Maricopa Association of Governments
Brookings Metropolitan Business Planning Initiative
Draft Strategic Overview
October 5, 2011

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Executive Summary

The Maricopa Association of Governments (MAG) is the council of governments and metropolitan planning organization for Maricopa County, Arizona. As a voluntary association of the municipalities, MAG is responsible for regional planning for transportation, environmental quality, and human services. In collaboration with the municipalities, economic development agencies, and academic talents, MAG has undertaken the Brookings Metropolitan Business Planning Initiative with the goal of enhancing the region's economic sustainability and creating jobs for Arizona's residents.

The purpose of the Metropolitan Business Planning Initiative is to shift our economic development culture from one of inter-city and inter-agency competition, to one of state-wide collaboration and mutual benefit. Concurrently, the region's cities and economic development agencies will identify strategic economic opportunities to pursue together. Through this initiative, the region will reorganize the way it does business by sharing information and working toward common goals that will improve the quality of life for all residents. The role of the Brookings Institution is to facilitate the region's self-analysis of our united strengths, challenges, and targeted opportunities. The end result will be that, by developing a robust, collaborative framework in which to pursue economic growth, our state's economy will be revitalized and the region will have a new process to approach economic development that may be utilized with a variety of industries and projects for years to come.

The region is marked by a historically volatile economy. The added impact of the recession has placed a significant burden on the region. Charles Darwin once said, "It is not the strongest of species that survives, nor the most intelligent, but the ones most responsive to change." Through this process, the MAG region will leverage its strength and intelligence to create the changes required to have a lasting positive impact on the region's economy. We cannot afford to wait. The residents of the region need a recovery from the recession and a more stable economic foundation now.

Achieving that goal has challenges. Prominent economists like Marshall Vest of the University of Arizona do not anticipate a full recovery from the recession until 2014. This planning process seeks to hasten the recovery while building a solid foundation that will vitalize the region for years to come. The strategic overview is an important step in this process. Though this overview, the region's economy will be described in substantive detail, offering an accurate portrait of the assets and opportunities. From this foundation, one or more lead initiatives will be indentified and pursued. Concurrently, we will develop the process to encourage the region's municipalities and economic development agencies to work in collaboration rather than competition. The end result will be both a process and a product that will focus the region's economic development efforts and invigorate the economy.

This document will cover the following areas:

- Top-Line Performance Measures

- Next Economy Indicators
- Leverage Point One: Enhance Regional Concentrations
- Leverage Point Two: Deploy Human Capital Aligned with Jobs
- Leverage Point: Develop Innovation-Enabling Infrastructure
- Leverage Point Four: Increase Spatial Efficiency
- Leverage Point Five: Create Effective Public and Civic Culture and Institutions

The region has a number of viable opportunities to recover from the recession and build a sustainable economy for all residents. National rankings place the region in the top tier for growth and entrepreneurialism. Advancements like the Translational Genomics Research Institute (TGen) and Arizona Biodesign Institute, unique facilities such as the Air Force Research Lab, and natural assets in solar energy offer a set of robust assets that create a strong foundation. Based on analysis of the strategic overview, the region would be well-served to concentrate efforts on attracting and maintaining high-wage, high-skills employment opportunities in targeted industries. Such a result will be achieved by, among other efforts, investments in human capital and appropriate incentives for targeted companies to locate in this region.

During the expansionary years, when the region's population grew significantly, housing and other population-driven industries were prominent. In the wake of the recession, there is an opportunity to transfer the skills and knowledge learned in a now weak economic sector to one of economic opportunity. For example, the skills accrued by the construction industry may be realigned with other opportunities that offer depth to the skills, research, and value of other industries. Given a focus on clear regional objectives, the economic future of the region may be more prosperous as a result of the region working collaboratively.

The following is a summary of the region's strengths, challenges, and opportunities by each point to be presented in the report:

<u>Top-line performance measures</u>:

The region leads the country in a number of areas, including growth in population, employment, and output.

Until recently, the region invested more in education and experienced lower rates of poverty than the national average. For example, until 2007, the region's poverty rate was below the national average. Today, the reverse is true.

The Gross Domestic Product cycles tend to outperform the country in times of expansion. The Arizona Indicators Project (AIP) reports the 7.5 percent annual average inflation-adjusted growth rate in Arizona outperformed the 3.7 percent national rate from 1991 to 2001. From

2001 to 2009, the 2.9 percent GDP growth rate in Arizona was slightly higher the nation's growth rate of 1.6 percent.

Next economy indicators:

The region's export activity is spread among a diverse number of industries. The largest export from 2007 to 2010 was civilian aircraft, representing 10.9 percent of all export value while other industries such as high technology experienced a significant decline from 2007 to 2010.

Efforts to explore and identify a lead initiative could provide focus and the edge needed to take an industry to the next level. For example, the region has a substantial number of "clean" jobs, but not in proportion to the high number of other jobs.

The ability to attract better opportunities will increase personal income, as well as regional wealth.

Regional concentrations

The five "C"s of the region's economy, cattle, citrus, climate, cotton, and copper, have evolved to varying degrees. For example, cotton continues to be a thriving industry with increasing importance notwithstanding the cost for cotton has tripled in the last ten years. In addition, new bio-fuel research depends heavily on cotton production and other non-feedstock cellulose, according to GPEC. The quest is to define the 21st century "C"'s for the region.

A number of assets make aerospace and defense a lucrative regional concentration. Unique facilities such as Luke Air Force Base in the West Valley and Phoenix-Mesa Gateway in the East Valley position this region to outperform the nation and state.

Advanced business services have shown the most employment growth, but this industry is now on the decline. Aerospace and aviation is on an upward trend, although nationally the aerospace industry is in decline. Aviation may be responsible for the majority of the growth seen in this cluster.

High tech offers the highest wages of any cluster in the region. Investments in education could propel the region to greater employment and recruitment of new companies in this area.

Solar energy production, and production of the constituent manufacturing, is a natural industry for the region. The state enjoys the highest level of solar irradiance, or the amount of sunlight hitting the ground, in the country. This keeps the cost of producing solar energy lower than most other parts of the country. In addition, there is a large amount of available, affordable land that may be cultivated for solar energy production. Further, as the cost of other sources of energy rise, a "solar-energy" cost advantage may emerge to power other industries.

Human Capital

The region significantly benefits from academic leadership and achievement from Arizona State University and Thunderbird School of Global Management.

Nearly a third of residents have at least some college experience and nearly an additional 20 percent have a Bachelors degree or a graduate/professional degree.

Robust workforce development programs through Maricopa Community Colleges and Arizona Department of Commerce tailor training to the unique needs of employers and job candidates.

Efforts to increase educational attainment would increase the region's workforce development and prosperity. One or two years of post secondary education increases an individual's earning potential by more than $411,000 in that person's lifetime.

Innovation-enabling Infrastructure

The region benefits from a significant number of small to medium sized entrepreneurial enterprises with more than two thirds of establishments in the region having 20 or fewer employees.

The region performs well in the area of business churn. Efforts in the future could help develop capacity within these establishments and encourage the development of high-wage, high-skill companies.

New programs in the state such as the Angel Investment Program will stimulate entrepreneurship and economic development by providing venture capital.

The region ranks low in Small Business Administration loans, indicating the region's entrepreneurs are not always getting the federal support they need.

Public private partnerships could be a vital strategy to employ. This could help generate the additional venture capital needed to support new entrepreneurs.

In the shift to enhance the region's economy, a significant opportunity could be found in improving high technology and STEM (Science, Technology, Engineering, and Mathematics) workers, the former a high-wage industry and the latter the expertise needed to produce work within that industry. Currently, the region ranks in the top half of the 100 largest regions with ranks of 41st and 43rd respectively.

Innovative research programs through the region's universities, such as Arizona State University's Center for the Convergence of Physical Science and Cancer Biology, provide cutting edge research with life-saving and economic implications.

Spatial Efficiency

Thanks to a well-designed transportation system, the region scores well in congestion. This supports distributed growth with a number of subregional employment centers with higher than anticipated density.

The foreclosure crisis has deeply affected the region, dropping home values by 50 percent and pushing residential completions back to levels not seen since 1990. Despite the burdens this has caused on the region, such as displacing some people from their homes, the upside to this has been that housing affordability has increased where people that did not have the opportunity to purchase a home before has the capability to do so now .

For a desert climate, water can be a main concern or be perceived as a concern. Thanks to the region's aggressive water conservation efforts since the 1980's, water supply is not a barrier for the region's growth.

A connected centers approach, or where transit, highways, and development are optimally connected, maximizes space and resources by increasing the spatial efficiency of development. According to the Urban Land Institute's *Moving AZ One* report, implementing a connected centers strategy would save the region $10 billion in transportation costs and capital costs. In addition, 33 million miles of driving would be eliminated.

Public and Civic Institutions

Thanks to a professional culture of manager/council governance, the region excels in this area.

The low number of municipalities under a single county for such an expansive geographic area contributes to successful coordination of interests, activities, and priorities.

The development of the MAG Economic Development Committee provides a credible venue for convening elected officials, business leaders, and academic talents to address economic development from a holistic perspective.

Strategic Opportunities

Overall, the region benefits from a number of natural and cultivated assets that supports a range of industries. Opportunities to raise the bar for the region in an inclusive way may be achieved through the following action steps:

Invest in human capital, particularly in education to support STEM workers and knowledge workers, giving the region an ample supply of quality employees to work in the lucrative high-paying, high-skill jobs for which the region strives.

Create incentives to recruit and keep competitive industries, reducing the ability of other regions to lure companies out of state.

Maintain and expand the aerospace and aviation industry while leveraging natural assets, such as the region's climate.

Capitalize on opportunities to expand emerging clusters such as solar and renewable energy.

Strengthen the region's amenities and infrastructure that create a high quality of life. This is critical to attracting talented workers to the region who will bring jobs with them.

The identification of lead initiatives will cement support for these action steps for the benefit of the region's economy. The analysis and information from the strategic overview will be carried forward in the process under the advisement of the Leadership Advisory Team and the oversight of the MAG Economic Development Committee (EDC). We extend gratitude to these esteemed professionals for sharing their expertise, time and talents. This endeavor is richer for their leadership. The Leadership Advisory Team and the EDC comprise the brightest and best multi-disciplinary professionals and elected officials dedicated to transforming the economy. The combination of public, private, and academic representatives ensures planning that will be responsive to and reflective of diverse interests. This will support the implementation of the lead initiatives in the future.

For more information, please visit the MAG website at the Brookings Metropolitan Business Planning Initiative page:
http://www.azmag.gov/Projects/Project.asp?CMSID=3577&CMSID2=3888.

Introduction

The purpose of the Metropolitan Business Planning Initiative is to shift our economic development culture from one of inter-city and inter-agency competition, to one of state-wide collaboration and mutual benefit. Concurrently, the region's cities and economic development agencies will identify strategic economic opportunities to pursue together. Through this initiative, the region will reorganize the way we do business to share information and work toward common goals that will improve the quality of life for all residents. The role of the Brookings Institution is to facilitate the region's self-analysis of our united strengths, challenges, and targeted opportunities. The end result will be that, by developing a robust, collaborative framework in which to pursue economic growth, our state's economy will be revitalized and the region will have a new process to approach economic development that may be utilized with a variety of industries and projects for years to come.

The Brookings Metropolitan Business Planning Initiative (MBP) includes the development of a strategic overview of the region's economy. This document reflects data analysis that has been completed to date. These data may updated, as appropriate, as this analysis continues.

The 2010 State New Economy Index (Index) by the Information Technology and Innovation Foundation and the Ewing Marion Kauffman Foundation, offers an overview for many of the same indicators addressed by Brookings. This includes a focus on 26 indicators such as job churn, broadband access, patents, research and development, venture capital, the green economy, and others related to the economic structure of the country. This structure is assessed and ranked at the state level. The 2010 Index builds on previous reports issued in 1999, 2002, 2007, and 2008. The term "new economy" focuses on activities that foster innovation and entrepreneurialism.

When the Index was first released in 1999, Arizona had a strong showing in the top ten. Arizona's ranking plummeted to a low in 2007 of 22, but has improved slightly from 2002, to a rank of 20.

2010 Rank	07 Rank	02 Rank	99 Rank	Change from 2002	Change from 2007
20	22	15	10	-5	2

Arizona's lowest score was a 49 in the immigration of knowledge workers and three in the manufacturing value added. Manufacturing value added is defined by Kauffman by the productivity of each worker as demonstrated by the difference between the value of the inputs and the value of the final product.

Manufacturing value-added as a percent of the top five U.S. average:

1	Washington	128.2%

2	Connecticut	122.0%
3	Arizona	113.5%
4	Nevada	108.5%
5	Delaware	108.0%
U.S. Average		100.0%

Source: U.S. Census, 2007 data.

The state's robust aerospace and defense industry contribute to the high rank in manufacturing. Despite having a low-wage economy, Arizona scores higher than might be anticipated. Arizona is also an outlier in terms of where the New Economy has prospered. This kind of innovation is considered to be more prominent in the Northeast, mid-Atlantic, Mountain West, and Pacific regions of the United States with thirteen of the top twenty states hailing from these four regions. Arizona's strong aerospace and aviation industries play a significant role in its placement in the top 20 average and in the top five for manufacturing value added, as indicated in the chart below.

This strategic overview has been compiled with data from the Brookings Institution and local data sources. The following chart summarizes the region's rankings in areas identified by Brookings for the top 100 largest metros. The region's standing in these areas illustrates both opportunities, strengths, and challenges as the region seeks to enhance its economy. The following sections will offer additional detail and analysis into each data category.

The table below indicates the average ranking for the region in each of the areas identified by Brookings. Each ranking is based on the 100 largest metro regions. Lower scores indicate higher ranking, such as in the region's best area, effective public and civic institutions, or governance. High scores indicate the region scored in the among the worst of the metro regions. According to this metric, the region struggles in the areas of spatial efficiency and next economy indicators. Individual rankings will be provided within each section.

Top-Line Performance Measures	28.6
Next Economy Indicators	44
Innovation-Enabling Infrastructure	29.42
Spatial Efficiency	47.75
Human Capital	58
Public and Civic Institutions/Culture	11.5

Top-Line Regional Performance Measures

Top-line performance measures describe the demographics and vitality of the region. Such indicators include population, output, and productivity as defined by the Gross Domestic Product, employment, wages, and poverty. The following table provides a summary of how the region ranks according to these indicators.

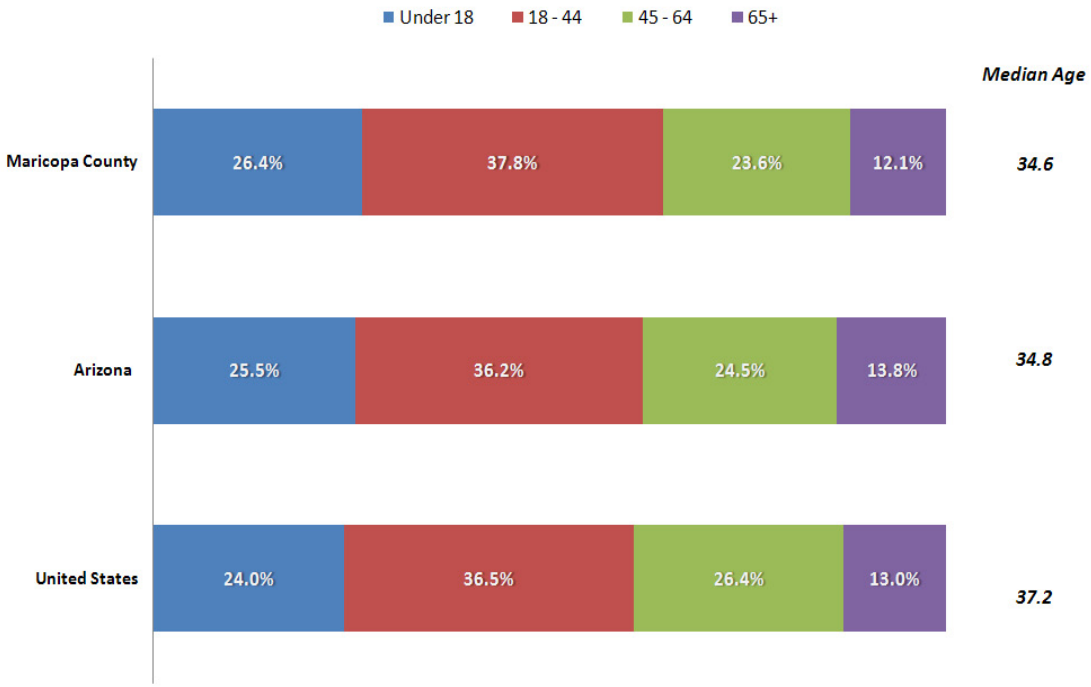
Top-line performance measures	
Population	12
Population growth	5
Output	13
Output growth	5
Productivity	33
Productivity growth	22
Employment	14
Employment growth	6
Wages	30
Wage growth	64
Poverty	71
Poverty change	69
Average	28.6

As portrayed in the chart, the region's main strengths are related to population, productivity, and employment growth and challenges in this area are found in the high rate of poverty and the low rate in wage growth. Details for each indicator are offered below.

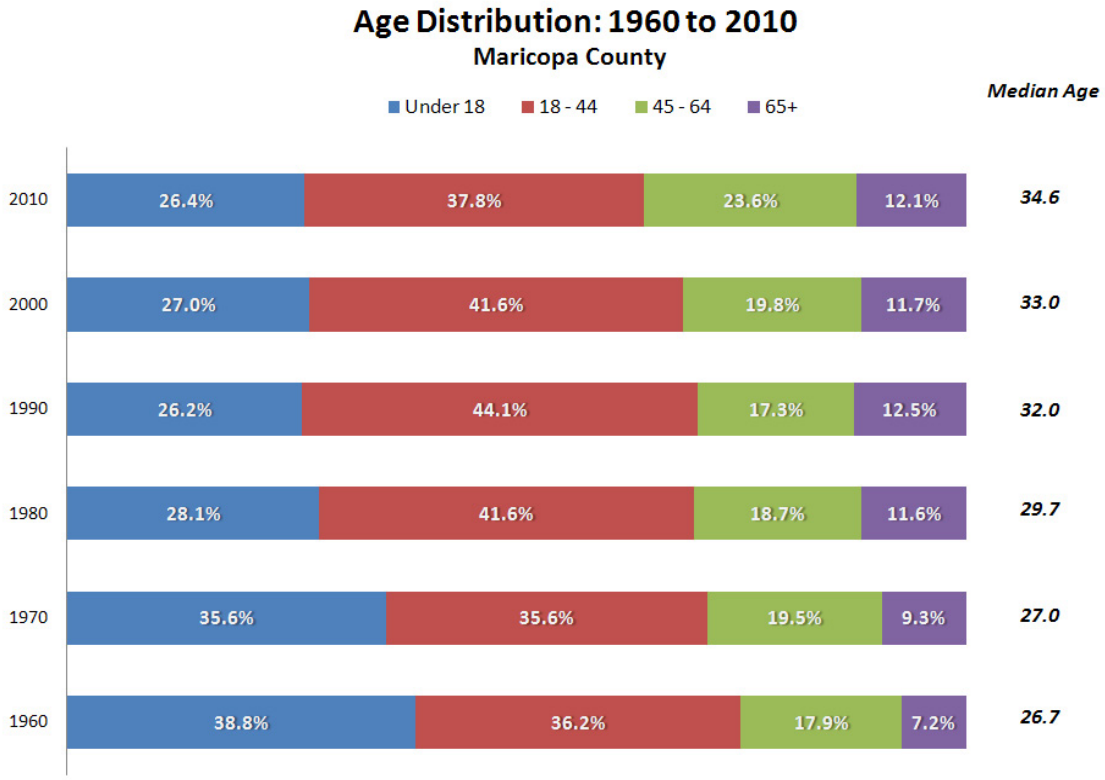
Population

According to the U.S. Census, the average age of the 3.8 million people who live in the region is younger than the national average of 37.2 years. From 1960 to 2010, the average age in the region has increased from 26.7 years in 1960 to the current average. The number of people of working age, 18 to 64 years, peaked in 1990 at 44.1 percent, but has since declined to the current 37.8 percent. This implications of an aging workforce impacts the region's economy and ability to care for its older residents. The second MAG chart below provides additional detail.

Age Distribution 2010

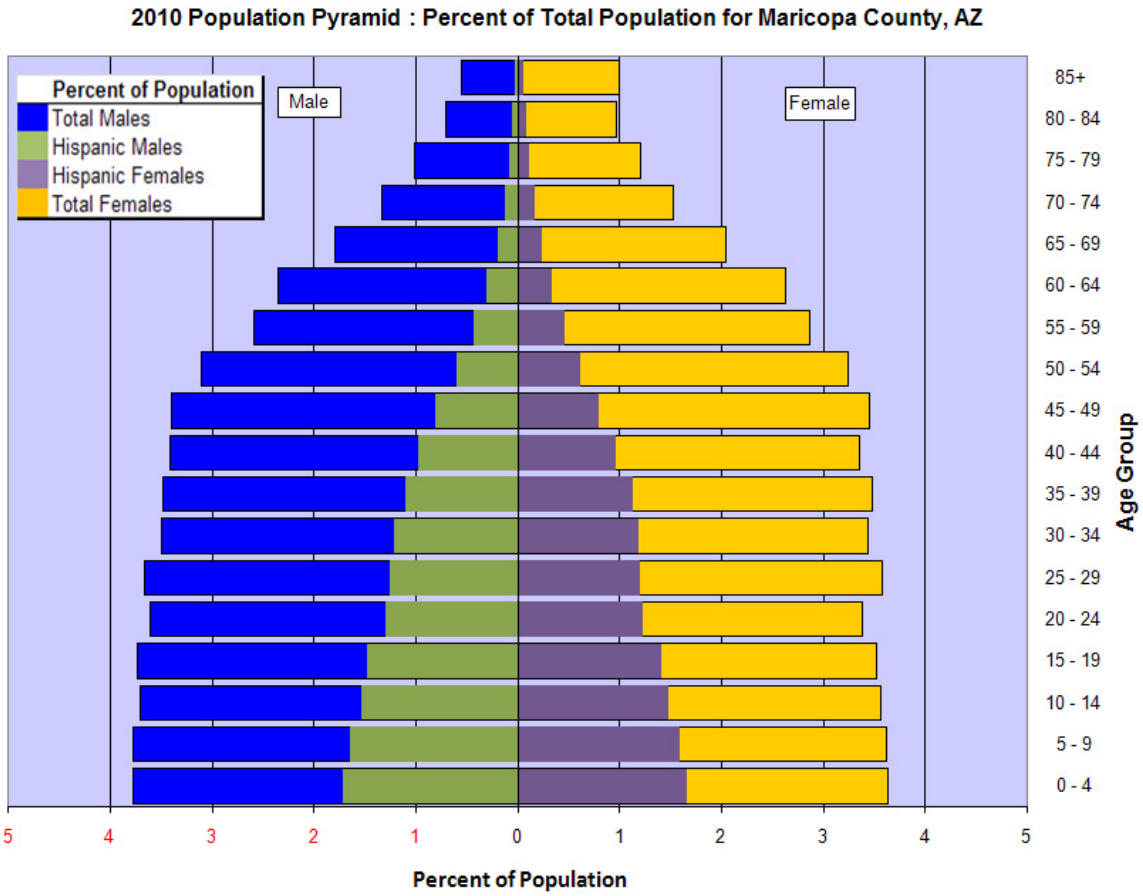


Source: U.S. Census Bureau, Decennial Census Program -2010

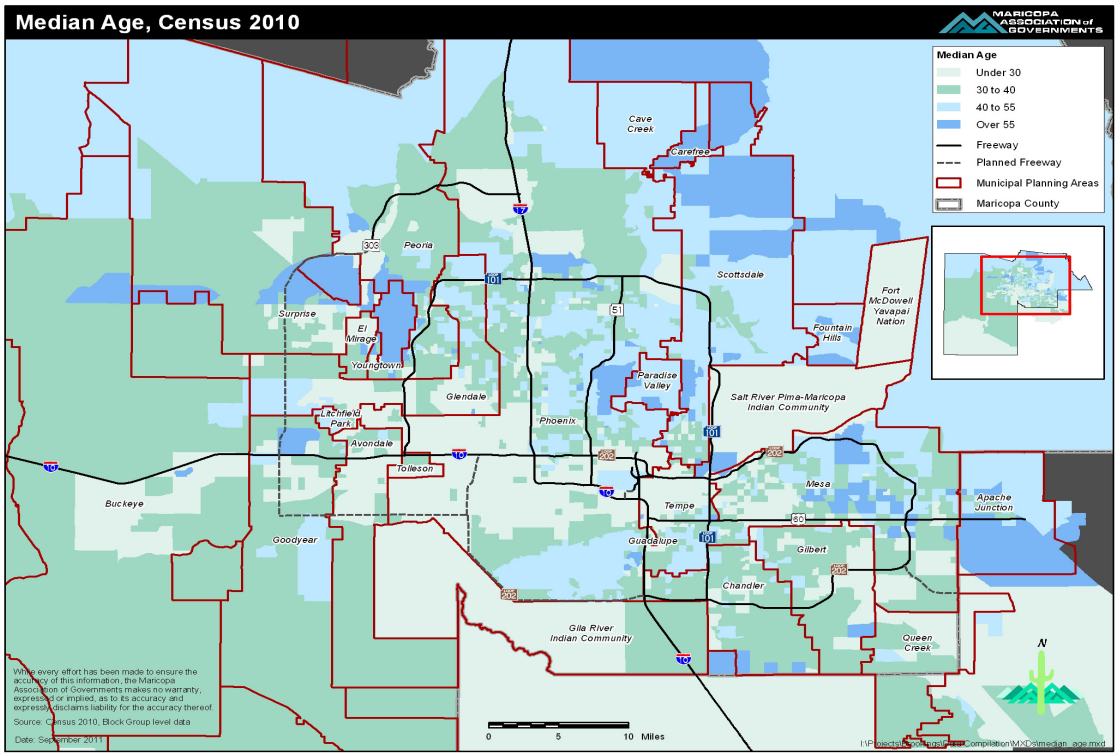


Source: U.S. Census Bureau, Decennial Census Program 1960 - 2010

Despite the increases in the 46 to 64 years and the 65 years plus age groups, the general population and Hispanic populations are fairly balanced, as depicted in the MAG chart below based on 2010 Census data. This puts the region in a good position to care for older residents, raise children, and support a healthy workforce.

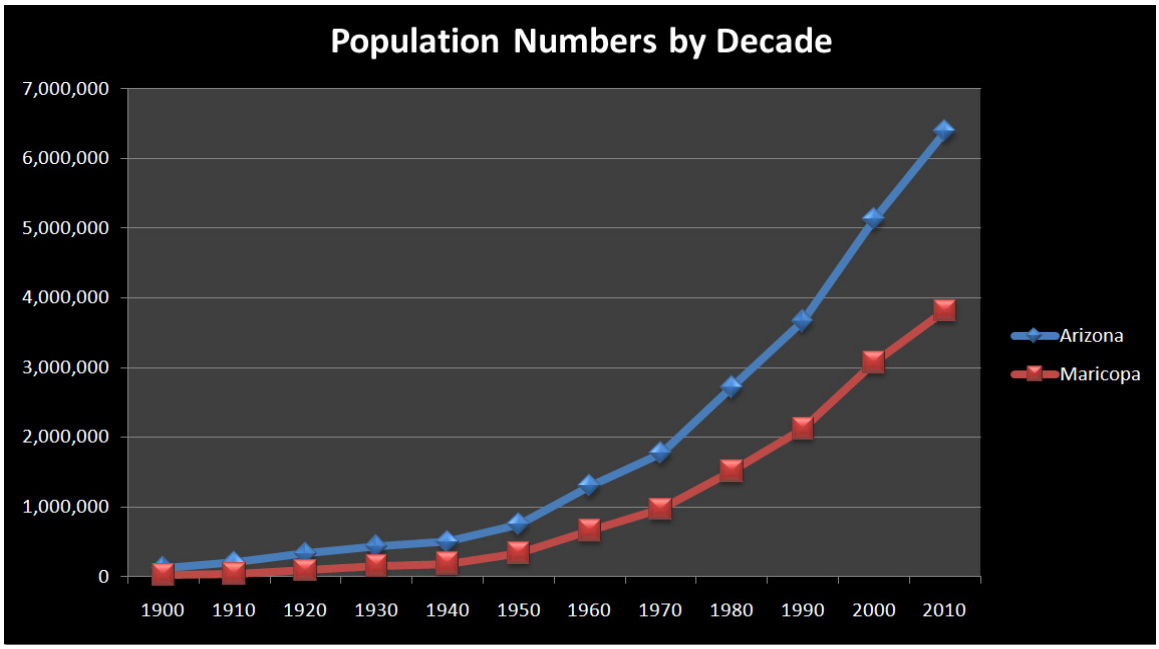


The following MAG map conveys the median age according to the 2010 Census. The outlying areas of the region tend to have higher densities of people age 55 years and older, as a result of the concentration of retirement communities in these areas. This may be an advantage given the higher level of services in these kinds of communities.

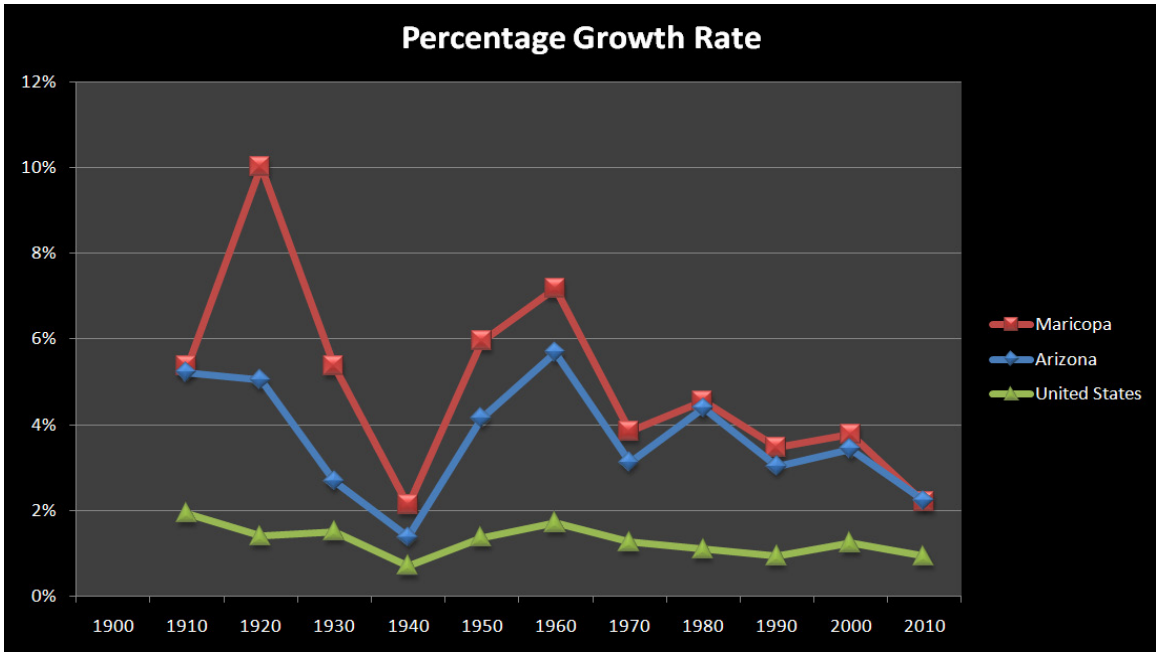


Over the years, the region has been marked by significant growth. Even amidst the impact of the recession, population projections predict this growth will continue, although perhaps not as aggressively. As the population does increase, communities will face new challenges and opportunities related to their proximity and interrelated and/or competing interests.

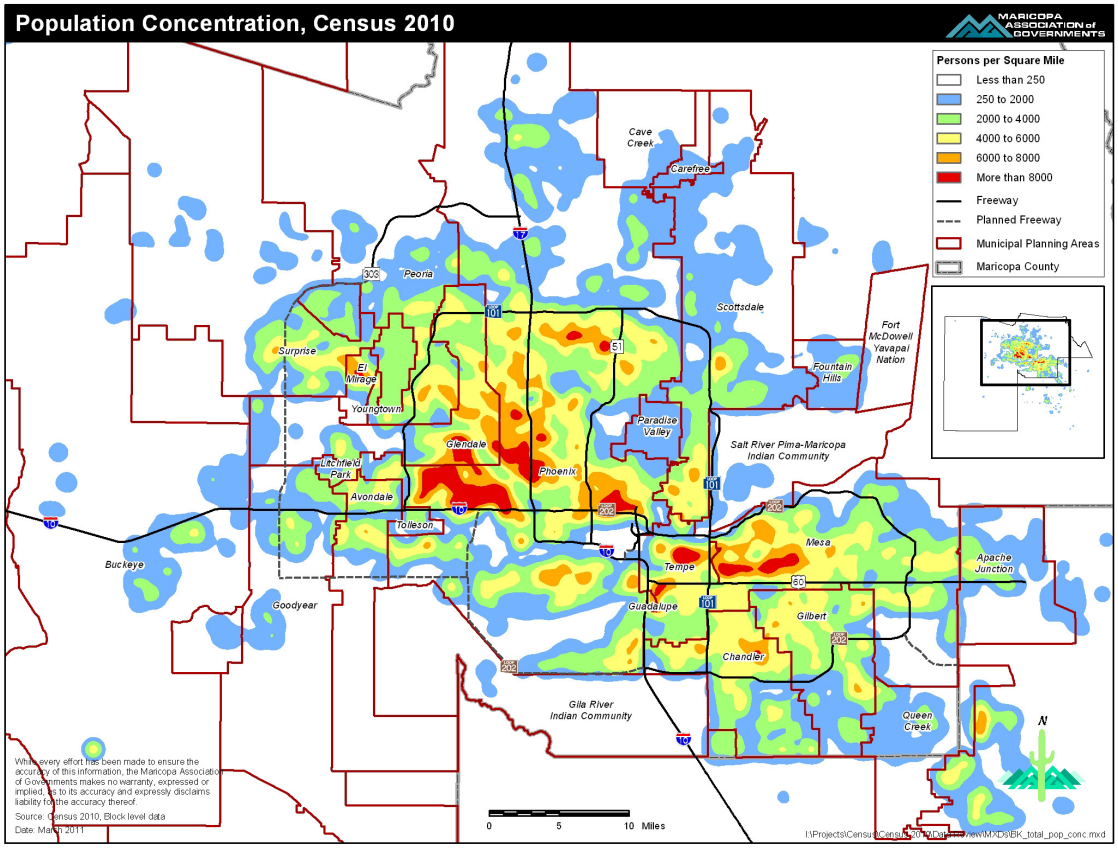
As the MAG chart below illustrates, Arizona's population grew steadily from 1900 to 1950, when the population numbered just below one million people. Beginning in 1950, the population in the state began to build more rapidly, from approximately 750,000 people in 1950 to the current total just below 6.5 million people. Maricopa County, which today accounts for sixty percent of the State's population, has grown from about 20,000 residents in 1900 to the current count of just under four million people.



MAG's analysis of Census data indicates the region has grown by 475 percent from 1960 to 2010. This growth has, for the most part, mirrored the state's growth with the exception of a spike from 1910 to 1920 when the region's population increased by 160 percent. Nearly 30 percent, or 29.6 percent of the population, is Hispanic and ten percent of the population aged five years and older speak Spanish and speak English less then "very well," according to the American Community Survey 2009 one-year estimates. This has implications for the economy, especially in the categories of Human Capital and Workforce Development.

