

# 96th Arizona Town Hall

April 25-28, 2010 • Tucson, Arizona



## Building Arizona's Future: *Jobs, Innovation & Competitiveness*

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Tucson, Arizona



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We thank you for making the commitment to participate in the 96th Arizona Town Hall to be held in Tucson on April 25-28, 2010. You will be discussing and developing consensus with fellow Arizonans on Arizona's economic development.

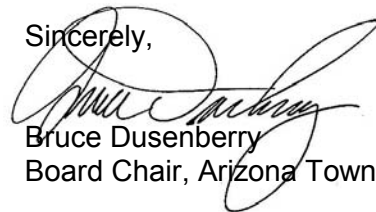
An essential element to the success of these consensus-driven discussions is this background report that is provided to all participants before the Town Hall convenes. As they have so often done for past Arizona Town Halls, the University of Arizona has prepared a detailed and informative report that will provide a unique and unparalleled resource for your Town Hall panel sessions.

Very special thanks go to editors Vera Pavlakovich-Kochi and Jen McCormack who spearheaded this effort and served as contributing authors, marshaled top talent to write individual chapters, and ensured all deadlines were met. For sharing their wealth of knowledge and professional talents, our thanks go to the many authors who contributed to the report. Special thanks also go to Michael Proctor, Dean of The Outreach College, who made great efforts to ensure that the University of Arizona would be able to provide this resource even as it faced significant financial cutbacks.

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When the 96th Town Hall ends, the University of Arizona's background report will be combined with the recommendations from the Town Hall into a final report. This final report will be available to the public on the Town Hall's website and will be widely distributed and promoted throughout Arizona. The work of the Town Hall participants and the final report will help to create solutions that will generate a competitive, thriving, and prosperous Arizona economy.

Sincerely,



Bruce Dusenberry  
Board Chair, Arizona Town Hall



**Ninety-Sixth Arizona Town Hall  
April 25-28, 2010**

**Building Arizona's Future:  
Jobs, Innovation & Competitiveness**

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Vera Pavlakovich-Kochi, Town Hall Report Coordinator  
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Tucson, Arizona  
February 2010

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## LIST OF ACRONYMS

AAED	Arizona Association for Economic Development
ACC	Arizona Corporate Commission
ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
AIC	Arizona Investment Council
AICCAz	American Indian Chamber of Commerce of Arizona
AMA	Active Management Areas
APNE	Arizona Partnership for the New Economy
ARRA	American Recovery and Reinvestment Act
ASPED	Arizona Partnership for Economic Development
ASU	Arizona State University
AZPI	Arizona Personal Income
BEA	Bureau of Economic Analysis
BNSF	Burlington Northern and Santa Fe
BRIC	Brazil, Russia, India, and China economies
BSF	Budget Stabilization Fund
CAIED	Center for American Indian Economic Development
CANAMEX	trade corridor connecting Canada, United States and Mexico
CCD	Common Core of Data
EDA	Economic Development Administration
GDP	gross domestic product
GE	General Electric
GPEC	Greater Phoenix Economic Council
GSOC	Grow Smarter Oversight Council
HPAIED	Harvard Project on American Indian Economic Development at Harvard University
HELP	Highway Expansion and Extension Loan Program
IEDC	International Economic Development Council
INA	Irrigation Non-Expansion Areas
ITC	Investment Tax Credit
JLBC	Arizona Joint Legislative Budget Committee
LCOE	levelized energy costs
MSA	metropolitan statistical area
NABE	National Association for Business Economics
NAICS	North American Industry Classification System
NAFTA	North American Free Trade Agreement
NASBO	National Association of State Budget Officers
NAU	Northern Arizona University
NIC	National Intelligence Council
NNI	Native Nations Institute at the Udall Center for Studies in Public Policy, at the University of Arizona

O&M	operation and management
PPE	payroll per employee
QOL	quality of life
R&D	research and development
RES	Renewable Energy Standards
SB1403	Arizona Renewable Energy Tax Credit
SFAz	Science Foundation Arizona
SIC	Standard Industrial Classification
STAN	Statewide Transportation Acceleration Needs
TREO	Tucson Regional Economic Opportunities, Inc.
UA	University of Arizona
UCLA	University of California, Los Angeles
UP	Union Pacific
USEAC	U.S. Export Assistance Center
VMT	vehicle miles traveled

# Building Arizona's Future: Jobs, Innovation & Competitiveness

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## INTRODUCTION

Although the first meeting with the Arizona Town Hall Research Committee, which was held on the Winter Solstice -- the “celebration of darkness giving way to light”-- was a pure coincidence, it is hard not to attach some symbolic meaning to this December 21, 2009 meeting. Just a few weeks earlier, the National Association for Business Economics (NABE) reaffirmed their October announcement that the Great Recession was over, and that an upward, although very slow recovery was ahead of us. Soon after that, Marshall Vest of the University of Arizona in his annual economic outlook presentation delivered somber news that the recovery of Arizona's economy would take considerably longer than the nation's. About the same time, Elliott Pollack, another leading Arizona's economist, in his *Report to the Speaker of the House of Representatives* pointed out that the current downturn exposed the weaknesses in Arizona's economic composition.

The state's economy and economic development have been the topic of several town halls in the past. Looking only at last ten years, Arizona's economy and economic development were specifically addressed in 2001 report titled *Moving All of Arizona into 21<sup>st</sup> Century Economy*; Arizona's role in global economy was the topic of 2005 report, *Arizona as a Border State – Competing in the Global Economy*, while the role of biosciences/biotechnology was discussed in 2006 report, *Maximizing Arizona's Opportunities in the Biosciences and Biotechnology*. A number of other town halls in last five-six years also addressed topics directly related to Arizona's economic development such as infrastructure, land use, education, transportation, and tax system.

Thus, economy and economic development have been a reoccurring theme; this reflects a continuing process of globalization and rapidly changing world, which requires frequent adjustments if a state or region wants to stay in, or even better, lead the game. The recent recession has underscored the need for a better understanding of what drives an economy, how are wealth and prosperity created, what makes some regions grow faster than others, how to build nationally and globally competitive regional economy, and last but not least, how to sustain a high quality of life.

As Arizona's state and community leaders congregate at the 96<sup>th</sup> Town Hall, this background report provides a context for the discussion on Arizona's economy and economic development-- a basis of Arizona's future. The report builds on the findings and conclusions of a number of more recent Town Hall reports and also incorporates conclusions from a number of nationally and internationally recognized research organizations in the field of economic development. It

also provides a peak into the experiences of economic development practitioners and needs of Arizona's business community.

While there is no time to dwell on the past experiences, it is important to understand what brought Arizona to where it is now, and more importantly, how Arizona can move quickly and successfully into the future. To do that in an efficient way, we will need to consider the Arizona that we want,<sup>1</sup> and then assess how to achieve it.

The report provides perspectives on basic concepts, such as basic versus non-basic economic activities; the role of exports in economic growth; competitiveness versus competition; the importance of high technology industries; and the link between globalization and regional economies – all of which set the stage for understanding of how the modern economy works. But the focus of the report is on Arizona's challenges and opportunities in building a competitive economy and high quality of life.

Arizona's challenges are also a source of opportunities and stem from a highly interlinked web of economic, societal and environmental components. From Arizona's leaders in high tech industries such as aerospace, pharmaceuticals, semiconductors; to emerging solar energy, to the transportation system, to border ports of entry, to diverse human capital and the unique but sensitive natural environment – all of these components individually and collectively frame Arizona's present and future.

The severe economic downturn facing Arizona today – which is in many ways more severe than the rest of the nation – makes it difficult to focus on issues beyond the short-term imperative of reversing the deep declines in jobs and job opportunities. However, it is important not to lose sight of a larger picture, e.g. the creation and sustainability of quality jobs. According to the prevailing thoughts in economic development, these quality jobs are intrinsically related to innovation and competitiveness, which are considered the key building blocks of regional economies in the 21<sup>st</sup> century.

This report is organized into four parts. In Part I we start with the question “What's the problem? The Arizona we want and the Arizona we have.” In Part II we review “What resources and tools do we currently have (or don't have)” to deal with the problem and achieve expectations. In Part III we review Arizona's strengths and weaknesses, and identify what are the major “Challenges and opportunities,” and in Part IV, a background is provided for a “Roadmap from here to there.”

## **WHAT IS THE PROBLEM?**

### **THE ARIZONA WE WANT AND THE ARIZONA WE HAVE**

**Visions.** As shown in Chapter 1, “Visioning Arizona: Where Do We Want To Be?” a number of visions developed for Arizona: from Arizona as an industry-cluster-based economy, to a knowledge-based economy, to a bioscience/biotechnology-lead economy, to a globally and nationally competitive economy with a high quality economic, social and physical environment. Some of these visions are the result of an all-encompassing strategizing process such as the Arizona Partnership for Economic Development (ASPED) in the early 1990s. Others are produced by out-of-state but nationally and internationally known economic development



consulting and research firms such as Battelle Memorial Institute and the Milken Institute; and still others were crafted by the homegrown expertise at the Arizona State University Morrison Institute, and a relatively new Center for the Future of Arizona.

**Quality/well paying jobs.** A key to all of those visions is quality jobs that pay well and allow Arizona residents to build and nurture higher standards of living. From a regional economic perspective, quality jobs are a top priority because they retain and attract talented individuals, generate demand for other high quality services, and generate higher tax revenues. Therefore, creation and nurturing of quality jobs has become a major focus of every community – be it a small town, metropolitan area or state. While some may argue that in the current economic crisis, any jobs count, the argument for quality/well paying jobs even in this situation is extremely valid. Quality/high paying jobs are mostly generated in high-tech industries, and through intricate relationships in the local economy, quality/well paying job-generating industries benefit all.

**Competitiveness vs. competition.** Competitive economies are sustained by competitive businesses, i.e., businesses that innovate, invest in R&D, produce high value products, attract talented individuals, attract capital investment, export their products and bring new money into the region and thus increase the economic prosperity. The ingredients for building long-term competitiveness are well-known: winners have the best research infrastructure, the best markets to develop products and innovate, and the best climate for inventors and productive workers. Competition, on the other hand, frequently boils down to just a rough “stealing” of jobs from other states. Arizonans might be tempted to look for some quick fixes to improve the state’s competition for quality/well paying jobs, but it is of utmost importance not to lose sight of building long-term competitiveness of state’s businesses, products and workforce.

**Arizona is “solidly behind high-tech competitors such as Colorado, Oregon, Utah, and New Mexico.”** This has been a conclusion of the Milken Institute based on the 2009 *State Technology and Science Index*, where Arizona ranks 19<sup>th</sup> nationally. This performance marks a decline from 2008 when Arizona held 17<sup>th</sup> place; this also is a worsening from last two rankings in 2004, when Arizona was in 17<sup>th</sup> place and in 2002 in 18<sup>th</sup> place. For Arizona to become competitive with its western rivals, the state would need to move from the current 23<sup>rd</sup> place in industry research and development (R&D) dollars per capita to among top 15 in the nation; from the current 36<sup>th</sup> place in academic R&D dollars to top-20 ranking; from the current 21<sup>st</sup> in degrees in science and engineering to among top 15; from the last place in concentration of life and physical scientists to among top 30 at a minimum; from the current 43<sup>rd</sup> place in per capita state appropriations for education to among top 20, and from the current 44<sup>th</sup> in the number of business incubators per 10,000 business establishments to at least among top 30.

**Arizona is 28<sup>th</sup> in the nation based on *State Business Tax Climate Index*,** developed by the Tax Foundation research group. Compared to 2006, Arizona’s rank improved from 29<sup>th</sup> place. In comparison with its key western competitors, Nevada, Utah, and Colorado have a better business tax climate than Arizona based on the corporate tax index. Nevada, Utah, Colorado, and New Mexico rank better than Arizona based on individual income tax index. Based on the sales tax index, all five states are ranked better than Arizona, although Nevada and New Mexico are close to Arizona’s rank of 46<sup>th</sup>. Based on two other components -- the property tax index and

unemployment insurance tax index -- Arizona is ranked among the top ten states and ahead of all her rivals, with the exception of New Mexico and Utah in property tax index.

**In perceptions of business climate, Arizona trails behind its key rivals, Colorado, Utah, Oregon, and Nevada.** Based on a review of seven leading business climate rankings compiled by Elliot D. Pollack & Company, Arizona's key competitors have been perceived as having a better business climate than Arizona. Colorado and Utah are ranked among the top 10 on three lists; Oregon on two lists, and while Nevada was ranked among the top 10 only once like Arizona, it was placed in the 6<sup>th</sup> place, two notches ahead of Arizona's 8<sup>th</sup> place.

Clearly, in a number of indicators **Arizona is far from being “the state we want.”** What can be learned from best practices of those who are more successful? For example, in terms of technology-based economic development, New Mexico's effective competition in the science and technology arena is attributed to leveraging public funds to attract and grow private business; boosting commercialization of technology through venture capital, and publicly demonstrating a commitment to strategic areas development. Oregon developed a comprehensive strategic plan. Utah created a fully funded organization to oversee technology-based development, and created the Utah Fund of Funds to encourage venture capital investment to boost entrepreneurship. Colorado maintains the strengths of research institutions in addition to developing effective means to maximize technology transfer. Best practices of economic incentive programs are discussed in Part II following the review of Arizona's current tool box in economic development.

#### **WHAT IS THE ROLE OF ECONOMIC DEVELOPMENT AND WHAT RESOURCES AND TOOLS DOES ARIZONA HAVE (OR NOT HAVE)?**

Chapter 3 defines economic development as the process in which governments or community-based organizations engage to stimulate or maintain business activity and/or employment for the purpose of improvement in economic well-being and the standard of living. Although economic development consists of many different activities and tools, it is usually separated into three main components: business recruitment, business retention and expansion, and business creation.

**Business recruitment remains the primary foundation for most economic development organizations.** Due to increasing calls from community members for “smart growth” and greater attention being paid to issues of sustainability, economic developers increasingly must understand the types of jobs and businesses that are desired by—and compatible with—their communities. In addition, practitioners today must compete with thousands of other jurisdictions for a dwindling number of relocates in any given year. Therefore, they must also better understand a desired company's needs and location decision factors, and then design targeted, quantitative marketing campaigns to reach and persuade that company.

**Business retention and expansion programs are increasingly being seen as vital components in an organization's economic development toolkit.** Retention and expansion programs are designed to help local businesses grow during good economic times and survive the tough times. However, retention and expansion efforts can be time-consuming and resource intensive; few organizations can implement a comprehensive program on their own. Chambers of commerce, industry trade associations, downtown groups, cluster organizations, and municipal economic development agencies all often play a large role in retention and expansion activities. The

effectiveness of retention and expansion efforts—even more so than recruitment activities—is very difficult to measure.

**Business creation.** Many economic development organizations now devote considerable effort to encouraging entrepreneurship, transferring technology from universities to the marketplace, incubating innovative new companies, and helping them find traditional financing or venture capital. Organizations such as small business development centers, university research parks and technology transfer offices, business incubators, and entrepreneur networks, as well as traditional economic development agencies, all contribute to business creation efforts.

**What major organizations are engaged in Arizona’s economic development?** This question is addressed in Chapter 4. There exist a variety of public-sector and private-sector entities, as well as organizations that receive both public and private funding. In addition, the field contains both for-profit and non-profit organizations.

**Public-sector organizations** include a number of federal agencies, four Economic Development Administration (EDA)-designated economic development districts, six Councils of Governments (sometimes called Regional Councils), and the Arizona Department of Commerce. All three state universities have entities involved in economic development, including affiliated incubators or research parks, and offices for technology transfer and business/entrepreneurship training. Community colleges provide economic development services, including small business development centers and workforce training and development. Most cities, towns, and counties in the state have economic development departments.

**Private-sector organizations** include many national and international groups that provide networking opportunities, research services and other services; statewide organizations such as the Arizona Association for Economic Development (AAED) and the Arizona Small Business Association. Utility companies in Arizona have also been active in economic development.

**Public-private partnerships.** Two trends have driven the formation of many other groups in Arizona: building regional alliances and funding by both public and private partners. These include The Greater Phoenix Economic Council (GPEC), Tucson Regional Economic Opportunities, Inc. (TREO), and numerous other local or regional organizations such as Greater Yuma Economic Development Corporation, Central Arizona Regional Economic Development Foundation, Sierra Vista Economic Development Foundation, Verde Valley Regional Economic Organization, Southeast Arizona Economic Development Group, and Bullhead Regional Economic Development Authority.

Incubators and research/technology parks are examples of public-private partnerships that increasingly contribute to the economy of Arizona through technology transfer, intellectual property protections, entrepreneurial and start-up assistance, and help matching good business ideas with funding sources.

**Economic development is sometimes a controversial topic in Indian Country.** In the contemporary era of Indian self-determination, commitment to development has led to diverse

strategies, reflecting not only different opportunities or assets but also different cultures and diverse preferences for economic outcomes. Arizona's Native nations pursue development for multiple purposes: to enhance political clout, to gain resources for land purchases, to fund litigation in support of rights, to fund programs that revitalize language or improve community health, to sustain their own governments, to educate their people, to reduce their dependence on outside funds and decision-makers, or to support some other purpose, economic or not.

**Issues and trends shaping economic development.** Funding for economic development activities depends upon ups and downs in state's economy. When the economy is in recession, other pressing concerns tend to reduce support for economic development activities. Conversely, when the economy is growing, economic development is seen as unnecessary. Other factors that affect economic development activities in Arizona aside from globalization and demands of the new economy include regionalization, limitation of resources, jurisdictional conflicts, accountability, incentives, diversification, sustainability and quality of life.

Although limited in scope, an ad hoc **survey of economic development practitioners** provided a glimpse in how the things look in the field, where these issues are being faced on a daily basis. Respondents reflected on the tools and obstacles for economic development at the statewide level, and expressed detailed responses on how state policies have been implemented and perspectives of state leadership. Many verbalized a disconnect with lawmakers on business policies for the state and felt the "laissez faire" approach contributed to a lack of economic competitiveness in Arizona, especially compared to other states.

**Arizona's economic incentive programs used for business retention, attraction and deal closing** are discussed in Chapter 6. According to CBRE's<sup>2</sup> Economic Incentives Group, Arizona is currently considered "Non competitive" based on most common economic incentive programs including recent precedence for offering discretionary incentives. Seven primary incentives were identified: job tax credit; investment tax credit; job training grant; payroll rebate; cash grant/closing fund; sales/use tax exemption or rebate, and other tax exemptions. Arizona has a limited job tax credit (currently limited to Enterprise Zone Program); an investment tax credit limited to renewable industries ("Solar legislation"); an inactive job training grant program; a nonexistent payroll rebate; an inactive cash grant/closing fund; limited sales/use tax exemption rebate, and limited other tax exemptions (government property lease excise tax).

Currently, Arizona is facing a challenging economic situation as a result of the recent recession. This creates an **urgency to focus on immediate job creation**, which is critical for individual citizens, as well as the state's operations. Chapter 7 presents considerations for specific recommendations for job creation, which were recently presented to the Speaker of the State of Arizona House of Representatives. The most widely used economic development programs include job training, reimbursements for creating higher wage jobs, and the strategic use of a deal closing fund. Secondary considerations may be given to the State's tax code with emphasis on easing the burden on businesses with modifications to the corporate income tax and real and personal property taxes.

## ARIZONA'S CHALLENGES AND OPPORTUNITIES

On its way into the future, Arizona faces many challenges. These challenges emanate partly from what Arizona currently is – its economic foundations, geography, demographics, governance, and fiscal system. While this is important as the basis for building reasonable expectations, it is even more important to recognize opportunities springing from what we have now and what needs to be expanded, modified or profoundly redesigned.

### **Economic Base, Globalization, and Importance of High-Tech**

**Arizona's economic base, i.e. economic activities that sell products or services to customers located outside the state, and thus bring new money into the economy, is dominated by a high-technology cluster and tourism** (Chapter 8). The high-technology cluster is by far the largest based on wages, while tourism is the largest based on employment. However, as a share of the economy, the high-technology cluster has been declining. High-technology is dominated by three manufacturing industries: semiconductors and other electronics, aerospace, and search and navigation instruments. Each, especially semiconductor and other electronics manufacturing, is declining relative to the size of the entire economy.

**High-technology powers Arizona's economy** (Chapter 9). In 2007, 16,000 high-tech firms in Arizona accounted for 11% of 149,900 total establishments and about 11% of the state's 2,647,100 total workers. High-tech firms pay 75% higher wages than the average for all industries in Arizona. High-tech manufacturing constitutes nearly half of all the employment in manufacturing, and offers significantly higher wages than any other sector in Arizona economy. The highest levels of employment are in aerospace; semiconductors and electronics; and navigation, measuring, electro medical and control instruments manufacturing.

**The fastest growing high-tech industries** tend to be small industries with rapid growth from a small base. These include: various telecommunications; resin, rubber, synthetic fibers and filaments manufacturing; satellite telecommunications; and internet publishing and broadcasting. **The largest overall employment gains in high-tech sector** over the period 2001-2007 were predominantly professional-related services such as architectural and engineering services; computer systems design; management of companies and enterprises; and management, scientific and technical consulting services.

**The largest employment losses** from 2001 to 2007 occurred in the semiconductor industry; wired telecommunication carriers; computer and peripheral equipment manufacturing; and data processing, hosting and related services.

**The future economic development in Arizona will be impacted with the state's ability to attract, retain, expand and start up high-tech industry.** The likely emerging industries are bio-industry, optics, and nanotechnologies. Another cluster of industries that is likely to have a significant presence in the future is "green" or sustainable industry, such as environmental technologies, renewable energy, water resource management and solar energy manufacturing. Several of these emerging technologies will involve heavy emphasis on science and engineering occupations, as well as requiring significant research and development activities.

High technology firms value many of the same **location factors** as non-high-tech industries such as low operating costs (labor, transportation, taxes, materials), and good access to markets and to sources of specialized inputs. However, **high-tech industries have additional requirements**, among the most important being a pool of highly skilled and educated workforce, presence of strong universities and a good overall quality of life.

**Arizona's participation in the global economy is dominated by a smaller number of large companies and Mexico as the primary destination for commodities** (Chapter 10). About 10% of the 5,404 companies that exported from Arizona locations (in 2007) were large enterprises with 500 or more employees. They generated 81% of Arizona's total exports of merchandise. Mexico accounts for close to 30% of the \$20 billion worth of Arizona's exports to the world (2008). While the small and middle-sized companies account for 19% of the total value of Arizona's exports, they represent the largest business category among exporters (90%).

**Key factors that will drive global economy in next fifteen years**, according to the National Intelligence Council include: huge transfers of relative wealth and economic power from West to East; the coming-of-age of BRIC economies (Brazil, Russia, India, and China); continuing shifts in manufacturing and some service industries away from their traditional locations in the West to other locations; increased pressure on energy transition from oil toward natural gas, coal and other options; aggravation of resource scarcity (water in particular); and the need for increasing the pace of technological innovation (delivery of energy in particular). These trends will challenge Arizona's economy, but at the same time will provide new opportunities for Arizona businesses.

#### **Arizona's Uniqueness and Regional Diversity**

**Arizona has a wide range of natural, economic, political and cultural attributes that set it apart from other states** (Chapter 11). These include: diversity of landscape; climate, sun and clear skies; historical heritage; border location and border economy; trans-border industry clusters; trade conduit, and Right to Work State status. Each of these unique characteristics have played specific roles in Arizona's past and continue to provide opportunities for Arizona's current and future economic development.

**Arizona has forged long standing cultural and economic ties with its neighbor state of Sonora in the south.** The idea of an integrated, trans-border economic region was formalized by the Arizona-Mexico Commission and Comisión Sonora Arizona in 1993, with a specific goal to enhance economic development and regional growth through formal collaboration and more efficient utilization of complementary resources within the NAFTA framework.

**Three major cross-border, export-driven economic activities link the economies of Arizona and Sonora:** the maquiladora sector (production sharing facilities), the fresh produce industry and cross-border tourism. A number of manufacturing assembly and production facilities (maquiladoras) in Sonora are owned or operated by Arizona based firms. Supplying components and providing services to Mexican maquiladora sector is an important component of Arizona's exports, and provides additional opportunities. (The Arizona-Sonora Manufacturing Initiative was launched recently to enhance the regional integration in manufacturing). Arizona is the

major gateway for fresh produce imported into the United States from Mexico accounting for more than 40% of all imports through all border ports of entry along the U.S.-Mexico border. Cross-border tourism brings billions of dollars to Arizona.

**The majority of export-import trade between Arizona and Mexico takes place through Arizona's border ports of entry**, by truck and rail. In 2008, this amounted to 7.2% of all U.S. imports from Mexico flowing through the southern ports of entry.

**Arizona is at the heart of the CANAMEX trade corridor**, a multi-state partnership linking the west Mexican states of Sonora, Sinaloa and Jalisco with Canadian provinces through the western U.S. states. The corridor has evolved to become an essential component for efficient transportation of goods, services, people, and information between the United States and Mexico.

**The State of Arizona is one of 22 states in the United States with the Right to Work provision.** This provision secures the right of a person to obtain or retain employment whether or not they are members of a labor organization, and prohibits corporations, individuals or associations from excluding anyone from employment or continuation of employment because of non-membership to a labor organization.

Like most other states, Arizona has its share of regional diversity.

**Like many growing states**, Arizona will have a minority majority population shortly after 2015 if current rates continue. Arizona has the fastest growing Hispanic population in the U.S., which according to the 2000 census comprises 29% of state residents and numbers at least 1.8 million people. Border counties of Yuma and Santa Cruz have majority Hispanic populations. Although an area of considerable foreign migration, in-migration from around the United States is the main source of the population growth. Many domestic migrants are retirees (Chapter 12).

County by county comparisons reveal that **higher incomes and diversified economic activity exists in the six metropolitan areas**, but lag in the non-metropolitan regions of the state. Regional diversity in a recession exaggerates the disparity of wealth, as non-metropolitan areas that rely on mining, agriculture, construction, and seasonal migration are more vulnerable than metropolitan areas with high technology, public administration and education services.

**Once on the margins of Arizona's economy, Native nations are now significant contributors to Arizona economy** (Chapter 13). Arizona has the largest Native American land base and third largest Native American population in the U.S., numbering over 250,000 people (4.5% of AZ's population). Not only gaming, but mining, timber harvesting, tourism, and resort operations, among other Indian-owned business activities generate jobs for Arizonans. While reservation economies are growing at a fast pace, low starting points for growth mean that it will take years for American Indian indicators of well-being to approach the levels enjoyed by non-Indian residents of Arizona.

## **Infrastructure, Energy, and Human Resources**

**Transportation impacts economic development in a number of ways** (Chapter 14).

Transportation infrastructure – rail, truck, and air – is essential for both bringing goods into the region and exporting them to outside markets. It is also essential for accessibility to the workforce within the region. The delivery of final consumer goods has also become an important aspect of the economy for quality of life and for tourism. For both quality of life and business efficiency reasons, the increasing gridlock in Arizona’s two metropolitan areas is a concern.

For Arizona, **the Mexican border also presents a transportation challenge**. Mexico is Arizona’s largest trading partner and its largest source of international visitors. Surface transportation right up to the international border crossing is the responsibility of the state. However, the state is completely dependent on the federal government for the actual port of entry, both in terms of physical build-out and processing, and significantly impacted by Mexican government decisions as well.

**Arizona funds its surface transportation system in two ways: gas taxes and vehicle license taxes**. Taxes comprise only a small part of the pump price. The combined federal and state average 39.5 cents per gallon. In Arizona, state fuel taxes have not increased in almost 16 years, and federal taxes have not increased in 12 years. As a result, taxes have not kept pace with costs or demand. The combined spike in fuel prices and the recession that has gripped Arizona since 2008 have resulted in lower fuel consumption. This is a result of both reduced driving and a switch to more fuel-efficient vehicles. In many ways this shift is positive – less dependence on foreign oil, less pollution, less congestion, more use of public transit. But it also dramatically reduces fuel tax revenues to the state, and the drop in available revenue far exceeds the small drop in demand.

**Arizona’s human capital is far from uniform in terms of both the distribution and educational attainment** (Chapter 15). Currently 80% of Arizona’s population resides in the Sun Corridor encompassing Maricopa, Pima, and Pinal counties. Twenty-five percent of residents (25 and older) have bachelor’s degree or higher. In counties which contain state universities, 36% of residents hold a post-secondary degree in contrast to 22% of residents in counties with no state university. On the other end of the spectrum, 17% of Arizona’s residents have no high school diploma. Non-university counties have higher percentage of residents with the lowest educational levels; on average, 22% of residents (25 and older) have no high school diploma compared to 15% in university counties.

**Arizona’s renewable energy potential** (Chapter 16). Solar electric generation has the second largest capacity of the renewable energy resources in Arizona, but contributes less than 1% of the state’s total electric capacity. Wind energy has made virtually no entrance into the Arizona electric generation market. Benefits of expanded solar energy production include increased national security, compliance with the emission standards, as well as increasing jobs and wages in the state. However, subsidies are still required to make solar power cost competitive with conventional generation systems.



## **Environment, Water, Air, and Quality of Life**

**Our natural environment, economy and quality of life are all connected** (Chapter 17).

Maintaining a quality environment within and around our communities requires regular engagement between environmental managers, residents, economic development planners and other stakeholders in our future. Growth and economic development decisions need to account for water availability, water and air quality, and ecosystem health as well as the costs associated with meeting state and federal standards.

In general, **there are no unallocated surface water supplies in the state**, and most areas are already overusing local groundwater. Therefore, supplies for growth will predominantly come from re-allocation or by investing in conservation to free up existing supplies. Two potential new supplies are water reuse (wastewater treated for reuse) and seawater desalination.

**Despite significant progress in improving air quality, there are still several locations in Arizona that exceed federal pollutant standards.** Communities in non-attainment areas are typically required by federal law to reduce pollutants through controls on industrial facilities and business, government operations, and consumer activities. These restrictions can result in tax increases, restrictions on highway improvements, slower economic expansion due to increased costs on existing businesses, as well as discourage new businesses from locating in the region.

**Quality of life (QOL) acts as a magnet to attract and spur economic development** (Chapter 18). Many sources cite the importance of quality of life issues for attracting and retaining highly skilled and educated workers. Businesses that need highly educated workers are motivated to locate in areas where the workforce matches their needs. Arizona's outstanding quality of life has been an important driver of the state's growth for decades, and economic growth has, in turn, reinforced QOL by enabling the growth of cultural and social amenities. As the state reshapes its economy, QOL and economic development will continue to mutually benefit each other.

## **Fiscal Environment**

**Arizona's fiscal environment is in a state of crisis** (Chapter 19). The contributing factors include economic cycle and revenue volatility; tax cuts made during expansions and the permanency of those tax cuts due to the supermajority requirement for tax increases; underfunding of the Budget Stabilization Fund (BSF); and an increase in the demand for formula-driven government services during recessions.

**Recessions and business cycles will always be with us.** Arizona will likely continue to be more cyclical than the nation as a whole and Arizona revenues likely will be much more volatile than Arizona's economy. Unless major changes are made to the political environment, to the operation of the BSF fund, and to Arizona's tax structure, Arizona can expect both future cyclical budget crises and a long-term structural deficit.

## **MOVING FORWARD: UPDATING THE ROADMAP**

This final section reviews selected recommendations for consideration in building a competitive, thriving, and integrated Arizona economy. These considerations can further support the

statewide forum, as the 96<sup>th</sup> Arizona Town Hall participants discuss strategies and recommendations to guide Arizona into the future.

Arizona already has a general roadmap for the future based on the premise that the road to prosperity is paved with innovation, productivity, science, high-technology and talent. **What is needed is to update the roadmap and stick to its course** (Chapter 20). Although detailed plans may vary from a three-step to ten-step plan to move Arizona forward, several tenets are shared by many and focus on: 1) improving the state education system; 2) generating science and technology industries; 3) supporting a conducive business climate; and 4) investing in research and development.

\*Finally, a note on statistics throughout this report. All data cited by the authors is accurate, but due to the normal variances created by having multiple authors, the statistics are from different sources (national, state and private agencies) and/or time periods, i.e., annual reports from different years or spans of time (6 month, 12 month, etc.). This may account for some slight differences in statistical statements.

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## **PART I**

### **THE PROBLEM: THE ARIZONA WE WANT AND THE ARIZONA WE HAVE**

- 1. Visioning Arizona: Where do we want to be?**
- 2. Where Arizona is: How Arizona compares to other states**

## Chapter 1

# VISIONING ARIZONA: WHERE DO WE WANT TO BE?

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### KEY POINTS

- Several visions for Arizona have been developed. While they differ in detail, their underlying goal is “the best possible state.”
- Quality/well paying jobs allow higher standards of living, and attract and retain talented individuals.
- In today’s world, this translates into building and sustaining a globally and nationally competitive economy.
- Competitive economies are sustained by businesses that innovate, invest in research and development (R&D), produce high value products, attract capital investment and bring new money into the economy.
- Two of the most recent roadmaps emphasize bioscience and technology as the major drivers of Arizona’s competitiveness.

Whether we are solving an existing problem or pondering the realization of a dream, we first have to have an idea of what outcomes we expect. Therefore, in our quest to build Arizona’s future, we must first get an idea of what future we have in mind. There are several well developed visions and dreams in Arizona – from those of average citizens to elected leaders, professionals and researchers (Table 1.1). And every so often, new visions of Arizona emerge in response to changes in our own in-state developments, shifting paradigms around us, or a rapidly changing global environment.

### THE MANY VISIONS OF ARIZONA

One of the first modern *visions* of Arizona was created in the early 1990s as an outcome of a year long, all-encompassing process of strategizing about getting Arizona ready for the 21<sup>st</sup> century. The process was led by the Arizona Partnership for Economic Development (ASPED). The final report *Creating a 21<sup>st</sup> Century Economy: Arizona’s Strategic Plan for Economic Development* provided a new way of thinking about the economy. It gave us the idea of clusters as the driving agents of state and regional economies. Eleven industry clusters were identified: bio-industry; environmental technology; food, fiber and natural products; high technology; minerals and mining; optics; plastics and advanced composite materials; senior industries; software and information; tourism; and transportation and distribution.<sup>3</sup> ASPED also introduced the idea of foundations in support of cluster development. Eight foundations were identified: capital; education and workforce development; human resources; information and communications infrastructure; physical infrastructure; quality of life; tax and regulation; and technology.<sup>4</sup> These were later called the traditional foundations.

Soon after the Governor's Partnership for Economic Development (GSPED) was formed to implement ASPED recommendations, the debate about the North American Free Trade Agreement (NAFTA) between the United States, Canada and Mexico intensified. Arizonans started thinking about advantages of a border location and how to capitalize on long established commercial and cultural ties with neighboring Mexican state of Sonora. Energized by prospects of "borderless" economies, new partnerships were formed between businesses, government agencies, and universities on both sides of the border. In 1993, under the auspices of the Arizona-Mexico Commission and its sister organization, Comisión Sonora-Arizona, a bold idea was proposed of building an economically integrated transborder region – the Arizona-Sonora Region. The resulting *Strategic Economic Development Vision for the Arizona-Sonora Region* outlined a model based on targeted economic cross-border collaboration that would increase global competitiveness and higher quality of life for residents of both states.

The late 1990s were all about the "new economy." The Arizona State University's Morrison Institute, in a 1999 paper, *The New Economy: A Guide for Arizona*, helped Arizonans understand the principal underpinnings of the new economy. These eight principles are: (1) technology is a given; (2) globalization is here to stay; (3) knowledge builds wealth; (4) people are the most important raw material; (5) there is no such thing as a smooth ride; (6) competition is relentless; (7) alliances are the way to get things done, and (8) place still matters, but for different reasons than before (e.g., proximity). With the Governor's support, the Arizona Partnership for the New Economy (APNE) was created in 1999 and by 2001 APNE offered a new vision of Arizona as a New Economy hot spot. APNE identified five new foundations (in addition to ASPED's traditional eight) deemed critical for supporting the New Economy Arizona: "connecting" (telecommunications infrastructure); "E-government" (getting government on-line for faster/better service); "E-learning" (distance learning and technology in classrooms); "creative communities" (amenity-rich communities with strong quality of place); and "knowledge leaders, entrepreneurs and capital" (higher education, research & development, technology transfer, incubation, and venture capital). A long list of specific recommendations was prepared to ensure that these foundations received the attention in order for Arizona to benefit from the New Economy opportunities.

In 2002, Arizona received its first bioscience roadmap. By then, Arizonans had mastered the terminology of the New Economy. But as everybody else tried to build a "knowledge-based economy," it was critical to find out what exactly makes some states (regions) prosper faster than others. With the help of the Battelle Memorial Institute, a renowned consulting company specializing in research and development, it was determined that biotechnology was the one area with the highest promises for Arizona's future. Bioscience was defined as an umbrella encompassing agricultural feedstock and chemicals; drugs and pharmaceuticals; medical devices and equipment; hospitals, and research, testing and medical laboratories.<sup>5</sup> Bioscience was recognized as one of the major drivers of regional economic growth; one in which the U.S. was highly competitive; one that attracted and nurtured talent; one which produced high incomes, but also one that required considerable capital investments and longer-term commitment. Since the first roadmap was revealed, the Battelle Memorial Institute continued to monitor the pulse of Arizona's bioscience sector to assess the progress on an annual basis.

In 2005, the Center for the Future of Arizona created a *Vision of Arizona* that captured the ideas of both Arizona leaders and the citizens they represented. This particular vision called for the state to become “one of the best places in the nation to live a rewarding and productive life.” To fulfill this vision, three main goals were identified: (1) providing and enhancing opportunities for all; (2) preserving and enhancing quality of life; and (3) vigorously pursuing a knowledge-based economy.

Based on the findings of the 2008 Arizona Gallup Poll, the Center for the Future of Arizona released a follow-up study, *The Arizona We Want*, in 2009. The report offered a compelling picture of what citizens thought about life in their communities and what they wanted for the future. Ideally, Arizona of the 21<sup>st</sup> century has been envisioned as a high quality economic, social and physical environment sustainability. The central tenets of a high quality economic environment were identified as quality jobs and the workforce supported by a modern, effective transportation system and infrastructure. In fact, “quality jobs” and “21<sup>st</sup> century workforce” were among the top eight items on the citizens’ agenda for building a desirable Arizona.

In 2008, the Arizona State University’s Morrison Institute published a visionary *Megapolitan Sun Corridor* report. The report provides a vision of Arizona in 2035 as the world’s first sustainable region and America’s leading center for creativity at all levels including energy. The heart and the engine of the future Arizona is seen in the emerging Sun Corridor, a megapolitan area stretching from the Prescott region to the border with Mexico. In this 2035 scenario, the Sun Corridor has in place a collaborative knowledge strategy for investment in science, engineering, technology, higher education, and science-technology driven business; it also has a strategy for domestic and foreign investment. And, most importantly, Arizona’s residents enjoy unparalleled quality of life.

**Table 1.1**  
**The Many Visions of Arizona**

<b>Vision of Arizona</b>	<b>Architect of Vision</b>
Industry cluster based economy	ASPED 1991/1992
A part of an economically integrated and globally competitive transborder region	Arizona-Mexico Commission 1993
A New Economy hot spot	APNE 2001
Bioscience roadmap	Battelle Memorial Institute 2002
One of the best places to live a rewarding and productive life	Center for the Future of Arizona 2005
Sun Corridor: the world’s first sustainable region; America’s leading center for creativity in world energy arena; unparalleled quality of life for Arizona’s residents	ASU Morrison Institute 2008
The Arizona We Want: high quality economic, social and physical environment	Center for the Future of Arizona 2009

Source: Various sources

### **IT ALL BOILS DOWN TO JOBS – QUALITY/HIGH PAYING JOBS**

A major key to all visions of a modern Arizona is jobs; not only jobs, but quality jobs. For most people, jobs are the major or even their only source of income. Quality jobs are the ones that not only pay more, they allow higher standards of living, and generally provide higher satisfaction as

well. These characteristics – higher living standard and satisfaction -- are for a majority of people the basic characteristics of good life. This focus and concern about having access to quality jobs has been echoed in another Gallup Poll of Arizona residents, conducted in 2008 for the Center for the Future of Arizona.

From a regional economic perspective, quality jobs are a top priority because they retain and attract talented individuals, generate demand for other high quality services, and generate higher tax revenues. As more highly skilled workers are employed, productivity increases. This also leads to higher incomes and a higher standard of living for employees in these industries. All of this adds to the wellbeing of a region (state).

Creating and nurturing quality jobs is a major focus of every community – be it a small town, metropolitan area or state. In a 2005 survey of voter perceptions on growth and growth plans in Arizona conducted by the Grow Smarter Oversight Council (GSOC) and funded by the Arizona Department of Commerce, a full 75 percent of interviewed Arizonans said that quality jobs and quality workforce were “very important” or “really crucial.”<sup>6</sup>

While some may argue that in the current economic crisis, any jobs count, the argument for quality/high paying jobs even in this situation is extremely valid. Quality/high paying jobs are mostly generated in high-tech industries. It is true that the core of high-tech industries is highly skilled labor such as engineers and technicians, but they also offer employment opportunities for the less skilled labor force. For example, a high-tech biotech company that manufactures medical equipment and supplies requires high skilled workforce (with graduate degrees) for its core operations (innovation, design, management), but at the same time it may employ another 50 percent of its workforce with high school diploma or less.<sup>7</sup> What this means is that the fight for quality/high paying job-generating industries benefits all.

How are quality/better paying jobs generated? Before answering this question in the next section, we need first to understand how jobs are generated in general. Arizona’s economist Elliot Pollack explains it in this way:

“One needs to first understand how businesses impact the economy. Base industries are those that export their products out of a region, and result in the importation of money into a region. Once a dollar makes its way into the State it flows from person to person as demanded products and services are supplied. Eventually some money leaves the local economy when products (and some services) are provided by companies outside of the State. This is natural leakage and cannot be avoided. In order to compensate for these outgoing dollars, an economy must be internally productive and export products beyond its borders and attract dollars from other areas. The State’s base industries serve this purpose. Examples of base industries include the manufacturing sector, export-oriented business services, tourism, retirement, and federal government employment. As one can see, some base industries are high paying while others are relatively low paying. The key is to encourage higher value added/higher paying base industry development.”<sup>8</sup>

## **CREATING QUALITY/HIGH PAYING JOBS: COMPETITIVENESS VS. COMPETITION**

The literature points out inseparable links between innovation, productivity, competitiveness, and quality/high paying jobs. Innovation is considered a major driver of the economy. Innovation leads to new product categories (goods or services) and increases productivity. According to the 2007 report, *A Strategic Assessment of the Economic Benefits of Investments in Research in Arizona*, prepared for the Science Foundation Arizona by Arizona State University and The University of Arizona, productivity is the key to sustainable prosperity in an economy. Individuals who create high value per hour of work earn the highest wages, and the high rates of productivity growth sustain competitive economies.

Competitive economies are sustained by competitive businesses, i.e., businesses that innovate, invest in research and development, produce high value products, attract talented individuals, attract capital investment, export their products and bring new money into the region and thus increase the economic prosperity.

For the last two decades, science and technology have held the key not only as job generating engines, but also primarily as quality job generators with higher salaries and long-term impact. According to the latest Milken Institute's report *Charting a Course for Arizona's Technology-Based Economic Development*, in multiple locations across the United States knowledge-intensive fields have demonstrated the ability to spur and maintain prosperity.

While the importance of competitiveness is sinking into our minds and hearts, in our daily lives we hear and fear more about competition from other regions – outside and inside the United States. Michael Porter in the 2006 Council on Competitiveness Report, *Where America Stands*, emphasized that competitiveness is different from competition, and should not be understood as a rough “stealing” from other states. However, the reality is that today states and communities are in stiff competition for jobs.

Companies have been moving to newly emerging regions that offer lower production costs and higher profits. This so-called off-shore production has been a topic of academics and economic development practitioners for last several decades. It is a real nightmare for states and communities when well-established companies announce closing their facilities *in situ* and move production to foreign countries.

The competition for jobs has been increasing within the United States as well. As U.S. Department of Labor reported in “*Extended Mass Layoffs in the First Quarter of 2007*,” most mass job relocations occurred from one U.S. state to another rather than to an overseas location.<sup>9</sup>

As we contemplate competition from Arizona's rivals, Robert Atkinson in his 2007 article, *Deep Competitiveness*,<sup>10</sup> reminds that a distinction needs to be made between high-road and low-road competitions. On the high-road, winners have the best research infrastructure, the best markets to develop products and innovate, and the best climate for inventors and productive workers. Competition on this level benefits all serious competitors who are able to improve in these dimensions. In contrast, battles on the low road are manifested in battles over jobs at all costs.



Therefore, as Arizonans might be tempted to look for some quick fixes to improve the State's competition for quality/high paying jobs, it is important not to lose sight of building long-term competitiveness of State's businesses, products and workforce.

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<sup>1</sup> The term has been borrowed from the Center for the Future of Arizona. When referring to Center's project, the term will be indicated within quotation marks; otherwise, it will refer to a general vision of Arizona.

<sup>2</sup> CBRE is CB Richard Ellis, a commercial real estate firm.

<sup>3</sup> Although these eleven clusters were recognized, not all are represented by active cluster organizations. Two sub-state cluster organizations –for software and information cluster, and the aerospace cluster – were organized as separate organizations in central and southern Arizona. Additionally, there are clusters that have been recognized at the community level and are important to specific metropolitan economic development strategies. Source: Gail Lewis, Brian C. Catts and David A. DeKok, "Positioning Arizona in the New Economy," p. 75-104 in *Moving All of Arizona into 21st Century Economy* (Arizona Town Hall 2001).

<sup>4</sup> Gail Lewis, Brian C. Catts and David A. DeKok, "Positioning Arizona in the New Economy," p. 75-104 in *Moving All of Arizona into 21st Century Economy* (Arizona Town Hall 2001).

<sup>5</sup> Walter H. Plosila, "Arizona's Bioscience Roadmap: Performance Assessment 2002-09" (Presentation and Discussion, January 2010).

<sup>6</sup> Bruce Merrill and Tara Blanc, *Voter Perceptions of Growth and Growth Plans in Arizona* (Arizona Department of Commerce and the Maguire Company, October 2005).

<sup>7</sup> A generalized model for biotech educational attainment by occupation associated with medical equipment and supply manufacturing indicates the following occupational composition: 1% graduate degree; 14% BS/BA degree; 19% high school and some college or specialized training; and 66% high school or less. Estimates based on IMPLAN Input-Output model. Source: Lay J. Gibson, Bruce Wright, Raphael Gruener and Vera Pavlakovich-Kochi, *Closing the Industry-Community Gap Through Community Engagement: High Tech/Biotech's New Frontier* (EDA Project Number 07-79-05928, U.S. Department of Commerce Economic Development Administration, March 31, 2009).

<sup>8</sup> Elliott D. Pollack & Company, *The Job Recovery Package for the State of Arizona*, prepared for The Speaker of the House of Representatives, State of Arizona (December 2009)

<sup>9</sup> Published August 9, 2007. Available at <http://www.bls.gov/opub/ted/2007/may/wk2/art04.htm>, cited by Kail M. Padgitt, 2010 State Business Tax Climate Index, *Background Paper* Number 59: p.1-36 (Tax Foundation, September 2009).

<sup>10</sup> Published in *Issues in Science and Technology*, Winter 2007; cited in ASU/UA report *A Strategic Assessment of the Economic Benefits of Investments in Research in Arizona* (April 2007).

## Chapter 2

# WHERE ARIZONA IS: HOW ARIZONA COMPARES TO OTHER STATES

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### KEY POINTS

- Based on selected indicators, the Arizona we have is far from the Arizona we want.
- According to 2009 *Technology and Science Index* Arizona ranks 19<sup>th</sup> significantly behind other Western states – Colorado, New Mexico, Oregon, and Utah - which are considered its key rivals in technology-based economic development.
- Arizona also ranks in the lower 50% of states based on *Business Tax Climate*; its 28<sup>th</sup> place puts it solidly behind the key Western competitors.
- In perception of business climate, Arizona does not do well either. All its key rivals are perceived as having a better business climate.

