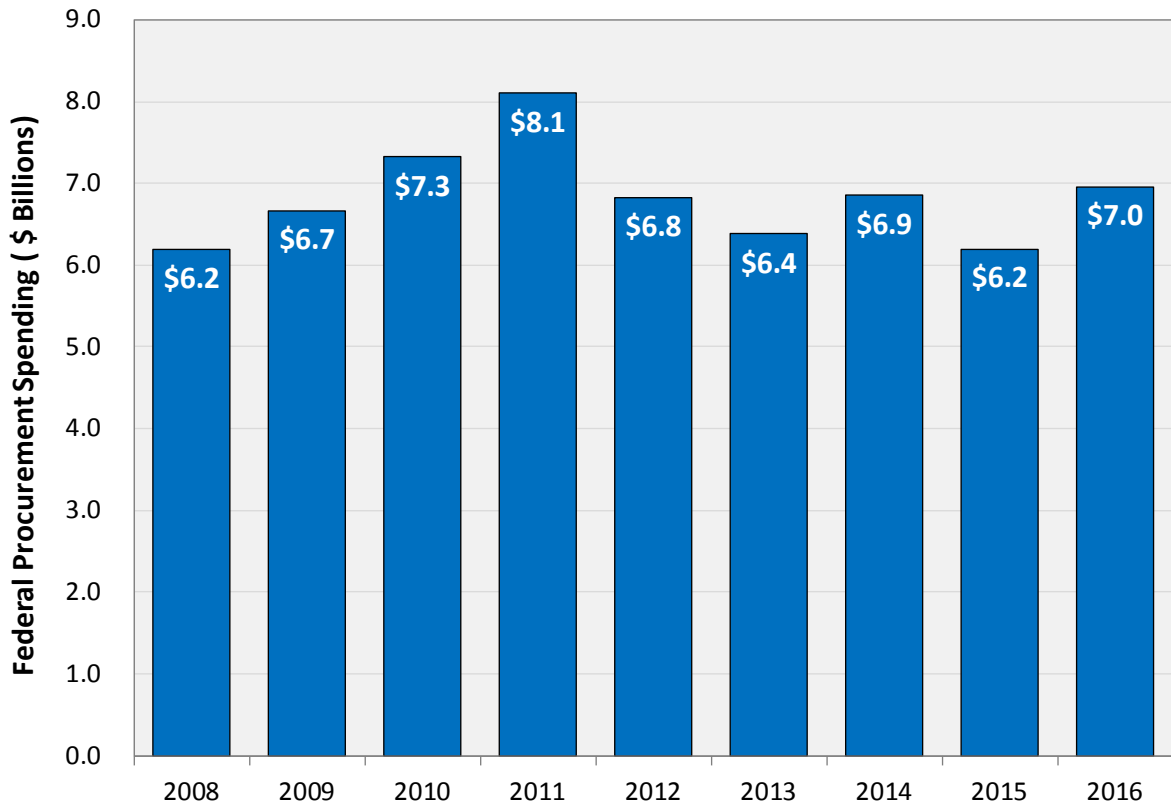
These trends reflect the region's relationship with the federal government. Much like Northern Virginia, a strong federal presence allowed the region to weather the worst consequences of the recession. The region did not face as steep a recession as the nation as a whole did. Nevertheless, as private sector growth fueled the US economic recovery, cuts in

Figure III-4: Real Gross Domestic Product (2009 Chained Dollars)



Source: US Bureau of Economic Analysis, 2015 regional GDP number is based estimates from ODU's Center for Economic Analysis

Figure III-5: Federal Procurement Spending on Contracts in Region 5



Source: USAspending.gov

federal spending resulting from the Budget Control Act of 2011 and the resulting sequestration created significant headwinds for Virginia and the Hampton Roads' economic recovery.

Figure III-5 shows federal spending in Region 5. Between 2011 and 2013, there was a reduction of approximately \$1.7 billion dollars of federal spending in the region due in large part to sequestration. These spending reductions are one of the underlying causes of the region's negative economic growth between 2014 and 2015. Federal spending levels have started to rebound and the most recent year of GDP growth shows that the region has rebounded slightly, keeping pace with Virginia. This is an encouraging sign, but another round of sequestration will create significant headwinds for the regional economy.

Employment growth in the region remains sluggish

Much like the region's GDP trends, employment growth for both the region and the state outpaced the nation between 2000 and 2010. Table III-1 shows the employment trends for the US, Virginia, Region 5 and the individual jurisdictions within the region. Due in large part to the recession, US employment only grew 0.2 percent annually between 2000 and 2010, while Virginia and Region 5's employment grew 0.9 percent and 0.8 percent, respectively during that period. As noted above, a heavy reliance on federal spending

moderated the impacts of the recession, but that same federal dependence slowed the region's economic recovery. Since 2010, the region's employment grew only 0.4 percent annually. By comparison this is less than half the Virginia employment growth rate and less than a third of the national growth rate during the same period. Among the individual jurisdictions, James City County grew the fastest since 2010, with an average annual rate of 1.3 percent and was the only jurisdiction to grow consistently over one percent annually since 1996. Chesapeake City saw consistent growth around 0.8 percent annually since 2000. Accomack and Northampton counties on the eastern shore saw the largest rate of job decrease at a loss of about 0.7 percent jobs on average annually since 2010.

Table III-1: Employment Growth

	Annual Growth (96-00)	Annual Growth (00-10)	Annual Growth (10-16)
United States	2.0%	0.2%	1.4%
Virginia	1.9%	0.9%	0.9%
Region 5	0.8%	0.8%	0.4%
Accomack	6.5%	-1.3%	-0.6%
Isle of Wight	1.6%	1.8%	0.3%
James City	1.1%	2.8%	1.3%
Northampton	2.1%	0.6%	-0.7%
Southampton	0.5%	1.8%	0.2%
York	0.1%	1.1%	0.4%
Chesapeake city	0.1%	0.9%	0.8%
Franklin city	-0.6%	-0.6%	0.7%
Hampton city	0.1%	-0.3%	0.1%
Newport News city	0.9%	0.3%	0.3%
Norfolk city	2.9%	1.3%	0.3%
Poquoson city	-0.2%	0.5%	-0.1%
Portsmouth city	-0.4%	-0.1%	0.2%
Suffolk city	2.2%	3.0%	0.5%
Virginia Beach city	0.3%	0.5%	0.5%
Williamsburg city	-4.3%	2.9%	0.7%

Source: US BLS Local Area Unemployment Statistics (2016 preliminary)

Per Capita Income

Per capita income lags behind both Virginia and the nation in both absolute value and growth rate. In 2015, the region's per capita annual income was \$46,192—a figure 11 percent lower than the state and 4 percent lower than the nation. The highest per capita income levels were located in James City County and Williamsburg at \$58,504, with the

lowest located on the eastern shore as well as Southampton in the western part of the region.

Keeping consistent with other regional economic trends, income growth in Region 5 also outperformed the state and the nation between 2000 and 2010. However, since 2010, the region's income growth has not kept pace with either. Between 2010 and 2015, per capita income grew 0.8 percent annually in Region 5, compared to 0.9 percent in Virginia and 1.5 percent in the nation. The City of Virginia Beach was the only jurisdiction to have higher annual per capita income growth in the past five years, compared to the decade previous.

To alter these trajectories, Region 5 does not necessarily need a small federal footprint, but rather it needs to develop additional sources of private sector job growth. Enabling that growth will require the region to address several other additional challenges.

Challenge 2.

Region 5 is overly reliant on a small set of large firms in its key clusters

In addition to being highly dependent on federal spending, Region 5 is also overly reliant on a small set of large firms in its key clusters. This means that the future of these clusters in the region will be largely determined by how those firms react to and plan for the competitive market pressures in their respective industries. To illustrate the 'top heavy' quality of the regional clusters, Table III-6 shows location quotients (LQs)⁴ based on cluster employment and cluster establishments.⁵ We can assume that clusters with employment LQs that are significantly larger than their establishment LQs are dominated by a limited number of larger firms. Conversely, clusters with establishment LQs that are dramatically larger than their employment LQs likely have a more diverse set of firms and firm sizes.

⁴ LQs measure the relative percentage of the region's cluster employment, as compared with the cluster's national employment share. If a region has a location quotient of 1, it means that the industry cluster represents the same share of employment regionally as it does nationally; a location quotient of 2 would indicate that the cluster's share of employment regionally is twice as great as it is nationally. Location quotients for establishments would follow the same logic, although it looks at the industry cluster's share of total establishments. An LQ greater than 1.0 means that one might assume the region has more workers than are required to make the product or service that supplies the region. The excess employment would presumably be used to produce extra products or services for export from the region, thus indicating a potential regional advantage.

⁵ These clusters are based on the clusters identified in the Hampton Roads Cluster Mapping Project. Filer, Larry. (2016). The Hampton Roads Industry Cluster Mapping Project. <http://reinventhr.org/documents/HRclustertechnicalreport.pdf>

Shipbuilding and repair is one of the most obvious examples of a top heavy industry cluster. This cluster has an employment LQ greater than 40 and an establishment LQ that is greater than 6. This cluster is dominated by large employers such as Huntington Ingalls Industries/Newport News Shipbuilding and BAE Systems Norfolk Ship Repair. More than other clusters, this reflects the uniqueness of these activities in the Hampton Roads and the fact that these activities do not take place in many other US regions. The port operations, logistics and warehousing cluster is less unique. Average establishment size in the region is only slightly larger than the national average, and as a result its employment and establishment locations are more aligned with one another.

Beyond ship building and repair, the region's manufacturing clusters also display a top-heavy quality. Employment in the advanced manufacturing cluster—led by large manufacturers such as Canon Virginia, STIHL, TE Connectivity, Liebherr Mining Equipment and others—is 2.5 times more concentrated in the region than it is nationally which would

Table III-2: Location Quotients for Cluster Employment and Establishments

Clusters	Employment LQ	Establishment LQ	Region 5 Avg Estab. Size	US Avg Estab. Size
Advanced MFG	2.55	0.91	68.55	37.72
Business Services	0.94	0.90	12.61	12.07
Food & Beverage MFG	1.54	0.71	140.44	27.06
Information Analytics & Security	1.00	1.05	16.05	17.05
Life Sciences	0.33	0.55	27.20	38.86
Port Ops, Logistics & Warehousing	1.22	0.91	29.11	21.89
Ship Repair & Ship Building	41.29	6.45	493.02	92.98
Tourism & Recreation	1.49	1.24	29.07	19.01
Unmanned Systems	0.07	0.22	25.56	92.98
Grand Total	1.00	1.00	14.64	16.22

Source: US Census Bureau, 2015 County Business Patterns

*Paid employees for pay period including March 12

*For employment size classes identified due to withheld data, the midpoint of size class was used to calculate employment totals

indicate that the region has a real competitive advantage. However, its establishment LQ is less than 1 meaning that manufacturing firms make up a smaller share of establishments regionally than they do nationally, which again reflects the top heavy nature of the cluster. Similar trends are seen in the region's food and beverage manufacturing cluster where the employment LQ exceeds 1, but the establishment LQ does not. Large firms such as Smithfield, Anheuser Busch InBev, Keurig Green Mountain, and several other prominent manufacturers employ a large share of this cluster's workers.

These large firms are all foundational elements of the region's economy, and the data show that Region 5 is top heavy in the clusters in which it excels. However, achieving more sustainable growth will necessitate greater 'bench strength' in these clusters. Creating more

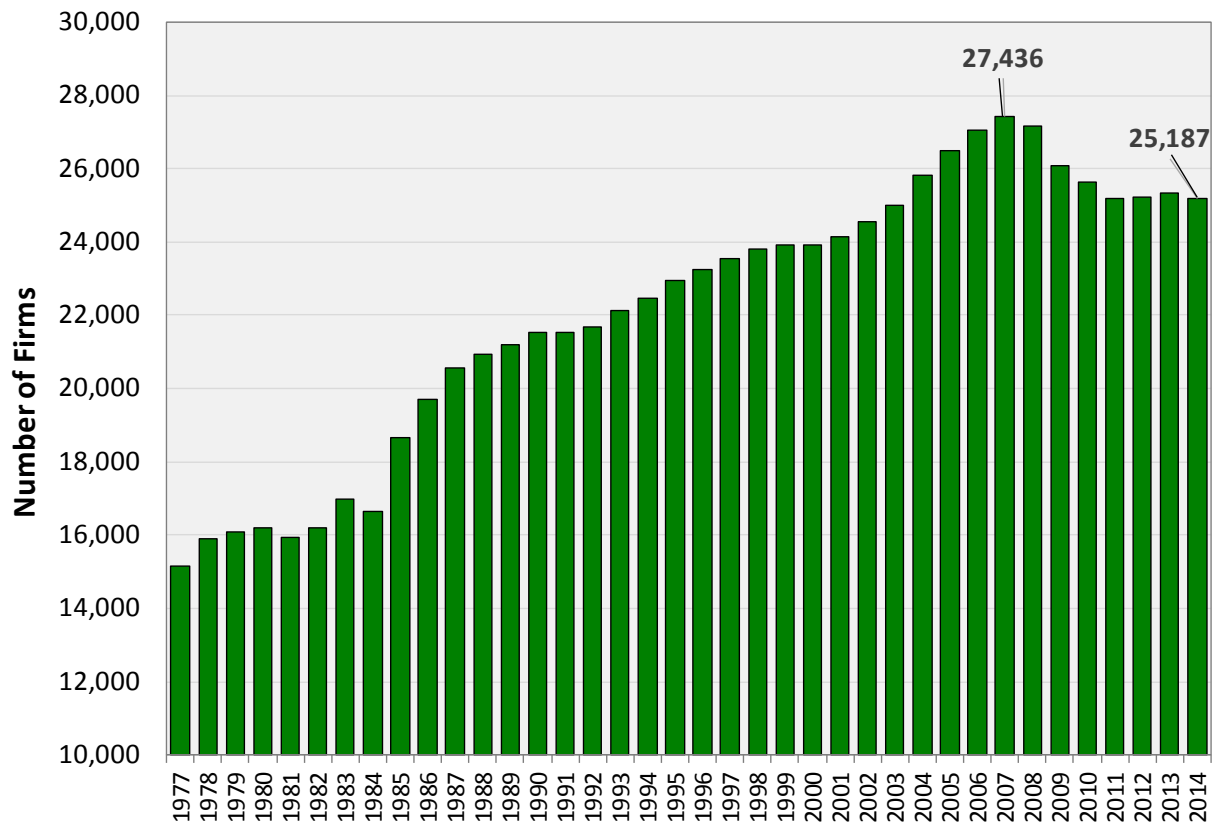
small- and medium-sized firms (SMEs) in these will not only contribute to regional job creation and innovation, but will also be important for diversifying the region's economy. With more firms these clusters, and the region at large, would be better equipped to weather the closure or relocation of any of these large firms. Small- and medium-sized firms are also more likely to be locally-based than larger, perhaps multinational, firms that may be headquartered somewhere else. Where decisions are made that can influence the future of a given establishment; locally-based firms are more likely to be invested in the region than are larger multinational firms headquartered elsewhere.

Challenge 3.

Region 5 is creating small and medium-sized enterprises (SMEs) at a pace far below its peer metro areas

Establishment data further reflects the region's sluggish growth, particularly since the recession. Figure III-6 shows the number of establishments in the region. The region peaked in 2007 with 27,436 establishments. However, the combination of the recession and sequestration caused a decline in the number of regional establishments. By 2014 the

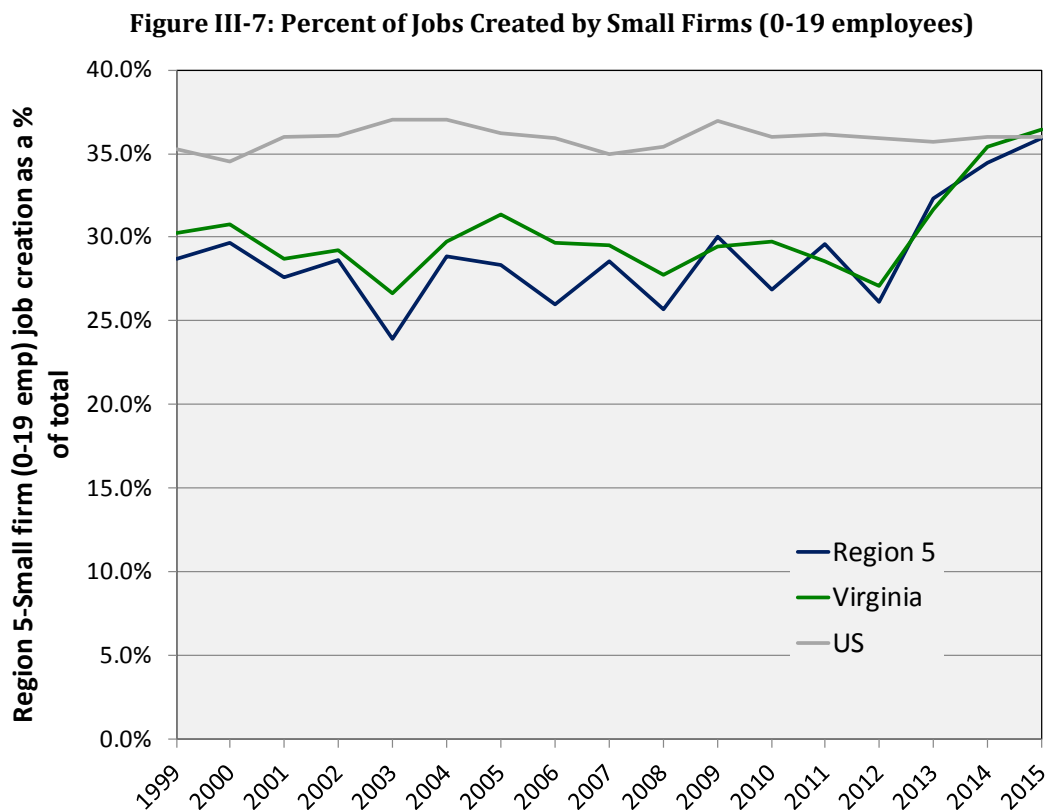
Figure III-6: Number of Establishments



Source: US Census Bureau, Business Dynamics Statistics

region had just over 25,000 establishments, and was down 8 percent from its pre-recession highs.

Small firms are often the source of much of the region's overall job creation. In many ways mirroring trends within the Commonwealth of Virginia, Region 5's smallest firms (0-19 employees) have historically contributed a smaller share of new jobs than the national average. Figure III-7 shows these trends for Region 5, Virginia and the nation since 1999. Small firms consistently account for about 35 percent of new job creation nationally. Until the first part of this decade small firms were responsible for between 25 and 30 percent of new job creation. This has changed since 2012 and both Region 5 and Virginia are now at the national average of around 36 percent. However, this recent increase is not necessarily the result of small firms in Region 5 creating more jobs than in the past. In an absolute sense they are creating 20 percent fewer jobs than they were in 2000, but they are currently creating a greater share of new job creation because the economy overall is creating fewer new jobs.



Source: US Census Bureau, Longitudinal Employer-Household Dynamics, Quarterly Workforce Indicators

This all speaks to a need for greater economic dynamism, and much of that dynamism will come from small- and medium-sized enterprises (SMEs). However, Region 5 is creating SMEs at a pace far below the majority of metropolitan areas across the nation. A national

2016 innovation index developed by Indiana University's Indiana Business Research Center showed that the Virginia Beach-Norfolk-Newport News MSA ranks 256 out of 380 metropolitan areas in the US in change in establishment births to total establishments.⁶ This puts the Hampton Roads in the bottom half of US metros overall. However, among the region's 30 peer metro areas the Virginia Beach-Norfolk-Newport News MSA was only ranked higher than Memphis, TN and Las Vegas, NV.

