

# New Jersey's Advanced Manufacturing Cluster Winter 2013

Prepared by:

Jason Timian

Labor Market Analyst

NEW JERSEY DEPARTMENT OF

**LWD**

LABOR AND WORKFORCE DEVELOPMENT

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The goal of this report is to get an “IDEA” of what advanced manufacturing means to New Jersey

**Identify** the types of industries and establishments that make up the advanced manufacturing cluster based on a standard industry classification system

**Describe** any similarities and differences among its components with regard to such variables as employment, wage, occupation type, education, and demographic characteristics

**Examine** any present distinctions within the cluster and its components that give New Jersey a competitive advantage compared to neighboring states, regions or the nation, or show areas where New Jersey could improve to add to the state’s economy

**Analyze** the current state of the advanced manufacturing cluster and provide an outlook for employment into the future

# New Jersey Advanced Manufacturing Highlights

- The advanced manufacturing industry cluster contributed over \$20.7 billion to the Gross Domestic Product in 2011, or about 4.8 percent of all output
- In 2012, New Jersey employed 49,100 people in chemical manufacturing, the state's largest segment of advanced manufacturing, which ranks third among states behind only California and Texas
- Greater than half of all manufacturing industry employment in the state is classified as advanced
- Average wages paid in many advanced manufacturing industries are well above the statewide average of \$58,100 in 2012
- Advanced manufacturing establishment employers paid nearly \$12.4 billion in total wages in 2012, or about 6.7 percent of all wages paid

# Overview

There were over 4,250 establishments in New Jersey that employed more than 134,600 people in the advanced manufacturing cluster in 2012. Employment is scattered throughout the state and found in places ranging from very large pharmaceutical firms to much smaller machine shops. These establishments are generally found in the Northeastern part of the state and also along the Interstate 95 corridor.

The occupational composition within advanced manufacturing industries is continuously changing as more technical skills are required to operate more advanced processes. The expectation of higher skills has resulted in many higher paying jobs, especially among chemical manufacturing firms.

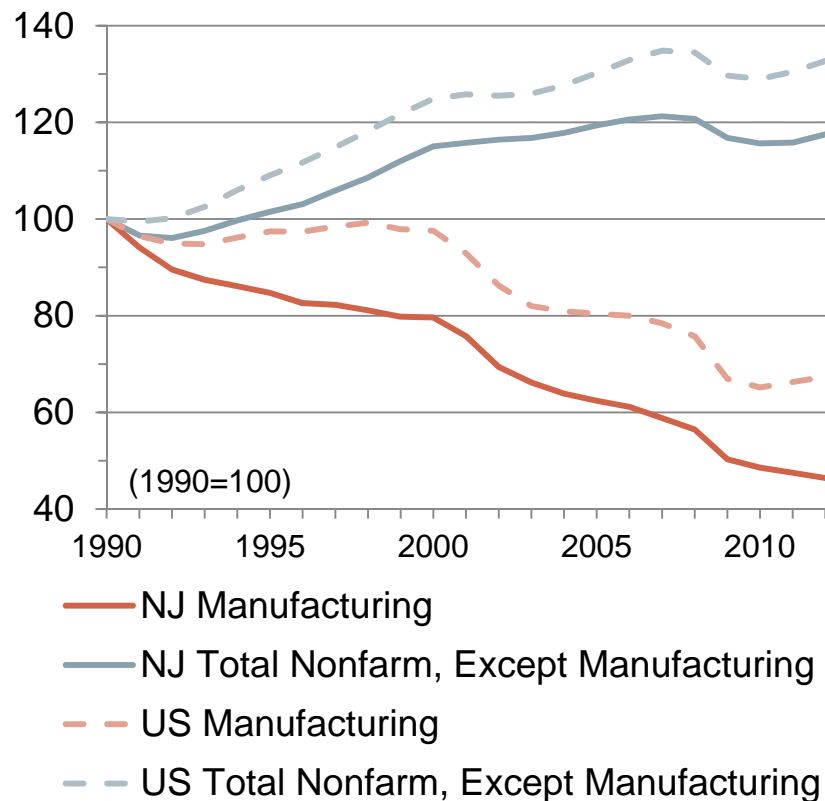
According to the 2011 American Community Survey, the profile of the average worker is generally older than average and male. More than 50 percent of the workforce is aged 45 and over. Racially, it is more diverse than average, especially among the Asian population. The workforce is highly educated, with nearly 48 percent having attained at least a bachelor's degree.

# Advanced Manufacturing

Industry Analysis

## New Jersey has followed a similar employment trend as the nation, but has fared worse over the last 22 years

**Employment: Manufacturing vs.  
All "other" Industries  
New Jersey & United States: 1990-2012**



Manufacturing has lost nearly 284,000 jobs in New Jersey since 1990, a 3.4% annual decline, while the nation has declined at a 1.8% annual rate, shedding nearly 5.8 million jobs

The "other" non-agricultural industries posted a net gain of 544,200 jobs in New Jersey, while the United States added over 30 million

Since 1990, the manufacturing sector in New Jersey has failed to experience a year over year gain. Its best year was a 0.2 decline from 1999-2000

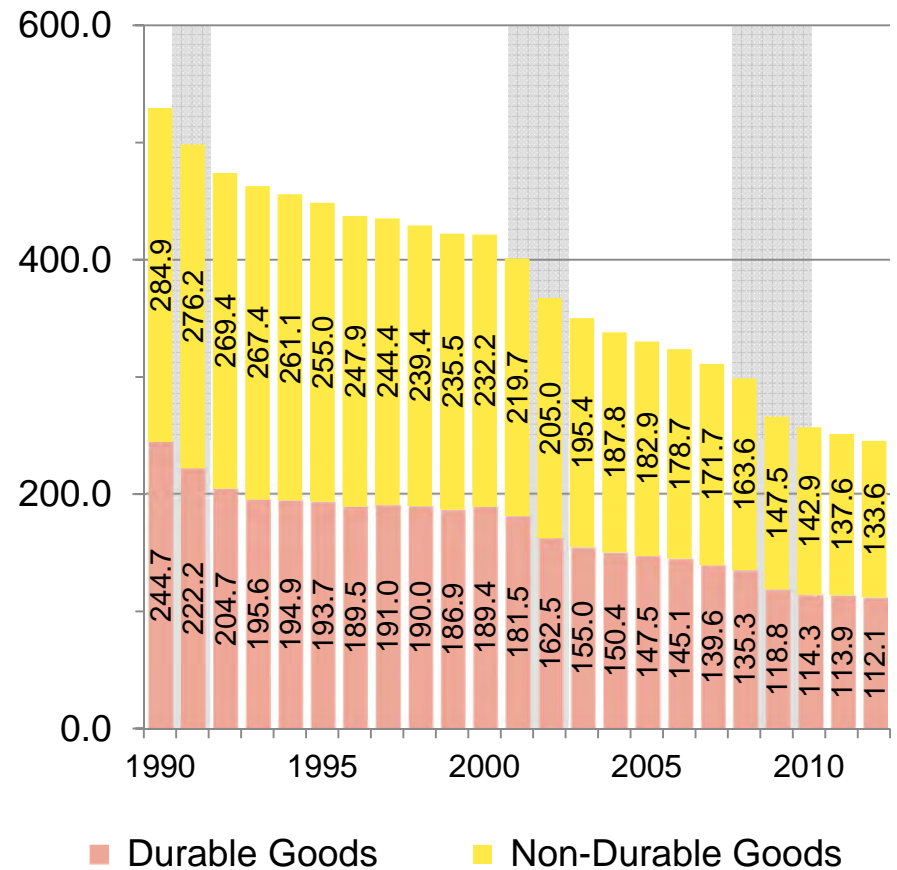
# Manufacturing employment in New Jersey has declined from 14.6% of all jobs in 1990 to 6.3% in 2012

Nationally, manufacturing's share of total employment has declined from 16.2% in 1990 to 8.9% in 2012

Widespread and consistent losses among industries that manufacture both durable and non-durable goods have resulted in closely distributed annual average losses of 3.5 and 3.4 percent, respectively

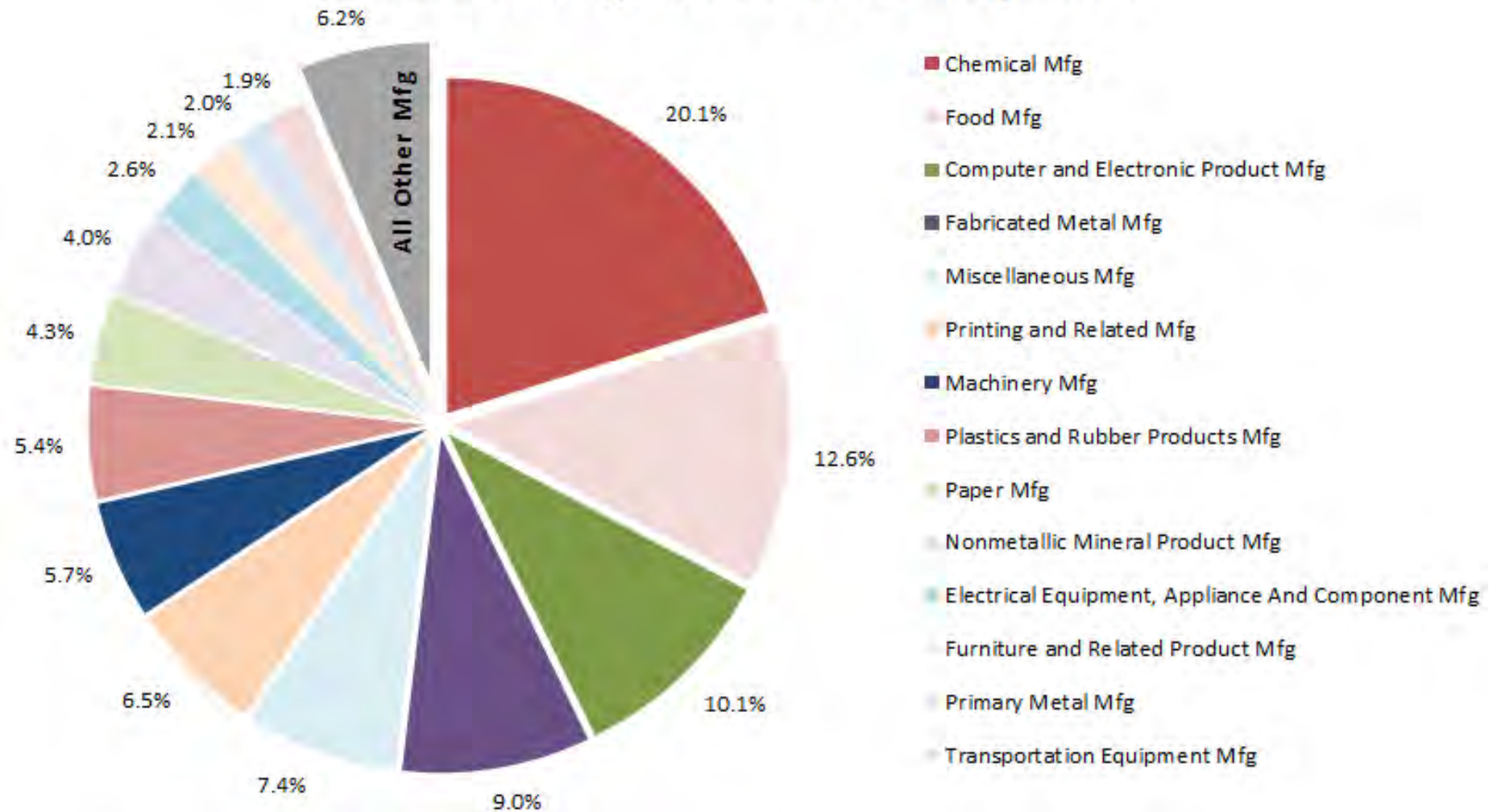
During the six worst years for manufacturing employment in New Jersey ('91-'92, '01-'02, '08-'09), more than 156,000 of the 283,800 total jobs losses occurred, an average rate of decline of more than 6% per year