Regardless of unavoidable biases implicit in the nature of different rankings, it is helpful to know how others see us on selected indicators. While we may not agree with the selection of variables that are used to compose various indexes, nor do we have time to critically evaluate specific methodologies, the rankings can still be useful in showing how fast (or slow) we move and what it would take to get where we want to be.

There are two major reasons why it is important to know how we compare to other states. The first reason is to know where we are now, and how far our goals are from where we stand. As briefly shown in the preceding section, Arizonans aim high in what they want their state to be. Aiming high is positive and necessary. But it is also important to know how much we need to invest, rearrange priorities or sacrifice in order to achieve our goals.

The other reason is competition. Talking about competition and competitiveness, most of us primarily think of global competition as markets have become increasingly global. But as those who work in economic development area know well, competition is increasingly fierce with other states within the United States.

### **HIGH-TECH MATTERS: STATE TECHNOLOGY AND SCIENCE INDEX**

The Milken Institute ranking of states based on the *State Technology and Science Index* (T&S) is one of the most respectable barometers of how each state is faring in the 21<sup>st</sup> century knowledge economy.<sup>11</sup> It is organized into five major composites that together provide a picture of state's comparative strengths and weaknesses. These five composite indexes are: (1) research and development inputs; (2) risk capital and entrepreneurial infrastructure; (3) human capital investment; (4) technology and science work force, and (5) technology concentration and dynamism.

Within the overall T&S index, Arizona ranks 19<sup>th</sup> place nationally. This performance marks a decline from 2008 when Arizona held 17<sup>th</sup> place; this also is a worsening from the last two rankings in 2004, when Arizona was in 17<sup>th</sup> place and in 2002 in 18<sup>th</sup> place. The report’s authors concluded that, “this leaves the state solidly behind competitors such as Colorado, Oregon, Utah and New Mexico.”<sup>12</sup> Only Nevada is trailing far behind Arizona (Table 2.1).

**Table 2.1**  
**State Technology and Science Index Rankings: Arizona and Key Rivals**

<u>State</u>	<u>2002</u>	<u>2004</u>	<u>2008</u>	<u>2009</u>
Arizona	18	17	17	19
Colorado	2	3	3	3
Nevada	42	43	45	44
New Mexico	20	14	16	10
Oregon	23	19	23	13
Utah	9	9	8	8

Source: Milken Institute

On individual components, Arizona performs relatively well in two composites. In the Research and Development Inputs Index,<sup>13</sup> Arizona ranks 13<sup>th</sup> in the nation. Like New Mexico, Arizona gets a significant boost in this composite from a flow of federal research money (it ranks 10<sup>th</sup> in the nation in federal R&D). Another area of relatively good performance is the Risk Capital and Entrepreneurial Infrastructure Index,<sup>14</sup> where Arizona ranks 16<sup>th</sup> nationally. This reflects a large number of business starts and a solid number of patents and Small Business Investment Company (SBIC) awards.

On the remaining three composites, Arizona does not do well. Arizona’s low ranking of 35<sup>th</sup> in the Human Capital Investment Index<sup>15</sup> continues to represent a major potential impediment to long-term development influencing all fields, and technology in particular. Arizona’s 23<sup>rd</sup> place in the nation in the Technology and Science Work Force Index<sup>16</sup> is a significant drop from her 10<sup>th</sup> place in 2004. Historically Arizona was able to recruit specialized workers from out of state, but to grow and expand companies need to find skilled workers locally rather than incurring the costs of long-distance recruitment. Arizona also lost some momentum in the Technology Concentration and Dynamism Index,<sup>17</sup> which measures technology outcomes. Arizona ranks 29<sup>th</sup> based on the average yearly growth of high-tech employment.

As special areas of concern, the Milken Institute identified Arizona’s industry R&D (23<sup>rd</sup> nationally), and academic R&D (36<sup>th</sup> nationally), both of which hamper Arizona’s ability to boost local technology transfer. In total venture capital investment growth, Arizona ranks in 39<sup>th</sup> place. In addition, Arizona lacks active venture capital sources, which makes it even harder for local companies to access the financing they need to grow and thrive.

By comparing where Arizona stands now and what it would take to become competitive with her Western rivals, the report’s authors identified the following key areas: moving from the current 23<sup>rd</sup> place in industry R&D dollars per capita to among top 15 in the nation; from the current 36<sup>th</sup> place in academic R&D dollars to top-20 ranking; from the current 21<sup>st</sup> in degrees in science and engineering to among top 15; from the last place in concentration of life and physical scientists to among top 30 at a minimum; from the current 43<sup>rd</sup> place in per capita state appropriations for

education to among top 20, and from the current 44th in the number of business incubators per 10,000 business establishments to at least among the top 30.

**BUSINESS TAX MATTERS: STATE BUSINESS TAX CLIMATE INDEX**

As the competition for jobs intensifies among states, an area of increased concern is the various incentives that states and communities are willing to offer to potential relocates or/and existing companies to discourage them from moving somewhere else. Among the most controversial are the tax incentives.

The Washington D.C.-based tax research group, the Tax Foundation, developed the *State Business Tax Climate Index* to gauge how states compare on their tax systems.<sup>18</sup> The index is an indicator of which states’ tax systems are the most hospitable to business and economic growth. However, as authors of the index point out, the index does not attempt to measure economic opportunity, or even the broad business climate. Instead, this index measures the narrower business tax climate.

Comparing states’ tax systems is more complicated than comparison on science, technology or related indexes. First, there are states that do without one or more of the other major taxes: the corporate tax, the individual income tax, or the sales tax. These states automatically score higher. Secondly, tax systems differ substantially from state to state in many details that are hard to measure. Most states have at least one major tax area that is hospitable to business and economic growth, and most have at least one punitive tax that makes the state’s tax climate look comparatively bad. These aspects need to be kept in mind as we briefly present the rankings.

The index is a composite of five separate aspects of tax system: corporate tax, individual income tax, sales tax, unemployment insurance tax, and property tax. Arizona’s overall rank (composite index) is 28<sup>th</sup> place among 50 states. Compared to 2006, Arizona’s rank improved from 29<sup>th</sup> place. Table 2.2 compares Arizona’s ranking with those of key rivals, as defined by the Milken Institute.

**Table 2.2  
State Business Tax Climate Index 2006-2010 Rankings: Arizona and Key Rivals**

<u>State</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>
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

With regard to sub-indexes (which are not shown here, but are reported in the Tax Foundation report), Arizona is among the top five states in the unemployed insurance tax index, and in the property tax index (top rankings indicating more hospitable business tax climate). With respect to the individual income tax index Arizona is 23<sup>rd</sup> and with respect to the sales tax index Arizona is 46<sup>th</sup> in the nation.

According to *2010 State Business Tax Climate Index*, the ten best states are: South Dakota, Wyoming, Alaska, Nevada, Florida, Montana, New Hampshire, Delaware, Washington, and Utah. The absence of a major tax, such as the corporate tax or the sales tax, is a dominant factor in vaulting these ten states to the top of the rankings.

Two of Arizona's key rival states<sup>19</sup> – Nevada and Utah – are among the top 10. Of the other three, Colorado is in 13<sup>th</sup> place, Oregon in 14<sup>th</sup>, and New Mexico in 23<sup>rd</sup> place, compared to Arizona's 28<sup>th</sup> place.

Nevada, Utah, and Colorado have more hospitable business tax climates than Arizona based on corporate tax index; Nevada, Utah, Colorado, and New Mexico rank better than Arizona in the individual income tax index. Based on the sales tax index, all five states are ranked better than Arizona, although Nevada and New Mexico are close to Arizona's rank of 46<sup>th</sup>.

With regard to other components – the property tax index and unemployment insurance tax index – Arizona is ranked among the top ten states and ahead of all her rivals, with the exception of New Mexico and Utah in property tax index.

#### **PERCEPTION OF BUSINESS CLIMATE MATTERS: STATE BUSINESS CLIMATE RANKINGS**

Unlike the rankings composed by Milken Institute and Tax Foundation, which are based on quantitative measures, the rankings of business climate presented in Table 2.3 are based primarily or exclusively on perceptions, commonly solicited from business leaders. Yet, as Elliot Pollack & Company's 2009 report *The Job Recovery Package for the State of Arizona* argues, business climate rankings tend to be one of the first items of business when considering new locations for operations. "Right or wrong," says the report, "the typical CEO tends to rely on these rankings at face value."

The report summarized leading business climate rankings including *Site Selection Magazine*, *Business Facilities*, *CNBC*, *Forbes*, *Chief Executive Magazine*, and *IBM Global Business Services*. Arizona was found among top 10 states only on one of them -- the *Chief Executive Magazine* 2009 best states for business list (Table 2.3).

Two top states that are listed among the ten best on six out of these seven selected lists are North Carolina and Texas; Virginia follows and South Carolina and Georgia are among the ten best on four lists.

It is interesting how Arizona compares to her key rivals, Colorado, Utah, Oregon, New Mexico, and Nevada. Except for New Mexico (which did not make it on any of the selected lists), all are perceived as having better business climates than Arizona. Colorado and Utah are ranked among the top ten on three lists; Oregon on two lists, and while Nevada was ranked among the top ten only once like Arizona, it was placed in the 6<sup>th</sup> place, two notches ahead of Arizona's 8<sup>th</sup> place.

**Table 2.3  
State Business Climate Rankings, 2009**

	<b>2009 Business Climate Rankings</b>	<b>2009 Top Ten Competitive States</b>	<b>2009 Top Ten States &amp; Provinces in North</b>	<b>2009 Best &amp; Worst States for Business</b>	<b>2009 America's Top States for Business</b>	<b>2009 The Best States for Business</b>	<b>2009 Top Ten States for Business Climate</b>
	<i>Site Selection Magazine</i>	<i>Site Selection Magazine</i>	<i>America IBM Global Business Services</i>	<i>Chief Executive Magazine</i>	<i>CNBC</i>	<i>Forbes</i>	<i>Business Facilities</i>
1	North Carolina	Ohio	Ontario	Texas	Virginia	Virginia	Texas
2	Texas	North Carolina	Virginia	North Carolina	Texas	Washington	South Dakota
3	Virginia	Michigan	Ohio	Florida	Colorado	Utah	Wyoming
4	Ohio	Pennsylvania	South Carolina	Georgia	Iowa	Colorado	Utah
5	Tennessee	Kentucky	Pennsylvania	Tennessee	Utah	North Carolina	Florida
6	South Carolina	Texas	Quebec	Nevada	Minnesota	Georgia	Delaware
7	Alabama	Tennessee	North Carolina	Virginia	Kansas	North Dakota	Washington
8	Georgia	Alabama	California	Arizona	Massachusetts	Texas	Montana
9	Indiana	Indiana	Illinois	South Carolina	North Carolina	Nebraska	Oregon
10	Kentucky	South Carolina	Indiana	Colorado	Georgia	Oregon	New Hampshire
<b>Arizona</b>	<b>24</b>	--	--	<b>8</b>	<b>18</b>	<b>36</b>	--

Source: Elliott D. Pollack & Company, *Site Selection Magazine*, *IBM Global Business Services*, *Chief Executive Magazine*, *CNBC*, *Forbes*, *Business Facilities*.

### **LEARNING FROM BEST PRACTICES IN OTHER STATES**

Clearly, in a number of indicators Arizona is far from being “the state we want.” In searching for the best way to put Arizona on the track to Arizona we want, it will be beneficial to briefly review success stories of Arizona’s rivals. Known as “best practices” here is a selection of initiatives, investments, incentives and similar tools that other states have developed and implemented to enhance competitiveness and/or beat the competition.

#### **Best Practices in Technology-Based Economic Development**

Table 2.4 summarizes the most important components of best practices in Colorado, New Mexico, Oregon and Utah.

**Table 2.4**  
**Technology-Based Economic Development:**  
**Components of Rivals' Success Stories**

**New Mexico** (smaller than Arizona in terms of population, but competes effectively in the science and technology arena):

- Public funds leveraged to attract and grow private business (Institute of Advanced Microelectronics; New Mexico Computing Applications Center; New Mexico State University's Physical Science laboratory)
  - Commercialization of technology boosted through venture capital (New Mexico Private Equity Program)
  - Publicly demonstrated commitment to strategic areas development ("Green Cabinet")
- 

**Oregon** (Arizona's principal competitor among the peer states):

- Comprehensive strategic plan (Oregon Innovation Council; Oregon Innovation Plan; Oregon Built Environment and Sustainable Technologies Institute; Oregon Nanoscience and Microtechnologies Institute; Oregon Translational Research and Drug Development Institute)
- 

**Utah** (one of Arizona's chief rivals in terms of technology-based development):

- Created a fully funded organization to oversee technology-based development (Utah Science and Technology Research Initiative; Technology Outreach Innovation Program)
  - Developed and encouraged venture capital investment to boost entrepreneurship (Utah Fund of Funds).
- 

**Colorado** (a model that other Western states seek to emulate):

- Developed effective means to maximize technology transfer (Colorado Technology Transfer Plan for Economic Development; Colorado Advanced Technology Institute; Colorado Advanced Materials Institute; Colorado Venture Capital Authority)
  - Maintains the strengths of research institutions
- 

**Nevada** (efforts in economic development are linked to tourism and primarily to luring established companies from other states)

- Partnership between the state's economic development board and private industry (Nevada Center for Entrepreneurship and Technology; reliance on private and local partners)
- 

Source: Milken Institute

Unlike four of Arizona's key rivals, Nevada has made only sporadic efforts in terms of technology transfer and technology-based economic development. Nevada's efforts in economic development are primarily linked to tourism and to luring established companies from other states.

**Best Practices of Economic Incentive Programs**

The role of economic incentive programs together with a review of best practices is provided in Chapter 6.

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<sup>11</sup> Kevin Klowden and Anita Charuwrn with Ross C. DeVol, *Charting a Course for Arizona's Technology-Based Economic Development* (Milken Institute 2009).

<sup>12</sup> The Milken Institute report *Charting a Course for Arizona's Technology-Based Economic Development* (December 2009), co-authored by Kevin Klowden and Anita Charuwrn with Ross C. DeVol, identified identified the following states as Arizona's key peer states: Colorado, Nevada, New Mexico, Oregon and Utah. They are selected due to regional proximity, relatively comparable population size, concentration around one major metro area, and/or their success in pursuing high-tech development.

<sup>13</sup> As defined by the Milken Institute in *Charting a Course for Arizona's Technology-Based Economic Development* (December 2009), the Research and Development Inputs Composite captures a state's capacity for innovation as well as federal and state funding commitments to regional economic development. It consists of 18 components, including R&D expenditures coming from the federal government, private industry and academia. risk capital and entrepreneurial infrastructure, startup companies and other.

<sup>14</sup> As defined by the Milken Institute in *Charting a Course for Arizona's Technology-Based Economic Development* (December 2009), the Risk Capital and Entrepreneurial Infrastructure captures the level of entrepreneurial activity as a proxy for innovation and the easy of doing business in a given region. It is based on indicators such as the number of startups and access to venture capital.

<sup>15</sup> As defined by the Milken Institute in *Charting a Course for Arizona's Technology-Based Economic Development* (December 2009), the Human Capital Investment Composite is composed of multiple indicators focusing on education. It measures education funding, the numbers of graduates being produced with advanced degrees and specialized training.

<sup>16</sup> As defined by the Milken Institute in *Charting a Course for Arizona's Technology-Based Economic Development* (December 2009), the Technology and Science Work Force Composite reflects the ultimate product of human capital development, which is a skilled technical and scientific work force – a key to a region's technological sophistication, innovation, and economic growth. It is based on 18 components measuring the intensity of engineers, scientists and other highly skilled labor in the state's work force.

<sup>17</sup> As defined by the Milken Institute in *Charting a Course for Arizona's Technology-Based Economic Development* (December 2009), the Technology Concentration and Dynamism Composite measures outcomes in the form of high-tech employment, business formation, industry growth, and concentration.

<sup>18</sup> Kail M. Padgitt, 2010 State Business Tax Climate Index, *Background Paper* Number 59: p.1-36 (Tax Foundation, September 2009).

<sup>19</sup> For simplicity, we'll keep the definition established by the Milken Institute.



## **PART II**

### **ECONOMIC DEVELOPMENT: ARIZONA'S RESOURCES AND TOOLS**

- 3. The Role of Economic Development**
- 4. Arizona's Economic Development Organizations**
- 5. Voices from the Field**
- 6. Business Retention, Attraction and Deal Closing**
- 7. Considerations for Replenishing the Economic Development Toolbox**

## Chapter 3

# THE ROLE OF ECONOMIC DEVELOPMENT

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### KEY POINTS

- Economic development can be defined in a variety of ways, but at its most basic, it is concerned with stimulating or maintaining quality business activity and employment, thereby improving the standard of living.
- Economic development is a process, not a destination. Varying geographic locations (communities, regions, counties, states) often have different goals, but there are widely-accepted practices and strategies that most economic developers utilize.
- The three main pillars of economic development are: business recruitment, business retention and expansion, and business creation.
- Specific strategies include: workforce development, community development, real estate/property management, technology development, and international trade development.
- Arizona's Native nations pursue economic development for multiple purposes, and use diverse strategies to balance cultural protection and material gains.

Economic development is a fascinating profession that is vital to all Arizonans. It is also a very diverse and broad field, and even those who are involved in it every day often focus only on their small piece of the larger whole. For the majority of the rest of the state's citizens, economic development is a concept that's not well understood at all.

### WHAT IS ECONOMIC DEVELOPMENT?

Numerous definitions of the term *economic development* exist, all of them slightly different but concerned with the same goal: an improvement in economic well-being and the standard of living. Here's a fairly comprehensive definition taken from Blakely and Bradshaw's book *Planning Local Economic Development: Theory and Practice*:

*"Economic development refers to the process in which governments or community-based (neighborhood) organizations engage to stimulate or maintain business activity and/or employment. The principal goal of economic development is to stimulate employment opportunities in sectors that improve the region or community using existing human, natural and institutional resources."*<sup>20</sup>

In other cases, economic development is more narrowly defined as a process that creates wealth through quality jobs that fit the needs of a community/region, or as a process that helps to bring in new money to a community/region from the outside (as a result of what are called "basic" or "primary" activities; these are described in detail later in this report).<sup>21</sup>

In all cases, economic developers believe that it is both possible and desirable to intervene in national, state, and local economic systems in order to improve conditions in a particular community or region. Economic development is predicated on the idea that a series of thoughtful actions undertaken by a community/region can indeed influence individual business decisions and larger marketplace trends.

Regardless of the precise definition used, one thing should be readily apparent after reading these examples: economic development is a process, not just a destination. It's something that must be done consistently and constantly, through periods of economic growth and through recessions. In the past, many would joke that economic developers "shoot everything that flies, and claim everything that falls." Although this is no longer completely accurate, it is true that economic developers are often still given more than their fair share of credit in boom times and receive more than their fair share of criticism when times are tough.

It's also true that many Arizonans think of economic developers only as "smokestack chasers." As shown in the next section, however, economic development entails much, much more than just finding businesses and planting them in a community. Instead, it involves numerous complementary activities and is usually performed by multiple organizations working together.

### **THE THREE PILLARS OF ECONOMIC DEVELOPMENT**

Economic development is one of the most interconnected professions in existence today. Practitioners must be able to work with local businesses of all kinds, firms in other parts of the world, multiple governmental jurisdictions, planners, educators, environmental groups, and community activists. They must understand their community's strengths and weaknesses, including the composition of the workforce, availability of land and buildings, infrastructure or lack thereof, educational systems, and tax and regulatory structures. Economic developers are by turns marketers, salespeople, researchers, business coaches, lobbyists, customer service representatives, and real estate brokers.

Although economic development consists of many different activities and tools, it is usually separated into three main components for simplicity. Most tasks that economic developers take on can be classified as either 1) business recruitment; 2) business retention and expansion; or 3) business creation.

#### **Business Recruitment**

As implied by the name, business recruitment encompasses all of the activities involved in targeting desirable companies and encouraging them to relocate. Recruitment used to be about the only activity that economic developers engaged in, and it still garners most of the press coverage—both good and bad. Today, although the other two components have become increasingly important, recruitment remains the primary foundation for most economic development organizations. A successful recruitment program can benefit a region or community by providing job growth and significant capital investment.

Over time, recruitment strategies have become much more sophisticated and savvy. First, due to increasing calls from community members for “smart growth”<sup>22</sup> and greater attention being paid to issues of sustainability, economic developers increasingly must understand the types of jobs and businesses that are desired by—and compatible with—their communities. In addition, practitioners today must compete with thousands of other jurisdictions for a dwindling number of relocates in any given year. So, they must also better understand a desired company’s needs and location decision factors, and then design targeted, quantitative marketing campaigns to reach and persuade that company.

The following are examples of recruitment activities:

- Site Selection
- Marketing and Marketing Material Development
- Prospecting (identifying, targeting and making the first contacts with potential relocates)
- Trade Shows
- Participation in Cluster-Related Activities
- Involvement in Regional and National Networks
- Creating and Packaging Incentives
- Provision of Information/Facilitation of Relationships
- Relocation Assistance

### **Business Retention and Expansion**

As mentioned above, recruitment is not the only game in town anymore. Increasingly, retention and expansion programs are being seen as vital components in an organization’s economic development toolkit. Most importantly, study after study has shown that, in most communities, existing businesses are responsible for the vast majority of jobs created. In addition, residents around the state have become much more vocal in their insistence that a larger share of community/region resources be used to take care of businesses that are already in place (and in some cases have been in place for decades) rather than to bring in new firms.

Retention and expansion programs are designed to help local businesses grow during good economic times and survive the tough times. The latter task is just as critical as the former; preventing layoffs, a relocation, or an outright closure is just as important as creating new jobs.

However, retention and expansion efforts can be time-consuming and resource intensive; few organizations can implement a comprehensive program on their own. One strategy for overcoming this limitation is to take a targeted approach. Many organizations either 1) focus their survey efforts/company visits on the largest or most important employers; 2) use a multi-year cycle so that not all firms are contacted at the same time; or 3) utilize a system that addresses the concerns of those businesses that are most at risk of closing, moving, or downsizing. Another strategy involves sharing the load among several organizations. Chambers of commerce, industry trade associations, downtown groups, cluster organizations, and municipal economic development agencies all often play a large role in retention and expansion activities.

It should be noted, as well, that the effectiveness of retention and expansion efforts—even more so than recruitment activities—is very difficult to measure and justify.

Below are some examples of retention/expansion activities:

- Local Employer Visits
- Survey Programs
- Export Assistance/International Trade Promotion
- Involvement in Local Networks
- Participation in Cluster-related Activities
- Provision of Information (Website, Newsletter, Direct)
- Workforce Development Assistance/Training
- Problem-solving
- Increasing the Competitiveness of Local Businesses

### **Business Creation**

The third major area that economic developers focus on is business creation. New small businesses in a community are another vital source of job growth; in particular, during economic recessions, many people on the unemployment rolls start up new businesses.

With the amazing success of large, global firms like Google, Microsoft, and Dell that were originally very small startups, many economic development organizations now devote considerable effort to encouraging entrepreneurship, transferring technology from universities to the marketplace, incubating innovative new companies, and helping them find traditional financing or venture capital. Organizations such as small business development centers, university research parks and technology transfer offices, business incubators, and entrepreneur networks, as well as traditional economic development agencies, all contribute to business creation efforts.

The following are examples of creation activities:

- Entrepreneurship Education/Training
- Assistance Starting a Business: Business Plans, Record Keeping, Financial Assistance, etc.
- Evaluation of Business Ideas
- Assistance in Locating Financing/Capital
- Advanced Management and Operations Assistance
- Incubator/Research Park Operations
- Technology Development/Technology Transfer

### **Additional Economic Development Activities/Strategies**

Almost everything economic developers do can be tied back to those three main components. Since the ultimate goal of an economic development program is to improve the standard of living by increasing the number of quality jobs for the citizenry, all relevant activities will either help to 1) create new businesses locally; 2) assist existing businesses; or 3) bring in new businesses from the outside. However, there are a few ancillary activities that are often mentioned separately,

even though technically they do assist with the basic tasks of business creation, recruitment, or retention and expansion (and usually all three).

*Tourism Development:* Tourism as an industry accounts for a sizeable share of total employment in Arizona. It is also a basic activity: one that brings a great deal of outside money into the state. Entities such as convention and visitors bureaus, tourism agencies, downtown associations, chambers of commerce, and industry associations are all concerned with tourism promotion and development.

*Workforce Development:* Most companies today indicate that finding a skilled workforce is their number one concern. For this reason, economic developers are very interested in activities like improving the K-12 educational system; developing and implementing university, community college, distance learning, and workforce-training programs; and even recruiting talented individuals from elsewhere around the world. There are also substantial federal, state, and local dollars available for job training and retraining.

*Community Development:* Community development can be thought of as a larger process that includes economic development, but also involves improving the social, leadership and environmental aspects of a community. Quality-of-life issues have always been important for residents, but they are becoming increasingly important for many businesses and the labor pool they're trying to attract, as well.

*Real Estate/Property Management:* Some economic development agencies have taken it upon themselves to own land or speculative buildings (buildings built before a tenant has been identified) in order to simplify recruitment, sell or lease space in order to generate revenue, or run business parks or incubators to enhance their other efforts.

*Technology Development:* In order to attract high-technology businesses, economic developers are focusing on telecommunications infrastructure, university partnerships, technology transfer, research parks, and the quality of life issues that are important to footloose entrepreneurs, the "creative class,"<sup>23</sup> and other young, highly-educated workers.

*Export/International Trade Development:* Economic development organizations recruit foreign-based companies now more than ever, and also help local firms find new export markets or recruit global talent, organize international business missions, and participate in knowledge networks that include cities on other continents.

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<sup>20</sup> Blakely, Edward J. and Ted K. Bradshaw. *Planning Local Economic Development: Theory and Practice*. (Thousand Oaks: Sage Publications, Inc., 2002).

<sup>21</sup> There is a difference between economic *development* (as defined in the main text) and economic *growth*.

Economic growth typically refers to job growth, increased aggregate or regional incomes, expanded tax bases and the addition of new businesses and industries. It does not inherently explain if the economy is better or worse.

<sup>22</sup> “Smart Growth” refers to a continuous land use planning process used to guide the preservation, development, or redevelopment of a neighborhood, community, or region in order to promote the goals and ambitions of its residents when facing growth pressures. Long-term sustainability, quality of life, infrastructure, and land use are typically key considerations in the process.

<sup>23</sup> In his book *The Rise of the Creative Class: And How it's transforming work, leisure, community and everyday life* (New York: Perseus Book Group, 2002), an economist and social scientist Richard Florida defines the creative class as a class of workers whose job is to create meaningful new forms. The creative class is composed of scientists, engineers, university professors, poets, architects, people in design, education, arts, music and entertainment, and others who are in positions that are knowledge-intensive and that usually require a high degree of formal education.

## Chapter 4

# ARIZONA'S ECONOMIC DEVELOPMENT ORGANIZATIONS

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### KEY POINTS

- Economic development encompasses a wide variety of activities and numerous organizations in Arizona are concerned with economic development in some fashion.
- Both the public and private sectors contribute to economic development in our state, and successful public/private partnerships are numerous.
- The field of economic development is much more sophisticated now than it was several decades ago and it continues to be refined by its practitioners. New challenges such as dwindling resources, changing roles and responsibilities, and inter-jurisdictional conflicts—all considered in the context of the current economic recession—will have to be addressed.
- New opportunities include new federal stimulus dollars, increasing regional cooperation, and emerging industries like bioscience and alternative energy.
- Overall, trends like globalization, diversification, sustainability/smart growth, and regionalization will continue to have a lasting impact on the way the profession operates.

This chapter catalogs the types of organizations in Arizona that are currently doing economic development work. Although not meant to be an exhaustive list, it will point out the variety and sheer numbers of economic development entities that exist.

Throughout the state of Arizona, there are numerous organizations dedicated to carrying out the economic development functions described in Chapter 3. There exist a variety of public-sector and private-sector entities, as well as organizations that receive both public and private funding. In addition, the field contains both for-profit and non-profit organizations. Again, the following is not a comprehensive list but is meant to give an idea of the many types of groups operating in the state.

### PUBLIC-SECTOR ORGANIZATIONS

#### Federal Agencies

There are several agencies in the U.S. federal government that provide resources and leadership for economic developers in Arizona. Most importantly, the Economic Development Administration, part of the U.S. Department of Commerce, takes a lead role by promoting innovation and competitiveness through a variety of investment programs including technical assistance, trade adjustment assistance, and public works. Arizona's U.S. Export Assistance Centers, part of the U.S. Commercial Service, are dedicated to helping Arizona companies



develop international markets. Several other federal agencies, including the Small Business Administration, the Department of Housing and Urban Development, the International Trade Administration, and U.S. Department of Agriculture Rural Development provide grant funding and other financial assistance for economic development projects, as well.

### **Economic Development Districts**

Economic Development Administration (EDA) funds economic development districts in economically-distressed regions throughout the country in order to help them create and update a long-term strategy and then apply for grant funding. There are four EDA-designated economic development districts in the state of Arizona: the Northern Arizona Council of Governments, the Central Arizona Association of Governments, the SouthEastern Arizona Governments Organization, and the Western Arizona Economic Development District (a private non-profit).

### **Councils of Governments**

There are six Councils of Governments (sometimes called Regional Councils) in Arizona and all of them partner in economic development activities to some extent although they rarely have staff solely dedicated to economic development; three of the six are also economic development districts and are listed in the previous paragraph. A Council of Governments is a public organization that encompasses a multi-jurisdictional regional community and serves the local governments and the citizens in the region by dealing with issues and needs that cross city, town, county and even state boundaries.

### **Arizona Department of Commerce**

Historically, the Arizona Department of Commerce had been the state's community and economic development agency, and had partnered with other organizations around Arizona to address a variety of economic development challenges. It has been particularly valuable for the state's rural areas, although recent budget cuts have diminished its capacity in this area. It has run a variety of programs including global marketing and promotion; export assistance; workforce programs including the Arizona Job Training program; a small business assistance program; the Office of Smart Growth; an Energy Office; a Film Office; several incentive programs including the Enterprise Zone program; a research division; and numerous community development programs like the Rural Economic Development Initiative, Arizona Main Street, and the Greater Arizona Development Authority.<sup>24</sup> Two other state agencies, the Department of Economic Security and the Department of Education, also assist Commerce in its mission.

### **Universities and Community Colleges<sup>25</sup>**

All three state universities have entities involved in economic development, although none have a dedicated economic development office any longer. Northern Arizona University (NAU), the University of Arizona (UA), and Arizona State University (ASU) all have affiliated incubators or research parks, as well as offices that handle technology transfer functions and business/entrepreneurship training. Other entities like NAU's Arizona Rural Policy Institute, ASU's Center for Competitiveness and Prosperity Research, and UA's Economic and Business Research Center provide a variety of research and analysis services. In addition, the University of Arizona is home to the state's EDA University Center, which provides economic development research and technical assistance support around the state through the Arizona Cooperative

Extension network; and the Arizona Economic Development Course. Community colleges around the state also provide economic development services, including small business development centers and workforce training and development.

### **County/Municipal Economic Development Departments**

Most cities, towns, and counties in the state have economic development departments. These entities often work with other departments that have planning/zoning/development services, transportation, and finance functions in order to do economic development work. County and municipal departments may work with larger regional organizations, and often focus on strategic planning, retention and expansion programs, and business creation, although some do engage in recruitment activities. Regardless, they are concerned with enhancing and utilizing local tools and incentives such as tax abatements, zoning, and infrastructure provision.

## **PRIVATE-SECTOR ORGANIZATIONS**

### **National/International Groups**

Many national and international organizations exist to serve the economic development community, or a specific subset of it. Groups like the Committee for Economic Development, Association of University Research Parks, National Association of Counties, National Association of Development Organizations, the National Business Incubation Association, and the Council for Community and Economic Research provide networking opportunities, research services, and other membership benefits. The world's largest membership organization serving the profession is the International Economic Development Council (IEDC). IEDC provides numerous professional development opportunities including conferences; advisory services and research; publications; legislative advocacy; and the Accredited Economic Development Organization program, which provides feedback and recognizes excellence in the profession.

### **Arizona Association for Economic Development**

The Arizona Association for Economic Development (AAED) is the state's premier economic development membership organization, with over 500 practitioner and provider members. It offers leadership and networking opportunities, lobbies at the state level for economic development interests, and serves as a communication forum for the profession by hosting conferences and meetings and publishing newsletters.

### **Arizona Small Business Association**

A not-for-profit organization that focuses on retention and expansion, the Arizona Small Business Association provides professional services, and education and networking opportunities to help Arizona businesses save money, make money and create opportunities.

### **Financing/Lending/Venture Capital**

Scores of banks, credit unions, venture capital groups, angel investors, and other debt or equity financing organizations exist in the state and are vital to economic development processes, particularly for business startups.

### **Utilities**

Utility companies have been active in economic development for decades. Arizona Public Service and Salt River Project, in particular, have active economic development departments. Other utilities such as Southwest Gas, Cox Communications, and Qwest are also interested in expanding their ratepayer base while improving the state's economy at the same time.

### **Other Businesses**

A range of other private, for-profit companies such as those in real estate and development, construction, architecture, engineering, consulting, and transportation participate in economic development efforts and networks, because new business activity is good for both the community and their bottom-line.

## **PUBLIC-PRIVATE ORGANIZATIONS/PARTNERSHIPS**

### **Greater Phoenix Economic Council**

The Greater Phoenix Economic Council (GPEC) is probably the largest economic development organization operating in the state today. It also illustrates two trends that have driven the formation of many other groups in Arizona: it is a regional organization, and it is funded by both public and private partners. GPEC is supported by Maricopa County, 18 municipalities and over 140 private-sector investors. It provides a variety of business development services, but primarily operates as the Phoenix metropolitan area's top recruitment and site selection organization. It is heavily involved with the aerospace, bioscience, health care, high-tech, and solar clusters, and also is working in the areas of international commerce and sustainability.

### **Tucson Regional Economic Opportunities, Inc.**

Tucson Regional Economic Opportunities, Inc. (TREO) is a similar regional public-private economic development group that serves the Tucson metropolitan area. It was formed in 2005 when several public and private organizations merged, and is now the lead agency for the greater Tucson region. As with GPEC, TREO focuses on business attraction and cluster/sector development, but also is a source of several valuable resources for existing local firms. TREO has targeted its business development efforts on Tucson's strongest industry sectors: aerospace, bioscience, solar, and transportation and logistics.

### **Chambers of Commerce and Trade Associations**

There are chambers of commerce, chamber coalitions and trade associations in all corners of Arizona; these organizations may have public funding, but are also membership-supported (and many take no government funds at all). These groups exist to serve their members, and so primarily focus on retention and expansion activities. State organizations like the Arizona Chamber of Commerce and Industry, and the Arizona Restaurant and Hospitality Association do similar work on a larger scale and do not receive any public funding. The focus of statewide organizations is to advance legislation to improve the business climate and promote economic development.

### **Tourism Promotion Organizations**

Tourism is extremely important to the state, and tourism promotion is a vital economic development activity. Convention and visitors bureaus, tourism industry associations, and other groups use a mix of public and private funding to help strengthen the industry, assist new businesses to get started, promote Arizona and its communities worldwide, and help to recruit tourists and conventions.

### **Technology Incubators/Research Parks**

Incubators and research/technology parks are also great examples of public-private partnerships that are contributing immensely to the economy of Arizona through technology transfer, intellectual property protections, entrepreneurial and start-up assistance, and help matching good business ideas with funding sources.

### **Airport Authorities**

Airports are vital economic development tools for communities and regions. Airport authorities not only run airports but work to promote local air travel and serve the needs of local businesses and potential new businesses. In addition, airports often include industrial parks that go beyond airport-related uses such as industrial and warehouse uses. Areas zoned for industrial/warehouse uses, located near transportation infrastructure (such as airports or rail), often have tax benefits.

### **Downtown Associations/Main Street Programs**

Both urban and rural areas in Arizona want the vibrant downtowns their communities used to have, and so are increasingly trying to revitalize their downtown business districts. Both downtown associations and Main Street programs are examples of organizations serving this need.

### **Workforce Development Partnerships**

As mentioned previously, labor and workforce issues are often at the top of the list of businesses' concerns. With the passage of the Workforce Investment Act in 1998, an extremely innovative workforce development system—called the One-Stop Delivery System—was created nationwide that is a shining example of a successful partnership. The idea is that multiple workforce partners collaborate to create a seamless system for adults, youth, and displaced workers in need of job search assistance, training, and employment opportunities. These One-Stop Career Centers are overseen by Workforce Investment Boards made up of private- and public-sector representatives. Partners in the One-Stops include County Boards of Supervisors, private organizations such as the Yuma Private Industry Council, community colleges and high schools, the Arizona Department of Commerce, the Arizona Department of Economic Security, the Arizona Workforce Connection network, and many others.

### **Other Local/Regional Organizations**

There are numerous other local or regional organizations—either private or public-private in nature—doing some mixture of recruitment, retention/expansion, or creation work around the state. Examples include Greater Yuma Economic Development Corporation, Central Arizona Regional Economic Development Foundation, Sierra Vista Economic Development Foundation,

Verde Valley Regional Economic Organization, Southeast Arizona Economic Development Group, and Bullhead Regional Economic Development Authority.

### **ARIZONA'S NATIVE NATIONS AND ECONOMIC DEVELOPMENT\***

Economic development is sometimes a controversial topic in Indian Country. The needs in many Native communities are substantial. Poverty and related problems have long given American Indian and Alaska Native nations ample reason to look for ways to increase economic activity. At the same time, some Native people have been concerned about what development might mean for them, associating it with assimilation into the mainstream society, the reorganization of their communities around market forces and corporate structures, and the loss of Indigenous cultures.

The poverty of Indian Country is a historical product. As the United States seized control of Indian lands, it destroyed the basis of most Indigenous economies, leaving Native nations without the means to support their communities and leaving Native citizens with little opportunity to effectively support their families. As a result, generations of Indigenous leaders, hoping to sustain their governments and improve the welfare of their people, have seen economic development as a critical priority.

In the contemporary era of Indian self-determination, this commitment to development has led to diverse strategies, reflecting not only different opportunities or assets but different cultures and diverse preferences for economic outcomes. Development, as found in Native America, takes multiple forms. In one community it may involve casino gambling; in another, expanded subsistence hunting and trapping; in yet a third, manufacturing or timber harvesting or internet marketing of art created by the nation's citizens. In a fourth, it may involve all these things—and numerous others—at once. This suggests a spacious definition of development. Elsewhere, we and our colleagues have defined development as “the process by which a community or nation improves its economic ability to sustain its citizens, achieve its sociocultural goals, and support its sovereignty and governing processes.”<sup>26</sup>

As this suggests, Native nations pursue development for multiple purposes: to enhance political clout, to gain resources for land purchases, to fund litigation in support of rights, to fund programs that revitalize language or improve community health, to sustain their own governments, to educate their people, to reduce their dependence on outside funds and decision-makers, or to support some other purpose, economic or not. In our experience, few Native nations are primarily concerned with making themselves rich. Nor are they merely interested in generating jobs and income, as important as those things may be in improving the quality of life in Native communities. Instead, they are trying to be successful *as nations and as communities* while reserving to themselves the power to decide what “success” means—economically, politically, socially, and culturally.

Recognizing this, Duane Champagne, professor of sociology at UCLA and a citizen of the Turtle Mountain Band of Chippewa, argues that many Native nations are participating in capitalist development—but that it is a particular kind of capitalism. He calls it “tribal capitalism,” an approach that seeks a balance between “community and cultural protection and the enhancement of tribal sovereignty” on one hand and material gains on the other.<sup>27</sup> It is an approach that consciously takes into account the effects of various development strategies on culture, social

relationships, land relationships, political autonomy, and other aspects of community life—things that are typically absent from profit-and-loss statements but are critical to most Native nations. Balancing them all is part of the development challenge these nations face.

### **Organizations Addressing Native Nations Economic Development**

The American Indian Chamber of Commerce of Arizona (AICCAz) is a non-profit organization funded in 1995. Its focus is on the promotion of American Indian entrepreneurs, their businesses and connection with other businesses. The Chamber also provides resources, training and networking.

The Center for American Indian Economic Development (CAIED) is located on the campus of Northern Arizona University and provides information, technical assistance, business consulting and training, and educational workshops to Arizona tribes.

The Native Nations Institute (NNI) based out of the Udall Center for Studies in Public Policy at The University of Arizona, along with its' sister program, the Harvard Project on American Indian Economic Development (HPAIED) at Harvard University works in many areas of economic research with Native Nations. Among its many research and outreach areas, NNI works directly with Native leaders to document what is working in various community development and governance arenas, and to develop reliable, rigorous analyses that tribal decision-makers can use as their new strategies and tools.

### **ISSUES AND TRENDS SHAPING ECONOMIC DEVELOPMENT**

A variety of factors affect the way economic development organizations operate and determine how successful they can be. There are many larger economic and societal trends that economic developers are keenly aware of and that help to shape their agendas. In addition, these organizations continue to face a variety of challenges that often make it difficult to do their work effectively. Listed below are some of the major issues and trends.

#### **The Economic Cycle**

The economy has always moved up and down, but a consistent economic development program helps to smooth out those troughs and peaks. Unfortunately, when the economy is in recession, as is the case currently, citizens and politicians alike would rather focus attention—and money—on other pressing concerns, rather than supporting economic development activities. Conversely, when the economy is growing, economic development is seen as unnecessary.

#### **Globalization**

For better or worse, the nations and regions of the world are becoming more interconnected every day. This provides both opportunities and risks for Arizona's communities and businesses. Labor and capital are increasingly free to locate anywhere, or at least any place that provides the communications, transportation and financial infrastructure that are required. However, this means that both firms and cities must compete on a global level.

#### **Regionalization**

One way for communities to compete on a worldwide stage is to band together with their neighbors to increase opportunities and minimize weaknesses. More and more places in Arizona

have realized that it makes sense to pool resources, create regional strategic plans, and both serve and market a larger region.

### **Resource Limitations**

If there's a constant in the economic development world, it's that there's never enough in the way of resources. Economic development organizations are chronically underfunded and/or understaffed. It's also difficult to obtain the data necessary to make good decisions because 1) publicly-accessible data are almost always released months or years after they are collected, 2) data for smaller geographic areas are often not available, and 3) it's often expensive and time-consuming for economic development organizations to collect their own data.

### **Jurisdictional Conflicts**

As demonstrated in the previous section, there are a variety of organizations in the state that operate at different scales and serve different constituencies. On a geographical basis, statewide agencies may have different objectives than individual communities. Even regional groups may feel pressure from the municipalities that fund them to produce equal results in all jurisdictions. On an operational level, different organizations in the same community often duplicate efforts, work at cross purposes, or hold different views on key political issues.

### **Accountability**

Economic developers have a hard time finding good data, but the constituencies they serve have the same problem: how should the performance of economic development organizations be measured? How can a myriad of factors such as the economic cycle, collaboration between multiple agencies, the quality of jobs created or retained, and the long-term nature of the economic development process be accounted for?

### **Incentives**

Incentives are a hotly-debated topic. Economic developers in Arizona are severely hampered by the state's lack of incentives when competing for quality relocating firms. However, despite the availability of new tools that practitioners can use to ensure that those companies create quality jobs over the long-term, citizens, politicians, and even existing firms remain concerned about what's sometimes called "corporate welfare."

### **Diversification, Sustainability and Quality of Life**

These terms may be hard to define, but they are becoming hugely important to economic developers across the state. Communities that are largely dependent upon one or two industries realize that they need to diversify their economies or risk a catastrophic shock should those industries decline. In addition, more and more citizens understand that they should consider the long-term future of their communities, not just the next few months or years; they also see that the economy, social networks and the environment are inextricably linked. Finally, practitioners are grappling with the importance of quality-of-life issues, both to companies targeted for relocation and to a high-quality labor force.

## The “New Economy”

There are always opportunities available for economic developers in addition to the many challenges they face. New business sectors are being created every day and the potential for new, quality jobs is growing. Green building, restoration, alternative energy production and manufacturing, bioscience, and emerging high-tech are all examples of new possibilities for economic development in the state.

**Erik Glenn** is an area assistant agent in community resource development for The University of Arizona Cooperative Extension. In this capacity, he works with community and economic developers, planners and landowners in Yavapai, Coconino and Mohave counties. He also serves as project manager of the Regional Center for Sustainable Economic Development, an Economic Development Administration-funded university center that provides economic development research and technical assistance services to the entire state through the Cooperative Extension network. Glenn is director of the Arizona Economic Development Course, as well. This course, accredited by the International Economic Development Council, provides intensive training in the basics of economic development. He received his Bachelor of Science degree in regional development in 1995 and his Master of Arts degree in geography in 1996; both degrees are from The University of Arizona.

**\*The section on Native nations was written by Stephen Cornell and Miriam Jorgensen.**

**Stephen Cornell** is professor of Sociology and director of the Udall Center for Studies in Public Policy at the University of Arizona. Among his publications are *The Return of the Native: American Indian Political Resurgence* and *What Can Tribes Do? Strategies and Institutions in American Indian Economic Development* (co-edited with Joseph P. Kalt). A specialist in political economy and cultural sociology, Cornell holds a PhD degree from the University of Chicago and taught at Harvard University for nine years before moving to the University of California, San Diego, in 1989 and then to The University of Arizona in 1998.

**Miriam Jorgensen** is research director of the Native Nations Institute for Leadership, Management, and Policy at the University of Arizona and Research Director for the Harvard Project on American Indian Economic Development at Harvard University. She is editor and co-author of *Rebuilding Native Nations: Strategies for Governance and Development* and a contributing author of *The State of the Native Nations: Conditions under U.S. Policies of Self-Determination*. She received her B.A. in economics from Swarthmore College (1987), B.A. and M.A. in human sciences from the University of Oxford (1989, 1995), M.P.P. from the Kennedy School of Government at Harvard University (1991), and PhD from Harvard University (2000).

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<sup>24</sup> At the time of the preparation of this background report, most of these programs have been eliminated due to budget cuts.

<sup>25</sup> The role of universities and community colleges in the economy of southern Arizona has been discussed in 2009 report *Supporting the Contribution of Higher Education Institutions to Regional Development* prepared for the Organization for Economic Co-operation and Development (OECD)’s Program on Institutional Management in Higher Education and Directorate for Public Governance and Territorial Development ([www.oecd.org/edu/imhe/regionaldevelopment](http://www.oecd.org/edu/imhe/regionaldevelopment)).

<sup>26</sup> Manley A. Begay, Jr., Stephen Cornell, Miriam Jorgensen, and Joseph P. Kalt, “Development, Governance, Culture: What Are They and What Do They Have to Do with Rebuilding Native Nations?” In *Rebuilding Native Nations: Strategies for Governance and Development*, ed. Miriam Jorgensen. (Tucson: University of Arizona Press, 2007), 36.

<sup>27</sup> Duane Champagne, Tribal Capitalism and Native Capitalists: Multiple Pathways of Native Economy.” In *Native Pathways: American Indian Culture and Economic Development in the Twentieth Century*, ed. Brian Hosmer and Colleen O’Neill. (Boulder: University Press of Colorado, 2004), 323.



## Chapter 5

# VOICES FROM THE FIELD

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and  
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### KEY POINTS

- Previous surveys from 2007-2009 have identified several factors which could affect Arizona's competitiveness in the global economy: workforce and education, infrastructure, labor costs, and geographic location. They also identified key emerging industries.
- Voices from the field include those people who work daily in economic development and have experienced the effects of state legislation, political leadership and daily business operations in the current climate.
- Their observations can offer a unique perspective to the discussion on economic development in Arizona, by reflecting on "what they see is going on" and "what needs to be done" for economic development.

