

Appendix B: Greater Richmond Partnership Target Industry Cluster Analysis

Greater Richmond Partnership
30 and Thriving
2025-2030 Strategic Plan

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Proposed target industries

Target industry analysis overview

Understanding the trajectory and concentration of industry clusters in the Greater Richmond region is an integral part of the strategic planning process. Identifying industries and sectors with a track record of growth, and potential for future growth, can help focus time and resources to achieve tangible results.

This analysis included an assessment of GRP's current target industries and a broader assessment of relevant industry clusters (*see page 64 for more details*) to gain insight on possible changes and updates to the organization's targets over the next five years. Evidence of foundational assets and enablers to support the future growth of industries were taken into consideration during the analysis.

The proposed update and reframing of target industries is informed by research (including competitive benchmarking, asset mapping and document review), stakeholder input and the SWOT analysis. It reflects a consolidation of some adjacent industries that have shared assets and enablers, including education and workforce, sites, supporting associations, and other resources and ingredients for success.

Several previous target industries are included as potential targets moving forward as part of GRP's new strategy. Emerging technology sectors may still be nascent but are positioned to grow in coming years.

Greater Richmond's current target industries

Corporate Services

- ▶ Corporate Headquarters
- ▶ Middle Office
- ▶ Back Office

Information Technology

- ▶ Data Centers
- ▶ Cybersecurity
- ▶ Digital Sciences

Finance & Insurance

- ▶ Banking and Securities
- ▶ Insurance

Advanced Manufacturing

- ▶ Chemicals
- ▶ Machinery
- ▶ Fabricated Metal Products

Food & Beverage

- ▶ Food Processing
- ▶ Beverages
- ▶ Machinery and Equipment

Life Sciences

- ▶ Life Sciences
- ▶ Medical Equipment
- ▶ Health IT

Target industry analysis

The charts on the next two pages combine location quotients (LQs), growth and relative size to illustrate a snapshot of Greater Richmond's industry cluster performance. The chart is created using industry clusters across the regional economy to assess trends and uncover if there are new emerging industries that could be added to the target industry list. Beyond target industries, this analysis can also provide insight into which niches should be included within each target industry.

The horizontal axis displays employment growth of each cluster from 2018 through 2023 on the first chart (page 9) and projected growth from 2023 to 2028 on the second chart (page 10). The size of each bubble indicates the number of local jobs in the cluster while the vertical axis shows how concentrated the cluster is in Greater Richmond. Together these indicators paint a picture of employment trends by industry cluster in Greater Richmond.

A possible update and reframing of the target industries is presented on page 11 (*the list of industries evaluated for the target industry cluster analysis and more insights can be found on pages 57-61*).

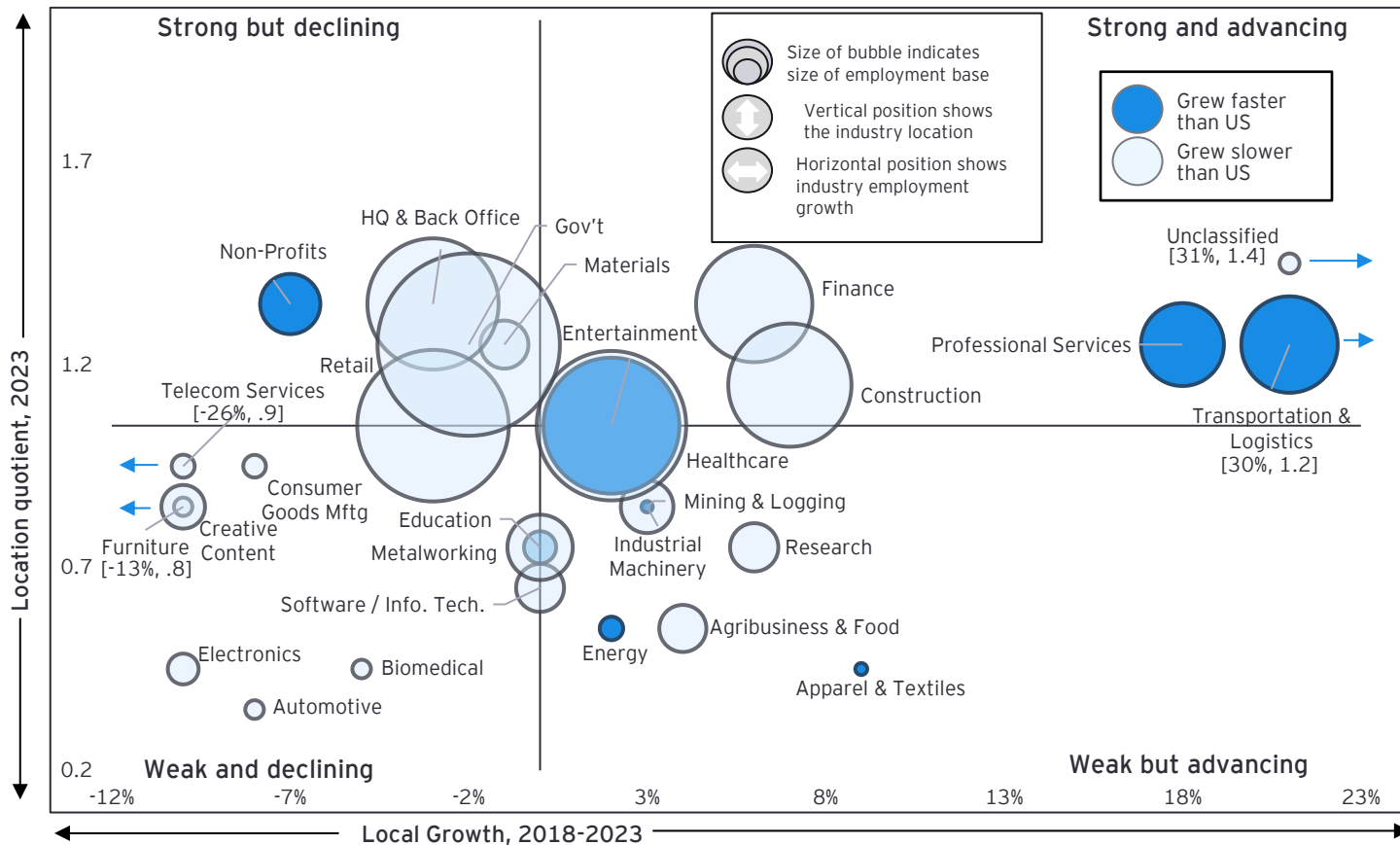
Logistics & E-commerce

- ▶ Fulfillment Centers
- ▶ Wholesalers
- ▶ Warehousing

Industry Cluster Analysis

Recent cluster employment growth: 2018-2023

Based on the industry concentration (relative strength) and employment growth, clusters can generally be grouped into four categories: *strong but declining*, *strong and advancing*, *weak and declining*, and *weak but advancing*. A forward-looking industry cluster analysis which includes industry forecast data is included on the next page.



Industry clusters: Groups of similar and inter-related industries. Estimated employment in the aerospace cluster is less than 10, so they are not included in the chart.

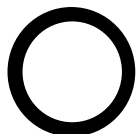
Source: Lightcast, 2024.2; QCEW employees, non-QCEW employees, self-employed

Selection for future target clusters is driven primarily by the following questions as filters in the identification process:



Is the cluster employment growing and projected to grow within the region and US?

Examining national and international trends helps you understand if the target cluster will continue to grow and create opportunities in your region.



What clusters have an existing presence in the region?

Clusters with an existing concentration in your region reflect local competitive strengths and present some of the best opportunities for expansion, recruitment and startup growth.



Which clusters are best suited to the region's assets?

The ability of your region to leverage its assets to support cluster ecosystems and expanded cluster activity is an important filter.



Which clusters align with the region's goals and values?

