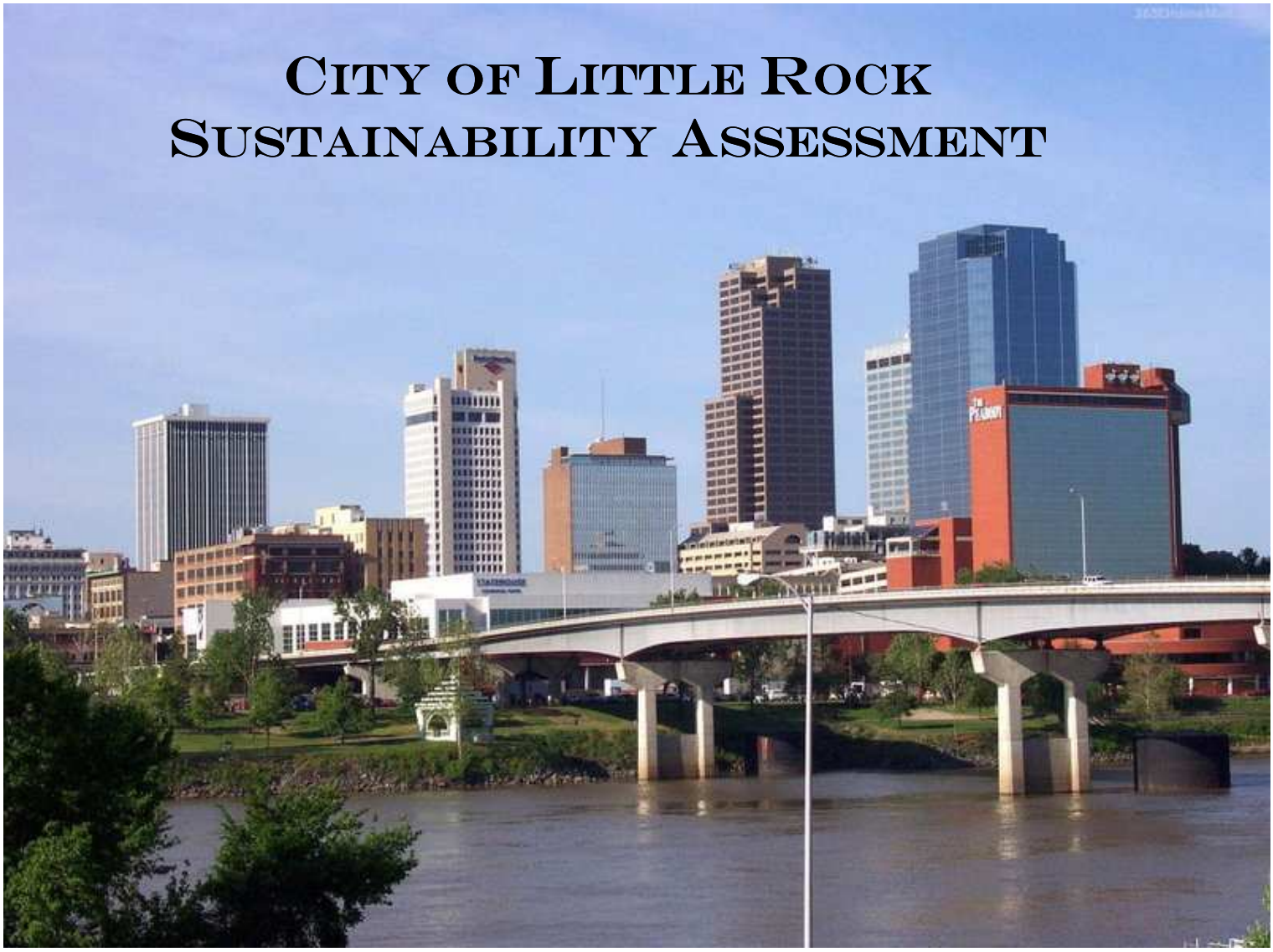
City of Little Rock Sustainability Assessment



A report prepared for the Little Rock Sustainability Commission

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EXECUTIVE SUMMARY

This report was prepared for the Little Rock Sustainability Commission. It is an analysis of Little Rock's current sustainability performance and is intended to assist in the Commission and its goal to make Little Rock a more sustainable city. The external analysis focuses on cities that are leading the way and cities that are comparable with Little Rock. The internal analysis focuses on Little Rock's performance on common sustainability indicators and the city's performance compared to similar cities across the country. This executive summary will highlight the most essential points covered by each section.

External Analysis

1. There are numerous cities addressing sustainability in some form. The National Association of Counties surveyed 200 of the most populous US counties. They found sustainability programs have increase over 400% in the last three years. These efforts typically arise from a grassroots or top down approach. Sustainability can greatly enhance the economic development of a city. It can help attract new residents, green businesses, and enhance the quality of life for citizens. The leadership of city government has been instrumental in creating a sustainable economy in aspirant cities.
2. There are four chief factors driving sustainability 1) Social 2) Political 3) Economic and 4) Business. Social forces address the growing concerns about quality of life in cities. Political forces describe how sustainability is receiving more attention from the government than ever before. Economic forces discuss how sustainability relates to key economic indicators. Business forces observe the increasing pressure on firms to incorporate sustainable practices and integrate them into operations. Cities are often addressing sustainability because of pressure, trendiness, financial benefits, and/or the goal to become a model city.
3. Many model (or aspirant) sustainability cities issue annual reports and/or have detailed action plans. Reporting is a major trend in addition to city involvement, bicycling, revitalizing downtown, train usage, embracing green as mainstream, alternative energy, and community groups. Model cities for

sustainability used for this research were Seattle, Portland, Oakland, San Francisco, Minneapolis, Chicago, Boston, and Austin.

4. We identified fifteen sustainability indicators commonly used by most model cities. These indicators are grouped into three major categories: environment, economy, and social. Environmental indicators include measures of air quality, water quality, waste reduction, recycling, renewable energy usage, energy reduction, green buildings, land management, and public transportation usage. Economic indicators include measures of unemployment, affordable housing, and job creation. Social indicators include measures of educational attainment, crime, and healthcare access.
5. For the purposes of comparison, we identified cities across the country similar to Little Rock. The referent cities identified were Chattanooga, Columbus (GA), Fort Lauderdale, Huntsville, Jackson (MS), Knoxville, Lubbock, Mobile, Montgomery, Newport News, Richmond, Shreveport, and Springfield.
6. Sustainability actions and performance varies among the aspirant and referent cities. While there are certain trends in the aspirant cities, the referent cities actions vary and their initiatives are neither well monitored nor documented.
7. Sustainability will continue to grow into the future. It will be characterized by increasing awareness and support from government, business, community, and academic institutions. The advantages of sustainability will help spread a green vision to cities across the US. This will help cultivate sustainable innovations and communities. Partnerships between other cities and local businesses are also expected to increase, so multiple parties can capitalize from best practices learned and exchanged.

Internal Analysis

1. Little Rock has numerous independent initiatives taking place. The most visible actions are recycling and public transportation. There is a grassroots green community but the majority of people are not

aware of the sustainability efforts taking place. These independent actions need to be coordinated into a cohesive sustainability plan that capitalizes on the synergy of these independent efforts. Little Rock has the opportunity to lead the way in transparency and information availability by creating a comprehensive website that is easy for the community to locate.

2. Little Rock has strengths, weakness, threats, and opportunities when it comes to its present situation. Some strengths include the Sustainability Commission, government support, and several non-profit organizations that support the sustainability vision. Some weaknesses are that it is difficult to find information, efforts are not transparent, and there is limited funding for the Commission and initiatives. Threats include overcoming public opposition, and gaining support for projects that require a large initial investment and payback slowly over time. Opportunities include the wealth of information available from aspirant cities, stimulus funds, partnerships with organizations, and community engagement.
3. Little Rock rates particularly high against referent cities in the areas of green buildings, education, and healthcare. Little Rock is comparable to referent cities in the areas of air quality, number of Energy Star buildings, and affordable housing. There is room to improve in the areas of public transportation, job creation, unemployment rates, and crime and safety. There was limited data on some indicators, which prevented comparison of all cities on all indicators. For example, there was no data on water quality for all cities under study, so effective comparisons could not be made. However, among cities where water quality data was available, Little Rock ranked the 4th highest in number of contaminants in tap water.
4. We created a weighted sustainability strength assessment of Little Rock and its 13 referent cities, comparing each on the sustainability indicators. The results ranked Little Rock 4th in urban sustainability.
5. Recommendations for the city of Little Rock

1. Develop a comprehensive website
2. Develop a sustainability plan for the city with a focus on greenhouse gas reductions.
3. Hire a full-time Director to oversee the Commission's mission and efforts
4. Identify funding sources to carry out the city's sustainability plan.
5. Market and promote sustainability, the city's sustainability plan and its initiatives.
6. Build upon existing strengths in green building, education, and healthcare.
7. Increase transparency of information related to the city's sustainability plan, progress, strengths, and weaknesses.
8. Identify additional sustainability indicators which reflect the city's sustainability plan and goals.
9. Collect primary data on sustainability indicators where no information currently exists.
10. Develop a plan to improve performance in crime and safety, unemployment rates, public transportation, and water quality
11. Obtain data on indicators which are not easily accessible, and
12. Consider adopting the U.N. Habitat Agenda Indicators

There are numerous benefits to becoming a more sustainable city. Citizens will have a greater quality of life, the city earns a better reputation, risks and costs are reduced, and a sustainable economy will emerge and perpetually grow.

INTRODUCTION

This research paper is to make recommendations to the City of Little Rock's Sustainability Commission for planning for sustainability within the City. We will discuss sustainability from the perspective of both external and internal analyses. The external analysis will discuss what other cities are doing and will include aspirant cities and referent cities. The internal analysis will discuss what Little Rock is currently doing and its current state of sustainability initiatives and comparative performance.

We will first discuss the industry environment of urban sustainability. This industry analysis will discuss the driving forces behind the move towards sustainability, why cities are addressing sustainability, and how sustainability is a factor in attracting new residents, new industries, and new companies. Our industry perspective will summarize the future direction of urban sustainability. We then identify aspirant or model cities for urban sustainability; cities that are on the forefront of sustainability and sustainability efforts. We identify common sustainability indicators used by aspirant cities. We then identify referent cities for Little Rock; cities that are similar to Little Rock on many socioeconomic factors.

The internal perspective will begin with Little Rock's current sustainability initiatives. We compare Little Rock to its referent cities on the common urban sustainability indicators used by model cities. We will discuss how Little Rock compares to referent cities. We will then offer a sustainability strength assessment and use the data to rank Little Rock relative to its referent cities. An analysis of Little Rock's strengths, weaknesses, opportunities, and threats relative to sustainability will follow. Finally, we will make our recommendations to the City of Little Rock's Sustainability Commission.

URBAN SUSTAINABILITY: AN INDUSTRY ANALYSIS

Cities Addressing Sustainability

The tem "sustainability" has different meanings in various contexts. Since the 1980's, human sustainability has become increasingly associated with the integration of economic, social, and environmental frameworks. The most common sustainability definition is the one for sustainable development from the United Nations' World Commission on Environmental and Development (the Bruntland Commission) which is to meet the needs of the present without compromising the ability of the future generations to meet their own needs. Efforts toward adopting principles of sustainable development within governments began in the 1970s through the work of the United Nations and its various initiatives, including the Earth Summit, Agenda 21, and Habitat Agenda, to name a few. Urban sustainable development is continuing to evolve today and can best be described as the balanced development of economic, social, and environmental systems within a city.

The sustainability industry is a global industry that is becoming more popular day by day due to the ability to positively redirect climate change. This Industry Analysis will focus on sustainable cities in the United States of America (USA) and sustainability's growing importance to cities and governments.

Cities continue to struggle in identifying how to measure sustainability. The UN-HABITAT Agenda indicators offer one attempt to identify comprehensive indicators of sustainability that integrate urban economic, social, and environmental systems. The Habitat Agenda indicators address gender equity, adequate housing, access to credit, access to land, provision of basic services, urban violence, infant mortality, disaster prevention, urban pollution, unemployment, and a wide range of other indicators. In a related effort, there has been academic research attempting to define integrated indicators of urban sustainability, including open space programs, environmental and social justice program, and pesticide reduction programs.[1] In addition to struggling with how to identify and measure sustainability, cities also struggle with how to implement sustainability. The Environmental Protection Agency's Green Communities

[1] http://ase.tufts.edu/polsci/faculty/portney/PARarticle.pdf

initiative is an attempt to provide a roadmap for cities wishing to pursue sustainability.[2] The research produced by this analysis constitutes step one of the EPA Green Communities' recommended five-step process.[3]

In 2009, it was determined that at least 50 major cities in the USA were addressing sustainability in some form.[4] These policies consist of general frameworks of sustainability as a policy goal, and the implementation of targeted programs to support the pursuit of those policy goals. The US Green Building Council, which tracks government mandates for implementing LEED construction; states that legislation, executive orders, resolutions, ordinances, policies, and incentives are found in 53 cities, 10 counties, 17 states, 33 schools, and 11 federal agencies across the USA and Canada.[5] The National Association of Counties (NACO) surveyed 200 of the most populous USA counties and found that green/sustainable programs have increased over 400 percent in the last three years.[6]

According to research on civic engagement and sustainable cities in the USA by Professor Kent Portney of Tufts University, most of the sustainable cities addressing sustainability are administering broad programs, involving smart growth efforts, and others are narrowly targeted, including bicycle ridership and pesticide-reduction programs. A recurring theme in these cities is the role of public participation in shaping and implementing these programs. In cities where the sustainable cities idea first emerged in local grassroots organizations, such as Seattle, these programs owe their existence to public involvement. Other cities have taken a top down approach, treating sustainability as a matter for experts rather than ordinary citizens. Civic engagement is manifest both in development of the sustainability programs and as an explicit goal of the sustainability program.

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[2] http://www.epa.gov/greenkit/index.htm
[3] http://www.epa.gov/greenkit/intro1.htm
[4] http://www.nyas.org/ebrief/miniEB.asp?ebriefID=590 http://ase.tufts.edu/polsci/faculty/portney/localNonprofit2007.pdf
[4] http://ase.tufts.edu/polsci/faculty/portney/PARarticle.pdf
[5] http://www.sustainlane.us/downloads/SLGnewsletter_20070301.pdf
[6] http://www.naco.org/Content/ContentGroups/Programs_and_Projects/Environmental1/Green_Government_Initiative/GreenGovernmentInitiativeOverview_Sept_1_08.pdf

US Sustainable Cities' Trends

City Involvement

According to Professor Kent Portney's research, the number of cities engaging in sustainability initiatives is increasing. In some of Portney's early 2001 research, there were approximately 40 cities engaging in sustainability compared to his 2009 research stating that there are currently 50 sustainable cities.[7] Thus, over the past six years of Portney's research, there have been ten additional cities to engage in sustainability in some form.

Reporting

Cities are developing long-range plans for increasing citywide sustainability, decreasing citywide greenhouse gas emissions, and seeking Smart Growth. Long-range plans are frequently missing important details, such as the City's target goal for achievement or the specific action steps necessary to reach the target goal. Nonetheless, cities are issuing annual progress reports containing qualitative and quantitative data to communicate progress and increase transparency. To further increase transparency, the plans and progress reports are readily available and accessible on the Internet.

Sustainability Indicators

The identification of urban sustainability indicators and the measurement of urban sustainability has not yet matured enough that well-integrated and commonly used indicators exist. Although the UN Habitat Agenda[8] indicators are an effort to create standardized urban sustainability indicators, they have not yet been uniformly adopted by cities around the world. Furthermore, academic researchers, such as Portney, have suggested additional indicators believed to be more closely aligned with sustainability.

In the absence of standardized sustainability indicators, many cities are using traditional measures of quality of life, economic development, and other indicators in unison as a reflection of urban sustainability.

[7] http://ourgreencities.com/

[8] United Nations Human Settlements Programme (2004). Urban indicators guidelines: Monitoring the Habitat Agenda and the Millennium Development Goals. Retrieved March 17, 2009 from http://ww2.unhabitat.org/programmes/guo/documents/urban_indicators_guidelines.pdf

Recognizing the limitations of existing sustainability indicators, several cities are adopting additional local indicators in an effort to truly reflect urban sustainability.

The Top Green Trends of 2008

According to SustainLane, US sustainable cities are experiencing widespread green trends. Below is a brief depiction of SutainLane's top green trends of 2008 for US sustainable cities.[9]

1. More Bicycling: More city support for bicycling as a transportation mode; 12.3 percent more cyclists across the US year-over-year.

2. Revitalizing Downtowns: With high density, mixed used, infill redevelopment and transit; creating 24hour work/live spaces – livening up downtown "mausoleums," zoned single use and hollowed out in the 1960's-70s due to suburban investment.

3. Trains Usage: New light rail and other public transit infrastructure investment. This trend leads to more dense, energy efficient and livable cities of the pre-World War II era. Studies also show that investment in transit creates more jobs than investment in highway construction.

4. Green Movement Goes Mainstream: More city governments are becoming more aware of sustainability development. These city governments are appointing high level sustainability officers; climate change/expensive energy adaptation, biodiesel/hybrid use, green building, and planning. In addition, we are seeing more cities with green city websites and sustainability task forces.

5. Alternative/Renewable Energy: Sustainable cities are showing support for wind/solar installations and increased energy conservation and efficiency through incentives, performance contracting and community outreach.

[9] 2009 SustainLane. 2008 City Ranking "Mega-Trends" Retrieved on March 22, 2009 from http://www.sustainlane.com/us-city-rankings/articles/2008-city-rankings-mega-trends/BL...

6. More Neighborhood/Community Groups: Citizens increasingly getting together to solve problems caused by rising fuel prices and climate change.

Forces Driving the Move Towards Sustainability

There are several industry change factors influencing cities and how they are addressing sustainability. These factors are impacting cities and creating a movement of 'Green Initiatives' across the country. The four chief factors are (1) social forces, (2) political forces, (3) economic forces, and (4) competitive business forces. We will look in depth at each of these in turn, and will discuss why cities are addressing sustainability.

Social Forces. Some common causes and concerns in the social sector that have brought attention to sustainability include population growth and quality of life. Most major metropolitan areas have experienced tremendous increases in their population. For example, Atlanta went from a population (Metropolitan area) of 2,036,000 in 1970 to over 5,000,000 currently![10]

Quality of Life is also a topic that more people are concerned about. Residents are realizing some situations need to be addressed. Some examples of things causing a general deterioration are traffic congestion and the smog the traffic produces. The problem is more evident in large cities; however, any dramatic increase in these components can disrupt even smaller towns. People are also interested in better and more efficient ways of doing things. It seems that convenience is no longer the motivating factor. People are even experiencing major *inconvenience* in favor of the environment. Not only are more people taking public transportation, such as buses, they are even riding their bikes to the bus-stop.