### LISTENING TO THOSE WHO ARE ACTUALLY INVOLVED WITH ECONOMIC DEVELOPMENT

In this chapter the results from three different surveys are used to present opinions and perceptions of a variety of people involved with economic development, including businesses. The results are not used to show statistical significance of a particular issue, but rather to provide a glimpse in how things look in the field, where these issues are being faced on a daily basis.

### BUILDING COMPETITIVENESS WHILE COPING WITH COMPETITION

In an economic survey conducted by the University of Arizona and Arizona State University<sup>28</sup> for the Central Arizona Association of Governments in 2008, more than 20 planners, developers, and economists provided opinions regarding the future of the Arizona economy. The focus was on the economic development of the three-county megapolitan region (Pinal, Pima, and Maricopa Counties). While these voices obviously do not represent the entire state of Arizona, the three-county region accounts for an overwhelming majority of Arizona's economic activity and population growth.

The participants identified several major factors that could affect the future global competitiveness in Arizona (with a focus on the 3-county megapolitan region):

- Workforce and education: Arizona is going to have to improve the quality of its education system to compete in the global market.

- Infrastructure improvements: water and transportation infrastructure need to keep pace with demand. Recent rail and airport investments are improving the competitiveness of the megapolitan region.
- Labor costs: Low labor costs and Arizona's status as a right to work state give it a competitive advantage over some regions.
- Geographic location: Arizona can capitalize on its location relative to California and Mexico to develop transportation and distribution industries and markets for its products.

The respondents identified targeted industries for economic development efforts in the megapolitan region. These include professional services; health industries and health care; aerospace, defense and homeland security; transportation and logistics; and light clean manufacturing. They also identified biotech, bioscience, renewable energy (primarily solar) and sustainable industries as important emerging industries in Arizona.

### **RETENTION AND EXPANSION OF EXISTING BUSINESSES**

As discussed in Chapter 3, business retention and expansion activities (BRE) are one of the core components of economic development programs. The Arizona Association of Economic Development (AAED) conducted a statewide survey<sup>29</sup> of economic development professionals and businesses to elicit opinions over a vast range of issues that affect Arizona's communities. The businesses included representatives from both economic base and non-base activities. Surveys were conducted during 2007 and 2008 and the results were summarized in the 2009 *B3 Report*. While many of the responses are specific to local areas rather than directly representative of the state as a whole, the data still provide a good indicator of overall perceptions of strengths, weaknesses and needs as they relate to economic development.

Among other things, businesses were asked to rate the availability, quality and stability of workers in their area. When evaluating the overall workforce, businesses rated the availability and quality of workforce just above the average. But almost half (47.5%) of the companies indicated that they were having difficulty recruiting for specific skills. The greatest recruiting problems at the industry level were experienced by building and construction, advanced manufacturing, and aeronautics and defense.

When asked how local economic development organizations can facilitate business growth, the responses included a common mix of tools: transportation and rail enhancement, workforce attraction, business development services, workforce training, and financial assistance.

The importance of this survey is that it emphasizes the role of existing businesses, which may have been often overlooked during competition for new companies from out of state.

### **ECONOMIC DEVELOPMENT TOOLS AND NEEDS**

In the preparation of this background report for the 96<sup>th</sup> Town Hall, the intention was to probe the pulse of economic development professionals – people who deal with issues of economic development on daily basis. Given the time constraint, a short survey instrument was designed containing only two basic questions and sent to the membership of Arizona Association for Economic Development.<sup>30</sup>

The first question was related to current economic development practices: “What have been the most successful economic development tools at the statewide or local level and /or what have been the major obstacles?” The second question was related to Arizona’s future: “What needs to be changed/improved in the economic development approach to make Arizona more competitive and more successful in creating quality jobs?”

Although limited in scope, this survey added to the findings of the two earlier surveys done by the Arizona Association of Economic Development (2007, 2008) and the Central Arizona Association of Governments (2008), as well as the other background information provided in this report. Respondents here reflected on the tools and obstacles for economic development at the statewide level, and expressed detailed responses on how state policies have been implemented and perspectives of state leadership. Many verbalized a disconnect with lawmakers on business policies for the state and felt the “laissez faire” approach contributed to a lack of economic competitiveness in Arizona, especially compared to other states. Legislation was reviewed in terms of what has worked and what has not resulted in success. The respondents’ analysis of these policies and political leadership is significant, because they are the people who operate in daily economic development and can point to “what is going on” and “what needs to be done” based on experience.

Regarding the existing tools, one respondent wrote: “Workforce training and business assistance programs are often the most successful. Helping a client navigate through the often time cumbersome development process is a tremendous benefit and service that ED agencies provide. And of course, workforce training is critical to the potential investor; it is also a quality of life issue.”

Another respondent sees great promise in the recently enacted Renewable Tax Credit (SB1403).<sup>31</sup> “It is now becoming the best tool ...and it is nearly our only tool... Job Training used to be one of the best... but it does not have funding. The current Enterprise Zone is very limited, and usually the companies that we want the most cannot qualify.”

“In my opinion,” wrote another respondent, “the corporate regulatory/anti-business climate in California has worked to Arizona’s advantage for perhaps two decades but is diminishing in effectiveness as Nevada and Utah have stepped up to the plate and became more aggressive in their state economic development policies and incentives.”

The importance of the Arizona Renewable Energy Tax Credit (SB1403) was echoed by another respondent. The bill “shows a great deal of promise and has been critical to getting Arizona back in the game of being competitive with other states. The major obstacle has been the Legislature’s practice of ‘sweeping’ accounts. It has wrought havoc with job training funds, the tiny ‘deal closing fund,’<sup>32</sup> and others.”

Leadership was an important facet for one respondent, who spoke of it in detail. “I think that it all boils down to leadership and the lack thereof. This comment pertains to both the public and private sectors. Without strong leadership and commitment, Arizona will continue to be a second

tier product. With effective leadership the other necessary ingredients will fall into place. These items obviously include a well funded organization that can stand out above the crowded competition; a professional and innovative staff; and a compelling ‘product’ that can be differentiated from the competition.

This respondent continued by adding how critical diverse efforts are for a prosperous and global Arizona economy. “We also need a proactive and aggressive international business development effort and we have to be extremely innovative in adapting to changes in the global economy. Another important attribute that continues to allude us is an understanding that a blended approach to creating economic prosperity includes recruitment, retention and entrepreneurial development. Because of the parochialism that exists in communities and organizations throughout the state we divide these activities and are less competitive as a result. I have learned throughout my economic development career that you do not have to have the best product to win. It is such a shame that Arizona – that is such a great product -- cannot get its act together.”

Several respondents also discussed these notions of leadership and diversification, and compared existing state policies as well as their views on potential legislation. For example, one respondent wrote, “Tort reform is a critical necessity to the state of Arizona. Business ventures are skeptical about their ability to be profitable once they invest in Arizona while not being able to have a firm grasp of their true costs of doing business.”

The respondent continued, “A balanced, diversified state economic development policy that is supported by public resources is also a key to long-term success. Rather than just having the plan, Arizona also needs to be able to back-up their commitment to quality economic development by providing the necessary public investment to make this happen. Economic Development has to be a top three priority for the Governor, the Senate and House, and every state agency. Everyone has a role to play and everyone needs to be on the same page.”

Another respondent spoke of existing policies and necessary changes. “SB1403 was a great start... shows how an incentive can be used... only problem is that it is limited to Renewable companies only. A re-work of the Enterprise Zone program<sup>33</sup> is sorely needed and in my opinion, the number one priority. This re-work needs to be using the advice of actual economic developers throughout the state. (Currently, the GPEC proposal has input from most of the state economic developers.) Job Training could again be successful and helpful if it was funded...but we can’t have these programs that we can’t count on. TIF (Tax Increment Financing)<sup>34</sup> could help us locate projects as well ... we are the only state that doesn’t use it. In closing, I think one of the most important elements for developing tools is to work with the Economic Development practitioners in our state. They are the ones who know what it takes to locate these companies. Too often proposals are thrown out that don’t have an input from ED practitioners, although they may be helpful.”

Finally, a third respondent directly discussed political leadership. “This ‘hands-off’ laissez-faire attitude by our state legislature desperately needs to change. It may play well with votes at the polls but it is killing this state’s ability to compete with our direct competitors (i.e., states like Nevada, Utah, Texas, New Mexico, and Oklahoma), pre-SB1403 we were losing solar deals to

Oregon for gosh sakes! And globally... we aren't even in the game. Someone needs to sit the Governor and the entire body of both legislative houses down and lay out for them why this hands-off philosophy isn't working in today's market place and what it will take organization and incentive-wise if we truly want to be competitive. In language they might understand: 'in the global gunfight that is modern day economic development, Arizona is armed with a pocket knife'."

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<sup>28</sup> William P. Patton and Tom Rex, *Pinal Projections Study: Economic White Paper* (prepared for the Central Arizona Association of Governments, October 2008).

<sup>29</sup> Interviews included participants from Camp Verde, Chino Valley, Cornville, Cottonwood, Flagstaff, Gilbert, Glendale, Goodyear, Maricopa, Mesa, Page, Peoria, Phoenix, Prescott, Prescott Valley, San Luis, Scottsdale, Sedona, Show Low, Snowflake, Surprise, Taylor, Williams, Yucca and Yuma. Source: Arizona Association of Economic Development, B3 Report, Monitoring the Economic Pulse of Arizona, 2009 Executive Summary (Arizona Business Retention and Expansion Council), [www.AAED.com](http://www.AAED.com)

<sup>30</sup> A special thank you goes to Bruce Coomer, executive director of the Arizona Association for Economic Development (AAED) who distributed survey instrument to AAED's membership. We thank the following respondents who provided their opinions: Southern Gila County Economic Development, APS Statewide Comm & Economic Development, Apache Junction Economic Development, and Falcon Field Area Alliance.

<sup>31</sup> According to Database of State Incentives for Renewables & Efficiency (DSIRE): "SB 1403, signed in July 2009, created tax incentives intended to draw renewable energy product manufacturers to Arizona. Specifically, income tax credits and property tax incentives are available for companies choosing to establish or expand their manufacturing facilities and corporate headquarters in Arizona. To be eligible the business must meet certain minimum requirements for the quality and quantity of new jobs created. The bill stipulates different incentive levels depending on how many full-time jobs are created and the salary for those jobs."

[http://www.dsireusa.org/incentives/incentive.cfm?Incentive\\_Code=AZ41F&re=1&ee=1&](http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=AZ41F&re=1&ee=1&)

<sup>32</sup> At the time of the preparation of this report, the Arizona Deal Closing Fund was incorporated in the Arizona Economic and Job Recovery Bill proposed by the Speaker of the House on January 5, 2010. According to the official release, the Arizona Deal Closing Fund "will provide incentive funds to attract much needed, high-impact base industries to the State... Seeding of this fund would come through a use of existing Arizona Federal Stimulus proceeds, and maintained through a percentage of withholding tax revenue generated from the newly-created quality jobs and job training programs at base industry companies." Source: Fact Sheet, Arizona House of Representatives. [http://www.evp\\_az.org/documents/FACTSHEET.DOC](http://www.evp_az.org/documents/FACTSHEET.DOC)

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<sup>33</sup> Arizona enterprise zones are designated by the Arizona Department of Commerce. The primary goal of the Arizona Enterprise Zone (EZ) program is to improve the economies of areas in the state with high poverty or unemployment rates. The two incentives provided under the EZ program are Income or Premium Tax Credits, and Property tax Benefits. The program was set up in 1989.

<http://www.azcommerce.com/doclib/finance/ez%20summary.pdf> In March 2010, the Arizona House Speaker introduced bill HB 2250 to expand the program and make the entire state one large enterprise zone until 2016 to attract companies in specific industries. Source: Kristena Hansen Cronkite “House speaker proposing enterprise zone expansion,” *Arizona Daily Star* (March 17, 2010).

<sup>34</sup> According to the Cleveland, OH based Council of Development Finance Agencies, the tax incentive financing (TIF) is an increasingly popular tool for redevelopment and community improvement projects across the country. TIF captures the future tax benefits of real estate improvements in a designated area to pay the present cost of those improvements. It is designated to channel funding, or tax increment, toward improvements in distressed or underdeveloped areas where development would not otherwise occur. Arizona is the only state that has not enabled legislation for TIF. <http://www.cdfa.net/cdfa/cdfaweb.nsf/pages/tifnationalroundup.html>

## Chapter 6

# BUSINESS RETENTION, ATTRACTION AND DEAL CLOSING

Jim Rounds  
Elliott D. Pollack & Company

### KEY POINTS

- A number of factors go into business relocation or expansion decisions but the provision of select incentives appear to be closing the deals in other states.
- Arizona, unfortunately, has historically been weak in terms of support for economic development programs.
- Opportunities currently exist to enact economic development incentives that do not cost anything to provide but will still result in additional business locations to the State.
- Any new incentives need to be managed by a strong, State funded economic development entity such as a retooled Arizona Department of Commerce.

### RETENTION, ATTRACTION, AND DEAL CLOSING

Times have changed and Arizona finds itself several years behind the curve when it comes to strategic economic development. Other states (mostly east of the Mississippi River) are providing limited and very targeted economic development tools designed to have an immediate influence on business decisions. In combination with aggressive and strategically targeted business development efforts, these incentive tools have been implemented to respond to a company's primary concern of finding the best overall net economic opportunity. Arizona is considered by many as being uncompetitive in this regard. However, opportunities exist right now to strategically address these issues.

### WHAT DRIVES BUSINESS LOCATIONS?

*Site Selection Magazine* conducts an annual survey of corporate real estate executives from a broad array of industries. This survey asks each executive to list the main site selection factors they consider when evaluating a location decision. Infrastructure, workforce, and tax climate are on the top of the list (Table 6.1). Following these items are availability and cost of real estate, and regulatory concerns. Economic incentives tend to be one of the final factors in a location decision. Again, a competitive tax structure (and an adequate supply of affordable or skilled labor, etc.) may get us on the list of considered sites, but the incentive programs tend to separate the winners from the losers. In some cases, improving workforce skills can be part of the incentive package (Quality Jobs Program) as can infrastructure improvement or the offsetting of start-up costs (Deal Closing Fund, etc.).

**Table 6.1**  
**Top Site Selection Criteria,**  
**2009 Corporate Real Estate Executive Survey**

- |           |   |
|-----------|---|
| <b>1</b>  | Transportation Infrastructure               |
| <b>2</b>  | Existing workforce skills                   |
| <b>3</b>  | State and local tax scheme                  |
| <b>4</b>  | Utility infrastructure                      |
| <b>5</b>  | Land/building price and supply              |
| <b>6</b>  | Ease of permitting and regulatory procedure |
| <b>7</b>  | Flexibility of incentives programs          |
| <b>8</b>  | Access to higher education resources        |
| <b>9</b>  | Availability of incentives                  |
| <b>10</b> | State economic development strategy         |

Source: *Site Selection Magazine*

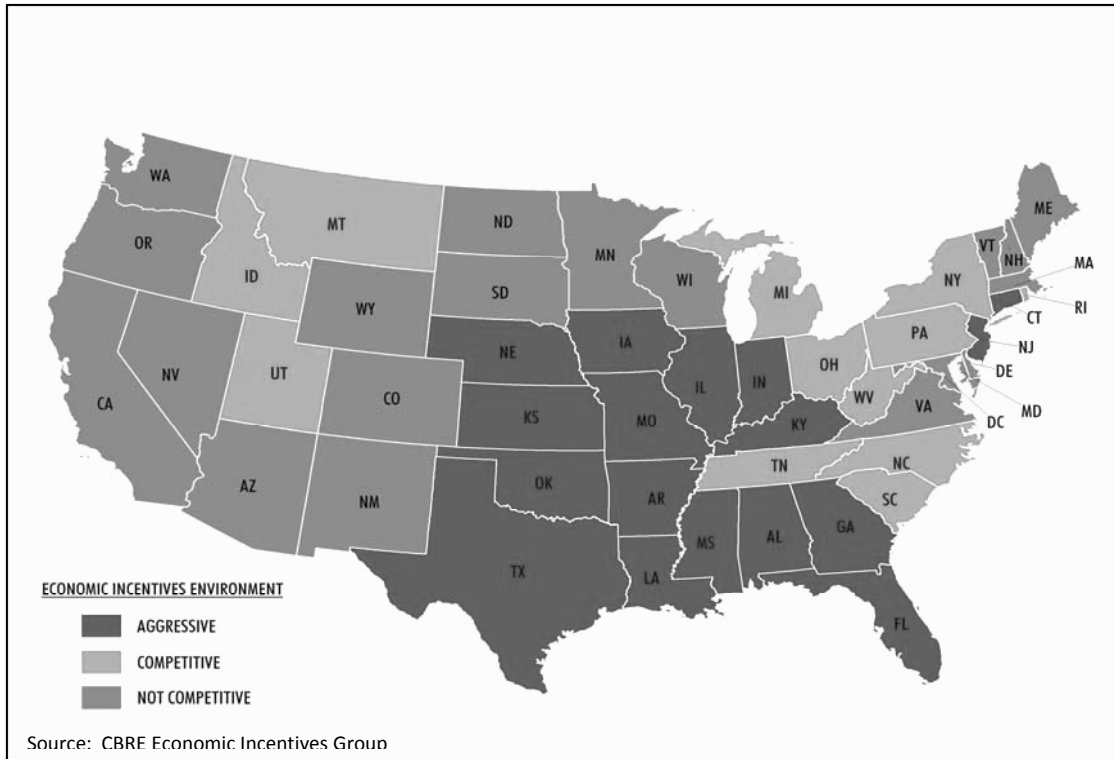
The results of the Corporate Executive Survey provide a practical and realistic picture of site selection today. Based on a 15 year history of site selection engagements conducted by the CBRE Labor Analytics Group and Economic Incentives Group, the availability and cost of adequate labor, land, and facilities are usually the most important initial site selection factors. Incentives become more decisive when competing markets have relatively similar labor costs, tax structures, employee skill levels, etc.

**HOW COMPETITIVE IS ARIZONA WITH ECONOMIC INCENTIVES?**

All things considered (including geography, transportation infrastructure, supply chain, labor cost and availability, and other factors), economic incentives play a critical role in recruiting and retaining strong economic development prospects across the United States. Figure 6.1 illustrates each state's relative competitiveness with economic incentives. This map is produced by CBRE's Economic Incentives Group and is based on the Group's extensive experience with economic incentive negotiations across the United States during the past five years, each state's main economic incentive programs, and recent precedence for offering discretionary incentives. Arizona is currently considered "Not Competitive" in this particular assessment. Note that the map does not highlight a state's economic health or ability to grow. Instead, it highlights those states that have implemented economic development programs that are likely to have a significant impact on their ability to create new, higher-wage jobs over time.



**Figure 6.1  
Economic Incentives Environment in 2009**



**CASE STUDY: A COMPARISON OF PRIMARY INCENTIVES BY STATE**

All 50 states have a number of economic incentive programs. These programs vary by type, availability, target industry, performance metrics, and methods of payment. For purposes of comparing Arizona to each state, and for simplicity, the following comparison is limited to seven incentive programs available for general commercial and industrial businesses (Table 6.2). Exclusions to this analysis are: direct business financing, municipal grants and loans, local incentive programs, and other state programs not directly available to economic development prospects. Table 6.3 shows an inventory of incentives by state.

**Table 6.2**  
**Economic Incentive Programs and Use in Arizona**

<b>Economic Incentive Program</b>	<b>State Usage</b>	<b>Arizona Usage</b>	<b>Program Description</b>
Job Tax Credit	38 of 50	<i>Limited: Enterprise Zone Program</i>	These programs provide corporate income tax credits based on job creation and/or retention. Tax credits are issued upon employment verification on an annual basis, allowed to cover between 50% and 100% of tax liability in any given year, and permitted to be carried over to future tax years should tax liability not be sufficient to cover the earned tax credits. Some states allow tax credits to be transferred/sold to third parties. A few states allow these tax credits to be refunded.
Investment Tax Credit	32 of 50	<i>Limited: Renewable Industries ("Solar" legislation)</i>	These programs provide corporate income tax credits based on capital investment in real and/or personal property. Tax credits are issued upon investment verification, allowed to cover between 50% and 100% of tax liability in any given year, and permitted to be carried over to future tax years should tax liability not be sufficient to cover the earned tax credits. Some states allow tax credits to be transferred/sold to third parties. A few allow tax credits to be refunded.
Job Training Grant	49 of 50	<i>Inactive</i>	These programs provide grants to offset a portion of a company's training costs. Grants typically cover a defined list of eligible training costs and are typically paid out on a reimbursement basis. These costs include trainer salaries, travel costs, books, materials, training facility rent, and other items. Few states allow reimbursement of trainee wages.
Payroll Rebate	9 of 50	<i>None</i>	Payroll rebates involve annual or quarterly cash refunds of a proportion of new annual payroll generated by an approved business. Payroll rebate benefits are expressed as either a percentage of gross taxable wages or a percentage of withholding taxes. Refunds are typically approved for 3 to 10 years.
Cash Grant/ Closing Fund	19 of 50	<i>Inactive/ Previously limited (CEDC Fund)</i>	Cash grant funds are discretionary incentive programs that provide upfront cash to qualified businesses whose operations have a significant economic and fiscal impact on a State. These cash grants are typically paid upon receipt of full government approvals of an economic development agreement, prior to certificate of occupancy, or within two years. State deal closing funds are part of this category.
Sales/Use Tax Exemption or Rebate	19 of 50	<i>Limited (i.e., Film Tax Credit)</i>	Sales/use tax exemptions allow for full or partial abatement of sales or use taxes due on purchases of construction materials, equipment, and/or utility usage. Most sales/use tax exemption programs are limited to certain industries, types of operations, or performance metrics (i.e., job creation or capital investment).
Other Tax Exemptions	19 of 50	<i>Limited: Government Property Lease Excise Tax</i>	Miscellaneous tax exemptions are offered by states to offset burdens of sales taxes, income taxes, use taxes, local property taxes, and fuel taxes just to name a few. These programs generally are not applicable to the typical economic development prospect. Most other tax exemption programs are limited to certain industries, types of operations, or performance metrics (i.e., job creation or capital investment).

Source: Elliott D. Pollack & Company

**Table 6.3  
Inventory of State Economic Incentives\***

State	Job Tax Credit	Investment Tax Credit	Job Training Grant	Payroll Rebate	Cash Grant/ Closing Fund	Sales/Use Tax Exemption or Rebate	Other Tax Exemptions
Alabama	X	X	X			X	X
Alaska			X				
<b>Arizona</b>	<b>X</b>	Renewable	Suspended				<b>X</b>
Arkansas	X	X	X	X	X	X	
California	X		X				X
Colorado	X	X	X			X	
Connecticut	X	X	X		X		X
Delaware	X		X	X			
Florida	X	X	X		X	X	
Georgia	X	X	X		X		X
Hawaii	X	X	X				X
Idaho	X	X	X			X	
Illinois	X	X	X		X	X	
Indiana	X	X	X				X
Iowa	X	X	X		X	X	
Kansas	X	X	X	X	X	X	X
Kentucky	X	X	X				
Louisiana	X	X	X	X	X	X	
Maine		X	X			X	
Maryland	X	X	X		X		
Massachusetts		X	X				
Michigan	X	X	X				
Minnesota	X		X			X	X
Mississippi	X		X	X			
Missouri	X	X	X	X		X	X
Montana	X	X	X		X		
Nebraska	X	X	X			X	
Nevada			X			X	
New Hampshire			X				
New Jersey	X	X	X	X		X	
New Mexico	X	X	X		X		
New York	X	X	X			X	X
North Carolina	X	X	X	X	X		
North Dakota	X		X				X
Ohio	X	X	X				X
Oklahoma		X	X	X			
Oregon			X		X		X
Pennsylvania	X		X		X	X	X
Rhode Island	X	X	X				X
South Carolina	X	X	X		X		X
South Dakota			X				
Tennessee	X		X				X
Texas			X		X	X	
Utah	X	X	X		X		
Vermont	X	X	X			X	
Virginia	X		X		X		
Washington			X				X
West Virginia		X	X		X		X
Wisconsin	X		X				
Wyoming			X				

Source: CBRE Economic Incentives Group, \*Most widely used economic development programs

## BEST PRACTICES OF ECONOMIC INCENTIVE PROGRAMS

In consultation with the CBRE Economic Incentives Group, a review was conducted on all 1,300+ economic incentives programs in their database to find the most effective, flexible, targeted, and financially significant state programs across the United States. These best practices are considered the most effective at recruiting and retaining businesses. The benefits, eligibility thresholds, and funding mechanisms should serve as the basis for any new economic incentive program in Arizona (Table 6.4).

**Table 6.4**  
**Best Practices in Incentive Programs**

<b>Job Training Grant Programs</b>	Forty-nine out of 50 states (Arizona being the exception) currently have an active State job training grant program. Most job training grant programs across the United States are funded by general appropriations and reimburse a limited proportion of actual training costs incurred by businesses. Eligible training costs tend to include trainer salaries, books, materials and supplies, travel costs, curriculum and development, and some portion of rent for a training facility. Iowa, Kansas, and New Mexico have the most effective State job training grant programs in the United States according to CBRE. These job training grant programs have unique funding mechanisms and have evolved beyond the standard program to include reimbursement of trainee wages.
<b>Payroll Rebate Programs</b>	Nine out of 50 states offer some type of payroll rebate incentive program. A payroll rebate mostly involves annual or quarterly cash refunds from a state based on a percentage of either new gross wages or new withholding taxes. This type of incentive is designed to be pay-for-performance. Incentives are directly tied to new payroll generation and job creation. Upon payroll generation and remitting withholding taxes to a state, the company is eligible for a cash refund. A state's motivation for offering a payroll rebate incentive is two-fold. First, the periodic refunds directly motivate an eligible company to create new jobs and generate new payroll. Second, the refund is delivered in the form of cash rather than tax credits or tax exemptions. Beyond the marketing benefits, a well-designed payroll rebate program can be inherently revenue neutral or positive. Cash refunds are only paid out when payroll and withholding taxes are received. Cash refunds will not exceed incoming tax revenue. Arkansas, Kansas, Louisiana, Missouri, and Oklahoma have the most effective payroll rebate programs in the United States.
<b>Deal Closing Funds</b>	Nineteen out of 50 states offer some type of deal closing fund or cash grant program. A deal closing fund involves upfront cash grants and/or forgivable loans only in highly competitive situations and only for projects with a substantial economic and fiscal impact to a state and community. Deal closing funds are mostly financed through periodic general fund appropriations. The Texas Enterprise Fund is the most plentiful, active, and highly marketed deal closing fund among the states. Arkansas, Florida, Louisiana, North Carolina, and Virginia have established deal closing funds and have been actively funding projects during 2009, according to the CBRE Economic Incentives Group.
<b>Retention Incentive Programs</b>	Nearly all statutory and discretionary state incentive programs are designed to subsidize the creation of new jobs, new payroll, and new capital investment. These programs inherently cannot support the retention of major employers and their corresponding on-going generation of tax revenues in a state. Even the payroll rebate and deal closing fund programs previously discussed focus on net new business recruitment. According to the CBRE Economic Incentives Group, there are only six state incentive programs specifically designed to target business retention. These best practices are found in Illinois, Indiana, Kentucky, Michigan, New Jersey, and Ohio.
<b>Business Personal Property Tax Exemption</b>	Recognizing the need to help reduce a company's total cost of doing business, about 10 states have statutorily eliminated <i>ad valorem</i> taxes on business personal property for commercial and industrial uses. This means that neither a municipality, county, nor school district accrue property tax revenue from business personal property. The statutorily exempt states include Delaware, Illinois, Iowa, Kansas, Minnesota, New York, New Jersey, Ohio, North Dakota, and South Dakota.
<b>Tax Increment Financing</b>	Forty-nine states and the District of Columbia have enabled the use of Tax Increment Financing (TIF) for qualified economic development opportunities. Arizona is the only state without a tax increment financing law. Tax Increment Financing allows cities to help offset a company's start-up investment by capturing increased property tax revenues generated by economic development projects. These tax revenues are used to pay back city funds (with interest) injected at the front end of the development of new industrial or commercial facilities. TIF may be used to offset the cost of public improvements and utilities that will serve the new private development, to finance direct grants or loans to a company, or to provide the local match for federal or state economic development assistance programs. TIF has been an effective economic development tool because infrastructure improvements do not leave if a company chooses to leave. Infrastructure improvements funded by TIF are a perpetual benefit.

Source: Elliott D. Pollack & Company

As shown in Table 6.3, the State of Arizona appears to be lacking the most basic tools when it comes to business recruitment and retention and is also less competitive in two primary areas of business taxation: the corporate income tax, and real and personal business property taxes.

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## Chapter 7

# CONSIDERATIONS FOR REPLENISHING THE ECONOMIC DEVELOPMENT TOOLBOX

Jim Rounds  
Elliott D. Pollack & Company

### KEY POINTS

- Arizona appears to be well behind other states in terms of having a proactive economic development plan.
- The most immediate economic impact will come from the implementation of specific, targeted economic development programs.
- The most widely used of the economic development programs include job training, reimbursements for creating higher wage jobs, and the strategic use of a deal closing fund.
- Secondary considerations may be given to the State's tax code with emphasis on easing the burden on businesses with modifications to the corporate income tax and real and personal property taxes.

### SELECTING THE RIGHT ECONOMIC DEVELOPMENT TOOLS

The following recommendations include excerpts from *The Job Recovery Package for the State of Arizona* report that was commissioned by the Speaker of the House of Representatives and written by Elliott D. Pollack & Company.

### SPECIFIC POLICY RECOMMENDATIONS FOR THE RECOVERY

There are two primary components to economic growth that could have a short term impact on the local economy: 1) the provision of a competitive tax structure, and 2) the provision of competitive economic development programs. Many studies have been written on how tax policy impacts an economy. However, most exclude the necessary economic development component. Competitive tax policy that targets base industry operations gets you "in the game", but competitive economic development policy "closes the deal." This entire recommendation can be reduced down to a singular question: How can policy makers best facilitate the closing of such deals and create higher paying base industry jobs while diversifying the economic base and stabilizing the revenue base?

Job growth and retention are achieved through the attraction and retention of base industry companies and through the internal growth of companies from within the State. There are multiple options for identifying these base industries.

The following recommendations are separated into various types. Some items will have an immediate impact on the State and also do not require a monetary appropriation to implement. Other items could require a legislative appropriation for enactment, at least in the initial stages of the program. In these cases, it is recommended that policymakers first use any remaining federal stimulus monies.

A more complicated problem arises related to focused business retention. The Arizona aerospace industry is of particular importance in this example. A “saved” job is just as valuable as a “created” job. In fact, the level of incentive needed to retain a current job is often less than the level of incentive needed to create a new job. However, current jobs are already contributing monies to the State General Fund. If an industry such as aerospace expands, and the expansion otherwise would not have occurred absent some economic development or tax law policy change, then redirecting a portion of the related new tax revenues for use on economic development will come at “no-opportunity-cost”. This means the State will not lose any tax revenue that otherwise would be here.

If a program instead focuses on retaining jobs that are already here, then redirecting a portion of the related tax revenues could cost the State when compared to current collections. In these cases, some tough decisions must be made related to the appropriate use of current funds. On the other hand, if a business is confirmed to be leaving the State absent some incentive program, the incentive can also be considered a no-opportunity-cost provision. Job retention should be considered, along with both benefits and costs, when adopting the recommendations contained in the following sections. Unfortunately, it is very difficult to identify those companies that are truly considering leaving versus those that are making threats for financial gain.

The following tax policy modifications and economic development programs were recommended for consideration during the 2010 Regular Legislative Session; they would not require an immediate appropriation except for possible program management or, in select cases, targeted job retention.

- Create a new business real and personal property classification with a reduced assessment ratio. This class will be available on a discretionary basis to base industry operations only. “Base industries” will be difficult to identify in statute and careful wording must be incorporated into any proposed legislation. Property tax sub-classes that distinguish between a building’s precise operational use may be a good starting point.
- Create a “Quality Jobs” program that provides incentives for the creation and retention of high paying jobs at base industry companies. This type of a program is typically funded through withholding taxes that otherwise would not be collected absent the new business location and new job creation. Job *retention* could have a cost unless the “retained” job would have left the State absent the incentive provision. This is not always easy to verify. In this specific case, the retained job can be treated as new for analysis purposes.
- Create a new Job Training program to replace the one that was recently suspended. This program would also be funded through net new withholding taxes instead of the previous

legislative appropriation and separate business tax. The same issues related to job retention also apply here. The current Job Training Tax can then be utilized to seed select economic development funds or used to finance a new, more focused Arizona Department of Commerce.

*Incentives for the Quality Jobs and Job Training programs are designed to be primarily revenue neutral or positive in relation to new business development. Any incentive benefits paid to a qualifying company are directly funded from a percentage of employee personal income tax revenue (i.e. withholding taxes) that the new target company contributes. For one example, if incentive benefits are equal to 50% of employee personal income tax revenue, the State collects 50 cents and the Company collects 50 cents for every \$1 of net new tax collections. These percentages can vary from program to program.*

In addition, the State's net benefit can be increasingly positive with the potential generation of net new State sales taxes, unemployment taxes, and corporate income taxes. This would be enhanced further as “spin-off” multiplier jobs are created and the State collects the associated revenues. This basic design effectively requires no cost to the State (except for program management; see recommendations below) and, under the right program details, could produce excess revenues that could seed or fund other economic development programs such as job retention.

The next set of policy recommendations are of similar importance as those above and may require an appropriation for enactment. Again, discretionary federal stimulus monies would be of proper use or any net new revenues to the State from the implementation of other economic development programs. The second option will require accurate economic modeling prior to funding.

- Create a “deal closing” fund to provide financing/grants for individualized investment that may be required to attract a particular base industry company. The fund may require an initial endowment of discretionary stimulus dollars or an initial appropriation but could be designed to be self sustaining in the longer term as a result of new businesses locating in Arizona along with their associated tax liability. Too long of a delay in providing seed money for the fund could dampen economic development prospects and high-quality job creation in the State.
- Reduce the corporate income tax rate. This will make the State more competitive in terms of the visible, up front tax rate. This will allow for better marketing of the area and will be in closer alignment with the State’s top individual income tax rate. It should be noted the State’s effective corporate income tax rate is not overly oppressive on those businesses that fuel the economy, but it is high enough to make the State appear less competitive in terms of business relocation or expansion decisions. Only a moderate rate reduction is recommended and must be combined with enhanced marketing of the State.
- Modify the State’s Enterprise Zone Program to be base industry oriented and to better target new growth. Currently, to receive the designed property tax assessment ratio of



5%, a company must first meet certain criteria that typically do not apply to export industry businesses. The businesses are already eligible for corporate income tax relief though. The current program design is of limited economic development value and needs to be enhanced. The appropriate vehicle for this modification could be through a broader review of state economic development programs and tax credits by legislators and economic development professionals to ascertain what programs/credits work and which programs/credits need to be modified or eliminated altogether.

As of the writing of this review the Legislature is considering a modified Enterprise Zone program that is Statewide and would offer aggressive reductions in business property taxes if certain thresholds are met including significant NEW capital investment and higher wage employment. This would have the same effect at the first recommendation: create a separate property classification for base sector industries.

The final set of policy recommendations requires additional study to strategically implement for purposes of achieving the State's economic development goals and still may be considered in 2010. Appropriations may also be necessary in certain cases.

- Adequately fund a State entity that promotes economic development along with improvements in branding. All successful business recruitment states rely on an adequately funded *state* entity to serve as the primary point of contact to coordinate with the state's economic development entities. One recommendation is that any new or modified State entity must utilize a seasoned economic development director that is appointed by individuals from the private sector for a limited term. The main point is to limit political influence when it comes to economic development. A portion of the current Job Training Tax monies should be used to fund this new entity.
- Commission a State economic development strategy that *focuses on coordinated marketing and branding*. The successful business recruitment states also have a specific focus when implementing economic development policy. These documents also outline how the economic development entities utilize each other's services. To date, the documents produced by the State on economic development have been relatively weak in terms of this kind of proactive effort and not in full consideration of site selection and economic facts. Overall, the State currently does not tell its economic story very well.

### **FINAL THOUGHTS ON LOCAL ECONOMIC DEVELOPMENT**

The above recommendations do not imply that additional investment is not needed in transportation infrastructure or education. These areas of investment are still needed to improve our economy in the long run. It is also important to note that the discussion of local economic development must continue to be a focus of policymakers even after the above policy recommendations are enacted. It will take a decade or more to modify the State's economic base to any perceptible degree.

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economic development, public policy, taxation, real estate analysis, and litigation. He has written and co-authored a number of economic articles on the state of the local and national economies. In addition to opining on the state of the economy through written format, he has delivered hundreds of presentations to national organizations, private companies, local civic organizations, universities, and legislative committees. He has been quoted in the local print media, nationally recognized newspapers and websites, and provides commentary on local radio and television programs. Prior to his eight years of employment with Elliott D. Pollack and Company, he served as a senior economist and senior budget analyst with the Arizona Joint Legislative Budget Committee, the budget and economic analysis arm of the Arizona Legislature. As an employee of the Arizona Legislature, he was responsible for analyzing and forecasting a variety of state taxes. In addition to his tax analysis duties, he was responsible for analyzing dozens of state agency budgets. He has a Bachelor of Science degree and a Master of Science degree in Economics from Arizona State University.

## **PART III**

### **ARIZONA'S CHALLENGES AND OPPORTUNITIES**

- 8. Economic Foundations of Arizona's Economy**
- 9. The Economic Importance of High-Tech Industry in Arizona**
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## Chapter 8

# ECONOMIC FOUNDATIONS OF ARIZONA'S ECONOMY

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### KEY POINTS

- Companies that sell their goods and services to customers located outside Arizona form the state's economic base and are responsible for the health and growth of the economy.
- Most companies, however, predominantly sell their goods and services to local residents and local businesses. These “population-serving” activities respond to conditions within the economic base and do not cause economic growth.
- Economic development focuses on mobile companies within the economic base. Considerable competition with other states and other countries exists for high-paying companies with prospects for growth.
- Arizona's economic base in the early 21<sup>st</sup> century is diverse, with the high-technology cluster the largest component based on dollar measures and tourism the largest based on employment. Other important base activities include manufacturing other than high technology, the federal government, and some services, such as insurance carriers.
- Most of the Arizona base industries important during the 20th century—agriculture, mining, high technology, manufacturing, and the federal government—have declined as shares of the overall economy.
- The economic base varies widely from one community to another across Arizona. Many communities are reliant on the economies of nearby communities or are highly dependent on just one activity, such as mining.

### THE ECONOMIC BASE

A significant dichotomy exists in the nature of economic activities in any region (such as a metropolitan area or a state). While only a minority of companies sell the majority of their goods and services to customers located outside the region, these “export” (or “basic”) companies form the region's economic base and are responsible for the health and growth of the regional economy. In contrast, most companies predominantly sell their goods and services to local residents and local businesses. These “population-serving” activities respond to conditions within the economic base and do not cause economic growth.

Basic economic activities take many forms. The classic examples are agriculture and mining, whose locations are dependent on local attributes of the land. These sectors are not mobile. Tourism and retirement migration also are basic economic activities. (Retirement migration is considered basic since the retirement income and savings of the migrants was earned outside the region but is largely spent in the region.) Tourism and retirement migration are similar to agriculture and mining in that their presence is in part due to local natural attributes (such as

climate and topography). However, the aspects of quality of life that are determined by human decisions and activities also influence the number of tourists and retirement-aged migrants that any region receives.

In contrast, most companies that form the economic base can locate anywhere. Regions across the United States, and sometimes other countries, compete with one another for economic base activities such as manufacturing facilities.

The presence in a region of mobile export businesses is due to the region's economic competitiveness (business climate). A long list of regional factors (as discussed in Chapters 2, 5, and 6) determine the business climate and influence location decisions of manufacturers and other mobile export businesses.

Just as private-sector markets that work most effectively allocate resources freely across competing uses to the ones that are most likely to result in growth, public-sector policies need to distinguish between economic-base and population-serving industries to the extent possible in order to maximize economic competitiveness and growth. For example, economic literature suggests that providing tax cuts and incentives to population-serving companies serves no economic purpose from a regional perspective.

On the other hand, not all export industries have an equal effect on the regional economy. The wage level is one important distinction. A low-paying base industry such as tourism has much less economic impact per employee than does a high-paying base industry, such as high-technology manufacturing. A second practical distinction is the industry's prospect for growth. Some base industries are unlikely to be a source of future growth. Mining, for example, is limited by dwindling natural resources. Many of the mature manufacturing industries have limited growth prospects and are shifting facilities to overseas locations where costs are lower.

### **Measuring the Economic Base**

It is difficult to specify the economic base of a region with any precision. Economic activities are classified by industry, with each business establishment (an establishment is a single physical location at which business is conducted; a company may consist of one or more establishments) assigned to an industry by its primary economic activity. The current classification system, the North American Industry Classification System (NAICS) uses a hierarchical structure, with each establishment progressively placed into an industry, industry group, subsector, and finally one of 20 broad sectors.

Though some establishments may sell all of their output either locally or externally, many establishments sell a portion to internal customers and a portion to external customers. Moreover, the degree of basic activity occurring at any establishment within an industry may differ from that of another establishment in the same industry. Thus, many industries, most subsectors, and nearly all sectors cannot be classified as wholly basic or non-basic.

Relative to other sectors, a high proportion of agriculture is basic. The mining sector, though primarily a basic activity, has a portion of its output intended for sale in the local market, such as

that of the construction sand and gravel industry. Similarly, though most manufactured goods are exported, some (such as bottled drinks) are sold primarily in the local market.

A lesser portion of the other sectors are basic. Other than agriculture, mining, and manufacturing, the sectors with the greatest proportion of basic activities are accommodation and food services, wholesale trade, and transportation. Part of the activity is basic in several services sectors, including finance and insurance; professional, scientific and technical services; information (such as software publishers); administrative support (such as call centers); and government. Within government, the federal civilian and military portions receive their funding from outside the region and are considered to be basic.

Though construction and real estate sometimes are portrayed as being economic drivers in growing regions, only a small portion of these sectors is basic. They are highly cyclical activities, and are unusually large in Arizona because of the state's fast growth. Thus, they have considerable influence over economic conditions in Arizona, but generally respond to conditions in basic sectors of the economy instead of causing economic growth.

While tourism and retirement migration typically are considered to be basic activities, they are not defined activities within the NAICS. They consist of portions of many industries across several sectors.

Because of tourism and retirement migration, small portions of what otherwise are nonbasic activities are basic, including retail trade, health care and social assistance, educational services, and other services. The utilities sector also largely serves local businesses and individuals, but has a basic component due to the sale of energy to consumers in other states.

### **The Economic Base and Economic Development**

Economic development is focused on those aspects of the economic base that are mobile. The definition of mobile export activities varies with geography. Within a metropolitan area, even population-serving activities frequently have a choice of cities in which to locate. Thus, cities compete with each other for activities that serve the local population, such as retail stores, frequently offering municipal incentives to attract population-serving companies. Since such companies would locate somewhere in the metro area, there is no benefit to the metro area from such municipal competition.

Modern economic development concentrates on providing high quality jobs in industries that have prospects for long-term growth. In the 21<sup>st</sup> century, many of these activities involve innovation and the development of new and better technologies. Because of this, high-technology activities are high on the list of targeted activities throughout the country. Education and research and development have become particularly important factors in determining the economic competitiveness of a region.

## THE ECONOMIC BASE IN ARIZONA

For state and local areas, much of the industry data, and even some of the data for subsectors and sectors, are withheld due to federal disclosure restrictions. Since detailed industrial data are needed to clearly delineate base from nonbase activities, identifying the specific components of Arizona's economic base is difficult.

Because of the federal disclosure restrictions, some sources of economic data, such as the Regional Economic Information System of the U.S. Bureau of Economic Analysis (BEA) and the Current Employment Survey of the U.S. Bureau of Labor Statistics, do not publish any data for states or local areas below the subsector level. In contrast, the County Business Patterns data produced by the U.S. Census Bureau provides full industrial detail for the number of establishments, but much of the employment and payroll detail is withheld. However, since the number of establishments by employment size is provided, it is possible to estimate withheld employment with a reasonable degree of accuracy. Existing studies of the economic base of the state, its counties, and its communities are largely based on the County Business Patterns employment data.<sup>35</sup>

Any historical review of industrial data is complicated by the switch from the Standard Industrial Classification (SIC) to the NAICS. It is not possible to accurately compare data from the two industrial classification systems. Thus, any attempt to look at Arizona's economic base over time has a break in series when the shift to the NAICS occurred (the timing of which varied by dataset from 1997 through 2001).

A look at the changes in the industrial mix of the Arizona economy over the past 40 years or so is provided in Table 8.1. This table is not specific to the economic base; it instead provides a look at all major sectors. Though both indicators—gross domestic product by state and employment—are produced by the BEA, the two series come from different programs. The gross product data are available since 1963, with data available for both the SIC and NAICS only for 1997. The employment data start in 1969; SIC and NAICS data are available for 1990 through 2001.

**Table 8.1**  
**Sectoral Shares in Arizona**

	SIC				NAICS		Change*
	1967	1977	1987	1997	1997	2007	1967-2007
<b>Gross Product</b>							
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
<b>Employment</b>	<b>1969</b>	<b>1977</b>	<b>1987</b>	<b>1997</b>	<b>1997</b>	<b>2007</b>	<b>1969-2007</b>
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.

Sectoral shares vary with the economic cycle. The years shown in Table 8.1 all are midway through an economic cycle, but variations from one cycle to another still may be affecting the apparent trend in the shares. The sectoral shares based on employment are very different from those based on gross product in many sectors, primarily due to the wide range in the average wage by sector. In general, sectoral shares have fallen over time in agriculture, mining, manufacturing, and government. Most of the services sectors have recorded gains in share.

### The Historical Economic Base

The BEA is the primary source of historical sectoral economic data for Arizona. It reports earnings—the compensation of wage and salary employees plus proprietors' income—since



1929. From 1929 through 1968, the detail is limited to only nine sectors. Starting in 1969, some additional detail is available.

