Sustainable Cities

21st Century Strategies for Inhabitable Urban Regions

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Introduction

When architects speak about sustainable architecture, they often refer to design principles that address a building’s use of resources. Particular emphasis is placed on strategies which make more responsible use of these resources. The context for this goal of more efficient resource consumption is found in the Brundtland Report’s definition of sustainable development, described as development which “seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future.” In other words, the goal of sustainability when viewed through this lens is grounded in a temporal context: the present and its impact on the future.

Ricky Burdett, in his lecture at the University of Texas School of Architecture, addresses the issue of sustainable development at the scale of cities and regions as opposed to a single building. In speaking about sustainable cities, Burdett offers additional lenses through which to view sustainability: density, integration, and connectivity. This is not a rejection of the importance of responsible resource consumption, but a call to think of urban form as more than the left-over space between individual buildings. Likewise, it is a call to see our cities as complex interconnected organisms in which the parts cannot be so easily delimited as individual buildings whose influence stops at the property line.

Burdett puts forth two important points designers must understand which are fundamental to shift toward more sustainable cities. First, they must realize that the design of the built environment has a tremendous effect on the integration and connectivity of our cities. Secondly, only a few of the powerful decision makers in cities
around the world see the built environment as a critical part of the sustainability question. In other words, sustainable cities require designers, planners, and policy makers to work together. Policy and planning strategies are of obvious importance to the issue of creating equitable access to resources for all, but the role of architecture and urban planning cannot be discounted in this equation, as it is the built manifestation of the implemented policies.

This paper addresses three issues confronted by cities integral to sustainable cities: growth management, infrastructure, and adequate affordable housing. Drawing on examples from Burdett’s lecture, this paper examines some of the policy strategies related to these issues and the resulting built implications on the urban fabric.

Density and Growth Management

According to Burdett, density is one of the major issues affecting the relationship between sustainable cities and urban form. The reason is conceptually simple. Lower densities are indicative of sprawling cities. These cities constantly absorb and develop existing greenfields around their periphery. On this fact alone a case could be made for the inherent barrier to sustainability created by urban sprawl. This case becomes even stronger when the reliance on personal automobiles as the primary mode of transportation is taken into account. Studies suggest that gasoline usage and carbon dioxide emissions are greatly increased as density decreases. Since public transportation is not economical and cannot be supported at low densities, if cities allow their growth to be a gradual outward expansion, then they are effectively choosing an automobile-centric lifestyle and its related physical infrastructure.

There are several strategies available to cities to attempt to reign in their growth. The green belt is a strategy prominently used in Great Britain. This tactic designates a specific area of land between the urban city core and the countryside to serve as a mediation space between the two; it does not have to be green, nor is it necessarily land of particularly high quality. While existing buildings are allowed to remain in the green belt, no new construction is undertaken within the green belt itself. The goals of the green belt are:
1. to check the unrestricted sprawl of large built-up areas;
2. to prevent neighbouring towns from merging into one another;
3. to assist in safeguarding the countryside from encroachment;
4. to preserve the setting and special character of historic towns; and
5. to assist in urban regeneration by encouraging the recycling of derelict and other urban land.

Critics of the strategy are quick to point out that sometimes the land in the green belt is not necessarily “green” and not worth sustaining. Others argue that greenbelts actually accomplish the opposite of their goal. Limiting growth artificially, raises property values to a point where fewer people can afford to purchase a house. Additionally, it encourages developers to leapfrog the greenbelt in search for lower land values. Rather than limiting sprawl, in this case, it is greatly increased because it is now located several miles outside of the city edge. This can result in more vehicle mile traveled because commuters must drive through the green belt and then across the city.

In contrast to green belts, an alternative method of growth management is an urban growth boundary (UGB), which is one of the most well-known tactics used in the United States. An UGB is a ring designated by a city or municipality within which all building must occur. Usually designed as the expected amount of land needed for 20 years of development, it is assumed the ring with be evaluated and redefined as higher, more desirable densities are reached.

