A Sustainable Austin is...

Research Proposal
Capstone in Environmental Studies, Spring 2013

Audrey Calhoun   Elizabeth Funk
Austin Gentry   Grady Sampley
Cate Jones   Katie Campbell
Elise DiNuzzo   Liliana Galvez

Instructor: Dr. Joshua Long

Environmental Studies Program

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Executive Summary

A capstone course at Southwestern University is designed to be cumulative, where students demonstrate skills gained during their undergraduate careers. The interdisciplinary Environmental Studies program requires its students to perform a group research project where they identify and investigate a regional environmental issue. We have framed the following research proposal with the intention to integrate the knowledge and research skills from multiple disciplines under a single theme. Through our project, we will attempt to gain a broader understanding of how Austinites define and prioritize the sustainability of their city. By reaching out to Austin's citizens and asking them to complete this sentence: "A Sustainable Austin is …," we will create a platform for public discussion and participation concerning sustainability in Austin, Texas.

Environmental Studies Capstone, Spring 2013

Research Proposal

Cities are the greatest of human inventions. They embody our histories and manifest our technological innovations, cultural and social interactions, economic structures [and our] political systems… Cities contain our imagined communities, our socially constructed identities, and the spaces that shape our daily activities.
(Boone & Modarres 2006, 1)

1. Introduction

The total population of the world is estimated to have surpassed seven billion people in March of 2012, and more than half of those people live in urban areas.[1] Some estimates claim that "by 2025 the urban share of the global population will reach 58 percent" (Boone & Modarres 2006, 61). Urbanization is increasing in nearly all regions of the world, but the developing world is seeing the greatest increases. With the majority of the global population choosing to reside in urban areas, cities have become increasingly important sites for investigating our most challenging environmental, social, political, and economic issues. Cities are sites of investment, entrepreneurialism, trade, and industrialization. They are increasingly becoming the focus of our explorations into economic growth, job creation, and innovation. But cities are also the loci of significant problems. As numerous scholars have noted, the urban environment is facing unprecedented challenges from population pressures, global financial crises, the effects of climate change, increasing resource constraints, and widening social inequality (Low et al. 2005;

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[1] The United States Census Bureau's definition of "urban area" will be used throughout this proposal. Using this definition, there are 313 million total inhabitants in the United States with 256 million of those inhabitants residing in urban populations (US Census Bureau 2010; The World Bank 2012).

Kahn 2006; Newman et al. 2009). Although cities consume the vast majority of the world's energy, they are the sites with the greatest potential for reducing energy consumption because of their relative density and their capacity for innovation (Boone & Modarres 2006; Newman et al. 2009; Fitzgerald 2010; Girard 2011). In addition, cities are sites for making great choices about the future of our planet. They have been, and will likely continue to be, the seats of political power in the world, where decisions are made that affect the governance of entire countries. In this way, cities have come to represent the "starting point," a place at which we can reshape and direct a more desirable future (Girard 2011, 123). Simply put, cities retain potential for creation and destruction, regeneration and degradation, resilience and vulnerability. It is for this reason that they are the ideal scale at which to investigate, promote, and apply the concept of sustainability.

The philosophy of sustainability has been explored since the emergence of the environmental movement during the 20th century, but it wasn't until the publication of *Our Common Future* in 1987 that the terms "sustainability" and "sustainable development" were permanently cemented as part of the global lexicon. And while the conceptual meaning of sustainable development as "development that meets the needs of the present generation without compromising the ability of future generations to meet their needs" (WCED 1987) is well understood, its application to real urban theory and planning is the subject of intense debate (Jepson & Edwards 2010). As such, defining sustainability in the context of urban development—a concept we explore in the next chapter—requires careful consideration of the ways in which cities and their inhabitants impact the surrounding environment. The following section addresses those impacts, briefly explaining the ways that cities draw heavily upon natural resources, degrade public health, and pollute surrounding ecosystems.

1.1 The Environmental Impacts of Cities and Urbanization

Cities are responsible for 75 percent of global energy consumption while simultaneously producing 80 percent of the world's greenhouse gases (Fitzgerald 2010; World Watch 2007). Urban areas rely upon energy to heat and light buildings, fuel transportation networks, and power industrial production, and while each region of the world uses energy in different ways for different sectors, urban areas in all regions are increasing their levels of energy consumption (UN Habitat 2008). In the United States, buildings are responsible for 39 percent of energy consumption and produce nearly half of the country's greenhouse gas emissions (Fitzgerald 2010), while transportation consumes 28 percent of all end-use energy and produces 27 percent of the country's greenhouse gas emissions (Fitzgerald 2010; ACEEE 2012). In the United States, the industrial sector accounts for approximately 25 percent of energy use and 20 percent of the country's greenhouse gas emissions (EIA 2012; EPA 2012). This is as much a problem globally as it is in the United States. According to Grimm et al. (2008, 756):

> The unprecedented rates of urban population growth over the past century have occurred on <3% of the global terrestrial surface, yet the impact has been global, with 78% of carbon emissions, 60% of residential water use, and 76% of wood used for industrial purposes attributed to cities.

In addition to energy consumption, cities are major consumers of food, water, and raw materials—and for all of the resources that cities consume, they are equally responsible for enormous amounts of waste generation and pollution (Benton-Short & Short 2008; Fitzgerald 2010; Lorr 2012). The United States produced 250 million tons of trash in 2010 alone, of which 34.1 percent was recycled or composted (EPA: Solid Waste 2011). Twelve percent was burned for energy, leaving 54.2 percent, 136 million tons of garbage, going to landfills (EPA: Solid Waste 2011).

Air and water pollution is another major concern of urban waste generation. Air pollutants from cities, primarily attributed to car exhaust, smoke, and industrial processes, have a negative effect on human health and the health of other species. These range from greenhouse gases to other sources of airborne pollution such as ozone, nitrous oxides, carbon monoxide, volatile organic compounds, and other airborne pollutants (EPA: Ozone Pollution). These processes, and numerous other related issues, are major causes of global warming and ozone depletion, which create bad air quality and smog that can significantly harm the health of the population.

While solid waste generation and air pollution are frequently touted as major ecological problems with urbanization, the effects of water pollution are just as significant. The physical infrastructure of cities creates vast areas of impermeable surface, which not only create increased flooding risk, but also transport large amounts of pollutants into nearby streams (Birch & Wachter 2008). Rainwater runoff accumulates debris and pollutants from the city streets on its way to more rural/non-concrete areas, which, again, results in the spread of urban contaminates to local water sources and more rural, undeveloped areas (Grimm et al. 2008). Sewer systems are also major sources of pollution. Approximately 700 cities have combined sewer systems and the overflow associated with those systems is a significant source of pollution. According to Birch and Wachter (2008, 21), during major weather events such as storms or heavy snow-melts, "dangerous levels of bacteria-laden sewage are released into waterways, threatening drinking water supplies and often leading to beach closings."

In addition to waste and other physical pollutants generated by cities, there is now overwhelming evidence to suggest that cities are transforming the temperature and climate in the immediately surrounding areas. According to McPherson (1994), downtown temperatures in the

United States have increased by 0.14° to 1.1°C per decade since the 1950s. Cities tend to modify the environment around the city, creating issues related to the "urban heat island" effect (Benton-Short & Short 2008, 7). This is due to the topographic change from open, vegetative land to concrete and other impermeable surfaces, which capture and retain heat that makes highly populated cities "often cloudier [and] more prone to thunder and slightly warmer than surrounding rural areas" (Benton-Short & Short 2008, 7). This also leads to higher energy consumption and water use, as precipitation from storms absorbs the excess heat that flows along impermeable surfaces. This rainwater eventually arrives at bodies of water, which then raises their temperature and affects their aquatic ecosystems (EPA: Heat Islands). In short, the urban heat island phenomenon "affects not only local and regional climate, but also "water resources, air quality, human health, and biodiversity" (Grimm et al. 2008, 758).

1.2 Changing the Way We Think About Cities

Because of the effect that cities can have on the world, there is plenty of reason to dwell on the negative impacts that their growth has had on the environment. Traditionally, cities are portrayed as a purely human construction separate from all things 'natural' or organic. Following the ideas of scholars like William Cronon (1995), Benton-Short and Short (2008, 5) note:

> Cities provide an inevitable contrast to the "natural." A consistent strand of thought has sought to place the city as a human invention in opposition to the "natural", the "pristine", and the "wilderness"…Most often, environmental protection has been defined as meaning something outside of, and mostly unrelated to, the concerns and interest of our cities.

Such a mindset has served to detach urban dwellers from thinking about their actions as having a clear impact on the natural environment. This disconnect implies that cities themselves cannot become environmentally conscious and that they are inherently bad for the natural world, almost

as an excuse to continue harmful habits and avoid changing lifestyles (Cronon 1995). Ultimately, the assumption that cities are 'unnatural' and 'environmentally destructive' is supported by these negative side effects of urban living, as well as a multitude of other, more complicated issues.