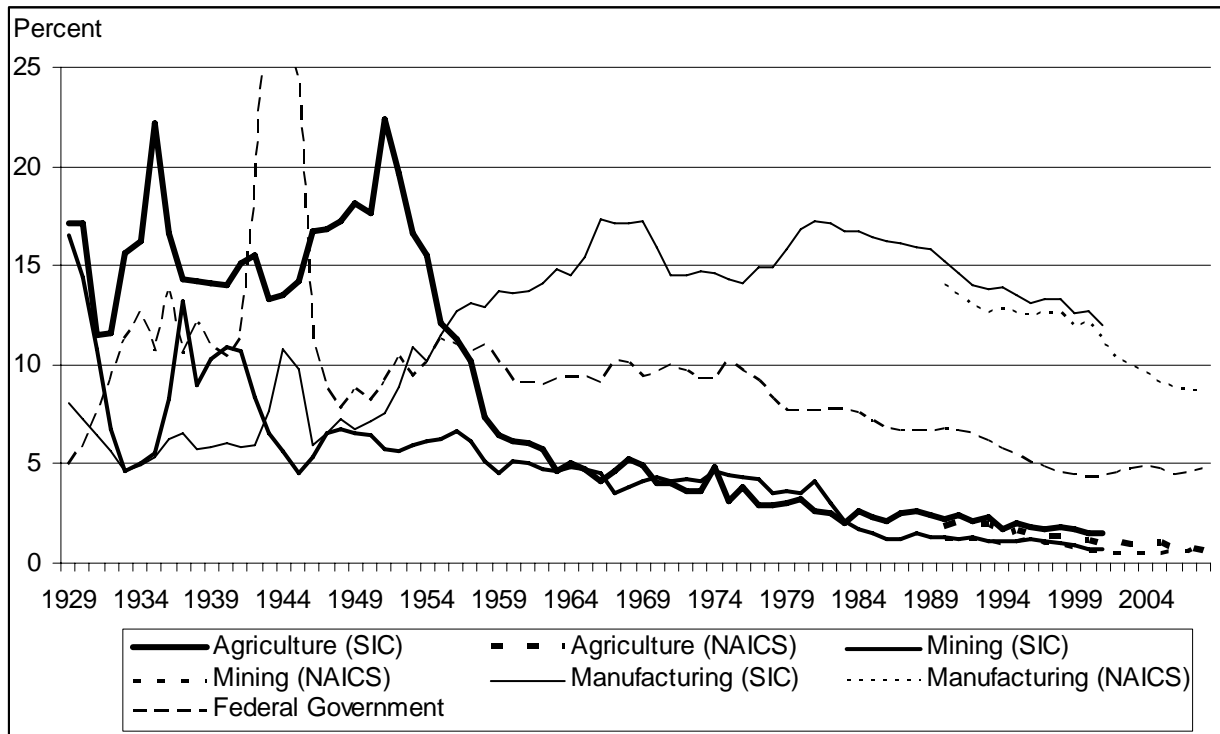
A review of the historical BEA data is complicated by the BEA's switch from the Standard Industrial Classification (SIC) to the NAICS in 2001. It is not possible to accurately compare data from the two industrial classification systems. Thus, any attempt to look at Arizona's economic base over time has a break in series when the shift to the NAICS occurred. The BEA reconstructed the 1990 through 2001 sectoral and subsectoral data by the NAICS. Thus, alternative measures are available for those years, as displayed in Figure 8.1 for most of the base activities that were historically important in Arizona.

Mining and agriculture were the base industries on which the state was founded. Mining began to decline as a share of the economy as early as the 1930s, though the decline was erratic due to the strong cycles in mining activity. Agriculture did not begin to decline until the 1950s, when its importance as a base activity largely began to be replaced by manufacturing. The relative declines in agriculture and mining have continued through the present, with each sector responsible for less than 1 percent of the state's economy in recent years.

The highest shares of total earnings from the manufacturing sector occurred from the mid-1960s through the mid-1980s. Manufacturing's sectoral share has declined substantially since 1990, back to the level of the early 1950s.

The federal government was a small base activity in 1929, but the Great Depression prompted an increase in the civilian federal government in the 1930s; World War II resulted in a much larger military component, which was temporarily responsible for a large share of the state's economic activity during the war. Both the civilian and military portions declined in importance from the 1970s through 2000. Federal government's share since 1997 has been lower than that in 1929. Tourism also was important historically, but its size in the early decades of the time series cannot be measured due to the lack of detailed industrial data. Its sectoral share likely rose steadily with improvements in roads and automobiles and with the expansion of air transportation.

**Figure 8.1**  
**Sectoral Shares of Selected Sectors in Arizona, Based on Earnings**



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

Though the sectoral shares of most of the old-line base activities have declined in recent decades, base activities have not necessarily become a declining share of Arizona's economy. Instead, other base activities, particularly certain services, have become more important.

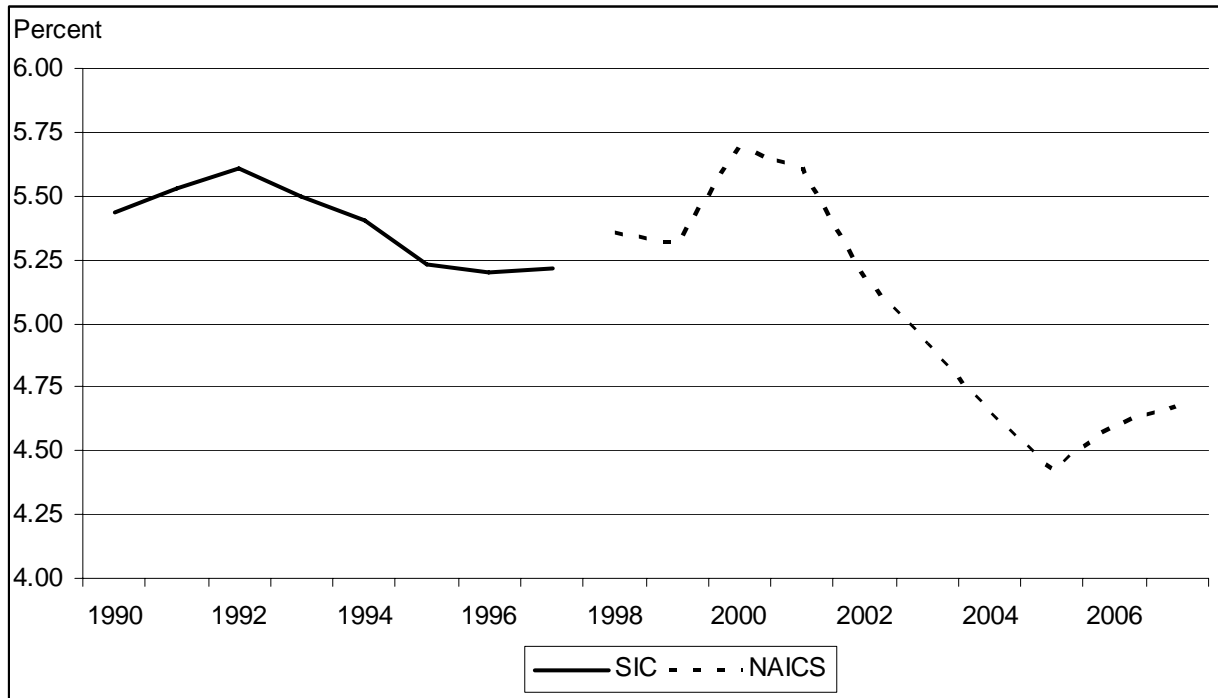
### The Economic Base Early in the 21<sup>st</sup> Century

A more detailed look at the economic base is possible using County Business Patterns data, which are available under the NAICS for 1998 through 2007. Employment and wages are included, with estimates made for missing data.

Arizona's economic base is headlined by high-technology manufacturing. In conjunction with various high-tech services, the high-technology cluster is the largest base activity in the state as measured by wages. However, as a share of the economy, the high-tech cluster has been declining in Arizona, as can be seen in Figure 8.2.

Arizona's high-tech base is narrow, dominated by three manufacturing industries: semiconductors and other electronics, aerospace, and search and navigation instruments. Each, especially semiconductor and other electronic manufacturing, is declining relative to the size of the entire economy. Aerospace is now the largest and most stable of the three industries in Arizona.

**Figure 8.2**  
**High-Technology Employment as a Share of Total Employment in Arizona**



Sources: U.S. Department of Commerce, Bureau of Economic Analysis and Census Bureau.

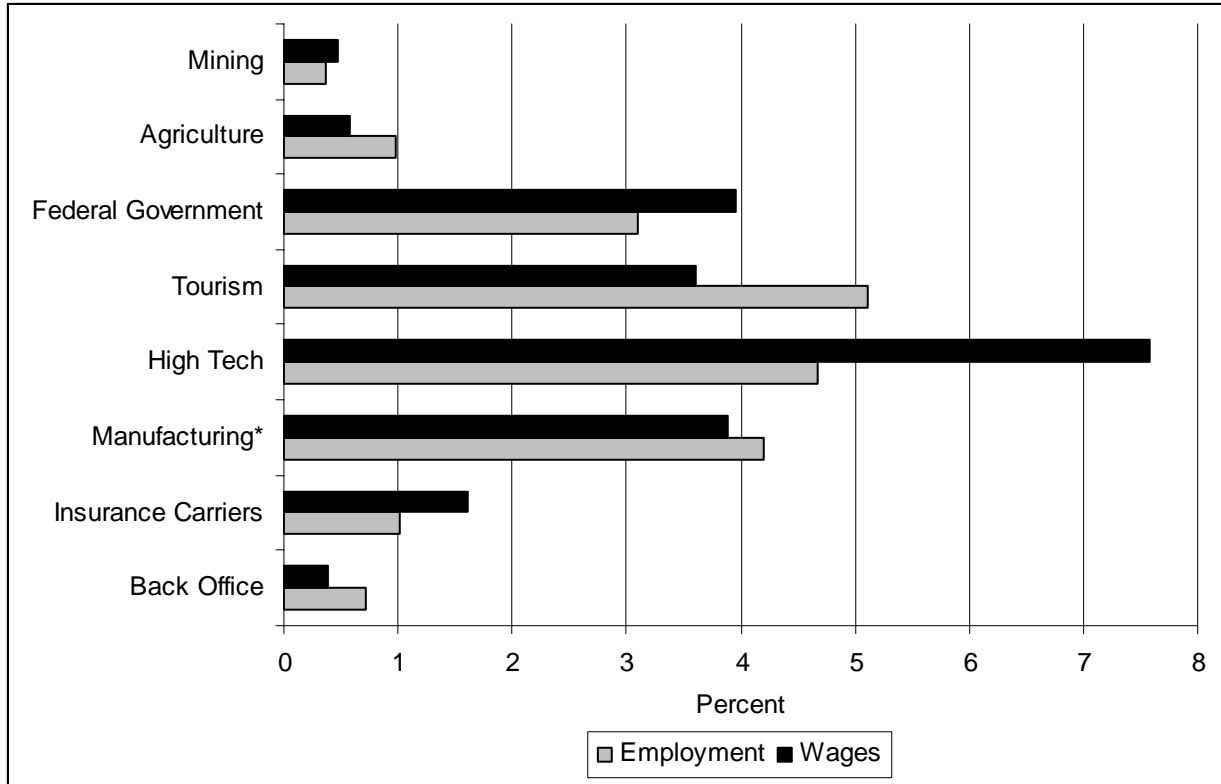
The relative size of selected base activities is shown in Figure 8.3. Based on wages, the high-tech cluster is by far Arizona’s largest basic activity. In contrast, tourism is the largest based on employment. Among the export activities shown in the chart, the average wage is highest in high tech and insurance carriers and also is considerably above average in mining and the federal government. The average wage is near average in manufacturing other than high-technology but far below average in tourism, agriculture, and back-office operations.

Some service activities became more important parts of the economic base over the last 20 years of the 20<sup>th</sup> century. In recent years, the share of the economy has grown a little further for insurance carriers but has begun to decrease for telemarketing and other back-office operations. Tourism’s share of the economy is holding steady, but the shares in each of the other selected base activities fell between 1998 and 2007. Employment dropped in mining, agriculture, and manufacturing other than high technology. Employment increased, but considerably less than the total, in back-office operations, the federal government, and high tech.

The composition of the economic base differs from community to community in Arizona. The base is broadest (most varied) in the largest metro areas. The Phoenix area’s economic base is essentially the same as that for the state, minus copper mining. The Tucson area’s base is somewhat different. In addition to telemarketing and back-office operations, tourism, and retirement migration, the Tucson area has a particular concentration in aerospace manufacturing; the federal government is more important due to the relative size of Davis-Monthan Air Force Base to the metro economy; the University of Arizona acts as a base activity; and software

publishing is a significant employer. Primarily, it is these two large metro areas that are in a position to compete for 21<sup>st</sup> century high-technology activities.

**Figure 8.3**  
**Selected Basic Activities in Arizona as a Share of the Total Economy**



\* Other than high technology

Sources: U.S. Department of Commerce, Bureau of Economic Analysis and Census Bureau.

Many communities—suburbs of the large metro areas as well as small rural communities not far from larger towns—have little in the way of base economic activities. These communities are reliant on the economy of the surrounding area. Other less populous communities, especially in rural areas, are highly dependent on just one activity, such as agriculture, mining, tourism, or the federal government.

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<sup>35</sup> *Arizona State and County Economic Base Studies* (April 2007), *Arizona Regional Economic Base Studies* ( July 2007), and *Arizona Community Economic Base Studies* ( January 2008), produced for the Arizona Department of Commerce (<http://www.azcommerce.com/Research>).

## Chapter 9

# THE ECONOMIC IMPORTANCE OF HIGH-TECH INDUSTRY IN ARIZONA

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### KEY POINTS

- High-tech industries are major sources of employment and income, provide high wage jobs, and support new company spin-offs, as well as new product development. Innovative high-tech industries are better equipped to compete in the global market place than traditional industries such as manufacturing. A healthy high-tech sector can be an engine of regional economic growth and development.
- In 2007, high-tech industries accounted for 11% of total employment and 18% of the total payroll for all Arizona industries in 2007. The average wage for all high-tech industries combined is 75% higher than the average wage for all industries.
- In 2007, 900 high-tech manufacturing firms in Arizona accounted for 18% of the total number of manufacturing firms, 47% of the employment in the manufacturing sector, and a whopping 60% of all manufacturing payrolls.

Because of the importance of high tech industry in the Arizona economy, this chapter provides a detailed analysis of its composition and trends. High tech firms constitute a significant share of the total firms in Arizona.<sup>36</sup> In 2007, there were 16,000 high tech firms, which accounted for 11% of the 149,900 total establishments in Arizona. High tech manufacturing firms are extremely important to the Arizona economy because they offer high wages and tend to be larger than traditional manufacturing firms. In 2007, there were 900 high tech manufacturing firms in Arizona. These companies represent 18% of the total number of manufacturing firms. In addition, the average employment in high tech manufacturing companies is 2.5 times that in non-high tech manufacturing firms.

### EMPLOYMENT IN HIGH TECH INDUSTRIES

High tech industries employ a significant portion of the state's workforce. In 2007, high tech industries employed 278,700 workers or 11% of the state's total employment (2,647,100 workers). High tech manufacturing employment constitutes nearly half of all of the employment in manufacturing industries. In 2007, there were 79,500 jobs in the high tech manufacturing sector. This amounts to a 47% share of total manufacturing employment (Table 9.1).

**Table 9.1**  
**High Tech Employment in Arizona**

<u>Industry</u>	<u># Employees</u> <u>2007</u>	<u>% of AZ</u> <u>Employment</u>
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.

The high tech industries with the highest levels of employment are shown in Table 9.2. Aerospace manufacturing, semiconductor & electronics manufacturing, and management of companies and enterprises all employed roughly 27,000 workers in 2007. Navigation and control instrument manufacturing was a distant fourth place with 12,800 employees. The only other high tech industry with more than 10,000 employees was wired telecommunications carriers.

**Table 9.2**  
**Largest High Tech Sectors in Arizona**

<u>Industry</u>	<u>Employees 2007</u>
Aerospace manufacturing	27,421
Semiconductor & electronics mfg.	27,146
Management of companies and enterprises	26,947
Navigation, measuring, electro med, & control instr. mfg.	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.

The fastest growing high tech industries tended to be small industries with rapid growth from a small base. Table 9.3 shows the fastest growing high tech industries over the period, 2001-2007. While these industries experienced extremely rapid annual average growth rates, they all started from a small base and all of them currently employ less than 1,000 workers.

**Table 9.3**  
**Fastest-Growing High Tech Sectors in Arizona**

<u>Industry</u>	<u>Employment Growth Rate</u> <u>2001-2007</u>
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.

A better measure of employment growth is the overall change in employment over time. Table 9.4 shows the high tech industries that had the highest gain in employment over the period, 2001-2007. With the exception of navigation and control instrument manufacturing, all of the highest growth industries were professional services related.

**Table 9.4**  
**Largest Gains in High Tech Sectors in Arizona**

<u>Industry</u>	<u>Employment Change</u> <u>2001-2007</u>
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, electro 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.

The high tech industries with the largest employment losses from 2001-2007 are listed in Table 9.5. The semiconductor industry lost 13,459 jobs over this period. Wired telecommunications lost 4,203 jobs, while aerospace and computer manufacturing both lost over 2,000 jobs.

**Table 9.5**  
**Largest Losses in High Tech Sectors in Arizona**

<u>Industry</u>	<u>Employment Change</u> <u>2001-2007</u>
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 INDUSTRY PAYROLLS**

High tech firms pay a large share of Arizona's total wages (Table 9.6). The payrolls of high tech companies in Arizona represent a significant portion of all the payrolls generated by all firms within the state. In total, high tech industries contributed \$20.3 billion of payroll in 2007. This amounts to 18% of the total payrolls for all industries.

Similarly, high tech manufacturing payrolls totaled \$6.4 billion or 6% of total payrolls in the state. However, high tech manufacturing payrolls constituted the majority of the payrolls from the Arizona manufacturing sector. In 2007, high tech manufacturing contributed a whopping 60% of all manufacturing payrolls. The reason that high tech manufacturing industries create such large payrolls is that they employ high wage workers and are 2.5 times larger than non-high tech firms.



**Table 9.6**  
**High Tech Payrolls in Arizona**

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

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

### HIGH TECH INDUSTRY WAGES

High tech industries, particularly those in manufacturing, pay considerably higher wages compared with other industrial sectors. The payroll per employee is often used as a proxy for wages by industry. Table 9.7 shows the payroll per employee (PPE) for high tech industries vs. the average for all industries.

The average wage (PPE) for all high tech industries combined is 75% higher than the average wage for all industries. In 2007, the average annual wage for high tech industries was \$72,700 vs. \$41,600 for all industries.

Similarly, high tech manufacturing industries offer significantly higher wages than any other sector in the Arizona economy. The average annual wage for high tech manufacturing industries was \$80,100. This is 37% higher than the average annual wage rate for the entire manufacturing sector, and almost double the average annual wage rate for all industries in Arizona.

The overall wages in Arizona tend to be lower than the U.S. average. The second column of Table 9.7 shows the Arizona wages as a percent of the U.S. by industrial category. The average annual wage for all industries in Arizona is 93% of the national average. The average wage for the total Arizona high tech sector is 91% of the U.S. average. Average annual wages in Arizona's manufacturing and high tech manufacturing sectors both exceed the national average.

**Table 9.7**  
**High Tech Wages in Arizona**

<u>Industry</u>	<u>Payroll per Employee</u> <u>2007</u>	<u>% of US PPE</u> <u>2007</u>
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 high tech industries offering the highest wages are listed in Table 9.8, along with their average annual wages (PPE). The wages for all of these industries exceed the \$41,600 average

annual wage for all Arizona industry sectors by a wide margin. The highest paying industry is satellite telecommunications with an average annual wage of \$102,000.

**Table 9.8**  
**High Tech Industries with Highest Wages in Arizona**

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

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 HIGH EMPLOYMENT CONCENTRATION**

A location quotient is used to identify the regional employment concentration in a particular industry as compared to the same industry for the nation as a whole. The regional location quotient for an industry is calculated by taking the local industry’s share of total regional employment, divided by the industry’s share of national employment.

A location quotient greater than one indicates that regional employment in an industry is relatively more concentrated than it is at the national level. The higher the location quotient, the more concentrated the regional employment in an industry.

The Arizona high tech industries with the highest employment concentrations are shown in Table 9.9. Semiconductor and electronics, and aerospace manufacturing have the highest employment concentrations. Their respective location quotients indicate that their employment levels are roughly 3 times higher than the U.S. average. Navigation and control instrument manufacturing, and facilities support services have employment concentrations 50% higher than the national average.

**Table 9.9**  
**High Tech Industries with Highest Concentration Ratios in Arizona**

<u>Industry</u>	<u>Location</u> <u>Quotient</u>	<u>Growth Rate</u> <u>2001-2007</u>
Semiconductor & elect. mfg	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%

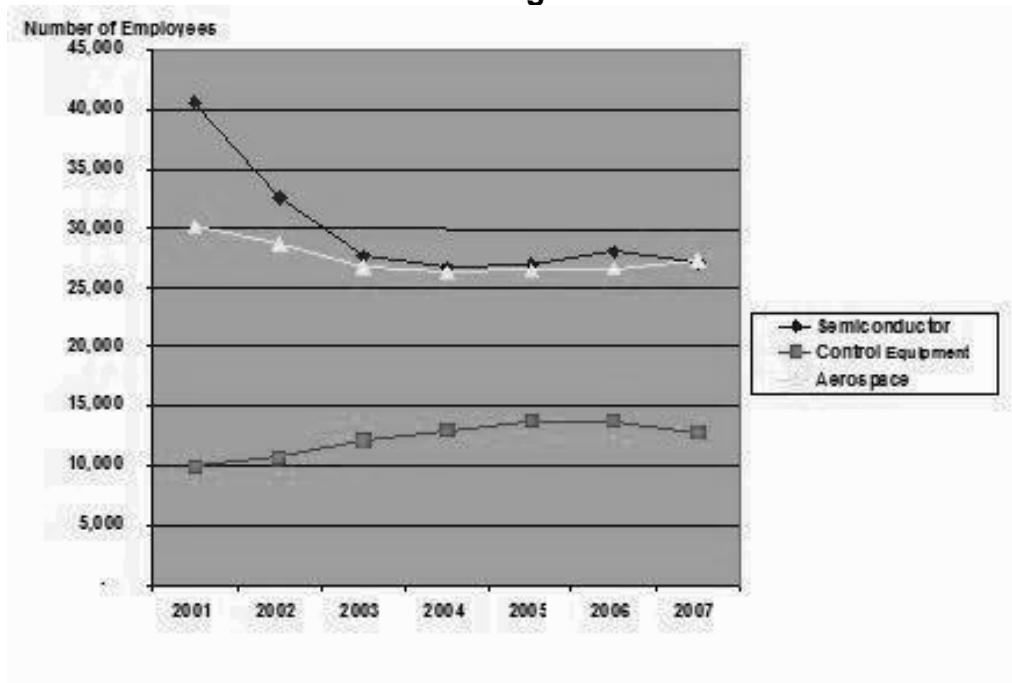
Source: U.S. Bureau of Labor Statistics and Economic and Business Research Center, Eller College of Management, the University of Arizona.

The average annual growth rates for the industries with the highest location quotients are shown in the second column of Table 9.9. Unfortunately, semiconductor manufacturing and aerospace manufacturing, the two high tech industries with the highest employment levels in 2007 have been losing employment over the period 2001-2007. Semiconductor manufacturing and aerospace manufacturing lost 13,500 and 2,800 jobs, respectively, over the 2001-2007 period.

It is evident from the information presented in this report that there are three high tech manufacturing industries that are especially important to the Arizona economy: aerospace, semiconductors and control instruments. These three industries have high levels of employment, offer high wages, and have large location quotients. Figure 9.1 shows the employment in each of these industries over the period 2001-2007.

Semiconductor and electrics manufacturing employment dropped from 40,600 jobs in 2001 to 27,150 jobs in 2007. The Arizona semiconductor industry suffered a steep decline in employment in 2002 and 2003. This was related to a worldwide downturn in the semiconductor market. Employment levels have remained relatively flat since that time. However, Arizona’s semiconductor and electronics industry remains susceptible to conditions in worldwide commodity markets. Major semiconductor companies with a presence in Arizona include: Intel, Motorola, Freescale Semiconductor, Microchip Technology and On Semiconductor. Texas Instruments used to have a significant presence in Arizona, but it has radically scaled back its operations in the state.

**Figure 9.1**  
**Employment in Aerospace, Semiconductors and Control Instrument Manufacturing in Arizona**



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

Aerospace manufacturing employment declined from 30,240 jobs in 2001 to 27,420 jobs in 2007. Currently aerospace employment is slightly higher than semiconductor employment. Aerospace manufacturing employment is affected by conditions in civilian aviation markets and by defense contracting. Important aerospace companies in Arizona include: Raytheon Missile Systems, Honeywell Aerospace, Boeing, and Northrop Grumman. Control instrument manufacturing, on the other hand, has been experiencing a gradual increase in employment over the years 2001-2007.

Employment in control instrument manufacturing totaled 12,800 in 2007. This is a significant amount of employment, but it still amounts to less than one-half of the employment in aerospace or semiconductor manufacturing. Major Arizona control instrument manufacturing companies include: Honeywell, General Dynamics, Medtronic, and Universal Avionics.

### **FUTURE HIGH TECH INDUSTRIES IN ARIZONA**

The future of economic development in Arizona is going to be heavily impacted by the state's ability to attract, retain, expand and start up high tech industry. The aerospace, semiconductor and electronics, control instruments manufacturing industries will undoubtedly continue to play major and important roles in Arizona's economic future. However, other high tech industries are expected to increase their size and importance over time.

Several of these emerging technologies will involve heavy emphasis on science and engineering occupations, as well as requiring significant research and development activities. Some of the likely emerging industries in the future are bioindustries, optics, and nanotechnologies. Arizona's three universities will play major roles in supporting the requirements of these industries by preparing highly skilled technical workers and by performing R&D activities.

Another cluster of industries that is likely to have a significant presence in the future is "green" or sustainable industry. This would include environmental technologies, renewable energy, and water resource management. It is likely that solar energy manufacturing and power generation will add jobs in Arizona due to the fact that Arizona's solar resources are among the best in the country.

### **RECRUITING AND GROWING HIGH TECH INDUSTRY IN ARIZONA**

High tech industries value many of the same location factors as non-high tech industries. Ideally, they would like to locate in a place with low operating costs (labor, transportation, taxes, materials, etc.). They would also like to have good access to their markets and to sources of specialized inputs. However, high tech industries have additional requirements that are critically important to their business location decisions. Important high tech location factors that they take into consideration when they choose their business location are:

1. Availability of a highly skilled and educated workforce
2. Location in urban areas
3. Access to strong universities
4. Access to air transport
5. High concentration of R&D activity

6. Availability of capital (especially venture capital)
7. High quality of life

The most important of the location factors for high tech firms is to have a highly skilled and educated workforce in the region. Since their workforce is critically important to the success of high tech businesses, they like to locate in areas with strong universities that can produce educated employees. They also like to locate in urban areas with a good overall quality of life. This helps them to retain workers who might otherwise move elsewhere.

High tech industries are major economic drivers in Arizona. They are major sources of jobs and major generators of state payrolls. High tech industries offer high wages and employment growth opportunities for Arizona's citizens. A healthy high tech sector will improve Arizona's competitiveness in global markets. Arizona's ability to attract, expand and retain high tech industries is going to depend on its ability to maintain a strong educational system from K-12 through graduate school, and on its ability to create and retain a high quality workforce.

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**Marshall J. Vest** is director of the Economic and Business Research Center (EBR) at the University of Arizona's Eller College of Management. The EBR was founded in 1949 with the purpose of practical investigation and study of business and economic issues that pertain to Arizona. The Center researches and disseminates economic information that businesses and government units use to intelligently deal with current developments as well as to plan for the future. Vest is an authority on Arizona's economy and is a consultant to a number of Arizona's largest companies, Arizona's Governor and Legislature, as well as a number of local governments. With 30 years heading the College's Forecasting Project, Marshall has authored over 175 articles on the economy. These forecasts are recognized as among the most accurate in the western states, and he is frequently quoted in both the local and national business press. Vest is a fellow and past-president of the Association for University Economic and Business Research, whose membership includes university-based applied research centers from across the country. He also is a member of the National Association for Business Economics (NABE) and is past president of the Arizona Chapter of NABE.

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<sup>36</sup> This article updates and expands on data and analysis provided in our article "High-Tech Powers Arizona's Economy," from the July 2006 issue of *Arizona's Economy*.

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The high tech industries examined in this study were selected on the basis of a 2005 Bureau of Labor Statistics (BLS) study that identified 46 4-digit NAICS industries as high tech industries. The BLS classified industries as high tech on the basis of the employment of technology-related workers by each industry. The proportion of technology-related workers to total employees in high tech industries must exceed 2 times the average proportion in all industries combined (for a more detailed description of the BLS high tech industries, refer back to the original article).

## Chapter 10

# GLOBAL TRENDS AND ARIZONA'S ECONOMY

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### KEY POINTS

- Globalization is not new; however, advances in information technology have dramatically transformed our day-to-day activities and shifted the focus of our thinking to the international setting.
- Changes due to globalization have impacted financial systems across the world and have produced massive increases in international trade, cultural exchange, legal and illegal immigration, and global telecommunications infrastructure.
- The impacts of globalization also have created a growing tendency for higher education to become more market-oriented. This approach has resulted in universities entering into new alliances with corporations to fill the gap produced by declining state support for education.
- 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.

The movement toward a single global economy is not new to the world. History documents specific instances of international contact and exchange for thousands of years where individual traders bought and sold goods from each other. Through this process they began the facilitation of cultural exchange that typically occurs when people from different regions meet whether on a friendly or unfriendly basis. This process of integration has dramatically increased in recent years with the adoption of free-market policies by many nations in the past couple decades which have provided avenues for vast increases in international trade and overseas investments.

This new era of globalization that was encouraged and facilitated by government policies has been "marked by growing trade in intermediate goods and services, expanding capital flows, more rapid transfer of knowledge and technologies, and mobile populations [and] partly results from inexpensive, rapid communications, and information transmission enabled by the IT (information technology) revolution."<sup>37</sup>

While the political environment has played a role in the movement toward a one-world economy, there is no doubt that technology has been a principal driver in speeding the

process along. Advances in information technology have dramatically transformed the day-to-day activities of individuals and businesses throughout the world, and have provided numerous opportunities to identify and pursue “economic opportunities, including faster and more informed analyses of economic trends around the world, easy transfers of assets and collaboration with far-flung partners.”<sup>38</sup>

Globalization means different things to different people and clearly has its proponents and detractors; however, it is likely that all parties agree that globalization has resulted in a shift of focus from the local market to the international setting and will require ongoing innovation as new communication and technology come to dominate our thinking in social, economic, cultural, political, environmental, and many other dimensions.

### **CHARACTERISTICS OF GLOBALIZATION**

A number of globalization characteristics have been identified in numerous publications, and typically include many of the following trends:<sup>39</sup>

- Increases in international trade at a faster rate than the growth in the world economy, along with increases in the international flow of capital including foreign direct investment.
- Greater transborder data flow, using such technologies such as the Internet, communication satellites and telephones.
- Greater international cultural exchange.
- Reductions in global cultural diversity accompanied by erosions of national sovereignty and national borders through international agreements leading to organizations like the World Trade Organization.
- Greater international travel and tourism.
- Greater immigration, including illegal immigration.
- Development of global telecommunications infrastructure and increases in the number of standards applied globally; e.g. copyright laws.
- Development of global financial systems and an increase in the share of the world economy controlled by multinational corporations.

### **DRIVERS OF THE GLOBAL ECONOMY**

The drivers of global trends typically are associated with broad concepts related to demographics, education, natural resources and the environment, science and technology, globalization, and governance issues. Together, these items create a picture of where the world is headed and provide decision makers a description of the factors likely to shape the course of world events.

A comprehensive summary and analysis of the drivers of the global economy is completed every five years the National Intelligence Council<sup>40</sup> (NIC) through its Global Trends series that is designed to identify and track key factors that will drive the economy for the next fifteen years. The NIC recently published *Global Trends 2025: A Transformed World*. Their report provides numerous illustrations that examine how various global drivers may interact along with a discussion of the challenges and opportunities these changes will bring to the



world and its residents.<sup>41</sup> The following paragraphs offer a summary of the conclusions from the report. Any review of global trends must be tempered by the knowledge that past events are not always the best predictors of future activity, and that what we truly have is a discussion of factors likely to play an important role in influencing future events, as opposed to a prediction of what will occur. Nevertheless, a summary of the discussion contained in the Global Trends 2025 Report provides a useful starting point for this discussion.

- The world of 2025 will be vastly different from 2010. Huge transfers of relative wealth and economic power will have occurred that reflect the growing importance of the East relative to the West.<sup>42</sup> At the same time, the relative importance of nation-states will diminish and the gap will be taken up by “nonstate actors” which the Global Trends report describe as businesses, tribes, religious organizations and criminal networks. Although 2025 should still reflect a prosperous economy, the increased use of energy, food and water will bump up against resource constraints that will limit the rate of potential growth in economic activity. The U.S. is likely to remain the most influential actor in the world’s environment; however, the relative strength, importance and leverage of the U.S. are expected to decline.
- The transfer of wealth and power from West to East is in part explained by increases in the price of oil and other commodities that have generated huge amounts of wealth in the Gulf Region and other locations. At the same time, the lower costs of production in many of the emerging nations has lead to a shift in manufacturing and some service industries away from their traditional homes in the West to other locations including Asia.
- The coming-of-age of the BRIC economies (Brazil, Russia, India, and China) will bring major changes to the economic landscape with China expected to have the world’s second largest economy by 2025. Almost all the growth in overall world population between now and 2025 will occur in Asia, Africa and Latin America while changes in population growth in the West will be barely above replacement levels.
- The continued rise in population levels combined with the increased pressure on energy, food and water resources should speed the energy transition away from oil and toward natural gas, coal and other options.
- Global changes in climate will further aggravate the issues surrounding resource scarcity, and the effects will disproportionately impact the developing countries which are dependent on water resources for agricultural production. Although new technologies are expected to provide some relief, we must recognize that all existing technologies are currently inadequate to replace the present means of delivering energy to the world’s economies and any new developments are unlikely to be either economically feasible or widespread in their use by 2025. Even the adoption of favorable policies and generous funding may not be sufficient to provide the overhaul required for the transition unless the pace of technological innovation improves, and

even then the “adoption lag” historically can take several years or even decades for the changes to be fully adopted.

- The potential for increased prospects for terrorism and conflict is likely. In the absence of healthy economic growth and employment opportunities, disaffected youth will forsake legal means for political expression and heighten the prospects for disaffection and increase the attraction of terrorist groups as has already occurred in the Middle East.

Each of the scenarios described above is tempered by the unknown – the shocks and surprises which cannot be measured or predicted, as well as the amount of time it takes for various transitions to occur. Some of these changes are more likely and predictable, while others are less so. Changes in demographic trends along with the potential for political and economic liberalization in places like China and Russia are of equal importance to developments in the areas of technological change, public health and other human conditions. Although these global trends are not certain to occur, each represents a potential to vastly influence the world of the future.

### **GLOBAL TRENDS IN EDUCATION**

The influence of globalization extends beyond economic, political and demographic factors. Changes in education also have been shaped by emerging global forces. Global trends in education are increasingly evident as societies have become more culturally integrated. Rapid change brought about by new technologies requires that advances in education keep up in order that all segments of the population are able to benefit from the changes. However, Colin Power has found that globalization has increased the gap between the rich and the poor both within countries and between countries leading to increased marginalization of minority populations.<sup>43</sup> While Power agrees that access to education can provide the means for individuals to climb above the poverty level, countries who struggle to meet the costs associated with global change often reduce the funding for education which results in fewer opportunities for the masses and reductions in the quality of life over time.

The increased demand for education is not confined to the secondary level but exists at the postsecondary or higher education level as well. However, governments at all levels in many countries have been unwilling or unable to provide the necessary funding to support public education at levels required in the new economy. Power argues that as nations become more intertwined, it is incumbent that education systems are able to address the “resurgence of discrimination, racism, ethnic violence and xenophobia which has erupted at the close of the Twentieth century.”<sup>44</sup>

Adriana Medina<sup>45</sup> suggests a growing tendency exists for higher education to become more market-oriented as a result of globalization and that given the cutbacks in state support for education, universities have entered into new alliances with corporations resulting in reduction in autonomy of the faculty and the promotion of technoscience over the humanities and social sciences as higher education becomes the focal point for providing training and developmental research in the new economy.

Medina cites the work of Sheila Slaughter as a means to summarize the effects of globalization on higher education. Slaughter emphasizes the contributions resulting from the greater importance of technoscience, an increasing role for multinational corporations and an increased focus on global intellectual property strategies. Slaughter's list of specific impacts of globalization on higher education appears in numerous sources, and a summary is included here.<sup>46</sup>

- Higher education is moving toward supporting the nations' wealth growth as opposed to focusing on the liberal education of undergraduates.
- Disciplines related to technoscience -- that is, related to the market economy -- have the highest status and support, not only from the schools' administration, but also from the state and corporations.
- Intellectual property at universities is more protected and regulated than ever.
- Universities are a key producer of technoscience through faculty and graduate students' work, and they also provide the training to maintain and keep developing it.
- Faculty and graduate students are increasingly working with industry on government-sponsored technoscience initiatives.
- Given the pressure to participate in the technoscience's drive, faculty professors have lost autonomy.
- Grants are scarce and prioritized. Technoscience projects have priority.
- State support has diminished. Tuition is high, but students do not get as much federal financial aid as in previous periods. Loans are encouraged.
- Corporations have infiltrated the universities and are influencing the policy-making decisions.

These changes have resulted in a significant push toward a corporate and technoscience perspective in higher education that likely would have been less pronounced in the absence of globalization.

### **ARIZONA AND THE GLOBAL ECONOMY**

Arizona participates in the U.S. Commercial Service program and operates the Arizona U.S. Export Assistance Center (USEAC) while maintaining a staff of International Trade Specialists located in Phoenix, Tucson and Scottsdale; however, the services of the Trade Specialists are made available throughout the state.

These business-related services are listed on the Arizona USEAC website<sup>47</sup> and include:

- Counseling and advocacy
- Market research
- Finding qualified business partners in a particular country
- Trade Events to provide increased exposure for business products
- Online matchmaking

In addition, the Arizona Department of Commerce also contains an international business component whose mission is to “Assist(s) small and medium sized Arizona companies with their exporting efforts...and help market Arizona to foreign companies as an excellent location for their U.S. expansion.”<sup>48</sup>

A few of the primary services provided by the staff employed at the Arizona Department of Commerce include offering advisory services to Arizona businesses, as well as sponsoring trade fairs, compiling industry profiles available in different languages, and maintaining foreign trade offices in Mexico, Japan, and Canada.<sup>49</sup>

### **ARIZONA EXPORT STATISTICS**

The Department of Commerce Office also maintains the database containing Arizona Export Statistics. Information available from this database confirms that Arizona exports to the rest of the world continue to increase each year. By 2008, the value of Arizona merchandise exports was \$19.74 billion, an increase of 2.68% over 2007.

Arizona’s top export commodities are shown in Table 10.1. The table lists the dollar-value of the exports in 2008 by type of commodity as well as the percentage change in these values from the previous year.

**Table 10.1  
Arizona’s Top Ten Commodity Exports in 2008  
and Change From 2007**

<u>Commodity</u>	<u>Value of Exports</u> <u>(Millions)</u>	<u>Percent</u> <u>Change</u> <u>2008/2007</u>
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

In 2008, Arizona’s trade with Mexico increased by 12.9% over the previous year. Mexico is Arizona’s largest trading partner with over \$5.9 billion in exports. Canada is Arizona’s second largest trading partner with \$2.28 billion in exports, which represents an increase of 3.7% from 2007.<sup>50</sup>

Table 10.2 shows the value of Arizona’s exports to its ten largest trading partners in 2008. Mexico, Canada, and China head the list.

**Table 10.2**  
**Arizona’s Exports to Top Ten Countries, 2008**

<u>Country</u>	<u>Value of Arizona Exports in 2008 (Millions)</u>
Total to Rest of World	\$ 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

According to the U.S. Office and Trade Administration<sup>51</sup> export-supported jobs linked to manufacturing account for an estimated 4.2 % of Arizona's total private-sector employment. This is below U.S. average of 5.1%, and also below Oregon’s 7.6% and New Mexico’s 4.6%. The other Arizona’s rivals (Colorado, Utah and Nevada) have lower percentages of their private sector employment linked to exports.

Almost one-quarter (23.9 percent) of all manufacturing workers in Arizona depend on exports for their jobs. This is higher than in any of the five rival states. (2006 data are the latest available.)

- A total of 5,404 companies exported from Arizona locations in 2007. Of those, 4,814 (89 percent) were small and medium-sized enterprises with fewer than 500 employees. Small and medium-sized firms generated almost one-fifth (19 percent) of Arizona's total exports of merchandise in 2007. The role of small and medium-size enterprises is total export value is behind those in Oregon, Colorado and Utah.
- Foreign investment in Arizona was responsible for 3.1 percent of the state's total private-industry employment in 2007. Except for Nevada, all other Arizona’s rivals have higher percentages of their workforce related to foreign investment, from 3.4% in Utah to 5.7% in Oregon.

- In the first half of 2008, the metropolitan area of Phoenix-Mesa-Scottsdale exported \$6.4 billion in merchandise, 72 percent of Arizona's total merchandise exports. Other major metropolitan areas in Arizona that exported in the first half of 2008 included Tucson (\$1.5 billion), Yuma (\$115 million), and Flagstaff (\$49 million).

Arizona businesses exported almost \$20 billion dollars of commodities in 2008. While this figure is impressive, there is plenty of room for improvements to reach at least national average. There is also room for small and medium-size exporters; Arizona exports are currently dominated by a smaller number of large-size companies and thus vulnerable to changes in a single company. Oregon and Colorado, where small and medium-size enterprises account for 34% and 28% of total exports of merchandise, might be good examples to follow.

**Ronald J. Gunderson** is professor of economics at Northern Arizona University. He has been employed at NAU since 1977, and has held several positions including special assistant to the president for economic development, associate dean of the College of Business, and the director of the Bureau of Business and Economic Research for the College. He has actively participated in economic development and economic forecasting conferences throughout Arizona and has co-authored several research reports including economic impact studies for various cities and organizations within the state. During his tenure at NAU, Gunderson has served on the board of directors of the Arizona Association for Economic Development, the Greater Flagstaff Economic Council and the Coconino County Workforce Investment Board (WIB) and has completed numerous studies that address economic development throughout northern Arizona. He holds a B.A. degree in Economics from Augustana College, a M.A. in Economics from The Pennsylvania State University and a PhD in Economics from the University of Nebraska.

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<sup>37</sup> Rand Labor and Population Research Brief. *The Future at Work—Trends and Implications* (2004).

<sup>38</sup> The Levin Institute: Globalization101.org. *What is Globalization?* (2010)

<sup>39</sup> [http://ivythesis.typepad.com/term\\_paper\\_topics/2009/04/the-character-and-impact-of-globalization-trends.html](http://ivythesis.typepad.com/term_paper_topics/2009/04/the-character-and-impact-of-globalization-trends.html)

<sup>40</sup> The NIC is a center of strategic thinking within U.S. Government, reporting to the Director of National Intelligence (DNI) and providing the President and senior policymakers with analyses of foreign policy issues that have been reviewed and coordinated throughout the Intelligence Community.  
[http://www.dni.gov/nic/NIC\\_home.html](http://www.dni.gov/nic/NIC_home.html)

<sup>41</sup> National Intelligence Council. *Global Trends 2025: A Transformed World*. (Washington, DC: 2008).  
[www.dni.gov/nic/NIC\\_2025\\_project.html](http://www.dni.gov/nic/NIC_2025_project.html)

<sup>42</sup> The terms WEST and EAST are used in this study to roughly measure the shift in economic wealth from the traditional industrial powers in the West including the U.S. and Western European nations, to emerging powers which are located primarily in the East such as China, India, Russia and the Gulf States of the Middle East. There are some exceptions to this definition. For example, Japan would typically be grouped with the western nations although it is located in the EAST while Brazil is associated with the eastern nations but is located in the WEST.

<sup>43</sup> Power, C. *Global Trends in Education*. International Education Journal. Vol. 1, No. 3, (2000).

<sup>44</sup> *Ibid.*, p. 162.

<sup>45</sup> Adriana Medina. *The Impact of Globalization on Higher Education*. LLC Review. (Baltimore, MD).

<http://www.umbc.edu/lc/PDFfiles/theimpactofglobalization.pdf>

<sup>46</sup> Slaughter, S. *National Higher Education Policies in a Global Economy*. In J Currie and J Newson (Eds.), *Universities and Globalization: Critical Perspectives* (Sage Publications, Thousand Oaks, CA: 1998).

<sup>47</sup> <http://www.buyusa.gov/arizona/services.html>

<sup>48</sup> <http://www.azcommerce.com/BusAsst/International/>

<sup>49</sup> At the time of the preparation of this report, many programs have been eliminated due to State's budget crisis.

<sup>50</sup> *Arizona Global Network*. Arizona Department of Commerce. Vol. 1, Issue 1, (2009).

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<sup>51</sup> Office of Trade and Industry Information, International Trade Administration, (U.S. Department of Commerce, January 2010).

## Chapter 11

# UNIQUENESS OF ARIZONA

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### KEY POINTS

- Arizona has an array of attributes that alone or combined provide the necessary conditions for firms to competitively maintain market positions in the goods and services they are good at producing and create wealth for the region.
- Some of Arizona's unique attributes are its diverse landscape, natural and cultural heritage and location along the U.S.-Mexico border.
- Trade flows and cross-border interdependencies and economic foundations have resulted in the growth of unique 'export-oriented' trans-border industries and clusters.
- Arizona's Right to Work status enables businesses to relocate and entrepreneurship to flourish with fewer impediments to hiring therefore encouraging faster economic growth.
- Policy makers and market participants must have an understanding of these unique attributes prior to setting policies that affect the economy.

The ability of a state (or region) to sustain its competitive position in a given market is a two part process. First, a region must possess and identify unique attributes that provide the economic foundation necessary for firms or industry clusters to innovate and produce goods and services for export. Second, policymakers must be creative at developing and implementing value-creating strategies that provide the support, infrastructure and conditions necessary for firms to grow and compete in an ever changing economy. Gail Lewis stressed the preconditions necessary for effective economic development strategies and policies in the 2001 Arizona Town Hall report:

*“Economic developers must have a thorough understanding of a community's or region's unique attributes and how they may be utilized effectively. Just as importantly, they must understand a community's and region's weaknesses and how these weaknesses may be addressed.”<sup>52</sup>*

The proper combination and effective utilization of these state-specific (region-specific) attributes result in prosperity and sustainable standards of living.



## **ARIZONA'S ATTRIBUTES**

Arizona has a wide range of natural, economic, political and cultural attributes that set it apart from other states. These include:

- Diversity of landscapes
- Climate, sun and clear skies
- Historical heritage
- Border location and trans-border economy
- Trans-border industry clusters
- Trade conduit, and
- Right to Work State status.

### **Diversity of Landscapes**

Arizona has one of the most diverse topographies in the United States. Mountain ranges soar over 12,000 feet and can receive significant precipitation, while low lying deserts receive scant inches of rain each year. Canyons, valleys and arroyos are filled with rich riparian habitats, while high mountains are covered in coniferous forest. Seasonal washes and rivers provide effective run-off across the state, while the Colorado River dominates the entire western boundary of the state and continues to shape Arizona's most spectacular landmark, the Grand Canyon. The high country consists of elevated plateaus, buttes and immense escarpments.

The high mountain ranges run from the northwest to the southeast corners of the state and geographically split the state in two. The majority of the low lying desert is situated in the southwest quadrant, reaching its lowest point near where the Colorado River basin enters Mexico. The dramatic change in elevation between the high mountain ranges and the low lying desert is exquisitely visualized in the escarpments of the Mogollon Rim.

In the northeast lies the Colorado Plateau. It is covered with native grasses and sagebrush making it ideal for grazing. It also has deep canyons carved out by the Colorado River and is one of the most biologically diverse ecosystems in North America. The world-famous Grand Canyon is one of the Colorado plateau canyons. The Painted Desert is also a part of the plateau. This is an expanse of colorful badland hills and buttes formed by years of erosion by the Little Colorado River which flows northwest along the plateau to join the Colorado River. This region also has large concentrations of petrified wood along with numerous historic and archeological sites.

This diverse mountainous and arid landscape is rich in species and habitats unique to Arizona. Most of southern Arizona is part of the Sonoran Desert which is characterized by legume trees and columnar cacti. Arizona is the only state in the nation that supports a favorable habitat for the Saguaro cacti, *Carnegiea gigantea* only found in the Sonora Desert. It is no surprise that Arizona has large protected areas, parks and monuments. The diversity of wildlife and habitat also provides some of the best hunting opportunities in the nation.

