



Valley of the Sun: Beyond Desert Survival

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Sustaining Phoenix

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When discussing sustainability, is it fair to repeatedly single out Phoenix as a model of vulnerability? How does the Arizona desert city compare to other U.S. cities? Should businesses and people continue to flock to the Valley of the Sun? Or, is Phoenix really an at-risk city with a questionable future due to climate, water supply and politics?

The future of the world's cities has come under question of late for a whole variety of reasons, ranging from hurricanes to rising oceans to changing economic tides. Superstorm Sandy may be the latest, most dramatic example of the potential impact of climate change on coastal cities built at sea level. There is debate about whether to allow rebuilding portions of the New Jersey and New York coastlines and how to do it more effectively.

There also was considerable debate after Hurricane Katrina about the wisdom of rebuilding New Orleans in such a vulnerable location. Meanwhile, the decline of 20th-century

manufacturing threatens a slew of Midwestern industrial cities, such as Detroit, where a swath of the urban fabric is now so under-populated that it must be dramatically rebuilt. Internationally, some European cities today essentially are monuments to their own past. Venice is sinking, as islands off the coast threaten to disappear. Rapidly arising Asian cities are choked with pollution. Huge megapolitan areas appear nearly ungovernable.

The sustainability of the world's urban places seems in doubt, even as the world's population becomes increasingly urban. Amidst all this, some cities are dismissed out of hand as unsustainable and eventually unlivable. Phoenix, the nation's sixth-largest city, often finds itself under suspicion. The city's size and its rapid population growth during the past five decades shock some commentators. The recent recession, with its headline-making statistics about deflating property values and record foreclosures, coupled with controversial immigration legislation, further thrust the Phoenix region into the national spotlight.

But Phoenix's economy is steadily emerging from the recession, and the state's anti-immigrant legislation is being sorted out by the courts as Congress deals with national immigration reform. Still, the glare of national attention on Phoenix remains. There seems to be a deeper strain in national commentators' shifting impression of Phoenix — a place few understand politically, ideologically and, indeed, geographically; that this place in the desert is a kind of demographic misstep, an accidental metropolis that makes no sense. Phoenix is, after all, a city named after a bird that periodically immolates itself in search of rebirth. The name itself implies impermanence and fragility of an unstable thing always in transition.

The Hohokam once lived in the Salt River Valley but were unable to sustain their civilization in the harsh desert climate and left. Phoenix was built atop their ruins. Surely, critics surmise, this must not be a place destined to last.

In this era of global anxiety about rapid population growth, the potential scarcity of natural resources and the effects of climate change, Phoenix is being offered up by some critics as a prime example of an unsustainable city.¹ William deBuys, author of *A Great Aridness: Climate Change and the Future of the American Southwest*, wrote the latest screed about why Phoenix is doomed, in a March 2013 op-ed article in *The Los Angeles Times* that was posted and reposted across the blogosphere. The best-known previous blast was Andrew Ross' 2011 book *Bird on Fire: Lessons from the World's Least Sustainable City*.

Phoenix's newcomer status in the large city ranks, its improbable desert location, its sizzling temperatures, and its dependence on water imported from the Colorado River all contribute to this image of Phoenix as the obvious target.

LOOKING AT THE NUMBERS

Metropolitan Phoenix sits in a fragile, dry and almost impossibly hot location. In the summer of 2012, 20 days exceeded 110° F.² The year before, there were 30 days – collectively, about a month – over 110° F. In 2009, the summer rains delivered only 0.87 inches of rain, 31 percent of “normal” levels.³ The next year was somewhat wetter, but 2011 again had low summer precipitation (1.6 inches).⁴ But in 2012, 3.0 inches of rain fell.

A phenomenon known as the “heat-island effect” means the desert no longer cools off at night during the summer as it once did, as deBuys duly noted. In the last 50 years the average nighttime low temperature in Phoenix in the summer has increased by more than 10 degrees Fahrenheit – the result of the buildings, pavement, concrete, and asphalt absorbing heat during the day and radiating it all night. But over the last decade Arizona State University has been researching the heat island and developing ways to mitigate its effects through innovation, landscape, building materials, and energy efficiency. We have not fully solved the problem but all the evidence leads to confident conclusion that the heat-island effect is a plateau that levels off in the range of today's current temperatures, and therefore is a problem we can manage.

Long-term trends from climate change predict that the temperature may continue to rise, and rainfall likely will continue to diminish. Such forecasts have not deterred growth. In fact, for most of the past five decades metropolitan Phoenix has continued to be one of the fastest-growing cities in the United States, adding as many as 100,000 new residents a year. These newcomers were drawn by sunshine, cheap housing, and an economy creating lots of jobs. Recently, however, those trends have changed with the Phoenix metro area suffering precipitous job declines in 2008 and 2009. There are signs that growth is returning, with metro Phoenix ranking seventh in the nation for 2011 job growth,⁵ which is the most recent figure available.

