COMPLETE STREETS & LIVABLE CENTERS
Why Location Matters

Robin Holzer and Zakcq Lockrem

INTRODUCTION

In recent years, Houston has made great strides in green building, moving into the top ten nationally on both LEED certified and Energy Star rated structures. At the same time, fewer steps have been taken to address transportation, which accounts for one third of U.S. greenhouse gas emissions. To achieve greater sustainability, architects, planners, and developers must take the space between buildings into greater account.

As in other metropolitan areas, Houston’s commercial developers and property owners are continuing to embrace green building standards, particularly the U.S. Green Building Council’s Leadership in Energy and Environmental Design (LEED) standard for new construction. As a result, new offices, schools, institutions, and commercial buildings are increasingly efficient, incorporating a full array of technologies to minimize energy use and greenhouse gas emissions. These are major steps in the right direction, but we can and must do more.

Individuals spend only part of their day in any given home, office, school, or other facility. They must also travel between other locations. According to the U.S. Environmental Protection Agency, in 2009, approximately one-third of GHG emissions came from buildings and another one-third came from transportation. If we are to reduce total GHG emissions, it will not be enough to address only buildings.

The (lack of) proximity of these daily destinations to one another is a significant driver of the energy consumption and emissions of travel. Further, the quality of the public infrastructure between destinations directly affects which travel modes are available. Destinations that are well-connected by wide sidewalks, bike lanes, or transit—complete streets—are likely to be reached on foot, bike, or transit. Distances that are connected only by auto-oriented roads or highways are likely to be traversed in cars.

LEED for New Construction offers 17 (out of 110) points that are related to location of a building or the transportation options serving it. However, none of these points is mandatory and in many cases they can be earned too easily. For example, points are available if there is any bus or other transit stop within 1/4 mile of a project, without regard for the frequency that buses stop there or whether the connectivity that would allow someone to get from the stop to the project site exists.

In order to create greener buildings, it behooves developers and others making site-selection decisions to locate new buildings in or near existing activity centers, to take...
CONSIDER TWO GREEN BUILDINGS

BG Group Place (formerly Main Place) is a 46-floor, 972,000-square-foot, office tower located in downtown Houston and completed in spring 2011. The building’s sustainability features include a fully-vegetated green roof; a 39th-floor “skygarden” terrace including trees; highly-efficient heating and ventilation systems; electronic air cleaners; water filtration throughout; a condensate recovery system; 10-foot ceilings to allow in more natural light; and horizontal glass fin sunshades that protect up to 40% of the building façade from direct sun, thereby reducing air conditioning requirements. Developed by Hines and designed by Pickard Chilton Architects, the skyscraper is pre-certified at the platinum level under the LEED core and shell rating system.5

BP Helios Plaza is a 6-floor, 400,000-square-foot, office facility located in Houston’s westside Energy Corridor. Designed by Gensler, the campus’ sustainability features include independence from the electric grid, using natural gas for combined heat and power generation (CHP); a high-performance exterior curtain wall with sunshades; a light-colored, highly reflective roof; a 400,000-gallon rainwater collection system that is used for irrigation, flushing toilets, and cooling tower make-up water; and under floor air delivery (UFAD) for floors 2 to 6 to reduce air conditioning requirements. Completed in 2010, Helios Plaza is Houston’s first LEED platinum-certified office building.6,7

Designed to USGBC’s highest LEED standards, both of these buildings conserve energy and water, reduce harmful greenhouse gas emissions, are healthier for occupants, and reduce operating costs for owners. Both BG Group Place and BP Helios Plaza are sustainable at the building level.

