Green Downtown

Sustainability in Dense Urban Environments

Matt Covert
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About the Author

Matt Covert received a Masters of Science in Environment and Resources from the Nelson Institute for Environmental Studies at the University of Wisconsin-Madison in 2012. He has worked on sustainability issues from a variety of different angles, including a stint as the co-director of the UW-Madison's student farm, an internship with the Natural Heritage Land Trust working on farmland protection, a master's thesis on land use policy and planning and urban agriculture, and previous work with 1000 Friends of Wisconsin on the Green Tier Legacy Communities program. In addition to his work on the Green Downtown research, he also assists with other programs at 1000 Friends.

Acknowledgements

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Thank you as well to Susan Schmitz at Downtown Madison, Inc., who was instrumental in some of the most crucial and interesting data gathering in this project, especially the residents survey.

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Introduction

Green Downtown explores Downtown Madison's sustainability successes and challenges and highlights potential initiatives that could capitalize on the connections, networks, and creativity inherent in dense urban areas to produce meaningful, sustainable change.

Why downtowns?

Downtowns, once neglected in favor of suburban malls and subdivisions, are making a comeback. Spurred by private investment, public planning, and demographic shifts, this has resulted in much more than just gleaming new office buildings. A resurgence of mixed use development, improved walkability and transportation options, and recognition of the creativity, competition, and collaboration that comes from having a vibrant urban center reflect this focus on downtowns. Whether a community is small or large, the benefits of a revitalized city center are increasingly apparent.

This revitalization has profound implications for sustainability. With a majority the world over now living in urban areas, and over seventy percent of the population in the United States, understanding how cities use and move people and resources becomes vitally important for ensuring a robust economy and quality of life within ecological limits.

Dense urban areas are in some ways inherently more sustainable than low-density suburban development. Denser dwelling units can decrease energy use per capita. Having daily needs and destinations within close walking, biking, or transit distance is more convenient and lessens the need for parking. Building housing proximate to employment gives employers and employees the ability to opt out of a grinding commute. Building more intelligent urban areas that are attractive and affordable can help preserve natural areas. All of these variables can have positive effects on greenhouse gas emissions, air and water quality, public health, ecosystem health, and overall quality of life.

Despite their many contributions to environmental, economic, and social sustainability and vibrancy, however, cities remain consumptive networks heavily dependent on resource extraction. As downtowns become reinvigorated and repopulated, we must ask hard questions about what it takes to feed, power, build, and rebuild our urban cores.

Cities can also be the source of the solutions to their own sustainability challenges. A healthy urban area's dense array of networks, connections, and relationships renders it a hub of creativity and innovation, a hotbed of new ideas and forms of collaboration to address its greatest challenges. Just as cities and states are the laboratories of democracy and governance, so are urban neighborhoods the laboratories of new ideas in cities.

Downtown Madison, Wisconsin

The City of Madison is recognized as a leader in sustainability thanks to a century of forward-thinking city planning, the presence of UW-Madison, and a high level of civic engagement and public concern with sustainability issues.

Within Madison, neighborhoods and districts form a crucial interface between residents and the broader community. Many Madison neighborhoods' strong sense of civic pride as well as efforts to support local businesses and maintain the historic character of the neighborhood make them lively and livable. In many areas, sustainability plays a key role, especially concerning walkability, transportation infrastructure, parks and open space, food access, and others.

Downtown Madison is one such area. It is geographically unique, bounded on three sides by lakes and only seven blocks wide in areas. The downtown area is compact and lively, boasting the highest residential density in the city as well as some of Madison's best shopping and entertainment destinations. Home to state government and the flagship university, downtown is also Madison's largest employment center. It is vibrant because of, not in spite of, its commitment to walkability, transportation choice, a mix of uses, and other pillars of sustainable neighborhoods.

Many participants in the day-to-day life of Downtown Madison embrace principles of sustainability. The city's development of State Street and Monona Terrace and adoption of bike- and pedestrian-friendly measures have provided residents and visitors with more transportation choice. The Farmer's Market, local restaurants, and consumer demand continue to drive powerful changes to local and regional food systems. Climate change and resource availability compels local officials and businesses to think creatively about renewable energy, attracting innovative energy and transportation companies, and making Madison a model for strong, ecologically sensitive economies.

Strategy

Short Term Goals:

- Work with DMI Quality of Life Committee to develop district-scale sustainability metrics in line with the 2012 DMI State of the Downtown Report
- Begin identifying willing partners in the business and development community who would be willing to work with us on a pilot project for sustainability initiatives

Medium Term Goals:

- Identify series of projects, improvements, and initiatives possible in potential downtown pilot project areas and resources needed to move projects forward
- Develop marketing plan for Green Downtown in conjunction with DMI, WEI, City of Madison, Sustain Dane, and other partners

Long Term Goals:

- Establish a scalable, replicable strategy for bringing together spatially associated businesses, developers, and landowners to accomplish sustainability goals below policy scale but larger than what individuals can accomplish on their own
- Develop useful tools and information sharing resources for landowners, developers, businesses, and residents to help them take part in a truly sustainable neighborhood
- Fully incorporate sustainability in the State of the Downtown Report to demonstrate meaningful progress in the sustainability of the downtown district
- Engage with City of Madison to improve the regulatory process to encourage more creative, collaborative environmental improvement projects

Methods

Survey

An integral part of our research for Green Downtown was the administration of a survey of downtown residents. This survey was created in conjunction with Downtown Madison, Inc. and its Quality of Life committee. As part of the process of collecting data for a second annual State of the Downtown Report, DMI wished to include a sustainability component in this year's report. We developed this survey to gather general information about how downtown residents live their lives and also to offer insight into how they feel about sustainability in their neighborhood. The survey consists of 42 questions, mostly multiple choice with some open-ended. The survey was built in Survey Monkey Pro and administered through email to more than 30 condo and neighborhood associations, apartment managers, and developers and then advertised in the Isthmus weekly paper and on the Isthmus' website. Responses were collected in Survey Monkey, and data were analyzed in various statistical programs.

Survey Information
Sample Size: n=329
Response Rate: roughly 10%
Questions: 42

In this survey, we did not actively seek participation of students at the UW-Madison. We did not exclude them from the data, but given the transient nature of student housing from year to year, we decided to focus on residents with more permanence and interest in the neighborhood. Additionally, each question was optional to allow participants to choose the information they shared, which could affect statistical significance. We also chose to include a mix of discrete answer questions and open-ended questions, despite the difficulties in coding open-ended responses.

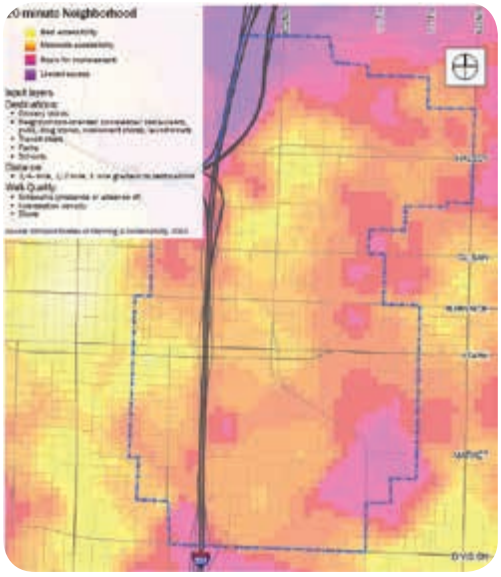
Program Data Requests

In order to get data on other useful metrics of sustainability downtown, we contacted organizations that run various sustainability programs in Madison, including MG&E, B-Cycle, Green Madison, Madison Environmental Group, and Sustain Dane. We received data from these organizations in a variety of formats, including maps and tables.

Madison is not the first community to tackle urban sustainability at the neighborhood scale. Other urban areas in cities nationwide have taken innovative approaches that can serve as useful examples.