**Employment breakdown  
Durable vs. Non-durable Goods  
New Jersey: 1990-2012**



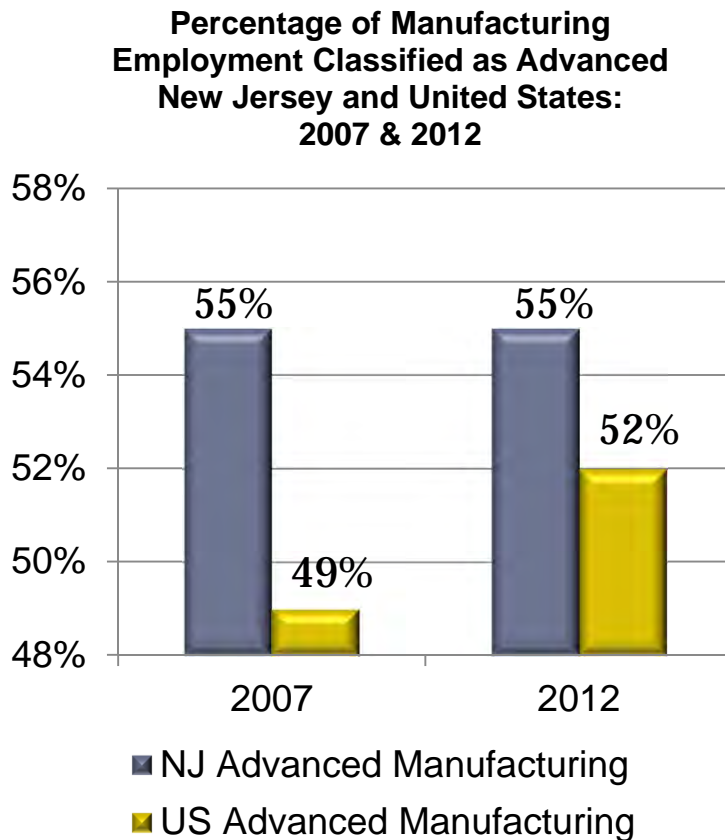
Source: NJLWD, Current Employment Statistics, Annual Averages  
Prepared by: New Jersey Department of Labor and Workforce Development  
October 2013

## Manufacturing Industries as a Percentage of Total Manufacturing Sector in New Jersey: 2012



Source: NJLWD, Quarterly Census of Employment and Wages, Annual Average  
Prepared by: New Jersey Department of Labor and Workforce Development  
October 2013

## The New Jersey Department of Labor and Workforce Development has classified 163 out of 364 NAICS-based manufacturing industries as advanced



Employment in advanced manufacturing industries declined at nearly the same rate (4.8 percent) as non-advanced industries in New Jersey from 2007 to 2012.

In 2012, there were more than 134,600 people employed in industries classified as advanced manufacturing in New Jersey

Roughly 55 percent of all manufacturing employment in New Jersey occurred in advanced industries in 2012 versus only 52 percent nationwide in 2012

## The advanced manufacturing sector and its components with some examples of industries classified within them

### Chemical Manufacturing

- Basic chemical
- Pharmaceutical & medicine
- Cleaning compound and toiletry
- Paint, coating & adhesive

### Fabricated Metal Product Manufacturing

- Architectural and structural metals
- Machine shops and threaded product
- Forging and stamping
- Coating, engraving, and heat treating metals

### Machinery Manufacturing

- Industrial machinery
- HVAC and commercial refrigeration equipment
- Commercial and service industry machinery
- Turbine and power transmission

### Computer and Electronic Product Manufacturing

- Computers and peripheral equipment
- Communications equipment
- Audio and visual equipment
- Semiconductors and other electronic components

# The complete list of 163 detailed NAICS classified as advanced manufacturing

## Chemical Manufacturing

325110	Petrochemical Mfg	325311	Nitrogenous Fertilizer Mfg	325611	Soap and Other Detergent Mfg
325120	Industrial Gas Mfg	325312	Phosphatic Fertilizer Mfg	325612	Polish and Other Sanitation Good Mfg
325130	Synthetic Dye and Pigment Mfg	325314	Fertilizer (Mixing Only) Mfg	325613	Surface Active Agent Mfg
325180	Other Basic Inorganic Chemical Mfg	325320	Pesticide and Other Agricultural Chemical Mfg	325620	Toilet Preparation Mfg
325193	Ethyl Alcohol Mfg	325411	Medicinal and Botanical Mfg	325910	Printing Ink Mfg
325194	Cyclic Crude, Gum and Wood Chemical Mfg	325412	Pharmaceutical Preparation Mfg	325920	Explosives Mfg
325199	All Other Basic Organic Chemical Mfg	325413	In-Vitro Diagnostic Substance Mfg	325991	Custom Compounding of Purchased Resins
325211	Plastics Material and Resin Mfg	325414	Biological Product (except Diagnostic) Mfg	325992	Photographic Film, Paper, Plate, and Chemical Mfg
325212	Synthetic Rubber Mfg	325510	Paint and Coating Mfg	325998	All Other Misc. Chemical Product and Preparation Mfg
325220	Artificial and Synthetic Fibers and Filaments Mfg	325520	Adhesive Mfg		

## The complete list of 163 detailed NAICS classified as advanced manufacturing, continued

### Fabricated Metal Product Manufacturing

332111	Iron and Steel Forging	332323	Ornamental and Architectural Metal Work Mfg	332812	Metal Coating and Allied Services to Manufacturers
332112	Nonferrous Forging	332410	Power Boiler and Heat Exchanger Mfg	332813	Electroplating, Plating, Polishing, and Coloring
332114	Custom Roll Forming	332420	Metal Tank (Heavy Gauge) Mfg	332911	Industrial Valve Mfg
332117	Powder Metallurgy Part Mfg	332431	Metal Can Mfg	332912	Fluid Power Valve and Hose Fitting Mfg
332119	Metal Crown, Closure, and Other Metal Stamping	332439	Other Metal Container Mfg	332913	Plumbing Fixture Fitting and Trim Mfg
332215	Metal Kitchen Cookware and Flatware Mfg	332510	Hardware Mfg	332919	Other Metal Valve and Pipe Fitting Mfg
332216	Saw Blade and Handtool Mfg	332613	Spring Mfg	332991	Ball and Roller Bearing Mfg
332311	Prefabricated Metal Building and Component Mfg	332618	Other Fabricated Wire Product Mfg	332992	Small Arms Ammunition Mfg
332312	Fabricated Structural Metal Mfg	332710	Machine Shops	332993	Ammunition (except Small Arms) Mfg
332313	Plate Work Mfg	332721	Precision Turned Product Mfg	332994	Small Arms, Ordnance, and Accessories Mfg
332321	Metal Window and Door Mfg	332722	Bolt, Nut, Screw, Rivet, and Washer Mfg	332996	Fabricated Pipe and Pipe Fitting Mfg
332322	Sheet Metal Work Mfg	332811	Metal Heat Treating	332999	All Other Misc. Fabricated Metal Product Mfg

## The complete list of 163 detailed NAICS classified as advanced manufacturing, continued

### Machinery Manufacturing

333111	Farm Machinery and Equipment Mfg	333413	Industrial and Commercial Fan and Air Purification Equipment Mfg	333912	Air and Gas Compressor Mfg
333112	Lawn and Garden Tractor Equipment Mfg	333414	Heating Equipment Mfg	333913	Measuring and Dispensing Pump Mfg
333120	Construction Machinery Mfg	333415	AC, Refrigeration, & Forced Air Heating	333921	Elevator and Moving Stairway Mfg
333131	Mining Machinery and Equipment Mfg	333511	Industrial Mold Mfg	333922	Conveyor and Conveying Equipment Mfg
333132	Oil and Gas Field Machinery and Equipment Mfg	333514	Special Die and Tool, Die Set, Jig, and Fixture Mfg	333923	Overhead Crane, Hoist, and Monorail System Mfg
333241	Food Product Machinery Mfg	333515	Cutting Tool and Machine Tool Accessory Mfg	333924	Industrial Truck, Tractor, and Trailer Machinery Mfg
333242	Semiconductor Machinery Mfg	333517	Machine Tool Mfg	333991	Power-Driven Handtool Mfg
333243	Sawmill, Woodworking, and Paper Machinery Mfg	333519	Rolling Mill and Other Metalworking Machinery Mfg	333992	Welding and Soldering Equipment Mfg
333244	Printing Machinery and Equipment Mfg	333611	Turbine and Turbine Generator Set Units Mfg	333993	Packaging Machinery Mfg
333249	Other Industrial Machinery Mfg	333612	Speed Changer, Industrial High-Speed Drive, and Gear Mfg	333994	Industrial Process Furnace and Oven Mfg
333314	Optical Instrument and Lens Mfg	333613	Mechanical Power Transmission Equipment Mfg	333995	Fluid Power Cylinder and Actuator Mfg
333316	Photographic and Photocopying Equipment Mfg	333618	Other Engine Equipment Mfg	333996	Fluid Power Pump and Motor Mfg
333318	Other Commercial and Service Industry Machinery Mfg	333911	Pump and Pumping Equipment Mfg	333997	Scale and Balance Mfg

## The complete list of 163 detailed NAICS classified as advanced manufacturing, continued

### Computer and Electronic Product Manufacturing

334111	Electronic Computer Mfg	334413	Semiconductor and Related Device Mfg	334513	Industrial Process Variable Instruments
334112	Computer Storage Device Mfg	334416	Capacitor, Resistor, Coil, and Other Inductor Mfg	334514	Totalizing Fluid Meter and Counting Device Mfg
334118	Terminal and Other Computer Peripheral Equip. Mfg	334417	Electronic Connector Mfg	334515	Instrument Mfg for Measuring Electrical Signals
334210	Telephone Apparatus Mfg	334418	Printed Circuit Assembly Mfg	334516	Analytical Laboratory Instrument Mfg
334220	Radio and Other Broadcasting Equipment Mfg	334419	Other Electronic Component Mfg	334517	Irradiation Apparatus Mfg
334290	Other Communications Equipment Mfg	334510	Electromedical and Electrotherapeutic Apparatus Mfg	334519	Other Measuring and Controlling Device Mfg
334310	Audio and Video Equipment Mfg	334511	Search, Detection & Navigation Instrumnt	334613	Blank Magnetic and Optical Recording Media Mfg
334412	Bare Printed Circuit Board Mfg	334512	Automatic Environmental Control Mfg.	334614	Software, CD, Tape, and Record Reproducing

## The complete list of 163 detailed NAICS classified as advanced manufacturing, continued

### All Other Advanced Manufacturing

324110	Petroleum Refineries	335313	Switchgear and Switchboard Apparatus Mfg	336412	Aircraft Engine and Engine Parts Mfg
324121	Asphalt Paving Mixture and Block Mfg	335314	Relay and Industrial Control Mfg	336413	Other Aircraft Parts and Auxiliary Equipment Mfg
324122	Asphalt Shingle and Coating Materials Mfg	336310	Motor Vehicle Gasoline Engine and Engine Parts Mfg	336414	Guided Missile and Space Vehicle Mfg
324191	Petroleum Lubricating Oil and Grease Mfg	336320	Motor Vehicle Electrical and Electronic Equipment Mfg	336415	Space Vehicle Propulsion Units and Parts
324199	All Other Petroleum and Coal Products Mfg	336330	Motor Vehicle Steering and Suspension Mfg	336419	Other Guided Missile/Space Vehicle Parts
327211	Flat Glass Mfg	336340	Motor Vehicle Brake System Mfg	336611	Ship Building and Repairing
327212	Other Pressed and Blown Glass and Glassware Mfg	336350	Motor Vehicle Transmission and Power Train Mfg	336612	Boat Building
327213	Glass Container Mfg	336360	Motor Vehicle Seating and Interior Trim Mfg	339112	Surgical and Medical Instrument Mfg
327215	Glass Product Mfg Made of Purchased Glass	336370	Motor Vehicle Metal Stamping	339113	Surgical Appliance and Supplies Mfg
335311	Power, Distribution, and Specialty Transformer Mfg	336390	Other Motor Vehicle Parts Mfg	339114	Dental Equipment and Supplies Mfg
335312	Motor and Generator Mfg	336411	Aircraft Mfg	339115	Ophthalmic Goods Mfg
				339116	Dental Laboratories

