

***COLORADO -  
LABOR MARKET RESEARCH***  
*June 2016*



**COLORADO**

Office of Economic Development  
& International Trade

# Outline

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# Project Background

- OEDIT & Mercer Consulting will develop a report identifying the health of Colorado's economy by evaluating strengths, gaps and opportunities across industries, occupations and wage levels.
- This study will be used to determine how OEDIT will focus its recruitment, expansion and retention activities.
- Objective of Report: report on how occupations in Colorado are suited for current and future state, national and global trends, and determine the type of occupations (and companies that support these occupations) that should be retained or recruited to meet current and future demands.
- Desired Outcomes:
  - Review existing data sources to deliver a report on Colorado's current occupational, wage and industry landscape.
  - Provide future projections of occupations and industry clusters, defining the optimal mix of occupations and wage levels across industries and how it relates to business retention and recruitment in the state.

# Executive Summary

- From the industry perspective, Colorado has a higher concentration in mining, construction (more recent), professional services (especially engineering and computer services) and hospitality; and a lower concentration in manufacturing and healthcare.
  - Within manufacturing, Colorado has a higher concentration in computer and electronic product manufacturing, which utilizes more engineers and computer experts.
- Consistent with the industry distribution, Colorado has a higher concentration in knowledge-based jobs in computer, life sciences and engineering, and a lower concentration in healthcare, transportation, production and farming.
- Comparing job openings versus graduates, the current supply of engineer and healthcare graduates are just enough to support the demand growth. There might be talent gap risks once demand growth accelerates.
- Colorado has a higher median pay than the nation, which is due to Colorado employing more people in higher pay occupations (e.g. management, engineering), and due to people in the SAME occupations are paid higher in Colorado, even after adjusting for cost of living.
  - Colorado is attractive to talent, ranking third nationally in net inflow (in-migrants minus out-migrants), and is a relatively attractive destination across different education and income levels
- In the past 10 years, Colorado workforce has been growing faster than the US, especially in mining, government, education and healthcare
- Looking into the future, the ten-year labor force projections show that Colorado will grow two times as fast as the national average.

## *Executive Summary (Continued)*

- Colorado's faster growth is expected to span across all occupations, except for healthcare support and farming
  - The faster growth is especially prominent for engineering, computer and healthcare jobs (even without any changes in government incentives).
- Colorado's future Utopia would be a further strengthening of knowledge economy and occupations that rely on higher skills, while balancing the current landscape by catching up on the relatively lower representation of larger size employers.
- The State could consider some near-term planning including creating a five-year visionary view and identify the target industries/occupations to support that vision; reviewing and refining the State's incentive programs to be aligned with the target employers - not only by industry/occupation classification, but more importantly by technology and skills utilized.
- As for longer-term planning, the State might consider a strategic workforce planning to strengthen the knowledge based workforce, which will be critical to the state's future success. Initiatives to support this goal could include: expand STEM graduates; improve talent attraction and retention; bridge employers and educators by supporting work-based internships; implement the incentive programs in the way that it helps attract and retain the companies using the targeted technology and skills.

# *Industry*

# % of Workforce By Industry, CO Vs US, and Competitor States

Colorado has higher concentration in mining, construction, professional service & hospitality; and lower concentration in manufacturing and healthcare

Percentage of Total Workforce in Area	Colorado	National Average	Competitor States Average*	Arizona	California	Massachusetts	North Carolina	Texas	Utah	Ohio	Washington
Employed Workforce (000s)	2,559	144,116	N/A	2,723	16,408	3,532	4,311	12,008	1,408	5,496	3,198
Mining and Logging	1.3%	0.5%	0.5%	0.4%	0.2%	0.0%	0.1%	2.1%	0.7%	0.2%	0.2%
Construction	6.2%	4.5%	4.8%	4.8%	4.5%	4.1%	4.5%	5.8%	6.0%	3.6%	5.4%
Manufacturing	5.6%	8.6%	8.6%	5.9%	7.8%	7.1%	10.7%	7.2%	8.8%	12.6%	9.0%
Financial Activities	6.3%	5.7%	5.7%	7.4%	4.9%	6.3%	5.1%	6.1%	5.8%	5.3%	4.7%
Information	2.7%	1.9%	2.3%	1.7%	3.0%	2.5%	1.8%	1.7%	2.5%	1.3%	3.7%
Professional and Business Services	15.0%	13.9%	14.1%	15.4%	15.6%	15.2%	14.0%	13.4%	13.8%	13.1%	12.4%
Leisure and Hospitality	12.6%	10.4%	10.2%	11.1%	11.3%	9.4%	10.5%	10.4%	9.8%	9.6%	9.6%
Educational Services (Private)	1.5%	2.5%	2.5%	2.4%	2.2%	4.7%	1.9%	1.6%	3.1%	2.4%	1.8%
Health Care and Social Assistance	10.9%	13.1%	13.0%	12.7%	13.2%	17.2%	11.6%	11.8%	10.2%	14.4%	12.7%
Government	16.5%	15.5%	15.7%	15.4%	15.2%	13.1%	17.1%	15.8%	16.9%	14.3%	17.8%
Federal **	2.1%	1.9%	1.8%	2.0%	1.5%	1.3%	1.7%	1.6%	2.5%	1.4%	2.3%
State Educational Services	2.9%	1.8%	2.3%	1.9%	1.5%	1.8%	2.9%	1.7%	3.5%	2.2%	2.8%
State Other (e.g. Hospital)***	1.7%	1.8%	1.7%	1.4%	1.6%	2.1%	2.0%	1.5%	2.1%	1.3%	2.0%
Local Educational Services	5.3%	5.6%	5.5%	5.5%	5.8%	5.2%	5.0%	7.3%	5.1%	5.2%	5.2%
Local Other (e.g. Hospital)***	4.5%	4.3%	4.4%	4.7%	4.8%	2.8%	5.6%	3.7%	3.8%	4.2%	5.4%
Others (Trade, Transportation , Utility, etc.)	21.4%	23.3%	22.5%	22.8%	22.0%	20.3%	22.7%	24.1%	22.2%	23.0%	22.8%

Green font - greater than national average; Red font - less than national average. N/A - data not reported

Source: BLS Current Employment Survey December 2015.

\*Average of the eight states in this table, which was provided by COEDIT as states where Colorado competes for talent. \*\*Federal includes U.S. Postal Service, Department of Defense, Federal Hospitals, Other. \*\*\*Other State and Local includes State and Local Hospitals, General Administration, Utilities, and Transportation

# % of Workforce By Industry, CO Vs US, and Competitor States

Within manufacturing, Colorado has slightly higher concentration in computer and electronic products; Within Professional Services, Colorado has higher concentrations in engineering and computer related services

Percentage of Total Workforce in Area	Colorado	National Average	Competitor States Average*	Arizona	California	Massachusetts	North Carolina	Texas	Utah	Ohio	Washington
Manufacturing Workforce (000s)	144	12,323	N/A	161	1,284	250	460	864	124	691	287
Manufacturing	5.6%	8.6%	8.6%	5.9%	7.8%	7.1%	10.7%	7.2%	8.8%	12.6%	9.0%
Durable Goods	3.6%	5.4%	5.7%	4.5%	4.9%	4.5%	5.8%	4.6%	6.2%	8.5%	6.6%
Fabricated Metal Product Manufacturing	0.7%	1.0%	1.0%	0.7%	0.8%	0.9%	0.8%	1.1%	1.1%**	1.9%	0.6%
Computer and Electronic Product Manufacturing	0.8%	0.7%	1.0%	1.2%	1.6%	1.6%	0.8%	0.8%	0.8%	0.4%	0.6%
Transportation Equipment Manufacturing	0.4%	1.1%	1.1%	N/A	0.7%	0.4%	0.8%	0.7%	0.8%	2.2%	3.3%
Other Durable Goods	1.7%	2.5%	2.6%	2.6%	1.8%	1.7%	3.3%	2.1%	3.5%	4.0%	2.1%
Chemical Manufacturing***	0.2%	.6%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Plastics and Rubber Products	0.2%	.5%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nonmetallic Mineral Products	0.3%	.3%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Machinery Manufacturing	0.5%	.8%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Non-Durable Goods	2.0%	3.2%	2.9%	1.4%	2.9%	2.6%	4.9%	2.6%	2.6%	4.1%	2.4%
Professional and Business Services	15.0%	13.9%	14.1%	15.4%	15.6%	15.2%	14.0%	13.4%	13.8%	13.1%	12.4%
Architectural, Engineering, and Related Services	1.8%	1.0%	1.0%	N/A	1.0%	1.0%	0.8%	1.3%	1.0%	0.8%	1.1%
Computer Systems Design and Related Services	2.1%	1.4%	1.5%	N/A	1.8%	2.2%	1.2%	1.4%	1.7%	1.1%	1.5%
Management, Scientific, and Technical Consulting Services	0.9%	0.9%	1.0%	N/A	1.3%	1.3%	1.0%	1.1%	N/A	0.5%	N/A
Legal Services	0.8%	0.8%	0.7%	N/A	0.8%	0.8%	0.6%	0.7%	0.7%	0.6%	0.6%
Others (Waste management, Admin, etc.)	9.4%	9.8%	9.9%	15.4%	10.7%	9.9%	10.4%	8.9%	10.4%	10.1%	9.2%

Green font - greater than national average; Red font - less than national average. N/A - data not reported

Source: BLS Current Employment Survey December 2015. Other Durable Goods includes: Machinery, Wood Products, Miscellaneous, Furniture, Electrical Equipment, Primary Metals, Nonmetallic Mineral Products. \*Average of the eight states in this table, which was provided by COEDIT as states where Colorado competes for talent. \*\*Utah Fabricated Metal Products includes Primary Metals. \*\*\* Includes Chemical, Plastics and Rubber, Nonmetallic Mineral, and Machinery sourced from Colorado LMI 2016 Industry Employment Projections



# Highlights Of Observations - Industry Profile

- From the industry perspective, Colorado has a higher concentration in mining, construction (more recent), professional services (especially engineering and computer services) and hospitality; and a lower concentration in manufacturing and healthcare.
  - Although Colorado has a relatively lower concentration in manufacturing overall, there are some sub-industries where Colorado does have a higher concentration, such as computer and electronic product manufacturing, which utilizes more engineers and computer experts ...and those are occupations where Colorado has a strength.
  - Similarly, within professional services, Colorado has a higher concentration in engineering and computer systems related services, but only a comparable concentration (to the US) in other types of services such as management, legal, etc. Again, this reflects the state's workforce being more focused on engineering/computer skills.
  - Education is broken down into private and public education. Colorado has a lower concentration in private education but a higher concentration in public education. Taken together, Colorado is similar to the national average in the concentration of education workforce.
  - Health care and social assistance industry concentration is lower in Colorado than the national average. This will be reaffirmed in the occupation comparison section. This is an area where Colorado would benefit from spending more resources to catch up, as it would create a more appealing living environment to better attract and retain talent.

# *Occupation*

# Occupational Composition, CO Vs US

Colorado has a higher concentration in computer, life sciences, engineering jobs; and a lower concentration in healthcare, transportation, production, farming jobs.

Occupation (2-digit SOC Codes Bolded)	Colorado Employed Workforce	% of Colorado Workforce (A)	% of US Workforce (B)	% Difference from US Workforce (A-B)/B
<b>Computer and Mathematical</b>	96,120	4.1%	2.8%	43%
Software Developers Applications	22,680	1.0%	0.5%	89%
<b>Life Physical and Social Science</b>	28,760	1.2%	0.8%	43%
Atmospheric and Space Scientists	1,690	0.1%	0.0%	789%
Environmental Scientists and Specialists Including Health	2,890	0.1%	0.1%	86%
<b>Architecture and Engineering</b>	56,640	2.4%	1.8%	34%
Computer Hardware Engineers	3,710	0.2%	0.1%	177%
Environmental Engineers	2,040	0.1%	0.0%	119%
Industrial Engineers	2,740	0.1%	0.2%	-34%
Petroleum Engineers	1,850	0.1%	0.0%	213%
<b>Business and Financial Operations</b>	160,300	6.8%	5.1%	34%
<b>Construction and Extraction</b>	122,030	5.2%	3.9%	32%
<b>Legal</b>	21,440	0.9%	0.8%	16%
<b>Arts, Design, Entertainment, Sports and Media</b>	36,530	1.5%	1.3%	16%
<b>Sales and Related</b>	267,090	11.3%	10.5%	7%
<b>Food Preparation and Serving Related</b>	228,960	9.7%	9.1%	6%
<b>Building and Grounds Cleaning and Maintenance</b>	78,670	3.3%	3.2%	3%
<b>Installation Maintenance and Repair</b>	90,950	3.8%	3.9%	-1%
<b>Personal Care and Service</b>	69,830	2.9%	3.1%	-4%
<b>Office and Administrative Support</b>	362,760	15.3%	16.0%	-4%
<b>Education Training and Library</b>	140,480	5.9%	6.2%	-5%
<b>Community and Social Service</b>	31,260	1.3%	1.4%	-8%
<b>Protective Service Occupations</b>	52,750	2.2%	2.4%	-9%
<b>Healthcare Support Occupations</b>	62,500	2.6%	2.9%	-9%
<b>Healthcare Practitioners and Technical</b>	124,530	5.3%	5.8%	-10%
Licensed Practical and Licensed Vocational Nurses	5,610	0.2%	0.5%	-54%
<b>Management</b>	103,470	4.4%	5.0%	-12%
<b>Transportation and Material Moving</b>	130,560	5.5%	6.8%	-19%
<b>Production</b>	97,640	4.1%	6.6%	-38%
<b>Farming, Fishing and Forestry</b>	4,510	0.2%	0.3%	-42%



More concentrated than US



Similarly concentrated as US workforce



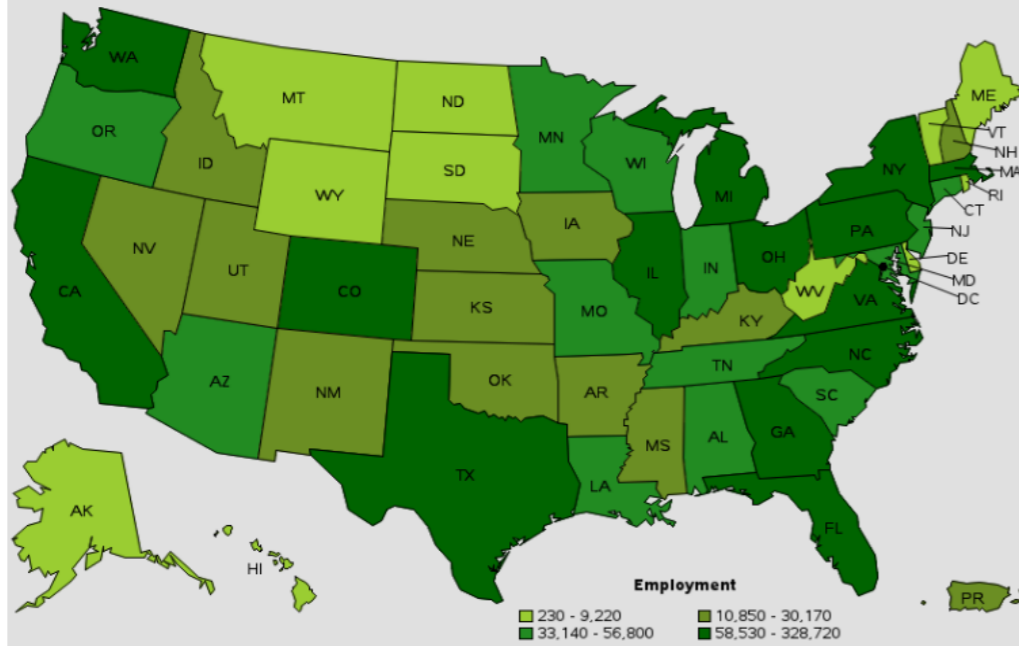
Less concentrated than US

Source: BLS Occupational Employment Statistics Survey May 2014.