LOCATION AND TRAVEL OPTIONS ALSO AFFECT ENERGY USE

Individuals spend only part of their day in any given home, workplace, school, or other facility, which means that a given building accounts for only a fraction of total energy use and emissions.
In 2009, the latest year for which data are available, commercial and residential buildings account together for 36% of total U.S. greenhouse gas (GHG) emissions, or just more than one-third, as shown in Table 1. Transportation accounts for 27.4%, or nearly one-third. In Houston, this number is higher. According to the City of Houston’s Greenhouse Gas Inventory, 37.2% of the city’s GHG emissions are in the transportation sector. If we are to reduce total GHG emissions, it will not be enough to address buildings in isolation.

Individuals make daily trips between multiple locations, which means we must consider the relationship between buildings and transportation. Proximity (or lack of proximity) between daily destinations is a significant driver of the energy consumption and emissions of travel. Distances that are connected only by auto-oriented roads or highways are likely to be traversed in cars, driving both energy consumption and greenhouse gas emissions.

Conversely, high-quality public infrastructure between destinations can enable use of more efficient transportation alternatives. Destinations that are in close proximity and well-connected by wide sidewalks or bike lanes—complete streets—are more likely to be reached on foot or bike, reducing both energy use and emissions.

**SOME SITES WITHIN A CITY ARE RICHER THAN OTHERS**

Houston, like many major metropolitan areas, is polycentric. While many cities developed around a single central business district surrounded by lower density residential development, Houston includes many business districts or job centers. For example, Downtown—Houston’s central business district—included more than 155,000 jobs in 9 square miles, based on 2008 data from the American Community Survey. The Texas Medical Center, Greenway Plaza, Uptown, Westchase, and Greenspoint are additional distinct activity centers, each separated by several miles, and each with more than 50,000 jobs in a comparable area, as shown in Table 2. This high level of job density makes each of these centers comparable to many other US downtowns, such as Miami or San Diego.

In fact, the Houston region has more than two dozen job centers. The areas between these activity centers are interspersed with a widely-varying mix of development types, including walkable historic streetcar suburbs, auto-dependent suburban cul-de-sacs, mid- to high-density townhouse developments, and town centers. However, the activity centers are the heart of everything. More than 75% of the entire region’s jobs, and 59% of the region’s population, are located within 5 miles of Houston’s 25 largest activity centers, as shown in Figure 1.

### Table 1. Transportation accounts for nearly one-third of U.S greenhouse gas emissions with electricity-related emissions distributed across sectors (Tg or million metric tons CO$_2$ Eq.).

<table>
<thead>
<tr>
<th>Implied Sectors</th>
<th>1990</th>
<th>2000</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>2,238.30</td>
<td>2,314.40</td>
<td>2,162.50</td>
<td>2,194.60</td>
<td>2,192.90</td>
<td>2,146.50</td>
<td>1,910.90</td>
<td>28.8%</td>
</tr>
<tr>
<td>Transportation</td>
<td>1,548.30</td>
<td>1,935.80</td>
<td>2,022.20</td>
<td>1,999.00</td>
<td>2,008.90</td>
<td>1,895.50</td>
<td>1,816.90</td>
<td>27.4%</td>
</tr>
<tr>
<td>Commercial</td>
<td>947.7</td>
<td>1,135.80</td>
<td>1,205.10</td>
<td>1,188.50</td>
<td>1,225.30</td>
<td>1,224.50</td>
<td>1,184.90</td>
<td>17.9%</td>
</tr>
<tr>
<td>Residential</td>
<td>953.8</td>
<td>1,162.20</td>
<td>1,242.90</td>
<td>1,181.50</td>
<td>1,229.60</td>
<td>1,215.10</td>
<td>1,158.90</td>
<td>17.5%</td>
</tr>
<tr>
<td>Agriculture</td>
<td>460</td>
<td>518.4</td>
<td>522.7</td>
<td>544.1</td>
<td>553.2</td>
<td>531.1</td>
<td>516</td>
<td>7.8%</td>
</tr>
<tr>
<td>U.S. Territories</td>
<td>33.7</td>
<td>46</td>
<td>58.2</td>
<td>59.3</td>
<td>53.5</td>
<td>48.4</td>
<td>45.5</td>
<td>0.7%</td>
</tr>
<tr>
<td>Total Emissions</td>
<td>6,181.80</td>
<td>7,112.70</td>
<td>7,213.50</td>
<td>7,166.90</td>
<td>7,263.40</td>
<td>7,061.10</td>
<td>6,633.20</td>
<td>1</td>
</tr>
</tbody>
</table>