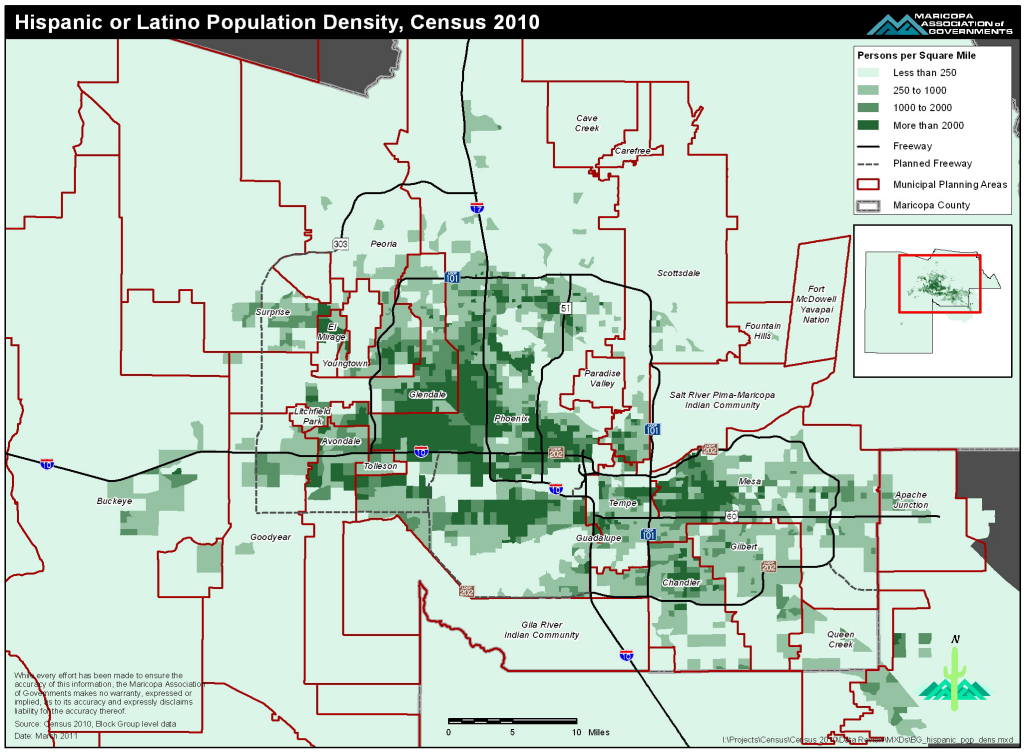


The 2010 Census population reveals the overall population tends to be more densely populated in Mesa, Tempe, south Glendale, west Phoenix, and central Phoenix as the MAG chart below illustrates.

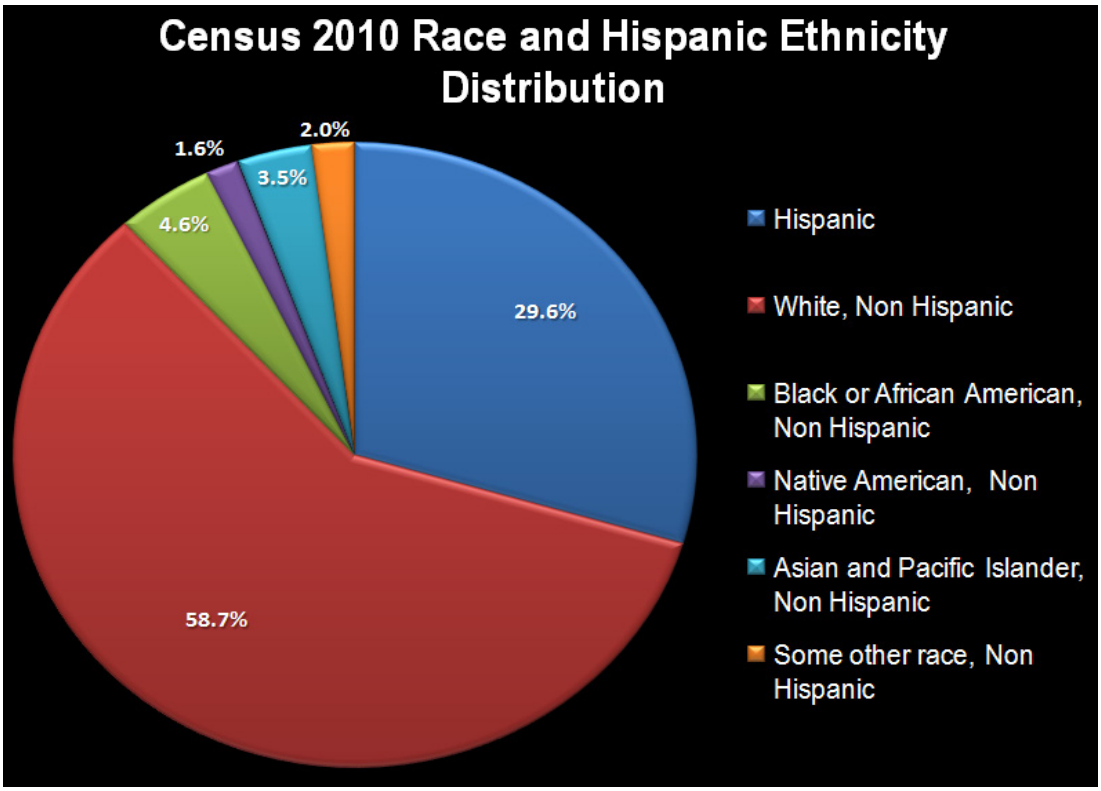


The Arizona Indicators Project, a research effort undertaken by the Arizona State University's Morrison Institute for Public Policy, reports the increase in the Hispanic population is triple the growth rate of Caucasian, non-Hispanic residents. The impact is particularly felt in the region's more urban areas, such as the City of Phoenix which experienced 40 percent of the growth in the Hispanic population. Thirty-nine percent of Phoenix residents are Hispanic; many reside in central and south Phoenix neighborhoods in particular. This growth is even more dramatic in Hispanic children under the age of ten who comprise half of the children in kindergarten through 12th grade throughout the region. This makes the quality of culturally-appropriate curriculum even more important.

The MAG map below indicates where Hispanic residents live in the region. Southwestern and central areas of the region are shown to be densely populated by people of Hispanic or Latino origin, according to the 2010 Census.



A breakdown from the 2010 Census of the race and ethnicity of the population is provided in the MAG chart below.



Population growth is estimated to continue, as portrayed by the FY 2012 third quarter update population projections provided by the Eller College of Management, University of Arizona.

Population projection for 2041 in millions:

	HIGH	BASE	LOW
Arizona	11.2	10.2	9.8
Metro Phoenix	8.0	7.2	6.7
Metro Tucson	1.5	1.4	1.3
Sun Corridor	9.5	8.6	8.0

Output

The region may also be described in terms of the output of the economy. The State is considered to have one of the most volatile economies in the country, second only to Nevada. According to the Eller School of Management at the University of Arizona, the economy is considered volatile because the state's booms are higher than the nation's periods of increase and the state feels the impact of the downward turns in the economy more so than the national average. The benefits of the housing boom may have been productive, but the price is being paid since the recession began. The Eller College of Management created the Volatility Index below.

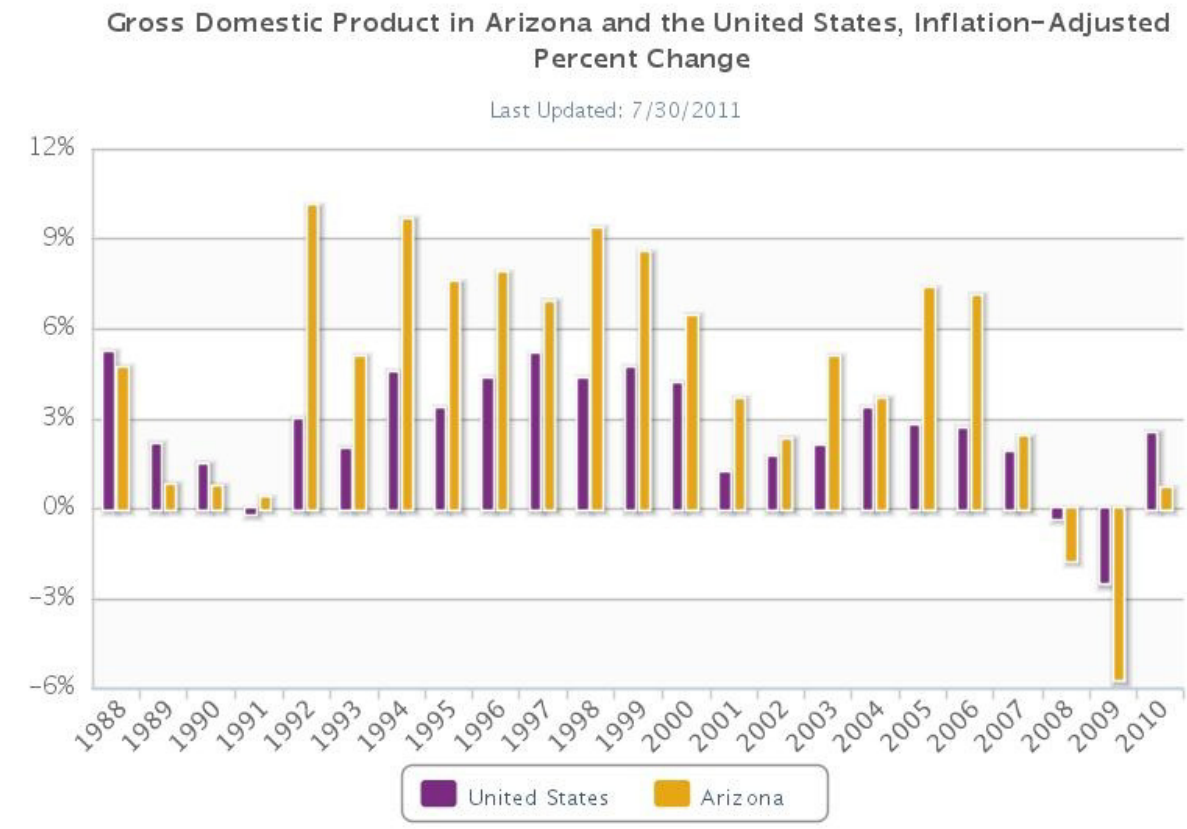
Volatility Index, 10 Most Volatile State Economies Index*

Nevada	130.6
Arizona	119.5
Florida	113.7
Colorado	112.2
Utah	111.1
Georgia	110.8
Texas	110.5
Washington	107.8
Idaho	107.6
North Carolina	107.5

* U.S. average = 100

Productivity

For the purpose of this report, productivity is measured by Gross Domestic Product (GDP) cycles and performance. The GDP cycles tend to outperform the country in times of expansion. The Arizona Indicators Project (AIP) reports the 7.5 percent annual average inflation-adjusted growth rate in Arizona outperformed the 3.7 percent national rate from 1991 to 2001. From 2001 to 2009, the 2.9 percent GDP growth rate in Arizona was slightly higher than the nation's growth rate of 1.6 percent. The AIP chart below compares the state and national growth rates from 1988 to 2010.



Source: U.S. Department of Commerce, Bureau of Economic Analysis

The state's GDP performance, according to AIP, was poor from 1980 to 1990. In years that marked expansionary growth, the state ranked within proximity to the top ten. The descent to the bottom ten ranking is stark and quick. In 2006, Arizona's GDP was ranked 11th in the county, but by 2008, had fallen to 43rd. According to a 2009 policy presentation by the Greater Phoenix Economic Council (GPEC), Economists Paul Portney of the Eller School of Management, Elliot Pollack, and Lee McPheters of Arizona State Univeristy predict that Arizona's economy will feel the effects of the recession until 2012 with 2010 featuring the third consecutive year of job losses, home prices stabilizing in 2011, 50,000 single home permits in 2012, jobs returning to the 2007 peak in 2013, and unemployment having a level of six percent or less by 2012.

The GPEC table below indicates the GDP for the Phoenix metro area from 2001 to 2009, including the metro GDP as a percent of the state's GDP as compared to the US GDP.

GDP (millions of dollars)

Area	2001	2002	2003	2004	2005
Phoenix-Mesa-Glendale, AZ (MSA)	$128,404	$134,117	$143,055	$152,305	$168,890
Arizona	$170,174	$177,106	$189,139	$201,287	$222,968
% of Arizona	75.45%	75.73%	75.63%	75.67%	75.75%
US GDP	$10,286,200	$10,642,300	$11,142,200	$11,853,300	$12,623,000

	2006	2007	2008	2009
Phoenix-Mesa-Glendale, AZ (MSA)	$187,243	$196,615	$196,850	$190,725
Arizona	$246,837	$260,122	$260,454	$249,711
% of Arizona	75.86%	75.59%	75.58%	76.38%
US GDP	$13,377,200	$14,028,700	$14,291,500	$13,939,000

GDP and employment vary by industry throughout the region. The 2010 Arizona Town Hall on the Economy tracked changes in both areas from 1967 to 2007. Industries such as finance and insurance show the greatest gains in this time period, while others, such as manufacturing, reveal significant declines. The Arizona Town Hall table below displays the data.

Standard Industrial Classification (SIC) North American Industry Classification System (NAICS) Change*

			SIC		NAICS		Change
Gross Product	1967	1977	1987	1997	1997	2007	1967-2007
Agriculture	4.19%	3.32%	2.24%	1.60%	1.22%	1.02%	-2.79
Mining	2.57	3.12	1.27	1.56	1.32	1.77	-0.56
Construction	5.76	7.11	6.75	5.21	5.22	6.33	0.56
Manufacturing	13.98	13.20	13.97	15.03	15.06	7.93	-6.08
Wholesale Trade	6.39	6.09	5.54	6.64	6.00	5.75	0.00
Retail Trade	11.85	1.44	10.91	10.28	10.25	10.52	-1.30
Transportation	4.01	3.03	2.99	3.06	2.81	2.75	-1.01
Finance & Insurance	3.96	4.40	5.87	7.49	7.17	7.82	4.18
Real Estate	9.91	10.70	12.26	11.61	11.58	13.95	4.07
Health Services	3.43	4.25	5.69	5.97	5.70	7.20	4.04
Other Services	15.90	15.52	17.22	18.26	20.92	22.52	3.96
Government	18.05	17.81	15.27	13.28	12.77	12.45	-5.09

Employment	1969	1977	1987	1997	1997	2007	1969-2007
Agriculture	4.67%	3.55%	2.66%	2.38%	1.52%	1.32%	-2.49
Mining	2.87	2.18	0.86	0.68	0.68	0.47	-2.40
Construction	5.98	5.97	7.23	6.61	6.97	8.23	1.89
Manufacturing	13.55	11.27	11.04	8.71	8.57	5.62	-7.79
Wholesale Trade	3.69	4.00	4.21	4.60	3.77	3.50	0.64
Retail Trade	16.86	17.58	17.53	17.62	17.78	17.51	0.49
Transportation	2.18	2.09	2.38	2.96	2.89	2.82	0.71
Finance & Insurance	3.71	4.32	5.88	5.61	5.26	5.47	2.11
Real Estate	3.37	4.49	4.17	3.93	3.69	5.00	1.87
Health Services	NA	5.64	6.68	7.65	8.08	8.92	**
Other Services	NA	18.13	21.46	24.93	26.49	28.12	**
Government	21.35	20.77	15.90	14.31	14.31	13.02	-8.33

* Sum of the 1967-97 change by SIC and the 1997-2007 change by NAICS.
** The change in health services and other services combined was 13.29.
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Employment

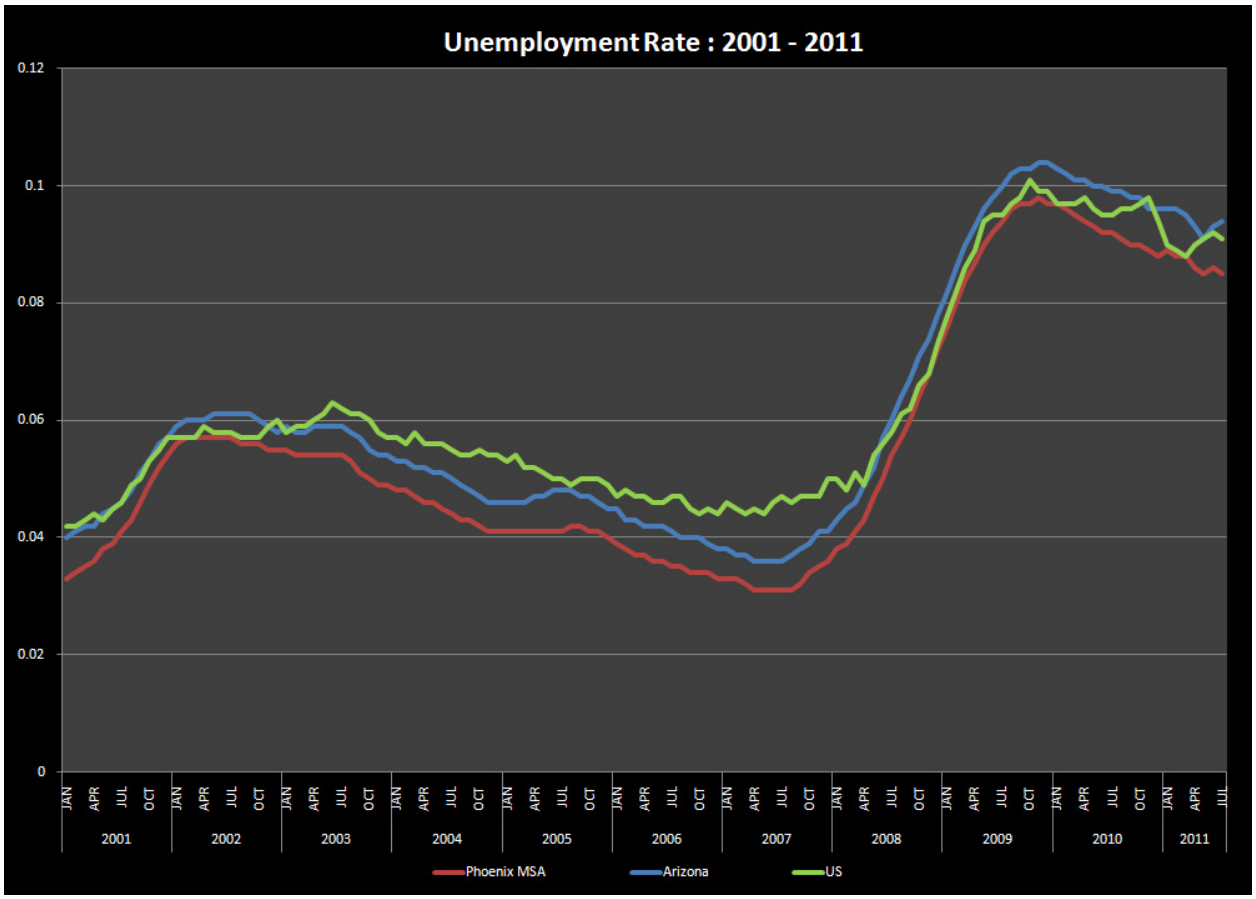
The number of jobs continues to climb. Brookings analysis of Moody's analytic data reveals the region has a strong standing in the number of jobs and overall job growth. According to Brookings, the region ranks 14th in the number of jobs in 2009 and ranks sixth for growth in employment from 1980 to 2009. Out of the 162.6 percent growth, local factors account for 116.4 percent of the growth, while industry factors account for only 6.5 percent. Absent local factors, the anticipated growth would have been much lower at 21.8 percent.

In the 1990's, employment in the region dramatically changed when Motorola moved its semiconductor manufacturing off-shore. Motorola was one of the region's largest employers. Currently, its presence in the region and the semiconductor industry as a whole has greatly diminished. Much of the subsequent employment growth has occurred in three sectors, services, trade, and construction, according to the 2010 Arizona Town Hall. *The Arizona We Want,* written by the Center for the Future of Arizona, report notes the state has a proportion of low-wage jobs that is higher than the national average, and conversely, a lower average of higher-paying jobs. Construction workers earned slightly above the average wage in Arizona. As an industry, construction has suffered the biggest employment losses since the housing market crashed in 2007.

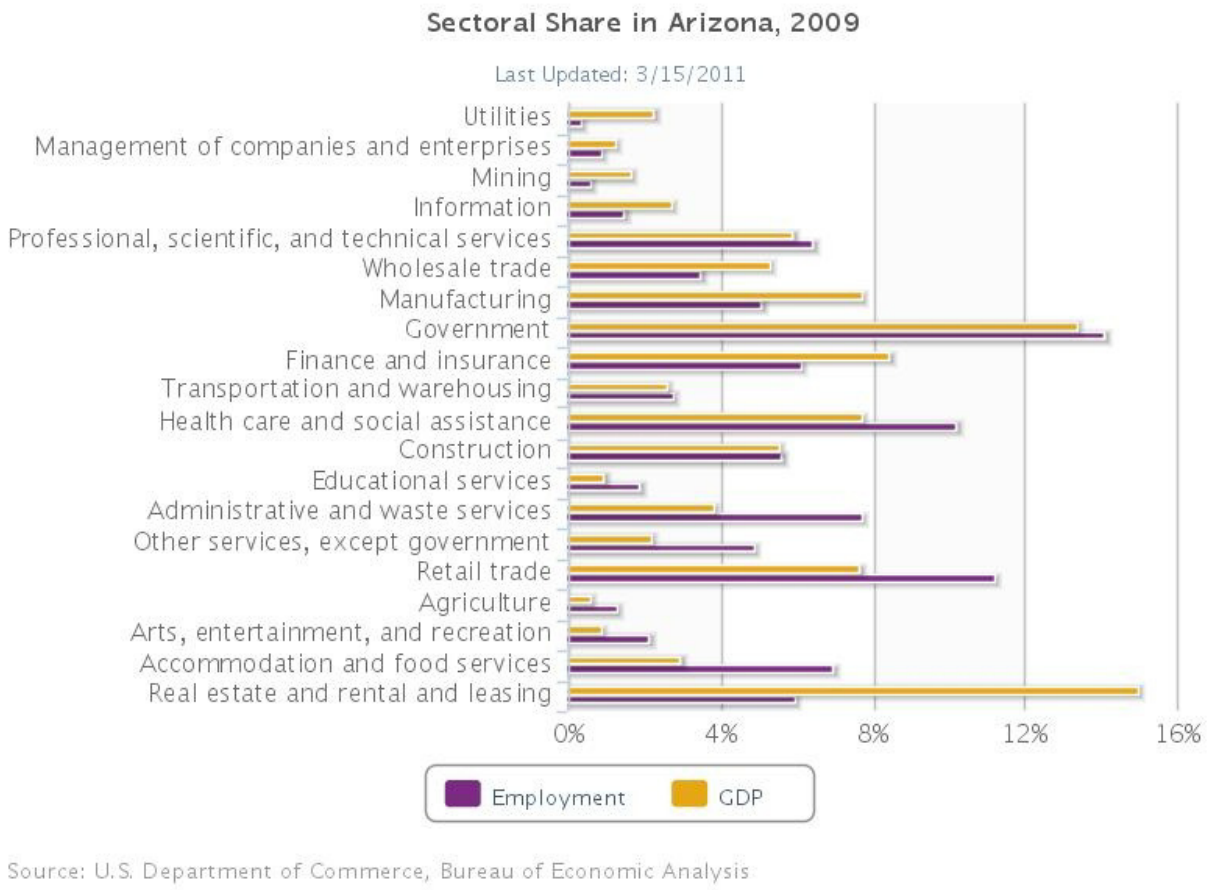
The availability of quality employment significantly contributes to a healthy economy. Recent polls suggest this may be a concern in this region. A 2010 Behavior Research Center poll, as reported by Arizona State University in *To Learn and Earn*, indicates the quest to secure

employment is a major factor in people considering leaving the state. Thirteen percent of state residents, especially younger residents and Hispanic residents, were considering a move and 52 percent cited better employment opportunities as the reason. In a Gallup poll commissioned by the Center for the Future of Arizona for the *Arizona We Want* report, a mere six percent of Arizona residents thought the area to offer "very good" job opportunities for young adults graduating from college.

The region's unemployment rate is generally better the state's, but underperforms when compared to the country, as illustrated by the MAG chart below of unemployment rates from 2001 to 2011.



The AIP chart below indicates the 2009 sectoral share in the state.

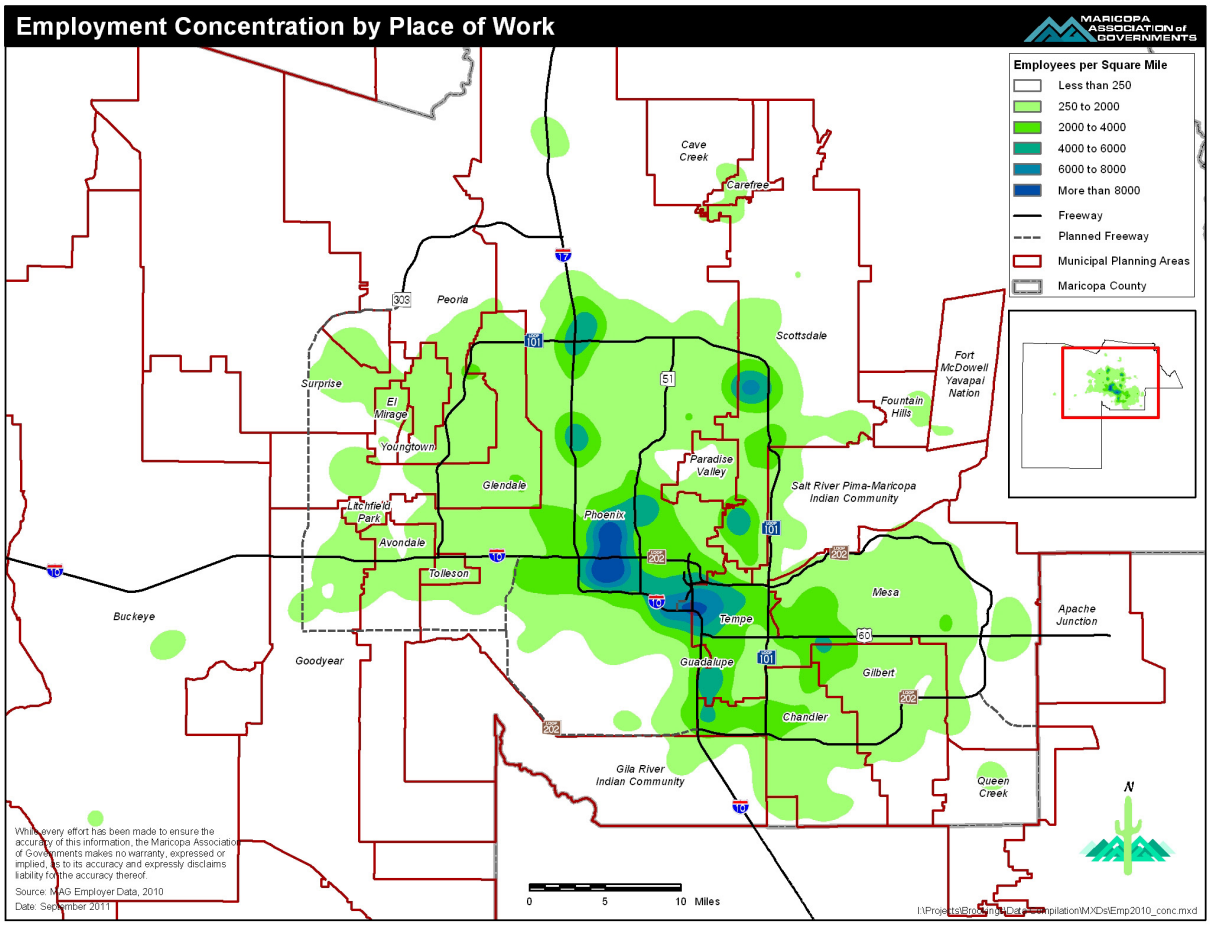


The following MAG chart uses information from GPEC to track a number of industries from 1990 to 2008. Green up arrows indicate job gains and red down arrows indicate job losses. A blank space indicates no significant change.

From this chart, it appears that some industries such as mining have experienced consistent job losses. Other industries like construction maintained strong growth until the foreclosure crisis. According to this chart, other industries like trade, transportation, and utilities have not experienced much job growth or decline over the years.

Sectors	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08
Construct.	↓	↑	↑	↑	↑			↑			↑	↓	↑	↑	↑	↑	↓	↓
Education and health services	↑	↑									↑	↑	↑	↑	↑		↑	↑
Financial activities		↓				↑	↑	↑					↑					↓
Govern.									↑			↑					↑	
Info.	↓	↓				↑	↑		↑	↑	↓		↓	↓	↓	↓	↓	
Leisure and hospitality			↑															
Manufact.	↓	↓							↓		↓	↓	↓				↓	↓
Natural resources and mining	↑		↓	↓	↑	↓	↓	↓	↓	↓	↓	↓	↓		↓	↑	↑	↑
Professional and business services		↑	↑	↑	↑	↑	↑	↑	↑	↑				↑	↑	↑		
Trade, transport, and utilities				↑														
Other services										↑	↑	↑						↑

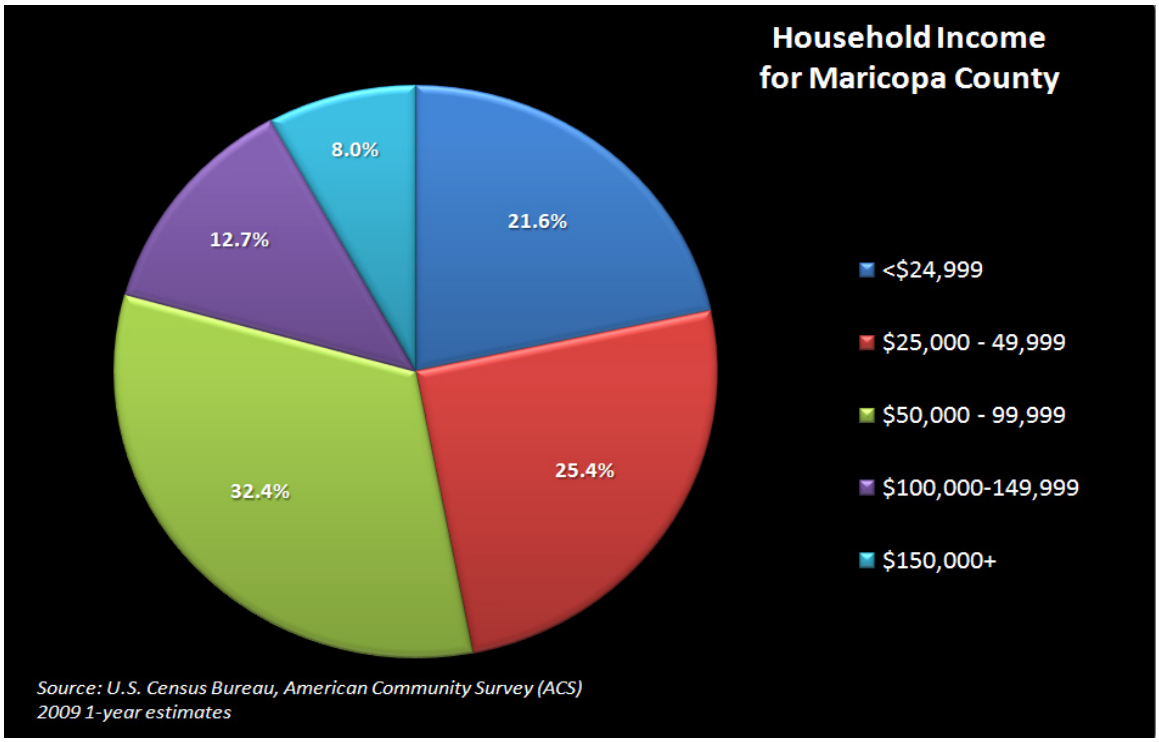
The MAG map below indicates employment concentration by place of work in the region. From the map, it is apparent that employment pervades the entire region with concentrations in the Central and Southeast Valley.



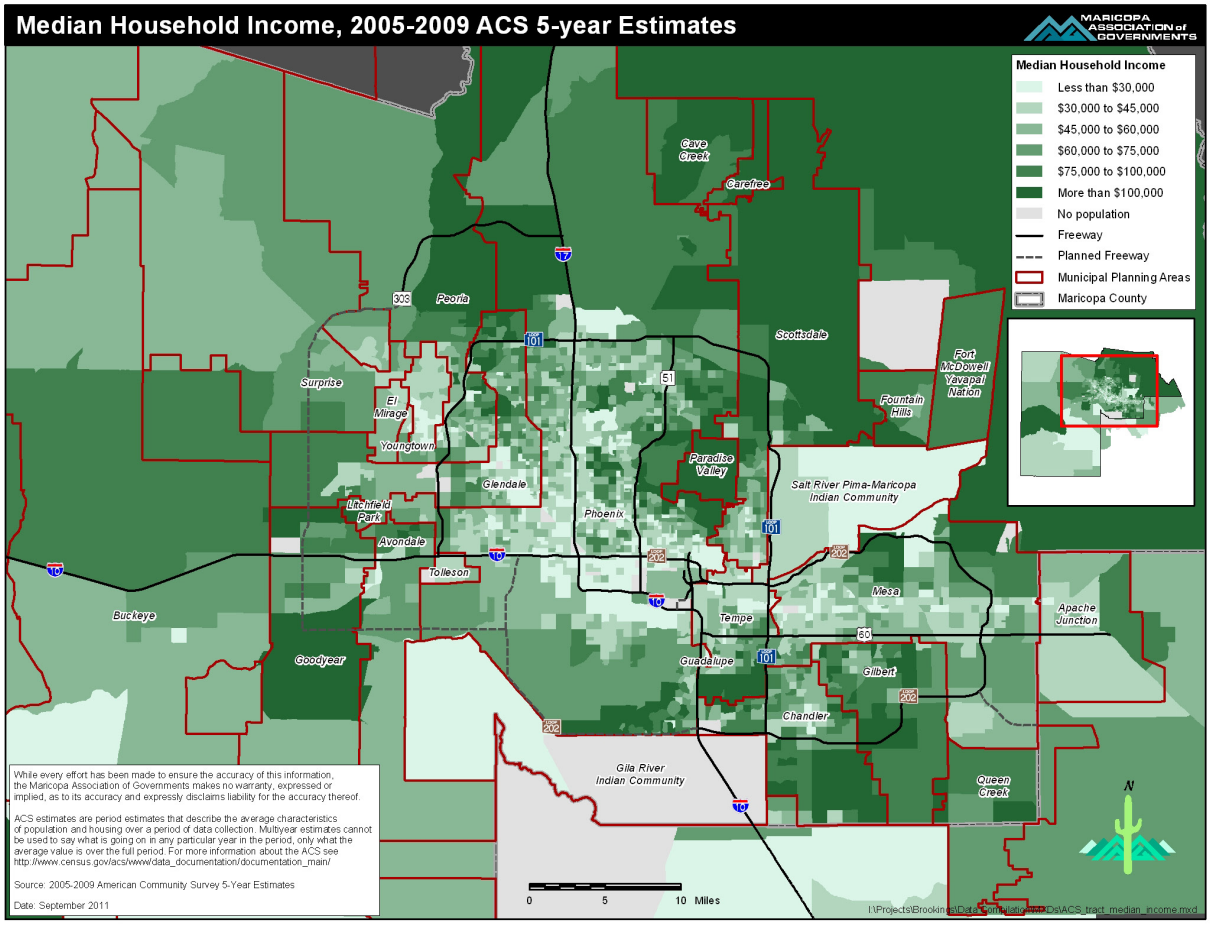
Wages

High tech jobs currently represent the state's highest wage cluster, while tourism is the biggest cluster for employment. Given job losses in some sectors and opportunities in others, there is a need to attract more high-tech and knowledge-based industries with higher paying jobs. The 2010 Arizona Town Hall emphasizes this need while noting the leverage provided by the region's universities and their strengths in optics, engineering, medicine, computer science, aerospace, planetary sciences, water resources and bioscience. The Town Hall also focused on health care as providing important opportunities and displaying considerable growth. Renewable energy may hold potential for the region, particularly in the solar field. The region's natural advantages could translate to a number of jobs.

The MAG chart below provides data from the American Community Survey 2009 one-year estimates for household income in the region. As it illustrates, more than one out five households in the region earn less than $24,999 a year.