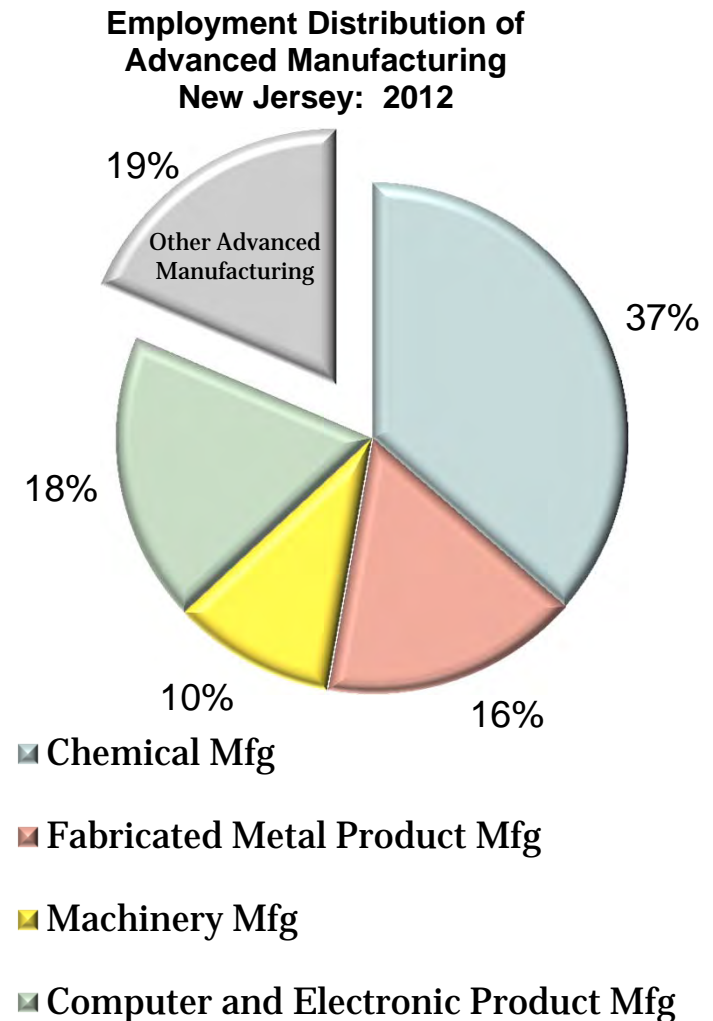
## The four major components of advanced manufacturing account for more than 80% of its employment in New Jersey in 2012

Chemical manufacturing, which includes pharmaceuticals and medicine, employed over 49,000 in 2012, which is about 20 percent of all manufacturing in the state

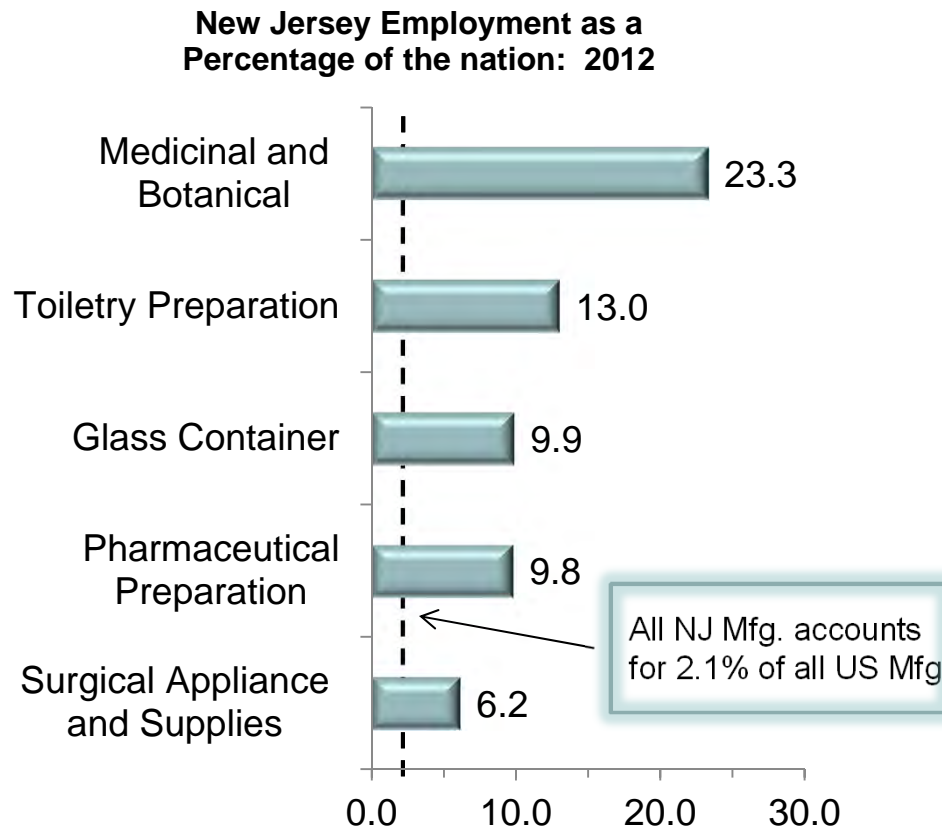
Computer and electronic product and fabricated metal product manufacturing together employed more than 46,700 in 2012

The remaining 19 percent of advanced manufacturing employment is comprised of a group of industries producing goods such as glass and glass products, electrical equipment, transportation equipment, and medical instruments and devices

Source: NJLWD, Quarterly Census of Employment and Wages, Annual Average  
Prepared by: New Jersey Department of Labor and Workforce Development  
October 2013



These industries each employ a significant number of people in New Jersey and account for a large portion of industry employment in the nation in 2012 as well.



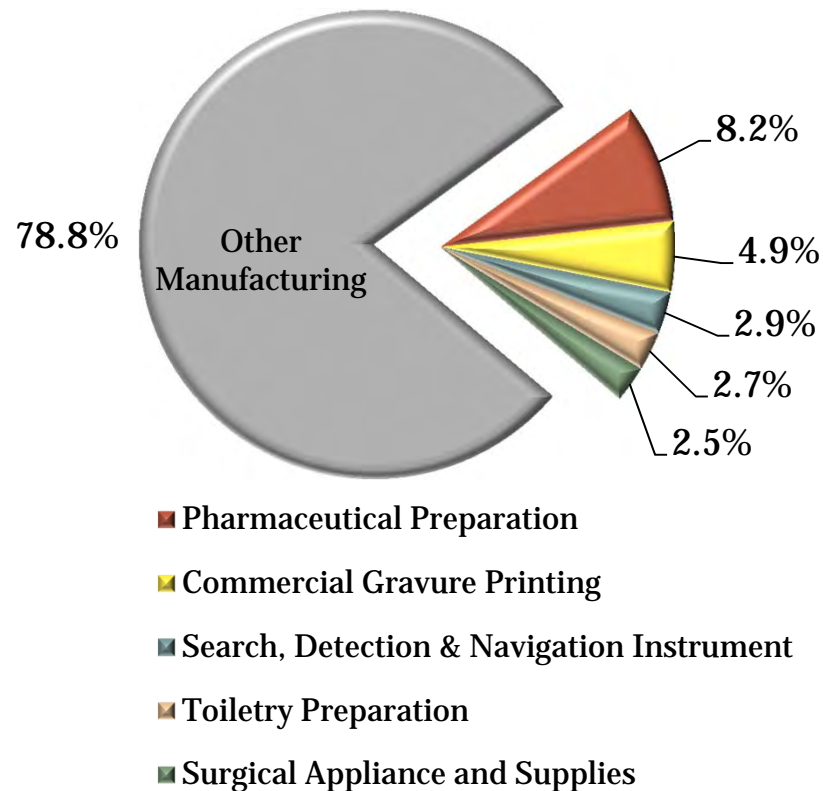
Chemical manufacturing in New Jersey, where three of the five industries on this list are classified, accounts for 6.2 percent of chemical manufacturing employment in the nation

Overall, New Jersey employed 2.2 percent of all advanced manufacturing in the nation

Each of these industries pays an average wage significantly higher than the statewide average of \$58,100

## The five largest manufacturing industries make up over 21% of all manufacturing employment in the state in 2012

**Percentage of Industry's Employment  
of All Manufacturing  
New Jersey, 2012**



Pharmaceutical preparation accounts for one of every twelve manufacturing jobs in New Jersey, but less than 2 percent of all manufacturing jobs nationally

Among these five largest manufacturing industries, only commercial gravure printing is not considered to be advanced

Each of these industries earns a substantial average annual wage, ranging from \$57,300 for commercial gravure printing to \$144,100 for pharmaceutical preparation

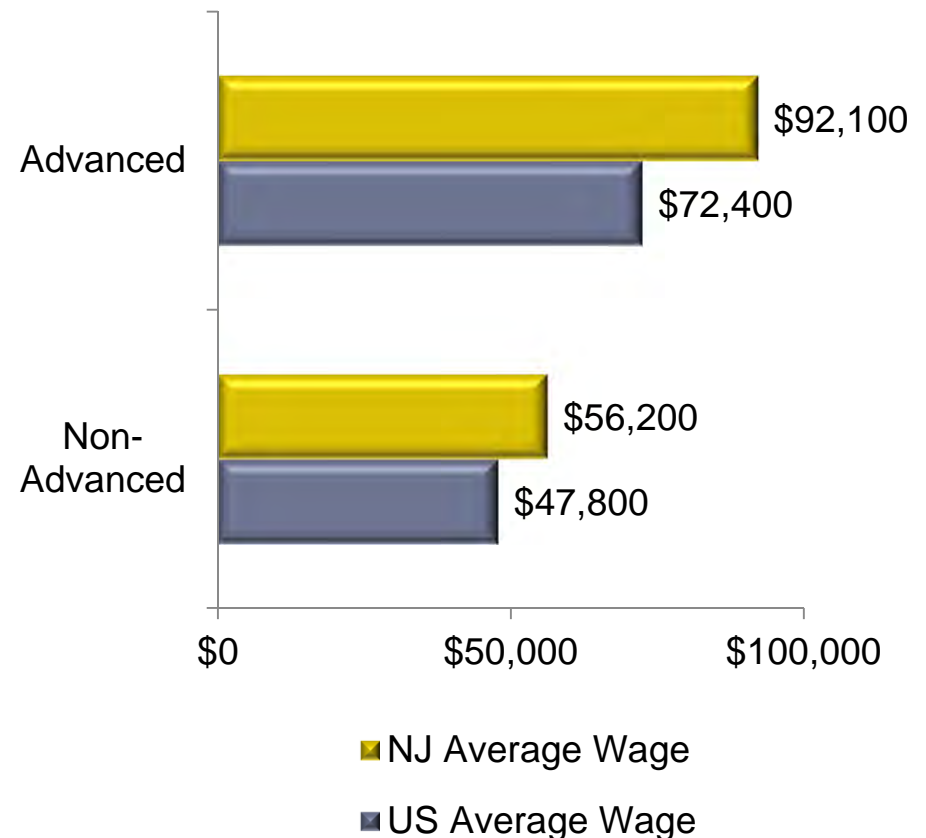
## Annual average wages in New Jersey in 2012 among advanced manufacturing industries are about 64% more than those non-advanced manufacturing industries

From 2007 to 2012, annual average wages in New Jersey in advanced manufacturing have increased 2.2 percent per year compared to only 1.0 percent per year for non-advanced

Annual average wages paid are 27 percent higher in New Jersey in 2012 than the nation among advanced manufacturing industries