In 2009, the latest year for which data are available, commercial and residential buildings account together for 36% of total U.S. greenhouse gas (GHG) emissions, or just more than one-third, as shown in Table 1. Transportation accounts for 27.4%, or nearly one-third.
TABLE 2. At least eight Houston job centers include more than 50,000 jobs in a 9-square-mile area.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Job Center</th>
<th>9 Square Mile Area</th>
<th>1 Square Mile Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Jobs</td>
<td>Population 2010</td>
</tr>
<tr>
<td>1</td>
<td>Downtown</td>
<td>155,094</td>
<td>50,169</td>
</tr>
<tr>
<td>2</td>
<td>Uptown/Galleria</td>
<td>129,525</td>
<td>58,861</td>
</tr>
<tr>
<td>3</td>
<td>Texas Medical Center</td>
<td>118,933</td>
<td>47,141</td>
</tr>
<tr>
<td>4</td>
<td>Greenway Plaza</td>
<td>88,762</td>
<td>53,956</td>
</tr>
<tr>
<td>5</td>
<td>Westchase</td>
<td>72,201</td>
<td>68,664</td>
</tr>
<tr>
<td>6</td>
<td>Gulfton (Westpark at Hillcroft)</td>
<td>55,596</td>
<td>86,425</td>
</tr>
<tr>
<td>7</td>
<td>Northwest Mall (290 at 610)</td>
<td>52,219</td>
<td>24,009</td>
</tr>
<tr>
<td>8</td>
<td>Greenspoint</td>
<td>51,464</td>
<td>41,338</td>
</tr>
<tr>
<td>9</td>
<td>Northwest Crossing (290 &amp; halfway to BW8)</td>
<td>44,667</td>
<td>24,730</td>
</tr>
<tr>
<td>10</td>
<td>Memorial City</td>
<td>44,364</td>
<td>43,633</td>
</tr>
<tr>
<td>11</td>
<td>Greenbriar Southwest (59 at Beltway 8)</td>
<td>37,910</td>
<td>36,223</td>
</tr>
<tr>
<td>12</td>
<td>Energy Corridor</td>
<td>35,303</td>
<td>27,045</td>
</tr>
<tr>
<td>13</td>
<td>NASA</td>
<td>32,839</td>
<td>32,013</td>
</tr>
<tr>
<td>14</td>
<td>The Woodlands</td>
<td>32,251</td>
<td>12,661</td>
</tr>
<tr>
<td>15</td>
<td>Sugar Land</td>
<td>29,599</td>
<td>21,950</td>
</tr>
<tr>
<td>16</td>
<td>Galveston</td>
<td>22,830</td>
<td>15,817</td>
</tr>
<tr>
<td>17</td>
<td>HP campus</td>
<td>16,869</td>
<td>27,021</td>
</tr>
</tbody>
</table>

FIGURE 1. The Houston region includes more than two dozen job centers, with the majority of the region’s jobs and population located within 5 miles of these centers (credit Houston Tomorrow).
CONSIDER DIFFERENCES IN ACCESS TO DESTINATIONS

Where a building is located affects both its proximity to other destinations and the travel options available. The two green buildings we identified enjoy very different levels of access as a result of very different locations.

BG Group Place is located on Main Street in the heart of downtown Houston. With more than 92,000 jobs within one square mile, this area has the highest concentration of jobs in the entire Houston region. The presence of large numbers of jobs indicates proximity to destinations; not just offices, but also shops, restaurants, and homes. Tenants and users of BG Group Place will enjoy increased access to destinations and reduced travel demand by being where the people are.