Eco-Districts - Portland, OR

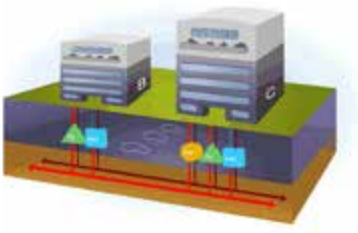
The Portland Sustainability Institute (POSI) has championed the creation of Eco-Districts to address sustainability issues by delivering environmental services to neighborhoods to reduce overall ecological footprint while providing more opportunities for people in those neighborhoods to benefit from these investments. Areas that wish to become Eco-Districts commit to ambitious ecological footprint reduction goals, guide investment and community action, and track results over time. The city of Portland currently boasts five Eco-Districts. Below left is POSI's Eco-District implementation structure; directly below is a "20 minute neighborhood" evaluation tool developed by Gateway, one of Portland's eco-districts.



Living City Block - Denver, CO

In Denver, Living City Block (LCB) is focused on creating a scalable demonstration of what it calls a "regenerative urban center." LCB is working with residents, businesses, and property owners in a contiguous 2 square block area of Denver's historic LoDo district to help whole buildings and groups of buildings reach net zero energy consumption and achieve superior environmental performance while creating a thriving urban fabric. Challenges include securing financing and convincing a large number of diverse stakeholders to make capital investments with 5-year paybacks that will benefit others as well as themselves. The proximity, scale, and density of an urban neighborhood like LoDo make this possible, however, and if the financing pencils out, LCB has the potential to become a model for city-block-scale sustainability improvements.

Above, an envisioning of the LCB site and streetscape in 2016; and below, a geothermal district heating and cooling system envisioned as a potential lynchpin of an energy overhaul at the district scale.



Case Studies

Eco-District - Washington, DC

Washington, DC has also adopted the Eco-District model from Portland and adapted it for an area near the National Mall replete with large government buildings. The 15-square-block section of southwest Washington includes the Department of Energy and U.S. Postal Service buildings as well as a commuter rail line. The EcoDistrict initiative hopes to bring in mixed uses, including residences, and extend the civic quality of the National Mall to the neighborhood as a whole. Specific goals include the creation of 14 acres of new parks and public spaces, construction of 1.8 million square feet of residential or hotel space and 1 million square feet of office space, and installation and improvement of green infrastructure, including an ambitious goal of 35% of surface area being pervious to stormwater. While the district is modeled after the POSI Eco-District framework, the challenges of existing federal government infrastructure and management make DC's first Eco-District relevant to Madison's downtown. Above, a bird's-eye schematic shows neighborhood goals for the Southwest Eco-District.

LEED-ND - Milwaukee, WI

The US Green Building Council's (USGBC's) LEED rating system, originally applied to new construction and then extended to and specified for retrofits, commercial interiors, schools, and other situations, has created LEED-Neighborhood Development, or LEED-ND. In a departure from earlier LEED rating systems, which were sometimes criticized for placing more emphasis on technical elements of building design and construction than on a project's context, LEED-ND allows a neighborhood, district, association, or development to get LEED certified for neighborhood-scale achievements in areas such as site design and selection and regional connectivity and context in addition to more sustainable construction and building techniques. For example, The Brewery, an amibitious brownfield redevelopment in Milwaukee on the 26-acre site of the old Pabst Brewing Company, has earned a Platinum rating from the LEED-ND pilot program. The project includes rehabilitation of 26 historic structures, extensive green infrastructure to manage stormwater runoff, and a diverse mix of uses (including a campus of UW-Milwaukee and a senior living center).

Green infrastructure and a historic building in Milwaukee's Brewery LEED-ND project.

Zero Emissions District - Fort Collins, CO

The city of Fort Collins, a mid-sized college town smaller than but similar in many respects to Madison, recently established the nation's first Zero Emissions District, or ZED. This project, known as FortZED, intends to "transform the downtown area and the main campus of Colorado State University into a net Zero Energy District through conservation, efficiency, renewable sources and smart technologies."

FortZED's pilot effort involved five large employers: New Belgium Brewing, Larimer County, the City of Fort Collins, Colorado State University, and Integrid Labs. While the ZED as a whole contains over 7,000 separate utility accounts, these five employers served as a test case. Using a wide variety of techniques, including smart grid e-meters, on-site generators and solar panels, and energy storage techniques, they were able to reduce collective peak demand by 20 percent in only four weeks of testing. FortZED's first phase was funded by the Department of Energy through its Renewable and Distributed Systems Integration (RDSI) grant and through a mix of stimulus funds and donations from suppliers and vendors.

The lessons from FortZED for Madison are plentiful. The ZED encompasses not just one block or any one particular campus or employment center but the entirety of Downtown, the university's main campus, and a major large commercial area. Fort Collins began with five large employers to "soft launch" the ZED instead of grappling with the complexity of all 7,000 utility accounts at once. Additionally, the ZED is not just a partnership of large employers; integral to the idea is the spatial association of a district. The area encompassed in FortZED is the city's densest and contains residences, large employers, and the vibrant, walkable downtown. FortZED works because it captures the benefits of proximate participants on the same electrical grid working together.

FortZED also illustrates the importance of soliciting in-kind and monetary donations from suppliers, vendors, and support systems. The likely absence of future stimulus funding and probable constraints on the U.S. Energy Department funding stream make reliance on community partners all the more important.

Case Studies

Sustainable Transportation Initiatives

As urban areas get new leases on life, transit ridership is up and car trips are down in many areas. The American Public Transportation Association's report on ridership through September of 2012 shows a 2.6% increase in overall ridership from the same period in 2011. This includes a 3.6% increase in heavy rail, 4.2% increase in light rail, 2.4% increase in commuter rail, and a 1.8% increase in bus ridership. Conversely, vehicle miles traveled (VMT) and car ownership per person are down in many communities, especially among certain demographic groups. For example, total miles traveled by car peaked in the US in 2004, and new car purchases among those 21 to 34 years of age declined from 38 to 27 percent of total sales over 25 years. Additionally, the aging Baby Boomer generation has expressed increasing preference for downsizing housing, giving up cars, and living in walkable areas. What have cities done to capture the attention of these key demographic groups that also contribute to neighborhood-scale sustainability?

Rail - Several metro areas have continued investing in new lines. Boston's Green Line, the nation's oldest (1897) and busiest light rail service, continues to attract commuters and students. Denver, which has had light rail in its downtown since 1994, continues to expand lines and service, with 122 miles of rail transit forecast by 2022. Portland, an early leader in rail, has expanded the reach of its service and now offers heavy rail, light rail, buses, and a streetcar network, all of which are multi-modal (i.e., accomodate bikes).

Buses - While bus service has been a mainstay of transit in American cities for decades, changes to bus transit systems have major sustainability implications. The average annual cost of owning and operating a car in 2011 was, according to the AAA, more than $8,000. In contrast, monthly passes on Madison Metro add up to an annual cost of $660 and result in less air and greenhouse gas pollution per capita. Innovations in bus system design are ushering in a new era of sustainable transit. For example, Madison purchased hybrid electric buses that greatly reduce air pollution along the busiest routes, which go through downtown. Bus Rapid Transit (BRT) lines, often used as a part of corridor redevelopment plans, offer many of the benefits of rail at a lower cost. BRT in Cleveland, for example, connects the city's university district and its downtown along beautiful and historic Euclid Avenue, and has been successful at ushering in transit-oriented development.

Bicycles - Cities and metro areas compete hard for the title of "most bike-friendly city in the nation." Bike friendliness, like transit accessibility, walkability, and attraction density, is one of the primary ways in which cities try to tap into changing demographics and living preferences. Additionally, evidence suggests that people who use bikes to commute and reach daily destinations are doing well by their own, as well as others', health. Many of the cities that top lists of bikeability are college towns that cater to the university community, but many larger cities, like Minneapolis, Portland, Chicago, and New York have made significant investments in bicycle infrastructure. Bike sharing programs have taken off in cities like Denver, Washington, D.C., Madison, and Minneapolis.

