



Advanced
Manufacturing

PHOENIX METRO



Phoenix Leads the Way for Domestic Manufacturing

After decades of decline, driven by offshoring, automation and consolidation of global supply chains, the U.S. has entered a new chapter in domestic manufacturing.

Although nationwide manufacturing job growth is still expected to decline by 2% over the next decade, the downward trend is slowing towards an inflection point.

Rising manufacturing costs in China, driven in part by U.S. tariffs, coupled with greater

federal and state incentives for domestic manufacturing, have producers reconsidering their strategy. Demand for industrial real estate has been explosive over the last few years and remains at record levels. While concerns around slowing demand amid rising lease rates and construction costs are worrisome, industrial markets are benefiting from the increasingly inelastic demand for production space.

The Next Global Manufacturing Hub

The Phoenix metro is positioned to be a prime beneficiary of U.S. production reshoring and is expected to be a strong outlier relative to the nation. Heightened attention on the Valley from producers over the last few years is unsurprising. Domestic manufacturers are attracted to Phoenix metro for its geography, climate, skilled labor force, abundant development opportunities, modern infrastructure and favorable economic policies.

In particular, the Phoenix metro is reaping the transformative benefits of high-tech and advanced manufacturing operations, driven by semiconductors, microelectronics, aerospace and defense, biomedical, electric and autonomous vehicles and alternative energy production. Thanks to billions of dollars' worth of investment over the last three years, the Valley of the Sun is quickly establishing itself as a global hub for advanced manufacturing.



A Deep and Diverse Labor Pool

Local manufacturing accounts for roughly 150,000 jobs, making up nearly 6% of jobs in the metro. The sector showed remarkable resiliency through the pandemic. In March of 2020, Phoenix manufacturing peaked at 136,200 jobs. The following month, the sector shed approximately 4,600 jobs as much of the economy ground to a halt. By the end of 2020, Phoenix manufacturing had recovered 100% of jobs lost.

Since then, the sector continued to gain momentum. At the end of 2022, Phoenix manufacturing reached 151,600 jobs, a level not seen since 2001. Recent investments by global players like TSMC, Intel, LG Energy Solutions and KORE Power are expected to spur advanced manufacturing job growth to the tune of nearly 20,000 jobs over the next few years. These transformational commitments are drawing additional investment by a global network of suppliers and product end-users looking to get in on the ground floor of the Valley's manufacturing evolution.

PHOENIX MANUFACTURING EMPLOYMENT



Manufacturing remains a key driver of high-wage jobs in Arizona, employing a large share of the state’s software developers, engineers and technicians.

Employment has increased in nearly every production occupation in the last five years, with significant growth in front-line assemblers and fabricators, engineering and information systems managers and industrial engineers.

In-Demand Manufacturing Occupations	Employment 2022	Median Wage 2022	Job Growth 2017–2022
MANAGEMENT			
General and Operations Managers	4,370	\$109,680	20.7%
Industrial Production Managers	2,330	\$119,490	34.7%
Architectural and Engineering Managers	2,300	\$165,600	87.0%
Computer and Information Systems Managers	1,120	\$164,520	124.0%
ENGINEERING AND COMPUTER SCIENCE			
Software Developers	6,130	\$108,390	38.7%
Industrial Engineers	6,020	\$102,240	77.1%
Mechanical Engineers	3,060	\$99,890	27.5%
Electrical Engineers	2,190	\$111,410	-3.5%
PRODUCTION			
Miscellaneous Assemblers and Fabricators	15,450	\$37,190	66.7%
Inspectors, Testers, Sorters, Samplers, and Weighers	5,780	\$47,280	37.6%
First-Line Supervisors of Production and Operating Workers	5,020	\$64,200	5.9%
Semiconductor Processing Technicians	2,540	\$41,160	35.1%

Source: Bureau of Labor Statistics (BLS) Occupational Employment and Wage Statistics, May 2023.

The most recent labor data aligns with the growing investment by advanced automotive, aerospace, computer and electronic component manufacturing subsectors, which account for 36% of manufacturing jobs in Arizona. The lion’s share of these jobs are located in the Phoenix metro, which accounts for 77% of manufacturing jobs in the state. These manufacturing subsectors have seen strong and steady growth and bring a significant share of high-wage jobs to the region.

The Brookings Institution identified 50 R&D and STEM-worker intensive industries—35 of which are manufacturing-related—that function as key drivers of economic prosperity in the U.S.¹ As seen below, these ‘advanced manufacturing’ industries are primary drivers of Arizona’s manufacturing employment growth. Advanced manufacturing accounts for roughly half of Arizona’s manufacturing employment and has attracted over 17,000 additional jobs to the state over the last five years—roughly 60% of statewide total manufacturing job growth in that time period. As advanced manufacturing expands its footprint and manufacturing processes become more sophisticated, demand for high-wage production jobs in the metro is expected to accelerate in the coming years.