Nonetheless, urban populations are skyrocketing. If living in a city is so wasteful and bad for an individual's health, why are these areas continuing to grow at such a rapid pace? The fact is that cities often act as efficient cultural and social centers, with a high concentration of diverse populations. This high density essentially requires a more efficient infrastructure, at least compared to sprawling suburbs, as "city residents rely less on cars and live in more compact dwellings than suburbanites, they tend to leave smaller carbon footprints" (Street-Savvy 2011). The apartments are smaller than the large, spacious houses popular in more rural and suburban areas, with greater access to extensive public transportation systems as well as an infrastructure ideal for walking from place to place for a large concentration of people. As a result, "urbanites use less energy and emit less carbon dioxide per household than their suburban counterparts do" (Biello 2011). Even though urbanites consume more than rural and suburban households, they also tend to have smaller families, which reduces the ecological impact of national population growth (Kahn 2006, 11). Furthermore, cities provide easy access to social interactions, as well as intellectual growth from universities, libraries, museums, and other cultural centers. In today's world, these places act as "the nexus of production and consumption, service provision and *neglect*" (Boone & Modarres 2006, 1). Therefore, the arbitrary disconnect between what is viewed as 'natural' and 'unnatural' must be dissolved to take full advantage of the possibilities cities have to improve the quality of life. This will also remove the association of neglect they currently carry from the abundant negative consequences in both their environmental and social

spheres. Rather than think of cities and nature in separate terms, we must think holistically about the urban relationship with the environment.

One way that cities can provide benefits to the environment, and consequently, their inhabitants, is by viewing the city as an ecosystem with measurable inputs and outputs. Thinking of a city as an ecosystem can help confront this challenge because it measures these inputs and outputs in a tangible way (Benton-Short & Short 2008). Cities use energy, create waste, transform the environment, and use resources in ways that are similar to ecosystems. However, these inputs and outputs are not limited to environmental factors. Instead, the ways of measuring the ecological impacts of cities—and ultimately, their level of sustainability—must consider both environmental and economic perspectives (Kahn 2006). Ecologists and environmentalists measure the overall ecological footprint that can be "constructed for an individual or for population groupings" (Kahn 2006, 8-9). The idea of an ecological footprint often reveals that the typical 'American Dream' is one that inadvertently encourages ample amounts of consumption, such as large homes, high amounts of construction, and significant levels of waste. At the scale of a sprawling city, this lifestyle can be extremely damaging to the environment (Kahn 2006, 10).

1.3 Greening the City

The apparent problems of cities have forced urban planners to rethink notions of urban ecology by focusing on new strategies for designing and retrofitting cities. Smart Growth strategies, for instance, "[focus] on existing developments in order to utilize their infrastructures and to preserve open space" (Benton-Short 2008, 225). In 1996, principles were created by the Smart Growth Network in order to give clearer outlines that lead to smarter development (Benton-Short

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& Short 2008, 225). A few of the concepts are to "mix land uses, design more compact buildings, construct walkable communities, create a sense of place, preserve open space, and provide a variety of transport choices," all while including the community opinion in the process (Benton-Short & Short 2008, 225).

Cities that do not have the resources to completely change the systems they already have in place still have the ability to adapt their existing infrastructure to make it more efficient. These cities try to expand and diversify their various components of infrastructure through the implementation, adaptation, and utilization of sustainable practices. For instance, the average building in the United States was built in the 1970s, thus sustainable cities must develop projects to retrofit old buildings with energy-efficient features. Replacing black-tar roofs with reflective white roofs to keep buildings cooler in the summer or installing solar-thermal hot water heaters are examples of how to generate major energy savings, thereby increasing energy efficiency (Biello 2008, 69). The installation and utilization of efficient public transportation systems contributes to a city cleaning up the air and improving efficiency of travel while also reducing our society's dependence on cars. The city of Denver saved more than 24 million gallons of gasoline between 2005 and 2009 by converting their city buses to run on compressed natural gas instead of diesel (Biello 2008, 68). Another method of reducing greenhouse gas emissions is to implement more efficient waste management techniques. Capturing methane from landfills is an inexpensive method used to reduce greenhouse gas emissions while also making a new 'natural' resource for the purpose of generating electricity (Biello 2008, 69). More efficient water use can also lead to greater energy efficiency. Energy service companies can offer incentives, such as rebates for rainwater harvesting or water-conserving toilet installations, to curb water use by city residents (Biello 2008, 67).

All of these technological and systematic developments are ineffective unless the general public of the city values sustainability as much as those making the decisions for the city. Education about the relationship between the sustainability of the city and the surrounding environment is a key aspect of prosperous sustainable cities. Promoting general awareness about ecology and the environment to city residents through programs and community activities is a way in which to educate the public and future generations about how they affect the environment in which they live. For example, in Milwaukee school children in three distinct neighborhoods have an Urban Ecology Center through which they can learn about their city's ecology and particular environment through programs and activities (Sustainable Cities Network 2013).

Case studies such as these exemplify some of the ideas that are being applied to reduce urban waste and consumption, but they only begin to scratch the surface of what it means to be sustainable. Cities are diverse. Each city develops under its own unique values, economic circumstances, and environmental climate, which results in "different conceptualizations of urban sustainability" (Maclaren 1996, Defining Urban Sustainability, para. 3). This then emphasizes the need to understand "urban sustainability" on many different levels, from large national governments to local city councils, as each community will have different concerns and different assets that can be acted upon, leading to very different manifestations of urban sustainability from place to place (Lorr 2012, 24).

The following section reviews the current literature on urban sustainability with an aim to further define sustainability in an urban context and measure sustainability levels from multiple perspectives. The literature review then addresses how scholars, city planners, and urban dwellers are attempting to achieve sustainability in their cities. The review concludes by focusing on the benefits of moving toward a more sustainable urban environment.

2. Literature Review

2.1 Defining Urban Sustainability

When it comes to defining sustainability in the urban context, the lack of a universally accepted definition by scholars has resulted in having the concept "referenc[e] a future goal to be reached by regulating and monitoring urban behavior to improve the environment while at the same time improving the economy and equity or social justice" (Lorr 2012, 23). Differences between how communities address environmental, economic, and social issues also lead to differences in how they define urban sustainability (Maclaren 1996, 186-187).

The ambiguity of the term 'urban sustainability' makes it incredibly difficult to decide whether a city initiates truly 'green' and equitable policies, as "there is not a consensus about what practices and policies are 'really' sustainable" (Tretter 2013, 298). The term is seen as an ideal and has often been molded to achieve the greatest economic benefit rather than actual political or social change (Lorr 2012). For the purpose of our study, we must consolidate many of these different approaches and definitions in order to more adequately analyze urban sustainability in general. As mentioned in the Brundtland Commission Report, while sustainability itself refers to "development that meets the needs of the present without compromising the ability of future generations to meet their own needs," recent studies have emphasized the need to incorporate social equitability in the term (Lorr 2012, 17; Pearsall 2010; Maclaren 1996).

Many believe that environmental justice issues should be at the forefront of this discussion. These issues, such as the unequal and harmful effects of urbanization on lower socioeconomic or minority populations, help illustrate the necessity for a "holistic approach that balances environmental, economic, and social concerns" so the term 'sustainability' can be more

accurately defined (Maclaren 1996, Defining Urban Sustainability, para. 2). Lorr defines the term as "the process of developing and redeveloping urban areas in a way that will improve the urban environment and economy and promote equity or social justice," thus implying that the process of addressing environmental and economic issues could also address social concerns (Lorr 2012, 23). However, when Maclaren (1996) explicitly states the categories needed for urban sustainability, she includes several that address environmental justice, such as the need to include:

> intergenerational equity, intragenerational equity (including social equity, geographical equity, and equity in governance), protection of the natural environment (and living within its carrying capacity), minimal use of nonrenewable resources, economic vitality and diversity, community self-reliance, individual well-being, and satisfaction of basic human needs (Defining Urban Sustainability, para. 2).

Thus, the pillars of sustainability - environment, economy, and equitability - are described as equally significant and worthy of acknowledgement.

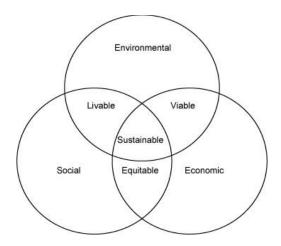Figure 1: Classic dimensions of sustainable development (Tanguay 2010, 408)

While cities are places replete with opportunity for economic growth, that growth is rarely shared by the entire population, and impacts that follow growth are often felt differently by various groups. The importance of urban sustainability may also be understood by acknowledging the way urban sustainable development seeks to avoid negative outcomes among

the ecological, social, and economic aspects of all members of the city (Tretter 2013, 298). Likewise, the success or failure of undertaking sustainable development may be understood by analyzing the actions, interactions, and methods that cities undertake (Roseland 2005, 17). The following section addresses some of the modes of analysis that are used to evaluate a city's level of sustainability.

2.2 Measuring urban sustainability

Throughout the rise of modernity in the United States, there has been an increase in the prevalence of environmental concerns with regard to urban development. This concern has resulted in pursuing ways to measure sustainability, especially in urban areas, through the use of sustainability indicators and indices. An indicator is a datum or variable that has been verified as having a role in a certain phenomenon, while an index is a combination of these indicators (Tanguay 2010, 408). Indicators for urban sustainability are important tools for developing policy priorities, and are crucial for "target setting, performance reviews and facilitating communication among the policy makers, experts, and public" (Shen et. al 2011, 17). Sustainability indicators are frequently used by urban governance systems because of the ability to receive concrete answers with which to create or change policy that affects the outcomes of these indices (Pearsall & Pierce 2010). Many sustainability indicators provide information about: energy management (e.g. energy use in the public sector, electricity sources, etc.), water management (e.g. accessibility to water, how much water is used, etc.), waste management (e.g. total amount of waste in the municipality, amount of waste to landfill, etc.), and green space management (e.g. maintenance budget per inhabitant, biodiversity, etc.) – just to name a few examples of issues often covered by sustainable indices and examples of the sustainable

indicators often used to do so. Such information helps to establish goals and inspire attention, discussion, and action just as the process of framing environmental issues does within the context of urban development.

