

ANALYZING MANUFACTURING IN COLORADO

Opportunities and Skills Analysis

EXECUTIVE SUMMARY, OCT. 2018

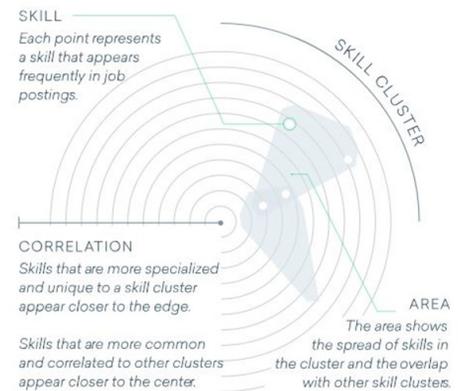


ABOUT THE REPORT

This report is structured into two primary components that focus directly on manufacturing in Colorado. The first component comprises a detailed analysis of job posting data to determine the top skills Colorado's manufacturing businesses need. It groups Colorado's primary manufacturing skills into clusters and compares them to skills clusters for the nation and key states for manufacturing. The second component uses an analysis of traditional labor market information and economic data to identify economic development opportunities within manufacturing.

In March 2018, Emsi published a research report titled "Manufacturing Is Not Dead: The Rise of High-Skill, High-Wage Production Jobs" examining nearly 400,000 production job postings from 2017 to determine the top skills that employers need. Then we grouped those skills together to form skill clusters. For this report we took the same approach for Colorado.

Using Emsi's proprietary labor market information and input-output model, we also analyzed the manufacturing industries in Colorado to determine likely business expansion and recruitment opportunities for each of the six regions, that would help support, and potentially bolster, manufacturing statewide.



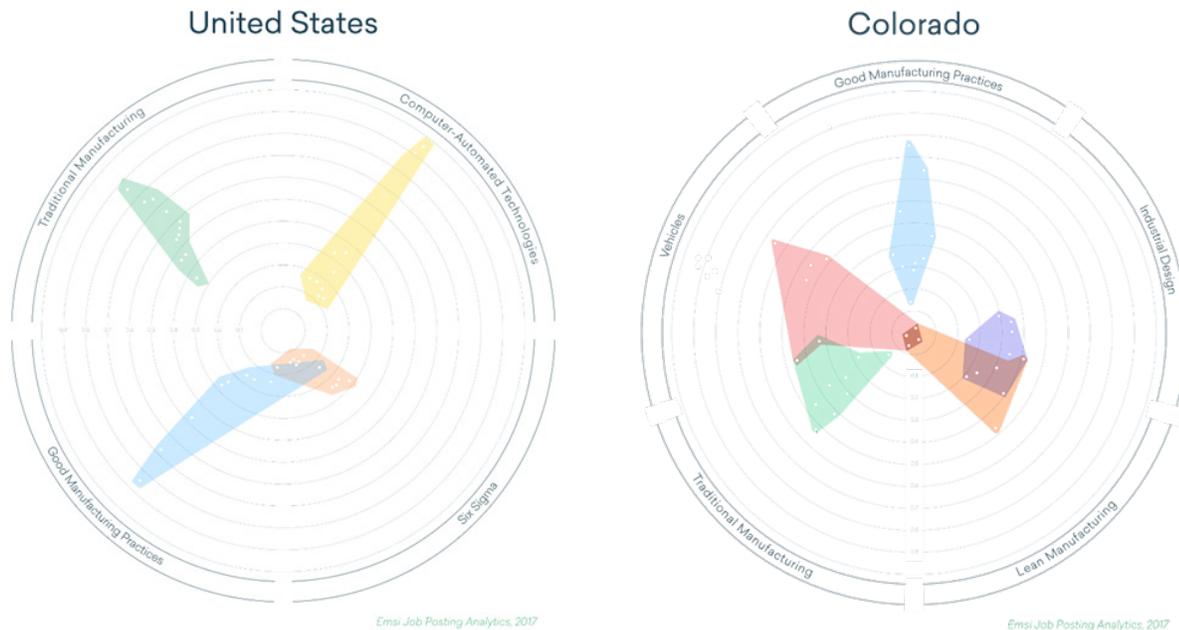
KEY TAKEAWAYS

1. Colorado has a diverse manufacturing landscape with a fusion of design, efficient processes, and vehicle-oriented manufacturing in five skill clusters:
 - Good manufacturing practices
 - Industrial design
 - Lean manufacturing
 - Traditional manufacturing
 - Vehicles
2. The manufacturing industry in Colorado imports 91.6% of all purchases (\$316 million) from plastics material and resin manufacturing, making it a prime target for recruiting opportunities.
3. Colorado industries demand \$81 billion of goods and/or services from manufacturing, only \$25 billion (31%) of which is currently satisfied by manufacturing businesses in Colorado. Greater Denver and South Central Urban regions have the highest demand at \$49.3 billion and \$12.9 billion, respectively.