### **Climate, Sun and Clear Skies**

Climatic conditions in Arizona are determined by elevation and seasons. The high mountainous range receives about 35 inches of precipitation a year while the low desert valley only receives about 3 inches of rain a year. There are more days of clear skies in April, May and June. The

cloudiest days are during the monsoon season in July and August and during the winter season from December to February. On average, Arizona has more than 300 days of sunshine in a year.

The many days of clear, blue skies have made Arizona a preferred location for astronomical observatories. These observatories are a collaborative effort of universities, research organizations, business partners and governments from all over the world. Mount Graham International Observatory, Kitt Peak National Observatory and Fred Lawrence Whipple Observatory are some of the observatories located in Arizona. The world's strongest telescope is located in the Large Binocular Telescope Observatory on Mount Graham in southern Arizona.

In addition to the sun and clear days, the large expanse of desert area in Arizona provides some of the highest solar power harnessing opportunities in the nation. Arizona's four main climate zones: Sonoran Desert; Basin and Range; Colorado Plateau; and High Mountain/Mogollon Rim zones offer a range of different elevations, terrain, temperatures, solar-radiation levels and vegetation that provide and necessitate varying architectural and building strategies to suit each region's needs<sup>53</sup>.

Warm winters in the lower elevations and cooler summers in the higher elevation provide yearlong outdoor recreation opportunities which include hiking, mountain biking, fishing, camping, skiing and visiting historic sites and monuments. The beautiful clear skies, sunny days and outdoor recreational opportunities attract domestic and international tourists to Arizona and have encouraged many people to make this state their home. Until very recently, as documented in other chapters, Arizona has had one of the highest population growth rates in the nation and was the second fastest growing state after Nevada between 2000 and 2009. Most of the growth was attributed to people migrating to Arizona from other states.

### **Historical Heritage**

Arizona's history continues to shape its culture, politics, economy and people, and influences how the state interacts with Mexico. Arizona's prehistory starts with the Native Americans. Archaeological evidence shows diverse cultures spread across Arizona such as those of the Anasazi, Mogollon and the Hohokam. Following the conquest of what is now central Mexico, the Spanish rode north in search of riches and religious converts. Spanish missionaries were in Arizona as early as 1536 with the most influential being the Jesuit missionary, Father Eusebio Kino, who founded churches and missions across Arizona, including Guevavi, Tumacacori and San Xavier de Bac, which are popular site-seeing destinations today.

The transitions of Arizona occupation and control between Native American, Spanish, Mexican and American entities have always been difficult. Prior to becoming part of the United States, Arizona was part of the Nuevo Vizcaya region (with Sonora) formed in 1562 during Spanish colonial rule. Thereafter, Mexico took control of the region after the Mexican War of Independence from Spain ending in 1821 and later gave up the area north of the Gila River to the United States in the Treaty of Guadalupe Hidalgo of 1848. With the Gadsden Purchase finalized in 1854, the land south of the Gila River to the present U.S.-Mexico border was purchased from Mexico to provide land necessary for the southern transcontinental railroad and to close conflicts lingering after the Mexican-American War.

The forces that spurred settlement of Arizona are also those that created the major conflicts in the region, while leaving a lasting impression on Arizona's cultural heritage. These forces include: 1) the Homestead Act; 2) the end of the civil war; 3) mining; 4) ranching; 5) coming of the railroad; and 6) Native American conflicts. The Homestead Act promised 80 acres of unclaimed land 'free' to any individual who could improve his land claim. This promise of a new start, coupled with the end of the Civil War and the return of soldiers to Arizona provided fresh impetus for migration.

The early economy of Arizona was initially dominated by ranching. Mining in Arizona was not conducted at a large scale until after 1849, when people crossing Arizona on their way to California during the California gold rush discovered gold, silver and copper in Arizona. Mining boomed in 1870s, helped by the introduction of the railroad in 1882, and led to the establishment of the Copper Queen Company in Bisbee and to the inflow of silver miners to Tombstone in 1877. Today, Arizona is the top producer of copper in the United States, producing more than 63 percent of U.S. recoverable copper in 2008<sup>54</sup>.

The influx of people, carried on the new railroads saw the loss of traditional lands of the Native Americans. As a result, Native American conflicts increased as illustrated in the lives of Geronimo and Cochise. Arizona currently has one of the largest Native American populations in the United States with 22 tribal nations and communities.<sup>55</sup>

### **Border Location and Trans-border Economic Integration**

It is difficult to discuss the influence of the U.S.-Mexico international border on Arizona without mentioning the historic and economic importance of Arizona's interaction with Sonora, Mexico. Arizona is one of four states in the United States along the U.S.-Mexico international border. Other U.S. border states include California, New Mexico and Texas. Arizona shares with Sonora 361 miles of the 1,969 mile long international border. Both states are part of the Sonoran Desert and have similar ecosystems and watersheds that are part of international water agreements between the U.S. and Mexico. Arizona and Sonora experienced similar Spanish influence during the time of settlement and both were made Mexican territories until the international border was drawn-up following the Gadsden Purchase in 1854 effectively separating both states.

Economic Integration: As a result of its past political and cultural ties with Mexico, Arizona has forged long standing cultural and economic ties with its neighbor state of Sonora in the south. It is these ties that led to the recognition of Arizona and Sonora as an emerging integrated economic region; a modern day model of regional integration. This idea was formalized by the Arizona-Mexico Commission and Comisión Sonora-Arizona in 1993, with a specific goal to "... *enhance economic development and regional growth through formal collaboration and more efficient utilization of complementary resources within the NAFTA framework*<sup>56</sup>."

These two sister organizations were formed in 1972 to promote trade, increase commerce and enhance the quality of life of the residents of Arizona and Sonora.

The interdependencies between Arizona and Sonora represent shared economic foundations such as capital, human resource, and physical infrastructure, which are unique to border regions. These shared economic factors have enabled the region to grow and retain its economic value added through economically competitive trans-border industry clusters.

### **Trans-border Industry Clusters**

Trans-border industry clusters have the following attributes:

- they are export driven;
- have a functioning value-chain in the region with strong vertical and horizontal integration and interdependencies between the industry and its suppliers, customers and collaborators; and
- have a concentration in the region greater than the national average.

Three major cross-border, export-driven economic activities that transcend the border in Arizona and Sonora fit these requirements: maquiladora and other production sharing facilities, the fresh produce industry and border tourism.

Maquiladoras and Other Production Sharing Facilities: The maquiladora sector is a major economic driver in northern Mexico. The maquiladora program was established by the Mexican government in 1965 to create employment along Mexico's northern border for thousands of Mexican workers who found themselves unemployed after the end of the Bracero guest worker program in 1964. Under the maquiladora program, firms in foreign countries would export raw materials or inputs duty-free (in-bond) to Mexico for assembly into final goods and re-import the maquiladora-assembled products back duty free.

This production sharing/outsourcing model has enabled firms in the United States to remain competitive through cost reductions by efficiently plugging into global supply chains, cheap labor pools, tax incentives and cheaper access to resources. It is estimated that by the end of the 1990s, about 30 percent of Sonoran production sharing facilities were owned or operated by Arizona based firms.

Over the last decade, the preferred duty-free position maquiladoras had enjoyed in the pre-NAFTA days has slowly been eliminated: NAFTA provisions eliminated import-export fees between the member states, while Mexican government extended special position to other export-oriented companies. The last NAFTA provisions were fully implemented on January 1, 2008. After NAFTA, existing maquiladora facilities were able to continue operating under the maquiladora-like benefits such as duty free import of components for assembly and re-exportation. However, the Mexican government stopped recognizing the maquiladora sector as a separate entity beginning in March 2007. The term maquiladoras now refers to facilities engaged in international production-sharing operations that were once under the maquiladora program as well as facilities that enjoy maquiladora-like benefits.

Fresh Produce Industry: The fresh produce industry is a cross-border, vertically integrated, complex operation that links growers in Mexico to U.S. consumers through a network of elaborate organizational structures. The elaborate network provides services at each level of the

production to market process such as input supplies, financing, growing, picking, packaging, branding, transportation, warehousing, loading, marketing and retailing. Networks of producers, distributors, supplies and retailers are geographically located in close proximity and collaborate and share information in order to maximize returns and increase efficiencies from production to sale. Most activities along the production-to-sale process are handled by family members or close friends. However, globalization has increased competition in logistics as well as along the supply chain, resulting in shifts in business alliances where economically profitable business relationships are becoming more preferred.

Fresh produce exports through Arizona comes primarily from Sinaloa with extensive farming located in Los Mochis and Culiacán. Most farms are financed by U.S. based produce distributors who provide inputs such as seeds, fertilizers, material and equipment in lieu of capital or cash injection. In the last decade, the fresh produce industry has become less labor-intensive and more technology oriented through the use of Spanish and Israeli technologies. Common fresh produce includes tomatoes, cucumbers, onions, peppers, squash and beans and other winter vegetables. Tomatoes are mostly exported to the Western region cities such as Los Angeles, Portland, and Seattle.

In Arizona, and especially in Nogales, the fresh produce industry generates employment in transportation and warehousing, federal government (inspection and customs offices) and brokerage and insurance sectors. In Sonora, the industry creates employment in loading, trucking and federal government. Since most of the produce is grown in Sinaloa, most of the farm employment is in that state.

### **Border Tourism**

The diversity of Arizona's natural, historical, cultural and economic landscape is a major attraction to both domestic and international visitors. The contribution of these visitors to Arizona's economy is evident in its effect on the travel and tourism industry, an important 'export-oriented' industry in Arizona. A study by Dean Runyan Associates<sup>57</sup> estimated that over 166,900 jobs were generated in the travel industry in 2008 with earnings of \$5.0 billion. In addition, spending by visitors to Arizona contributed an estimated \$1.4 billion in state and local government tax revenues, and an additional \$1.2 billion in federal revenues -- an equivalent of \$1,080 per Arizona household.

It is important to note that border tourism is a two-way activity that involves visitors from U.S. traveling to Mexico as well as visitors from Mexico traveling to the U.S. Border tourism gained its name from the fact that the majority of Mexicans visiting the U.S. and the majority of U.S. visitors to Mexico stay in border states. Unlike "typical tourists," the overwhelming majority of border tourists return home the same day.

Visitors from Mexico make a subset of all international visitors to Arizona. Due to Arizona's proximity to Mexico, the characteristics of Mexican visitors are uniquely different from other international tourists. A 2008 study by Pavlakovich-Kochi and Charney, *Mexican Visitors to Arizona: Visitor Characteristics and their Economic Impacts, 2007-2008*, revealed that over 99 percent of Mexican visitors enter Arizona through its six border ports of entry with majority of

them coming from Sonora, Mexico. Of those, 90 percent were day visitors with more than two-thirds of them traveling for the purpose of shopping. Other reasons for traveling to the U.S. include visiting friends, relatives and for business. Consequently, the effect of Mexican visitors on Arizona's retail industry, referred to as 'retail exports', is enormous.

According to the study, Mexican visitors spent about \$2.7 billion in retail stores, hotels, restaurants and other spending-related activities in fiscal year 2008. Spending in stores (retail) was the largest expenditure category, about 57.5%, of all Mexican visitor expenditures. This represents about \$1.5 billion of the \$2.7 billion total expenditures by all Mexican visitors. This direct spending generated about 23,400 jobs in Arizona with an additional 7,000 jobs generated from the ripple effect of their spending. These jobs accounted for \$837 million in income and \$3.6 billion in sales. Tax contributions to state and local government amounted to \$235.3million.

### **Trade Conduit, Ports of Entry and Trade Corridors;**

As one of four U.S.-Mexico border states, Arizona plays a critical role in facilitating the flow of trade between the U.S. and Mexico by processing commercial trade and people at its ports of entry and facilitating their movement and distribution into the U.S. interior through its transportation network.

Ports of Entry: Arizona's ports of entry, collectively referred to as the Nogales Customs District, include six border ports of entry: Nogales, Douglas, Lukeville, Sasabe, Naco and San Luis; and four air ports of entry: Nogales International airport, Phoenix Sky Harbor airport, Tucson International airport and Scottsdale airport.

The Nogales port of entry is made up of four border crossings: Morley, Mariposa, DeConcini and a rail border crossing. Morley is a pedestrian only port of entry, DeConcini is a personal-owned-vehicle, buses and pedestrian border crossing and Mariposa is a commercial truck, personal-owned-vehicles and bus border crossing. The rail border crossing is purely for processing freight.

The contribution of Arizona's border ports of entry to trade in the U.S. is significant. In 2008, \$13.9 billion of all northbound shipments to the U.S., or 4.5%, was processed by the Nogales Customs District. This amounts to about 7.2% of all U.S. imports from Mexico flowing through the southern ports of entry. California facilitated over 12.8% of all northbound trade from Mexico to the U.S. that went through the southern border, New Mexico about 0.5% and Texas processed the remaining 75%.

Of the total dollar value of imported goods from Mexico through the Nogales District, about 33% in 2008 were Arizona imports, while the majority (67%) was for other destinations in U.S. (Table 11.1).

**Table 11.1  
Arizona and U.S. Imports from Mexico (in Million Dollars)**

	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>
<b><u>Arizona Imports</u></b>					
Douglas	219.7	364.2	391.3	454.7	400.4
Lukeville	0.1	0.1	0.2	0.1	0.3
Naco	19.0	24.4	22.3	24.2	3.0
Nogales	3,005.1	3,262.2	4,076.3	4,170.3	4,087.5
Phoenix	61.2	29.6	53.0	50.2	61.7
Sasabe	-	-	-	-	-
San Luis	61.0	70.9	55.4	54.1	67.7
Tucson	33.1	3.0	1.2	73.8	10.9
Nogales Customs District (Total)	3,399.1	3,754.5	4,599.7	4,827.4	4,631.4
<b>U.S. Imports</b>					
Nogales Customs District	9,351.6	10,761.9	14,150.9	14,249.2	13,919.4
AZ % of Imports	36.3%	34.9%	32.5%	33.9%	33.3%

Sources: Research and Innovative Technology Administration, Bureau of Transportation Statistics.

More than 74% of the \$6.8 billion southbound shipments processed by the Nogales Customs District in 2008 originated from Arizona (Table 11.2). Five billion dollars, or 86%, of Arizona's \$5.9 billion worth of exports to Mexico were facilitated through its own ports of entry. The remaining 26% were exported through other southern ports of entry.

**Table 11.2  
Arizona and U.S. Exports to Mexico (in Million Dollars)**

	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>
<b><u>Arizona Exports</u></b>					
Douglas	223.9	289.9	283.5	306.1	310.1
Lukeville	7.1	6.6	7.2	7.9	3.1
Naco	32.1	37.0	61.3	26.3	13.6
Nogales	3,056.6	3,658.4	4,149.5	3,814.8	4,464.6
Phoenix	0.8	107.2	155.3	193.3	104.2
Sasabe	0.1	0.0	0.1	0.3	0.8
San Luis	75.3	169.6	223.1	225.7	181.2
Tucson	18.0	45.8	6.0	0.6	0.8
Nogales Customs District (Total)	3,413.8	4,314.5	4,885.9	4,574.9	5,078.2
<b><u>U.S. Exports</u></b>					
Nogales Customs District (Total)	4,064.2	4,527.5	6,069.6	5,951.7	6,849.2
AZ % of Exports	84.0%	95.3%	80.5%	76.9%	74.1%

Note: Exports are by all Modes of Transportation, through all Nogales Customs District  
Sources: Research and Innovative Technology Administration, Bureau of Transportation Statistics.

The Mariposa border crossing at Nogales processes most of the exports from Arizona to Mexico, about 88% in 2008. San Luis is the second largest port of entry handling 3.6% of all commercial traffic. The top 3 export commodities processed at the Mariposa border crossing includes Arizona's top 5 exports to Mexico: computer and electronic products; transportation equipment; and electrical equipment, appliances, and components.

The Mariposa port of entry at Nogales is also specialized in handling fresh produce imports from Mexico. In 2008 more than 44% of all fresh produce imports from Mexico to the U.S. interior were processed at Mariposa, Nogales. Most of the produce is transported by truck. In 2008, 303,757 commercial vehicles with an import value of \$4.4 billion (including both fresh produce and manufacturing products) originating in Mexico crossed at Mariposa port of entry.

**CANAMEX Trade Corridor:** South-north highways in Arizona facilitating trade flows between the United States and its NAFTA partners, Mexico and Canada, are the core of the CANAMEX trade corridor. In 1995, Congress designated the south-north NAFTA trade corridor, now referred to as CANAMEX Corridor-26 as a high priority corridor. The corridor stretches from Sinaloa and Jalisco Mexico through Arizona, Nevada, Utah, Idaho, and Montana in the U.S. to British Columbia and Alberta in Canada. In the State of Arizona the CANAMEX corridor encompasses Interstate-19 from Nogales to Tucson, Interstate-10 from Tucson to Phoenix, and the United States route 93 between Phoenix and the Nevada border. It continues on Interstate-15 to Canada. The corridor has evolved to become an essential component for efficient transportation of goods, services, people, and information between the United States and Mexico.



## **Right to Work State**

The State of Arizona is one of 22 states in the United States that secures the right of a person to obtain or retain employment whether or not they are a member of a labor organization, and prohibits corporations, individuals or associations from excluding anyone from employment or continuation of employment because of non-membership to a labor organization.

What this means is, if you live and work in Arizona, the Right to Work Law ensures that:

- You are free to join, not join or leave a union at your own will;
- You may not be fired if you decide not to join a labor union;
- You may not be fired if you decide to resign from a labor union;
- You are not compelled to pay labor union dues if you do not belong to a labor union;
- Workmates who are union members cannot threaten, intimidate you or interfere with you, your family or property to compel you to join a labor union, a strike or leave employment;
- Conspiracy to induce other workmates to refuse to work with you for not being a member of a labor union is prohibited;
- All federal government employees including postal service employees are guaranteed the right to decline membership to labor organizations;
- Railway and airline employees are not protected under the Right to Work Law. Their employment relations are defined in the Railway Labor Act;
- State and local government employees including public school teachers and college professors are protected under the Right to Work law;

Pros of the State Right to Work Law: It has been argued that state Right to Work laws enable businesses to relocate and entrepreneurship to flourish when there are fewer impediments to hiring therefore encouraging faster economic growth. The ability of an employee to negotiate his or her earnings and benefits is assumed to be based purely on merit and market demand and supply. State Right to Work laws reduce forced bargaining representation for individuals. These individuals may not agree with the terms being negotiated and may feel powerless against their union leaders. The Right to Work law protects these individuals from union violence, intimidation and harassment.

Cons of a State Right to Work Law: Unions have argued that employees who are not members, free-ride on benefits obtained by unions. Membership in unions enhances the bargaining power of employees in negotiating for better wages and working conditions when dealing with large corporations. It also prevents workplace abuse and provides avenues to address workplace issues that would otherwise be ignored.

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*Project* ([www.bip.arizona.edu](http://www.bip.arizona.edu)), a strategic initiative of the Arizona-Mexico Commission endorsed by former Governor Janet Napolitano in 2004. She has co-authored various economic impact studies and progress indicators for the Arizona-Sonora Region. In addition, she developed and manages the *EBR Database Online*, an online source of data on Arizona and its counties, and is responsible for the business and economic database that supports most of EBR research and publications.

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<sup>52</sup> *The Role of Economic Development, Moving All of Arizona into the 21st Century Economy*, Seventy-eighth Arizona Town Hall ( May 13 – 16, 2001).

<sup>53</sup> Arizona Solar Center <http://www.azsolarcenter.org/> (Accessed February 2010).

<sup>54</sup> *Copper in July through December, 2008*, Mineral Industry Surveys <http://minerals.usgs.gov/minerals>. (U.S. Geological Survey, 2008).

<sup>55</sup> Center for American Indian Economic Development. <http://www.franke.nau.edu/businessoutreach/caied>

<sup>56</sup> Vera Pavlakovich-Kochi, Vera and Jaewon Lim, *Arizona-Sonora Region: Economic Indicators and Regional Initiatives, 2009*. (Arizona-Mexico Commission and the University of Arizona).

<sup>57</sup> Dean Runyan Associates, *Arizona Travel Impacts 1998-2008*. (Prepared for the Arizona Office of Tourism, Phoenix, Arizona, June 2009.)

## Chapter 12

# ARIZONA'S REGIONAL DIVERSITY

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### KEY POINTS

- Arizona is rich in human energies and environmental resources, but economic development and activity are concentrated in core metropolitan areas.
- Spatial differences in economic activity and development create a disparity in quality of life for citizens.
- Previous Arizona Town Hall sessions (1990, 2001) have asked how to incorporate the whole state into a thriving economy, and many of those questions remain relevant today.
- Education is under-funded throughout the state, perpetuating social and geographic inequalities, and failing to prepare the future talent pool of Arizona.
- County by county comparisons reveal how higher incomes and diversified economic activity exist in the metropolitan areas, but lag in the non-metropolitan regions of the state.
- A recession exaggerates the disparity in wealth, resources and capital between non-metropolitan areas that rely on mining, agriculture, construction, and seasonal migration, and metropolitan areas with high technology, public administration, education and health services.

Humorist Will Rogers once quipped: “The trip across Arizona is just one oasis after another. You can just throw something out and it will grow there, I like Arizona.” This conception of Arizona points to an environment full of opportunities: a wide range of natural resources and human capital.

But many times, when economic development is analyzed in terms of geography and statistical measures, the emphasis is on the Phoenix and Tucson metropolitan areas, and the connecting I-10 corridor of Pinal County (the fastest growing area in Arizona). The other metropolitan areas of Yuma, Flagstaff, Lake Havasu-Kingman, and Prescott are also significant, whereas the remainder of the state receives less attention.

This is partially due to the population density in which approximately 66% of Arizonans live in the Phoenix metropolitan statistical area (MSA); 16% live in the Tucson MSA; 2-3% live each in the Yuma, Flagstaff, Lake Havasu-Kingman, and Prescott MSAs; and the remaining 7% of Arizonans are spread throughout the state.<sup>58</sup> Although integral to the state's economic activity, this metropolitan focus creates a fragmentation of development and investment in the state's markets and industries.

In other words, the state does not operate within a fully integrated system of economic development. Arizona is composed of considerable environmental, resource and human diversity. This is the basis for all of the creativity that the people generate in Arizona, but is often unevenly distributed in terms of its economy and quality of life for all citizens. The 78<sup>th</sup> Arizona Town Hall in 2001 tackled this very question of economic fragmentation with its' theme of "Moving All of Arizona into the 21<sup>st</sup> Century Economy." One of the key points discussed at the session was that many areas lacked the social (health care and education) and technical (transportation, communications, human and natural resources) infrastructure needed to bring the entire state into the global economy.

This economic fragmentation creates diametrically opposed spatial dynamics, such as the divides between the metropolitan and non-metropolitan areas, or the classic rural versus urban dynamic. Additionally, the north of the state is often disconnected to the central and south, while the southern counties, which border Mexico, operate as their own "border region." Many areas outside the Maricopa-Pinal-Pima county areas deal with high unemployment and poverty levels, made worse by the effects of the latest recession.

However, these different spatial dynamics coincide with human diversity that is invaluable to the state in terms of regional history and culture, as well as creative economic activity today. This human diversity includes a wide-range of ethnic backgrounds, ages, skills and educational expertise. Like many growing states, Arizona will have a minority majority population shortly after 2015 if current rates continue.<sup>59</sup> The state has been the site of migration from other U.S. states and foreign countries, and although growth has declined a little since the recession, it remains one of the fastest growing states in the U.S.<sup>60</sup>

As noted in the previous chapter, the state is also a place of considerable natural beauty. Arizona's sites not only sustain the tourism industry and are part of several national parks and monuments, but also continue to be a main attraction for relocating working families. The environment also has been utilized for resource extraction and agriculture throughout Arizona's economic trajectory.

These disparate geographies and peoples are all assets of the state economy. How they integrate together and cope with disparity is a continuous challenge. This chapter reviews current data on population and geographic diversity and how they come together in the state economy. With this information, questions emerge for the statewide session: Can state strategies bring these assets together into a thriving and integrated economic space, now separated by disparate development and priorities? And how can regional diversity be utilized to regenerate the economy in a brutal recession?

## **WHAT ARE THESE DIVERSE ASSETS?**

### ***People***

Arizona is home to an ethnically and age diverse population with diverse skills—an asset to social and economic development. Arizona has the largest Native American land base and third largest Native American population in the U.S., numbering over 250,000 people (5% of Arizona's population) consisting of 22 nations and communities.<sup>61</sup> Each nation sustains its

distinct traditional cultures and simultaneously develops projects to build sustainable economies (see Chapter 13).

Arizona has the fastest growing Hispanic population in the U.S. which, according to the 2000 census, comprises 29% of state residents and numbers at least 1.8 million people. Yuma and Santa Cruz counties both have majority Hispanic populations. Based on 2006 Census estimates, white individuals (non-Hispanic) constituted 59.6% of the state population, and African-Americans were represented at 3.8%. The diversity of Arizona's population also includes: an Asian population at 2.4%, Native Hawaiian and Pacific Islanders at 0.2%, and individuals identified in the census as "Other Race" at 9.3%.<sup>62</sup>

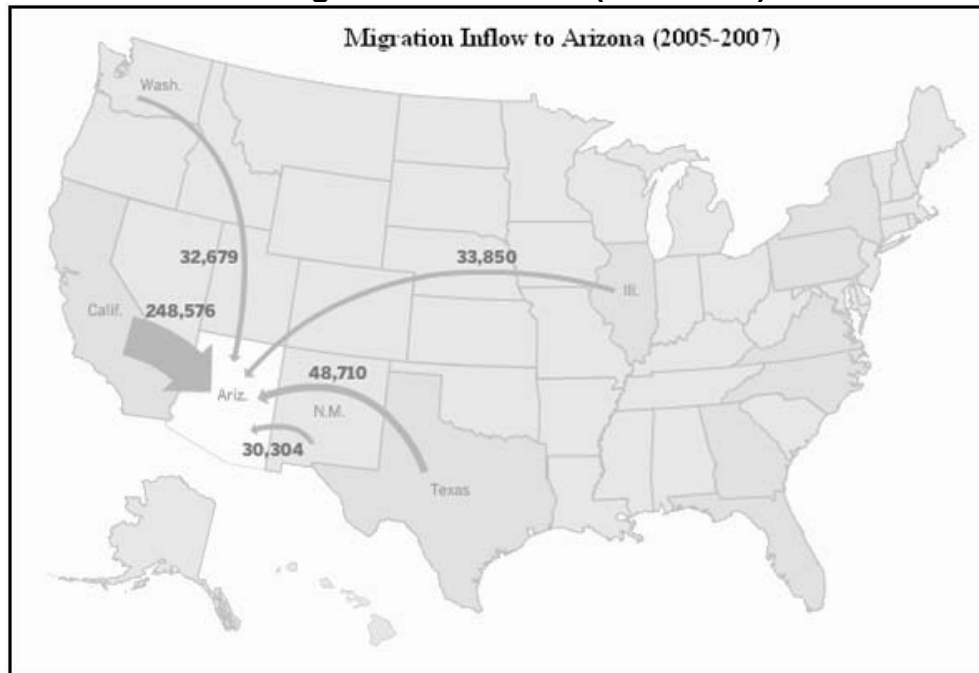
Wide age ranges exist through AZ counties, with areas like Apache, Navajo and Santa Cruz counties have a predominantly young population while counties like Yavapai, La Paz, Mohave and Gila have older populations.

Between 1990 and 2000, Arizona's population increased by 40%, exceeding five million people, largely due to growth in Maricopa and Pinal counties.<sup>63</sup> Since 2005, the population growth has been 3.6%.

In-migration from around the United States is the main source of the population growth (Figure 12.1). Many domestic migrants are retirees. From 1995 to 2000, Arizona's net number of domestic migrants aged 65 and over was 53,241.<sup>64</sup> Retirement communities such as Green Valley in Pima County attract much of this migration; in 2002, 73.3% of its population of 12,662 was aged 65 or over. Foreign-born migration has also accounted for new residents who actively participate in the labor market. From 1995 and 2000, there was a foreign-born migration inflow of 141,602. And just between 2006 and 2007, 46,713 immigrants moved to Arizona from abroad.<sup>65</sup>

Education of Arizona's growing population has not been the top budget priority for decision makers. The state government general fund is the primary source of funding for elementary and secondary education in Arizona. As will be shown in the next section "County-by-County Comparisons", many Arizona schools serve lower income communities, with high numbers of students qualifying for free or reduced lunch rates (a proxy for measuring poverty).

**Figure 12.1**  
**In-Migration to Arizona (2005-2007)**



Source: Pew Research Center (Originally printed in SARSC 2009)

State funding for universities and community colleges has dropped rapidly since 1999. Expenditures per student in Arizona have been considerably lower than the national average for years. Fewer than 5% of the students in Arizona attend school in districts with per-pupil expenditures that are at or above the national average.<sup>66</sup> Scores for Arizona students tend to be below national averages.<sup>67</sup>

In recent years, employment for Arizonans has been in three main economic sectors—services, trade, and construction—with service jobs providing the greatest source of employment, accounting for 1,000,000 jobs in 2006.<sup>68</sup> In that same year, wholesale and retail trade provided 428,000 jobs, many related to the state’s tourism industry. The tourism sector has brought an estimated \$12-18 billion dollars annually to the state’s economy in the past few years. However, the tourism sector has experienced important setbacks since the end of 2007 by reductions in total direct travel spending and total employment.<sup>69</sup> Similarly, in 2006, 242,800 people in Arizona were employed in construction, but that number has gone down rapidly since the recent bust in the housing market. The manufacturing sector accounted for 183,100 jobs in 2006.<sup>70</sup>

### ***Land***

The state land base is nearly 114,000 square miles, of which only 17.6% is privately owned. The federal government through the Bureau of Land management and the Forest Service owns 42.1%, and another 12.7% was set aside as State Trust land.<sup>71</sup> Native nations and reservation lands cover 27.6% of the state. Several of the core industries—agriculture and copper mining—rely directly on natural resources.

In terms of statistics, agriculture (produce, cotton and cattle ranching) continues to be a vital aspect of Arizona's economy occupying 37% of the state's total land area, and generating an estimated \$3 billion for the 2000 Arizona Gross State Product, with direct, induced and ripple effects totaling \$6.6 billion on a total output basis.<sup>72</sup> An estimated 72,000 jobs are created by agribusiness.

Copper mining and other mineral extraction contributes to the state economy, with copper mining having an estimated direct impact of \$3.2 billion, and a combined direct and indirect impact of over \$6.8 billion. From 2006 to 2007, jobs in copper rose from an estimated 8,200 to 10,300.<sup>73</sup>

Finally, lands in the myriad of national and state parks continue to the tourism or "travel" industry throughout the state. In 2008, the direct travel industry earnings were estimated at \$5.0 billion and 166,900 jobs, with direct and indirect earnings totaling approximately \$10.2 billion and 310,000 jobs.<sup>74</sup>

In all of these sectors, which draw directly from Arizona's natural resources, there are issues that challenge long-term sustainability. The reliance on agriculture and mining in many of the non-metropolitan areas of Arizona calls for comprehensive solutions to develop sustainable economies.

#### **DIVERSE CHALLENGES: COUNTY-BY-COUNTY COMPARISONS**

Tables 12.1 and 12.2 compare data on a county-by-county basis, looking first at population, geographic area and education attainment levels. Geographic information reveals how much land constitutes each county (pointing to density issues), as well as the predominance of non-private ownership, be it federal, state or Native Nations'. The median age for each county is included to show the wide range of differences. Arizona is both a relatively young and senior state, with counties that have either one end of the extreme and simultaneously deal with higher poverty rates than the rest of the state

In Maricopa County, the population rose 24% from 2000-2006, four times the national average. At least four cities (Mesa, Tempe, Scottsdale and Glendale) in the Phoenix MSA have populations of over 100,000 people. As noted previously, the population of Pinal County is growing twice as fast as anywhere else in Arizona, but lags in education attainment rates.

Many counties have large Native American populations. Navajo County is close to 50% Native American and has one of the highest birth rates in the state. In Coconino County, which has the highest education attainment rates in Arizona, one out of four people are Native American. Apache County, with a large Native population as well, has the lowest median age. In contrast, in La Paz County, which has predominantly white population, 26% of residents are over the age of 65.

**Table 12.1  
County-by-County Population Comparison**

<b>County</b>	<b>Land Base (in sq miles)/ Ownership</b>	<b>County Seat/ Largest Cities</b>	<b>Population (2006)</b>	<b>Median Age</b>	<b>Education Data/ Free Lunch Eligibility*</b>
<b>Apache</b>	11, 218; 13% privately owned; Navajo and White Mountain Apache Nations cover 2/3 area	St Johns (3,294) Chinle (5,366)	74,515	27	Low scores, high dropout/highest rate of free lunch
<b>Cochise</b>	6,219; 40% privately owned	Bisbee (6,000) Sierra Vista (45,000)	135,150	37	Average scores, one of lowest dropout/average free lunch
<b>Coconino</b>	18,661 (largest); 13% privately owned; National forests, parks, Native nations	Flagstaff (62,000)	132,270	30	Average scores, average dropout/average free lunch
<b>Gila</b>	4,796; 2% privately owned; substantial is Native nations or federally owned	Globe (8,000) Payson (16,000)	56,800	42	Average scores, high dropout/ above average free lunch
<b>Graham</b>	4, 641; 10% privately owned; San Carlos Nation owns 1/3 area, federal ownership large	Safford (9,000)	36,380	31	Average scores, lower dropout/above average free lunch
<b>Greenlee</b>	1,848; 8% privately owned; Federal largest landowner	Clifton (2,000)	83,000	34	Higher scores, lowest dropout in AZ/lowest free lunch
<b>La Paz</b>	4, 413; 5% privately owned; Federal largest landowner	Parker (3,000) Quartzsite (3,000+)	21, 255	47	One of lowest scores, above average dropout/high free lunch
<b>Maricopa</b>	9, 222; 29% privately owned; Federal government major land owner	Phoenix (1.5M) (Four cities 100,000+)	3.793 M	33	Higher scores, below average dropout/amongst lowest free lunch
<b>Mohave</b>	13, 470; 17% privately owned	Kingman (28,000) Lake Havasu (55,000)	198,320	43	Lower scores, one of highest dropout rates/average free lunch
<b>Navajo</b>	9, 959; 30% privately owned; 55% Native nations	Holbrook (5,000) Show Low (11,000)	113,470	30	Slightly below average scores, slightly higher dropout/above average free lunch
<b>Pima</b>	9, 189; 14% privately owned; Native nations, federal and state ownership is substantial	Tucson (535,000)	981,280	36	Average scores, average dropout/average free lunch
<b>Pinal</b>	5, 374; 22% privately owned; State and Native nations ownership	Florence (21,000) Casa Grande (38,000)	299,875	37	Low scores, one of highest dropout/average free lunch
<b>Santa Cruz</b>	1, 236 (smallest); 38% privately owned, Federal ownership	Nogales (22,000)	45,245	32	Low scores, slightly lower dropout/one of highest free lunch
<b>Yavapai</b>	8, 128; 25% privately owned; Federal and state ownership	Prescott (42,000)	213,285	45	Highest scores in AZ, slightly higher dropout/one of lowest free lunch
<b>Yuma</b>	5, 519; 13% privately owned; Federal ownership dominant	Yuma (92,000)	196,360	34	Among lowest scores, lower dropout/among highest free lunch

Source: Morrison Institute, 2010; [arizonaindicators.org/pages/economy/summaries/county.html](http://arizonaindicators.org/pages/economy/summaries/county.html)

\*Free and reduced lunch rates are used as a barometer for poverty of student body.



**Table 12.2**  
**County-by-County Economic Information**

<b>County</b>	<b>Per capita personal income</b>	<b>Unemployment</b>	<b>Economic Drivers</b>
<b>Apache</b>	\$18,637	10.1%	Federal government, other private service - providing; also transportation, utilities and tourism
<b>Cochise</b>	\$26,886	5.1%	Federal (Fort Huachuca and border); also utilities, agriculture
<b>Coconino</b>	\$28,045	4.8%	Federal, tourism, Northern Arizona University, surgical manufacturing
<b>Gila</b>	\$24,165	5.7%	Mining; also agriculture, federal and tourism
<b>Graham</b>	\$19,034	4.2%	Agriculture; also commercial printing, tourism, utilities and federal
<b>Greenlee</b>	\$25,319	4.5%	Copper mining, construction, wholesale trade; also agriculture
<b>La Paz</b>	\$20,683	6.8%	Agriculture; also seasonal residents, tourism and manufacturing
<b>Maricopa</b>	\$33,178 (highest)	4.4%	High technology manufacturing, construction, administrative & support & waste management & remediation, tourism, wholesale trade, telemarketing; and also state business hub
<b>Mohave</b>	\$22,055	6.5%	Retiree, seasonal and tourism, health care, construction; also some manufacturing
<b>Navajo</b>	\$18,380 (lowest)	8.6%	Mining, construction, federal; also rail, newsprint mill, electric power and tourism
<b>Pima</b>	\$28,869	4.9%	High-technology, federal, tourism, telemarketing; also The University of Arizona
<b>Pinal</b>	\$20,835	6.6%	Agriculture and mining; also manufacturing and correctional facilities
<b>Santa Cruz</b>	\$19,967	9.3%	International border activities (wholesale trade, transportation, warehousing, exported goods); health care/social assistance; Mexican resident shopping; Government border trade/security
<b>Yavapai</b>	\$24,521	5.0%	Mining, in-migrating retirees, seasonal residents, tourism
<b>Yuma</b>	\$21,005	15.9%	Agriculture and related activities, federal military and border security; also seasonal residents

Source: Morrison Institute, 2010; Arizona Department of Commerce, 2008  
 Population estimates are based on Arizona Department of Economic Security, 2006  
<http://arizonaindicators.org/pages/economy/summaries/county.html>  
 Unemployment rates based on data from the Arizona Department of Commerce, 2008

Santa Cruz County has a Hispanic population of 81% of which 38% are foreign born. The county is a major gateway between the U.S. and Mexico, and as shown in Table 12.3, the main economic drivers are border related industries—government, wholesale trade, and transportation among others.

Arizona's high technology industries, which include micro-electronics, aeronautics, scientific instruments and computers, have been concentrated in the Phoenix and Tucson MSAs. These industries generate higher personal incomes and mark Arizona's transition into global, post-industrial industries. High technology industries require a high education and skill level, and Arizona is often required to recruit out-of-state talent, rather than utilize an extensive in-state pool. Recruitment can be difficult as studies from Tucson Regional Economic Opportunities (TREO) and other economic groups have found.<sup>75</sup>

In Yuma the high unemployment rate in part results from the low share of residents who are of working age. Federal monies are important economic drivers in the operation of nation parks, border security, and several military bases.

### **THE METROPOLITAN VS. NON-METROPOLITAN DIVIDE**

The difference between metropolitan/non-metropolitan areas and rural/urban is important to distinguish. Metropolitan and non-metropolitan distinctions are based on statistical population measures and economic relationships. Metropolitan areas have a large population nucleus with adjacent communities that have a high degree of economic and social integration with that nucleus. Arizona has six metropolitan areas: Phoenix, Tucson, Yuma, Flagstaff, Lake Havasu-Kingman, and Prescott.

Businesses are attracted to metropolitan areas, which have infrastructures already in place and a large, skilled population from which to draw employees. Non-metropolitan areas have widely dispersed populations and although they may have incorporated towns, may lack infrastructure and a full business network of companies.

Comparatively, “rural” and “urban” connote the specific economic activities and ways of life in an area: rural concentrating on agricultural activities and urban on manufacturing, services and trade. Although there are obvious links between non-metropolitan areas and rural economies, and metropolitan areas as urban—this is not a simple equation. As seen in the county-by-county comparisons, many of the metropolitan areas incorporate rural agricultural activities (consider the growing I-10 corridor). Similarly, non-metropolitan areas are not solely dependent on rural/agricultural economies; many rely on seasonal migration and federal contracts.

For the 1990 Arizona Town Hall, “The Many Faces of Economic Development in Arizona”, the background report discussed how uneven development operates throughout the state and several of the questions asked twenty years ago continue to be subject of the current Town Hall session. Namely, how the under-development of many areas in the state in the 1990s continue to be economically lagging today.

Looking at specific areas and industry clusters throughout the state, it is clear that metropolitan areas are where the high technology industries are concentrated, in addition to agricultural activities and tourism. The challenges to non-metropolitan areas are multiple: high unemployment rates, reliance on federal employment, high poverty levels and a widening income gap in comparison with the metropolitan areas. For example, the per capita incomes for Apache, Navajo and Santa Cruz counties, are below \$20,000 in comparison with Coconino, Pima and Maricopa, which are closer to or exceed \$30,000.

### **REGIONAL DIVERSITY IN A RECESSION**

Since the recession hit Arizona, job losses have been high, hurting the entire state but especially those areas with already vulnerable and non-diversified economies. Marshall Vest of The University of Arizona writes, “Nonfarm employment in Arizona peaked in September of 2007, and during the following 24 months, nearly 275,000 jobs disappeared. That’s 10.3% of the workforce.” He continues by noting how construction has actually been the hardest hit, with

115,000 jobs lost since May 2006. Many of those construction jobs are dispersed throughout the state, but in areas like Navajo, Greenlee and Mohave construction is one of the main industries. Arizona has been hard hit by the recession, arguably suffering among the worst of U.S. states and poised to recover slowly.<sup>76</sup>

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<sup>58</sup> Sally Wittlinger. Wittlinger, "Sustainability: An Expert's Insight on the Issue in Arizona." *Indicator Insight, Arizona Indicators*. (December 2009).

<sup>59</sup> A Reynaldo Contreras. "Epilogue: Latinos at the Portal of the 21st Century." *Education and Urban Society*. Vol. 36, (2004), 223.

<sup>60</sup> "Arizona, Nevada and California Cities Show Fastest Growth, Census Bureau Says." *Press Release*. <http://www.census.gov/Press-Release/www/releases/archives/population/001856.html> (U.S. Census Bureau, 2009).

<sup>61</sup> The Center for American Indian Economic Development, The W.A. Franke College of Business, Northern Arizona University. <http://www.franke.nau.edu/businessoutreach/caied/Tribes.htm>

<sup>62</sup> SARSC 2009, and "Arizona." *2006-2008 American Community Survey 3-Year Estimates*. [http://factfinder.census.gov/servlet/ACSSAFFacts?\\_event=Search&geo\\_id=&\\_geoContext=&\\_street=&\\_county=&\\_cityTown=&\\_state=04000US04&\\_zip=&\\_lang=en&\\_sse=on&pctxt=fph&pgsl=010](http://factfinder.census.gov/servlet/ACSSAFFacts?_event=Search&geo_id=&_geoContext=&_street=&_county=&_cityTown=&_state=04000US04&_zip=&_lang=en&_sse=on&pctxt=fph&pgsl=010) (U.S. Census Bureau. 2006-2008).

<sup>63</sup> "Arizona Indicators." *A Project Managed by the Morrison Institute for Public Policy. Official Website*. <http://arizonaindicators.org/index.html> (Morrison Institute for Public Policy. 2010).

<sup>64</sup> U.S Census Bureau.

<sup>65</sup> SARSC, 2009.

<sup>66</sup> G. Sanchez. "State next to bottom nationally in per-pupil spending, report says." *Arizona Daily Star*. (January 10, 2008).

<sup>67</sup> Matthew Ladner. "Demographics no excuse for Arizona's dismal test scores." <http://www.goldwaterinstitute.org/article/4109> (Goldwater Institute, November 9, 2009).

<sup>68</sup> *Official Website*. <http://www.azcommerce.com/EconInfo/Demographics/> (Arizona Department of Commerce, 2009)/

<sup>69</sup> Official Website. <http://www.azot.gov/> (Arizona Department of Tourism, 2009).

<sup>70</sup> Arizona Department of Commerce, 2009.

<sup>71</sup> In 1915 the State Land Code established the Land Department and the system by which State Trust lands are managed today. State Trust land is either leased for its highest and best use or sold to the highest bidder at public auction, which is mandated by law. The largest beneficiaries are the Common Schools (K-12), receiving 87% of Trust land revenue. Other beneficiaries include the Legislative, Executive & Judicial Buildings, the University of Arizona, and the School for the deaf & Blind in Tucson. Source: Arizona State Land Department <http://ag.arizona.edu/backyards/articles/winter09/p8-9.pdf>

<sup>72</sup> Susan McGinley. "Economic Report on Arizona Agriculture." *2004 Agricultural Experiment Station Research Report*. [cals.arizona.edu/arec/pubs/econimpacts.html](http://cals.arizona.edu/arec/pubs/econimpacts.html) (The University of Arizona College of Agriculture and Life Sciences, 2004).

<sup>73</sup> George F. Leaming. "The Economic Impact of the Arizona Copper Industry 2007: A Report on the Contribution of the Arizona Copper Industry to Personal Income, Business Sales and Government Revenues in 2007." <http://www.azcu.org/pdf/Leaming%202007.pdf> (Western Economic Analysis Center. Marana, AZ, 2008).

<sup>74</sup> Dean Runyan Associates. "Arizona Travel Impacts." ([http://www.azot.gov/documents/AZ\\_Travel\\_Impacts\\_2008p\\_final.pdf](http://www.azot.gov/documents/AZ_Travel_Impacts_2008p_final.pdf) (Report prepared for the Arizona Office of Tourism. Portland, OR, Dean Runyan Associates. 2009.)

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<sup>75</sup>“Living and Working.” <http://www.treoaz.org/Living-and-Working.aspx> (Tucson Regional Economic Opportunities, Inc.)

<sup>76</sup> Marshall Vest. “Recovery for Arizona: When? How Strong?” *Arizona’s Economy*. <http://ebr.eller.arizona.edu/azeconomyissues/AEwinter10.pdf> (January 2010).

## Chapter 13

# NATIVE NATIONS AND ARIZONA'S ECONOMY

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### KEY POINTS

- American Indians are disproportionately represented among the low-income residents of the state of Arizona.
- Across the United States—including in Arizona—reservation economies are growing at a fast pace. But low starting points for growth mean that it will take years for American Indian indicators of well-being to approach the levels enjoyed by non-Indian residents of Arizona.
- Once on the margins of Arizona's economy, Native nations are now significant contributors. Not only gaming, but mining, timber harvesting, tourism, and resort operations, among other Indian-owned business activities, generate jobs for Arizonans.
- Increased Native self-determination created new economic opportunities for Indian nations. Strengthened Indigenous governance institutions created institutional environments that can sustain development. Together, these factors have spurred Native nation economic growth in the Southwest—and across the U.S.

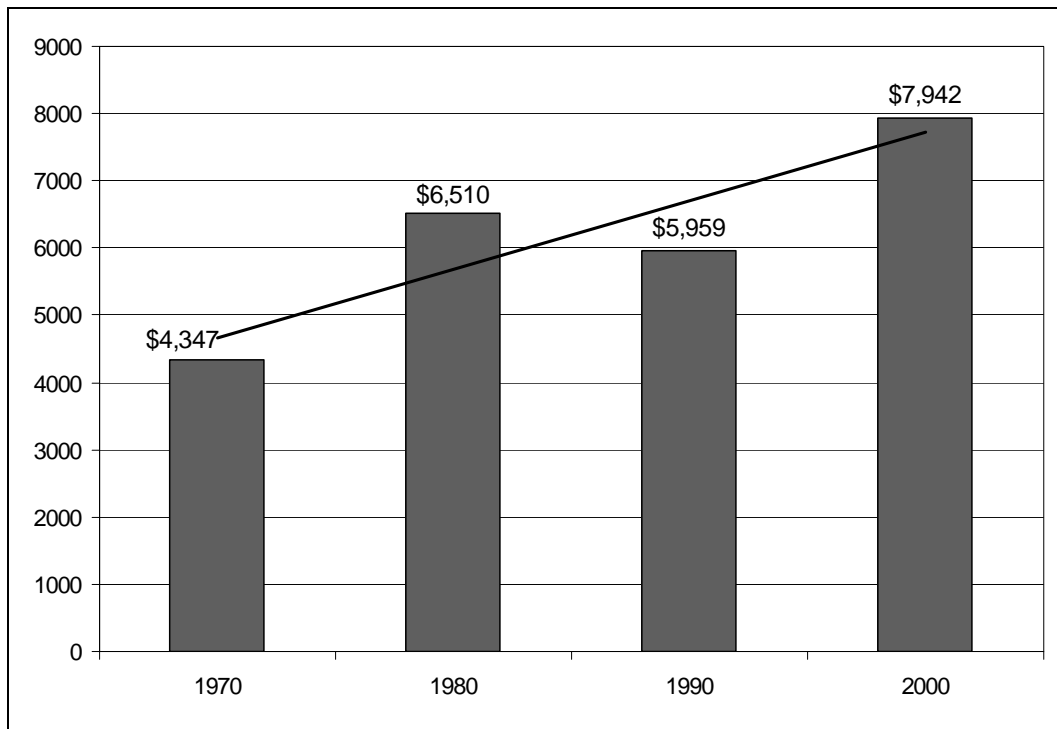
### NATIVE NATIONS

The Indigenous peoples of Arizona—like the Indigenous peoples of the United States as a whole—have long been among its poorest citizens. As of the 2000 Census, for example, American Indians represented 13% of the state's population in poverty, although they represented only 5% of Arizona's population overall.<sup>77</sup> Some of the most severe pockets of poverty are on reservations.