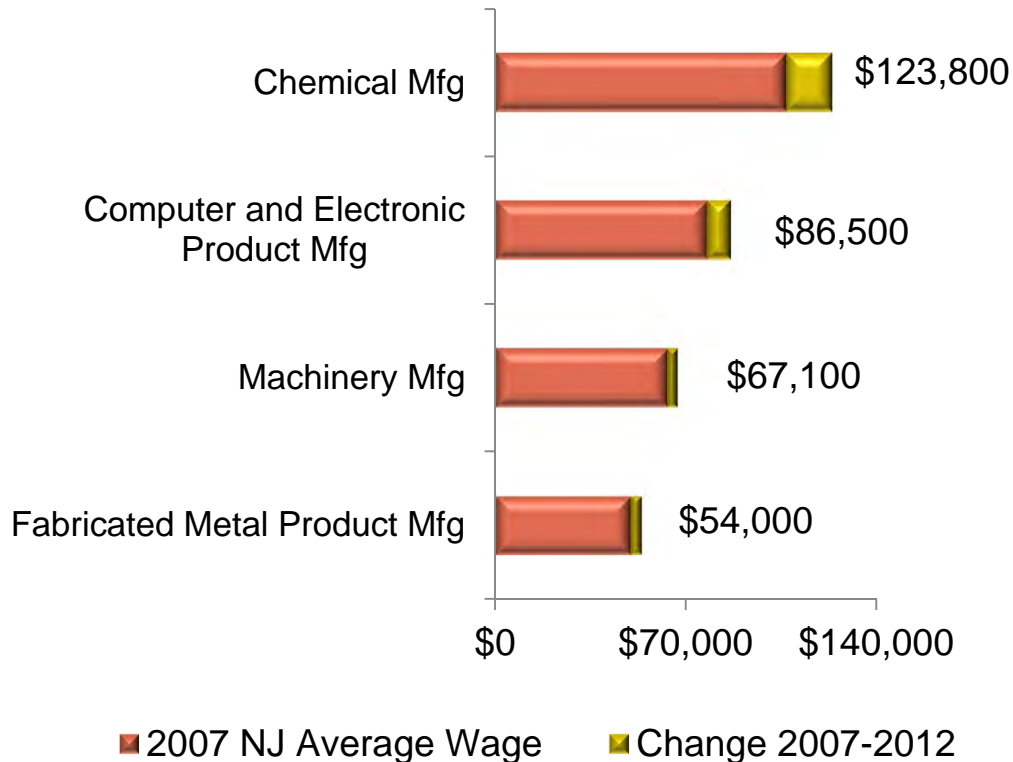
One of the highest paying industry clusters in New Jersey, the advanced manufacturing industry earns about 58 percent more than the state average of \$58,100 in 2012

**Comparison of Annual Average Wages Among Advanced and Non-advanced Manufacturing: New Jersey & United States, 2012**



## Annual average wages in New Jersey among the four main components of advanced manufacturing have averaged 2.2 annual growth from 2007 to 2012

**Annual Average Wage of Major Components of Advanced Manufacturing  
New Jersey, 2012**



The chemical manufacturing industry earned more than twice as much as the state average in 2012, and averaged annual increases of 3.0 percent from 2007 to 2012

The higher annual average wages paid in both chemical and computer and electronic product manufacturing are reflective of the greater composition of jobs requiring higher educational levels

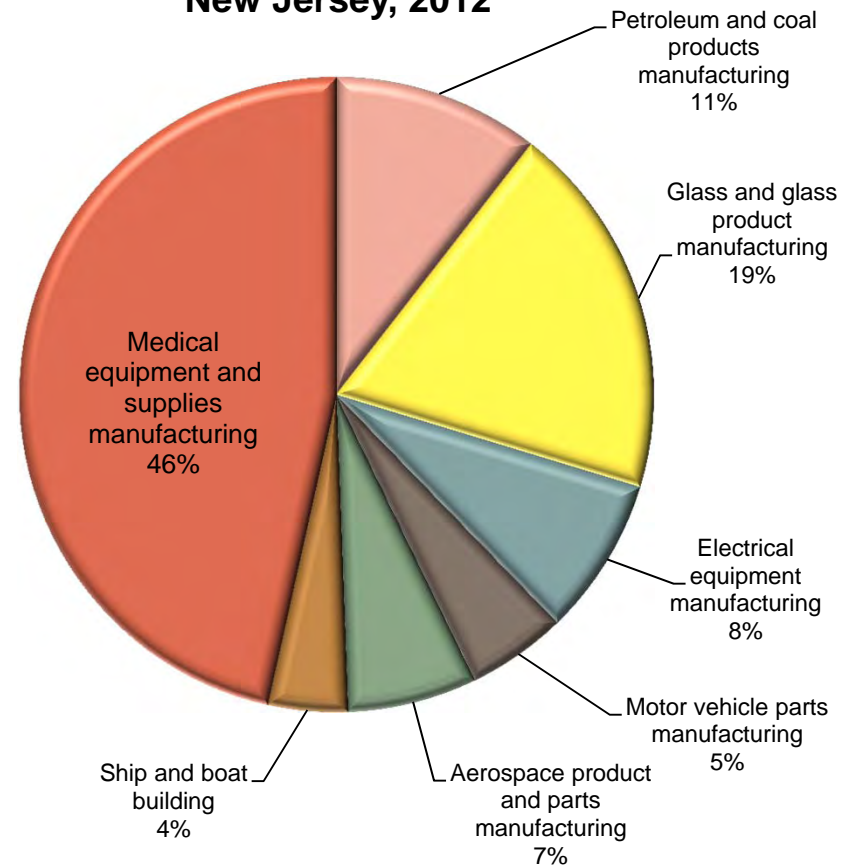
The skill requirements at machinery and fabricated metal product manufacturing establishments are increasing quickly, and wages should reflect that over time

## Seven detailed industries make up the roughly 25,000 workers employed in the “other” advanced manufacturing component

Nearly half of these “other” workers are employed in the medical equipment and supplies manufacturing industry, which tends to have very high annual average wages and are primarily located in northeast New Jersey

Glass and glass product manufacturing is a vital industry in New Jersey unique mainly to its southern counties

**Breakdown of Employment of “Other” Advanced Manufacturing New Jersey, 2012**



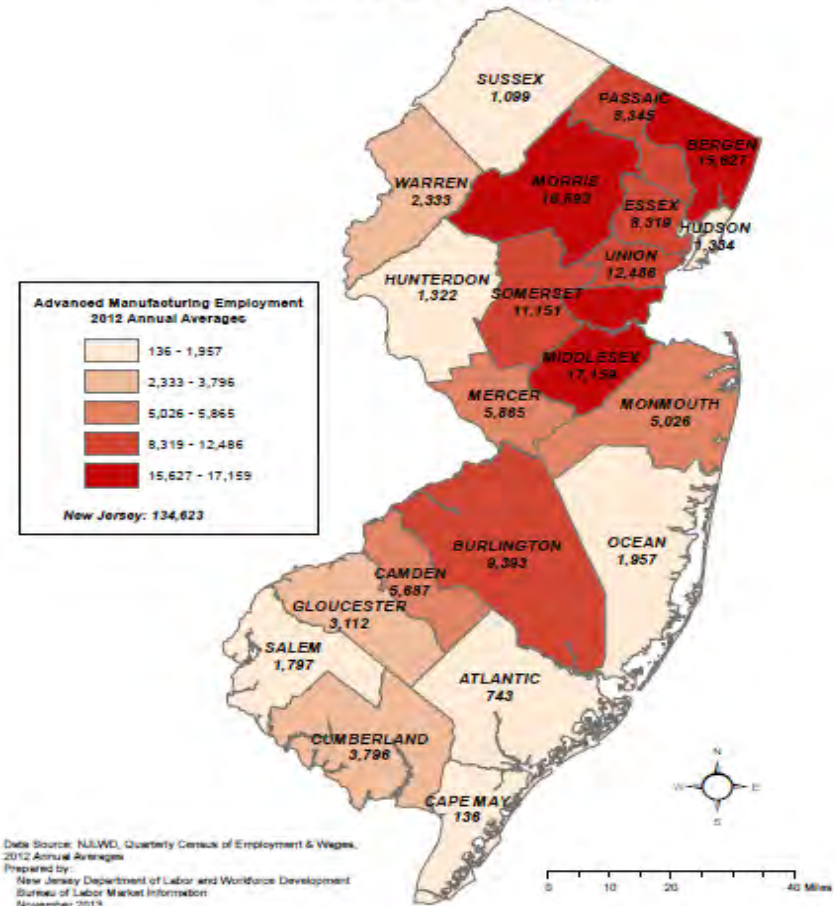
Employment in advanced manufacturing is highly concentrated in New Jersey's most populous counties and along the Interstate 95 corridor...

*New Jersey offers unique business advantages including:*

- geographic proximity to roughly 40 percent of the US population, or around 100 million potential consumers
- highly educated and very diverse workforce
- extensive transportation network in place to carry goods by land, air, and sea

Source: NJWLD, Quarterly Census of Employment and Wages< Annual Average  
Prepared by: New Jersey Department of Labor and Workforce Development  
October 2013

**Advanced Manufacturing Employment  
New Jersey Counties  
(2012 Annual Averages)**



...however, advanced manufacturing in New Jersey's more sparsely populated counties make up a larger percentage of total private sector employment

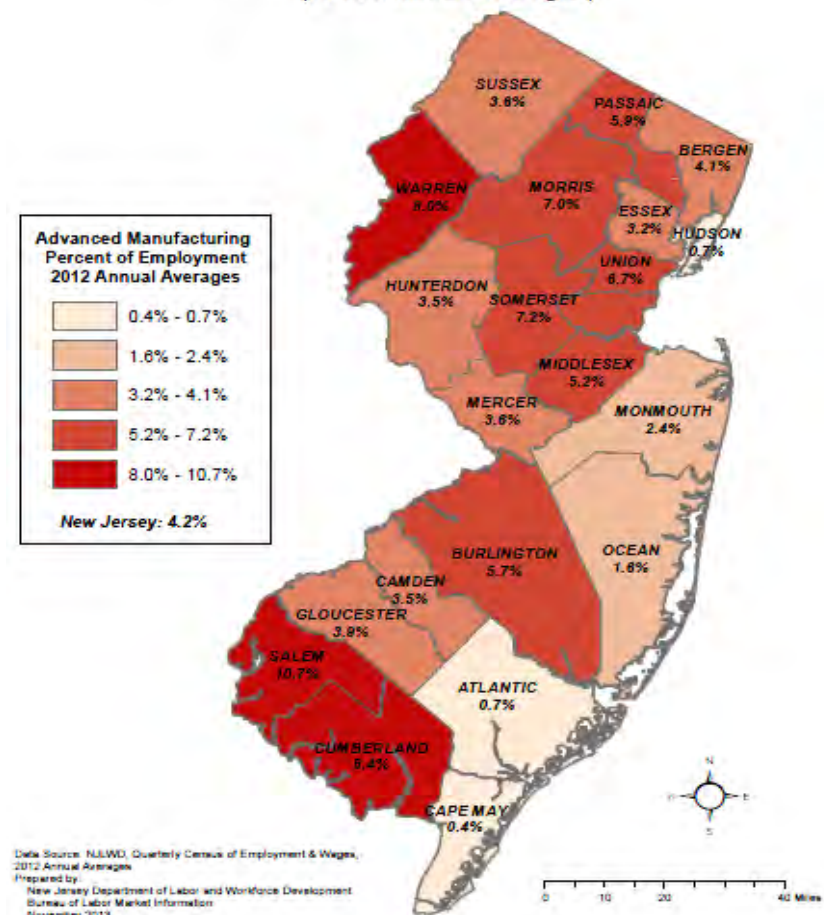
Cumberland, Salem, and Warren Counties have the largest shares of advanced manufacturing of total employment

Morris, Somerset, and Union Counties are at the center of the chemical manufacturing employment base in New Jersey

In the coastal counties of Ocean, Atlantic, and Cape May, less than 2 percent of employment is classified as advanced manufacturing