However, the use of sustainability indicators and indices is nowhere near perfect. Many critics still argue over indicators' credibility and strength as measuring tools of sustainability. And there are other problems as well, including: the lack of or inappropriateness of indicators to supervise urban sustainable development, the lack of a unified decision or understanding when selecting and relating urban sustainability indicators with policies and goals, and the lack of a universal standard or method for developing and selecting urban sustainability indicators (Benton-Short & Short 2008). Still others have noted the failings of sustainability indicators in practice. For instance, Levett (1998) argues that while sustainability indicators are intended to inform policy decisions, the actual progress towards sustainability is frequently lost in the process of policy formulation. This is often because policy formulation tends to focus on specific targets and goals, and not always on a comprehensive approach. As explained by Singh et al. (2009, 209): "although there are various international efforts on measuring sustainability, only few of them have an integral approach taking into account the pillars of sustainability. In most cases the focus is on one of the three aspects."

The use of indicators to measure urban sustainability requires the incorporation of all three pillars. Indicators go further and illustrate regions between the environmental, economic, and social sectors of a city that present conventional measures of economic performance and urban quality of life, which prove difficult to capture (Alberti 1996). There are many indices that contain various indicators to define and decide whether or not an area is sustainable. According

to Holden (2006, 175), the government in Western Australia utilizes a "systems-based approach" that examines the following indicators:

> Long-term economic health, equity and human rights, biodiversity and ecological integrity, settlement efficiency and quality of life, community, regions, 'sense of place' and heritage, net benefit from development, common good from planning, precaution, and hope, vision, symbolic and iterative change.

Cities are livable only when they are able to combine environmental and social spheres, and uphold the characteristics of equitability (Tanguay et al. 2010). All of these defining names of livable, viable, and equitable allow for an easy comprehension of the interlinked qualities involved within that city system, making indicators time savers for companies and cities that want to identify how they can increase strengths between themselves and the community.

Some experts acknowledge the critiques of sustainable indices, but still look toward improving indices for further use. Rydin et al. (2010) presents a list of the key features of 'good' indices which include: relevance to the process under investigation, sensitivity to change in that process, clarity of directionality, transparency, and linkage to available, reliable, and regularly updated data. The use of indicators, whether problematic or not, as essential tools for measuring sustainability within urban centers shows important progress towards building a solidified, legitimate, and universally accepted means for establishing green rankings. Ultimately, as Yli-Vikari (2009, 891) argues, indicators and their subsequent integration into an index are essentially designed to "improve the transparency of decision-making and to promote mutual communication among stakeholders." Transparency is the system's greatest advantage in that it opens up communication within a municipal organization or company, as well as with the public at large. The continuous molding and reworking of sustainability indicators and indices may potentially produce a viable and productive means of measuring sustainability in every situation

of concern: globally, nationally, regionally, and locally. Measuring urban sustainability is an important first step towards achieving sustainability.

2.3 Achieving urban sustainability

In order to achieve global sustainability, it is immensely important to understand the numerous and diverse viewpoints on the topic, each derived from uniquely urban environments and each developing different means of measuring such sustainability. The United States has begun its own strides towards achieving urban sustainability and, although likely not considered a world leader in this pursuit, "there are at least 45 major cities that have adopted some form of sustainable policies…general articulation of sustainability as a primary goal, and the creation of specific programs to support the pursuit of that goal" (Portney 2010, 324). An important component of achieving sustainability programs, policies, and incentives is the involvement of the local community in the process.

According to Amado et al. (2010), a plan of urban sustainability necessitates public participation among citizens to be successful. Their study concluded that the implementation of public participation in the urban planning process was key to its success (107):

> Community participation enabled that the intervention area resources (human, natural, economic and cultural) are valued by the local agents and thus constitute the basis for the creation of proposed new sustainable activities, developing employment and wealth, preserving natural values and promoting an appropriation of public space with greater social sensitivity and responsibility.

In other examples, the emphasis is on the creation of a comprehensive plan and connectivity of the three pillars of sustainability. In these cases, public feedback is just one aspect. This is illustrated in the examples of Dubuque, Iowa, "PlaNYC," and the URGE project. In Dubuque, their comprehensive plan "looks at the city as a whole and the surrounding region,

with a policy statement, goals, and objectives established for the physical, economic, and social environments of the community" (Carstens 2010, 11). As Carstens eloquently states, "I believe that sustainability is good environmental planning; think of your community as an ecosystem, where everything is connected to everything else" (2010, 11). Another example comes from New York City, where a successful program in achieving sustainable urban regeneration was implemented through the integrated use of the three pillars of sustainable development. As posed by Ester R. Fuchs of Columbia University's School of International and Public Affairs, New York City "epitomizes the economic decline, transformation and resurgence of America's cities in the twentieth century" (Fuchs 2012, 48). As part of the resurgence of NYC, Mayor Bloomberg implemented the urban planning process "PlaNYC" in 2007 that would "link economic development to city policies that promote environmental sustainability" (Fuchs 2012, 49). Fuchs also states that the success behind the sustainable improvement of the city was the "robust, institutionalized land-use planning process," which, according to Fuchs, is well supported by governmental factions as well as communities and private businesses (2012, 49).

A European example of comprehensive sustainable development planning is the URGE project, whose goal is "to improve the future management of green spaces in cities and urban regions by providing methods and procedural guidelines on how to include ecological, social and economic demands in the process of planning and maintenance by the planning authorities" (Rodenburg et al. 2001, 117). The project evaluated the three pillars of sustainability, as well as planning issues, by comparing two city-picked green spaces to test, analyze, and draw conclusions about the effectiveness of national and regional policies and their implementation (Rodenburg et al. 2001, 106). This project is also considered an ongoing plan for the future because they are taking further steps to combine and integrate various criteria and indicators

from all urban perspectives which Rodenburg et al. (2001, 118) believes can "then lead to the necessity to improve the criteria and indicators used so far … an opportunity to develop a common language among the different disciplines involved in green planning and management." Another example of green planning comes from Section 3 of the UNEP 2012 disclosure: *Sustainable, resource efficient cities: Making it happen*. This section contains explicitly outlined strategies to achieve sustainability for cities in developing and developed countries. The plan suggests, via the International Panel on Resource Management, that there are four routes that a city could take to begin or continue sustainability efforts. These four strategic routes are: new urban developments as integrated ecosystems, reconfiguring cities as systemic urban transitions, constructing new urban networked technologies, and retrofitting cities as systemic urban networked infrastructures.

It is also important to note alternate methods to planning as a means to produce urban sustainability progress, such as the performance-based and the institutional approaches. The performance-based approach "offers the possibility of transformative change by encouraging an outcomes-based approach to urban and regional areas" even though it is often viewed as a misunderstood failed concept (Steele 2011, 206). Alternatively, the institutional approach has been successful in the Australian context in transforming urban planning resulting in improved sustainability as it provides "a valuable window into strategic efforts to 'see' urban areas in different - that is more sustainable - ways" (Steele 2011, 219). Both approaches were attempted in Queensland, Australia and, according to Steele, had the "potential to yield valuable insights that can be applied to other strategic urban agendas at the supranational, national, regional, or local levels within a contemporary climate of reform-led change" (2011, 219). Seeking new and

innovative methods in planning sustainability programs and policies will produce positive results in our quest for improved urban sustainability.

Educating and promoting awareness in urban communities is also an essential part to a successful urban sustainability plan. For instance, the case of Worcester, Massachusetts and its "Worcester Smart Growth Forum," illustrates how a meeting of over one hundred community participants in 2002 can greatly contribute to the development of a strategy for moving towards sustainability while also focusing on local business, equal opportunity for education, and equal access to environment amenities (Buckingham & Krueger 2012, 493). Another method of promoting awareness and education regarding urban sustainability is the implementation of urban sustainability extension services. By applying this source to higher education campuses, the hope is that universities will become "catalysts for sustainability efforts in the cities in which they are located" (Molnar et al. 2011, 19).

Education is immensely important to the success of urban sustainability initiatives and widespread growth of sustainable urban development when regarding innovation. As Newman (2010, 7) states, "the growth of sustainable cities will only be main-streamed when the green transformation involved all elements of the policy process - especially the processes that help people want to change." If citizens do not understand how these green innovations and improvements operate or why they should take up these new green practices, the work towards achieving sustainability becomes useless and possibly even damaging to the new "eco" situation. Newman (2010) explains two approaches as successful educational programs that produced a positive cultural change in urban sustainability practices. The first approach, TravelSmart, educated the public and made it aware of sustainability concerns, while the second approach, LivingSmart, followed the same strategy by focused on household sustainability education.

These policy approaches helped to inspire change within public ideology regarding sustainable living and transportation practices due to an innovative and intimate education technique. This resulted in improvements in overall sustainability within Australia (Newman 2010). These sorts of approaches may very well be just as successful in improving urban sustainability elsewhere in the world.