The Des Moines Bicycle Collective offers free bike valet parking at the city's downtown farmers market.

Pedestrians - Foot traffic is at the heart of a successful urban center. Downtowns that are cleaved into pieces by expressways, barriers, and pedestrian-hostile arterial roads will have a difficult time creating the streetscapes, urban fabric, and sense of place that make downtowns attractive to a widening demographic. Examples of initiatives that encourage walking include Complete Streets, placemaking, urban design and zoning standards that make the walking environment more pleasant, useful, and interesting.

Downtown Summary

Downtown Madison Selected Demographics

Population, 2010 Census: 24,009
Population, 2000 Census: 22,168
Area: 0.90 square miles

Gender	Percent
Male	52.6
Female	47.4

Age Range	Percent
Under 15	0.8%
15 - 19	17.4%
20 - 24	51.4%
25 - 34	17.0%
35 - 44	4.0%
45 - 54	3.4%
55 - 64	2.9%
65 - 74	1.3%
75 - 84	0.9%
85 or older	0.9%

Educational Attainment	Percent
Less than 9th grade	1.1%
Some high school	5.5%
High School graduate	13.4%
Some college, no degree	16.5%
Associate's Degree	5.2%
Bachelor's Degree	29.9%
Graduate/Professional Degree	28.5%

Race or Ethnicity	Percent
White	80.0%
African American	6.0%
American Indian	0.5%
Asian	7.4%
Native Pacific Islander	0.0%
Some other race	3.3%
Two or more races	2.8%

We define Downtown as the core area of Madison's Isthmus between Park Street and Blair Street.

State Street, home to Madison's only Business Improvement District, is dominated by buses, pedestrians, and bicyclists and is one of the nation's finest public malls.

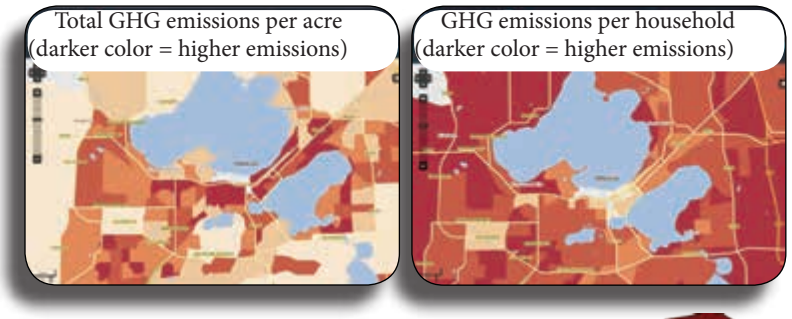
Dane County Farmers Market on a Saturday. DCFM is an example of Downtown's support for sustainability.

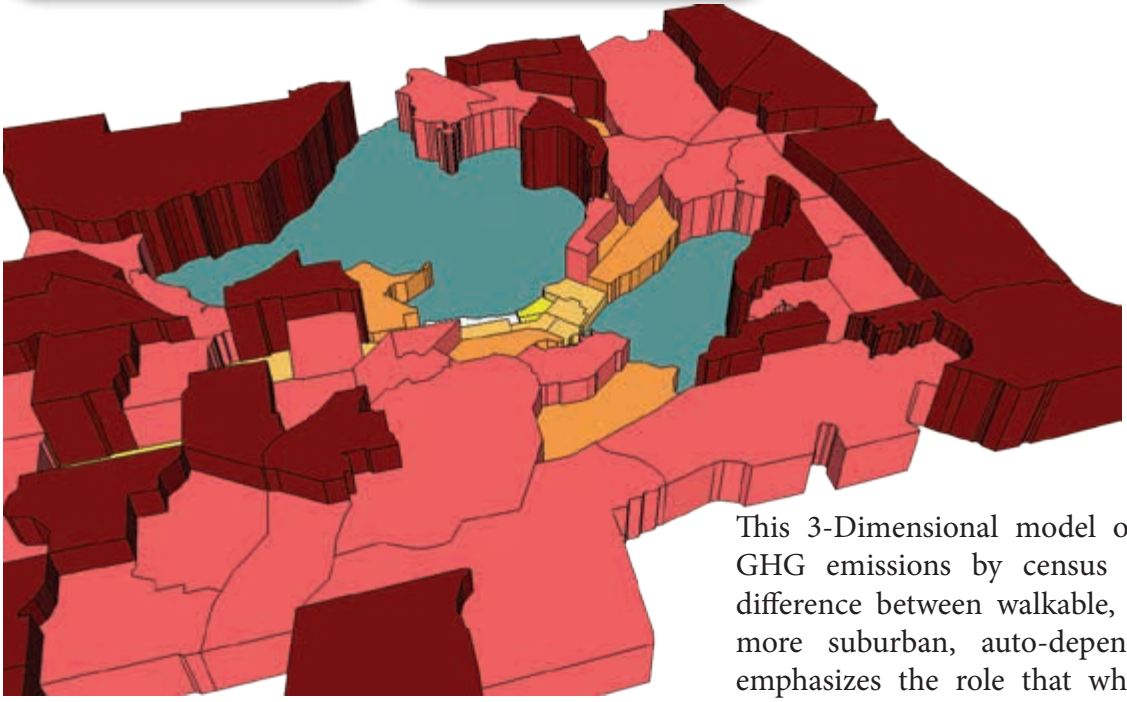
Energy - The Basics

One of the principal arguments in favor of denser urban development from a sustainability perspective is the idea, articulated by David Owen in his 2009 article, "Greenest Place in the U.S.? It's Not Where You'd Think," that Manhattanites live in the nation's greenest neighborhood or district. New York City's dense housing and the difficulty of driving a car there ensure residents a per capita greenhouse gas emission lower than virtually anywhere else in North America. The discussion around energy and sustainability revolves around how we live and move around. Luckily, an increasing amount of data reveal how downtowns are using, making, and saving energy.

Metric: Greenhouse Gas Emissions Per Capita

Where one lives is one of the greatest single determinants of individual greenhouse gas emissions. Evidence demonstrates that residents of neighborhoods with denser housing, more walkable and lively streets, and a variety of daily needs and destinations within a short, convenient distance have lower per capita greenhouse gas emissions than those who live in more isolated, automobile-dependent areas typical of postwar suburban construction and development. As these maps from the Center for Neighborhood Technology show, due to its density, smaller housing unit size, and lower transportation costs per household, Downtown Madison boasts the lowest greenhouse gas emissions per household in the city, despite having overall high gross GHG emissions. This is consistent with the research, which emphasizes the GHG benefits of smaller, more connected housing units, less reliance on private vehicles, and other characteristics.

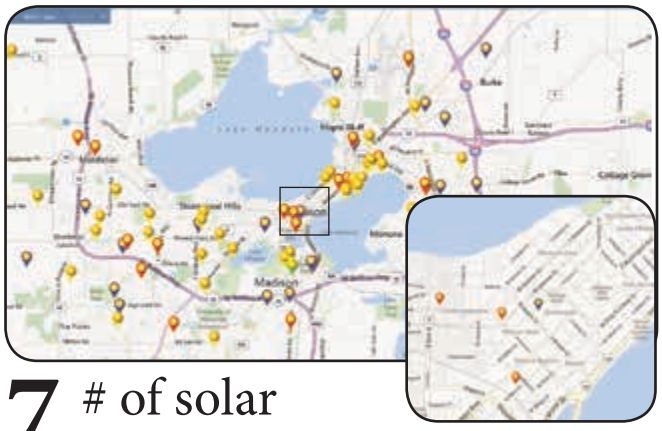




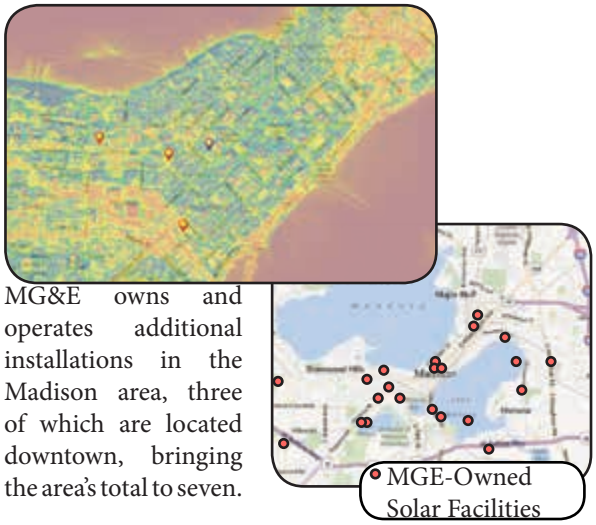
This 3-Dimensional model of per household GHG emissions by census tract shows the difference between walkable, urban areas and more suburban, auto-dependent areas and emphasizes the role that where one chooses to live plays in one's environmental impact.