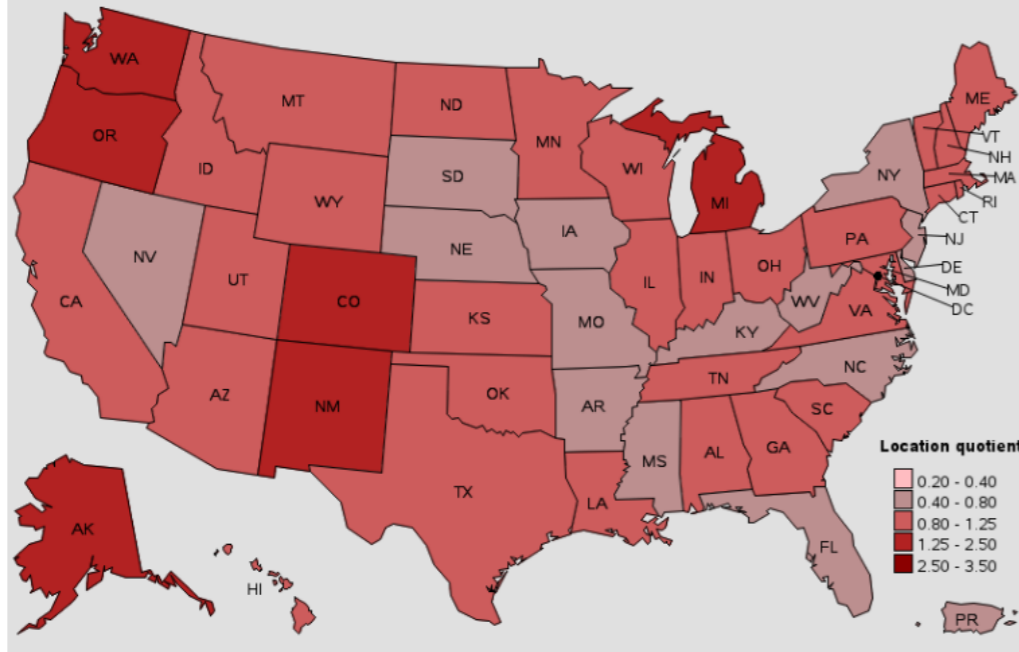
# Engineering Occupation Concentration

Colorado is one of the top 5 states with the highest concentration in engineering jobs

Employment of architecture and engineering occupations, by state, May 2015



Location quotient of architecture and engineering occupations, by state, May 2015



Top States (Top Ten LQ)	Location Quotient	Top States (Top Ten Size)	Engineering Employment
Michigan	1.75	California	328,720
New Mexico	1.49	Texas	239,650
Washington	1.46	Michigan	130,040
Colorado	1.39	New York	111,300
Alaska	1.37	Florida	96,650
Oregon	1.26	Pennsylvania	95,550
Alabama	1.24	Ohio	93,140
Massachusetts	1.24	Illinois	87,700
Maryland	1.22	Washington	77,970
Vermont	1.19	Massachusetts	75,750

**Location quotient (LQ)** measures the concentration of an occupation in a state to that of US. Greater LQs indicate a higher concentration of employment than the US.\*

Source: BLS Occupational Employment Statistics, May 2015. \*LQ = (State occupational employment / State total employment) / (U.S. occupational employment / U.S. total employment)

# Talent Supply and Demand Gap By Job

There are relatively larger talent gaps for construction/extraction, office/administrative jobs due to large demand. Current supply of engineer, business and financial, and healthcare graduates is just enough to support the demand and may encounter gap risks once demand increases.

Occupation (2-digit SOC Codes Bolded)	Workforce (000s) (A)	DEMAND - Annual Job Openings (B)	SUPPLY – Annual Graduate Completions (C)	Surplus/Gap (C-B)	Surplus/Gap as % of Workforce (C-B)/A
Advertising, Marketing, Promotions, Public Relations, and Sales Managers	8,380	397	10,359	9,962	119%
Physical Scientists	10,024	587	8,637	8,050	80%
Life Scientists	5,530	278	3,808	3,530	64%
Supervisors of Protective Service Workers	4,310	216	1,864	1,648	38%
<b>Management</b>	103,470	5,756	28,837	23,081	22%
Electrical and Electronic Equipment Mechanics, Installers, Repairers	11,080	389	2,663	2,274	21%
Media and Communication Workers	11,250	613	2,842	2,229	20%
Other Healthcare Support	26,140	1,475	5,907	4,432	17%
Business	104,970	5,211	12,196	19,482	12%
<b>Arts, Design, Sports, Entertainment and Media</b>	36,530	2,185	6,259	4,074	11%
<b>Architecture and Engineering</b>	56,640	2,852	5,290	2,438	4%
Engineers	38,840	2,145	3,574	1,429	4%
<b>Business and Financial Operations</b>	160,300	8,355	14,261	5,906	4%
<b>Healthcare Practitioners and Technical</b>	124,530	6,492	10,035	3,543	3%
<b>Protective Service Occupations</b>	52,750	2,736	2,716	-20	0%
<b>Computer and Mathematical</b>	96,120	4,764	4,397	-367	0%
<b>Legal</b>	21,440	1,033	926	-107	0%
Computer-Related	94,280	4,669	3,606	-1,063	-1%
<b>Production</b>	97,640	3,852	2,609	-1,243	-1%
Financial Specialists	55,340	3,144	2,065	-1,079	-2%
Preschool, Primary, Secondary, and Special Education School Teachers	74,950	3,456	1,976	-1,480	-2%
<b>Transportation and Material Moving</b>	130,560	6,029	1,612	-4,417	-3%
<b>Office and Administrative Support</b>	362,760	15,359	2,020	-13,339	-4%
<b>Construction and Extraction</b>	122,030	8,356	1,973	-6,383	-5%

Source: Legislative Report On the Skills for Jobs Act., 2016. Colorado Department of Higher Education. BLS Occupational Employment Statistics Survey May 2014.

# Talent Supply and Demand Gap By Job (Additional Occupations)

Colorado has a talent surplus of mathematical workers, and science and engineering technicians

Occupation (Additional 3-digit SOC Codes)	Workforce (000s) (A)	DEMAND - Annual Job Openings (B)	SUPPLY – Annual Graduate Completions (C)	Surplus/Gap (C-B)	Surplus/Gap as % of Workforce (C-B)/A
Other Management Occupations	35,730	1,505	22,488	20,983	59%
Supervisors of Protective Service Workers	4,310	176	1,864	1,688	39%
Mathematical	1,830	95	791	696	38%
Religious Workers	960	73	170	97	10%
Entertainers and Performers, Sports and Related	10,390	476	1,495	1,019	10%
Engineering Technicians	10,510	388	1,325	937	9%
Other Teachers and Instructors	7,270	-196	415	611	8%
Sciences Technicians	7,550	424	999	575	8%
Metal Workers and Plastic Workers	16,650	218	1,226	1,008	6%
Health Technicians	39,540	1,821	3,973	2,152	5%
Vehicle and Mobile Equipment Mechanics, Installers, and Repairers	28,200	1,156	2,387	1,231	4%
Nursing, Psychiatric, Home Health Aides	34,360	926	2,277	1,351	4%
Health Diagnosing and Treating	81,810	4,547	6,260	1,713	2%
Other Office and Administrative Support	41,530	20	789	769	2%
Other Protective Service Workers	24,770	52	469	417	2%
Media and Communication Equipment Workers	11,250	201	386	185	2%
Firefighting and Prevention	4,880	214	290	76	2%
Architect	5,030	319	391	72	1%
Air Transportation Workers	6,870	12	91	79	1%
Counselors, Social Workers, and Other Community and Social Service Specialists	30,300	1,338	1,603	265	1%
Legal Support Workers	8,400	280	298	18	0%
Lawyers, Judges, and Related	12,930	623	628	5	0%
Law Enforcement Workers	18,740	876	580	-296	-2%
Construction Trades Workers	87,510	3,119	1,556	-1,563	-2%
Librarians, Curators, and Archivists	5,240	303	196	-107	-2%
Plant and System Operators	5,040	244	138	-106	-2%
Other Installation, Maintenance, and Repair Occupations	43,030	2,033	684	-1,349	-3%

Source: Legislative Report On the Skills for Jobs Act., 2016. Colorado Department of Higher Education. BLS Occupational Employment Statistics Survey May 2014.

# Highlights Of Observations - Occupation Profile

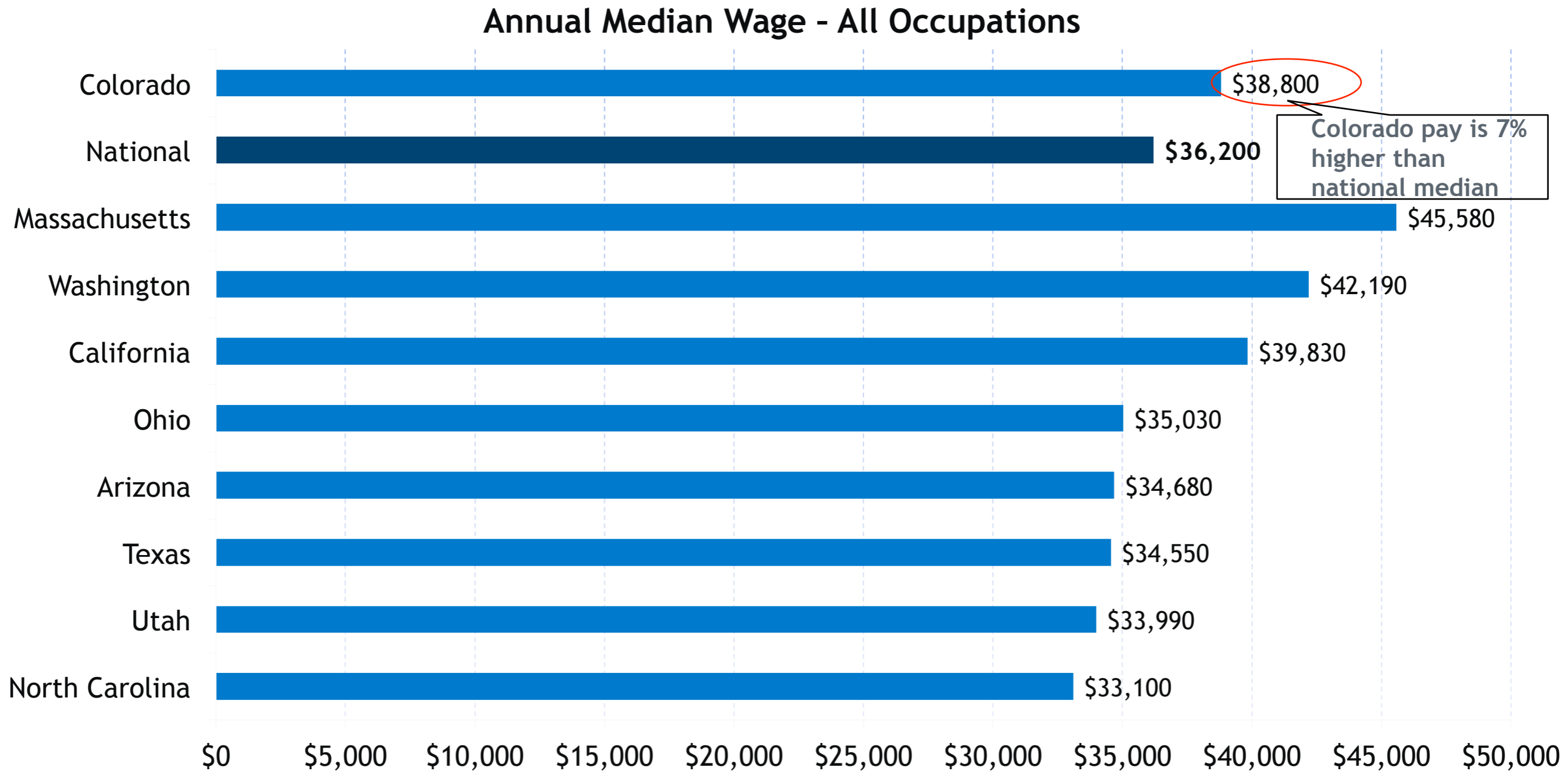
- Consistent with the industry distribution, Colorado has a higher concentration in knowledge-based jobs in computer, life sciences and engineering, and a lower concentration in healthcare, transportation, production and farming.
- Colorado is one of the top 5 states with the highest concentration in engineering jobs
  - There are variations within the engineering occupation. Colorado has a higher concentration in “specialty engineers” such as computer hardware engineers, environmental engineers and petroleum engineers, but a lower concentration in the more general “industrial engineer” job.
  - Due to a lower industry concentration in manufacturing and healthcare, Colorado has a lower concentration in production and healthcare occupations. The former might be sustainable given that Colorado’s comparative advantage is not in labor-intensive manufacturing, but the latter needs some attention since it impacts the quality of life and therefore attractiveness to talent.
  - Talent demand versus supply are assessed by comparing job openings versus graduates. Most jobs seem to have a sufficient supply to support demand, except a relatively large gap for construction/extraction and office/administrative jobs due to greater demand.
    - Also, current supply of engineer and healthcare graduates are just enough to support the demand growth and may encounter gap risks once demand growth accelerates. Therefore, it will be helpful to keep growing the supply of engineer and healthcare talent, through both internal building and external in-migration.