In contrast, BP Helios Plaza is located in the Energy Corridor on Houston’s west side, 18 miles west of Downtown. The Energy Corridor boasts a significant concentration of the region’s jobs, but the level of density is much lower. There are just over 10,000 jobs within one square mile of the Helios site. Lower density will translate into more and longer trips for BP employees at Helios Plaza.

CONSIDER DIFFERENCES IN TRANSPORTATION OPTIONS

Raw proximity to other people and destinations is not the only driver of daily travel demand. Availability of a variety of transportation mode options also makes a difference.

Downtown’s compact form, rich street grid with short block lengths, wide sidewalks, and underground tunnel system all help to enable walking between destinations. In contrast, the Energy Corridor remains car-oriented. Helios Plaza is sited adjacent to IH-10, the Houston

FIGURE 2. Aerial photo of downtown Houston including BG Group Place tower (photo credit Hines Interests).
region’s largest freeway, and the campus is comprised of low-rise buildings connected by parking lots.

Unlike in Downtown, distances between buildings are great in the Energy Corridor, sidewalks narrow, and streets disconnected. Whereas in Downtown there is an intersection every 320 feet, in Energy Corridor the distance between intersections is often 1,000 feet or more. Compounding the issue, a large amount of land is dedicated to surface parking lots, which both increases distances one must walk between destinations and contributes to an unfriendly pedestrian environment.

There are also significant differences in available transit service between the two centers. Between 1983 and 1999, the Texas Department of Transportation (TxDOT) and the Metropolitan Transit Authority of Harris County (METRO) invested more than $1.1 billion of federal and local transit funds to construct 115 miles of limited access, high-occupancy vehicle (HOV) lanes to connect Downtown to suburbs via Houston’s radial freeways. In 2011, METRO’s park-and-ride commuter bus routes which use these lanes carried more than 31,000 commuters daily.

In addition, METRO invested $324 million in an urban light rail line which connects Downtown to the Texas Medical Center, several universities, an entertainment complex, and a dozen neighborhoods. With more than 37,000 average daily boardings, METRO’s Main Street rail line rapidly became the most-successful modern light rail in the United States in terms of passengers per mile since it opened in 2004.
BG Group Place is well-positioned to take advantage of all of this transit investment. It is sited on Main Street, just one block from a light rail station, walking distance to 16 park-and-ride commuter routes, and in the midst of a rich grid of local bus service (nearly 50 routes). The Energy Corridor has not benefited from comparable transit investment. As a result, just three local bus routes and one commuter bus route from the nearby Addicks park-and-ride lot connect BP’s Helios Plaza to the city’s transit system.

**ACTIVITY CENTERS REDUCE DAILY AUTO TRAVEL**

These dramatic differences in transit infrastructure investment have translated into significant differences in transit mode share within each center. According to a 2010 analysis by METRO, fully 37% of Downtown travelers use public transit for their commutes. In the Energy Corridor, just 2% of travelers use public transit.\(^\text{17}\)

Even for those who do drive, the environmental benefits of working in a denser job center are measurable. The Houston-Galveston Area Council (H-GAC) analyzed daily vehicle miles traveled (VMT) per job within Houston’s five largest activity centers. The analysis used quantitative travel data from 2000 and considered all trips that occurred within the densest one-mile area of each activity center. In Downtown, Houston’s densest job center, daily auto travel averaged just 9 VMT per employee. In Westchase, which like the Energy Corridor is much lower density and auto-oriented, daily travel averaged 27 VMT per employee. It appears that Downtown’s higher density, shorter blocks, and greater access to transit significantly reduce daily levels of auto use within the center. However, compared to a regional average of 51 VMT per employee, it’s clear that within job centers—even the more auto-oriented centers—a significant number of daily trips are made by foot, bike, or transit, rather than car, and the proximity to housing and commercial that follows job center development significantly lowers the distance one travels in a day, even by car.\(^\text{18}\)

All of this data demonstrates that where a building is situated will have a significant effect on both the travel demand and the travel options of its users.