What does this mean for Phoenix's future? Measuring the “sustainability” of any city is complex, difficult and fraught with judgment. There is no consensus matrix or widely accepted scorecard, but the typical analysis boils down to questioning whether a city is likely

to thrive over the long term. By that measure, the principal indictments leveled against Phoenix and its geography are that its lack of rainfall, its auto-centric sprawling geography and dependence on air-conditioning make it more “at risk” compared to most other cities.

This report examines how the Phoenix metropolitan region compares against the nation’s largest metropolitan regions on specific indicators of environmental factors. This is not an examination of Arizona’s often-colorful politics, which also garner much attention and speculation among national critics and the media. But on closer look, there is no denying the link between challenging geography and the role of government in Phoenix. There is no question about that, with other queries taking center stage.

Is Phoenix in a position to manage its potential sustainability challenges? Are its opportunities to do so better or worse than other places? Is the evidence so overwhelming that the only logical conclusion is Phoenix is in trouble? Indeed, such questions are often asked in the form of thinly veiled accusations, as if Phoenix itself were on trial.

THE INDICTMENTS AGAINST PHOENIX

Count I: There’s No Water

In a 2006 radio interview on National Public Radio, author Simon Winchester was discussing his book about the San Francisco earthquake, *A Crack at the Edge of the World*. At the end of his talk he proposed that there were at least three American cities that “should never have been built” – San Francisco because of earthquake faults; New Orleans, in the wake of the devastation wrought by Hurricane Katrina and the potential for future hurricanes; and Phoenix because “there’s no water there.”⁶

Winchester’s litany against American cities lumped together the phenomenon of catastrophic events with the availability of a particular resource to support an urban population. This makes little sense. Cities are by definition concentrations of people supported by the resource base of a larger geographic area. Most cities suffer some measure of resource scarcity. Water is a resource like any other: It’s susceptible to transport. Why take water and hold it to a standard not applied to any other resource necessary to support a city?

Nevertheless, when one national group in 2008 ranked the sustainability of American cities for water supply,⁷ it used as its primary measure how far water is

transported. Not surprisingly, Phoenix ranked 49 out of 50. Indeed, water is transported long distances to support Phoenix. On the other hand, until recent years, Tucson existed primarily on mined groundwater, so it was rated by this same source as “more sustainable.” Yet Arizona’s water policy for more than 30 years has been to try to wean cities from using the non-renewable resource of groundwater and instead to build on renewable surface water supplies. Moving surface water to urban use is an official early policy example of shifting to more “sustainable” practices. This distinction is embedded in Arizona’s Groundwater Management Act and a host of other policy decisions.

Every system that supports Phoenix was built in recognition of its geographical challenges. Balmier places have taken for granted that their hospitable climate will continue into the future, so a place like Atlanta is greatly challenged when rainfall decreases by 15 or 20 percent. Phoenix, on the other hand, depends virtually not at all on rainfall occurring within its geographic proximity. Phoenix’s water comes in large measure from the mountains of central Arizona (delivered through the Salt River Project) and from the Rockies (transported through the Colorado River and the Central Arizona Project). Together these two sources can generally deliver about 2 million acre feet of water to the Phoenix metro area (an acre foot is about 325,000 gallons).

Even if climate change decreases that supply by 25 percent or more, the storage systems serving the Sun Corridor hold several years’ worth of water and are designed to smooth out a highly variable supply. More than half of the Sun Corridor’s water supply is used for agriculture. In 2011, a Morrison Institute for Public Policy study, *Watering the Sun Corridor*, concluded that even under negative climate assumptions, with moderately increased conservation and a steady decline in agriculture, the Sun Corridor could add several million people.⁸

Sustaining Phoenix requires a lot of water. As *Table 1* shows, water usage in Phoenix is the second-highest out of the nation’s 15 most populous metropolitan areas. This placement should not be surprising: The region’s arid climate and hot summers lead to higher average consumption, primarily because water is used to support landscaping.

Aridity is a challenge — but it is not a challenge like a hurricane. Hurricanes are periodic catastrophic events that can be anticipated by a few days, or if forecasting improves, a few weeks. They are events with potentially dire, immediate, sudden consequences. While it is possible to take steps to mitigate the impact of catastrophes they

occur quickly and often must be managed after the fact by way of emergency response. A drought, on the other hand, even in the worst of circumstances, is a slowly unfolding, largely incremental change to climate. Urban Arizona’s vast and complex plumbing systems are a precise example of man’s capacity to manage resources against challenge. Growth and the potential further drying of the American Southwest will pose new and incrementally greater challenges to these systems. This has already happened, and the result has been the replacement of agricultural use with subdivisions, a steady increase in water prices, and a dramatic reduction in per capita water use.⁹

To sustain Phoenix, major policy choices will need to be made over the next several decades:

- Should any agriculture be preserved in Central Arizona?
- Does future urban growth occur at higher densities, where less water is used per capita?
- Can more water be reclaimed, and be put to more productive uses?
- Are there new sources of water to be developed and relocated for urban growth?
- Does more water need to be stored against times of extreme drought?
- Should the high water use for landscaping Metro Phoenix be eliminated?

