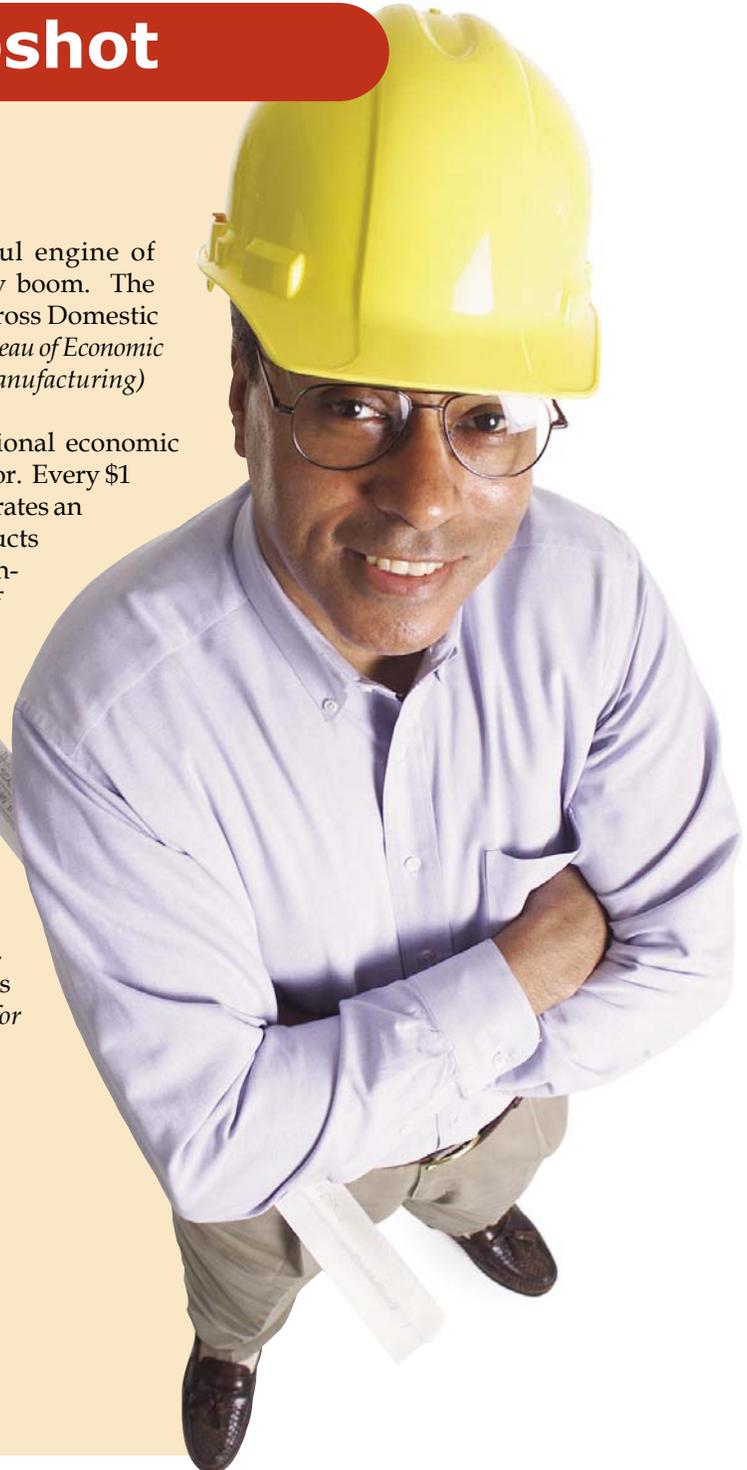
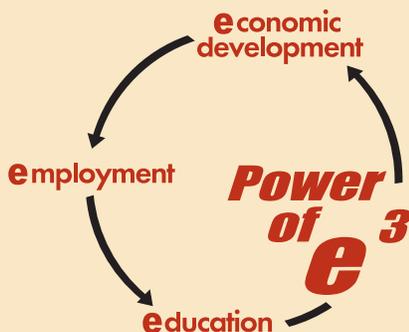