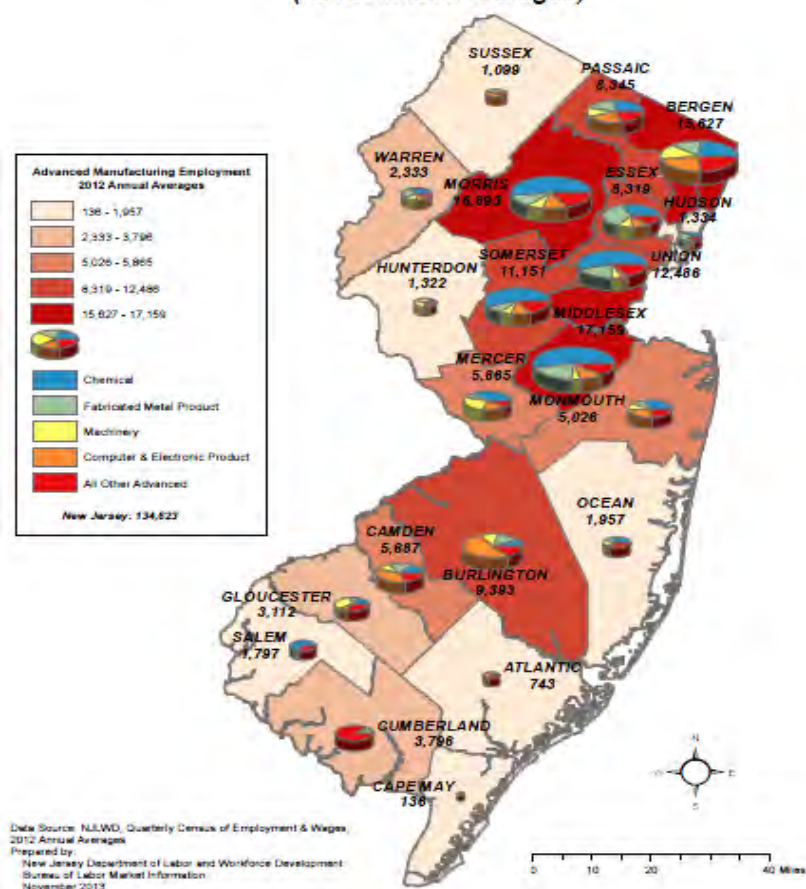
Source: NJLW, Quarterly Census of Employment and Wages, Annual Average  
Prepared by: New Jersey Department of Labor and Workforce Development  
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**Advanced Manufacturing  
Percent of Total Employment  
(2012 Annual Averages)**



# Industry components tend to group among one another within the advanced manufacturing cluster

### Advanced Manufacturing Employment New Jersey Counties (2012 Annual Averages)



Roughly 76 percent of all chemical manufacturing employment is found in these six counties in the northeastern region of New Jersey:

- Bergen     -Essex     -Somerset
- Union     -Morris     -Middlesex

Nearly 30 percent of all computer and electronic product manufacturing employment is found in the southern counties of Camden and Burlington

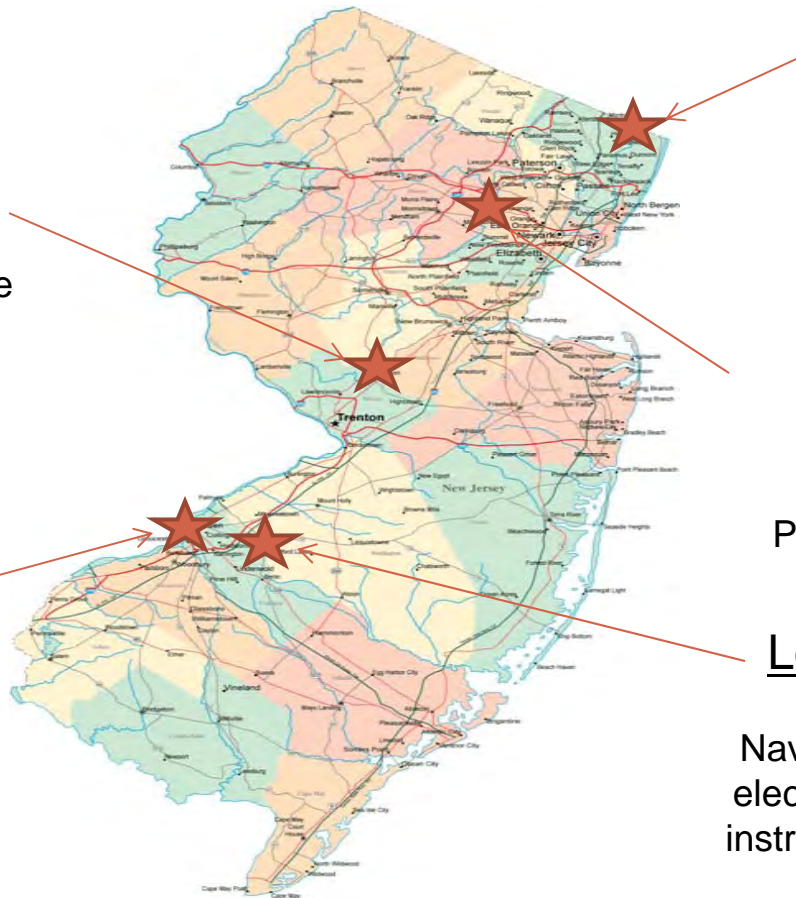
Cumberland county is the glass center of New Jersey, employing nearly two-thirds of all glass product manufacturing workers in the state

Source: NJLWD, Quarterly Census of Employment and Wages, Annual Average  
Prepared by: New Jersey Department of Labor and Workforce Development  
October 2013

## Some examples of New Jersey's most well known advanced manufacturing companies

**Bristol-Myers Squibb**  
Princeton, NJ  
Pharmaceutical and medicine  
manufacturing

**L-3 Communications**  
Camden, NJ  
Radio and television  
broadcasting and wireless  
communications equipment  
manufacturing



**Crestron  
Electronics**  
Rockleigh, NJ  
Semiconductor and  
electronic component  
manufacturing

**Novartis  
Pharmaceuticals**  
East Hanover, NJ  
Pharmaceutical and medicine  
manufacturing

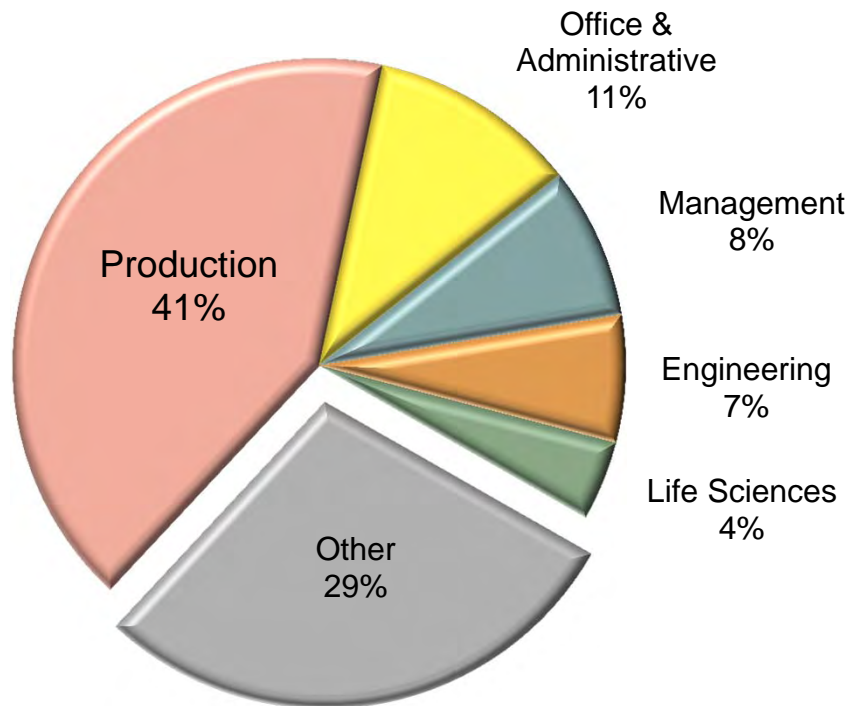
**Lockheed Martin**  
Moorestown, NJ  
Navigational, measuring,  
electromedical and control  
instruments manufacturing

# Advanced Manufacturing

## Occupational Analysis

# Greater than 70% of all advanced manufacturing jobs are classified into these five groups

## **Breakdown of Major Occupational Groups within Advanced Manufacturing Industry: New Jersey, 2012**



More than 40 percent of advanced manufacturing workers are directly involved with production

Roughly 11 percent of workers contributes to research and development as part of the engineering and science groups

The “other” 29 percent of advanced manufacturing occupations primarily consists of business, computer, material moving, and sales occupations

## This list shows the top 20 occupations by employment in advanced manufacturing

Occupation	2012 Employment	Share of Industry	2012 Average Salary	Minimum Education Requirements
Total, Advanced Manufacturing	135,504	100.0%	\$57,180	
Top 20 Occupations	55,022	40.6%	\$55,110	
Packaging and Filling Machine Operators	5,010	3.7%	\$26,070	High school diploma or equivalent
Inspectors, Testers, Sorters, Samplers, and Weighers	4,519	3.3%	\$38,320	High school diploma or equivalent
Supervisors of Production Workers	4,342	3.2%	\$62,880	Postsecondary non-degree award
Electrical and Electronic Equipment Assemblers	3,978	2.9%	\$31,090	High school diploma or equivalent
Machinists	3,537	2.6%	\$46,310	High school diploma or equivalent
Chemical Equipment Operators	2,852	2.1%	\$47,200	High school diploma or equivalent
General and Operations Managers	2,696	2.0%	\$161,160	Associate's degree
Mixing and Blending Machine Operators	2,654	2.0%	\$37,600	High school diploma or equivalent
Chemists	2,595	1.9%	\$82,090	Bachelor's degree
Industrial Production Managers	2,503	1.8%	\$119,730	Bachelor's degree
Freight, Stock, and Material Movers	2,480	1.8%	\$26,820	Less than high school
Team Assemblers	2,420	1.8%	\$27,670	High school diploma or equivalent
Shipping, Receiving, and Traffic Clerks	2,287	1.7%	\$33,040	High school diploma or equivalent
Industrial Machinery Mechanics	2,213	1.6%	\$53,130	High school diploma or equivalent
Wholesale Sales Representatives	2,196	1.6%	\$76,680	High school diploma or equivalent
Extruding, Forming, Pressing, and Compacting Machine Operators	1,969	1.5%	\$33,520	High school diploma or equivalent
Packers and Packagers	1,871	1.4%	\$22,220	Less than high school
Mechanical Engineers	1,736	1.3%	\$89,800	Bachelor's degree
Industrial Engineers	1,718	1.3%	\$83,910	Bachelor's degree
Chemical Technicians	1,447	1.1%	\$57,780	Associate's degree

Source: NJLWD, Occupational Employment Statistics Survey, May 2012  
 Prepared by: New Jersey Department of Labor and Workforce Development  
 October 2013



Production occupations

## Skills, Knowledge and Abilities most important to the top 20 occupations found in advanced manufacturing

Skills	Knowledge	Abilities
Active listening Critical thinking Speaking Reading comprehension Monitoring Judgment and decision making Complex problem solving Time management Coordination Writing	Production and processing Mathematics English language Mechanical Customer and personal service Administration and management Education and training Computers and electronics Engineering and technology Clerical	Oral comprehension Oral expression Problem sensitivity Near vision Written comprehension Information ordering Deductive reasoning Speech clarity Speech recognition Inductive reasoning

**\*\*In addition to industry specific SKAs, effective communication is key\*\***

## Many of the occupations found in advanced manufacturing have moderate to high education/training requirements for entry