**FINDING THE RIGHT LOCATION**

As this data suggests, while density is a good starting point, it is not a perfect indicator of how accessible a site is to alternative forms of transportation, whether walking, biking or traveling by transit. A number of other factors are also important to creating the built environment necessary to support truly green building. Although in many ways “good” urbanism is more something that is felt than something that can be quantified, a number of tools have emerged that can assist developers, planners, and decision makers to better understand urban environments and seek out better locations for their projects.

**LEED ND**

Released in 2009, the LEED for Neighborhood Development (LEED ND) Rating System, developed by the U.S. Green Building Council (USGBC), the Congress for the New Urbanism (CNU), and National Resources Defense Council (NRDC), is perhaps the best attempt to quantify urbanism. While LEED ND certification requires at least two buildings, the principles it lays out are appropriate for assessing any site.
LEED ND has three environmental categories:

- Smart Location and Linkage,
- Neighborhood Pattern and Design, and
- Green Infrastructure and Buildings.

While the last focuses largely on infrastructure that is constructed as a part of a project, the first two deal directly with quantifying the elements that make up a compact, walkable neighborhood and contribute to reduced automobile dependence.

The Smart Location and Linkage category seeks to “encourage development within or near existing communities and public transit infrastructure” and requires developers to seek out sites that were either previously developed or are adjacent to (and connected with) existing neighborhoods. Using criteria such as the distance between intersections (not more than 600 feet) and a minimum daily transit service measure that counts the number of available daily trips (remember back to the LEED for New Construction standards that only required that a bus stop exists), this category works to make sure that development occurs in places where people already live, work, and play, and where the development will contribute to reduced auto dependence.

For those who are not seeking LEED ND certification, this portion of the checklist still provides useful criteria for understanding where and how a building can be located. One interesting criterion is the proximity of the project to a number of what LEED calls “Diverse Uses.” Used as a way to understand the ability of a neighborhood to support a complete life within walking or biking distance, these criteria measure the distance to supermarkets, clothing stores, banks, gyms, cultural facilities, schools, and more.

**Walkscore**
Technology has greatly expanded the tools available to both developers and laypeople to map this sort of information. One useful tool for those trying to assess a potential site is www.walkscore.com. Like LEED ND’s diverse uses, this website uses public data to assess the accessibility of an address to ten types of amenities on a scale of 100: restaurants, coffee, groceries, shopping, schools, parks, books, bars, entertainment, and banking. Although designed primarily for residential users, this information is still useful for commercial properties, as it essentially assesses the level of concentrated activity as a stand-in for measuring density.

The site also provides a separate transit score, which measures how well a location is served by public transportation. The analysis relies on bus and rail route and schedule data provided by transit agencies.

BG Group Place scores highly on both scales, with a 95 walkscore and a 95 transit score. BP Helios Plaza fares less well, with a 46 walkscore and a 42 transit score.

**Mapnificent**
A second interesting web tool to emerge recently is available at www.mapnificent.net. Although it currently only functions in major cities, it provides a fascinating look at how quickly transit riders can reach destinations. Starting from an address, the map overlays the distance that one can travel by transit or foot in a given amount of time (provided by the user operating a slider at the bottom of the map). The tool reveals that all distances are not equal. Transit, which moves along fixed routes to specific stops or stations, makes some areas of a city more accessible than others. By graphically showing transit access and range, Mapnificent allows transit users to better understand their own mobility to and from a site.
GreenTRIP

LEED is not alone in certifying projects that seek to green their transportation options. GreenTRIP (Traffic Reduction and Innovative Parking) is a program developed by a non-profit called TransForm and piloted in the San Francisco Bay Area. Specifically a program for multi-family, multi-use, infill developments, the certification program requires parking and traffic reduction strategies to reduce greenhouse gas emissions, while also freeing up valuable land that might have been used for parking, to increase affordability and provide more services on site.

