The Current Microchip Shortage and the Virginia Manufacturing Industries that Use Them

If you have gone shopping for cars lately, you've probably noticed fewer cars on the lot or that some high-tech features on your favorite car have become unavailable options. A major reason for this has been the shortage of microchips that are vital to more and more of a car or truck's systems. This not only effects the consumer but also OEM plants and their workers because if a vital component that goes into a part is unavailable, it could create a bottleneck and disrupt production altogether.

Although there are certainly OEMs and even vehicle manufacturers in the commonwealth, there is less concentration of these factory jobs compared to a South Carolina or Michigan. So workforce developers in Virginia have little to be concerned about, right? Not so fast, because Virginia is home to many factories that produce a wide array of equipment and machinery that also need microchips for what they make.

Across all manufacturing, microchips comprise only around one percent of all materials costs and usually only a few percent or so among microchip consuming industries. Therefore, microchips as an input into production are not as important as flour to a baker, but they are more like baking powder or salt because, although they typically don't make up more than a few percent of materials costs, they are essential for producing much of today's modern equipment and machinery.

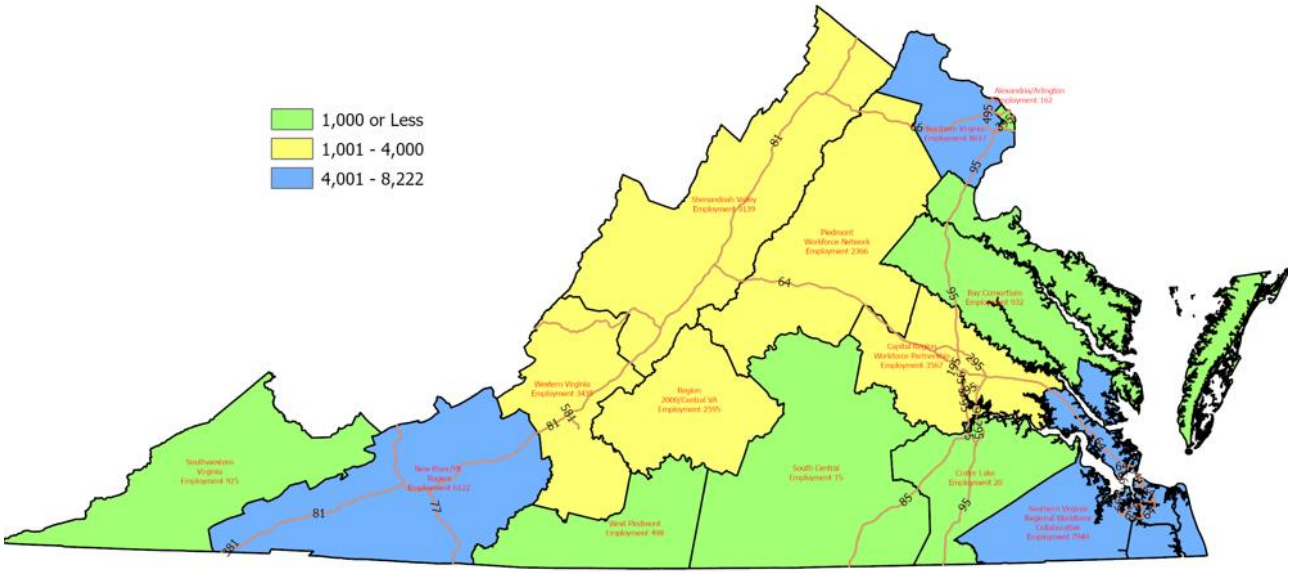
The main exception is the semiconductor and other electronic component manufacturing industry, in which microchips make up nearly a third of purchased material costs. Virginia production of semiconductors and other electronic components is centered in the Northern Virginia LWDA, with approximately 2,000 in employment. However, this production is also scattered in more rural regions including; Shenandoah Valley, Western Virginia, and Piedmont Workforce Network, with over 300 jobs apiece.

How many jobs are we talking about? If you combine information on which industries purchase microchips for production with LWDA regional employment by industry, you are left with a picture of the number of jobs that could be directly affected by microchip supply-chain disruptions. Statewide, approximately 44,000 jobs would fall into this category. This number decreased by 4,000, or eight percent, in 1Q21 compared to the same time period before the pandemic in 2019. The largest absolute loss (-600 jobs) occurred in the Hampton Roads region, while the largest percentage loss (-26%) occurred in the Southwestern Virginia region. The Western Virginia and Shenandoah Valley regions bucked this trend by growing around three percent each during that period.

> "The world will have lost **11.3 million units** of (auto) production in 2021 because of the chip shortage, according to AutoForecast Solutions. Drive by any almost empty dealer lot to see what this looks like on the ground."
> Motor Trend Magazine

Figure 1. 1st Q 2021 Employment in Companies using Microchips as a Component in Manufacturing by Local Workforce Development Areas (LWDAs)

All corners of the commonwealth are home to employers that purchase microchips as in input into production.



Map produced by the Virginia Employment Commission, Economic Information & Analytics Division, February, 2022
Sources: Census Bureau, 2017 Economic Census, Materials Consumed by Industry.
Census Bureau, Quarterly Workforce Indicators (QWI) 1Q21. BLS Quarterly Census of Employment and Wages (QCEW), 2Q21.
**LWDA employment totals account for approximately 90% of the state total due to disclosure rules.*

The New River/Mt. Rogers region is another example of a rural region with a large number of jobs with manufacturers who purchase microchips. After Northern Virginia, it has the second-largest number of these jobs. In addition to semiconductors and other electronic components, over 6,000 workers there make things like electrical equipment, industrial machinery, and aerospace products and parts. In rural areas, thousands of these workers make a larger impact on their local economy than the same number would in more urban areas because regions like Western Virginia are less industrially diverse than metropolitan areas like the Capital Region, for example, and rely more on these jobs. Also, when a factory stops production due to a supply chain bottleneck, additional effects may be felt in surrounding towns. Things like locally produced parts sold to that factory might not be ordered or local administrative or maintenance services provided to that factory may not be needed. Finally, as resulting layoffs cut into household incomes, reduced restaurant, retail, and other spending in the local economy may contribute to additional job loss.