Count II: It Takes Too Much Energy to Live Where It’s Hot

There is sometimes a tendency to view the question of sustainability as a kind of extension of the Puritan ethic: We as a species have been bad and must atone by

TABLE 1

Water Usage	
Metropolitan Area	Gallons/Person per Day
New York	69.3
Boston	73.5
Atlanta	121.9
Seattle	127.7
Philadelphia	134.4
San Francisco	142.0
Chicago	144.8
Washington	149.5
Charlotte	153.3
Houston	158.4
Detroit	172.3
Miami	172.6
Denver	181.2
Los Angeles	187.0
Phoenix	217.3
Dallas	219.3

Source: USGS, 2005 (as reported in the Green City Index, 2011, The Economist Intelligence Unit)

dramatically changing our lifestyle. This perspective views those who live in the desert as especially bad.

But in a March 2013 Environmental Research Letters, Michael Sivak of the University of Michigan Transportation Research Institute cites his study showing the favorable side of cooling over heating in terms of energy consumption: “The results indicate that climate control in Minneapolis is about 3.5 times as energy demanding as in Miami. This finding suggests that, in the U.S., living in cold climates is more energy demanding than living in hot climates.”

Writing for Slate, Daniel Engber in August 2012 analyzed the American policy bias against air conditioning. Federal subsidies long have been far more plentiful for heating than for cooling. A series of critiques of the rise in air-conditioning use seem to assume it is a negative, even though the southward migration has produced a net decline in energy use for climate control.¹⁰

The reality is that by many comparative measures, metropolitan Phoenix is less impactful in its energy consumption than many other American cities. Arizona ranks 45th out of 51 of the states and District of Columbia in per capita energy consumption, about 25 percent below the U.S average. Phoenix is similarly below the average.¹¹ *Table 2* and *Table 3* show the metro area’s relative position.

TABLE 2

Per Capita Carbon Emissions from Residential Energy Use, 2005	
Metropolitan Statistical Areas	Metric Tons
Washington-Arlington-Alexandria, DC-VA-MD-WV MSA	1.958
Dallas-Fort Worth-Arlington, TX MSA	1.177
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD MSA	1.114
Atlanta-Sandy Springs-Marietta, GA MSA	1.049
Salt Lake City, UT MSA	1.046
Denver-Aurora-Broomfield, CO MSA	1.025
Detroit-Warren-Livonia, MI MSA	1.002
Boston-Cambridge-Quincy, MA-NH MSA	0.996
Tampa-St. Petersburg-Clearwater, FL MSA	0.988
Houston-Sugar Land-Baytown, TX MSA	0.983
Las Vegas-Paradise, NV MSA	0.981
Miami-Fort Lauderdale-Miami Beach, FL	0.861
Chicago-Joliet-Naperville, IL-IN-WI MSA	0.833
Charlotte-Gastonia-Rock Hill, NC-SC MSA	0.792
New York-Northern New Jersey-Long Island, NY-NJ-PA MSA	0.670
Phoenix-Mesa-Glendale, AZ MSA	0.658
Los Angeles-Long Beach-Santa Ana, CA MSA	0.391
San Francisco-Oakland-Fremont, CA MSA	0.390
San Jose-Sunnyvale-Santa Clara, CA	0.389
Riverside-San Bernardino-Ontario, CA MSA	0.372
San Diego-Carlsbad-San Marcos, CA	0.360
Seattle-Tacoma-Bellevue, WA MSA	0.356

Source: Brookings, *Shrinking the Carbon Footprint of America*, 2008

Viewed in terms of carbon footprint this energy consumption statistic becomes even more positive. Much of Phoenix' electricity is generated by nuclear power. And while a fair amount is generated by coal, those large coal-fired generating stations do have scrubbers making them less polluting than the diesel oil that is burned in basements to heat the Midwest. Analysis done by the Center for Climate Strategies indicates that Arizona emits on average 14 metric tons of CO₂e (carbon dioxide equivalent) per person, while the U.S. average is closer to 22 metric tons.¹² The difference is the result of warmer temperature, the lack of heavy industry, newer and more efficient