Sustainability may be a term that is associated with more current conversations, however, the awareness of using resources and eliminating waste began many years ago. Earth Day is a good example of large groups getting organized to address these issues. Earth Day has gained incredible popularity since its

[10] http://www.demographia.com/db-atl1960.htm

beginning days. In 1970, approximately 20,000,000 people participated. Recycling became popular in the late 1980s and approximately 200,000,000 people participated in Earth Day in 1990. As 2000 rolled around and attention was on global warming and clean energy, hundreds of millions participated in Earth Day. That number increased to a staggering 1,000,000,000 in 2007 as the focus shifted to Clean Energy.[11]

Political Forces. Political factors have also influenced sustainability for many years. The issue was a common topic in many local and national political conversations; however, little was done beyond the discussions until the high profile efforts of Al Gore. Al Gore almost single-handedly brought the global warming issue to the forefront of the most important political and social agendas. He has spent almost his entire political and personal career on a mission to raise awareness and address the topic of global warming. This seemed to pull all sustainability-related issues into the spotlight and cause a chain-reaction of politically formed projects for local municipal governments to act.

In 1987, the United Nations prepared a report, "World Commission on Environment & Development". This introduced and brought the terms 'sustainability' and 'sustainable development' into widespread use.[12]

The Obama administration is giving even more attention to these issues. The President and his staff have made promises of investment in several important categories to address sustainability – alternative energy, electric automobiles, a "smart" electric grid, and green jobs resulting from these initiatives.

Economic Forces. The economy plays a key role in sustainability. The key areas that affect the economy and can impact sustainability the most are;

- Unemployment
- Income Distribution
- Housing affordability

[11] http://www.earthday.net/node/77
[12] http://worldinbalance.net/agreements/1987-brundtland.php

- Poverty

How does sustainability and the economy relate? This quote in the Seattle Sustainability report sums it up; "A sustainable economy minimizes its throughput – the amount of materials and energy it uses- to provide for individuals needs and wants."[13]

The economy is already being affected by the sustainability movement. Just in the renewable energy field, there are 2,300,000 people employed. Investments in sustainability efforts for the economy could result in a much-needed boost. The likely result is a chain reaction of job creation. For example,

- A $300B investment in America's economic and energy future over 10 yrs would produce 3.3 million jobs and a $1.43 trillion gain in GDP.
- The jobs by category would look like this; Energy diversity>932,000 | Industries of the future (Hybrid cars, Energy-Efficient Appliances)>900,000 | High-Performance Buildings>827,000 | Infrastructure>679,000[14]

Business Forces. Business have become increasingly conscious of their operations and manufacturing processes due to the emphasis on sustainability. They have felt increasing pressure to reduce their emissions, be more responsible in regards to their carbon footprint and give back to their communities.

There are also several positive factors leading to business expansion and opportunities for new products and new companies, too. Three movements having the biggest impact include: (1) the rise in green building, (2) the increased production of more efficient automobiles (such as hybrid and electric), and (3) increased awareness by consumer product manufacturers of the environmental impact of products.

The move toward sustainability has created an extensive new vocabulary of related terminology, such as green economy. A green economy describes economic development built upon companies with products,

[13] http://www.sustainableseattle.org/Programs/RegionalIndicators/1998IndicatorsRpt.pdf
[14] http://apolloalliance.org/new-apollo-program/data-points-nap/data-points-green-collar-jobs/

services and business models that promote economic growth, reduce environmental impact, and improve social well-being.[15]

One company that has embraced the sustainability concept is Wal-Mart. The company recently launched a green jobs council to promote the creation of green jobs. Leslie Dach, executive vice-president of corporate affairs and government relations for Wal-Mart explained,

> "We believe that creating green jobs is essential to keeping the United States competitive in the global marketplace. We also think that it's important that we're working collaboratively with vendors to foster an environment to create these green jobs in the U.S."[16]

Wal-Mart goals include being supplied 100% by renewable energy, creating zero waste and selling environmentally-friendly products.[17]

Given these four driving forces, we see that cities are addressing sustainability for a variety of reasons. Some reasons are simply due to outside pressure; if other cities are doing it, then it becomes a matter of competitive pressure. Some cities address sustainability to appease residents or businesses, and maybe even due to political pressure. The green movement is currently a popular topic and even a 'trendy' thing to do. Addressing sustainability can also lead to a monetary gain. One needs to look no further than the American Recovery and Reinvestment Act of 2009 to see record amounts of dollars tied to projects for sustainability. Although these are actual reasons many cities are addressing sustainability, most have a better motive and reasoning behind their movements. Cities are quickly realizing that sustainability can produce benefits for the residents of the city, as well as the city as a whole, including the local businesses. Some Cities also want to lead by example. Laura Fiffick, Director of the Office of Environmental Quality for

[15] http://www.greenbiz.com/feature/2009/02/02/green-business-2009-green-economy
[16] http://www.greenbiz.com/news/2008/12/03/wal-mart-leading-suppliers-form-council-foster-creation-green-jobs
[17] http://walmartstores.com/FactsNews/NewsRoom/8835.aspx

Dallas states, "The City has to be a leader, we shouldn't necessarily tell residents to change their light bulbs, recycle their trash, and conserve their water if we aren't doing it ourselves."[18]

Although there can be dramatic costs involved in a city addressing and implementing sustainability efforts, there can also be many associated benefits. Several benefits that can be a result of sustainability include:[19]

- Increasing citizen and employee satisfaction
- Strengthening the city's reputation
- Creating a healthier, more livable city
- Reducing risks related to energy, environment, and climate change
- Reducing resource consumption
- Saving money over the long term

Cities, such as Austin, Chicago, Fort Collins, and Portland, reported that investing in renewable energy and energy efficiency programs helped them:[20]

- Save Money - literally millions of dollars each year.
- Provide economic benefits to their residents.
- Reduce future energy cost risks.
- Comply with and improve upon Federal clean air standards.
- Provide a more livable environment.

Just as importantly, residents approve of these programs (e.g., some Austin programs receive 94% approval ratings).[21]

Mayor Daley (Chicago) has suggested that,

[18] http://greendallas.net/about_us02.html
[19] http://www.rmi.org/sitepages/pid445.php
[20] http://rmc.sierraclub.org/energy/library/sustainablecities.pdf
[21] http://rmc.sierraclub.org/energy/library/sustainablecities.pdf

"Encouraging environmental innovation will be beneficial for the health of both our citizens and our economy. Conserving natural resources, and encouraging environmentally efficient behavior from citizens and businesses, not only ensures the sustained health of the City but it also makes plain common sense. Why be wasteful when we can save? Save environmental resources, tax payer dollars, business costs and the quality of life in our great neighborhoods."[22]

"Leading by example" is Chicago's intent. The city has established aggressive goals for city and allied agency buildings, including a target of 20 percent municipal electricity from renewable sources, and an envisioned 30% reduction in environmental footprint by 2020.

The City of Portland listed its goal is to "…promote a sustainable future that meet's today's needs without compromising the ability of future generations to meet their needs, and accepts its responsibility to:

- Support a stable, diverse and equitable economy
- Protect the quality of the air, water, land and other natural resources
- Conserve native vegetation, fish, wildlife habitat and other ecosystems
- Minimize human impacts on local and worldwide ecosystems."[23]

Cities are definitely feeling pressure from many sources, including the political arena, businesses, and society (including their own residents). However, in particular due to the new American Recovery and Reinvestment Act, the pressure from the politics arena is stronger than at any other time in history. The funding available from the Act sends a strong and clear message that new and future infrastructure, buildings, and even products, should be environmentally friendly.

The current movement in buildings is to be Energy Star rated or LEED certified. The United States Green Building Council (USGBC) has defined a green building as a structure that is designed, built, renovated, operated, or reused in an ecological and resource-efficient manner. The USBGC LEED

[22] http://rmc.sierraclub.org/energy/library/sustainablecities.pdf
[23] http://rmc.sierraclub.org/energy/library/sustainablecities.pdf

(Leadership in Energy and Environmental Design) rating system ensures certain environmental objectives are met. Green building has dramatically accelerated in growth. For example, between 2005 and 2006 there was 50% growth in LEED registered projects. That number grew to 75% between 2006 and 2007 and up to 80% before 2008. There were 16,400 registered projects in 2008 and the average size was +100,000 SF. The payback for LEED buildings provides an exciting bonus; greater rental income/resell value, faster lease-up, tax benefits and utility incentives.[24]

The growth in green building has spawned associated complimentary products. Manufacturers are introducing products that compliment LEED buildings and add another degree of environmentalism to them; the most common are products that increase energy efficiency. Examples include intelligent building energy management systems, lighting controls (occupancy sensors and dimmers), daylight harvesting systems and window shade systems, energy-efficient lighting and solar power systems.

Sustainability as a Differentiating Competitive Factor

Stronger communities are more likely to support economic growth in a variety of ways, including retaining and attracting new residents.[25] With proper actions, Little Rock can help grow, promote, and recruit companies that provide sustainable products, technologies and services; can help businesses implement sustainable practices within their firms; and can ensure our community maintains a high quality of life that attracts and retains businesses and recruits sustainable businesses and a highly skilled workforce.

There is great political appeal of virtually anything to do with sustainability these days. From taskforces to commissions, states and cities are doing what they can to be known as sustainable. We are inundated with reports almost daily about the dangers of climate change and the need for sustainable growth. There is no government agency tracking the overall growth of sustainable businesses, but industry

[24] Yudelson, J. (2009). Green Goes Mainstream: How to profit from green market opportunities. http://www.greenbuildconsult.com/pdfs/ggm-exec-summary.pdf
[25] www.hnzc.co.nz/hnzc/web/research-&-policy/housing-research-&-evaluation/summary

publications say it's huge. A report released last year by the American Solar Energy Society estimates that renewable energy and energy-efficiency industries now generate around 8.5 million jobs and nearly $1 trillion in revenue.[26]

For the state of Delaware, sustainable development has become the cornerstone for economic development. The Delaware Economic Development Office (DEDO) is focusing its efforts on economic development that supports the principle of preserving life through sustainable development. They are placing a strong emphasis on redevelopment, preserving green space, and ensuring quality jobs are located where infrastructure exists to support them. The DEDO has a commitment to local, small business startups and expansions that build on local strengths. There are several major factors that Delaware uses to implement these strategies within its overall plan, which we will discuss now.

Delaware has placed an emphasis on job quality rather than quantity. Traditional economic development organizations get caught up in a job "body count." They believe that not all jobs are created equally. Delaware has focused on jobs that raise Delaware's standard of living through higher wages and paid medical and other benefits. Delaware has focused its sustainability efforts on three major cities – Wilmington, Newark, and Dover. One part of the state's efforts is on strategic fund grant applications. Delaware has chosen not to spend taxpayer dollars to attract jobs that may qualify for public assistance and this has helped the state attract high quality jobs. Also, this emphasis on quality jobs – especially in high-tech areas such as biotechnology – has grown the cities' standards of living with cleaner, higher-paying jobs that may produce less of an impact on the environment, transportation infrastructure, and quality of life.

The next thing Delaware has focused on is creating industry clusters. The point of this was to group industries together that drive wealth to a certain area at a time. For example, transportation/distribution was not focused on because it would result in more truck traffic and a proliferation of large, featureless buildings and lower-paying jobs. This way of promoting a sustainable economy and job growth has led Delaware to

[26] Personal communication, Little Rock Sustainability Commission

concentrate on building the economy's existing strengths. This strategy focuses on attraction of firms that will support existing companies and skilled labor. The strategy also proactively nurtures a business climate that has helped Delaware's strongest economic sectors grow.

Delaware also focused on building an entrepreneurial culture and enhancing its entrepreneurial capacity. The state has implemented a new economic initiative, which includes proposals to encourage the growth of high-tech start-up companies – which has eventually produced clean, high quality jobs that has provided the state with sustainable economic growth. The DEDO has helped the target cities recognize their unique assets and acquire the tools for growing successful entrepreneurs, enabling smaller businesses to grow and prosper throughout the state. The state's strategy of linking capital resources, connectivity, and collaboration to build a new entrepreneurial capacity has fit in perfectly with its livable principle of managing growth and guiding it to areas where existing services and infrastructure has been able to use it successfully. Delaware has won recognition from the federal Small Business Administration for implementation of these practices.[27]

In addition to the state of Delaware, cities are also depending upon sustainable development as a path toward economic development. A sustainable economy is a fundamental requirement for a sustainable San Francisco. A sustainable economy will provide a good quality of life for all current and future San Francisco residents without undermining the biological and physical processes of the environment upon which people depend. San Francisco has identified four major characteristics to achieve these goals (1) the predominant use of renewable energy; (2) energy and resource efficiency, including complete recycling of minimized resources; (3) minimum use of toxic material and no release into the environment; and (4) the use of full-cost pricing (an analysis of the costs involved in the full cycle of a product's existence, from the pollution caused in production to the cost of disposal) in policy, production, and consumer decision-making. San Francisco's transition to an ecologically sustainable economy involved creating a circular flow of resources.

[27] http://stateplanning.delaware.gov/strategies/document_04/08_jobs.pdf

This means that resources are continually used, broken down, and recombined – waste is eliminated as discards become the resources of reuse or of other production processes. A sustainable economy follows the principles of industrial ecology, which is the complete interaction of production, services, resource and energy use through the complete recycling of by-products, elimination of waste, and reduction of use of toxins or products harmful to local ecosystems and communities. The change in the way San Franciscans do business has fostered the transformation of existing industries and spawn entirely new industries, products and services.

The leadership of city government was key to the transition of an environmentally sustainable economy. Integrating community values and purposes with those of commerce and the environment was a crucial element to achieving the city's goals of sustainable economic growth. San Francisco has exploited one of its major competitive advantages, which includes clean output and a highly trained and educated workforce. However, there are many residents of the city who lack the education or skills to take advantage of these new, knowledge-based industries. Industrial society has not only undervalued the natural resources it makes into disposable products, it has also disregarded the value to society of providing meaningful employment and a high quality of life to people of all skill levels. The conservation and reuse of resources is notable for its production of useful work for people of limited education and training. Moving toward a sustainable economy provides opportunities for the economic betterment of all current and future San Franciscans.[28]

Portland, Oregon, has turned to creating jobs to endure that it remains a sustainable city. Portland's development commission decided to allot a miniscule portion of its budget to lure sustainable businesses to Portland. The Portland Development Commission has proved that city support can attract new sustainable businesses. Using a mix of tax breaks, infrastructure improvements, and the newly allotted funding, the agency helped bring a new business, a solar power-related manufacturing plant, to the city and created new

[28] www.sustainable-city.org/plan/economy/intor.html

jobs for existing industries, such as installation of energy-saving technologies in new and existing businesses. Despite some negative opinions of those who think that sustainable jobs are short termed, top officials say that growth in the sustainability field will be 30 to 40 percent a year and that it could last for thirty years or more. Portland knows that sustainable economic growth is not only important, but necessary for future growth.[29]

Future Directions in Urban Sustainability

The sustainability industry as a whole is growing. Globally, there is an increased ability to redirect change. One obvious direction is the increasing awareness of environmental consciousness. Many efforts have been made within the industry to continue green initiatives. It is very important that as more research becomes available, cities take the next step in implementing them.

Many companies are now pursuing the goal of sustainability realizing that protecting the environment makes good business sense. The National Environmental Policy Act programs have anticipated and contributed to advancing sustainability concepts. Several prominent EPA programs relate to business in non-regulatory ways, emphasizing business practices ranging from raw materials and manufacturing to waste and recycling.[30]

Education. Not only are governmental programs being implemented, but sustainability education is becoming more common. Incorporation of sustainability into the curriculum is on the rise at colleges and universities.

Colleges and universities throughout the United States offer an array of educational programs related to sustainability. Many were designed for undergraduate and graduate students seeking a degree. But many certificate programs have been created to educate adult professionals who want to take advantage of new career opportunities and update job skills.

[29] Portland Tribune, http://www.portlandtribune.com/news/story.php?story_id=120458216605766500
[30] http://www.epa.gov/sustainability/basicinfo.htm

Sustainability education is most valuable when it considers the triple bottom line, taking a comprehensive view of the financial, environmental, and the social impacts of management decision-making and public policy. This is the measure we believe should be the standard for sustainability education.[31]

Advantages in Addressing Sustainability. By promoting sustainable urban form and function, cities become healthy viable communities for citizens. Efficient urban form also helps protect the hinterland ecosystems that cities depend upon. In many ways, the advantages to sustainable communities are underlined in the characteristics and definitions of urban sustainability. Quality of life, natural open spaces, reduced waste, equality, access, lower crime, sense of community, clean air and water quality, and environmental diversity are just a few beneficial characteristics previously mentioned. The most important advantage of a sustainable city is that it follows a development path that allows for integral and long-term development without compromising future generations.

Risks in Not Addressing Sustainability. The path towards sustainable cities often requires changes in current practices and actions. It requires different social attitudes, long-term thinking, and different decision-making processes. Considering all these issues, there are still a number of major obstacles that hinder the development of sustainable cities, even though it is becoming more and more widely accepted that this is the only way to go in the long run.

Implementing sustainable change can be a complex task with numerous organizations and competing issues involved. Some research has explored why sustainable urban development is difficult to achieve. However, it should be noted that different communities face different challenges as a result of different population structures, regulations, degrees of government stability, financial resources, human resources, and developmental stages.

Little Rock for instance has a recycling rate of 38% for weekly participation. This rate could be increased, but in order to do so individuals have to be made aware of the need for improvement. The attitude

[31] http://www.sustainableindustries.com/commentary/42020562.html

of the public might be a direct relation to the need for additional advertising and marketing of recycling efforts. Residents might not be as concerned because they are not as aware.

In one article, residents of Portland were thought to be very concerned about recycling. The study found overall that 78 percent of Portland residents consider themselves to be "eco-conscious," 88 percent plan on being more environmentally conscious in the next year and 57 percent think their city is on the right track to becoming more environmentally responsible. Portland ranked first for using reusable containers in place of single-serve bottles of water and other beverages, using reusable containers in place of disposable food storage items, buying bulk food to avoid extra packaging, not buying bottled water, shopping at local markets that carry locally grown food, using a reusable grocery bag and buying second-hand clothing, electronics and furniture.[32]

Although the environment is very important when dealing with sustainability, there are other risks involved as well. This includes the risk of failing to address social issues in the community.

Economic issues include good jobs, good wages, stable businesses, appropriate technology development and implementation, and business development. If a community does not have a strong economy, then it cannot be healthy and sustainable over the long term. From an environmental standpoint, a community can be sustainable over the long term only if it is not degrading its environment or using up finite resources.

A healthy environment plays an important role in effective urban sustainability. Places for recreation, clean water and minimizing air pollution all go hand in hand in the industry. Environmental concerns include protecting human and environmental health; having healthy ecosystems and habitat; reducing and/or eliminating pollution in water, air, and land; providing green spaces and parks for wildlife, recreation, and other uses; pursuing ecosystem management; and protecting biodiversity. If a community has significant social problems, such as serious crime, then it cannot be healthy and stable over the long term. Furthermore,

[32] http://www.bizjournals.com/portland/stories/2009/03/30/daily13.html

such a community will not be able to address other key community issues, such as environmental problems, because it is so busy dealing with its social problems. Social issues addressed in sustainable community efforts include education, crime, equity, inner-city problems, community building, spirituality, environmental justice, etc. A major assumption of the sustainable community definition is that trying to address such issues in isolation eventually results in neglecting some other part of the community's health.[33]

As the industry uses sustainability efforts to make the community stronger there is a major need for all groups, and organizations to work together. Most sustainable community efforts also involve an open process in which every member of the community is encouraged to participate. The focus is on consensus building for the community. The emphasis is on communication and cooperation among many different interests and stakeholders from the community and also from those outside the geographic community if their actions might affect the community. Compromise by special interests is also a key. All the segments of the community at the local and regional level, including businesses, individuals, environmental and community groups, and government, need to work together cooperatively to move toward sustainability.