While there are many examples of urban areas that excel in designing urban sustainability plans and achieving these goals, there are also many challenges to achieving true sustainability. For developing communities on the outskirts of urban areas, Mapes and Wolch (2011, 117) put forth that land developers will market their project to people who enjoy open space, yet are filling that open space at the same time they are building. Further, they suggest that these types of suburban communities are affected by a "small job base and lack of transit service [which] means that residents are auto-dependent and commute long distances to work, fuelling the charge that the community promotes additional sprawl" (Mapes & Wolch 2011, 119). These types of communities are described as 'award-winning' in regards to their efforts towards sustainability. They acknowledge that the marketing behind these types of suburban communities in pursuit of an award (thus boosting their marketing scope) is itself a means to an end for the company, not considering the "breadth and depth" of building a sustainable community (Mapes & Wolch 2011, 121). Therefore, the implication is that in pursuit of sustainability, the challenges met by urban or suburban communities should consider not only their development plan, but the consequences to their plan at a local and regional level.

Also, when looking at the City of Worcester's sustainable development plan known as the 'CitySquare' project, it becomes apparent that even a progressive and upper tiered sustainable city like Worcester runs into very detrimental obstacles in achieving true

sustainability. In 2004, the CitySquare project proposed to create rental and condominium housing units in close proximity to transportation, commercial, cultural, and entertainment hubs while also proposing an open-air street grid around a central green space that incorporates clinical, office, residential, retail uses. Although seemingly sustainable due to the "promoted concepts of mixed use, proximity to mass transit and brownfield redevelopment, the conversation about 'greening' or urban 'sustainability' ended there" (Buckingham & Krueger 2012, 497). In this case study of the CitySquare project, Buckingham and Krueger (2012, 498) show that the decision of this proposed initiative illustrates "the problems of short-term planning on the part of developers, city planners, and decision makers, and raises the question of who is responsible for taking on the longer-term interests of Worcester" in the scope of greater environmental sustainability. The CitySquare case shows that "urban greening is dispensable in the face of certain economic and political conditions" even when the city is as progressive and 'green' as Worcester. The City of Worcester is one of many which should strive to incorporate all pillars of sustainability into their urban sustainability development plan (Buckingham & Krueger 2012, 498).

When keeping sustainability in mind, it is crucial to understand that the concept does not simply apply to wealthy countries that can seemingly afford to be sustainable. Across the globe, many developing countries are trying to implement sustainable practices into their development plan, which include the three pillars of sustainability. Although, the three are absolutely necessary for success, UNEP, as well as other experts, argue that social or equitable concerns are often overlooked while the economy and the environment dominate the forefront of policy development and implementation (Buckingham & Krueger 2012, 500; Lorr 2012, 26; UNEP 2012, 28). To possibly combat this evident lack of social justice concern, Buckingham and

Krueger believe that when developing new urban sustainability programs, policies, and plans the "economic and environmental concerns should sit completely within social justice concerns" (Buckingham & Krueger 2012, 500). Thus, social equity and justice must be prioritized when further inspecting and engaging the processes of urban sustainability as to "correct for the shallow, hollowed out 'greening' many North American cities currently implement" (Lorr 2012, 26).

2.4 Benefitting from urban sustainability

Despite cities' many environmental problems involving overuse of resources, pollution, and excessive consumption, the high concentration of production and people in cities also provide many environmental opportunities (Savage, 1; Hardoy et al. 2001, 20). Because most cities and towns make up less than one percent of total surface area in their countries, they utilize much less land in relation to their concentrated populations, which results in a thriving and highly efficient community (Hardoy et al. 2001, 21). This oftentimes allows people living in such dense and convenient communities to decrease their dependence on cars, have access to cleaner air and water, and enjoy more protected open spaces (Jenks et al. 1996; Fumega 2010). Such highly dense cities also allow lower transportation expenditures to become feasible by decreasing the travel distances of urban city vehicles. Lower heating costs are also attainable when city homes and business buildings are adequately designed to capture heat waste and when urban residential areas include apartments and terraces because of their higher heating efficiency than single homes. Thus, while simultaneously reducing costs, reducing pollution via emissions and greenhouse gases are able to keep global warming in check (Jenks et al. 1996, 8; Van den Berg 2007, 79-80). Furthermore, given that most of the greenhouse gas emissions a country emits

originate within its cities, these urban areas have the most cost-effective means to reduce greenhouse gas emissions (Hardoy et al. 2001, 24).

Cities striving for sustainable development are also implementing strategies to efficiently maximize their water availability. In areas that face scarce freshwater resources, cities rely on techniques that encourage homes and businesses to conserve water. City resources are also at play in implementing methods that directly reuse or recycle wastewater. Furthermore, the collection of rainwater for direct use or storage is another strategy urban areas employ to maximize their use of their water resources. The fact that many water consumers are conglomerated in a dense area also allows cities to reduce the costs of water infrastructures and services (Hardoy et al. 2001; Savage, 2). This benefit can also be appreciated when urban areas employ per capita cost of measures to either lessen the threat of natural disasters, such as when there is a need for "better watershed management or drainage to reduce the scale of floods," reduce risks as they occur, such as having a building that can withstand earthquakes and floods, or rapidly and effectively responding to a disaster (Hardoy et al. 2001, 23).

Efforts to preserve urban green areas also reflect environmental benefits for cities working on urban sustainability. Urban parks, along with open green spaces, are beneficial not only in providing ecosystem services, but also in improving the quality of life of an urbanized society. For instance, natural areas provide wind and noise filtering, air and water purification, microclimate stabilization, habitat for various organisms, and biodiversity conservation (Chiesura 2004, 129-130; Andersson et al. 2007, 1267; Miller 2005, 430). A city's natural assets, such as green belts, urban parks and forests, and other components, such as bodies of water and trees, also provide psychological and social benefits to urban dwellers. Such benefits include mitigation from a growing disconnection from nature, rejuvenation, stress reduction,

peacefulness, enhanced contemplativeness, and tranquility (Andersson et al. 2007, 1267; Chiesura 2004, 129-130; Miller 2005, 430).

As discussed earlier, in order to better address the benefits of a sustainable city, one must take a more comprehensive approach to sustainability. As Tanguay (2010) argues, there must be an integration of development being equitable, livable, and viable. Economic and environmental sustainability translate into social and equitable benefits for the citizens of a city. The adherence a city may possess to eliminate or reduce pollutants and increase renewable energy and energy efficiency has significant impacts on community health. Sustainable cities also tend to have more 'social capital' including, grassroots movements as well as social justice movements, that lend toward education and community building which is essential for social and environmental awareness (Budd et al. 2008).

Quantifying the benefits and perks that come with a sustainable city can really only be subjectively decided by those who live there and know the city best. While the focus of the three pillars of sustainability is beneficial in and of itself to urban sustainability, progression cannot be made toward sustainability without an involved community that is united in the goals they wish to achieve (Alberti 1996). This kind of united community complements the study done by Holian and Kahn which shows that cities are transforming from being producer cities to consumer cities in order to offer a higher quality of life (Holian & Kahn 2013). Furthermore, when these cities offer sustainable options, such as local public goods and consumption opportunities, they are more likely to retain skilled, educated citizens within the heart of the city by also encouraging a smaller carbon footprint from transportation (Holian & Kahn 2013).

Linking sustainable cities to those that have large numbers of college graduates and creative outlets for leisure time is done by the previous study mentioned by Holian and Kahn, but

also by Florida (Holian & Kahn 2013; Florida 2002, 2008). Sometimes these plans are used in the inherent design of the layout of the city, such as in the case of Portland, Oregon. Their defining characteristics of urban design include the following principles: making places for people to interact in public places, strengthening the connections between green areas with safe pathways, enhancing existing areas to honor historic and cultural identity, creating new places to embrace the future, leading by example by identifying as a sustainable city, and making it happen with multiple strategies (City of Portland 2012). These ensure that the concept of sustainability is enriched with the community's support.

Richard Florida examines the question raised by Robert Lucas, a Nobel Prize-winning economist, of why so many people pay more to live downtown if housing is less expensive in the suburbs and outside the cities (1988). This then became the underlying economic power of what Florida calls the *clustering force*, "the clustering of people and productivity, creative skills and talents that powers economic growth," which is why cities are of such importance in moving the world forward (Florida 2008). The geographic nature resulting from the sheer number of people, ideas, and markets acts as a breeding ground of sorts for innovation and productivity. Ideas flow freely in this environment, which increases the creativity, but is facilitated by the fact that creative people tend to cluster regionally. Florida explains that humans have a kind of "preferential attachment" to cities that cultivate like-minded beings (Florida 2008, 58). His work goes on to explain that cities should encourage this phenomenon by educating their citizens on the economic and social benefits of a creative, more sustainable city.

Florida also implies that marketing a city as creative, sustainable, and diverse is a vital step in attracting an educated, creative workforce. This can be achieved, as postulated by Zavattaro, by marketing a certain city as 'green.' She states that "cities are creating image-driven

realities that shape and mutate through time, depending upon when the [cities] needs or wants to create a new reality," (Zavattaro 2010, 192). Thus, in order to draw a creative workforce and build upon the 'sustainable' city concept, cities can "capture the affectivity that environments have on people as well as elements of the push toward going green" and act upon them (Zavattaro 2010, 197). By using "environmental qualities and programs as tools to sell and promote" themselves, cities can 'booster' this label of sustainability, which would lead to a greater return on all the benefits discussed above (Zavattaro 2010, 204). The term 'boosterism' refers to this act of marketing a city so that its reputation will attract more business and bring more growth to the city, in this case referring specifically to boosting a green image. While boosterism is certainly not inherently a negative process, it can be perceived as such when a city markets a misleading image of itself, or alternatively, when funding for boosterism projects is prioritized over actual city improvement initiatives. In the context of sustainable cities, boosterism runs the danger of "greenwashing" real programs intended to improve the sustainability of a city (Mapes & Wolch 2011).