Metric: Solar Installations and Solar Potential

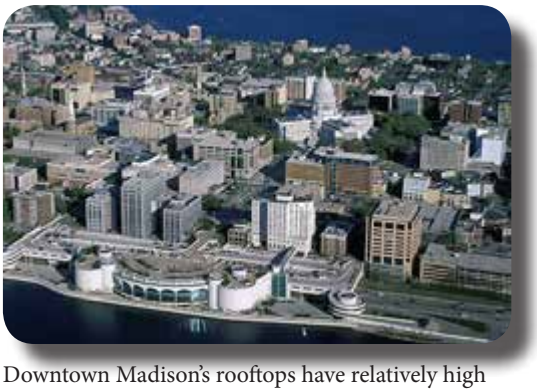
Downtown Madison currently has more renewable energy potential than is currently being harnessed. At right is a a map of solar installations in Madison by ownership. Zooming in on the downtown and adding solar energy potential (below, with greens representing low solar potential and reds representing high potential) reveals that downtown is relatively well situated to take advantage of solar due to the large number of high, flat rooftops. However, only four private and three MG&E installations exist within the downtown area.



7 # of solar installations with **26.7 kW** installed



MG&E owns and operates additional installations in the Madison area, three of which are located downtown, bringing the area's total to seven.

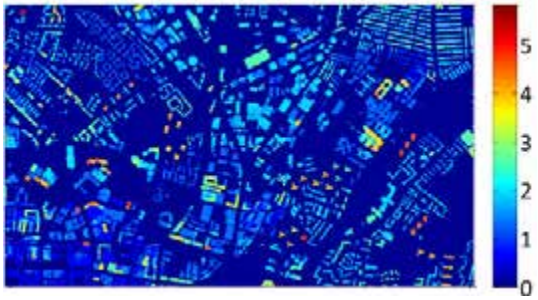


Downtown Madison's rooftops have relatively high solar potential, being largely tall and flat, but only seven installations can be found here.

Solar parking canopy	8.5 kW
State capitol building	9.8 kW
Children's Museum	1.9 kW
Van Hise Hall	6.5 kW
Aberdeen Apartments	solar thermal
Fire Station 01	solar thermal
Depot Apartments	solar thermal

What about wind?

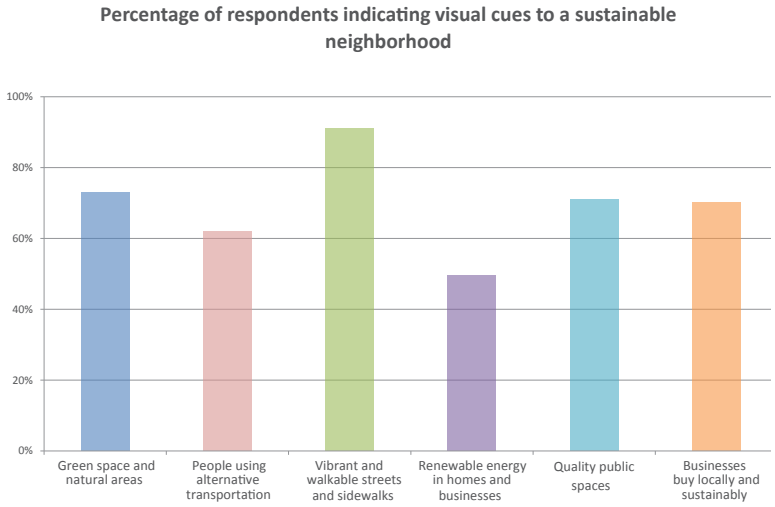
Few would argue that a dense urban downtown neighborhood is a good location for a conventional wind turbine. However, small-scale wind turbines, called "micro-wind," can be mounted on the tops and sides of buildings, are visually unobtrusive, and deserve further study. Researchers at the University of Leeds in England modeled variable wind conditions across metro areas in the UK and concluded that given building height and variable wind conditions at ground level, downtowns were the best places within a city to locate micro-wind power (See wind potential map of Leeds at right). This research could be replicated for Madison.



Energy - Perception and Education

Metric: Public Perception of Sustainability and Energy

While there may be a relationship between dense urban living and lower per capita GHG emissions, downtown residents did not identify renewable energy on homes and businesses as an important visual cue of a sustainable neighborhood. This may be due to a belief that energy consumption is not a neighborhood concern or simply that other factors are more important. However, this reinforces rather than lessens the need for neighborhood-scale energy projects, demonstrations, and outreach efforts.



One way of enhancing public perception of sustainability and energy issues is creating public, visible demonstrations of small-scale renewable energy and conservation strategies. Energy installations that have an educational component can raise awareness, particularly in dense downtowns that see heavy traffic and host a large share of a city's visitors. **The access, density, and visibility inherent to urban downtowns can make a big difference when deploying renewable energy demonstrations.**

Madison Gas & Electric has used sites like the state capitol building in exactly this way. The capitol's 9.8 kW of solar photovoltaic panels (bottom right) were installed as part of an effort by then-governor Jim Doyle to promote renewable energy. There is an educational kiosk (top right) describing the project and the importance of renewable energy at the West Wing information desk, and since the capitol is one of the most heavily visited locations in the state, MG&E has the opportunity to have a larger impact than if the panels existed with no demonstration or education component.

Another site in Downtown Madison where sustainability is an integral part of educating the public is at the Madison Children's Museum. The MCM, housed in one of downtown's many green buildings, boasts one of the city's best and most visible green roofs (including a flock of chickens) in addition to the MG&E solar installation.

62% of Downtown Madison residents believe they live in a sustainable neighborhood

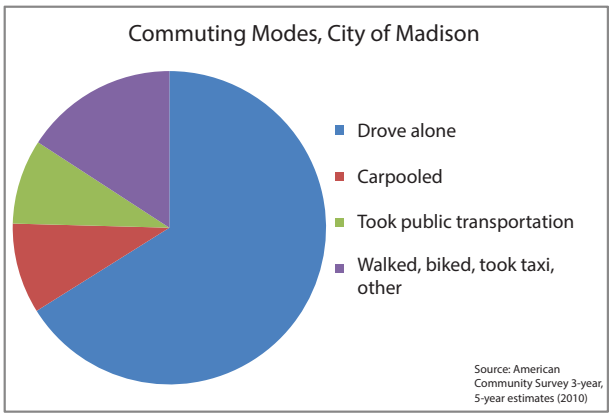
94,500 people took guided tours of the Capitol Building in 2012 and saw MG&E's solar kiosk

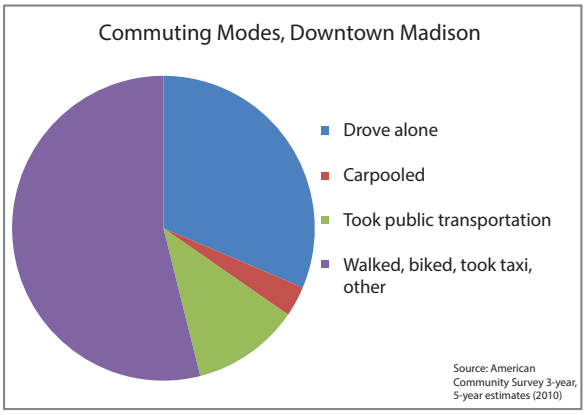
Transportation - The Basics

One important feature of an urban area is how people get around and where they are going. Dense downtown environments are often (but not always) served well by public transit, and they increasingly offer visitors and residents a variety of destinations and services within a convenient distance. The environmental and economic impacts of transportation choices downtown deserve greater attention.