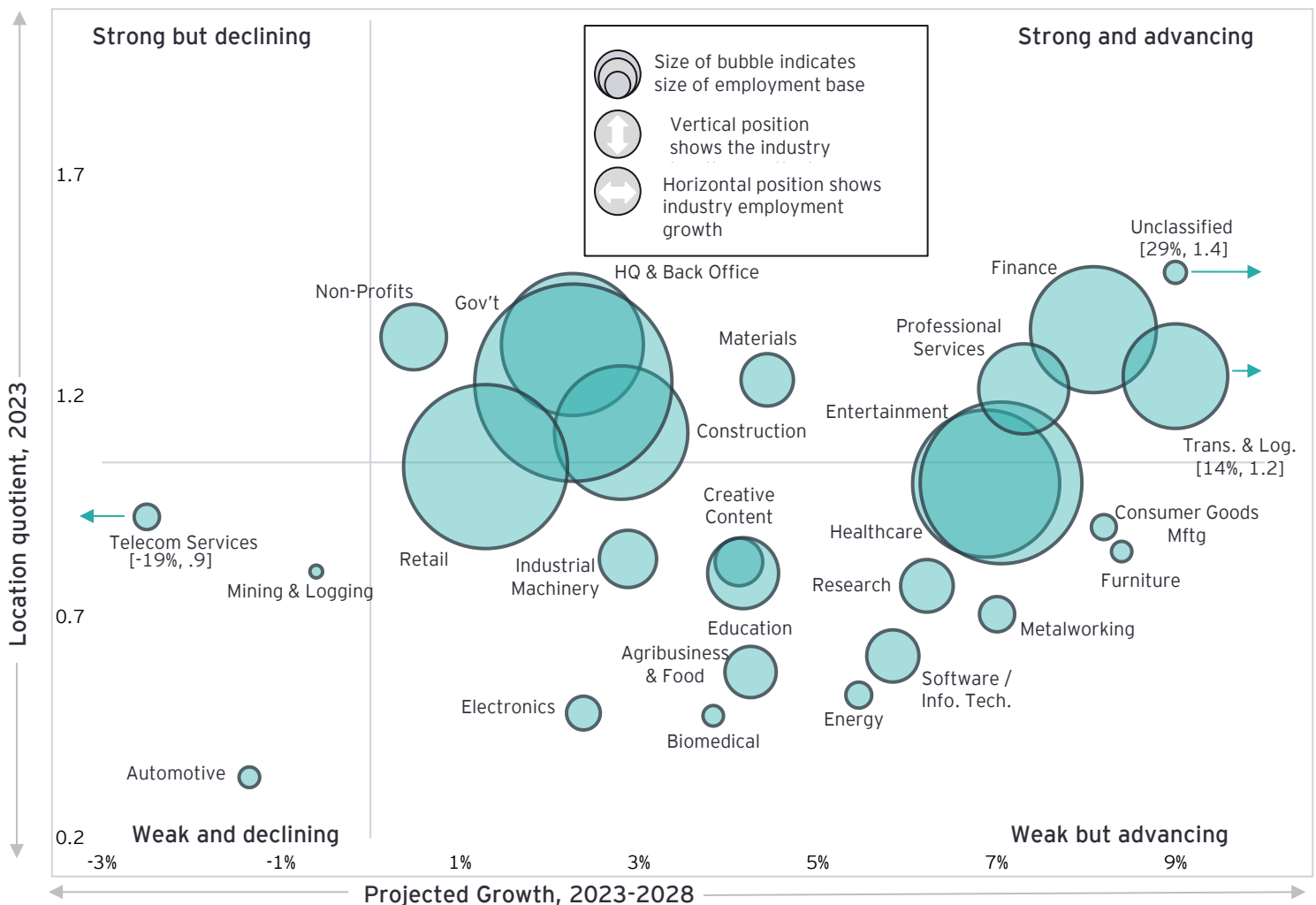
Every cluster should be evaluated on whether it reinforces the goals and values identified by your regions, usually through conversations and focus groups.

Industry Cluster Analysis

Projected cluster employment growth: 2023-2028

There are limitations to employment projections, but it can provide guidance and direction. The graph below shows projected employment trends by industry cluster in Greater Richmond. Employment data is helpful in partnership with stakeholder feedback, compiling of industry and educational assets, and the goals of the community to determine targets that provide opportunity to greater Richmond region.

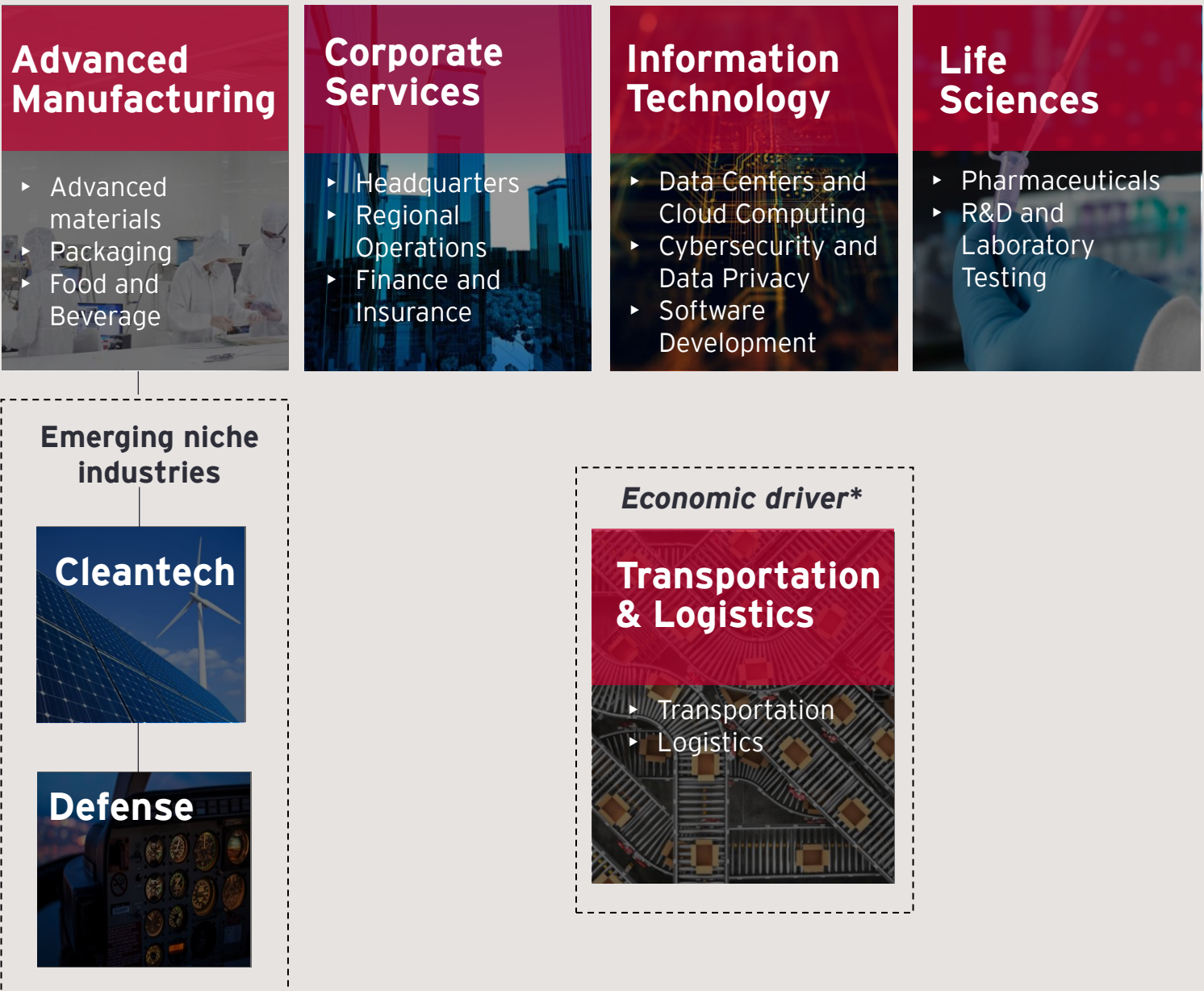
Many of the industries and niche sectors identified in the target industry analysis correlate with industry clusters that are projected to be fast-growing including transportation & logistics, finance (fintech), research and healthcare (life sciences), materials (advanced materials and packaging) software/information technology (information technology), and agribusiness & food (food and beverage).



Industry clusters: Groups of similar and inter-related industries. Estimated employment in the aerospace cluster is less than 10, so they are not included in the chart.

Source: Lightcast, 2024.2; QCEW employees, non-QCEW employees, self-employed

Proposed target industries and niches



**Economic driver: Considered an important regional industry and a competitive advantage that can contribute to the growth of other industries. GRP is not planning to actively recruit companies within this sector, but can provide assistance upon request.*



Clusters reviewed and additional criteria used for target industry selection

Target cluster selection

Below is the total set of industry clusters that were evaluated to identify potential future target industries for Greater Richmond. Looking at each cluster based on concentration, growth trajectory, industry assets, and whether they tend to engage economic development organizations can help prioritize which sectors to focus on. Most clusters will not check every box, but it helps eliminate certain clusters and provide guidance on which direction to explore. This process along with insights gleaned from stakeholder engagement and broader economic trends guide target cluster identification.

The industries in bold met the most criteria in terms of location quotient, potential growth trajectory, supporting assets and track record of economic development projects (target industry nomenclature and possible sub- and niche industries are in parentheses). Industries in italics did not meet that criteria but were selected because of potential for growth in the region.