Yet the situation is better than it was four decades ago. Native nations in Arizona and elsewhere are in the process of creating productive economies that generate benefits far beyond reservation boundaries.

Using U.S. Census data, Figure 13.1 shows the growth, 1970 to 2000, in inflation-adjusted per capita incomes for American Indians living on U.S. Indian reservations. This income growth rate was much higher than the comparable rate for the U.S. population as a whole. Other indicators also show promising patterns. During the same period, for example, aggregate poverty rates among reservation households were falling, and reservation employment rates were rising.<sup>78</sup>

**Figure 13.1**  
**Inflation-Adjusted Per Capita Income, 1970-2000:**  
**American Indians on Reservations**

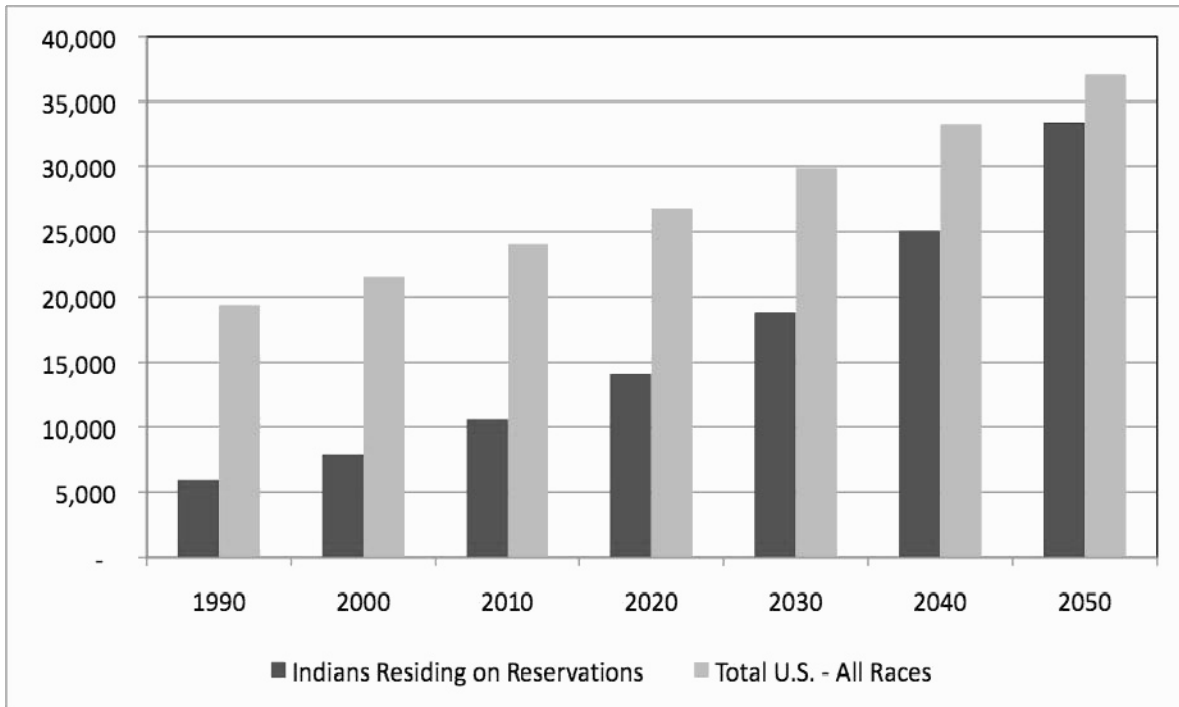


Source: Taylor and Kalt, 2005.

While rates of change vary somewhat by region and economic indicator, the results hold for the Southwest generally, including Arizona. Looking to the future, changes in tribes' opportunity sets and the recent economic downturn may slow these trends, but we expect the *overall* pattern of improvement to continue.

This does not mean that all is well, socioeconomically, on Indian lands in Arizona or elsewhere. In the aggregate, economic conditions on reservations continue to be characterized by low per capita incomes, high unemployment, inadequate housing, and some of the worst health indicators in the country. This combination of dramatic improvement on the one hand and continuing dire conditions on the other results in part from the extremely low starting point for most Native nations. In 1974, the U.S. Department of Health, Education, and Welfare (now the Department of Health and Human Services) issued a report describing the rural Indian population in the U.S. as "in a class of poverty by themselves."<sup>79</sup> In 2010, that population still has a long way to go. For example, even if the high rates of change in per capita incomes on reservations were to continue, it would be nearly half a century before reservation incomes approached the mainstream (Figure 13.2).

**Figure 13.2**  
**Actual and Projected Inflation-Adjusted Per Capita Income, 1970-2050:**  
**Indians on Reservations and U.S. All Races**



Source: Taylor and Kalt (2005)

Note: Statistics for 1970-2000 are actual values; statistics for 2010 through 2050 are projected values, using the growth rates experienced in the 1990s.

### **RESERVATION ECONOMIES**

The core point, however, is that after a century or more of relentless poverty, the Indigenous economies of the United States have begun to grow, and those of Arizona have been no exception. Having been on the margins of the state's economy, Native nations are rapidly becoming not only participants in but significant contributors to that economy. To offer just one example: a 2002 University of Arizona study found that in FY 2000-2001, the Pascua Yaqui Tribe spent approximately \$103 million on goods and services; 89% of those dollars went to businesses, agencies, and governments within the State of Arizona. Those expenditures stimulated \$58.8 million in new economic activity in Arizona, activity that in turn generated more than 1200 regional jobs. This is employment above and beyond the jobs offered by the Tribe itself.<sup>80</sup> And Pascua Yaqui is one of the smaller tribes in the state.

Of course when people talk about the economics of Indian Country, they often focus on tribal gaming operations. This is understandable, given the headlines, and these operations indeed are important, both to Indian nations and to Arizona. Gaming operations generate literally thousands of jobs, many of them held by non-Indians, whose impacts ripple through the state's economy.<sup>81</sup>

Additionally, gaming tribes share a portion of their profits with the state, monies which provide Arizona communities with greater flexibility in serving their citizens' needs.

But it would be a mistake to focus solely on gaming. As large as its impact has been, it also has been narrowly distributed, with gaming revenues concentrated among those nations located close to urban markets. Meanwhile, other economic activity has been having its own effects. The Navajo Nation, the Hopi Tribe, and other Native nations attract thousands of tourists to Arizona every year. Those tourists pay for lodging, food, transportation, gifts, and souvenirs as they explore Arizona's Native past and present. The Gila River Indian Community is one of several nations that run first-class destination resorts. Prior to the massive Rodeo-Chediski forest fire in the summer of 2002, the White Mountain Apache Tribe, located in the east-central part of the state, was a major exporter of timber. The White Mountain Apaches, the San Carlos Apaches, and the Hualapai Tribe run top-of-the-line trophy hunting operations that draw hunters from across the United States. Navajo oil, gas, and coal resources bring millions of dollars into Arizona.

### **WINDS OF CHANGE**

In short, Native nations have become significant players in the state's economic growth.

What explains this transformation? One critical factor has been federal policy. In the 1970s the United States moved from overt, paternalistic controls of Indian affairs to a policy of self-determination. While it's an open question whether federal policy-makers had genuine self-determination (Native nations taking over control of their lands, governments, and decisions) in mind, tribal leaders seized the opportunity to maximize practical decision-making power in Indigenous hands. For the first time in generations, development decisions began to reflect Indigenous priorities instead of federal ones. One result was accountability: for the first time in the modern history of Indian affairs, those making the decisions were also the ones experiencing the results of those decisions, a crucial link between decisions and outcomes that was entirely missing when the federal government called the shots on Indian lands.

A second critical factor has been the reorganization of Indigenous governing systems. As Native nations moved into the driver's seat in their own affairs, they began to rethink the governing systems they had inherited, largely from federal bureaucrats who came up with models of tribal "governance" in the 1930s. These models were poorly designed for the demands of contemporary times. Across the country Native nations have been developing new ones, introducing strong court systems, rethinking tribal administration, and working to create institutional environments that can sustain development.

Arizona tribes are participants in this trend and occasionally have been at the forefront. The Navajo court system, for example, is one of the most innovative in the country. As Native nations continue to assume direct control of their own affairs and back up that control with capable governing institutions of their own design, their economies are likely to expand further—and further enhance their already productive role in Arizona's economy.

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**Miriam Jorgensen** is research director of the Native Nations Institute for Leadership, Management, and Policy at the University of Arizona and Research Director for the Harvard Project on American Indian Economic Development at Harvard University. She is editor and co-author of *Rebuilding Native Nations: Strategies for Governance and Development* and a contributing author of *The State of the Native Nations: Conditions under U.S. Policies of Self-Determination*. She received her B.A. in economics from Swarthmore College (1987), B.A. and M.A. in human sciences from the University of Oxford (1989, 1995), M.P.P. from the Kennedy School of Government at Harvard University (1991), and PhD from Harvard University (2000).

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<sup>77</sup> Kids Count Census Data Online, “2000 Census Data Race Profile for Arizona” [www.kidscount.org](http://www.kidscount.org)

<sup>78</sup> Jonathan B. Taylor and Joseph P. Kalt. *American Indians on Reservations: A Databook of Socioeconomic Change between the 1990 and 2000 Censuses*, Harvard Project on American Indian Economic Development, John F. Kennedy School of Government. (Harvard University, Cambridge, MA, 2005).

<sup>79</sup> *A Study of Selected Socio-Economic Characteristics of Ethnic Minorities Based on the 1970 Census*, Vol. 3: American Indians, HEW Publication No. (OS) 75-122, Office of Special Concerns, Office of the Assistant Secretary for Planning and Evaluation. (U.S. Department of Health, Education, and Welfare, Washington, DC, p. v., 1974).

<sup>80</sup> Stephen Cornell, Laura Ledwith, and Jonathan Taylor. *An Analysis of the Economic Impacts of Pascua Yaqui Tribal Operations on the Arizona Economy*. Native Nations Institute for Leadership, Management, and Policy. (University of Arizona, Tucson, AZ, 2002).

<sup>81</sup> Stephen Cornell and Jonathan B. Taylor. *An Analysis of the Economic Impacts of Indian Gaming in the State of Arizona*, Udall Center for Studies in Public Policy (University of Arizona, Tucson, AZ, 2001).

## Chapter 14

# TRANSPORTATION AND PUBLIC INFRASTRUCTURE

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### KEY POINTS

- Economic Development and Transportation are closely linked.
- Transportation is critical for the movement of goods and people in and out of a region.
- Transportation is also a critical element for quality of life, which helps regions and states attract top quality talent.
- Transportation is vitally important to rural communities, which suffer in terms of both production and tourism if transportation is poor.
- Transportation is the critical component to bringing in outside dollars, which are the source of wealth creation.

Transportation infrastructure is a critical element of economic development capacity. This takes many forms and has shifted over time, but the basic premise – economic vitality depends on mobility – goes back to ancient days. World’s great ancient cities were on trade routes, many of them seaports. As America matured into a prosperous colony and then a young nation, our first economic powerhouses were those on the sea – New York, Boston, Philadelphia. They became bustling centers of trade and commerce because goods and people could easily flow in and out. New land acquisition brought new opportunities, and the mighty Mississippi became the waterway that opened up the Midwest to development.

Things changed with the industrial revolution. Transportation became an asset that could be built by man, not dependent upon access to water. Over time, the development of the railroad opened up the west and allowed for inland cities, such as Denver, to grow and develop. The invention of the automobile and subsequent system of highways and the Interstate system, helped open up cities like Phoenix and Tucson for development. In the same time period, the development of commercial airlines provided another means of relatively inexpensive access to the interior of the nation.

### TRANSPORTATION AND ECONOMIC DEVELOPMENT

Transportation impacts economic development in a number of ways. Traditionally, transportation has been critical because of the movement of goods. Manufacturing

inputs, consumer goods, food and spices – the ability to bring in goods has been critical to prosperity for hundreds of years.

While almost everything else has changed since colonial times, this central aspect of economic development has not. In fact, globalization has made logistics a more critical and complex aspect of the economy. The ability to use inputs from all over the world in a just-in-time manufacturing process is critical to the global supply chain and underlies today's economy. Without a transportation infrastructure – rail, truck, and air – that supports global logistics, any type of manufacturing or value-added processing would be nearly impossible. The more efficient the infrastructure, the stronger this element of the economy can be.

The delivery of final consumer goods has also become an important aspect of the economy for quality of life and for tourism. A wide variety of goods from all over the world has become an expected aspect of modern life. Without it, tourism revenue and population growth will falter.

On the other end of the spectrum, exports are also completely dependent on transportation infrastructure. Selling goods and services within one's own region is important, and it is one of the primary determinants of small business growth. But it is simply recycling existing wealth. In order to create new wealth, money must come in from outside the regional economy. This is the fundamental driver of what economists call the "virtuous cycle". Money flows in from outside the region, personal wealth grows, wealth is invested in the local economy, creating more jobs, and used to create goods or services that are sold outside the region again, bringing in even more wealth. Without the infrastructure that allows firms to sell goods and services outside of the new region, new wealth cannot be created. More to the point in today's economy, without infrastructure that can allow firms to sell outside of the region *as effectively and efficiently as they could do in another region*, new wealth will not be created.

Another critical element of economic development is the workforce. Access to talent may be the single most important factor impacting firms' locational decisions today. Firms want to know that a region has the talent that the firm needs, that the talent is accessible, and that the region is a place where valued employees will want to stay.

Accessibility to the workforce within the region requires excellent regional mobility. Time in gridlock reduces employee productivity and means that specialized workers may be unable or unwilling to travel across the region. Firms that cannot access the workforce will look for other locations where they can.

Transportation is also an important aspect of quality of life, which is one of the key components of attracting a top flight workforce. When in-demand professionals make a decision about where to live, one of the issues is mobility and accessibility, commute times, alternative forms of transportation, and a wide variety of housing types and

neighborhoods. All of these issues are directly related to transportation and a willingness to consider mobility first, rather than a specific form of transportation.

Transportation and accessibility may be “the” issue for the economies of rural communities. Rural businesses need rapid accessibility to markets for a rural community to be a viable location. They also need access to professional services that may not be available in their smaller location, and, of course, easy access to a major airport. Small airports in rural communities can be critical advantages for their regions, providing fast and direct links to major air service as well as air freight when necessary. Finally, transportation access is essential for the mainstay of many rural communities – tourism. Tourism brings in critical outside dollars, creating new wealth in small communities that might not be otherwise possible. In brief, the more isolated a community, the less likely that the crucial export oriented businesses can thrive there.

The final element of transportation that is critical in today’s economy is a first class airport. Any major city that expects to compete as a location for world class business simply must have a major airport with easy access to major U.S. and global markets. The economic problems of the airline industry have made access more challenging, as airlines cut back on the total number of flights and on flights to less profitable locations. These kinds of cuts will make it even more challenging for mid-sized cities to compete for global business and tourism.

### **ARIZONA CHALLENGES**

Freight is an important element of the transportation – economic development connection. No one entity in Arizona is solely responsible for freight planning, although Arizona Department of Transportation (ADOT) is the agency most responsible for freight movement. As is typical in the United States, trucks carry most of the freight traveling in Arizona. Trucks handle roughly 76% of all weight and 85% of the value of merchandise moving in Arizona. Most of the freight traveling in Arizona travels on I-10 or I-40 if going by truck, or on the Burlington Northern and Santa Fe (BNSF) northern route or the Union Pacific (UP) Sunset Route if moving by railroad. The concentration of freight on these few routes adds to congestion problems for Arizona, especially in the crowded metropolitan areas of Phoenix and Tucson. Both I-10 and I-40 typically handle over 10,000 trucks per day, and in the less populated regions of Arizona heavy trucks make up 40-50% of the vehicles on those routes. I-17 also has significant truck traffic since it serves as a connection between these routes.<sup>82</sup>

For both quality of life and business efficiency reasons, the increasing gridlock in Arizona’s two metropolitan areas is a concern. Traffic congestion is ubiquitous in modern urban society and has negative economic, environmental, and social impacts. According to the *Urban Mobility Report* released in 2007, Americans in 437 urban areas lost 4.2 billion hours and 2.9 billion gallons of fuel in 2005 just by sitting in traffic jams, resulting in \$78 billion worth of delay and excess fuel costs.<sup>83</sup> With increasing population and projected growth in VMT, congestion-related problems will likely become more severe. In 2005, Phoenix was the 13th largest urban area in terms of population (3.3 million) and

ranked 14th in terms of total annual delay, total excess fuel consumed, and total congestion cost. Tucson ranked much lower (52nd) in terms of population in 2005. However, it ranked around 40th in terms of annual delay, excess fuel consumption, and congestion cost.<sup>84</sup>

For Arizona, the Mexican border also presents a transportation challenge. Mexico is Arizona's largest trading partner and its largest source of international visitors. Surface transportation right up to the international border crossing is the responsibility of the state. However, the state is completely dependent on the federal government for the actual port of entry, both in terms of physical build-out and processing, and significantly impacted by Mexican government decisions as well. An excellent example is the recent decision to inspect all southbound traffic at ports of entry. The decision to slow southbound traffic not only makes cross-border business less attractive overall, but also backs traffic up onto the local streets of Arizona border communities, creating problems in their downtowns. Neither ADOT nor the local border communities were prepared for the change, and it is virtually impossible to retrofit community streets on such short notice. Threading the needle between security and accessibility at the border is critical to keep Arizona competitive.

### **TRANSPORTATION FUNDING**

Economic development and transportation are integrally connected. As a result, future of economic development in Arizona will be impacted by the future of transportation – a future that is called into question due to current funding challenges.

As a result of the shift toward automobiles, trucks, and air, the United States today relies on petroleum—gasoline, diesel, and jet fuel—for 96% of its transportation energy.<sup>85</sup> Arizona is in line with this national statistic. The volatility of oil prices, the nervousness about dependence on oil that comes from unstable and/or unfriendly nations, and a growing concern about the role of petroleum-based transportation in global climate change, have all led to a sense that transportation must change. Yet the sunk costs in roads, highways and airports, combined with the length of time needed to upgrade auto, truck and aircraft fleets, have led to resistance. When two major trends – the need for change and the cost of doing so – meet head on, the result is almost always a period of confusion and even chaos.

Arizona funds its surface transportation system in two ways: gas taxes and vehicle license taxes. To continue with the discussion about conflicting trends, one element of the chaos is fuel prices. World daily oil demand rose from 82.4 million barrels per day in 2007 to 87.0 million barrels per day in the fourth quarter of 2007, without a corresponding increase in supply, and this led to high spikes in fuel prices during that time. When combined with the knowledge that over half of the world's oil comes from North Africa, the Middle East, and the former countries of the Soviet Union, there is always a concern about political interruption of supply. The conflict between increasing demand and worry about supply has led to a great deal of confusion in the marketplace.<sup>86</sup>

Fuel taxes also contribute to the uncertainty. Taxes comprise only a small part of the pump price. The Arizona state tax is 18 cents per gallon, below the average state tax of 21.5 cents. The federal tax is 18.4 cents. The combined federal and state average of 39.5 cents per gallon is far lower than in other industrial countries such as Canada (\$1.19), Japan (\$2.29), and the U.K. (\$5.02). In Arizona, state fuel taxes have not increased in almost 16 years, and federal taxes have not increased in 12 years. State and federal officials have been reluctant to increase fuel taxes with the underlying price of the fuel itself so vulnerable. As a result, taxes have not kept pace with costs or demand.<sup>87</sup>

The combined spike in fuel prices and the recession that has gripped Arizona since 2008 have resulted in lower fuel consumption. This is a result of both reduced driving and a switch to more fuel efficient vehicles. The reduction in driving is both a response to high fuel prices and high unemployment and underemployment. Fewer people are driving to work, and those that are working may have jobs that pay less than they are accustomed to making, so they are looking for less expensive alternatives. With consumer demand down and fewer goods to carry, fewer trucks are on the highways and those that are are being more careful about making trips as efficient as possible.

In some ways this shift is positive – less dependence on foreign oil, less pollution, less congestion, more use of public transit. But it also dramatically reduces fuel tax revenues to the state, and the drop in available revenue far exceeds the small drop in demand. Fully loaded trucks and hybrid vehicles still need the same infrastructure, although they contribute far less in fuel taxes.

The federal highway fund has also been depleted, for the same reasons, and for the first time ever has exceeded tax revenues into the fund. Twice in the last 18 months, Congress has shifted large sums of money from general revenues into the highway trust fund just so the federal government could continue to meet its obligation to states.

The second source of revenue for the Arizona Department of Transportation is Vehicle License Taxes. With the recession and enormous drop in auto sales, this figure has also dropped dramatically. In addition, with the financial crisis in the State's General Fund, lawmakers have diverted over \$125 million from the Vehicle License collections. ADOT's overall revenue is down nearly 30% for FY 2010 over FY 2007.<sup>88</sup>

As the recession nears an end, state revenues will gradually begin to rise again, and the car sales will climb. But it is unclear when registration revenue will return to normal. More to the point, many economists, including a group of Arizona professionals that gives pro bono advice to ADOT on economic forecasting, believe that gas tax revenues per capita will never return to previous levels. The shift toward less driving and more fuel efficient vehicles may be permanent, meaning that gas tax revenues will never fully recover. However, no alternatives are being discussed at the state level.

According to an Arizona Investment Council (AIC) report, over the next 25 years, passenger VMT are expected to grow by 103%, rural bus ridership by 108%; air traffic

by 109%; urban bus ridership by 100%; intercity bus traffic by 52%; and truck VMT by 117%. System demands are outpacing investment and system maintenance costs are competing with capital improvements.

Fortunately, Maricopa, Pima and Pinal Counties have all taken the step of passing a voter-approved, 20-year sales tax devoted to transportation funding. Although sales tax collections are currently down as a result of the recession, the commitment to a long-term and broad-based tax assists in long-term stability, and particularly in the two urban areas. In rural counties, where the sales tax base is not large enough to provide sufficient additional funding, the state's shortfall will continue to be acutely felt.

### **FUNDING ALTERNATIVES**

Arizona has been innovative in generating money for capital in the past. For example, in the mid-1990s, using the State Infrastructure Bank, ADOT developed a Highway Expansion and Extension Loan Program (HELP), which worked with a creative financing mechanism called Board Funding Obligations. In partnership with local governments, HELP cut seven years off the completion date of the Maricopa Freeway system.<sup>89</sup> Another creative example is the Statewide Transportation Acceleration Needs (STAN) program, which in 2007-2008 received \$307 million to expedite new highway construction in Maricopa and Pima Counties.<sup>90</sup>

Transportation analysts, facing the decline of gas tax revenues nationwide, are considering other ideas for long term funding. One idea that is being piloted in the State of Oregon is the VMT tax. This is considered by some to be an equitable tax that reflects actual miles on the highway and not just variations in fuel efficiency. New technologies are making it much simpler to calculate VMT for commercial trucks, and these technologies are quickly making their way to the individual market though "fast pass" and "easy pass" types of systems.

A second method that will help states leverage their dollars is the use of public private partnerships (P3s). Although tolls and fees are often the revenue source that repays private partners, many nations around the world have become very creative about using P3s. For example, a number of locations have replaced highway lighting with privately-provided solar-powered lighting. Government agencies repay the private provider by sharing the savings from previous utility costs. This saves DOTs money, is healthier for the environment, and provides private investors with a multi-year payback that can be leveraged to invest in other projects. In another example, in Texas a private partner offered to upgrade a four lane highway to interstate standards by using the revenues from providing Texas DOT right-of-way for utility transmission, fiber optic cable placement, and cell phone towers. As proposed, the upgrade would cost Texas DOT nothing.

Most experts agree that P3s will only be viable for some 15% of projects, meaning the remaining 85% still have to find more traditional funding. Still, offloading even a few projects and maintenance items will be a welcome development for state DOTs and for economic developers.

## WORKING TOGETHER FOR THE ECONOMY

Economic developers and transportation providers share an important common interest. As traditional transportation funding sources decline, both large cities and small towns are feeling the squeeze. Although technology has enabled more work to be conducted remotely, there is no viable substitute for face-to-face sales calls, client development, and information sharing. Further, as the global economy continues to develop, global supply chains will continue to be the norm. These supply chains only work when the transportation infrastructure is fully functional, meaning that those regions with less-than-ideal transportation systems will suffer and fall behind. Finally, critical outside revenues, those that create new wealth in communities can only come from outside the city, region, or state. Those outside dollars only come by exporting goods and services outside of the region, or by drawing tourists in.

Clearly businesses, economic development interests, and transportation providers need to work closely together to make sure their transportation systems work for the economy, and have a variety of funding options on which they can rely.

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<sup>82</sup> Amie Maltz. *Freight and Logistics*, Report of the 94<sup>th</sup> Arizona Town Hall.

<sup>83</sup> D. Schrank and T. Lomax. *The 2007 Urban Mobility Report*. (Texas Transportation Institute, 2007).

<sup>84</sup> Soyoung Ahn. *Highway Travel and Congestion*, Report of the 94<sup>th</sup> Arizona Town Hall.

<sup>85</sup> Steven Blank, Erik Lee and D. Rick Van Scoik, *International Trade and Transportation*, Report of 94<sup>th</sup> Arizona Town Hall.

<sup>86</sup> Michael Kuby,. *Gasoline Prices*, Report of the 94<sup>th</sup> Arizona Town Hall.

<sup>87</sup> See Blank, *et al.*

<sup>88</sup> See Blank, *et al.*

<sup>89</sup> [www.azdot.gov/adot\\_and/ctoc/PDF/2007/Min092507.pdf](http://www.azdot.gov/adot_and/ctoc/PDF/2007/Min092507.pdf)

<sup>90</sup> Jeff Chapman and Martin L. Shultz. *Transportation Finance*, Report of the 94<sup>th</sup> Arizona Town Hall.



## Chapter 15

# HUMAN CAPITAL RESOURCES

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### KEY POINTS

- Based on 2009 figures, the unemployed labor force in Arizona varies significantly, from a low of 6.9% in Cochise County to a high of 21.3% in Yuma County.
- Education is uneven across Arizona's 15 counties, and those containing state universities have a more educated population.
- In the next decade, Pinal County is projected to grow by 67%; the population of Greenlee County is expected to remain relatively unchanged.
- In general, rural populations will grow more slowly than urban populations.
- Apache, Coconino, Graham, Navajo, and Santa Cruz Counties have relatively young populations and workforces.
- Cochise, Gila, La Paz, Mohave, and Yavapai Counties have relatively old populations and workforces.
- Counties without universities are not uniform in education; Yavapai County is highly educated, with 22% of the population 25 years and older holding a bachelor's degree or higher, while 35% of Santa Cruz County residents 25 years and older have no high school diploma.

The face of Arizona's workforce is far from uniform. The state contains both the fifth most populous city and the largest Indian Nation within the United States. Yuma County is home to thousands of agricultural workers, permanent and temporary, and experiences extreme unemployment as part of a cyclical pattern based on the seasons. Workers in the Copper mining regions, including Graham and Greenlee counties, Bagdad, and numerous other areas are extremely sensitive to fluctuations in mineral prices, which can create or destroy the job market overnight. Portions of the desert, in areas such as La Paz County have become temporary homes to many of the nation's retirees.

As discussed in more detail in Chapter 8 prior to the recent recession Arizona's economy was based on growth, with help from tourism and retirement income. With the sudden collapse of the construction and building trades, many skilled laborers are out of work. Problems in the rest of the country create additional barriers for those who wish to move to the Grand Canyon State, slowing the influx of immigrants such as retirees, which in turn adds uncertainty to the accompanying health professions.

This chapter contains charts illustrating select population demographics of Arizona's 15 counties. Indicators include annual population projections through 2020, as well as the age distribution of these populations. Educational attainment of the population 25 years

old and up is also displayed. Together, these statistics illustrate the diversity of the state’s workforce.

**POPULATION PROJECTIONS**

For years Arizona was one of the fastest growing states in the country; in 2006 it was the fastest.<sup>91</sup> Recent economic events have slowed that growth considerably. Real estate collapses in other states have made it difficult for people to sell their homes and move, and the construction jobs that were once plentiful throughout Arizona have mostly disappeared. Assuming an eventual recovery from the recession, economists and state analysts still project Arizona to experience significant population growth in the future.

Table 15.1 lists state government estimates of the population of Arizona from 2010 until 2020. The expected growth during this time is just over 25%. The information contained in this chapter was retrieved from sources published prior to the height of the recession of 2007-2009. Because of this, population projections will not be accurate in immediate years. Most of Arizona’s recent growth was predicated on people who moved from other areas. With home prices depressed, potential immigrants will not be able to sell their homes as easily, and the population shift to Arizona will slow.

**Table 15.1  
State Population Projections, 2010-2020**

<b>Arizona Population</b>	
2010	6,999,810
2011	7,186,070
2012	7,370,993
2013	7,554,429
2014	7,736,022
2015	7,915,629
2016	8,093,110
2017	8,268,253
2018	8,441,095
2019	8,611,507
2020	8,779,567

Source: Arizona Department of Commerce, “Unemployment Report.”

The three largest counties by population make up the ever-growing urban corridor of Maricopa, Pima, and Pinal Counties. Together these counties contain 80% of the population of the state, and after expanding by 27% over the next decade, that will grow to 81%. During this 10-year period, Maricopa County is expected to grow by 25%, and Pima County is expected to grow by 19%. Pinal County is likely to outpace the rest of the state with a growth rate of 67%. The aggregate population projections of these three counties are shown in Table 15.2.

**Table 15.2**  
**Population Projections of Urban Corridors, 2010-2020**  
**Urban Corridor**

2010	5,652,737
2011	5,809,422
2012	5,965,133
2013	6,119,747
2014	6,273,026
2015	6,424,803
2016	6,574,938
2017	6,723,334
2018	6,869,959
2019	7,014,726
2020	7,157,706

Source: Arizona Department of Commerce, "Unemployment Report."

Of the 12 remaining counties, some might not accurately be described as rural after the changes they are likely to experience over the coming decade. As Table 15.3 shows, the collective population of these rural counties is projected to grow by 20% over 10 years. Yavapai County alone is expected to be home to over 300,000 people by 2020, an increase of 26%. Mohave, Yuma, and Santa Cruz Counties are projected to grow by 27%, 24%, and 23%, respectively.

**Table 15.3**  
**Population Projections of Rural Counties, 2010-2020**  
**Rural**

2010	1,347,073
2011	1,376,648
2012	1,405,860
2013	1,434,682
2014	1,462,996
2015	1,490,826
2016	1,518,172
2017	1,544,919
2018	1,571,136
2019	1,596,781
2020	1,621,861

Source: Arizona Department of Commerce, "Unemployment Report."

In contrast, Greenlee County is expected to remain virtually unchanged, experiencing a net loss in population of 20 people. Estimates of 10-year growth rates for the other rural counties are as follows:

- Navajo County, 19%
- Cochise County, 16%
- Coconino County, 13%
- La Paz County, 13%

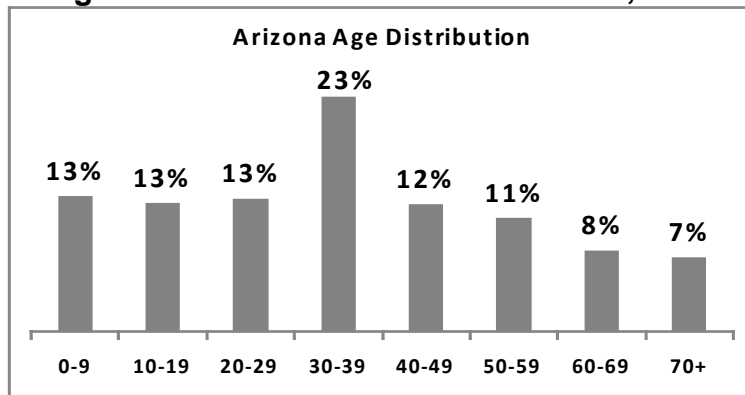
- Apache County, 11%
- Gila County, 11%
- Graham County, 10%

### AGE DISTRIBUTION

Age is an important indicator of workforce demographics. Workers’ abilities, skills, and desires vary as they age. An older workforce will have better-developed skills or specialized knowledge, whereas a younger workforce may require more training effort and be more flexible in regard to job requirements. An employer seeking physical labor would be better served seeking out counties with a higher percentage of young people. Age distribution gives an idea of what a workforce might look like in future years, as a larger percentage of children in 2010 would hint at a larger labor pool in the future. The numbers used for this analysis are from 2008.<sup>92</sup>

The age distribution of Arizona residents is illustrated in Figure 15.1. The average age of state residents is 36, and the largest 10-year age group is 30-39.

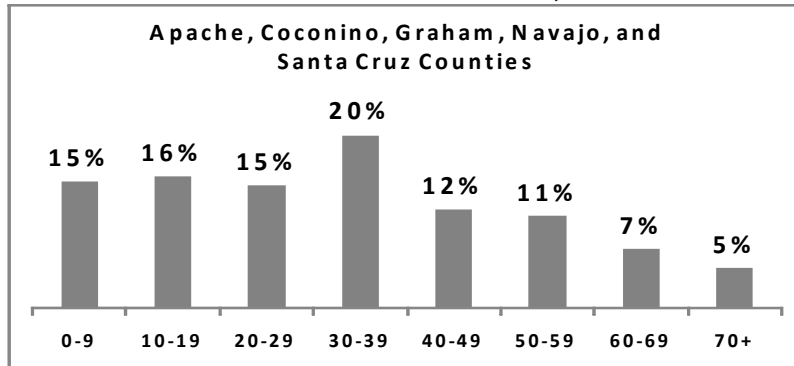
**Figure 15.1**  
**Age Distribution of Arizona Residents, 2008**



Source: *Population Demographics and Education Statistics*. University of Arizona, 2010.

As with other indicators, considerable variance exists among the age distribution of residents in Arizona’s 15 counties. For display purposes, the counties have been gathered in groups of five, based on the average age of their residents. Figure 15.2 gathers together the five youngest counties: Apache, Coconino, Graham, Navajo, and Santa Cruz. As the graph suggests, these counties will likely experience growing populations of workers as the larger young population takes the place of the smaller, older population. Apache County is the youngest in the state, with an average age of 31. Populations of the other counties in this category each average 33.

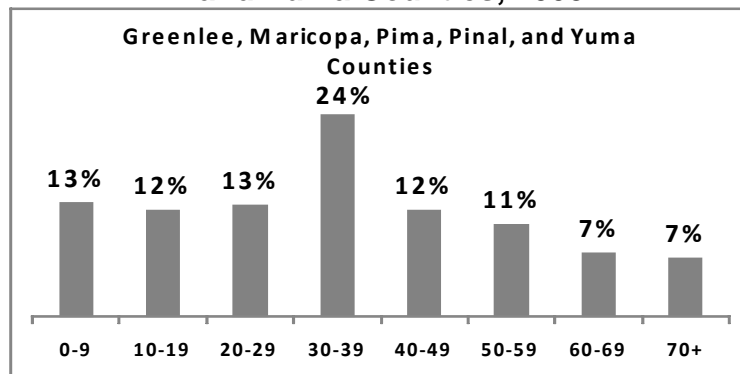
**Figure 15.2**  
**Age Distribution in Apache, Coconino, Graham, Navajo,**  
**and Santa Cruz Counties, 2008**



Source: *Population Demographics and Education Statistics*. University of Arizona, 2010.

The five middle counties, in terms of age are Greenlee, Maricopa, Pima, Pinal, and Yuma. As Figure 15.3 shows, these populations closely mirror those of the state. Considering that together they make up 84% of the state population, this is to be expected. The average age in Greenlee and Maricopa Counties is 35 years. In Pima and Pinal Counties that figure is 37 years, and Yuma's average age of 36 is roughly equal to the state average.

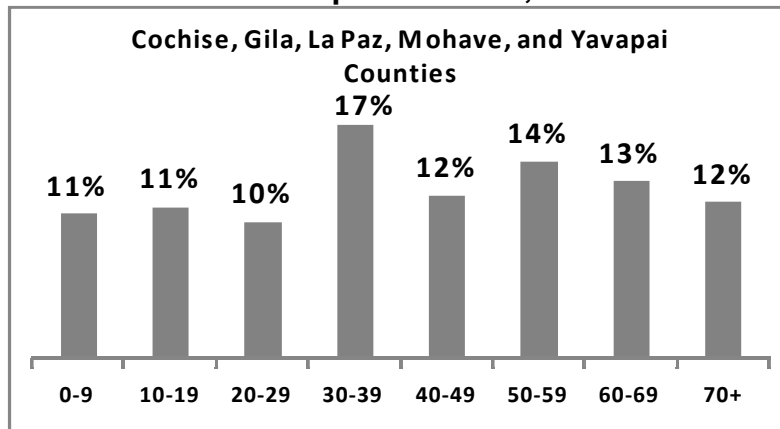
**Figure 15.3**  
**Age Distribution in Greenlee, Maricopa, Pima, Pinal,**  
**and Yuma Counties, 2008**



Source: *Population Demographics and Education Statistics*. University of Arizona, 2010.

Arizona is well known as a retirement destination, and the remaining five counties in Figure 15.4 are examples of this trend. Each has an established elderly presence which is shown on the graph. The average ages of these populations are: Cochise, 38 years; Gila, 41 years; Mojave, 42 years; Yavapai, 43 years; and La Paz, 46 years.

**Figure 15.4**  
**Age Distribution in Cochise, Gila, La Paz, Mohave,**  
**and Yavapai Counties, 2008**



Source: *Population Demographics and Education Statistics*. University of Arizona, 2010.

### EDUCATION

Table 15.4 demonstrates that 16% of Arizona’s population has less than high school diploma, which is less favorable in comparison with the U.S. average of 14%. This holds for every major category with the exception of population with some college (but no degree).

**Table 15.4**  
**Educational Attainment in Comparison with the U.S. Average, 2008**

	Arizona	U.S. Average
Less than 9 <sup>th</sup> Grade	7%	6%
High School/No Diploma	9%	8%
High School Graduate	26%	31%
Some College/No Degree	25%	17%
Associate Degree	8%	9%
Bachelor’s Degree	16%	19%
Grad/Professional Degree	9%	10%

Source: US Census Bureau, Current Population Survey, 2008 Annual Social and Economic Supplement (Internet Release Date April 2009); *Population Demographics and Education Statistics*, University of Arizona (February 2010).

Education levels are as varied among Arizona’s counties as the other measures.<sup>93</sup> Tables 15.5 and 15.6 divide the education levels of each counties’ citizens into two groups: University Counties and Non-University Counties. The University Counties are home to the central campuses of the three state universities. These are Coconino (Northern Arizona University), Maricopa (Arizona State University), and Pima (University of Arizona) Counties. Thirty-six percent of residents over the age of 25 in these counties

hold a post-secondary degree of some sort. In Coconino County, the most highly educated of the three, 32% have earned a bachelor’s degree or higher.<sup>94</sup>

**Table 15.5**  
**Educational Attainment in University Counties**  
**University Counties**

Less than 9 <sup>th</sup> Grade	7%
High School/No Diploma	8%
High School Graduate	25%
Some College/No Degree	25%
Associate Degree	8%
Bachelor’s Degree	18%
Grad/Professional Degree	10%

Source: *Population Demographics and Education Statistics*. University of Arizona, 2010.

In contrast, those counties without universities have lower levels of education. This does not mean that a county with no state university lacks education, however. Thirty percent of Yavapai County residents have a college degree of some sort. On the lower end of the spectrum, 35% of Santa Cruz County residents have less than a high school education. Table 15.6 is based on aggregate numbers from these 12 counties.

**Table 15.6**  
**Educational Attainment in Non-University Counties**  
**Non-University Counties**

Less than 9 <sup>th</sup> Grade	9%
High School/No Diploma	13%
High School Graduate	31%
Some College/No Degree	25%
Associate Degree	7%
Bachelor’s Degree	9%
Grad/Professional Degree	6%

Source: *Population Demographics and Education Statistics*. University of Arizona, 2010.

Table 15.7 lists each county according to two attributes: percent of population with less than a high school diploma and percent of population with a bachelor’s degree or higher.

**Table 15.7**  
**Educational Highlights By Counties**  
**No High School Diploma      Bachelor's Degree or Higher**

<b>Arizona</b>	17%	25%
<b>Apache</b>	32%	12%
<b>Cochise</b>	18%	20%
<b>Coconino</b>	14%	32%
<b>Gila</b>	19%	15%
<b>Graham</b>	21%	13%
<b>Greenlee</b>	17%	12%
<b>La Paz</b>	27%	9%
<b>Maricopa</b>	15%	27%
<b>Mohave</b>	19%	11%
<b>Navajo</b>	25%	13%
<b>Pima</b>	14%	29%
<b>Pinal</b>	24%	13%
<b>Santa Cruz</b>	35%	17%
<b>Yavapai</b>	13%	22%
<b>Yuma</b>	30%	13%

Source: *Population Demographics and Education Statistics*. University of Arizona, 2010.

The above-national-average percentage of population without high school diploma reflects Arizona's lower-than-average graduation rates<sup>95</sup> and higher-than-average dropout rates<sup>96</sup> shown in Table 15.8 and 15.9.

**Table 15.8**  
**Public School Graduation Rates; Arizona and U.S., 2002-2007**

	<b>Arizona</b>	<b>U.S. Average</b>
2002-03	75.9%	73.9%
2003-04	66.8 %	77.0%
2004-05	84.7%	74.7%
2005-06	70.5%	73.2%
2006-07	69.6%	73.9%

Source: U.S. Department of Education, National center for Education Statistics, Common Core of Data (CCD).



**Table 15.9  
Public School Dropout Rates; Arizona and U.S., 2006-2007**

	<b>Arizona</b>	<b>U.S. Average</b>
Grade 9	4.7%	3.4%
Grade 10	5.7 %	3.7%
Grade 11	7.5%	4.2%
Grade 12	13.2%	6.5%

Source: U.S. Department of Education, National center for Education Statistics, Common Core of Data (CCD).

**LABOR FORCE BY OCCUPATION**

Unemployment levels throughout the state were discussed previously. Continuing from that data as well as the comparative education levels throughout the state, Table 15.10 defines the Arizona workforce by occupation.

**Table 15.10  
Composition of Arizona Workforce by Occupation 2007**

<b>Standard Occupational Classification</b>	<b>Employment</b>	<b>Percent</b>
Office and Administrative Support Occupations	527,590	18%
Sales and Related Occupations	320,615	11%
Construction and Extraction Occupations	247,623	8%
Food Preparation and Serving Related Occupations	244,054	8%
Management Occupations	164,866	6%
Transportation and Material Moving Occupations	163,136	6%
Education, Training, and Library Occupations	144,069	5%
Business and Financial Operations Occupations	131,449	4%
Production Occupations	129,669	4%
Healthcare Practitioners and Technical Occupations	127,618	4%
Building and Grounds Cleaning and Maintenance Occupations	121,113	4%
Installation, Maintenance, and Repair Occupations	112,360	4%
Personal Care and Service Occupations	94,486	3%
Protective Service Occupations	70,698	2%
Healthcare Support Occupations	66,584	2%
Architecture and Engineering Occupations	62,052	2%
Computer and Mathematical Occupations	59,391	2%
Arts, Design, Entertainment, Sports, and Media Occupations	42,957	1%
Community and Social Services Occupations	32,696	1%
Life, Physical, and Social Science Occupations	22,173	1%
Legal Occupations	20,557	1%
Farming, Fishing, and Forestry Occupations	17,851	1%

Source: Arizona Department of Commerce, <http://www.azcommerce.com/EconInfo/>.

## UNEMPLOYMENT

Table 15.11 displays employment numbers by Arizona county for the first 10 months of 2009. The resulting unemployment rates vary from a low of 6.9% in Cochise County to a high of 21.3% in Yuma County.<sup>97</sup>

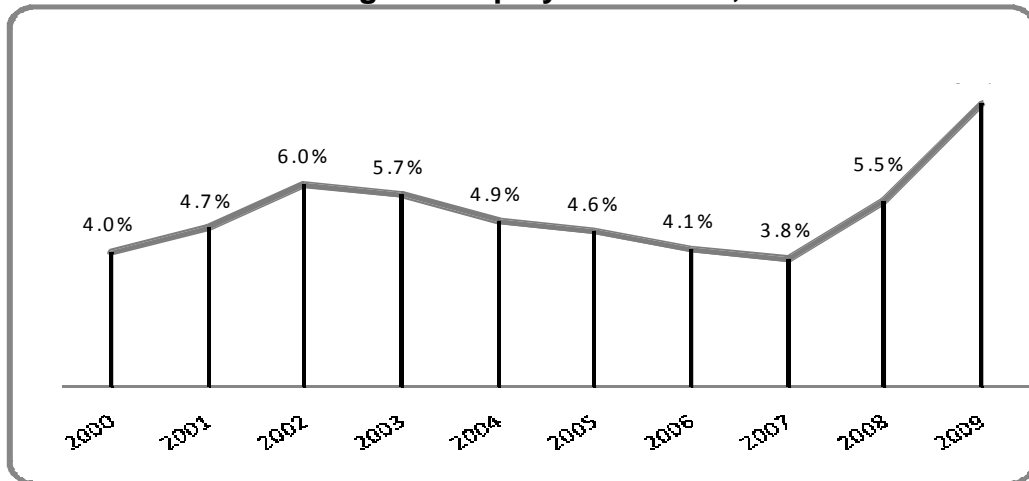
**Table 15.11**  
**Labor Force, Employment, and Unemployment in Arizona, by County**

Jan-Oct 2009 Average	Labor Force	Employment	Unemployment	Unemployment Rate
<b>Arizona</b>	3,151,499	2,886,458	265,041	8.4%
<b>Apache</b>	22,369	19,222	3,147	14.1%
<b>Cochise</b>	62,098	57,826	4,272	6.9%
<b>Coconino</b>	74,225	68,889	5,336	7.2%
<b>Gila</b>	22,425	20,129	2,296	10.2%
<b>Graham</b>	14,807	12,795	2,012	13.6%
<b>Greenlee</b>	4,390	3,618	772	17.6%
<b>La Paz</b>	7,648	6,990	658	8.6%
<b>Maricopa</b>	2,000,429	1,848,044	152,385	7.6%
<b>Mohave</b>	93,520	84,442	9,078	9.7%
<b>Navajo</b>	40,150	34,701	5,449	13.6%
<b>Pima</b>	488,578	451,560	37,018	7.6%
<b>Pinal</b>	117,524	104,617	12,907	11.0%
<b>Santa Cruz</b>	18,417	15,844	2,573	14.0%
<b>Yavapai</b>	99,193	90,339	8,854	8.9%
<b>Yuma</b>	85,728	67,442	18,286	21.3%

Source: Arizona Department of Commerce, "Unemployment Report."