3. Case Study

3.1 Overview of Austin demographics, geography, economy

The city of Austin's population has been steadily increasing from the beginning of the twenty-first century until today. In the face of Austin's growing population, one needs to look cautiously toward the future to understand how it can affect the overall functionality of a city and the efficiency of implementing sustainable practices. A city's population density may affect the makeup and social structures of how individuals interact with each other. While experiencing limited space and resources due to an unprecedented population explosion, a struggle can be

created amongst different groups within the city while they vie for resources. In this situation, it is imperative that our definition of a livable city is one that is characterized by open 'green spaces.' Travis County has a current population of 1,095,805 and a land area of 1,019.70 square acres (City of Austin 2013a). Thus, the total leftover land area, without the land area of Austin, is about 701.1 square acres which holds only about 257,600 of its inhabitants. Simplifying this data in terms of percentages, the city of Austin, with a land area of 318.60 square acres, makes up about three-quarters of the total inhabitant population of Travis County while only fitting them all on a little over one-third (31.24 percent) of the total square acreage available in Travis County (US Census Bureau 2010: State and County Quickfacts).

There are ten trends associated with Austin's population that serve as descriptors instructing ways in which to go about analyzing its ability to be sustainable. First, an important demographic trend in Austin is its consideration as a 'no majority city,' meaning that it is no longer a 'Majority-Minority' city. Austin is growing in diversity; therefore no longer can one demographic group say that it exists as the city's majority population. Second, there is an ongoing decline of 'families-with-children' as part of the share in the urban core. The number of "families-with-children" is on the decline and may provide an insight into the ways Austin is changing demographically. As the number of young, highly educated workers increases in the Austin core, many families are choosing to move to nearby suburban locations, thus changing the median age and persons-per-household within the city limits. This affects public services such as transportation, schooling, and city services directed toward youth. Therefore, Austin may be suffering from a loss of those individuals that would call for the advancement of educational infrastructures and facilities. The city of Austin may need to adapt its incentives by focusing on improving sectors such as transportation, specifically traffic congestion, its housing market

prices, and pollution for those 'families-with-children' to stay and encourage investment in the city.

Outside inner-city Austin, "the overall number of families-with-children has increased while the share of total households from families-with-children has decreased" (City of Austin 2013d). Additionally, the African American share in the city is on the wane, while the Hispanic share of total population is rising consistently. The fact that those families consistently have a higher-than-average household size, with more children per household than any other racial group, the Hispanic population has acted to counter the increase in the city's median age, contributing Austin's ranking as one of the youngest cities in the country (City of Austin 2013d). The Asian population is skyrocketing and "by the middle of the next decade, the number of Asians in Austin will more than likely exceed the number of African Americans" (City of Austin 2013d). The level of residential segregation for African Americans has dropped significantly as their level of spatial concentration has diminished (City of Austin 2013d). Conversely, the geography of Hispanics is intensifying in the urban barrios, along with their movement into rural, residential areas (City of Austin 2013d). Austin has an increasingly sharp edge of affluence dividing its citizens by class characterizing the city as a region with a high health care burden. Further, a schism is growing between those that actually live in the urban core, who are being out voted by affluent populations living in Austin's suburbs. This division helps explain how location affects the amount of support urban hospitals receive and the amount of attention given to issues regarding environmental justice in Austin. In summation, these above descriptors or trends of Austin's population makes it one of the most radically intensifying urban sprawls in the nation.

The urban sprawl in Austin poses an interesting side effect on its economy. Austin is an attractive place not only in terms of having an economic pull for hard working 'sustainably minded' individuals. As well, Austin draws upon a certain type of character because of its physical setting along the Balcones Escarpment, a city wedged between coastal plain and dramatic cliffs with canyons and juniper carpeted rolling hills that sits on the edge of the Chihuahuan desert. This solidifies Austin as a physical and cultural oasis where talented, entrepreneurial, hardworking people are drawn from all over the world. The investments in the ascetics and beauty of the city's landscape by its citizens has made Austin's "quality of life become its biggest economic development engine, [while its] diverse demographic structure serves to support and enrich its quality of life" (City of Austin 2013d).

Typically, a main economic concern involves the Civilian Labor Force and Unemployment statistics. According to the Bureau of Labor Statistics, the total civilian labor force for Austin and its metropolitan areas, including Round Rock, is 971,200. Of the labor force, approximately 922,600 Austinites are employed and about 48,600 are unemployed, which makes the unemployment rate 5 percent (U.S Department of Labor 2012).

The creative sector in Austin is a beneficial and essential aspect to Austin's economy recovering from the Recession in 2008. Despite a current trend in low job creation, TXP, an economic analysis and consulting firm in Austin, found that the creative sector has had a substantial positive economic impact on the city. TXP claims that the creative sector accounts for "over $4.35 billion in economic activity...over $71 million in City tax revenue and almost 49,000 jobs" (2012). Overall, the expansion in economic growth in the creative sector has increased by 25 percent over the past five years, compared to only 10 percent growth of the whole local economy (TXP 2012). A strong economy is an essential part of sustainable growth.

3.2 Historical discussion of Austin's history of environmental protection, action, advocacy

Austinites have a strong connection to their city's natural landscape, which has created a distinct sense of place. This connection can be found throughout Austin's history, as well as in the desire to protect and preserve its natural resources. This connection has been played out through many avenues, such as environmental protection by government agencies and institutions, nonprofits setup to raise awareness about upcoming problems or natural benefits, and Austinites banding together to save their local waterways and green spaces.

In his book *Environmental City*, William S. Swearingen, Jr. describes how contrasting ideas of how to define a place have contributed to the environmental image that has come to define Austin. One idea was that Austin "would be a place defined by economic output," while the other was defining a place by its "quality of life" (Swearingen 2010, 1). The concept of 'The Growth Machine' emerged in the 1970s as an explanation as to why cities grow (Molotch 1976). The ideology explained that "the combined actions of real estate, developers, landowners, businesspeople, the press, and government agencies promote growth" due to the expressed interests by each party (Swearingen 2010, 3). As long as there is a consensus that growth is good and beneficial for a city, the majority of the population will support this ideology (Swearingen 2010).

As growth intensified, many people in Austin began to view their city in another way, thus did not necessarily buy into this ideology of growth. Further, the idea to define Austin by its quality of life over economic output began to emerge (Swearingen 2010, 3). The people who were beginning to stray away from the ideology of growth were individuals that did make their living from jobs that were dependent upon constant growth. In contrast, most jobs were in the

state and local government and education. For these people, the quality of life of Austin came from more cultural factors: the music, the laid-back feel of a college town, and the more liberal atmosphere (Swearingen 2010, 3). The city's quality of life was rendered so much by its natural environment that the environment became the main focus of concern for many people. This eventually led to the constant battle between quality-of-life groups and members of the Growth Machine (Swearingen 2010). Beginning in the late 1960s and early 1970s, there was an effort to "preserve things that were 'Austin': historical features, neighborhoods, cultural events, music venues, etc.; things that gave the city its special feel" (Swearingen 2010, 4-5). The environment was a defining characteristic of place, which people worried would be destroyed by growth, and eventually become the symbol for defining Austin by its quality of life, rather than its size or economy (Swearingen 2010, 5). Quality-of-life groups are made up of Austin community members who are determined to preserve aspects of the city that each group deems crucial to the overall character of Austin. Initially, these efforts struggled to be successful because of the constant clashing of ideologies about the identity of Austin.

By the mid-1980s, "developers vs. environmentalists" came to symbolize the two ideologies about growth in the city of Austin (Swearingen 2010, 6). Despite their discourse, these conflicting groups began to listen to each other beginning in the 1990s. It was during this time the environmental groups gained a foothold in the political constituency of Austin. Kirk Watson was a lawyer and member of the Austin Chamber of Commerce prior to his term as mayor, which was during the "Green Council" of the 1990s (Swearingen 2010, 9). During this time, elected officials made up of both businesspeople and environmentalists began working together to address local environmental issues. The three pillars of sustainability thus became the way in which Austin would shape its future (Swearingen 2010, 9). Through the integration of the

two ideologies, "building a city and being green [were] no longer opposite actions" (Swearingen 2010, 9).

Up until this point, environmental justice groups had not been able to play a role in defining sustainability. Although often unacknowledged and purposefully ignored, evidence suggests that Austin is largely divided and segregated socially, economically, and spatially. The historical development of the East Austin landscape has followed continuous "patterns of spatial exclusion and marginalization of the impoverished… and thus should be considered a constant in this urban landscape" since these patterns have been perpetual and largely disregarded (Skop 2009, 113). One historical plan developed by Austin was the Master City Plan of 1928, which principally contributed to the layout of the segregated Austin landscape seen today. According to Skop, the Master City Plan "was crafted by city planners to remove and dismantle all Black enclaves not located in East Austin, and to design a deliberately segregated city" (2009, 112). Another example of Austin policy that prompted the development of a minority dominated and lower-income East Austin area, as well as the marginalization and unfair repression of the area's population, was The Federal Highway Act of 1956. This Austin policy prompted the construction of Interstate 35 through the center of the then thriving East Austin urban community. Although the construction of the highway was viewed as positively creating jobs and stimulating the economy while causing little disruption to the community, "in reality, the highway split the city in two and concretized racial divisions between east and west Austin" (Skop 2009, 117).The minorities who lived within this community and plagued with the construction of I35 were being forced out, even before the highway's actual construction, as their previous living spaces were seized, their sense of place destroyed, and their very quality of life put in danger. These plans and programs enacted by the city of Austin helped form the blatantly

marginalized and segregated city one observes in Austin today, while many of Austin's current policies continue to do the same. Thus, the formation and work of community advocacy groups in fighting against such injustice is immensely important to protecting these oppressed minority populations and the landscape they live within.