While the criteria for GreenTRIP certification vary somewhat by place (requirements are stricter in a downtown area than in a regional center), they all stem from three base requirements:

- reducing parking provided,
- reducing auto traffic demand, and
- placing a maximum on daily miles driven per residential unit.

Depending on the site, developers are required to fulfill up to three traffic reduction strategies that wed the selection of a good site to incentives for residents to engage in good behavior. The three possible strategies are unbundled parking, discounted transit passes, and/or free car-share membership.

Unbundled parking is a strategy that removes the cost of parking from the cost of a unit. In other words, charging extra for units that require a parking space (or, looking at it another way, not charging those who don’t). By separating the cost of parking from the cost of the unit, incentive is given for people not to park a car. The second strategy, discounted transit passes, is self-explanatory. Providing transit passes to each unit encourages transit use, and, for the developer, is significantly less expensive than providing parking spaces, in most cases. The final strategy includes providing shared vehicles for units who do not own cars. This allows car-free households the ability to make occasional large shopping trips or to get out of town, trips that would be difficult without a car. Many major American cities now have convenient car sharing programs available and new technology is creating opportunities for peer-to-peer car sharing programs, where private vehicles can be rented by the hour when their owners do not need them.

Having certified only five pilot projects to date, GreenTRIP is already seeing big impacts. The developer of a project in San Leandro, California saved $3.9 million by reducing the amount of parking constructed, allowing for the development of additional units of housing and on-site childcare, and reducing the per-unit cost for development by nearly $40,000, which in turn led to the provision of 30 more affordable units than planned.

FIXING EVERYWHERE ELSE

Though all of this data reveals the benefits of choosing a green location for green buildings, we must also develop strategies for reducing transportation-related greenhouse gas emissions in existing areas. Major job centers may be the easiest places to do so. As Table 2 showed, despite being the largest job center in the Houston region, Downtown contains only some of the city’s jobs, and four job centers (Gulfton, Westchase, Uptown/Galleria and Greenway Plaza) each have higher populations than Downtown. Clearly, we need strategies to encourage the retrofit of our other job centers with greener public infrastructure.
**Livable Centers**

In Houston, one of the primary strategies to address this issue is the Livable Centers program through the Houston-Galveston Area Council (H-GAC). Drawing from a number of sources to fund both planning studies and implementation, the program seeks to develop compact, mixed-use, accessible, and walkable centers throughout Houston's eight-county region with the goal of improving environmental quality and promoting economic development.\(^{21}\) Houston's Energy Corridor is among the areas to have completed a Livable Center Plan.\(^ {22}\)

For their plan, the Energy Corridor laid out the following goals:

1. To improve connectivity and choices for all modes of movement and become a pedestrian, bicycle, and transit friendly community.
2. To envision how development/redevelopment can be a high-quality and mixed-use place with a focus on the [Addicks] Park and Ride Lot as a target opportunity site.
3. To become the transit hub for west Houston.\(^ {23}\)

The plan’s goals demonstrate that leading stakeholders in the district understand the opportunities to improve the environmental, social, and economic sustainability of their area through redevelopment and retrofit of the existing built environment.

The plan focuses on improving the pedestrian realm and improving transit service, both to connect people to other areas and to improve circulation within the district. Through this

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**FIGURE 4.** The livable centers plan for Houston’s Energy Corridor proposes redevelopment of a single-use park-and-ride transit parking lot into a compact, mixed-use, walkable, transit village (credit Energy Corridor District).
roadmap, Energy Corridor, along with the region’s other Livable Centers, will be able to transform the area between the buildings to better leverage the investments in green building that have taken place within the district.