Top Advanced Manufacturing Industries by Total Employment	Employment 2022	Median Annual Wage	Job Growth 2017–2022
Aerospace Product and Parts Manufacturing	29,630	\$84,930	14.1%
Semiconductor and Other Electronic Component Manufacturing	24,590	\$81,140	23.3%
Medical Equipment and Supplies Manufacturing	8,820	\$54,600	36.1%
Nonmetallic Mineral Product Manufacturing	8,140	\$49,900	24.8%
Chemical Manufacturing	7,910	\$41,040	26.0%
Machinery Manufacturing	7,910	\$59,480	19.5%
Other Miscellaneous Manufacturing	4,620	\$45,090	1.5%
Electrical Equipment, Appliance and Component Manufacturing	3,520	\$47,610	11.4%
Pharmaceutical and Medicine Manufacturing	3,490	\$36,530	46.6%

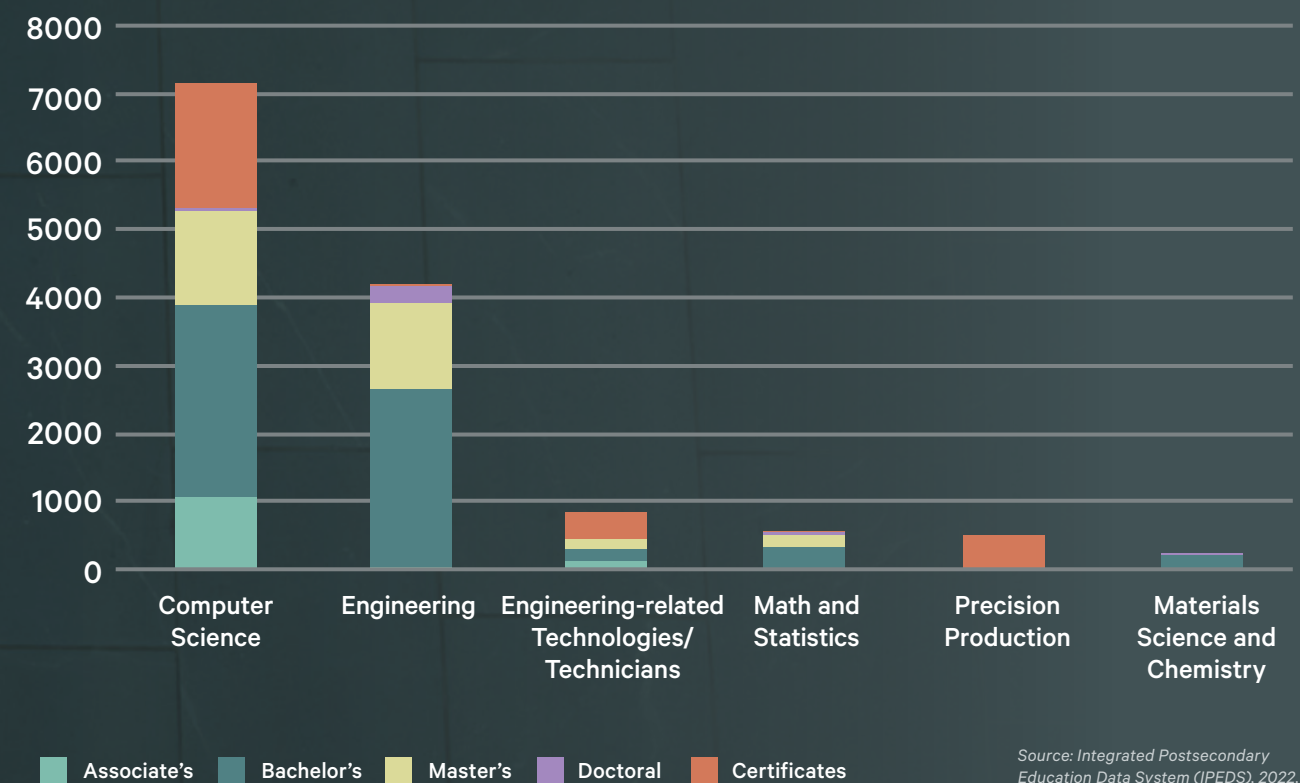
Source: Bureau of Labor Statistics (BLS) Occupational Employment and Wage Statistics, May 2023.



A National Leader in Workforce Development

In addition to a deep labor pool, Phoenix-based manufacturers benefit from a diverse education and workforce training ecosystem that produces over 100,000 degrees and certificates each year. That includes over 11,000 graduates in engineering and computer science fields. The Fulton Schools of Engineering at ASU compose one of the largest Engineering Colleges in the country with over 30,000 students enrolled. The Fulton Schools have expanded aggressively over the last decade to keep pace with the explosive demand for STEM workers. Recent data from the Arizona Board of Regents also shows the talent pipeline is choosing to stay in-state after graduation, providing a deep pool of new talent for producers looking to scale.