These rates are significantly higher than they have been in previous years. As recently as 2007 the state was essentially at full employment. Figure 15.5 graphs out the unemployment rates in Arizona over the past nine years.

**Figure 15.5**  
**Arizona Average Unemployment Rates, 2000-2009**



Source: Arizona Department of Commerce, "Unemployment Report."

The statewide unemployment rates are still trending up. The data used to formulate Tables 15.10 and 15.11 was released in October 2009. More recent state-level data has been released, indicating that unemployment in Arizona has reached 9.1%.<sup>98</sup>

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<sup>91</sup> Christie, Les. "Growth states: Arizona overtakes Nevada." CNNMoney.com. (December 25, 2006).

<sup>92</sup> *Population Demographics and Education Statistics*. (University of Arizona, February 2010).

<sup>93</sup> *Population Demographics and Education Statistics*. (University of Arizona, February 2010).

<sup>94</sup> All statistics in this section refer to populations over the age of 25.

<sup>95</sup> Average Freshman Graduation rate (AFGR) is an estimate of the percentage of an entering freshman class graduating in 4 years. For 2006-07, it equals the total number of diploma recipients in 2006-07 divided by the average membership of the 8<sup>th</sup> grade class in 2002-03, the 9<sup>th</sup>-grade class in 2003-04, and the 10<sup>th</sup>-grade class in 2004-05. Source: U.S. Department of Education, National center for Education Statistics, Common Core of Data (CCD). [http://nces.ed.gov/pubs2010/2010313/tables/table\\_03.asp](http://nces.ed.gov/pubs2010/2010313/tables/table_03.asp)

<sup>96</sup> Ungraded students (students not in a standard grade) who drop out of school are assigned by the local education agency (LEA) to the graded dropout count that most closely matches the grade they would have been enrolled in based on their age. Ungraded student enrollments are prorated by NCES into grades based on graded enrollments to calculate denominators for dropout rates. Source: U.S. Department of Education, National center for Education Statistics, Common Core of Data (CCD). [http://nces.ed.gov/pubs2010/2010313/tables/table\\_05.asp](http://nces.ed.gov/pubs2010/2010313/tables/table_05.asp)

<sup>97</sup> Arizona. Research Administration. Arizona Department of Commerce: Unemployment Report. (Accessed February 3, 2010).

<sup>98</sup> *Arizona Workforce Employment Report*. Research Administration. (Arizona Department of Commerce. January 21, 2010).

## Chapter 16

# RENEWABLE ENERGY: FOCUS ON SOLAR ENERGY

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### KEY POINTS

- Arizona is uniquely situated for solar energy due to the highest national levels of solar irradiance and high levels of land availability, but solar power has a low profile in the state's electric power generation market.
- Based on a levelized energy cost analysis, Arizona is among the states that have the best potential to promote and develop solar electric power generation without having to resort to extremely high subsidies.
- The economic impact of the solar power industry is driven by construction capital investment and by operation and management (O&M) expenditures, which are determined by the rate at which solar capacity is added to the market and by the cumulative amount of operating solar generation capacity.

Arizona is blessed with some of the best weather found throughout this country. With over 300 days of sunshine per year, Arizona has the highest level of solar irradiance in America. Solar irradiance is the measure of the amount of sunlight hitting the earth's surface in a particular area. Large amounts of sunlight, high levels of land availability in combination with the State's goal of accelerating renewable energy development through incentives, and the Arizona Corporate Commission (ACC) mandated Renewable Energy Standards (RES) create significant potential for solar power development in Arizona.

The levelized<sup>99</sup> cost of solar energy in Arizona is much lower than it is in most other parts of the U.S. due to the abundant solar radiation and sunny climate. The land and water resources in Arizona are sufficient to support the amount of solar generation that would be required to meet the RES requirements for the next twenty years.

The competitiveness of solar electricity could be greatly improved by future spikes in the prices of fossil fuels used in current energy generation since solar power has no fuels costs. In addition, coal generation could be negatively affected by restrictions on greenhouse gas emissions or taxes on emissions. This would make solar power even more competitive since it does not emit significant levels of greenhouse gases. Solar electricity production revenue could potentially be enhanced by selling carbon credit to other companies.

## **STATE OF SOLAR ENERGY DEVELOPMENT IN ARIZONA**

At the present time, the solar energy production industry is in its infant stage in Arizona. Despite the fact that Arizona and other southwestern U.S. states have abundant solar energy resources, there has been little penetration of solar power into the Arizona electric power generation market.

Several forces have encouraged the development of solar power in recent years. The federal government retained the 30% Investment Tax Credit (ITC) for solar energy projects, but removed the maximum payment cap, encouraging the development of larger solar projects which had previously had their tax credit limited by the payment cap.

The Arizona Corporation Commission's Renewable Energy Standard (ACC RES) goal of producing 15% of Arizona's electricity production using renewable energy by 2025 has put pressure on Arizona's regulated electric utilities to increase their utilization of electricity from renewable sources, including solar. The instability of global energy supplies and prices have placed growing emphasis on using renewable domestic energy sources as a way to mitigate the effects of higher energy prices and reduce America's dependence on unreliable foreign energy sources.

## **CURRENT SOLAR MARKET PENETRATION**

The electric generation capacity for Arizona renewable energy sources is shown in Table 16.1 for the period 2003-2007.

As of 2007, the most significant renewable energy source was hydroelectric power with a net summer capacity of 2,720 MW<sup>100</sup> or 10.6% of Arizona's net summer generation capacity<sup>101</sup>. Arizona has made use of its rivers and dams to tap its hydroelectric generation resources. However, most of the high potential hydro power resources have been tapped, so there is limited room for its further growth in the state.

Solar electric generation has the second largest capacity of the renewable energy resources in Arizona. The state's solar electric capacity has grown from 1 MW in 2002 to 9 MW in 2007<sup>102</sup>. However it still trails hydro electric power by a significant amount, and constitutes less than 1% of the state's total electric capacity of 25,579 MW<sup>103</sup>.

The only other renewable energy sources that have penetrated into the Arizona electric generation market are wood and wood waste, and municipal solid wastes and landfill gas. These energy sources, combined, have less generation capacity than solar.

Wind energy has made virtually no entrance into the Arizona electric generation market. According to a recent report by Black and Veatch, the wind resource in Arizona is relatively limited and will probably be exhausted quickly once it enters the market.

In 2007, renewable energy sources accounted for 6,639 GWh<sup>104</sup> or 5.8% of the 113,341 GWh generated by the Arizona electric generation industry. Hydroelectric generation represents 99.4% of the renewable energy electric production<sup>105</sup>.

**Table 16.1**  
**Arizona Renewable Electric Power**  
**Net Generation (Thousand MWh) by Source, 2003-2007**

<b>Energy Source</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
Geothermal	-	-	-	-	-
Hydro Conventional	7,075	6,973	6,410	6,793	6,598
Solar	s	4	14	13	9
Wind	-	-	-	-	-
Wood/Wood Waste	-	-	12	8	-
MSW Biogenic	41	44	45	28	29
Other Biomass	4	s	4	4	4
<b>Total</b>	<b>7,120</b>	<b>7,021</b>	<b>6,484</b>	<b>6,846</b>	<b>6,639</b>

s=Value is less than 0.5 of the table metric, but value is included in any associated total.

- = No data reported.

Notes: Hydro Conventional does not include pumped storage. Other Biomass includes agricultural byproducts/crops, sludge waste and biomass solids, liquids and gases. Solar includes solar thermal and photovoltaic. MSW = Municipal Solid Waste. MSW Biogenic includes paper and paper board, wood, food, leather, textiles and yard trimmings. Total may not equal sum of components due to independent rounding.

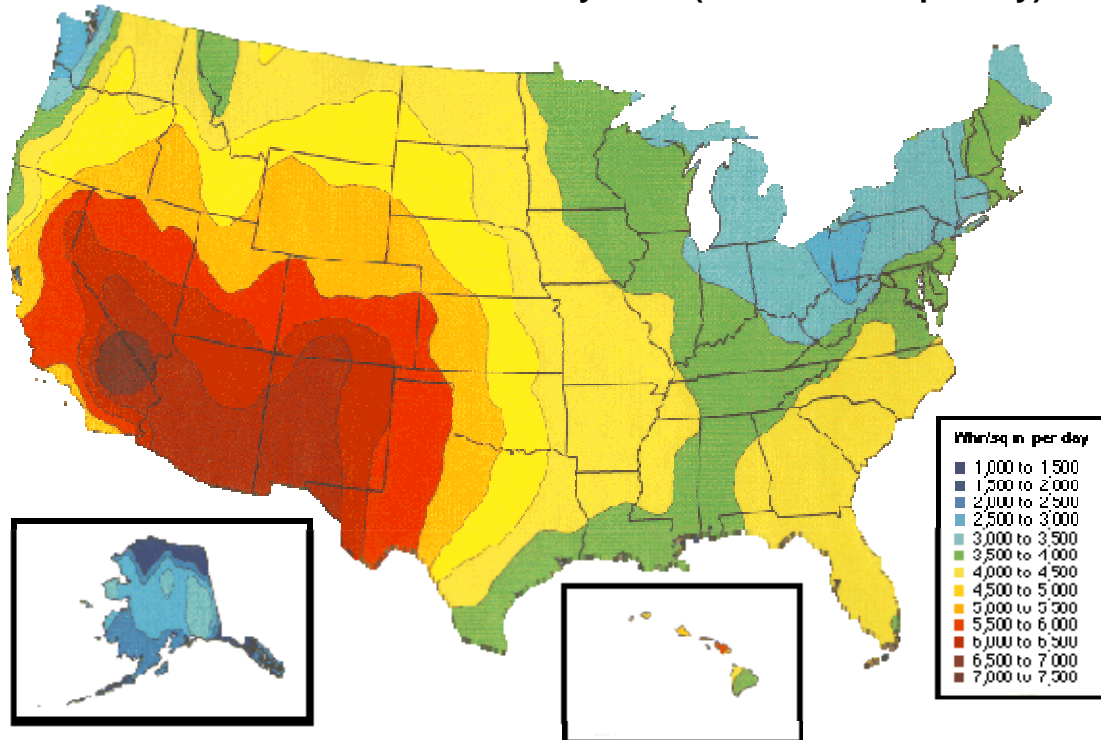
Sources: Energy Information Administration, Form EIA-906, "Power Plant Report" and EIA-920, "Combined Heat and Power Plant Report."

### **ARIZONA SOLAR RESOURCE POTENTIAL**

While solar electric capacity and production have made limited entry into the Arizona electric market to date, the solar resource potential in the state is enormous. Arizona is blessed with two critical resources that are essential to solar power production. These are a high level of solar radiation per square inch and large amounts of contiguous, relatively flat, undeveloped land.

The amount of daily solar radiation in various regions of the United States is shown in Figure 16.1. Southwestern states have the highest levels of solar radiation. The most intense solar radiation in the United States is located in southeastern California and southern Nevada which average 7,000 to 7,500 W-hr/in.<sup>2</sup> per day of solar radiation<sup>106</sup>. The remaining southwestern states have significant levels of daily solar radiation. This includes portions of west Texas, the southern portions of Utah and Colorado, and the majority of land area of New Mexico, and Arizona.

**Figure 16.1**  
**United States Solar Resources by State (Watt-hr./inch<sup>2</sup> per day)**



Source: Black and Veatch. *Arizona Renewable Energy Assessment*. Prepared for APS, SRP and TEP, Final Report B&V Project Number 145888, September 2007

The amount of solar radiation in a region is an important determinant of the cost of solar electric energy economics. In general, cities with higher levels of solar radiation tend to have lower levelized costs of energy. To illustrate this point, Table 3 shows the levelized energy costs (LCOE) for selected U.S. cities that have different levels of solar radiation. The LCOEs for the nine cities were estimated for a residential photovoltaic system and a large utility scale parametric solar trough system.

To minimize the effects of state and local incentives on the cost of solar energy production, the LCOEs for each city were estimated using the federal, state, local and utility incentives and electric rates faced by customers in the Phoenix area served by Arizona Public Service. The only factor that was varied was the level of solar radiation and weather experienced in each city.

The results in Table 16.2 are striking. The subsidized LCOE for a residential photovoltaic (PV)<sup>107</sup> system ranges from a low of 17.1 (¢/kWh) in Albuquerque to a high of 33 (¢/kWh) in Fairbanks, Alaska (see Table notes)<sup>108</sup>. The levelized cost of energy for a residential PV system in Fairbanks is roughly double that in Albuquerque. The results for a solar thermal system like a parabolic solar trough are even more pronounced. The subsidized levelized energy cost for a solar trough range from a low of 14.3 (¢/kWh) in Las Vegas to a high of 64.0 (¢/kWh) in Fairbanks<sup>109</sup>.

**Table 16.2  
Solar Power Levelized Cost  
of Energy (LCOE) by City \*\*\***

<u>Location</u>	<u>Residential Photovoltaic LCOE (¢/kWh)*</u>	<u>Utility Solar Trough LCOE (¢/kWh)**</u>
Albuquerque, NM	17.1	14.3
Las Vegas, NV	17.2	13.4
Phoenix, AZ	17.6	13.2
Fort Worth, TX	20.2	20.0
Miami, FL	20.9	25.3
Minneapolis, MN	22.6	29.5
New York, NY	23.3	37.4
Seattle, WA	28.4	39.5
Fairbanks, AK	33.0	64.9

\* The residential PV system is a 3.8 kW unit with a \$9,000 per kW installed cost and a \$50/kW annual O&M cost. The PV unit receives a 30% federal ITC and a 25% state ITC with a \$1,000 maximum payment. It also receives a \$3/Watt utility incentive.

\*\* The utility solar trough system is a 100 MW unit with a \$5,500 per kW installed cost and a \$50/kW annual O&M cost. The PV unit receives a 30% federal ITC and a 10% state ITC with a \$25,000 maximum payment. It also receives a \$1.5/Watt utility incentive.

\*\*\* The solar unit size, costs and subsidies in all locations are assumed to be identical to those in the APS service area in Phoenix. Only the solar radiation is different for each of the cities.

Source: National Renewable Energy Laboratory (NREL), Energy Analysis Office. Solar Advisor Model. August 2008.

The implication of this is that the southwest states, such as Arizona, have the best potential to promote and develop solar electric power generation without having to resort to extremely high subsidies. Since the economics of solar electricity production are much better in Arizona and surrounding states than in other regions of the country, it is likely that solar power production will develop here first, and then spread to other regions. If solar power can't make it in Arizona, Nevada, California and New Mexico, it won't make it in other regions without heavy subsidies.

### **IMPACT ON JOBS AND WAGES**

In a recent white paper, the economic impact of solar power development in Arizona was estimated for both the construction phase and the operation and maintenance (O&M) phase of the solar generation life cycle.<sup>110</sup>

The economic impact of the solar power industry is driven by construction capital investment and by O&M expenditures. These, in turn, are determined by the rate at which



solar capacity is added to the market and by the cumulative amount of operating solar generation capacity.

In order to meet RES requirements, annual solar power generation will steadily increase from 32,300 MWh in 2010 to 9,544,100 MWh in 2030. This amount of production will require the construction of 4,340 MW of cumulative solar generation capacity by 2030. From 2025 to 2030, all of the incremental renewable energy requirements will be filled by solar power.

Starting in 2010, the annual amount of capital investment will rise dramatically from \$84 million in 2010 to a peak of \$2.5 billion in 2025. By 2030 the annual rate of capital investment drops to about \$1.1 billion. In total, the construction of solar power plants to meet the ACC RES requirements will cost around \$22 billion in cumulative capital expenditures by 2030. The economic impacts of these capital expenditures on Arizona’s jobs, wages and value added are shown in Table 16.3.

**Table 16.3  
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 million	\$74 million
2025	16,530	15,552	32,082	\$1,560 million	\$2,240 million

**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	\$8.0 million	\$6.6 million

**Natural Resource Requirements**

- The solar power industry would require 13,137 acres or 20.5 square miles of land to produce the amount of electricity required to support the ACC RES.
- Water use in solar energy generation is minimal. It is only after 2015 that statewide solar water demand exceeds that of one average water-using farm.

Source: William P. Patton and Stan Reynolds, 2009. “Arizona Solar Summit Executive Summary.”

As shown in Table 16.3, the massive level of solar plant construction over the next 20 years generates the lion's share of solar power's economic benefit in terms of employment, wages and value added. The annual number of direct labor used on solar construction and installation projects will increase from 565 jobs in 2010 to a peak of 16,530 jobs in 2025. The total number of jobs created (including direct, indirect and induced jobs) increases from 1,068 to a maximum of 32,082 in 2025. Over the same period, the total annual wages (direct, indirect and induced) will rise from \$51 million in 2010 to a peak of \$1,560 million in 2025. The total value added (direct, indirect and induced) increases from \$74 million in 2010 to a peak of \$2,240 million in 2025.

The O&M phase of the solar generation process adds very little economic impact in Arizona. The number of permanent jobs added each year rises from 2.5 in 2010 to a peak of 50 in 2025. Total employment (direct, indirect and induced) added each year increase from 3 in 2010 to a peak of 87 in 2025. The total incremental annual wages (direct, indirect and induced) generated by ongoing solar O&M activity increases from \$200,000 in 2010 to a peak of \$8 million in 2025. At the same time, the total incremental value added (direct, indirect and induced) increases from \$400,000 in 2010 to a peak of \$6.6 million in 2025.

Compared to irrigation use, solar demand equals less than one-quarter of one percent of agricultural applications. It is only after 2015 that statewide solar water demand exceeds that of one average water-using farm. By 2030, solar demand is projected to be equivalent to about six average water-using farms.<sup>111</sup>

### **ARIZONA BENEFITS OF EXPANDED SOLAR ENERGY PRODUCTION**

The deployment of solar electric generating capacity will have a number of positive benefits for Arizona. Some of the benefits of increased solar generating deployment in Arizona are listed below.

- It would enhance national security by decreasing U.S. dependence on risky and unreliable foreign oil supply sources
- It would help to mitigate adverse climate change by reducing greenhouse gas emissions
- It would hedge against future price increases in oil, natural gas and nuclear generation
- It would hedge against the potential loss or limitation of coal-fired generation due to CO<sub>2</sub> emission limitations or the expense of additional emissions remediation equipment
- It would help state utilities meet their ACC renewable energy portfolio standard requirements
- It would allow utilities to add generating capacity incrementally as it is needed, rather than in large units like nuclear and coal base load generating stations
- Solar generation and manufacturing would add jobs and increase wages in the state.
- Solar generation and manufacturing would contribute higher tax revenues to Arizona governments at all levels

As a follow-up to the Arizona Leadership Summit on Solar Energy and Economics, held in Phoenix in January 2009, the Science Foundation Arizona (SFAz) was asked to accept responsibility for serving as the statewide organization to develop a structure that would become the focus of Arizona solar activities.<sup>112</sup> Specific goals were identified as: 1) attracting more solar manufacturing industry to Arizona; 2) increased solar energy generation in the state, and 3) increased federal, state and venture capital funding for solar manufacturing and energy development in Arizona.

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<sup>99</sup> Levelized cost is the cost per kWh that would have to be charged to customers to pay for the investment in the generation unit and the cost of running the unit for such things as fuel and labor over the life of the unit. The levelized cost is obtained by dividing the present value of the total cost of building and operating a generating plant over its economic life by the total energy output of the facility.

<sup>100</sup> MW (megawatt) is equal to one million watts. The productive capacity of electrical generators operated by a utility company is often measured in MW. <http://en.wikipedia.org/wiki/Watt>

<sup>101</sup> U.S. EIA. *State Renewable Electricity Profiles 2007* (June 2009).

<sup>102</sup> U.S. EIA. *Renewable Energy Consumption and Electricity Preliminary 2007* (May 2008).

<sup>103</sup> U.S. EIA. *State Electricity Profiles 2007* (June 2009).

<sup>104</sup> GWh (gigawatt hour) = unit of electrical energy equal to one billion watt hours. Energy in watt hours is the multiplication of power in watts and time in hours. <http://businessdictionary.com/definition/Gigawatt-Hour-GWh.html> and [http://en.wikipedia.org/wiki/Kilowatt\\_hour](http://en.wikipedia.org/wiki/Kilowatt_hour)

<sup>105</sup> U.S. EIA. *State Renewable Electricity Profiles 2007* (June 2009).

<sup>106</sup> Black and Veatch. *Arizona Renewable Energy Assessment*. Prepared for APS, SRP and TEP, Final Report B&V Project Number 145888, (September 2007).

<sup>107</sup> A photovoltaic system uses solar cells to convert light into electricity. [http://en.wikipedia.org/Photovoltaic\\_system](http://en.wikipedia.org/Photovoltaic_system)

<sup>108</sup> National Renewable Energy Laboratory (NREL), Energy Analysis Office. Solar Advisor Model. (May 2008).

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<sup>109</sup> National Renewable Energy Laboratory (NREL), Energy Analysis Office. Solar Advisor Model. (August 2008).

<sup>110</sup> William P. Patton and Stan Reynolds, Arizona Solar Energy. Presented at the Arizona leadership Summit on Solar Energy and Economics, (Phoenix, AZ in January 2009).

<sup>111</sup> Water use in solar energy generation depends on the generation and cooling technology utilized. According to the Sonoran Institute's project findings, photovoltaic solar uses very little water, only for washing off the PV panels. However, most of current applications for large solar facilities in Arizona are for Thermal Solar generation with wet cooling. Thermal solar plants are estimated to have a higher water use than any other energy generation technology, approximately 900 gallons of water per MWh produced (Nuclear generation is 785 gal/MWh, Coal 510 gal/MWh, Natural gas 200 to 415 gal/MWh depending on the technology). From a statewide perspective, less than five percent of total water use in Arizona goes to energy production. More on findings from other studies of water-energy relationship is available at Arizona Water Institute's website [www.azwaterinstitute.org](http://www.azwaterinstitute.org) and the Sonoran Institute's website [www.sonoraninstitute.org](http://www.sonoraninstitute.org).

<sup>112</sup> Science Foundation Arizona, Solar Collaboration Plan for Arizona, prepared by the Science Foundation Arizona Solar Technology Institute (February 2009).

## Chapter 17

# ENVIRONMENT, WATER AND AIR

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### KEY POINTS

- Protecting the environment and sustaining the economy depend on each other.
- Maintaining a quality environment will require regular engagement of all stakeholders and an ability to work across jurisdictional and issue boundaries.
- Growth and economic development decisions impact water availability, water and air quality, and ecosystem health as well as the costs associated with meeting state and federal standards.
- There is no comprehensive report or long range plan evaluating the security and reliability of Arizona's future water supply.
- Air quality is important due to its significant impacts on health, vegetation, ecosystems, and visibility.
- Ensuring a stable economy for Arizona will require increasing investments in long term environmental management and infrastructure to consistently deliver the natural resources – water, energy, land, and clean air necessary to maintain such an economy. This also presents new opportunities for creation of green jobs.
- The resource demands “footprint” of different industries could be criteria for helping decide which employers are most appropriate to pursue.
- Evaluating alternative scenarios can help ensure that Arizona is prepared to deal with an uncertain future.

### CHANGING PARADIGMS

#### **Environmental Quality & Economic Development are Complimentary**

Arizona's environment and economy are integrally related. Just as previous chapters have discussed the changing nature of economic development, environmental challenges as well as awareness of the interrelationships between environment and economy are also changing. Previously, many advocates for economic development might have argued that it was necessary to choose between jobs and the environment should not protect at the cost of lost jobs. Today, most employers require a high quality of life and environmental amenities to recruit and retain employees. This is particularly true for the knowledge workers of today and tomorrow on whom a vibrant economy will depend. Additionally, environmental managers increasingly recognize the need for a strong economy to generate public revenues to invest in maintaining environmental quality. Especially desirable are businesses that generate sufficient profits to be able to invest in clean technology and good environmental

practices. A key message of the sustainability movement is that economy and environment are complementary and not in competition.

Tourism, one of Arizona's key industries, clearly depends on clean air for scenic vistas; healthy deserts, forests and waterways for hunting, fishing and hiking; and sufficient water for golf courses and resorts. Additionally, green jobs can be a significant component of a growing economy. Battelle Memorial Institute, in a 2004 Report commissioned by the Arizona Commerce and Economic Development Commission, highlighted water management systems and energy efficiency/renewable energy production as two areas where Arizona could be world leader and exporter of technology.<sup>113</sup>

Finally, as Arizona has transitioned from a rural state dependent on cattle, copper and citrus to the rapidly growing home of an emerging megaregion, it is necessary to increasingly attend to the need for a stable economy for Arizona's millions of residents. This will require a capability to consistently deliver the natural resources – water, energy, land, and clean air necessary to maintain such an economy. Reliably providing such natural and environmental resources will require increasing investments in long term environmental management and infrastructure such as water and wastewater treatment and delivery, flood control, air pollution controls and generation of clean energy from renewable supplies.

### **Scale and Scarcity**

As Arizona's population grows and the urban areas expand, so too does the need to both manage the environment at this larger regional scale and to coordinate across multiple jurisdictions. For example, Arizona's cities could no longer act alone on issues like transportation and joined to form metropolitan planning organizations. Likewise, the Phoenix and Tucson metropolitan areas and Pinal County increasingly share economy as well as a water supply and air quality region. As Arizona continues to grow in this arid region the limits of scarce resources, water most immediately, are rapidly approached. As resources become increasingly scarce and valuable, ensuring efficient and sustainable use will require careful and longer term management approaches. If Arizona's climate is also warming this would further stress environment and natural resources. The potential consequences in terms of temperature increases and loss of water supply are of such significance that consideration and preparation for this as one potential future is in place.

## **ENVIRONMENTAL CONCEPTS AND PRINCIPLES**

### **Everything is Connected**

A key principal of environmental management is recognizing that natural environment, economy and quality of life are all connected. Communities and development profoundly impact the environment. The quality of environment in return impacts public health and welfare. Ecological footprints are one way to examine these connections. The footprint of a city incorporates not just the city boundary but the upstream watersheds from which water comes and the areas to which treated and discharged water flows. Similarly, the broader areas can be impacted by air pollution generated within cities and by the power plants that supply those cities. Part of the cost of economic development is managing, and hopefully reducing, both the use of natural resources and the pollution created. Additionally, different industries

have different resource demands, or footprints, and these characteristics could be part of the criteria used to determine which types of employment are most appropriate for Arizona.

### **Change is Inevitable**

Environmental managers increasingly recognize the need to anticipate future changes and maintain sufficient flexibility to address changes they did not expect. Although change is inevitable it is not always predictable. In general, increases in resource demands and pollution that result from population growth and economic development are reasonably certain. Other types of events, such as a flood, are random but can be anticipated and planned for based on historic experience and modeling. Still other events are truly uncertain (perhaps climate change is an example of this category) but can be managed by collecting data, considering alternative future scenarios, and designing environmental infrastructure and management mechanisms so they will be reliable under many different scenarios. For example, to ensure a reliable and secure water supply sufficient to sustain continued economic development, it will be necessary to consider a water supply, treatment and distribution system with enough capacity and flexibility to work during droughts, floods and even a changing climate.

### **People are Part of the Environment**

The interaction of Arizonans with the environment provides not only physiological sustenance (air to breath, water to drink) but also opportunities for recreation, aesthetics and stress reduction as well as enhanced property value. Therefore, maintaining a quality environment within and around Arizona's communities requires regular engagement between environmental managers, residents, economic development planners and other stakeholders.

### **Institutional Structure Makes a Difference**

Traditionally, local governments are poorly suited for managing issues, whether environmental or economic, that cross jurisdictional boundaries. Additionally, many management agencies focus on only one issue and are poorly equipped to consider multiple connections such as those between economic development, land use, environmental health, water supply, energy use, transportation and air quality.

## **WATER**

Ensuring sufficient quantities of water at an adequate quality and affordable price is clearly a key to economic development, human health and environmental quality. Any discussion of development in Arizona sooner or later, typically sooner, comes to the question of whether there is sufficient water. Many areas of Arizona are supported by extensive water delivery and treatment infrastructure such as the Central Arizona Project, the Salt River Project and agricultural irrigation districts throughout Arizona. Other areas, however, are dependent on local groundwater supplies or streams. In general, there are no unallocated surface water supplies in the state, and most areas are already overusing local groundwater. Therefore, supplies for growth will predominantly come from re-allocation or by investing in conservation to free up existing supplies.

## Sources and Usage

In Arizona, as in most Southwestern states, approximately 70% of all water use is for agricultural irrigation. Investing in agricultural conservation or purchasing and retiring the land from production, and moving supplies to urban uses is typically seen as a major source of water for growth. However, agriculture has historically been a significant economic activity and could have a continuing role in economic development, the culture of Arizona, and provision of food supplies, open space and other ecosystem services. Notable problems resulting from overuse of water include loss of reliable supplies, land subsidence and fissuring due to depletion of underground water, decreasing quality as groundwater is being withdrawn from greater depths, and increasingly impaired environmental quality, particularly for Arizona's limited riparian areas.

Two potential new supplies are water reuse (wastewater treated for reuse) and sea water desalination. Wastewater reuse is already extensively utilized in Arizona. Although reuse will allow getting more out of current supplies, it does not generate new water. Desalination is seen as a panacea by some, but its potential limitations are not yet fully understood. Certainly desalination is expensive and requires considerable energy, treatment and delivery infrastructure, sometimes within protected coastal areas.

There is no comprehensive report or long range plan evaluating the security and reliability of Arizona's water supply. A recent study of the ability to supply Central Arizona's water for 100 years indicated that for areas with access to the CAP canal and other infrastructure, supplies could potentially be secured for future growth by purchasing and moving senior agricultural or tribal water rights from the Colorado River<sup>114</sup>. Other essential options include extensive water reuse and conservation. Accommodating such growth would however require considerable infrastructure investments in water and wastewater treatment, expansions of the CAP canal, and eventual completion of a new canal. Some difficult political choices will need to be addressed, such as whether to move water from Colorado River communities to central Arizona and other growing regions. However, this study did not account for climate change, which some studies indicate could reduce flows in the Colorado and Salt River watersheds by up to 25 to 30%. Other studies have indicated that securing sufficient water supplies for the economic development desired in the rural areas of Arizona will require the provision of major water importation infrastructure (such as a pipeline from Lake Powell to Flagstaff, Williams and perhaps even Prescott) as well as purchasing water rights from other users.

Employers and investors looking at operations in Arizona typically do consider the long term security and reliability of water supplies. Fortunately, Arizona's comprehensive water quantity management programs have aided the states previous economic development efforts. However, with growing awareness of recent drought trends and the impacts of potential climate change, it remains important for Arizona to demonstrate that it continues to have adequate and secure water supplies.



## Quality

Water quality, though it receives less attention, is certainly important to both public and environmental health. Protecting water quality also leads to far lower treatment costs and maintains the viability of potential supplies. One key for effective use of all water supplies will be matching water supplies of different qualities to appropriate uses (e.g. some industrial processes can use water that is higher in salt or other contaminants). One assessment of water quality throughout Arizona is the 305b reports produced every other year by the AZ Department of Environmental Quality (named for section 305b of the Clean Water Act)<sup>115</sup>. According to the 2006/2008 report 51% of stream miles assessed and 78% of lake and reservoir acres assessed were judged to have water quality sufficient for attaining their designated uses. Thirty-one percent of stream miles and nine percent of lake and reservoir acres were deemed to be impaired by one or more contaminants. Although the non-random nature of the areas assessed and the changing nature of assessments over time make a trend analysis or statewide assessment difficult, the coverage of the assessments is increasing over time. From the 2002 assessment to the 2006/2008 assessment, the percentage of total perennial (wet throughout the year) lake and reservoirs assessed grew from 24% to 50%, and for perennial stream miles the coverage grew from 40% to 76%.

## Management Regulatory Programs

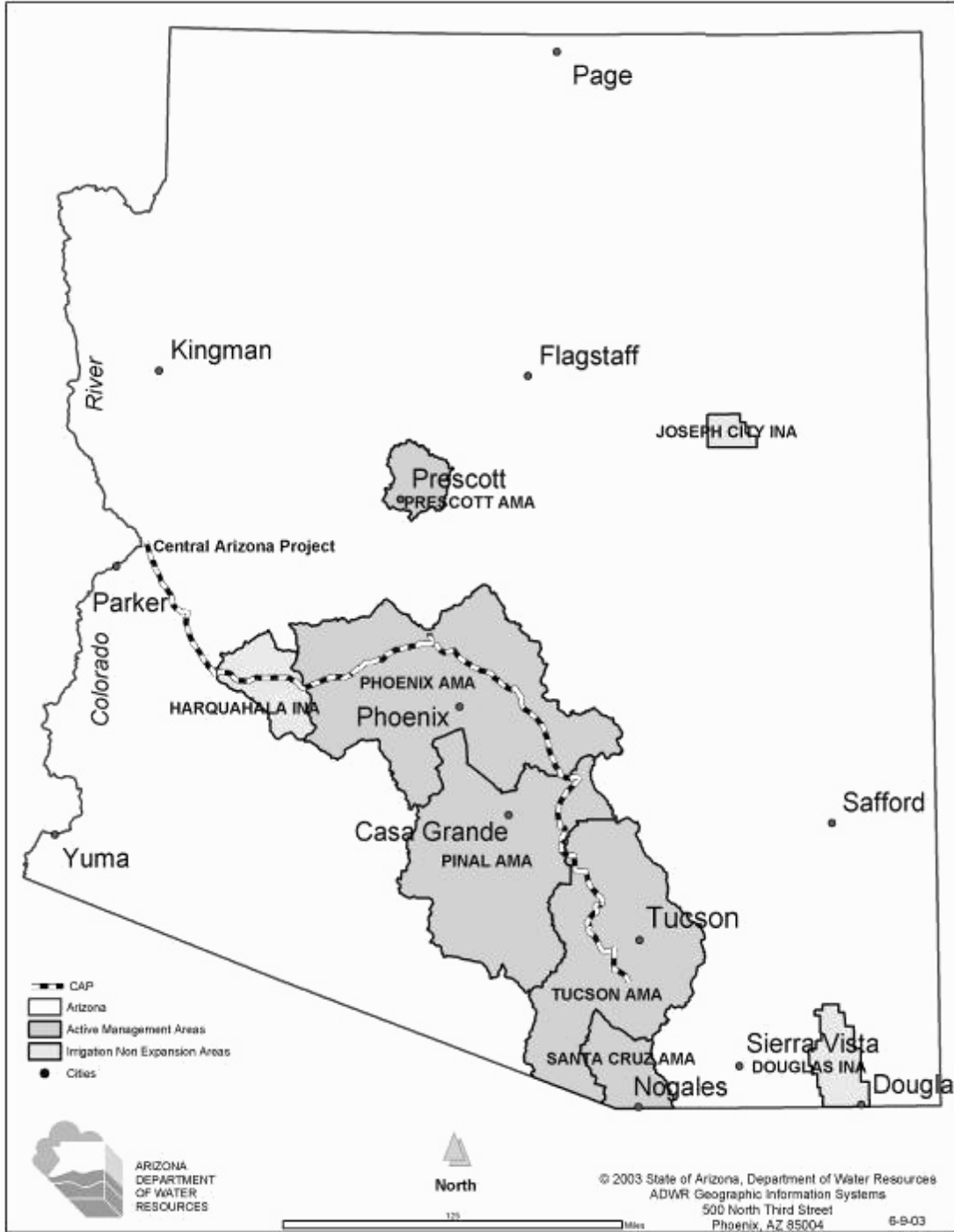
Key water management regulatory programs with implications for economic development include:

- Arizona Assured and Adequate Water Supply Rules require a firm and renewable 100 year supply prior to subdividing land within most of the Active Management Areas (AMA) in Arizona. Outside Arizona's five AMA's the adequacy rules require an assessment of whether a 100 year supply (which does not have to be renewable) exists, and if it does not exist notice must be provided to the first purchaser of a subdivided lot. Figure 17.1 indicates the location of Arizona's five active management areas.
- Arizona Water Conservation requirements for water providers within AMA's require meeting per capita consumption targets or implementing specific conservation programs. In some limited cases these requirements could impact the ability of water providers to serve certain high water using developments or industries.
- Arizona Water Conservation requirements for agriculture and certain industries within AMA's may require investment in conservation practices but for the most part these do not constrain any economic development activity.
- Federal Safe Drinking Water Act requirements specify levels of various contaminants in drinking water and technological requirements for water treatment plants. In some cases these standards can significantly increase the cost of water treatment and new standards for arsenic are causing difficulty for some rural areas of Arizona.
- Federal Clean Water Act standards specify what levels of pollutants can be discharged to washes, streams, rivers and other surface waters. These standards can increase treatment costs and impose limits on certain types of industrial contaminants.

- Arizona Aquifer Protection Permits extend to Arizona's groundwater aquifers discharge requirements similar to those in the Clean Water Act.

Arizona could evaluate the water using characteristics of industries the state seeks to recruit. Considering the water use per job created or per unit of income generated might be worthwhile criteria. Additionally, economic development recruiters could target industries that can utilize the high salinity water in Arizona or reclaimed water supplies.

**Figure 17.1**  
**Arizona's Active Management Areas (AMA) and**  
**Irrigation Non-Expansion Areas (INA)**



## AIR

Air quality is important due to its significant impacts on health (including sensitive populations such as children and the elderly), vegetation, ecosystems, and visibility. In accordance with federal standards specified in the Clean Air Act, Arizona monitors and controls criteria pollutants, including carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), ozone (O<sub>3</sub>), and both coarse (PM<sub>10</sub>) and fine (PM<sub>2.5</sub>) airborne particulate matter.<sup>116</sup>

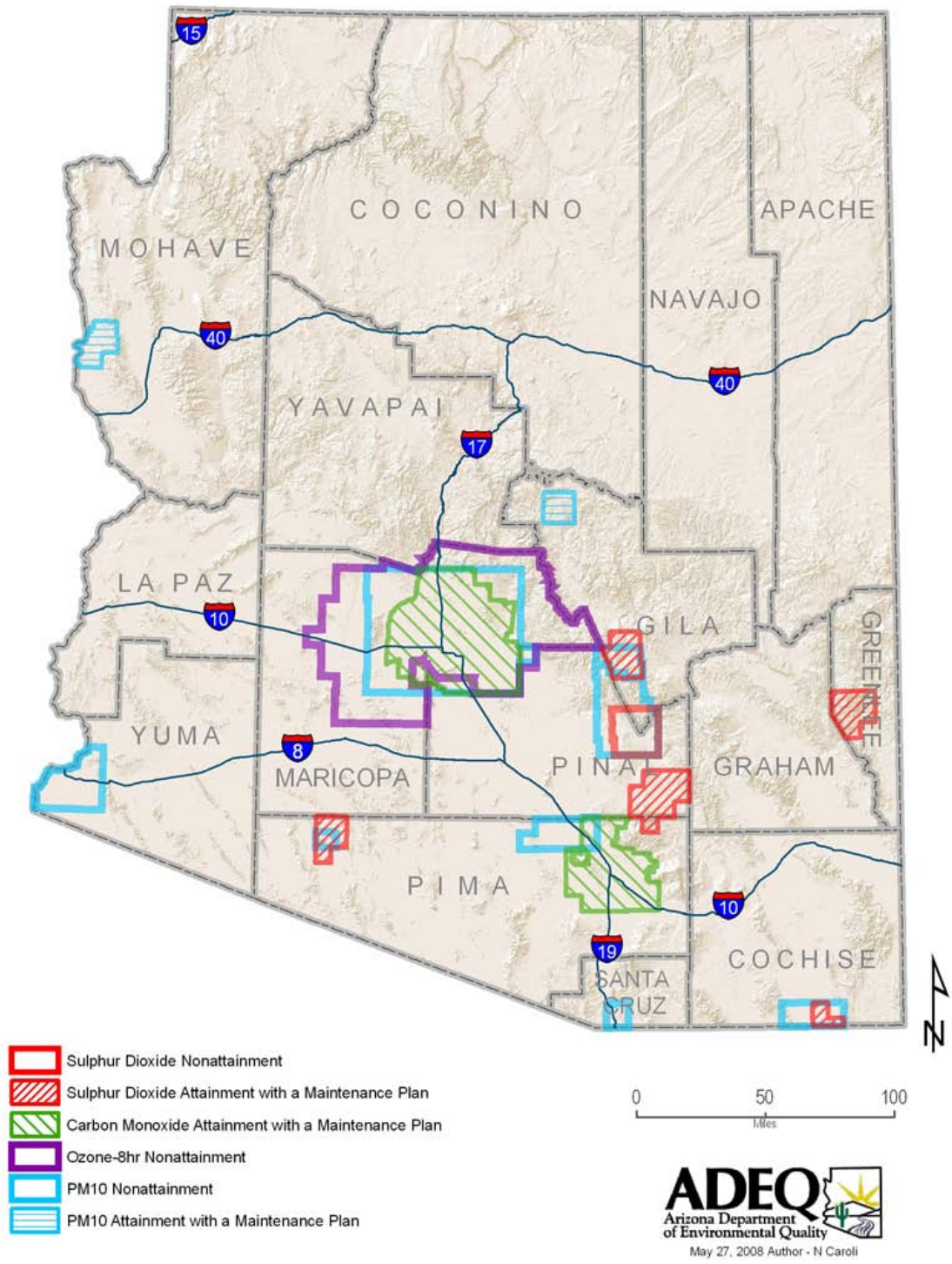
Arizona has generally experienced improving air quality for several decades. This progress can be attributed to specific mitigation efforts, including federal new-vehicle emission standards, emission reductions from the vehicle inspection and maintenance program, the use of oxygenated fuels in the winter, cleaner burning gasoline, controls on industry emissions, and dust abatement programs<sup>117</sup>. Since motor vehicles are a major pollutant source, continued progress can be achieved by improving the availability of alternative modes of transportation such as increased transit options or additional park and ride lots to encourage carpooling.

Despite significant progress, there are still several locations that exceed federal pollutant standards. For instance, due to increasing population and natural background concentrations, O<sub>3</sub> levels do not meet federal standards in the Phoenix metropolitan area. The Hayden area does not meet federal standards for SO<sub>2</sub>, due to a copper smelter in the region. Areas in six counties are not compliant with ambient PM<sub>10</sub> standards, including the Phoenix metropolitan area.<sup>5</sup> Non-attainment areas for PM<sub>10</sub> in border communities such as Douglas, Nogales and Yuma are partially due to pollution sources in Mexico. There are several studies and programs aimed at identifying and mitigating the effects of these cross border pollution sources.<sup>118</sup>

Figure 17.2 identifies non-attainment areas for these Clean Air Act criteria pollutants. Communities in non-attainment areas are typically required by federal law to reduce pollutants through controls on industrial facilities and business, government operations, and consumer activities. These restrictions can result in tax increases, restrictions on highway improvements, slower economic expansion due to increased costs on existing businesses, as well as discourage new businesses from locating in the region<sup>119</sup>. Thus, decisions concerning growth and economic development in Arizona need to account for issues related to air quality, such as its effects on human welfare and the environment, the costs associated with meeting federal standards, and repercussions incurred when these standards are not met.

**Figure 17.2**  
**Arizona's Air Quality Non-Attainment Areas**

**Nonattainment and Attainment With a Maintenance Plan Areas**



## OTHER ENVIRONMENTAL ISSUES

While this chapter's primary focus is on water and air issues, other significant environmental considerations relevant to economic development include:

- Solid waste and hazardous wastes generated by industry and the related management and disposal needs of different businesses.
- Benefits of identifying businesses that increase reuse and recycling opportunities for byproducts produced in Arizona.
- Importance of providing strategically located land with appropriate infrastructure for new businesses and the potentially critical role of both State Trust Lands and the ability of Arizona to strategically guide employment growth to optimal locations.
- Effective management of future growth to reduce environmental impacts, to integrate environmental amenities into new development, to protect public health, to protect critical natural areas and open space, and to ensure a rational urban pattern.

**Jim Holway** directs Western Lands and Communities, a joint venture between the Lincoln Institute for Land Policy and the Sonoran Institute. This program supports research, tool development, demonstration projects, education and publications focused on managing growth, sustaining regions, protecting resources and empowering communities throughout the intermountain west. Prior to joining the Sonoran Institute in 2009, Jim taught as a professor of practice at Arizona State University and served as the ASU Coordinator for the Arizona Water Institute. Jim previously served as assistant director of the Arizona Department of Water Resources, overseeing the state's active management areas, conservation, assured water supply, recharge, well permitting, and groundwater and surface water rights programs. Jim earned his bachelor's degree in political science from Cornell University and both a PhD and master's in regional planning from the University of North Carolina.

**James Tamerius**, author of the air quality section, is a graduate researcher at the School of Geography and Development at The University of Arizona. His research is aimed at understanding the role of climate in the ecology of certain infectious disease, such as coccidioidomycosis ("Valley Fever") and influenza. He plans on finishing his doctorate degree in geography during the spring of 2011.

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<sup>113</sup> "Positioning Arizona for the Next Big Technology Wave: Development and Investment Prospectus To Create A Sustainable Systems Industry in Arizona." (Battelle Memorial Institute; Cleveland, Ohio. March 2004).

<sup>114</sup> Jim Holway, Peter Newell and Terri Sue Rossi. "Water and Growth: Future Water Supplies for Central Arizona." Global Institute of Sustainability Discussion Paper. Draft for Discussion, (June 13, 2006).

<sup>115</sup> Arizona Department of Environmental Quality. *2006/2008 Status of Surface Water Quality in Arizona: Arizona's Integrated 305(b) Assessment and 303(d) Listing Report*. (November 2008).

<sup>116</sup> Environmental Protection Agency. "Clean Air Act." [www.epa.gov/air/caa/title1.html](http://www.epa.gov/air/caa/title1.html) (Accessed January 21, 2010).

<sup>117</sup> Arizona Department of Environmental Quality. "Air Quality Annual Report." Technical Publication, (Phoenix, 2009).

<sup>118</sup> Office of Border Environmental Protection (OBEP). Air: Projects. <http://www.azdeq.gov/obep/air.html> (Accessed February 3, 2010).

<sup>119</sup> D. Keyes, D. Anderson, C. McKaughan, and H. Eyrich." Estimating the costs of violating air quality standards." *EM: Air and Waste Management Association's Magazine for Environmental Managers*. (April, 22-30, 2001).

## Chapter 18

# QUALITY OF LIFE

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Sonoran Institute  
with  
Andrea Whitsett

Morrison Institute for Public Policy, Arizona State University

### KEY POINTS

- Quality of life (QOL) acts as a magnet to attract and spur economic development.
- It is part of Arizona's economic infrastructure.
- Arizona's historic growth has been largely due to the excellent quality of life offered.
- QOL is best measured by monitoring perceived changes to feelings about it.
- QOL is an important aspect of a sustainable economy.
- Skilled workers demand a high quality of life.
- QOL can be a powerful tool for business attraction.
- 

### WHAT IS QUALITY OF LIFE?

Quality of life, especially in Arizona, also acts as a magnet to attract and spur economic development. In this respect, it is useful to think of QOL as part of the state's economic infrastructure. The quality of life offered in Arizona influences business attraction and growth, in the same way as the condition of the roads, schools, and tax structure does.

There is a complementary relationship between QOL and the economic success of a state. As the economy of an area grows, so does the demand for the goods that increase QOL for the people. Similarly, as the QOL in a region increases, that area will attract more residents and more businesses, causing the economy to grow.