*Wage*



# Wage Comparison, CO Vs US, And Competitor States

Colorado median wage is higher than national average, while lower than the top pay states, e.g. MA, WA, CA



Source: BLS Occupational Employment Statistics Survey May 2015.

# % of Workforce By Occupation, CO Vs US, And Competitor States

Colorado has a higher concentration in higher pay occupations such as management and engineering; and a lower concentration in lower pay jobs such as transportation and production

% of Total Workforce in Area	Colorado	National Average	Competitor States Average*	Arizona	California	Massachusetts	North Carolina	Texas	Utah	Ohio	Washington
All	2,451	137,897	N/A	2,587	15,497	3,397	4,125	11,573	1,324	5,281	2,984
Management	4.4%	5.0%	5.2%	5%	5.9%	7.5%	4.4%	4.0%	5.6%	4.6%	4.9%
Business and Financial Operations	6.8%	5.1%	5.3%	5%	5.7%	5.8%	4.7%	4.7%	5.2%	4.8%	6.0%
Computer and Mathematical	4.0%	2.9%	3.4%	3%	3.5%	4.0%	2.8%	3.1%	3.1%	2.6%	4.8%
Architecture and Engineering	2.5%	1.8%	2.0%	2%	2.1%	2.2%	1.4%	2.1%	1.9%	1.8%	2.6%
Life, Physical, and Social Science	1.2%	0.8%	0.9%	1%	1.1%	1.4%	0.8%	0.7%	0.8%	0.7%	1.1%
Community and Social Service	1.4%	1.4%	1.5%	2%	1.5%	2.4%	1.2%	0.9%	1.3%	1.4%	1.5%
Legal	0.9%	0.8%	0.7%	1%	0.8%	0.8%	0.6%	0.7%	0.6%	0.6%	0.7%
Education, Training, and Library	5.8%	6.2%	6.1%	5%	6.1%	6.8%	6.3%	6.2%	6.2%	6.0%	5.9%
Arts, Design, Entertainment, Sports, and Media	1.6%	1.3%	1.3%	1%	1.9%	1.4%	1.0%	1.0%	1.4%	1.1%	1.5%
Healthcare Practitioners and Technical	5.3%	5.8%	5.7%	6%	4.8%	6.9%	6.2%	5.3%	4.7%	6.7%	5.1%
Healthcare Support	2.5%	2.9%	2.9%	3%	2.3%	3.1%	3.7%	2.6%	2.5%	3.7%	2.5%
Protective Service	2.2%	2.4%	2.3%	3%	2.5%	2.3%	2.5%	2.5%	1.7%	2.2%	2.1%
Food Preparation and Serving Related	9.6%	9.1%	9.1%	10%	9.4%	8.6%	9.7%	9.4%	7.9%	9.3%	8.9%
Building and Grounds Cleaning and Maintenance	3.3%	3.2%	3.0%	3%	3.1%	3.1%	3.1%	2.8%	3.1%	3.0%	2.9%
Personal Care and Service	3.1%	3.1%	2.9%	3%	3.0%	3.2%	2.4%	3.3%	2.7%	2.2%	3.0%
Sales and Related	11.3%	10.5%	10.4%	11%	10.2%	9.6%	10.8%	10.7%	10.6%	9.7%	10.3%
Office and Administrative Support	14.8%	15.8%	16.0%	17%	15.9%	14.7%	15.1%	17.1%	17.9%	15.4%	14.2%
Farming, Fishing, and Forestry	0.2%	0.3%	0.4%	1%	1.3%	0.1%	0.2%	0.2%	0.1%	0.1%	0.6%
Construction and Extraction	5.3%	4.0%	4.1%	4%	3.6%	3.3%	3.4%	5.1%	5.7%	3.3%	4.5%
Installation, Maintenance, and Repair	3.9%	3.9%	3.8%	4%	3.2%	3.0%	4.1%	4.3%	4.1%	3.9%	3.9%
Production	4.2%	6.6%	6.4%	4%	5.6%	4.7%	8.3%	6.1%	6.7%	9.5%	6.0%
Transportation and Material Moving	5.6%	6.9%	6.6%	6%	6.5%	5.0%	7.2%	7.2%	6.1%	7.4%	7.1%

Green font - greater than national average by more than 0.5%; Red font - less than national average by more than 0.5%; Black font - within +/-0.5% of national average.

Source: BLS Occupational Employment Statistics Survey May 2015.

\*Average of the eight states in this table, which was provided by COEDIT as states where Colorado competes for talent.

# Wage By Occupation, CO Vs US, And Competitor States

Within the same occupations, Colorado pays higher wages than the national median in most cases

Annual Median Wage (\$)	Colorado	National	Competitor States Average*	Arizona	California	Massachusetts	North Carolina	Texas	Utah	Ohio	Washington
All	38,800	36,200	37,369	34,680	39,830	45,580	33,100	34,550	33,990	35,030	42,190
Management	107,380	98,560	98,086	87,530	110,430	108,080	101,720	101,670	79,740	90,260	105,260
Business and Financial Operations	68,370	65,710	65,598	59,840	73,010	74,240	63,300	67,280	57,470	60,780	68,860
Computer and Mathematical	88,340	81,430	84,429	77,210	98,840	92,380	79,840	80,360	70,760	73,850	102,190
Architecture and Engineering	81,280	76,870	78,260	72,850	92,660	82,230	69,830	80,430	70,180	70,790	87,110
Life, Physical, and Social Science	65,490	62,160	60,806	54,570	74,330	67,080	58,660	57,500	53,090	58,190	63,030
Community and Social Service	44,860	42,010	41,921	38,280	47,430	40,430	41,890	44,040	37,170	41,320	44,810
Legal	74,520	78,170	76,475	74,890	101,640	93,050	57,080	77,220	61,960	66,890	79,070
Education, Training, and Library	44,660	47,220	47,535	38,480	52,960	58,450	41,230	47,820	42,620	50,570	48,150
Arts, Design, Entertainment, Sports, and Media	43,050	46,160	44,756	39,350	55,960	53,130	41,490	43,810	38,160	38,750	47,400
Healthcare Practitioners and Technical	67,510	62,610	66,709	65,770	84,300	76,170	57,260	61,080	57,660	58,050	73,380
Healthcare Support	30,240	27,040	27,836	28,910	32,350	30,980	23,110	24,590	26,290	23,980	32,480
Protective Service	40,220	37,730	40,529	39,970	42,050	50,630	32,360	38,020	35,570	38,840	46,790
Food Preparation and Serving Related	19,570	19,580	20,339	19,270	21,820	22,240	18,650	18,930	19,220	18,980	23,600
Building and Grounds Cleaning and Maintenance	24,420	23,860	24,515	22,330	26,410	32,430	21,740	21,170	21,340	22,520	28,180
Personal Care and Service	22,480	21,850	22,314	21,780	23,300	27,000	20,620	18,680	21,590	20,600	24,940
Sales and Related	29,060	25,660	26,741	25,410	28,410	28,930	24,660	26,300	25,580	24,780	29,860
Office and Administrative Support	35,360	33,200	33,904	32,520	36,940	39,320	31,590	31,850	30,130	31,960	36,920
Farming, Fishing, and Forestry	25,120	21,760	23,761	18,760	19,790	26,820	24,390	21,970	24,410	26,350	27,600
Construction and Extraction	41,570	42,280	44,038	38,580	51,160	56,240	34,780	36,320	38,250	44,490	52,480
Installation, Maintenance, and Repair	45,650	42,790	44,093	41,340	46,970	50,380	40,750	39,950	43,000	41,510	48,840
Production	33,670	32,250	32,711	31,410	29,960	35,870	29,570	31,530	31,680	33,990	37,680
Transportation and Material Moving	32,660	30,090	30,504	29,390	29,540	32,900	27,740	29,780	31,710	28,830	34,140

**Green font** - higher than national average by more than \$1,000 ; **Red font** - lower than national average by more than \$1,000. **Black font** - within +/- \$1,000 national average.

Source: BLS Occupational Employment Statistics Survey May 2015.

\*Average of the eight states in this table, which was provided by COEDIT as states where Colorado competes for talent.

# Wage By Occupation, Adjusted By Cost Of Living

Even with consideration of a slightly higher living cost, Colorado still pays higher wages than the national median in most cases

Annual Median Wage, Adjusted by Cost of Living (\$)	Colorado	National	Competitor States Average*	Arizona	California	Massachusetts	North Carolina	Texas	Utah	Ohio	Washington
Regional Price Parity (Cost of living)	102.2	100	99.39	97.1	112.3	107.3	91.7	96.7	97.2	89.6	103.2
All	\$37,946	\$36,200	37,598	35,686	34,931	42,253	35,847	35,690	34,942	38,673	40,840
Management	\$105,018	\$98,560	98,687	90,068	96,847	100,190	110,163	105,025	81,973	99,647	101,892
Business and Financial Operations	\$66,866	\$65,710	66,000	61,575	64,030	68,820	68,554	69,500	59,079	67,101	66,656
Computer and Mathematical	\$86,397	\$81,430	84,946	79,449	86,683	85,636	86,467	83,012	72,741	81,530	98,920
Architecture and Engineering	\$79,492	\$76,870	78,739	74,963	81,263	76,227	75,626	83,084	72,145	78,152	84,322
Life, Physical, and Social Science	\$64,049	\$62,160	61,178	56,153	65,187	62,183	63,529	59,398	54,577	64,242	61,013
Community and Social Service	\$43,873	\$42,010	42,178	39,390	41,596	37,479	45,367	45,493	38,211	45,617	43,376
Legal	\$72,881	\$78,170	76,943	77,062	89,138	86,257	61,818	79,768	63,695	73,847	76,540
Education, Training, and Library	\$43,677	\$47,220	47,826	39,596	46,446	54,183	44,652	49,398	43,813	55,829	46,609
Arts, Design, Entertainment, Sports, and Media	\$42,103	\$46,160	45,030	40,491	49,077	49,252	44,934	45,256	39,228	42,780	45,883
Healthcare Practitioners and Technical	\$66,025	\$62,610	67,118	67,677	73,931	70,610	62,013	63,096	59,274	64,087	71,032
Healthcare Support	\$29,575	\$27,040	28,006	29,748	28,371	28,718	25,028	25,401	27,026	26,474	31,441
Protective Service	\$39,335	\$37,730	40,777	41,129	36,878	46,934	35,046	39,275	36,566	42,879	45,293
Food Preparation and Serving Related	\$19,139	\$19,580	20,464	19,829	19,136	20,616	20,198	19,555	19,758	20,954	22,845
Building and Grounds Cleaning and Maintenance	\$23,883	\$23,860	24,665	22,978	23,162	30,063	23,544	21,869	21,938	24,862	27,278
Personal Care and Service	\$21,985	\$21,850	22,451	22,412	20,434	25,029	22,331	19,296	22,195	22,742	24,142
Sales and Related	\$28,421	\$25,660	26,905	26,147	24,916	26,818	26,707	27,168	26,296	27,357	28,904
Office and Administrative Support	\$34,582	\$33,200	34,112	33,463	32,396	36,450	34,212	32,901	30,974	35,284	35,739
Farming, Fishing, and Forestry	\$24,567	\$21,760	23,907	19,304	17,356	24,862	26,414	22,695	25,093	29,090	26,717
Construction and Extraction	\$40,655	\$42,280	44,308	39,699	44,867	52,134	37,667	37,519	39,321	49,117	50,801
Installation, Maintenance, and Repair	\$44,646	\$42,790	44,363	42,539	41,193	46,702	44,132	41,268	44,204	45,827	47,277
Production	\$32,929	\$32,250	32,911	32,321	26,275	33,251	32,024	32,570	32,567	37,525	36,474
Transportation and Material Moving	\$31,941	\$30,090	30,691	30,242	25,907	30,498	30,042	30,763	32,598	31,828	33,048

**Green font** - higher than national average by more than \$1,000 ; **Red font** - lower than national average by more than \$1,000. **Black font** - within +/- \$1,000 national average.

Source: BLS Occupational Employment Statistics Survey May 2015. Cost of living difference is measured by Regional Price Parities (RPPs) from BEA (Bureau of Economic Analysis), which compares the differences in the price levels of goods and services across states and metropolitan areas for a given year. Colorado's RPP is 102%, meaning its cost of living is 2% higher than national average.