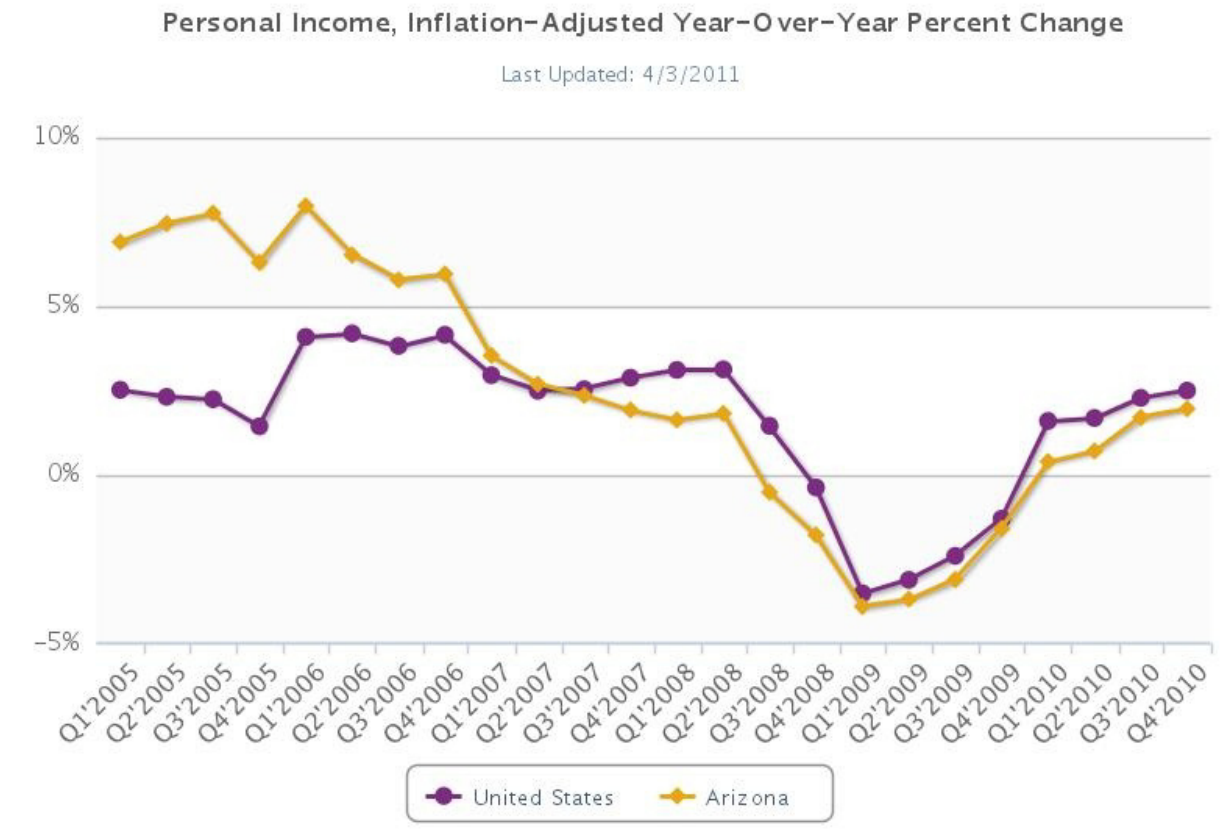


The MAG map below uses data from the American Community Survey 2005 to 2009 five-year estimates to illustrate the distribution of median household income in the region. The more affluent households with incomes more than $100,000 tend to have higher densities in the outlying areas of the region.



Brookings' analysis of Moody's data indicates the region ranks 30th in 2009 wages and only 64th in wage growth. The region's lower than average wages are falling further behind as wages in other regions grow. GPEC reported that 70 percent of the region's employment paid below average wages in 2000. Gains have been made in recent quarters, but the region is still recovering from the impact of the recession. AIP reports personal income growth in Arizona was third fastest in 2006. By 2008, after the housing crash and the recession hit, personal incomes growth fell to a ranking of 46.

The changes made in personal income are supported by the AIP chart below.

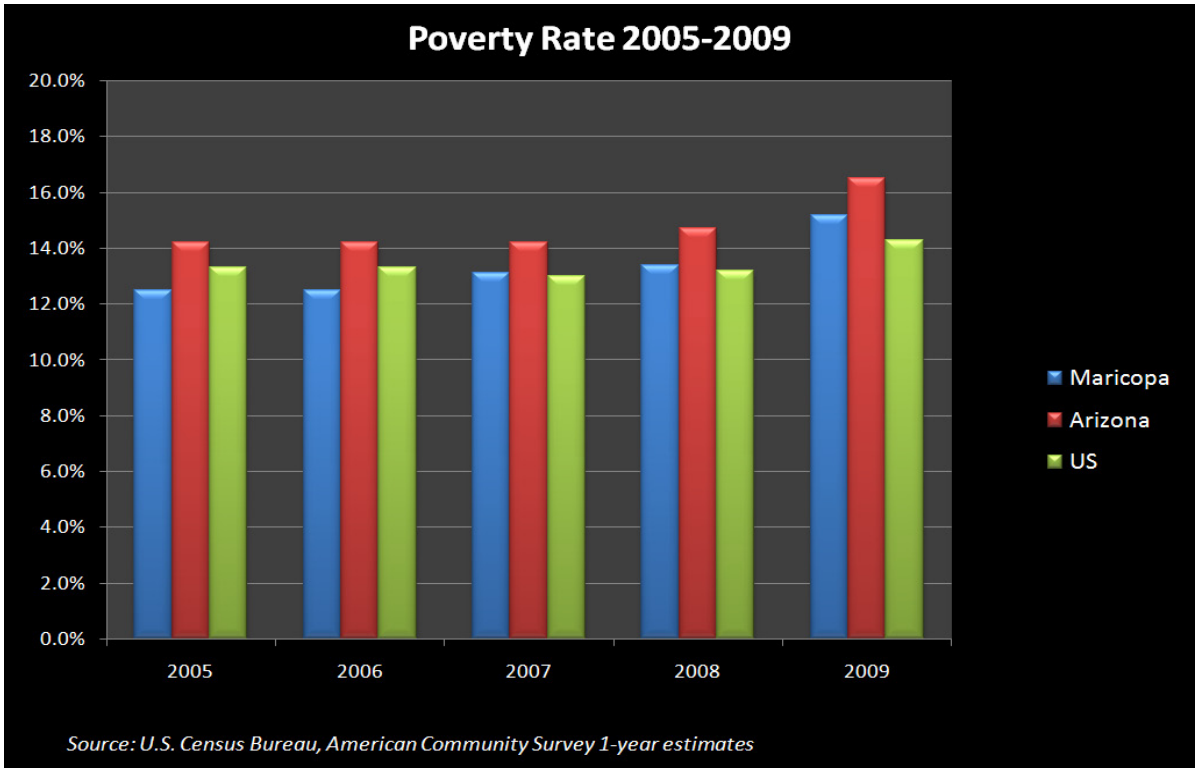


Source: U.S. Department of Commerce, Bureau of Economic Analysis

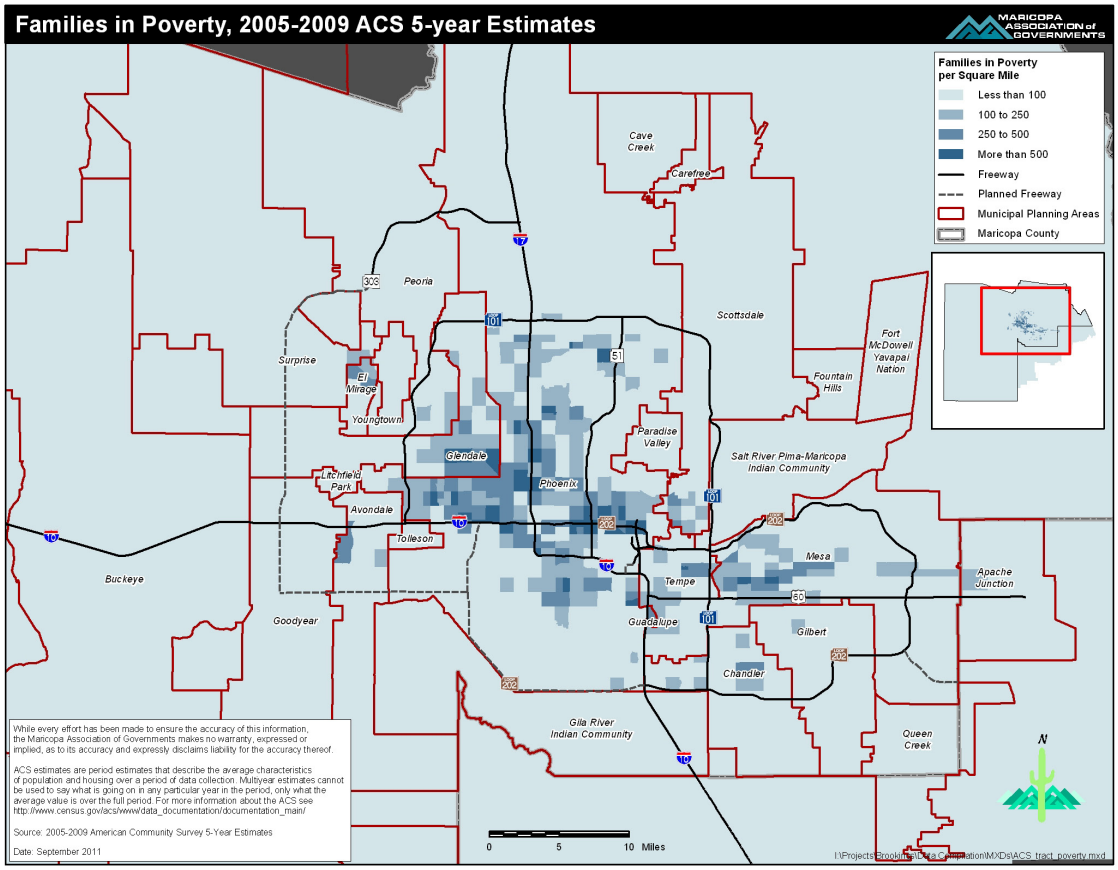
Poverty

The presence of low-wage jobs and reductions in personal income contribute to poverty. According to the 2009 American Community Survey, the region's poverty rate scored 71 out the largest 100 metro regions (100 indicating the highest poverty rate). The Washington D.C.-Arlington-Alexandria region had the lowest poverty rate at 7.5 percent. The poverty rate for this region is more than twice that figure at 15.1 percent. A range is seen through the region with urban areas experiencing a 4.8 percent increase to an 18 percent poverty rate and the suburbs having an 11.6 percent poverty rate, up 1.6 percent from 2000 to 2009.

The MAG chart below provides the region's poverty rates from 2005 to 2009 as compared to the state and the country. As this information from the American Community Survey one-year estimates illustrates, the region's poverty rate was below the state and national rate in 2005 and 2006. In 2007 and 2008, the region's poverty rate was approximately equal to the country's poverty rate. In 2009, the region remained below the state's poverty rate but exceeded the national poverty rate.



The MAG map below portrays densities for where people in poverty live. This information from the 2005 to 2009 American Community Survey five year estimate reveals higher densities in the southwest Valley and central corridor.



Increases in poverty are evidenced by record numbers of people on food stamps. According to AIP, 26.9 percent more households were receiving food stamps in 2009 than in 2008. Before 2008, food stamp enrollment experienced little change. After the spike in 2009, enrollment continues to increase with another 6.3 percent increase, resulting in record high numbers of people enrolled.

The Association of Arizona Food Banks reports that food stamp assistance is not always enough to keep households out of hunger. The average food stamp benefit for one meal is $1.42. Nearly 30 percent of people receiving food stamps also received assistance from food banks. Food banks supplement the assistance provided through food stamps. Significant increases are found in food bank assistance as well. The AIP reports that between 2009 and 2010, the pounds of food distributed by Arizona food banks increased by 26.7 percent. This equates to an additional 28 million pounds of food in a one year period. Like food stamp enrollment, food bank distribution had been fairly level before this spike.

The number of people receiving emergency food assistance increased even more dramatically. From 2006 to 2009, more than 888,000 people received emergency food assistance, representing an increase of 85 percent. Nearly half of the people receiving food were under the

age of 18 years. According to the Hunger in America 2010 report, the state ranked 13th highest in the country for the number of people considered to be food insecure, or unable to consistently obtain food. Their data indicate 14.5 percent of residents in this state are food insecure, a 10.7 percent increase from 2006. This increase resulted in an additional 22 percent of people turned away from food banks due to lack of food.

In addition to food stamps, the government provides assistance through the Jobs Program, administered by the Arizona Department of Economic Security. The goal of the program is to assist low income individuals to secure and maintain employment, thus reducing their poverty and reliance on other forms of government assistance. Data about the number of participants in this program from 2000 to 2009 reveal a dramatic decline of nearly 50 percent in the number of people able to maintain employment for 90 days. The table below provides the detail.

TOTAL JOBS PROGRAM PARTICIPANTS, TOTAL EMPLOYED AND PERCENT EMPLOYED AT LEAST 90 DAYS

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total Employed Participants	9,950	12,405	12,513	15,490	20,185	20,940	21,067	16,780	18,101	13,097
Number of Participants	23,802	23,290	23,818	32,008	42,565	51,130	53,377	42,405	46,558	53,800
Percent Who Retained Employment > 90 Days	52%	46%	46%	46%	44%	50%	48%	37%	33%	27%

The next section will offer data and analysis for the region's economy and performance in exports, the clean economy, innovation, and opportunity.

Next Economy Indicators

The economy of the future will be based on innovative opportunities that are sustainable and offer prosperity throughout the region. This section will illustrate the region's performance and identify areas for opportunity to improve. The following table illustrates the region's ranking according to data analysis completed and/or provided by the Brookings Institution for the 100 largest metro regions. A low number in the ranking system indicates a better ranking, such as being number one in the country for exports. A high number in the ranking system represents a poor score, such as being last in median income.

Next economy indicators	
Exports	15
Export intensity	46
Clean jobs	20
Clean jobs intensity	78
Inequality	62
Inequality (Gini)	37
Median income	44
Median income change	50
Average	44

Exports

Exports are a subset of outputs. Brookings analysis shows the region to have a strong rank of 15 in terms of total exports in 2009. When exports are compared to the share of the region's total output, this ranking drops significantly to 46. This indicates a large total value of exports, but in comparison to the rest of the economy, the value of the exports is 10.4 percent. In particular, the Arizona State University *North America Next* report indicates the value of high technology electronic exports has decreased significantly from 2007 to 2010. The largest export in this time period in the state was civilian aircraft, representing 10.9 percent of all export value. The remaining commodity exports are spread among a large number of diverse categories as illustrated by the table below.

Arizona's Top Ten Commodity Exports in 2008 and Change From 2007

	Value of Exports Commodity (Millions) 2008/2007	*Percent Change*
Electrical Machinery	$7,601	-5.62
Aircraft/Spacecraft	2,670	-3.09
Machinery	2,158	-7.68
Ores/Slag/Ash	1,305	71.57
Optic/Nt 8544;Medical Instruments	965	10.00
Plastic	539	4.48

Vehicles/Not Railway	476	11.39
Copper and Articles Thereof	376	-6.53
Precious Stones/Metals	371	-0.26
Arms and Ammunition	311	23.03

Source: Arizona Exports 2008, Arizona Department of Commerce

North America Next reports declines since the 1990's with the state historically performing better than the national average in manufactured commodities exports and less than the national average in other commodities components. The report offers the following insights:

- In 2008, the value of Arizona merchandise exports exceeded $19 billion.
- Arizona's primary exports are electrical machinery, aircraft, general machinery, and ores.
- Arizona businesses sell almost $6 billion in exports to Mexico each year.
- Canada, China, United Kingdom, and Singapore are Arizona's next largest trading partners; however, the combined exports to these four nations did not equal the amount sold to Mexico in 2008.
- Almost 90% of the 5,404 companies that exported from Arizona locations in 2007 were small and medium-sized enterprises with fewer than 500 employees.
- A significant portion of the exports from Arizona is received by Mexico, as illustrated by the *North America Next* table below:

<u>Arizona's Exports to Top Ten Countries, 2008</u>

Value of Arizona Country Exports in 2008 Total to Rest of World (Millions) $19,784

Mexico	5,909
Canada	2,319
China	1,255
United Kingdom	1,013
Singapore	1,008
Germany	964
Japan	732
Taiwan	652
France	608
Thailand	469

Source: Arizona Exports 2008, Arizona Department of Commerce

Being a border region offers opportunities for trade with Mexico. According to *North America Next,* the Nogales Customs District has six ports of entry outside the region and five airports of entry, two of which are in this region, Phoenix Sky Harbor International Airport and Scottsdale Airport. The ability of the region to add value to the supply chain supporting these exports will stimulate the region's economy. Four and one half percent of all exports from Mexico to the United States in 2008, valued at $13.9 billion, move through the Nogales Customs District. Seventy five percent of the exports came through ports of entry in Texas. Exports from Arizona to Mexico are concentrated in the areas of computer and electronic products; transportation equipment; and electrical equipment, appliances, and components, according to *North America Next*. Assets like the CANAMEX Corridor area from Mexico, through Arizona north to Canada; promote ease of movement for exports.

The opportunity for the region would be to take advantage of the north/south flow of goods passing through Arizona's southern ports of entry with Mexico. Due to the geographic location to the ports of Long Beach and Los Angeles, Arizona has primarily been a consumption market and a land bridge for pass-through freight that is destined for markets beyond our borders. The region would benefit from optimizing the supply chain and identifying its unique value-add. A few opportunities already identified in the MAG Freight Transportation Framework Study would be to create additional Foreign Trade Zones and intermodal facilities throughout the region and specifically along Arizona's southern border. Another opportunity would be to better promote the region's assets in regards to the movement of goods. The results from the Shipper and Carrier Survey, conducted as part of the freight study, indicated the region can do a better job of promoting Arizona and that the decision makers that impact the supply chain are "not familiar" with the study area.

Exports support employment in the region at 4.2 percent, a rate that is below the national average of 51 percent. This also trails peer states such as Oregon at 7.6 percent and New Mexico at 4.6 percent. In 2007, 89 percent of the 5,404 companies that exported goods from the state were small to medium sized companies with fewer than 500 employees.

The region trails peer competitive market regions in the area of services exports. Out of the 12 peer region markets, only two rank lower than the region's rank of 22 out of the 100 largest metro regions with seven ranking in the top ten, significantly above the region's performance.

Clean Economy

Similar to exports, the region has a strong number of low-carbon or clean economy jobs, amidst diverse jobs in relation to the overall economy. According to the Brookings Battelle Clean Economy database, the region ranks 20th in the country with 22,904 low carbon jobs, but this ranking falls to 78th with low carbon representing 1.3 percent of all jobs in the region. This may indicate a diverse economy and there may be opportunities to focus more on cultivating jobs in

this sector. Opportunities for solar energy production abound, as will be addressed in the Regional Concentration section.

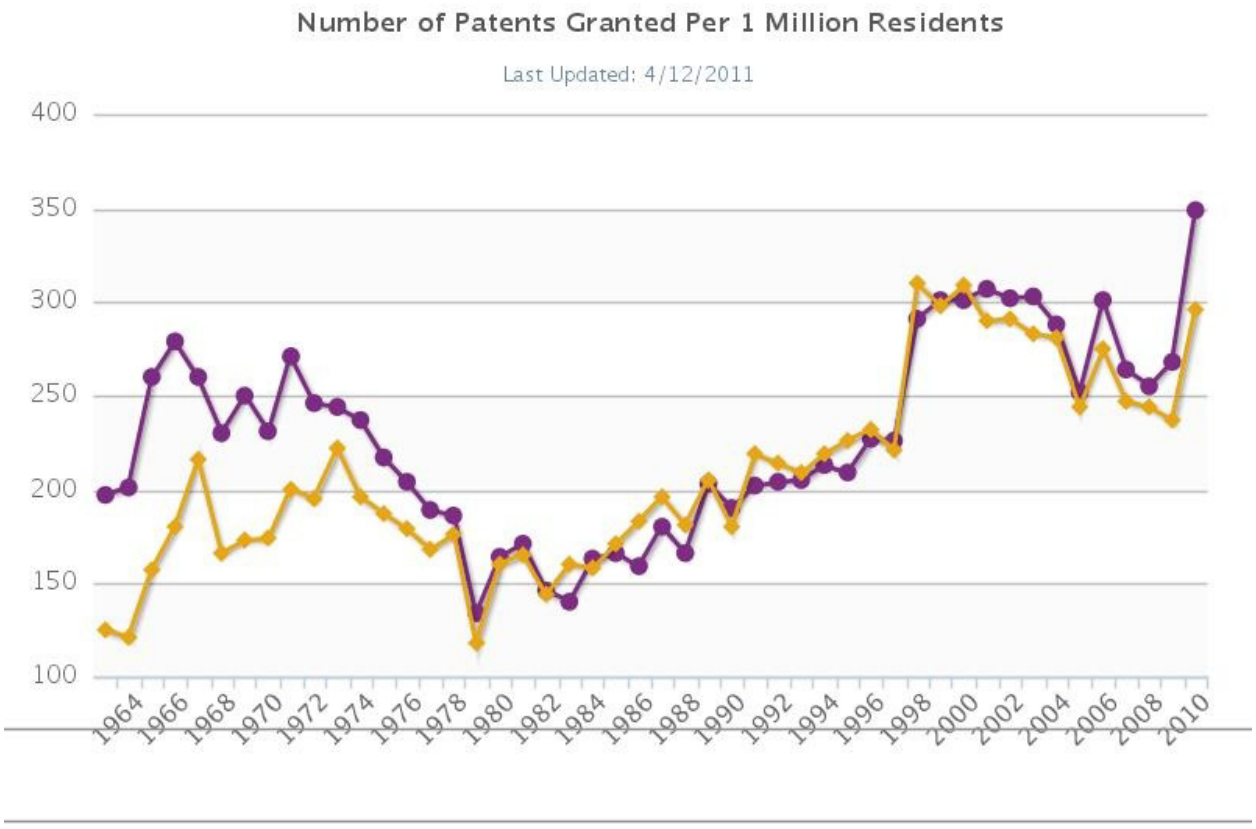
According to the Brookings' *Sizing Clean Economy* report, clean economy jobs in the region increased 2.9 percent from 18,814 jobs in 2003 to 22,904 jobs in 2010. All peer regions in the competitive market, with the exception of San Jose experiencing a .04 percent reduction, experienced greater growth in clean jobs, including New Mexico at 7.8 percent and Colorado at six percent.

According to the 2010 Arizona Town Hall, the majority of the state's renewable electric power was generated by hydro conventional sources, followed by solar and biogenic sources. The *North America Next* report cites significant opportunities for the region to develop solar energy. This report estimates attracting solar energy companies could generate 15,000 jobs in the state. They report figures from the Center for Energy, Resources, and Economic Sustainability that California's energy efficiency policies generated nearly 1.5 million jobs from 1977 to 2007. Given the region's natural assets like prolific sunshine, this could be a transformative and achievable goal.

MAG has recently made strides in the area of electric vehicles by partnering with a private firm, ECOtality. The Pima Association of Governments is a third partner in the project to establish an electric vehicle infrastructure between Tucson and Phoenix. This is a unique and innovative venture that can position the region for more opportunities in the future.

Innovation

According to the U.S. Patent and Trademark Office, information obtained from the Strumsky Patent database from the University of North Carolina at Charlotte, 32,885 patent applications were filed in the region from 2001 to 2010. This represents 18.8 applications per 1,000 workers for a ranking of 36 among the 100 largest metro regions. This places the region nearly in the middle of the competitive peer regions with eight peer regions scoring higher and six regions scoring lower. AIP reports the number of patents granted in the state was on par with the national average from the 1970's until 2000. Since the year 2000, the state began to trail the national average, by 12 percent in 2009 and by 15 percent in 2010. The number of patents jumped in Arizona significantly in 2010, but the ranking still trails the national average because the number jumped nationally as well. The chart below provides additional detail. National statistics are reflected by the darker, purple line. The state's statistics are in the lighter yellow line.



Source: U.S. Patent and Trademark Office; U.S. Dept of Commerce, Census Bureau

Opportunity

An economy is considered to be more sustainable when more people enjoy access to opportunities within the economy. This is in part measured by the ratio of high-wage jobs to low-wage jobs. The region's rank of 62 is better than 10 of the peer competitive market regions while trailing behind four of the peer regions located in Washington, Texas, and Nevada. The region fares less well in median household income and growth. The region's rank of 44 is better than the previous 62 ranking, yet only two of the 14 peer regions ranked lower. Comparing the growth of median wages from 2000 to 2009 results in a ranking of 50 out of the 100 largest regions. Higher wages are supported by expenditures in education and academic research which will be addressed under the human capital leverage point.

Leverage Point: Enhance Regional Concentrations

An emphasis on regional concentrations or clusters is a perennial activity, yet the paradigm has shifted from focusing on one large cluster like the automotive industry in Detroit to a wider, more diverse array of clusters throughout a region.

Currently, clusters in the region are defined by five *target clusters*. Of these clusters, advanced business services represent the largest and fastest growing cluster. Together, the activity in these clusters expanded by 80 percent in the 1990's.

- Advanced business services
- High tech electronics
- Life sciences
- Aerospace and aviation
- Software

GPEC also tracks seven *basic clusters*. Of the clusters in this region, the largest are tourism and transportation/distribution.

- Tourism
- Transportation and distribution
- Other basic industries
- Other supplier industries
- Agriculture and food processing
- Mining and primary metals
- Plastics

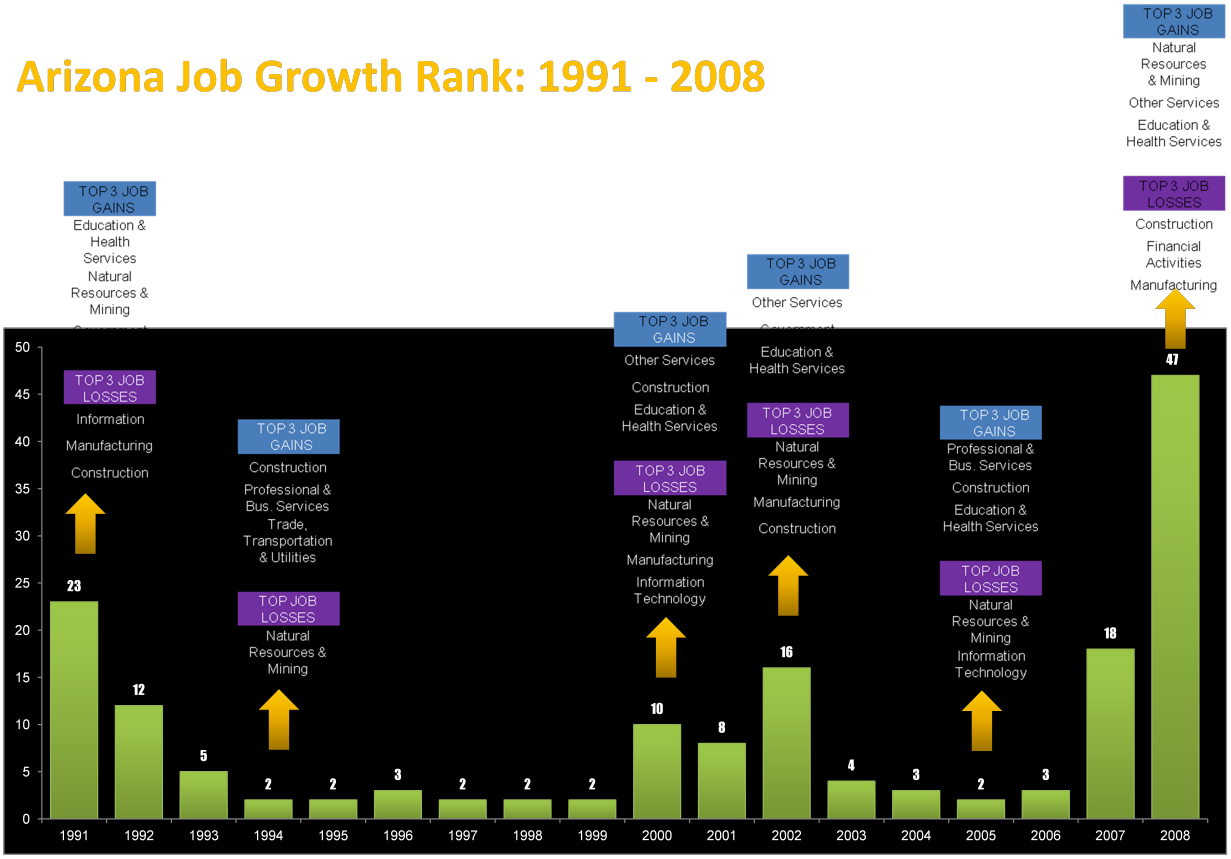
Fueled by population growth, *non-basic clusters* grew by 52 percent in the 1990's.

- Consumer industries
- Government
- Growth cluster
- Health services
- Educational services

Emerging clusters in sustainable industries (such as solar) are becoming increasingly important to the region's economy. This section will offer highlights on these clusters originally developed through the Governor's Strategy for Economic Development (GSPED) and monitored by GPEC currently.

GPEC illustrates growth within the target clusters from 1991 to 2008 in the following slide:

Arizona Job Growth Rank: 1991 - 2008



These clusters have emerged in recent years and are not the clusters that defined the region in the beginning. According to AIP, ranching was the predominant cluster in the early days of the region. Mining came into its own in Arizona after 1849, boomed in the 1870s, and started to decline in the 1930's. Currently, the state retains the distinction of producing the most copper in the country, amounting to 63 percent of all copper mined in 2008. Much of the agriculture that dominated the region's early economy has since declined, yet produce, cotton, and cattle continue to generate $3 billion in the state with this figure increasing to $6.6 billion when taking direct, induced, and ripple effects into account. This supports an estimated 72,000 jobs, according to the 2010 Arizona Town Hall. Mining also continues to play a significant role by generating $3.2 billion in direct revenue and $6.8 billion including indirect impacts.

The five "C"s of the region's economy, cattle, citrus, climate, cotton, and copper, have evolved to varying degrees. For example, cotton continues to be a thriving industry with increasing importance considering the cost for cotton has tripled in the last ten years. In addition, new bio-fuel research depends heavily on cotton production and other non-feedstock cellulose, according to GPEC. The quest is to define the 21st century "C"'s for the region.

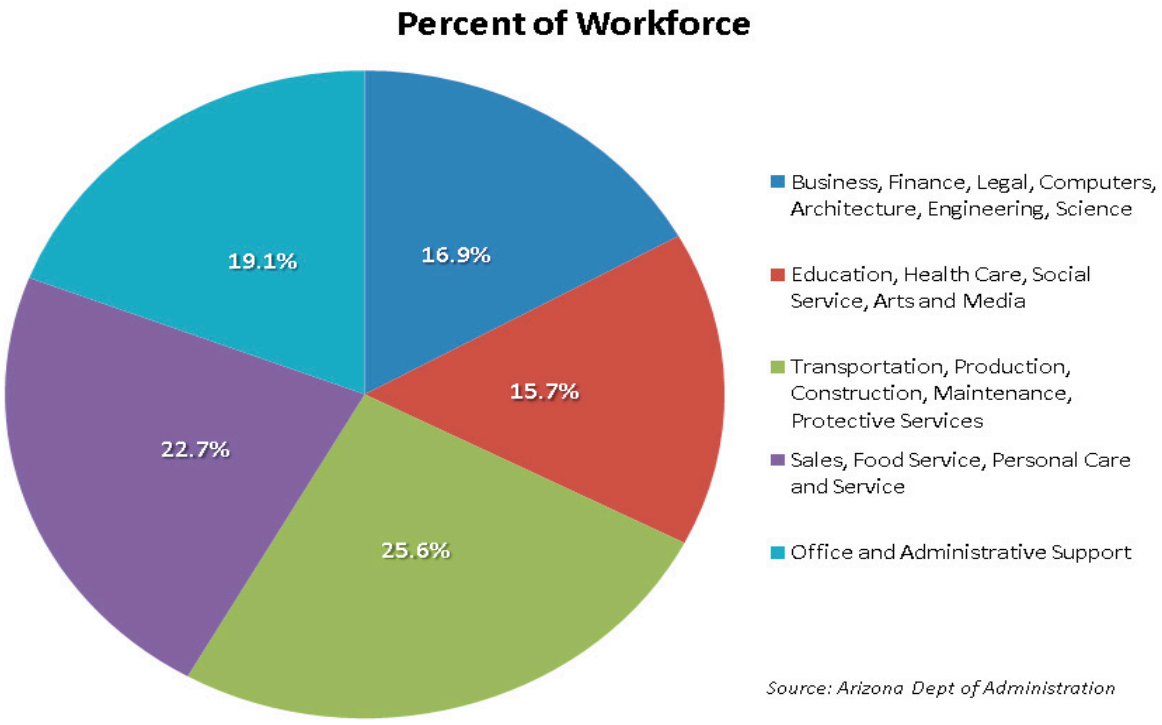
In the early 1990's, the state updated the five "C"s through the *Governor's Strategic Partnership for Economic Development*. They identified the following industries as holding value: bio-

industry, environmental technology, food, fiber and natural products, high technology, mining and minerals, optics, plastics and advanced composite materials, senior living, software, tourism, and transportation and distribution.

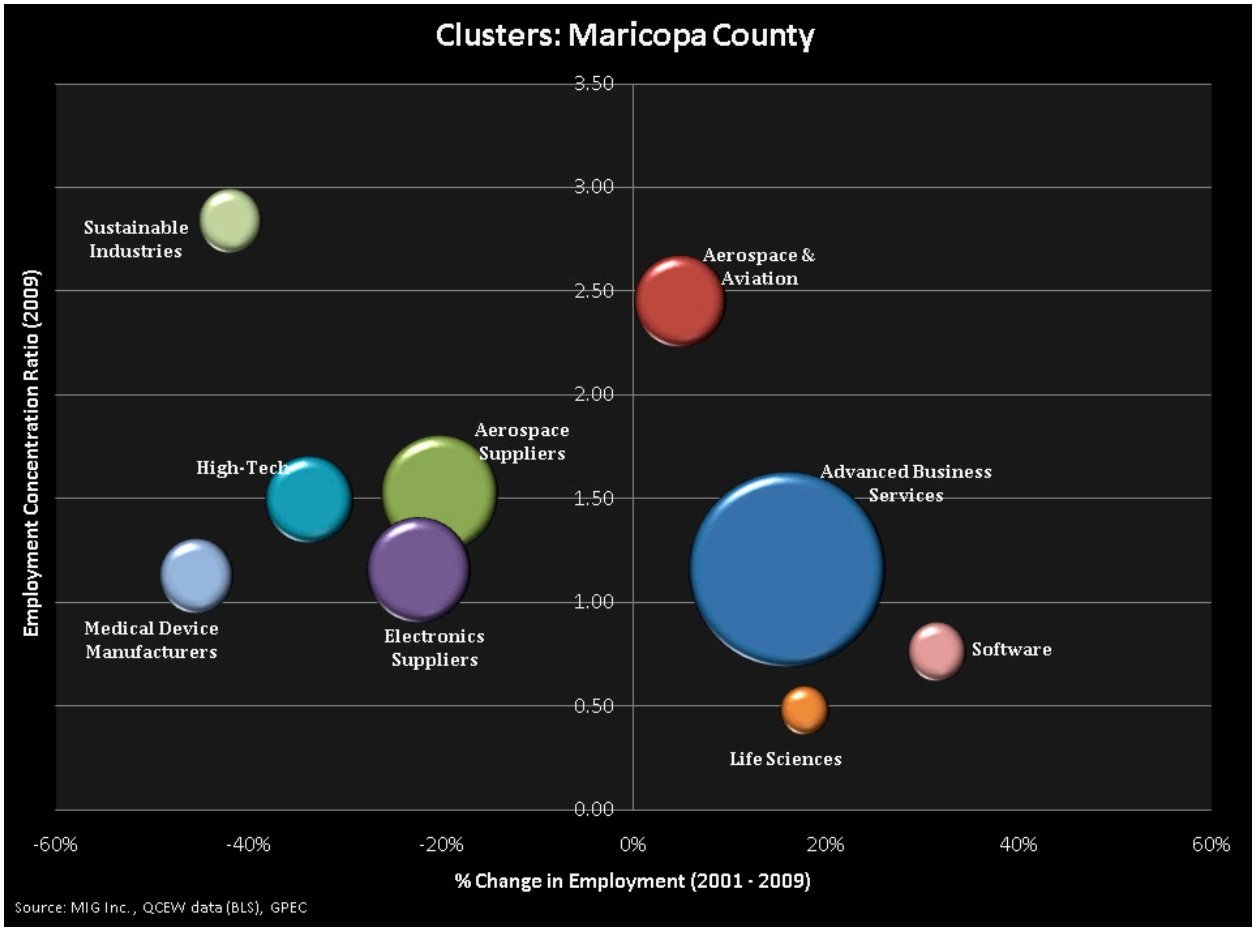
During the expansionary years, industries driven by growth took an increasing importance despite their low wages. Retail is a prime example. Currently, the focus is to attract high-wage clusters such as high technology. The 2010 Arizona Town Hall notes that out of 14 possible high tech industries, the state has developed into four clusters. This includes electronic components, aircraft, space vehicles and navigational equipment. Much of the technology growth in the state has been in manufacturing. Companies like Intel and Motorola have extensive manufacturing operations in the region, yet their research and development activities are located out of the state.

These knowledge-based activities appear to be more lucrative in terms of wages and as drivers in the next economy. The Kauffman State Index reports Arizona fell from a rank of 23 in 2007 to 27 in 2010 in knowledge-based jobs. This represents a decline, as well as an opportunity to make progress in this area. According to the 2003 GPEC *Economic Change* report, the challenge will be to break away from a disproportionate focus on population growth (construction, real estate, and utilities) and consumer demand clusters (retail, personal services, health services, and local government).