COMPLETIONS, 2020-2021 ACADEMIC YEAR



Source: Integrated Postsecondary Education Data System (IPEDS), 2022.

Arizona research universities are key drivers of technology and innovation in the state with tangible spillover effects for local employers. Arizona public universities account for over \$1.5 billion in annual research expenditures². Additionally, in 2021, Arizona public research universities generated 40 startup companies and secured over 300 patents³.



A Thriving Ecosystem of Collaborative Innovation



As part of the New Economy Initiative, ASU established five new Science and Technology Centers (STCs) focused on technology development in collaboration with private industry. STC areas of focus include advanced materials processes, energy devices, manufacturing automation, data engineering and more. The STCs enable new levels of collaboration with major industry players including Honeywell, Boeing, Rockwell Automation, PADT, Siemens, Raytheon and TPI Composites.

ASU's decades-long relationship with Intel has resulted in over 30 projects ranging from research initiatives, workforce training and curriculum development. For the last few years, ASU has been Intel's single largest talent pipeline, contributing roughly 5% of Intel's global workforce.

In June 2023, ASU announced a partnership with TSMC to focus on student support, training and recruitment, and faculty work projects and research that will create a talent pipeline for years to come.



The start of 2021 saw the opening of Drive48, a new state-of-the-art job training center for advanced manufacturing and automotive assembly. The center is a result of collaboration among government, academia and private industry players including Central Arizona College, Pinal County, the City of Casa Grande, the Arizona Commerce Authority and Lucid Motors. Over 1,900 individuals have completed the program so far, with the first several hundred going on to work at Lucid's Casa Grande facility.



Maricopa County Community College District (MCCCD), one of the largest community college networks in the country, has invested heavily in new accelerated workforce training programs in advanced manufacturing, artificial intelligence, cloud computing, cybersecurity and more. MCCCD's new Semiconductor Quick Start Technician Program allows students to earn a certificate in just 10 days and guarantees finishers an initial interview with TSMC.

These are just a few examples of innovative public-private collaboration in the Valley that have helped make the Phoenix Metro a premier manufacturing and technology hub.

Strong Incentives for Manufacturers



QUALIFIED FACILITY

Arizona aims to promote the expansion of headquarters facilities or manufacturing facilities, including manufacturing-related research and development, through the Qualified Facility tax credit. Arizona employers may be eligible for up to \$30 million in refundable income tax credits each year if they meet the minimum capital investment and job creation requirements.



ADVANCED MANUFACTURING FACILITIES GRANT

In 2022, the Arizona Commerce Authority partnered with Arizona State University to help advanced manufacturing startups achieve commercialization. Through the Advanced Manufacturing Facilities Grant, semiconductor and hard-materials startup companies can receive up to \$50,000 in matching funds to access ASU's established Core Facilities. Through ASU's Core Facilities, startups have access to state-of-the-art equipment, specialized services and consultation.