# Migration, CO And Competitor States

Colorado ranks third nationally in net inflow (in-migrants minus out-migrants), and is a relatively attractive destination across education and income levels

Migration		Colorado	Competitor States Average*	Arizona	California	Massachusetts	North Carolina	Texas	Utah	Ohio	Washington
Net Inflow (% of total 2014 population)	Net Inflow***	1.5%	1.0%	1.4%	0.6%	1.0%	0.9%	1.2%	1.1%	0.3%	1.3%
	In-Migrants	252,246	369,651	298,594	831,989	217,653	332,519	755,964	111,815	238,694	287,382
	Out-Migrants	173,332	254,793	203,810	593,308	153,736	248,938	435,107	79,697	207,006	198,200
	National Net Inflow Rank	3	15	7	25	14	17	10	11	41	9
Inflow by Educational Attainment** (annual average % of population at each education level)	Population 25 years and over	4.0%	2.9%	4.1%	1.9%	2.4%	2.9%	2.6%	3.0%	1.7%	3.3%
	Less than high school graduate	3.0%	2.2%	3.2%	1.2%	2.0%	1.7%	2.0%	2.6%	1.6%	2.8%
	High school graduate (includes equivalency)	3.3%	2.2%	3.6%	1.4%	1.6%	2.2%	2.0%	2.3%	1.1%	2.6%
	Some college or associate's degree	3.8%	2.6%	3.9%	1.5%	1.8%	2.8%	2.3%	2.6%	1.5%	2.9%
	Bachelor's degree	5.1%	3.7%	5.2%	2.7%	3.1%	3.8%	3.4%	3.5%	2.3%	4.3%
	Graduate or professional degree	4.8%	4.4%	5.4%	3.4%	4.0%	4.9%	4.5%	4.7%	3.1%	5.2%
Inflow by Income** (annual average % of population at each income level)	\$1 to \$9,999 or less	6.8%	4.8%	5.8%	2.8%	5.4%	4.3%	3.5%	7.0%	3.1%	4.9%
	\$10,000 to \$14,999	5.0%	3.3%	4.5%	1.8%	2.8%	3.0%	2.7%	4.0%	1.9%	3.9%
	\$15,000 to \$24,999	5.1%	3.2%	4.2%	1.9%	2.5%	3.1%	2.7%	3.4%	1.7%	4.2%
	\$25,000 to \$34,999	4.7%	2.9%	3.9%	1.7%	2.4%	3.0%	2.4%	2.7%	1.5%	3.5%
	\$35,000 to \$49,999	3.9%	2.6%	3.6%	1.7%	2.4%	2.8%	2.3%	2.3%	1.2%	3.1%
	\$50,000 to \$64,999	3.8%	2.7%	4.2%	1.7%	2.3%	3.1%	2.3%	2.4%	1.3%	2.9%
	\$65,000 to \$74,999	3.2%	2.6%	3.6%	1.8%	1.9%	3.4%	2.5%	2.2%	1.7%	3.2%
	\$75,000 or more	3.7%	2.8%	4.2%	1.8%	2.0%	3.3%	2.6%	2.8%	1.8%	3.2%

Green font - greater than national average; Red font - less than national average. N/A - data not reported

Source: 2010-2014 American Community Survey. Educational attainment and income data spans 2010-2014. \*\*\*Includes foreign immigrants, but not emigrants.

\*Average of the eight states in this table, which was provided by COEDIT as states where Colorado competes for talent.

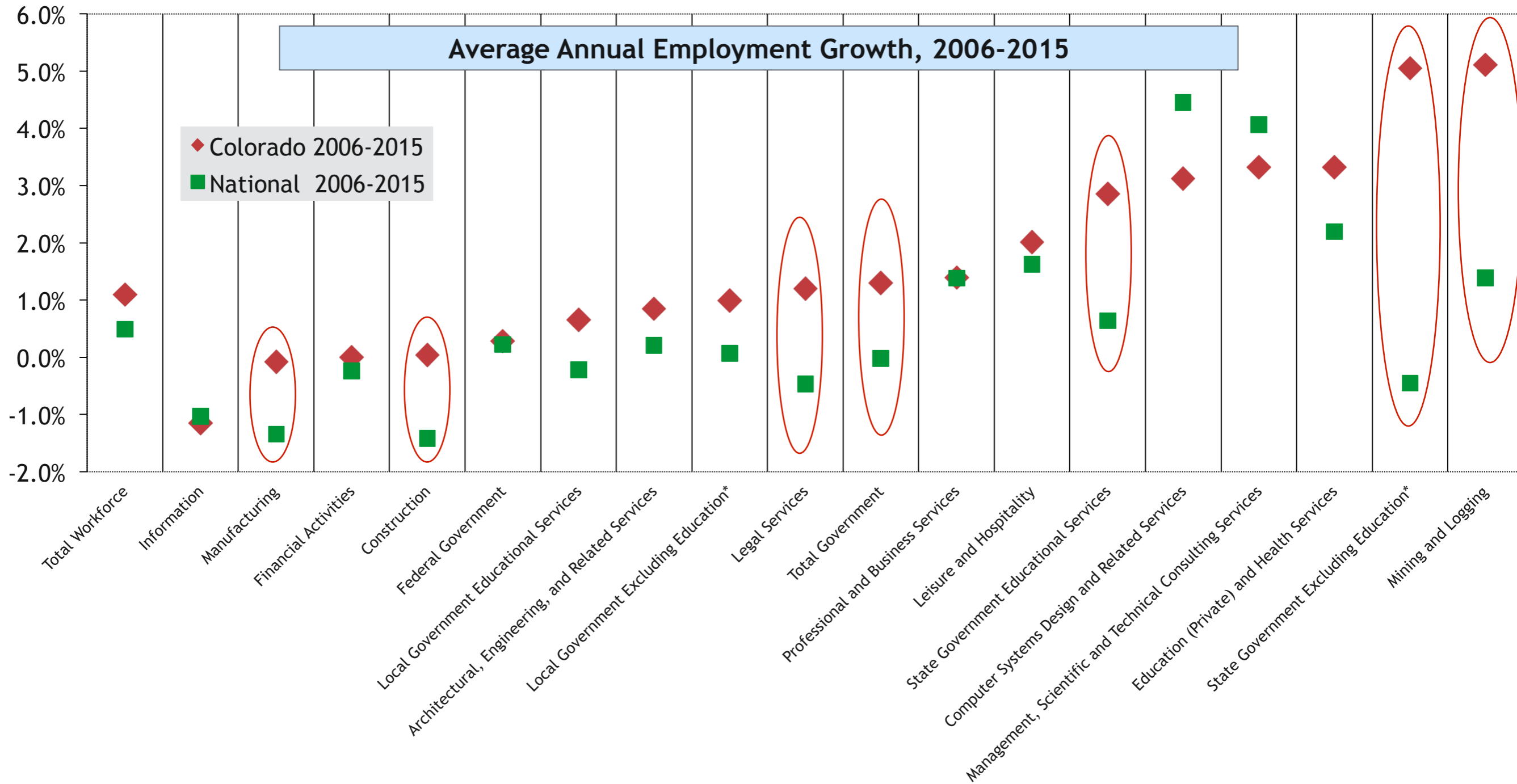
# Highlights Of Observations - Wage Profile

- Colorado pays employees 7% higher than national median. Even though the pay is lower than the top pay comparison states Massachusetts, Washington and California, it is higher than most other states.
- Colorado's cost of living is about 2% higher than the national average. So, the cost of living adjusted pay in Colorado is still higher than most other states.
  - Is the higher pay due to Colorado employing more people in higher pay occupations (e.g. management, engineering), or is it because people in the SAME occupations are paid higher in Colorado? It is both!
    - Colorado has a higher concentration in higher pay, highly skilled knowledge-based occupations such as management, business, computer and engineering, and a lower concentration in lower pay, blue collar jobs such as transportation and production.
    - In the same occupations, Colorado pays higher wages in most cases. For the industry specific occupations like engineering and computer jobs, the higher pay is likely driven by a higher demand; while for the more general occupations like management, the higher pay is probably due to the higher technical employers paying higher pay (e.g. software company HR managers are paid higher than retail company HR managers).
  - These pay observations are consistent with Colorado's comparative advantage being in highly skilled knowledge-based occupations.
  - Colorado is already ranked high as a destination for migrants, which is beneficial for maintaining a strong pipeline for workforce growth. Further improving the quality of living can better help attract and retain talent.

# *Growth Trend*

# Historical Industry Employment Growth, CO Vs US

Colorado has a higher workforce growth than the US, especially in mining, education and healthcare



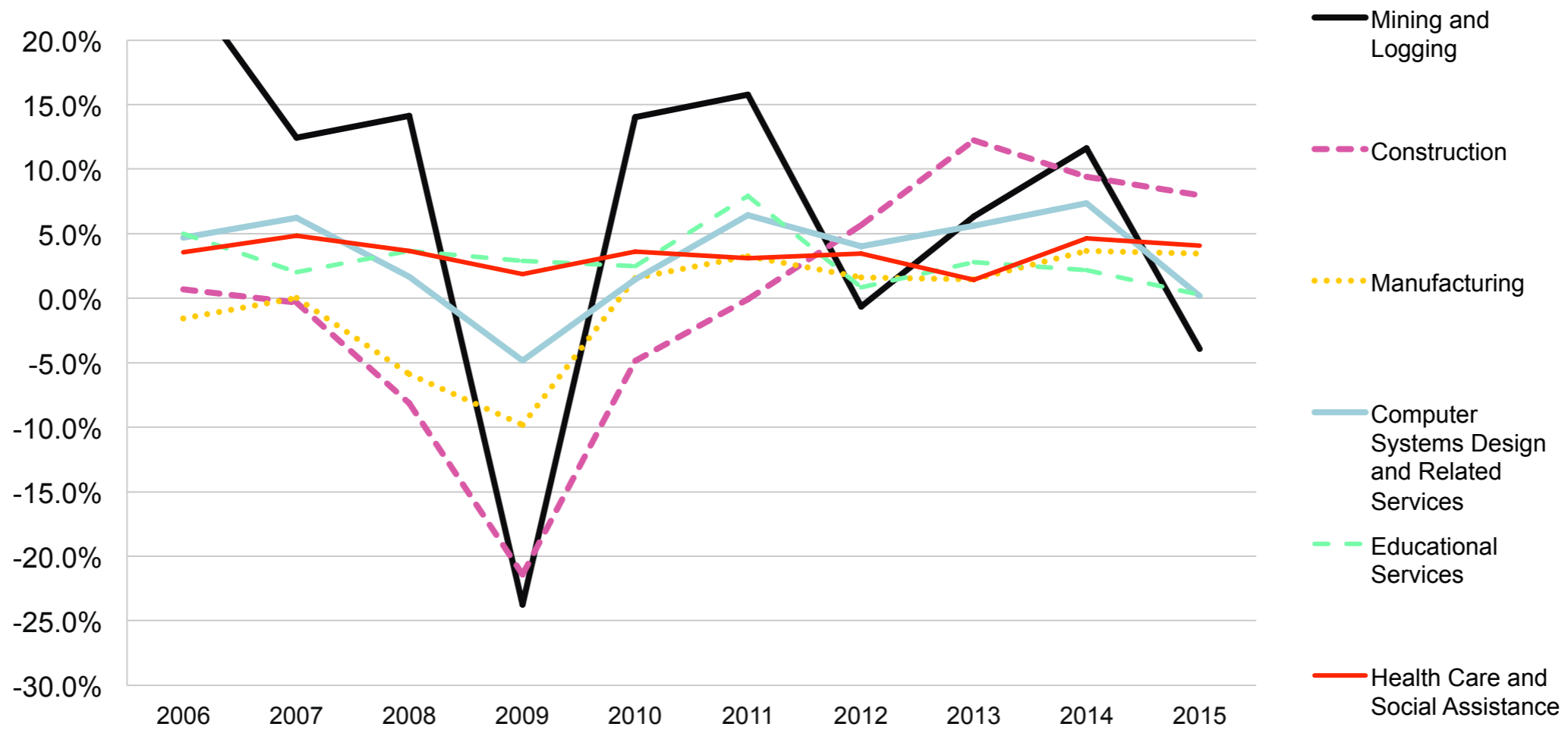
Source: BLS Current Employment Survey 2006-2015. \*Other State Government includes Hospitals, General Administration, Utilities, and Transportation



# Historical Private Industry Employment Growth, By Year

*Mining fluctuates more substantially than other industries; construction and manufacturing grew stronger after 2010; Computer-related services and education/healthcare have more stable trends, except the disruption in 2009*

Annual Employment Growth, Colorado 2006-2015

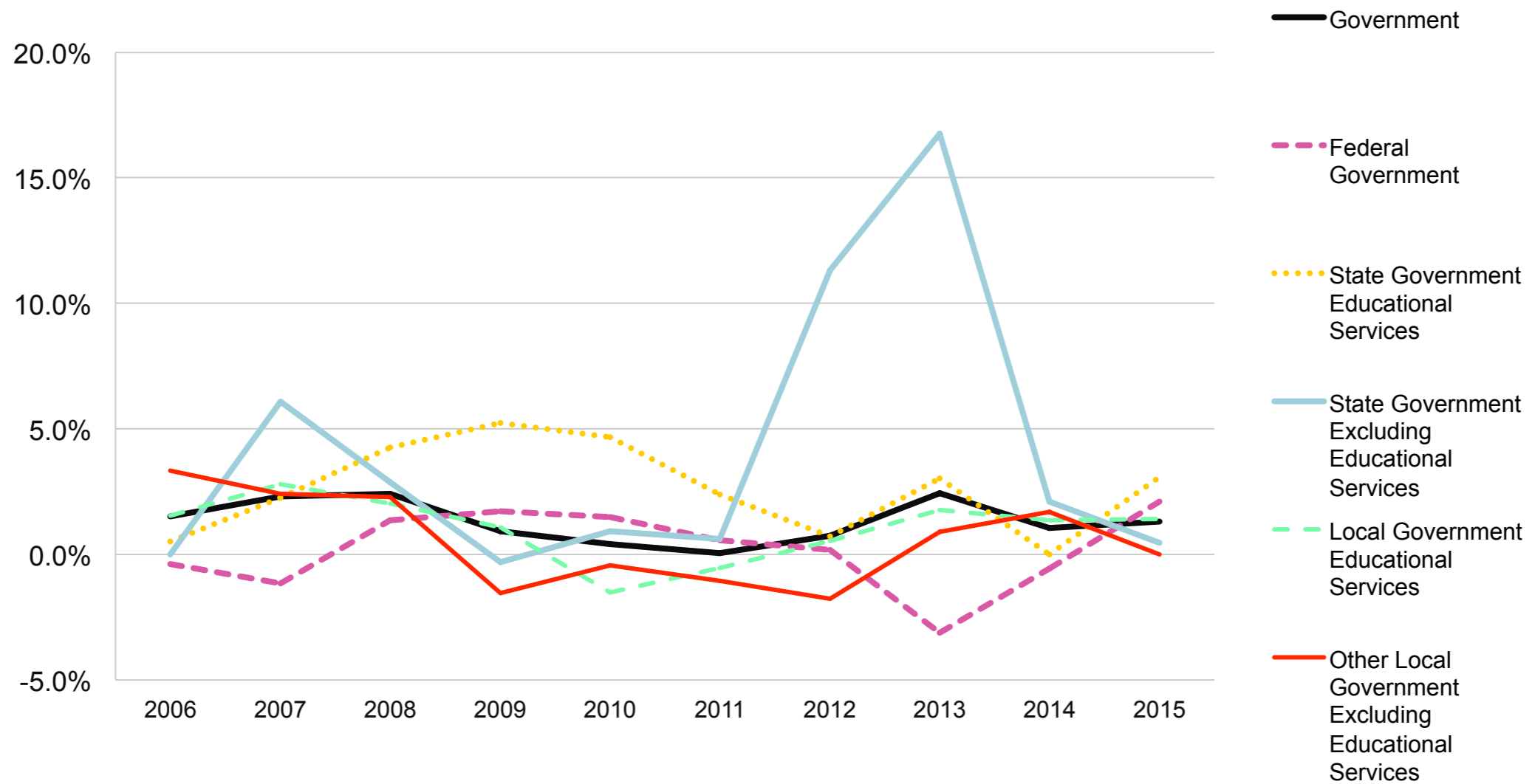


Source: BLS Current Employment Survey 2006-2015.