### Total Number of Employment in Advanced Manufacturing by Minimum Education Requirement New Jersey, 2012

Educational Requirement	2012 Employment	% of Total
Total, Advanced Manufacturing	135,504	100.0%
<b>Total High Requirements</b>	<b>34,582</b>	<b>25.5%</b>
Doctoral or professional degree	953	0.7%
Master's degree	45	0.0%
Bachelor's degree	26,875	19.8%
Associate's degree	6,710	5.0%
<b>Total Moderate Requirements</b>	<b>6,356</b>	<b>4.7%</b>
Postsecondary non-degree award	5,821	4.3%
Some college, no degree	536	0.4%
<b>Total Low Requirements</b>	<b>86,455</b>	<b>63.8%</b>
High school diploma or equivalent	76,689	56.6%
Less than high school	9,766	7.2%
Education Unavailable	8,112	6.0%

Scientists and engineers primarily account for the roughly 25 percent of the occupations found in advanced manufacturing that require at least an associate's degree for entry

Although the majority of employment in advanced manufacturing may not require postsecondary education, the tradesmen and production workers that comprise this group often have many years of experience, and may have completed an apprenticeship or on-the-job training program

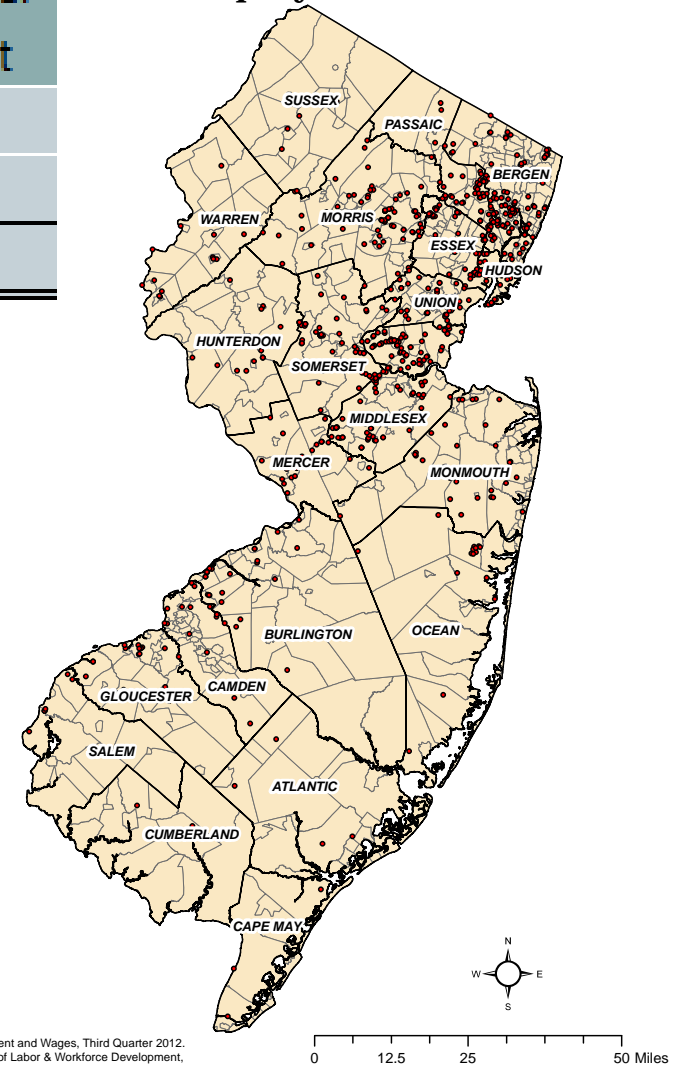
# Advanced Manufacturing

Closer Look at Component  
Industries

# Chemical Manufacturing

	Establishments	Employment	Employment Per Establishment
2007	919	70,706	77
2012	826	49,049	59
<b>Change</b>	<b>-93</b>	<b>-21,657</b>	<b>-18</b>

Chemical Manufacturing Employers - 2012



Chemical manufacturing declined from 2007-2012 both in the absolute number of establishments and also in the average employment per unit

## Some well-known employers vital to New Jersey's economy include:

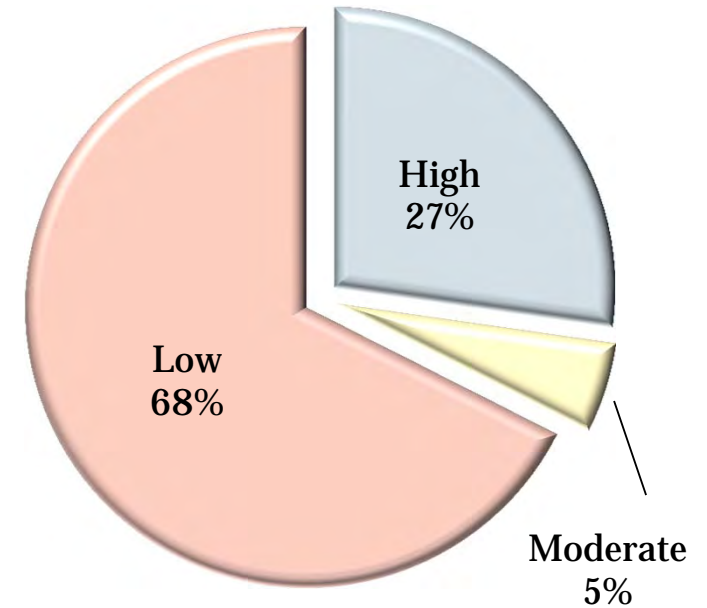
- Johnson & Johnson
- Bristol-Myers Squibb
- Hoffman-La Roche
- Colgate Palmolive
- Smith Kline Beecham
- Sanofi-Aventis
- Novartis
- L'Oreal
- Merck
- Pfizer

Occupations requiring **high levels of education** for entry make up 27% of chemical manufacturing. More than 20% require a bachelor's degree and almost 2% of the workforce requires at doctorate degree.

Roughly 5% have **moderate education** requirements. Production supervisors primarily make up this group.

The remaining 68% of the workforce require only **high school education or less**

### Minimum Educational Requirements



### Top Ten Occupations in Chemical Manufacturing

Occupation	2012 Employment	Education Requirement	2012 Average Wage
Packaging and Filling Machine Operators and Tenders	4,894	High school diploma or equivalent	\$ 26,070
Chemical Equipment Operators and Tenders	2,771	High school diploma or equivalent	\$ 47,200
Mixing and Blending Machine Setters, Operators, and Tenders	2,623	High school diploma or equivalent	\$ 37,600
Chemists	2,527	Bachelor's degree	\$ 82,090
Inspectors, Testers, Sorters, Samplers, and Weighers	2,023	High school diploma or equivalent	\$ 38,320
Supervisors of Production Workers	2,017	Postsecondary non-degree award	\$ 62,880
Laborers and Freight, Stock, and Material Movers, Hand	1,666	Less than high school	\$ 26,820
Extruding, Forming, Pressing, and Compacting Machine Operators	1,610	High school diploma or equivalent	\$ 33,520
Chemical Technicians	1,433	Associate's degree	\$ 57,780
Industrial Machinery Mechanics	1,396	High school diploma or equivalent	\$ 53,130

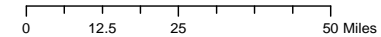
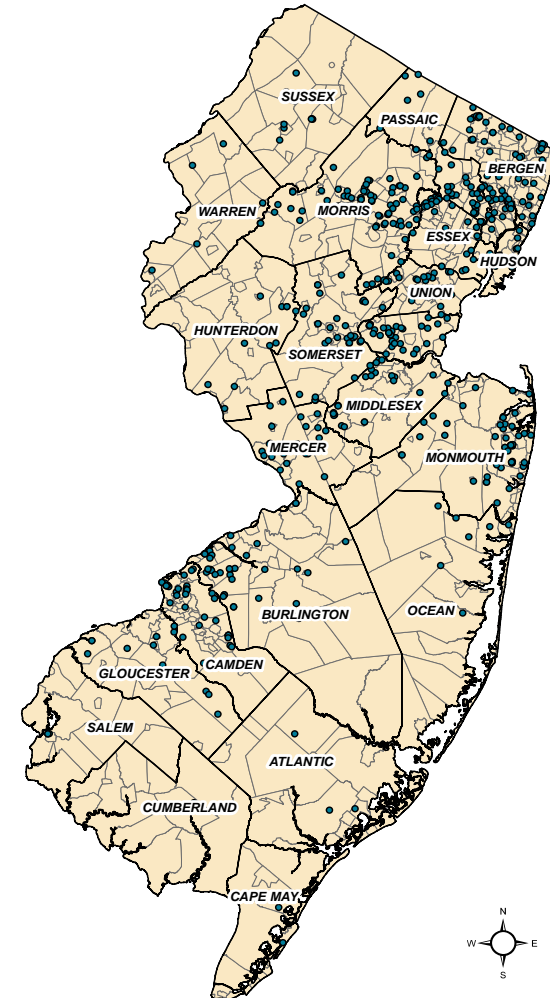
Nearly half of all chemists in the state work for companies classified in chemical manufacturing

Source: NJLWD, Occupational Employment Statistics Survey, May 2012  
 Prepared by: New Jersey Department of Labor and Workforce Development  
 October 2013

# Computer and Electronic Manufacturing

## Computer and Electronic Manufacturing Employers - 2012

	Establishments	Employment	Employment Per Establishment
2007	751	30,546	41
2012	710	24,674	35
Change	-41	-5,872	-6



Among the four components, the number of establishments declined at the slowest rate in this industry

Some well-known employers vital to New Jersey's economy include:

- L-3 Communications
- Lockheed Martin
- Crestron Electronics
- ITT Industries
- Smiths Detection
- Datascope
- BAE Systems
- Honeywell
- Anadigics
- Oticon

Source: NJLWD, Quarterly Census of Employment and Wages, Annual Average  
 Prepared by: New Jersey Department of Labor and Workforce Development  
 October 2013

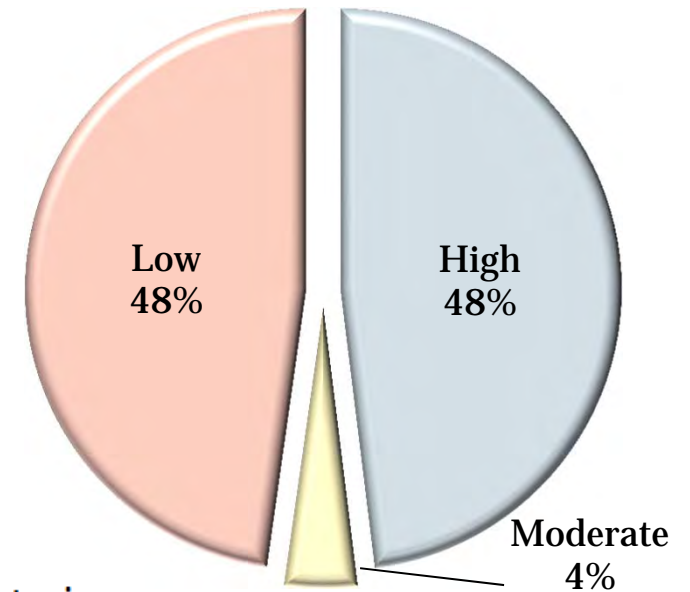
Source: Quarterly Census of Employment and Wages, Third Quarter 2012.  
 Prepared by: New Jersey Department of Labor & Workforce Development,  
 Bureau of Labor Market Information,  
 November 2013

Occupations requiring **high levels of education** for entry make up 48% of computer and electronic product manufacturing. Nearly 40% require at least a bachelor's degree.

Roughly 4% have **moderate education** requirements. Production supervisors and maintenance and repair workers primarily make up this group.

The remaining 48% of the workforce require only **a high school education or less**.