- ▶ **Transportation & Logistics**
- ▶ **Finance (Corporate Services - Finance and Insurance)**
- ▶ Professional services
- ▶ Apparel & Textiles
- ▶ **Research (Life Sciences - R&D)**
- ▶ **Materials (Advanced Manufacturing - Advanced Materials and Packaging)**
- ▶ Metalworking
- ▶ **Headquarters and Back Office (Corporate Services)**
- ▶ Energy
- ▶ **Healthcare (Life Sciences - Laboratory Testing)**
- ▶ **Software & Information Technology**
- ▶ **Industrial Machinery (Advanced Manufacturing - Food and Beverage and Packaging)**
- ▶ **Agribusiness & Food (Advanced Manufacturing - Food and Beverage)**
- ▶ **Biomedical (Life Sciences - Pharmaceuticals)**
- ▶ Construction
- ▶ Entertainment & Hospitality
- ▶ Furniture
- ▶ Consumer Goods Manufacturing
- ▶ Mining & Logging
- ▶ Non-Profits
- ▶ *Electronics (Advanced Manufacturing - Cleantech)*
- ▶ *Aerospace (Advanced Manufacturing - Defense)*
- ▶ Automotive
- ▶ Creative Content
- ▶ Government

Factors for continued growth in certain target industries

To identify potential changes to the existing target industries, EY evaluated industry clusters across the regional economy and prioritized industries that exhibited significant indicators for projected growth. In the proposed update, there is a consolidation and refining of target industries along with the addition of newer, emerging targets that may provide new opportunities for the Greater Richmond region. The business recruitment pipeline, employment clusters, recent investments (both private and public) and broader macroeconomic trends that have the potential to shape the future were all considered when identifying these target industries and niche sectors.

Advanced Manufacturing

- ▶ Advanced Materials
- ▶ Packaging
- ▶ Food and Beverage

- ▶ Nationally, employment growth is expected to grow by 5% over the next five years, much faster than the 2% growth of the previous five years.
- ▶ The plurality of projects has been in Advanced Manufacturing over the past 10 years, typically consisting of 30% to 50% of all projects.
- ▶ Packaging is highly concentrated in the Greater Richmond region (LQ: 1.7) and leverages Richmond's strategic location and concentration of fulfillment centers.
- ▶ Controlled environment agriculture (within food and beverage) has some momentum in the region and aligns with state priorities.

Corporate Services

- ▶ Headquarters
- ▶ Regional Operations
- ▶ Finance and Insurance

- ▶ The Greater Richmond region has the most Fortune 1000 headquarters among benchmarks and employment is twice as concentrated as the national average.
- ▶ There was a significant investment in the industry in recent years.
- ▶ Given the high concentration of finance employment along with the presence of important tech skill sets, there appears to be opportunity to grow the cluster through targeted business recruitment efforts.

Information Technology

- ▶ Data centers and Cloud Computing
- ▶ Cybersecurity and Data Privacy
- ▶ Software Development

- ▶ Greater Richmond has had success in attracting data centers, which can boost the local tax base.
- ▶ There is the infrastructure, available sites and incentive policies in place to attract data centers.
- ▶ Virginia has developed a reputation as a leader for data centers.
- ▶ Greater Richmond has the second-highest share of cybersecurity workers among the benchmark regions.

Factors for continued growth in certain target industries

Life Sciences

- ▶ Pharmaceuticals
- ▶ R&D and Laboratory Testing

- ▶ Greater Richmond was awarded two competitive federal grants in Life Sciences for a total of over \$50M and was designated as a Tech Hub.
- ▶ GRP's role recruiting new Life Sciences companies is complementary to the projects recently funded that will enhance innovation, workforce and infrastructure.
- ▶ Despite relatively modest employment growth, there have been over 10 Life Sciences announcements since 2019, representing significant investment and created jobs.

Economic driver

Transportation & Logistics

- ▶ Transportation
- ▶ Logistics

- ▶ The rise of e-commerce and supply chain challenges helped spur fast growth in warehousing and distribution over the past few years.
- ▶ Richmond has benefited from this trend due to key transportation assets such as I-95 and I-64 and being strategically located among many large metros on the east coast.
- ▶ Given the regional assets, local population growth, and location of the community, that activity should continue but not actively recruited.

Indicators for emerging niche industries

Cleantech

- ▶ Several tailwinds have supported the growth of this industry, including corporate commitments to renewables, customer preferences and federal investment.
- ▶ Had recent significant announced investment in this sector.
- ▶ While the speed of the transition toward clean energy may slow depending on shifting political priorities, the general direction toward renewable energy is unlikely to reverse course.

Defense

- ▶ The Greater Richmond region has direct connectivity to the major defense markets of Hampton Roads and Washington DC which concentrates military personnel and contractors.
- ▶ There is a concentration of information security analysts and the region's quality of life and cost of living is a draw for knowledge workers.
- ▶ \$9 million grant from the Department of Defense for the Convergence Labs @ VCU, which aims to advance defense innovation in the US.

Proposed NAICS codes for target sectors and niches

Advanced Manufacturing

Niche	NAICS	NAICS Description
Advanced Materials	3251	Basic Chemical Manufacturing
Advanced Materials	3252	Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing
Advanced Materials	3253	Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing
Advanced Materials	3255	Paint, Coating, and Adhesive Manufacturing
Advanced Materials	3256	Soap, Cleaning Compound, and Toilet Preparation Manufacturing
Advanced Materials	3259	Other Chemical Product and Preparation Manufacturing
Food and Beverage	1110	Crop Production
Food and Beverage	3118	Bakeries and Tortilla Manufacturing
Food and Beverage	3119	Other Food Manufacturing
Food and Beverage	3112	Grain and Oilseed Milling
Food and Beverage	3117	Seafood Product Preparation and Packaging
Food and Beverage	3116	Animal Slaughtering and Processing
Food and Beverage	3113	Sugar and Confectionery Product Manufacturing
Food and Beverage	3111	Animal Food Manufacturing
Food and Beverage	3114	Fruit and Vegetable Preserving and Specialty Food Manufacturing
Food and Beverage	3115	Dairy Product Manufacturing
Food and Beverage	3121	Beverage Manufacturing
Food and Beverage	333241	Food Product Machinery Manufacturing
Packaging	3221	Pulp, Paper, and Paperboard Mills
Packaging	3222	Converted Paper Product Manufacturing
Packaging	326112	Plastics Packaging Film and Sheet (including Laminated) Manufacturing
Packaging	333993	Packaging Machinery Manufacturing
Packaging	333921	Elevator and Moving Stairway Manufacturing
Packaging	333922	Conveyor and Conveying Equipment Manufacturing
Packaging	333923	Overhead Traveling Crane, Hoist, and Monorail System Manufacturing
Packaging	333924	Industrial Truck, Tractor, Trailer, and Stacker Machinery Manufacturing

Corporate Services

Niche	NAICS	NAICS Description
Headquarters and Regional Offices	5511	Management of Companies and Enterprises
Finance and Insurance	5211	Monetary Authorities-Central Bank
Finance and Insurance	5221	Depository Credit Intermediation
Finance and Insurance	5222	Nondepository Credit Intermediation
Finance and Insurance	5223	Activities Related to Credit Intermediation
Finance and Insurance	5231	Securities and Commodity Contracts Intermediation and Brokerage
Finance and Insurance	5232	Securities and Commodity Exchanges
Finance and Insurance	5239	Other Financial Investment Activities
Finance and Insurance	5241	Insurance Carriers
Finance and Insurance	5242	Agencies, Brokerages, and Other Insurance Related Activities
Finance and Insurance	5251	Insurance and Employee Benefit Funds
Finance and Insurance	5259	Other Investment Pools and Funds

Proposed NAICS codes for target sectors and niches, continued

Information Technology

Niche	NAICS	NAICS Description
Cybersecurity and Data Privacy	5415	Computer Systems Design and Related Services
Data Centers and Cloud Computing	5182	Data Processing, Hosting, and Related Services
Software Development	5132	Software Publishers

Life Sciences

Niche	NAICS	NAICS Description
Pharmaceuticals	3254	Pharmaceutical and Medicine Mfg.
R&D and Laboratory Testing	541713	Research and Development in Nanotechnology
R&D and Laboratory Testing	541714	Research and Development in Biotechnology (except Nanobiotechnology)
R&D and Laboratory Testing	541715	Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology)
R&D and Laboratory Testing	621511	Medical Laboratories

Transportation & Logistics

Niche	NAICS	NAICS Description
Logistics	4921	Couriers and Express Delivery Services
Logistics	4922	Local Messengers and Local Delivery
Logistics	4931	Warehousing and Storage
Transportation	4821	Rail Transportation
Transportation	483111	Deep Sea Freight Transportation
Transportation	483211	Inland Water Freight Transportation
Transportation	4841	General Freight Trucking
Transportation	4842	Specialized Freight Trucking
Transportation	488510	Freight Transportation Arrangement
Transportation	541614	Process, Physical Distribution, and Logistics Consulting Services

Emerging niche industries*

Niche	NAICS	NAICS Description
Cleantech	335910	Battery Manufacturing
Cleantech	334413	Semiconductor and Related Device Manufacturing
Cleantech	335312	Motor and Generator Manufacturing
Cleantech	335991	Carbon and Graphite Product Manufacturing
Defense	3364	Aerospace Product and Parts Manufacturing
Defense	334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing
Defense	325920	Explosives Manufacturing
Defense	332992	Small Arms Ammunition Manufacturing
Defense	332993	Ammunition (except Small Arms) Manufacturing
Defense	336992	Military Armored Vehicle, Tank, and Tank Component Manufacturing
Defense	332994	Small Arms, Ordnance, and Ordnance Accessories Manufacturing
Defense	901200	Federal Government, Military

**The emerging niche industries do not neatly align to NAICS industries. For Cleantech, the listed NAICS codes above capture some of the primary industries within Cleantech, but not all Cleantech companies will be captured by them. In instances where industries do not align well with NAICS codes, alternative data sources can be helpful to complement traditional data sources. For the economic development pipeline and announcements, determining whether a project fits into one of the emerging niche industries will require some judgement, as their NAICS code alone will not provide enough information.