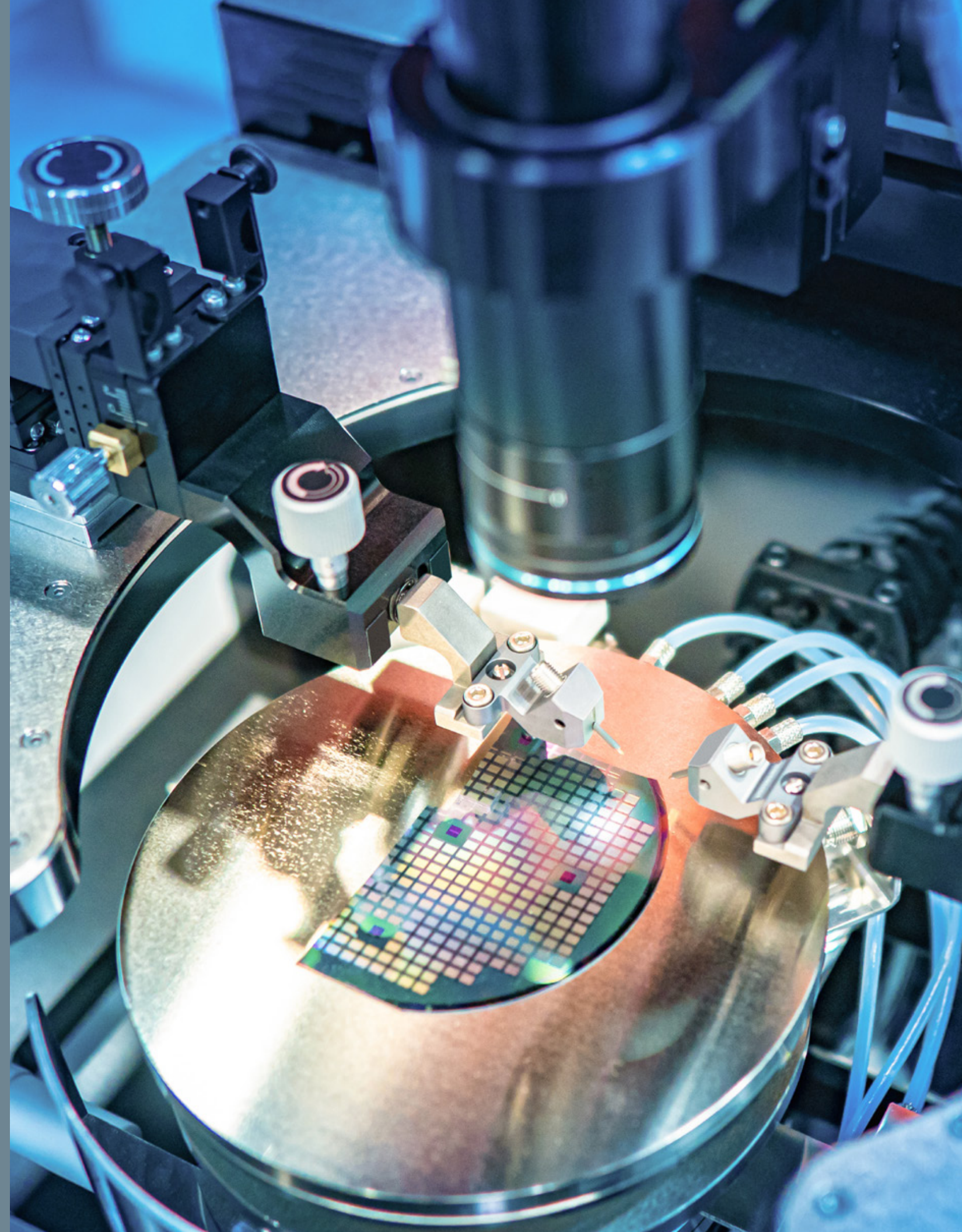
RESEARCH AND DEVELOPMENT

Arizona firms engaged in research and development (R&D) may be eligible for refundable tax credits worth up to 24% of the first \$2.5 million in qualifying expenses plus an additional 15% of qualifying expenses in excess of \$2.5 million.



ADDITIONAL DEPRECIATION

Arizona offers accelerated depreciation on personal property devoted to commercial, industrial and agricultural uses. Taxable full cash values of personal property can be reduced by 75% in the first year of use, 59% in year two, 43% in year three, 27% in year four and 11% in year five.



Attracting Global Players and Emerging Technology Startups

TOP ADVANCED MANUFACTURING EMPLOYERS

 11,810 EMPLOYEES	 7,550 EMPLOYEES	 3,950 EMPLOYEES	 2,850 EMPLOYEES
 1,970 EMPLOYEES	 1,470 EMPLOYEES	 980 EMPLOYEES	 940 EMPLOYEES
 880 EMPLOYEES	 880 EMPLOYEES	 750 EMPLOYEES	 710 EMPLOYEES

Source: Maricopa Association of Governments (MAG) Employer Database, 2021.

The Phoenix metro is home to over 1,000 advanced manufacturing and development operations that employ nearly 80,000 people, accounting for over half of all manufacturing employment in the region. Semiconductors, aerospace and defense, medical devices and advanced materials manufacturers make up some of the Valley's largest employers and continue to attract new suppliers and downstream producers to the region.

intel

Intel Corporation has a long history of investment in Phoenix metro. The company opened its first Phoenix manufacturing facility in 1979. The facility, known as Fab 7, was Intel's first semiconductor fabrication plant outside of California and signaled the beginning of a new technology sector evolution in the region. Since then, Intel has opened a total of four manufacturing facilities in Chandler that employ nearly 12,000 workers. In 2021, Intel announced an additional \$20 billion investment to construct two more facilities slated to begin production in 2024, bringing their total investment in the region to over \$50 billion.

	11,810 JOBS
	\$50 Billion INVESTED IN PHOENIX METRO
	6 WAFER FABRICATION PLANTS
	\$8.6 Billion IN ANNUAL ECONOMIC IMPACT ⁴

Source: Maricopa Association of Governments (MAG) Employer Database, 2021.

Taiwan Semiconductor

In May 2020, Taiwan Semiconductor Manufacturing Co. (TSMC) announced plans to enter the U.S. market with a \$12 billion investment to build a manufacturing facility in Phoenix.

Slated to be fully operational in 2025, the silicon wafer fabrication facility (fab) will produce 4nm transistor chips used in cutting edge technology applications. Before the facility was completed, TSMC announced plans to construct a second fab at the Phoenix site. With total investment at \$40 billion, TSMC marks one of the largest foreign direct investments in U.S. history and a catalyst for massive economic evolution in the Valley.