### Minimum Educational Requirements



### Top Ten Occupations in Computer and Electric Product Manufacturing

Occupation	2012 Employment	Education Requirement	2012 Average Wage
Electrical and Electronic Equipment Assemblers	3,242	High school diploma or equivalent	\$ 31,090
Inspectors, Testers, Sorters, Samplers, and Weighers	944	High school diploma or equivalent	\$ 38,320
Electromechanical Equipment Assemblers	901	High school diploma or equivalent	\$ 35,630
Mechanical Engineers	833	Bachelor's degree	\$ 89,800
Software Developers, Systems Software	813	Bachelor's degree	\$ 110,860
Software Developers, Applications	672	Bachelor's degree	\$ 99,840
Supervisors of Production Workers	640	Postsecondary non-degree award	\$ 62,880
Electrical Engineers	608	Bachelor's degree	\$ 91,440
Electrical and Electronics Engineering Technicians	564	Associate's degree	\$ 61,080
Computer Hardware Engineers	468	Bachelor's degree	\$ 105,050

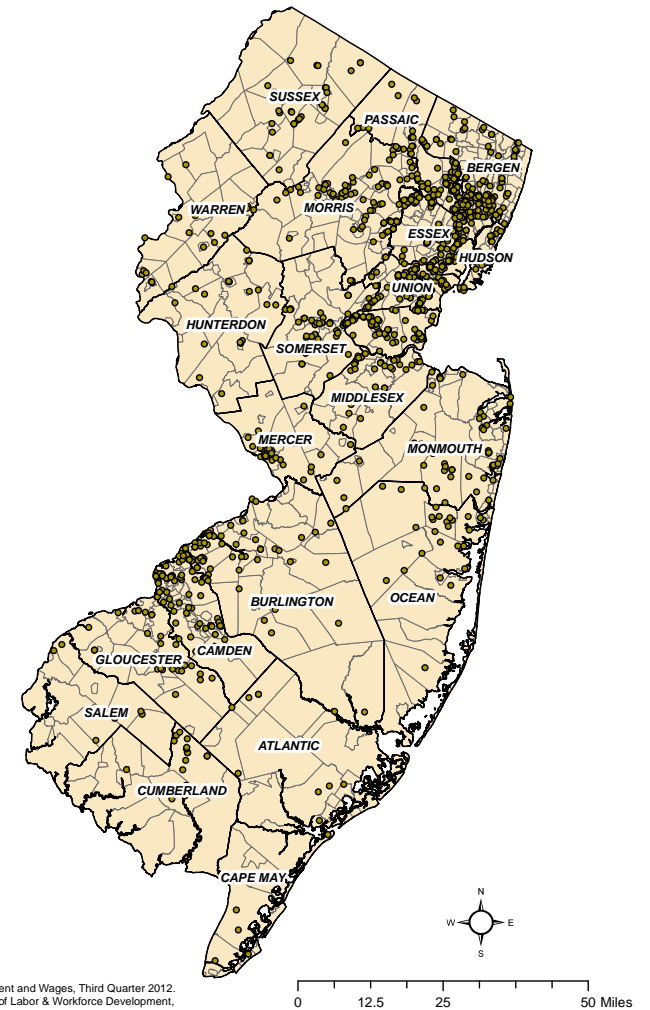
Engineering and production occupations account for more than half of all employment in this industry.

Source: Occupational Employment Statistics Survey, May 2012  
 Prepared by: New Jersey Department of Labor and Workforce Development  
 October 2013

# Fabricated Metal Product Manufacturing

	Establishments	Employment	Employment Per Establishment
2007	1,415	26,903	19
2012	1,233	22,055	18
Change	-182	-4,848	-1

Fabricated Metal Product Manufacturing Employers - 2012



Fabricated metal product manufacturing lost the most establishments from 2007-2012

Most of the establishments classified in this industry are smaller shops who predominantly operate in a support capacity to other types of manufacturers in the state and region

Source: NJLWD, Quarterly Census of Employment and Wages, Annual Average  
 Prepared by: New Jersey Department of Labor and Workforce Development  
 October 2013

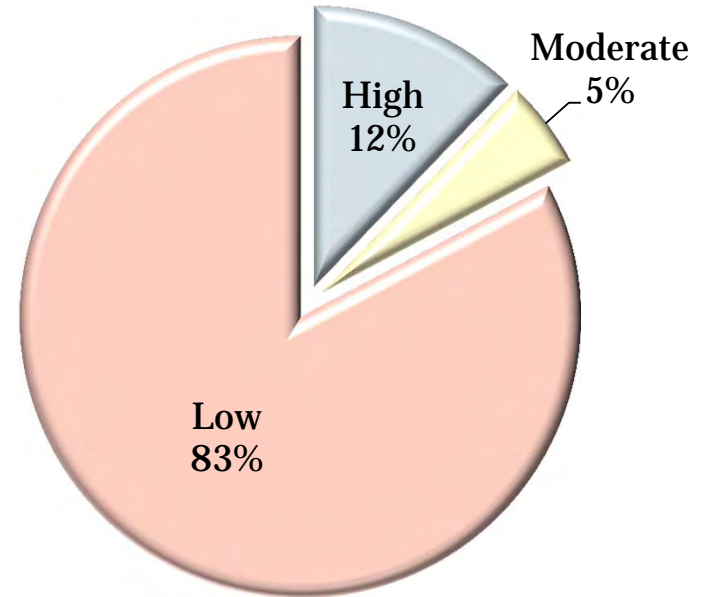
Source: Quarterly Census of Employment and Wages, Third Quarter 2012.  
 Prepared by: New Jersey Department of Labor & Workforce Development,  
 Bureau of Labor Market Information,  
 November 2013

Occupations requiring **high levels of education** for entry make up 12% of computer and electronic product manufacturing. Only 8% require at least a bachelor's degree.

Roughly 5% have **moderate education** requirements. Production supervisors and maintenance and repair work primarily make up this group.

The remaining 83% of the workforce require only **a high school education or less**.

### Minimum Educational Requirements



### Top Ten Occupations in Fabricated Metal Product Manufacturing

Occupation	2012 Employment	Education Requirement	2012 Average Wage
Machinists	1,766	High school diploma or equivalent	\$ 46,310
Cutting, Punching, and Press Machine Operators	1,395	High school diploma or equivalent	\$ 29,960
Supervisors of Production Workers	1,103	Postsecondary non-degree award	\$ 62,890
Welders, Cutters, Solderers, and Brazers	883	High school diploma or equivalent	\$ 43,090
Computer-Controlled Machine Tool Operators	840	High school diploma or equivalent	\$ 42,850
Team Assemblers	546	High school diploma or equivalent	\$ 27,670
Wholesale Sales Representatives	522	High school diploma or equivalent	\$ 76,680
Inspectors, Testers, Sorters, Samplers, and Weighers	507	High school diploma or equivalent	\$ 38,320
Sheet Metal Workers	483	High school diploma or equivalent	\$ 58,290
Coating, Painting, and Spraying Machine Operators	475	High school diploma or equivalent	\$ 35,790

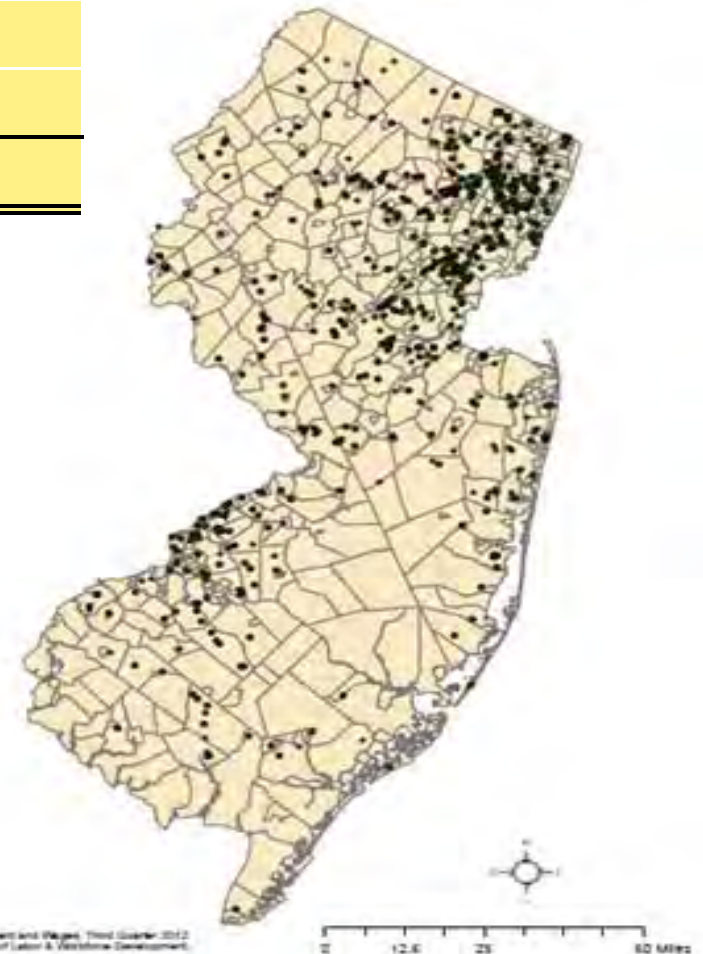
Although many of the occupations on this list require only a high school education, most require a great amount of skill and experience to excel

Source: Occupational Employment Statistics Survey, May 2012  
 Prepared by: New Jersey Department of Labor and Workforce Development  
 October 2013

# Machinery Manufacturing

	Establishments	Employment	Employment Per Establishment
2007	881	16,557	19
2012	732	13,843	19
Change	-149	-2,714	0

Machinery Manufacturing Employers - 2012



Employment declined an average of 3.7% per year

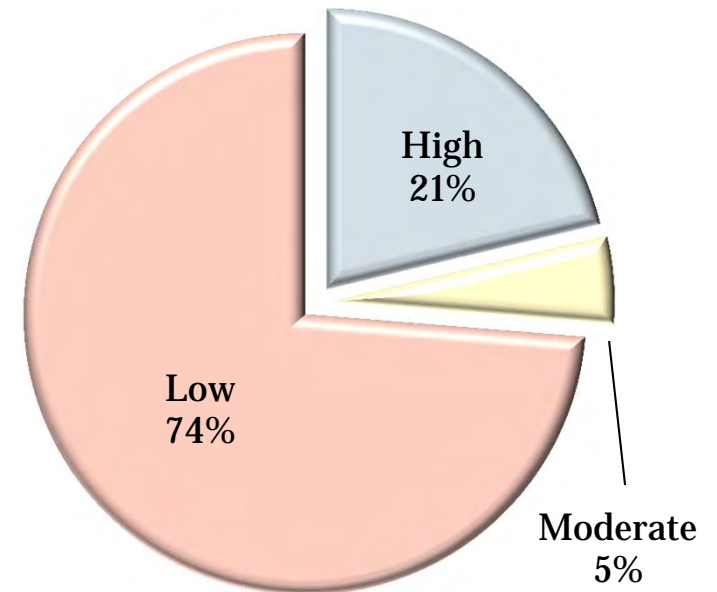
Similar to primary metal fabrication, many of the establishments in this component are relatively small and dispersed throughout the state, have less popularity or name recognition, and more commonly serve their local area instead of a broader market

Occupations requiring **high levels of education** for entry make up 21% of machinery manufacturing. Most of this group are classified as either engineering or computer occupations.

Nearly 5% have **moderate education** requirements. Production supervisors primarily make up this group.

The remaining 74% of the workforce require only **a high school education or less**.