PODER is one such example of a successful advocacy group working to preserve and protect the identity of Austin through discourse with businesses about the environment of East Austin. People Organized in Defense of Earth and Her Resources (PODER) takes a more human-based approach to environmental activism by "seeking to redefine environmental, economic, and social injustices in East Austin" (PODER). Founded in 1991, Chicano/East Austin activists and community leaders have worked to address injustices to the residents and communities within East Austin. Such success includes aiding in the closing of the Holly Power Plant, shutting down a gasoline tank farm that was causing health problems for local residents, and compiling a report in April 2012 that shed light on the increased housing price and demographic shift occurring in Central East Austin (PODER). The organization also works to raise awareness about the environmental and public health impacts associated with the businesses and industries located, and inquiring about locating in the future, in East Austin through their Land Use Community Health Action (LUCHA) program (PODER). PODER has paved a path of resistance as a grassroots organization and, as such, received no real attention from the city of Austin.

Another group, the Save Our Springs Alliance (S.O.S.), began as a popular, mainstream organization and is remembered as historically important to Austin. S.O.S was established as a league of citizens fighting a 4,000-acre development proposal for the Barton Creek Watershed. After an all-night meeting with Austin City Council members, the council unanimously rejected the planned development on June 7, 1990 (Save Our Spring Alliance). Formally organized in

1992 as the "Save Our Springs Coalition," SOS wrote and petitioned for the Save Our Springs Ordinance to protect the quality of water coming off of development areas and feeding into the fragile Barton Springs Watershed (Save Our Springs Alliance). The Ordinance received 30,000 supporting signatures thanks to the Coalition, and was overwhelmingly approved by Austin voters on August 8, 1992 (King 2012). Expanding their scope, SOS began to include building awareness and alliances throughout the Austin area, officially becoming the Save Our Springs Alliance in 1997. SOS routinely works with local conservation groups to advocate for the protection of Barton Springs and the Edward's Aquifer (Save Our Springs Alliance). Today, Barton Creek and Barton Springs are significant and irreplaceable sources of pride to many Austinites (Swearingen 2010, 37-38).

Although Austin's history is still being written, many aspects of the environmental culture remain the same, even if their expression has changed. For example, Mount Bonnell, a well-known natural area that overlooks downtown Austin and Lake Austin, is still a destination for Austinites, even if the view itself has evolved over the years as the city has developed and grown (Hall 2013). Its current growth rate will cause many changes in the near future, but Austin still maintains its ties to the past (Spong 2013). Austin potentially accepts, even appreciates, the evolving development as part of the new sustainable urban environment.

3.3 How is Austin faring in the "green rankings" or sustainability indicators?

Rankings are particularly attractive to the reading public partially because of our society's fascination with lists and the ranking of their components. Thus, in the recent years, there has been an influx of 'green city' rankings, which may not be considered scholarly data, yet certainly affect public opinion and perceptions of certain cities. Therefore, it is useful to analyze each

list's methodology and general approach to qualifying what makes a 'green' city, as there are no defined qualifications to determine this claim. In an early example of these rankings from 2007, Country Home magazine with Sperling's BestPlaces rated the Austin-Round Rock metropolitan area as the 52nd "Best Green City." According to the magazine's editor in chief, there is "a real interest, by both our readers and the marketplace, in exploring a green lifestyle" (Sperling's Best Places 2007). This quote illustrates why exactly these rankings are so important, and worthy of deeper examination. As 'sustainability' becomes more of a widespread concern and part of public debate, its nuances potentially could be exploited, leading to the misrepresentation or manipulation of data in order to address the specific audience of each publication, or to market certain cities in particular ways. In analyzing the city as a whole, it is thus relevant to understand how these rankings are developed and what the mainstream media has determined to be a 'green city.' The city of Austin frequently appears on green rankings lists, yet the accuracy of this 'green' claim is controversial due to the variety of indicators used to measure sustainability.

Country Home examined 24 indicators, which were divided into air and water quality, use of public transport, electricity use, farmers markets in the city limits, access to organic producers, and the number of LEED certified buildings in the area, which were then applied to 379 metropolitan areas. This is a huge number of cities, as many comparative surveys identified twenty to thirty cities or areas to analyze. However, this large data set explains how the relatively small city of Burlington, Vermont was determined to be the 'best' green city. While it is the largest city in Vermont, it is not even in the top 50 most populous cities in the United States, and very different from the sprawling and densely populated Austin/Round Rock Metropolitan area. However, the connotation of the title of the survey, "The *Best* Green Cities," specifically

identifies certain cities as better than others, thus in the comparison between many cities at very different scales.

In 2011, Site Selection magazine listed the top ten Sustainable U.S. Metro Areas using data from 2009 through 2011 on each city's renewable energy usage. This energy usage data included biofuels and biomass, number and effectiveness of recycling plants, the electric vehicle supply chain, as well as the number of LEED Certified projects as of May 2011, and the prevalence of incentive based community projects set up before May 2011. Austin-Round Rock-San Marcos, which is an even larger land area than in other studies, was number seven in the nation, tied with Phoenix-Mesa-Glendale, Arizona. Because this study did not publish exact scores cities received in each of the categories, it is impossible to exactly determine what aspects of Austin they felt were extraordinary, compared to other cities, and which need improvement.

More recently, Mother Nature Network published their list online of the Top 10 Green U.S. Cities in 2012. They did not explicitly break down the point allocation of this survey, but stated that they analyzed "several key areas to measure for effectiveness in carbon footprint reduction" (MMN 2012). Researchers looked at air and water quality, amount of renewable energy usage, the efficiency of the recycling program, general waste management, the amount of LEED-certified buildings, the amount of green-space, and access to 'green' living, such as 'green' public transportation and organic or local food. Like many of the lists, Portland was awarded the number one spot, with Austin coming in at number ten. The study highlighted Austin's goal to be carbon neutral by 2020, praising Austin Energy's efforts towards green energy and the large number of green spaces in the city, listing its "206 parks, 12 preserves, 26 greenbelts and more than 50 miles of trails" (MMN 2012).

In 2008, *Popular Science* ranked America's 50 Greenest Cities. They used US Census and information from *National Geographic* to analyze US cities with over 100,000 inhabitants. Analysts identified 30 indicators, which were then broken up into four broad categories: electricity, transportation, green living, and recycling and green perspective. Each city received points for each category, out of five or ten, which were then combined for an accumulative score. The electricity group focused on the amount of renewable energy sources utilized in the city, as well as the incentives offered to citizens to incorporate these sources into their own homes, such as roof solar panels. Transportation primarily identified high public transportation and air quality, while Green Living depended on the number of 'green' certified buildings and the amount of green spaces. Finally, the Recycling and Green Perspective measured the variety of materials that can be recycled in the city, as well as the citizens' perspectives on environmental issues. Interestingly, Austin was ranked number ten in the nation with a total of 21 points, which was only two points behind Portland, which was ranked as the 'greenest' city that year. Austin received its highest score in the Recycling and Environmental Perspective, with 4.9 out of five. This near perfect score helped outweigh the mediocre score of 5.9 out of ten for transportation.

Next, Corporate Knight, a magazine promoting "clean capitalism," put together their list of the Greenest Cities for 2012, which was featured on *Huffington Post*. The organization identified 38 policies and programs relating to sustainability and analyzed 54 of the largest cities in the United States to see whether the cities had adopted, as well as implemented, similar programs. For each program a city received one point with a check up on each city's websites to ensure it had been executed and not completely overlooked. Corporate Knight's policy-focused approach differs from the more general approach other surveys took, which perhaps explains

Austin's ranking at number 17 in the country with a total of 29 points, considerably further down than the other surveys, with Portland, Seattle, and San Francisco at the top with 35 points.

In 2010, the American City Business Journal compiled their "Green City Index," which incorporated 43 larger metropolitan areas into their analysis. The researchers utilized 20 indicators addressing the adoption of green technologies, the vague criteria of the "utilization of environmentally sound practices," as well as the air and water quality in the city. They then ranked each area in comparison to others in their travel time, public transportation usage, urban sprawl, the number of LEED certified projects, and the amount of green jobs per capita, which were then averaged to a final ranking. Austin-Round Rock was listed as number four, with an average rank of 13.25, with number one Portland-Vancouver-Beaverton at 11.15. This over-complicated ranking system showed that Austin did very well in the green-jobs sector, as well as the city's water quality. It did not, however, excel in any of the other categories. The city solidly ranked in the top twenty in each division, except carbon dioxide emissions, where it received the number 24 spot, but never was any higher than number seven. The other top ranked cities, comparatively, did very well overall, but scored badly in one category, such as number two, San Francisco, which received the 39th spot for travel time.

Therefore, out of the multitude of surveys determining the 'sustainability' or 'greenness' of a city, not one had identical criteria. Each had a different approach, much akin to the environment movement itself. This compilation of surveys, thus illustrates a wide variety of results. While Portland, Seattle, or San Francisco appears at the top of nearly every list, there is quite a bit of variance as a whole, particularly pertaining to Austin. Of the rankings that included Austin, most focused on Austin's amount of green jobs, green spaces, and recycling programs.