Model Cities and Sustainability

Sustainability is a broadly defined term that has different meanings to different groups. Despite which group develops the definition of sustainability, numerous factors are incorporated into the definition. Sustainability indicators evaluated in this analysis include environmental factors, economic factors, and social factors. In order to begin to understand what sustainability means at the city level, we identified cities that are generally considered green to serve as "model" cities for this research report. The model cities are generally larger cities that have developed and implemented advanced sustainability programs that represent "best practices." To find model cities, we reviewed a number of lists of green cities. Some of those lists can be found at MSN.com, Grist, Forbes, City Mayors, MOVE, SustainLane, Popular Science, and Country

[33] http://www.rand.org/publications/MR/MR855/index.html

Home Magazine/Sperling's Best Places 2007 Best Green Places. In order to narrow our list to include the most current information, we chose to use only lists published in the past 2 years. Therefore, we were left with 3 current lists from research conducted in 2007 and 2008: SustainLane, Popular Science, and Country Home Magazine/Sperling's Best Places.

SustainLane's third annual rankings (SustainLane's 2008 US City Rankings) are based upon data taken from the US Census Bureau, EPA, surveys, transportation departments, US Department of Agriculture, US Green Building Council, consultations with consultants, and other sources. The primary limitation of the SustainLane rankings is that it is a ranking of "greenness" among the 50 most populous US cities (based on 2004 US Census Bureau data) rather than a selection of the absolute greenest cities. That is to say, a city could potentially be greener than any of the cities on the list, but if it is not in the top 50 US cities in terms of population, it would be excluded from further consideration. The smallest city included was Arlington TX (pop. 359,467, according to 2004 US Census Bureau); a sample of smaller cities excluded from the study includes St. Louis, Pittsburgh, Tampa, and others. This ranking would exclude Little Rock and cities of similar size.

Popular Science has issued one list (America's Greenest Cities). Rankings are based upon data taken from the US Census Bureau and the National Geographic Society's Green Guide. The study included all US cities with populations over 100,000 and selected the top 50 cities. This ranking would include cities the size of Little Rock, although Little Rock was not ranked among the top 50.

Country Home Magazine/Sperling's Best Places second annual rankings (Country Home 2008 Best Green Places) included all the 379 major metropolitan areas defined by the U.S. Census Bureau, which includes over 80 percent of all U.S. residents. Data was collected from the US Census Bureau, U.S. Green Building Council, Department of Transportation, Environmental Protection Agency, U.S. Department of Agriculture, and the GreenPeople.org online directory. Because this ranking includes all the major

metropolitan areas of the United States, it allows for inclusion of cities with a population of less than 359,467 (which were excluded from the SustainLane study) and inclusion of cities with a population of less than 100,000 (which were excluded from the Popular Science study). The Little Rock-North Little Rock metropolitan area was ranked 250th.

Popular Science and SustainLane rank individual cities while Country Home ranks metropolitan areas (which can include multiple cities grouped together). Although the Country Home methodology allowed inclusion of cities that were excluded by the other two studies, the grouping of cities into metropolitan areas made it difficult to distinguish one city's sustainability performance separate from other cities in the same metropolitan grouping. Therefore, we chose to exclude Country Home metropolitan rankings and used only the individual city rankings of Popular Science and SustainLane.

In reviewing the top 15 cities on both the Popular Science and SustainLane rankings, we identified the cities common to both lists as model green cities: Portland, San Francisco, Seattle, Chicago, Boston, Oakland, Austin, and Minneapolis. However, it should be noted that due to the methodology employed by the lists, our own list of model cities was restricted to only include cities with a population over 359,467, thus excluding many potentially green cities as well as cities similar to Little Rock.

Sustainability Indicators. After selecting the model cities, we reviewed each city's publicly available information on sustainability programs, websites, and reports for all nine cities to determine what goals and measurements were common among the model cities. We identified 15 common sustainability indicators being used by the model cities. We have grouped those 15 sustainability indicators by three dimensions of sustainability: environmental indicators, economic indicators, and social indicators.

We once again reviewed the public information provided by the eight model cities to identify which cities were presenting information or progress on the 15 sustainability indicators. Table below lists the 15 indicators and shows which of the model cities included each indicator in its respective sustainability plan.

Table 1. Sustainability Indicators Used by Model Cities

	Seattle, WA	Portland, Or	Oakland, CA	San Fran., CA	Minn., MN	Chicago, IL	Boston, MA	Austin, TX
Environment								
Air quality	X	X	X	X	X	X	X	X
Water Quality	X	X	X	X	X	X	X	X
Waste Reduction	X	X	X	X		X	X	X
Recycling	X	X	X	X		X	X	X
Renewable Energy	X	X	X	X	X		X	X
Energy Reduction	X	X	X	X		X		X
Green Buildings	X	X	X	X			X	X
Land Management	X	X	X	X	X	X	X	X
Public Transportation	X	X	X	X	X	X		X
Economy								
Unemployment Rates				X		X		X
Affordable Housing		X	X		X	X		X
Job Creation		X	X		X	X		X
Social								
Education		X		X	X	X		
Crime & Neighborhood		X			X	X		X
Healthcare				X	X	X	X	

Observed Trends. As stated before, many cities are addressing comprehensive sustainability programs, seeking to reduce greenhouse emissions, and subscribing to principles of Smart Growth. In an effort to understand what model green cities are reporting, we reviewed websites for sustainability programs of eight cities: Seattle, Minneapolis, Chicago, Portland, Oakland, San Francisco, Boston, and Austin.

Minneapolis, MN

Minneapolis has issued three annual reports (2006-08).[34] The reports detail progress on six citywide goals, which are measured by 24 sustainability indicators identified in 2003 as part of the City's Sustainability Initiative. The reports provide information on each sustainability goal, identify the

[34] City of Minneapolis MN (2009). Reports & Publications: Sustainability living well annual report. Retrieved March 25, 2009 http://www.ci.minneapolis.mn.us/sustainability/livingwell.asp

quantifiable goal for achievement, provide qualitative and quantitative analysis on progress to date, and graph ten-year trends. Although the report identifies recent activities pertaining to each goal, the reports fail to identify the exact steps or strategy in place to achieve the goal. For instance, on the first sustainability indicator, healthy infants, the report explains that healthy infants is defined as the infant mortality rate and explains its significance as a sustainability indicator. Infant mortality rates are graphed to show trends over the past 10 years and the overall goal is stated: to reduce rates to 4.5 deaths per 1000 live births by 2010. The report identifies recent activities related to this goal, such as providing Healthy Start program screenings for 698 pregnant women, but the report never clearly identifies the planned strategy for achieving the goal of reduced infant mortality rates.

The City supplements its Sustainability Living Well reports with additional reports. GreenPrint is a more extensive report elaborating on the environmental indicators of the sustainability report. The Carbon Footprint Project Report Summary provides baseline data from the City's first inventory of community and city government greenhouse gas (GHG) emissions. The City's website provides specific quantifiable goals for reduced GHG emissions, but the action plan for reaching those goals is not reported.

Seattle, WA

Seattle's Environmental Action Agenda organizes the city's sustainability efforts into four categories: climate protection, green Seattle, water, and people and communities. The climate protection efforts were widely documented. Green Seattle only reported on the initiative to plant trees and did not provide information on additional initiatives or information on goals or progress related to tree planting. Several initiatives are discussed under the umbrella of water restoration and protection. The people and communities category includes the City's 20-year sustainable communities plan.

The Climate Action Plan report details the City's accomplishments to date on reducing Seattle's carbon footprint. The plan was issued in 2006 and details 18 target action areas for improvement in order to

reduce the City's carbon footprint (such as increase public transportation usage, expand bicycling infrastructure, etc.). Each action area is broken down into specific elements (such as creating a master bicycling pan), specifies how progress will be measured, but quantifiable goals to be achieved are never defined. The first progress report was issued in 2007-08.[35] The report details progress in each target area and provides graphs and discussion of 10 plus year trends. The Progress Report never makes clear the target goal, which was never defined in the original Climate Action Plan.

Chicago, IL

The Chicago Climate Action Plan (CCAP) outlines 26 actions to reduce greenhouse gases and 9 actions to prepare for climate change, helping the City, residents, and businesses reduce greenhouse gases by 25 percent below 1990 levels by 2020 and 80 percent below 1990 levels by 2050. The Chicago Climate Task Force, in consultation with hundreds of stakeholders, recommended these actions for the City of Chicago and every Chicago business and resident[36]. The CCAP is a product of Mayor Richard M. Daley's Chicago Climate Task Force (CCTF), a multi-stakeholder group.

The CCTF agreed that Chicago needed to achieve an 80 percent reduction below its 1990 GHG emissions by the year 2050 in order to do its part to avoid the worst global impacts of climate change. To achieve the desired 80 percent reduction, the CCTF proposed an initial goal of a 25 percent reduction below 1990 levels by 2020, a mid-term goal that was far enough in the future to allow time for major infrastructure and behavioral changes, but soon enough to ensure Chicago is on the right course.

In 2005, 36.2 million metric tons (MMT) of greenhouse gases in carbon dioxide equivalent units (MMTCO2e) were emitted in Chicago, averaging 12.7 tons per year for each of Chicago's 2.8 million residents. The 1990 baseline level of emissions is 32.3 MMT (1990 is specified by the Kyoto Protocol). If Chicago continues on its current path, which assumes continued population growth, its emissions would

[35] City of Seattle WA (2008). 2007-2009 Seattle Climate Action Plan Progress Report. Retrieved March 25, 2009 from http://www.seattle.gov/climate/docs/SeaCAP%20Progress%20Report2007.pdf
[36] City of Chicago IL. 2009 Chicago Climate Action Plan. Retrieved March 28, 2009 from http://www.chicagoclimateaction.org/pages/chicago_climate_action_plan/45.php

grow to 39.3 MMTCO2e by 2020. To achieve the CCTF's targeted 2020 goal of 24.2 MMTCo2e, projected emissions will need to be cut by 15.1 MMTCO2e by 2020[37].

In regards to qualitative and quantitative reports, Chicago only issues reports detailing projections and potential impacts of climate change. The reports detailed information concerning five potential climate impacts. Those five potential impact areas included the following: Climate, Water, Health, Ecosystems, and Infrastructure.

Portland, OR

Portland issued a Sustainability Update Report (2007-08). The report details progress on the city's sustainability efforts. For 2009, Portland has targeted three sustainability efforts to address: Energy, Fleet Fueling Contracts, and Green Building Techniques.[38] Portland's Energy goal is to save more than $3.3M annually from building, equipment, and traffic and street lighting energy efficiency. Portland's Bureau of Purchases and City Fleet constructed an innovative fleet fueling contract for biodiesel. The contract gives preference to Oregon Farmers and regional biodiesel producers, furthering the City's goals for job growth, reducing GHG emission and local environmental health. In addition, the Portland's Fire and Rescue Department is using green building techniques from tenant improvements to make workspaces healthy for city employees.

Portland's Sustainability Update Report is a qualitative progress report. This report details what the city has done to build on past sustainable actions and efforts by each city department and bureau. There was not any public information about quantifiable goals and progress reports within the Sustainability Update Report.

[37] City of Chicago IL. 2009 Chicago Climate Action Plan. Retrieved March 28, 2009 from http://www.chicagoclimateaction.org/pages/climate_change_101/21.php

[38] City of Portland OR (2007-08). 2007-2008 Portland Sustainability Update. Retrieved on March 28, 2009 from http://www.portlandonline.com/osd/index.cfm?a=217412&c=41630

Oakland, CA

Oakland has issued six annual reports (2001-2006).[39] These reports detail status updates on Oakland's sustainable programs from each previous year. The reports provide detailed information on each program, the program goals, fiscal impact studies, and recommendations on how to implement sustainability programs. The reports fail to identify key indicators that are directly linked to Oakland's Sustainability Initiative. However, the reports demonstrate an active participation on the City Council's directive to administer sustainability programs.

San Francisco, CA

San Francisco's Climate Action Plan provides background information on the causes of climate change and projections of its impacts from recent scientific results.[40] This plan presents estimates of San Francisco's baseline GHG inventory and reduction target of 20 percent. This plan also recommends emission reduction actions in the key target sectors – transportation, energy efficiency, renewable energy, and solid waste management. By addressing those standards, San Francisco is projected to reduce its GHG emissions by 20 percent. In addition, this plan presents the steps required over the next term to implement the plan.

Boston, MA

In 2007, Mayor Thomas Menino signed an Executive Order on Climate Action requiring the City of Boston to report annually on its GHG emissions.[41] The inaugural 2008 report provides information concerning inventories for municipal emissions for fiscal years 2000 and 2005 and for community emissions in calendar year 2005.

[39] City of Oakland CA (2009). 2001-2006 Oakland Annual Sustainability Reports. Retrieved on March 28, 2009 from http://www.oaklandpw.com/Page774.aspx
[40] City of San Francisco CA (2008). 2008 San Francisco Climate Action Plan. Retrieved on March 28, 2009 from http://www.sfenvironment.org/downloads/library/climateactionplan.pdf
[41] City of Boston (2007). 2008 City of Boston Progress Report. Retrieved on March 29, 2009 from http://www.cityofboston.gov/climate/progress.asp

According to the progress report, FY2006 municipal operations accounted for the emission of about 199,000 tons of equivalent carbon dioxide (eCO2), after adjustment for carbon offsets.[42] This is 11,000 tons less than the FY2005 figure. About half of the change comes from reduced energy consumption by the Boston Public Schools; the other half comes primarily from increased purchases of Renewable Energy Certificates (RECs) for electricity. In FY2000, the earliest year for which the City has a reliable inventory, emissions were 203,000 tons.

Austin, TX

Austin Climate Protection Plan was developed in 2007.[43] The plan consists of five major components, which include sub-category plans. Each sub-category plan is listed below.

a. Municipal Plan - Make all City of Austin facilities, vehicles, and operations carbon-neutral by 2020.
b. Utility Plan - Expand conservation, energy efficiency, and renewable energy programs to reduce Austin Energy's carbon footprint; cap carbon dioxide emissions from existing power plants; and make any new electricity generation carbon-neutral.
c. Homes and Buildings - Update building codes for new buildings to be the most energy-efficient in the nation, pursue energy efficiency upgrades for existing buildings, and enhance Austin Energy's Green Building program.
d. Community Plan - Engage Austin citizens, community groups, and businesses to reduce greenhouse gas emissions throughout the community.
e. "Go Neutral" Plan - Provide tools and resources for citizens, businesses, organizations, and visitors to measure and reduce their carbon footprint.

[42] City of Boston (2007) 2008 City of Boston Progress Report. Retrieved on March 29, 2009 from http://www.cityofboston.gov/climate/progress.asp
[43] City of Austin (2007) 2009 City of Austin Climate Protection Plan. Retrieved on March 29, 2009 from http://www.ci.austin.tx.us/acpp/acpp.htm

The progress report on Austin's Climate Protection Plan details qualitative information on each of the plan's sub-category plans. For example, Austin completed a greenhouse gas inventory for all City departments. This inventory measures the City's carbon footprint and will allow assessment of the relative impact of various reduction measures.[44] Tracking greenhouse gas emissions will allow the City to quantitatively monitor progress on achieving greenhouse gas reductions goals. Moreover, Austin's progress report does not detail quantitative measures of achieving their goals.

Many cities embraced green government years ago. Progressive cities have tested and tried many ideas and had time to determine which provide the most impact and return. These cities have also collaborated and partnered with other cities to find out what works and what doesn't. These moves have allowed many of the referent and aspirant cities to obtain a head start on urban sustainability. This allows Little Rock the advantage of researching what these cities have done and allows replication of the initiatives that complement the city's strategic plan (and could shorten the implementation curve).

The following are the trends observed in most aspirant cities:

- More Bicycling, Bike Plans and Amenities: cities are providing more support for bicycles as a transportation mode.
- Revitalizing Downtowns: cities are transforming downtown areas and providing redevelopment and transit. It will be shown that Little Rock has a great advantage in these first two trends.
- Bring trains back into the mainstream environment: this includes investments in light rail and other public transit infrastructure.
- Making green a part of the culture: cities are doing more things to incorporate the green concept into everyday life. This includes such things as appointing sustainability officers, using

[44] City of Austin (2007). 2009 City of Austin Climate Protection Plan Progress Report. Retrieved on March 29, 2009 from http://www.ci.austin.tx.us/acpp/acpp_progress.htm

hybrid/biodiesel vehicles in government fleets, and increasing the number of green buildings. Some cities also have websites for sustainability.

- Alternative/Renewable Energy: some cities are providing incentives for wind and solar installations.

In our research, we also identified additional initiatives that have not yet gained widespread adoption as trends, rather, they might be described as "what's hot."[45]

1. Green Building (in ALL developments) – parking lots, museums, zoos, and airports are now included and built using Green concepts. Some cities using this include San Francisco, Seattle, Chicago, Boston, Portland and Los Angeles.
2. Re-Forestation of Cities – cities are trying to bring back the benefits of resources that once were the first to go during development. Trees can provide urban canopies on streets and rooftops and can help in reducing the urban heat island effect.
3. Reusing Waste – Landfills and other waste sources produce methane gas that can be used as fuel.
4. Car-Free Weekends – encouraging other methods of transportation to reduce emissions.

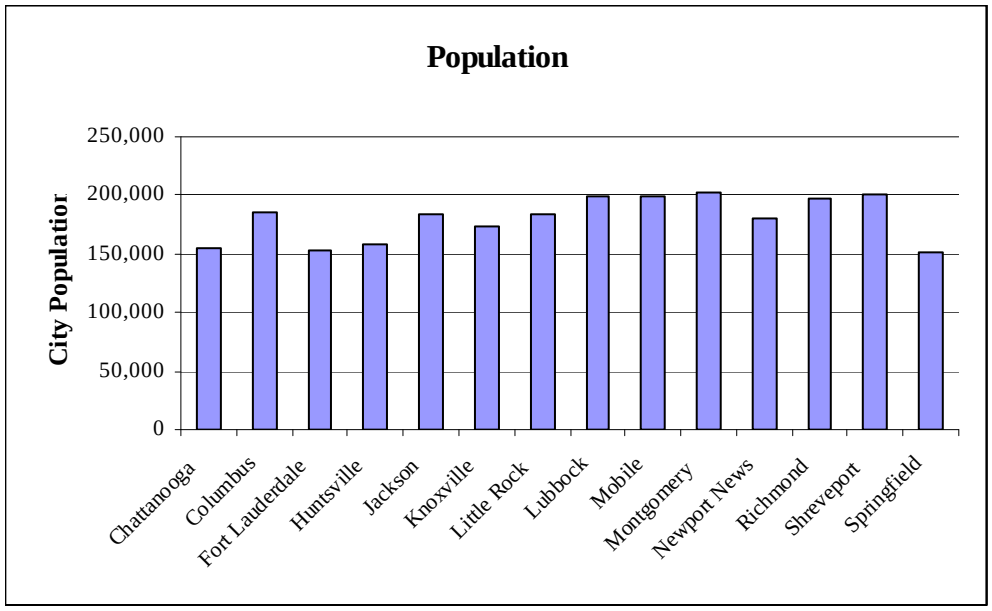
Referent Cities and Sustainability

Referent Cities. Since the lists we used to determine the eight model cities would exclude Little Rock and similar cities based upon population, we felt it was important to also identify the U.S. cities most similar to Little Rock, or referent cities, for comparison of sustainability performance. To identify the referent cities, the Institute for Economic Advancement (IEA) at the University of Arkansas at Little Rock (UALR) used data from the U.S. Census Bureau to find U.S. cities similar to Little Rock in population, industry mix, educational attainment, household income, and the portion of each city's population living below the poverty level.