**Complete Streets**
The livable centers approach is emblematic of a national movement called Complete Streets. Within the Complete Streets model, the goals of transportation engineers are transposed. Rather than considering automobile mobility as the primary goal, the Complete Streets model seeks to accommodate the most vulnerable users first: pedestrians, bicyclists, transit users, and finally automobiles. To accomplish this, a complete street often includes:

- wide sidewalks with street trees for shade,
- on-street parking to separate the pedestrian realm from vehicle traffic,
- on-street bike lanes, and
- a variety of traffic-calming design elements, such as curb bulb-outs at intersections to slow turning vehicles and shorten the pedestrian crossing distance.

These elements work together to create safe access for pedestrians, bicyclists, transit users, and motorists alike, as demonstrated in Figure 5.

The advantage to following a Complete Streets model is that it ensures access throughout a jurisdiction, without necessarily adding to the cost. Specifically, it ensures that streets are properly laid out as part of the design phase for construction or reconstruction, work that would be done anyway. Often, both demographic and fiscal benefits can be cited to justify the value of a Complete Streets approach.

In a country with an aging population, made up of individuals who value their freedom, infrastructure that enables seniors to move safely throughout a neighborhood to access services is a necessity to aging in place, especially once driving becomes unsafe. Likewise, good street design allows more freedom for teens and children, while also saving their parents from hectic schedules driving to and from youth activities.

The Complete Streets approach is rapidly gaining widespread acceptance in the U.S. By spring 2011, 24 states and more than 200 local jurisdictions had adopted or committed to adopt Complete Streets policies.24

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**FIGURE 5.** Complete street in Hamburg, New York, including safe facilities for pedestrians, cyclists, transit users, and motorists (photo credit Dan Burden, Walkable and Livable Communities Institute).
CONCLUSION
As far as green buildings have gone to improve quality of life, improve the quality of the environment, and reduce greenhouse gas emissions, failing to locate green buildings properly and take transportation options into consideration has created a situation of diminished returns for the green building community. Choosing infill locations in existing activity centers for new development or redevelopment poses opportunities to significantly reduce the building users’ overall lifetime carbon footprint. Creating better, greener buildings and better, greener cities requires a two-pronged approach. We must fight for better locations for new buildings, and we must also retrofit existing areas to improve connectivity, walkability, bikeability, transit availability, and access to services. Doing so will both reduce demand for driving and help reduce the average miles traveled for those who do drive, thereby reducing the energy use and emissions of daily travel.

NOTES
1. Robin Holzer is a former business consultant turned civic leader who lives in urban central Houston, TX. She earned an MBA from Rice University in 2002 and a BA from Rice in 1993. Robin chairs the board of the non-profit Citizens’ Transportation Coalition (CTC), a grassroots advocacy organization with members across the 8-county Houston-Galveston region. CTC advocates for transportation solutions that improve quality of life.
2. Zakcq Lockrem is an urban planner and designer for Asakura Robinson in Houston, TX. He has worked on sustainability projects, from green building to alternative transportation, in Texas, Louisiana, California, New England, Mexico and West Africa. He is a former board member of the LivableStreets Alliance in Cambridge, MA and the current vice-chair of the Citizens’ Transportation Coalition (CTC) in Houston. He is a contributor and co-editor of the webmagazine Plurale Tantum.
10. GIS data analysis courtesy of Houston Tomorrow. Population data is from the 2010 U.S. Census. Job data is from the 2008 American Community Survey. Population and job distributions were analyzed using a square grid measuring 1 square mile per square. “Job centers” encompass 9 square miles while “highest job concentrations” encompass 1 square mile.
11. Ibid.
12. Ibid.
17. Metropolitan Transit Authority of Harris County, 2010.
18. Houston-Galveston Area Council analysis of Daily Vehicle Miles Traveled per Employee in Houston’s five largest activity centers.
22. The entire Energy Corridor Livable Center Plan is available on the H-GAC website.