New firms that are being created tend to be locally-serving and do not contribute substantially to the region's economic growth. Locally-serving industries (e.g., retail) often recycle money in a community, and therefore will grow or decline based on the region's population trends. By contrast, traded or export based sectors (e.g., manufacturing) bring new money into the economy and are bigger drivers of the regional economy. Creating new firms in traded sectors is therefore paramount to growing the regional economy. However, the same index described above also looks at the growth and expansion of traded sector businesses relative to the number of deaths and contractions. This metric showed that the Virginia Beach-Norfolk-Newport News MSA ranked 306 out of 380 in traded sector establishment dynamics, putting it in the bottom quarter of US metro areas.

These challenges are not new and this relative lack of economic dynamism is something with which the region has long struggled. This is due in part to the region's development, which has focused heavily on the port, the military and manufacturing.⁷ Given that the region has largely been a 'company' town supported by federal funding and contracting, it has not developed a highly entrepreneurial culture. As a result, creating a dynamic and innovative entrepreneurial ecosystem comes harder for the Hampton Roads region than it does for many of its peer regions and thus, has not been as fertile for innovation and business creation as many of its peer metropolitan areas.

Challenge 4.

Region 5 is not creating a workforce for the next-generation knowledge-based economy at a quick enough pace

As with many regions, Region 5 faces significant, and multifaceted, workforce challenges. The region needs to produce and retain trained workers at all levels of the education spectrum. Figure III-8 shows that almost 30 percent of adults aged 25 and older in Region 5 had at least a 4-year degree. This puts Region 5 on par with the national population, but lags behind the Virginia. Indiana University's national innovation index shows that the Virginia Beach-Norfolk-Newport News MSA ranked 125th out of all 380 metropolitan areas in regards to the share of people age 25 and older with a Bachelor's degree.⁸ Even though this

⁶ StatsAmerica, Innovation 2.0 (<http://www.statsamerica.org/ii2/overview.aspx>). The 2016 Innovation Index uses the most recently available data, which varies depending on the data source. The development of this index was funded by the US Economic Development Administration.

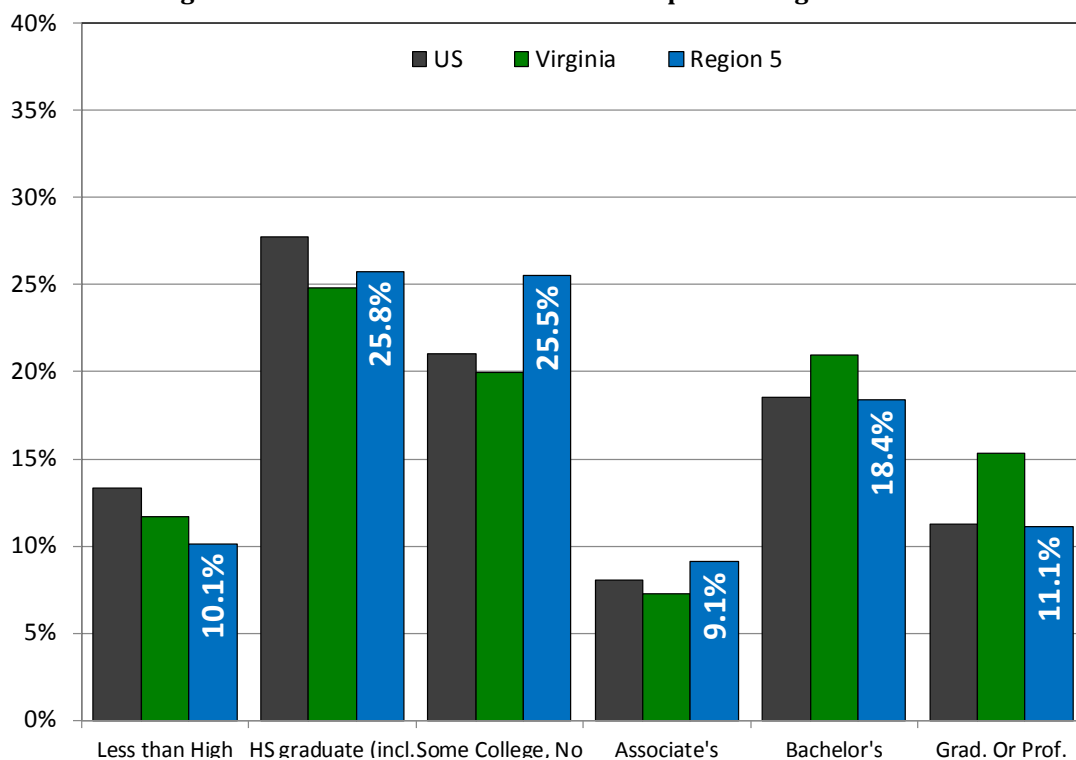
⁷ Fuller, Stephen S. (2016). The Action Plan for Future Economic Growth in the Hampton Roads Region. http://reinventhr.org/documents/FullerReport-FINAL_000.pdf

⁸ StatsAmerica, Innovation 2.0 (<http://www.statsamerica.org/ii2/overview.aspx>)

puts the region within the top half of metros, when these figures are compared to thirty peer cities, there were only 7 other metro regions with fewer residents with at least a 4-year degree. Keeping up is not getting ahead, and the region will need raise its overall level of education attainment if it is to effectively compete with peer metros for activities related to advanced professional and business services which rely heavily upon workers with 4-year or graduate degrees.

Within Virginia, Region 5 has the highest proportion of residents who hold an Associate's degree (9.1 percent). Several of the region's core industry clusters such as advanced manufacturing and ship building and repair rely heavily on workers that may not possess a 4-year degree, but rather are trained in some kind of skilled trade. The recent regional state of the workforce and gap analysis conducted by EMSI⁹ showed that across these clusters, occupations such as machinists, welders, and pipefitters were in-demand occupations. The EMSI report notes that many firms in these industries make extensive use of workplace learning through apprenticeships and internships, but it also notes that finding and keeping workers can prove challenging.

Figure III-8: Educational Attainment of Population Aged 25+



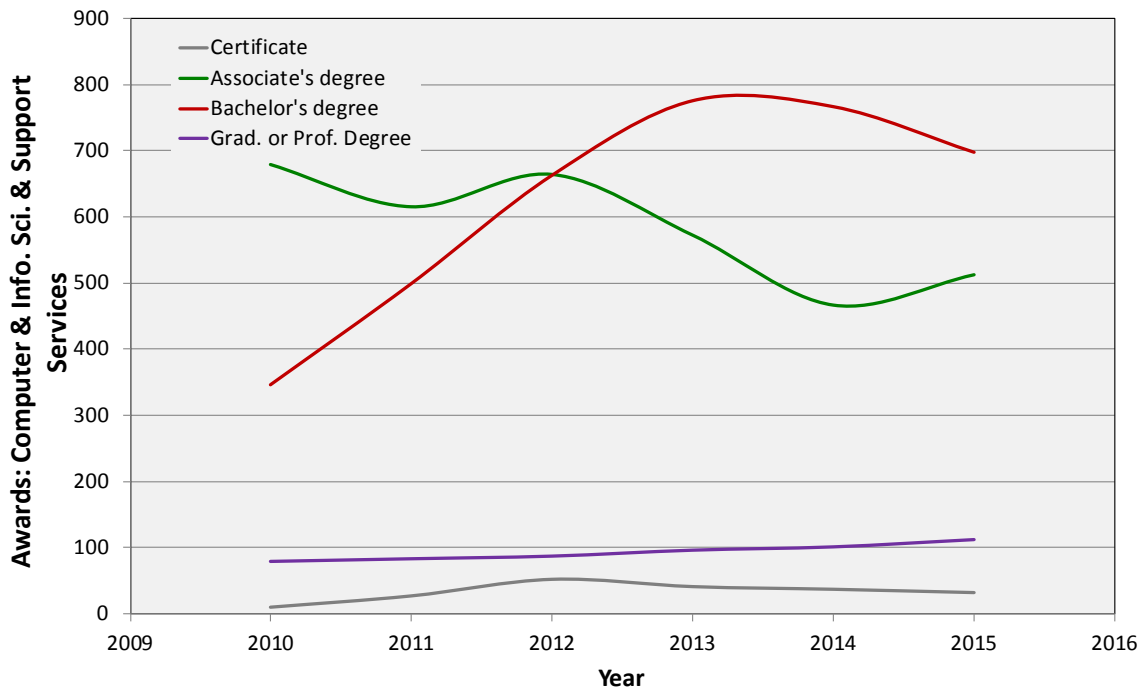
⁹ Emsi. (2017) Hampton Roads State of the Workforce and Gap Analysis 2017. *Opportunity Inc. of Hampton Roads, the Peninsula Council for Workforce Development, the Greater Peninsula Workforce Development Consortium, the Hampton Roads Economic Development Alliance, and ReInvent Hampton Roads.* <http://opp-inc.org/wp-content/uploads/2015/06/Hampton-Roads-Executive-Summary.pdf>.

Not only is there a competition for workers amongst firms within clusters, but there is also competition for workers between firms in different clusters because some of the skills are transferable across industries (e.g. ship building and manufacturing). There is therefore a clear need for a greater number of skilled trade workers within the region. This need will certainly grow as older trades workers leave the workforce.

The region's higher education institutions have increased their capacity to produce graduates. Combined, the region's colleges and universities had over 27,000 people complete certificates, associates, bachelors, and graduate degrees in 2015, this is almost 55 percent more than those completed ten years prior. Between 2005 and 2015, the region has seen a 10 percent decrease in the number of certificates, 92 percent increase in Associate's Degrees, 63 percent increase in Bachelor's Degrees, and 74 percent increase in the number of graduate or professional degrees awarded. The region is one of only two GO Virginia regions that saw a decrease in certificates awarded over this time period and is well below the 28 percent increase across Virginia.

The increase in degrees is a positive economic trend and contributes to the region's overall educational attainment. However, growing the region's key industry clusters will require more degree completers in key fields. For instance, more graduates from computer and information sciences programs will be necessary to scale up the region's data analytics and cybersecurity clusters. Figure III-9 shows that there was approximately 1,350 computer and information sciences certificates or degrees completed in 2015, which is 20 percent more than there was in 2010. The biggest increases were in the number of bachelor's degrees completed, where the number of awards doubled between 2010 and 2015. Not all awards were up, however, as the computer and information sciences associate's degrees declined by 25 percent during that period. In spite of the growing number of computer-related degree completers in the region, the region has not kept pace with the rest of Virginia. In 2015, 23 percent of all Virginia's computer sciences degree completers were awarded in Region 5; this figure is down from 28 percent in 2010.

Figure III-9: Awards in Computer and Information Sciences and Support Services Programs

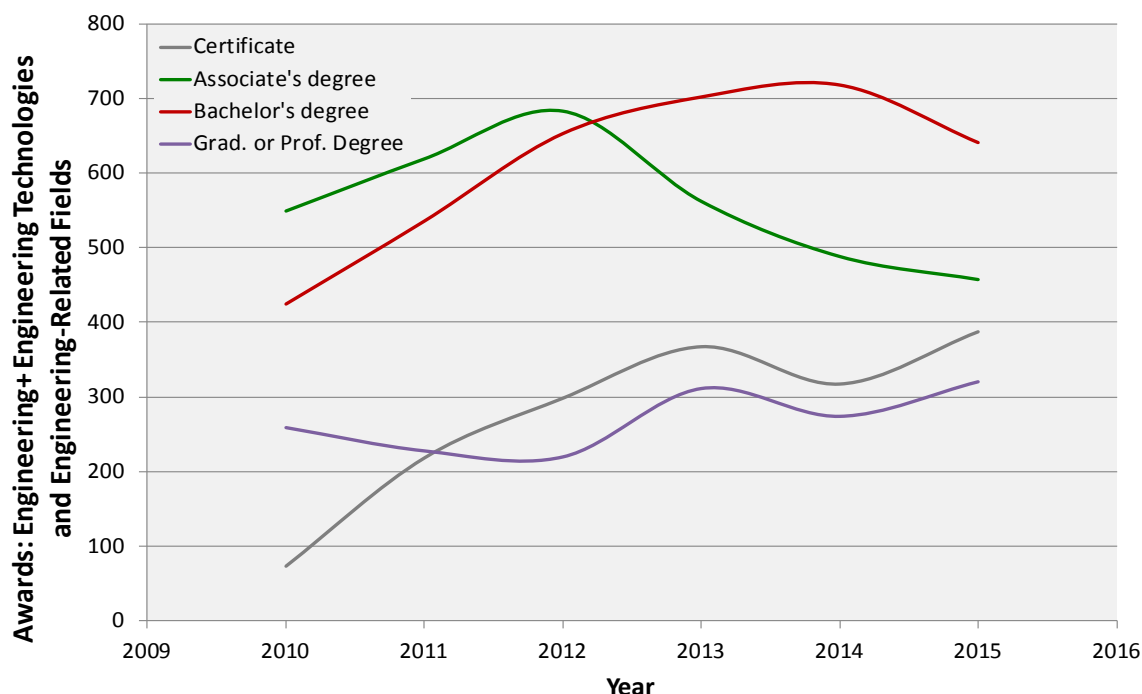


Source: US Dept. of Education, Integrated Postsecondary Education Data System (IPEDS), Chmura Economics Jobs EQ

Another critical area, particularly for the region's advanced manufacturing clusters, is in engineering and engineering technologies. In 2015, there were approximately 1,800 awards for degrees in these two fields with slightly more than half being bachelors and graduate degrees. Over half of these awards are coming from ECPI University-Norfolk. Figure III-10 shows completer trends since 2010. While the number of degrees are up overall, the total number of awards are down from 2013. Associate's degrees have declined from their recent high in 2012, but as the demand for skilled workers has increased participation in shorter certificate programs have grown and longer 2-year programs have declined.

Completers of engineering degrees have increased by more than a third between 2010 and 2015. Over 75 percent of the region's engineering awards were granted by Old Dominion University during this time period.

Figure III-10: Awards in Engineering and Engineering Technologies Programs



Source: US Dept. of Education, Integrated Postsecondary Education Data System (IPEDS), Chmura Economics Jobs EQ

Engineering technologies degrees, which tend to be more applied in nature and dominated more by 2-year degrees and certificates, accounted for 60 percent of the total engineering and engineering technologies degrees awarded in 2015. The region's higher education institutions—namely Tidewater Community College, ECPI-Norfolk, Old Dominion University, and Thomas Nelson Community College—have consistently produced about half of the Commonwealth of Virginia's engineering technology degrees over the past five years.

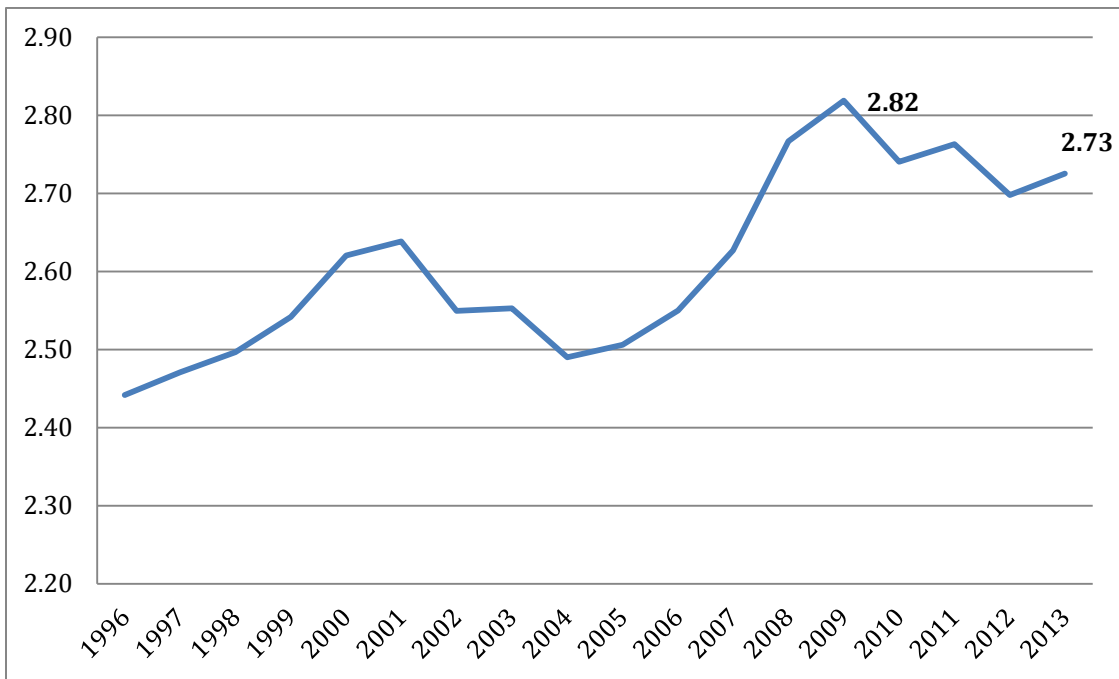
Challenge 5.

Region 5 lacks a deliberate and coordinated innovation strategy.

Innovation in Region 5 is lagging peer metros. Some of the issue for the region could be the result of a substantial decline in government-led R & D. Figure III-11 shows that since 2009 federal R&D expenditures as a percent of GDP have declined. In addition, an National Science Foundation report in 2016 illustrated that while R&D spending had reached high levels in 2014 and 2015, the federal share of that spending was at all time lows.¹⁰ Given the proclivity of the region's economy to tie itself to federal spending, it seems likely that the innovation ecosystem in the region was equally tied to federal R&D spending.

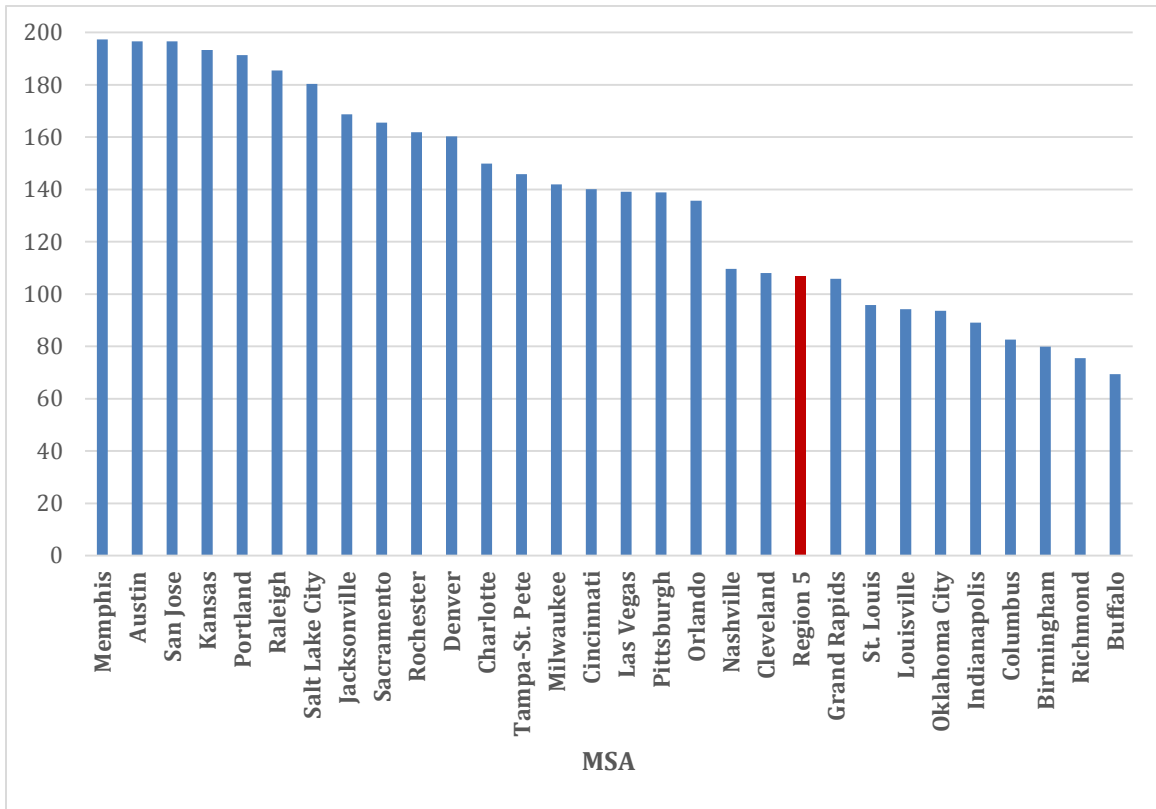
¹⁰ "U.S. R&D Increased by More Than \$20 Billion in Both 2013 and 2014, with Similar Increase Estimated for 2015", InfoBrief, September 2016, National Science Foundation.