Although there are many definitions of quality of life, there are a few aspects of QOL that are especially important for this discussion:

- A stable and thriving **environment** is important for the health, happiness, and recreation of residents, and long-term economic growth is impossible without it. A degraded physical environment will not attract or retain workers and will not support business.
- **Arts, culture and recreation** can be thought of as the amenities that workers acquire once their basic needs have been met. Culture in this context should be also considered in its broadest sense, ranging from high art opportunities such as museums and ballet, to NASCAR races and local street fairs.
- In a state as large as Arizona, **transportation and mobility** is a QOL issue that residents face on a daily basis as stressed in Chapter 14. Millions of commuters

utilize the complex transportation system of the cities during the work week, only to clog the roads to rural playgrounds on the weekends.

- **Sense of Community** “*The Arizona We Want*” cites research which indicates that economic prosperity and population growth are both correlated to citizen attachment to community.<sup>120</sup>

### **Arizona’s historic growth has been largely due to its quality of life**

Arizona’s greatest economic asset is its environment. Our ideal climate and spectacular natural setting has drawn people and business to the state for decades. Challenges to the state’s environment therefore challenge our economic potential.

Arizona’s growth from a dusty frontier territory to a populous and thriving state is directly attributable to the enhanced quality of life offered by the state. The spectacular scenery showcased in *Arizona Highways*, a climate that allows for year-round outdoor activities, and relaxed lifestyle has attracted millions to the state. In 1940, Barry Goldwater attributed the growth of Phoenix to “the capitalization of our climate, our natural beauties, and the romance of our desert.”<sup>121</sup> Maintaining the qualities that have made Arizona a desirable place to live become ever more important as urbanization continues in Arizona’s population centers, and rural areas transform from hubs of mining and agriculture to recreation centers.

Arizona’s recreational and cultural activities are often centered on the natural environment that has attracted so many residents. Today, highways clogged with motorists towing boats and all-terrain vehicles to the lakes and high country are testimony to the continuing relationship between the state’s natural environment and quality of life.

Early on, civic boosters such as Dwight B. Heard realized that arts and culture would position the state as stable and civilized, and help attract newcomers and investors. As the state grew, the increased population became able to support a wide range of cultural opportunities, from a professional ballet company to NASCAR races. Arts and business development organizations throughout the state continue to make the case that a rich environment for arts and culture produces economic benefits in addition to increasing quality of life for residents.

### **MEASURING QUALITY OF LIFE**

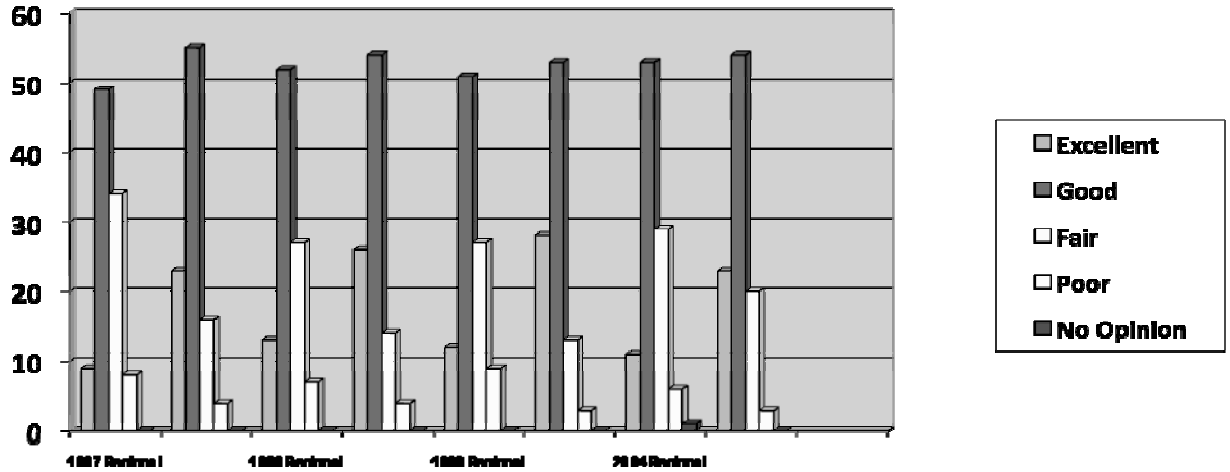
Quality of life can be an elusive concept. Individual perceptions of QOL are often quite different than objective measures of QOL. For example, perceptions of personal safety may be based on nuances that aren’t captured by crime statistics alone and perceptions of personal health may be based on far more than diagnostic labels. Furthermore, people generally rate their QOL relative to that of their social peers. Thus, as entire communities are impacted by major events and economic conditions, self-reported QOL often remains constant.

Morrison Institute for Public Policy at Arizona State University has been asking residents to rate their personal and regional QOL since 1997 with survey data showing consistently high ratings (Figure 18.1). Time and time again, two-thirds of residents report quality of life as “excellent” or “good” regardless of economic boom and bust periods. Measured in this way,



QOL is not a highly sensitive indicator, but rather an appraisal of long-term social stability. Consequently, for some purposes it is more valuable to question residents about perceived changes in QOL and feelings of community, social trust, and personal safety.

**Figure 18.1**  
**Perceptions of Quality of Life**



Source: Morrison Institute for Public Policy, Arizona State University, 2009

By reviewing regional data from Morrison Institute’s *What Matters* series and statewide data from the Arizona Indicators Panel, we see that residents’ perceptions of changes in QOL are a far better barometer of social conditions than a simple rating. Note the dramatic change shown in Table 18.1 from 2008 (24%) to 2009 (42%) in the percent of residents who said that QOL in their area “declined” in the last few years. Among those reporting the highest decline in QOL were minorities, those ages 45-59, or those making \$30,000 or less.

**Table 18.1**  
**Changes in Quality of Life**

Would you say the area’s quality of life has improved, declined, or stayed the same in the last few years?

Level	2008	2009
Improved	27%	12%
Declined	24%	42%
Stayed about the same	46%	45%
Total	100% (642)	100% (701)

Source: Morrison Institute for Public Policy, Arizona State University, 2009

We can also examine data on neighborhood cohesion and social trust to get a better sense of the QOL in Arizona communities. Survey data from the St. Luke’s Health Initiatives’ 2008 *Arizona Health Survey* show that Arizonans get along with their neighbors, but also harbor concerns that some neighbors negatively influence their children. The survey found that 86%

of respondents report that their neighbors can be trusted, and 85% agreed that “there are people in the neighborhood I can count on” (Table 18.2).

**Table 18.2**  
**Neighborhood Cohesion and Quality of Life**  
*“Arizonans Say They Get Along With Neighbors,  
 But Are Concerned About Bad Influences on Kids”*

	<b>Strongly Agree</b>	<b>Agree</b>	<b>Disagree</b>	<b>Strongly Disagree</b>	<b>Don't Know or Refused</b>
PIN* do not get along**	2%	8%	56%	30%	4%
PIN can be trusted**	27%	59%	8%	1%	5%
PIN do not share values**	4%	22%	48%	12%	14%
PIN help each other out**	20%	63%	10%	2%	5%
There are PIN I can count on**	28%	28%	9%	2%	4%
PIN watch each other's children***	27%	57%	13%	2%	3%
There are PIN who are a bad influence on children***	9%	40%	39%	8%	4%

\*PIN = People in Neighborhood  
 \*\*n=4,196, \*\*\*n=897

Source: St Lukes' Health Initiatives. Arizona Health Survey, arizonahealthsurvey.org.

The 2008 Arizona Indicators Panel also measured trust with most Arizonans expressing trust in their leaders and institutions. The survey found 85% of respondents expressing some or a great deal of trust in local police, 81% in local hospitals, 72% in local schools, and even 54% in local elected officials. Additionally, Arizonans responded positively to questions about crime and safety. Nearly 75% said they feel safe walking down their street after dark and 79% said that their area had a reputation for being a safe place. In combination, these indicators of community cohesion, social trust, and personal safety provide another way of measuring the QOL in Arizona neighborhoods.

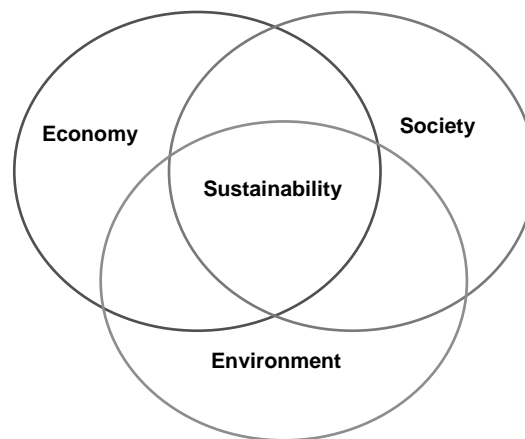
### **QUALITY OF LIFE AND ECONOMIC DEVELOPMENT**

The connection between economics and QOL is recognized as the 'triple bottom line' that is pursued by organizations looking to a sustainable future (Figure 18.2). This model states that in addition to economic returns, environmental and social returns are important measures of the strength. Triple-bottom-line thinking has been adopted by corporate giants such as General Electric not out of altruism, but because it is a more sophisticated model for measuring the success of an organization than simply looking at the bank balance. By attending to its environmental and social aspects, GE ensures that its finances will be taken care of not just for the coming quarter, but for years to come.

Arizona can benefit from a good look at its triple bottom line, as well. Since optimal QOL comes from a balance among these three features, efforts to improve the economy must also consider impacts to the environmental and social health of the state. High country forests damaged by fire and bark beetles reduce the ability of rural areas to profit from their

surroundings while restricting beneficial recreation opportunities. Likewise, cities will be less attractive to new industries if the urban heat island effect degrades the lifestyle of residents. Although the environment undoubtedly plays a key role in quality of life, QOL is represented by the “society” side of the triple-bottom-line model. From a business perspective, this means developing and maintaining the human capital needed for the organization to prosper and ensuring we provide a quality of life to facilitate recruiting and retaining these employees. As Arizona continues to evolve from a low-skill, low-wage economy based on agriculture and mining into a knowledge economy, the societal part of the triple bottom line will become increasingly important.

**Figure 18.2**  
**The “Triple Bottom Line” for a Sustainable Future**



Source: Morrison Institute for Public Policy, Arizona State University, 2009

### **Skilled Workers Demand a High Quality of Life.**

In 1957, a manager for Motorola, which reigned as the state’s top employer for decades, laid out the company’s strategy for locating in Arizona: “The principal reason we’re here is the serious shortage of engineers. We can run an ad in the trade magazines mentioning three places to work – Phoenix, Chicago, and Riverside, in California. We’ll draw 25-to-1 replies for Phoenix compared with the other cities . . . We don’t have to pay a premium to get engineers and other skilled employees to live here, either. The premium is free – sunshine (Luckingham 1989).”<sup>122</sup>

Like Barry Goldwater, Motorola realized that Arizona’s environment can be a powerful attraction. Arizona's climate continues to attract business, with the announcement that Yelp, an Internet search and business review company, plans to hire 200 employees for a new Scottsdale office. CEO Jeremy Stoppelman was attracted to the state due to its “affordable housing, great weather, and convenient airport.”<sup>123</sup> The challenge in coming years will be to maintain that attraction in a state of over six million people. With competition from across the sunbelt and around the globe, the days when Arizona could draw high paying jobs to the state by simply offering the free premium of abundant sunshine are long gone. Arizona’s climate, environment, and natural setting are still attractive to many potential residents, but

we must now pay considerable attention to the other aspects of QOL such as arts and culture, transportation, and education.

### **Business Attraction and QOL**

The most important QOL factors for attracting business will vary according to the type of industry. For example, when considering locations for a new call center, a company is likely to look for an area with low commute times and a large student population.<sup>124</sup>

When considering the attraction of large employers, the diversity of QOL offerings becomes important. A business seeking to relocate hundreds of employees to a region will look for a location with a variety of housing and transportation options and cultural amenities that will satisfy the needs of both entry level employees and managers.

Many sources cite the importance of quality of life issues for attracting and retaining highly skilled and educated workers. Businesses that need highly educated workers are motivated to locate in areas where the workforce matches can meet their needs. The importance of these workers has been highlighted in a recent Brookings Metropolitan Policy Program report which notes that cities with educated workforces “have weathered the recession significantly better than other Mountain metros on almost every measure.”<sup>125</sup> High concentrations in health and social related services have also protected areas against economic decline on a variety of measures, with Albuquerque and Tucson being indicative.”

### **QUALITY OF LIFE AS A MORE THAN A BYPRODUCT**

Arizona’s outstanding quality of life has been an important driver of the state’s growth for decades, and economic growth has, in turn, reinforced QOL by enabling the growth of cultural and social amenities. As the state reshapes its economy, QOL and economic development will continue to mutually benefit each other.

Policymakers need to understand that quality of life is more than just the pleasant byproduct of a thriving economy. The natural and social attributes that have drawn millions to the state will need to be nurtured, not taken for granted. If the foundations for excellent QOL are not reinforced, economic development is unlikely to occur, and certainly cannot be sustained.

The state will be unable to attract and retain the productive and highly skilled workers it needs if the environment becomes degraded or social and cultural resources are neglected. However, if QOL is considered as a vital part of the Arizona’s economic infrastructure and integrated into the planning and development of new economic opportunities, the state can continue to reap the benefits of an excellent quality of life.

**Dan Hunting** is an economic and policy analyst for the Sonoran Institute. His research interests include sustainable economic development in light of the Sun Corridor megapolitan concept, state trust land reform, and the role of arts and culture in economic development. After a career as a photojournalist, he pursued his interest in public policy at Arizona State University, where he helped develop core concepts of the Sun Corridor geography at the Morrison Institute while working on his master’s in public administration. Upon graduation, he took a job with the Arizona legislature, working as a fiscal analyst for the Joint Legislative Budget Committee. Duties included budget development and program analysis for nine state agencies, including Arizona Department of Environmental Quality and the Department of Administration. He has authored and contributed to works on domestic violence, sustainability, public art, and education.

**Andrea Whitsett** is a policy analyst at Morrison Institute for Public Policy at Arizona State University. She also manages the Arizona Indicators project, a centralized data resource and analysis tool that shows Arizona's competitive position and trajectory. Arizona Indicators promotes informed decision-making by helping community leaders, business leaders, policymakers, and the public identify areas where progress is needed. As project manager, Whitsett oversees data contributions from university scholars and community experts and conducts outreach to target user groups throughout the state. As a policy analyst, her research interests include education, healthcare, and criminal justice. Previously, Whitsett worked in early childcare, held an internship at Children's Action Alliance, and led a student-based effort to increase SCHIP enrollment in Connecticut. A native Arizonan, Whitsett graduated from Thunderbird High School and holds a Bachelor of Arts in American Studies from Yale University. She is currently pursuing a master's degree in nonprofit studies at Arizona State University.

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<sup>120</sup>Center for the Future of Arizona. *The Arizona We Want*. (Phoenix: Center for the Future of Arizona, 2009).

<sup>121</sup>Bradford Luckingham. *Phoenix: The History of a Southwestern Metropolis*. (Tucson: The University of Arizona Press, 1989).

<sup>122</sup>*Ibid.*

<sup>123</sup>Peter Corbett. "Yelp plans to open office in Scottsdale." *The Arizona Republic*. (February 10, 2010: D1).

<sup>124</sup>Mark Crawford. "When Quality of Life Closes the Location Decision Deal." *Area Development Online*. <http://www.areadevelopment.com/siteSelection/dec09/quality-of-life-location-factors010.shtml?Page=1> (January 2010).

<sup>125</sup>*Mountain Monitor: Tracking Economic Recovery in the Intermountain West's Metropolitan Areas*. (Las Vegas: Brookings Metropolitan Policy Program, 2009).

# Chapter 19

## Fiscal Crises

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Eller College of Management, The University of Arizona

### KEY POINTS

- Arizona will face a fiscal crisis during every economic downturn.
- The severity of the crisis will depend on the length and severity of the recession.
- Cyclical crises are caused by the strong cyclical nature of Arizona's revenues, numerous permanent tax cuts made during expansion periods, an increased demand for government services during recessions and an underfunded Budget Stabilization Fund.
- Numerous tax cuts since the mid-1990s have created a long-term structural deficit that cannot be closed with expenditure cuts alone.

### FISCAL CRISES ARE PREDICTABLE

Economists cannot always accurately predict the timing, length, and severity of an economic recession. What is entirely predictable, however, is that Arizona will face a fiscal crisis during every downturn, the severity of which depends on the length and severity of the recession.

In 1994, the following appeared as part of an article discussing the early 1990s budget crisis. "The combination of underfunding the rainy day fund during an upswing period, numerous tax cuts which are likely to downsize the General Fund, a supermajority requirement for all tax increases, the strong cyclical nature of revenues and an increased demand for social services during recessions will result in severe expenditure cuts in some government services during the next economic downturn."<sup>126</sup> Since this article, the state legislature passed the equivalent of \$2.6 billion additional tax cuts and the state is now in the worst economic downturn since the great depression. All of these factors predictably combined to create the budgetary crisis that Arizona currently faces.

### CAUSES OF PAST FISCAL CRISES

Each of the contributing factors to Arizona's fiscal crises is discussed below: economic cycle and revenue volatility; tax cuts made during expansions and the permanency of those tax cuts due to the supermajority requirement for tax increases; underfunding of the Budget Stabilization Fund; and an increase in the demand for formula-driven government services during recessions.

### Economic Cycle and Revenue Volatility

Although the timing of Arizona's economic cycle is similar to that of the nation, Arizona's economy is much more volatile than the U.S. as a whole. Arizona is one of the most volatile state economies in the country, second only to Nevada (Table 19.1). The volatility index is

based on fluctuations in quarterly personal income from 1950 through early 2009. The most volatile states are rapid growth states in which the growth-dependent construction and real estate sectors represent a disproportionate share of economic activity.

**Table 19.1**  
**Volatility Index, 10 Most Volatile State Economies**

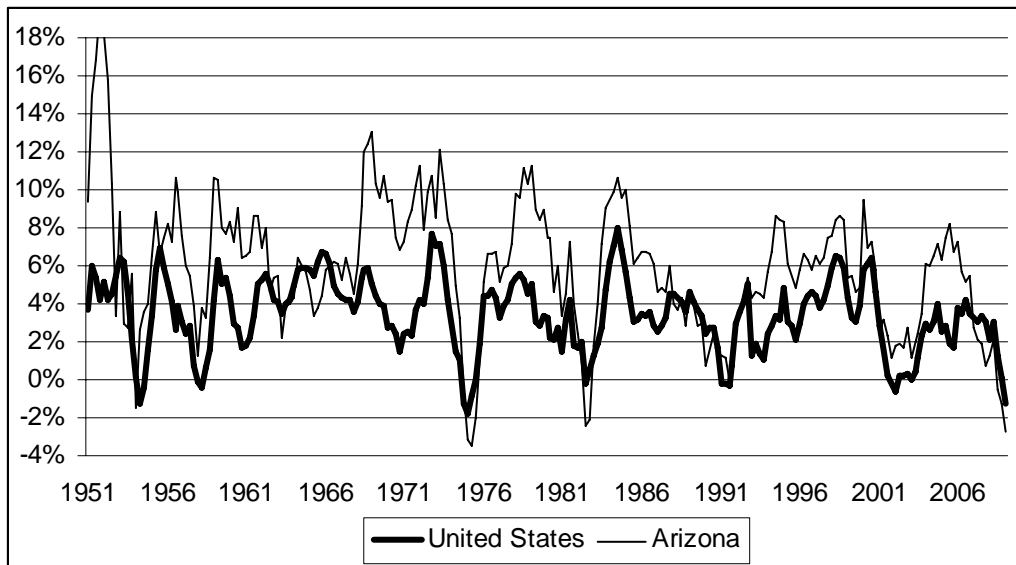
		<u>Index*</u>
1	Nevada	130.6
2	<b>Arizona</b>	<b>119.5</b>
3	Florida	113.7
4	Colorado	112.2
5	Utah	111.1
6	Georgia	110.8
7	Texas	110.5
8	Washington	107.8
9	Idaho	107.6
10	North Carolina	107.5

\* U.S. average = 100

Source: Economic and Business Research Center, Eller College of Management, The University of Arizona.

The annual rates of growth in quarterly inflation-adjusted personal income are shown for both Arizona and the nation in Figure 19.1. Arizona grows much more rapidly during business expansions but declines equally to the nation during recessions, resulting in Arizona's high volatility index.

**Figure 19.1**  
**Annual Real Percentage Change in Personal Income Based on Quarterly Data, Arizona and United States, 1951 Through 2008**

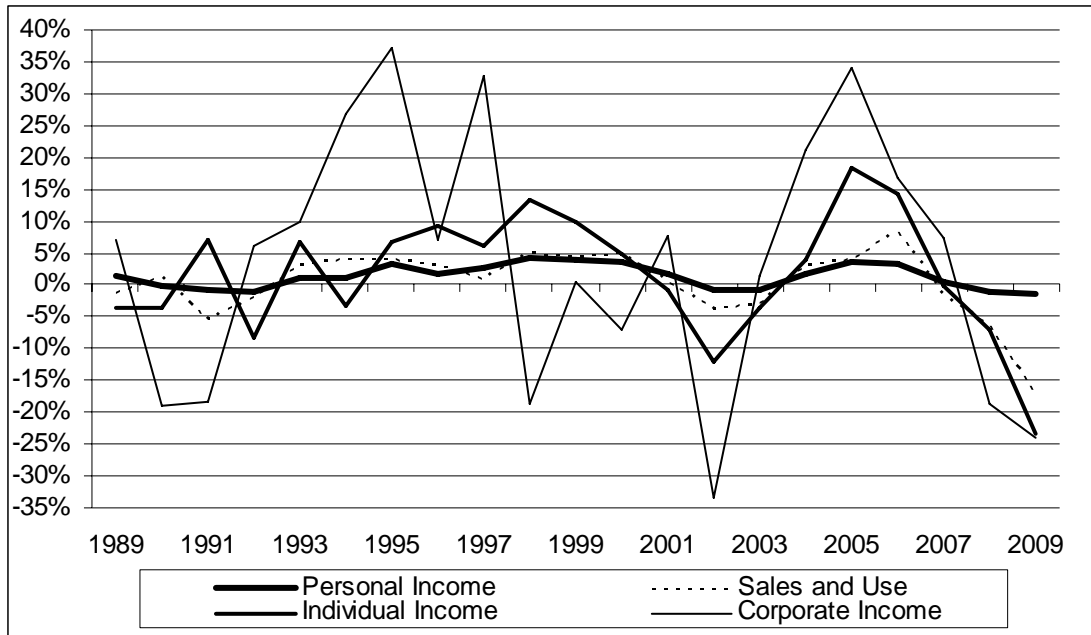


Source: U.S. Department of Commerce, Bureau of Economic Analysis.

As cyclical as Arizona's economy is, the economic cycle is calm compared to Arizona's wildly fluctuating revenue streams. Figure 19.2 shows the fluctuations of Arizona revenues (annual inflation-adjusted per capita percent change) of the three major sources of revenues and compares them to fluctuations in annual Arizona personal income. These two figures demonstrate that Arizona's economy is more cyclical than the U.S. economy and that Arizona's revenue sources are far more cyclical than Arizona's economy.

Figure 19.2 shows that the least volatile source of Arizona's three major revenues is the sales and use tax. The most volatile, but also a relatively small percentage of total revenues, is the corporate income tax. Individual income taxes are much more volatile than the sales and use tax, but less volatile than corporate income taxes.

**Figure 19.2**  
**Estimated Annual Real Per Capita Percentage Change in Major Sources of Arizona State Government General Fund Revenue and Arizona Personal Income, Fiscal Years 1989 through 2009**



Source: Arizona Joint Legislative Budget Committee (revenues) and U.S. Department of Commerce, Bureau of Economic Analysis (personal income and GDP implicit price deflator).

After adjusting for tax law changes, total real per capita revenue grew more than 10% in fiscal year 2006, declining slightly in fiscal year 2007 prior to the official start of the recession. In fiscal year 2008, adjusted revenue fell 9.5%. Rather than flattening in fiscal year 2009, it fell again by an astounding 20%.

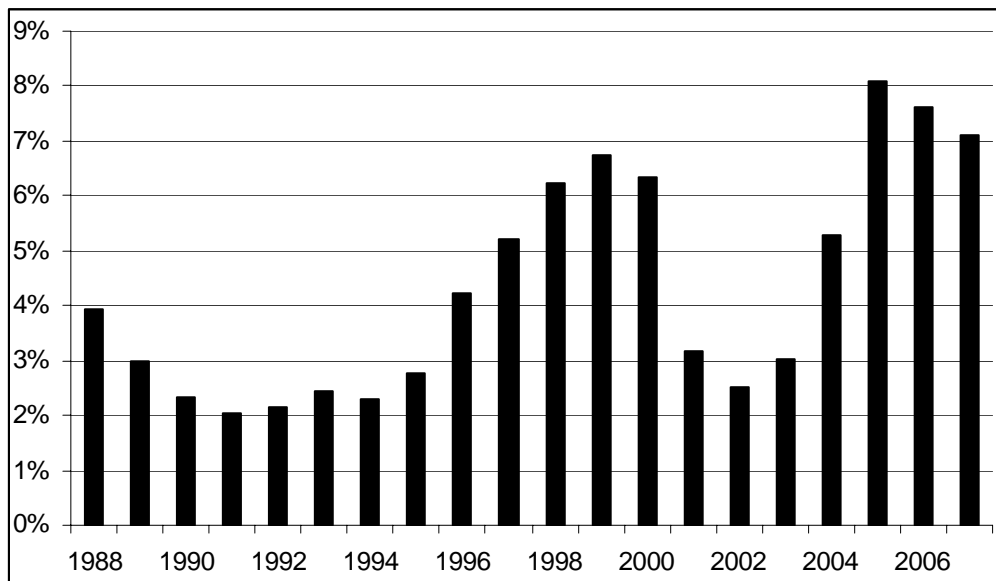


### Majority Votes for Tax Cuts and Supermajority for Tax Increases

There have been 42 tax cuts to the three largest general fund revenue sources since 1992, tax cuts estimated to be the equivalent of \$2.6 billion annually,<sup>127</sup> after adjusting for inflation and population growth. These tax cuts occurred during periods of expansionary periods of the economy. During the upswings, revenues exceeded the growth in Arizona's economy, creating surpluses. Legislators viewed these temporary surpluses as a trend line and they cut tax rates. Unfortunately, just as revenues grow very rapidly during upswings, they also decline very rapidly during downswings, but the tax cuts made during expansion are effectively permanent tax cuts because of the supermajority requirement for all tax increases. It is both politically popular and easy to cut taxes during periods of surpluses, but it is virtually impossible to get 2/3rds of legislators to vote to reverse those tax cuts during recessions.

Consider the individual income tax, which was cut 15 times since 1992. Almost all of those cuts were made during the upswings shown in Figure 19.2. Much of the volatility in taxable individual income during this period is due to realized capital gains. According to the Federation of Tax Administrators and reported by NASBO,<sup>128</sup> realized capital gains increased by more than 300% between 1994 and 2000 and state treasuries reaped windfall gains. Unfortunately, these one-time realized capital gains were interpreted as a trend line and permanent tax cuts were made. After plummeting around the 2001 recession, one-time realized capital gains again soared (see Figure 19.3), and taxes again were permanently cut.

**Figure 19.3**  
**Capital Gains as a Percentage of Personal Income,**  
**Arizona, 1988 through 2007**



Sources: Internal Revenue Service (capital gains) and U.S. Department of Commerce, Bureau of Economic Analysis (personal income).

### **Government Spending Needs are Noncyclical or Countercyclical**

While government revenues substantially decline during downturns, the demand for government services as a whole continues to grow. The demand for many government services grows rapidly during expansionary periods due to population growth, e.g., elementary and secondary education. Although the growth rate of the demand for these services dampens during recessions because of reduced in-migration, the number of school children continues to rise, just at a slower rate.

However, the demand for some government services is countercyclical, rising more during recessions when people lose their jobs and qualify for government-provided healthcare benefits and various welfare programs. Government safety net programs were established to help individuals and families in time of need. During most recessions, even enrollment in secondary education increases because individuals choose to enhance their education while unemployed or underemployed.

### **Underfunding of the Budget Stabilization Fund**

The Budget Stabilization Fund (BSF), established by the Arizona Legislature in 1990, was designed by the Arizona Joint Legislative Budget Committee (JLBC) to smooth out fluctuations in Arizona's revenue streams, calling for payments to be made to the fund during periods of rapid state income growth and for funds to be paid out of the BSF during periods of economic slowdowns or downturns. The BSF can be an important tool for the fiscal management of the state general fund because of the state's balanced budget requirement, the cyclical nature of revenues, and the countercyclical nature of certain state expenditures.

The five key features of the BSF are:

- Deposits into or withdrawal from the BSF for a given fiscal year is determined by comparing the most recent annual growth rate of inflation-adjusted Arizona Personal Income (AZPI) to a trend growth rate, which is the average of the most recent seven years.
- If the recent annual growth rate exceeds the trend growth rate, the difference multiplied by the general fund revenue of the prior fiscal year equals the amount recommended for deposit into the BSF. Thus, if the annual growth rate is 6% and the trend growth rate is 5%, then 1% of the prior fiscal year's general fund revenue would be recommended for deposit into the BSF.
- If the annual growth rate is *both* less than 2% and less than the trend growth rate, the deficiency multiplied by the general fund revenue of the prior year equals the recommended amount to be withdrawn from the BSF.
- By a two-thirds majority, the Legislature, with the concurrence of the governor, can decrease a signaled deposit or increase a recommended withdrawal.
- At the end of the fiscal year, the BSF's total balance cannot be larger than 7% of that year's general fund revenues.

Some of these key features differ from the original 1990 design. Under the original 1990 statute, the balance could reach as much as 15% before deposits to the fund would be stopped. The JLBC calculated the 15% cap as the amount necessary to smooth Arizona's

revenue flows through a modest recession. Despite this, the legislature reduced the size of the cap first to 5% from 1995 through 1997 before gradually increasing it to 7% in 2000.

In the mid 1990s, the condition was added that limits withdrawals from the BSF only when the annual growth rate in AZPI in the prior calendar year is *both* below the trend line and below 2%. In both 2002 and 2008, the formula failed to recommend payouts because the adjusted AZPI was 2.10% and 2.88%, respectively. In both cases, the Legislature authorized substantial withdrawals from the BSF to close budgetary shortfalls.

Finally, despite the BSF being designed solely as a management tool to smooth the fluctuations in the business cycles, it has been used as a contingency fund for other types of fiscal emergencies or requirements, such as major renovations to the Arizona State Hospital and the funding of liabilities related to the alternative fuels legislation.

No reasonably designed budget stabilization fund could have completely avoided the current fiscal crises in Arizona because of the unusual length and depth of the current recession. However, the BSF, as currently designed, failed to adequately serve the needs of the state in the more typical 2001 recession. The fund is limited to 7% of the general fund, but the three major sources of revenue can fall by an amount closer to 8% per year during a normal recession. If population growth and inflation are at normal recessionary levels, then the 8% decline in revenues reflects a 12-14% reduction in the state's ability to provide services to the ever-growing population in an increasingly expensive environment. To make matters worse, recessions typically impact multiple fiscal budgets. Recessions commonly impact revenues for three years, with slow growth one year, negative growth the next and flat or slow growth the third year. Thus even the original 15% cap will not provide sufficient funds in the BSF to offset the loss of revenue during a normal recessionary period. In addition, the transfer formulas for funding the BSF during expansionary periods may be insufficient to reach even a 15% cap in time to help cover funding during the downturn.

### **CURRENT FISCAL CRISES AND STRUCTURAL DEFICITS**

The current recession has been described as the worst since the great depression in both depth and length. This downturn, combined with the extreme volatility of Arizona's revenues has resulted in extreme shortfalls of the state budget. Arizona accepted the federal stimulus money, which helped to close the enormous deficits, but major budget cuts also have been made and the state has been borrowing money to pay for ongoing commitments.

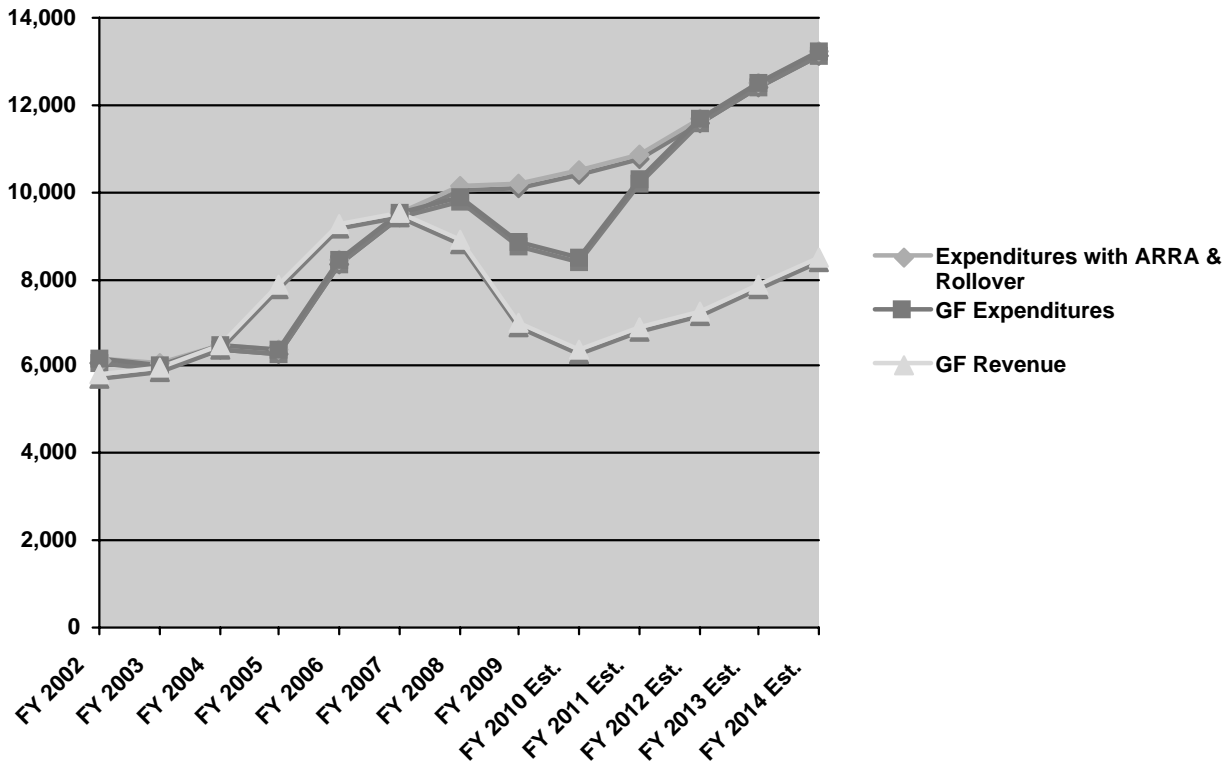
There is some evidence that, nationally, the recession is over and that we are in a period of gross domestic product (GDP) growth, although national employment has not seen progress. Arizona is expected to stay in recession until at least the middle of the current calendar year, largely because of the weak housing market, foreclosures, and the percentage of homes underwater. Regardless of when Arizona begins recovery, the state will continue to have problems of budget shortfalls because, in addition to the cyclical budget crisis, the state has created a massive structural deficit that will remain into the distant future.

Arizona's strong revenue cyclicity has resulted in long-term structural deficits through the actions of government leaders. During strong growth periods that resulted in temporary

budget surpluses, politicians have given back the surpluses to taxpayers by cutting tax rates permanently, limiting the size of the BSF, and expanding public programs. Voter initiatives have also expanded public programs without providing the necessary additional funding mechanisms. During the 1990s, the Arizona Legislature cut taxes repeatedly and more tax reductions were passed during the mid-2000s while expenditure commitments grew. All of these actions contributed to long-term structural deficits and increased financial instability.

Figure 19.4, reproduced from the Governor’s presentation at an emergency cabinet meeting on December 21, 2009, illustrates the structural deficit. This reproduction requires some explanation. The two upper lines coincide through most of the period, but diverge during fiscal years 2008 through 2011. These lines represent past and projected levels of Arizona’s general fund expenditures. The space between them during fiscal years 2008 through 2011 represents federal stimulus money from the American Recovery and Reinvestment Act (ARRA) of 2009. The lower portion represents what Arizona expenditures likely would have been without the ARRA money; the upper portion represents expenditures with ARRA.

**Figure 19.4**  
**Arizona’s Structural Deficit: Expenditures and Revenues**



Assumptions: **Revenue:** Ongoing revenue does not include one time items such as fund transfer, asset sales, etc. **Growth rates assumptions:** FY10: -9.2%, FY11: 7%, and FY12: 7%. Expenditure: Ongoing expenditure does not include rollover or ARRA. FY10 and FY11 estimated Expenditure from most current S&U, FY12 and beyond assuming 7% growth. January 8, 2010. Office of Governor Janice K. Brewer.

Source: Governor’s presentation at an emergency cabinet meeting, December 21, 2009.

The light grey line, the one that first exceeds expenditures through fiscal year 2007 and then falls substantially below expenditures and continues to stay well below expenditures represents projected general fund revenues. The gap between expenditures and revenues represents the structural deficit, which is \$3 - \$4 billion as far as the eye can see.

### **SUMMARY**

Recessions and business cycles will always be with us. Arizona will likely continue to be more cyclical than the nation as a whole and Arizona revenues likely will be much more volatile than Arizona's economy. Unless major changes are made to the political environment, to the operation of the BSF fund, and to Arizona's tax structure, Arizona can expect both future cyclical budget crises and a long-term structural deficit.

The BSF can be an excellent tool for fiscal management. It is important for voters, politicians, and policymakers to understand that a generously funded BSF will help prevent the public sector from having to make spending cuts to programs curing recessions and will help support the entire state economy by acting as a strong countercyclical stimulus. The expenditure of the BSF during a recession provides direct stimulus to the state by avoiding substantial reductions in the government sector at a time when other segments of the economy are weak and by avoiding major cuts in health and welfare benefits that can have between a 1-to-1 and a 6-to-1 federal-to-state match. This federal flow of money into Arizona can also act as a strong countercyclical force during recessions.

The structural deficit is another matter entirely. Figure 19.4 shows that much of Arizona's current budget deficit is structural, i.e., revenues are well below projected normal levels of expenditures. The structural deficit is too large to make up using expenditure cuts alone.

Proceeds collected from raising taxes are spent in Arizona to provide government services and build infrastructure. Portions of taxes are exported to non-Arizonans (tourists). Portions of taxes are exported to the federal government through the deductibility of state income taxes, state and local property taxes, and to a lesser extent, state and local sales taxes.

Arizona imposes a low tax burden on its residents. With all the tax cuts since the early 1990s, Arizona has become a low tax/low expenditure state, ranking 41<sup>st</sup> in state tax collections per capita and 49<sup>th</sup> in state revenue per capita among the 51 states (including the District of Columbia) in 2008, according to the Tax Foundation.<sup>129</sup> Taxes can increase without hurting Arizona's competitiveness. Low taxes do not guarantee economic development and certainly do not guarantee the attraction/creation of high-quality jobs because taxes are not the only factors businesses consider. A quality workforce, which is largely tied to the education and healthcare system in the state, and public infrastructure are both important considerations in business location decisions. Quality of life, including public services, is of major importance for the location of high-tech companies.<sup>130</sup>

Arizona must address both the cyclical nature of its revenue sources and the long-term structural deficit that has been created through repeated tax cuts. Redesign of the BSF fund

can mitigate the cyclical fiscal crises, but taxes will have to be increased to address the structural deficit. The proposed 1-cent sales tax will help, but a rollback of income tax cuts would improve the equity of the tax structure. In addition, a statewide property tax could be used to both reduce volatility and to create the sturdy three-legged stool of taxation, namely balancing taxes among income, wealth and consumption.

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<sup>126</sup> Alberta H. Charney. "Where Would You Cut State Expenditures When the Next Recession Comes?" *Arizona's Economy*, University of Arizona, College of Business and Public Administration, Economic and Business Research Program, (Fall 1994).

<sup>127</sup> Tom Rex. "State Government Revenue: Historical Record." In *Riding the Fiscal Roller Coaster: Government Revenues in Arizona*. 95<sup>th</sup> Arizona Town Hall. [http://aztownhall.org/pdf/95th\\_background\\_report.pdf](http://aztownhall.org/pdf/95th_background_report.pdf) (2009), 65.

<sup>128</sup> National Association of State Budget Officers. *Budgeting Amid Fiscal Uncertainty: Ensuring Budget Stability by Focusing on the Long Term*. <http://www.nasbo.org/Publications/PDFs/budgetstabilityFeb2004.pdf> (2004).

<sup>129</sup> Tax Foundation. *2009 Facts and Figures: How does your State Compare?* Mark Robin, Ed. [http://www.taxfoundation.org/files/f&f\\_booklet\\_midear-20090723.pdf](http://www.taxfoundation.org/files/f&f_booklet_midear-20090723.pdf) (2009).

<sup>130</sup> For a survey of the literature, see Ronald C. Fisher, "The Effects of State and Local Public Services on Economic development," *New England Economic Review* (March/April 1997): 53-67, <http://www.bos.frb.org/economic/neer/neer1997/neer297c.pdf>; Michael Wasylenko, "Taxation and Economic development: The State of the Economic Literature," *New England Economic Review* (March/April 1997): 37-52, <http://www.bos.frb.org/economic/neer/neer1997/neer297c.pdf>; Shelby Gerking and William Morgan, "State Fiscal Structure and Economic Development Policy," *Growth and Change* 29, no.2 (Spring 1998): 131-145, <http://www3.interscience.wiley.com/cgi-bin/fulltext/119106825/PDFSTART>.

## **PART IV**

### **PREPARING TO MOVE FORWARD**

#### **20. Updating the Roadmap and Sticking to Its Course**

## Chapter 20

# UPDATING THE ROADMAP AND STICKING TO ITS COURSE

Vera Pavlakovich-Kochi, Eller College of Management  
and  
Jen E. McCormack, School of Geography and Regional Development  
The University of Arizona

### KEY POINTS

- Existing considerations from key state leaders reiterate the importance of leadership, investment in education, workforce-training programs, financial incentives, relevant fiscal system, and out of state investment.
- Key leaders have opined that implementation and sustained tenacity in these and other recommendations has been critical for Arizona to move ahead and generate a competitive economy for the long term.
- The Milken Institute's 2009 report suggests specific steps for technology-based economic development in Arizona. This comprehensive plan brings together decision-makers and everyday operators in education, business, public policy and state politics into an economic network with detailed strategies.

### CONSIDERATIONS FOR THE ROADMAP

Just as the last pages of this report were taking final shape, *The Arizona Republic* ran a series of commentaries by Arizona's leaders in public and private spheres. Sara Presler, mayor of Flagstaff, optimistically stated that, "We have a prime opportunity today to shape our tomorrow." But to do that, she said, "We must make bold, courageous decisions and take calculated risks that will ultimately benefit Arizona."<sup>131</sup>

Similar optimism regarding Arizona's future was expressed by Michael Bidwill, chairman of the Greater Phoenix Economic Council. He said that Arizona has the opportunity to "reach great heights as it recovers." But, he added, "to do this, we need a new plan and it must come from the state's decision-makers: the governor and legislature."<sup>132</sup>

The Arizona State University president, Michael Crow, argued for an "aggressive pursuit of economic competitiveness" as the key to Arizona's long-term prosperity.<sup>133</sup> He outlined six key elements of an economic-competitiveness strategy:

- A cohesive education agenda focused on developing basic and advanced skills among students in our K-12, community college and university systems.
- A targeted workforce-training program designed to give current workers the updated skills needed by new business. Elements of this program can be applied



- to recent graduates who have abundant basic skills but who may require specific training to be competitive in certain industries.
- Financial-incentive package to attract new businesses in renewable energy and other innovative areas with clear incentive-return provisions based on the level of job creation.
  - Investments in education, transportation and communication infrastructure that provide immediate jobs to beleaguered construction industry while putting infrastructure in place that can yield returns for decades to come.
  - A fiscal system with broad-based taxes at modest rates that is both business-friendly and provides sufficient revenues that pay for the public services that Arizonans want and need.
  - An aggressive coordinated strategy to attract investment funding from out of state spanning traditional, private-public venture sources, pursuit of domestic or international business expansions, and seeking all federal sources of funding research, infrastructure, and health and welfare.

Aspects of the above recommendations have been heard before; practically every roadmap that was charted in the last ten years for Arizona's future contains the same basic building blocks. Most of them resemble what the 2009 Milken Institute report *Charting a Course for Arizona's Technology-Based Economic Development* summarized as the key five steps:

- Further develop the technology clusters around state universities and improve easy of technology transfer.
- Expand programs – and make a concentrated effort to retain graduates – in engineering and applied sciences, especially in those fields in high demand by local employers, while utilizing two-year colleges to train local workers for entry-level positions.
- Keep and grow high-tech companies by providing coordinated assistance for firms at all level of government and improving access to capital.
- Implement an incentive-based strategy in green technology, especially solar energy.
- Develop and execute a comprehensive strategic plan led by government, industry, and universities, and guarantee funding for several years to produce results.

The Milken Institute's report for Arizona's technology-based economic development recommended and reiterated a number of specific steps (Table 20.1). These steps can be looked at as detailed ways of operating between diverse decision-makers and institutions in Arizona's economy.

Aspects of the above recommendations have already been pursued at a regional or institutional level, but the report adds, "in order to be fully effective, they must be put into practice statewide, with active cooperation from government officials, agencies, universities, and regional and local stakeholders."<sup>134</sup>

**Table 20.1**  
**Specific Strategies for Building a Technology-Based Economy**

<b>Network</b>	<b>Strategy</b>
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 Government- Business	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 increased 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	Create an organized consortium of venture capital funds that either have operations in state or have as 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 incentives and rebates to keep clean-tech manufacturing local.
	Offer significant tax rebates not only for the construction of renewable energy plants, but also for purchasing the materials for such plants from in-state 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 in 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.

Source: Milken Institute, *Charting a Course for Arizona's Technology-Based Economic Development*, 2009.

### **WHERE DOES ARIZONA GO FROM HERE?**

In the same edition of *The Arizona Republic* where Arizona leaders offered their analysis on the state economy, Craig R. Barrett, former chairman and CEO of Intel Corporation also presented a ten-point plan for "Building a Smarter Arizona." Before launching into his plan, which overlaps with the priorities of those previously discussed, Barrett writes poignantly on why economic development continues to be an issue for citizens. "Survey

after survey about what Arizonans hope for their state show all the same key messages: a growing economy with high-paying jobs, a good education system, and an improving environment fostering a good quality of life.”<sup>135</sup>

As has been noted in this and other chapters throughout this background report, and in the 1990 and 2001 Arizona Town Halls, experts and practitioners have made myriad recommendations and plans for a competitive economy. Today in Arizona, the rippling effects of the recession have generated an immediate need to create jobs as many businesses have collapsed and several industries have declined, e.g., construction, real estate, semiconductor manufacturing, etc. The short term focus on employment is critical for the state, but long term investments in education, fiscal programs, business incentives, technology, research and development, and workforce training must be considered along other components suggested in these analyses.

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<sup>131</sup> Sara Presler. “We have a prime opportunity to shape our tomorrow.” *The Arizona Republic* (January 22, 2010).

<sup>132</sup> Michael Bidwill. “Big challenge: Good jobs, education.” *The Arizona Republic*. (January 22, 2010).

<sup>133</sup> Michael Crow. “Aggressive pursuit of economic competitiveness key to our long-term prosperity.” *The Arizona Republic*. (January 22, 2010).

<sup>134</sup> Kevin Klowden and Anita Charuworn, with Ross C. DeVol. *Charting a Course for Arizona’s Technology-Based Economic Development*. (Milken Institute, 2009).

<http://www.milkeninstitute.org/publications/publications.taf?function=detail&ID=38801224&cat=resrep>

<sup>135</sup> Craig R. Barrett . “Building a smarter Arizona.” *The Arizona Republic*. (January 22, 2010).





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