3.4 Listing and describing current environmental issues in Austin

In the previous sections, the various examples of publicized "green rankings" and the historical environmental protection, action, and advocacy information of Austin presents how it's widely recognized reputation as environmentally friendly has come to be. These past sections detail several of the numerous environmentally conscious efforts and the extensive history of environmental protection of Austin that supports its claim of being a 'green city.' However, there are still many sustainability issues that remain unresolved within the city of Austin in which are even − in some cases − completely unaddressed while more publicized and acknowledged issues take the forefront in a vast majority of media attention and public concern. Although many of these issues still exist within Austin, and are very important to address, we have chosen four major sustainability issues to exemplify the issues that still exist within a so-called 'green city'. Additionally, we expand upon what exactly these issues are, why these issues are detrimental to urban sustainability, and the primary attitude change or actions that are taking place within Austin as it moves into the future along with these ongoing and problematic sustainability issues.

The traffic congestion that Austinites experience on a daily basis reflects how an increasing population has exceeded the limits of the existing infrastructure and resulted in inefficiency and undesirable environmental impacts. According to a study done by Texas A&M in 2011, Austin ranked number three in the nation as the city with the highest traffic congestion. For the third straight year, Austin has also been listed as the fastest growing city in the United States by Forbes magazine, which helps to explain why the infrastructure is so inadequate for its population at this point in time. Consequently, there are community organizations, such as Austin Citizens for Personal Rapid Transit, who are making strides to improve the daily traffic problems in Austin by advertising the need to lessen the demand of transportation, promoting

carpooling and the use of public transit systems, and improving the infrastructure capacity to prevent traffic backup. Traffic congestion, as well as urban sprawl, is incredibly environmentally degrading as they severely affect livability in Austin. Thus, they serve as a contradiction to Austin's self-branded title as an 'environmental' city.

Additionally, the city signed off on a ten-year agreement with Formula One (F1) racing on June 29, 2011. This racing event is not only the most sophisticated race in the world with competitions held throughout numerous countries, but is also one of the most environmentally harmful international sporting events. Over 117,000 fans attended the first-ever purpose built F1 track in Austin, which was a nearly sold out event, with attendees traveling from the US, Europe, and South America (Wall Street Journal 2012). Formula One is inherently far from being a sustainable sporting event due to the excessive travel distances that participants, sponsors and fans make throughout a season. According to F1, each team travels over 100,000 miles a year between races and practices and uses about 200,000 liters (52834.4 gallons) per season during practice tests and races. With the growing need to preserve dwindling oil reservoirs, advocacy groups criticize the sport for its high consumption habits. Others, such as the Honda Motor Company chief executive, Takeo Fukui, responded to the issue by stating, "we might save some fuel if we're going to stop formula racing, but people don't live thinking about the environment only. You need to enjoy your life" (CNN 2008). It was only after construction of the track was underway that Formula One decided to hire Edgar Farrera to determine the environmental impact of the race. Critics suggest that the deal the city made before hiring Farrera was doomed to fail because many of the standards were not environmentally driven (Whittaker 2012).

Austin's efforts to improve its overall sustainability are reflected not only in the need to reduce or improve the efficiency of vehicles being driving around Austin, but also in issues that

arise due to the lack of convenient modes of transportation for minority or low-income populations to access healthy food. For example, the United States Department of Agriculture (USDA) has revealed the presence of food deserts, areas where residents are more than a mile away from stores that sell healthy foods, in Austin Texas (City of Austin 2012). To combat the lack of nearby supermarkets or stores selling fresh produce and meat in East Austin and to divert neighborhood residents from frequently consuming processed foods or fast food, the Sustainable Food Center (SFC) established a central farmers' market in East Austin's Saltillo Plaza in 2003. However, the decision to close the market went into effect in 2005, as the costs of the market outweighed the benefits. As an alternative to better address East Austin residents, establishing several smaller markets near Women, Infants, and Children (WIC) clinics was found to be effective (Whitacre, Tsai & Mulligan 2009, 51-53). On March 20, 2012, the fourth SFC year-round farmers' market, the SFC Farmers' Market East, had its grand opening. It is the first farmers' market in Texas to include the Double Dollar Incentive Program (DDIP), which doubles the amount of money Supplemental Nutrition Assistance Program (SNAP) and WIC beneficiaries may use at the market (Goddard 2012).

Community dialogues to combat Austin's food deserts are also occurring among Austinites. For example, on February 20, 2013, a community workshop titled "Food Deserts + East Austin: What Can Be Done To Help?" took place in order to educate the public on food desert issues, primarily those in the 79702 area code (Eventbrite 2013). Since the spring of 2009, a Sustainable Food Policy Board has also been elected to advise both the Travis County Commissioners' Court and the Austin City Council on how to provide nutritious, local, safe, and sustainable food to all residents of the Austin area in order to strengthen the local food system and economy (City of Austin 2013c). As Council Member Mike Martinez said:

We want to see more locally grown and produced products in our grocery stores, restaurants and schools and the Board is meant to bring together the community and figure out how the City and County can play an active role in making this happen. This benefits our community nutritionally, environmentally and economically. (Edible Austin 2013)

Issues on food deserts and the lack of accessible, sustainable food sources for low-income residents, such as those found in Austin, have also identified problems with how a food desert is identified. To determine where food deserts are located, the USDA only takes into account the accessibility of large supermarkets, making over two million dollars annually, to members of the community. This ultimately excludes family grocers, farmers' markets, and neighborhood bodegas, which might be providing better healthy food options than some of the large supermarkets (Franklin 2009; Klimas 2012).

Another large problem within the city of Austin is the environmental justice issue of gentrification, specifically with respect to the sustainable redevelopment of Austin's East Side. According to Pearsall and Pierce (2010, 370), environmental justice "is often characterized as a struggle against distributional inequity regarding environmental amenities (i.e. parks) or disamenities (i.e. incinerators) and efforts to increase the access of all populations to environmental decision-making processes."

Gentrification is one form of an environmental justice issue. This is defined as the restoration and cleanup of brownfield sites and run down urban areas by middle-class or affluent people, which often results in an influx of these higher-income residents into these areas and the displacement of the original, low-income residents who lived there. In this light, the sustainability efforts to help improve and eliminate food deserts within the lower-income and minority dominated East Austin can often serve as an instigating component to the gentrification process of the residents of this area.

Although highly unnoticed and unacknowledged, historically Austin has developed into a very racially segregated city with respect to their social, economic, and spatial positions due to the decisions made by the City Council. The Smart Growth Initiative of 1998, a prominent example of large-scale urban sustainability efforts, was involved in addressing food desert issues within east Austin. The Smart Growth initiative was "based on the three pillars of economic prosperity, ecology preservation and social equality" and worked towards limiting development in west Austin – primarily the Edwards Aquifer area – to preserve its more natural areas while also stimulating sustainable growth and development of the urban eastern Austin area that in close proximity to the current urban center (Tretter 2012, 303). However, even though the sustainable development and growth goals are positively constructed, negative environmental justice consequences resulted. Skop argues that the Smart Growth Initiative took up "the guise of stimulating urban renewal and economic development, [yet] the plan in fact serves to undermine local residents and reinforce their racializations" (2009, 119). The Smart Growth Initiative's sustainable redevelopment and rezoning of east Austin and the following influx of new, upper-income, young, and highly educated white "transplants" – who are attracted to the area for the affordable homes and their "character," the diverse urban culture, and the geographical close proximity to the downtown – increases the quality of life and thereby raises the cost of living in the area. This pushes the existing, lower-income and lower-educated minorities out of their homes and out of these areas of east Austin – in which they have inhabited throughout much of Austin's history – because they can no longer afford the living expenses or do not feel at home in such a setting any longer. As a result, since 1980, one of east Austin's minority populations – the African American population – has dropped over 25 percent while the white population has increased by 30 percent (Skop 2009, 121-122).

This environmental justice issue of gentrification is definitely becoming a major concern when developing urban sustainability programs, plans, and policies; however, it is often still forced to take the backseat on the 'three pillars sustainability short-bus' with economic and environmental growth and development frequently prioritized over the social equality aspects involved. PODER – which has been mentioned earlier in this paper – is an interracial organization that works to protect their communities of lower socioeconomic status from the negative consequences of sustainability efforts. Their most successful achievements that have given them widespread acknowledgement is their work against the establishment of locally unwanted land uses (LULU) usually in the form of disamenities, waste treatment plants, and incinerators, and have been a major player in fighting the gentrification of east Austin. In this gentrification issue, "PODER argued that the city was being reorganized using environmental principles that excluded communities of color" which was obviously justified (Tretter 2012, 306). PODER has been an extremely important, influential, and helpful non-profit organization in their ability to provide a voice for the minorities and lower-income members of their community who would otherwise have very little say in the making of local decisions and implementations of public policy. Their work for environmental justice has been quite successful due to their effective use of educating the public and promoting activism. Their work against gentrification of east Austin and LULUs have helped promote environmental justice issues as much more crucial to consider when working towards urban sustainability. PODER has helped to foster the belief in many that a healthy and all-encompassing approach towards urban sustainability must always take into consideration the social and equitable aspects of environmental justice. These aspects as they affect the city of Austin will be addressed and eventually analyzed in the following section and future research project. It is essential to

understand what Austinites prioritize in terms of sustainability, and how they line up with the current environmental issues outlined in this section.