Figure III-11: Federal R&D Expenditures as a Share of GDP



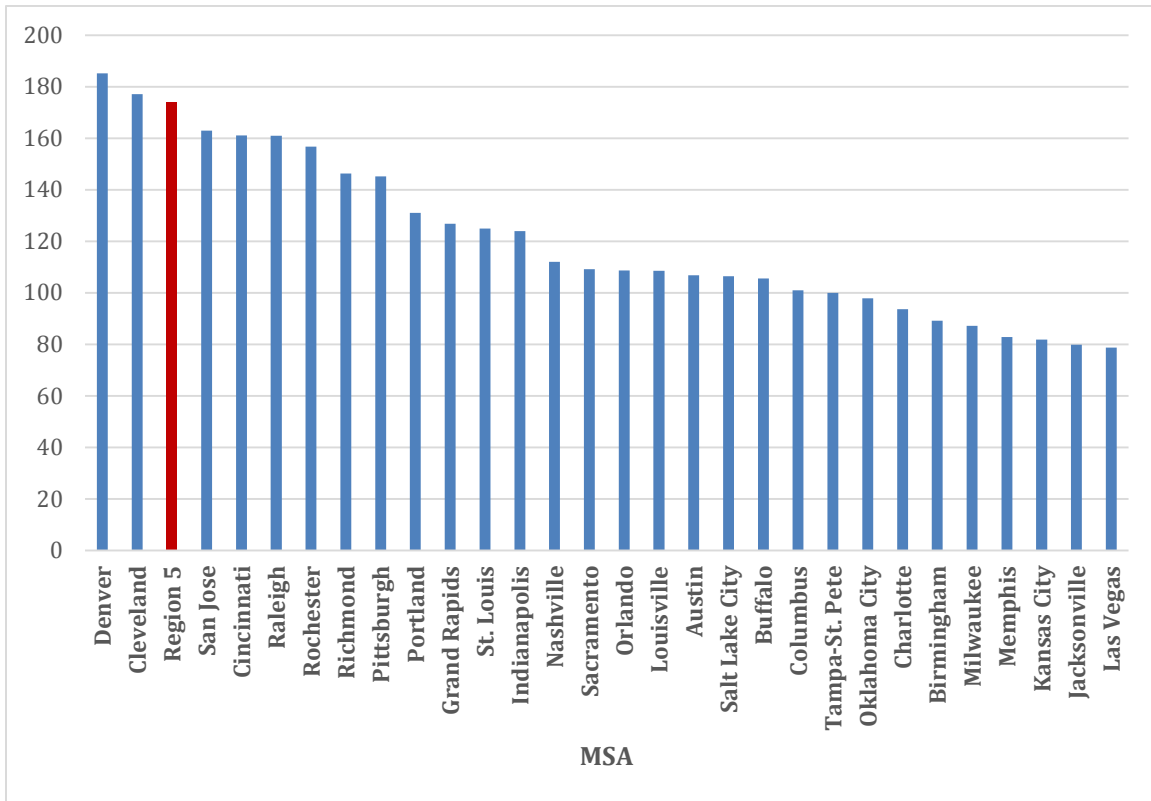
The region's innovation environment is simply not producing enough activity to keep up with our peer metros. One good measure of a region's efforts in innovation is the Patent Technology Diffusion Index presented in Figure III-12. This index measures both the number of patents in the region as well as the generality of the region's patents. The idea is that technology that can resonate with a general audience can diffuse more effectively. Region 5 is near the bottom of our peer metro areas on this measure. This is mostly a function of patent volume. Region 5 ranks near the bottom of patent volume for a region of its size.

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Next, we examine the level and potential of University-based innovation. Figure III-13 presents Region 5's ranking relative to the same peer metros in the University-Based Knowledge Spillover Index. The region ranks remarkably high in this measure trailing only Denver and Cleveland. This might seem surprising given the modest level of University R&D at Region 5's higher-ed institutions. However, a major component of the index is distance of the institution to the region. So, Region 5 scores quite high not because our institutions have large R&D spending, but because the region is located close to a number of institutions with R&D spending in science and engineering. The College of William and Mary anchors the far western part of the region and Hampton, ODU and Norfolk State anchor the south-eastern part of the region. The location of these institutions provides a wonderful opportunity for innovation spillovers to occur throughout the region. While this data is encouraging, the region's overall innovation metrics suggest it is not taking advantage of this opportunity.

Figure III-13: University-Based Knowledge Spillover Index



The economic challenges for Region 5 are hindering economic growth, but these challenges need not be the region's permanent reality. Aggressive intervention with a focus on the region's strengths can move the economy beyond its current state. Sections II and III provide some areas of strength for the region and a set of strategies that, if implemented, should change the trajectory of economic growth for Region 5.

Section IV. Areas of Potential Growth (Priority Industry Clusters)

Why Clusters?

Regional economies are complex systems. What often seems like an agglomeration of disparate firms performing isolated economic activity in the region is likely a set of several clusters of firms engaging in related economic activity. As a result, clusters have become the organizing framework for regional economies.

Proposing industry clusters could look like an attempt at picking winners and losers out of the vast amount of industrial activity occurring in the region. Nothing could be further from the truth. Through methodologically meaningful analysis, the clusters that are identified have already proved themselves to be winners. The economy of the region has “rallied the troops” around these complementary industries, so the whole (cluster) is greater than the sum of its parts (individual industries).

Clusters also provide an economic identity for the region. Excellent recent examples include the music business in Nashville, robotics in Pittsburgh and bio-medical in Boston. Historical examples include auto manufacturing in Detroit and IT in Silicon Valley. In this way, clusters could be seen as limiting for a region, but each of the clusters above include a number of supporting industries and occupations. Those supporting industries are as important to the health of the cluster as the final goods/services providers.

Previous Work on Clusters in Region 5

This section of the Growth and Diversification Plan lays out a set of clusters in which Region 5 has competency and capacity. The clusters presented in this section are motivated by a 2016 report entitled “The Hampton Roads Industry Cluster Mapping Project.” In that report, the authors identified a set of clusters for which the region had developed some capacity.

The clusters from that report are:

1. Advanced Manufacturing
2. Food and Beverage Manufacturing
3. Shipbuilding and Ship Repair
4. Port Operations, Logistics and Warehousing
5. Life Sciences
6. Business Services
7. Information Analytics and Security
8. Tourism and Recreation

It is important to note that these clusters were largely traded clusters and not local serving. In addition, there was a requirement that the clusters needed to have a large number of “high paying jobs.” As a result, there are industries not represented by the above list. This is not to suggest that such industries are not important to economic growth in the region,

rather it suggests that the traded and high paying job clusters are the engines of economic growth. Job creation in the other industries is “derived” from the creation of jobs in high-paying, traded clusters.

Also important to note, the prior report did not include the Eastern Shore of Virginia. However, for the purposes of GO Virginia, Accomack and Northampton County are part of Region 5.

Regions are becoming more focused and more concentrated in economic activity. This is, largely, a result of competitive forces. With binding resource constraints, it is impossible for regions to be good at everything. Instead, regions are moving toward being great in some things. Region 5 is no different. The region is highly specialized in the first four clusters listed.

In the same report, the authors also noted, “...it is imperative that we determine action plans for growing these clusters. Without connecting the clusters to actionable and appropriate development policies, the cluster project simply becomes an exercise in creating a visual image of the regional economy.”

The GO Virginia Economic Growth and Diversification plan provides an excellent opportunity for the region to develop actionable policies for the identified clusters. This is the focus of the next section of the report.

Best Opportunities for Increasing Region 5’s Economic Prosperity

While the eight clusters listed above help to motivate our list of opportunities in this report, there is not a direct overlap in some cases. The reason is that we are more focused on the future in this report. So, our recommended clusters below are based on the following set of criteria:

1. There is already some capacity in place in these clusters which can be scaled
2. The occupations in these clusters are forecasted to grow nationally (perhaps with the exception of advanced manufacturing)
3. There is a real opportunity for Region 5 to create a national identity in these clusters.

With this in mind, we propose and analyze the following clusters for Region 5:

- 1. Advanced Manufacturing**
- 2. Shipbuilding and Ship Repair**
- 3. Port Operations, Logistics and Warehousing**
- 4. Cyber Security, Data Analytics and Modeling and Simulation**
- 5. Water Technologies**
- 6. Unmanned Systems and Aerospace**
- 7. Life Sciences**
- 8. Business Services**
- 9. Tourism and Recreation**

These nine clusters are slightly different than the set of clusters from the list of clusters on page 27 in two ways. First, the names of the clusters have been changed in some cases to better reflect the unique areas of strength for the region within the broader cluster. For example, Information Analytics and Security from the Hampton Roads Industry Cluster Mapping study is now referred to as Cyber Security, Data Analytics and Modeling and Simulation to illustrate the unique strength that the region could possess in cyber and mod/sim. Second, two new clusters are introduced – Water Technologies and Unmanned Systems/Aerospace and two clusters are combined - Food and Beverage Manufacturing and Advanced Manufacturing.

Table IV-1 presents the basic situational analysis of the nine clusters. Columns 2 and 3 present the employment levels from 2012 and 2017 respectively. Seven of the nine clusters gained jobs over the 2012-2017 period. That is notable since this represents the time period where federal budgets were uncertain. So, this suggests the economy has some resilience to federal spending slowdowns.

However, focusing on columns 8 and 9 show the considerable weakness in the regional job market. While 7 of the 9 clusters experienced job growth from 2012-2017, none of the clusters grew at the national average. This includes many clusters that one would think the region would have some significant comparative advantage. This is an important result as it suggests that even in areas where we think the region has an opportunity, the region is currently lagging the nation. Indeed, advanced manufacturing and port operations, logistics and warehousing are the only two clusters growing at anything close to the national average for their respective cluster.

Focusing on column 5, eight of the nine clusters identified have wages in excess of average wages in the region (tourism and recreation is the only exception). That is a good sign. Clearly future job growth in these nine clusters will serve to increase average wages in the region.

Finally, we perform a quadrant analysis to identify the classification of each cluster. Identification of the clusters is important for defining appropriate growth strategies. The quadrant analysis categorizes clusters into four types based on location quotients (LQs in column 6 of Table IV-1) and cluster employment growth relative to national employment growth in the cluster. The four types of clusters are:

- **Mature** – These are clusters with strong LQs meaning a high degree of regional specialization, but are experiencing employment declines. Currently, ship repair and shipbuilding and tourism and recreation fall into this category. Regions should not abandon growth strategies for mature clusters, but must recognize the importance of deliberate intervention to advance the cluster. Growing mature clusters typically involves innovation strategies and seeking out new markets for the firms' products and services.
- **Stars** – Stars represent the regions' best opportunities. These are clusters with a specialization and employment growth. Region 5 has two clusters in this category –

port operations, logistics and warehousing along with advanced manufacturing. This is not a surprising result, but it is worth reinforcing the message. Star clusters are likely to become even more dominant for regional economic activity over time as other economic activities begin to serve a support role for the star cluster. These clusters still require important growth strategies. Often, star clusters become disconnected across a region as firms in the cluster locate in disparate locations throughout the region. In addition, star clusters tend to give birth to small, related firms that may go unnoticed. As a result, star clusters can benefit from frequent asset mapping and situational analysis that identifies the firms in the cluster and brings them together to discuss emerging market opportunities.

- **Transforming** – Transforming clusters have little specialization in the region and are also losing jobs at a regional and national level. Region 5 contains no transforming clusters.
- **Emerging** – Emerging clusters have low specialization in the region, but are experiencing employment growth at both the national and regional level. 5 of the 9 clusters are categorized as emerging, however, water technology and unmanned systems have LQs in excess of 1 (suggesting more specialization than the nation) and strong national growth. The reason these two clusters are not categorized as stars is that the employment growth in the region is significantly lagging the employment growth nationally. Also, the level of employment in both clusters (10,742 in unmanned systems and 34,940 in water technology) includes a large number of jobs that are not directly tied to either cluster. For example, water technologies include engineering services. However, not all engineering services in Region 5 are doing just coastal and environmental engineering. It is nearly impossible to get an accurate estimate of the number of FTEs dedicated to water technologies outside of directly surveying all engineering firms in the region. So, we recognize that our current employment estimates for unmanned and water technology are likely high – making these clusters more like emerging than stars.

Emerging clusters have very specific needs to evolve into star clusters. First, these clusters need strong regional trade associations to facilitate networking. Networking among the cluster firms provides firm density which assists with developing a regional brand in the emerging cluster. Second, firms in emerging clusters need a process for innovation to keep up with the rapid changes in technology happening in the cluster. Finally, emerging clusters need very clear and deliberate workforce development strategies. The “newness” of the emerging cluster means that a large stock of talent may not exist. This could inhibit firm growth and firm attraction. Workforce development strategies for emerging clusters should focus on both short-term quick credentialing programs as well as medium to longer-term bachelors and advanced degrees programs to promote sustainability of the cluster. Chances are the emerging clusters will need to import talent in the short-run to fill workforce gaps that might exist.

Table IV-1: Summary Table for the Clusters

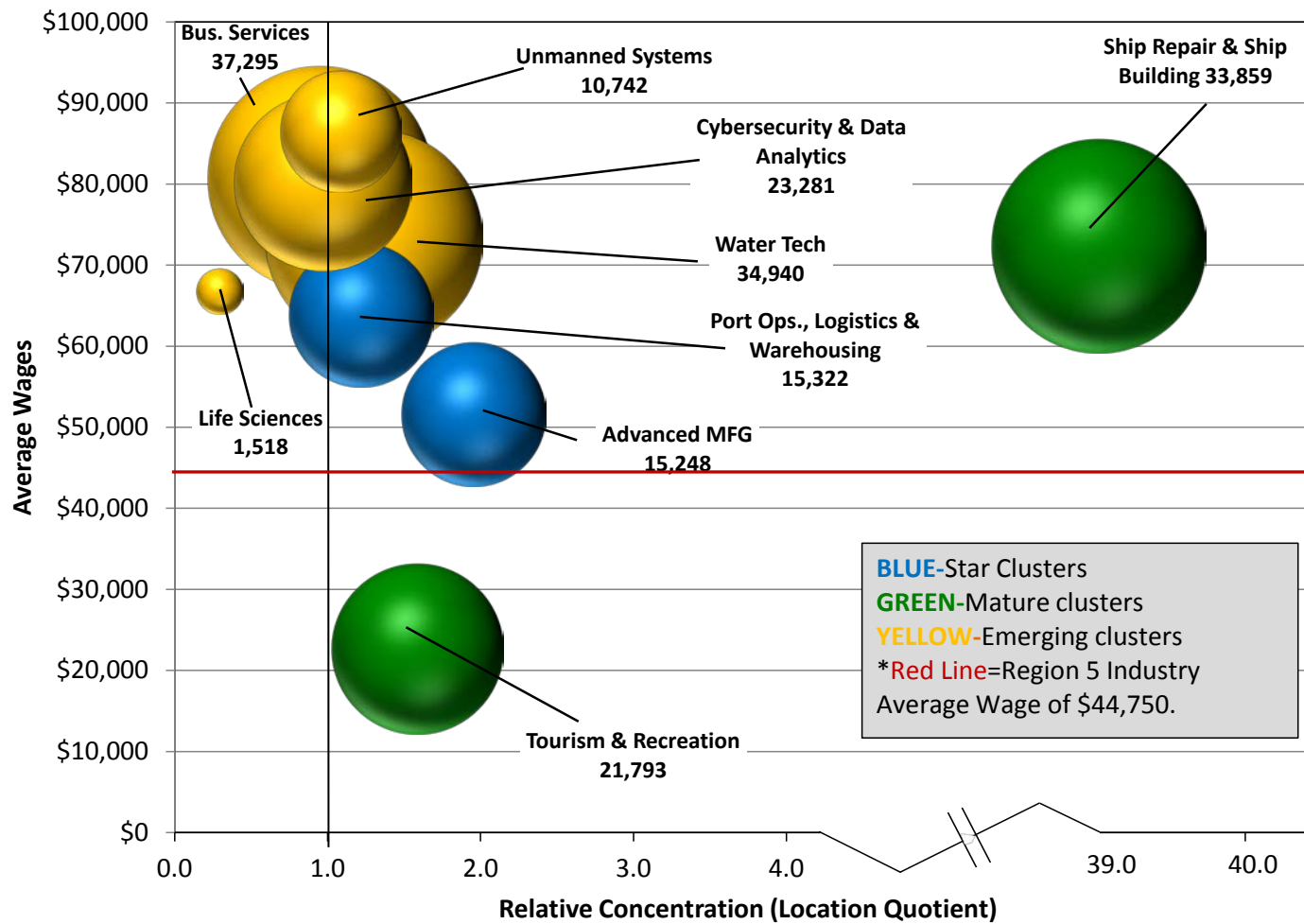
Cluster	2012 Emp	2017 Emp	12-17 Emp Change	Avg Wage	2017 LQ	12-17 LQ Change	HR 12- 17 Growth	US 12- 17 Growth	Type of Cluster
Advanced Manufacturing	14,098	15,248	1,150	\$52,610	1.92	0.20	1.1%	1.8%	Star
Business Services	36,149	37,295	1,146	\$80,726	0.95	-0.04	0.6%	2.4%	Emerging
Life Sciences	1,535	1,518	-17	\$66,800	0.30	-0.01	-0.2%	1.8%	Emerging
Port Operations, Logistics and Warehousing	13,482	15,322	1,840	\$63,846	1.22	-0.01	2.6%	3.9%	Star
Shipbuilding and Ship Repair	34,283	33,859	-424	\$72,377	39.04	-2.09	-0.2%	1.9%	Mature
Tourism and Recreation	21,727	21,793	66	\$22,681	1.59	-0.09	0.1%	2.3%	Mature
Unmanned Systems and Aerospace	10,515	10,742	227	\$86,480	1.09	-0.06	0.4%	2.6%	Emerging
Cybersecurity & Data Analytics*	22,208	23,281	1,073	\$80,282	0.97	-0.01	0.9%	2.2%	Emerging
Water Technology*	33,806	34,940	1,134	\$73,297	1.30	-0.09	0.7%	3.1%	Emerging
Total	758,092	782,609	24,517	\$44,750	1.00	0.00	0.6%	1.7%	

* Includes occupations that currently exist in Region 5 that could support the cluster, but may not be currently supporting the cluster.