TABLE 3

Greenhouse Gas Per Household	
Metropolitan Area	Tonnes/Year
New York-Northern New Jersey-Long Island, NY-NJ-PA MSA	6.48
Los Angeles-Long Beach-Santa Ana, CA MSA	7.20
San Francisco-Oakland-Fremont, CA MSA	7.43
Miami-Fort Lauderdale-Pompano Beach, FL MSA	7.45
Denver-Aurora-Broomfield, CO MSA	7.48
Chicago-Joliet-Naperville, IL-IN-WI MSA	7.66
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD MSA	7.67
Las Vegas-Paradise, NV MSA	7.75
Tampa-St. Petersburg-Clearwater, FL MSA	7.87
Seattle-Tacoma-Bellevue, WA MSA	8.00
Boston-Cambridge-Quincy, MA-NH MSA	8.05
Detroit-Warren-Livonia, MI MSA	8.12
Phoenix-Mesa-Glendale, AZ MSA	8.27
San Jose-Sunnyvale-Santa Clara, CA	8.32
San Diego-Carlsbad-San Marcos, CA 3	8.36
Washington-Arlington-Alexandria, DC-VA-MD-WV MSA	8.39
Houston-Sugar Land-Baytown, TX MSA	8.42
Salt Lake City, UT MSA	8.56
Dallas-Fort Worth-Arlington, TX MSA	8.58
Charlotte-Gastonia-Rock Hill, NC-SC MSA	9.15
Riverside-San Bernardino-Ontario, CA MSA	9.33
Atlanta-Sandy Springs-Marietta, GA MSA	9.43

Source: Center for Neighborhood Technology, Housing + Transportation Index 2011

building stock, and a generally newer and more efficient fleet of automobiles. If solar energy becomes a major component of Arizona's generation, as it seems poised to do, this metric will further improve. The single-family lifestyle of Arizona is particularly well-suited to the dawning era of distributed generation, where the roof of a single-family home becomes a power plant, and the electric vehicle in the garage acts as a storage device.

The carbon footprint of all American citizens needs to shrink dramatically. This is true of Arizonans as well, but Arizona and metro Phoenix are actually ahead of most of the rest of the country. If a consequence of climate change is to make Arizona even hotter, however, more action will be required. It seems relatively clear that the most important policy change to be made in a state with such abundant sunshine is the further development of the solar resource. This is a place where Arizona's example could lead the nation. Unfortunately,

however, as is often the case, Arizona public policy has meandered around in different directions with regard to solar mandates and incentives. In January 2013, the Arizona Corporation Commission – the state body that sets incentives for clean energy – canceled solar incentives for privately developed solar projects and reduced incentives for residential solar-panel installations by utility companies in the Phoenix and Tucson regions. For a region that already suffers from a bad reputation when it comes to sustainability, these measures create a climate of uncertainty regarding renewable energy.

While Arizona has a relatively positive energy profile, sustaining the region's future should be built on its greatest natural asset: sunshine. Consistent public policy is the most important component for creating a sustainable energy future.

Count III: Cars – lots and lots of cars

When it comes to car usage, Phoenix is representative of the post-war, auto-centric lifestyle created by cheap petroleum, but it is hardly unique. Only a few American cities are built to allow their residents to eschew the automobile and live a lifestyle based on walking and public transit. On this metric, such places do have a lower impact on the environment. But most large American cities are every bit as auto dependent as Phoenix and the majority rank worse for traffic jams and excess fuel consumption. The Texas Transportation Institute ranked Phoenix 12th in terms of per-capita gallons of fuel consumed in commuting.¹³ Phoenix was 35th in hours of delay per commuter because its traffic moves at higher speeds. *Table 5* and *Table 6* show these rankings.

Another respected source, INRIX, recently ranked Phoenix metro 39th on its scale for overall traffic congestion – far lower than *any* larger metro area and better even than smaller cities such as Honolulu, Seattle, Austin, Texas and Portland, Ore.¹⁴

Phoenix undeniably has an air-quality issue. Even if there were no cars, the combination of dust, sunshine and farming would create challenges. U.S. EPA ranks Maricopa County seventh in the number of unhealthy days for lung diseases behind Salt Lake City, Detroit, Philadelphia, Chicago and Houston. Not surprisingly, Los Angeles is way out in front on this scale.