# High Growth INDUSTRY PROFILE

## I ndustry Snapshot

### Growth Pattern

- Manufacturing remains the most powerful engine of economic growth and drives the technology boom. The industry accounted for 14% of the national Gross Domestic Product (GDP) in 2001, or \$1.4 billion. *(U.S. Bureau of Economic Analysis and National Coalition for Advanced Manufacturing)*
- Manufacturing growth spawns more additional economic activity and jobs than any other economic sector. Every \$1 of final demand for manufactured goods generates an additional \$0.67 in other manufactured products and \$0.76 in products and services from non-manufacturing sectors. *(National Association of Manufacturers)*
- Traditional perceptions of manufacturing are being transformed by the increasing use of advanced technologies in the manufacturing process, as well as the rise of new technology-intensive industries like semiconductors and pharmaceuticals. The dangerous, dirty, labor-intensive assembly lines of the 1950s are gone, replaced by robotics and intelligent systems requiring high-tech skills. *(National Coalition for Advanced Manufacturing)*



## Growth Pattern (continued)

- The technology-intensive manufacturing sector leads the nation in productivity growth, the key to increasing the standard of living and having the resources to meet the nation's multiple needs. The effective use of advanced technology enables manufacturers to produce the next generation of goods faster, cheaper, and cleaner than ever before. (*National Coalition for Advanced Manufacturing*)
- Between 2002 and 2012, pharmaceutical and medicine manufacturing employment is expected to increase by 68,000 jobs, plastics and rubber products manufacturing by 138,000 jobs, machinery manufacturing by 120,000 jobs, and a 97,000 projected job growth for fabricated metal product manufacturing. (*U.S. Bureau of Labor Statistics*)
- Due to skilled labor shortages and technological advances, job opportunities for metal and plastic workers such as computer-control programmers and operators, welders, cutters, solderers, brazers, and machinists are considered to be excellent. (*U.S. Bureau of Labor Statistics*)
- Manufacturing salaries and benefits average \$54,000, higher than the average for the total private sector. (*National Association of Manufacturers*)

# Occupational Outlook

The following occupations are expected to increase employment during the 2002 to 2012 time period:

Advanced Manufacturing-Related Occupations	Number Employed 2002 (000's)	Number Employed 2012 (000's)	Numeric Change (000's)	Change %	2002 Median Annual Earnings	Postsecondary Education & Training
Environmental engineering technicians	19	24	5	28.4%	\$36,850	Associate degree
Industrial truck and tractor operators	594	659	65	11.1%	\$26,070	**Moderate on-the-job training
Industrial engineers	158	175	17	10.6%	\$62,150	Bachelor's degree
Computer-controlled machine tool operators, metal and plastic	132	144	12	9.3%	\$29,050	**Moderate on-the-job training
Engineering managers	212	231	19	9.2%	\$90,930	Degree plus work experience
Industrial engineering technicians	62	67	5	8.7%	\$41,910	Associate degree
Machinists	387	419	32	8.2%	\$32,570	**Moderate on-the-job training
Industrial production managers	182	197	15	7.9%	\$67,320	Bachelor's degree
Industrial machinery mechanics	197	208	11	5.5%	\$37,980	*Long-term on-the-job training
Chemical technicians	69	72	3	4.7%	\$37,430	Associate degree
Electrical engineers	156	160	4	2.5%	\$68,180	Bachelor's degree

\* More than 12 months of on-the-job training or combined work experience and formal classroom instruction. This can include formal and informal apprenticeships that may last up to 5 years.

\*\* Skills needed to be fully qualified can be acquired during 1 to 12 months of combined on-the-job experience and informal training.

These occupations are broader in employment scope than just for advanced manufacturing. Additionally, these occupations do not incorporate an all-inclusive list of advanced manufacturing-related positions, but rather a sample of those that have projected employment growth.

For a full listing of advanced manufacturing-related occupations, please visit the U.S. Bureau of Labor Statistics projections Web page at [www.bls.gov/emp/home.htm](http://www.bls.gov/emp/home.htm).