# Historical Public Industry Employment Growth, By Year

State government grew rapidly from 2011 to 2013, perhaps due to reclassification of state hospitals. Growth in other government industries is otherwise steady, hovering between -5% and 5% since 2006

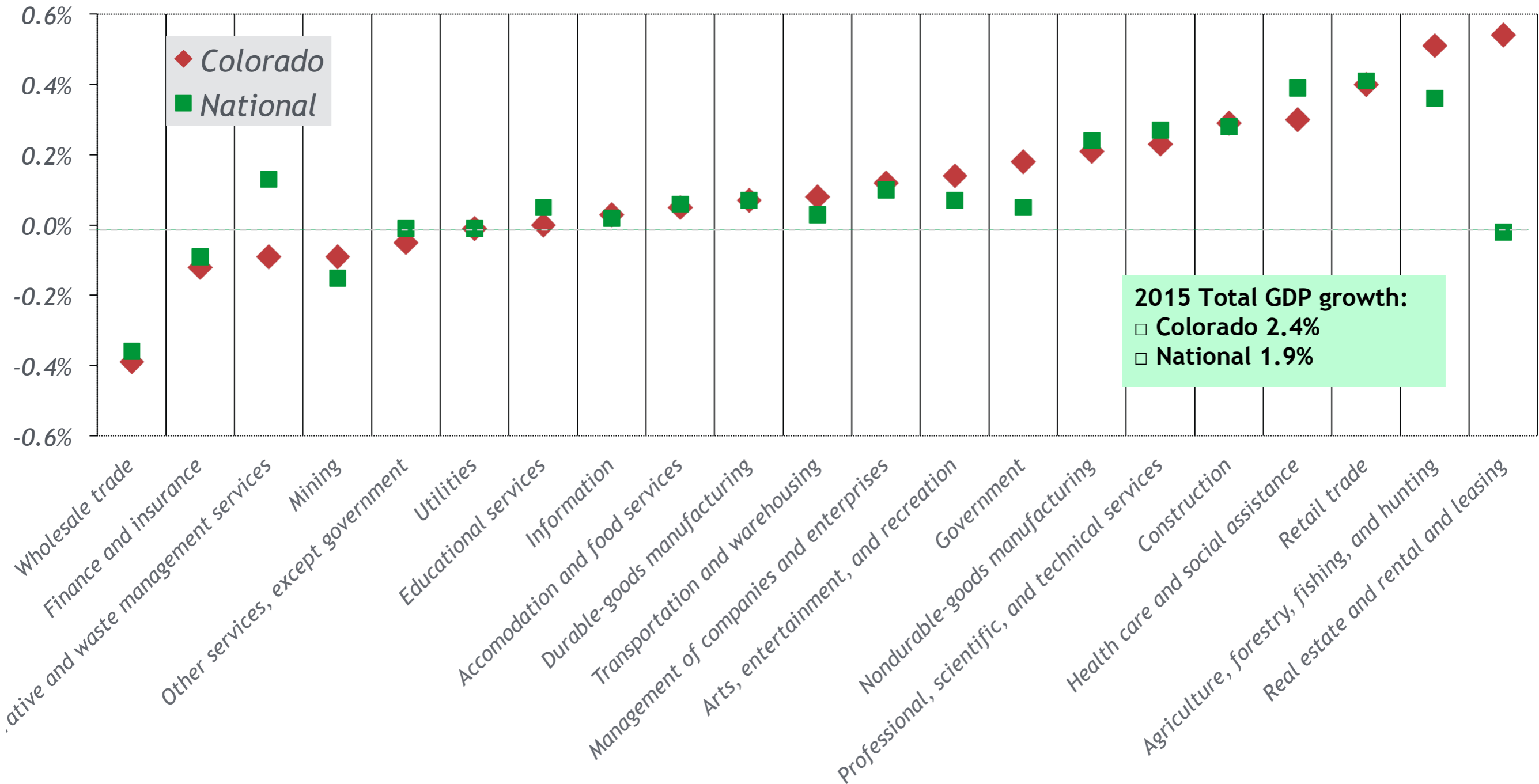
Annual Employment Growth, Colorado 2006-2015



Source: BLS Current Employment Survey 2006-2015. Federal includes U.S. Postal Service, Department of Defense, Federal Hospitals, Other. Other State and Local includes State and Local Hospitals, General Administration, Utilities, and Transportation

# Industry Contributions to GDP Growth 2015

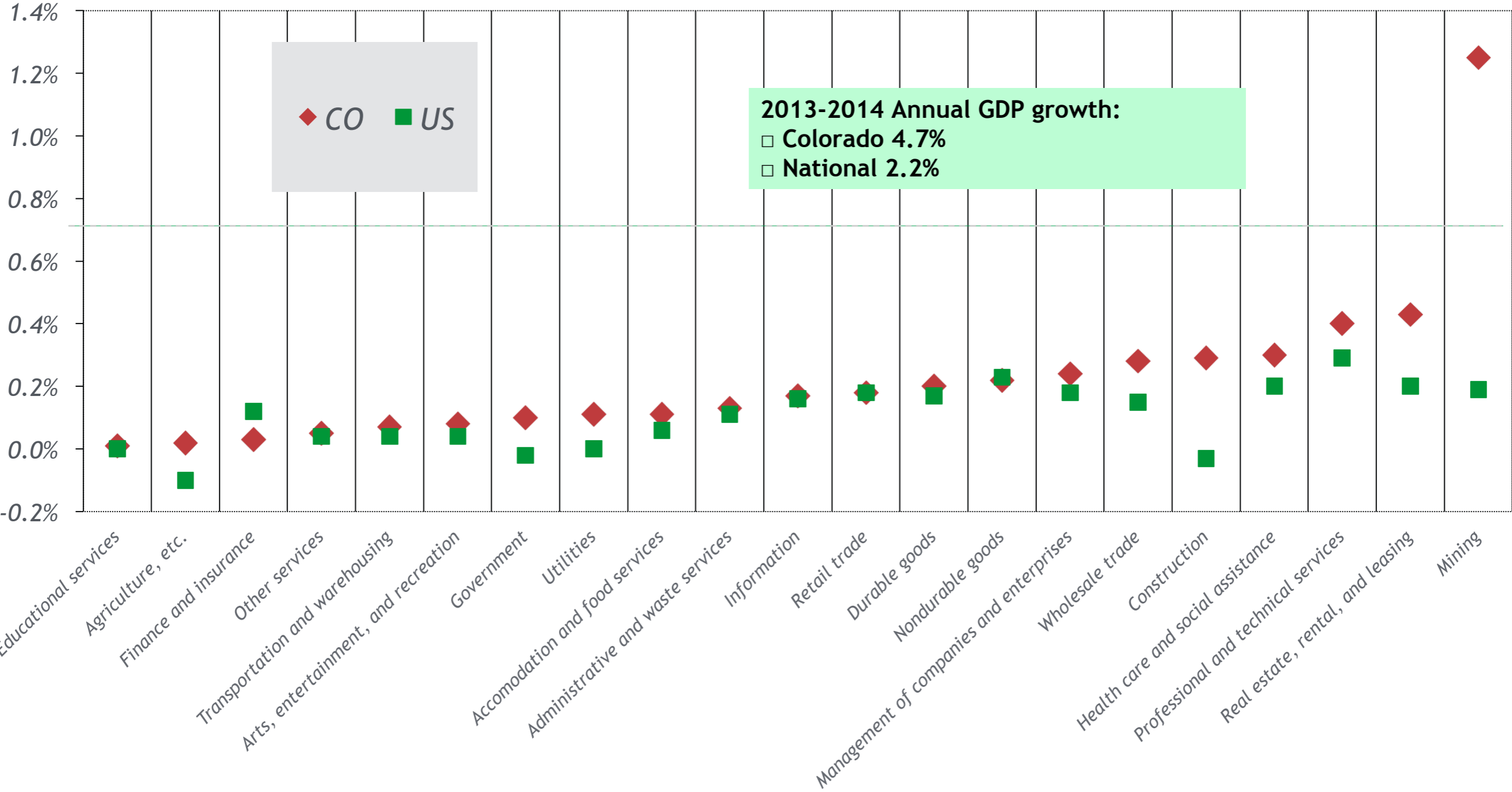
A large portion of Colorado's GDP growth comes from real estate industry in 2015



Source: U.S. Bureau of Economic Analysis

# Industry Contributions to GDP Growth, 2013 to 2014

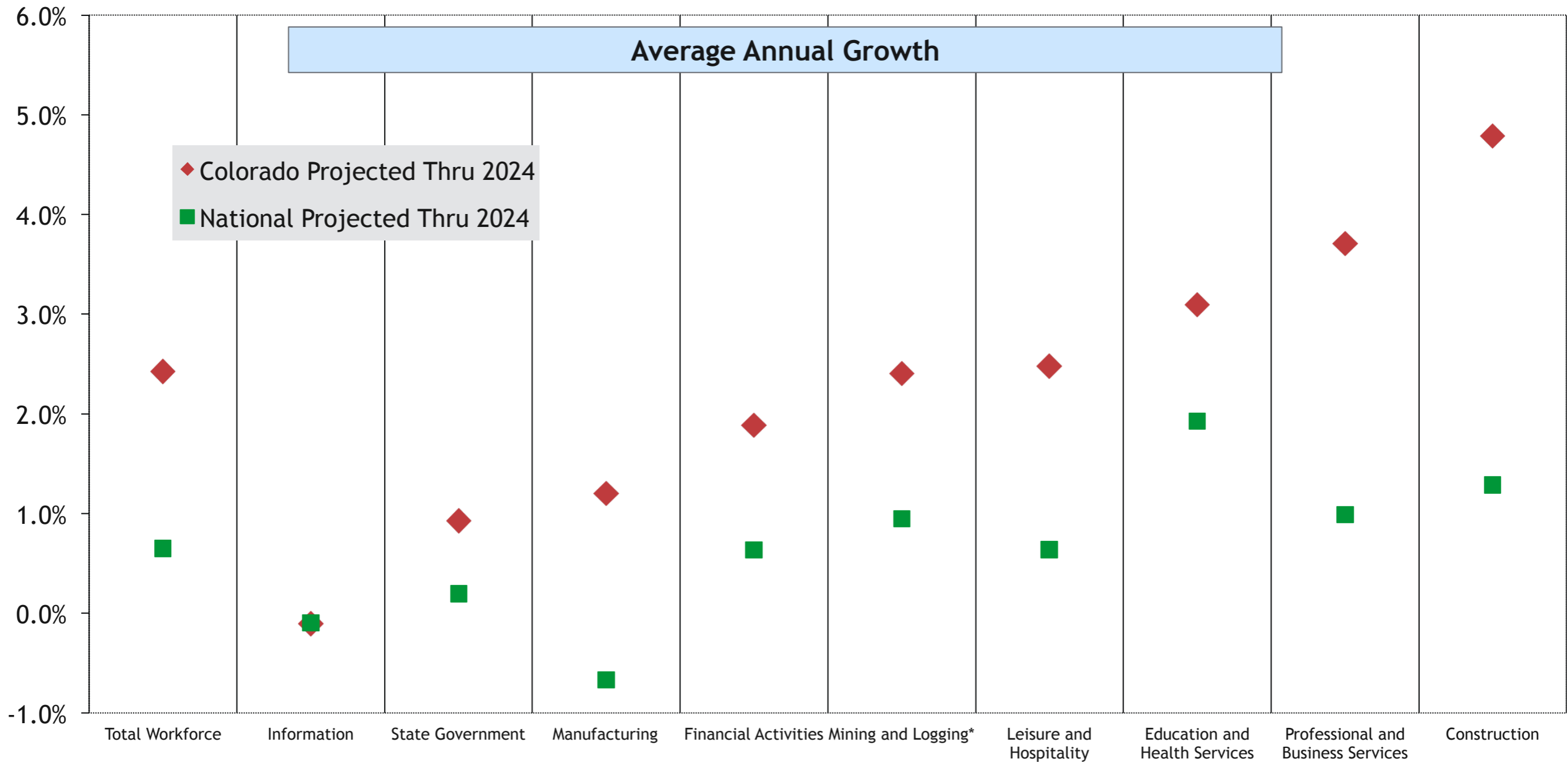
A large portion of Colorado's GDP growth comes from mining industry from 2013 to 2014