Traditional manufacturing centers in Virginia, like Richmond, still make many of the things that have supported its economy for a hundred years. While things like food and nondurable goods don't require microchips, other things like industrial machinery, heating and cooling equipment, and navigational equipment, which have become more complex, now require them, thus adding approximately 3,500 employment in the Capital Region. Similarly, Hampton Roads ship building is still a 20th century industry in many ways, but many motor vehicle OEMs and other equipment and machinery manufacturers in that region do need microchips and, as a group, employed 4,700 in the first quarter of 2021.

The current microchip shortage and resulting supply chain disruption could potentially affect manufacturing workers in every corner of the commonwealth. Even though much has been said about the shortage of microchips and its impact on the U.S. auto industry, states like Virginia, with a relatively small OEM footprint, may also be impacted due to the explosion in the number of consumer goods and capital equipment requiring microchips. All around the state, Virginians are hard at work making these products but impacts could be greater in rural areas which are relatively more dependent on these jobs to support their local economies.

Table 1. The Potential Impact of the Current Microchip Shortage on LWDA Manufacturing Employment

While a region like Alexandria/Arlington may help to design the products, regions with a long blue-collar manufacturing history like Capital Region and the SVRWC region are home to thousands of workers who potentially could be impacted by a shortage of microchips.

	Alexandria /Arlington LWIA XII	Bay Consortium LWIA XIII	Capital Region Workforce Partnership LWIA IX	Crater Area LWIA XV	Greater Peninsula LWIA XIV (Part of SVRWC region)
Employment in industries that use microchips in production*	173	876	3,542	21	2,442
This table lists some of the key LWDA region manufacturing industries that purchase microchips. Three data points were used to determine which industries could be most at risk from microchip supplychain disruption; microchips as a percentage of purchased materials in an industry, regional industry employment, and VA industry employment location quotient.	Navigational, Measuring, Electromedical, and Control Instruments	Semiconductor and Other Electronic Components	Electrical Equipment	Agriculture, Construction, and Mining Machinery	Navigational, Measuring, Electromedical, and Control Instruments
		Industrial Machinery	Industrial Machinery		Industrial Machinery
		Communications Equipment	HVAC and Refridgeration Equipment		Other Electrical Equipment and Component
			Navigational, Measuring, Electromedical, and Control Instruments		Aerospace Products and Parts

Sources: Census Bureau, 2017 Economic Census, Materials Consumed by Industry.
Census Quarterly Workforce Indicators (QWI) , 1Q21. BLS Quarterly Census of Employment and Wages (QCEW), 2Q21
**LWDA employment totals account for approximately 90% of the state total due to disclosure rules.*

Table 1. Continued

Largely rural regions like New River/Mt. Rogers and Region 2000 employ thousands of workers at factories that purchase chips. Electrical equipment manufacturing is a major employer and led the way as microchips comprised over six percent of purchased materials in that industry nationwide in 2017, which was the second-most reliant among industries after semiconductor and other electronic components.

	Hampton Roads LWIA XVI (Part of SVRWC region)	New River/Mt. Rogers LWIA II	Northern Virginia LWIA XI	Piedmont Workforce Network LWIA VI	Region 2000/Central VA LWIA VII
Employment in industries that use microchips in production*	4,718	6,126	8,222	2,372	2,557
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	Navigational, Measuring, Electromedical, and Control Instruments	Semiconductor and Other Electronic Components	Communications Equipment	Navigational, Measuring, Electromedical, and Control Instruments	Semiconductor and Other Electronic Components
	Other Electrical Equipment and Component	Industrial Machinery	Navigational, Measuring, Electromedical, and Control Instruments	Industrial Machinery	Metalworking Machinery Manufacturing
	Engine, Turbine, and Power Transmission Equipment	Aerospace Products and Parts	Computer and Peripheral Equipment	HVAC and Refridgeration Equipment	Industrial Machinery Manufacturing

Sources: Census Bureau, 2017 Economic Census, Materials Consumed by Industry.
Census Quarterly Workforce Indicators (QWI) , 1Q21. BLS Quarterly Census of Employment and Wages (QCEW), 2Q21
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Table 1. Continued

The Western Virginia region is home to a surprising variety of manufacturing industries that require microchips for production. Not only motor vehicles and parts but; Industrial machinery, commercial and service industry equipment, communications equipment, semiconductors and other electronic equipment, and electrical equipment are also made in the region.

	Shenandoah Valley LWIA IV	South Central LWIA VIII	Southwestern Virginia LWIA I	West Piedmont LWIA XVII	Western Virginia LWIA III
Employment in industries that use microchips in production*	3,241	32	685	453	3,545
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	HVAC and Refridgeration Equipment			Metalworking Machinery	Electrical Equipment
	Navigational, Measuring, Electromedical, and Control Instruments				Industrial Machinery
	Industrial Machinery				Commercial and Service Industry Machinery
					Motor Vehicle

Sources: Census Bureau, 2017 Economic Census, Materials Consumed by Industry.
Census Quarterly Workforce Indicators (QWI) , 1Q21. BLS Quarterly Census of Employment and Wages (QCEW), 2Q21
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