### Minimum Educational Requirements



### Top Ten Occupations in Machinery Manufacturing

Occupation	2012 Employment	Education Requirement	2012 Average Wage
Machinists	985	High school diploma or equivalent	\$ 46,310
Team Assemblers	833	High school diploma or equivalent	\$ 27,670
Supervisors of Production Workers	582	Postsecondary non-degree award	\$ 62,880
Computer-Controlled Machine Tool Operators, Metal and Plastic	407	High school diploma or equivalent	\$ 42,850
Wholesale Sales Representatives, Except Technical Products	384	High school diploma or equivalent	\$ 76,680
Engine and Other Machine Assemblers	384	High school diploma or equivalent	\$ 34,270
Mechanical Engineers	371	Bachelor's degree	\$ 89,800
Wholesale Sales Representatives, Technical Products	341	Bachelor's degree	\$ 96,130
Elevator Installers and Repairers	313	High school diploma or equivalent	\$ 81,150
Electromechanical Equipment Assemblers	309	High school diploma or equivalent	\$ 35,630

Many of the occupations on this list have low *minimum* educational and training requirements for entry, but are filled by workers with vast levels of experience

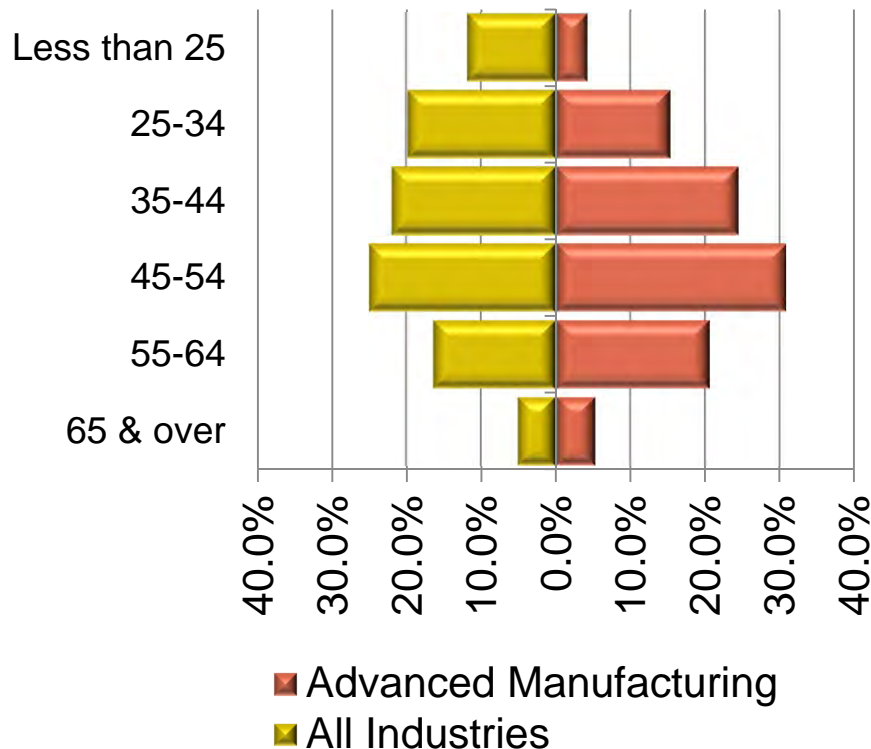
Source: Occupational Employment Statistics Survey, May 2012  
 Prepared by: New Jersey Department of Labor and Workforce Development  
 October 2013

# Advanced Manufacturing

Demographic profile

## The age breakdown of NJ residents working in the advanced manufacturing industries differs significantly from the overall economy

**Age Breakdown of Workers in  
Advanced Manufacturing Industry  
New Jersey, 2011**



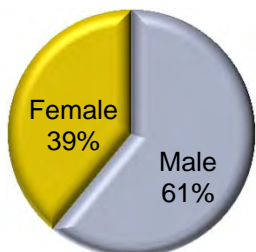
Only 4 percent of the workforce is under 25 years of age compared to almost 12 percent overall

Advanced manufacturing's workforce is very middle-aged heavy, with nearly 55 percent of all workers compared to about 47 percent overall

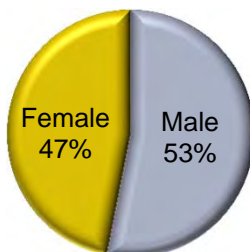
There is a greater proportion of the workforce aged 55 and older in advanced manufacturing compared to the overall economy, 25 and 21 percent, respectively

# Gender, racial, and ethnic profile of New Jersey residents working in advanced manufacturing industries.

### Advanced Manufacturing



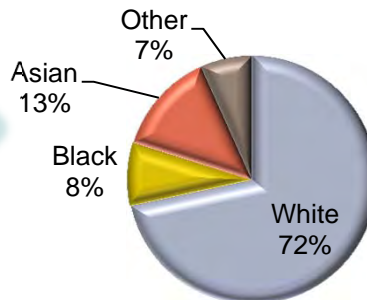
### All Industries



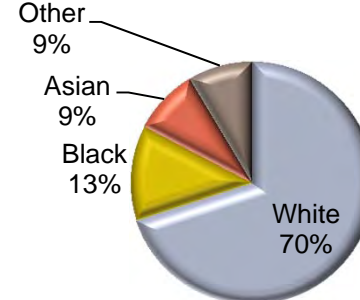
There are nearly two males for every female working in advanced manufacturing industries

The Asian population makes up a larger portion of the advanced manufacturing workforce than the overall economy

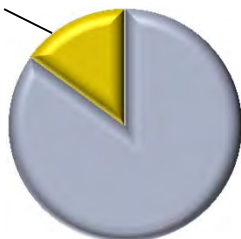
### Advanced Manufacturing



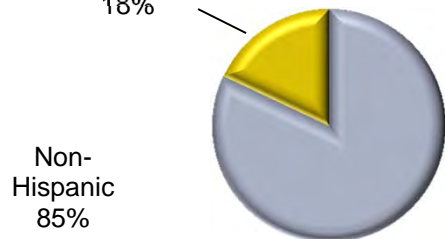
### All Industries



### Advanced Manufacturing



### All Industries



The Hispanic population is slightly less among advanced manufacturing industries

### Advanced Manufacturing

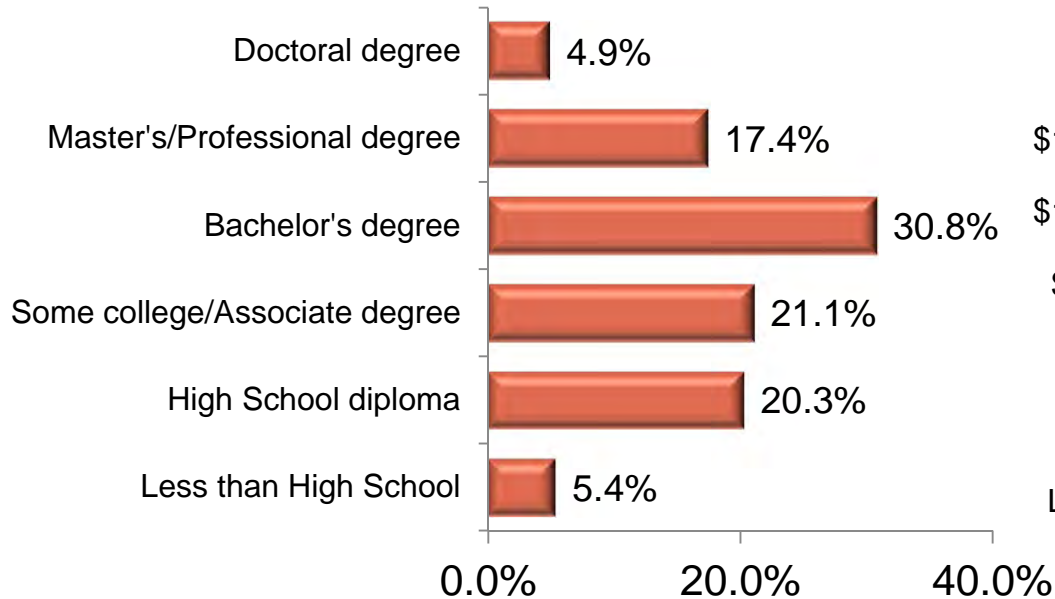
### All Industries

# Self-reported educational attainment and average wage of NJ residents in the advanced manufacturing workforce

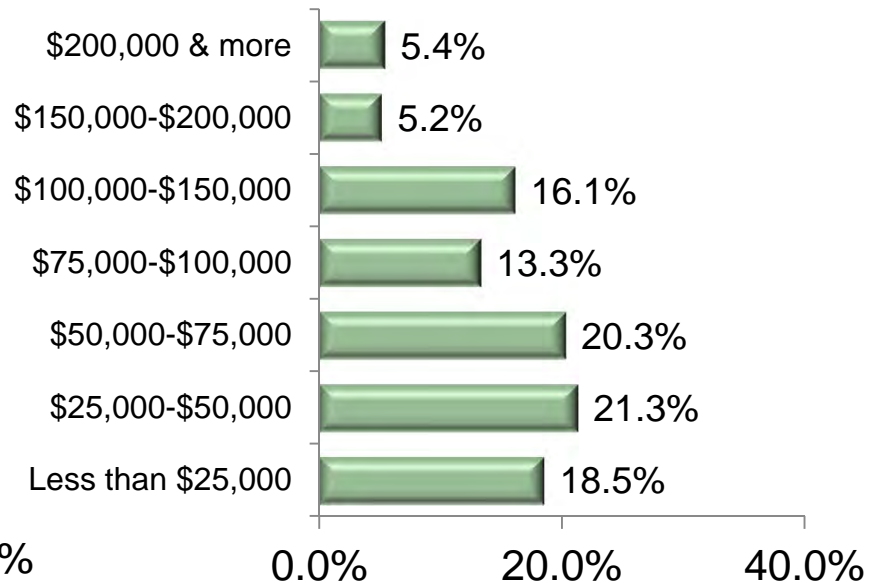
More than 53% of the workforce reported that they have earned at least a bachelor's degree, while...

...more than 60% of the workforce claimed to have earned wages above \$50,000

### Education Level



### Average Wage

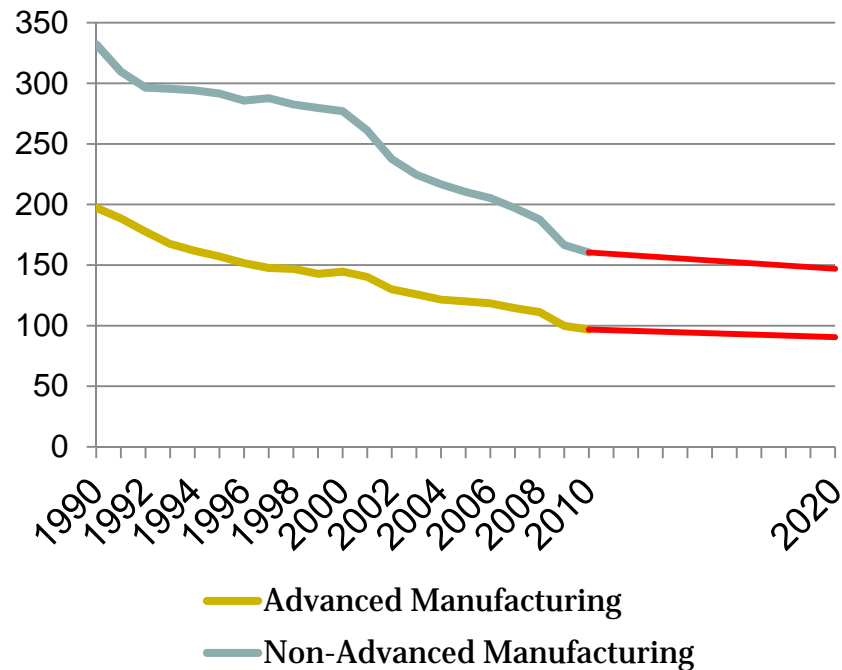


# Advanced Manufacturing

Outlook

## Manufacturing employment in New Jersey has been declining for decades, but the losses are projected to slow

**Actual and Projected Employment in Advanced and Non-Advanced Manufacturing (thousands): New Jersey, 1990-2020**



Manufacturing has shed nearly 284,000 jobs in New Jersey from 1990-2012, a 3.4% annual decline

From 2010 through 2020, declines are projected to slow in advanced and non-advanced manufacturing industries to -0.7 and -0.9 percent per year, respectively

Despite these consistent employment declines, output, by Gross Domestic Product, had remained steady from 1997 to 2007 before succumbing to recessionary pressures

The recession that began in late 2007 had strong effects on advanced manufacturing, particularly the chemical manufacturing sub-sector, and GDP dropped nearly 25% over those two years

# Contact Information

New Jersey Department of  
Labor and Workforce Development

<http://lwd.dol.state.nj.us>

Jason Timian  
Labor Market Analyst  
Tel: 609-633-0553  
E-mail: [jason.timian@dol.state.nj.us](mailto:jason.timian@dol.state.nj.us)