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Appendix B: Additional insights and data

Regional asset mapping

Identifying assets that enable industries to thrive in Greater Richmond

Greater Richmond offers a spectrum of assets that helps position the region as an attractive place for businesses. Assets in this context are defined as organizations, programs, policies, properties (commercial and industrial) and infrastructure that contribute to regional competitiveness. The following pages provide a non-exhaustive sample of key assets organized within four of the region's prominent industry areas that they support: Advanced Manufacturing, Corporate, Technology and Life Sciences. By visualizing the region's assets, a clearer picture emerges around tangible strengths that serve as enablers for the region's diverse and growing economy.

For the purposes of this report, assets fall into the following categories:



Education and workforce development

These assets encompass the community college, career and technical college, college, university and other means of skills production that provide an adequate talent base to meet corporate demand.



Research and development

R&D assets are the research centers, research parks and makerspaces that allow for the creation and refinement of new ideas and methods for downstream commercial applicability.



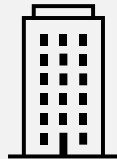
Entrepreneurial support

These include programs, organized capital and expertise to help entrepreneurs in a variety of sectors thrive in the region.



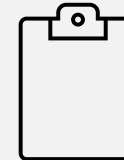
Sites and infrastructure

These assets are the available land, buildings and utility infrastructure that enable businesses to relocate or spin up operations in the region.



Established (legacy) firms

Established firms are key assets because of the talent base they develop, the suppliers and vendors they attract, and the policy and regulatory environment they nurture to pave the way for success.



Trade associations and policies

These include industry- and company-specific incentives and industry associations, as well as legislation and policies that help businesses to thrive.

Advanced manufacturing

**Non-exhaustive*

Education and workforce development	▶ Brightpoint Community College ▶ Community College Workforce Alliance ▶ Commonwealth Center for Advanced Manufacturing (CCAM)	▶ The Manufacturing Skills Institute ▶ VCU Materials & Manufacturing Research Center ▶ VCU School of Engineering	▶ WorkforceCoalitionRVA
Research and development	▶ HackRVA Makerspace ▶ Build RVA ▶ Maker Garage at VCU	▶ Commonwealth Center for Advanced Logistics Systems	
Entrepreneurial support	▶ Activation Capital ▶ Commonwealth Commercialization Fund ▶ Lighthouse Labs		
Sites and infrastructure	▶ Richmond Marine Terminal ▶ Northlake II ▶ White Oak Technology Park	▶ Holland Technology Park ▶ Meadowville Technology Park ▶ Upper Magnolia	
Established (legacy) firms	▶ Afton Chemical ▶ Alfa Laval ▶ Altria ▶ DuPont	▶ GE Power ▶ Honeywell ▶ Reynolds Consumer Products ▶ Spec Ops	▶ Stone Brewing Company ▶ TemperPack ▶ Ukrop's Homestyle Foods ▶ WestRock
Trade associations, policies, and other resources	▶ Industrial development bond program ▶ Green Job Tax Credit ▶ Go Virginia - GROW Capital Jobs Foundation	▶ R&D and Major R&D Tax Credits ▶ Richmond Technology Council ▶ Technology Zone Incentive Program	▶ VEDP Incentive Grant ▶ Virginia Innovation Partnership Corp.

Corporate services

**Non-exhaustive*

Education and workforce development	▶ VCU School of Business ▶ Robins School of Business at the University of Richmond ▶ Sydney Lewis School of Business at VUU		
Entrepreneurial support	▶ Activation Capital ▶ Commonwealth Commercialization Fund ▶ Lighthouse Labs		
Sites and infrastructure	▶ Bio+Tech Park ▶ Riverfront Plaza ▶ Richmond Times-Dispatch Building ▶ Innsbrook		
Established (legacy) firms	▶ Altria Group ▶ ASGN ▶ ARKO ▶ Brink's	▶ Capital One ▶ CarMax ▶ Dominion Energy ▶ Genworth Financial	▶ Markel Group ▶ NewMarket ▶ Owens & Minor ▶ Performance Food Group
Trade associations and policies	▶ Virginia Talent Accelerator Program ▶ Major Business Facility Job Credit ▶ Major Eligible Employer Grant ▶ Commonwealth Economic Development Opportunity Fund		

Information technology

**Non-exhaustive*

Education and workforce development	▶ Brightpoint College and the Technology Pathways Initiative ▶ CodeVA & CodeRVA ▶ VCU da Vinci Innovation Center ▶ VCU Cybersecurity Center
Research and development	▶ Dominion Energy Innovation Center ▶ Commonwealth Center for Advanced Computing ▶ Virginia Innovators Network
Entrepreneurial support	▶ Activation Capital ▶ Lighthouse Labs ▶ Startup Virginia ▶ 1717 Innovation Center
Sites and infrastructure	▶ Dominion Energy ▶ White Oak Technology Park ▶ Richmond Network Access Point ▶ Richmond DE-CIX Internet Exchange ▶ Upper Magnolia ▶ Meadowville Technology Park
Established (legacy) firms	▶ Allianz ▶ ASGN ▶ Capital One ▶ CoStar Group ▶ EAB ▶ SimpliSafe ▶ T-Mobile ▶ Truist ▶ Unboxed ▶ Verizon ▶ Workpath
Trade associations, policies, and other resources	▶ Chesterfield Data Center Tax Reduction ▶ Go Virginia - GROW Capital Jobs Foundation ▶ Henrico Data Center Tax Reduction ▶ RVATech ▶ Virginia Cybersecurity Partnership ▶ Technology Zone Incentive Program ▶ Virginia Blockchain Council

Life sciences

**Non-exhaustive*

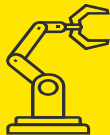
Education and workforce development	▶ Community College Workforce Alliance ▶ University of Richmond ▶ The Manufacturing Skills Institute	▶ VCU Medicines for All Institute (Virginia Research Triangle) ▶ VCU Pharma, Engineering & Sciences Center	▶ WorkforceCoalitionRVA
Research and development	▶ Commonwealth Biotechnologies ▶ Medicines for All Institute ▶ PPD Laboratories	▶ VA Bioscience Health Research Corp. ▶ VA Innovation Partnership Authority ▶ VCU Innovation Gateway	
Entrepreneurial support	▶ Activation Capital ▶ Alliance for Building Better Medicine ▶ Commonwealth commercialization fund ▶ Lighthouse Labs	▶ R&D and Major R&D Tax Credits ▶ Richmond Technology Council ▶ VCU Bio+Tech Center ▶ Virginia Innovation Partnership Corp.	
Sites and infrastructure	▶ Bio+Tech Park		
Established (legacy) firms	▶ Grenova ▶ Haleon ▶ Kaleo ▶ McKesson	▶ Owens & Minor ▶ Phlow Corporation ▶ Thermo Fisher Scientific ▶ United States Pharmacopeia	
Trade associations and policies	▶ BioHealth Capital Region ▶ Commonwealth commercialization fund ▶ Go Virginia - GROW Capital Jobs Foundation	▶ Healthcare Compliance Packaging Council ▶ OWIT ▶ R&D and Major R&D Tax Credits	▶ Virginia Bio ▶ Virginia Manufacturers Association ▶ Virginia Innovation Partnership Corp.

A photograph of three people in a professional setting. Two women and one man are gathered around a table, looking at documents and a laptop. The woman on the left has dark curly hair and is wearing a grey sweater. The woman in the middle has curly hair and is wearing a dark blazer. The man on the right has grey hair and is wearing a light pink shirt. They are in a room with bookshelves and large windows in the background. A semi-transparent dark grey bar is overlaid across the middle of the image, containing the text 'Target industry profiles'.