Source: Chmura Economics Jobs EQ Platform

Figure IV-1 shows the clusters relative to their average wages and location quotients. The size of the bubble represents the size of employment in the cluster. As illustrated, the majority of the clusters have average wages in excess of the median wage, however, the region is not highly specialized in these clusters. Unmanned systems/aerospace, cyber and data analytics and water technology all fall into this category. These clusters are emerging and have the potential to become stars.

Figure IV-1: Quadrant Mapping of the Clusters



Source: Chmura Economics JobsEQ, 2017 Q1

Custer Priorities

We use Table IV-1, Figure IV-1 and the results of the regional council members survey (Table IV-2) to recommend the following clusters as focus areas for the region:

Port Operations, Logistics and Warehousing – This cluster is easily the highest potential cluster for Region 5. The region possesses a number of existing assets in this space and already has a global brand due to the presence of the Port of Virginia. However, the region has failed to leverage its maritime assets into a broader economic development strategy. A recently announced economic development study of the Port of Virginia is a good, first step. The region is well positioned to attract companies to the area that work in this cluster.

Advanced Manufacturing – For this report, advanced manufacturing also includes food and beverage manufacturing. Region 5 has a long history of manufacturing and the Port of Virginia seems to provide a wonderful asset to help the cluster grow. While projections suggest that the nation will lose over 800 thousand jobs in manufacturing by 2024, some manufacturing jobs are forecasted to grow dramatically through 2024. Aerospace manufacturing, food manufacturing and medical equipment manufacturing are some examples. Old Dominion University, NASA, Cannon, Arconic and Newport News Shipyard are all currently affiliated with The Commonwealth Center for Advanced Manufacturing (CCAM) illustrating a strong commitment to innovation in advanced manufacturing. In addition, the community college system (Thomas Nelson Community College, Paul D. Camp Community College and Tidewater Community College) produces a strong degreed and credentialed workforce for advanced manufacturing.

Cyber Security, Data Analytics and Mod-Sim – This cluster is defined by the same industrial activity as the Information Analytics and Security cluster in the earlier cluster report (#7 above). The name was changed to highlight the two areas of particular strength for Region 5 (Cyber Security and Modeling and Simulation). Job growth is expected to be robust in this cluster nationally. In addition, the region may also have a unique advantage in cyber security given the large number of former military in the regional workforce. Also, cyber occupations are not just stand-alone. Instead, these occupations are becoming ubiquitous across several industries expected to grow over the next decade. Medical and financial companies are projected to have significant increases in demand for cyber security in the coming decade. Finally, advancing modeling and simulation in the region will require a pivot from the previous strategy that was tethered to the Department of Defense, but that effort is well underway. Virginia Modeling Analysis and Simulation Center (VMASC) provides a valuable anchor institution in this cluster.

Shipbuilding and Ship Repair – This cluster is truly a stalwart of the region. The cluster is tightly connected to the Department of Defense and, as a result, its fortunes are determined by federal budgets. It seems unlikely that regional shipyards will pivot entirely to

commercial work, but the skills and occupations needed by this cluster transfer nicely into advanced manufacturing. So, from a workforce development perspective, credentialing and training for this cluster is also beneficial for the more commercially oriented advanced manufacturing cluster. Regardless of its reliance on federal budgets, this cluster and its supporting industries have potential for growth in the short-term.

Water Technologies – Water Technology, Unmanned Systems and even Life Science could all be put in this final priority spot. However, we believe that water technology has the best chance for growth in the medium-term. This cluster represents a very new set of innovations and occupations focused on resilience, mitigation and adaptation to both too much and too little water. Often the occupations in this space are referred to as “green jobs” and all forecasts suggest these jobs will be in higher demand over the next decade. Several local engineering and architecture companies have started resiliency groups (Clark Nexsen) and the region has a small, but growing presence of national firms in resilient engineering (WSP/Parsons Brinckerhoff and Moffat and Nichol are examples). This is certainly an early stage cluster for region 5, but there is an incredible opportunity in this cluster given the region’s own needs. The recent formation of the Commonwealth Center for Recurrent Flooding Resiliency, a collaboration among The College of William and Mary, Old Dominion University and Virginia Institute of Marine Science provides an anchor organization for the cluster. The accelerator associated with RISE provides the innovation hub needed for moving the cluster forward.

It is important to mention that the employment numbers in Table IV-1 overestimate the existing employment in water technology. Much of the employment in this cluster is general engineering, architecture, land planning, etc. There is no way to separate engineering employment that is dedicated to resilience and flood mitigation from the employment in regular civil engineering. As a result, Table IV-1 includes all of the occupations that can support a water cluster. Rather than viewing this number as a current measure of cluster employment, we view this number as reflecting the amount of human capital available for the cluster as it grows.

Unmanned Systems and Aerospace –

The Unmanned System and Aerospace cluster is emerging in the region. The regional cluster is well positioned for growth since the nation is anticipating rapid growth in unmanned systems employment nationally. The region possesses many assets that could be leveraged. Wallops Island provides the most unique of those assets. Effective utilization of Wallops Island will be very important for the growth of this cluster. In addition, National Aeronautics and Space Administration (NASA Langley Research Center) can and should play an important role in the growth of this cluster along with National Institute of Aerospace (NIA). The region has an opportunity to advance beyond just aerial systems and into ground and autonomous maritime (surface and underwater) vehicles. Indeed, the unmanned maritime vehicles space could be a strong opportunity for Region 5 given its

proximity to multiple bodies of water. Finally, partnerships with Region 2 (Blacksburg, Lynchburg, Roanoke) are possible in ground-based unmanned vehicles as that region has a number of assets and initiatives in place. The role of aerospace (including small satellite, payload processing, advanced materials, sensors and sensor-based systems) is important to this cluster. Workforce development across unmanned systems, aerospace and cyber/mod-sim is highly complementary. Those complementarities should be utilized when building and expanding training programs.

Next, we provide a brief overview of these six clusters, the reason why Region 5 could be successful in these clusters and some emerging opportunities in these clusters. We also present some emerging opportunities for the clusters not included on the priority list.

Table IV-2: Regional Council Survey Results on Potential Clusters

Clusters	Priority 1	Priority 2	Priority 3	Possible priority, not Top 3	Response by Industry
Port ops., logistics and warehousing	14	5	0	0	19
Ship repair and ship bldg.	2	3	2	0	7
Adv. Manufacturing	4	7	4	2	17
Food and beverage mfg.	0	2	2	2	6
Unmanned systems and Aerospace	0	3	4	4	11
Cyber security	6	4	6	3	19
Info. and data analysis	3	1	5	0	9
Bus. and prof. services	0	1	4	0	5
Life sciences	1	1	2	1	5
Water technology	0	3	1	0	4
Priority Totals	31	30	30	12	
Total Responses for All Clusters					103

Port Operations, Logistics and Warehousing

Definition

Three types of economic activity broadly define this cluster: material moving, shipping services and warehousing. Of these three, material moving represents 53% of the employment in this cluster. Average wages in the cluster are \$63,000, well above the median wage in Region 5. Total employment in this cluster was 15,322 as of Q1 2017, a 2.6% increase over 2012. This rate of growth makes this cluster the fastest growing cluster in terms of employment over the 2012-2017 period.

Why Region 5?

The harbor of Hampton Roads is the most unique asset in all of Region 5. The Port of Virginia, the coal facilities and the shipyards all benefit and grow due to this geographical advantage. As container ships get larger, requiring deeper channels, Region 5 stands ready to handle the ships. Other ports along the east coast will need to make substantial investments to handle the drafts of the new Panamax ships.

Emerging Opportunities

- Economic development opportunities related to the coming expansion and modernization of the Port of Virginia.
- Deep-water rivers provide opportunity for a variety of terminal operations beyond just container terminals.
- The possible rebranding of Region 5 as “Virginia’s Global Gateway” provides a coordination of the Commonwealth’s multi-modal assets (air, rail and ports) which will open opportunities for business attraction.
- Highway improvements will better connect the Port to the I-95 corridor.
- Deepening and widening of the channel will position the port as a leader among the ports on the east coast.

Advanced Manufacturing

Definition

Advanced manufacturing, advanced materials and food and beverage manufacturing define this cluster. Definitions of advanced manufacturing are rather nebulous. So, we define “advanced” with the conditions suggested in a 2015 Brookings study on advanced industries. The criteria from that study were:

1. R&D spending for the industry in the 80th percentile or \$450 per worker
2. 21% or more of the occupations in the industry require a STEM education

The region has seen steady employment growth from 2012-2017, increasing 1.4%. This is in line with employment growth nationally (1.8%) over the same time period. Wages in the cluster average \$51,000 annually. Also, the cluster is seen as a star given the LQs and employment growth.

Why Region 5?

Region 5 has a specialization in advanced manufacturing, holding a 1.92 LQ in the cluster. So, there are assets as well as a workforce that are in place. In addition, there are strong overlaps between the skills needed for advanced manufacturing and the skills needed in the shipbuilding and ship repair cluster. The concern for this cluster is its rapid rate of change and transformation going forward. The region will need to create agility in both workforce and sites to respond to the technological changes in manufacturing in the future.

Emerging Opportunities

- Advanced manufacturing is becoming as much about how things are made than what is made. This opens opportunities for companies to create unique solutions for producers in the region.
- Advanced materials are growing at a rapid rate. The region could leverage the scientific talent at the higher education institutions to contribute in this space.
- The region has potential to leverage its previous assets in modeling and simulation to advance techniques in digital manufacturing.
- Data Analytics and “big data” analysis is becoming a more important part of manufacturing.

Shipbuilding and Ship Repair

Definition

The Shipbuilding and Ship Repair cluster is a stalwart for the region. As of 2017 Q1, the cluster was employing nearly 34,000 and this number is on the low end. While the shipyards are the most obvious employers in this cluster, there are also a number of supplier firms in the region. However, most of those firms are categorized in the Advanced Manufacturing cluster. Therefore, the estimate of 34,000 workers is only counting the shipyards and at least some of the 15,000 workers in Advanced Manufacturing are also making valuable contributions to this cluster. The cluster has average wages of \$72,377, but has lost some employment over the last 5 years. This is somewhat misleading, though, as the chaotic federal budget environment has created a boom-bust hiring cycle at the shipyards. It is not uncommon to see mass layoffs by a shipyard in one month and then a mass re-hiring 6-8 months later. Volatile layoff/hiring cycles are expected to continue in the short-term making sustainable growth in this cluster challenging.

Why Region 5?

The region has a long-standing tradition in Shipbuilding and Ship Repair. The shipyards, both public and private, mostly identify the cluster. However, the cluster also contains a vast number of suppliers. The region has firms that supply technology and products to the shipyards (electronics and instrumentation) and those that provide services (engineering and architects).

Emerging Opportunities

- The Navy's fleet is aging and will require substantial maintenance and construction of new vessels over the next decade.
- The Jones Act provides a competitive advantage to US shipyards in the construction of tugs, brown-water ships and other ships engaged in "coastwise trade."
- The region has an opportunity to be the leader in digital shipbuilding with Newport News Shipbuilding, The Apprentice School and ODU's Virginia Modeling, Analysis and Simulation Center (VMASC) playing leading roles

Cyber Security, Data Analytics and Modeling/Simulation

Definition

Cyber security is consistently mentioned as an industry of opportunity in Region 5. For the purposes of this report, we combine cyber security with data analytics and modeling and simulation given the tremendous overlap in the necessary skills for the workforce. In addition, firms in this cluster are very likely to do some combination of all three of these activities rather than specialize in just one.

A recent report on the cyber industry in San Diego revealed that only 24% of their “cyber” firms are entirely engaged in cyber. The remaining 76% of San Diego firms are primarily engaged in related IT business activities. Also, 75% of the firms reported that they had 10 or fewer employees doing cyber work exclusively. These findings highlight the need to think broadly about a cyber cluster.

The real growth opportunity for firms in this cluster is to become the supplier of cyber and data services to the firms in the clusters above. Firms in the region have significant needs in cyber and data analytics. Those needs represent “low hanging” opportunities for immediate job growth in the cluster.

Why Region 5?

Region 5 has two advantages in this cluster. First, the exiting military are a prime source of workers, a source that does not necessarily exist in other locations across the nation. San Diego is a great example of a location that has leveraged the military to expand their cyber and data analytics efforts. Second, the presence of military cyber operations provides an important source of talent and a source of demand for the region. For example, the Air National Guard has established a cyber squadron at Langley Air Force Base.

Emerging Opportunities

- A number of the existing regional clusters need services from this cluster. So, growth in shipbuilding and ship repair, for example, will drive growth in cyber and data analytics.
- Analysis of “big data” is becoming increasingly attractive.
- The move to digital manufacturing provides a valuable connection between the cyber/analytics/mod-sim cluster and the regional cluster in advanced manufacturing.

Water Technologies

Definition

This cluster includes firms in architecture, engineering, and urban planning, as well as firms and institutions doing coastal and climate research. The Bureau Labor Statistics classified many of these jobs as “green jobs”. The region has been developing a strong focus in this cluster. The numbers in Table IV-1 likely overestimate the employment in this cluster as only some of the employment in related occupations is specifically doing resilience.

Why Region 5?

“Necessity is the mother of invention.” Region 5 is expected to be one of the most vulnerable areas in the nation to recurrent flooding and sea-level rise. As a result, there will be a significant local demand for water technology. That increase in demand can catalyze firm creation. We are already seeing this occur with local engineering and architecture companies. Many of these firms have added people with backgrounds in resilient engineering and construction. Others have added full groups focused on this area. The existence of local projects also provides a valuable opportunity for local companies to gain a competitive advantage through “learning by doing.” Finally, the regional need can serve to attract companies outside the region to the area.

Emerging Opportunities

- Essentially, the whole cluster is an emerging opportunity.
- There is an increasing number of national firms establishing a region presence in Region 5 (for example Moffitt and Nichol and WSP/Parsons-Brinkerhoff). This helps to attract additional talent to the area.
- Regional educational and research institutions are increasing their work in water technology. The Commonwealth Center for Recurrent Flooding Resiliency represents a recent collaborative initiative among William & Mary, Old Dominion University and Virginia Institute of Marine Science.
- The creation of RISE provides an innovation champion for the cluster.

Unmanned Systems and Aerospace

Definition

This cluster includes firms in aircraft manufacturing (including drones), aircraft parts manufacturing, robotic manufacturing, and aerospace engineering. It is important to note that underwater navigational equipment employment and underwater remote vehicles employment currently sit within the Shipbuilding and Ship Repair cluster. This is due to the NAICS code definitions we are using. As this industry grows and develops, regional firms may find it valuable to lobby the Economic Classification Policy Committee to create or change NAICS codes to provide more accurate data on unmanned systems growth. As with Cyber and Water Technologies, the employment numbers shown in Table IV-1 overestimate the current amount of employment in this cluster as some of the occupations are not currently devoting 100% full -time effort to unmanned systems and aerospace.

Why Region 5?

The unmanned systems (UMS) cluster has strong potential in the region. There is an emerging network of firms, individual experts and federal agencies. The network is loosely affiliated, but industry groups are developing. Companies across the Commonwealth have created the Unmanned Systems Association of Virginia (UASV) and many of the existing regional companies are also members of the Association for Unmanned Vehicle Systems International (AUVSI).

The main obstacle for the development of the cluster is having an entity or set of entities responsible for tying together all aspects of the UMS cluster and serving as the one stop shop to assist companies in location, growth opportunities and procedures for readily testing at Wallops Island and other regional sites. By centralizing this organization, all Region 5 entities would provide a collective approach to growth instead of an individualistic voice. Additionally, Region 5 faces the challenge of effectively connecting the regional business activity to Wallops Island, NASA and NIA, though this has improved substantially over the last 5 years. Wallops Island is an asset that would separate the region from other regions looking to expand in this space. The effective utilization of Wallops Island would also expand the scope of the cluster, allowing activities like small satellite development and payload processing to be included. So, finding solutions to bridge the geographic distance to Wallops Island is important to the future success of this cluster.

Emerging Opportunities

- Development and attraction of firms that create technologies and software for use in unmanned and aerospace vehicles.

- Expand the use of this technology into agriculture, public safety, engineering and construction (air, ground and water) and unmanned traffic management technologies.
- Leverage the overlaps between the necessary skills in this cluster and Advanced Manufacturing, Cyber, Data Analytics and Modelling/Simulation, and Water Technologies to accelerate innovation and workforce development.

The Other Clusters

While the six clusters just presented represent the highest priority clusters for Region 5, we do not want to discount potential opportunities in the other clusters. Here, we present some thoughts on the remaining three clusters.

Business and Professional Services

This cluster is the largest employer in Region 5. In reality, the growth of jobs in this cluster is more tied to the growth of the other clusters than it is to direct intervention in this cluster. There are some unique opportunities within the cluster that should be the focus of workforce development efforts. All of those opportunities are directly tied to the six priority clusters and include, maritime law, maritime insurance, cyber law and resilient construction and design. Though these jobs would ultimately be counted within their respective cluster, they are clearly part of the broader business and professional workforce.

Life Sciences

The life sciences cluster is a difficult cluster to define. The most appropriate definition is to only include bio-technology, pharmaceutical and medical device manufacturing. This omits all of the local serving health practice activity. So, while the region is actively growing its healthcare workforce, it is not growing a life science cluster. In reality, the region will have to enhance the set of assets necessary to compete nationally in life science. Those ingredients include increasing the amount of federally funded research organizations in the region receive from agencies like National Institutes of Health and National Science Foundation; expanding workforce training in life science research and However, opportunities in this cluster will emerge. The opportunities are likely to be in niche areas, so they should be financially and politically supported in a manner proportional to their expected return, recognizing that niche areas by their very definition will possess employment levels lower than things like bio-tech or pharmaceuticals.

Tourism and Recreation

Tourism and recreation represents one of the traditional three legs of the Region 5 economy. It will always be an important piece of the regional economy. However, this cluster is the least likely to have programs or initiatives that fit into the guidelines for Go Virginia. The primary issue for this cluster is the low average wages paid to the occupations in the cluster. This makes it very difficult to meet the requirements of above average wage job creation. There are occupations in the cluster that pay well. The cluster employs executives, accountants, IT technicians and lawyers. Some of those occupations are directly hired within tourism and recreation companies. In addition, firms within the business and professional services cluster are contracted to provide some of these tasks. As with

business and professional services, the interconnectedness of tourism to the other clusters is strong. So, while there might not be any suitable intervention via Go Virginia for tourism, the health of the cluster is important and future growth in tourism will be directly linked to future growth of the priority clusters.

Section V. Action Framework

This Action Framework is a highly-focused component of a larger movement that has emerged from the GO Virginia strategic planning effort for Region 5. It provides a framework for future collaboration aimed at measurably advancing the Hampton Roads regional economy. Whereas the immediate purpose of this Action Framework is to define actionable objectives and evaluation criteria for GO Virginia grant-funded investments, the intense investigation of the region's economic development challenges and opportunities has also inspired a longer-term and more far-reaching vision for moving the region forward.