Source: U.S. Bureau of Economic Analysis

# Industry Forecast—2014 to 2024

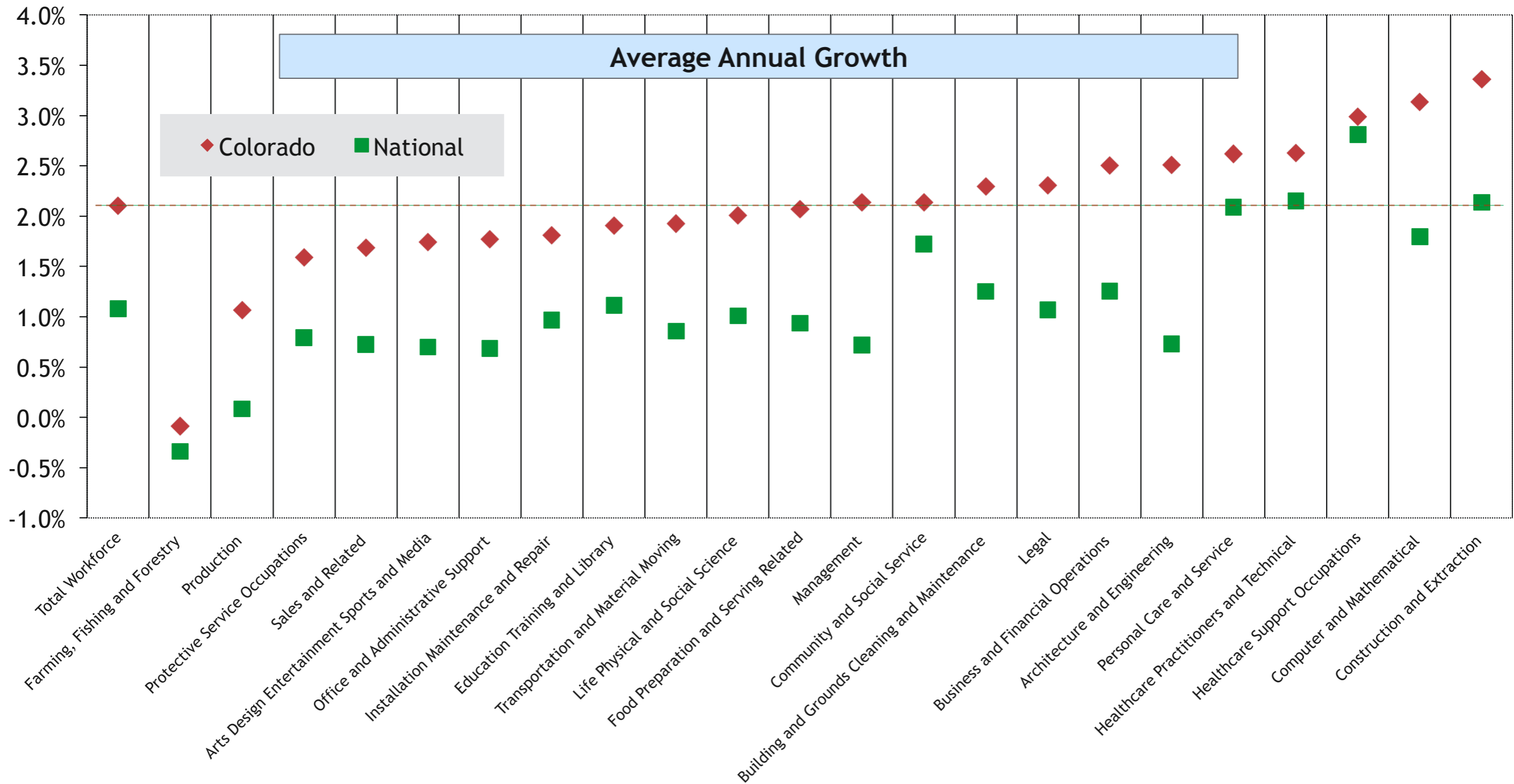
Colorado will continue to grow faster than the US, especially in construction, professional services



Source: BLS Employment Projections 2014-2024. Projections of industry and occupational employment are developed in a series of six interrelated steps, each of which is based on a different procedure or model and assumptions: labor force (using Current Population Survey data), aggregate economy, final demand (GDP) by consuming sector and product, industry output, industry employment (derived from industry output and labor force projections), and employment and openings by occupation using Occupational Employment Statistics.\*Projected growth thru 2024 for Mining only

# Occupation Forecast—2012 to 2022 (All 2-digit SOC Occupations)

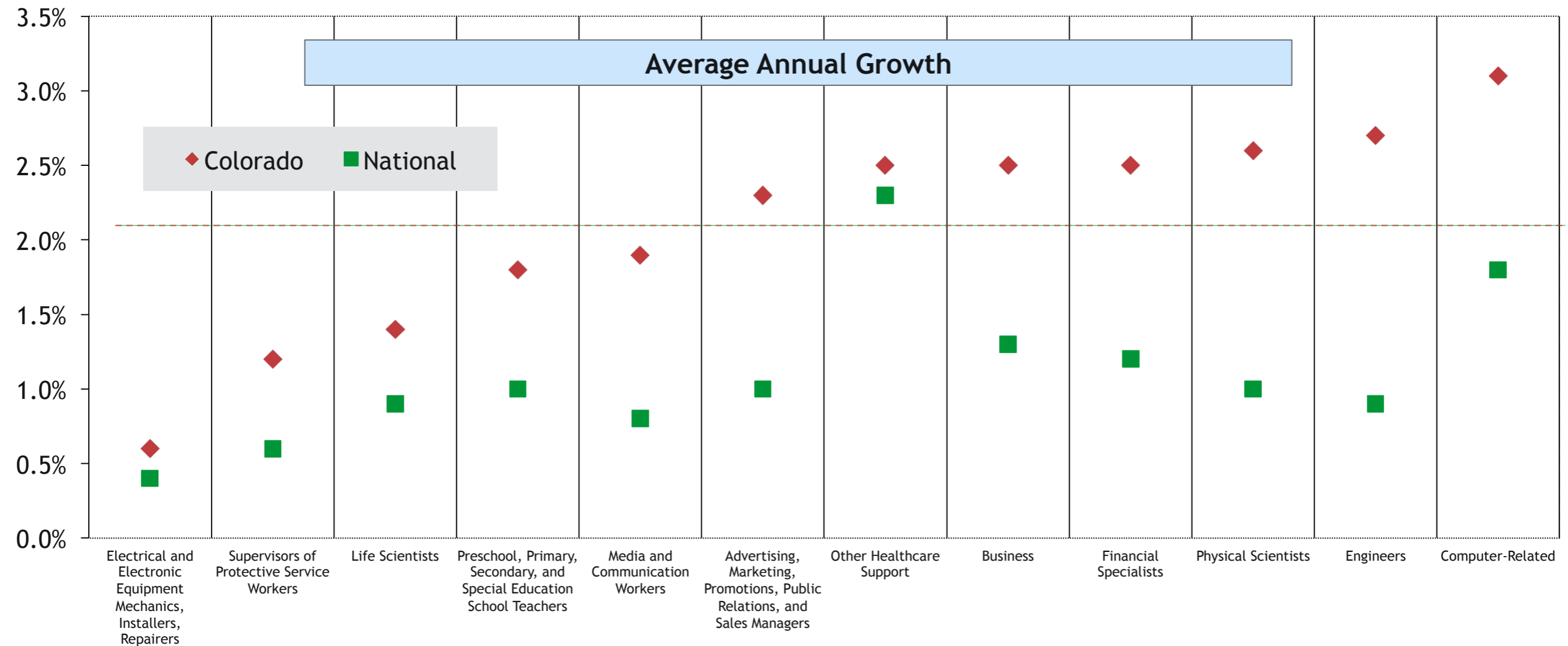
Colorado's faster growth is expected to span across all occupations, except for healthcare support and farming.



Source: Projections Central 2012-2022 projections. Each State Employment Security Agency, in cooperation with the Bureau of Labor Statistics, uses the Occupational Employment Statistics (OES) report to gather occupational employment data. These OES data are the basis for the staffing patterns used in the projections.

# Occupation Forecast—2012 to 2022 (Select Detailed Occupations)

Colorado's workforce is expected to grow rapidly in business, finance, engineering and computer-related occupations



Source: Projections Central 2012-2022 projections. Select 3 to 6 digit SOC occupations shown. Each State Employment Security Agency, in cooperation with the Bureau of Labor Statistics, uses the Occupational Employment Statistics (OES) report to gather occupational employment data. These OES data are the basis for the staffing patterns used in the projections.

# Highlights Of Observations - Growth Trends

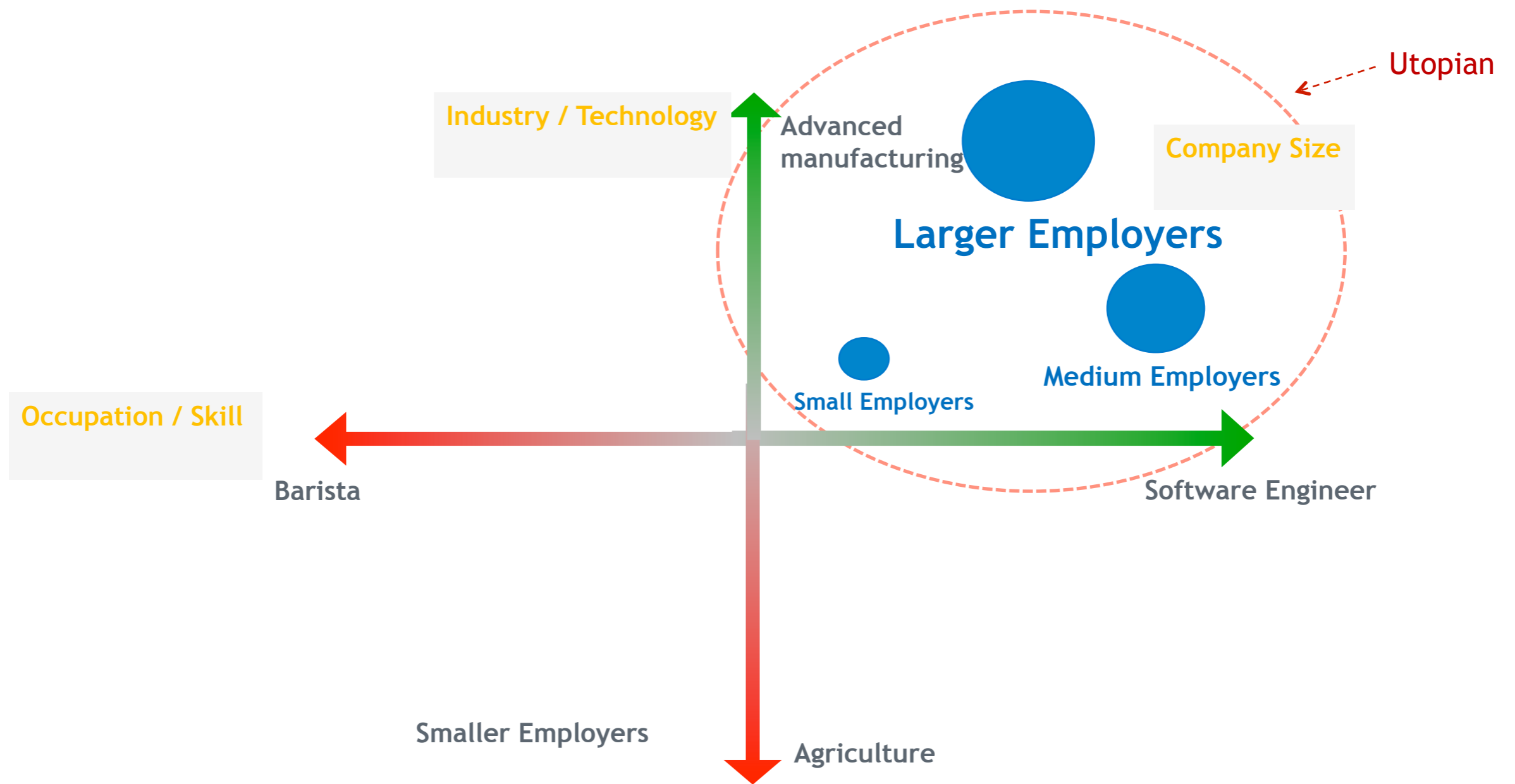
- In the past 10 years, Colorado workforce has been growing faster than the US, especially in mining, government, education and healthcare
  - Mining fluctuates more substantially than other, less volatile industries like engineering/computer related services and education/healthcare. This held true even after the 2008 recession
- In more recent years, a large portion of Colorado's GDP growth comes from real estate industry or mining
- Ten year labor force projections show that Colorado will continue to grow faster than the US—Colorado's workforce is expected to grow two times as fast as the national average
- Colorado's faster growth is expected to span across all occupations, except for healthcare support and farming
  - Growth in engineering, computer and healthcare jobs are projected to be higher than 2.5% (even without any changes in government incentives), which is higher than the overall workforce growth. Together with the fact that these occupations require a relatively long time to prepare talent, it is therefore critical to conduct strategic workforce planning at the state level, to ensure a strong pipeline to support healthy growth in the state economy.



# *Future Utopian and Optimal Mix*

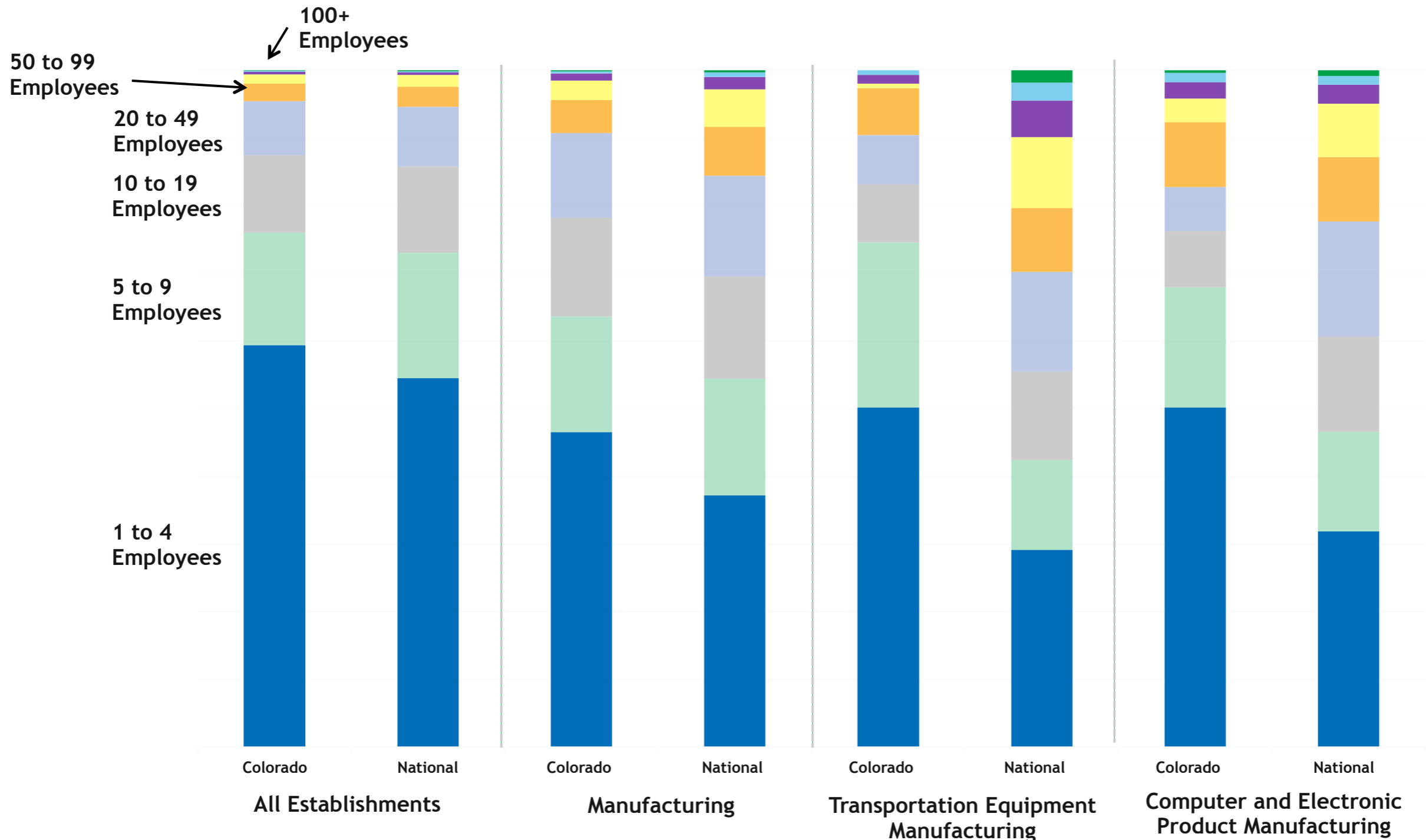
# Healthy Colorado

Colorado's comparative advantage lies in its highly educated and skilled workforce. Future Utopia would be a further strengthening of knowledge economy and occupations that rely on higher skills. These type of employers tend to be smaller size by nature, thus it's important to bring in more larger scale employers to maintain job creation.