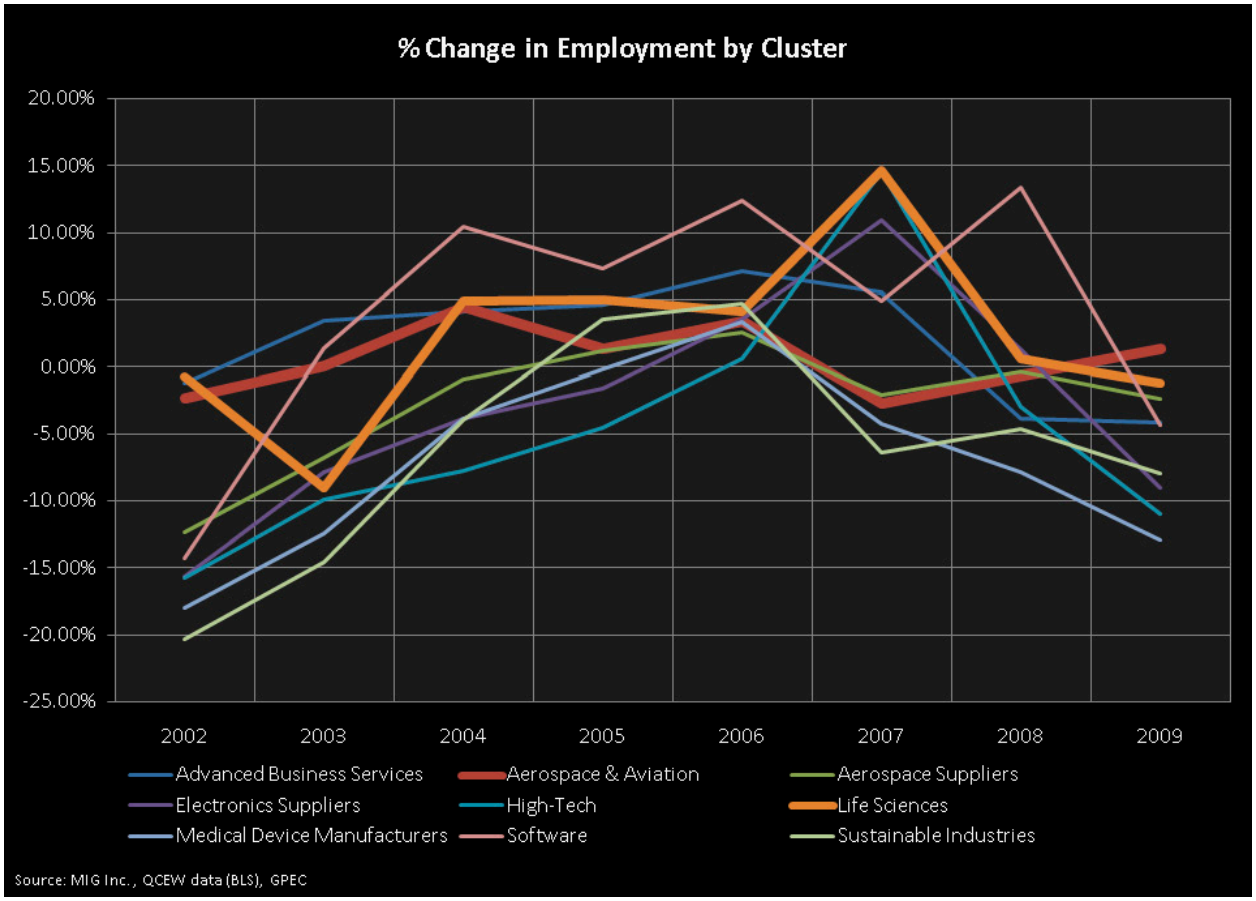
The following MAG chart indicates the current proportions of the region's residents working in various clusters. Nearly fifty percent of the region's workforce is employed in construction, which has declined considerably in recent years, and low-wage employment such as sales, food service, and personal care.



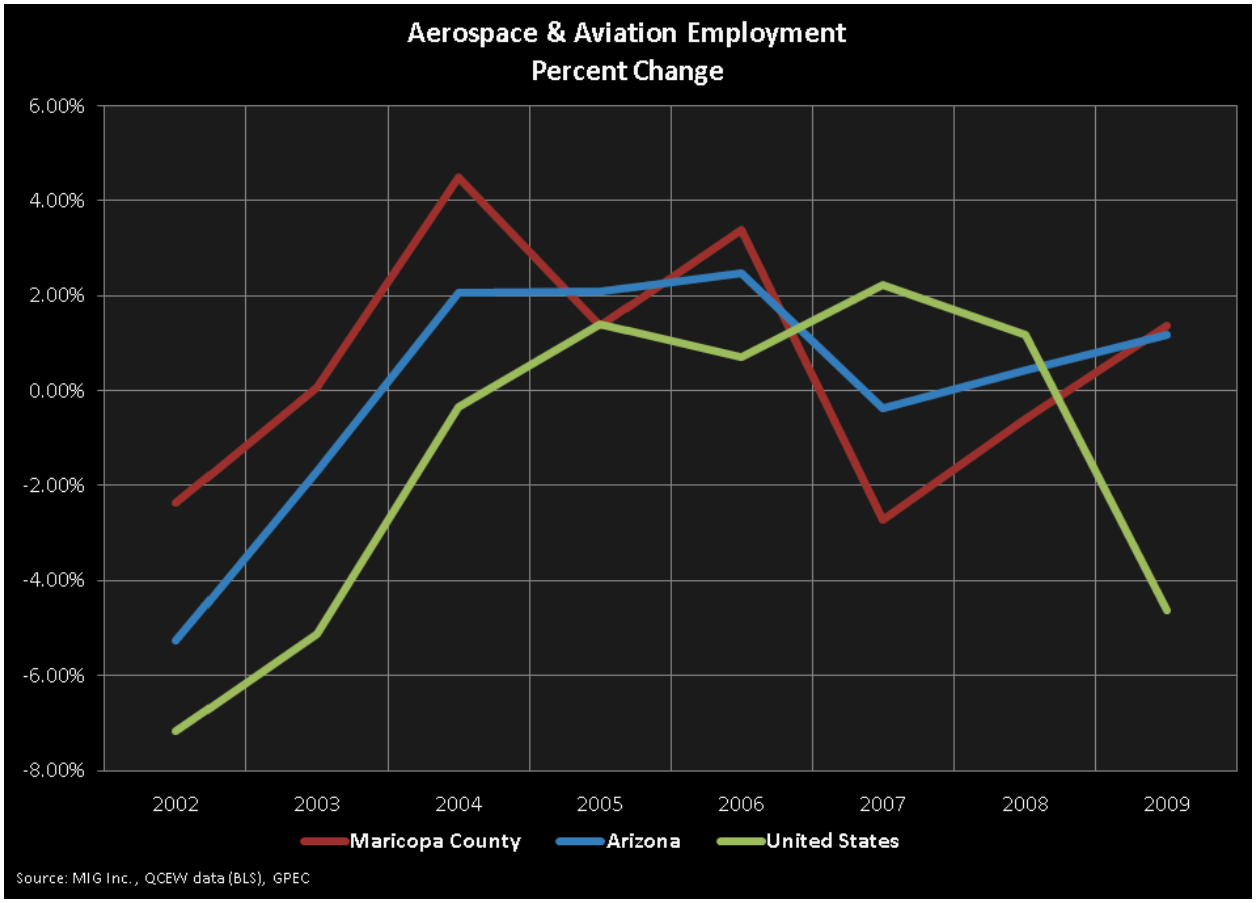
The relative sizes of the clusters are illustrated in the MAG chart below. Advanced business services has shown the most employment growth from 2001 to 2009 within the target clusters.



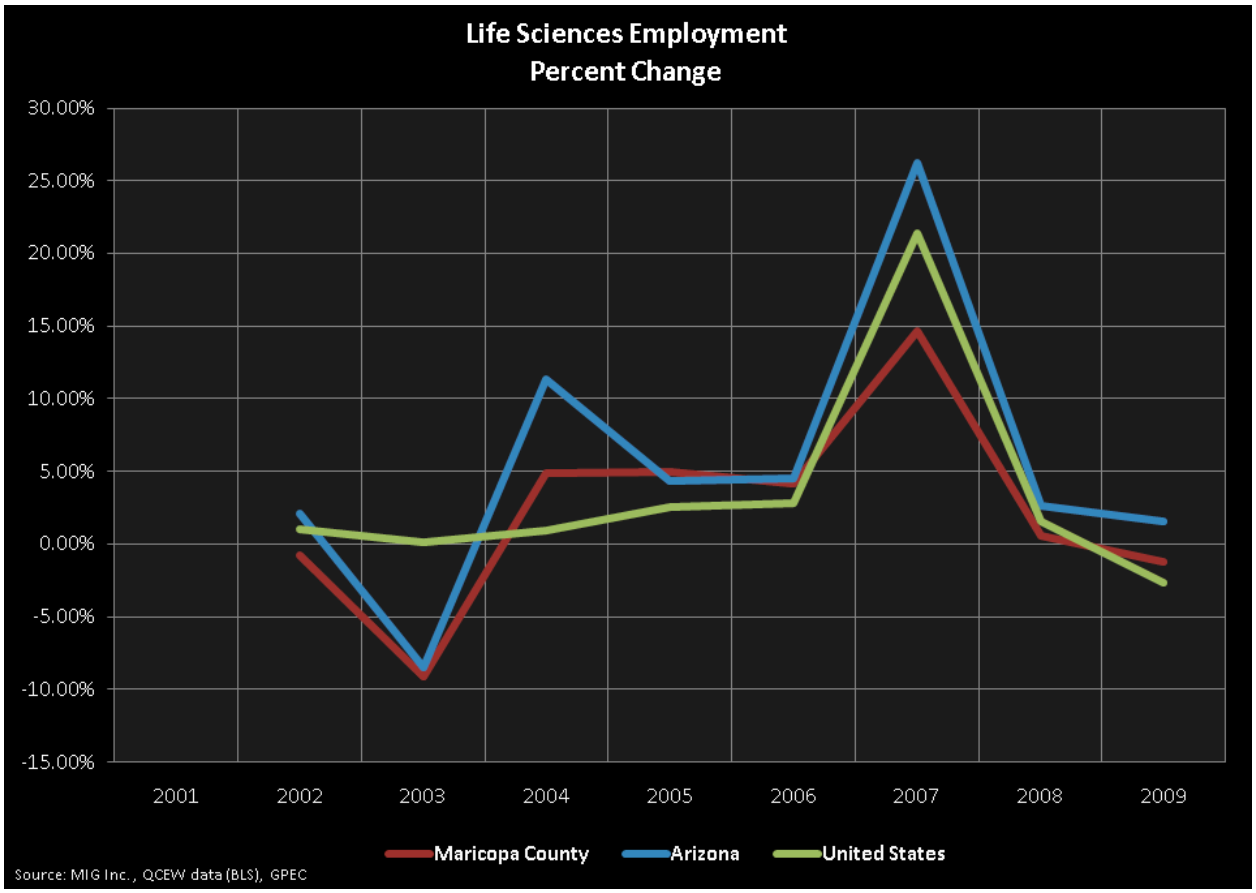
The percent change in employment is shown by each cluster in the MAG chart below from 2001 to 2009. While advanced business services demonstrated the most employment growth in the chart above, the chart below illustrates that aerospace and aviation is the only cluster that has an upward trend.



The MAG chart below compares the activity in aerospace cluster in the region, the state, and the country. As the chart demonstrates, the aerospace cluster in the region has lagged behind the state aerospace cluster, most notably due to significant activity in Pima County, Arizona. Recently, the regional aerospace cluster has caught up with the state cluster and is poised to outperform it. The national aerospace cluster has been on a downward decline 2007.



Conversely, the life sciences cluster peaked in 2007 nationally. The regional cluster lags behind the state's performance but has recently overtaken the national performance, although the cluster as a whole demonstrates a downward trend.



Location Quotients (Specializations)

The degree to which a region specializes in industries offers it a competitive edge over other regions without the degree of specialty. Brookings analyzed Moody's Analytics data and created the following chart:

Phoenix-Mesa-Scottsdale, AZ	
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works) (533)	5.08
Computer and Electronic Product Manufacturing (334)	2.34
Air Transportation (481)	2.25
Credit Intermediation and Related Activities (522)	1.85
Nonstore Retailers (454)	1.84

MAG created the following tables, indicating location quotients of the region's target clusters are higher than the national average for all but life sciences and software.

Cluster	% Change (2001 - 2009)	Concentration	Employment 2009
Advanced Business Services	16%	1.16	189,602
Aerospace & Aviation	5%	2.45	41,863
Aerospace Suppliers	-20%	1.52	66,940
Electronics Suppliers	-22%	1.15	54,323
High-Tech	-34%	1.49	37,561
Life Sciences	18%	0.48	11,715
Medical Device Manufacturers	-45%	1.12	27,005
Software	32%	0.76	16,762
Sustainable Industries	-42%	2.83	20,249

The 2010 Arizona Town Hall noted that in the high tech industries, semiconductor and electronics, and aerospace manufacturing have location quotients three times the national average. Industries with concentrations 50 percent higher than the national average include navigation and control instrument manufacturing, and facilities support services. The table below offers additional information.

High Tech Industries with Highest Concentration Ratios in Arizona

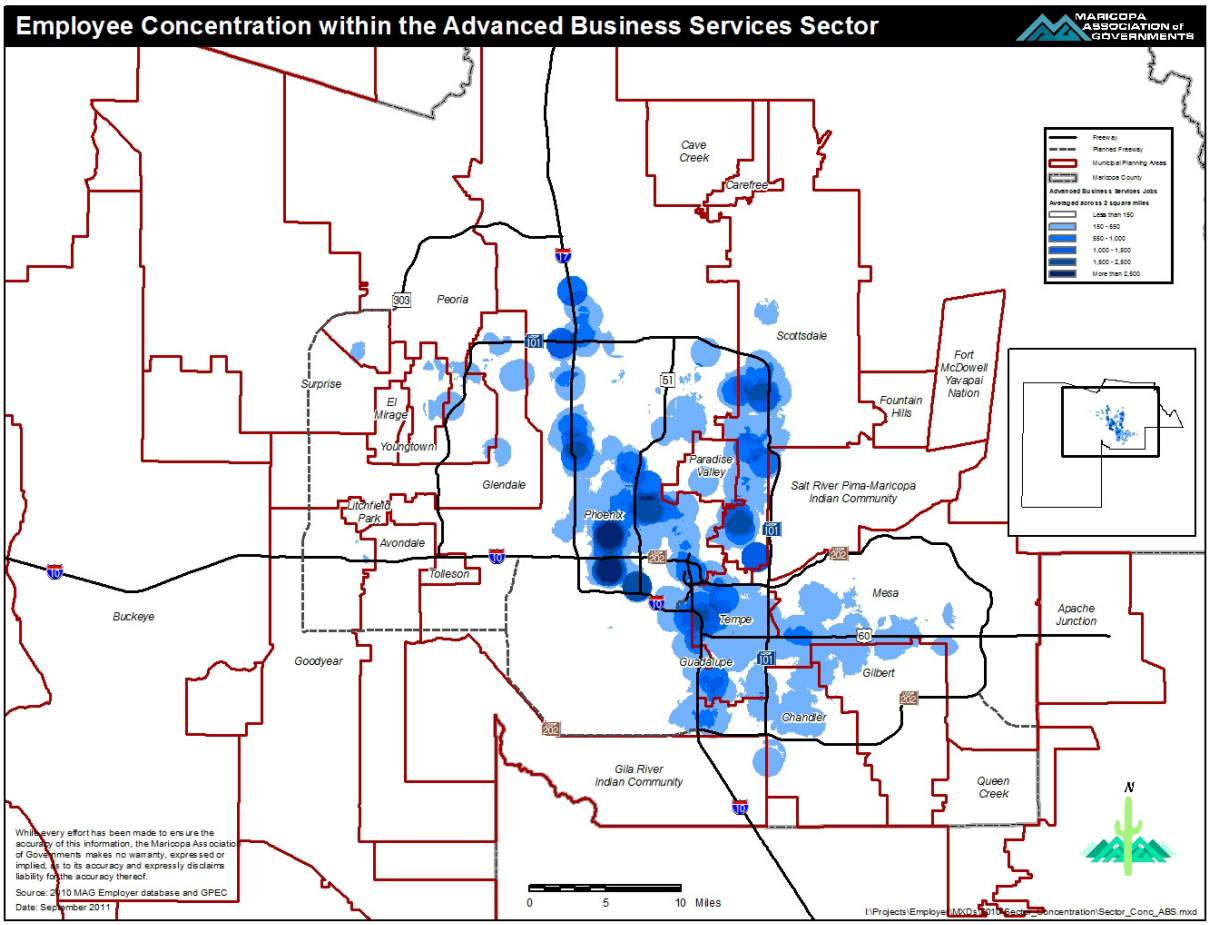
Industry	Location Quotient	Growth Rate 2001-2007
Semiconductor & electronic manufacturing	3.1	-6.5%
Aerospace manufacturing	2.9	-1.6%
Navigation and control instrument mfg.	1.5	+4.3%
Facilities support svc.	1.5	+5.1%

Source: U.S. Bureau of Labor Statistics and Economic and Business Research Center, Eller College of Management, the University of Arizona.

Target Clusters

Advanced Business Services

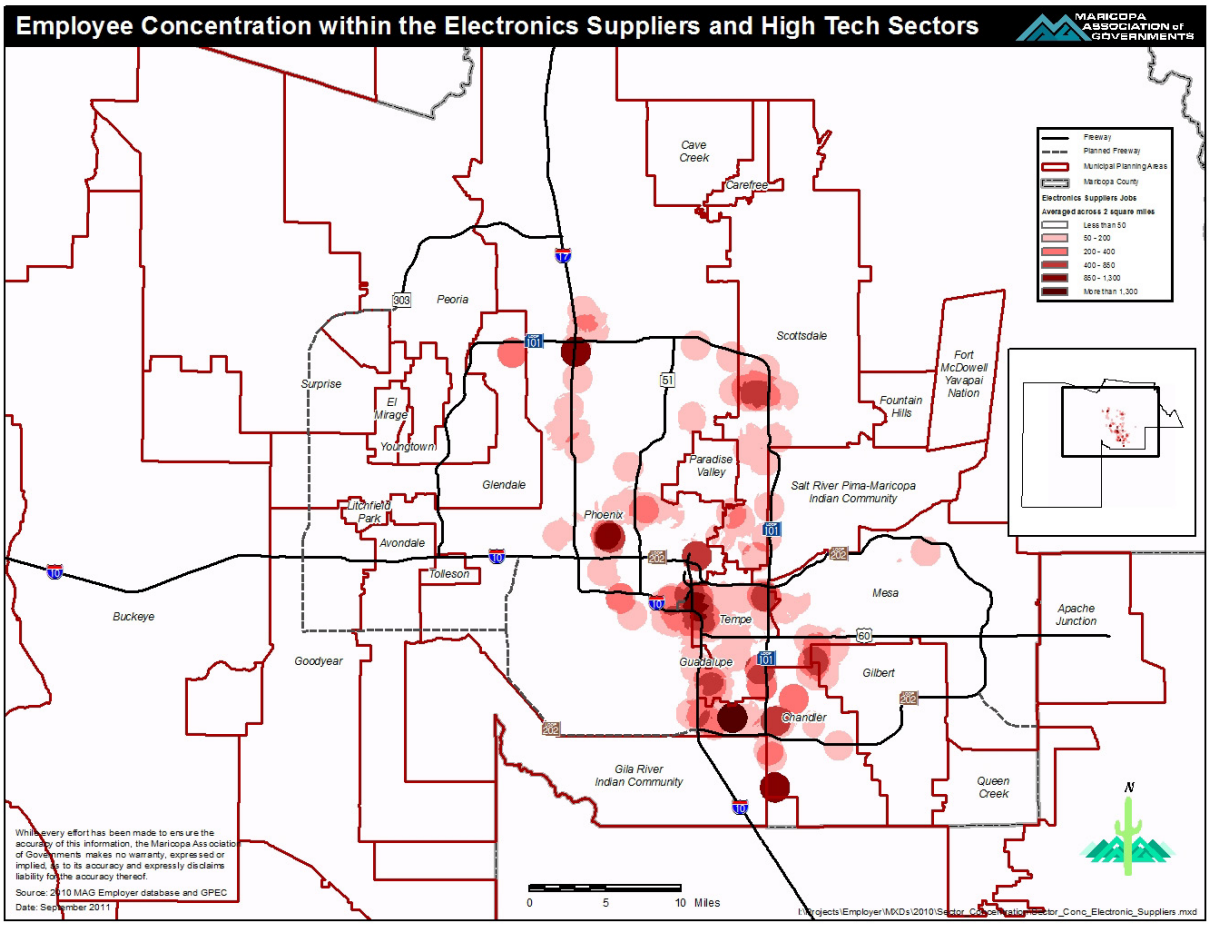
Advanced business services include credit intermediation, insurance, financial investments, accounting, management services, advertising, and legal services. The MAG map below indicates employee concentration within this cluster, especially along the central spine and the East Valley.



High Technology Electronics Cluster

The high tech industry is an important cluster and one that is targeted for growth. According to the 2010 Arizona Town Hall, these companies pay wages 75 percent higher than state's average wage and represent nearly half of manufacturing employment in the state. The most significant employment is seen in aerospace and navigation, measuring, electro-medical, and control instruments manufacturing. The Town Hall reports semiconductor and other electronics to be diminishing in size in comparison to the rest of the economy. High tech manufacturing firms in the region are 2.5 times larger than non-high tech manufacturing companies.

The MAG map below indicates this cluster is concentrated along the central spine and East Valley, similar to the advanced business sector.



A breakdown of employment by high tech industries is provided in the tables below.

Largest High Tech Sectors in Arizona

Sector	Employees in 2007
Aerospace manufacturing	27,421
Semiconductor & electronics manufacturing	27,146
Management of companies and enterprises	26,947
Navigation, measuring, electronic med, & control instrument. manufacturing	12,767
Wired telecommunications carriers	10,302

Source: U.S. Bureau of Labor Statistics and Economic and Business Research Center, Eller College of Management, the University of Arizona.

Fastest-Growing High Tech Sectors in Arizona

Industry Employment	*Growth Rate from 2001-2007*

Other telecommunications	75%
Resin, rubber, synthetic fibers and filaments mfg.	30%
Satellite telecommunications	26%
Internet publishing and broadcasting	22%

Source: U.S. Bureau of Labor Statistics and Economic and Business Research Center, Eller College of Management, the University of Arizona.

According to the Eller School of Management, 18 percent, or 900, of all the manufacturing companies in Arizona were high-tech. These high-tech manufacturing companies represented 47 percent of the employment in the manufacturing sector as well as 60 percent of all manufacturing payrolls.

High Tech Employment in Arizona

	# Employees	*% of AZ Employment in 2007*
Total all industries	2,647,101	100%
Total high tech industries	278,703	11%
Total all manufacturing	182,158	7%
Total high tech mfg.	79,502	3%

Source: U.S. Bureau of Labor Statistics and Economic and Business Research Center, Eller College of Management, the University of Arizona.

Largest Gains in High Tech Sectors in Arizona

Industry	*Employment Change 2001-2007*
Architectural, engineering, and related services	8,513
Computer systems design and related services	6,137
Management of companies and enterprises	5,858
Management, scientific, and technical consulting services	4,545
Navigational, measuring, electronic medical, and control instrument manufacturing	2,859

Source: U.S. Bureau of Labor Statistics and Economic and Business Research Center, Eller College of Management, the University of Arizona.

Despite high wages and employment gains, the high tech manufacturing industry experienced losses from 2001 to 2007, as illustrated in the table below.

Largest Losses in High Tech Sectors in Arizona

Industry	*Employment Change*

	2001-2007
Data processing, hosting, and related services	-1,638
Computer and peripheral equipment manufacturing	-2,447
Aerospace product and parts manufacturing	-2,821
Wired telecommunication carriers	-4,203
Semiconductor and other electronic component manufacturing	-13,459

Source: U.S. Bureau of Labor Statistics and Economic and Business Research Center, Eller College of Management, the University of Arizona.

High Tech Payrolls in Arizona

Industry	*Payroll ($Billion) 2007*	*% of AZ Payroll*
Total high tech industries	$20.3	18%
Total all manufacturing	$10.6	10%
Total high tech mfg.	$6.4	6%
Total all industries	$110.0	100%

Source: U.S. Bureau of Labor Statistics and Economic and Business Research Center, Eller College of Management, the University of Arizona.

High Tech Industries with Highest Average Wages

- Satellite telecommunications: $101,957
- Professional & communications equipment & supplies, wholesalers: $92,061
- Electric power: $91,004
- Semiconductor & electronics manufacturing: $88,990
- Aerospace manufacturing: $82,472
- Navigational, measuring, & control instrument manufacturing: $81,302

Source: U.S. Bureau of Labor Statistics and Economic and Business Research Center, Eller College of Management, the University of Arizona.

The Eller School of Management reports the average wage for high tech employment in 2007 was $80,100. This is 37 percent higher than the average manufacturing industry, but it lags behind the national average by seven percent as illustrated by the chart below.

High Tech Wages in Arizona

	Payroll per Employee (PPE) in 2007	*% of US PPE 2007*
Total all industries	$41,555	93%
Total high tech industries	$72,699	91%
Total all manufacturing	$58,402	112%
Total high tech mfg.	$80,059	103%

Source: U.S. Bureau of Labor Statistics and Economic and Business Research Center, Eller College of Management, the University of Arizona.

The technology cluster ranks well on national indices. The *2010 Milken Science and Technology Index* ranks Arizona 15th out of 50 states on the composite index with one as the high. Colorado, California, and Utah are ranked second, third, and fourth respectively. Texas and New Mexico are ranked #18 and 19 respectively. Since 2002, Arizona has moved three spots up from #18. Arizona's lowest rank was 32nd in human capital with a high rank of nine in risk capital. Other ranks include 15th for research and development, 20th for technology work force, and 10th for technology concentration and dynamism.

In addition, the Milken Institute provides the following points to strengthen this cluster.

Specific Strategies for Building a Technology-Based Economy

Organizations	*Network Strategy*
Business, State, Government	State must expand technology-transfer programs. State must create incentives for emerging firms to base themselves in Arizona's strategic locations. Expand the support of business incubators.
Education, State, Business, Government	State universities must be able to expand business partnerships. Provide access to university lab space or to research that can be commercialized. Build stronger linkages in the life sciences. Focus on significantly increasing the number of locally educated and trained engineers and scientists who are able and willing to be employed in Arizona. State must establish a process for matching

	engineering and science graduates with local employees, especially at smaller firms, to keep both firms and employees in-state. Public universities should use a combination of state funding and partnerships with the private sector to increase endowed chairs and scholarships in crucial fields. Create workforce-training partnerships between industry and the state's large community college system. Establish a system to match trained technicians with local employers. Build direct community college connections with other industries.
State Government, Business Public Policy, Legislators	Offer incentives and rebates to keep clean-tech manufacturing local. Create an organized consortium of venture capital funds that either have operations in state or have a dedicated amount of money to invest in Arizona. Provide a dedicated office to provide assistance in navigating regulations and tax breaks with various levels of government. Offer significant tax rebates not only for the construction of renewable energy plants, but also for purchasing the materials for such plants from instate manufacturers. Develop an Arizona-specific "green-tech" venture capital fund with initial backing from the state. Focus on execution and sticking with initiatives over multiple years.
State Government Business, Public Policy, Legislators, Education	Improve per capita state appropriations for education. Strengthen educational infrastructure. Stakeholders in the governor's office, legislature, regional development agencies, the business community, and Arizona's universities must be able to work together and do so over the long haul.

The 2010 Arizona Town Hall identifies challenges associated with growing this cluster. On a global scale, semiconductor employment has declined. Arizona's employment in this area followed suit in 2002 and 2003. Since that time, employment has remained fairly level. Companies that maintain a manufacturing presence in the region have moved their research and development operations out of state. This limits the number of knowledge-based jobs and opportunities to develop innovations within the region.

Life Sciences: Bioscience and Hospitals/Healthcare

Bioscience

Advances in the bioscience cluster provide high quality, high paying, knowledge-based jobs to the region. Efforts like Translational Genomics Research Institute (TGen), a cutting edge DNA and human genome research nonprofit agency, are noted by the *North America Next* report as driving progress in this area. Such progress is tracked by the *Arizona Bioscience Roadmap*, an initiative undertaken by Battelle and funded by the Flinn Foundation. An update offered in February 2011 reports the reputation the region has earned in the areas of research, testing, and medical laboratories. From 2002 to 2009, employment in the bioscience field grew by 31 percent, for a total of 269 establishments and 5,651 employees.

The region drives the state's activity in this area, accounting for 75 percent of total activity in Arizona. Out of the 19 goals established for the region, 11 areas have shown considerable progress, seven areas have made some progress, and one area remains to be implemented. *The Arizona Bioscience Roadmap* offers detail about the region's progress from 2002 to 2010 as shown in the table below.

Performance Assessment

Metrics	Performance	Comments
Bio Jobs	up 32% ('02-'09)	Arizona's growth exceeding country (up 11%). In 2009 bio jobs up 1.2% vs. down 8.3% for all Arizona private sector.
Bio Firms	up 28% ('02-'09)	Research, testing and medical labs have most establishments and grown faster (57%) but also strengths in devices; U.S. growth up 20 percent.
Bio Avg. Wages	up 47% ('02-'09)	Bio wages grew three percent in 2009. Average salary: $57,000

The metrics below represent funding received from the National Institutes of Health (NIH).

Metrics	Performance	Comments
NIH Funding	up 65% ('02-'10)	Arizona performance outpacing top 10 States (up 35%) and U.S. (up 54%) Bio Risk Capital down 84% ('02-'10) Reached 86% of goal in 2007 but only 18% of goal in 2010
Bio University Intellectual Property		
Bio Startups	Down 40% from 5yr average	3 additional startups in '10 and 53 bio startups ('02-'10)
Bio Licenses	Up 11% in '10	235 licenses ('02-'10)
Bio Income	Up 82% to $1,701,000 in '10	$17 m. plus ('02-'10)

The *Arizona Bioscience Roadmap* reports the region made progress in the midst of the recession and significant employment declines in the private sector. It appears that the state may be catching up with the national average. Still considered to be modest in size and scope, the state's bio science cluster grew significantly faster at seven percent than the national average of 2.8 percent. This includes employment increases of 32 percent from 2002 to 2009. This represents the addition of 22,000 jobs during a difficult time to find employment, especially jobs that pay well. The majority of this growth is found in hospital employment, another cluster that will be explored more deeply.

The GPEC chart below provides competitor market research for healthcare, bio industry, and bioscience-healthcare employment ratios Arizona, California, Massachusetts, Michigan, Texas, Virginia, Colorado, Washington, and Utah. The first five states outpace the state while the last three states trail Arizona's progress.

State	Health care industry employment	Bio industry employment	Bioscience-Healthcare Employment Ratio
CA	1,346,399	221,096	0.1642
MA	429,564	72,627	0.1691
MI	493,643	37,180	0.0753
TX	1,090,062	64,964	0.0596
VA	334,612	20,257	0.0605
AZ	247,326	14,717	0.0595
CO	207,069	21,268	0.1027
WA	287,072	26,123	0.0910

UT	102,628	20,418	0.1990

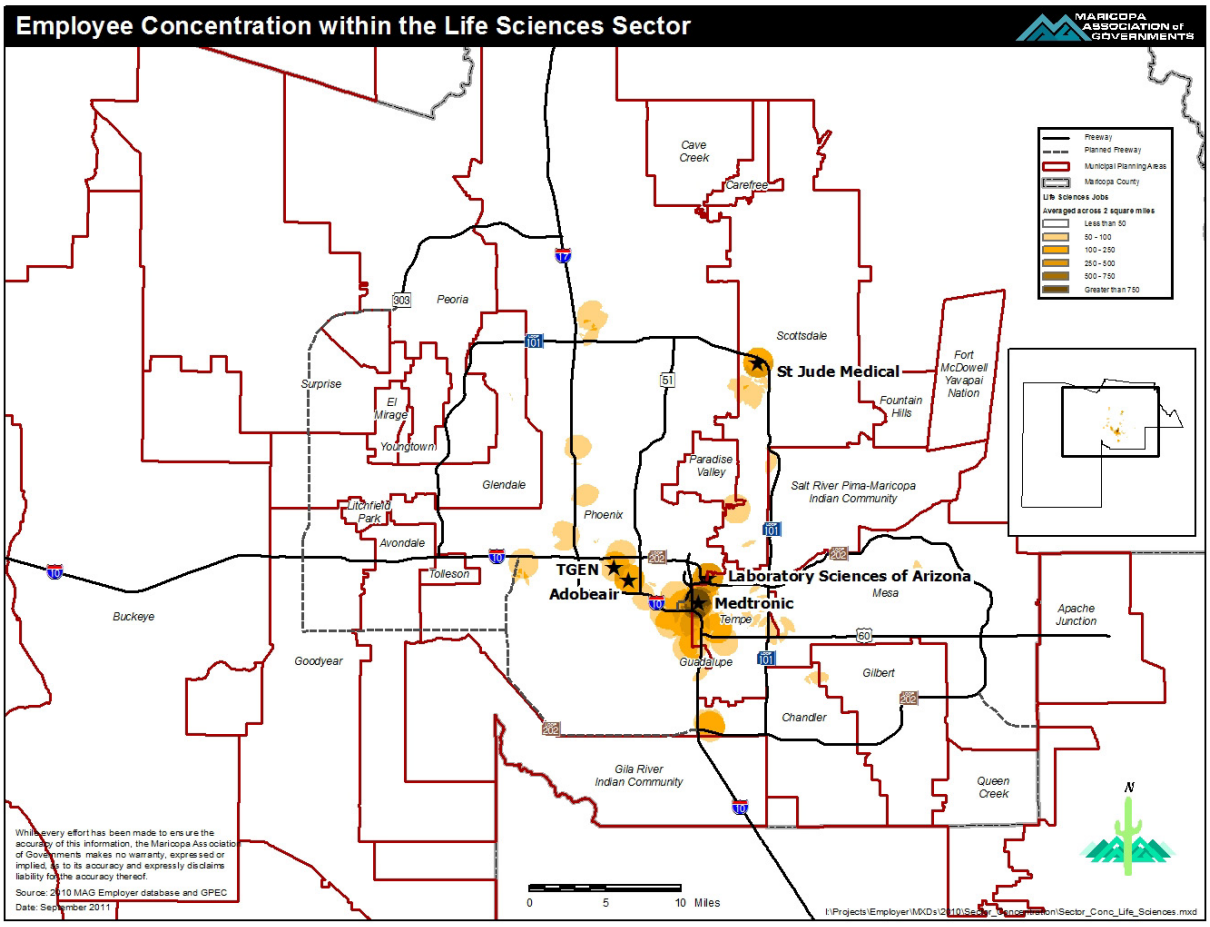
Organized initiatives and funding are required to support progress. The following GPEC chart demonstrates the commitments made by Arizona and the other states to stimulate this cluster.

State	Legislation (Year Enacted)	Total Public Investments	Year Program Started	Duration of Program (Years)	Supported Activities
CA	California Stem Cell Research and Cures Act (Proposition 71, 2004)	$3B (up to $350M per year)	2004	Ongoing	Research (59%), training (9%), and facility costs (32%) for embryonic, Induced Pluripotent Stem (iPS), adult, Somatic Cell Nuclear Transfer (SCNT), or cancer-related organizations.
MA	Massachusetts Life Sciences Act (H.B. 4829, 2008)	$1B	2008	10 years	$250M in job creation tax credits for life sciences companies. $250M for research grants; $500M for major construction and improvement projects.
MI	Michigan Health & Aging Research & Development Initiative (1999)	$1B	1999	20 years	40% Basic Research Fund (40%) Collaborative Research (50%) a Commercialization (10%)
TX	Emerging Technology Fund (H.B. 1188, 2005)	$200M initial investment, variable distribution	2005	Ongoing	Governor's discretion.
VA	Virginia Biotechnology Research Partnership	$511M	1995	Ongoing	Construction, improvement, furnishing, maintenance, acquisition or operation of the Research Park.

	Authority Act (1993)				
AZ	21st Century Competitive Initiative Fund (2006)*	$35M (FY05-07); $25M (FY06-07); $22.5M (FY08-09); $27.5M (FY10-11)	2006	Ongoing	Research, commercialization, and education.
CO	Bioscience and Life Science Fund (HB 08-1001)	$26.5M (HB 08-1001)	2006	5 Years	Commercialization of bioscience discoveries.
WA	Life Sciences Discovery Fund (S.B. 5581) (2005)	$350M	2005	5 Years	Research and commercialization.
UT	U Star Initiative (S.B. 75 2006)	$160M initial investment, $19M annual additions	2006	Ongoing	Construction of research park, talent, and research funding.