Policy Directions (Goals)

Based on the technical studies, stakeholder outreach, and direction of the Region 5 Regional Council, three major goals have been established for the Region 5 GO Virginia initiative:

- Goal 1: Create a Coordinated Region Capacity for Innovation in the Region's Key Cluster Areas**
- Goal 2: Increase the Pace of SME Job Creation Through Both Expansion of Existing Firms and the Attraction of Out-of-Region Firms**
- Goal 3: Close All Skills, Credentialing and Degree Gaps in the Regional Clusters' Workforce By 2022 Through Both In-Region Production and Talent Importation**

Framework for Solicitation and Evaluation of Proposals for GO Virginia Grant Funds

The Region 5 Regional Council anticipates the submittal of proposals from Region 5 stakeholders for projects suitable for GO Virginia funding, based to some degree on the guidance provided in this Framework. Two critical concepts of the Action Framework are innovation and local collaboration. In this spirit, the Framework purposely avoids prescribing pre-defined action items. Instead, the Framework outlines targeted objectives for a series of strategies, or "strategy categories." In other words, the Framework describes *what the Regional Council expects to achieve*, but leaves the *how* to be defined by individual proposers. In addition to defining expected objectives for each strategy category, the Framework identifies potential *types* of programs and projects that could address these objectives. Again, these ideas are not intended as proscriptive, but are merely provided as *examples* for the consideration of program proposers. Project/program proposals that go beyond the listed examples are encouraged so long as they meet the objectives and other criteria outlined in the Framework.

It is critical to note that strategic initiatives or “interventions” supported by GO Virginia resources are expected be saved for two very specific occasions:

First, when markets fail. To use the example of innovation: Left to the private market, innovation in the region would only occur with a double coincidence of wants (the firm wants the technology and scientist happens to be inventing that specific technology). That severely limits the amount of innovation, so subsidized innovation efforts are warranted.

Second, when there is a clear need to build capacity that would not be developed in the absence of intervention. The Regional Council anticipates that capacity-building will be the initial motivation for almost all GO Virginia proposals in Region 5. Put simply, the Regional Council will be most interested in intervening in situations where there is an existing promising effort, being run on constrained resources, and the GO Virginia money can meaningfully help to “scale” the program.

Strategy Categories

The strategy categories outlined in the Action Framework include two levels of strategic initiatives:

1. “Foundational” initiatives that would typically be regional in scale and focused on sustained investments in improving the region’s competitiveness and capacity for economic development; and
2. A series of immediately actionable strategy categories, each aimed at specific Region 5 goals. These are the priority strategy areas for which the Region 5 Regional Council is actively soliciting innovative proposals for near-term implementation. The nature of this second level of strategies is such that funded programs/projects will typically (but not always) be sub-regional in scale and focused in terms of discrete objectives.

Consistent with the expectations of the GO Virginia program, the Action Framework proposes new and/or enhanced activities that are carefully aligned with existing local and regional economic development efforts. In this regard, the Framework seeks to maximize leverage of GO Virginia investments not only through the program’s direct matching requirements but also based on the underlying programmatic infrastructure that will extend the effective impact of individual new initiatives.

The series of four Strategy Matrix tables provided below outline a total of 20 strategy categories, grouped according to the major goals described previously. Each of the four matrices addresses a different set of topics:

1. Strategy categories, their applicable Keynote Themes, and organizations/programs that could assist in their implementation. This matrix also includes an indication of relative cost to implement each strategy category.
2. Goal interrelationships among strategy categories.
3. Initial objectives that pertain to each strategy category, and examples of projects/program concepts applicable to each (with these examples reflecting contemporary “best practices” derived from other regions/places with similar strategies¹¹). Objectives shown in the matrix are intended only to facilitate early discussions.
4. Examples of performance metrics that could be applied to the process of monitoring implementation, for each strategy category.

Project Proposal Guidelines

As noted above, the first eight strategy categories are “foundational” in nature and not attached to specific goals (since they are intended to broadly enhance the region’s capacity to make progress across all of the goals). Whereas the Region 5 Regional Council will entertain proposals related to any of the 20 strategies, it is anticipated that most proposals will address Strategies 9 through 20 since these relate to potential initiatives that could be meaningfully addressed within the resources and performance timeframes of the GO Virginia program.

Although the proposal guidelines outlined below are specific to the initial round of GO Virginia grant applications, they are also intended to serve more broadly as overall guidelines for prioritizing future economic development collaborations (i.e., well beyond those initially funded by GO Virginia) in the region.

The following criteria will be utilized to evaluate and rank received proposals:

Relevance to the Four Keynote Themes for Region 5

- Connectivity
- Collaboration
- Productivity
- Innovation

Compliance with requirements of GO Virginia program

- Multi-jurisdictional (all proposals must be a joint venture of at least two jurisdictions)
- Matching requirements (20%) of grant funds must be matched by local monetary investment)

¹¹ See Appendix B.

- Focus on job creation within industry clusters that have been thoroughly vetted for growth potential
- Created jobs must have average wages above the existing average for all jobs in the region

Connection to priority industry clusters

- Port Operations, Logistics and Warehousing
- Advanced Manufacturing
- Cyber Security, Data Analytics and Mod-Sim
- Shipbuilding and Ship Repair
- Water Technologies

Application Components

All proposals for GO Virginia grant funds must provide:

- Detailed description of proposed use of funds
- Description of sources and amounts of matching funds
- Description of in-kind local resources that will support the proposed project/program (in-kind contributions do not count towards the monetary matching requirement, but will be viewed favorably in the ranking process)
- Description of how the proposed project/program would align with and leverage existing local and regional economic development investments)
- Description of the partner entities (public or private) for the proposed collaboration and of their individual/collective capacity for implementing the proposed initiatives (discuss readiness for immediate action)
- Specific description of how the proposed project/program will address one or more of the goals/objectives of the Action Framework in Region 5's Economic Growth and Diversification Plan
- Quantified targets for accomplishment (these should be directly tied to selected goals/objectives of the Action Framework in Region 5's Economic Growth and Diversification Plan)
- Description of how the applicant proposes to measure success of the proposed initiatives (where applicable, this description should reference the performance metrics outlined in Table V-4)

In evaluating the proposals, the regional council should follow the criteria proposed by the Board. The total score for proposals is important, but the Regional Council should also ensure that proposals meet certain minimum point totals in each of the four areas below. This is critically important since the grant scoring criteria language from the Board states on page 5, *“The Board reserves the right to not make an award to proposed grant requests that have a low score in one of more of the following areas:”*

Economic Impact - 40 points

1. Project application outlines the expected return on investment of the proposed project and the timeline for achieving that return.
2. Project application demonstrates the proposed project's alignment with and how it will address the prioritized needs and opportunities of the growth and diversification plan.
3. Grant requests that have a larger impact with regard to the creation of higher paying jobs and economic diversification, based on a return on investment model, in a smaller economic region shall receive higher scores.
4. Project outlines both behavioral as well as anticipated tangible results that will come from the collaboration.

Regional Collaboration - 30 points

1. The number and percentage of localities within the region that are participating in the proposed project and the portion of the region's population represented by the participating localities.
2. Participation of localities or regions (including interstate collaborations) that are outside the applying region.
3. Cost efficiencies, repurposing of existing funds, leveraging of existing assets, or other evidence of collaboration that can be demonstrated as a result of the proposed project.
4. The amount of involvement in the project by businesses, colleges and universities, and other public and private entities within the region in the conceptualization of and the implementation of the project.
5. The amount, timing, and form of the proposed project match that outlines the depth of the commitment by the public and private funding partners to the effort.
6. Inventory existing grant requests or programs with similar goals to ensure the proposed project is not duplicative of, but additive to, other efforts to support economic diversification and the creation of more higher-paying jobs.

Project Readiness - 20 points

1. Project application demonstrates that the project partners have the capability to successfully execute the project.
2. Project application outlines how the project may be coordinated with existing efforts in the region.

3. Project application fully analyzes the barriers to successful implementation and other associated risks along with a plan to overcome them.
4. Project application reviews any prerequisite activities undertaken by the collaborating parties to increase efficiency with regard to program delivery and to ensure a deeper and consistent level of support for the project once launched.
5. Project application demonstrates the project partners, including the lead public or private administering entity, have sufficient financial management and personnel to ensure compliance with the grant agreement.

Project Sustainability - 10 points

1. Plan for how a project will be sustained after grant funds are exhausted.
2. Demonstrated ability to meet the project performance metrics and to take remedial actions in the event those measures are not achieved.
3. Demonstrate leverage above the required amounts from any source.

Next, we present an asset matrix containing organizations and programs that would help with the strategies we identify. Table V-1 lists the strategy categories, the key theme for the strategy and existing organizations and programs that could be leveraged to advance the strategy. This matrix is important as each of the strategies will need “champions” to move them forward. This list of twenty strategies is not intended to be fully implemented. Instead, we are simply presenting a variety of possible strategies and organizations that can assist in implementation of those strategies. Ultimately, the applicants must determine the most appropriate strategies for their specific proposals in order to achieve the goals for Region 5.

Table V-1: Strategy categories and organizations/programs that could assist in their implementation

#	Strategy Category	Key Theme	Key Existing Organizations to Leverage	Key Existing Programs to Leverage	Cost ¹
"Foundational" Strategic Directions Having a Regionwide Focus and that are Applicable to All Goals					
1	Enhance coordination of innovation programs. Coordinate the current set of disparate innovation activities into one unified effort covering all stages of the entire innovation pipeline.				\$\$
		Collaboration	2. AccelerateHER		
			19. HREDA		
			20. HRIC	20.a. Cyber Works	
			27. Ignition		
			30. Jefferson Lab		
			31. LRC - NASA	31.a. Tech. Transfer Program	
			39. ODU	39.b. CEI; 39.e. CEI Women's BC	
			45. Peninsula Tech. Incub.		
			50. Reinvent Hampton Roads		
			56. Tech. Commer. Center		
2	Monitor role of major clusters in the region's economy. Maintain a foundation of strategic knowledge of how key industry clusters relate to the economic base of the region (and track changes in these relationships over time), such as: interactions among the clusters, linkages within or outside of the region, projected growth of the cluster industries, and potential for/interest in conversion/diversification to other activities				\$\$
		Productivity	<i>Local Economic Development functions³</i>		
			13. Greater Williamsburg Partnership		
			19. HREDA		
			50. Reinvent HR		
3	Monitor major clusters' potential effects on the region's workforce. Maintain a foundation of strategic knowledge of how key industry clusters relate to the region's workforce (and track changes in these relationships over time), such as: worker profiles and their educational needs (existing and potential transitional skill development), the impacts on the workforce of potential increasing automation, and the potential for future unusual expansions or contractions of the workforce				\$\$
		Productivity	10. ESCC		
			40. Opportunity, Inc.		
			41. PDCCC		

#	Strategy Category	Key Theme	Key Existing Organizations to Leverage	Key Existing Programs to Leverage	Cost ¹
			42. Peninsula Council for Workforce Development		
			57. The Apprentice School		
			59. TCC		
			60. TNCC		
4	Maximize integration of existing cluster industries into the local economy. On the basis of the results of implementing the preceding strategies, align efforts in business recruitment and retention/expansion, entrepreneurial development, and other initiatives with the identified potentials and needs of the identified priority clusters				TBD
		Productivity	Local Economic Development functions³		
			25. Hatch		
			27. Ignition		
			36. Norfolk City DoD	36.a. Norfolk Small Bus. Init.	
			37. NSU	37.a. NSU IE	
			39. ODU	39.a. ODU EC	
			45. Peninsula Tech. Incub.		
			50. Reinvent HR		
			53. StartPeninsula		
			54. StartWheel		
			60. TNCC	60.a. TNCC Entre. Program	
			65. WM	65.a. WM BC	
5	Implement regional marketing initiative focused on generating a Hampton Roads brand. Develop a branding program that will both achieve consensus about marketing messages for the region and increase awareness among stakeholders of the value of regional assets that can be used, leveraged, and promoted for mutual benefit				\$\$\$
		Collaboration	<i>Local Economic Development functions³</i>		See note 2
			4. ANPDC		
			13. Greater Williamsburg Partnership		
			19. HREDA		
6	Facilitate conversion/diversification of firms focused on defense/federal contracting. Set up system to facilitate conversion of firms' activities focused on defense/other government contracting to other markets				\$\$\$

#	Strategy Category	Key Theme	Key Existing Organizations to Leverage	Key Existing Programs to Leverage	Cost ¹
		Innovation	40. Opportunity, Inc.		
			42. Peninsula Council for Workforce Development		
			50. Reinvent HR	50.a. REAP	
7	Expand capacity for industrial land development. Consult with real estate professionals and others knowledgeable about real estate in the region, to compile a site selection inventory and identify suitable properties to program for business/industry site development, with public-partnership support as needed				\$\$\$
		Collaboration	4. ANPDC		
			<i>Local Economic Development functions³</i>		
			13. Greater Williamsburg Partnership		
			19. HREDA		
			22. HRPDC		
			50. Reinvent HR		
			67. Williamsburg City RHA		
8	Invest in critical Port improvements. Assess existing projects and plans pertaining to improvements to the Port, and master planning for the Port, and identify any required and unaddressed infrastructure or other improvements, current or anticipatable, and set processes in motion to secure these (with a focus on improvements that have a direct nexus to other strategic directions)				TBD
		Productivity	23. HRTPO		See note 2
			47. Port of Virginia	47.d. Port of Virginia Economic and Infrastructure Development Grant Program	
			Cities of Norfolk, Portsmouth, and others		
Goal 1. Create a Coordinated Region Capacity for Innovation in the Region’s Key Cluster Areas					
9	Define specific innovation focus for the region. Define alternatives and select one or more “innovation themes” within which to market and foster a high level of regional expertise, so that the region becomes known as a center or “thought leader” for [this theme]				\$

#	Strategy Category	Key Theme	Key Existing Organizations to Leverage	Key Existing Programs to Leverage	Cost ¹
		Collaboration, Innovation	<i>Local Economic Development functions³</i>		
			13. Greater Williamsburg Partnership		
			19. HREDA		
			50. Reinvent HR		
10	Focus on advanced manufacturing as an “innovation keystone.” Building on the region’s existing base of advanced manufacturing establishments and university-based research (and also federal labs), promote the growth of advanced manufacturing activity through the usual economic development functions, supplemented by additional efforts such as the creation of an advanced manufacturing cluster				\$\$-\$\$\$
		Innovation	<i>Local Economic Development functions³</i>		
			13. Greater Williamsburg Partnership		
			19. HREDA		
			50. Reinvent HR		
11	Augment the tech-oriented institutional base. Support and expand as appropriate existing events related to product showcasing, startup events, and the like, and assess the applicability of expanding local involvement in organizations such as the Manufacturing Extension Partnership (a national network, Virginia name is GenEdge)				\$\$
		Connectivity	21. Ignition		
			51. Virginia Peninsula CC	51.a. Young Entrepreneurs Academy Virginia Peninsula	
			53. StartPeninsula		
			56. TeCC		
12	Facilitate the creation of innovation districts. Promote tech-oriented entrepreneurial startups by combining specific institutional support such as research labs and incubator programs with compatible urban settings that offer exceptional lifestyle amenities (e.g., access to urban goods and services, housing, etc.)				\$\$-\$\$\$
		Collaboration Innovation	2. AccelerateHER		
			20. HRIC	20.a. Cyber Works	
			27. Ignition		
			30. Jefferson Lab		

#	Strategy Category	Key Theme	Key Existing Organizations to Leverage	Key Existing Programs to Leverage	Cost ¹
			31. LRC - NASA	31.a. Tech. Transfer Program	
			39. ODU	39.b. CEI; 39.e. CEI Women's BC	
			45. Peninsula Tech. Incub.		
			56. Tech. Commer. Ctr.		
			All city/county planning/development entities		
Goal 2. Increase the Pace of SME Job Creation Through Both Expansion of Existing Firms and the Attraction of Out-of-Region Firms					
13	Promote expansion of small businesses as a key element of innovation. Recognizing both the region's relative lack of SMEs and relative abundance of university-based research related to potential technology transfer activities (along with federal labs), promote the recruitment and accommodation of small but growing firms focused on innovative products and services				\$\$
		Connectivity, Innovation	2. AccelerateHER		
			20. HRIC	20.a. Cyber Works	
			27. Ignition		
			30. Jefferson Lab		
			31. LRC - NASA	31.a. Tech. Transfer Program	
			39. ODU	39.b. CEI; 39.e. CEI Women's BC	
			45. Peninsula Tech. Incub.		
			56. Tech. Commer. Ctr.		
14	Expand resources for entrepreneurs. Inventory and review resources, such as incubators and accelerators, for entrepreneurs in the region (targeting a selected set of industry/cluster types) and identify means of augmenting any deficiencies discovered				\$\$-\$\$\$
		Connectivity	See list of organizations from Strategy Category 4 and additional entries below.		
			1. 757 Angels		
			2. AccelerateHER		
			8. CNU	8.a. CNU LBI	
			11. Franklin/Southampton County ED, Inc.	11.a. Franklin BC	

#	Strategy Category	Key Theme	Key Existing Organizations to Leverage	Key Existing Programs to Leverage	Cost ¹
			13. Greater Williamsburg Partnership	13a. Launchpad GWBI	
			20. HRIC	20.a. Cyber Works	
15	Fund special-purpose websites. Consider generating special-purpose websites that would retain common branding elements while also serving specific targeted marketing purposes				\$
		Connectivity	19. HREDA		
			50. Reinvent HR		
16	Expand export assistance programs focused on region's core strengths. Identify and quantify unrealized export opportunities based on key relevant assets (e.g., Port infrastructure, existing and emerging core clusters, etc.); asses existing export-networking capacity of local clusters/firms; serve in matchmaking role with existing (predominantly federal) resources to promote export growth.				\$\$
		Productivity	47. Port of Virginia	47.c. International Trade Facility Tax Credit; 47.d. Economic and Infrastructure Development Grant Program	
			50. Reinvent HR	50.a. REAP	
Goal 3. Close All Skills, Credentialing and Degree Gaps in the Regional Clusters' Workforce By 2022 Through Both In-Region Production and Talent Importation					
17	Address higher-education skill gaps. Fully assess the reasons behind the region's low rankings in number of bachelor's and master's degrees among the workforce, and the implications of this for defining, in some detail, cluster development strategies				\$\$
		Connectivity	9. ECPI	9.a. ECPI Prof. Development Center	
			25. Hatch		
			27. Ignition		
			37. NSU		
			39. ODU		
			45. Peninsula Tech. Incub.		
			49. RU		
			50. Reinvent HR		
			53. StartPeninsula		
			59. TCC	59.a. TCC WCG	
			60. TNCC		
			64. VWU		

#	Strategy Category	Key Theme	Key Existing Organizations to Leverage	Key Existing Programs to Leverage	Cost ¹
			62. Virginia Maritime Assoc.		
			65. WM		
18	Pursue placemaking activities to facilitate retention and attraction of young technical talent. Whereas the innovation district concept (#13 above) would be focused on the development of specific <i>districts</i> to grow/host tech companies, a broader placemaking initiative would seek to position the overall region as a “hot spot” for young professionals				\$\$
		Collaboration	All city/county planning/development entities		
			All downtown business organizations		
19	Promote technical education at all practical levels. In coordination with area school systems (and local non-profits involved in STEM), some of which already have STEM programs, foster the further institutionalization of STEM/STEAM/STEM-H (health) programs in accordance with appropriate guidelines				\$\$
		Collaboration	26. HHR		
			32. MSHR		
			34. NHREC		
			Virginia Beach city Public schools		
20	Invest in veteran re-training. Support existing programs to cross-train exiting military personnel into civilian occupations, and expand as appropriate				\$\$
		Connectivity	39. ODU	39.d. HRVBOC	
			58. The Arsenal	17.a and 40.b Opp. Inc. and HR Chamber of Commerce	

1. Potential scale of investment for individual projects. Scale: TBD – to be determined based on the outcomes of other (earlier) initiatives; \$ - less than \$100,000; \$\$ - \$100,000 to \$500,000; \$\$\$ - more than \$500,000.