Metric: Commute Modes

One of the primary inherent advantages of downtowns is that as hubs of activity and economy, they are usually well served by transportation. However, the more important transportation measure is the ability to choose different options of moving about based on what is most convenient, enjoyable, and suited to the current task. In Downtown Madison, about 65 percent of residents report that they walk or bike to work, compared to about 35 percent in the city as a whole.





$8,588 Annual cost of owning and operating an automobile

$660 Annual cost of Madison Metro's monthly passes

$65 Annual cost of B-Cycle membership

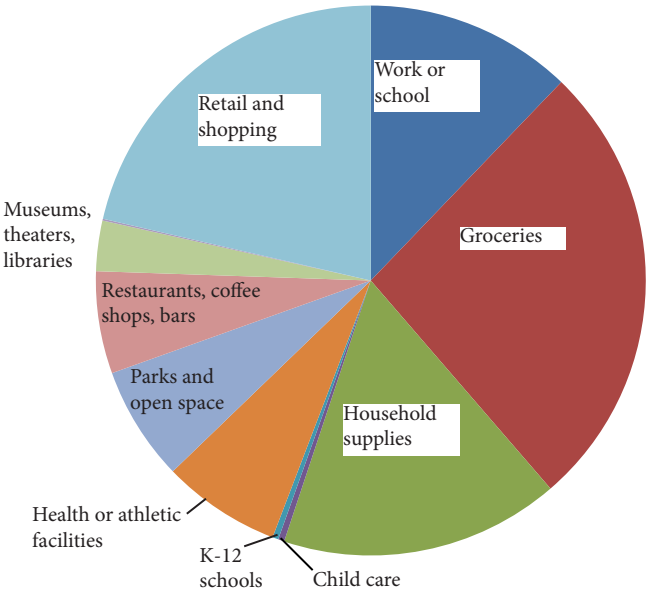
Transportation - Destinations and Choice

Metric: Perception of Community Completeness

Another important question we asked survey respondents was, "When you do leave downtown, what are you leaving for?" We hoped to learn something about what the downtown area does not have that causes people to travel to other areas of the city.

As the figure at right demonstrates, the most often cited reason among survey respondents for leaving the downtown area is groceries. This is consistent with some previous writing on the subject, including repeated calls and proposals for a public market and the city's Downtown Plan. It is difficult to incentivize stores of any size without the market to support them, but the changing demographics of downtown and redevelopment occuring in the area might make the market work for additional grocery shopping choices. After groceries and discounting travel, retail/shopping and other household supplies were the most often mentioned reasons for traveling out of the downtown area.

Proportion reporting various reasons for going out of downtown, not travel-related



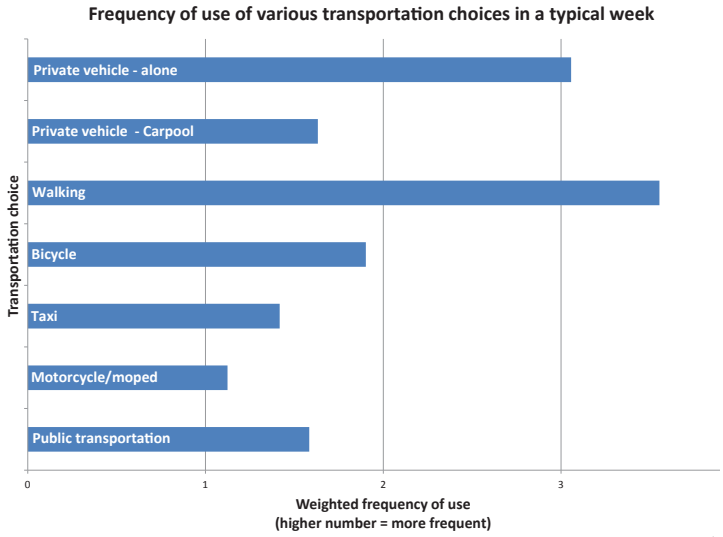
Milwaukee's public market, in the historic Third Ward, provides residents and visitors a wide variety of products, including food essentials.

Could Madison support a public market?

1.3 Average number of vehicles per household

1.15 Average number of bicycles per household

Note: Online surveys like the one utilized in Green Downtown can be re-used periodically to paint a more accurate picture of changes in behaviors and attitudes than can be gleaned from census figures.

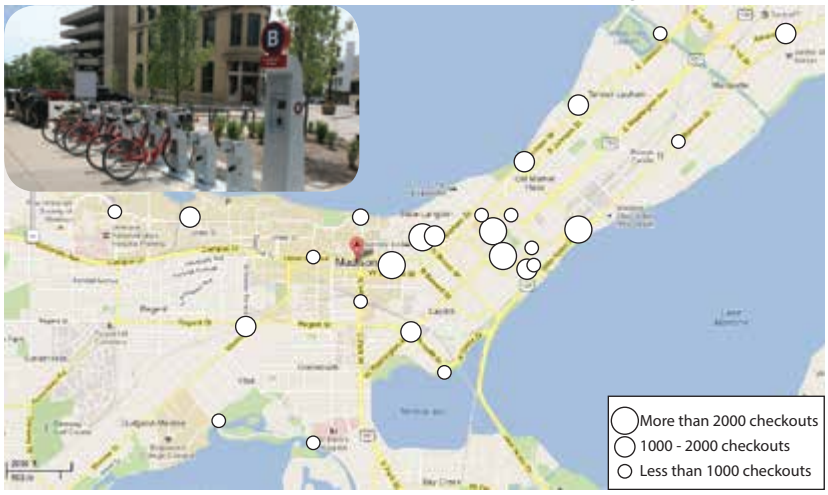


In the survey of residents, respondents were asked to enumerate the frequency with which they used various transportation choices to reach major destinations on a weekly basis. The results are noticeable both for the expected (walking is the most frequent) and the unexpected (driving alone is a close second, with bicycling trailing far behind). In terms of overall sustainability performance, this high reported rate of driving alone is not ideal. Fortunately, the survey results provide some guidance on how to incentivize people to drive alone less often.

Transportation - Bikes and Feet

Metric: Bike Infrastructure

Madison was the second city in the US to implement a Trek-sponsored bicycle sharing program called B-Cycle. Offering riders annual or hourly rates on new city bikes, B-Cycle has experienced phenomenal success since its launch, prompting the expansion of stations and available bikes. The program allows for collecting information on where the bikes are going and how many checkouts occur at each station. As the figure below demonstrates, the most heavily visited B-Cycle stations occur in the core of downtown and west along State Street to the University of Wisconsin campus.



356%

increase in annual B-Cycle memberships from 2011

245,587

fewer pounds of carbon dioxide emitted in 2012 thanks to B-Cycle

Metric: Walk Score

Walkscore, an online tool for evaluating the walkability of a neighborhood, uses a combination of proximity to various services, entertainment, and shopping options and the transit accessibility of a location to determine how pedestrian friendly it is. Downtown Madison scores a 94 out of 100, a "walker's paradise." One of the most under-appreciated advantages of tools like Walkscore and Mapnificent is that they are crowdsourced and thus constantly updated and current, rather than waiting several years for a market study or census report.

Downtown Walk Scores for Selected American Cities

100	Chicago
95	Minneapolis
94	Madison
94	Ann Arbor, MI
93	Seattle
89	Austin, TX
84	Lincoln, NE

Downtown Madison compares favorably with the urban centers of other American cities with reputations for good walkability.