**Prop 301 committed $1.6B in Arizona for education and construction of TGen, Phoenix biomedical campus, ASU Biodesign Institute, ASU Research Park, and other infrastructure.*

The MAG map below indicates employee concentrations for this sector which follows the same east/central alignment as the other clusters.



Challenges may impede progress if left unaddressed. The *Arizona Bioscience Roadmap* identified the following challenges for this cluster:

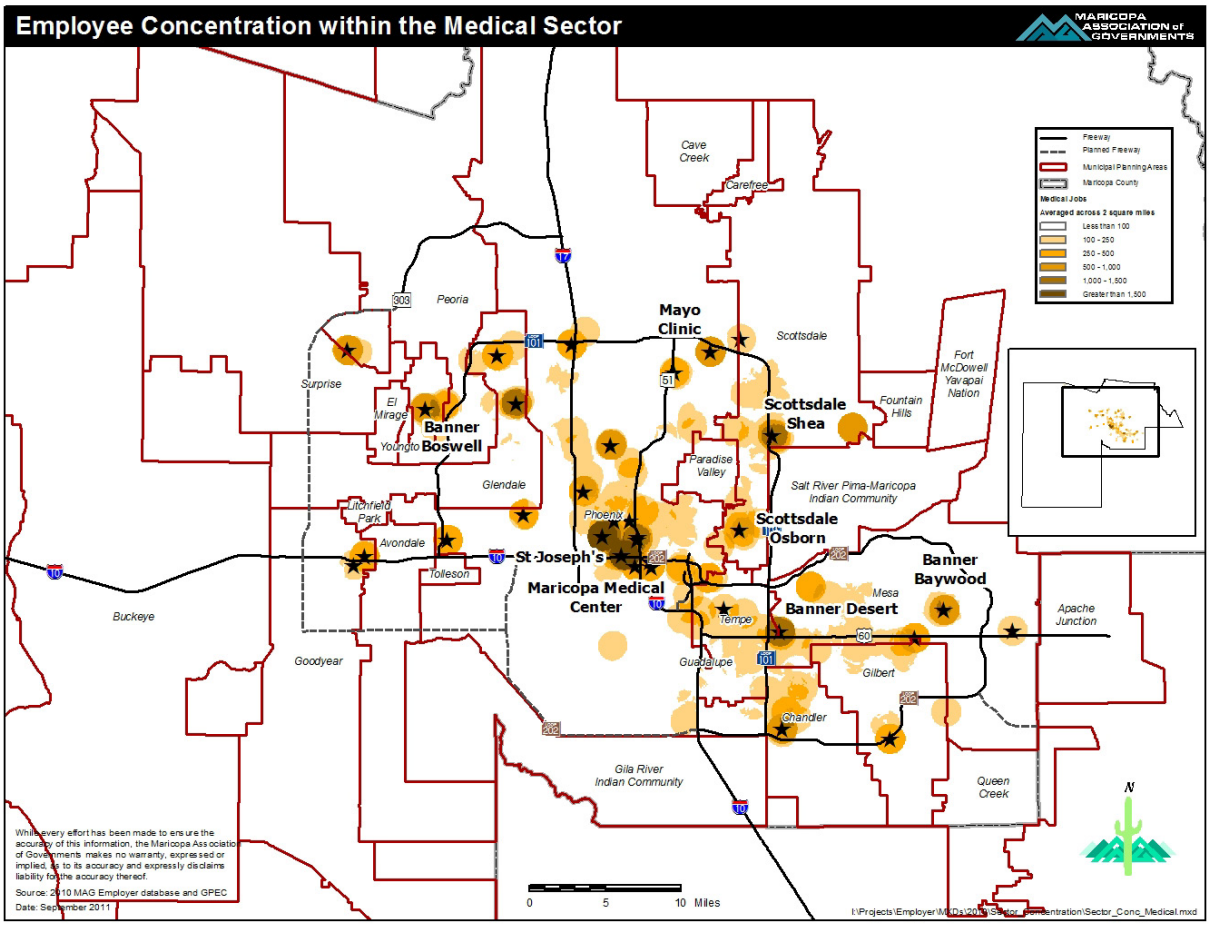
- Sufficient risk capital funds to continue momentum to build a critical mass of bio firms in Arizona.
- Continued state funding partnership critical to funding vital Science Foundation Arizona and efforts of universities critical to industry development.
- Ongoing federal funding support of NIH needed.
- Insuring national health care implementation encourages innovation.

Hospitals/Healthcare

Hospitals and healthcare facilities are a thriving cluster with a significant economic impact. The Arizona Hospital Association reports 80,000 staff were supported by the hospital industry, representing 2.8 percent of the state's overall employment. An additional 93,600 employees were supported in other industries dependent or affected by the hospital industry. In total, this industry contributed nearly $10 billion in wages and benefits in hospital and related industries. Sixty seven percent of this impact occurred within this region.

The region also leads the state in direct hospital employment at 65 percent of the state's total hospital employment. The Arizona Hospital Association reports that as a growth cluster, the number of hospitals grew by 46 percent since 2005, amidst the recession and steep employment declines in other industries. In the region, each hospital job supports 1.94 other jobs. Similarly, every dollar spent on employee compensation triggers an additional $.56 in employee compensation in other industries. The success of this cluster has a demonstrated positive ripple effect on the rest of the region's economy.

The MAG map below reflects employee concentrations within hospitals and healthcare.



There are opportunities for growth that will enhance future progress. Currently, GPEC reports the state is facing a shortage of physicians. There are 214 physicians for every 100,000 patients, ranking the state at 33rd in the country. This rank falls lower when assessing the percent of active physicians who completed their education in Arizona. At 10 percent, Arizona ranks 41st in the country. Expansions of the University of Arizona Medical School in this region along with Midwestern University Arizona College of Osteopathic Medicine (AZCOM) may increase these rankings and the availability of qualified physicians in the region.

The broader field of healthcare fares no better. According to *St. Luke's Health Initiative 2004 Workforce Fact Sheet*, the state made progress from healthcare employees representing 4.1 percent of all jobs to eight percent of jobs in 2003. This progress pales in comparison to national averages. From 1998 to 2000, growth fell below national averages as well. During this time period, the state's per capita growth of eight percent was significantly lower than the national per capita growth of 21 percent. Due to funding limitations, this analysis has not been updated since the 2004 report. As a result, it is difficult to assess the current conditions, although it is possible the trend has not significantly changed.

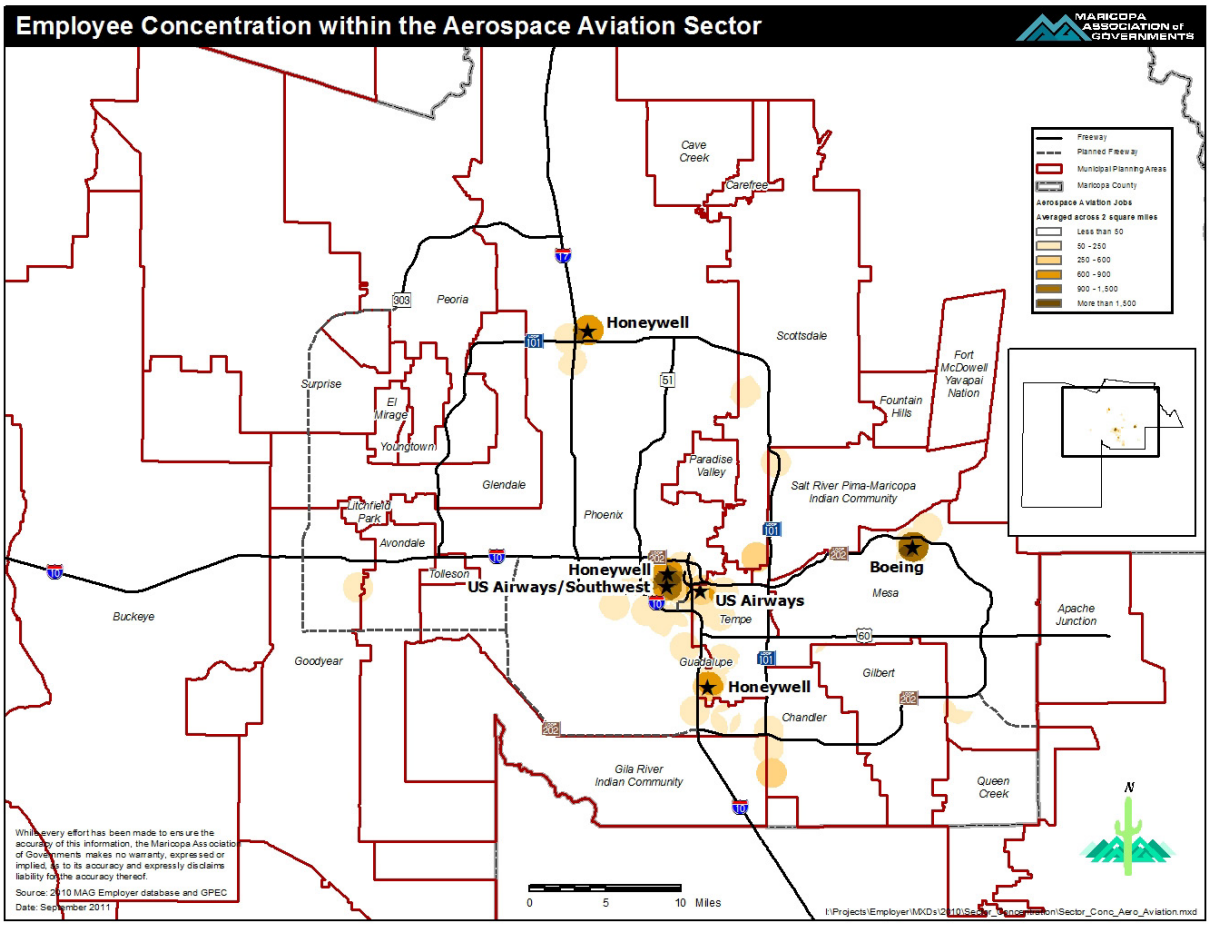
The *St. Luke's Health Initiative 2004 Workforce Fact Sheet* cites high turnover rates as challenging the supply of employees. This rate increased from eight percent in 2001 to 11 percent in 2003. Physician assistants had the lowest turnover rate during this time period at six percent, while nursing aides had a higher rate at 39 percent. Unfortunately, nursing aides are projected to have among the highest demand rates in the future. The age of employees is a factor as well. In 2003, only 39 percent of active MDs in the state were age 54 years or younger, compared to 50 percent in 1996. As more healthcare staff reaches retirement, the need to educate the next generation of employees is paramount. This is an important issue. In 2003, Arizona experienced a 6.2 percent decline in the number of physicians. This is greater than the national average of 3.9 percent. Data from 2000 reflects a similar shortage of nurses as well with 628 nurses per 100,000 people, compared to a national average of 782. Some of this demand was met by recruiting foreign born nurses or enticing nurses to come back from retirement, according to St. Luke's Health Initiative.

The variation among healthcare positions is striking. According to St. Luke's Health Initiative, the state ranks 41st in the number of dentists and 50th in the number of pharmacists. The state does much better in the area of chiropractors, coming in at 3rd in the country, and 6th in the percent of health employment offices and clinics. The assistance given by unpaid, informal caregivers had an estimated value of $4.6 billion in the state in 2003.

Aerospace and Aviation

The aerospace and aviation industry in the region has been exceptionally well-documented by a number of sources. The *Aerospace and Defense in Arizona* by the Arizona Commerce Authority and the *Aerospace and Defense Industry in Arizona, An Intellectual Roadmap for Arizona* by the L. William Seidman Institute, Arizona State University, March 2011, in particular, offer significant detail about the size, scope, and economic impact of this robust industry. This section will offer an overview of the strengths, challenges, and opportunities present in the industry in the region.

The MAG map below identifies employee concentrations for this industry and the largest employers, such as Honeywell and Boeing.



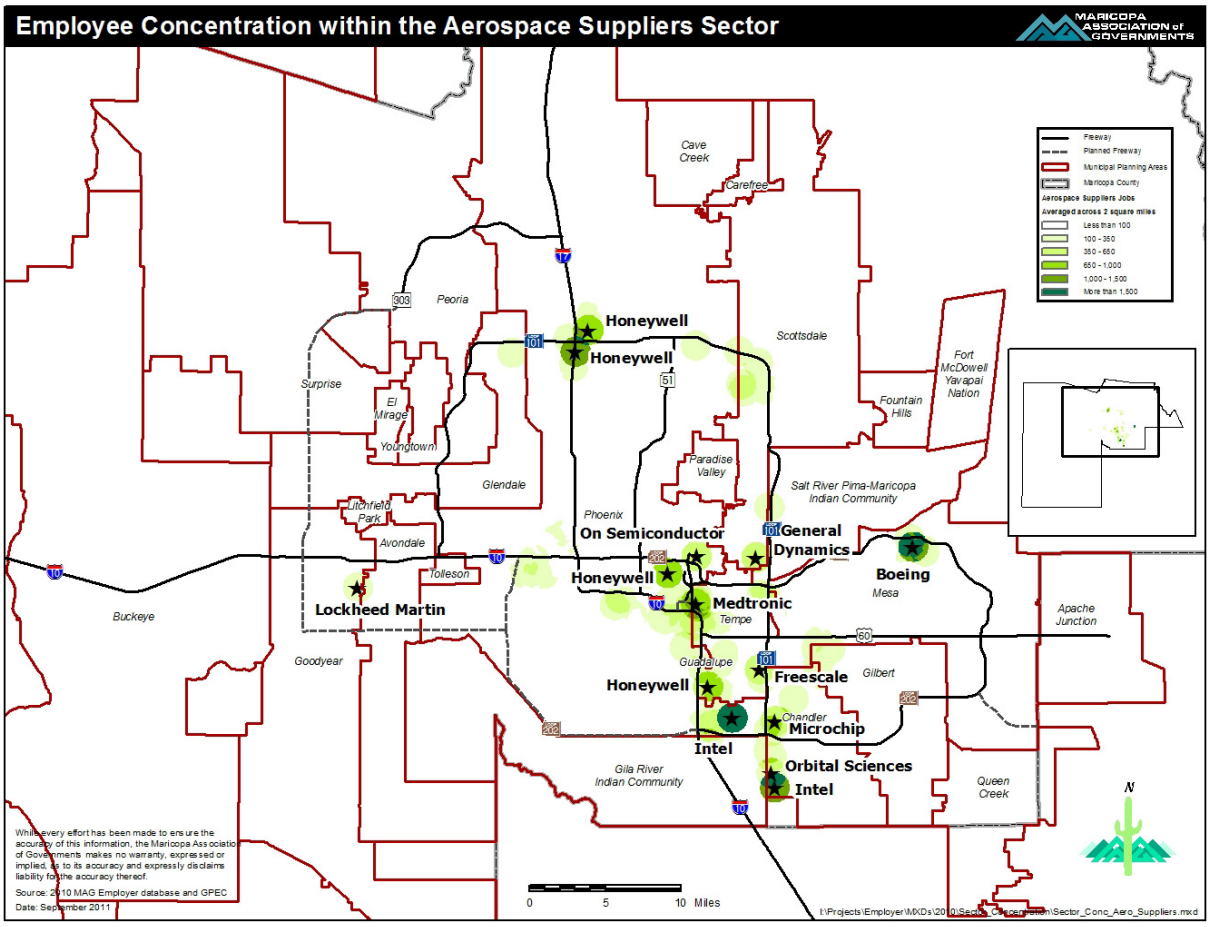
The state benefits from the $8.8 billion in GDP contributed by the aerospace and aviation industry, according to the *Roadmap* developed by the Seidman Institute. Raytheon Missile Systems, the Boeing Company, Honeywell Aerospace and General Dynamics C-4 Systems generate 83 percent of the 93,800 private jobs in the state. Military installations contribute another $9.1 billion and an additional 96,328 jobs. Seidman notes this is more than the economic output of Wal-Mart and Banner Health system, the state's largest private employers, combined.

According to the Arizona Commerce Authority (ACA), the aerospace and aviation cluster covers a number of activities, including manufacturing, fuel and power sources, human factors, performance materials, technologies to restore units to combat capability (RESET), unmanned air systems (UAS), and land warrior systems. The Arizona Commerce Authority reports human factors and UAS generate the state's largest share of employment. These two sub-clusters together supported more than 78,000 jobs in the state in 2010. The production of guided missiles and related activities is an important source of employment to the RESET sub-cluster, as missile and armed drone production drives the UAS sub-cluster. Seidman reports the core competencies of the state in the aerospace and aviation cluster in the following areas: national

defense, cyber warfare, intelligence and surveillance, special operations, counter terrorism, and border security.

According to the Seidman Roadmap, the majority of the Department of Defense contracts are awarded to very large manufacturers who depend upon second tier suppliers. The low number of second tier suppliers in the state as compared to other states puts the state at a disadvantage. It also represents an opportunity to recruit additional suppliers to the region. It is also reported that coordination and communication among the firms of all sizes in the state could be improved and coordinated. This could help leverage the existing companies and present a stronger base for the industry in the region.

The MAG map below denotes the locations of second tier suppliers for this industry.



The region benefits from a range of assets that support the industry. The Seidman Roadmap cites the following strengths: availability of restricted airspace, the economic engines of the military bases and training ranges, the strong presence of active and retired military, an adequate number of very large manufacturers (as opposed to the dearth of second tier suppliers), strong civilian aerospace facilities, excellent research entities such as Arizona State University, unique facilities such as the Air Force Research Laboratory in Mesa, existing

intermediary entities in the State like the Security and Defense Systems Initiative and the Aerospace and Defense Research Collaborative, economic incentives such as the Angel Tax Credit Program (to be addressed in more depth later in the report), the Arizona Commerce Authority, and favorable weather conditions.

The limited number of second tier suppliers as well as poor coordination and communication among firms have been identified as challenges. Seidman also points out the following weaknesses in the state's aerospace industry: weak support from the Congressional delegation, external perceptions of the state in areas like gun laws and immigration, poor development of STEM education, and limited promotion of beneficial state policies that support the industry.

Despite these challenges, firms in the state were awarded contracts totaling $10.8 billion in 2010, according to the Arizona Commerce Authority, giving the state the rank of ninth largest contract recipient in the country. This rank increased to seventh in the area of Department of Defense dollars per capita. The state received more than 95 percent of the contracts in the area of the guided missile market. Nearly half of all research and development contracts in the country came to firms in Arizona, an increase of 250 percent growth. Exceptional growth was also seen in contracts for guns over 30 mm with an increase of 227 percent. Contracts for aircraft wheel and brake systems increased by 104 percent. In total, this growth resulted in the contribution of $300 million in tax revenue for the state.

The impact of this industry fuels a significant economic impact in healthcare as well. Triwest Healthcare Alliance, part of Tricare, is the Department of Defense's fifth largest contractor as a result of providing healthcare services to the more than 30,000 federal employees in the state. They are also the single largest Department of Defense contract in Arizona. The region received $4.4 billion in Department of Defense contracts in 2010. Of this amount, more than 25 percent was paid to Triwest, according to the Arizona Commerce Authority.

Individual workers in the aerospace and aviation industry were well compensated as well with average wages of $109,000, two and a half times the average wage in the state. Even with slight job declines from 2001 to 2007, the aerospace industry maintains a slight edge over manufacturing employment. The state ranks exceedingly well in aviation maintenance employment at seventh in the country and even better in overall economic impact of aviation maintenance activities as third in the country, according to the Arizona Commerce Authority. The largest employers are listed in the Arizona Commerce Authority table below.

Largest employers

Employer	*Employment*	*City*	*Product Lines*
Raytheon Missile Systems	15,000	Tucson	Missile & Space Systems, Maintenance/Repair/Overhaul, Advanced R&D

Phoenix Sky Harbor Airport	9,600	Phoenix	Commercial Air Travel
General Dynamics C4 Systems	7,000	Scottsdale	Defense Electronics & Communications Equipment, Maintenance/Repair/Overhaul, Advanced R&D
Boeing Co.	4,000	Mesa	Aircraft Components
Honeywell Aerospace	3,000	Phoenix	Gas Turbines/Jet Engines, Fuel System Components
US Airways Group Inc.	2,000	Tempe	Commercial Air Travel
Bombardier Learjet	1,100	Tucson	Gas Turbines/Jet Engines
Orbital Sciences Corp	1,000	Chandler	Defense Missiles and Space Systems, Drones, R&D

Source: Reference USA

In the Phoenix area:

Company	*Number of Employees*
Comtech EF Data Corporation	600
Hexcel Corporation, Casa Grande	550
Goodrich Aircraft Interior Products	450
L-3 Access	310
ATK Medium Caliber Systems Division	250
Triumph Air Repair	225

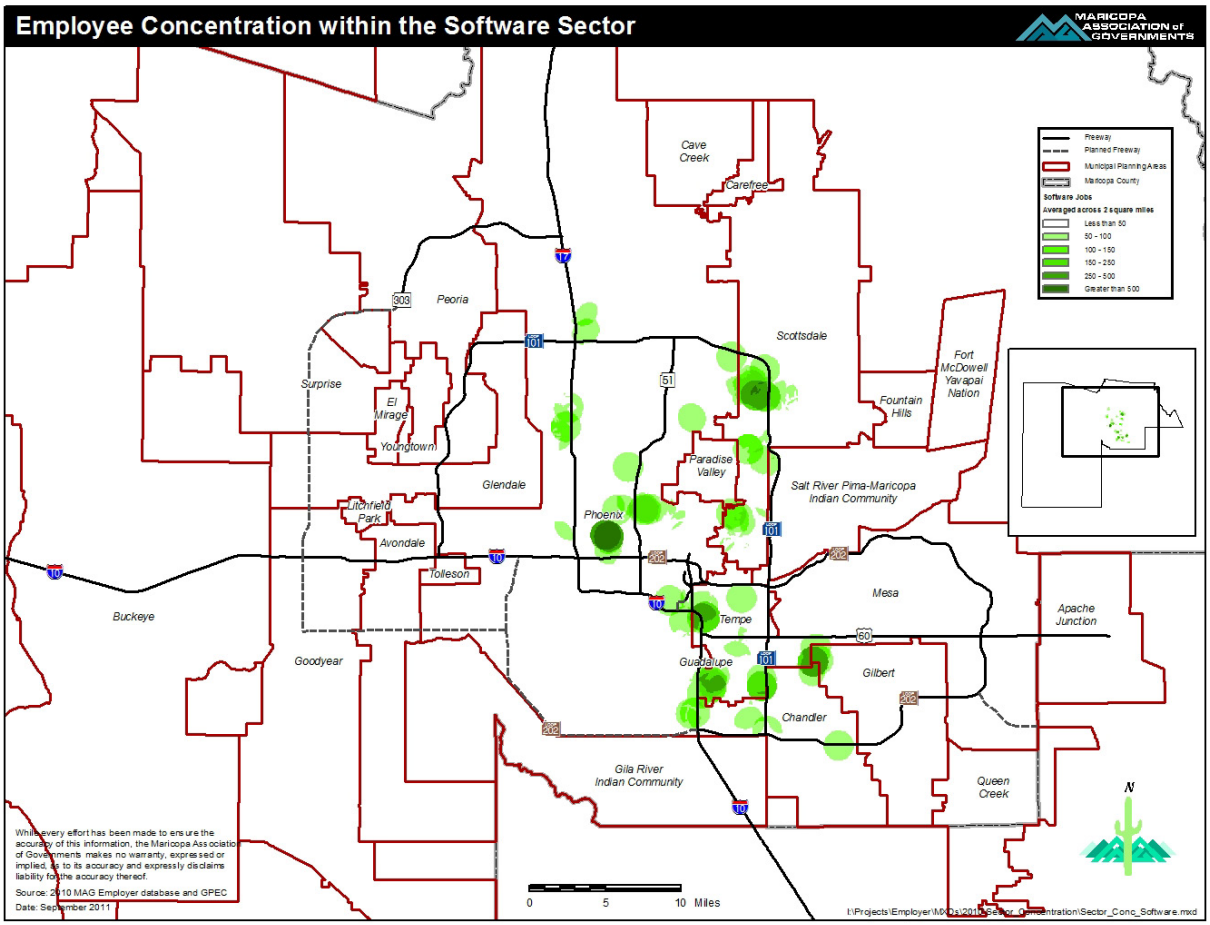
Luke Air Force base is an important regional employer and partner in the aerospace industry as a training base for the Air Education and Training Command and Air Combat Command for the 56th Fighter wing, according to the Arizona Commerce Authority. Despite the presence of 18 industry associations, more coordination is needed to maximize the capacity of these employers.

University research and recent activity by an advisory board of the Arizona House of Representatives have stressed the need to establish an Aerospace Institute with the goal of serving as a central resource point for the industry. The Seidman Roadmap identified workforce development; coordination among the private, public, military, and academic sectors; information management; and modeling as being key activities.

The pressure for the state to make progress grows as other states become more competitive. The Seidman Roadmap notes the state's two percent job loss from 2002 to 2008, the same time that North Carolina experienced a profound job increase of 81 percent. California serves as an example of the impact of falling behind. Since 1990, this neighboring state has lost 66 percent of its aerospace and aviation employment. In the meantime, North Carolina has lured large firms like Spirit Aerosystems with $240 million and a $100 million tech park.

Software

The MAG map below indicates a sparser number of employee concentrations within this cluster, but one that follows the same pattern of locating primarily in the East Valley and central Phoenix.



Basic clusters

Transborder Industries: Transportation and Distribution, Agriculture and Food Processing, and Tourism

The relevance of this information will be impacted by the focus of the lead initiative(s). There are many factors unique to border economies. This section will detail how they affect the region.

The 2010 Arizona Town Hall describes transborder clusters as having a greater presence in this region than the national average, being export driven, and having an interdependent value chain. Three specific industries exemplify these attributes: maquiladoras, fresh produce, and tourism. Each will be addressed in turn below.

Maquiladoras are an important economic driver in Mexico, and by association, in this region. The 2010 Arizona Town Hall describes maquiladora as a program initiated by Mexico to bring

unassembled exports into Mexico duty free to be assembled and shipped back to Arizona duty free. This keeps costs low and stimulates trade.

Fresh produce is another area that benefits from the region's proximity to the border. As earlier reported, the state of Arizona is losing ground to Texas. MAG is supporting officials in Nogales to explore opportunities to increase Customs and Border Protection staffing along the ports of entry and identify a dedicated funding source that can improve transportation infrastructure, which will overall improve the flow of goods (produce) across the state's southern border. Progress has been made in charging a fee for overweight vehicles crossing the border into Arizona. For example, the overweight trucks carrying produce used to stop at the border and split the produce into two vehicles to meet the required weight restrictions entering Arizona. The Arizona Department of Transportation created a new overweight vehicle fee that allows the overweight produce trucks entering Arizona to pay a fee to deliver the produce to distribution facilities located in close proximity to the border.

Tourism is a two-way activity that supported 23,400 jobs in the state and contributed $2.7 billion in retail revenue from shoppers visiting from Mexico, according to the 2010 Arizona Town Hall. More detail about the economic impact of tourism is included in the tourism cluster section.

Tourism

Considered to be a basic industry, tourism represents the largest cluster in terms of total employment according to the 2010 Arizona Town Hall. It also has a significant impact on the region's economy. The impact of trans-border tourism with Mexico was assessed earlier. This section will focus on overall tourism throughout the state.

In 2010, tourism began to recover from two years of significant hardship as a result of the recession, according to the *Arizona Travel Impact Study*, by Dean Runnyan Associates. Unfortunately, improvements in visitation and real visitor spending did not result in additional employment. From 2008 to 2010, tourism employment decreased by nearly nine percent. It is anticipated that employment will improve as the region continues to emerge from the recession.

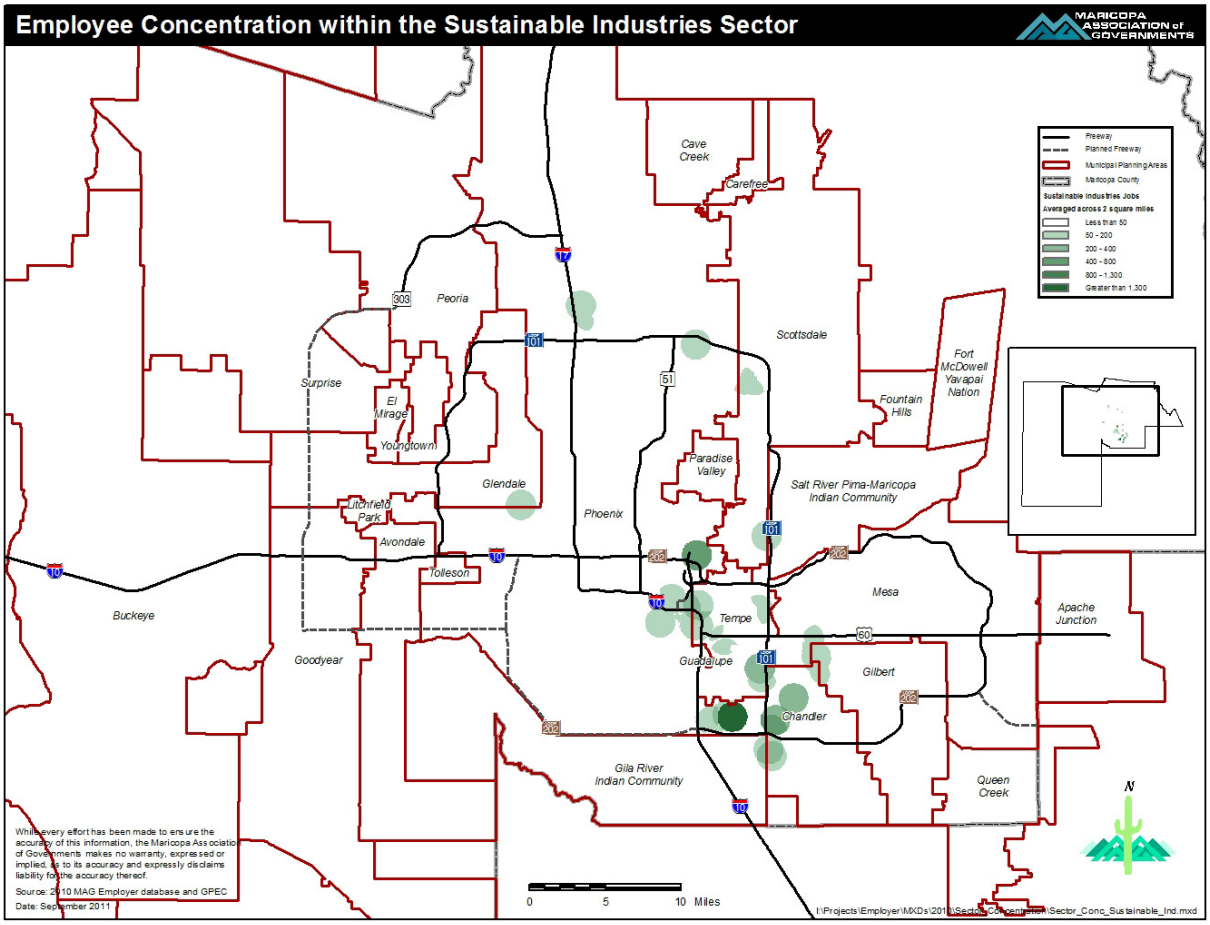
The state experienced a 7.9 percent increase in travel spending from 2009 to 2010, amounting to $17.7 billion spent in 2010. The majority, or 75 percent, of this spending comes from out of state visitors. This places the tourism industry as one of the top two export-oriented industries in the state. This ranking is shared with microelectronics. Revenue received from travel spending has an impact on tax revenue as well, with 75 percent of sales tax being collected by the state, local governments collecting property taxes, and income tax being paid to the state.

Like other industries, tourism supports a number of jobs and dollars beyond this cluster. The June 2011 *Arizona Travel Impact Study* notes 28,000 jobs and $1.5 billion in wages as being

supported by the tourism cluster in professional services such as legal, medical, and education. Other services such as dry cleaners and repair shops had 12,000 jobs supported with $336 million in wages. Government benefited from 21,000 jobs and $1.1 billion in wages, as did finance, insurance, and real estate benefit from 10,000 jobs and $436 million in wages. The infrastructure needed to support these jobs and activities is highly developed in the region and benefits local residents, as well as tourists.

Emerging Clusters

The following MAG map indicates employee concentrations for this emerging cluster. Sustainable industries have not yet achieved the concentrations or clusters of other industries, but it follows the same pattern of development in the East Valley and central spine.



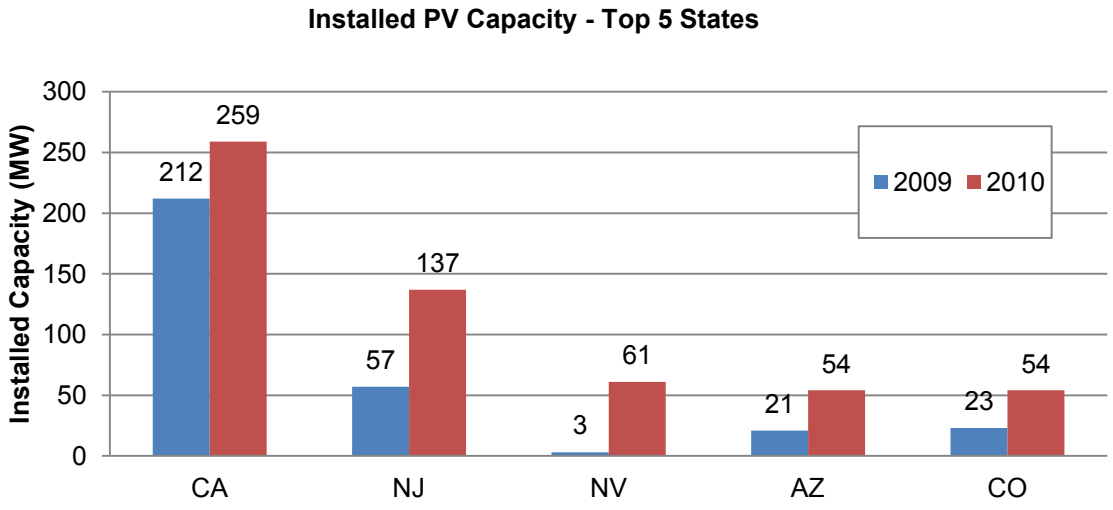
Solar

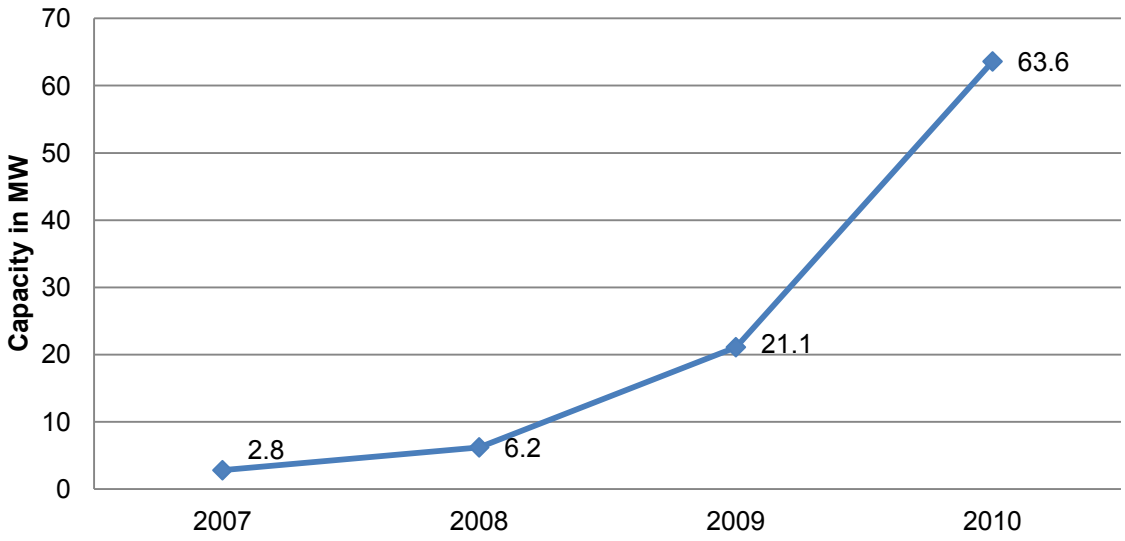
The 2010 Arizona Town Hall reports the state has significant natural assets that make solar a particularly viable enterprise in Arizona. The sun shines more than 300 days a year and the

state enjoys the highest level of solar irradiance, or the amount of sunlight hitting the ground, in the country. This keeps the cost of producing solar energy lower than most other parts of the country. In addition, there is a large amount of available, affordable land that may be cultivated for solar energy production.