Target industry profiles

Target industry analysis - *Advanced Manufacturing*

Advanced Manufacturing



- ▶ Advanced Materials
- ▶ Food and Beverage
- ▶ Packaging

Advanced Manufacturing: A plurality of projects in the GRP pipeline have been in Advanced Manufacturing since at least 2013, and the region has seen marquee announcements over the past few years. Given the region’s transportation assets, existing workforce and success attracting investment and jobs to the region, Advanced Manufacturing has continued potential for Greater Richmond.

Manufacturing employs over 30,000 in the Richmond MSA and has wages above the regional average. In addition, manufacturing projects tend to include more capital investment which supports the regional tax base. Employment growth is projected to be about 5% over the next five years nationally, which is faster than the 2% seen over the past five years. Regionally, employment is projected to grow by 6%, with all niches projected to grow at least as fast as the overall economy. With about 80% of jobs not typically requiring a bachelor’s degree, the industry also provides opportunities for residents with varying levels of educational attainment.

Industry	2023 jobs	2018-2023 change	2018-2023 % change	2023 wages	2023 employment concentration (US=1.00)	2023-2028 projected growth rate (Richmond)	2023-2028 projected growth rate (US)
All manufacturing	31,865	300	1%	\$78,478	.6	6%	5%
Advanced Materials	4,885	225	5%	\$105,418	2.1	6%	5%
Food and Beverage	5,513	326	6%	\$53,673	.5	10%	8%
Packaging	3,749	27	1%	\$82,911	1.7	5%	2%
Richmond - all jobs	682,605	9,276	1%	\$66,866	-	5%	-

Source: Lightcast, 2024.2; QCEW employees, non-QCEW employees.

Target industry analysis - *Advanced Manufacturing*

Target industry niches

Advanced Materials includes the manufacturer of artificial and synthetic fibers, plastic materials and resin manufacturing, and other basic chemical manufacturing. It employs nearly 5K in the Greater Richmond region, and it is twice as concentrated in the region as the national average. It pays relatively high wages and is expected to grow by about 6% over the next five years.

Food and Beverage includes food and beverage processing, food product machinery, and controlled environment agriculture. Food and beverage manufacturing is projected to grow 10% over the next five years, significantly higher than the industry and economy average. There has been announcements in the industry representing a diverse group of food and beverage products.

Packaging includes different materials and processes necessary for packaging including paper board manufacturing, corrugated box manufacturing, plastic film manufacturing, material handling equipment manufacturing and packaging machinery manufacturing. The Greater Richmond region has a concentration of employment in the sector and has a fast-growing logistics industry driven by transportation assets and proximity to major markets. This allows the region to be well-positioned to attract further investment to support the industry.

Estimated share of jobs not requiring a four-year college degree:

In manufacturing, about 80% of the jobs do not typically require a bachelor's degree or higher.

Industry and educational assets

- ▶ **VCU School of Engineering**
 - ▶ 275+ annual graduates
 - ▶ Mechanical, chemical, biomedical, electrical and computer programs
- ▶ **The Manufacturing Skills Institute**
 - ▶ Apprenticeships, online training and certificates
- ▶ **Community College Workforce Alliance**
 - ▶ Multiple certifications for manufacturing industry
- ▶ **Commonwealth Center for Advanced Manufacturing**
 - ▶ Partnership between academia, industry and government to support industry

Specific products or services to target:

- ▶ *Material handling equipment and packaging machinery*: Greater Richmond could be in a strategic position to supply the fast-growing logistics industry due to transportation assets, concentrated employment and proximity to major markets.
- ▶ *Controlled environment agriculture*: given recent success and alignment with state priorities, this may be an opportunity for Greater Richmond.

Opportunities to strengthen:

- ▶ Growing engineering talent base: The region has seen a decline in industrial and mechanical engineers, two important occupations for manufacturing.
- ▶ Stakeholders suggested there may be opportunities to strengthen CTE programs and for more connectivity and alignment among workforce development organizations.

Source: Lightcast, 2024.2; QCEW employees, non-QCEW employees.

Target industry analysis - *Advanced Manufacturing*

Packaging occupations

SOC	Description	Jobs	2018 - 2023 % change	Employment concentration	Median annual earnings
49-9041	Industrial Machinery Mechanics	1,830	(12%)	1.02	\$59,963
51-1011	First-Line Supervisors of Production and Operating Workers	2,255	2%	0.78	\$66,231
51-2098	Miscellaneous Assemblers and Fabricators	2,553	(1%)	0.40	\$36,676
51-5112	Printing Press Operators	495	(48%)	0.76	\$37,825
51-9032	Cutting and Slicing Machine Setters, Operators, and Tenders	330	6%	1.44	\$46,192
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	1,508	26%	0.59	\$46,264
51-9196	Paper Goods Machine Setters, Operators, and Tenders	944	(34%)	2.30	\$46,966
51-9198	Helpers--Production Workers	468	(70%)	0.60	\$35,429
53-7051	Industrial Truck and Tractor Operators	6,008	79%	1.82	\$48,709
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	11,151	(5%)	0.87	\$41,613

Advanced Materials occupations

SOC	Description	Jobs	2018 - 2023 % change	Employment concentration	Median annual earnings
11-1021	General and Operations Managers	14,515	73%	0.95	\$105,148
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	5,405	(11%)	0.95	\$62,690
49-9041	Industrial Machinery Mechanics	1,830	(12%)	1.02	\$59,963
51-1011	First-Line Supervisors of Production and Operating Workers	2,255	2%	0.78	\$66,231
51-8091	Chemical Plant and System Operators	236	290%	2.89	\$34,731
51-9011	Chemical Equipment Operators and Tenders	470	24%	0.92	\$49,275
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders	525	39%	1.17	\$46,846
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	1,508	26%	0.59	\$46,264
51-9111	Packaging and Filling Machine Operators and Tenders	1,296	(34%)	0.82	\$38,651
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	11,151	(5%)	0.87	\$41,613

Source: Lightcast, 2024.2; QCEW employees, non-QCEW employees, self-employed.

Target industry analysis - *Advanced Manufacturing*

Food and Beverage occupations

SOC	Description	Jobs	2018 - 2023 % change	Employment concentration	Median annual earnings
11-9013	Farmers, Ranchers, and Other Agricultural Managers	1,025	12%	0.43	\$27,832
45-2092	Farmworkers and Laborers, Crop, Nursery, and Greenhouse	779	17%	0.30	\$30,052
51-1011	First-Line Supervisors of Production and Operating Workers	2,255	2%	0.78	\$66,231
51-3011	Bakers	827	129%	0.82	\$29,832
51-3022	Meat, Poultry, and Fish Cutters and Trimmers	230	1%	0.38	\$36,165
51-3023	Slaughterers and Meat Packers	77	(63%)	0.25	\$44,934
51-3092	Food Batchmakers	435	27%	0.59	\$38,509
51-9111	Packaging and Filling Machine Operators and Tenders	1,296	(34%)	0.82	\$38,651
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	11,151	(5%)	0.87	\$41,613
53-7064	Packers and Packagers, Hand	1,600	5%	0.57	\$31,795

Source: Lightcast, 2024.2; QCEW employees, non-QCEW employees, self-employed.

Target industry analysis - *Life Sciences*

Life Sciences



- ▶ Pharmaceuticals
- ▶ R&D and Laboratory Testing

Life Sciences: The region has received two competitive federal grants totaling over \$50M to grow this cluster around pharmaceuticals and R&D and was designated a tech hub in advanced pharmaceutical manufacturing. This success reflects an opportunity in the market and cooperation among industry assets like the Alliance for a Better Medicine, the Commonwealth Center for Advanced Manufacturing, Virginia Biotechnology Research Partnership Authority, and The Medicines for All Institute at VCU.

The region has also had success in attracting investment and jobs to the region. GRP has an important complementary role in building the Life Sciences cluster by attracting new businesses to the region while other industry assets help with workforce development, research and development, and innovation. The industry has some sectors that have lost employment over recent years, including some R&D sectors and pharmaceuticals manufacturing. However, given the regional assets in the region and the strong story to tell about the industry, there is opportunity to reverse those trends.

Industry	2023 jobs	2018-2023 change	2018-2023 % change	2023 wages	2023 employment concentration (US=1.00)	2023-2028 projected growth rate (Richmond)	2023-2028 projected growth rate (US)
Life Sciences	4,970	164	3%	\$102,227	0.81	9%	11%
Pharmaceuticals	652	(79)	(11%)	\$115,233	0.44	9%	9%
R&D and Laboratory Testing	4,318	243	6%	\$100,262	0.93	9%	12%
Richmond - all jobs	682,605	9,276	1%	\$66,866	-	5%	-

Source: Lightcast, 2024.3; QCEW employees, non-QCEW employees. 2024.2 used for all jobs.