Phoenix was built on the auto. Today it has a rapidly evolving system of public transportation, including a highly successful light-rail line. The city will move slowly away

from the petroleum era – in step with the rest of the U.S. The transportation future of Arizona requires two things:

- An increasing emphasis on public transportation
- A move away from petroleum-based personal mobility vehicles toward a fleet of “cars” that will be smaller, lighter, more efficient and powered by electricity, natural gas and other alternatives

Count IV: That Awful Sprawl is Bad, Bad, Bad

William Whyte popularized the term “urban sprawl” in his 1958 book, *The Exploding Metropolis*.¹⁵ The phrase has come to mean low-density, automobile-oriented, leapfrogging development spread along streets and boulevards at the edge of urban areas, often resulting in the redistribution of an older, denser, pedestrian-oriented city into suburban patterns. Innumerable commentators see sprawl as one of the chief problems with modern America, and often cite Phoenix as a prime culprit.¹⁶

The relentless criticism of Sunbelt cities as poster children for sprawl is also largely inaccurate. The Metropolitan Policy Program at the Brookings Institution has looked at America’s newest

metropolitan places in its study of “mountain megas.” In analyzing the growth of the “Sun Corridor,” Brookings concludes that Arizona’s megapolitan region has grown relatively densely and is one of the most-efficient new urban areas. The region converted land to urban use at the rate of .148 acres of rural land for every new housing unit between 1980 and

Table 4

Residential Density	Household/ Residential Acre
Metropolitan Area	
Los Angeles-Long Beach-Santa Ana, CA MSA	3.85
Las Vegas-Paradise, NV MSA	3.72
San Jose-Sunnyvale-Santa Clara, CA	3.66
San Francisco-Oakland-Fremont, CA MSA	3.24
New York-Northern New Jersey-Long Island, NY-NJ-PA MSA	3.21
Miami-Fort Lauderdale-Pompano Beach, FL MSA	3.16
San Diego-Carlsbad-San Marcos, CA 3	2.85
Denver-Aurora-Broomfield, CO MSA	2.64
Salt Lake City, UT MSA	2.59
Tampa-St. Petersburg-Clearwater, FL MSA	2.57
Chicago-Joliet-Naperville, IL-IN-WI MSA	2.46
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD MSA	2.36
Boston-Cambridge-Quincy, MA-NH MSA	2.32
Dallas-Fort Worth-Arlington, TX MSA	2.23
Phoenix-Mesa-Glendale, AZ MSA	2.19
Seattle-Tacoma-Bellevue, WA MSA	2.17
Washington-Arlington-Alexandria, DC-VA-MD-WV MSA	2.16
Houston-Sugar Land-Baytown, TX MSA	2.06
Charlotte-Gastonia-Rock Hill, NC-SC MSA	1.96
Detroit-Warren-Livonia, MI MSA	1.89
Riverside-San Bernardino-Ontario, CA MSA	1.62
Atlanta-Sandy Springs-Marietta, GA MSA	1.57

Source: Center for Neighborhood Technology, Housing + Transportation Index 2011

2000. In the lower 48 states the average conversion rate was more than 2.0 acres.¹⁷ This is the result of the fact that most growth in the Phoenix metropolitan area takes place on the immediate edge of the city rather than leapfrogging far out into rural areas and is built out at relatively high densities on small single-family lots.

Phoenix is far from the least-dense major metro area, as shown in *Table 4* from the Center for Neighborhood Technology. The highest? Los Angeles, which many Americans see as a synonym for sprawl.

Much of the criticism of Phoenix, and indeed of most post-war America, as too low on density and too sprawling is really a criticism of the single-family home lifestyle. Higher-density European cities and American cities such as New York and San Francisco do indeed have a lower-carbon footprint. Density in Phoenix increases almost every year but it is still far from being the kind of pedestrian environment that allows its citizens to live a less-wasteful and environmentally impactful lifestyle.

In trying to assess and analyze the resilience and adaptability of urban form, it is never a good idea to write off the single-family home. Lifestyles in the future will probably involve multi-generational living and accommodation of a wide variety of different family patterns.

Detached single-family homes are more adaptable to these changes than almost any other residential form. Patios can be enclosed, garages can be converted and changes can be made without displacing where people live or have made a substantial investment. The investment that individuals and financial institutions make in a particular residential unit are less dependent on the actions of other property owners than would be the case in higher-

TABLE 5

Annual Excess Fuel Consumed	
Urban Area	Gallons per Auto Commuter
Very Large Area Average	25
Large Area Average	11
Washington DC-VA-MD	37
Chicago IL-IN	36
Los Angeles-Long Beach-Santa Ana CA	34
Houston TX	28
Denver-Aurora CO	24
Seattle WA	23
Dallas-Fort Worth-Arlington TX	22
New York-Newark NY-NJ-CT	22
San Francisco-Oakland CA	22
Boston MA-NH-RI	21
Atlanta GA	20
Phoenix AZ	20
San Diego CA	20
Miami FL	18
Tampa-St. Petersburg FL	18
Detroit MI	17
Philadelphia PA-NJ-DE-MD	17
Riverside-San Bernardino CA	17
San Jose CA	13
Raleigh-Durham NC	9
Charleston-North Charleston SC	8
Charlotte NC-SC	8
Las Vegas NV	7
Salt Lake City UT	7

Source: Texas Transportation Institute; 2011 Urban Mobility Re

density living. Single-family homes are the most scalable form of real estate development: build one, see if it sells, and adapt or change the design and build another. One of the mistakes that Phoenix developers made in the last real estate cycle was to anticipate a dramatic increase in density and suddenly started building high-rise, high-density residential living. That was too dramatic a shift, and the overbuilding of condominiums was a result of the non-scalability of that mistake.