94 Downtown Walk Score

81 Average score of next 9 Madison neighborhoods

Transportation - Mode and Employment Access

Metric: Multi-modal Accessibility

Geographic reach in ten minutes on public transportation without access to a bicycle

Geographic reach in ten minutes on public transportation with access to a bicycle

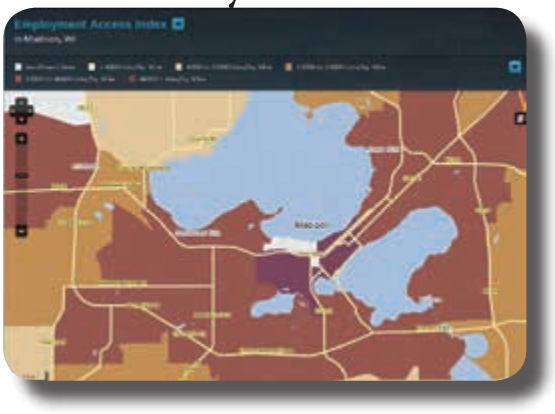
Downtown Madison and the University of Wisconsin are the epicenter of the infrastructure for B-Cycle and Metro Transit, allowing a person to combine bicycling and bus transit easily in the downtown area. As these maps from online tool Mapnificent show, access to a bicycle dramatically expands how far you can get from the downtown core in ten minutes while waiting no more than ten minutes at a station using a combination of your bicycle or (B-Cycle) and public transit. Geographic reach of transportation choice is a compelling metric for downtowns, made easier and more accessible by online tools like WalkScore and Mapnificent.

3,428  downtown residents per electric vehicle charging station

Metric: Employment Access

57% of residents employed or in school also work or study Downtown

Access to jobs in Downtown Madison is very high. This figure, from the Center for Neighborhood Technology, shows Downtown Madison and the near West Side having by far the highest employment access. Large employment generators for the neighborhood include the UW-Madison, state, local, and federal government, and services located near the capitol. Crucially for sustainability, a high number of residents in our survey report also working or going to school downtown (see right). This may partially account for the prevalence of walking in the downtown area, but it also suggests there is tremendous market potential for B-Cycle.



"It's clear that Madisonians are seeing the benefits of B-cycle as an **accessible, active means of transportation**. Growth during rush hours and in the university segment this year really reinforced that it's catching on for commuters."

Claire Hurley, Madison B-Cycle

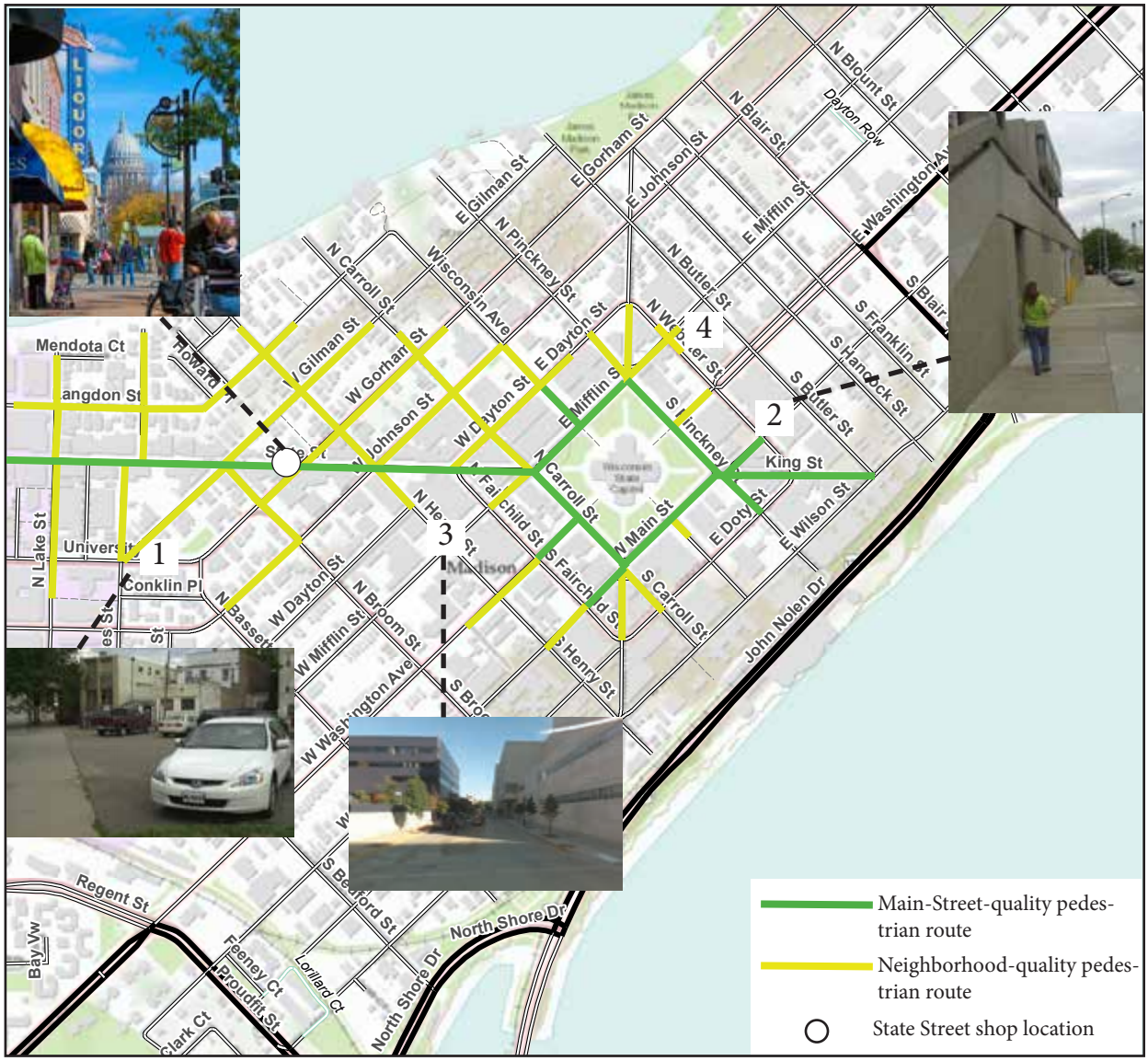
Metric: Walk Appeal

Not all walks of the same distance are of the same quality. How far a pedestrian is willing to walk to and from various destinations, whether a visitor or neighborhood resident, depends on whether the walk is interesting, safe, and convenient. That is the hypothesis of Steve Mouzon, a Florida-based architect, who recently introduced **Walk Appeal** as a framework for evaluating the walkability of any corridor or neigbhorhood. By applying the principles of Walk Appeal to Madison, we can gain a better understanding of where Downtown Madison must improve in order to become more sustainable.

The essential thesis of Walk Appeal is that people will walk a longer distance and enjoy that walk more if the quality of the environment is more conducive to walking. Conversely, if a street environment is hostile to pedestrians, people will be less likely to want to walk more than a short distance. Thus, a quality Main Street provides the motivation for a pedestrian to walk up to 3/4 mile, while an older urban neighborhood inspires him or her to walk only 1/4 mile. Suburban subdivisions, power centers, and parking-backed thoroughfares provide increasingly negative pedestrian environments and increasingly short walk tolerances. This explains why most people drive from one big box store to the next even if the next store is 300 feet away-not because they don't want to walk, but because the quality of the walking experience is incredibly poor (and possibly dangerous). The two photos above were both taken in Downtown Madison and illustrate the distinctions created with Walk Appeal. At right is a typical view of State Street, a classic American Main Street. With historic and interesting buildings, mixed uses, a human scale, constantly changing storefronts with window displays, good transit connections, and pedestrian safety features, State Street provides a walking experience that motivates pedestrians to walk around 3/4 mile. At left, the streetscape as it passes the State of Wisconsin's agency office buildings is considerably more hostile to pedestrians. Although only 4 blocks from State Street, a pedestrian here would be discouraged from walking more than 1/10 mile.