One of the most well known cases is that of Portland, Oregon. Throughout the 1960s and 1970s the Oregon legislature passed several bills requiring all incorporated cities to develop comprehensive plans which included UGBs. The urbanization goal is to limit sprawl and to create “an orderly and efficient transition from rural to urban use.” In Portland the UGB is the keystone of it urban planning and policy and has been widely credited with limiting urban sprawl since its implementation in the late 1970s (Figure 2). Within the boundary, the onus lies on opponents of development to prevent a particular project. Outside of the boundary, the burden is on developers to show that their proposal is an appropriate use of the land that cannot be accommodated within the UGB.

Census data suggest that the Portland UGB has contributed to an increase in density. Population
density decreased from 4,517 people per square mile in 1950 to 2,940 people per square mile in 1980. However, at the last census in 2000, Portland’s density had increased to 3,939 people per square mile. While, recognizing increased density is an important step toward a more sustainable city, the city of Portland acknowledges that there are other important factors contributing to a truly sustainable city. For this reason, the UGB policy works in tandem with the city’s public transportation and affordable housing efforts.

The sharpest critics of Portland’s UGB tend to address two issues: limitations on economic development and availability of affordable housing. Regarding the issue of economic development, there is little evidence that Portland has been adversely affected. On the contrary, Portland’s unemployment statistics are generally on par with cities without UGB. Additionally, UGBs, by reducing needed infrastructure and keeping related costs low, allow for lower taxes which tends to encourage economic development.

Strategies related to affordable housing will be addressed later in this paper, however regarding Portland it is important to note that there has been a real shortage of affordable houses. The city has implemented several policies attempting to mitigate this problem, but it is acknowledged that increased land and housing values may be inevitable to some extent. On the other hand, an UGB can be viewed
as preventing decreases in value, thus removing some of the risks in land investment.

Instituting an UGB is a political decision to be undertaken by policy makers, designers, and the community-at-large. Oregon’s statewide goals and policies have not been seriously challenged due in large part to public participation and the development of an important constituency. One writer notes that the UGB policy is “more than a regulatory mechanism,” but a “symbol of a morally informed choice.”

If a city such as Austin, roughly of similar size to Portland, is to implement an UGB, then a case must be made to residents for its importance and its benefits. In addition, learning from Oregon, an UGB would likely have to be part of a statewide policy encouraging regional planning strategies. Specific measures would also have to be in place to address housing affordability and public transportation, without which it would be difficult to convince residents to adopt an UGB policy or to enforce it after implementation.

Infrastructure

In 2006, the world population shifted from a majority of people living in rural conditions to a majority of people living in urban centers. Within the last thirty years, there has been a steep increase in new urban growth with a large number of cities surpassing one million residents, in addition to new mega-cities which have surpassed ten million residents. Although currently there are large cities spread throughout the world, as of 1985 there were only nine mega-city regions, three of which are in third-world countries. These numbers changed dramatically by 2005, when there were twenty mega-city regions, 15 of which were in third-world countries.

Within these rapidly growing cities there is a need for infrastructure to change and develop to meet the needs of the increasing populations. Unfortunately, problems of infrastructural change are being addressed in modern cities at a rapid pace compared to older cities such as London, Paris, and New York City. In addition, the older cities developed their infrastructure prior to the use of the vehicle, resulting in a different grain of urban fabric from modern cities.

Roadways

Cities continue to grow, some with greater density than others. In some cities such as Tokyo, the inner city is becoming too dense and pushing residents to outlying regions. Similarly, cities such as Mexico City contain a dense series of single-family homes, yet continue to sprawl and heavily rely on private vehicular transportation via roadways. As cities continue to sprawl outwards, they not only have major increases in roadway infrastructure, but they typically push themselves even further to dependency on cars. In addition, public transit is typically either non-existent in these areas or much less efficient to access the inner city.

Although the dependency on roadways is a continuing problem for cities, there is also a problem of divisions created by large roadways.