Cities change, grow and adapt in increments responding to changes in individual choices. For a place such as Phoenix, built on the single-family home model, there is a huge variety of incremental change that will

happen going into the future. This range gives a city such as Phoenix resilience and adaptability to deal with changing demands in the urban fabric.

To sustain and adapt its urban fabric, Phoenix and the surrounding cities should:

- Change development codes to permit existing neighborhoods to become incrementally more dense
- Plan new development at increasing densities, but still primarily based on single-family models, with an increasing mix of patio/town home product
- Redevelop obsolete retail projects for higher density housing and smaller scale retail.

TABLE 6

Metropolitan Area	Annual Hours of Delay per Auto Commuter
Washington DC-VA-MD	74
Chicago IL-IN	71
Los Angeles-Long Beach-Santa Ana CA	64
Houston TX	57
New York-Newark NY-NJ-CT	54
Very Large Area Average	52
San Francisco-Oakland CA	50
Denver-Aurora CO	49
Boston MA-NH-RI	47
Dallas-Fort Worth-Arlington TX	45
Seattle WA	44
Atlanta GA	43
Philadelphia PA-NJ-DE-MD	42
Miami FL	38
San Diego CA	38
San Jose CA	37
Phoenix AZ	35
Detroit MI	33
Tampa-St. Petersburg FL	33
Large Area Average	31
Riverside-San Bernardino CA	31
Las Vegas NV	28
Salt Lake City UT	27
Raleigh-Durham NC	25
Charlotte NC-SC	25
Charleston-North Charleston SC	25

Source: Texas Transportation Institute; 2012 Urban Mobility Report

Count V: It's Just One Big Ponzi Scheme

There is a fatalistic view of the possibility that Phoenix will crumble back into the desert landscape from which it came, as in Richard Florida's March 2009 article: "How the Crash will Reshape America." Criticizing "cities in the sand," Florida wrote:

"But in the heady days of the housing bubble, some Sun Belt cities — Phoenix and Las Vegas are the best examples — developed economies centered largely on real estate and construction. With sunny weather and plenty of flat, empty land, they got caught in a classic boom cycle. Although these places drew tourists, retirees, and some industry — firms seeking bigger footprints at lower costs — much of the cities' development came from, well, development itself."¹⁸

Given the economic decline between 2005 and 2008, Florida's criticism clearly had resonance. Housing prices declined, job creation nearly ceased. But housing sales and prices began to move upward in late 2011. By the first quarter of 2012, prices were increasing, at times, by 50 cents to \$1 per square foot per day. Home values overall rose about 25 percent from the trough. Job creation was slowly gaining.¹⁹ The region is once again garnering headlines as a place where employers are hiring, as recent employment figures indicate.

Metro Phoenix has long represented a boom and bust cycle. The city is often accurately characterized as being a giant real estate development machine: a place designed to attract people from colder climates by marketing sunshine, cheap houses, an outdoor lifestyle, and a relatively low cost of doing business. Another Eastern observer, Jonathan Laing, wrote a legendary article in 1988 chronicling the savings and loan industry's collapse after diversifying into real estate. His words then presaged Florida's of 20 years later: "In the end, Phoenix is proving to be just as much of a one-industry town as Houston or Denver. The industry isn't oil, of course. It's growth."²⁰ Laing was largely right. But by 1993 the metro area had begun to build its way right back into boom times. *That* catastrophic downturn had lasted about three years.

It is accurate to see Phoenix as a place driven by development. It is also fair to criticize an over-reliance on construction and growth as leading to cyclical extremes of boom and bust. But development is not a single industry like automobiles or steel that can be ravaged by changing consumer patterns or global competition. Real estate is not portable —

it is about accommodating demographic trends. An economy built on development is more diversified than it may seem, because people moving to a place bring with them capital investment, work effort, entrepreneurial zeal. As a result, the non-real estate side of the Phoenix economy is remarkably diversified. According to a 2012 report by Arizona State University's L. William Seidman Research Institute, the regional economy is fairly diverse, with several sectors including waste management, administrative support, finance and insurance, hospitality and restaurants, and high-tech manufacturing sectors providing an important source of employment and economic activity.²¹

The Urban Land Institute's *2013 Emerging Trend in Real Estate* uses Moody's Industrial Diversity Scale to rank America's largest cities for the diversity of their economy. The nation as a whole is assigned a value of 1.0. Phoenix scores a .79, placing it ahead of Los Angeles, New York, Philadelphia, San Francisco, and Houston but behind Atlanta, Dallas, and Chicago.