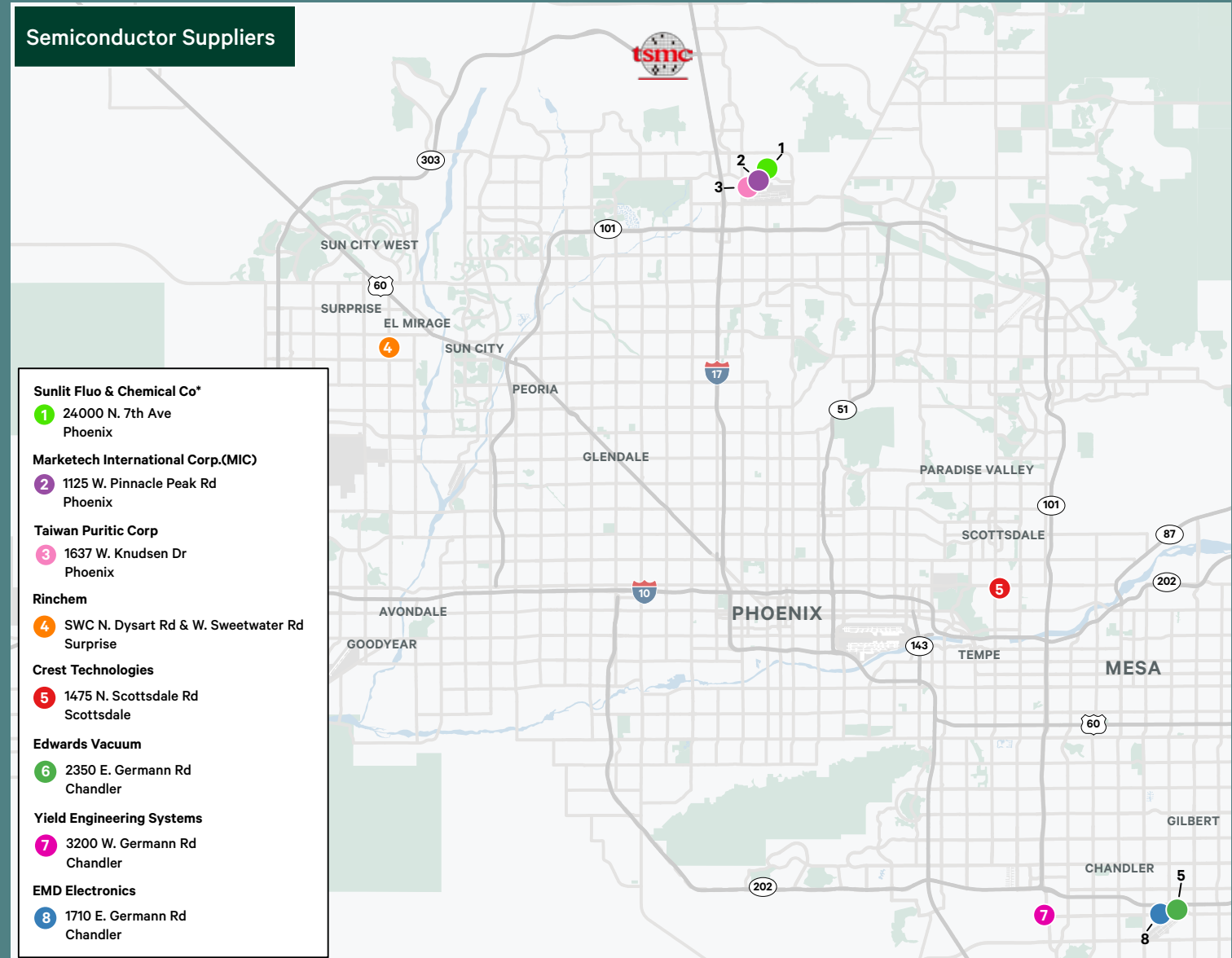
HIGH-WAGE JOB GROWTH

In addition to the 10,000 construction jobs required to build the facilities, TSMC is expected to employ 4,500 high-wage workers upon completion. The investment is also expected to attract more than 40 suppliers to the Valley, bringing significant capital investment and employment. Since TSMC's announcement, suppliers including Edwards Vacuum, Yield Engineering Systems and Rinchem, have occupied roughly 600,000 sq. ft. of space in the Valley. Over the next several years, the TSMC ecosystem is expected to yield tens of thousands of jobs, leveraging Phoenix's deep talent pool.

CATALYZING NEW DEVELOPMENT

TSMC's investment has also further catalyzed demand for housing in an already hot housing market, driving further residential development activity. Currently, there are 64 multi-family developments, comprising roughly 4,800 units. Additionally, more than 28,000 single family homes started construction in 2022, much of which can be reached within a convenient 30-minute drive from TSMC. The Phoenix metro is expected to average 35,000 new single-family construction starts and 15,000 multifamily construction starts through the end of the decade⁵. In anticipation of radical growth, developers have scooped up several hundred acres in the last couple of years to make way for build-to-rent (BTR) housing options in North Phoenix.