As seen in Figure 1, cities such as Caracas contain roadways that harshly divide the low-income slum regions from the affluent areas of the city. Not only does this create an extremely disjointed city, but it also results in a lack of integration among social classes within the city. In addition, many of the slums throughout the world have extremely poor infrastructure, lacking items such as water and sewage lines.

Public Transit

In addition to roadway infrastructure, another element of urban infrastructure implemented within cities is public transit. However, especially in the United States, many cities lack extensive public transit networks. In Los Angeles, 80% of the population drives to work. This number contrasts Tokyo, where 80% of the population uses public transit to get to work, typically with commute times under one hour.

In cities such as London, where public transit is also frequently used, there are varying issues. London has an extensive network through west and central London, most of which are affluent areas. Toward the eastern part of London, there are small pockets with convenient access to the transportation network, but many others that lack such access. Many of these are lower income neighborhoods, with residents who cannot afford private cars and need access to the transit system. The London Olympic Games is implementing a reconnection of the transit network to the Olympics site, which is in east London between the city center and Stratford. In turn, the reconnection...
to the city and infill due the games should help to revitalize the local neighborhood.

**Railways**

Cities must consider regional and international rail links in addition to public transit networks. Many rail systems have upgraded to faster trains throughout the years to allow for a competitive edge over air travel, especially since train stations are often located in city centers. In London, a new high speed rail station is being placed in Stratford near the Olympic venues to allow for easy rail access from other countries in Europe. In India, railways pose a different problem to residents. Although there is access, the freight and commuter rails often run through slums. This creates hazardous conditions for the residents who have been pushed to these areas, and has resulted in the Railway Relocation Program, whose purpose is to relocate residents away from the railroad rights of way.

**Example strategies**

Bogota, Colombia is the location of the first large scale bikeway network implemented into a city. In this example, the government decided to build a series of wide bikeways from the city center into undeveloped outlying regions. Areas adjacent to these bikeways are zoned for civic buildings such as schools and libraries. This has not only encouraged more sustainable forms of transit, but also has controlled the growth in the areas along these bikeways. In Figure 3, the bikeways are shown interconnecting with a regional bus network. The bus network uses private bus lanes allowing for more efficient movement through the city than the adjacent highway, a further incentive for residents to use the public transit within the city.

Another example of infrastructural implementation is the Olympics Games in London, where a large amount of funding will be directed toward the project all at once as a catalyst for future development of the area. As seen in Figure 4, the design proposes an extensive green space, with the venues aligning along the park. Since London has decided that only four of the ten Olympic venues will be permanent, many of them are being constructed for temporary use. After the games, these will be dismantled and the remaining area will infill over time to revitalize the adjacent neighborhood.

**Affordable Housing**

Sustainability of cities is tied to the inclusion of all its citizens into an integrated population, where people of certain socio-economic classes are not isolated from others. An example of stark separation of the wealthiest and poorest citizens of a city is Caracas, Venezuela (Figure 1), where
a freeway serves as a veritable separating wall between two vastly different neighborhoods.

Of concern in cities throughout the world, especially those where the population is expected to increase dramatically over the next few decades, is how to make adequate housing available to all. Three examples of “affordable housing” strategies illustrate government efforts to provide adequate housing for those unable to afford housing in the cities where they live.

There is no precise, universal definition of the term affordable housing. However, definitions of affordability in particular locations illustrate the principal concerns when we discuss affordable housing.

The US Department of Housing and Urban Development (HUD) defines a particular residence to be affordable to a particular family unit provided the sum of all expenses to live in the residence does not exceed 30 percent of the total household income. Community initiatives to provide affordable housing, however, must adopt guidelines that are not specific to a particular person. As an example of how a community might operationalize a definition of affordability in this context, the city of Austin defines a residence to be affordable provided it is affordable (in the HUD sense) to a family that earns 60 percent of the local median family income. A definition of this sort generates a specific dollar amount, specific to the local community, below which a residential unit is considered affordable.