The state provides incentives to support renewable energy development. The success of the tax incentive program may be measured through the addition of 11 companies that supported more than 6,300 jobs, bringing into the region $1.832 billion in investment. Additional support is found through the Arizona Corporation Commission mandated Renewable Energy Standards. In 2006, the Commission required 15 percent of energy from regulated electric utilities be obtained from renewable sources by 2025. Since then, utility companies have filed annual progress reports on their achievement of this goal, according to the Commission's website.

The Town Hall reports that capacity exists within the solar industry that other renewable energy industries do not share. Hydroelectric power provides 10.6 percent of the state's power, but most of the sources are already at capacity, making further development unlikely. Solar has the advantage of existing untapped potential that may be developed in the future. In the *Solar Market and Industry Growth report of 2011*, GPEC states that Arizona was one of five states to tap into this potential by installing more than 50 mega watt (MW). From 2009 to 2010, the state installations increased by 157 percent. The GPEC charts below provide additional detail for photovoltaics (PV) capacity.





Arizona Annual PV Installed Capacity

Cumulative PV Installed Capacity and Market Share

2010 Rank by State		MW	Market Share
1	California	1,022	47%
2	New Jersey	260	12%
3	Colorado	121	6%
4	Arizona	110	5%
5	Nevada	105	5%
6	Florida	73	3%
7	New York	56	3%
8	Pennsylvania	55	3%
9	Hawaii	45	2%
10	New Mexico	43	2%
	All Other States	264	12%
	Total	2,153	

The GPEC chart below provides detail on the number of jobs and investments by solar companies in the region.

Source: Interstate Renewable Energy Council, 2011.

Company	Project Type	Location	Jobs	Investment	Date
Suntech	Manufacturing	Goodyear	150	$14M	Oct. 2010
Tower Automotive	Manufacturing	Goodyear	182	$50.6M	Apr. 2010
Linamar	Manufacturing	Glendale	52	$3.5M	Jul. 2010
Rioglass	Manufacturing	Surprise	109	$50M	Aug. 2010
Alpha Energies	Headquarters	Phoenix	57	$5.1M	Feb. 2010
PowerOne	Manufacturing	Phoenix	350	$11M	Jan. 2010
Faist	Manufacturing	Phoenix	45	$5M	Jan. 2011
Gestamp	Manufacturing	Surprise	164	$57M	Feb. 2011
First Solar	Manufacturing	Mesa	4,800	$1,600M	Mar. 2011
Fluidic	Manufacturing	Maricopa Co.	400	$16M	Apr. 2011
Project Saint	Manufacturing	NDA*	50	$20M	N/A
Total			6,359	$1.832B	

*NDA: under non-disclosure agreement

Sources: Solar Energy Industry Association, GPEC.

Capital investments create the majority of the economic impact produced by the solar cluster, according to the 2010 Arizona Town Hall. Aggressive RES requirements will necessitate the production of 4,340 MW of solar energy production by 2030. Such production will result in capital investments increasing from $84 million in 2010 to a projected $2.5 billion in 2025. If all solar plants needed to meet the Renewable Energy Standards requirements are built by 2030, the state will benefit from an estimated $22 billion in capital investment. The overall value added by construction employment for these facilities is $2.2 million by 2025. Once in operation, the impact of employment to operate and maintain the plants is estimated to peak with 50 jobs in 2025. Additional details are provided in the Town Hall chart below:

Solar Industry Impacts and Resource Requirements
Estimated Impacts of Solar Industry on Jobs, Wages and Value Added

Construction Phase:	Direct Jobs	Indirect & Induced Jobs	Total Jobs	Total Wages	Total Value Added
2010	565	503	1,068	$51 M	$74 M
2025	16,530	15,552	32,082	$1,560 M	$2,240 M

Operation & Maintenance (O&M) Phase:	Direct Jobs	Indirect & Induced Jobs	Total Jobs	Total Wages	Total Value Added

2010	2.5	0.5	3	$200,000	$400,000
2025	50	37	87	$8 M	$6.6 M

GPEC reports in *Solar Industry Trends 2011,* that the Interstate Renewable Energy Council cites Arizona as "a very favorable site" for future solar development. Issues that may impede this progress include limited rebate funding availability in APS and SRP territories and the need to develop transmission infrastructure. The 2010 Arizona Town Hall reports that increases in other energy sources like fossil fuels may support solar industry growth. They cite additional opportunities as pursuing foreign investment to support development activities, utilizing a smart grid, and establishing facilities in airport accident-potential zones.

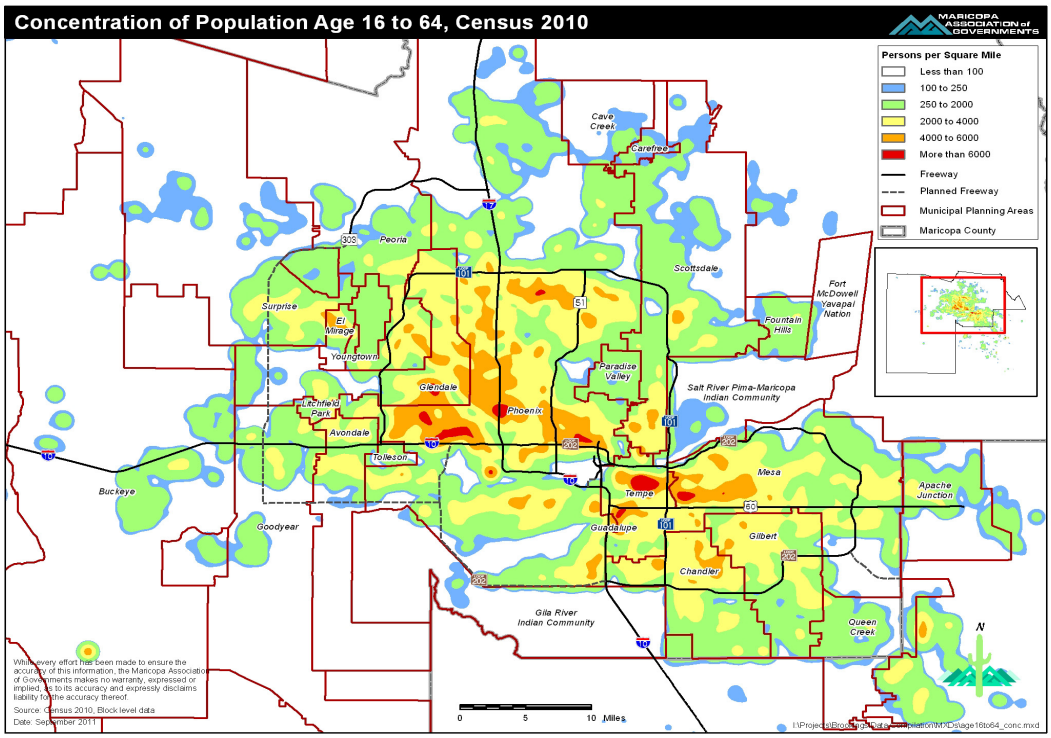
Leverage Point: Deploy Human Capital Aligned With Job Pools

A qualified workforce is an important element of robust, economically viable industries. Regional concerns in the areas of STEM workers and healthcare employees have already been noted. The demographics, challenges, and opportunities in human capital will be addressed in detail in this section. The following table is an overview of how the region ranks among the top 100 metro regions according to the data provided by Brookings.

Human Capital	
Immigrants	44
High skill immigrants	68
Skills gap	62
Average	58

The younger character of the region is demonstrated by the high number of residents who are working age. At 2.6 million people of working age in 2009, the region fares better than all but two of the 14 competitive peer regions. From 2000 to 2009, the number of working age people increased by 34.5 percent in the region. Some peer regions, like Colorado Springs, increased by only about half that amount (17.3 percent) in the same time period.

The MAG map below indicates the location of people aged 16 to 64 years in the region, according to the 2010 Census. Higher densities of working age people are found in areas within Glendale, Phoenix, Tempe, Mesa, and Guadalupe.

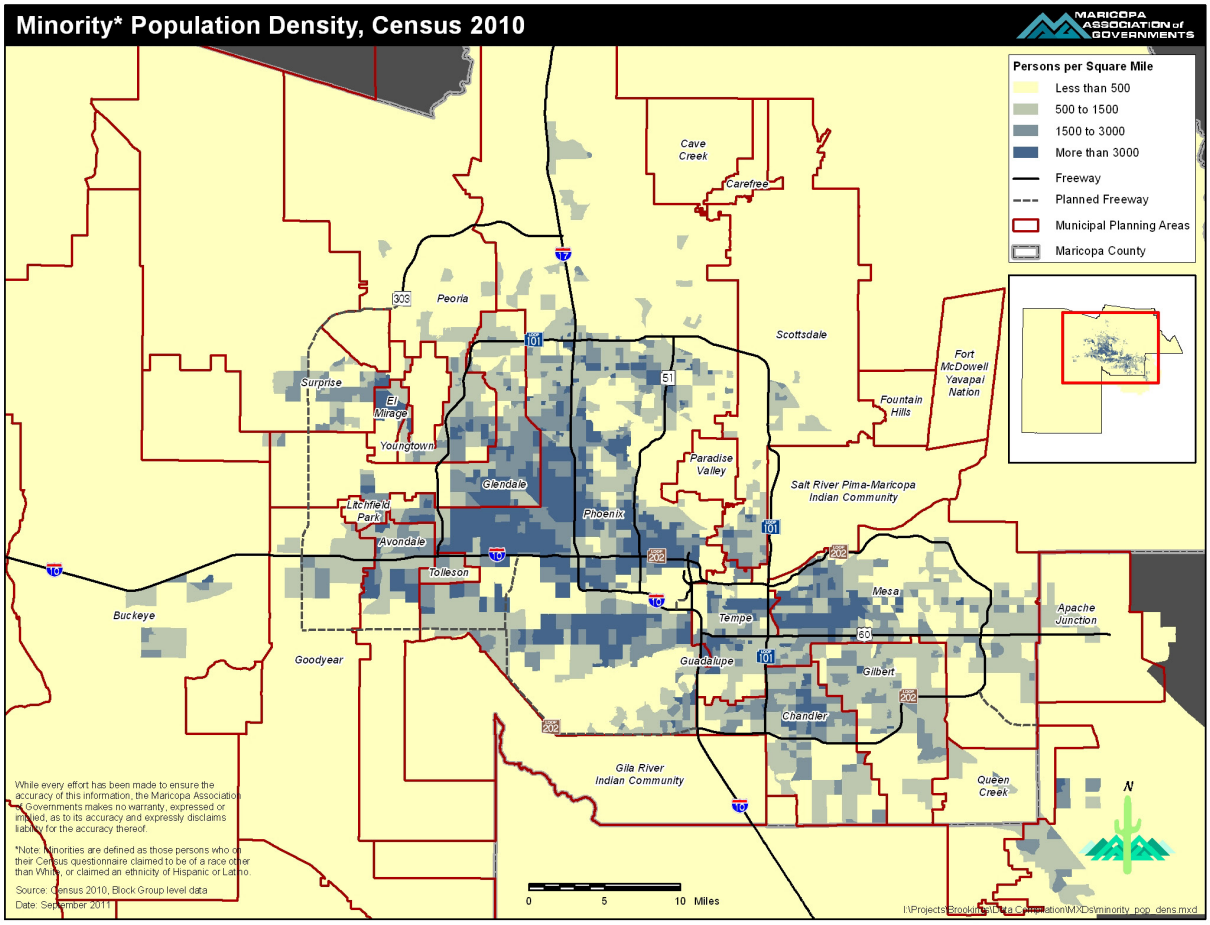


Much of this growth is fueled by a strong Hispanic population. The proliferation of Hispanic workers abated what could have been a labor shortage in the expansionary years, according to AIP. Much of this employment is found in lower paying, low-skill jobs. Traditionally, the AIP reports that Mexican American men are twice as likely to have these jobs, as opposed to their non-Hispanic peers. Low education levels make it difficult to secure jobs with better wages, resulting in Mexican Americans earning 60 percent of what their non-Hispanic peers earn. People who have recently immigrated to the region earn less than half what non-Hispanic workers make, according to AIP.

Half of Mexican Americans in the state were born in Mexico, where the average educational attainment is nine years, according to AIP. The 50 percent of Mexican American residents who were born in the United States tend to have higher levels of education. Overall, the school drop-out rate for Hispanic students (15 percent) is twice the average for non-Hispanic students. This contributes to the 52 percent high school diploma rate for Hispanic students, which trails the non-Hispanic rate of 85 percent.

Brookings reports that the region ranks 26th in the top 100 metro regions for the number of immigrants as a percent of total population. The percent of highly skilled immigrants in relation to the total population is lower, bringing the region's ranking down to 37. This places the region in the second half of the peer regions, with four below and nine above. The region's ranking for educational attainment for all races is marginally better, with six peer regions above and eight below the region's performance. In analyzing Bureau of Labor statistics, Brookings classified the region's workers as being "balanced." One other peer region, Las Vegas, was ranked as balanced, with four showing deficits and ten others showing surpluses. Having balanced skills means the education meets the job requirements in the region.

The MAG map below illustrates where people of minority status live within the region. This is not exclusive to immigrants, but includes them.



In a recent Gallup poll commissioned for the *Arizona We Want* report, approximately a quarter of respondents noted a skills gap and supported measures to decrease it, such as creating more job training programs for people of all ages (24%) and educating Arizona students to national/international standards (19%). The concern over whether students are being taught to national standards is reflected in the perception of urban residents, of whom only 18 percent rated their community as "very good" in overall quality of public schools. According to Census data collected by GPEC, spending for public schools from kindergarten to 12th grade was for the most part above the national average from 1964 to 1996. From 1996 to 2006, the state's spending was below the national average.

Education is an integral ingredient in preparing a qualified workforce. The Maricopa Community Colleges District (MCCD) play an important role in preparing students for four year universities and for the workforce. In FY 2009, they transferred nearly 5,500 students to ASU. Students from MCCD who transferred to public universities in Arizona earned degrees in the following top ten programs areas:

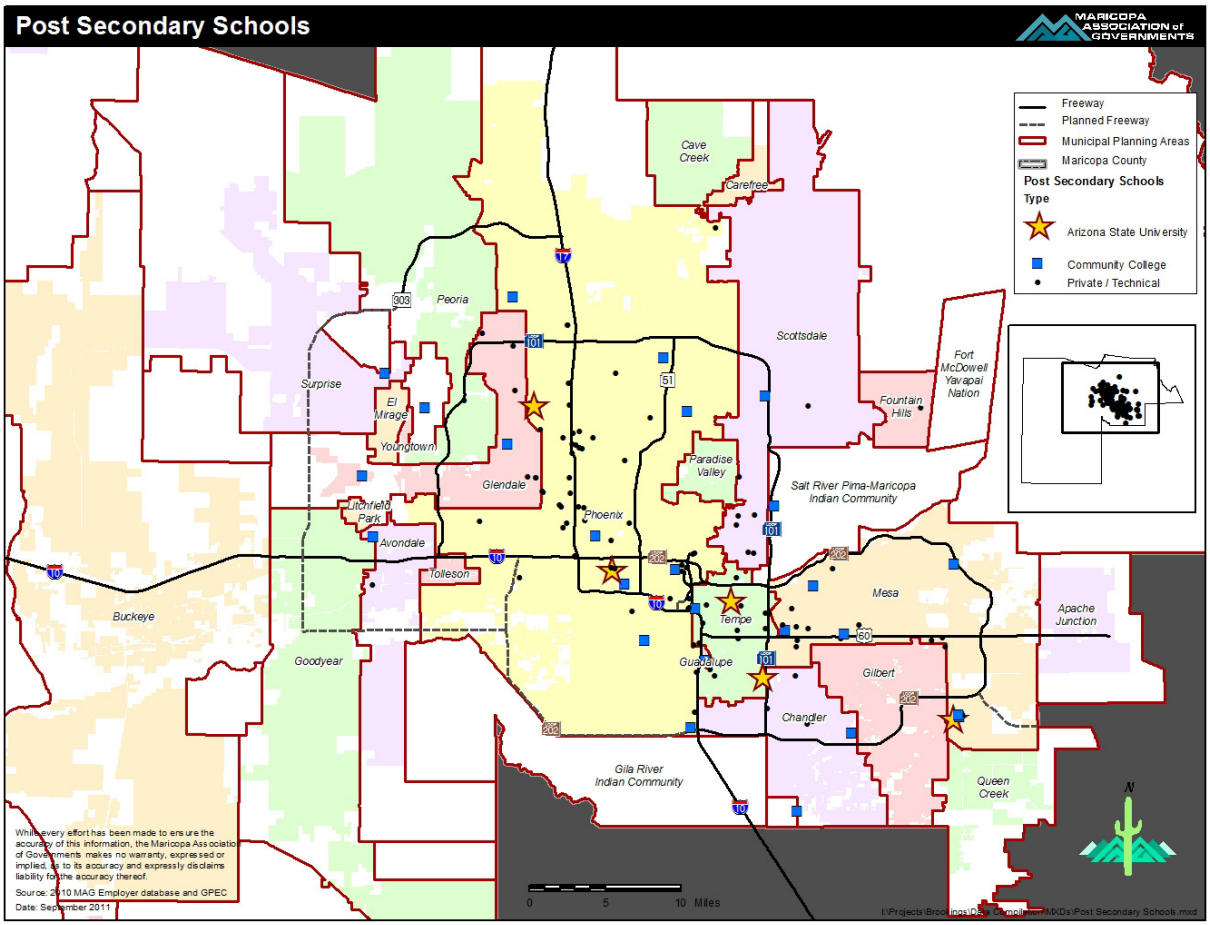
Program Areas with 12 or more MCCD Credits	Degrees Awarded

Business, Management, & Marketing	1,194
Education	905
Multi/Interdisciplinary Studies	463
Social Sciences	448
Biological & Biomedical Sciences	418
Psychology	409
Communication & Journalism	364
Health Professions & Related Clinical Sciences	361
Visual & Performing Arts	325
Engineering	297
Total Degrees	**5,184**

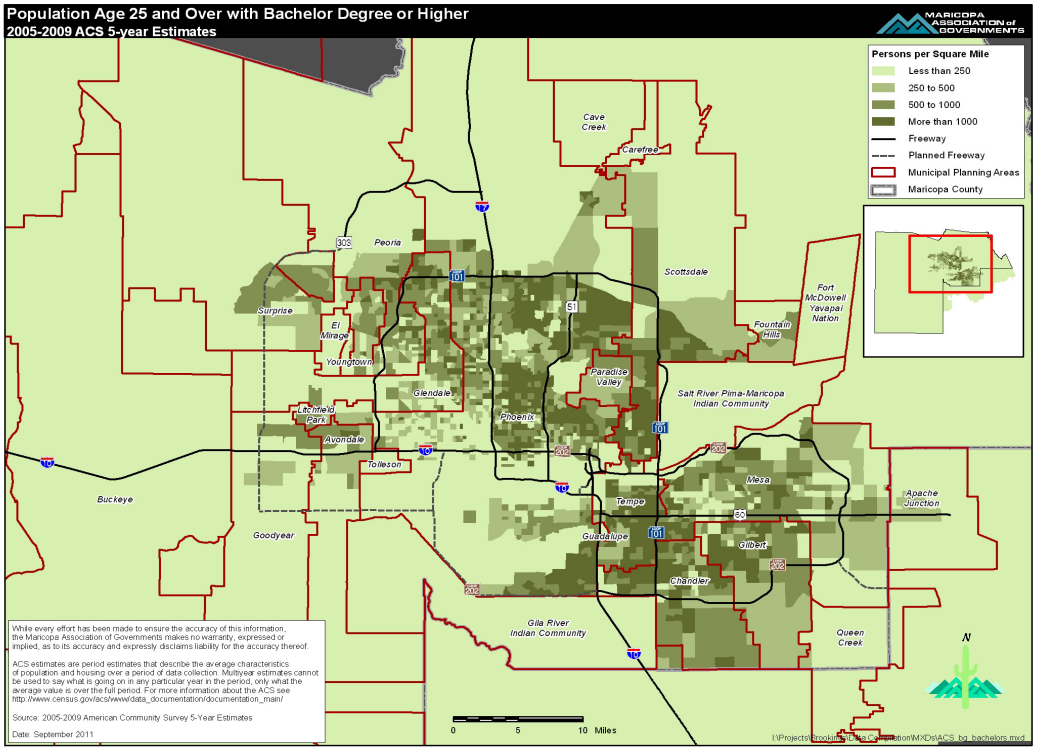
From 2007 to 2008, ASU granted the following number of degrees in the following areas, according to GPEC:

ASU: 2007-2008	BA/BS	Graduate
Applied Arts & Sciences	206	24
Business	1,233	805
Engineering	760	458
Global Management	435	59
Technology & Innovation	171	89
Subtotal Selected Degrees	2,805	1,435
TOTAL DEGREES	**10,706**	**3738**

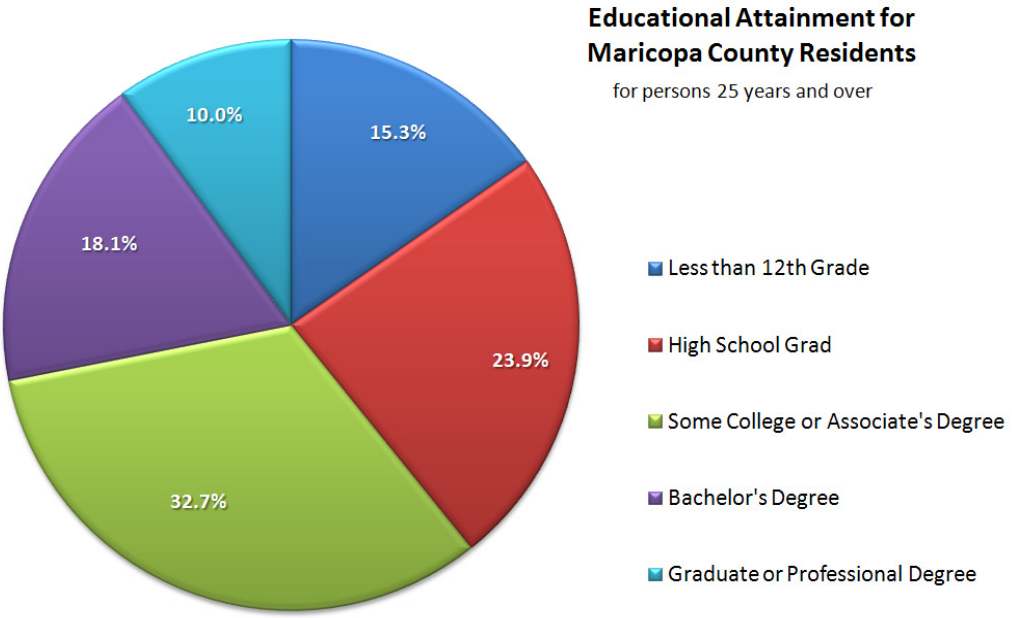
The following MAG map indicates the location of post secondary schools which appear to follow a diagonal line from the northwest to the southeast portion of the region.



The following MAG map portrays the distribution of people aged 25 and older with a bachelor's degree or higher throughout the region. This information from the 2005 to 2009 American Community Survey five-year estimates indicates higher densities in the East Valley.



The MAG chart below indicates educational attainment of the region's residents according to the US Census Bureau, American Community Survey 2009 one-year estimates.



Source: U.S. Census Bureau, American Community Survey (ACS) 2009 1-year estimates

Educational attainment is good for the economy. AIP reports if all ethnic groups had the same educational attainment and corresponding wages as White, non-Hispanic residents, the state would collect an additional $5.9 billion in personal income tax and a projected $2.1 billion in additional tax revenues.

This additional revenue will be within reach if the following challenges are resolved. Such challenges include the impact of limited funding. According to the ASU report, *Learn to Earn,* each resident without a high school diploma actually costs the state more than $16,500 throughout their lifetime. Attaining one to two years of post secondary education reverses the trend and amounts to an increase of $9,023 each year for each adult, totaling up to $411,450 over a person's lifespan. GPEC reports that recent funding reductions to kindergarten through 12th grade and university budgets have been disproportionate in relation to reductions in other areas. For example, overall spending was reduced by 20 percent in FY 2010, but the university funding sustained a 30 percent reduction.

Arizona's spending on education is below the national average, despite evidence that students in this state require levels of funding that are higher than the national average. A proportion of children in the state live with conditions that put a strain on their ability to learn, such as high poverty rates, low parental educational attainment, less stable parental employment, and learning English as a second language. If adequately funded, the education system would be in a better position to resolve the issues created by these demographics. Absent adequate funding, children are positioned to follow in the same footsteps as their parents. GPEC reports students' current performance to be lower than the national average, with fourth and eighth grade students ranking between 37th and 47th on NAEP tests. In terms of preparing students for college, the state is ranked 49th by the Measuring Up 2008 index.

This has implications for people who have not yet moved to the state, but who are considering the decision. The Morrison Institute for Public Policy publication, *Five Shoes Waiting to Drop,* reports that 52 percent of people weighing the decision to move to Arizona are concerned about the poor performance of public schools. The same report indicates the need for workers. For example, in the City of Phoenix, 27 percent of employees are over the age of 50 years. Other professions are impacted as well. More than 40 percent of registered nurses are over the age of 50. Pressure from competitive markets from within the country and beyond the country will continue to exacerbate this dilemma, according to the *North America Next* report.

Leverage Point: Develop Innovation-Enabling Infrastructure

Innovation is an important aspect of a vital economy. The ability to generate new ideas and put them into action defines entrepreneurialism and long-term economic prosperity. The table below indicates how the region performs in developing an innovation-enabling infrastructure as measured by regional rankings from Brookings for the 100 largest metro regions.

Innovation-enabling infrastructure	
Service export intensity	22
Academic research expenditures	33
High tech employment	41
STEM workers	43
Business churn	12
SME entrepreneurship	17
SBA loans	38
Average	29.42

As the table illustrates, the region struggles in the areas of services exports, STEM workers as previously presented, and Small Business Administration loans. This section will delve into the details behind these assessments.

Services Exports

According to Brookings, services exports add significant value but are often dismissed in assessments of regional economies. With a rank of 20, the region is within the top half of the country, but is significantly behind the seven peer regions that rank in the top ten nationally.

Academic Research Expenditures

The region falls in the middle of the peer regions with a rank of 33. Nationally in this area, the region actually falls within the second half of the 100 largest metro regions, but seven peer regions have lower rankings, compared to six peer regions that rank higher.

The Thunderbird School of Global management is a regional asset and an integral partner represented on the MAG Economic Development Committee and ranked number one in international business schools by the Financial Times and U.S. News & World Report. In addition, ASU is one of the region's premier research institutions with specializations in several aerospace and aviation categories, including but not limited to the following:

- Aerodynamics and fluid mechanics
- Helicopter electromagnetics
- Nanofabrication
- Control systems

- Combustion dynamics
- Planetary sciences
- Aeronautical Management Technology
- ADRC
- Security & Defense Systems Initiative (SDSI)

The Kauffman State Index cites the state as exhibiting significant progress in industry-performed research as a percentage of total worker earnings. Arizona has moved into the top 20 states in the country.

2007 2010 Change

	The Top Five Movers	Rank*	Rank	'07–'10
1	Washington	31	4	27
2	Arizona	25	15	10
3	New Mexico	37	27	10
4	Alabama	34	25	9
5	Colorado	16	8	8

The *AZ Bioscience Roadmap* notes trends in federal research grants similar to the progress highlighted by the Kauffman State Index. Research and development reached new levels in 2009 in the area of bioscience. Stimulus funding caused the spike seen in National Institutes of Health (NIH) funding and continued through 2010. Absent the stimulus funding, the state received .66 percent of NIH funding. Despite this, the state outperformed the rest of the country from 2002 to 2010, as well as the top ten states. The roadmap cites growth in research institutions outside the university setting.

The roadmap states that bioscience typically comprises 50 percent of research and development activities. Biological sciences and medical science research development make up nearly 30 percent of the bioscience research and development activity.

High Technology Employment

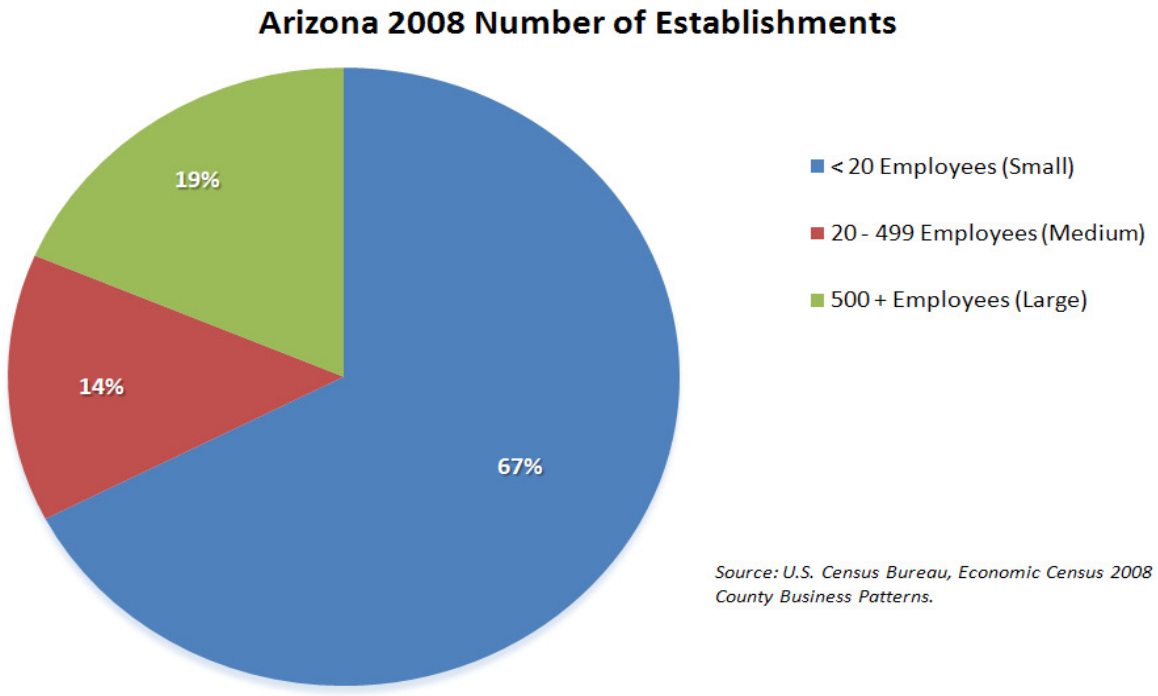
High tech employment, as discussed in the regional concentration section, continues to present a challenge for the region. According to Brookings' analysis of Moody's Analytics data, the region ranks 41st out of the 100 largest metro regions. This is behind all but two of the 13 peer regions, four of which are represented in the top ten. The availability of quality STEM workers directly impacts the ability of the high tech industry to function. This is another area of challenge for the region as indicated by the chart above and the region's ranking of 43 in STEM workers. Again, the region outperforms three of the peer regions but trails 11 others. In this area, five of the peer regions rank in the top five of the 100 largest metro regions. The ACA

reports the Governor's P20 Education Council recommended additional investments in kindergarten through 12th grade STEM and merit-based scholarships.

Business Churn and Small to Medium Size Entrepreneurship

Business churn and small to medium size entrepreneurship are two areas of strengths for the region. Brookings defines business churn as the establishment "births and deaths" as compared to the total number of establishments. Only Salt Lake City, Utah, outperformed the region's rank of 12th on this measure. Twelve regions fall below this region, with Portland coming in at the tail end of the peer regions with a rank of 72. Portland makes an impressive showing in the number of mid-size establishment births per 10,000 employees with a rank of five, slightly below the top-ranked region of San Francisco at the third rank. This region follows not far behind with a rank of 17, outperforming the other 12 peer regions. The region falls to a rank of 38 in Small Business Administration loans. This places the region in the middle of the peer regions with eight ranking higher and six ranking lower.

The MAG chart below indicates the number of establishments by size. More than two thirds of the establishments are small with less than 20 employees.



Arizona mirrors the region's ranking in the Kauffman State Index with a 2010 rank of seven in economic dynamism, a similar measure of Brooking's business churn. Kauffman cites impressive progress for the state, moving from a rank of 23 in 2007. Kauffman also noted significant

progress for the state in the area of entrepreneurial activity, ranking second highest in the country as indicated in the table below. The state's construction activity and rapid population growth were significant factors in the state's high ranking.

2007 2010 Change

The Top Five Movers		Rank	Rank	'07–'10
1	Nevada	46	6	40
2	Arizona	35	2	33
3	Florida	32	4	28
4	Michigan	40	13	27
5	Tennessee	41	15	26

Broadband Penetration

Brookings assessed high speed Internet connections in 2008 and ranked the region in the middle of the peer regions. The Kauffman State Index evaluated the progress made from 2007 to 2010 and found that the region had made significant progress, coming in at second highest in the country. The table below provides detail on the progress Arizona made, as well as the other four ranking states. With this improvement, the state now ranks in the top 20 in the country. This is reflective of enhanced innovation capacity.

2007-2010 Change

The Top Five Movers		Rank	Rank	'07–'10
1	Idaho	31	9	22
2	Arizona	29	18	11
3	Massachusetts	23	12	11
4	Florida	32	22	10
5	Connecticut	21	13	8

Air Connectivity

Brookings cites the region as being an international and domestic hub in air travel with 83 metropolitan and micro-politan connections. The majority of air connectivity activity is through Phoenix Sky Harbor International Airport. According to the airport, this activity places them among the top ten busiest airports in the country for passenger traffic. This amounts to a $90 million economic impact every day. Sky Harbor reports more than 100,000 passengers arrive and depart on a daily basis from 1,200 aircraft. In addition, more than 600 tons of cargo are handled at the airport every day.

The 2007 Phoenix Sky Harbor Economic Impact Study reported the direct economic impact of the airport to be $8.2 billion, an increase of 23 percent from 2003. The total impact of the region's entire airport system, including Phoenix Deer Valley, Phoenix Goodyear, and Phoenix Sky Harbor is provided below. As the table illustrates, the majority of economic activity is through Sky Harbor but Goodyear and Deer Valley airports play a role in the economy as well. This report predates Phoenix-Mesa Gateway Airport by one year, and as a result, their data are not included in the table below.

TOTAL ECONOMIC IMPACT OF PHOENIX AIRPORT SYSTEM: 2007

	Employment	Payroll (millions)	Economic Activity (millions)
Suppliers of Aviation Services	47,150	$2,285.0	$8,288.1
Phoenix Sky Harbor International	46,633	$2,241.2	$8,176.2
Phoenix Deer Valley	268	$11.9	$27.2
Phoenix Goodyear	249	$32.0	$84.8
Air Travelers and Tourism	90,283	$2,561.8	$6,430.3
General Aviation Value of Travel			$124.0
Direct Economic Impact	137,432	$4,846.8	$14,842.5
Secondary Economic Impact	167,703	$7,047.7	$18,172.3
Total Economic Impact	305,136	$11,894.6	$33,014.7

Freight Transport

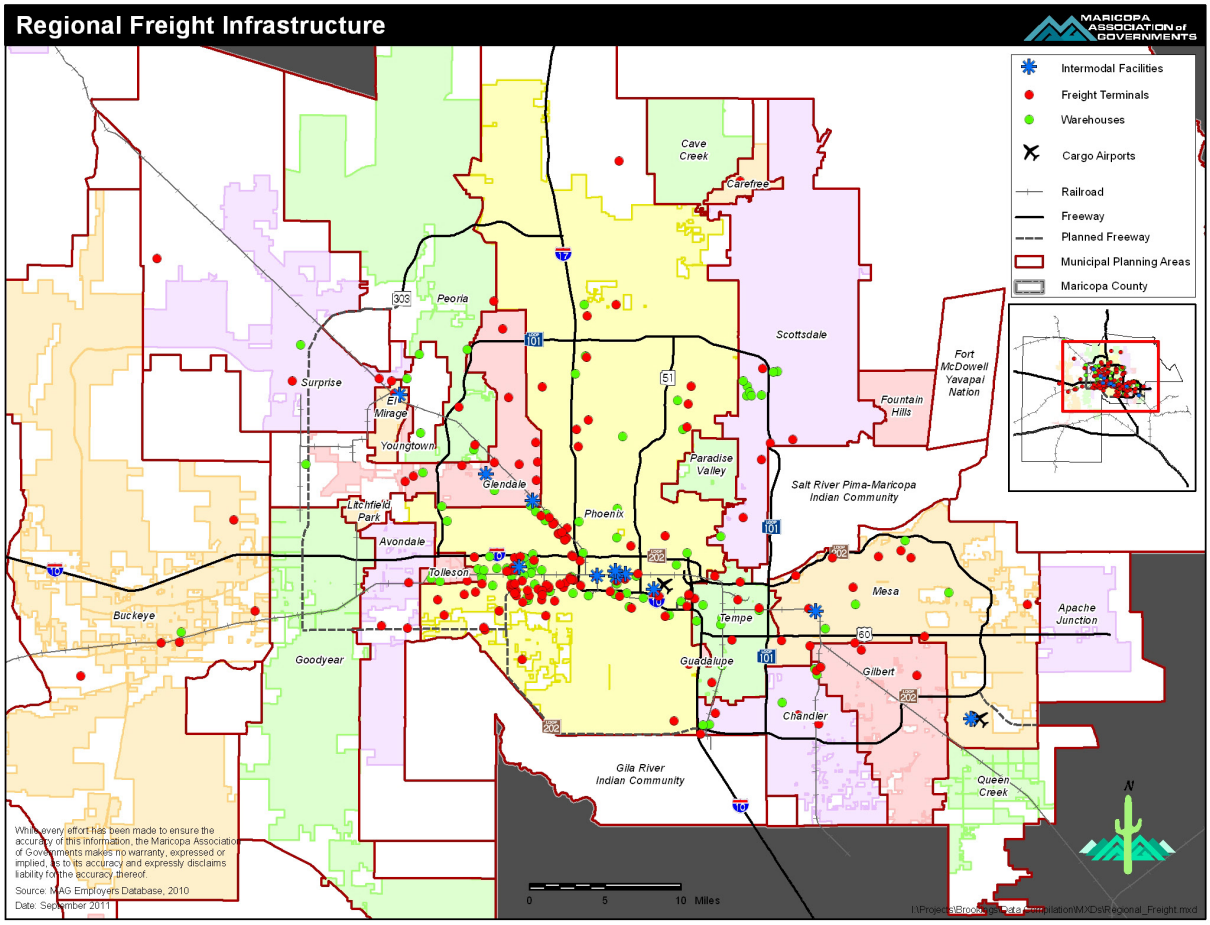
The cost of transportation is often the single most expensive part of doing business. Freight offers another mode to transport goods and services. According to the 2010 Arizona Town Hall, freight trucks transport approximately 70 percent of all weight and 85 percent of the freight's value through the state. The MAG Freight Transportation Framework Study will examine freight and multimodal opportunities in the Sun Corridor. The study area for this project includes Maricopa, Pinal, and Pima Counties. This project is being managed by MAG with input from the Joint Planning Advisory Council (JPAC), which consists of the Maricopa Association of Governments, Central Arizona Association of Governments, and Pima Association of Governments. The Freight Framework Study will develop a multimodal freight framework that will describe the movement of goods (truck, rail, air, and pipeline) through the study area, identify possible network deficiencies to the safe and efficient flow of goods in, out, through and within the region, and propose strategies to improve the transportation network that will enhance regional mobility for freight. The study will also prepare a commodity flow summary

and develop an inland port market assessment that will identify freight related economic development opportunities in the study area.