TSMC's investment is driving strong commercial development activity in the Northwest Valley as well. At the time of TSMC's announcement, just 250,000 sq. ft. of industrial space was under construction in the Northwest Valley. In the next twelve months, approximately 2.8 million sq. ft. of industrial space is expected to deliver, creating opportunity for TSMC suppliers and other high-tech manufacturing companies looking to tap into the growing ecosystem.



LOCAL AND GLOBAL IMPACT

TSMC's move to Arizona is expected to strengthen North American semiconductor supply chains and reduce reliance on dominant hubs in Taiwan, South Korea and China. Phoenix is a leading example of how these investments benefit global supply chains and support the domestic growth of cutting-edge technology sectors like electric vehicles, aerospace, consumer electronics and medical devices.

Much like Intel has done for Chandler, TSMC's groundbreaking investment will radically transform the North Phoenix community, spurring new commercial and residential development, high-wage job growth and cultivation of new technology clusters. TSMC is a welcome addition to the Valley's thriving semiconductor ecosystem and solidifies Phoenix as the next global hub for advanced manufacturing.

Emerging Technology

Since the Great Recession, Phoenix leadership has made great strides to diversify the local economy, resulting in a robust innovation ecosystem that welcomes new startups and global players.

Firms benefit from the deep skilled labor pool, supportive regulatory environment, abundant business resources and geographic advantages as they test and scale new technologies.

All the above has captured the attention of electric vehicle (EV), battery and energy storage technology firms and led to the birth of new emerging technology clusters in the region. The state of Arizona has also secured over \$32 billion in federal funding for EV and battery-related industry development⁶. Proximity to major automotive manufacturing hubs in Northern Mexico add to Phoenix's

value proposition. Consequently, several EV manufacturers such as Nikola, Lucid and ElectraMeccanica have selected Phoenix as their base for manufacturing and business operations. These firms have brought thousands of jobs to the Metro in the past few years.

Alongside semiconductors and EVs, Phoenix is at the forefront of sustainable energy, solar and battery technology, securing billions of dollars of investment in the last couple of years. Arizona is home to a thriving solar manufacturing sector that benefits from over 300 days of sunshine each year. Approximately 368 solar companies employ 8,200 people in the state. Roughly 76 of them—21%—are manufacturing-focused. Robust public support for these emerging technologies help to ensure Phoenix's competitive economic position in the coming decades.

EMERGING TECHNOLOGY IS A GROWING DRIVER OF PHOENIX INVESTMENT

Company	Employment	Footprint (Sq. Ft.)	Capital Investment	City	Year Established
 LG Energy Solution	4,000	1,420,440	\$6.9 billion	Queen Creek	2024
 NIKOLA™	2,000	1,000,000	\$1.0 billion	Coolidge	2023
 LUCID GROUP <small>Transforming lives. Always.</small>	2,000	820,000	\$700 million	Casa Grande	2020
 KORE POWER	1,250	2,000,000	\$1.0 billion	Buckeye	2024
 ELECTRA MECCANICA	500	235,094	\$35 million	Mesa	2021

Company	Employment	Footprint (Sq. Ft.)	City	Year Established
 ZERO ELECTRIC VEHICLES	300	103,000	Gilbert	2021
 DU	100	43,000	Mesa	2016
 URBIX	100	31,000	Mesa	2020
 NRS Logistics	90	65,000	Casa Grande	2024
 Li-Cycle®	50	140,000	Gilbert	2022
 EXO Technologies	50	15,000	Mesa	2021

Source: Maricopa Association of Governments (MAG) Employer Database, 2023; Greater Phoenix Economic Council (GPEC), 2023. Phoenix Business Journal, 2023.

HOME TO DOZENS OF ADVANCED INDUSTRY CLUSTERS



Chandler/Price

The Chandler-Price Corridor is one of the oldest tech corridors in Phoenix metro and home to the Valley's largest technology and high-tech manufacturing cluster. The hub began taking shape in the early 80s, largely driven by Intel's initial investment in the area. In subsequent decades, the corridor developed a robust high-tech manufacturing cluster driven by semiconductors, microelectronics and aerospace firms. More recently, the corridor has also become a premier location for software and healthcare technology firms. The corridor is currently home to over 700 companies that employ 45,000 workers including Northrop Grumman, Rogers Corporation, ASML, Microchip, NXP, Iridium, Viavi and many others.