# Size of Manufacturing Establishments Overview

Colorado has more smaller-sized employers than the national average, across many industries.



Source: U.S. Census Bureau, 2014 County Business Patterns

# Future Utopian and Optimal Mix

- Colorado's comparative advantage lies in its highly educated and skilled workforce. Future Utopia would be a further strengthening of knowledge economy and occupations that rely on higher skills.
- These type of employers tend to be smaller size by nature. The state could consider balancing the employer size composition by bringing in more larger scale employers.
  - Across industries, Colorado has a larger fraction of smaller employers (in terms of headcounts) than the national average. This could be because Colorado has a larger fraction of knowledge economy (e.g. advanced manufacturing, hi-tech, professional services), which tend to require a smaller workforce.
  - Within manufacturing, different sub-industries have different size profile. For example, car manufacturers have more larger plants than computer manufacturers. Colorado has a higher concentration of computer manufacturing and a lower concentration of car manufacturing, which leads to a higher fraction of smaller employers.
- On one hand, Colorado should keep leveraging its skilled workforce comparative advantage by attracting and retaining companies who employ more highly skilled workers. These companies tend to be innovative and use advanced processes regardless of what product or services they produce. These employers will create more higher paying jobs and eventually improve the overall income level in the state.
- On the other hand, Colorado could consider attracting more larger employers to help maintain more stability and ripple effects to benefit various parts of the local economy.

# *Recommendations For Business Retention and Recruitment*

# Recommendations

- Colorado should maintain and further advance its current comparative advantage in the highly skilled workforce and knowledge-based economy, while at the same time consider catching up on the relatively lower representation of health care professionals and larger size employers.
- Near term (one-year) planning:
  - Create a five-year visionary view - where do we want to be ? How is that aligned with the state's mission and brand? What challenges do we face to get there?
  - Identify the specific industries/occupations Colorado wants to target, as well as the technology/skill components that could span across industry/occupation.
  - Review the incentive programs and compare against other states. Are the current incentive programs aligned with the targeted industries/occupations? Is the incentive strong enough compared to opportunities in other states?
  - Further analyze the health care industry. Is the underrepresentation of health care professionals a more recent phenomenon? Is it only an issue in non-Denver areas? What can we do about it?
  - Conduct a strategic workforce planning session to ensure the pipeline of home-built and in-migration STEM talent will be strong enough to maintain Colorado's leader position in the knowledge-based economy years down the road.

# Recommendations

## Long term (five-year) planning

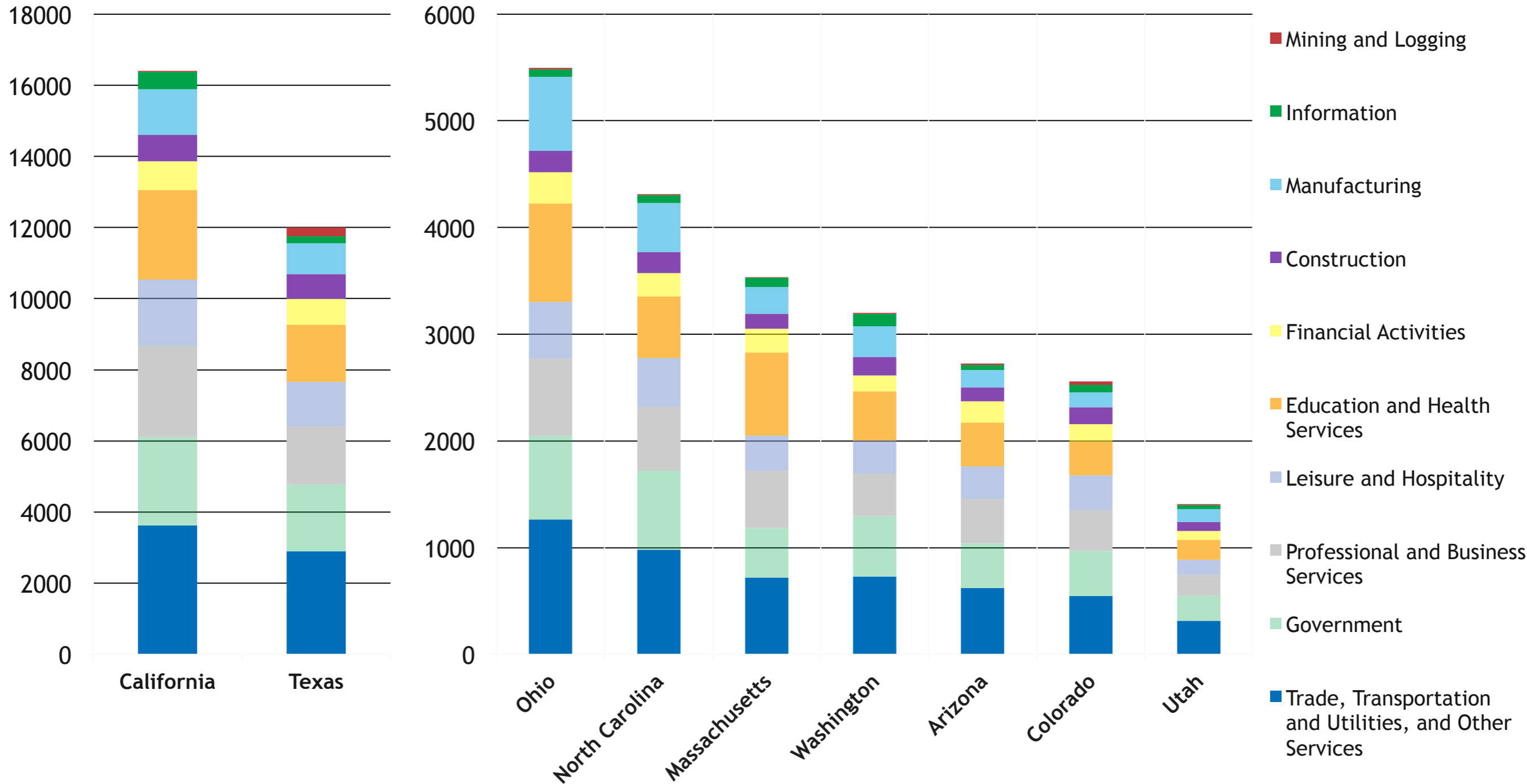
- Identify government initiatives that can be carried out to support the vision and mission, such as:
  - Increase STEM teachers and students in the state
  - Attract more skilled talent from other states/countries
  - Improve quality of living for families so that the attracted talents stay longer in Colorado
  - Support work-based internships to increase graduates' employability and expose other states' students to the attractive living environment in Colorado
  - Attract and retain the companies that utilize the advanced technologies and employ the higher skilled workforce
  - Design the incentives to focus on the technology/skills, in addition to industry/occupation
  - Determine how to implement the incentive programs by accurately identifying and monitoring the technology/skills used by companies