4. Methods and Justification

We are approaching this project with the intent to create a platform for Austinites to share feedback and offer their perspectives on sustainability within their city. Our study will focus on reaching out to Austin's citizens and asking them to complete this sentence: "A Sustainable Austin is …"

4.1 "A Sustainable Austin is..." Methods

In order to create this platform, we will be distributing 500 business cards and flyer at strategic locations throughout Austin. The distributed materials, as seen in the appendix, will include an explanation of the project, as well as contact information about where to send in their responses. As we pass out these materials, we will be available to document responses in the field by recording or writing down answers if the participant prefers that approach over digitally responding. They will additionally have the opportunity to physically write down their answers, rather than relying on our transcriptions. As a way of ensuring ethical research, we submitted our project to the Southwestern Institutional Review Board (IRB), and received approval on March 6th, 2013.

We will utilize social media sources, including Facebook, Twitter, Instagram, Email, and YouTube, to spread awareness of our project to the people of Austin. We will also be contacting local organizations, nonprofits, and businesses to encourage participation in the project. Participants are encouraged to provide demographic classifiers, such as their home location or

occupation, but are also given the option to retain anonymity. In order to solicit a response from a wide diversity of perspectives and viewpoints, we will focus on gaining participants through theoretical sampling. In the process of undergoing theoretical sampling we shall develop, collect, code and analyze our data from the participants and then decide what further data to collect and where to find it, in order to develop a theory about the citizens understanding of Austin as sustainable (Seale 2006, 83). This will free us from the confines of having to produce representative samples for the duration of the research. Thereby, in this freedom, it allows us to sample stimulating settings where the participants will be more obliged to provide quality feedback (Seale 2006, 84). To achieve aspects of purposeful, random, and snowball sampling, we will target specific locations throughout the city that are more likely to contain a random variety of individuals. Through the utilization of social media and contact with local community leaders, we hope to attain a snowball effect in results where word of mouth builds interest in the project.

We have created a website to showcase representative responses to the general public. We anticipate receiving a redundancy of responses, which could be potentially developed into a report summarizing the project. This report would then be distributed among city officials, community leaders and organizations. We hope to not only bring issues of sustainability into the public sphere, but to additionally give voice to the people of Austin regarding how they define a 'Sustainable Austin,' as well as what issues and concerns they prioritize in regards to sustainability in the urban context.

4.2 Justification: Why are we studying what we are studying? Why Austin?

The priorities of sustainable development vary from city to city and its success is largely attributed to citizen involvement and support. For our specific study, we will make this feedback available to all Austinites, including community leaders, once we have analyzed participant responses to allow for a better understanding of sustainability in Austin and the common goals Austinites have in mind for the sustainable future of their city.

We are focusing on Austin because of its leadership as a sustainable city in Texas, as well as throughout the United States. Austin is well known for having an active citizenry that is focused on the environment as well as social justice movements which, as we have stated previously, is essential to the success of a sustainable city. The City of Austin has also dedicated much land to parks and open green space including Lake Travis, Zilker Park, and Barton Springs, and is on its way to becoming a leader in renewable energy. Due to these sustainability measures, Austin has been recognized in national sustainable studies and has gained a reputation as a progressive, sustainable, and creative city both nationally and abroad.

4.3 Scope

The scope for this project focuses on residents from a variety of demographics within the Austin city limits. We will attempt to diversify responses by recruiting from well-known public landmarks and districts in Austin, as well as public areas that have high representations of lower income and minority populations throughout the city. Due to the online capabilities of the website and to ensure the most reliable information is portrayed, we will go through responses on a case-by-case basis and add them to the website on our discretion. The website will help better

distribute this information to organizations, legislators, and businesses, as well as a larger population of Austin in general.

The scope will prioritize gaining the opinions of community leaders and key experts that can help bring attention to our project. We hope that this will help give our study weight and accountability in the public realm to ensure its use to the city of Austin.

4.4 Limitations

As we begin our study, it is essential to recognize and take note of its inherent limitations. The majority of these limitations are due to our research methods and our broad and open-ended survey question. Because we are primarily relying on participant responses to business cards and flyers distributed in public locations, as well as the effectiveness of social media outlets, one of our main limitations is the unknown number of responses we may receive. We hope to receive 200 responses from the 500 business cards that will be handed out, but will plan on posting additional flyers in Austin businesses to supplement the response rate. The number of responses will ultimately be determined by the number of Austinites willing to answer our question.

Because of the unknown number of responses we will receive, it may prove difficult to maintain a well-proportioned response rate across demographic lines. Although we will try to solicit responses from residents of all demographic backgrounds, our sample results may possibly be skewed if more responses come from one population over others. However, because of the anonymity clause, the demography of respondents may not be fully reliable. The quality and content of responses will be the most important to our end analysis.

An additional limitation of our study is the inability to know what types of responses we may receive. We may encounter problems involving "the writing skills of respondents, the

impossibility of probing or extending responses, and the effort required of the person completing the questionnaire" (Patton 2002, 21). Participants may write as much as a full essay to answer our question or they may decide that one sentence will suffice. Additionally, they are not limited to a written answer. Participants may also respond through a song or video. This high degree of creativity allowed in answering our survey will hopefully cause more Austinites to respond, but it also makes their answers that much more difficult to analyze.

With respect to the responses that we receive from the participants in our study, we must also include the possibility, or even likelihood, for the presence of bias within the responses. Since our research will produce a majority of self-reported data which can rarely be verified, many sources of bias may show up within our data. Examples of some of these biases that we may face when conducting our research are described by the University of Southern California library in the following way (2013):

- Selective memory = remember or not remembering specific events or experiences that had occurred in the past.
- Telescoping = recalling past events that had occurred at a certain time as having occurred at another point in time.
- Attribution = act of attributing positive events/outcomes to one's own agency but attributing negative events and outcomes to external forces.
- Exaggeration = act of displaying outcomes or events as more significant than what the data suggests in actuality.

Other possible limitations include the lack of prior research on the topic, specifically concerning the public view of sustainability within Austin. In our scope we included the need to reach minority groups as well as popular areas in Austin, but there are still certain limitations

related to the access of certain demographic groups and organizations for our survey, as well as our heavy reliance on technology. While we have the ability to communicate in Spanish, we may still run across some instances where another language barrier hinders our ability to gain a response.

Although we are targeting Austinites, we cannot prevent others outside of Austin, or unaffiliated with Austin, from responding to our question. This could be considered a positive feature as well as a challenge. The fact that respondents can answer anonymously means that there could skew in our raw data obtained from the website. Lastly, our time limitations only allow for so much data collection and analysis of that data. Future studies that may be similar to this one should consider a longer time frame for sampling as well as a sampling method that would allow for a more balanced response.

4.5 Timeline

- March 6: Submit proposal for Student Work Symposium
- March 8: Begin Fieldwork in Austin and give access to the website to the public.
- March 15: Continue fieldwork by passing out information and promoting the project with social media.
- March 22: Austin for Fieldwork
- March 29: Austin for Fieldwork
- April 5: Prep for Student Works Symposium (early data analysis and coding)
- April 6 or 7: Fieldwork in Austin
- April 9: Student Works Symposium
- April 12: Fieldwork in Austin
- April 19: Data Analysis, coding, writing up results for each section
- April 26: Data Analysis, Coding, writing up results for each section
- May 3: Finalizing the results/reports for each section
- May 6-May 10: Publish the responses on the Website

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Appendix:
Distributed Materials

English Business Card

"A Sustainable Austin is…"
How would you finish that sentence? You can answer with a single word or a thousand. You can send images, poems, videos, songs, etc. If you are not living in Austin, tell us where you are living. Tell us everything about yourself, or if you like, choose to remain anonymous and we will clear your response of any identifying features.
asustainableaustin@gmail.com

We believe that a community only works when its people speak. We want to hear your voice. Send your responses to:
asustainableaustin@gmail.com
For details, please visit our website at:
http://asustainableaustin.blogspot.com/

A Sustainable Austin is…

How would you finish that sentence? You can answer with a single word or a thousand. You can send images, poems, videos, songs, etc. If you are not living in Austin, tell us where you are living. Tell us everything about yourself, or if you like, choose to remain anonymous and we will clear your response of any identifying features.

For details, please visit our website at:
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We believe that a community only works when its people's voices are heard. Send your responses to: asustainableaustin@gmail.com

Appendix
Spanish Business Card

"Un Austin Sostenible es..."
Como terminarías tu esa frase? Tu puedes responder con una
sola palabra o con mil. Tu puedes mandar imágenes, poemas,
vídeos, canciónes, etc. Si tu no estas viviendo en Austin, dí
nos donde estas viviendo. Dí nos todo sobre ti, o si tu gustas,
decide permanecer en el anonimato y nosotros borraremos tu
respuesta de cualquier rasgo de identificación.
asustainableaustin@gmail.com

Nosotros creemos que una comunidad sólo trabaja cuando
su gente habla. Nosotros queremos oír tu voz. Envía tus
respuestas a:
asustainableaustin@gmail.com
Para detalles, por favor visita nuestro sitio web en:
http://asustainableaustin.blogspot.com/

Un Austin Sostenible es...

Como terminarías tu esa frase? Tu puedes responder con una sola palabra o con mil. Tu puedes mandar imágenes, poemas, vídeos, canciónes, etc. Si tu no estas viviendo en Austin, dí nos donde estas viviendo. Dí nos todo sobre ti, o si tu gustas, decide permanecer en el anonimato y nosotros borraremos tu respuesta de cualquier rasgo de identificación.

Para detalles, por favor visita nuestro sitio web en:
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