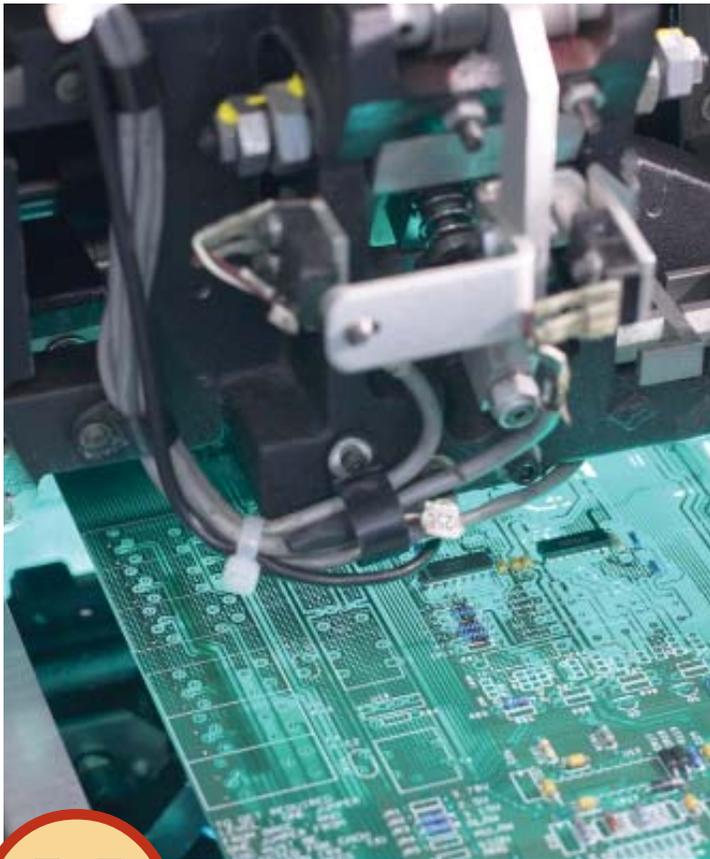
# T types of Jobs Created

## *Skill Sets:*

(Source: U.S. Bureau of Labor Statistics, 2004-05 Career Guide to Industries and 2004-05 Occupational Outlook Handbook)

- Within the pharmaceutical and medicine manufacturing industry, college courses in chemistry and related areas are particularly encouraged for highly skilled production workers who operate sophisticated equipment.
- More than 60% of workers in the pharmaceutical and medicine manufacturing industry have a Bachelor's, Masters, professional, or Ph.D degree – more than twice the proportion for all industries combined. The industry places heavy emphasis on continuing education for employees, and many firms provide classroom training in safety, environmental and quality control, and technological advances.
- Within the chemical manufacturing (except pharmaceutical and medicine manufacturing) industry, production facilities will be easier to run with the increased use of computers, and the new production methods will require workers with a better understanding of the use of the systems.
- Computer-control programmers and operators train in various ways – in apprenticeship programs, informally on the job, and in secondary, vocational, or postsecondary schools. Due to a shortage of qualified applicants, many employers teach introductory courses, which provide a basic understanding of metalworking machines, safety, and blueprint reading. A basic knowledge of computers and electronics is also helpful, and experience with machine tools is extremely important.
- Qualifications for computer numerically controlled (CNC) programmers vary widely depending upon the complexity of the job. Employers often prefer skilled machinists or those with technical school training. For some specialized types of programming, such as that needed to produce complex parts for the aerospace or shipbuilding industries, employers may prefer individuals with a degree in engineering.
- Machinists learn in apprenticeship programs, informally on the job, and in high schools, vocational schools, or community or technical colleges. High school or vocational school courses in mathematics (especially trigonometry), blueprint reading, metalworking, and drafting are highly recommended. Experience with machine tools is helpful. Many job entrants have previously worked as machine setters, operators, or tenders.





## What is the High Growth Job Training Initiative?

The President's High Growth Job Training Initiative, as implemented by the U.S. Department of Labor's Employment and Training Administration, is designed to provide national leadership for a demand-driven workforce system that ensures no worker is left behind. It is a strategic effort to prepare workers to take advantage of new and increasing job opportunities in high growth/high demand and economically vital industries and sectors of the American economy. The initiative is designed to ensure that worker training and career development resources in the public workforce system are targeted to helping workers gain the skills and competencies they need to obtain jobs and build successful careers in these industries.

The foundation of this initiative is partnerships that include the public workforce system, business and industry, education and training providers, and economic development working together to develop solutions to the workforce challenges facing these industries and to develop maximum access for American workers to gain the competencies they need to get good jobs in these industries.

# H igh Growth Job Training Initiative

In its efforts to meet the workforce demands of the 21st century economy, the U.S. Department of Labor's Employment and Training Administration (ETA) is conducting forums with various targeted high growth industries.

The Executive Forums are opportunities for senior industry executives to communicate the critical workforce issues facing their industry.