[45] http://www.sustainlane.com/us-city-rankings/articles/2008-city-rankings-mega-trends/BLWHWHVMNNAI7FSDCXPCTTM4PSJ4

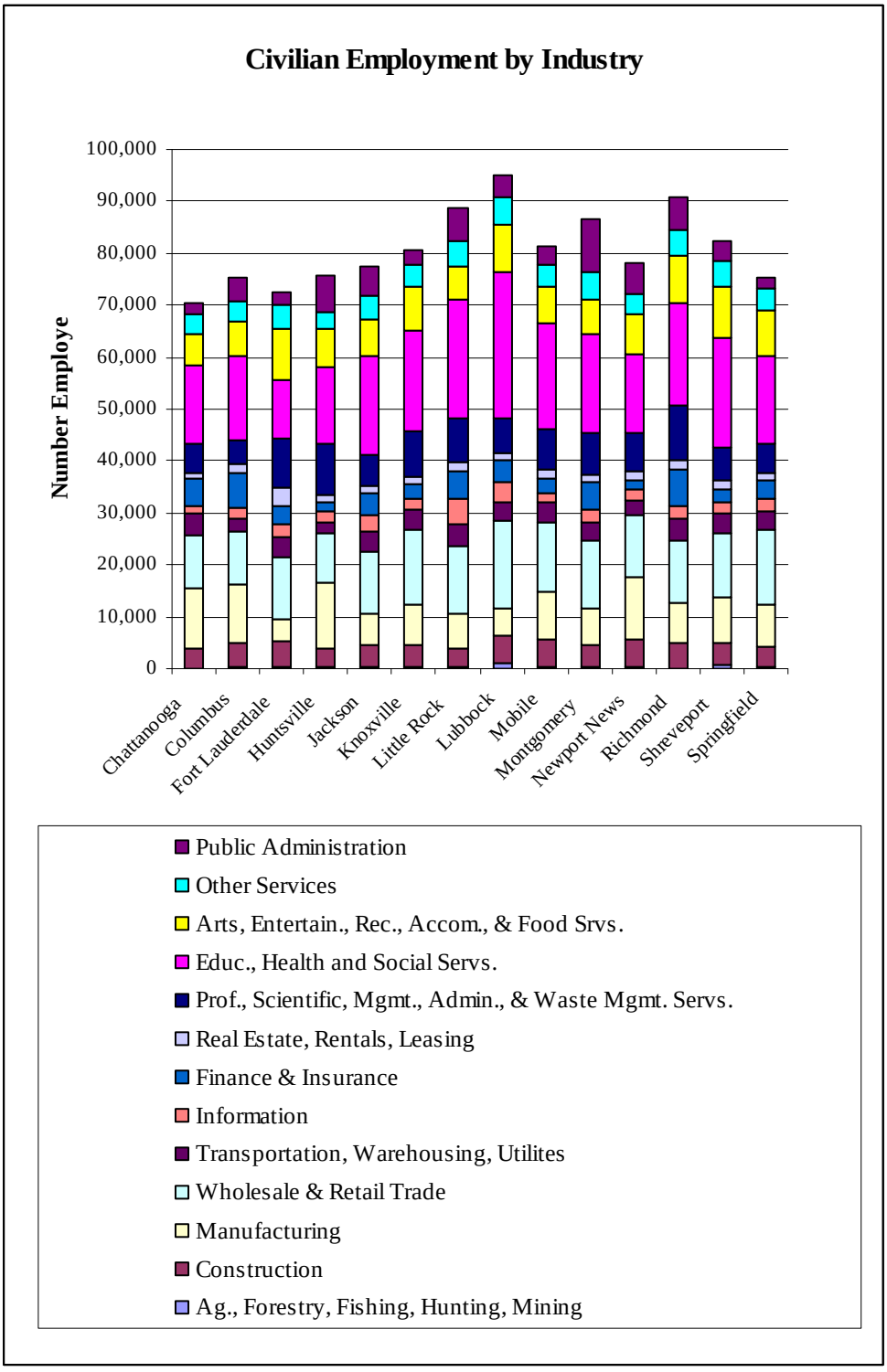
The IEA analysis resulted in the identification of 13 referent cities: Chattanooga, Columbus, Fort Lauderdale, Huntsville, Jackson, Knoxville, Lubbock, Mobile, Montgomery, Newport News, Richmond, Shreveport, and Springfield. Census data compiled for the 13 cities is presented in Table through Table below.

Table 2. Population of Little Rock and Referent Cities



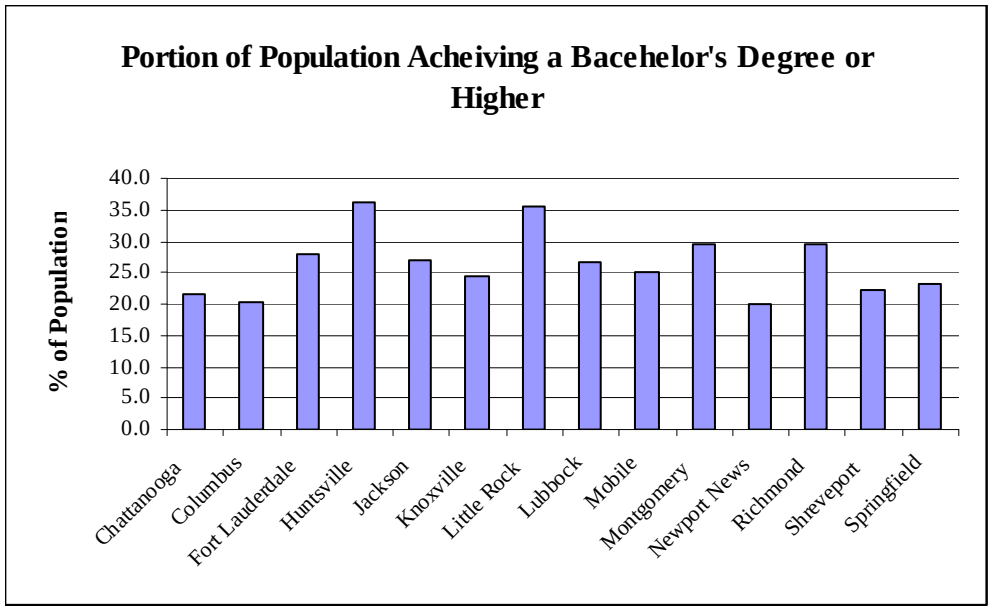
Source: UALR Institute for Economic Advancement 2000 Census of Population

Table 3. Civilian Employment by Industry in Little Rock and Referent Cities



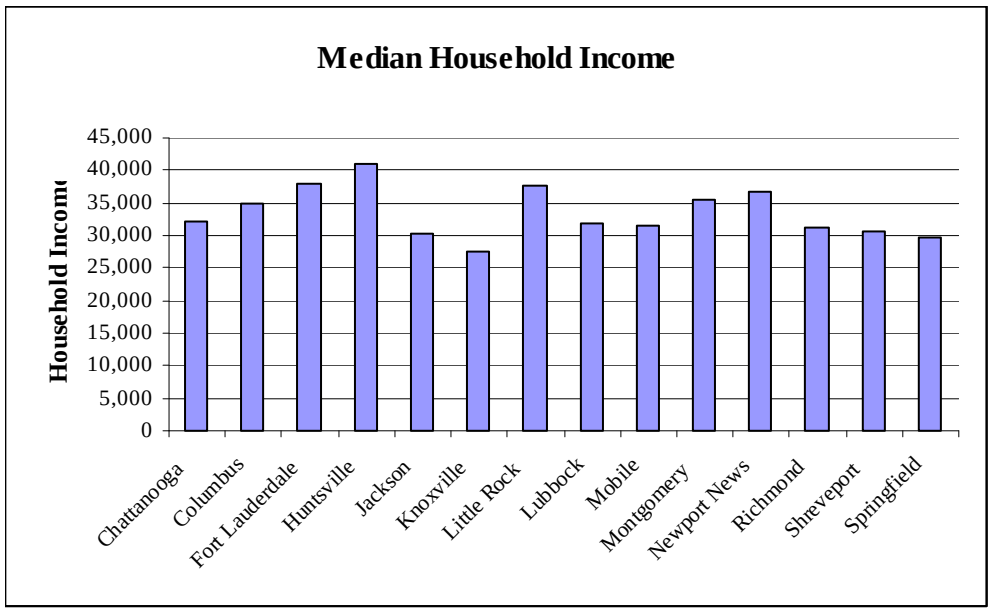
Source: UALR Institute for Economic Advancement 2000 Census of Population

Table 4. Educational Attainment of Population of Little Rock and Referent Cities



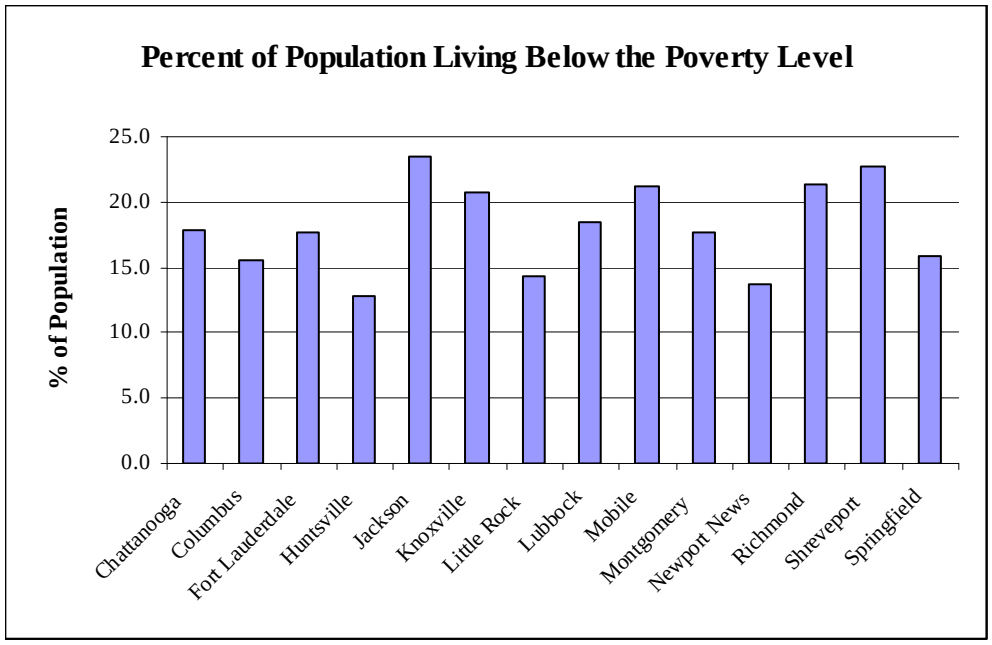
Source: UALR Institute for Economic Advancement 2000 Census of Population

Table 5. Median Household Incomes in Little Rock and Referent Cities



Source: UALR Institute for Economic Advancement 2000 Census of Population

Table 6. Percent of Population Living Below the Poverty Level in Little Rock and Referent Cities



Source: UALR Institute for Economic Advancement 2000 Census of Population and Housing

Referent City Performance on Sustainability Indicators

We researched the thirteen referent cities (those similar in size and other attributes to Little Rock) in regards to their performance on the 15 identified sustainability indicators. The referent cities include Chattanooga TN, Columbus GA, Ft Lauderdale FL, Jackson MS, Knoxville TN, Huntsville AL, Lubbock TX, Mobile AL, Montgomery AL, Newport News VA, Richmond VA, Shreveport LA and Springfield MO. The fifteen sustainability indicators are:

- Environment – Air Quality, Water Quality, Waste Reduction, Recycling, Renewable Energy, Energy Reduction, Green Buildings, Land Management, and Public Transportation
- Economy – Unemployment Rates, Affordable Housing/Cost of Living, Job Creation/Economic Development
- Social – Education, Crime & Neighborhood Safety, and Healthcare

Our research found that each city uses its own system of measurement for sustainability indicators. Cities identify unique boundaries in measurements, what to include, what to exclude, and other factors which result in non-uniform and inconsistent data between cities. We found that although most referent cities are doing something in regards to sustainability, it was hard to determine a pattern or system. The cities seem to be lagging in most areas, but are trying to develop a few initiatives in the major categories. For example, reviewing the categories we find that nine of the referent cities are monitoring and/or reporting Water Quality, but only three are monitoring Air Quality. Recycling is even more exaggerated; twelve of the thirteen are monitoring recycling and only one is monitoring energy reduction. The category of Renewable Energy/Energy Reduction actually has almost equal results; one city is monitoring Energy Reduction and two are monitoring Renewable Energy.

Although Green Buildings seems to be one of the hottest trends, only two cities report the number of green buildings on their own websites. Ten are monitoring Land Management and nine for Public

Transportation. Equally surprising, only two cities are monitoring Healthcare and five for Education. However, eleven monitor Crime and Neighborhood Safety.

Reviewing from another angle, let's look at how many indicators each city monitors. Knoxville leads the way monitoring and/or reporting an astonishing twelve of the fifteen indicators. Lubbock, TX is next with ten indicators, then Newport News, VA with nine. There are two cities monitoring eight indicators, Richmond VA and Springfield MO. Ft Lauderdale FL, Columbus GA and Huntsville AL all monitor seven indicators. There are two cities monitoring six, Shreveport LA and Montgomery AL. Mobile AL and Chattanooga TN monitor five and Jackson MS only three.

LITTLE ROCK AND SUSTAINABILITY: AN INTERNAL ANALYSIS

Little Rock Sustainability Initiatives

Little Rock's cohesive strategy for achieving a more environmentally sustainable city is just beginning to emerge thanks, in part, to the Mayor's creation of a Sustainability Commission designed to make recommendations to help the city further its sustainability efforts. There are numerous independent initiatives taking place by our government, organizations, and community that should be united into a concerted effort to educate and create greater awareness in the Metro Area.

The most essential issue is the general lack of awareness of the green initiatives happening locally. For a person new to environmental sustainability it is difficult to find the numerous efforts, activities, and information on Little Rock websites or through personal contact. This person may get the impression that much is being done but it requires a significant time commitment to scratch the surface. The most widely available information is on recycling. This initiative can be seen on television, websites, and on the streets. Other noticeable efforts include public transportation, air quality reports (in the summer), and maybe one publicized event. Beyond that, sustainability efforts in the Metro area are virtually invisible to the majority of people.

Air & Water Quality

The state of Arkansas fairs well in the indicator of air quality. Several laws help to protect both air and water.[46]

Federal Regulations

- Clean Air Act

[46] Air quality Conditions & Forecasts. Retrieved March 15, 2009, from AIRNow Web site: http://airnow.gov/index.cfm?action=airnow.showlocal&CityID=126

- Toxic Substance Control Act

State Regulations

- Arkansas Water and Air Pollution Control Act
- Removal of Asbestos Material Act
- Other laws found in ACA Titles 8 and 20

AIRNow

AIRNow is one program in particular that gives information relating to the current air conditions, it considers both ozone and particles. AIRNow often gives a report heard during the summer months when both ozone particles can rise to levels unhealthy for sensitive groups.[47] Little Rock has a median AQI (air quality index) of 40.

Carbon Emission Reduction

This indicator, also known as climate change mitigation, typically includes these two goals.[48]

- Reduction of carbon dioxide emissions from City operations
- Reduction of citywide carbon dioxide emissions

Mayor Mark Stodola has joined others in signing the Conference of Mayors' Climate Protection Agreement, which asks mayors to meet or beat the Kyoto Protocol. The Kyoto

[47] Air Division Home Page. Retrieved March 15, 2009, from ADEQ Web site: http://www.adeq.state.ar.us/air/default.htm

[48] (April 2008). Minneapolis Greenprint Report. Retrieved March 22, 2009, from Minneapolis Sustainability Initiatives Web site: http://www.ci.minneapolis.mn.us/sustainability/docs/GreenPrint2008.pdf

Protocol was designed as a means to combat climate change by asking developed countries to stabilize green house gas emissions.[49]

The average Little Rock resident's carbon footprint (energy consumption and transportation fuel) is 3.009 tons, compared to the 2.24 tons by the average resident within the 100 largest urban areas in the US. [50] This is an increase of 1.6% between 2000 and 2005 and ranks Little Rock 85th among the 100 largest urban areas in the US.

Reaching carbon emissions reductions goals can incorporate several indicators related directly or indirectly carbon emissions. Examples include increasing alternative energy usage, energy conservation, and advocating public or alternative modes of transportation.

To further reduce carbon emissions, the city has created its River Rail electric streetcar trolley system to help reduce traffic and congestion. Additionally, Central Arkansas Transit Authority implemented a Rack and Roll system to allow cyclists to utilize the public transport system.

Water Quality

Improving water quality involves reducing the contaminants and pollutants found in the city drinking water. When comparing cities, the Environmental Working Group investigation of water was used for quantitative data.[51] Little Rock has 18 contaminants found in the city tap water.

There are several efforts underway to improve water quality. A 'can-the-grease' program is being marketed to help prevent clogging the sewer system. Little Rock Wastewater is

[49] Mashburn, Beverly B. (2008). *Activity by Government Level to Address Sustainability* . Little Rock, Arkansas
[50] Brookings Institute (2008). Retrieved March 22, 2009 from http://www.brookings.edu/reports/2008/~/media/Files/rc/papers/2008/05_carbon_footprint_sarzynski/metropro files.pdf
[51] National Tap Water Quality Database. Retrieved March 22, 2009, from EWG Investigation Web site: http://www.ewg.org/tapwater/findings.php

particularly involved in several sustainable activities.[52] Water treated at the Adam's Field Treatment facility is disinfected by UV light as opposed to traditional treatment with chlorine.

Recycling & Waste Management

Waste management is the collection, transporting, recycling, disposal, and monitoring of waste materials. An important component of waste management is minimizing, preventing, and recycling waste.[53]

Little Rock places a significant focus on recycling. Taking further steps to improve waste management would involve increasing education and awareness or implementing means to convert waste to energy. Little Rock Wastewater captures methane from the Fourche Creek Treatment Facility to produce energy to power the facility.

Recycling is the process of preventing the waste of used materials and turning them into new products. It reduces the consumption of new raw materials and the negative effects from disposing of used materials. Negative effects include air pollution, water contamination, and additional landfills requirements. Recycling can include both biodegradable and non-biodegradable matter.[54]

Little Rock has a recycling rate of 38% for weekly participation. It also offers information about what, when, and where to recycle certain materials that cannot be included in curbside pickup and should not end up in a landfill.