Walk Appeal

Walk Appeal can be used to analyze the walkability of a neighborhood for various situations and locations with much more complexity and detail than a simple distance calculator like Walk Score can. Below, a hypothetical store on State Street is analyzed by coloring stretches of street with the "Main Street" walking quality green, while streets lined with either urban residential areas or less attractive commercial or institutional uses are colored yellow. Using the 3/4 mile and 1/4 mile tolerances, the hypothetical State Street business' ability to draw pedestrian traffic is mapped.



This analysis allows us to identify gaps in Downtown's walkability. Obviously, State Street and the Capitol Square provide high-quality walking experiences. However, on West University (1), the Outer Loop (2), and near the Overture Center (3), the pedestrian experience rapidly degrades away from State Street. Improvements in the streetscape could dramatically expand the pedestrian draw of the State Street business.

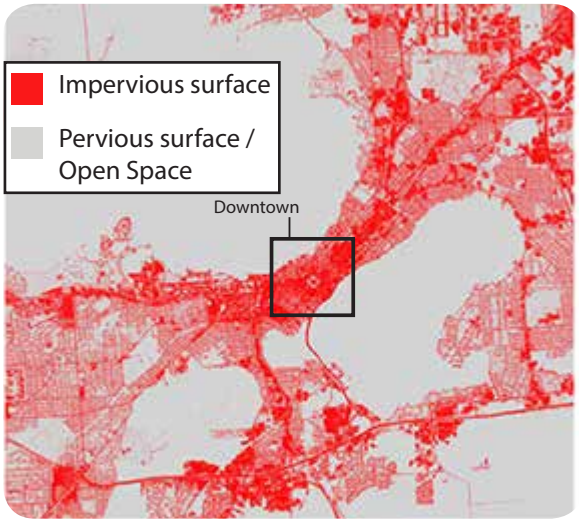
Walk Appeal

What, then, would happen to the pedestrian draw of the State Street business if the walkability of key streets was improved? Below, the pedestrian-friendly features recently installed on Webster Street (1) have been extended around the entire Outer Loop and part of West Washington, while the other trouble spots, on University Ave and Henry and Dayton Streets, have been similarly eliminated, bringing them into the neighborhood-standard walk appeal category. Additionally, all streets coming off the capitol square have been upgraded to Main Street-standard. The "ped shed" of the business has increased significantly, and walkability gaps have been nearly eliminated. Streetscape improvements can come at the hands of the city (like the outer loop upgrades), but they can also be neighborhood-driven. For example, a public art project can make the streetscape along the blank side walls of larger buildings a more appealing walk, a Business Improvement District can help businesses install green roofs or pervious paving, and restaurants can expand their outdoor dining offerings to create a more interactive streetscape.

For more analysis and discussion of Walk Appeal and how the walking environment can contribute to or detract from a person's willingness to walk, look for more analysis at www.1kfriends.org.

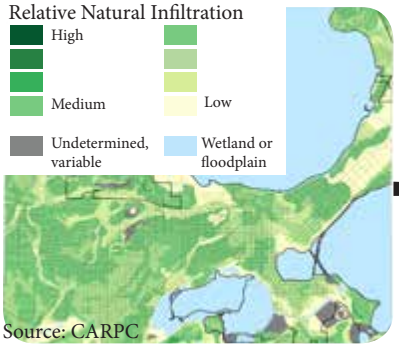
Watershed - Redevelopment

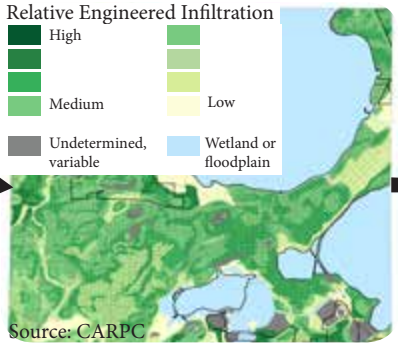
Metric: Impervious Surface

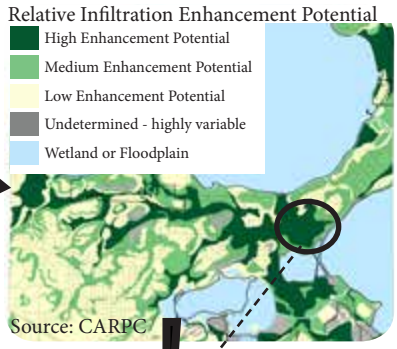


Downtown is filled with impervious surfaces like asphalt, roofs, and sidewalks. Stormwater runoff is generally channeled into storm sewers, which eventually end up in water bodies. Sediment, pollutants, and organic matter that is carried out of urban areas can damage water quality throughout the watershed. In Downtown Madison, this problem is particularly acute, owing to the proximity of the lakes and the high amount of impervious surface (figure at left). Combined with the intractable problem of farm runoff, stormwater drainage into the Yahara River watershed has negative implications for the health of the waters in the Madison area.

Metric: Underutilized Land and Infiltration Enhancement Potential





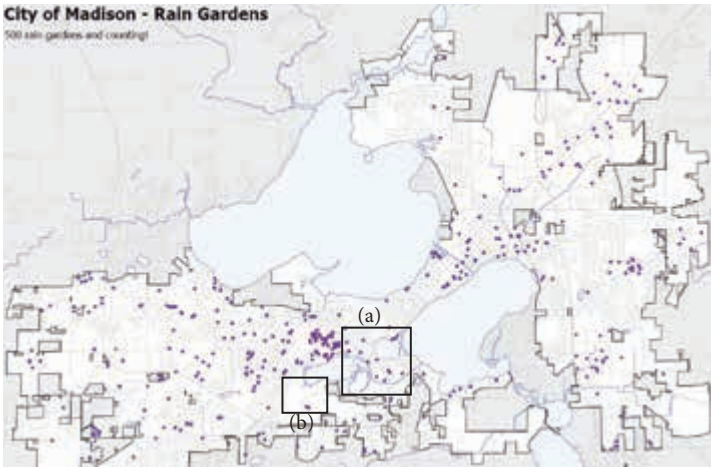


Crucial to the health of a watershed is the amount of impervious surface that forces runoff and pollutants into storm sewers. When downtowns redevelop, they have the opportunity to incorporate infiltration in areas where it would make the most difference. In Dane County, the Capital Area Regional Planning Commission analyzed a variety of soil, surface, and land use characteristics to determine which areas exhibit the largest difference between natural and engineered infiltration. When applied to a map of underutilized land in Downtown with infill potential, the greatest concentration of such land also has among the highest infiltration enhancement potential (green shaded area). The extent to which a neighborhood works with the city to prioritize reducing impervious surface in redevelopment will have profound impacts on neighborhood- or district-scale sustainability.

34 # of underutilized parcels with high infiltration potential

Metric: Rain Gardens

One method for intermediate-scale stormwater runoff mitigation is installing rain gardens, which involves planting a low-lying area with native vegetation (like grasses) to take up rainwater and slow its journey below the surface. Rain gardens can have positive impacts on downstream flood risk and urban heat island as well as pollutant load. However, they do require space. This may account for the heavy concentration of rain gardens targeted at the Lake Wingra watershed in the historic Regent neighborhood ((b), figure right) and the near total lack of rain gardens in Downtown Madison (a).



Source: City of Madison Planning Dept.

Metric: Green Roofs

A different method for stormwater runoff mitigation is the use of green roofs. This term can refer to a wide variety of structural and landscaping changes to buildings' rooftops that allow the buildings themselves to capture and slow water as it moves through the urban watershed. Some green roofs are heavily vegetated and accommodate multiple and diverse user groups (below left), while others merely involve using gravel and some grasses to keep costs and structural stresses to a minimum (below right). Like rain gardens, green roofs mitigate pollutants, flooding, and heat island, but they take up less two-dimensional space. As the map at bottom shows, Downtown Madison is home to a number of green roofs, especially northeast of the capitol. The UW-Madison also boasts a large number of green roofs, and the strong connection between university research and demonstration and neighborhood-scale implementation of green roofs is clear and compelling.