Target industry analysis - *Life Sciences*

Target industry niches

Pharmaceuticals: This sector primarily includes pharmaceutical manufacturing along with the upstream medicinal and botanical manufacturing that manufactures or processes uncompounded chemicals and botanicals. Recruiting pharmaceutical manufacturing to the region is an opportunity as the greater life sciences cluster, including in innovation, research and development, and talent development continues to strengthen. Complementary work at The Medicines for All Institute, which is driving efficiency in pharmaceutical manufacturing, will be part of a compelling story to share with prospective companies. Looking forward, employment in the sector is expected to grow by 9% over the next five years nationally, much higher than the 6% projected for total employment, and the Greater Richmond region is in a strong position to participate in that growth.

R&D and Laboratory Testing: This sector includes research and development in physical, engineering and life sciences; nanotechnology; and biotechnology along with medical laboratories. The region has seen investment recently in this sector. Research and development in nanotechnology and medical laboratories have seen the most growth and are most concentrated in the region.

The recent Build Back Better Grant award will help fund efforts to spur research and development in the Life Sciences, including the construction of a Development/Scale Up Center to catalyze innovation and commercialization.

Estimated share of jobs not requiring a four-year college degree:

In life sciences, about 33% of the jobs do not typically require a bachelor's degree or higher.

Industry and educational assets

- ▶ **Community College Workforce Alliance**
 - ▶ Multiple certifications for manufacturing industry
- ▶ **VCU Pharmaceutical Engineering & Sciences Center**
 - ▶ Partnership between VCU School of Pharmacy and School of Engineering
- ▶ **The Manufacturing Skills Institute**
 - ▶ Apprenticeships, online training and certificates

Specific products or services to target:

- ▶ *Small molecule active ingredient pharmaceutical manufacturers:* This is a specialty of the Medicines for All Institute, which received a GO Virginia grant to build the cluster. There is opportunity to collaborate, travel to prospects together and help recruit companies in this segment of pharmaceuticals.

Opportunities to strengthen:

- ▶ *Concentration of employers:* While there are several key pieces of a cluster present in Richmond currently, there is not a concentration of employers and talent in pharmaceutical manufacturing or in parts of the research and development ecosystem. GRP could help strengthen the overall ecosystem through a focused business recruitment effort in partnership with some of the industry assets in the region and state.
- ▶ *Infrastructure:* The region lacks adequate wet lab space to nurture early-stage life sciences company growth. Bio+Tech Park is currently the only provider of this space, and it is limited in availability.

Target industry analysis - Life Sciences

Pharmaceuticals

SOC	Description	Jobs	2018 - 2023 % change	Employment concentration	Median annual earnings
11-1021	General and Operations Managers	14,515	73%	0.95	\$105,148
11-3051	Industrial Production Managers	550	10%	0.57	\$120,714
17-2112	Industrial Engineers	694	(21%)	0.49	\$99,325
19-2031	Chemists	286	(32%)	0.79	\$80,311
19-4021	Biological Technicians	374	1%	1.06	\$50,723
51-1011	First-Line Supervisors of Production and Operating Workers	2,255	2%	0.78	\$66,231
51-9011	Chemical Equipment Operators and Tenders	470	24%	0.92	\$49,275
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	1,508	26%	0.59	\$46,264
51-9111	Packaging and Filling Machine Operators and Tenders	1,296	(34%)	0.82	\$38,651
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	11,151	(5%)	0.87	\$41,613

Source: Lightcast, 2024.2; QCEW employees, non-QCEW employees, self-employed.

R&D and Laboratory Testing

SOC	Description	Jobs	2018 - 2023 % change	Employment concentration	Median annual earnings
11-1021	General and Operations Managers	14,547	73%	0.94	\$105,154
11-9121	Natural Sciences Managers	269	57%	0.63	\$140,632
13-1082	Project Management Specialists	4,980	109%	1.20	\$96,218
15-1252	Software Developers	7,777	49%	1.09	\$128,674
17-2141	Mechanical Engineers	576	(33%)	0.47	\$93,909
19-1021	Biochemists and Biophysicists	126	24%	0.85	\$136,539
19-1042	Medical Scientists, Except Epidemiologists	371	37%	0.60	\$103,849
19-4021	Biological Technicians	375	1%	1.06	\$50,656
29-2018	Clinical Laboratory Technologists and Technicians	2,431	21%	1.66	\$62,187
31-9097	Phlebotomists	606	(9%)	1.03	\$44,633

Source: Lightcast, 2024.3; QCEW employees, non-QCEW employees, self-employed.

Target industry analysis - *Information Technology*

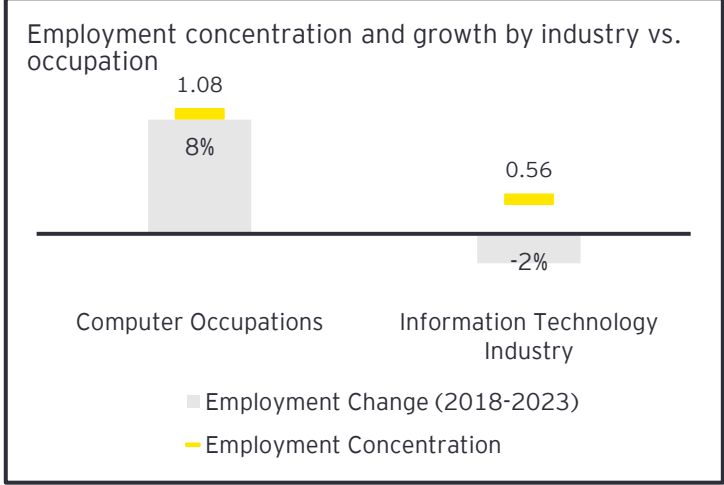
Information Technology



- ▶ Data Centers and Cloud Computing
- ▶ Cybersecurity and Data Privacy
- ▶ Software Development

Information Technology: While Information Technology is not currently highly concentrated in the region, there are bright spots in projects like data centers and a high concentration of key skill sets like cybersecurity. The relatively small tech sector is in contrast to a growing tech talent base which is employed across sectors. Helping bolster the tech industry locally is an important part of developing an economy built for the future.

The industry is projected to grow almost 3X the overall rate over the next five years nationally, suggesting opportunity to attract investment and employment in the near-term and bolster the tech sector.



Industry	2023 jobs	2018-2023 change	2018-2023 % change	2023 wages	2023 employment concentration (US=1.00)	2023-2028 projected growth rate (Richmond)	2023-2028 projected growth rate (US)
Information Technology	8,602	(218)	(2%)	\$120,281	0.56	5%	17%
Data centers and Cloud Computing	726	262	56%	\$115,507	0.35	4%	17%
Cybersecurity and Data Privacy	7,412	(648)	(8%)	\$118,587	0.7	4%	16%
Software Development	464	167	56%	\$154,776	0.17	26%	19%
Richmond - all jobs	682,605	9,276	1%	\$66,866	-	5%	-

Source: Lightcast, 2024.2; QCEW employees, non-QCEW employees.

Target industry analysis - *Information Technology*

Target industry niches

Data Centers and Cloud Computing: This sector includes data centers that have been a part of the strategy for communities in Virginia for several years, including in the Greater Richmond region. Most of the communities have specific data center incentives as well as sites and infrastructure to support them. There are many data centers that have located in the region, and firms that are comfortable doing business in Virginia but face challenges from over-saturation in Northern Virginia may be a strong target for business recruitment.

Cybersecurity and Data Privacy: Richmond has an estimated 7,200 cybersecurity workers, which is third per capita among benchmark communities. Richmond also had a high rate of “data privacy” job postings over the past year, demonstrating a high demand for that skill set in the region. While neighboring communities Hampton Roads and Washington, DC, have a higher concentration of workers due to their proximity to the federal government and military bases, Richmond provides an affordable alternative that is growing and has twice the concentration of information security analysts as the national average.

Software Development: While not a current strength of the region, there is a much higher concentration of software developers than software development companies. There is an opportunity to grow this very small current cluster in an industry that is expected to grow three times the economy average over the next five years nationwide. Continuing to build the tech talent pipeline through talent attraction and regional higher education programs will be important to growing this sector.

Estimated share of jobs not requiring a four-year college degree: In information technology, about 23% of the jobs do not typically require a bachelor’s degree or higher.

Industry and educational assets

- VCU College of Engineering - Computer Science
- VCU Cybersecurity Center
 - Center of excellence in cybersecurity research offering bachelor’s through doctoral degrees in cybersecurity and computer science
- VCU da Vinci Innovation Center
 - Open to all VCU undergrads, offers certifications in design thinking, innovation and intrapreneurship
- CodeVA & CodeRVA
 - High school offering blended learning and applied computer science education offering project-based learning

Specific products or services to target:

- *Data centers:* A continued focus on targeting data center operations could provide opportunity to increase tax revenues for local communities and would align with considerable local and state efforts to attract data centers through policy and planning.
- *Cybersecurity firms:* Given the concentration of cybersecurity workers in Richmond and the importance of the sector as the world becomes more connected, there is opportunity to target this sector moving forward.