To improve recycling rates, additional marketing advertisements could be utilized or pay-as-you-through programs could be implemented. Citizens could also be encouraged to compost and turn biodegradable waste into soil fertilizer for a garden. A growing problem in many places

[52] Mashburn, Beverly B. (2008). *Activity by Government Level to Address Sustainability* . Little Rock, Arkansas
[53] Regional Recycling & Waste Reduction District. Retrieved March 15, 2009, from Recycle this in your area Web site: http://www.regionalrecycling.org/rock.php
[54] Regional Recycling & Waste Reduction District. Retrieved March 15, 2009, from Recycle this in your area Web site: http://www.regionalrecycling.org/rock.php

is what to do with e-waste. Information on where to recycle electronics household chemicals, batteries, automobile fluids, mercury containing items, is available on the web. However, it may be advised to make this easier to access by putting advertisements on the radio or television. The easiest option for the community might involve a separate curbside pick-up recycling day for these electronics and hazardous items.

Farmers Market

Buying locally produced food is seen as a way to reduce energy consumption since it takes less energy to travel to the consumer. It is also thought to improve the ecosystem and individual's well-being. Lastly, it supports the local economy.

Little Rock has a farmers' market in which local farmers can sell produce. This market is open to local farmers, some of whom provide organic produce. Not every member sells locally-grown food at the market. This was the underlying reason for the creation of the locally-grown farmers' market in North Little Rock.

To increase the purchase of locally-grown food, produce should be clearly labeled at the farmers market so consumers are given the opportunity to buy local. Most local farmers do advertise this. Advertising the days and times when the market is open might help to sell more local produce. Information about how much and in what ways local food saves resources should be available on a website for educational purposes.

Nature Conservation

Nature conservation is the preservation of native biodiversity and ecosystems. Little Rock and the state of Arkansas practice many nature conservation actions including the following:[55]

- Collaborative efforts from UALR, Fisheries and Wildlife Management, and Maumelle Watershed
- Arkansas Game & Fish Commission, Wild Life Conservation Strategic Plan
- Little Rock Nature Center.

Heritage Gardening with Local Plant Species

Heritage is the gardening of geographically indigenous plant species. It is aimed at cultivating the existing ecology of an area. It also seeks to prevent foreign plant species from entering the environment and competing with local species.[56]

The Arkansas Natural Heritage Commission seeks to protect and establish natural areas. They collect and maintain information about native plant and wild life in these areas. They also provide educational programs.[57]

Improving access to information about local plants would help cultivate native planting. These plants are often low maintenance and attract local wildlife. People may respond to information about how plants and trees in specific areas can help them improve their resource consumption.

[55] Little Rock Parks & Recreation. Retrieved March 15, 2009, from City parks & maps Web site: http://www.littlerock.org/ParksRecreation/parks/
[56] Environmental Preservation. Retrieved March 15, 2009, from Arkansas Natural Heritage Commission Web site: http://www.naturalheritage.com/resources/
[57] Environmental Preservation. Retrieved March 15, 2009, from Arkansas Natural Heritage Commission Web site: http://www.naturalheritage.com/resources/

LED Streetlights

The city of Little Rock has already transitioned to energy-efficient LED streetlights.

Hybrid Automobiles

The city of Little Rock has already added hybrid vehicles to its fleet of vehicles.

Awareness, Events, & Public Information

The city hosts an Earth Day festival that has typically been an exhibition of the environmental community and technologies available locally. There are multiple local websites that feature environmental articles, recycling information, and some green business references. These sites can be searched, but lack the convenience of being found in one easy to locate place. A person may give up a search because finding information requires multiple queries and is not easy to locate. Beyond websites, there are other places to learn about green events, such as the calendar at Whole Foods Market, Natural Awakenings magazine, and the Little Rock event calendar. A city-managed green calendar combining these events into one location would be very beneficial. As with other sustainability-related initiatives, the current green calendar of events is difficult to find and is not well-known or publicized.

Green Buildings

Green buildings are more energy efficient and utilize renewable resources. These buildings can lead to lower operating costs, improved air quality, and a reduced environmental

impact. The Leadership in Energy and Environmental Design (LEED) is an accepted rating system for sustainability-constructed buildings.[58]

Little Rock has 10 LEED-certified or higher buildings. Little Rock also has four Energy Star buildings. The Camp Aldersgate Commons Building and the Winrock International Office Building have Gold LEED certification. There are also some green neighborhoods in the works.[59]

Increasing awareness of green buildings in the metro may help to attract more interest in LEED certification for future projects. Five years ago no building in Arkansas was LEED certified, and now there are multiple. In addition to promoting their presence, it is advised to communicate how energy efficient these buildings are by comparing them to non-LEED certified buildings. It could become another selling point for the certification because the differences could be seen in black and white.

Transportation

Metroplan has been developing plans to address public transportation. Their new program called ArkRide assists people in finding a carpool with similar schedules and traveling points. Metroplan also supports other environmental initiatives concerning air, water, and green agenda.[60]

Little Rock does have trolleys and areas for biking and walking. CAT buses have been updated to carry bicycles. The metro area has numerous parks and many places for outdoor

[58] In the news. Retrieved March 15, 2009, from US green building council Arkansas Chapter Web site: http://www.usgbcar.org/
[59] General Info. Retrieved March 15, 2009, from Stellar Sun Web site: http://www.stellarsun.com
[60] Today's topics. Retrieved March 15, 2009, from Metroplan Web site: http://www.metroplan.org/

recreation.[61, 62] The Big Dam Bridge is a great place for outdoor recreation and is the longest pedestrian bridge in North America.[63] However, the Little Rock has few bike lanes and this can make it difficult for bikers to remain safe while they ride.

Increasing the use of public transportation, car-pooling, walking, and biking could be a marginally helpful indicator. Improving this indicator may be limited due to urban sprawl and the inability to incorporate the inconvenience into people's lives. This is still an important indicator that should be measured in the sustainability efforts. Creating more places to walk, bike, and run should be continued.

Renewable Energy/Energy Reduction

As of right now, Little Rock has not incorporated renewable energy sources into its energy demands.

Green Economy

Little Rock is currently cultivating a green economy by attracting new environmentally sustainable companies, such as three manufacturers of wind turbine components. A green job listing website has also been created to help support the green community.

A green economy will mature as the indicators improve. As the Metro area demands more green activities, these jobs will grow, and as the indicators improve it will attract more

[61] Little Rock & Central Arkansas Mountain Biking. Retrieved March 15, 2009, from Trails Web site: http://www.trails.com/activity.aspx?area=10955#trailid=BGM005-057&lat=34.76&lon=-92.26&zoom=9&m=terrain&a=MB
[62] Little Rock parks & recreation. Retrieved March 15, 2009, from City parks & maps Web site: http://www.littlerock.org/ParksRecreation/parks/
[63] The Big Dam Bridge. Retrieved March 22, 2009, from About.com Web site: http://littlerock.about.com/od/thingstodo/p/bigdamnbridge.htm

green businesses. This circular relationship is expected to become perpetual as more awareness, education, and actions for sustainability are accomplished.

City Commissions

The City Beautiful Commission is over 30 years old. In addition, the city has numerous other Commissions which promote social, environmental, or economic health, including the Sustainability Commission.

Downtown Revitalization

Revitalizing neglected areas of a city contribute to enhanced social, environmental, and economic health. Little Rock has made great progress in revitalizing the downtown area and has many more plans for growth.

These are only a few of the many initiatives underway within the city of Little Rock to promote a healthier and more sustainable community. However, it can be noted that these initiatives are neither well publicized nor well-coordinated with one another.

Little Rock and Referent City Performance

In order to address the question of how Little Rock is performing on common sustainability indicators, particularly in comparison to cities most similar to Little Rock around the country, we began by collecting third-party publicly available secondary data on all 15 sustainability indicators for Little Rock and its 13 referent cities. Of the fifteen common indicators identified, only nine were used in our quantitative analyses due to a lack of uniform data being publicly available for these indicators. The indicators not included in the following analyses are: Water Quality, Waste Reduction, Recycling, Renewable Energy, Energy Reduction, and Land

Management. It should be noted that these indicators are important in determining urban sustainability. Little Rock and other cities need to identify uniform ways in which to measure these indicators in order to include them in future comparisons and evaluations of urban sustainability. However, given the limitation that uniform data was not available at the time of this research, we were left with comparative data for only eleven indicators.

Operational Definitions. Due to the inconsistencies in data measurement and reporting between cities, for the purposes of comparison, it is far more reliable to use data gathered in a systematic and uniform manner from a public source such as government statistics or non-governmental organizations. As such, for this research, we have defined and measured the sustainability indicators as closely as possible to those outlined in the 2008 SustainLane methodology.[64] Indicators not specifically used by SustainLane were defined for the purposes of this research and are detailed below, using publicly available data to the greatest extent possible. Following is an operationalized definition of each sustainability indicator and an explanation of how data was gathered.

Environment.

Air Quality – Air quality is defined as the 2008 Median Air Quality Index for a city as reported by the U.S. Environmental Protection Agency.[65]

Water Quality – Water quality is defined as the number of contaminants found in the primary source of tap water for a city as reported by the Environmental Working Group's

[64] SustainLane (2008). 2008 US City Rankings: The SustainLane methodology. Retrieved March 10, 2009 from http://www.sustainlane.com/us-city-rankings/articles/the-sustainlane-methodology/JXICFDNN7CF9H7MD7P8USMW9Y78J

[65] U.S. Environmental Protection Agency (2009). AirData. Retrieved March 10, 2009 from http://www.epa.gov/air/data/geosel.html

December 2005 US city drinking water database, "National Assessment of Tap Water Quality."[66] Data for Little Rock shows 18 contaminants present in the sample. However, data was not available for all cities, thus preventing comparison.

Waste Reduction – Waste reduction is defined as the average pounds per person per year of waste compared to the previous measurement recorded. Measurement is specific to each city and no publicly available uniform measurements exist for comparison.

Recycling - Recycling is defined as the estimated recycling rate for the city's residents. Measurement is specific to each city and no nationwide publicly available uniform measurements exist for comparison. Little Rock reports a 38% recycling rate. However, data was not available for all cities, thus preventing comparison.

Renewable Energy - Renewable energy is defined as a city's ability to generate a specific percentage of its electricity from renewable sources. The exact percentage of electricity generated from renewable energy is a measurement determined by the city itself. No publicly available uniform measurements exist for comparison.

Energy Reduction - Energy reduction is defined as the carbon per capita (energy consumption & transportation fuel) as reported by the Brookings Institute.[67] The average Little Rock resident's carbon footprint (energy consumption and transportation fuel) is 3.009 tons,

[66] Environmental Working Group (2005). National Assessment of Tap Water Quality. Retrieved March 10, 2009 from http://www.ewg.org/tapwater/findings.php

[67] Brookings Institute (2000-2005). Shrinking the Carbon Footprint of Metropolitan America. Retrieved March 10, 2009 from http://www.brookings.edu/reports/2008/~/media/Files/rc/papers/2008/05_carbon_footprint_sarzynski/metroprofiles.pdf

compared to the 2.24 tons by the average resident within the 100 largest urban areas in the US. [68] This is an increase of 1.6% between 2000 and 2005 and ranks Little Rock 85th among the 100 largest urban areas in the US. However, data was not available for all cities, thus preventing comparison.

Green Buildings - Following SustainLane methodology, green buildings is defined as the number of LEED buildings per city (all certification levels and all rating systems except pilot projects) as reported by the U.S. Green Building Council.[69] To reflect the varying attributes of levels of LEED buildings, we converted the raw scores into a green building score by assigning each certified building a score of .05, bronze buildings were assigned a score of 1, silver buildings were assigned a score of 1.5, gold buildings were assigned a score of 2, and platinum buildings were assigned a score of 2.5. Thus, using this scoring method, Little Rock's 10 LEED-certified or higher buildings generated a score of 15. We also included raw data on the number of Energy Star buildings per city. However, in following SustainLane's example, further analysis defined "green buildings" strictly by our scoring method related to LEED buildings.

Land Management - Following SustainLane methodology, land management is a measure of urban sprawl, as defined by Smart Growth America[70], and green space, as defined by Trust for Public Land.[71] However, both studies covered only larger urban areas, thus, this indicator needs further refinement for cities of similar size to Little Rock.

[68] Brookings Institute (2008). Retrieved March 22, 2009 from http://www.brookings.edu/reports/2008/~/media/Files/rc/papers/2008/05_carbon_footprint_sarzynski/metroprofiles.pdf

[69] U.S. Green Building Council (2009). LEED projects & case studies directory. Retrieved March 10, 2009 from http://www.usgbc.org/LEED/Project/CertifiedProjectList.aspx

[70] Smart Growth America (2002). Retrieved March 10, 2009 from http://www.smartgrowthamerica.org/sprawlindex/sprawlreport.html

[71] Trust for Public Land (2002). Acres of Parkland as Percentage of City Area (none of our referent cities were listed in this report)

Public Transportation - Public transportation is defined as the percent of the population using public transit to get to work as reported by the U.S. Census Bureau.[72]

Economic.

Unemployment Rates - Unemployment rates are those reported by the Bureau of Labor Statistics for 2007.[73]

Affordable Housing - Following SustainLane methodology, affordable housing is determined by using data provided by the US Census Bureau[74] regarding average housing prices and average household income levels. The US Census Bureau data was used to determine the ratio of average house price to average annual income.

Job Creation - Cities identify sustainability-related EXPOS, trade shows, networking events, training events, and conferences as well as research centers at local universities as an indication of the city's support of green economic development. However, there is no standardized comparative measure in place. In lieu of measures of green economic development, we used common indicators of urban economic development. Specifically, we used the Census' report of private non-farm business employment change from 2000-2005[75], which identifies the number of new jobs in private industry, as an indication of job creation.

Social.

[72] U.S. Census Bureau (2009). Data Fact Finder 2005-07: Percent of population using public transportation to go to work. Retrieved March 10, 2009 from http://factfinder.census.gov/servlet/STGeoSearchByListServlet?_lang=en&_ts=254792128671

[73] Bureau of Labor Statistics (2007). Local area unemployment statistics. Retrieved March 10, 2009 from http://data.bls.gov/cgi-bin/surveymost?la

[74] US Census Bureau (200) Data Fact Finder 2005-07: Average Housing and Income statistics. Retrieved March 17, 2009 from http://factfinder.census.gov/servlet/STGeoSearchByListServlet?_lang=en&_ts=255456812038 & http://factfinder.census.gov/servlet/STGeoSearchByListServlet?_lang=en&_ts=255456867587

[75] U.S. Census Bureau (2009). State and metropolitan area data book: Metropolitan and micropolitan area data tables: B-9. Labor force and private business establishments and employment. Retrieved March 17, 2009 from http://www.census.gov/compendia/smadb/SMADBmetro.html

Education - Education rates are defined as the percentage of a city's population over age 25 that have attained a bachelor's degree or higher as reported by U.S Census Bureau.[76]

Crime & Neighborhood Safety - Crime and neighborhood safety is defined as the total number of crimes recorded (all categories) for 2007 as reported by the Federal Bureau of Investigation Uniform Crime Reports.[77]

Healthcare - Healthcare was defined as the 2006 number of physicians per capita (an indication of available healthcare services) as reported by the U.S. Census State & Metropolitan Area Data Book.[78]

Raw data on all the sustainability indicators can be found in the following charts. Table 7 presents raw data from a variety of public sources on 9 of the 15 sustainability indicators. Tables 8 through 19 present a graphical representation of each individual sustainability indicator for all 14 cities covered in this study.

[76] U.S. Census Bureau (2009). Data Fact Finder 2005-07: Percent of city population with Bachelor's degree or higher. Retrieved March 17, 2009 from http://factfinder.census.gov/servlet/STGeoSearchByListServlet?_lang=en&_ts=255356698287

[77] Federal Bureau of Investigation (2008). Crime in the United States: Uniform crime reports: Offenses known to law enforcement. Retrieved March 10, 2009 from http://www.fbi.gov/ucr/cius2007/data/table_08.html

[78] U.S. Census Bureau (2009). State & Metropolitan Area Data Book: Metropolitan and micropolitan area data tables: Table B-6. Metropolitan Areas — Physicians, Medicare, Social Security, and SSI. Retrieved March 19, 2009 from http://www.census.gov/compendia/smadb/SMADBmetro.html

Table 7. Sustainability Indicator Data for Little Rock and Comparative Cities

	Little Rock, AR	Chattanooga, TN	Columbus, GA	Fort Lauderdale, FL	Huntsville, AL	Jackson, MS	Knoxville, TN	Lubbock, TX	Mobile, AL	Montgomery, AL	Newport News, VA	Richmond, VA	Shreveport, LA	Springfield, MO
Environment														
Air Quality	40	48	46	32	41	39	56	26	32	42	41	40	37	37
Water Quality	18	21	N/A	N/A	9	N/A	21	21	11	13	N/A	4.5	N/A	18
Waste Reduction	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Recycling	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Renewable Energy	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Energy Reduction (tons C02)	3.009	3.11	N/A	2.156	N/A	3.063	3.134	N/A	N/A	N/A	2.34	3.039	N/A	N/A
Green Buildings	15	0	0	0	3	0	0.5	0	0	0	0.5	6.5	1	2
Energy Star Buildings	4	4	1	8	0	0	7	0	0	0	11	32	2	0
Land Management	82.3	N/A	N/A	108.4	N/A	N/A	68.7	N/A	N/A	N/A	95.6	N/A	N/A	N/A
Public Transportation	1.40%	2%	0.90%	5.60%	0.40%	0.80%	1.60%	0.70%	0.80%	0.80%	3%	6.80%	3.20%	1.40%
Economic														
Unemployment Rates	4.6	4	5.2	3.8	2.7	5.2	3.7	3.6	3.6	3.5	3.2	3.1	4.4	4
Affordable Housing	3.27 : 1	3.52 : 1	3.10 : 1	7.33 : 1	2.98 : 1	2.65 : 1	3.27 : 1	2.65 : 1	3.17 : 1	2.67 : 1	3.90 : 1	5.10 : 1	3.32 : 1	3.07 : 1
Job Creation	1.968%	1.724%	-5.519%	4.305%	7.671%	0.579%	6.106%	4.869%	0.524%	-1.323%	5.916%	2.367%	4.128%	5.129%
Social														
Education	38.9	22.5	20.4	30.4	39	26.2	27.3	29.1	25.2	30.7	21.7	32	24.4	24.8
Crime/Neighborhood Safety	38291	29000	30267	22518	24269	27993	29939	27308	30694	28053	17309	21655	28863	30796
Healthcare	458	303	239	275	253	428	368	418	297	210	308	362	465	260