2. Considered to be outside the GO Virginia funding envelope.

3. See *Organization Legends* at end of table for complete list.

ORGANIZATION LEGENDS

Local Economic Development functions

3	Accomack County Economic Development Authority	38	Northampton County Economic Development Department
7	Chesapeake City Economic Development Department	46	Poquoson City Economic Development Department

10	Franklin/Southampton County Economic Development, Inc.	48	Portsmouth City Economic Development Department
14	Hampton City Economic Development Department	55	Suffolk City Economic Development Department
28	Isle of Wight County Economic Development Department	61	Virginia Beach City Economic Development Department
29	James City County Office of Economic Development	66	Williamsburg City Economic Development Authority
35	Newport News City Department of Development	68	York County Office of Economic Development
36	Norfolk City Department of Development		

Acronyms

		Index #s (where relevant)
ANPDC	Accomack-Northampton Planning District Commission	4
BC	Business Center	
CC	Chamber of Commerce	
CNU	Christopher Newport University	8
CEI	Center for Enterprise Innovation	
CTE	Career and Technical Education	5
DoD	Department of Development	
EC	Entrepreneurial Center	
ED	Economic Development	
ECPI	East Coast Polytechnic Institute	
ESCC	Eastern Shore Community College	10
GWBI	Greater Williamsburg Business Incubator	13.a
HHR	Horizons Hampton Roads	26
HR	Hampton Roads	
HREDA	Hampton Roads Economic Development Alliance	19
HRIC	Hampton Roads Innovation Collaborative	20
HRPDC	Hampton Roads Planning District Commission	22
HRTPO	Hampton Roads Transportation Planning Organization	23
HRVBOC	Hampton Roads Veterans Business Outreach Center	39.d
IE	Institute for Entrepreneurship	
LBI	Luter Business Institute	8.a
LRC	Langley Research Center	31
MSHR	Mad Science of Hampton Roads	32

		Index #s (where relevant)
NSU	Norfolk State University	37
ODU	Old Dominion University	39
PDCCC	Paul D. Camp Community College	41
RC	Research Center	
RU	Regent University	49
REAP	Regional Export Accelerator Program	50.a
RHA	Redevelopment and Housing Authority	
TeCC	Technology Commercialization Center	56
TCC	Tidewater Community College	59
TNCC	Thomas Nelson Community College	60
VWU	Virginia Wesleyan University	64
WCG	New Virginia Economy Workforce Credential Grants	59.a
WM	William & Mary	65

Selected Abbreviations

Entre.	Entrepreneurship
Init.	Initiative

For full list of referenced Organizations and Programs, see Appendix A

Table V-2: Strategy Categories and Goal Interrelationships

		Other Related Goals		
#	Strategy Category	Goal 1. Coordinated Capacity for Innovation in Key Clusters	Goal 2. Expand SMEs in Key Clusters	Goal 3. Close Skills and Credential Gaps in Clusters’ Workforce
“Foundational” Strategy Categories Having a Regionwide Focus and that are Applicable to All Goals				
1	Enhance coordination of innovation programs	X		
2	Monitor role of major clusters in the region’s economy	X		
3	Monitor major clusters’ potential effects on the region’s workforce	X		X
4	Maximize integration of existing cluster industries into the local economy	X	X	X
5	Implement regional marketing initiative focused on generating a Hampton Roads brand	X		
6	Facilitate conversion/diversification of firms focused on defense/federal contracting		X	X
7	Expand capacity for industrial land development	X		
8	Invest in critical Port improvements	X		
Goal 1. Create a Coordinated Region Capacity for Innovation in the Region’s Key Cluster Areas				
9	Define specific innovation focus for the region			
10	Focus on advanced manufacturing as an “innovation keystone”		X	X
11	Augment the tech-oriented institutional base		X	
12	Facilitate the creation of innovation districts			
Goal 2. Increase the Pace of SME Job Creation Through Both Expansion of Existing Firms and the Attraction of Out-of-Region Firms				
13	Promote expansion of small businesses as a key element of innovation	X		X
14	Expand resources for entrepreneurs	X		X
15	Fund special-purpose websites	X		
16	Expand export assistance programs focused on region’s core strengths	X		
Goal 3. Close All Skills, Credentialing and Degree Gaps in the Regional Clusters’ Workforce By 2022 Through Both In-Region Production and Talent Importation				
17	Address higher-education skill gaps	X	X	
18	Pursue placemaking activities to retain and attract young technical talent	X	X	
19	Promote technical education at all practical levels	X		
20	Invest in veteran re-training		X	

Table V-3: Strategy Category by Objectives and Examples of Projects/Program Concepts

#	Strategy Category	Objectives	Examples of Possible Project/Program Concepts (derived from model regions ¹²)
“Foundational” Strategy Categories Having a Regionwide Focus and that are Applicable to All Goals			
1	Enhance coordination of innovation programs. Coordinate the current set of disparate innovation activities into one unified effort covering all stages of the entire innovation pipeline.	This activity could result in a special-purpose plan, but is more likely to be adopted as an operating function by either an existing economic development coordinating organization or an ad hoc group dedicated to this and probably other coordinating activities related to economic development strategic planning in Region 5. Operationalizing this activity will recognize that the fluid nature of the task calls for flexible management, including frequent updating through ongoing consultation and other measures.	In a model region, a Regional Consortium was assembled from a select group of stakeholders, but with strong central management, to manage overall aspects of a comprehensive economic development strategic plan, within a county that is largely urbanized but made up of several individual, independent cities.
2	Monitor role of major clusters in the region’s economy. Maintain a foundation of strategic knowledge of how key industry clusters relate to the economic base of the region (and track changes in these relationships over time), such as: interactions among the clusters, linkages within or outside of the region, projected growth of the cluster industries, and potential for/interest in conversion/diversification to other activities	In addition to the monitoring outcomes listed, the mechanism established for this activity could also be designed to keep businesses and other stakeholders informed – about cluster-related opportunities, progress, challenges, etc.	A consortium of economic regions determined that maintaining fact-based documentation of why and how target clusters were selected, when disseminated throughout the regions, helps instill confidence in the economy, fostering additional entrepreneurial and other investment, and helping the workforce remain current in its awareness of emerging opportunities and related skill requirements.
3	Monitor major clusters’ potential effects on the region’s workforce. Maintain a foundation of strategic knowledge of how key industry clusters	This activity would be closely coordinated with Strategy Category #2. Even in slow-moving economies, maintaining alignment between educational and training	(See also examples for Strategy Direction #2, above.) Regions sometimes incorporate the research side of this activity into retention/expansion functions of an economic

¹² See Appendix B.

	relate to the region's workforce (and track changes in these relationships over time), such as: worker profiles and their educational needs (existing and potential transitional skill development), the impacts on the workforce of potential increasing automation, and the potential for future unusual expansions or contractions of the workforce	institutions, and industry, is a major challenge in most regions. This activity could help institutionalize methods for enhancing coordination among these groups. It is especially important given the development goals in Region 5, and the dynamic nature of the target clusters.	development organization, through which employers are systematically interviewed on a number of topics to identify challenges and possible paths of intervention that local economic developers could take.
4	Maximize integration of existing cluster industries into the local economy. On the basis of the results of implementing the preceding strategies (and others), align efforts in business recruitment and retention/expansion, entrepreneurial development, and other initiatives with the identified potentials and needs of the identified priority clusters	This activity would be tied closely to the cluster information Strategy Categories, #2 and #3, along with other entrepreneurial development activities within the Action Framework, e.g. #13 and #14. Overall, this activity would help focus entrepreneurial development on the target clusters for which documentation of viability within the region exists, while simultaneously strengthening the clusters themselves.	Processes that help coordinate the alignment between educational and training activities and industry needs would be applicable examples for this Strategy Category.
5	Implement regional marketing initiative focused on generating a Hampton Roads brand. Develop a branding program that will both achieve consensus about marketing messages for the region and increase awareness among stakeholders of the value of regional assets that can be used, leveraged, and promoted for mutual benefit	This activity could have a key role in achieving some degree of consensus on the region's overall growth and development direction, helping to bring together differing areas of focus in the various communities within a set of important, even if limited, shared points. Communities may still focus on different aspects of a brand message, and an ideal branding exercise will offer at least one marketing message for everyone.	A consortium of regions conceived of a branding exercise that would help tie currently "unbalanced" urban and rural areas together, based on their complementary, although diverse, assets.
6	Facilitate conversion/diversification of firms focused on defense/federal contracting. Set up system to facilitate conversion of firms' activities focused on defense/other government contracting to other markets.	This activity can strengthen "cluster identification" among firms, thereby fostering interactions among them, which are also more likely to occur under conditions of defense/federal conversion.	A region with a substantial focus on the defense industry undertook a Defense Conversion Strategic Plan, which not only fostered industry diversification but also resulted in the creation of additional worker retraining organizations.

7	Expand capacity for industrial land development. Consult with real estate professionals and others knowledgeable about real estate in the region, to compile a site selection inventory and identify suitable properties to program for business/ industry site development, with public-partnership support as needed	Objectives within this activity can meet various levels: identifying sites, getting properties in ownership suitable for development, undertaking land development resulting in improved (possibly “certified”) sites, establishing preapproved shovel-ready projects on paper, and producing speculative buildings. This activity will also increase the capacity of economic development organizations to respond to prospects’ specific site needs, as it will likely include an augmented database of available properties.	A state program (in another state) established an interactive, widely accessible property database that not only identified potential business locations but also allows users to visualize comprehensive demographic and economic data by specific jurisdiction.
8	Invest in critical Port improvements. Assess existing projects and plans pertaining to improvements to the Port, and master planning for the Port, and identify any required and unaddressed infrastructure or other improvements, current or anticipatable, and set processes in motion to secure these (with a focus on improvements that have a direct nexus to other Strategy Categories)	The initial objective of this activity would be a plan that addresses physical requirements as noted, and in the process helps confirm the perception on the part of clientele, investors, etc., of long-term viability of the Port, from both a physical-functioning and economic point of view, and confidence in its competitiveness.	In Australia, “priority” ports are mandated to master plan outside of their immediate boundaries to help ensure coordination of related infrastructure, land uses, and the like. These plans are the basis for regulatory overlays that take precedence over other plans; but this type of overlay concept could be adapted to serve as an “advisory” function.
Goal 1. Create a Coordinated Region Capacity for Innovation in the Region’s Key Cluster Areas			
9	Define specific innovation focus for the region. Define alternatives and select one or more “innovation themes” within which to market and foster a high level of regional expertise, so that the region becomes known as a center or “thought leader” for [this theme]	In addition to the initial objective of selecting innovation themes, this activity should lay out a pathway to secure the status of the region as a theme-based thought leader.	Stakeholders in a coastal region with a history of natural disasters committed to establishing the region as a thought leader in disaster recovery.
10	Focus on advanced manufacturing as an “innovation keystone.” Building on the region’s existing base of advanced manufacturing establishments and	This activity should result in a comprehensive program that is tied closely to, at a minimum, Strategy Categories Nos. 1 (innovation coordination), 9 (innovation	A model region formed a public-private partnership that provides small and mid-sized manufacturers throughout an 11-county area with the assessment, advisory and consultative

	university-based research (and also federal labs), promote the growth of advanced manufacturing activity through the usual economic development functions, supplemented by additional efforts such as the creation of an advanced manufacturing cluster	focus), and 13 (small-business creation), in addition to cluster-related strategies.	<p>services they need to “enhance competitiveness, accelerate adoption of new technologies, improve profitability, and strengthen long-term resiliency.” The program is affiliated with the Manufacturing Extension Partnership (MEP) program.</p> <p>In another example, part of a city’s strategy to focus on clean tech included creation of a Clean Tech Demonstration Center, intended to showcase technology and other aspects of solar energy, green fleet vehicles, and green building/energy efficiency emerging from the region’s university research centers and entrepreneurs.</p>
11	Augment the tech-oriented institutional base. Support and expand as appropriate existing events related to product showcasing, startup events, and the like, and assess the applicability of expanding local involvement in organizations such as the Manufacturing Extension Partnership (a national network, Virginia name is GenEdge)	This activity could result in a coordinated calendar, involving the maximum practical number of relevant organizations, highlighting functions that serve the entrepreneurial community. The activity could also serve as a catalyst for coordinating the many entrepreneurial efforts and facilities in Region 5.	An annual investors’ conference held in a major city brings together investors and industry leaders from the U.S. and a foreign country business partner, with the attendees working together to foster advances in innovation and local business growth.
12	Facilitate the creation of innovation districts. Promote tech-oriented entrepreneurial startups by combining specific institutional support such as research labs and incubator programs with compatible urban settings that offer exceptional lifestyle amenities (e.g., access to urban goods and services, housing, etc.)	Through this activity, relevant land use, redevelopment, proposed new development, and other plans in communities across the region could be brought together, so that areas in the region could be evaluated, using these plans and other criteria developed as part of this strategy, as locations in which to focus the creation of innovation districts.	A major, high-profile research park that has thrived for decades in a suburban setting is now re-planned to transform from this suburban environment to one that is much more urbanized, so that it is more attractive to the Millennial workforce.

Goal 2. Increase the Pace of SME Job Creation Through Both Expansion of Existing Firms and the Attraction of Out-of-Region Firms			
13	Promote expansion of small businesses as a key element of innovation. Recognizing both the region's relative lack of SMEs and relative abundance of university-based research related to potential technology transfer activities (along with federal labs), promote the recruitment and accommodation of small but growing firms focused on innovative products and services	This activity would coordinate closely with Strategy Direction #14 (entrepreneurial resources), and define a focus that distinguishes support for more and enhanced SMEs from typical entrepreneurial-development programs. This activity would identify opportunities for supporting SMEs through a closer examination of the cluster data assembled for the region (Strategy Categories # 2 and 3) and the primary industry drivers associated with those clusters, interests in the region for defense/federal conversion (#6), and emerging opportunities based on the region's innovation focus (#9).	One city that used innovation as a way to promote business development devised a program to help turn raw materials currently treated as waste into recycling-based new enterprises. This kind of program, while suitable for startups, is probably more compatible with existing small businesses that have the flexibility to diversify into these kinds of opportunities, once they are identified and certain technological and marketing hurdles are addressed through business support services that are likely to involve, in this case, university-based research as well as other kinds of entrepreneurial support.
14	Expand resources for entrepreneurs. Inventory and review resources, such as incubators and accelerators, for entrepreneurs in the region (targeting a selected set of industry/cluster types) and identify means of augmenting any deficiencies discovered	The inventory and review of entrepreneurial resources can include a focus on assessing not only the range of training/services covered but also the avenues by which each organization's programs are marketed (including any targeting to specific groups) and accessed, and indications of the extent to which marketing goals are achieved.	A statewide strategic plan recognized that resources for entrepreneurs were relatively plentiful, but the programs needed to be better coordinated in terms of their services provided and marketing outreach. One region instituted a system by which the one-stop workforce centers mandated by the Workforce Investment Act serve not just job seekers and industry, but entrepreneurs as well.
15	Fund special-purpose websites. Consider generating special-purpose websites that would retain common branding elements while also serving specific targeted marketing purposes	An initial objective in this activity is to identify any economic-development-related functions that might benefit from specially tailored messages, which could include targeted audiences by type of interest, region/nation, SME status, disadvantaged business status, military/veteran status, target-cluster affiliation, etc.	To better reach a foreign direct investment audience, a state organization developed a micro-[web] site targeted specifically at international business leaders. The site's content – page text, videos, industry data and company success stories – was made available in multiple languages compatible with the state's existing FDI market.

16	<p>Expand export assistance programs focused on region's core strengths. Identify and quantify unrealized export opportunities based on key relevant assets (e.g., Port infrastructure, existing and emerging core clusters, etc.); asses existing export-networking capacity of local clusters/firms; serve in matchmaking role with existing (predominantly federal) resources to promote export growth.</p>	<p>This activity would be coordinated closely with efforts to expand SMEs and entrepreneurs generally (#13, 14). One objective would be to inventory relevant industries and firms, and resources in the region related to this effort, aligning these with the considerable federal resources available for this kind of assistance.</p>	<p>A consortium of economic development organizations worked with a 10-county region of small cities and rural areas to expand the global reach of the region's businesses, in part by pooling resources across the region and adapting other best practices from the Global Cities Initiative, a joint project of the Brookings institution and J.P. Morgan Chase.</p>
<p>Goal 3. Close All Skills, Credentialing and Degree Gaps in the Regional Clusters' Workforce By 2022 Through Both In-Region Production and Talent Importation</p>			
17	<p>Address higher-education skill gaps. Fully assess the reasons behind the region's low rankings in number of bachelor's and master's degrees among the workforce, and the implications of this for defining, in some detail, cluster development strategies</p>	<p>The assessment resulting from this activity should be coordinated closely with the cluster-focused regional strategy categories (# 2, 3, and 4), other strategies exploring the economic structure of the region in greater detail, and strategies addressing SMEs and entrepreneurial resources (13 and 14). The assessment should add to the understanding of whether the educational levels of the workforce are due to the underlying structure of the economy and the major firms, possible less-than-optimal economic diversification, or other reasons.</p>	<p>A business accelerator leveraged a federal grant from the US Department of Labor to create focused training programs for the local workforce, for jobs within one especially desired target cluster. The organization worked with local educational institutions to create the curricula. The project encouraged educational advancement while also improving the prospects for the targeted cluster to expand.</p>
18	<p>Pursue placemaking activities to facilitate retention and attraction of young technical talent. Whereas the innovation district concept (#12 above) would be focused on the development of specific <i>districts</i> to grow/host tech companies, a broader placemaking initiative would seek to position the overall region as a "hot spot" for young professionals</p>	<p>Work within this activity should benefit from objectives achieved for the strategy category addressing Strategy Category 12, innovation districts, (or vice versa, depending on where efforts are initially focused), the essential initial objective being to assess the extent to which different communities and neighborhoods within the region have placemaking attributes or the potential to create them.</p>	<p>A grassroots organization generated a program designed to strengthen community life in the relatively small city where it was based, as one way of attracting and retaining talent that would support economic development goals. One of their early steps was to set up a community survey composed of just two questions: 1) Why do you live in [this city]? and 2) Why would you leave here? (This type of survey requires some serious processing time, but if intended to be</p>

			used on a large scale, a multiple-choice questionnaire could be developed using this open-ended survey on a limited basis to flush out the issues.)
19	Promote technical education at all practical levels. In coordination with area school systems (and local non-profits involved in STEM), some of which already have STEM programs, foster the further institutionalization of STEM/STEAM/STEM-H (health) programs in accordance with appropriate guidelines	An initial objective of this strategy category would be to inventory existing STEM programs in terms of the grade levels, geographic areas, and other details served by these programs, and gain an understanding of how the programs are received, the results monitored and evaluated, and similar details. A parallel objective would be to review case studies of regions where STEM programs were actively promoted and implemented, to gain an understanding of the ideal nature and level of program delivery.	A STEM-oriented partnership developed in one region included a program to connect teachers with employers, so that the teachers could visit workplaces and see firsthand how math and science are being applied on the ground in business and industry.
20	Invest in veteran re-training. Support existing programs to cross-train exiting military personnel into civilian occupations, and expand as appropriate	An initial objective of this activity should include a system for defining the typical profiles of exiting military personnel in the region, their existing civilian-applicable skills, cross-training interests and needs, and similar details.	Military.com, which bills itself as the “largest online military and veteran membership organization” is set up primarily to help maintain connections among servicemembers, military families and veterans. The online resource also provides guidance to companies that want to increase veteran hiring, which focuses largely on practices that make companies more attractive and welcoming to veterans, including a number of simple marketing/networking steps.