Opportunities to strengthen:

- *Software developers:* Software developers are the most common occupation in all three sectors within information technology. While growth in this occupation has been faster in Richmond than the US overall, continuing to strengthen this skill set will improve competitiveness in this industry and economy-wide.

Source: Lightcast, 2024.2; QCEW employees, non-QCEW employees. Cyberseek, “Supply and Demand Heat Map”.

Target industry analysis - *Information Technology*

Data Center and Cloud Computing occupations

SOC	Description	Jobs	2018 - 2023 % change	Employment concentration	Median annual earnings
11-1021	General and Operations Managers	14,515	73%	0.95	\$105,148
11-3021	Computer and Information Systems Managers	2,086	38%	0.81	\$171,536
13-1082	Project Management Specialists	4,973	108%	1.20	\$96,179
13-1161	Market Research Analysts and Marketing Specialists	4,067	12%	1.07	\$72,833
15-1211	Computer Systems Analysts	3,216	(11%)	1.47	\$103,867
15-1232	Computer User Support Specialists	2,813	7%	0.92	\$58,412
15-1252	Software Developers	7,810	50%	1.09	\$128,717
15-1299	Computer Occupations, All Other	1,355	1%	0.65	\$97,390
41-3091	Sales Representatives of Services, Except Advertising, Insurance, Financial Services, and Travel	5,409	9%	1.08	\$59,559
43-4051	Customer Service Representatives	15,484	10%	1.25	\$38,201

Software Development occupations

SOC	Description	Jobs	2018 - 2023 % change	Employment concentration	Median annual earnings
11-1021	General and Operations Managers	14,515	73%	0.95	\$105,148
11-3021	Computer and Information Systems Managers	2,086	38%	0.81	\$171,536
13-1082	Project Management Specialists	4,973	108%	1.20	\$96,179
13-1161	Market Research Analysts and Marketing Specialists	4,067	12%	1.07	\$72,833
15-1232	Computer User Support Specialists	2,813	7%	0.92	\$58,412
15-1252	Software Developers	7,810	50%	1.09	\$128,717
15-1253	Software Quality Assurance Analysts and Testers	754	20%	0.88	\$105,464
41-3091	Sales Representatives of Services, Except Advertising, Insurance, Financial Services, and Travel	5,409	9%	1.08	\$59,559
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	623	(45%)	0.46	\$100,828
43-4051	Customer Service Representatives	15,484	10%	1.25	\$38,201

Source: Lightcast, 2024.2; QCEW employees, non-QCEW employees, self-employed.

Target industry analysis - *Information Technology*

Cybersecurity occupations

SOC	Description	Jobs	2018 - 2023 % change	Employment concentration	Median annual earnings
13-2011	Accountants and Auditors	8,080	(0%)	1.21	\$78,808
15-1212	Information Security Analysts	1,557	72%	1.99	\$108,725
15-1232	Computer User Support Specialists	2,813	7%	0.92	\$58,412
15-1241	Computer Network Architects	868	(13%)	1.16	\$121,411
15-1242	Database Administrators	589	10%	1.80	\$93,270
15-1243	Database Architects	335	(11%)	1.32	\$122,130
15-1244	Network and Computer Systems Administrators	1,714	(19%)	1.21	\$95,432
15-1252	Software Developers	7,810	50%	1.09	\$128,717
15-1299	Computer Occupations, All Other	1,355	1%	0.65	\$97,390
15-2051	Data Scientists	734	78%	0.88	\$116,227

Source: Lightcast, 2024.2; QCEW employees, non-QCEW employees, self-employed. Occupations selected by looking at job postings with Lightcast's Cybersecurity and Data Privacy industries.

Target industry analysis - Corporate Services

Corporate Services



- ▶ Headquarters
- ▶ Regional Operations
- ▶ Finance and Insurance

Corporate Services: Corporate Services is one of the strongest in the region's current target sectors. There are notable companies headquartered in the region and there is a strong talent base, with a high share of the region's population having a bachelor's degree or higher. With 12 Fortune 1000 headquarters, Greater Richmond has the most Fortune 1000 per capita among the benchmark communities. Employment within both niches is highly concentrated in the Greater Richmond region and the industry tends to have higher wages.

Looking forward, it is projected that employment nationally in these types of establishments will grow by 7% over the next five years, surpassing the economic average. While the number of corporate services projects in the pipeline has been in decline in recent years, and projected employment is relatively slow regionally, the region remains competitive for these types of projects given the concentration of talent and business climate.

Industry	2023 jobs	2018-2023 change	2018-2023 % change	2023 wages	2023 employment concentration (US=1.00)	2023-2028 projected growth rate (Richmond)	2023-2028 projected growth rate (US)
Corporate Services	60,943	-390	-1%	\$134,500	1.54	3%	7%
Headquarters and Regional Operations	21,927	138	1%	\$137,152	2.02	0%	10%
Finance and Insurance	39,016	-528	-1%	\$133,009	1.36	5%	6%
Richmond - all jobs	682,605	9,276	1%	\$66,866	-	5%	-

Source: Lightcast, 2024.2; QCEW employees, non-QCEW employees.

Target industry analysis - Corporate Services

Target industry niches

Headquarters and Regional Offices: Some data from CBRE suggests that the number of corporate headquarters relocations surged in 2021 but has regressed in more recent years. 2023 saw a particularly small number of relocations likely due in part to higher interest rates putting downward pressure on business investment.

While uncertainty remains in the short term about the appetite in the market to relocate or expand corporate services, Richmond remains a competitive location. Employment has remained largely flat over the past five years, but the talent base and business climate suggest the region is competitive for investment.

Finance and Insurance: This niche industry is at the intersection of finance and insurance. The niche includes large, well-known firms along with innovative startups. Given the high concentration of finance and insurance talent in the Greater Richmond region along with the presence of important tech skill sets which are increasingly important in the niche, there appears to be opportunity to grow the cluster through targeted business recruitment efforts.

Estimated share of jobs not requiring a four-year college degree: In corporate services, about 46% of the jobs typically do not require a bachelor's degree or higher.

Industry and educational assets

- ▶ **VCU School of Business**
 - ▶ Offers both undergraduate and graduate degrees across accounting, finance, marketing and supply chain
- ▶ **Robins School of Business at the University of Richmond**
 - ▶ Liberal arts school offering undergraduate and graduate degrees; named among the "Top 25 Best Colleges for Accounting" by GradReports
- ▶ **Sydney Lewis School of Business at Virginia Union University**
 - ▶ HBCU offering undergraduate and graduate degrees in business

Opportunities to strengthen:

Specific products or services to target:

- ▶ *Smaller, function-specific projects:* Many firms have downsized their office space in the midst of hybrid and remote-work models, strategically choosing what needs to be done in person. Rather than a large headquarters relocation, there may be more opportunities for smaller headquarters in an industry that is strong in Richmond like financial services, or a regional headquarters where a company is looking for a presence on the East Coast.

Opportunities to strengthen:

- ▶ *Airport connectivity:* Building upon recent success, greater connectivity at the airport could be helpful for companies considering relocating their corporate headquarters or expanding into the market with a regional office. Remaining connected to various business units and clients can be a priority for many large companies.

Target industry analysis - Corporate Services

Headquarters and Regional Operations occupations

SOC	Description	Jobs	2018 - 2023 % change	Employment concentration	Median annual earnings
11-1021	General and Operations Managers	14,515	73%	0.95	\$105,148
11-3031	Financial Managers	3,334	20%	0.95	\$160,198
13-1071	Human Resources Specialists	5,124	28%	1.25	\$71,348
13-1161	Market Research Analysts and Marketing Specialists	4,067	12%	1.07	\$72,833
13-1199	Business Operations Specialists, All Other	5,822	118%	1.17	\$77,975
13-2011	Accountants and Auditors	8,080	(0%)	1.21	\$78,808
15-1252	Software Developers	7,810	50%	1.09	\$128,717
43-1011	First-Line Supervisors of Office and Administrative Support Workers	7,809	(1%)	1.19	\$62,259
43-3031	Bookkeeping, Accounting, and Auditing Clerks	7,935	(11%)	1.14	\$46,803
43-4051	Customer Service Representatives	15,484	10%	1.25	\$38,201

Source: Lightcast, 2024.2; QCEW employees, non-QCEW employees, self-employed.