While Phoenix continues to build on its diverse economic base, it remains a relatively low-wage economy since it's based on construction, warehouse distribution, back office and service industries. The average per-capita income in Phoenix is \$36,833, which ranks 180th out of America's 370 largest cities. There is significant evidence that the United States is sorting itself into cities based on high-wage, knowledge industries, and lower-wage service and support economies. In *The New Geography of Jobs*, economist Enrico Moretti examines the phenomenon of "winner" and "loser" cities in the knowledge economy. Metropolitan Phoenix is a place that could go either way.

To begin moving away from an emphasis on growth as the economic driver of the region, urban Arizona needs to consider public policy changes to:

- De-emphasize population growth as the basis for tax, land use, and economic development policies;
- Consistently support education and innovation with long-term public policy.

WILL PHOENIX GO THE WAY OF THE HOHOKAM?

The Hohokam civilization represented a several-hundred-year-long adaptation to desert life based on growing crops by draining water out of the Salt River through canals. At the height of Hohokam civilization around 1000 A.D., the Hohokam population has been estimated at about 40,000.²² The sophistication of their settlements included sports venues

and even multi-story “condominiums” like the “Big House” at Casa Grande.²³ Their society sounds eerily familiar.

For generations, modern Arizonans wondered what became of the Hohokam, and why they seemed to suddenly vanish from the archeological records after about 1450. In 2008 a team of archaeologists concluded that the population decline wasn't nearly as sudden as people often assumed — 75 percent of the population was lost over a 150-year period. The pattern was one of “population aggregation.” Because of long-term drought throughout the Southwest, migration from areas to the north brought larger populations into central Arizona. As populations swelled, crop yields were stressed, social tensions between newcomers and long-term residents arose and health declined. High-density population clusters began to form around the best-irrigated areas, and maintenance of the canals between those clusters suffered. The localized high-density areas likely became more parochial, leading to increased competition for resources. Between climate changes, resource challenges, social tension and too much in-migration, the area became less and less attractive, and the Hohokam began to leave. Those who were left assimilated into smaller, lower-density and less-distinctive cultures.

In his book *Collapse*, Jared Diamond catalogues the factors which can stress a society to the point of extinction: 1) relationships with trading partners go awry; 2) the society is eradicated by enemies; 3) global climate changes; 4) local resource depletion, and, 5) how a place responds to the other four factors.²⁴ The most critical factor is the last one listed. Ultimately, the Hohokam apparently were unable to react — to adapt — to the challenges they faced.

Cities do shrink as well as grow. Throughout history, once proud and flourishing urban centers have reached points of economic obsolescence and have declined, often precipitously, in population. Potosi, Tyre, Babylon, and Ur are legendary examples. Venice and Dubrovnik are today largely museums of their past glory. Detroit is half its former size.²⁵

St. Louis was once the greatest boomtown in America. The gateway to the West, St. Louis saw the Mississippi River as the forever paramount avenue of commerce in the United States. But it turned out railroads were more important than the river, and Chicago placed its bet on railroads. In the 1890s, St. Louis was the fourth-largest city in America, with 450,000 people. By 1950, it had grown to more than 850,000. In 2007, it was the 52nd-

largest city in America, with about 355,000 people. Today Mesa, Arizona, has nearly 100,000 more people than St. Louis.

Could Phoenix today be on the cusp of dramatic decline? Forty-thousand Hohokam may have been pushing the carrying capacity of their infrastructure, especially their water systems. At nearly 4 million, is Maricopa County (which includes Phoenix) getting close? *Watering the Sun Corridor* concludes that the water supply can be stretched quite a bit further, though tough choices will be required. The end of the petroleum era will add stress to a place built around the automobile. A planet that gets even hotter will make the hottest places less attractive.

The reality is, Metropolitan Phoenix exists in a kind of geography of insecurity. Because the city is the youngest of American's major metropolitan areas its identity is still unclear. Because it is a city of transplants from a different geography, usually from a place that rains a lot more, there tends to be a misunderstanding of how the city's resources are managed. Because the place has grown so quickly it is not implausible to imagine that it might shrink just as quickly. But the real story of Phoenix is a tale of adaptation and the power of collective action — government action — to confront the challenges of geography and respond through public policy. Canals and dams were built, highways and airports created connections, and a city was built in a place of geographic challenge.

The past challenges of dwelling in the desert proved manageable. In Arizona, extreme variations in rainfall and extreme summer heat are a way of life. Climate change will increase uncertainty and increase the magnitude of these familiar challenges. Phoenix will likely get hotter, drier and dustier.