Table 8. Air Quality as Indicated by the Median Air Quality Index

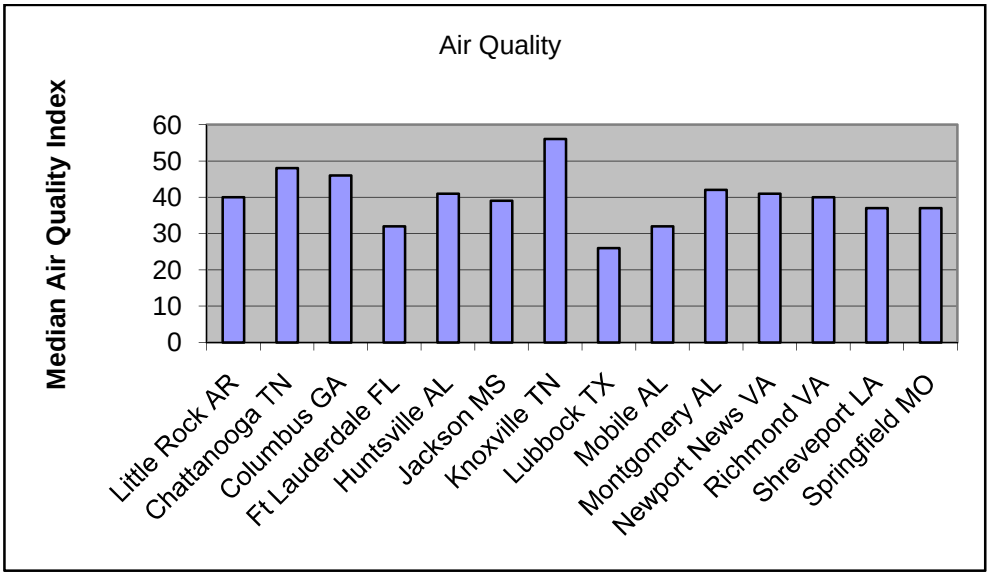


Table 9. Water Quality as Indicated by Number of Contaminants

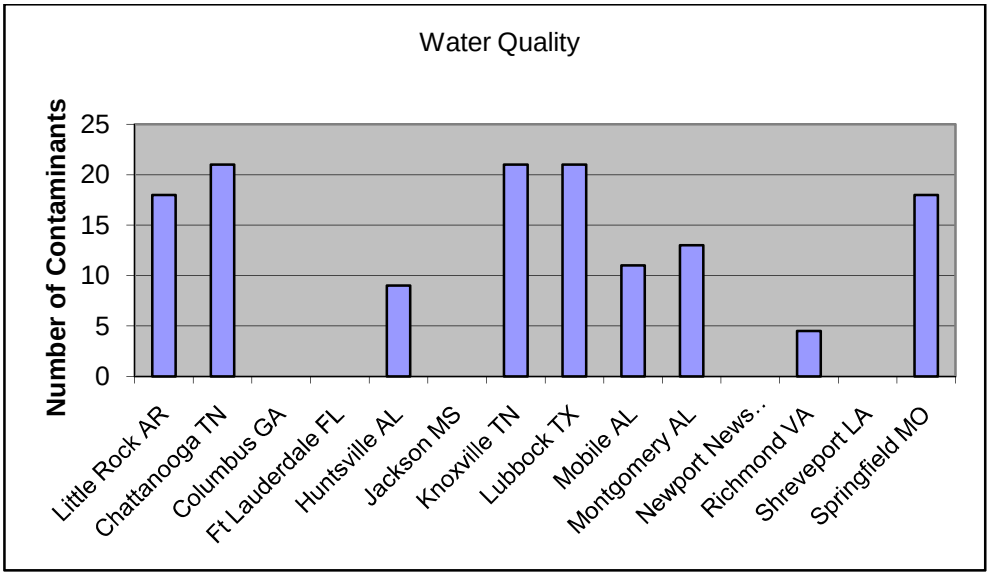


Table 10. Energy Reduction

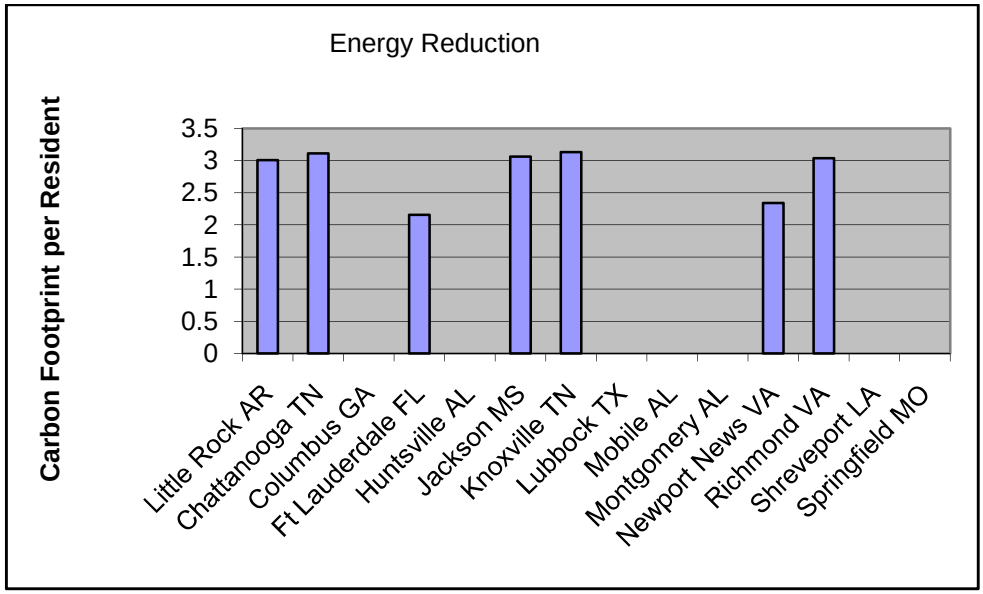


Table 11. Green Building Score Based Upon Number of LEED Certified or Higher Buildings

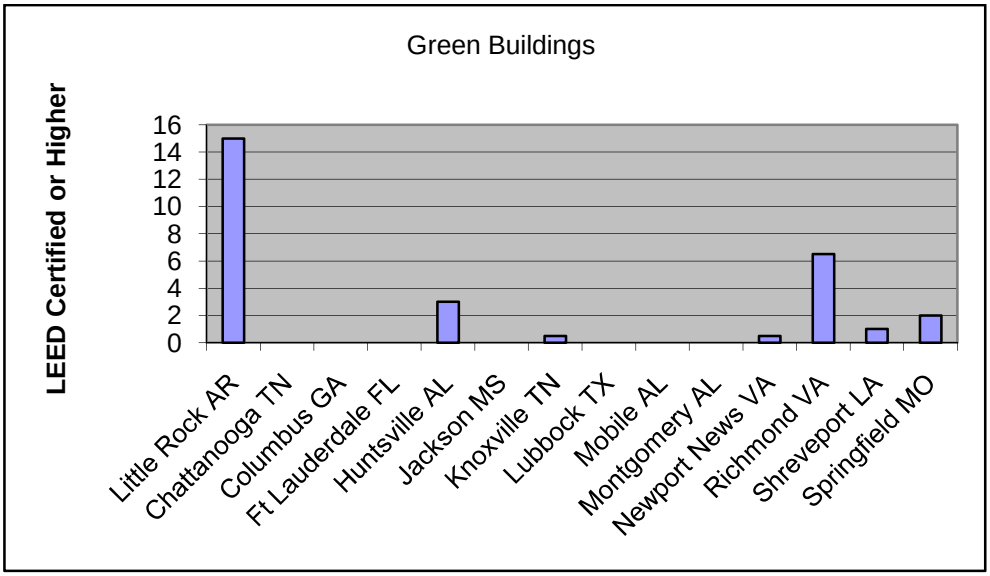


Table 12. Land Management

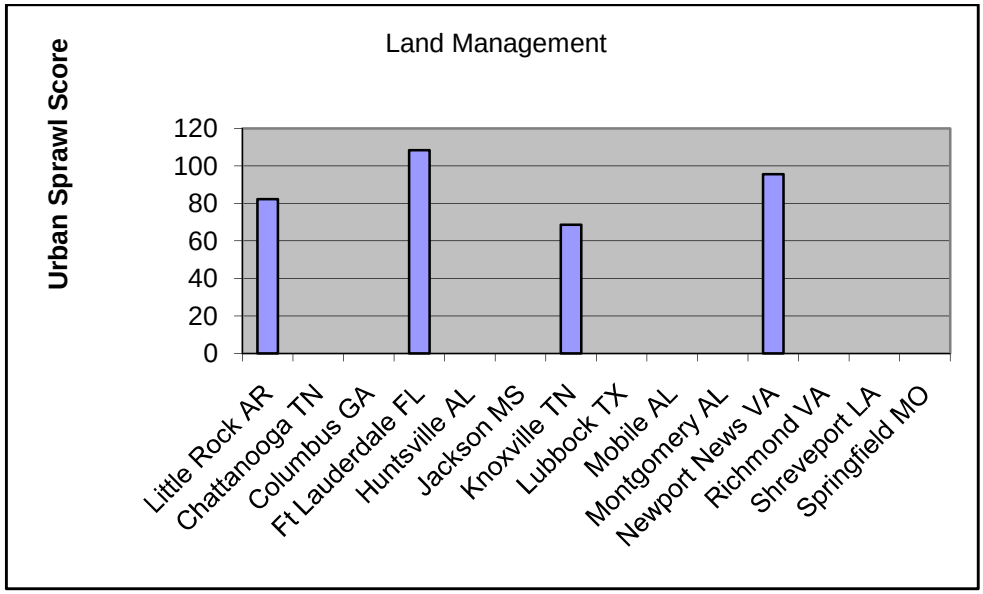


Table 13. Percent of Populations Using Public Transportation to Work

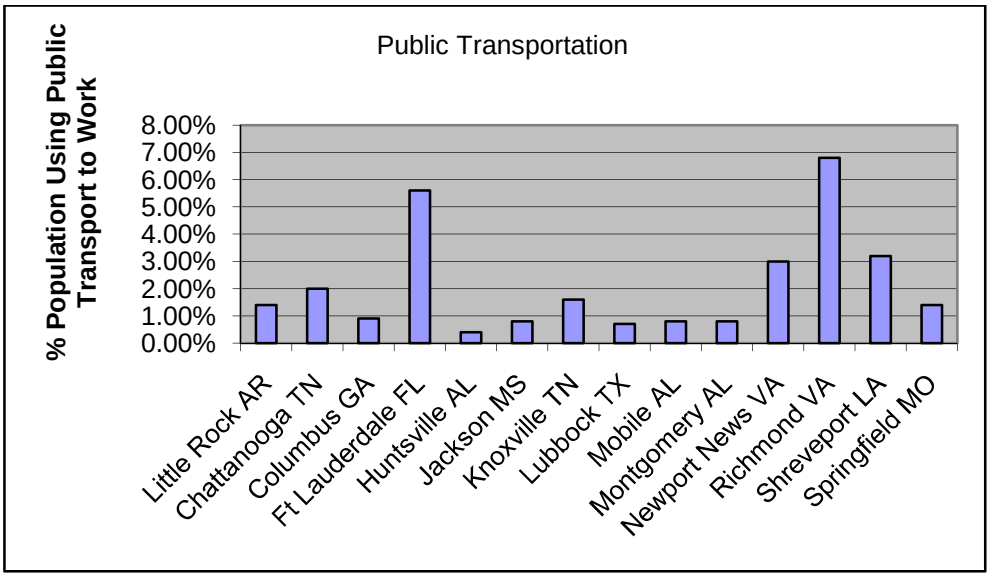


Table 14. Unemployment Rates

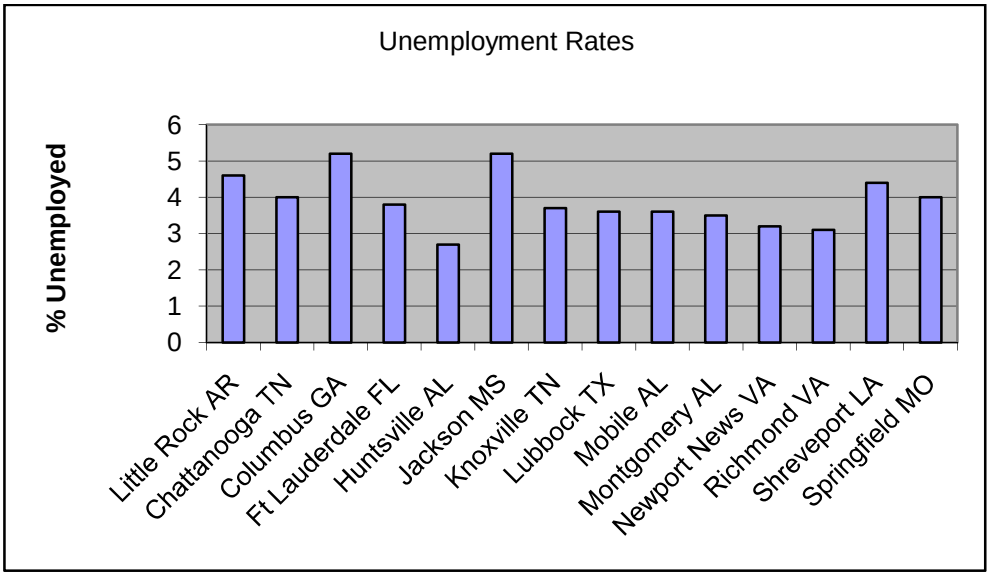


Table 15. Affordable Housing

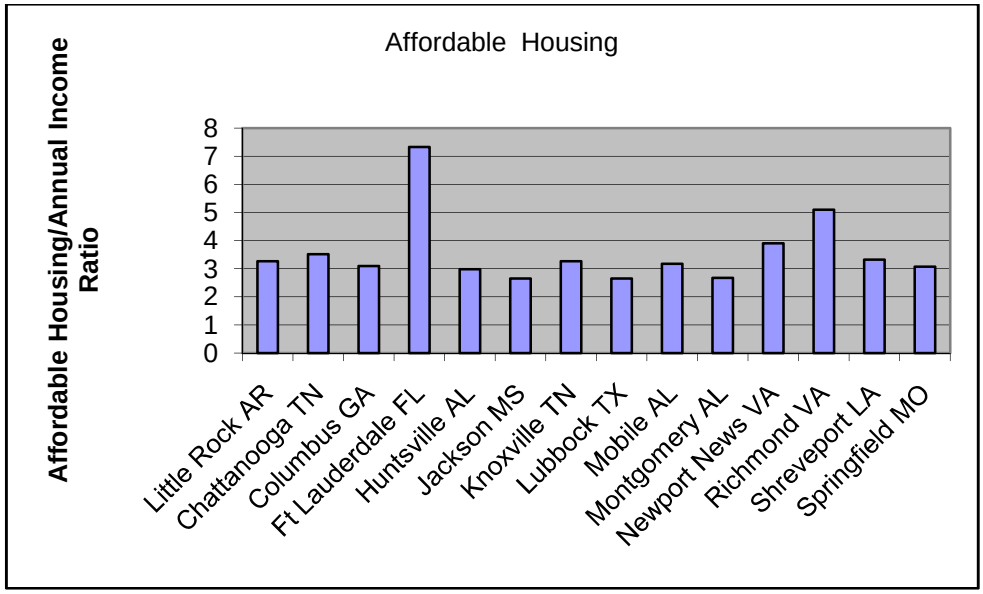


Table 16. Job Creation/Economic Development at Indicated by Percent of Private Industry New Jobs