Finance and Insurance occupations

SOC	Description	Jobs	2018 - 2023 % change	Employment concentration	Median annual earnings
11-1021	General and Operations Managers	14,515	73%	0.95	\$105,148
11-3031	Financial Managers	3,334	20%	0.95	\$160,198
13-2051	Financial and Investment Analysts	1,412	16%	0.97	\$102,812
13-2072	Loan Officers	1,815	(6%)	1.31	\$72,830
15-1211	Computer Systems Analysts	3,216	(11%)	1.47	\$103,867
15-1244	Network and Computer Systems Administrators	1,714	(19%)	1.21	\$95,432
15-1252	Software Developers	7,810	50%	1.09	\$128,717
15-2051	Data Scientists	734	78%	0.88	\$116,227
41-3031	Securities, Commodities, and Financial Services Sales Agents	3,167	45%	1.46	\$81,987
43-9041	Insurance Claims and Policy Processing Clerks	2,043	(6%)	1.85	\$41,306

*Selected occupations expected to be the most relevant, including technology roles.

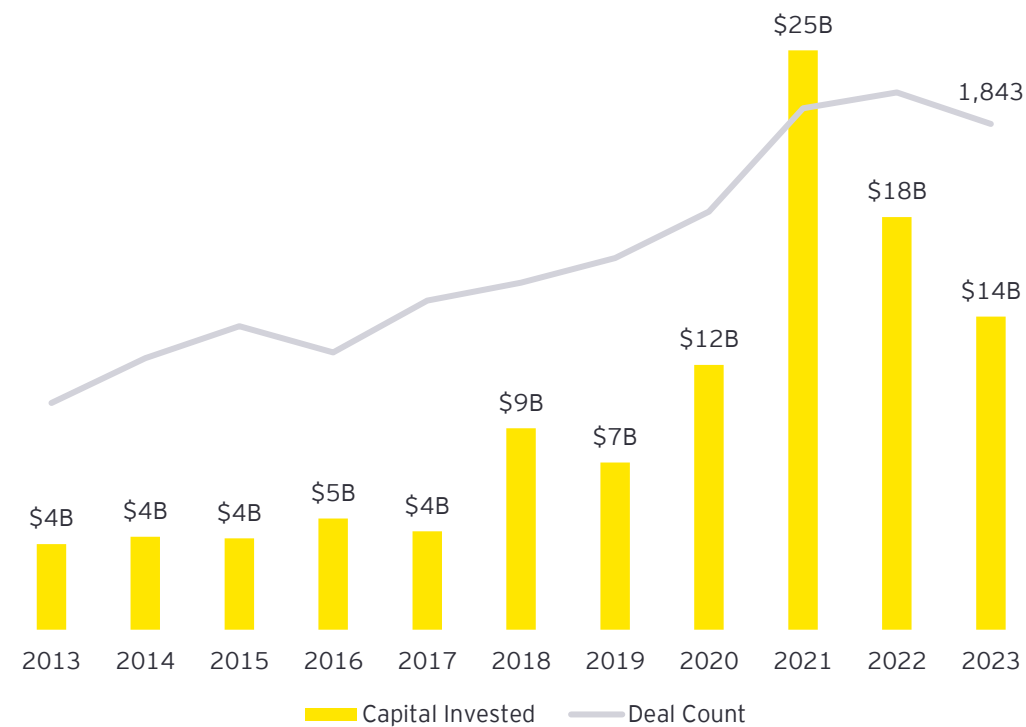
Target industry analysis - *Emerging technology niche industries*

Emerging technology niche industries

Defense: Greater Richmond is strategically located between Hampton Roads and Washington DC, two strongholds for the defense industry. There is direct connectivity to Hampton Roads via I-64 and the Richmond Marine Terminal as well as connectivity to Washington DC via I-95. Hampton Roads is the home of 18 military installations and 80K military personnel. Washington DC is the center of the US defense industry, including key government departments and a concentration of defense contractors. While there is not a concentration of defense employment currently in Greater Richmond, these logistical and geographic advantages, along with a \$9 million grant from the Department of Defense for the Convergence Labs @ VCU, which aims to advance defense innovation in the US, position Greater Richmond to attract investment in this niche sector. As the proximate markets become more saturated, there may be increasing opportunities for Richmond to recruit defense affiliated businesses seeking qualified talent and suitable sites.

Cleantech: This niche industry includes digital and physical technologies that move toward decarbonization. It includes renewable energy sources and components, energy storage (e.g., batteries), software and components for grid management, and the electric vehicle supply chain. The region has attracted several announcements within Cleantech. While the speed of the transition toward clean energy may slow depending on shifting political priorities, the general direction toward renewable energy is unlikely to reverse course given corporate commitments and customer preferences. Looking at VC money flowing into cleantech, there has consistently been more investment over the past few years than during the 2010s, even with a difficult macro environment.

Capital invested and deal count for cleantech firms in the US by year



Source: Lightcast, 2024.2; QCEW employees, non-QCEW employees. Hampton Roads Alliance. Pitchbook, 2024,

Industry Cluster Descriptions

Aerospace: Operations engaged in research, design, and manufacturing aerospace and space technology, products, and parts, including commercial aircraft, military craft, and unmanned aerial vehicles (UAVs).

Automotive: Operations engaged in the manufacturing of motor vehicle and their parts along with wholesalers.

Agribusiness & Food: Operations engaged in raising, harvesting, processing, and manufacturing crops, food, and beverage products. Operations include farming, dairy, ranching, hunting, fishing, and all support activities, such as pesticide manufacturing. Also includes manufacture of tobacco and processed food products, such as sugar, flour, and canned goods.

Apparel & Textiles: Operations engaged in processing natural products such as cotton and leather into consumer textiles and apparel products. These include fabric mills, textile mills, and cut and sew apparel manufacturing.

Back Office: Operations engaged in support activities for the day-to-day operations of other businesses, including office administration, facilities support, employment services, and business support.

Biomedical Supplies & Labs: Operations engaged in manufacture and wholesale of medicine, pharmaceuticals, and medical equipment. Also includes medical and diagnostics laboratories.

Construction: Operations engaged in construction of buildings and engineering projects, such as highways and utility systems. Also includes operations manufacturing products related to construction, such as lumber, clay, glass, cement, and lime.

Consumer Goods Mfg.: Operations engaged in manufacture of household appliances and other miscellaneous nondurable goods for consumers.

Creative Content: Operations engaged in creative and information sectors such as movie and music production, radio and television programming, newspaper and magazine production, and internet publishing.

Industry Cluster Descriptions

Education: Operations engaged in education institutions, including elementary and secondary schools (government and private), colleges, universities, professional schools, trade schools, and educational support services.

Electronics: Operations engaged in manufacture, wholesale, and repair of electronic equipment, including computers, televisions, semiconductors, and other electronic components.

Energy: Operations engaged in all vertically aligned elements of the energy sector, including oil extraction, coal mining, pipeline transportation of oil and gas, and electric power generation, transmission, and distribution.

Entertainment: Operations engaged in leisure and accommodation, including hotels, restaurants, bars, casinos, museums, performing arts, and sporting facilities. Also includes independent performers, artists, and direct tourist activities.

Finance: Operations engaged in financial, insurance, and real estate activities, such as banks, insurance carriers, and real estate brokers.

Furniture: Operations engaged in manufacture and wholesale of household, office, and commercial furniture and cabinets.

Government: Operations of federal, state, and local government agencies, waste collection and management, and water treatment. Military employment is not included in these numbers.

Healthcare: Operations engaged in direct provision of healthcare and social services, including private hospitals, doctor offices, elderly care, child day care, family services, and home nursing care.

Industrial Machinery: Operations engaged in manufacture and wholesale of industrial application machinery, including agricultural and mining equipment, HVAC systems, metalworking machinery, turbines, lighting, and other equipment.

Industry Cluster Descriptions

Materials: Operations engaged in design, wholesale, and manufacture of traditional and complex materials, including paper, chemicals, plastics, rubber, and other advanced materials.

Metalworking: Operations engaged in processing minerals into metal products and manufacture of components and products from metal. This includes steel mills, foundries, fabricated metal and structural metal manufacturing, and hand-tool manufacturing.

Mining & Logging: Operations engaged in forestry, logging, and mining: not including oil, gas, and coal extraction.

Non-Profits: Operations engaged in non-profit activities, including churches, social advocacy, and civic and professional associations.

Professional Services: Operations engaged in architecture, engineering, legal, accounting, management, and other technical services.

Research: Operations engaged in scientific research and development and scientific consulting services.

Retail: Operations engaged in retail sale of goods and services to consumers, including car dealers, grocery stores, clothing stores, gas stations, auto repair, personal care, and equipment rental.

Shipbuilding: Operations engaged in construction of ships and boats.

Software / Information Technology: Operations engaged in information technology sectors, including software publishing, internet service providers, computer system design, data processing and hosting, and other information services.

Telecom Services: Operations engaged in wired, wireless, and satellite telecommunications, including cell phone and cable providers.

Transportation & Logistics: Operations engaged in transportation of goods and individuals; warehousing and storage of goods; and delivery of post and packages. This includes commercial, personal, and tourism transportation on air, rail, water, and roads.