# *Appendix*



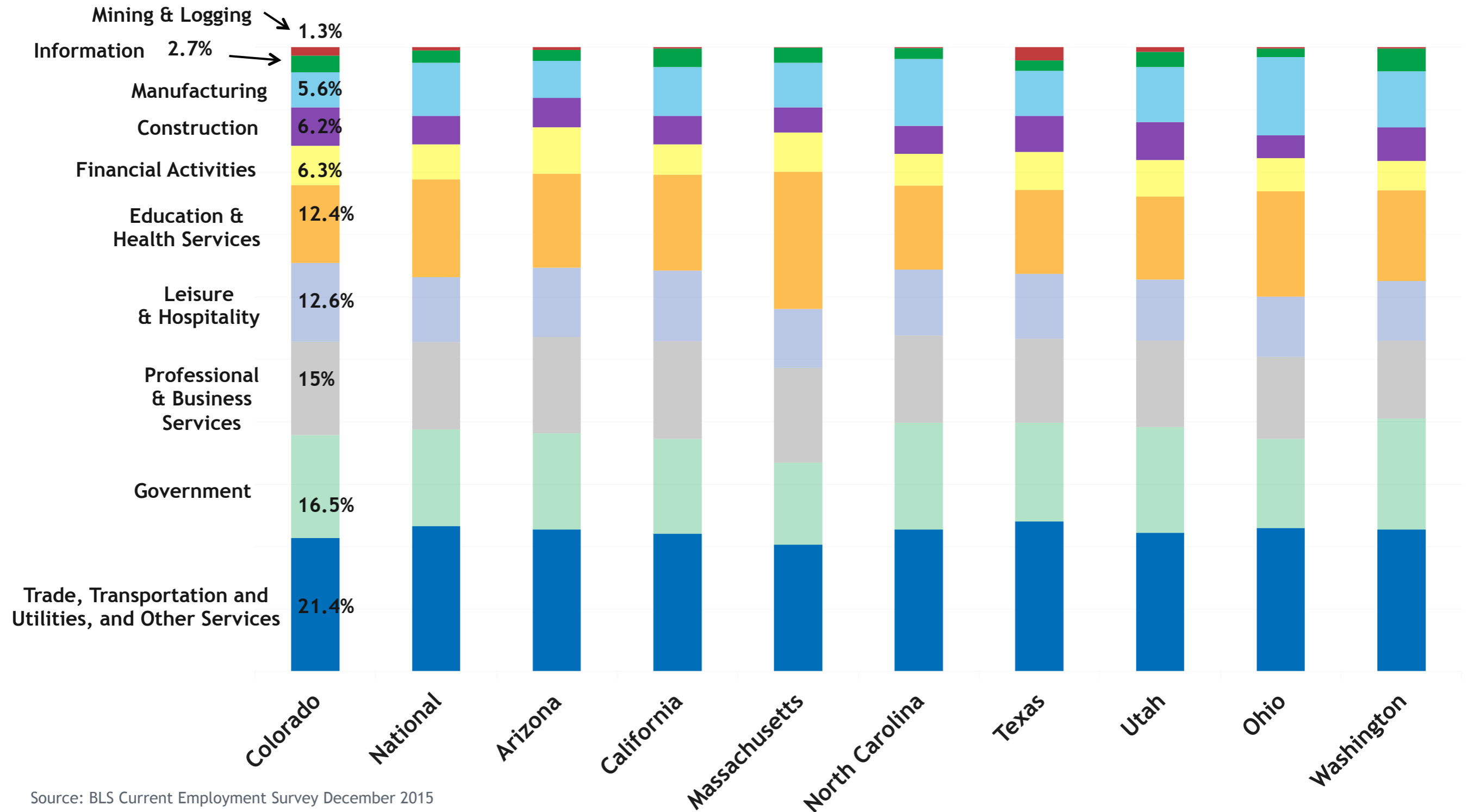
# Industry Overview

## Employed Workforce (Thousands)



Source: BLS Current Employment Survey December 2015

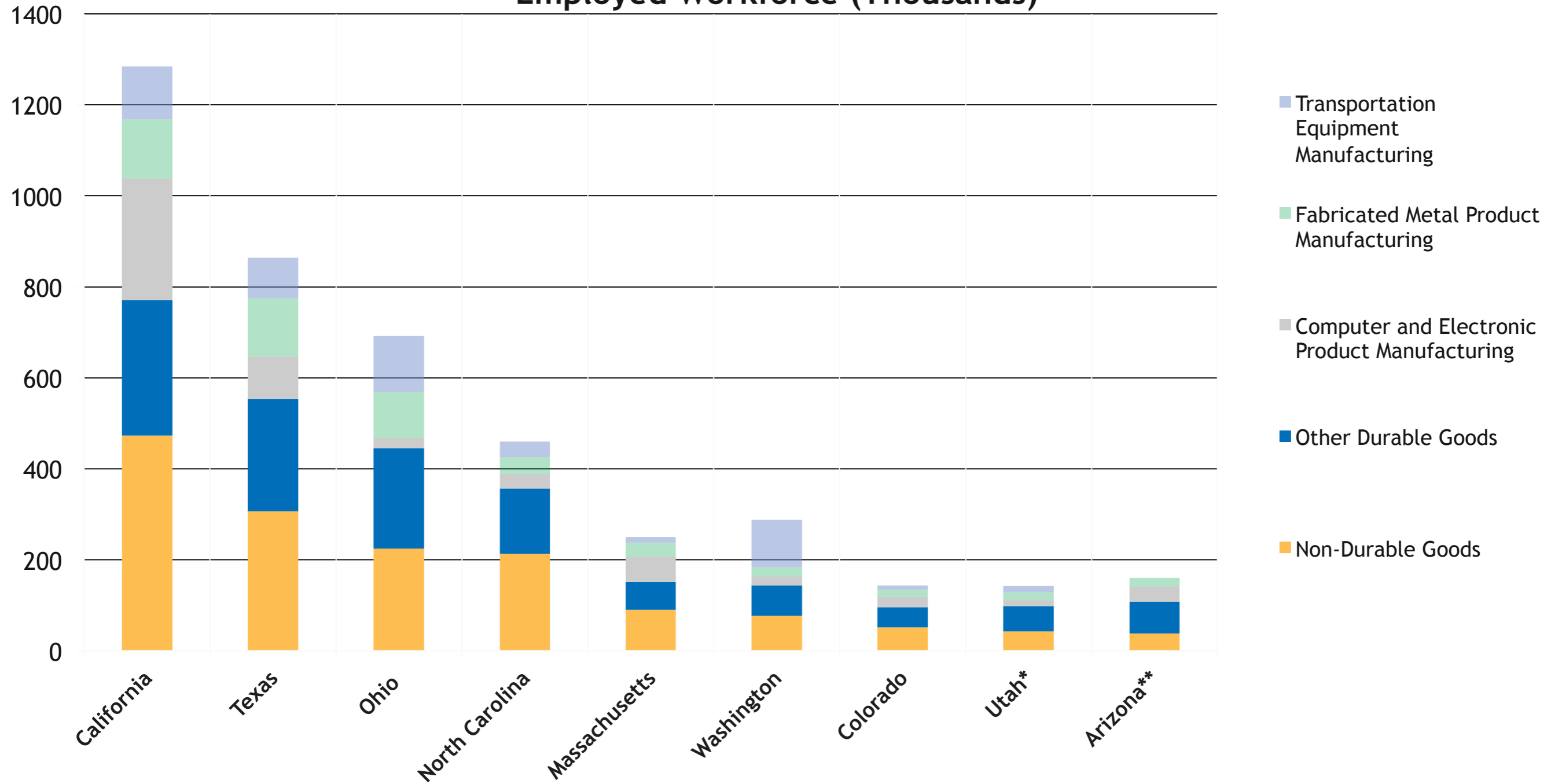
# Industry Overview



Source: BLS Current Employment Survey December 2015

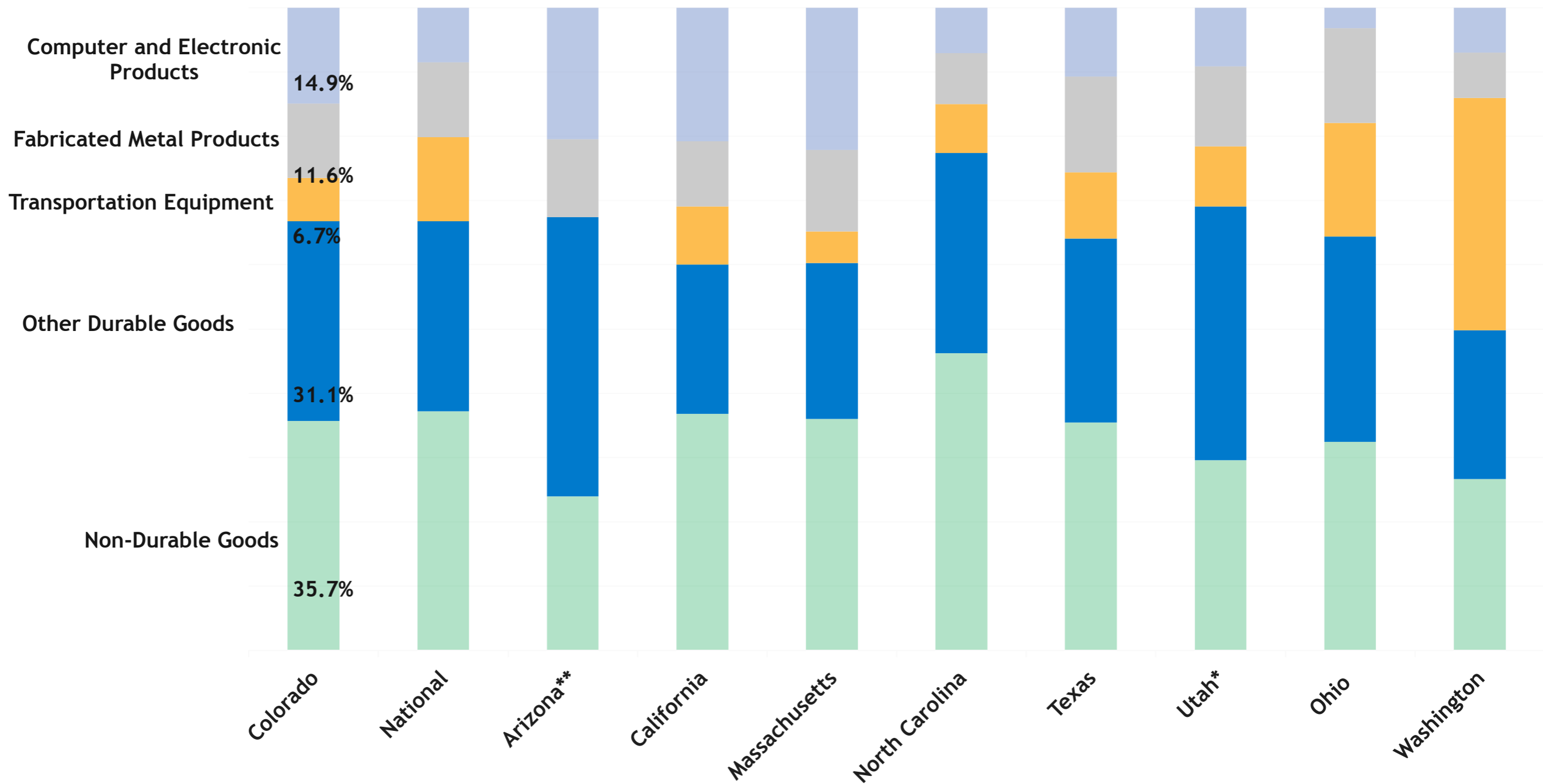
# Manufacturing Overview

## Employed Workforce (Thousands)



Source: BLS Current Employment Survey December 2015. Other Durable Goods includes: Machinery, Wood Products, Miscellaneous, Furniture, Electrical Equipment, Primary Metals, Nonmetallic Mineral Products. \*Utah Fabricated Metal Products includes Primary Metals. \*\*Transportation Equipment not reported for Arizona

# Manufacturing Overview



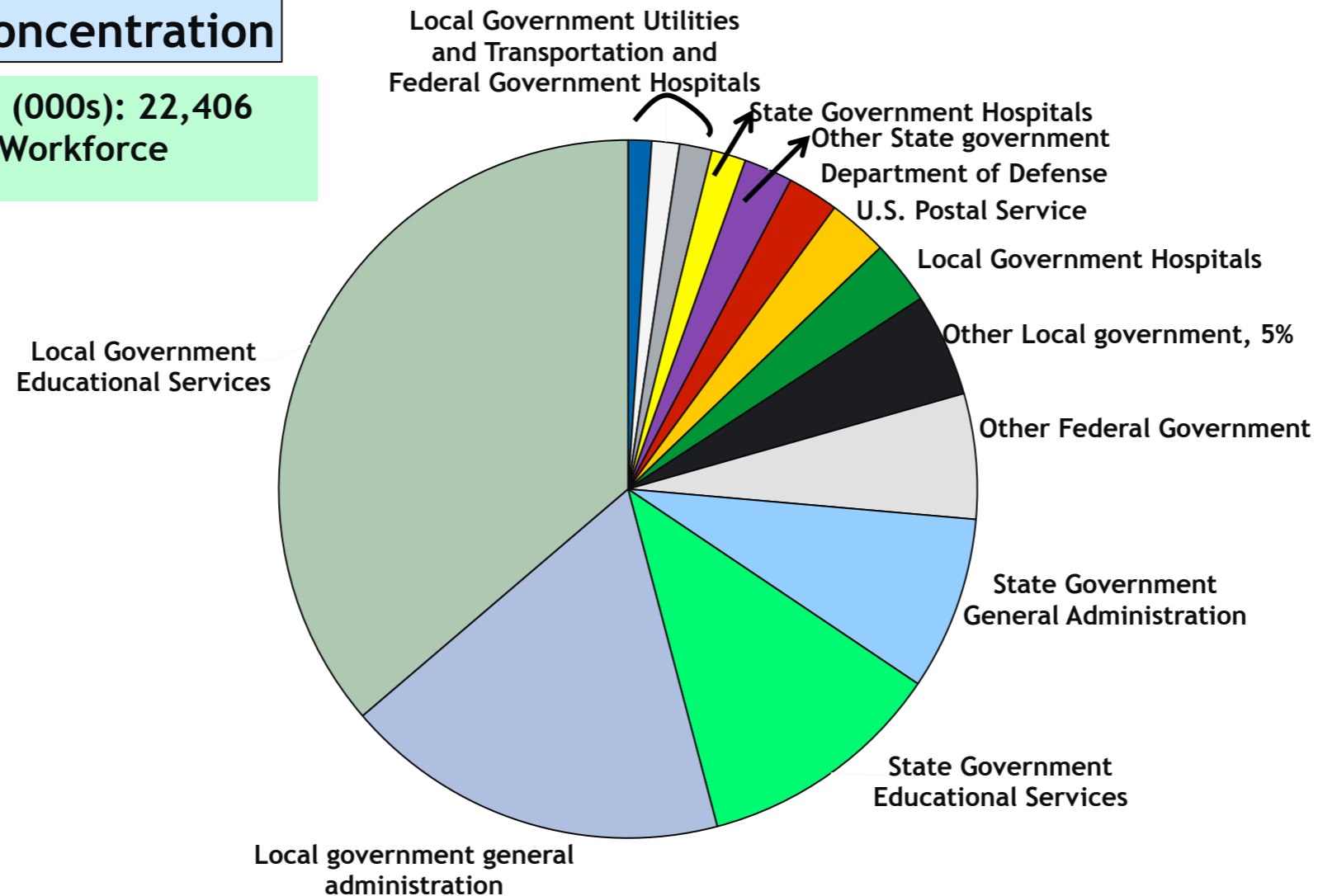
Source: BLS Current Employment Survey December 2015. Other Durable Goods includes: Machinery, Wood Products, Miscellaneous, Furniture, Electrical Equipment, Primary Metals, Nonmetallic Mineral Products. \*Utah Fabricated Metal Products includes Primary Metals. \*\*Transportation Equipment not reported for Arizona

# Headcount Composition of Government Workforce

Public hospitals comprise a small percentage of the overall government workforce;  
Educational services employ many more

## Employed Public Workforce Concentration

- National Public Workforce (000s): 22,406
- 16% of Total US Non-farm Workforce



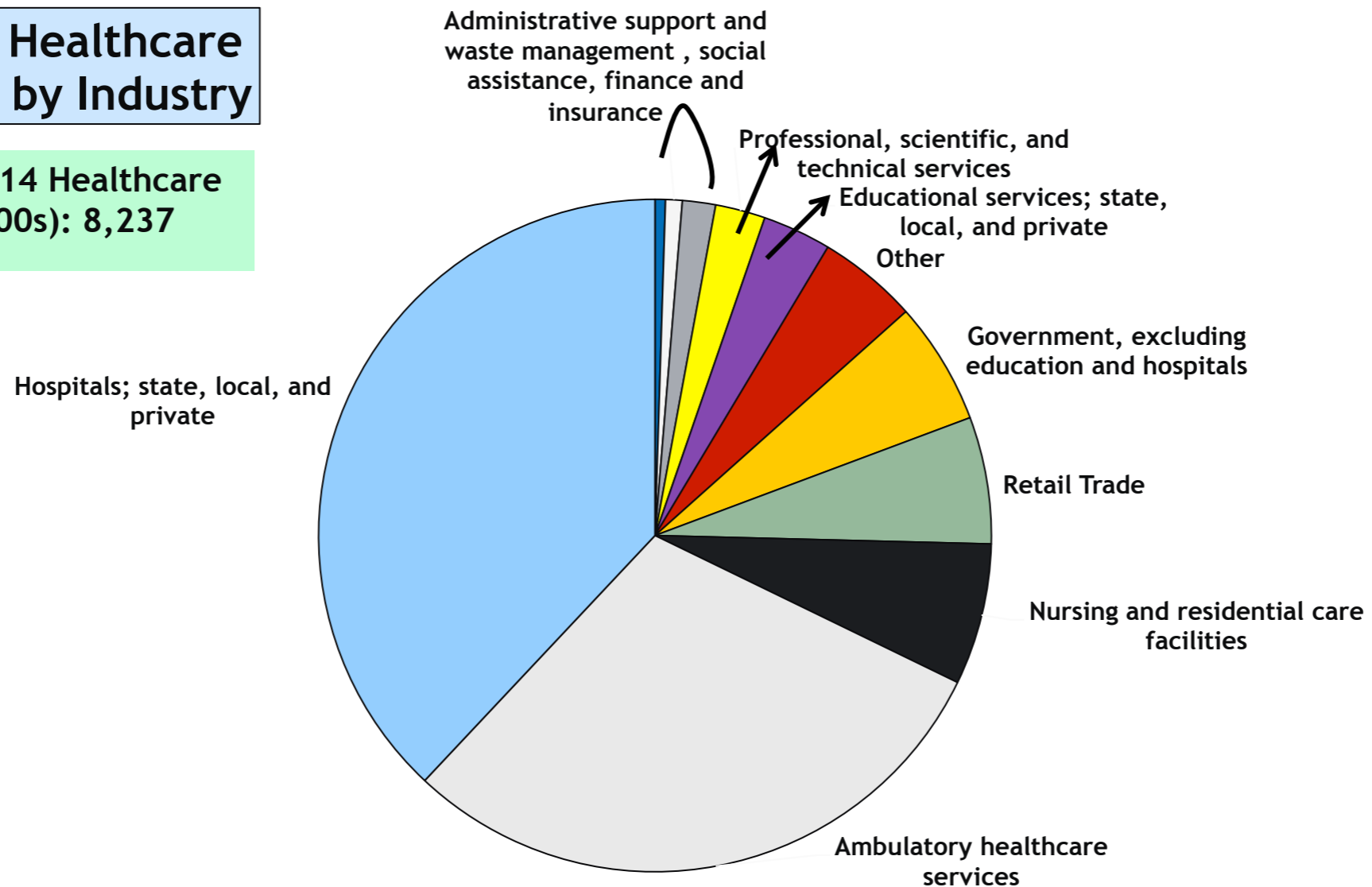
Source: BLS Current Employment Survey December 2015.

# Distribution of Healthcare Professionals by Industry

About three-quarters of healthcare workers are employed within the healthcare industry, while there are some working in schools, government, insurance companies, retail, ...

## Employed Healthcare Workforce by Industry

□ National 2014 Healthcare Workforce (000s): 8,237



Source: BLS Employment Projections Program 2014.