The project started in January of 2011 and is scheduled for completion in July 2012. During the first six months of the project, the project team has completed the commodity flow analysis and the shipper and carrier survey. These two initial tasks are key to understanding why shippers make the goods movement decisions they do to enhance their supply chain effectiveness. The project is currently starting phase two of the project in which the project team will conduct an economic needs analysis and assess the feasibility of an inland port or expansion of existing freight facilities currently located in the Sun Corridor.

Preliminary results suggest the region is a consumption economy, creating a cost imbalance when imports arrive without a corresponding export trip to return to the point of origin. The study suggests the region is a pass-through area for freight, creating an opportunity to capture additional revenue if freight can be diverted to stop in this region. Additional opportunities may be found by creating additional foreign trade zones throughout the Sun Corridor including along the southern border with Mexico.

The following MAG map displays the distribution of the freight infrastructure. It reflects a presence throughout the region, especially the Southwest Valley, as opposed to other industries that are predominantly focused in the East Valley and Central Phoenix.



Emerging Ports

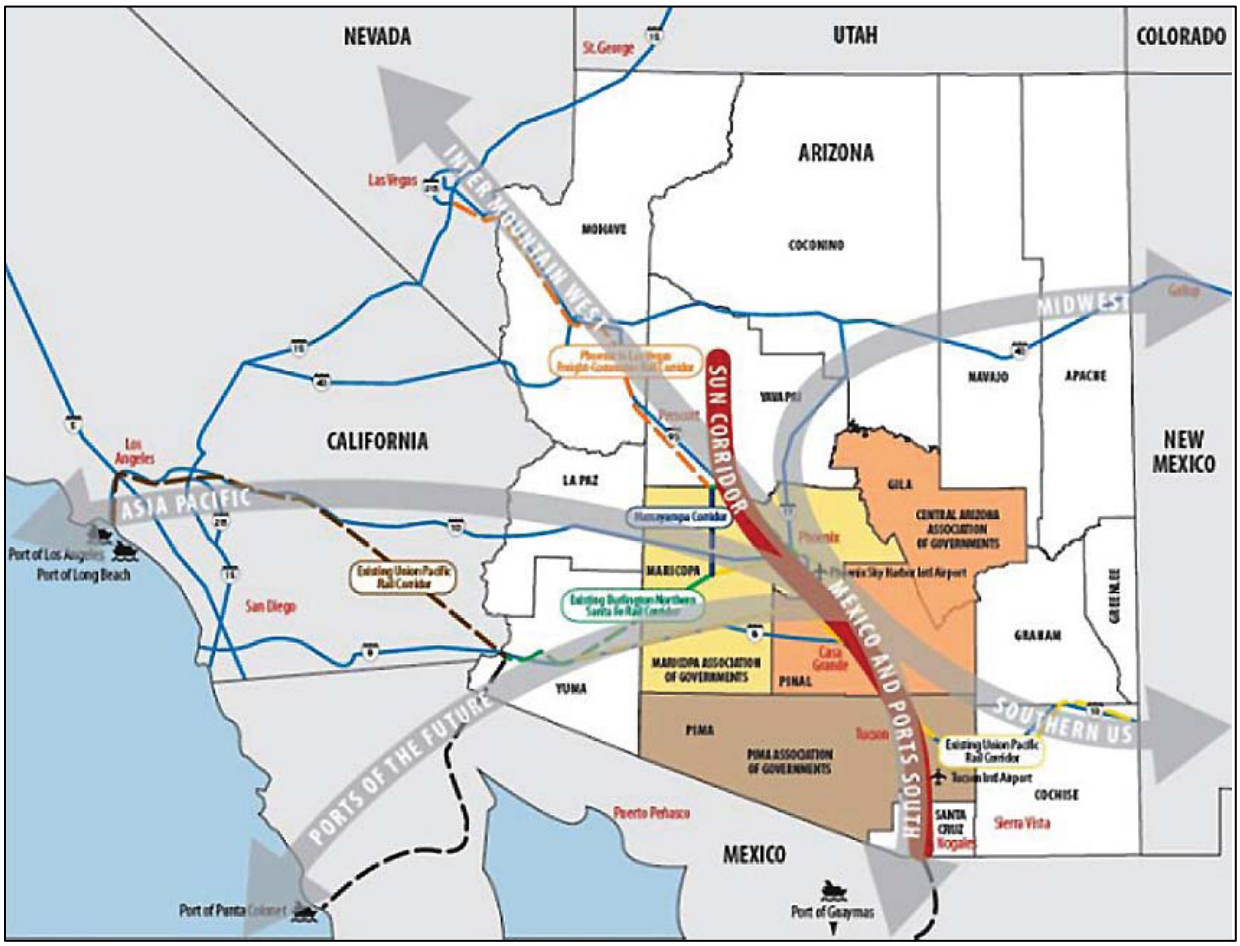
The ability of the region to expand freight opportunities will support the development of emerging inland ports, according to the *North America Next* report. The report notes Mesa-Gateway Airport's efforts to establish itself as a reliever for Phoenix Sky Harbor Airport. Passenger service continues to increase but freight activity remains relatively smaller. Freight coming from Mexico and California in particular may provide lucrative opportunities. Ports in California are near or at capacity. If this trend continues, the region may benefit from diverted freight. If international sea port expansions such as Punta Colonet materialize, the region could benefit unless the freight passes through the region without stopping. Conversely, the expansion of the Panama Canal could offer freight shippers a less expensive option that would divert freight away from the state, according to the *North America Next* report.

Transportation Improvements and Activity

A strong transportation system will be needed to accommodate growth in the freight industry. The *North America Next* report cites the coordination and collaborations that will be needed

among the public and private sectors to achieve this goal. New highways, like the proposed Interstate 11, have garnered multi-state support as a new way to connect travel and freight movement from Mexico, through Arizona and the United States, to Canada. Development of I-11 would also connect a number of military installations, one of the primary goals when the country's first highways were built decades ago.

The *North America Next* map below depicts the movement of freight through the state and into other parts of the country and the world.



Venture Capital

Venture capital is important to bringing new projects into commercialization. The state has been active throughout the years as illustrated in the following GPEC chart.

PricewaterhouseCoopers/National Venture Capital Association MoneyTree Report

Year-Qtr	Investment Amount	Number of Deals
1995-1	16,374,000	6
1995-2	10,322,800	8
1995-3	28,443,000	5
1995-4	11,209,100	8
1996-1	30,070,000	8
1996-2	23,623,200	9
1996-3	11,911,000	5
1996-4	26,900,000	7
1997-1	21,970,100	8
1997-2	55,808,000	4
1997-3	63,604,000	7
1997-4	28,773,000	10
1998-1	53,062,000	10
1998-2	70,563,000	13
1998-3	46,024,000	10
1998-4	49,055,000	5
1999-1	44,308,900	10
1999-2	94,662,000	13
1999-3	82,395,000	17
1999-4	98,875,000	17
2000-1	130,504,900	14
2000-2	150,527,400	18
2000-3	227,266,900	22
2000-4	95,700,000	14
2001-1	59,766,200	12
2001-2	48,993,100	10
2001-3	15,673,000	7
2001-4	71,296,000	7
2002-1	77,774,800	10
2002-2	38,541,000	8
2002-3	62,348,000	5
2002-4	10,900,000	2
2003-1	25,750,000	4
2003-2	12,874,900	5
2003-3	22,894,100	7
2003-4	15,047,500	2
2004-1	19,449,900	6

2004-2	21,010,900	4
2004-3	32,489,900	3
2005-1	27,970,000	9
2005-2	38,507,000	8
2005-3	30,558,200	5
2005-4	18,849,900	6
2006-1	47,068,300	9
2006-2	45,948,000	5
2006-3	155,134,400	9
2006-4	15,036,200	7
2007-1	85,008,000	10
2007-2	46,382,600	7
2007-3	55,496,300	7
2007-4	21,188,300	5
2008-1	89,489,200	7
2008-2	46,876,300	8
2008-3	14,495,000	3
2008-4	74,240,000	4
2009-1	15,494,000	4
2009-2	65,192,000	4
2009-3	17,689,200	6
2009-4	12,661,000	5
2010-1	13,500,000	4
2010-2	26,930,200	4
2010-3	10,500,000	2
2010-4	24,029,900	5
2011-1	55,859,200	9
2011-2	152,699,100	5

The *Arizona Bioscience Roadmap* details the venture capital (VC) investments made in bioscience initiatives.

Total VC Investments in Arizona and the U.S., 2002 – 2010
ARIZONA

Metric	Biosciences	All Industries	Bioscience Share of Total VC	AZ Biosciences Share of US Biosciences
Nmbr. of Deals	74	273	27%	.75%
Number of Individual Companies Invested In	28	113	25%	.84%

Investment in $Millions	$449	$2,026	25%	.65%

U.S. Biosciences	All Industries	Bioscience	Share of Total VC
Number of Deals	9,903	39,230	25%
Number of Individual Companies Invested In	3,337	15,000	22%
Investment in $Millions	$78,954	$385,950	20%

The state follows national trends in bio venture capital investments. Venture capital investments tend to cluster in expansion and later stage firm financing compared to the rest of the country.

Tax Increment Financing

The Council of Development Authorities provides information on tax increment financing, a tool governments may use to finance redevelopment projects. Arizona is currently the only state in the country to not have laws providing this tool. Tax increment financing uses the estimated future tax benefits to cover current costs associated with the project.

Angel Investors

In 2005, the state created a new program to support entrepreneurial activity through the Small Business Capital Investment Incentive Program (Angel Investment Program). Tax credits are offered to investors to support capital investments that have been certified by the ACA through this program. Legislation defined that the credits will not exceed $20 million during the ten year span of the program. The state notes that the income tax credits may equal 30 to 35 percent of the investment.

Business Tax Climate

The 2010 Arizona Town Hall reports the state ranked 28th in the country in the Tax Foundation Research Group's State Business Tax Climate Index. This represents movement from the ninth ranking in 2006. The state excelled in the property tax index and unemployment insurance tax index. Otherwise, Arizona trailed peer states such as Nevada, Utah, and Colorado in the

corporate tax index, sales tax index, and individual income tax index. The table below provides additional detail.

State Business Tax Climate Index 2006-2010 Rankings: Arizona and Key Rivals

State	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
Arizona	29	29	25	24	28
Colorado	13	11	10	13	13
Nevada	4	3	4	3	4
New Mexico	23	25	29	26	23
Oregon	10	9	8	8	14
Utah	15	18	12	11	10

Source: Tax Foundation

Opportunities

The *North America Next* report cites public private partnerships as a significant opportunity for the region. It points to toll roads, bridges, and lanes as an effective way to cover the costs of financially significant transportation infrastructure improvements. MAG has recently embarked on a managed lane study to explore this option. Recent legislation in 2009 provided more flexibility to support public private partnerships, House Bill 2396.

The report also cites the Greater Arizona Development Authority and the Arizona International Development Authority as additional tools that can be used to finance infrastructure projects. They are used when municipalities cannot secure the bonds needed for planned improvements.

Challenges

The 2010 Arizona Town Hall cites limited capital funding as a challenge to create jobs. This is compounded by the aggressive incentive programs sponsored by other states. In addition, they note external perceptions about the state as hampering progress. Peer states as measured by Elliot Pollack and Company are perceived to have a better business climate.

Leverage Point: Increase Spatial Efficiency

Spatial efficiency assists regions by achieving productive economies of scale. Efficient location of housing, employment, and amenities reduces transportation costs and congestion. Equitable distribution of infrastructure reduces the effect of poverty and optimizes access to opportunity. The following table depicts the region's ranking according to Brookings data.

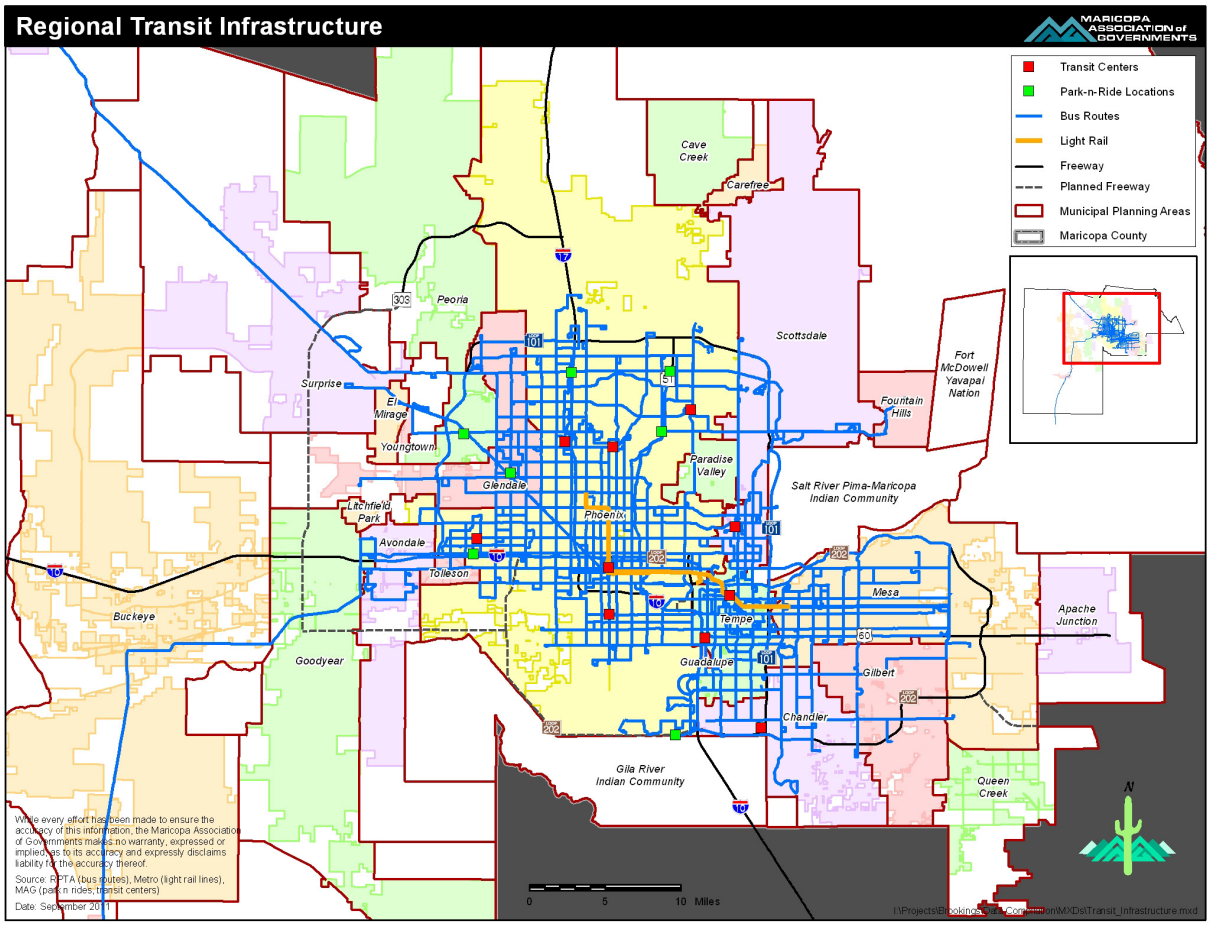
Spatial efficiency	
Transit access combined ranking	43
Transit coverage	35
Transit access jobs	61
Transit access low skill jobs	55
Congestion	19
Segregation	17
Segregation change	79
Housing affordability	73
Average	47.75

As the table above illustrates, the region varies in its attainment of spatial efficiency. In some areas like congestion, the region is well served by its extensive network of highways and arterial streets that reduce congestion. Some areas are not as relevant to this region, such as black/white segregation, although the change in this segregation seems extreme. A more pertinent measure would be Hispanic/non-Hispanic segregation. Other measures would not have been expected, such as the region's low ranking of 73 out of the 100 largest metro regions for housing affordability. The 2009 American Community Survey indicates 41.3 percent of the region's residents pay more than 30 percent of their income on housing costs. This makes them more vulnerable and likely to lose their housing and/or be unable to meet other needs such as food and medical care.

According to Brookings' analysis, the region can improve in the area of transit accessibility, as measured by a rank of 35 out of the 100 largest metro regions. This places the region ahead of two peer regions and below 12 others. The region's performance drops lower when evaluating the accessibility of transit to employment. In this area, the region falls to a rank of 61. Access to low-skill employment is marginally better at a rank of 55. A robust transit system is an important tool to connect people of all skills and abilities to employment, educational opportunities, and medical care. During the recession, it has also been an important lifeline for those unable to pay for their own vehicle.

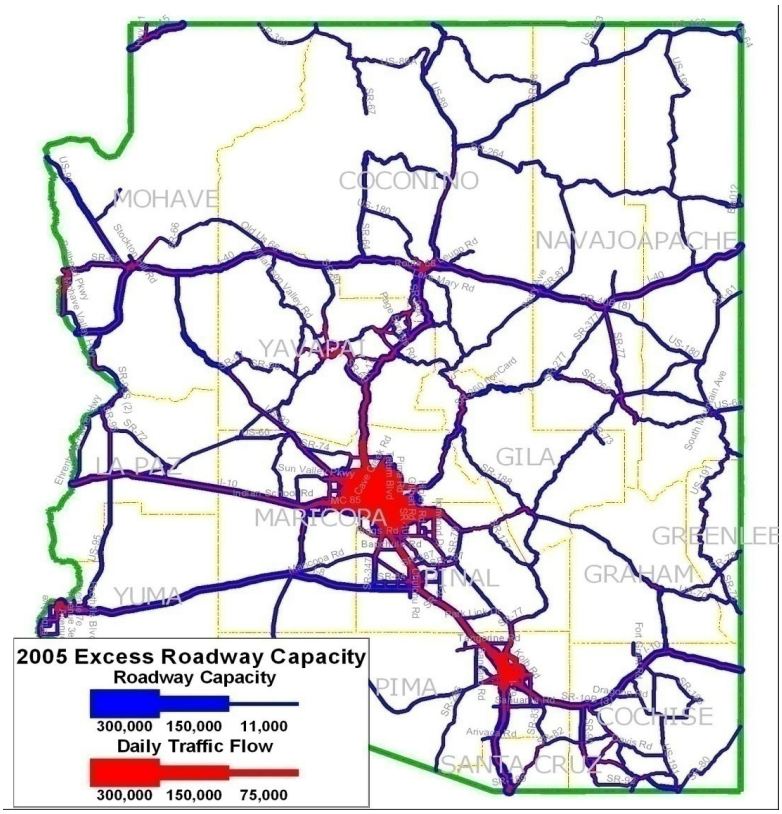
According to the Gallup poll conducted for the *Arizona We Want* report, there is public support for improving transit accessibility and reducing congestion. Seventeen percent of respondents chose improving transit over all other actions to improve the state's infrastructure. One out of five respondents reported the highway and freeway systems to be "very good."

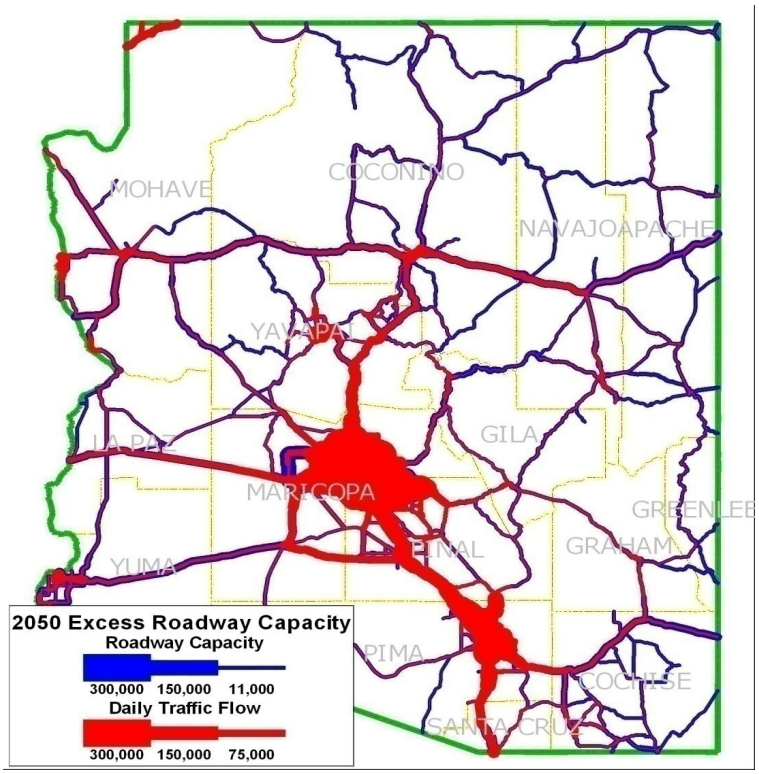
The MAG map below features the transit network in the region with a heavier concentration in the central core and southeast Valley.



Enhancing the connections among transit, highways, and development has a documented cost savings. According to the Urban Land Institute's *Moving AZ One* report, implementing a connected centers strategy would save the region $10 billion in transportation costs and capital costs. In addition, 33 million miles of driving would be eliminated. A connected centers approach maximizes space and resources by increasing the spatial efficiency of development.

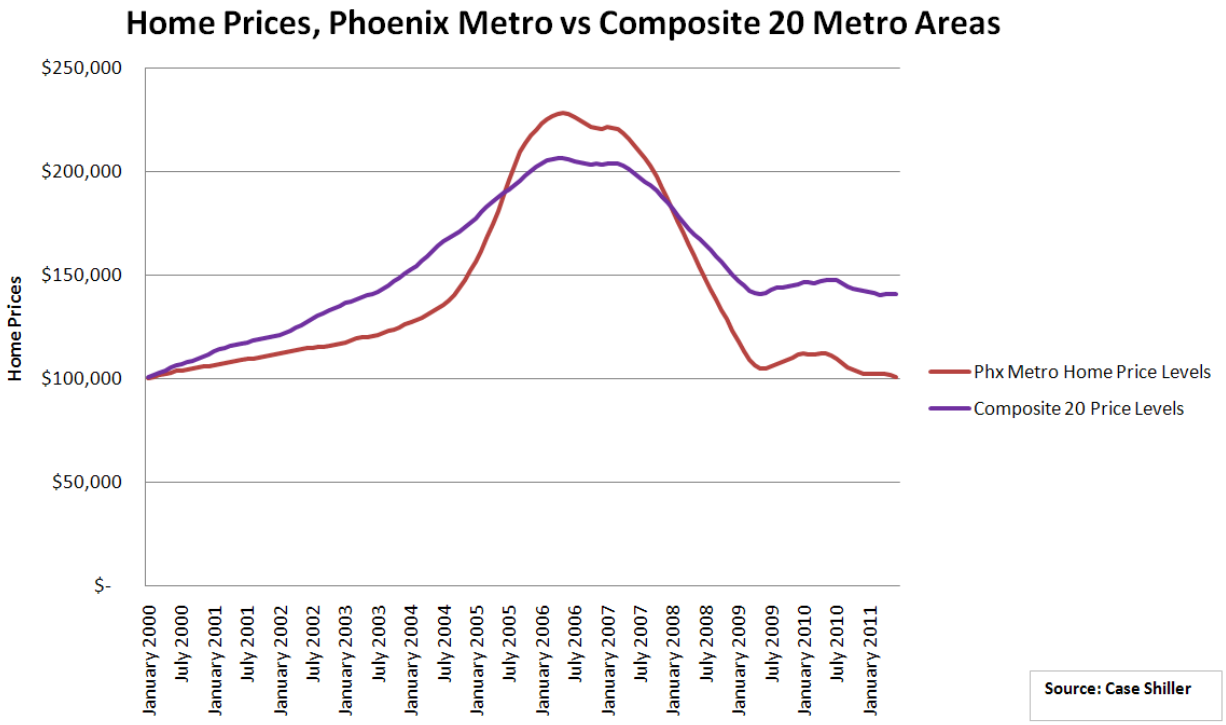
Planning for the future with spatial efficiency as a priority will reduce potential for congestion to worsen over time. The region's current congestion ranks fairly low, but this may not always be the case. The following MAG maps convey the impact of increasing traffic flow to the state's capacity for travel. The first map indicates excess roadway capacity in 2005. The second map projects capacity in 2050.


MOHAVE
COCONINO
NAVAJOAPACHE
YAVAPAI
GILA
MARICOPA
GREENLEE
GRAHAM
PINAL
YUMA
PIMA
COCHISE
SANTA CRUZ
2005 Excess Roadway Capacity
Roadway Capacity
300,000 150,000 11,000
Daily Traffic Flow
300,000 150,000 75,000

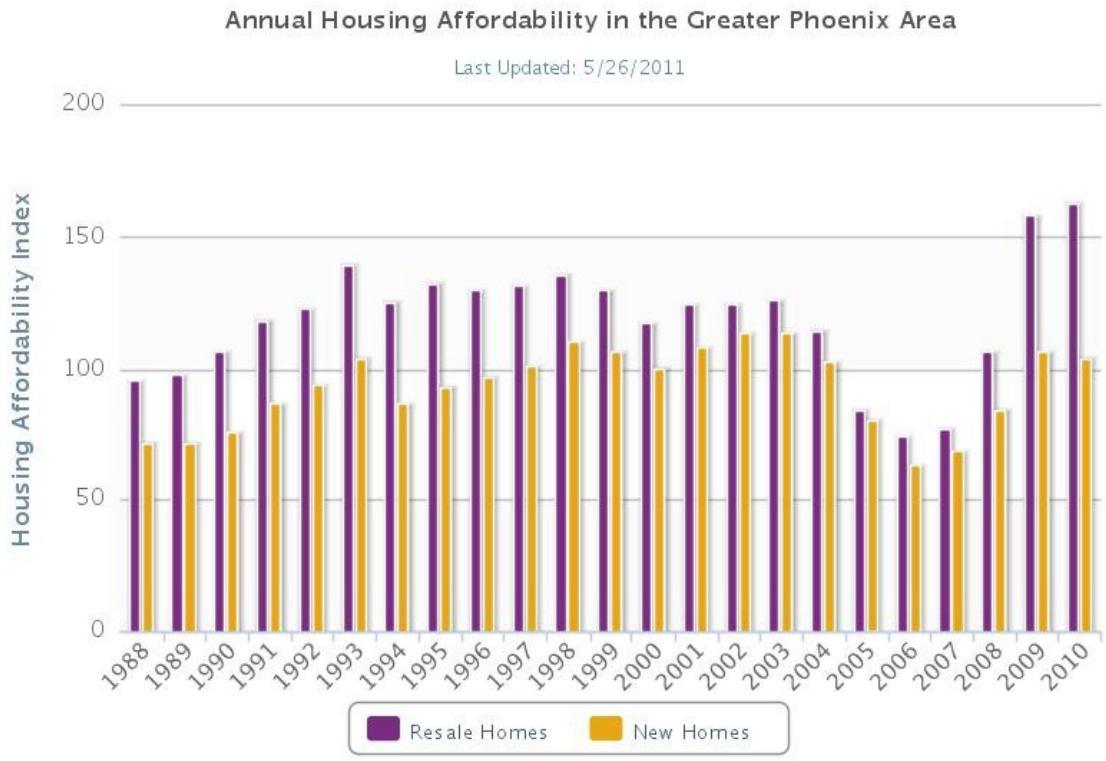

MOHAVE
COCONINO
NAVAJOAPACHE
YAVAPAI
GILA
MARICOPA
GREENLEE
GRAHAM
PINAL
YUMA
PIMA
COCHISE
SANTA CRUZ
2050 Excess Roadway Capacity
Roadway Capacity
300,000 150,000 11,000
Daily Traffic Flow
300,000 150,000 75,000

Housing Affordability

During the housing boom, home values soared. Since the recession and the foreclosure crisis, the value of homes in the region has dropped substantially. While the region still ranks well for housing affordability, this may be a factor of the low wages that characterize a portion of the region's employment. AIP reports since the first quarter of 2007, the median sales prices in the region has continued to decrease. The first quarter of 2010 marked a new median sales price low of $136,460. Sales of single-family homes have ranged from a low of 17,835 in 2008 to 32,975 in 2010. AIP attributes increases in the number of sales to the affordability of the area in relation to the rest of the country. The MAG chart below portrays the median home sales price for the region and 20 peer regions from 2000 to 2011.

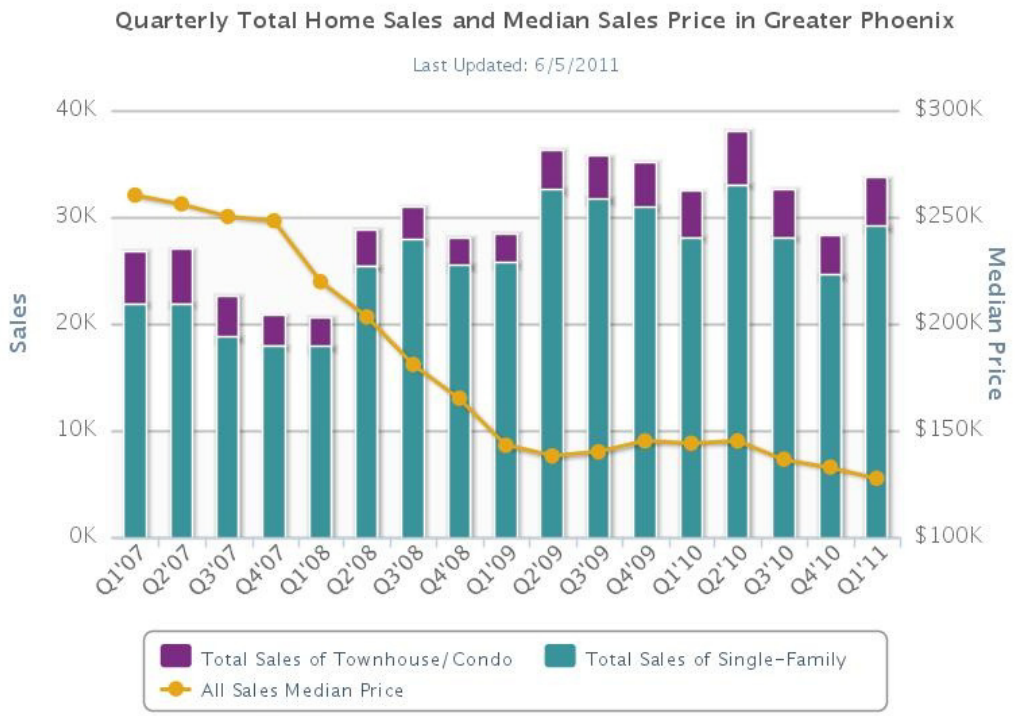


The chart below was based on a housing affordability created by ASU Realty Studies. Researchers have tracked housing affordability since 1985. The index is based on the assumption that the home buyer earns the median income. The chart below is reflective of affordability for the region. The value of 100 in the index indicates a household earning the median income can purchase the median priced home at the interest rate at the time and not spend more than 30 percent of their income on housing costs. The lower the index values, the less affordable the home is for the household. Note the drop in affordability at the time of the housing peak. After the foreclosure crisis, affordability started to increase again.



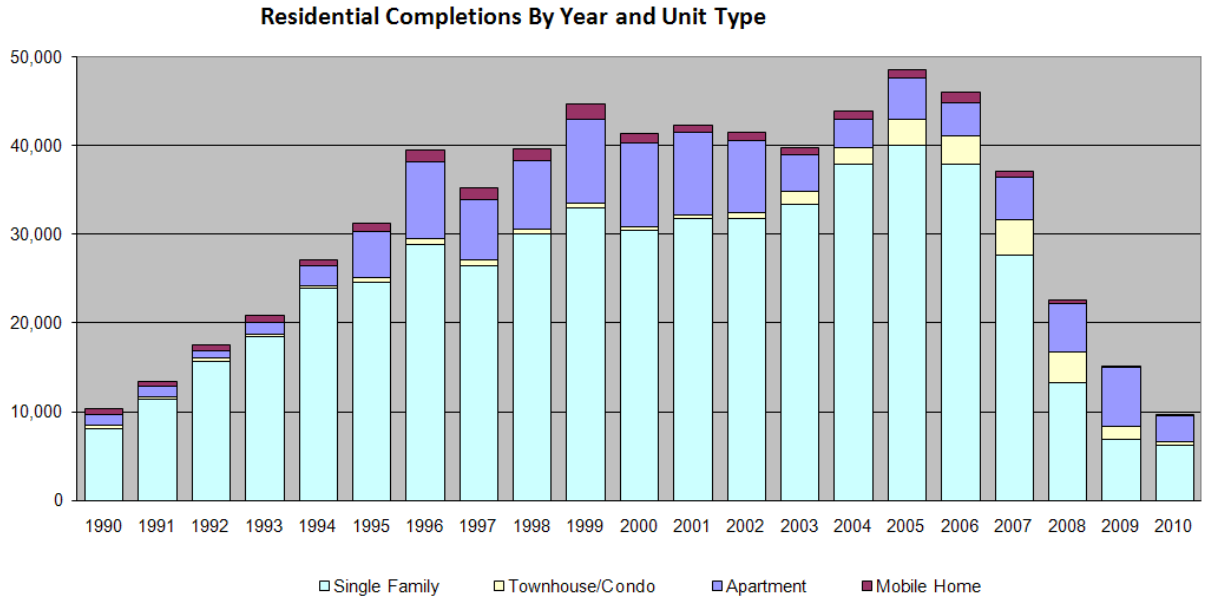
Source: ASU Realty Studies

The chart below provides detail on the descent of the home sales price. AIP notes sales price in the region hit its highest point in 2006 at $264,900. In 2010, the same housing was selling for $140,000.



Source: ASU Realty Studies

The MAG chart below indicates the steep decline of residential completions in the region. Completions peaked in 2005, but in 2010, had fallen below 1990 levels.