But in a place that has long dealt with extremes and a high degree of uncertainty, an increase in the range and extent of that uncertainty can be met with the same kind of creative management that has worked before. In this, metro Phoenix actually may be better positioned to deal with the future than other places that relied on natural bounty and a temperate climate, where climate change may portend dramatic changes. For locations just above what has been a predictable sea level, any increase can be hugely significant and may require massive responses such as the construction of sea walls or, eventually, abandonment.

The potential ubiquity of the impact of climate change on Phoenix runs the “frog in the boiling pot risk” – turn up the heat slowly, and the frog simply boils without ever thinking

of escape. The threat to Phoenix' sustainability isn't hurricanes or tsunami, it's complacency. It is the expectation that abundant land and sunshine, along with portable water and cheap housing and petroleum, will forever provide a winning formula. As the climate challenges make a place built on climate less attractive, and as lifestyle and work patterns move beyond the age of the automobile, it would be easy for a place like Phoenix to miss out.

Sustaining Phoenix will not require massive new infrastructure like levees or sea walls. What it will require is confronting the future with the forthright candor that built the city in the first place. Ultimately, sustainability isn't about geography – it is about politics. It is about a collective commitment to a place: a desire to stay.

Political dysfunction is a legitimate threat to the future of not just to Phoenix but all U.S. cities and the nation in general. It takes a belief in government and recognition for its capacity to solve problems to sustain cities. A city is, after all, a gigantic public/private partnership. Arizona politics are sometimes zany, but Phoenix was built by people who understand government was not the problem but the solution. We need only to turn on the water faucet to be reminded of that fact. Perhaps others should take note of that and other facts when determining whether critics' arguments against Phoenix's sustainability truly hold water.

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Endnotes

¹ The most recent and longest examination of Phoenix appeared in 2011 in Andrew Ross' book *Bird on Fire: Lessons from the World's Least Sustainable City*. People who actually read Ross' book will discover a lively critique of the local politics and economy. But he does not actually try to prove the thesis of his subtitle, saying simply: "If [Phoenix] is not the world's least sustainable city...it is a very close contender, and in any event, the title is not worth arguing over." Many who live outside Arizona will simply hear the title and allow it to reinforce their view of a desert metropolis that is headed, like its namesake, back to the ashes.

² National Weather Service, Preliminary Monthly Climate Data (CF6).

³ National Weather Service.

⁴ National Weather Service. (www.wrh.noaa.gov)

⁵ Brookings Report.

⁶ National Public Radio, October 10, 2005 and Winchester, Simon, *A Crack in the Edge of the World: America and the Great California Earthquake of 1906*, 2005.

⁷ www.sustainlane.com/us-city-rankings/.

⁸ In late 2012, the U.S. Bureau of Reclamation issued its long awaited Colorado River Basin Water Supply and Demand study. This complex analysis highlights the challenges of the Colorado Basin, but does not undermine the basic conclusion of *Watering the Sun Corridor*: Phoenix is better off than nearly anywhere else in the arid West.

⁹ In the last 10 years, Phoenix residents have curtailed per-capita water consumption by more than 20 percent.

¹⁰ Slate articles

¹¹ *Arizona: State Energy Profiles*, U.S. Energy Information Administration, December 10, 2009.

¹² The Center for Climate Strategies, *Final Arizona Greenhouse Gas Inventory and Reference Case Projections, 1990-2020*, June 2005.

¹³ Texas Traffic Institute study.

¹⁴ INRIX study.

¹⁵ Whyte, William H., *The Exploding Metropolis*, 1958.

¹⁶ James Howard Kunstler, Jon Talton, and Delores Hayden have written extensively about sprawl and Phoenix.

¹⁷ Lang, Robert E., Andrea Sarzynski, and Mark Muro, *Mountain Megs: America's Newest Metropolitan Places and a Federal Partnership to Help Them Prosper*, July 2008.

¹⁸ Florida, Richard, "How the Crash Will Reshape America," *The Atlantic*, March 2009.

¹⁹ Rudolf, John Collins, "Construction That Fueled Growth in the Sun Belt Slows," *New York Times*, August 28, 2009.

²⁰ Laing, Jonathan R., "Phoenix Descending: Is Boomtown U.S.A. Going Bust?" *Barron's*, December 18, 1988.

²¹ Hoffman and Rex, *The Economic Base of Arizona, Metropolitan Phoenix, Metropolitan Tucson, the Balance of the State, and Chandler*, June 2012.

²² Clark, Lyons, Hill, Nevzil and Doelle, "Immigrants and Population Collapse in the Southern Southwest," *Archaeology Southwest*, Fall 2008.

²³ Sheridan, Thomas, *Arizona, A History*, 1995.

²⁴ Diamond, Jared, *Collapse: How Societies Choose to Fail or Succeed*, 2005.

²⁵ Longworth, Richard C., *Caught in the Middle: America's Heartland in the Age of Globalism*, 2008.

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