Performance Metrics

The matrix of Strategy Categories and Performance Metrics, below, embodies the following principles:

- The metrics are intended, with a few exceptions, to be unique/specific to each Strategy Category.
- Where applicable/practical, the performance assessment for all programs/projects should address the core GO Virginia objectives of job creation and elevation of average wage levels. Since these core objectives apply to all programs/projects (although in some cases direct impacts may be infeasible to measure), they are not repeated on the table below.
- The intended performance metrics are intended to be customized for each program/project approved under this Framework. Monitoring is intended to measure the direct impact of a specific program (versus tracking changes in the regional economy as a whole). This approach embodies the assumption that specific types of progress, aligned with selected metrics, will be monitored as part of the overall management of the Action Framework implementation process, so that metric statistics are reportable.
- In some cases, as noted on the matrix, the customized performance measures will need to be determined later based on the nature of proposed/approved programs and projects (in all cases, applicants for GO Virginia grant funds are expected to propose and commit to specific monitoring metrics based on the individual proposals).

Table V-4: Strategy Categories and Performance Metrics

#	Strategy Category	Metrics
"Foundational" Strategy Categories Having a Regionwide Focus and that are Applicable to All Goals		
1	Enhance coordination of innovation programs. Coordinate the current set of disparate innovation activities into one unified effort covering all stages of the entire innovation pipeline.	<ul style="list-style-type: none"> • Number of public and private entities participating in innovation consortium • Number of distinct programs offered, (within a coordinated framework) • Total funding of offered programs • Number of firms / start-ups assisted
2	Monitor role of major clusters in the region's economy. Maintain a foundation of strategic knowledge of how key industry clusters relate to the economic base of the region (and track changes in these relationships over time), such as: interactions among the clusters, linkages within or outside of the region, projected growth of the cluster industries, and potential for/interest in conversion/diversification to other activities	<ul style="list-style-type: none"> • Number of new/expanded supply chain relationships within region • Number of new/expanded supply chain relationships outside region • Number of new firms attracted/started within targeted clusters • Number and activity levels of cluster networking programs offered (specific measures to be defined based on the nature of the offered events/programs)
3	Monitor major clusters' potential effects on the region's workforce. Maintain a foundation of strategic knowledge of how key industry clusters relate to the region's workforce (and track changes in these relationships over time), such as: worker profiles and their educational needs (existing and potential transitional skill development), the impacts on the workforce of potential increasing automation, and the potential for future unusual expansions or contractions of the workforce	<ul style="list-style-type: none"> • Documentation of new cluster-focused workforce development initiatives pursued (including baseline studies of cluster specific workforce supply/demand, training/degree programs, employer-industry partnerships, etc.) • New degrees awarded in cluster-demanded disciplines • New certifications awarded in cluster-demanded fields • (Additional measures to be tracked based on the nature of specific studies / programs pursued)
4	Maximize integration of existing cluster industries into the local economy. On the basis of the results of implementing the preceding strategies, align efforts in business recruitment and retention/expansion,	<ul style="list-style-type: none"> • Number of public and private entities participating in cluster development efforts • Number of distinct programs offered • Total funding of offered programs

#	Strategy Category	Metrics
	entrepreneurial development, and other initiatives with the identified potentials and needs of the identified priority clusters	<ul style="list-style-type: none"> Number of firms / start-ups assisted by cluster
5	Implement regional marketing initiative focused on generating a Hampton Roads brand. Develop a branding program that will both achieve consensus about marketing messages for the region and increase awareness among stakeholders of the value of regional assets that can be used, leveraged, and promoted for mutual benefit	<ul style="list-style-type: none"> Baseline measures of external perceptions (awareness and favorability ratings of the region by external site selectors / corporate executives) Periodic (e.g., 3-year) follow-up surveys to measure changes in external awareness and perceptions) Baseline measures of internal awareness/perceptions of economic and cluster development initiatives Periodic follow-up measures of changes internal awareness/perceptions
6	Facilitate conversion/diversification of firms focused on defense/federal contracting. Set up system to facilitate conversion of firms' activities focused on defense/other government contracting to other markets.	<ul style="list-style-type: none"> Number of public and private entities offering conversion/diversification assistance Number of distinct programs offered Total funding of offered programs Number of firms assisted by cluster Dollar volume of converted/diversified contracting opportunities by cluster
7	Expand capacity for industrial land development. Consult with real estate professionals and others knowledgeable about real estate in the region, to compile a site selection inventory and identify suitable properties to program for business/ industry site development, with public-partnership support as needed	<ul style="list-style-type: none"> Number/acreage of development-ready sites identified in coordinated regional database (and changes in these metrics over time) Number/acreage of new sites made available by land assembly/rezoning efforts Number/acreage of major commercial/ industrial developments per year (list by location)
8	Invest in critical Port improvements. Assess existing projects and plans pertaining to improvements to the Port, and master planning for the Port, and identify any required and unaddressed infrastructure or other improvements,	<ul style="list-style-type: none"> Dollar value of new port-related capital improvements by year (As appropriate, define specific goals for port-related infrastructure investments by category, based on master planning efforts)

#	Strategy Category	Metrics
	current or anticipatable, and set processes in motion to secure these (with a focus on improvements that have a direct nexus to other Strategy Categories)	
Goal 1. Create a Coordinated Region Capacity for Innovation in the Region's Key Cluster Areas		
9	Define specific innovation focus for the region. Define alternatives and select one or more "innovation themes" within which to market and foster a high level of regional expertise, so that the region becomes known as a center or "thought leader" for [this theme]	<ul style="list-style-type: none"> Summarize results of a focused effort to define potential innovation themes (Identify specific measures of outcomes based on the nature of the theme[s] selected)
10	Focus on advanced manufacturing as an "innovation keystone." Building on the region's existing base of advanced manufacturing establishments and university-based research (and also federal labs), promote the growth of advanced manufacturing activity through the usual economic development functions, supplemented by additional efforts such as the creation of an advanced manufacturing cluster	<ul style="list-style-type: none"> Number of public and private entities offering advanced manufacturing assistance Number of distinct programs offered Total funding of offered programs Number of firms/start-ups assisted by cluster Number of firms expanded/attracted/ started within advanced manufacturing cluster
11	Augment the tech-oriented institutional base. Support and expand as appropriate existing events related to product showcasing, startup events, and the like, and assess the applicability of expanding local involvement in organizations such as the Manufacturing Extension Partnership (a national network, Virginia name is GenEdge)	<ul style="list-style-type: none"> Number and participation levels of tech-oriented development events offered by year Number of public/private entities sponsoring the events (and funding levels) (As appropriate based on the nature of the events/programs) number of firms expanded/attracted/started as a result of the events
12	Facilitate the creation of innovation districts. Promote tech-oriented entrepreneurial startups by combining specific institutional support such as research labs and incubator programs with compatible urban settings that offer exceptional lifestyle amenities (e.g., access to urban goods and services, housing, etc.)	<ul style="list-style-type: none"> Documentation of planning and pre-development efforts related to potential innovation districts (including feasibility studies, needed rezoning, site assembly, scoping of institutional partnerships, etc.) (Other measures to be determined once specific development/marketing plans are proposed)
Goal 2. Increase the Pace of SME Job Creation Though Both Expansion of Existing Firms and the Attraction of Out-of-Region		

#	Strategy Category	Metrics
Firms		
13	Promote expansion of small businesses as a key element of innovation. Recognizing both the region's relative lack of SMEs and relative abundance of university-based research related to potential technology transfer activities (along with federal labs), promote the recruitment and accommodation of small but growing firms focused on innovative products and services	<ul style="list-style-type: none"> • Number of public and private entities offering SME-targeted business assistance programs • Number of distinct programs offered • Total funding of offered programs • Number of assisted SMEs expanded/attracted/started by cluster
14	Expand resources for entrepreneurs. Inventory and review resources, such as incubators and accelerators, for entrepreneurs in the region (targeting a selected set of industry/cluster types) and identify means of augmenting any deficiencies discovered	<ul style="list-style-type: none"> • Number of public and private entities engaged in entrepreneurial support • Number of distinct programs offered (segmented by major program type such as incubators, accelerators, access to capital, etc.) • Total funding of offered programs • Number of start-ups emerging from these efforts
15	Fund special-purpose websites. Consider generating special-purpose websites that would retain common branding elements while also serving specific targeted marketing purposes	<ul style="list-style-type: none"> • Number of new special-purpose websites developed • (Additional success measures to be defined based on the nature of each developed website)
16	Expand export assistance programs focused on region's core strengths. Identify and quantify unrealized export opportunities based on key relevant assets (e.g., Port infrastructure, existing and emerging core clusters, etc.); assess existing export-networking capacity of local clusters/firms; serve in matchmaking role with existing (predominantly federal) resources to promote export growth.	<ul style="list-style-type: none"> • Number of jurisdictions and public and private entities offering export assistance programs • Number of distinct programs offered • Total funding of offered programs • Number of firms assisted by program/cluster • Dollar value of new exports by program/cluster

Goal 3. Close All Skills, Credentialing and Degree Gaps in the Regional Clusters' Workforce By 2022 Through Both In-Region Production and Talent Importation		
17	Address higher-education skill gaps. Fully assess the reasons behind the region's low rankings in number of bachelor's and master's degrees among the workforce, and the implications of this for defining, in some detail, cluster development strategies	(Metrics for this Strategy Category should be coordinated with and similar to #3 above, with a particular focus on higher education)
18	Pursue placemaking activities to facilitate retention and attraction of young technical talent. Whereas the innovation district concept (#12 above) would be focused on the development of specific <i>districts</i> to grow/host tech companies, a broader placemaking initiative would seek to position the overall region as a "hot spot" for young professionals	<ul style="list-style-type: none"> • Number of public and private entities participating in placemaking activities focused on young talent • Number of distinct programs offered • Total funding of offered programs • Before/after perception measures (survey-based) • (Other specific performance measures to be defined based on the nature of the pursued programs)
19	Promote technical education at all practical levels. In coordination with area school systems (and local non-profits involved in STEM), some of which already have STEM programs, foster the further institutionalization of STEM/STEAM/STEM-H (health) programs in accordance with appropriate guidelines	<ul style="list-style-type: none"> • Number of public and private entities offering new technical education programs • Number of distinct programs offered • Total funding of offered programs • Number of job placements by program / cluster
20	Invest in veteran re-training. Support existing programs to cross-train exiting military personnel into civilian occupations, and expand as appropriate	<ul style="list-style-type: none"> • Number of public and private entities offering veteran re-training programs • Number of distinct programs offered • Total funding of offered programs • Number of veteran job placements by program / cluster

Section VI: Concluding Remarks

Region 5 has struggled economically since the end of the Great Recession in 2009. The recession along with the subsequent federal budget uncertainty has caused economic growth to slow, employment and wages to stagnate and new firm growth to fall. However, along with the timing of the Go Virginia initiative comes a number of pro-growth initiatives in the region. The widening of I-64 to Williamsburg, the expansion and modernization of Norfolk International Terminal, the landing of two trans-Atlantic cables on the shores of Virginia Beach, and investments in Wallops Island all set the stage for a greatly improved economic environment over the next decade. To capitalize on these foundational investments, we are calling on the Regional Council to make strategic and proportional investments in some of the areas discussed in this plan. Funding through Go Virginia can provide just the right amount of stimulus to specific areas that, when added to the ongoing infrastructure improvements, Region 5 may seize a brighter economic future.

Appendix A: Existing Organizations and Programs in Region

#	Organizations	#	Programs
1	757 Angels	1.a	757 Angels
2	AccelerateHER	2.a	AccelerateHER
3	Accomack County Economic Development Authority		
4	Accomack-Northampton Planning District Commission	4.a	Stronger Economies Together (SET) - Accomack-Northampton Planning District Commission
5	Career and Technical Education (CTE)		
6	Chesapeake Bay Foundation		
7	Chesapeake City Economic Development Department		
8	Christopher Newport University	8.a	Christopher Newport University Luter Business Institute
9	East Coast Polytechnic Institute (ECPI)	9.a	ECPI Cyber Security Center for Innovation
		9.b	ECPI Professional Development Center
10	Eastern Shore Community College (ESCC)		
11	Franklin Southampton County Economic Development, Inc.	11.a	Franklin Business Center
12	Future of Hampton Roads		
13	Greater Williamsburg Partnership	13.a	Launchpad - Greater Williamsburg Business Incubator
14	Hampton City Economic Development Department		
15	Hampton Roads Business OutReach		
16	Hampton Roads Business Roundtable		
17	Hampton Roads Chamber of Commerce	17.a	Hampton Roads Veterans Transition Center
18	Hampton Roads Community Foundation		
19	Hampton Roads Economic Development Alliance		
20	Hampton Roads Innovation Collaborative	20.a	Hampton Roads Innovation Collaborative Cyber Works
21	Hampton Roads Military and Federal Facilities Alliance (HRMFA)		

#	Organizations	#	Programs
22	Hampton Roads Planning District Commission (HRPDC)		
23	Hampton Roads Transportation Planning Organization		
24	Hampton University		
25	Hatch Norfolk	25.a	Hatch Norfolk
26	Horizons Hampton Roads		
27	Ignition Center Business Incubator	27.a	Ignition Center Business Incubator
28	Isle of Wight County Economic Development Department	28.a	Economic Development Incentive Grant (EDIG)
29	James City County Office of Economic Development	29.a	Economic Development Authority Grant (EDA)
30	Jefferson Lab	30.a	Jefferson Lab
31	Langley Research Center, NASA	31.a	Langley Research Center, NASA Technology Transfer Program
		31.b	CERTAIN - City Environment for Range Testing of Autonomous Integrated Navigation
32	Mad Science of Hampton Roads		
33	National Institute of Aeronautics		
34	New Horizons Regional Education Center		
35	Newport News City Department of Development	35.a	E-Commerce Grant Program
		35.b	Newport News Capital Fund Loan Program
		35.c	Newport News Micro Loan Program
		35.d	Newport News Urban Action Grant Loan Program
		35.e	Peninsula Revolving Loan Fund Program
		35.f	Tax Exempt & Taxable Industrial Revenue Bonds
		35.g	PACT Grant Program
36	Norfolk City Department of Development	36.a	Norfolk Small Business Initiative
37	Norfolk State University	37.a	Norfolk State University Ernest M. Hodge Institute for Entrepreneurship
38	Northampton County Economic Development Department		
39	Old Dominion University	39.a	Old Dominion University Strome Entrepreneurial Center

#	Organizations	#	Programs
		39.b	Old Dominion University Center for Enterprise Innovation (CEI)
		39.c	Hampton Roads Procurement Assistance Center (ODU CEI)
		39.d	Hampton Roads Veterans Business Outreach Center (HRVBOC)
		39.e	Center for Enterprise Innovation Women's Business Center
40	Opportunity, Inc.	40.a	Launch Hampton Roads - Business Startup
		40.b	Hampton Roads Veterans Transition Center
41	Paul D. Camp Community College (PDCCC)	41.a	SkillsOnline
42	Peninsula Council for Workforce Development		
43	Peninsula Economic Resource Team	43.a	Peninsula Economic Resource Team
44	Peninsula Home Based Business Program	44.a	Peninsula Home Based Business Program
45	Peninsula Technology Incubator	45.a	Peninsula Technology Incubator
46	Poquoson City Economic Development Department		
47	Port of Virginia	47.a	Port Volume Increase Tax Credit
		47.b	Barge and Rail Usage Tax Credit
		47.c	International Trade Facility Tax Credit
		47.d	Port of Virginia Economic and Infrastructure Development Grant Program
		47.e	Foreign
48	Portsmouth City Economic Development Department	48.a	Business Personal Property Investment Grant - Enterprise Zones #1 and #2
		48.b	Machinery and Tool Investment Grant - Enterprise Zones #1 and #2
49	Regent University		
50	Reinvent Hampton Roads	50.a	Regional Export Accelerator Program (REAP)
51	RISE accelerator (funded by NDRC HUD grant)	51.a	RISE accelerator (funded by NDRC HUD grant)
52	Small Business Development Center		

#	Organizations	#	Programs
53	StartPeninsula	53.a	StartPeninsula
54	StartWheel	54.a	StartWheel
55	Suffolk City Economic Development Department	55.a	Economic Development Incentive Grant (EDIG)
		55.b	Technology Zone
56	Technology Commercialization Center	56.a	Technology Commercialization Center
57	The Apprentice School		
58	The Arsenal	58.a	The Arsenal
59	Tidewater Community College (TCC)	59.a	New Virginia Economy Workforce Credential Grants (WCG)
		59.b	Center for Workforce Solutions
60	Thomas Nelson Community College (TNCC)	60.a	Thomas Nelson Community College's Entrepreneurship Program
		60.b	Advanced Integrated Manufacturing Program
61	Virginia Beach City Economic Development Department	61.a	Virginia Beach Economic Development Investment Program (EDIP)
62	Virginia Maritime Association		
63	Virginia Peninsula Chamber of Commerce	62.a	Young Entrepreneurs Academy Virginia Peninsula
64	Virginia Ship Repair Association		
65	Virginia Wesleyan University		
66	William & Mary	65.a	William & Mary's Technology and Business Center (TBC)
67	Williamsburg City Economic Development Authority	66.a	E-Commerce Grant Program
		66.b	Tax Exempt Industrial Revenue Bonds
		66.c	HUB Zone
		66.d	Small Business Jobs Grant Fund
		66.e	Tourism Development Financing Program
		66.f	Virginia Tourism Growth Fund
		66.g	Williamsburg Tourism Zone
68	Williamsburg City Redevelopment and Housing Authority		
69	York County Office of Economic Development		

Appendix B: Best Practice Examples from Model Regions

As part of the GO Virginia strategic planning process, the Region 5 Regional Council and the consultant team identified relevant projects/programs in other regions that can serve as “aspirational models” for Hampton Roads. Key elements of these best practice models are summarized below.

NC Tomorrow

NC Tomorrow is a 2014 economic and community development strategic plan document produced through an initiative of the North Carolina Association of Regional Councils, in partnership with the US Economic Development Administration and the US Department of Housing and Urban Development, through the North Carolina Department of Commerce’s Community Assistance Division.

Some of the key points the authors of this report make are the following:

- Part of North Carolina’s economic development focus can be courting disruptive industries. The document authors may have been motivated to take this approach based on the fact that traditional manufacturing businesses in North Carolina had themselves been disrupted in the not-too-distant past. Part of the implications of taking this approach is that it’s important to keep all types of economic development stakeholders up-to-date on the opportunities that are occurring as a result of industry disruption, so that opportunities can be recognized, educators and workforce trainers can be aware of the kinds of skill requirements that would be needed, and the like.
- In fact, the authors note that this kind of information sharing, for stakeholders ranging from investors to workers, is important no matter what industry targets are being encouraged. Information sharing starts with data-driven industry/cluster targeting, which helps provide a basis for investing in these industries and for instilling confidence in the communities working with these targets. Workers, particularly, need to be kept aware of both job opportunities and the kinds of training required to connect with these opportunities. Generally speaking, educational and workforce training resources struggle to maintain their alignments with industry needs, and this is all the more true in these periods of rapid change in manufacturing and other industries.
- There are many urban/downtown areas of the state, particularly the smaller areas, that need to be made more functional in terms of meeting varied lifestyle choices, and achieving quality “urban living” in general – essentially placemaking – and this need is integral to economic development success. One aspect of this is providing tools to help local governments be as effective as possible. In Durham, officials created the “Innovate Durham” program, to open up the city’s resources and databases to entrepreneurs so that they could propose innovative solutions to various civic challenges. Durham officials claim to have been inspired by successful similar programs in cities like Pittsburgh and San Francisco.