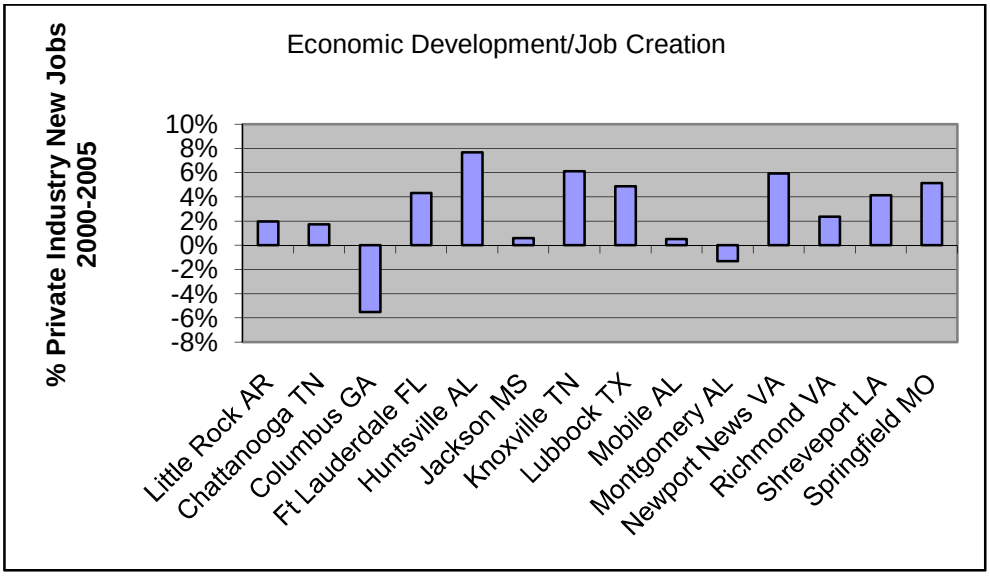


Table 17. Educational Attainment

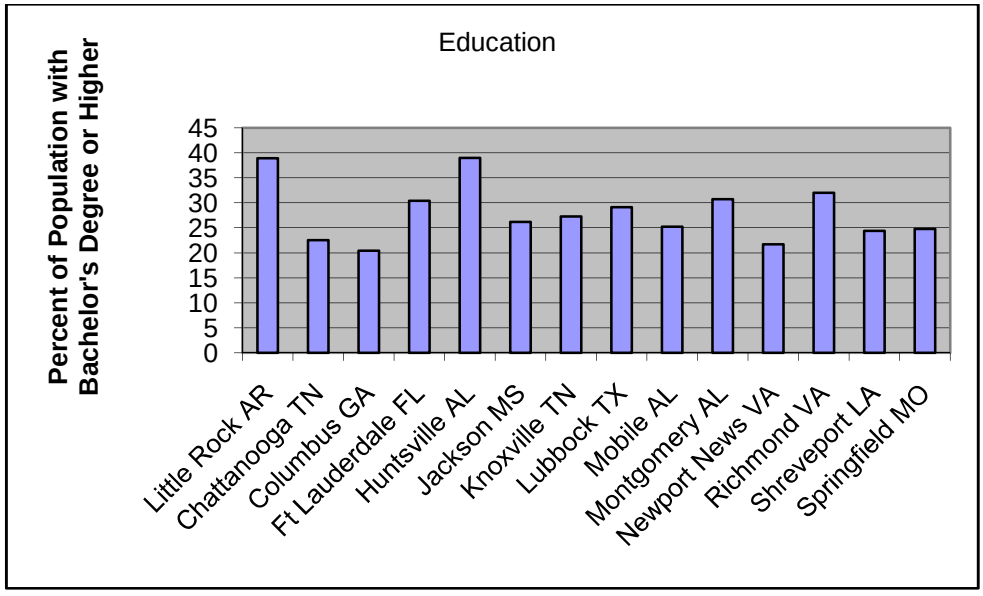


Table 18. Crime Rates

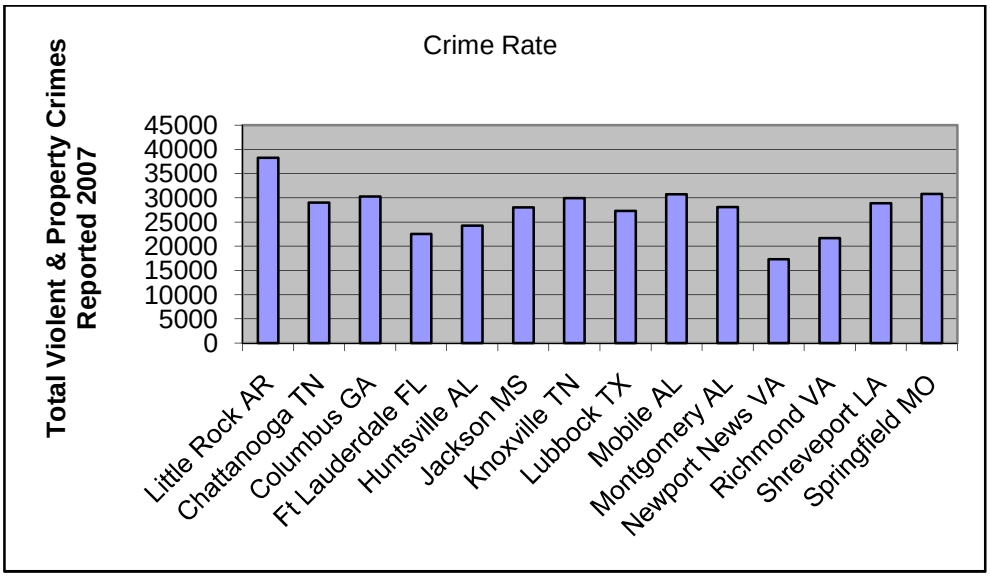
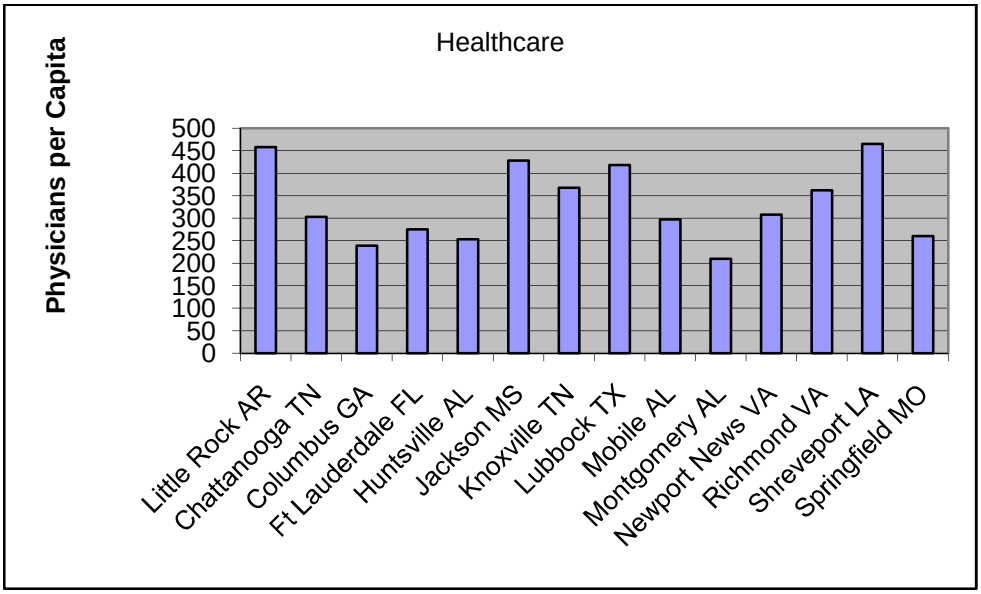


Table 19. Healthcare (Physicians per Capita)



Environmental Data.

Air Quality – Little Rock has a median Air Quality Index of 40. This number is close to many of the referent cities and appears to be about average.

Water Quality – Little Rock has 18 contaminant particles found in the city drinking water. When compared to the mean of 15.2, the city is a bit high.

Energy Reduction – Data was available for 7 of the 14 cities which prevented meaningful comparison across all cities. However, among the half of cities with data available, only two cities had a smaller average carbon footprint per resident.

Green Buildings – This indicator clearly reveals a strength for Little Rock. With 10 LEED-certified or higher buildings in the city, Little Rock has a strong lead over any other city. Little Rock also lists 4 Energy Star buildings within the city.

Land Management – data was only available on 4 cities thus preventing meaningful comparison across the 14 cities in our study. Little Rock's score of 82.3 was third among the four cities with data.

Transportation - This indicator involves reducing single passenger vehicles and providing more transportation options for the citizens. More options could include, buses, trains, trolleys, bicycle lanes, carpooling lanes. The percentage of people using public transportation in Little Rock is about 1.4%, which leaves room to improve.

Economic Data.

Unemployment Rates - Arkansas employment rate is at 4.6%. This is in the upper range and is among the highest when compared to other referent cities.

Affordable Housing/Cost of Living - Little Rock is somewhere in the middle when compared to referent cities in the area of average housing price to average annual income.

Job Creation - Little Rock is below the average and median when it comes to job creation and economic development. Improving this indicator would help with the overall mission of the sustainability commission.

Social Data.

Health Care - Little Rock's health care physicians per capita among the highest compared to referent cities. In the metro area from 1997-2001, 14.4% of people were without health insurance. From 2005-2007 the rate of uninsured people was at 17.5%.[79,80]

Education - Little Rock does exceptionally well when comparing graduation rates among both referent and aspirant cities. Little Rock has the second highest percentage of the population with a bachelor's degree or higher among the referent cities. Ideally, this indicator should also measure the amount of elementary and high schools that teach about environmental sustainability. This type of qualitative data is usually measured by a survey of environmental literacy. The survey is given before and after a program to measure the content retained by the students.[81,82]

[79] Demographia. Retrieved March 15, 2009, from International Housing Affordability Survey Web site: http://www.demographia.com/dhi.pdf
[80] Income, Poverty, and Health Insurance in the United States 2007. Retrieved March 15, 2009, from US Census Web site: http://www.census.gov/prod/2008pubs/p60-235.pdf
[81] About AEEA. Retrieved March 15, 2009, from Arkansas Environmental Education Association Web site: http://www.arkansasee.org/content/about-aeea
[82] Environmental Education US. Retrieved March 15, 2009, from Environmental Protection Agency Web site: http://www.epa.gov/enviroed/eepubsEPA.htm

Safety/Crime - Little Rock has a high crime rate in comparison to referent cities. Reducing crime could encourage environmental sustainability because it involves reducing the basic concern of safety.

Quantitative Analysis. We conducted two quantitative analyses on this data. First, we calculated the median of each sustainability indicator and determined the standard deviation for each (Table 21) and then we conducted a weighted sustainability strength assessment (Table 22).

Data distribution. The median and standard deviation calculations allow us to analyze the distribution of scores for the 14 cities in order to determine how each city is doing in comparison to each other regarding the sustainability indicators. The analysis consisted of a calculation of the median of the referent cities and the standard deviation of the referent city sustainability indicator data (Table 8). To be objective, the calculation of the number of standard deviations Little Rock is from the median is used to identify trends and anomalies amongst referent cities. Several items did not have any numerical data to use, so they are reflected as “n/a” in the spreadsheet.

Table 20. Distribution of Data

Little Rock, AR	Median	Standard Deviation	**L.R. S.D.s from Median**		
40	40.00	7.66	**0.00**		Air Quality
18	15.50	6.36	**0.39**		Water Quality
3.009	3.05	0.44	**-0.10**		Energy Reduction (tons C02)
15	0.00	1.89	**7.95**		Green Buildings
4	1.00	8.63	**0.34**		Energy Star Buildings
82.3	95.60	20.26	**-0.66**		Land Management
1.40%	0.01	0.02	**0.00**		Public Transportation
4.6	3.70	0.74	**1.22**		Unemployment Rates
3.27 : 1	3.17	1.30	**0.08**		Affordable Housing
1.968%	0.04	0.04	**-0.60**		Job Creation
38.9	26.20	5.05	**2.52**		Education
38291	28053.00	4149.68	**2.47**		Crime/Neighborhood Safety
458	303.00	79.61	**1.95**		Healthcare

From this analysis, Little Rock's standard deviations from the median will highlight above and below average sustainable indicator performance. According to the analysis, in comparison to all the referent cities, Little Rock is strong and competitive in the following areas:

- Green Buildings – at more than 7 standard deviations from the median, Little Rock is considerably stronger than any of its referent cities.
- Education – at more than 2 standard deviations from the median, Little Rock has a well-educated population when compared to referent cities.

- Healthcare – at more than 1 standard deviation from the median, Little Rock has a high number of physicians when compared to referent cities.

Little Rock's sustainability indicator performance concerning where the city is weak or not competitive:

- Unemployment Rates – at more than 1 standard deviation from the median, Little Rock's unemployment rates are high when compared to referent cities.
- Crime/Neighborhood Safety – at more than 2 standard deviations from the median, Little Rock's crime rate is much higher than referent cities.

Sustainability Strength Assessment. Another quantitative analysis conducted in order to create meaningful comparisons with this abundant amount of information was to create a weighted sustainability strength assessment. The sustainability strength assessment (SSA) provides a quantitative measurement for evaluating how a city compares to its referent cities in key areas of sustainability. The SSA is comprised of key sustainability indicators which are weighted based upon their importance (Table 22).

The SSA is calculated by first weighing the importance of each indicator. The SSA in Table 3 is based upon the fifteen most commonly used sustainability indicators as explained in the previous discussion on sustainability indicators. Of the fifteen common indicators identified, only nine were used in the SSA calculation due to a lack of uniform data available in the public domain for these indicators. The indicators not included in the calculation of the SSA are: Water Quality, Waste Reduction, Recycling, Renewable Energy, Energy Reduction, and Land Management. The nine remaining indicators used in the SSA were weighted based upon relative importance in urban sustainability. To determine relative importance of each indicator, we

closely followed weightings used by SustainLane and Popular Science rankings. Of the nine indicators used in the assessment, eight were given a weighting of 0.9. The two remaining indicators were weighted as follows:

Public Transportation weighted at 0.22

Air Quality weighted at 0.15

Public transportation was given the highest weighting because Popular Science and SustainLane gave this indicator the highest weighting. Public transportation was determined to be the most important indicator because it affects many other indicators such as air quality, water quality, and energy reduction. Air Quality was above average in importance (according to SustainLane and Popular Science) because a city's air quality affects every citizen on a daily basis and is can be affected by a city's actions in a variety of ways. The remaining indicators were weighted of equal importance.

Once sustainability indicators have been weighted according to their importance in urban sustainability, we next turned to rating the performance of each city on each indicator (using a 1 to 10 rating scale where 1 is poor and 10 is best). Ratings were determined through analyzing data collected from publicly available sources as defined previously in the discussion on sustainability indicators. The city with the best performance on an indicator was given a score of 10 and the city with the worst performance on an indicator was given a score of 1; all other cities were scored accordingly.

The rating for each city is then multiplied by the assigned weight of that indicator (a rating of 4 multiplied by a weight of 0.20 gives a weighted indicator score of 0.80) and the

results summed to find the Sustainability Score for each city.[83] These scores can then be rank ordered to determine how Little Rock compares to referent cities in the United States on common sustainability indicators used by cities throughout the country (Table 23).

[83] Thompson, Strickland and Gamble (2007). *Crafting & Executing Strategy: Text & Readings,* 15th ed. Boston: Irwin McGraw-Hill.

Table 21. Weighted Sustainability Strength Assessment

	Indicator Weight	Little Rock, AR		Chattanooga, TN		Columbus, GA		Ft Lauderdale, FL		Huntsville, AL	
		Strength	Score	Strength	Score	Strength	Score	Strength	Score	Strength	Score
Environment	**0.46**	**18.3**	**2.32**	**7.6**	**1.441**	**5.7**	**0.974**	**16.5**	**3.056**	**9.1**	**1.279**
Air quality	0.15	5.8	0.87	3.3	0.495	4	0.6	8.2	1.23	5.5	0.825
Green Buildings	0.09	10	0.9	0	0	0	0	0	0	2.6	0.234
Public Transportation	0.22	2.5	0.55	4.3	0.946	1.7	0.374	8.3	1.826	1	0.22
Economy	**0.27**	**17.9**	**1.611**	**19.43**	**1.7487**	**11.1**	**0.999**	**14.6**	**1.314**	**29.5**	**2.655**
Unemployment	0.09	3	0.27	5.33	0.4797	1	0.09	6	0.54	10	0.9
Affordable Housing	0.09	8.8	0.792	8.2	0.738	9.1	0.819	1	0.09	9.6	0.864
Jobs Creation	0.09	6.1	0.549	5.9	0.531	1	0.09	7.6	0.684	9.9	0.891
Well Being	**0.27**	**20.68**	**1.8612**	**11.2**	**1.008**	**7.5**	**0.675**	**16.75**	**1.5075**	**19.66**	**1.7694**
Education	0.09	9.98	0.8982	2	0.18	1	0.09	5.85	0.5265	10	0.9
Crime & Neighborhood Safety	0.09	1	0.09	5	0.45	4.5	0.405	7.6	0.684	7	0.63
Healthcare	0.09	9.7	0.873	4.2	0.378	2	0.18	3.3	0.297	2.66	0.2394
Totals	**1**	**56.88**	**5.79**	**38.23**	**4.20**	**24.30**	**2.65**	**47.85**	**5.88**	**58.26**	**5.70**

Strength rating scale = 1 poor to 10 best.

	Indicator Weight	Jackson, MS		Knox., TN		Lubbock, TX		Mobile, AL		Montgomery, AL	
		Strength	Score	Strength	Score	Strength	Score	Strength	Score	Strength	Score
Environment	**0.46**	**7.8**	**1.282**	**4.7**	**0.834**	**11.4**	**1.808**	**9.8**	**1.582**	**6.8**	**1.132**
Air quality	0.15	6.2	0.93	1	0.15	10	1.5	8.2	1.23	5.2	0.78
Green Buildings	0.09		0	1	0.09	0	0	0	0	0	0
Public Transportation	0.22	1.6	0.352	2.7	0.594	1.4	0.308	1.6	0.352	1.6	0.352
Economy	**0.27**	**16.1**	**1.449**	**24.03**	**2.1627**	**24.76**	**2.2284**	**20.81**	**1.8729**	**20.8**	**1.872**
Unemployment	0.09	1	0.09	6.33	0.5697	6.66	0.5994	6.66	0.5994	7	0.63
Affordable Housing	0.09	10	0.9	8.8	0.792	10	0.9	9	0.81	9.9	0.891
Jobs Creation	0.09	5.1	0.459	8.9	0.801	8.1	0.729	5.15	0.4635	3.9	0.351
Well Being	**0.27**	**17.86**	**1.6074**	**15.6**	**1.404**	**19.2**	**1.728**	**11.8**	**1.062**	**12.4**	**1.116**
Education	0.09	3.8	0.342	4.4	0.396	5.2	0.468	3.3	0.297	6	0.54
Crime & Neighborhood Safety	0.09	5.4	0.486	4.6	0.414	5.7	0.513	4.5	0.405	5.4	0.486
Healthcare	0.09	8.66	0.7794	6.6	0.594	8.3	0.747	4	0.36	1	0.09
Totals	**1**	**41.76**	**4.34**	**44.33**	**4.40**	**55.36**	**5.76**	**42.41**	**4.52**	**40.00**	**4.12**

	Indicator Weight	Newport News VA		Richmond VA		Shreveport, LA		Springfield, MO	
		Strength	Score	Strength	Score	Strength	Score	Strength	Score
Environment	**0.46**	**11.16**	**1.9402**	**20.4**	**3.484**	**13.1**	**2.231**	**11.05**	**1.7085**
Air quality	0.15	5.5	0.825	5.8	0.87	6.7	1.005	6.7	1.005
Green Buildings	0.09	1	0.09	4.6	0.414	1.4	0.126	1.95	0.1755
Public Transportation	0.22	4.66	1.0252	10	2.2	5	1.1	2.4	0.528
Economy	**0.27**	**24.63**	**2.2167**	**20.26**	**1.8234**	**20.4**	**1.836**	**22.83**	**2.0547**
Unemployment	0.09	8.33	0.7497	8.66	0.7794	4	0.36	5.33	0.4797
Affordable Housing	0.09	7.6	0.684	5.3	0.477	8.8	0.792	9.2	0.828
Jobs Creation	0.09	8.7	0.783	6.3	0.567	7.6	0.684	8.3	0.747
Well Being	**0.27**	**15.9**	**1.431**	**21**	**1.89**	**18.05**	**1.6245**	**10.5**	**0.945**
Education	0.09	1.6	0.144	6.6	0.594	2.95	0.2655	3.2	0.288
Crime & Neighborhood Safety	0.09	10	0.9	8.1	0.729	5.1	0.459	4.5	0.405
Healthcare	0.09	4.3	0.387	6.3	0.567	10	0.9	2.8	0.252
Totals	**1**	**51.69**	**5.59**	**61.66**	**7.20**	**51.55**	**5.69**	**44.38**	**4.71**

The result of the weighted Sustainability Strength Assessment allows us to create a ranking of mid-size cities in the US based upon sustainability indicators (Table 23). The total weighted score reveals that Little Rock is ranked third among similar cities across the United States.

Table 22. Little Rock Sustainability Comparison to Similar Cities

CITY	SCORE
1. Richmond VA	7.2
2. Ft. Lauderdale FL	5.88
3. Little Rock AR	5.79
4. Lubbock TX	5.76
5. Huntsville AL	5.70
6. Shreveport LA	5.69
7. Newport News VA	5.59
8. Springfield MO	4.71
9. Mobile AL	4.52
10. Knoxville TN	4.4
11. Jackson MS	4.34
12. Chattanooga TN	4.2
13. Montgomery AL	4.12
14. Columbus GA	**2.65**

SWOT Analysis

When a community is sustainable it meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainability is a key emerging "best practice" and increasingly recognized across the United States as a critical component of city operations and economic redevelopment strategies. This is the reason the City of Little Rock decided to create a Sustainability Commission. An analysis of Little Rock's strengths, weaknesses, opportunities, and threats (SWOT analysis) will help identify the key internal and external factors that are important to achieving the city's objectives. Identifying and connecting Little Rock's strengths, weaknesses, opportunities and threats will give the Little Rock Sustainability Commission the ability to recognize the skills and resources they need to meet their objectives and vision.[84]

Strengths. Strengths are attributes of the city that are helpful to achieving the objective of increased sustainability.

- Creation of the Little Rock Sustainability Commission brings together individuals to provide recommendations and help shape the sustainability agenda of the city.
- Many current initiatives already underway.
- In our sustainability strength assessments of Little Rock versus the ascribed referent cities, we found that Little Rock placed third among the US cities that are most like Little Rock. Little Rock is most responsible in the environmental indicator aspect. Little Rock has initiatives in place and has made progress in air

[84] Little Rock Sustainability Commission's recommendations

quality, water quality, energy reduction, green buildings and public transportation (CAT system, trolley system, bike trails).

- Green Buildings - Little Rock is doing very well compared to referent cities. There are ten LEED-certified or higher green buildings in the city. In addition, there are 4 Energy Star rated buildings or factories.
- Education – Little Rock has a high educational attainment compared to referent cities.
- Healthcare – Little Rock has a strong physicians per capita score.
- Governor's Commission on Global Warming – Arkansas is fortunate to be among early states that have conducted a greenhouse gas emissions audit. Based upon the GHG audit, the Governor's Commission on Global Warming made the following recommendations which can be coordinated with and integrated into the city's sustainability planning:[85]

    - A statewide reduction of 20 percent below 2000 levels by the year 2020, 35 percent by 2025, and 50 percent by 2035.
    - An investment of about $3.7 billion over 17 years to put these measures in place.
    - Establish an Arkansas Climate Change Center.
    - Adopt nuclear power as a cleaner alternative to coal-fired power plants.
    - Ban new coal-fired power plants until "sequestration" technology is available.