**Mumbai**

Mumbai, India is one of the fastest growing cities in the world, and is expected to overtake Tokyo in population, whose metropolitan area has a population of 36 million. Sixty percent of Mumbai’s residents live in slums, some of which are immediately adjacent to railroad rights of way. India’s Slum Rehabilitation Authority has built many high rise residential towers in an effort to eliminate these slum neighborhoods. Designed by architects, with compromised standards of site design and construction, the towers illustrate repeated failures of the process (Figure 5). A tower at Dharavi, under construction in 2007, illustrates a common criticism, in that lack of maintenance “will turn it into a replica of every other SRA building: a decaying Stalinist-
styled pile, covered with Rorschach-like mildew stains. Inside is a long, dank hallway with 18 apartments on either side, which one nearby resident called ‘36 rooms of gloom.’ These are commonly known as “vertical slums.”

London

In the UK, government ministers of the National Housing Federation have declared an initiative to build 3 million affordable homes by 2020. The UK government presumes to initiate and direct the construction of this “social housing,” as well as manage them as rental properties.

Social housing projects in the UK illustrate a paradigm similar to that in India—that government initiates development of particular sites into residences for lower income families. These developments may have greater or lesser degrees of integration into the surrounding areas, and can still allow for the insulation and isolation of certain groups in a way inconsistent with sustainable cities as we are addressing it here.

Other paradigms are possible, and the plan for the 2012 Olympics, to be held in London, illustrate what could prove to be a great opportunity to address London’s affordable housing needs. According to Burdett, after the Olympics are over and the Olympic facilities are repurposed, 37 percent of the housing in the Olympic Village will be designated as affordable housing and sold to qualifying citizens.

Austin

The United States Government has initiated its share of housing projects over the past century. An example was the short-lived Mutual Ownership Housing Division of the Federal Works Agency (1940–42), a New Deal effort by President Roosevelt. The residences in its eight projects were all sold to the occupants after WWII, and seven of these projects still operate as mutual housing corporations owned by their residents. These are held up as being among the very few American success stories in the US government’s public housing efforts.
Like most cities, Austin has a shortage of affordable housing. According to the Austin Chronicle, the distribution of housing that is affordable to families who live on 51 to 80 percent of median family income has crept away from the city center and is contributing to urban sprawl and worker commute times (Figure 6). Austin’s “Downtown Affordable Housing Strategy” report from July 2009 notes that most people who work downtown cannot afford to live there, and that it is becoming even less affordable. Clearly these realities contribute negatively to Austin’s sustainability as a city.

Austin’s efforts to provide affordable housing illustrate a multi-faceted approach that involves both the public and private sectors. Several private nonprofit organizations contribute to the effort. Jim Rouse founded Enterprise Community in 1982, “with the ambitious goal of making sure every American lives in a decent, affordable home.” The Texas State Affordable Housing Corporation is a private nonprofit, created by statute in 1994, but which receives no state funding. The Austin Tenants’ Council and Texashousing.org are private advocacy groups that provide information and counseling in order to “organize and empower low-income people.”

Local government is also actively involved in addressing Austin’s affordable housing needs. In October 2007, the City of Austin’s Neighborhood Housing and Community Development effort held an Affordable Housing Summit. As ongoing follow-up to this summit, the city hosts monthly Affordable Housing Forums. The nature of these discussions varies, and three recent topics are noteworthy as efforts toward sustainability in both of the ways we use this term here.

In September 2009, the city forum hosted a panel to discuss “Green Building and Energy Efficiency in Affordable Housing.” In July 2008, the discussion centered around transit-oriented development and affordable housing. The presentation by Ken Bacon (Exec VP of Fannie Mae’s Housing and Community Development division) is perhaps most directly related to the integration component of a city’s sustainability. When asked how he feels about mixed-income housing developments, Bacon replied:

*Mixed-income developments are a great thing. Problems of segregation and isolation occur when it’s only low-income. Chicago and Atlanta have developed excellent mixed-
income developments with HOPE-VI funding—from the outside it’s impossible to tell that some units are subsidized. Mixed-income development makes sense if you can do it. It takes the stigma away.”