- A comprehensive branding exercise will be one way in which rural or other outlying areas will become better connected to the urban centers.
- North Carolina stakeholders see themselves as being in need of an “entrepreneurial ecosystem” that is much better coordinated and marketed than what currently exists (even though entrepreneurial resources are fairly widely available), which will help entrepreneurs make connections to big companies and other clients. The ranks of independent workers have increased in North Carolina, which is in part a phenomenon happening throughout the country, partly a result of the reality of contract labor replacing full-time employees. The growth of contract labor is in fact an independent justification for expanding entrepreneurial-support programs.

Nashville Partnership 2020

The Nashville Area Chamber of Commerce’s *Partnership 2020* is the Nashville 10-county region’s public-private economic development initiative (undated but apparently 2015). The Partnership was formed in 1990 to maintain and grow the Nashville region’s economy by creating jobs through working with relocating and expanding businesses, attracting a talented and creative workforce, and developing and promoting a quality of place and livability.

Partnership 2020 focuses on three strategic drivers:

1. Economic prosperity, in five diverse target industry sectors: 1) corporate services (headquarters and other operations and the like, which is not really an industry target but a type of business focus), 2) healthcare management and information technology, 3) advanced manufacturing, 4) distribution and trade, and 5) music and entertainment.
2. Talent development, keeping the workforce current with required skills.
3. Place and livability, maintaining affordability and quality of life in tandem.

A key characteristic of the Strategy, one which cuts across the three strategic drivers, is *effective regionalism*, in which regionalism is not seen as a tactic but “a quality to be embedded in all strategic pursuits.”

The Rise of Innovation Districts

The authors of this Brookings report¹³ note that the Research Triangle Park, one of the most successful and iconic research and development campuses in the nation, generated a new master plan in 2012 focused on changing the park from an essentially suburban environment to one that is much more urbanized, specifically to create places where knowledge workers are more likely to want to live and work.

¹³ Bruce Katz and Julie Wagner, *The Rise of Innovation Districts: A New Geography of Innovation in America*. (Brookings, May 2014), 3.

Rhode Island Innovates: A Competitive Strategy for the Ocean State¹⁴

The Rhode Island economic development strategic plan was prepared in response to the fact that the state had been slower to recover from the Recession than neighboring areas. Part of the explanation for the slow recovery was presumed to be the small state's lack of critical mass in its industry structure, along with some underlying gaps in business development institutions. The proposed strategic approach focused around three competitiveness drivers:

1. Strengthen the innovation capacity of the state;
2. Apply concepts like innovation districts to enhance the quality of places; and
3. Make certain that educational and job training systems were producing a workforce ready for future, if not present, industry requirements.

To support these drivers, supporting platforms needed bolstering – specifically, the business environment (including especially incentives and the like) and civic business engagement processes.

Rhode Island's strategic industry clusters are similar to those of Hampton Roads. In summary form, these clusters are: shipbuilding, IT/software/data analytics and cyber, logistics, and (combined) arts, education, hospitality, and tourism. At less than 1.1 million people, the State of Rhode Island is roughly 1/3 the population size of Virginia's Region 5. In spite of its small size, as an economic region Rhode Island has the full authority of the state to bring to bear on its economic development efforts. For these reasons, it is instructive to note that the Rhode Island strategic approach includes a combination of building up the "innovation capacity" of the state along with making it more attractive to innovation/knowledge workers.

To spur innovation, the recommended multidimensional initiative includes building up the research and product-commercialization capacity of the state's universities along with expanding entrepreneurial infrastructure.

Recent, High-profile Examples of Economic Development Best Practices

Program Category: Special Purpose Websites

**Foreign Direct Investment Microsite
(invest.inwisconsin.com)
Wisconsin Economic Development Corporation
Madison, WI**

The Wisconsin Economic Development Corporation (WEDC) expanded its foreign direct investment (FDI) strategy in 2015, leveraging the organization's well-established export programs and relationships to draw attention to business investment opportunities within key industries among business leaders in target international markets. The strategy builds on Wisconsin's central North American location; infrastructure assets; workforce excellence

¹⁴ Prepared by Battelle Technology Partnership Practice in association with the Metropolitan Policy Program at Brookings with support from Monitor Deloitte and TEconomy Partners, LLC, January 2016.

and industry leadership. To support this strategy, WEDC developed a micro-site targeted specifically at international business leaders. The site's content—page text, videos, industry data and company success stories—is available in English, French, Spanish, German, Chinese and Japanese, reflective of Wisconsin's priority international markets.

The site highlights Wisconsin's distinctive advantages relative to the chief drivers of investment decisions—location, infrastructure and workforce availability—as well as the state's leadership in key industries—manufacturing; energy, power and control; food and beverage; water technology; and bioscience. The site also emphasizes the state's efficient access to major markets via highways, ports, airports and rail system, and provides compelling data related Wisconsin's strong business climate.

**Techweek AKL Website
(techweek.co.nz)
Auckland Tourism, Events & Economic Development
Auckland, New Zealand**

Techweek.co.nz is a special purpose website created for the inaugural Techweek AKL, a cluster of design, innovation and technology events held in Auckland, New Zealand from May 14-22, 2016. The website has remained online to promote subsequent Techweeks in 2017 and 2018. Techweek AKL events feature international and local keynote speakers, covering a wide range of relevant, trend-focused topics. The special-purpose website was the primary information source for the inaugural Techweek, supported by Techweek AKL Facebook and Twitter pages and an event experience tool, which allowed attendees to interact digitally before, during and after the event.

Program Category: Talent Retention/Attraction

**Game Changers Action Plan – Pitch It! Competition
(www.halifaxgamechangers.com)
Halifax Partnership
Halifax, Nova Scotia, Canada**

Halifax is home to six universities and three community college campuses graduating a steady stream of skilled, educated young people each year. Retention of young talent is a significant challenge and a strategy priority for the Halifax Partnership (Nova Scotia's economic development organization) and the City of Halifax.

The Game Changers Action Plan is talent retention initiative aimed at reducing youth out-migration from net 1,300 to net zero over the next three years. It focuses on raising awareness about the issue, changing attitudes about hiring youth, and encouraging businesses to hire young talent, offer experiential learning opportunities and connect young talent with the business community.

Pitch It! was an online contest inviting soon-to-be and recent graduates to upload a 30-second video pitching their skills, career ambitions and value to Halifax businesses. Students competed for cash prizes and an opportunity to pitch live to a business audience. Pitches were featured on the Partnership's Twitter feed and YouTube channel. Students and local businesses also connected via Twitter.

2015 Live-Work-Play Narrative Survey
(AEDCweb.com)
Anchorage Economic Development Corp.
Anchorage, AK

Live-Work-Play (LWP) is a grassroots movement aimed at strengthening community life in Anchorage, and attracting and retaining talent. To establish the initial vision for the initiative (in 2010), an aspirational grassroots narrative was developed through a community survey composed of two questions: 1) Why do you live in Anchorage? 2) Why would you leave Anchorage?

In 2015, AEDC re-launched the LWP survey in an effort to get a new pulse on Anchorage and confirm that the narrative/vision is still on-point. The 2015 survey was conducted over seven months without an advertising budget and resulted in over 1,275 responses. The success of the project was achieved through use of web-based outreach platforms (including Survey Monkey), social media, e-newsletters and web ads.

YPWeek
(<http://www.ypweek.com/>)
Wisconsin Economic Development Corporation and NEWaukee
Madison and Milwaukee, WI

With Wisconsin facing a significant demographic/age shift in the foreseeable future, developing the state's workforce pipeline is a critical economic development challenge. The challenge is compounded by the fact that Wisconsin loses approximately 9,000 college educated adults aged 18-34 per year.

Through collaborative leadership between the Wisconsin Economic Development Corporation (WEDC) and NEWaukee, a social architecture firm changing the ways professional interact with each other and their environment, Wisconsin has begun an unprecedented collaboration among young professional (YP) organizations and communities to address the state's "bright flight." Working with young professional leaders throughout Wisconsin, WEDC and NEWaukee have produced a forum for talented individuals to share their stories about finding success in Wisconsin. The goal is increase the talent pipeline of professionals by addressing the state's outbound talent migration through information and access.

Young Professionals Week (YPWeek), an annual event, provides young people the resources they need to choose Wisconsin as their career/life destination: leadership training, cultural exhibition and a forum for their ideas to be heard. Most importantly, it provides a connection to their peers, not only in their community, but across the state.

Program Category: Site Selection Websites

Utah Economic Development Map
(Locate.utah.gov)
Utah Governor's Office
Salt Lake City, UT

The Utah Economic Development Map is an interactive mapping tool that allows users to virtually explore Utah's business grade broadband infrastructure, extrapolate workforce data for any location, easily identify public utility providers, and locate nearby transportation and lifestyle features. The tool was developed by the Utah Broadband Outreach Center in the Governor's Office of Economic Development, in partnership with the State's Automated Geographic Reference Center (AGRC) and the Economic Development Corporation of Utah.

**County Profile Tool
(TNECD.com)**

**Tennessee Department of Economic and Community Development
Nashville, TN**

Tennessee's county profile tool sets an industry standard in the way that it allows corporate decision makers, site selectors and local economic development organizations to easily identify potential business locations throughout the state. The user experience provides a friendly interface that is responsive across all mobile device types. The application allows users to visualize comprehensive data by individual county or region. The tool can categorize areas by population and demographics, tax structure, labor force, education, housing and income, health and public safety, industries, top employers, climate and community information.

Program Category: Economic Development Initiatives with Components Relevant to Hampton Roads Region

**ProsperityNOLA
(<http://www.nolaba.org/prosperity-nola/>)
The New Orleans Business Alliance
New Orleans, Louisiana**

ProsperityNOLA – the first comprehensive development plan in New Orleans' recent history – is a catalyst for economic transformation, designed to ensure the city's vitality for its tri-centennial in 2018 and beyond. Stakeholders from business, government, education and philanthropy, as well as the broader economic development community, came together in 2012 to create the plan. Using a data-driven process, the initiative's Strategic Advisory Council selected to aggressively support five key industry clusters based on their strength and projected growth. Plan components relevant to Hampton Roads include the following:

- Positions New Orleans as a "thought leader" in a disaster recovery (could Hampton Roads do this for a key local challenge/opportunity such as sea level rise?).
- Transportation, trade and logistics is a foundational cluster.
- Advanced manufacturing is a foundational cluster.

**NEPIRC Manufacturing Extension Partnership Program
(<http://www.nepirc.com/>)
Northeastern Pennsylvania Industrial Resource Center
Hanover Township, PA**

NEPIRC is a public-private partnership that provides small and mid-sized manufacturers throughout an 11-county regional of northeastern and the northern tier of Pennsylvania

with the assessment, advisory and consultative services they need to enhance competitiveness, accelerate adoption of new technologies, improve profitability and strengthen long-term resiliency – which in turn creates well-paying advanced manufacturing jobs. Program components relevant to Hampton Roads include the following:

- Affiliated with the Manufacturing Extension Partnership (MEP) program – a national work of organizations that collectively strengthen the U.S. manufacturing economy. The MEP program is available in Virginia through GenEdge.
- NEPIRC specifically links advanced manufacturing to a larger defense industry adjustment initiative.

Program Category: Business Start-up / Entrepreneurial Development

**OktoberINVESTfest – Annual Investors Conference
(oktoberinvestfest.com)
Bavarian U.S. Offices for Economic Development
New York, NY**

OktoberINVESTfest is an annual investors' conference in New York City. The one-day event brings together investors and industry leaders from the U.S. and Germany dedicated to pursuing advances in innovation and growing their businesses locally. The conference features panel discussions and keynotes by thought leaders and key individuals from Bavaria's strongest business sectors. U.S. and German investors get together to share ideas on how to finance business expansion.

**Increasing Entrepreneur Financing Availability in Kentucky
(<http://www.northernkentuckyusa.com>)
Northern Kentucky Tri-County Economic Development Corporation
Ft. Mitchell, KY**

Between 2012 and 2014, Northern Kentucky Tri-ED undertook a statewide campaign to build a coalition/support for creating an angel tax credit. In 2014, the angel tax credit became law, with Tri-ED on the tax credit implementation team. In 2015, the tax credit became available and the \$3 million tax credit was exhausted in just 8 months. In 2016, the annual credit was exhausted in 2 months. This program has overwhelmingly increased entrepreneurial financing available in the state of Kentucky.

**UpTech Accelerator
(<https://www.uptechideas.org/>)
Northern Kentucky Tri-County Economic Development Corporation
Covington, KY**

UpTech was born out of a vision to transform the Northern Kentucky economy into a high-tech, 21st Century destination that cultivates talent through education and leverages public and private capital to support a new information-driven sector of entrepreneurs. UpTech's founders set out to rally the community behind an investment fund that invests in data and informatics, rewarding innovative big ideas. The program provides the platform for this regional transformation to occur through identification and selection of top tech talent to start and grow their businesses in the region.

BREW Accelerator – Empowering Entrepreneurs & Innovation in Water
(<https://thewatercouncil.com/programs/brew-accelerator/>)
The Water Council
Milwaukee, WI

The BREW Accelerator, launched in 2013, unleashes water innovation by funding water technology startups with commercialization potential, with the goal of launching each portfolio within 24 months. The first of its kind accelerator pairs a unique water-focused startup community, located within the Global Water Center, with resources found only in Milwaukee's World Hub, to help entrepreneurs from around the world commercialize their unique technologies and accelerate results that impact the global community.

Program Category: Tech-oriented Workforce Development

Alamo STEM Workforce Coalition (ASWC) Externship for Teachers Program
(<http://ate.utsa.edu/ASWC>)
Workforce Solutions Alamo
San Antonio, TX

The Alamo STEM Workforce Coalition (ASWC) is composed of committees from the Alamo area that have partnered to extend learning opportunities in the classroom and grow the number of students on STEM degree pathways to help employers gain a competitive edge while contributing to economic growth. The partnership was designed to connect teachers with employers in learning how math and science are being applied in the real world. The success of 2015 resulted in additional funding for 2016 and the addition of SA Works!

The goal of the Alamo STEM Workforce Coalition is to increase student awareness of STEM careers in the Alamo region to be better prepared for those careers. During summer 2016, more than 150 teachers traveled to employer sites to learn how math and science are applied in real world workforce settings.

Program Category: Industry Cluster Partnership with Educational Institution
Dayton Aerospace Hub of Innovation and Opportunity
(<http://www.daytonconventioncenter.com/dcc/ohio-aerospace-innovation-and-opportunity>)
University of Dayton
Dayton, OH

The Hub is a successful partnership between local industry stakeholders and the University of Dayton. The project grew out of the City of Dayton's 2020 Economic Development Strategy, which recognized the need for new approaches to create long-term sustainable economic growth engines for the City and region. The Hub project adopted and emphasized many of the City's economic development practices by focusing on systems and relationships, and creating an environment that businesses recognize as a place where they can gain productive advantages.

Under the leadership of the University of Dayton and its Research Institute, the partnership includes the City of Dayton, Montgomery County, CityWide Development Corporation, the Dayton Development Coalition, and the State of Ohio. These entities came together in 2009

to develop the Hub as a magnet for aerospace entrepreneurs, innovators, and business owners seeking the opportunity to live, work and learn in a creative environment. The partners also sought to revitalize blighted areas and enhance Dayton's place-making strategies.

Program Category: Export Assistance

Tampa Bay Export Alliance

(<http://www.tampabayexportalliance.com/>)

Tampa Hillsborough Economic Development Corporation & Pinellas County

Economic Development

Hillsborough and Pinellas County, FL

Recognizing that an effective international strategy is regional in nature, the Tampa Hillsborough Economic Development Corporation (THEDC) and Pinellas County Economic Development (PCED) created an alliance to leverage bi-county resources for international programs. In 2014, the Tampa Bay Export Alliance (TBEA) was established, which ushered in a new era of regional collaboration in the region.

The TBEA helps to grow jobs and capital investment by increasing international business opportunities for companies within the bi-county area and marketing the region globally as a top business destination.

The TBEA conducts joint activities, such as seminars, trade events and trade missions, and supports the international-related growth initiatives of regional economic partners, including Tampa International Airport and Port Tampa Bay. The TBEA works closely with other federal, state and local entities to offer a seamless network of international support services.

OH-PA Stateline Export Initiative

(<http://www.ohpaexports.com/>)

Youngstown/Warren Regional Chamber

Youngstown, OH

The OH-PA Stateline Export Initiative is an effort to bring exporting awareness, foreign direct investment and supply chain matching to a 10-county region of eastern Ohio and western Pennsylvania. Initiated by the Youngstown/Warren Regional Chamber (YWRC) and the Ohio SBDC Export Assistance Network at Youngstown State University, the program shares potential development leads, resources and events in order to further company investment and create/retain jobs as well as attain economic stability in the region. The Brookings Institution has praised this initiative as follows: "The OH-PA Stateline Export Initiative shows a strong commitment to expanding global economic reach through the identification of regionally competitive strengths and an increase in exports. Drawing on data and best practices from the Global Cities Initiative, a joint project of the Brookings Institution and JPMorgan Chase, this is the kind of innovative action that is needed to ensure long-term economic success for business located in the 10-county area that are interested in expanding to global markets."

Program Category: Specialized, awarding-winning programs that may have some application in Hampton Roads region

Greater MSP Driving Perception Change

(<https://www.greatermsp.org/blog/2016/11/21/main/new-report-geared-to-employers-make-it.-msp.-insights-talent-in-the-minneapolis-saint-paul-region/>)

GREATER MSP

Saint Paul, MN

GREATER MSP was formed in 2011 as the Minneapolis Saint Paul region's economic development organization, with the mission of accelerating job growth and capital investment. The organization conducted a perception study among site selectors and C-suite executives to gather external perceptions about the region, and found awareness of the region to be low and unclear. The findings of the survey directed promotional efforts over the next three years. A follow-up survey found a 13% increase in positive perceptions of the region's business climate, and a 30% increase in willingness to consider MSP for future projects. In addition, the number of respondents who had considered the region in the past five years nearly doubled.

[Re]Verse Pitch Competition

(<http://reversepitch.org/>)

City of Austin

Austin, TX

The [Re]Verse Pitch Competition is a social innovation program to help turn valuable raw materials that are currently leaving local businesses, non-profits, and institutions as waste into the foundation of new social enterprises. Local entrepreneurs hear pitches from the businesses with these materials, then work with mentors and advisors over several weeks to develop and refine repurposing business ideas. At the closing event, finalists pitch their new business ideas to compete for the top Innovation Prizes that help them start these new ventures. The 2015 Competition led to the founding of Brewnola, a start-up that repurposes spent brewery grain into granola snacks.

The City of Austin's Recycling Economic Development Program works to attract, retain, and grow zero waste businesses and entrepreneurs in order to create local jobs and foster a resilient zero waste ecosystem in Central Texas. The program is a joint partnership between the Economic Development Department and Austin Resource Recovery.