[85] www.arclimatechange.us

- Require electric companies to supply a percentage of their electricity from renewable energy sources.
- Reduce current demand for electricity use through adoption of energy-efficiency practices.
- A sales tax exemption for purchase of energy-efficient products.
- Expand biomass conversions.
- Forestry management to preserve as many trees as possible.
- Tax incentives and financing for renewable energy systems and net metering.
- Energy audits, weatherization, and other energy-efficiency programs for low-income residents.
- Rebates for purchase of fuel-efficient vehicles.

- In addition to the statewide recommendations of the Governor's Commission on Global Warming, Pulaski County's Competitive Realities report[86] addresses holistic sustainable community development. Both reports provide an important resource for coordination and integration within the city sustainability plan.
- The city has signed the Mayor's Climate Protection Agreement.

Weaknesses. Weaknesses are attributes of the city that could interfere with the objective of increased sustainability.

- One major weakness of the city and the Little Rock Sustainability Commission is its lack of a website detailing the city's current initiatives.

[86] http://www.bettertogether-lr.info/Competitive-Realities.pdf

- Furthermore, the city lacks a sustainability plan detailing the goals the city expects to achieve and the current (baseline) performance. This research report should assist in providing baseline performance data on common sustainability indicators.
- Information on what the city is currently doing related to sustainability, the city's goals and objectives related to sustainability, and the methods and processes for monitoring and evaluation of sustainability initiatives is not readily available for public consumption. Transparency is an important component of sustainability and making this information publicly available and easily accessible is necessary.
- In this time of recession and extreme budget cuts, a lack of available funding devoted to the creation of a Sustainability Coordinator or Sustainability Office is a weakness for the city. To implement the measures needed for the city obtain the sustainability standards as our listed by our aspirant cities; Little Rock will have to secure funding, an already limited resource for the city, state and nation. Due to a lack of funding, a full time employee(s) may not be feasible in the early stages of development. A full time employee would be useful to keep the city and Commission on track and focused on the developed goals. Devoted staff can also maintain day-to-day tasks and events that will be necessary for the Commission to see its mission fulfilled.
- Since the Commission operates as a volunteer initiative, this could potentially be a weakness. The city has no person or group whose full devotion rests with the goals of the Commission.
- Limited coordination between the various initiatives administered by the city and by other organizations.

- Little awareness of sustainability efforts beyond the core community of citizens engaged in these efforts.
- Land Management – although information on urban sprawl was not available on all cities for comparison, we do know that the city's westward growth is an indication of urban sprawl. Urban sprawl is the expansion of human structural developments, such that rural land is built over.[87] As a result, people must commute a greater distance between work and home.
- Public Transportation - is slightly below average when compared to other cities similar to Little Rock.
- Unemployment Rates – is above average when compared to other cities similar to Little Rock.
- Water Quality – is below average when compare to other cities similar to Little Rock.
- Crime Rates – is considerably higher than other cities comparable to Little Rock and this presents an image as a dangerous place
- Quality of primary and secondary public education.[88]
- Strained race relations.[89]
- Sustainability Curriculum in the Public School System - Many Arkansas organizations offer educational programs to help increase environmental awareness at the elementary and high school level. At the college level, momentum can be created internally from knowledgeable faculty. Little Rock Public School District does not currently have a district-wide sustainability curriculum. Developing a method for measuring

[87] What is Sprawl?. Retrieved March 22, 2009, from Sprawl City Web site: http://www.sprawlcity.org/hbis/wis.html
[88] http://www.bettertogether-lr.info/Competitive-Realities.pdf
[89] http://www.bettertogether-lr.info/Competitive-Realities.pdf

environmental literacy that accompanies a program concerning environmental sustainability is advised. A program of this nature could be developed in conjunction with local universities, government agencies, and the community. Surveys then could be implemented to measure its success.

- The average Little Rock resident's carbon footprint is growing.
- Lack of data in some areas covered by the sustainability indicators - Specifically, Little Rock needs a way to measure, track, and manage urban sprawl/land management, renewable energy, recycling, waste diversion,

Opportunities. Opportunities are external industry conditions that could positively impact the city's ability to achieve its objective of increased sustainability. The city and the Little Rock Sustainability Commission should carefully evaluate opportunities in light of its strengths and weaknesses. As each opportunity is reviewed, the city should determine if it has the strengths to pursue the opportunity or if it must further develop an area of weakness before the opportunity becomes viable.

- There is a wealth of information and ideas available from the aspirant cities. Cities are exploring many exciting options in sustainability and Smart Growth under the realm of our 15 sustainability indicators.
- The lack of standardized and uniformly adopted sustainability indicators often discourages efforts toward urban sustainability. Cities frequently are uncertain what to do or how to do it. Many cities will not have the initiative to pursue sustainability in the absence of clear direction, guidance/guidelines, standards, benchmarks, and without the existence of a well-established road map.

- Civic engagement – there are enormous opportunities to engage residents and citizens in sustainability initiatives which is enhanced by sustainability's current popularity. This raises awareness, builds support, and reduces resistance.
- American Recovery and Resource Act of 2009 - Although we do not know the exact amount or organization of the stimulus funding at this time, the city and Commission should pursue these funds to further its sustainability goals.
- Partnerships with established organizations pursuing similar goals:

    - Several local chapters of national/international nonprofit organizations are located in Little Rock. For example, Audubon Arkansas envisions a state where the love and respect for nature is a cultural legacy. Audubon Arkansas seeks to inspire and lead environmental education, resource management, habitat restoration, bird conservation and enlightened advocacy. Preservation of our natural resources and cultural awareness of Audubon Arkansas' vision is a well founded partnership for the city and the Little Rock Sustainability Commission.[90] Another example is the Arkansas Environmental Federation (AEF) is dedicated to promoting environmental protection within Arkansas' manufacturing and business sectors. The AEF is committed to a balanced, effective and efficient approach to environmental protection. They understand that job creation often comes with an environmental impact. Charting a sustainable future are goals that AEF and the Little Rock Sustainability Commission have in common.[91] Additional national/international nonprofit organizations with related interests include Sierra

[90] www.ar.audubon.org
[91] www.environment-protection.org

Club, Nature Conservancy, The Wildlife Society, Wildlife Federation, US Green Building Council, and many more.

- Prominent international nonprofit organizations with common interests are also headquartered in Little Rock. For example, Winrock International is a nonprofit organization that works with farmers, communities and private sectors in Arkansas and throughout the southern region to develop programs that increase long-term productivity, equity, and sustainable resource management. By linking individuals and communities with new ideas and technologies, Winrock enhances their ability to effectively grow market opportunities, develop innovative technologies, and responsibly manage natural resources.[92] Another exceptional example is Heifer International's Initiative in finding global solutions is to promote agroecology. In a world where land is overused, community members need to learn how to protect and rejuvenate their land, water and other natural resources. Heifer helps by teaching environmentally sound agricultural techniques.[93]
- There are also several local and statewide nonprofit organizations that share common interests with the Little Rock Sustainability Commission. For example, the Arkansas Sustainability Network (ASN) is a non-profit, educational organization. Their mission is to develop more sustainable communities through education, innovation, and collaboration. They promote understanding of sustainability and awareness of local, national, and international resources that assist them in achieving the goals of sustainable development. They achieve this

[92] www.winrock.org
[93] www.heifer.org

through local food programs, community education and youth programs.[94] Additional organizations include Arkansas Earth Day Foundation, SustainArkansas, Keep Arkansas Beautiful Foundation, and many more.

Threats. Threats are external industry conditions which could negatively affect the city's ability to pursue its sustainability goals. The city must reflect on how its strengths will shield it from the negative impacts of these potential threats and on how its weaknesses make it particularly vulnerable to the negative impacts of these potential threats. In the latter, the city must address and develop its weaknesses in order to withstand these potential threats.

- A threat to urban sustainability is those who are unsupportive. Unfortunately there are those who are extremely negative and confrontational regarding the issue of sustainability and how to best approach it. Even worse, are those who believe in it and think it's a good idea, but do not believe funding should be funneled for any worthy sustainability initiatives. Also, the Commission faces the threat of the everyday, ordinary person who is uninformed on the issue and will not want to participate. Many believe that sustainability initiatives are unimportant, inconvenient, and expensive and that current ways are better, more convenient, and cheaper.
- Economy – may hinder urban sustainability efforts due to lack of funding or perceived high costs to implement sustainability initiatives.
- Increasing competition among all cities to become more sustainable as a competitive point in attracting economic development, industry, residents, and other prized factors.
- It is believed that current sustainability indicators do not adequately reflect the integrated and balanced approach necessary for sustainability. Therefore, common metrics are

[94] www.arnetwork.org

being used by cities which could potentially continue to support an imbalance between social, economic, and environmental systems and the practices which have lead us to our current conditions.

The SWOT analysis will be useful in the implementation process of the Commission's goals and vision. Knowing and determining how to best utilize the city's strengths, weaknesses, opportunities, and threats will be an asset for short and long term planning.

RECOMMENDATIONS

After our comprehensive analysis of the aspirant cities, referent cities, and the City of Little Rock itself, we have made the following general observations:

1. First and foremost, throughout our entire research our analysis has revealed a significant lack of information available regarding urban sustainability and consistent measurement of sustainability indicators. Most cities do not have sustainability information on their websites, nor do they have a web link to a website with such information. Some cities casually mention some indicators, but provide no quantitative data regarding the indicators. Little Rock is no exception to this pattern. Information can be gained about Little Rock, but it requires extensive searching through multiple websites to locate and obtain any significant information.
2. Although efforts toward urban sustainability began in the 1970s, urban sustainability remains in its infancy. As such, there is limited guidance, standardization, or consistency between efforts of various municipalities and governments. Additionally, it is generally believed that current measures used by cities do not adequately reflect true urban sustainability. There is a need to develop appropriate metrics that capture the balanced and integrated nature of sustainability.
3. There is growing awareness among governments, businesses, and individuals to incorporate sustainability into everyday practices. Of most prominence is the need to reduce greenhouse gas emissions.

Based upon these observations, we offer the following recommendations:

1. **Creation of a website.** The Little Rock sustainability website would communicate current activities and to bring local information into one unified and coordinated location. The website should be linked from the City's website (www.littlerock.org) with a Sustainability heading alongside Citizen Services, City Departments, City Clerk's Office, and others. The website could be maintained by the City, the Commission, or another entity. The content of the website should include a calendar of all local sustainability-related events, a page of links to local nonprofit and for-profit organizations supporting sustainability, a page or link devoted to citizen education efforts (such as how to reduce your carbon footprint, where to recycle electronics or hazardous waste, and other information), a page or link to the City's sustainability plan and subsequent progress reports, and a page or description with links to the City's many sustainability initiative. For example, Austin's website had a particularly comprehensive list of relevant sustainable topics. Each topic had several websites that provided relevant information to the reader.[95] The following broad topics were covered:
    - Building & Construction
    - Sustainable local food
    - Voting & Volunteering
    - Energy Efficiency
    - Indoor Air Quality
    - Landscaping
    - Local Green Businesses

[95] Environmental Portal. Retrieved March 22, 2009, from Austin City Connection Web site: http://www.ci.austin.tx.us/environmental/

- Sustainable Consumer Products
- Transportation
- Waste Reduction

2. **Creation of a sustainability strategic plan with a focus on GHG reduction**. Our research offers an assessment of the current state of the city with regards to sustainability performance. This research report provides many areas of strength and weakness as well as trends in urban sustainability, all of which are recommended for consideration in the development of the city's sustainability strategy. The next step is to use this information in the creation of a comprehensive sustainability strategy.
    a. To be consistent with the Governor's Commission on Global Warming recommendations and the Mayor's Climate Protection Agreement, the city's sustainability plan must include a detailed and specific plan of action for reducing greenhouse gas emissions (GHG). The sustainability plan as well as the GHG reduction plan should put forth goals, objectives, and timelines for achievement, identify roles and responsibilities, and should outline a plan for measurement, tracking, and reporting progress. Greenhouse gas emissions reduction could serve as the point of focus for the city's sustainability plan.
    b. Furthermore, the plan should initially utilize the fifteen common sustainability indicators (as identified in this report) and then work on the development of additional supplemental indicators important to the city of Little Rock. Within the Commission's current committee structure, each committee could be charged with oversight of the sustainability indicators relevant to its scope of work, such as the development of goals, objectives, timelines, roles, responsibilities,

measurement/tracking, and reporting mechanisms. Committees could also help develop more specific indicators unique to Little Rock's sustainability goals. For example, based upon the 15 commonly used sustainability indicators identified, LRSC committees might have the following tasks suggested below. Furthermore, if the Commission chooses a focus on GHG reduction, the work of the committees (as suggested below) would focus on how each goal and objective contributes to the reduction of GHG.

i. Green Collar Jobs/Economic Development Committee – could outline goals, objectives, timelines, roles, responsibilities, measurement/tracking, and reporting mechanisms related to the following urban sustainability indicators: unemployment reduction, job creation/economic development, education. The goals and objectives would reflect how each indicator would contribute to the main focus, such as GHG reduction. Other committees could do the same for indicators related to their scope of work.
ii. Land Use & Planning – land management
iii. Built Environment – green buildings, affordable housing
iv. Green City Operations – air quality, water quality, waste reduction, recycling, renewable energy, energy reduction, public transportation, affordable housing, education, crime rates, healthcare
v. Communications – promoting and raising public awareness of sustainability, currently viewed as an area of weakness for the city.
vi. Nominating – identification of individuals with strengths or resources in the areas covered by the city's sustainability plan.

c. The plan should engage the input and support of multiple constituencies.

d. Based upon the final sustainability plan, additional committees may be necessary.

3. **Coordination and oversight of city sustainability efforts**. The city needs to demonstrate commitment and priority to sustainability by providing focused coordination and oversight of sustainability for the city. This could take the form of one person, a department or division, a paid staff person, or a volunteer. By appointing one or more full-time individuals to coordinate and oversee sustainability efforts, this elevates sustainability efforts to a level of importance and demonstrates a commitment on behalf of the city. The Sustainability Coordinator or Department could then be tasked with carrying out the recommendations of this report, such as the creation of a website and the development of a sustainability strategic plan. Although this will require an expense, thus may not be immediately feasible, it is a priority recommendation for the Commission. The current members of the Commission are volunteers with other full-time jobs. A full-time Director or Coordinator would be able to devote his or her efforts to the Little Rock sustainability on a full-time basis.

4. **Identify funding sources to promote the city's sustainability efforts**. The American Recover and Reinvestment Act of 2009 (ARRA) has been approved, but we still do not know the extent of the availability of the package's funds to the area of city sustainability. As ARRA gets further defined and funds start to become available, Little Rock needs to follow the definitions and research what portions of the funds may be available for sustainability use. Once Little Rock has located funds available for sustainability, these funds ought to be obtained for Little Rock sustainability purposes.

5. **Market and promote sustainability**. Unfortunately, outside the local green community, the average citizen is unaware of local sustainability initiatives. Encouraging more events or developing a marketing campaign would be another way to go about creating more awareness. Promote, publicize, and market the city's sustainability goals, current initiatives, and progress on goals. For example, the city could launch a campaign to raise awareness among residents of personal carbon footprints and what citizens can do to decrease their carbon footprint. Creating awareness is the result of many actions that inform and educate the community about environmental sustainability. The community must learn that there is a need to be more environmentally friendly and how to go about doing this.
6. **Build upon strengths**. Little Rock has many strengths. For example, Little Rock promotes bicycling, bicycle paths, and amenities, as well as revitalization of the downtown area. Little Rock is also significantly above the average on education and healthcare. We recommend that Little Rock capitalize on these positive indicators and increase public awareness. An additional point for continued development of strengths includes Little Rock's numerous green and Energy Star buildings. Green buildings are considered a very desirable trend with our aspirant cities and Little Rock is well above average for our referent cities.
7. **Transparency of information**. Information on goals and progress (both positive and negative) needs to be shared and communicated with the public. Processes and methods should be revealed in strategic plans, progress reports, and website to allow comparison and replication by others. Researching information about environmental sustainability for any city is difficult. The best cities make it easy to find but do not readily compare

themselves with other cities or give much quantitative data. If Little Rock developed such a comprehensive website, they would increase their transparency to its citizens, neighboring cities, public officials, researchers, and the nation. Not only will a comprehensive website add increased transparency, which is an important component of sustainability, but will also provide available research information to other cities, which may be seeking sustainability research for their own city. By providing this information in an easy to locatable and accessible manner, Little Rock could become a model city for referent cities, become a model for sustainability researchers, and become a benchmark in the area of municipal sustainability.

8. **Identify sustainability indicators which reflect the strategic and sustainability goals of the city**. For example, the City of Little Rock could review the recommendations of the U.N. Habitat Agenda and Prof. Portney in the creation of well-integrated sustainability indicators. Additionally, those indicators must be unique to the needs and priorities of the City as defined in the city's strategic plan and the sustainability strategic plan. This may help place Little Rock on the forefront of development of sustainability indicators and a standardized pattern system of sustainability efforts. One example might be the integration of sustainability into public school curriculum and a way to measure implementation, progress, and learning outcomes. Other examples specific to Little Rock and which would require the development of unique indicators, measurement, and tracking system include quality of primary and secondary public education and local race relations.[96]
9. **Collect primary data on the sustainability indicators**. For example, waste reduction and tons of waste diverted from landfills are common indicators used by the model cities.

[96] http://www.bettertogether-lr.info/Competitive-Realities.pdf

Little Rock needs to develop a system for tracking, measuring, and reporting this indicator. Another indicator currently not being measured is the amount of renewable energy being purchased or used by the city as a percentage of its overall energy usage. While our research was based on secondary data (information that is already researched, available, and accessible), there is still much more information that is needed to complete the evaluation of Little Rock's current standing among referent and model cities. Areas that have had no locatable secondary information and need further research to obtain consistent quantitative data include waste reduction data, recycling data, renewable energy data, energy reduction of most of our referent cities, and land management data for most of our referent cities. Once obtained and factored into Little Rock's ranking, it could alter the current ranking and could highlight further areas of improvement. Another in need of further primary research is land management. Land management data varies in definition and can be a measure of urban sprawl or green space.

10. **Develop a plan for improving areas of weakness**. Little Rock's number of crimes is well above the average of the referent cities. This is a long-term area for improvement, but must be addressed. Unemployment rates, job creation, public transportation, and water quality are also areas that need to be addressed.

Summary of Recommendations

1. Creation of a website
2. Creation of a sustainability strategic plan
3. Coordination and oversight of city sustainability efforts
4. Identify funding sources to promote the city's sustainability efforts

5. Market and promote sustainability
6. Build upon strengths
7. Transparency of information
8. Identify sustainability indicators which reflect the strategic and sustainability goals of the city
9. Collect primary data on the sustainability indicators
10. Develop a plan for improving areas of weakness

The potential benefits of initiating sustainability efforts are increased citizen and employee satisfaction; stronger city reputation; a healthier and more livable city; reduced risks associated with energy, environment, and climate change; reduced resource consumption, and financial savings over the long-term. Cities that have invested in sustainability programs have saved money, provided economic benefits to their residents, reduced energy costs risks, and complied and improved upon Federal clean air standards, and provided a more livable environment.[97]

[97] http://rmc.sierraclub.org/energy/library/sustainablecities.pdf