31
HIGH-TECH
MANUFACTURING FIRMS

11,041
HIGH-TECH
MANUFACTURING EMPLOYMENT

10.2M Sq. Ft.
INDUSTRIAL
INVENTORY

670,000 Sq. Ft.
INDUSTRIAL
CONSTRUCTION PIPELINE

4.0%
INDUSTRIAL
VACANCY

\$1.45
INDUSTRIAL ASKING
RATE (NNN PSF)



Deer Valley

The once sleepy north Phoenix village situated near the I-17 and Loop 101 has seen modest yet steady development over the last 20 years, but Deer Valley is now on the cusp of radical transformation. Thanks to a \$40 billion investment by TSMC, Deer Valley is the new development darling of the decade. Since TSMC began construction, hundreds of acres of land have traded for residential development including large swaths of multifamily and build-to-rent (BTR). The submarket is well situated near two main freeways offering quick access across metro Phoenix and northern Arizona. As many landlocked suburbs approach buildout, Deer Valley is poised to capitalize on continued economic growth in the next decade.

29
HIGH-TECH
MANUFACTURING FIRMS

4,550
HIGH-TECH
MANUFACTURING EMPLOYMENT

16.5M Sq. Ft.
INDUSTRIAL
INVENTORY

1.9M Sq. Ft.
INDUSTRIAL
CONSTRUCTION PIPELINE

2.5%
INDUSTRIAL
VACANCY

\$1.30
INDUSTRIAL ASKING
RATE (NNN PSF)



Sky Harbor

The area surrounding Phoenix Sky Harbor International Airport remains a strong and steady industrial submarket. Nearby manufacturers benefit from the submarket's central location within the metro as well as proximity to key transportation infrastructure that includes nonstop flights to 141 markets across North America, the United Kingdom and Germany.

The submarket also benefits from its proximity to downtown Tempe, which is home to a robust technology cluster and Arizona State University. Unsurprisingly, the Sky Harbor submarket is highly sought after by aerospace and transportation-oriented manufacturers like Honeywell, Mercury Systems, Northstar Aerospace, Cadence Aerospace and GKN Aerospace. Far from just an aerospace manufacturing hub, the Sky Harbor submarket is also home to many producers of semiconductors, computer peripherals and components, microelectronics and medical instruments.



Mesa

With over a half million residents, Mesa is the largest suburb in the Phoenix metro. Many are not aware that Mesa is also home to a thriving advanced industry base that includes Boeing, Dexcom, Nammo Talley, Northrop Grumman, Infineon, Cirrus Logic, Textron Aviation and many others.

Several advanced industry employment corridors have emerged in recent years, becoming major contributors to economic growth in the Valley. Falcon Airfield to the north, the Elliott Road Corridor to the east, and Phoenix-Mesa Gateway Airport to the southeast continue to attract industry players of all sizes with strong development opportunities, quality labor, new infrastructure and housing. The Elliott Road Corridor has attracted investments from global tech firms including Apple, Meta and Google and is poised to become a hub for semiconductors, electric vehicles and battery technology. Phoenix-Mesa Gateway Airport is also home to SkyBridge Arizona, the nation's first inland port of entry for shipping between the U.S. and Mexico with over 3.5 million sq. ft. of planned industrial development.

31
HIGH-TECH
MANUFACTURING FIRMS

13,930
HIGH-TECH
MANUFACTURING EMPLOYMENT

18.6M Sq. Ft.
INDUSTRIAL
INVENTORY

0 Sq. Ft.
INDUSTRIAL
CONSTRUCTION PIPELINE

3.3%
INDUSTRIAL
VACANCY

\$1.21
INDUSTRIAL ASKING
RATE (NNN PSF)

98
HIGH-TECH
MANUFACTURING FIRMS

8,600
HIGH-TECH
MANUFACTURING EMPLOYMENT

24.7 Sq. Ft.
INDUSTRIAL
INVENTORY

13.6 Sq. Ft.
INDUSTRIAL
CONSTRUCTION PIPELINE

4.8%
INDUSTRIAL
VACANCY

\$1.15
INDUSTRIAL ASKING
RATE (NNN PSF)