- Aerospace Industries Assn.
- Aerospace States Association
- Air Conditioning and Refrigeration Institute
- Association for Manufacturing Technology
- Battelle Memorial Institute
- Behlen Manufacturing Co.
- Boeing Company
- Brown Corporation

### Advanced Manufacturing Industry Executive Forums

Companies and associations with which ETA has engaged include:

- Charmilles Micron
- Chicago Manufacturing Center
- Comau Pico
- Deloitte & Touche
- Dow Chemical Company
- Emerson
- FANUC Robotics, N.A.
- Ford Motor Company
- General Motors Corporation
- Glencoe/McGraw-Hill
- Gulf Coast Shipbuilding Partnership
- Harley Davidson, Inc.
- High Voltage Engineering Corporation
- IBM
- Ingersoll-Rand Co.
- Johnson Controls, Inc.
- Kansas City Power & Light Co.
- Lightspeed Technologies, Inc.
- Lockheed Martin Corporation
- Manufacturers Alliance
- Manpower, Inc.
- Manufacturers Association of South Central Pennsylvania
- Michigan Manufacturers Assn.
- National Association of Manufacturers
- National Coalition for Advanced Manufacturing
- National Institute for Metalworking Skills
- National Tooling and Machining Association
- New Vista Enterprises, LLC
- Northrup Grumman
- Raytheon Company
- Reed Hycalog
- Rockwell Automation
- Southern Company
- Vermeer Company
- Visteon Corporation
- Whirlpool Corporation
- Yellow Corporation

## Background & Next Steps

ETA is addressing the workforce issues of the advanced manufacturing industry from a national perspective by conducting Executive Forums with different sectors of the advanced manufacturing industry to gather relevant information from informed groups in a disciplined manner.

These forums provide ETA and the public workforce system with the opportunity to gain further understanding of the overall critical workforce needs of the industry. After meeting with industry leaders, ETA will develop strategic alliances with business, education, and workforce leaders who are proactively focused on the workforce issues confronting the advanced manufacturing industry and engage them in developing innovative approaches to address their needs.

ETA is partnering with employers and education providers to develop and model skills training solutions nationally that can be replicated and sustained throughout the state and local public workforce system. These approaches will help ensure that workers have the right skills for the right jobs at the right time.

## Workforce Issues

The overarching workforce issues are retention, recruitment, education, and training. The following workforce issues have been gathered by the National Association of Manufacturers:

- Demographers point out that with the retirement of the baby-boom generation, there will not be enough employees to fill all of the jobs. According to a recent report from the Center for Workforce Success, *Keeping America Competitive: How a Talent Shortage Threatens U.S. Manufacturing*, more than 76 million baby boomers will retire over the next 20 years, but only 46 million Generation Xers will take their places. Rising productivity, technology, training, and immigration are all elements of the solution but may not be enough. American manufacturers face a severe shortage of men and women to run tomorrow's factories and offices.
- Contrary to widespread public perceptions, modern manufacturing is notable for its innovations, its widespread use of advanced technology, and its demand for highly trained workers. One of the most protracted problems that employers face is the lack of new skilled workers to operate their high-tech manufacturing plants. Even during the recent recession, 80% of manufacturers said they had a moderate to serious shortage of good production applicants, not just of engineers and advanced manufacturing workers. The more pervasive problem is now the need for production workers, machinists, and craft workers skilled enough to work in the manufacturing jobs of the 21st century.



## A dditional Resources

### *Online Tools*

CareerOneStop  
([www.CareerOneStop.org](http://www.CareerOneStop.org))

The CareerOneStop is a resource for businesses and job seekers. It contains links to America's Job Bank, America's Service Locator, and America's Career InfoNet.

[www.careervoyages.gov](http://www.careervoyages.gov)  
[www.doleta.gov](http://www.doleta.gov)  
[jobcorps.doleta.gov](http://jobcorps.doleta.gov)  
[www.onetcenter.org](http://www.onetcenter.org)

### *Other Tools*

Toll-Free Help Line  
1-877-US2-JOBS (1-877-872-5627)  
1-877-889-5627 (TTY)

The Toll-Free Help Line provides up-to-date information about the full range of workforce services for workers and businesses as well as answers to employment and training questions.

## N ational Programs

### *Job Corps*

Training in advanced manufacturing is available at three Job Corps centers. Students receive instruction on the basics of manufacturing and can progress to integrated systems training, which covers fluid power systems, electrical systems, mechanical systems, programmable controllers, design processes, manufacturing processes, and electrical control wiring. The program meets certification requirements established by the National Institute for Metalworking Skills, Inc. By fall 2003, Job Corps graduated 28 students from advanced manufacturing programs.

## C ontact the BRG

For more information on the activities and services of the ETA's Business Relations Group (BRG), please contact:

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Administration  
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