One other local government effort to address Austin’s affordable housing needs is “SMART Housing,” a municipal policy initiative whose name SMART is an acronym for “Safe, mixed-income, accessible, reasonably priced, transit oriented.” The Austin Housing Finance Corporation (AHFC) has trademarked the initiative’s name and has as its express goal to “stimulate the production of affordable housing for low and moderate income residents of Austin.”

As part of its efforts through the SMART Housing initiative, the AHFC offers incentives to developers either to build housing for lower income residents or to include certain percentages of affordable units in multifamily developments. These incentives take the forms of such things as fee waivers (up to 100 percent if 40 percent of residential units meet the criteria of being reasonably priced). As an example, for a 1200 square foot single family home on an infill lot, waived fees would total approximately $1300. Other benefits to developers include expedited review by a dedicated SMART Housing review team, and advocacy for developers in resolving issues with other departments of the City.

In January 2007, Austin City Council adopted the Design Standards and Mixed Use Ordinance, designed to allow vertical mixed use developments certain exemptions from conventional requirements of floor-area ratio and parking requirements.

Developers who earmark certain minimal percentages of included residential units qualify for these exemptions.

One project illustrates a particularly creative strategy to provide affordable housing. It is Chestnut Commons in east Austin, a TOD of condominiums and single family houses at the MLK station of the CapMetro Red line (Figure 7). In 2003, Tom Meredith, a former financial officer for Dell, bought 30 acres in east Austin with the intent of helping the Chestnut neighborhood improve without precipitating gentrification. With developers Terry Mitchell and David Mahn, they built 62 residential units available only to those whose income does not exceed 80 percent of the area’s median family income. This project, however, has an added dimension, in that $250,000 of the profit has been earmarked for existing home renovation in surrounding neighborhoods.

Conclusion

The issue of creating sustainable cities is multifaceted and complex. The problems facing cities are not discrete, but overlapping. Therefore developing sustainable cities requires a holistic approach where a variety of issues are addressed simultaneously at a variety of scales. In also means that cooperation between designers, planners, and policy makers is of fundamental importance. The topics discussed in this paper, growth management and density, infrastructure, and affordable housing, are just three, albeit important, examples of many such overlapping problems.
The development of sustainable cities is made even more complex by virtue of the fact that cities are always changing. What worked five, ten, or twenty years ago may no longer be an appropriate response. These issues must be continually evaluated as new solutions are tested, consequences are evaluated, and new information is learned.

Lastly, choosing to develop more sustainably is a political decision. It can not be a decision made only by policy makers, planners, architects, or the citizens. These groups must work together toward the goal of a sustainable city. This is not to say that a consensus must be reached, but rather as Burdett suggested a recognition by each group of the important role played the others in the shift toward sustainable cities.

Notes


27. http://www.direct.gov.uk/en/HomeAndCommunity/SocialHousingAndCareHomes/index.htm


Figures

Figure 1: Ricky Burdett and Deyan Sudjic, trans. The Endless City (London: Phaidon Press Limited, 2007), 311.

Figure 2: “Portland, Oregon: 100 Years of Growth,” Sightline Institute, http://www.sightline.org/maps/animated_maps/portland_historic.gif.

Figure 3: “South American Cities: Securing an Urban Future,” Urban Age, http://www.urban-age.net/0_downloads/SouthAmerica_Newspaper_eng.pdf.

Figure 4: Dorell, Ed. “Victory in our Sites,” Architects’ Journal 220 (July 8, 2004): 14-17.

Figure 5: From the blog of Ciara Leeming: http://ciaraleeming.blogspot.com/2009_04_01_archive.html

Figure 6: From the Austin Chronicle: http://www.austinchronicle.com/gyrobase/Issue/story/?oid=774691

Figure 7: http://www.flickr.com/photos/57822052@N00/2404794215

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