MANUFACTURING SKILLS ANALYSIS

The U.S. has four distinct clusters: traditional manufacturing, computer-automated technologies (CAT), Six Sigma, and good manufacturing practices (GMP).

Compared to the nation, Colorado's is more diverse. As a result, five skill clusters emerged: good manufacturing practices, industrial design, lean manufacturing, traditional manufacturing, and vehicles.



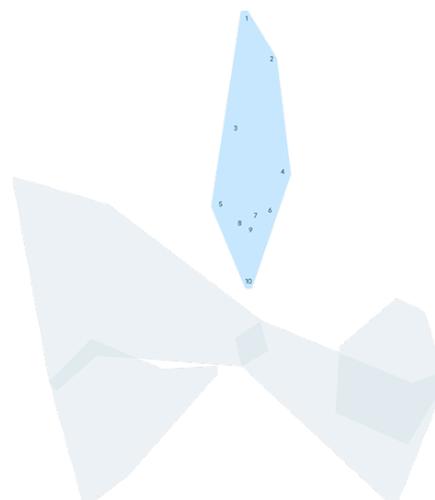
In Colorado, the five skills appearing in both industrial design and lean manufacturing include a combination of engineering and processes: Mechanical Engineering, SolidWorks (CAD), Manufacturing Processes, Manufacturing Engineering, and Continuous Improvement Process.

The prominent skill cluster seen nationally and in Colorado is good manufacturing practices (GMP). GMP encompasses quality control and ensuring products meet necessary standards.

GOOD MANUFACTURING PRACTICES

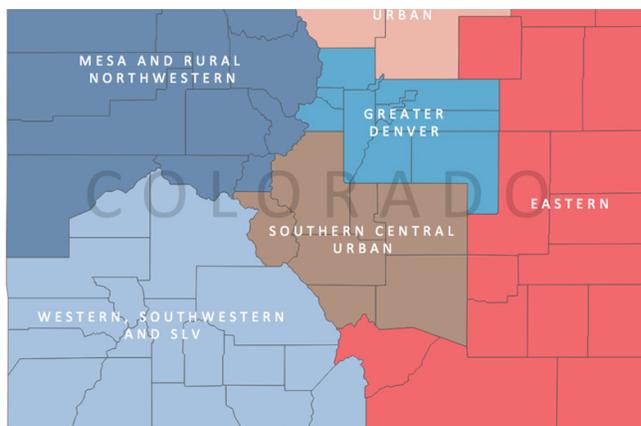
- 1 Good Manufacturing Practices
- 2 Hazard Analysis And Critical Control Points
- 3 Product Quality Assurance
- 4 Quality Management
- 5 Pharmaceuticals
- 6 Corrective And Preventive Actions
- 7 Regulatory Compliance
- 8 Production Management
- 9 Occupational Safety And Health
- 10 Supplier Quality Engineer

Emsi Job Posting Analytics, 2017



MANUFACTURING REGIONS

The manufacturing opportunities represent industries that offer a strong potential future for each region in the Colorado economy. These industries offer diverse opportunities for Colorado residents in five distinct clusters identified in the skills analysis, the most prominent of which is good manufacturing practices. Each cluster further represents opportunities for growth and diversification for the Colorado manufacturing economy as well as opportunities for regional businesses to diversify their market base.



The Greater Denver region is, by far, the largest in terms of current manufacturing employment (90,000), businesses (3,300), and GRP (\$16 billion), but this region is projected to have the slowest manufacturing job growth over the next five years (4.1%).

The South Central Urban region has the second highest demand for manufacturing goods and/or services (\$12.9 billion), but the region is only able to satisfy 11.0% of that demand locally.

Colorado Manufacturing Overview

Region	2012-17 % Change	2017-22 % Change	2017 Ave. Earnings	2017 Payrolled Business Locations	2017 GRP
Greater Denver	9.80%	4.30%	\$76,700	3,304	\$15,952,404,319
North Central Urban	18.40%	10.60%	\$69,621	831	\$4,830,162,888
South Central Urban	-6.80%	-2.40%	\$67,766	744	\$2,779,615,762
Mesa and Rural Northwestern	20.20%	9.90%	\$54,796	426	\$633,170,581
Eastern	4.60%	7.30%	\$54,874	147	\$593,240,139
Western, Southwestern and SLV	13.00%	11.90%	\$47,875	350	\$427,391,882
Colorado	9.10%	5.10%	\$73,649	5,818	\$25,215,985,571

INDUSTRY PURCHASE ANALYSIS

One strategy to bolster growth is to reduce the amount of goods and/or services imported into the region by 1) encouraging local businesses to buy from one another and 2) recruiting businesses that provide goods and/or services that local businesses are importing.