Unprecedented Industrial Demand

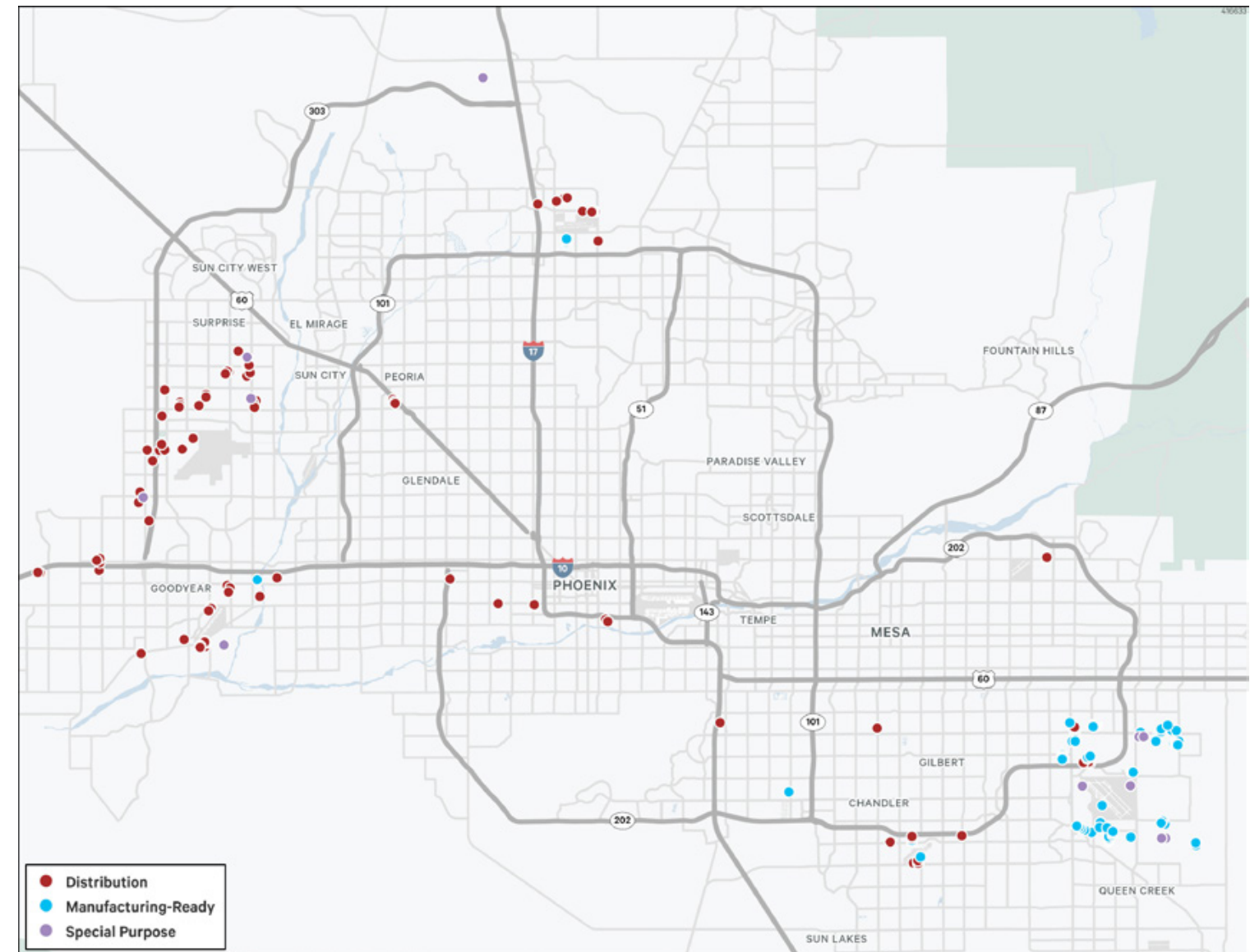
In the last few years, Phoenix metro has seen explosive demand for commercial space from manufacturing users. Since 2018, manufacturing space requirements have grown 107% while advanced manufacturing space requirements have grown a whopping 366%.

USER DEMAND: MANUFACTURING

	2018	2023
Tenants in the Market	18	62
Space Required (Sq. Ft.)	5,799,000	12,022,230

USER DEMAND: ADVANCED MANUFACTURING

	2018	2023
Tenants in the Market	4	18
Space Required (Sq. Ft.)	844,000	3,930,040



In a similar timeframe, Phoenix has become one of the hottest industrial markets in the country with consecutive years of record-breaking leasing activity and development. Prior to the pandemic, Phoenix had an average of 9 million sq. ft. of industrial product under construction. Midway through 2021, active industrial construction more than doubled pre-pandemic levels and continued to grow steadily. In 2022, a record-breaking 26 million sq. ft. of new industrial product entered the market. In the first quarter of 2023, Phoenix

saw an additional 5 million sq. ft. delivered with an additional 45 million sq. ft. under construction. Despite record development, inventory has barely kept pace with demand.

While much of this development is geared towards distribution and logistics users, the Valley also has a healthy supply of general industrial shell space and build-to-suit options for manufacturing users. Much of this product is located in the Southeast Valley, but producers can find opportunity in all corners of the Phoenix metro.



The Top Choice for U.S. Advanced Manufacturing

The U.S. has reached a new chapter in domestic manufacturing and Phoenix has secured a front-row seat. The Valley remains a growth-driven market and continues to capture the attention of manufacturing firms across the country. Ongoing investment from advanced manufacturers in the semiconductor, microelectronics, aerospace and defense, biomedical, electric and autonomous vehicles and alternative energy production will ensure Phoenix has one of the most technologically sophisticated manufacturing sectors in the U.S. Local manufacturers will remain, thanks to a deep and fast-growing skilled labor pool, operational affordability, strong public support and investment and unbeatable quality of life.

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