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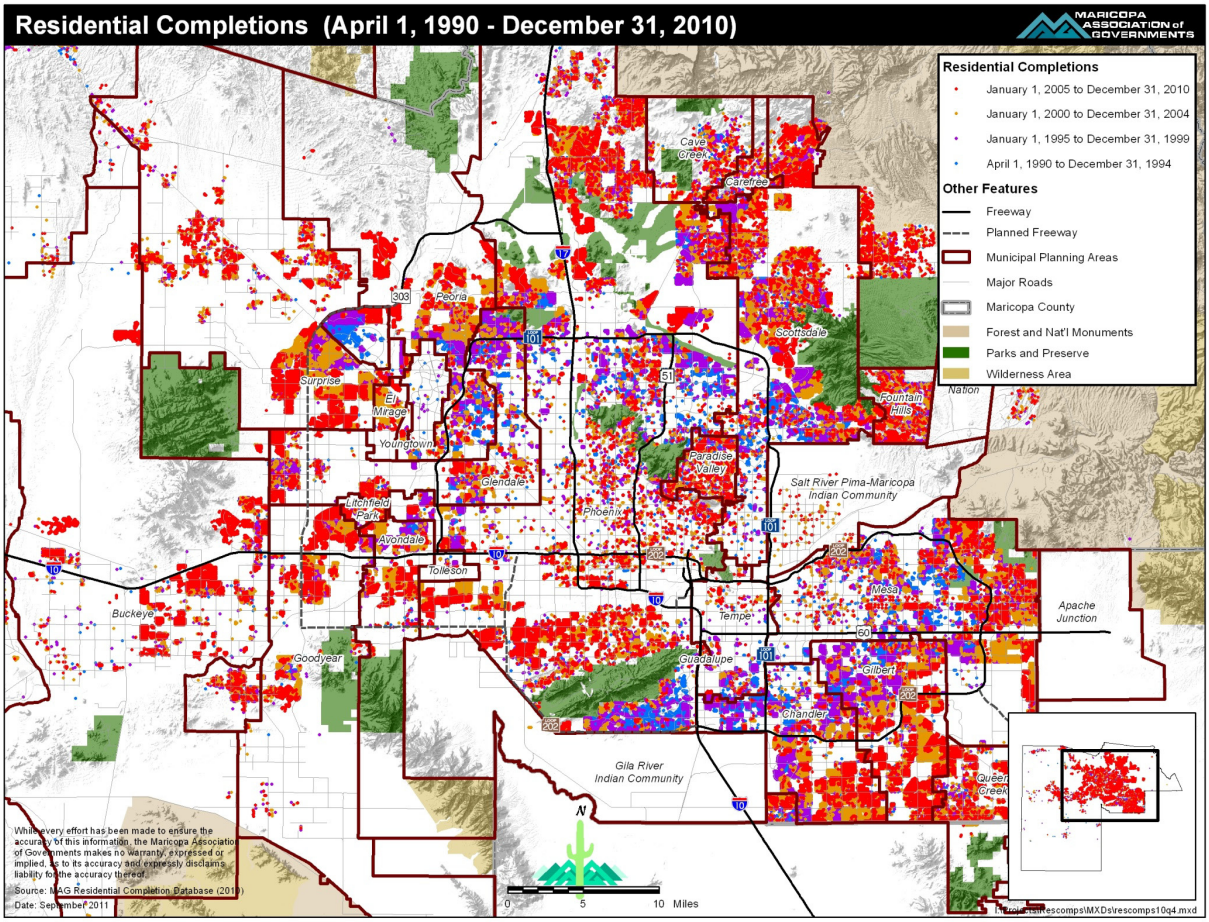
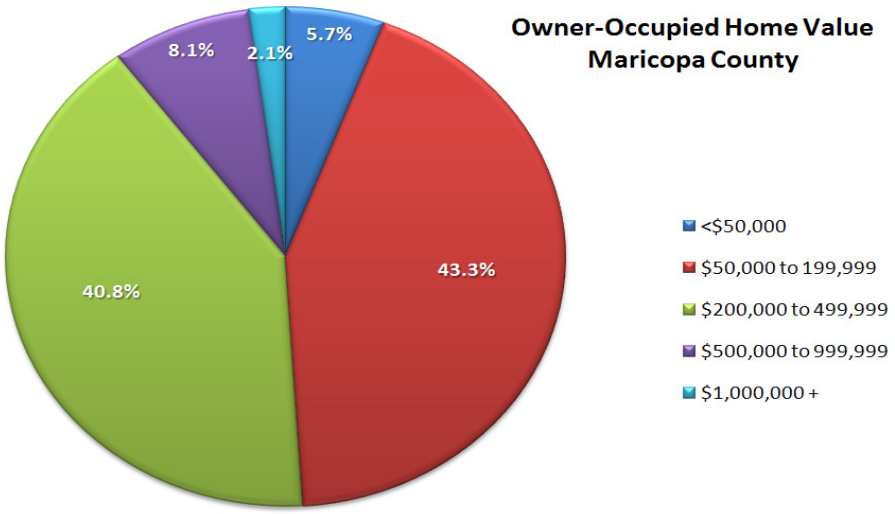
The MAG map below illustrates the pattern of development by residential completions from 1990 to 2010 in four and five year increments. A significant portion of the completions from 2005 to 2010 were in the outlying areas, among those hardest hit by the foreclosure crisis.

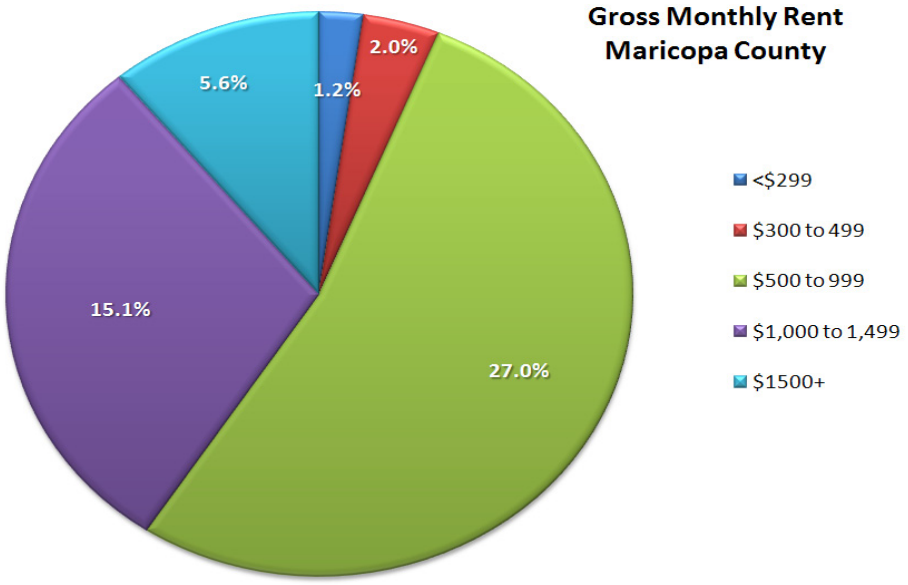


The value of homes in the region is depicted in the MAG map below using American Community Survey 2009 one-year estimates. More than 80 percent of the homes are valued between $50,000 to $499,999.



Source: U.S. Census Bureau, American Community Survey 2009 1-year Estimates

Rent is an important factor in housing affordability for those who do not own their homes. With the advent of the foreclosures, the rental market has gained new prominence as more people are living in rental units. The chart below, based on American Survey 2009 one-year estimates, indicates that more than one out of four households are paying between $500 to $999 a month for rent.



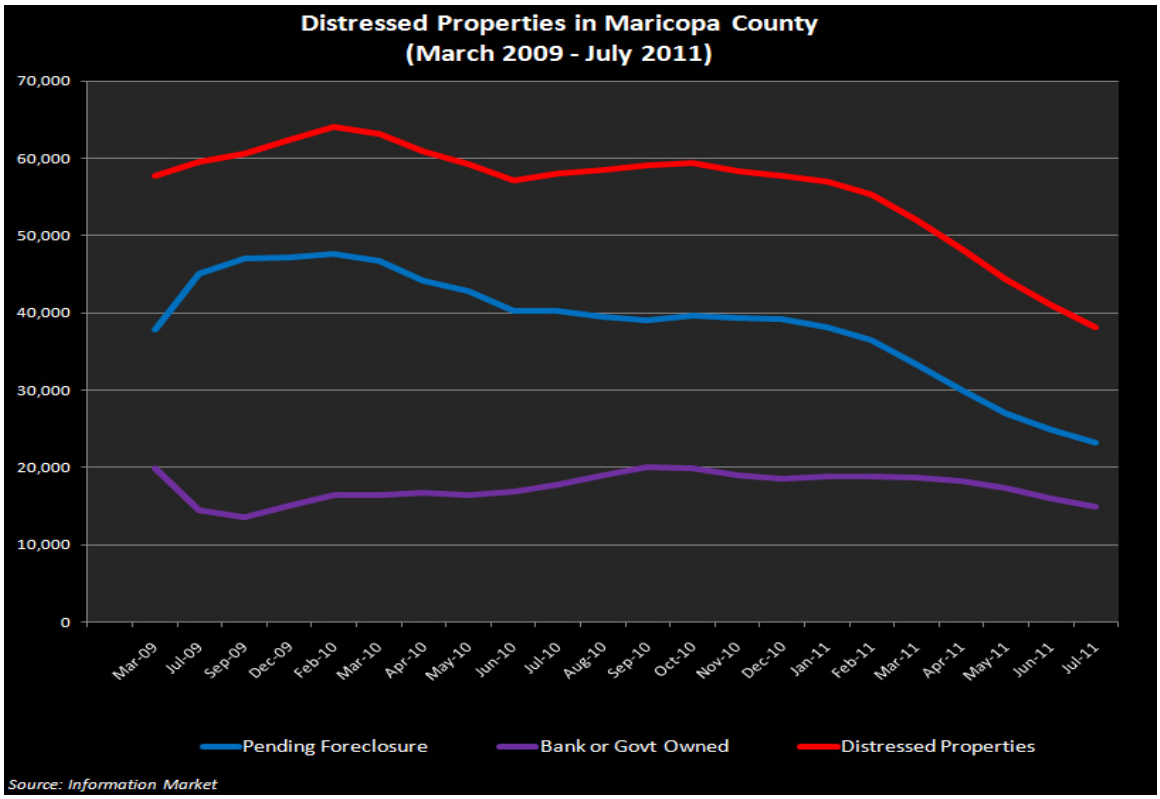
Source: U.S. Census Bureau, American Community Survey 2009 1-year Estimates

Foreclosures

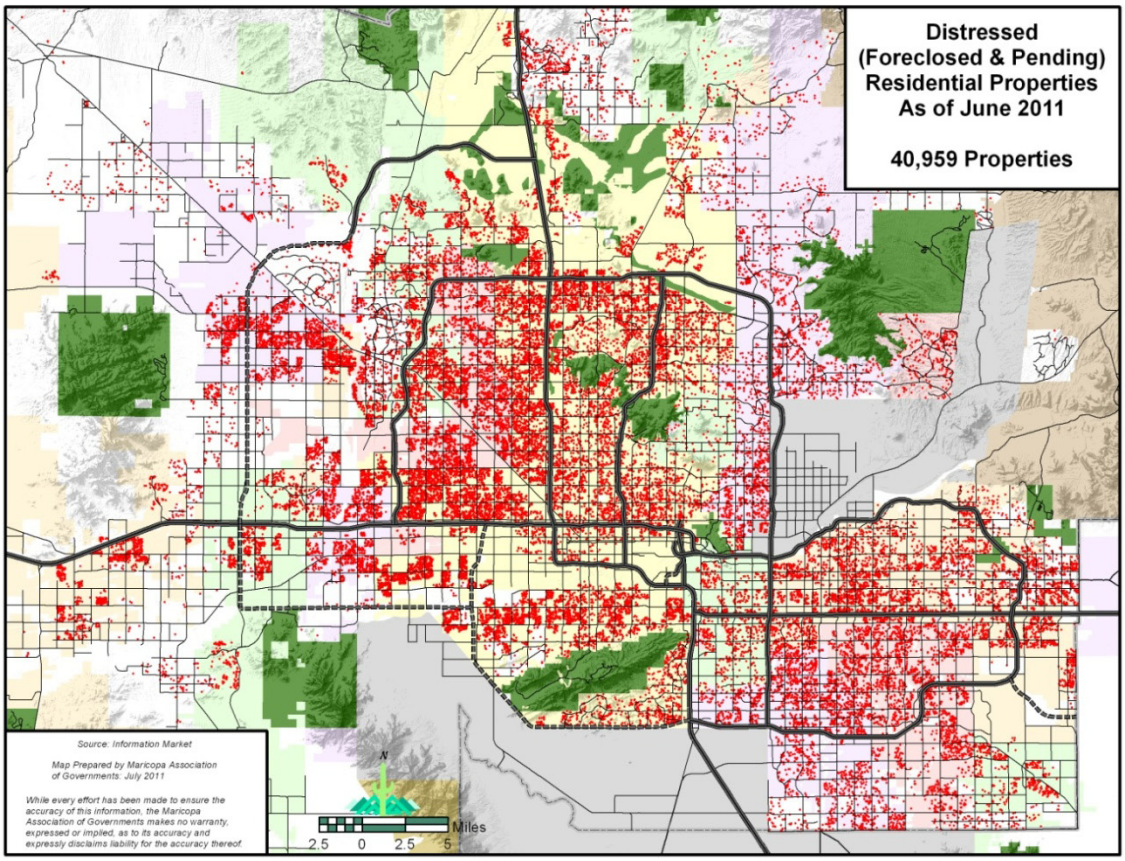
The dramatic impact of foreclosures on the region displaced thousands from their homes, yet made this same housing affordable for others. The Brookings *Monitor*, second quarter 2011, notes that housing prices have decreased in the region by 49.9 percent since 2006. They cite the region as being one of the hardest hit by the housing boom and bust and one of the slowest to recover, marking the region as one of the 20 weakest regions in the country. In the second quarter of 2011, housing prices fell in the region by 18.7 percent, one of the five regions experiencing the most significant housing price declines in the country. Despite some small incremental gains against the tide of foreclosures, the region continues to have the largest supply of foreclosed homes than any other region in the country. The Brookings table below recounts the foreclosure activity in terms of employment and output for this region and ten other regions, including averages for the Intermountain West states and the national average.

	Change in Employment				Change in Output			
	Peak to 2011Q2	Peak to trough	Trough to 2011Q2	2011Q1 to 2011Q2	Peak to 2011Q2	Peak to trough	Trough to 2011Q2	2011Q1 to 2011Q2
Albuquerque, NM	-6.5%	-6.6%	0.1%	0.1%	4.7%	-2.7%	7.5%	0.2%
Boise City-Nampa, ID	-8.9%	-9.8%	1.1%	0.2%	-5.1%	-6.6%	1.6%	0.2%
Colorado Springs, CO	-3.9%	-3.9%	0.0%	-0.9%	-0.8%	-3.0%	2.3%	0.1%
Denver-Aurora, CO	-4.8%	-5.7%	0.9%	-0.1%	0.4%	-1.8%	2.2%	0.1%
Las Vegas-Paradise, NV	-13.4%	-14.1%	0.9%	0.4%	-12.8%	-14.1%	1.4%	1.1%
Ogden-Clearfield, UT	-3.2%	-5.8%	2.8%	1.8%	0.3%	-2.7%	3.0%	0.4%
Phoenix-Mesa-Glendale, AZ	-11.3%	-12.5%	1.3%	0.2%	-7.3%	-8.5%	1.3%	0.0%
Provo-Orem, UT	-4.9%	-7.7%	3.1%	1.9%	-0.5%	-3.7%	3.4%	0.4%
Salt Lake City, UT	-4.4%	-6.1%	1.9%	0.2%	1.4%	-1.6%	3.1%	0.5%
Tucson, AZ	-7.7%	-8.6%	1.0%	0.5%	-4.0%	-5.5%	1.6%	-0.2%
Intermountain West metros	-8.0%	-8.7%	0.8%	0.2%	-3.6%	-4.9%	1.4%	0.2%
Top 100 metros	-5.1%	-6.1%	1.1%	0.2%	0.5%	-3.8%	4.5%	0.3%
United States	-4.8%	-5.9%	1.2%	0.3%	0.4%	-5.1%	5.8%	0.4%

The MAG chart below supports the improvements made in the number of distressed homes in the region.



The MAG map below indicates the locations of the homes in foreclosure and in distress. The June 2011 map reflects nearly 41,000 homes. This is significant progress from the 64,000 homes in foreclosure or distress in February 2010.



Water

Like foreclosures, water is an issue that holds particular relevance for the region. As a desert climate, an adequate water supply has never assumed. The availability of water, or the perception of water availability, can have a definite effect on economic development. A recent report by the Morrison Institute for Public Policy, *Watering the Sun Corridor,* analyzed the ability of the region to meet its demands for water now and in the future.

The report notes that the region has adopted a rigorous conservation approach since the 1980s. This focus has served the region well and puts it ahead of other regions in the country. The Morrison report cites the region as being one of the leaders internationally in re-using effluent water to support landscapes and cool water at the Palo Verde Generating Station. Regulations abound to conserve and reuse groundwater. As a result, per capita use of water has been on the decline since the 1980s. The report concludes the region will not run out of water, but it may need to modify its lifestyle choices to maintain an adequate supply.

Arizona State University's Global Institute of Sustainability is pioneering water conservation research through Decision Center for a Desert City, one of five research projects sponsored by the National Science Foundation's Decision Making Under Uncertainty Initiative. The center

plays out hypothetical situations in order to educate people on the effects of water conservation. This innovative approach combines science and policy-making through a case study model that has been applied internationally, according to the center's website.

Leverage Point: Create Effective Public and Civic Culture and Institutions

Different factors contribute to the region's strong ranking in the area of public and civic institutions and culture. A relatively small number of municipalities under one county for such a large geographic area contribute to coordination. The table below represents how the region ranks on the Brookings data points of special districts and fragmentation based on the 100 largest metro regions.

Public and civic institutions/culture	
Special districts	18
Fragmentation	5
Average	11.5

The region ranks well in both measures. The low number of special districts per 10,000 people at .24 ranks the region at 18. This places the region under three of the peer regions but above nine peer regions. The region fares even better in fragmentation with a score of .08 for the number of local governments per 10,000 people. This gives the region the third highest rank, lower than two of the peer regions, Las Vegas and San Diego, but ahead of 12 other regions.

Over the years, the region's council/manager form of government has served the region well. It has provided professionalism, expertise, and consistency. This is evidenced by municipalities receiving national recognition for their governance, such as the City of Phoenix being named an All America City five times. Other cities to win this honor five times include Des Moines, Iowa; Cleveland, Ohio; Kansas City, Missouri; Roanoke, Virginia; and Worcester. Massachusetts. Criteria include civic accomplishments in innovation, inclusiveness, civic engagement, and cross sector collaboration, according to the National Civic League website.

The *North America Next* report cites MAG's coordination of the Regional Transportation Plan as an example of an effective process that convened elected officials and the private sector to achieve an important goal. The passage of Proposition 400 to continue the half cent sales tax for another 20 years assured the region would have resources to meet its transportation needs. In 2006, MAG received the national award for excellence in transportation planning. This is one example of the national standing and recognition the region has received.

Such leadership and coordination continues with a series of framework studies that will establish the transportation infrastructure needed to support a healthy economy. Efforts like Hassayampa and Hidden Valley Framework studies project the investments needed to ensure communities achieve spatial efficiency and maximize their resources. Building a Quality Arizona leverages these regional activities to plan for the state's growth and development.

The recession has challenged the ability of the region in many ways, but it has also spurred the region into new areas of focus. When sales tax for the region declined, $6 billion had to be cut from the MAG Regional Transportation Plan. The MAG elected officials, acting through the

Regional Council, realized that one of the tenets of the federal transportation law was to foster economic development. To that end, the Regional Council formed the MAG Economic Development Committee (EDC), a collaboration of elected officials and the business community. The committee provides a unique opportunity to bring elected officials together with the private sector on a consistent basis to plan for the economic development of the region.

A host of economic development agencies support the work of the EDC as well as the Metropolitan Business Planning Initiative. This process is indebted to their expertise and knowledge that poise these endeavors for success. These partners include the following:

- Greater Phoenix Economic Council
- Greater Phoenix Leadership
- Arizona Commerce Authority
- Phoenix Chamber of Commerce

The effectiveness of the governance structure in the region is affected by the ability and propensity of people to be actively involved. This is measured in part by voter registrations and turn-out. The 2010 Arizona Civic Health Index suggests some progress may be made in this area. The table below indicates the state's activity in these areas trail the national average. In 2008, the state ranked 40th in the country for voter registration. Trends that are common elsewhere in the country, like increased voting by people 18 to 29 years, has not manifested here. Voter turn-out among this demographic was 47 percent in 2008, compared to a national average of 51 percent.

Voter registration, turnout and fulfillment rates (2008)

	National average	**State average**
Voter registration	71.0%	68.9%
Voter turnout	63.6%	59.8%
Voter turnout for 18 to 29 year olds	51.1%	47.0%
Voter fulfillment rate	89.6%	86.9%

The regional average for voter turn-out of 60.4 percent is higher than the state's average, but lower than rates seen in other urban areas. Tucson, for example, has a voter turn-out rate of 63.6 percent in 2008, according to the 2010 Arizona Civic Health Index. The same index reports six percent expressed strong confidence in Congress or the President. Ten percent have confidence in their elected leaders, according to the 2009 Gallup Poll. The table below reflects additional data from the 2010 Arizona Civic Health Index.

INDICATOR

Activity	**State average**	**Rank**
Voter registration	68.9%	40th

Voter turnout	59.8%	43rd
Voter turnout for 18 to 29 years olds	47.0%	41st
Voter fulfillment	86.9%	Not available
Discuss politics frequently.	39.1%	32nd
Participate in non-electoral political activities.	24.8%	36th

The *Arizona We Want* report indicates residents in the state desire more corporate leadership as well. There are few corporate headquarters located in the region. This can affect the engagement of corporate leaders in the development of this region who are located outside the state. If the region cannot retain local leaders and professionals who may consider leaving for better employment, the goal of cultivating corporate leadership will be further exacerbated.

Summary of analysis

The region has a number of viable opportunities to recover from the recession and build a sustainable economy for all residents. National rankings place the region in the top tier for growth and entrepreneurialism. Advancements like the Translational Genomics Research Institute (TGen), unique facilities such as the Air Force Research Lab, and natural assets in solar energy offer a set of robust assets that create a strong foundation. Based on analysis of the strategic overview, the region would be well-served by concentrating efforts on attracting and maintaining high-wage, high-skills employment. This will benefit from investments in human capital and incentives for companies.

During the expansionary years when the region's population grew significantly, housing and other population-driven industries were prominent. In the wake of the recession, there is an opportunity to transfer the skills and knowledge learned. For example, the skills accrued by the construction industry may be realigned with other opportunities that offer depth to the skills, research, and value of other industries. Given a focus on clear regional objectives, the economic future of the region may be more prosperous as a result of working collaboratively.

The following is a summary of the region's strengths, challenges, and opportunities by each point as presented in thus overview:

Top-line Performance Measures

The region leads the country in a number of areas, including growth in population, employment, and output.

Until recently, the region invested more in education and experienced lower rates of poverty than the national average. For example, until 2007, the region's poverty rate was below the

national average. In addition, until 1996, spending for kindergarten was above the national average. Today, the reverse is true.

The Gross Domestic Product cycles tend to outperform the country in times of expansion. The Arizona Indicators Project (AIP) reports the 7.5 percent annual average inflation-adjusted growth rate in Arizona outperformed the 3.7 percent national rate from 1991 to 2001. From 2001 to 2009, the 2.9 percent GDP growth rate in Arizona was slightly higher the nation's growth rate of 1.6 percent.

Next Economy Indicators:

The region's export activity is spread among a diverse number of industries. The largest export from 2007 to 2010 was civilian aircraft, representing 10.9 percent of all export value while other industries such as high technology experienced a significant decline from 2007 to 2010. Efforts to explore and identify on a lead initiative could provide focus and the edge needed to take an industry to the next level. For example, the region has a substantial number of clean jobs, but not in proportion to the high number of other jobs.

The ability to attract better opportunities will increase personal income, as well as regional wealth.

Regional Concentrations

The five "C"s of the region's economy, cattle, citrus, climate, cotton, and copper, have evolved to varying degrees. For example, cotton continues to be a thriving industry with increasing importance considering the cost for cotton has tripled in the last ten years. In addition, new bio-fuel research depends heavily on cotton production and other non-feedstock cellulose, according to GPEC. The quest is to define the 21st century "C"'s for the region.

A number of assets make aerospace and defense a lucrative regional concentration. Unique facilities such as Luke Air Force Base in the West Valley position this region to outperform the nation and state.

Advanced business services have shown the most employment growth, but this industry is now on the decline. Aerospace and aviation is on an upward trend, although nationally the aerospace industry is decline. Aviation may be responsible for the majority of the growth seen in this cluster.

High tech offers the highest wages of any cluster in the region. Investments in education could propel the region to greater employment and recruitment of new companies in this area.

Solar is a natural industry for the region. The state enjoys the highest level of solar irradiance, or the amount of sunlight hitting the ground, in the country. This keeps the cost of producing

solar energy lower than most other parts of the country. In addition, there is a large amount of available, affordable land that may be cultivated for solar energy production.

Human Capital

The region significantly benefits from academic leadership and achievement from Arizona State University and Thunderbird School of Global Management.
Nearly a third of residents have at least some college experience and nearly an additional 20 percent have a Bachelors degree or a graduate/professional degree.

Robust workforce development programs through Maricopa Community Colleges and Arizona Department of Commerce tailor training to the unique needs of employers and job candidates.

Efforts to increase educational attainment would increase the region's workforce development and prosperity. One or two years of post secondary education increases an individual's earning potential by more than $411,000 in a person's lifetime.

Innovation-enabling Infrastructure

The region benefits from a significant number of small to medium sized entrepreneurs with more than two thirds of establishments in the region having 20 or fewer employees.

The region performs well in the area of business churn. Efforts in the future could help develop capacity within these establishments and encourage the development of high-wage, high-skill companies.

New programs in the state such as the Angel Investment Program will stimulate entrepreneurship and economic development by providing venture capital.

The region ranks low in Small Business Administration loans, indicating the region's entrepreneurs are not always getting the federal support they need.

Public private partnerships could be a vital strategy to employ. This could help generate the additional venture capital needed to support new entrepreneurs.

In the shift to enhance the region's economy, a significant opportunity could be found in improving high technology and STEM workers, the former a high-wage industry and the latter the expertise needed to produce work within that industry. Currently, the region ranks in the top half of the 100 largest regions with ranks of 41st and 43rd respectively.

Innovative research programs through the region's universities, such as Arizona State University's Center for the Convergence of Physical Science and Cancer Biology, provide cutting edge research with life-saving and economic implications.

Spatial Efficiency

Thanks to a well-designed transportation system, the region scores well in congestion. This supports distributed growth with a number of subregional employment centers with higher than anticipated density.

The foreclosure crisis has deeply affected the region, dropping home values by 50 percent and pushing residential completions back to levels not seen since 1990. The burden this places on the region is significant, although it does make housing more affordable for others with the income and stability needed to purchase homes.

For a desert climate, water can be a main concern or be perceived as a concern. Thanks to the region's aggressive water conservation efforts since the 1980's, water supply is not a barrier for the region's growth.

A connected centers approach maximizes space and resources by increasing the spatial efficiency of development. According to the Urban Land Institute's *Moving AZ One* report, implementing a connected centers strategy would save the region $10 billion in transportation costs and capital costs. In addition, 33 million miles of driving would be eliminated.

Public and Civic Institutions

Thanks to a professional culture of manager/council governance, the region excels in this area. The low number of municipalities under a single county for such an expansive geographic area contributes to successful coordination of interests, activities, and priorities.

The development of the MAG Economic Development Committee provides a credible venue for convening elected officials, business leaders, and academic talents to address economic development from a holistic perspective.

Overall, the region benefits from a number of natural and cultivated assets that supports a range of industries. Opportunities to raise the bar for the region in an inclusive way may be achieved through the following action steps:

- Invest in human capital, particularly in education to support Science, Technology, Engineering, and Mathematics (STEM) workers and knowledge workers, giving the region an ample supply of quality employees to work in the lucrative high-paying, high-skill jobs for which the region strives.
- Supplement incentives to recruit and keep competitive industries, reducing the ability of other regions to lure companies out of state.

- Maintain and expand the aerospace and aviation industry while leveraging natural assets, such as the region's climate.
- Capitalize on opportunities to expand emerging clusters such as solar and renewable energy.
- Strengthen the region's amenities and infrastructure that create a high quality of life. This is critical to attracting talented workers to the region who will bring jobs with them.

The identification of lead initiatives will cement support for these action steps for the benefit of the region's economy.

Attachments

Attachment: GPEC list of top hospitals, biomedical, and research institutions

Abrazo Health Care
The second largest health care delivery system in Arizona, Abrazo Health Care includes five acute care hospitals such as Arizona Heart Hospital.

Arizona State University
College of Nursing and Health Innovation
World class enterprise of discovery that prepares innovative, evidence-based healthcare providers, educators, leaders, and researchers.

ASU Biodesign Institute
Spurs scientific breakthroughs that improve health, protect lives and sustain our planet.

ASU Skysong
An innovation center designed to help companies grow by providing business services and programs offered or facilitated by ASU.

Arizona Biomedical Research Commission
Awards contracts for projects researching the causes and diagnosis, formulation of cures, medically accepted treatment and prevention of diseases.

AstraZeneca
A global research-based biopharmaceutical company.

A.T. Still University
Home of the world's first osteopathic medical school, established in 1892, A.T. Still University is recognized around the world as a renowned, multidisciplinary healthcare educator.

AZBIO
The unified voice of the bioscience industry in AZ which strives to make Arizona a place where bioscience organizations can grow and

AZ TechCelerator
Designed to accommodate the needs of entrepreneurs, small business start-ups and late-stage innovation companies.

AZ Alzheimer's Consortium
The nation's leading model of statewide collaboration in Alzheimer's disease research.

Banner MD Anderson Cancer Center: Banner Health, one of the country's largest nonprofit hospital systems, has joined internationally renowned cancer treatment and research organization, MD Anderson, offering the broadest extension of MD Anderson's cancer care program outside Houston, Texas.

Scheduled to open on September 26, 2011, the Banner MD Anderson Cancer center will provide care for all types of cancers.

Banner Sun Health Research Institute
World-class leader in basic and translational research, clinical care, prevention and education in age-related conditions.

Bard Peripheral Vascular Systems and Bard Biopsy
The worldwide leader in Bard Biopsy Systems product innovations.

Barrow Neurological Institute
Internationally recognized as a leader in neurological research and patient care. BNI treats patients with a wide range of neurological conditions, including brain and spinal tumors, cerebrovascular conditions, and neuromuscular disorders.

BioAccel
A non-profit that drives economic development through the commercialization

succeed.

Cardionet
The world's leading supplier of Mobile Cardiac Outpatient Telemetry™ (MCOT™).

Caris Life Sciences
A diagnostics company based on the concept that earlier and more accurate diagnosis is the key to improving healthcare.

Cancer Treatment Centers of America
Dedicated to a personalized treatment plan and whole-person approach to fight cancer.

Celebration Stem Cell Centre: Registered with the FDA in 2010, Celebration is designed to process and store umbilical cord blood for potential use in patient transplant and regenerative medicine.

The Stem Cell Centre also offers genetic counseling, bone marrow match testing, and a registry that will be available to the public and medical community.

Celerion
An industry leader in the conduct of early clinical research and bioanalytical studies. One of the largest Clinical Pharmacology Sciences teams in industry.

Celgene Corporation
A global biopharmaceutical company; manufactures Abraxane at Phoenix site.

Critical Path Institute
A non-profit uniquely positioned to help shorten the critical path for developing new medical products. Scientists from academia, biotechnology companies, the government and pharmaceutical industry are working together of late-stage basic and applied research in the life sciences.

Flinn Foundation
Committed to helping Arizona become a global competitor for research and commercialization in the biosciences. Facilitates and coordinates discussions among key leaders to encourage successful collaborations and achieve the goals outlined in Arizona's Bioscience Roadmap.

IASIS Healthcare
Includes St. Luke's Behavioral Health Center for chemical dependency and psychiatric conditions as well as Tempe and Phoenix St. Luke's Medical Centers specializing in cardiac medicine, bariatric procedures, robotic surgery and orthopedics.

ImmuneRegen
A focused drug development firm centered on the compound Homspera, an adult stem cell active compound has been shown to enhance wound healing.

InNexus
A drug development company commercializing the next generation of monoclonal antibodies.

Innovations Technology Incubator
Incubator in Chandler which offers state-of-the-art facilities, laboratories and a specialized core of services, equipment and support to accelerate business success.

International Genomics Consortium
A non-profit, medical research organization that facilitates the translation of genomic discoveries.

thru C-Path to develop innovative testing methods that enable life-saving drugs, devices and biological products to reach patients faster and with greater safety.

Covance
One of the world's largest and most comprehensive drug development services companies.

Dedicated Clinical Research
Has experience conducting Phase I-IV in-patient/out- patient studies. Provides clinical care and most cutting edge medicine available, and provide sponsors and CRO's with rapid study enrollment, high subject retention and meticulous data.

Mayo Clinic
The Scottsdale and Phoenix hospitals serve more than 90,000 patients each year and specialize in transplantation, heart care, neurosciences and cancer treatment.

Medelis, Inc.
A provider for oncology CRO and oncology drug development services, providing a total solution for biotechnology and pharmaceutical companies seeking rapid drug development and approval.

Medicis
The leading independent specialty pharmaceutical company in the US focusing primarily on the treatment of dermatological and aesthetic conditions.

Medtronic
Develops life changing technologies that improve the way chronic diseases are treated.

Midwestern University

Intrinsic Bioprobes
Perform high-throughput protein analysis, the most cost-effective, data-rich, and accurate means available of finding new biomarkers.

The John C. Lincoln Foundation
Advances the mission of the John C. Lincoln Health network through philanthropic giving. Provides progressive, innovative care to more than 100,000 patients each year, and is regarded as a national role model for community service.

Makucell, Inc.
A regenerative medicine biotechnology company, which utilizes its proprietary platform technology, to create a revolutionary next generation of skin, hair and nail-care products.

Scottsdale Healthcare
With two comprehensive medical centers and the first hospital north of the Loop 101, patients benefit from excellent clinical care provided by Level I Trauma Center, Primary Stroke Center, accredited Chest Pain Centers and Level III neonatal intensive care unit. Leaders in groundbreaking cancer clinical trials in collaboration with TGen.

Southwest Autism Research & Resource Center
Advances research and provides a lifetime of support for individuals with autism and their families.

St. Joseph's Hospital and Medical Center
Not-for-profit hospital that provides a wide range of health, social and support services, with special advocacy for the poor and underserved.

Patient-centered learning in the sciences. Team-oriented, interdisciplinary, hands-on experiences in the art of patient care. The colleges and academic programs skillfully blend these critical components into the outstanding professional education that will take students into successful 21st century health care practice.

Phoenix Analysis & Design Technologies
Dedicated to helping entrepreneurs achieve early and critical milestones in the development of complex mechanical and electromechanical systems.

Phoenix Children's Hospital
One of the ten largest children's hospitals in the country and provides specialty and sub-specialty inpatient, outpatient, trauma, emergency and urgent care to children in Arizona and the Southwest.

Provista
Provides early detection tests in areas of breast cancer, lung cancer, Alzheimer's and other serious diseases.

Regenesis Biomedical, Inc.
Privately held medical technology company focused on developing and marketing noninvasive regenerative medicine products. Regenesis developed, patented, and now markets the Provant® Wound Therapy System.

Univita
Dedicated to helping people live and age with independence. Transforming home based care by integrating a full range of needs from basic assistance and care-giving through complex home medical care.

Sun Health Partners
Collaborates with other organizations to see that area residents have options that meet their various healthcare needs.

Translational Genomics Research Institute
A non-profit organization focused on developing earlier diagnostics and smarter treatments. TGen is on the cutting edge of translational research where investigators are able to unravel the genetic components of common and complex diseases.

Translational Research Institute (TRI): Celebration Stem Cell Centre recently doubled the size of its facility in Gilbert to house the Translational Research Institute. Seen as the next key component in the advancement of cellular technologies and stem cell therapy in the United States, TRI is a private company formed to develop innovative treatments for cardiovascular disease through breakthrough cellular technologies and medical devices.

University of Arizona
Phoenix Biomedical Campus
The College of Medicine – Phoenix is a collaborative effort among the City of Phx, TGen, hospitals, community physicians, foundations and other organizations to bring research and biomedical engineering to further strengthen health care for AZ.

Visiongate
Dedicated to saving lives through early cancer detection and prevention, utilizing its revolutionary automated 3D cell imaging platform, the Cell-CT™, that is capable of generating high-resolution 3D biosignatures from intact cells.

W.L. Gore
A leading manufacturer of thousands of advanced technology products for the electronics, industrial, fabrics, and medical markets.

360 Vantage
Customize CRM applications for the sales and marketing teams in pharmaceutical, biotech and medical device organizations.