- The manufacturing industry in Colorado imports 91.6% of all purchases (\$316 million) from plastics material and resin manufacturing, making it a prime target for recruiting opportunities.
- Meat processed from carcasses is imported the second-most (\$178 million) by Colorado manufacturers. It is part of a robust food manufacturing sub-sector, the largest-employing 3-digit NAICS industry group in Colorado.

Top 5 Manufacturing Industry Opportunities

NAICS	Description	2017 Jobs	2022 Jobs	Job % Change 2017-22	2017 Total Earnings	2017 Location Quotient	2017 Payrolled Business Locations	Imported Purchase by Manufacturing Cluster	% Imported Purchase by Manufacturing Cluster
325211	Plastics Material & Resin Manufacturing	152	193	27%	\$78,039	0.14	10	\$315,710,442	92%
311612	Meat Processed from Carcasses	1,534	1,679	9%	\$52,450	0.65	34	\$178,524,519	51%
311211	Flour Milling	168	201	20%	\$76,475	0.65	4	\$119,722,693	62%
331315	Aluminum Sheet, Plate, & Foil Manufacturing	132	152	15%	\$107,288	0.44	4	\$94,840,825	80%
311615	Poultry Processing	116	147	27%	\$62,724	0.03	2	\$57,595,421	95%

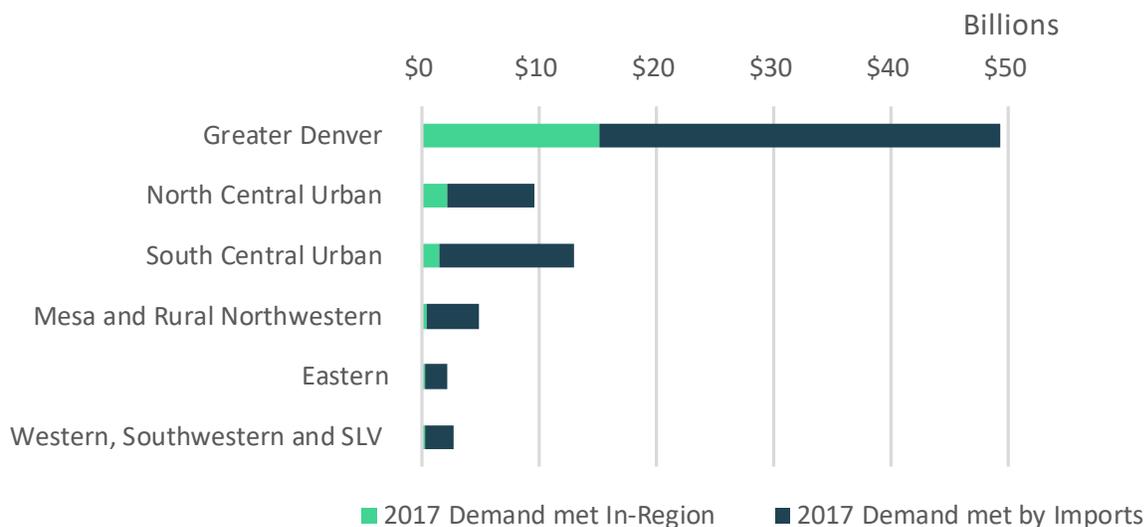
SUPPLY CHAIN ANALYSIS

When an organization identifies and fills their supply chain gaps, more money can be brought into the local economy from outside the region, driving prosperity long-term.

Colorado industries demand \$81 billion of goods and/or services from manufacturing, only \$25 billion (31.0%) of which is currently satisfied by manufacturing businesses in Colorado.

- The Greater Denver region has the highest demand for manufacturing goods and/or services (\$49.3 billion), which is \$17.3 billion more than the demand for manufacturing goods and/or services in the other five regions combined. Businesses in the Greater Denver region also satisfy the highest percentage of that demand in-region (30.6%), compared to the other five regions.
- The South Central Urban region has the second highest demand for manufacturing goods and/or services (\$12.9 billion), but the region is only able to satisfy 11.0% of that demand locally.

Colorado Manufacturing Demand



RECOMMENDATIONS

Like the rest of the country, Colorado manufacturing is re-emerging after decades of job losses with a new demand for multi-skilled production workers. It's up to economic developers, workforce professionals, and educators to spread the word about the changing yet still promising future of manufacturing

Here are a few recommendations on what you can do in your local communities:

Ground Truthing: Use labor market data to assess your region's needs, then validate those needs through conversations with employers on the ground to develop a local action plan.

Partnerships: Promote workforce development and education programs that focus on the modern manufacturing skills. If these programs are not in place, partner to develop a stronger education pipeline.

Support: Find new or better ways to support local manufacturers. Understand local employer skills gaps and provide insight using the research provided today. Speak with employers on internship, apprenticeship, and training opportunities to grow a steadier pipeline. Discuss wage and job description opportunities with employers to assist in their recruitment efforts.