10 Number of green roofs Downtown

8 Number of rain gardens Downtown

Source: Madison Children's Museum

Source: Harford Community College

Source: Greening Madison

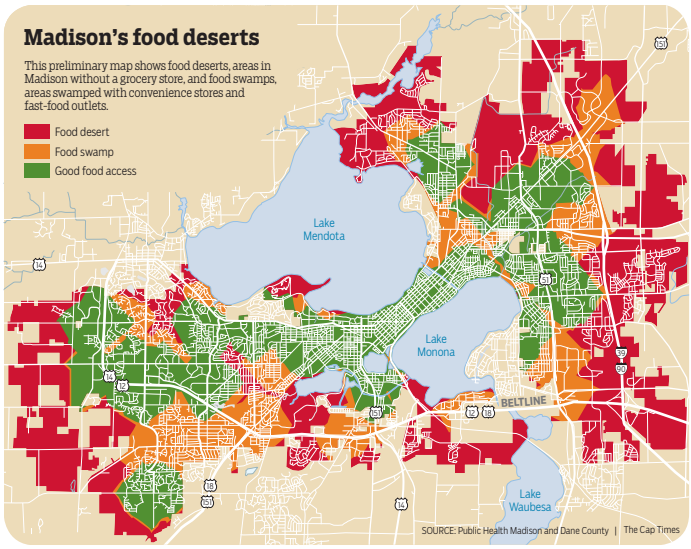
Food Systems - Deserts and Markets

Since downtowns are heavily developed areas, land use conflicts are often particularly acute there. As a result of food and land use policy, most city centers and the people in them are isolated physically and conceptually from the process of producing and distributing the food that they eat. Indeed, even with the ongoing surge in interest in local, sustainable food, the challenges of feeding a densely populated urban area in an environmentally sensitive, economically viable, and socially just fashion remain persistent. Nevertheless, cities like Madison are home to innovative organizations and programs that address sustainability by working to improve the local food system.

Metric: Farmers Markets

Downtown residents and visitors have easy access to world-class farmers markets year-round, and three days a week during the summer. Farmers markets provide an opportunity for consumers in urban areas to forge direct relationships with food producers, cutting out steps in the food system, and therefore to express preferences for food that is grown sustainably.

Metric: Food Deserts



One useful way to measure the strength of the local food system is to look for the presence of "food deserts" or "food swamps." A food desert is an area where residents and visitors have little or no access to food, while food swamps are areas with an abundance of convenience stores and fast food outlets but little to no access to groceries and fresh food. Central Madison, including Downtown, has good food access according to this analysis. However, our survey of downtown residents indicates that many long-term residents tend to leave the area for groceries, and the gaps in walk appeal, covered in the walkability analysis, may indicate a potential reason for this. The City of Madison's study does not adequately reflect the connection between walkability and sustainable urban food systems.

4 Number of farmers markets in or within 1 mi of Downtown

Tuesday East Side Market

Wednesday Downtown Market

Sat Market - Winter | Saturday Market - Summer | Sat Market - Early Winter

J F M A M J J A S O N D

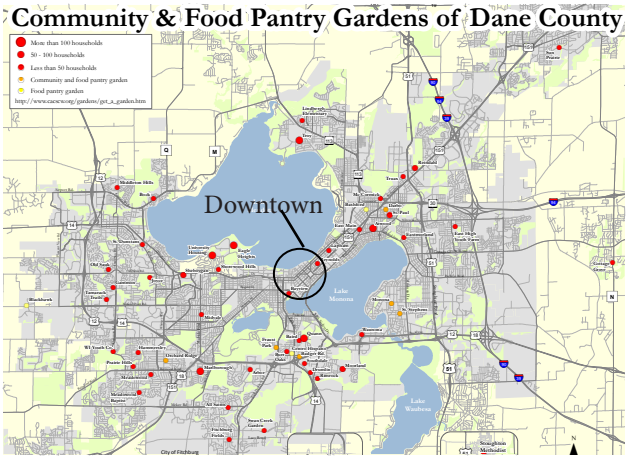
Food Systems - Gardens and CSAs

Metrics: Community Gardens and CSA Dropoff Sites Per Capita

Community Growers in Milwaukee operates a rooftop garden that produces enough to offer CSA shares.

While Downtown boasts impressive farmers market access, the quality of the urban food system also depend on backyard and community gardens as well as buying clubs for small, diversified farms, known as Community Supported Agriculture (CSA), where consumers can pay up-front to support a farm when income is most needed in return for regular deliveries of boxes of local produce, meat, cheese, and more. Community gardens offer urban residents and those without land access the ability to grow food for themselves, and more importantly, they strengthen neighborhoods and communities.

As the map below left demonstrates, downtown is home to only 2 community gardens. One is located in a public housing complex; the other is very small and has a long waiting list. Space is at a premium, but opportunities exist to offer such an asset to downtown residents and regulars.



2 Number of community gardens

9 Number of CSA Dropoff sites

At right, the Fair Share CSA Coalition depicts dropoff locations for farms that offer community-supported agriculture CSA shares. Note the paucity of locations downtown, which is the densest area in Madison. This does not necessarily mean that downtown residents are not shopping sustainably-it could be that downtown residents are buying more sustainable food at the farmers' markets or grocery stores. However, these metrics serve both as a base of comparison with other areas and as a starting point for discussing where sustainability and food fit into the urban landscape.

Food Systems

Metric: Food Waste Composting

In Downtown Madison, the high concentration of restaurants, bars, coffee shops, farmers' markets, and institutional food service leads to an abundance of food waste. Because a crucial part of sustainability is diverting materials from landfills, composting food waste is one of the most important things an individual, organization, neighborhood, city, and region can do. In Madison, there are currently three approaches to dealing with food waste and gleaning unsold produce.

34,906

pounds of food waste collected in Downtown Madison in 2011

An F.H. King Students for Sustainable Agriculture bike compost intern with the Full Cycle Freight program picks up food scraps for off-site composting from Graze, a well-regarded restaurant in Downtown Madison well known for forging direct relationships with farmers and purchasing sustainable food.

1. City-wide composting pilot program
Since 2011, the City of Madison has been running a pilot program collecting food waste separately from trash and recycling, hauling the former to a large-scale composting facility in Columbia County. The program has been quite successful and now counts five businesses among its participants in addition to hundreds of households.

2. Gleaning unsold produce
At the Dane County Farmers' Market, unsold produce that would otherwise go unclaimed is collected, along with perishable food from grocery stores, restaurants, and other organizations, by Community Action Coalition of South-Central Wisconsin. CAC's gleaning program (left) collects and distributes over 1 million pounds of food per year to organizations that serve primarily low-income individuals.

3. Bike composting
Since 2010, F.H. King Students for Sustainable Agriculture, the student-run farm at the UW-Madison, has operated a food waste pickup program called Full Cycle Freight. In this program, students pick up food scraps from households, restaurants, coffee shops, institutions, and other sources on large bicycle trailers and ride them to the farm, where the food waste is composted. Finished compost is used to feed the fruits and vegetables grown at the farm, which are handed out for free at a weekly stand on the UW-Madison campus and donated to local food pantries. Many pickup sites are located downtown. Growing Food and Sustainability, a youth education program in Middleton, has adopted the bicycle compost pickup model and now picks up food scraps from three downtown Middleton restaurants.

Food Systems - Comparisons

City Downtown	Community gardens per 10,000 residents	Farmers markets per 10,000 residents	Grocery stores per 10,000 residents
Madison, WI	0.42	1.26	1.26
Tacoma, WA	18.0	3.6	7.19
Lincoln, NE	3.2	4.79	3.20
Portland, OR	0.45	1.35	2.7
Seattle, WA	0.33	0.17	1.83
Boulder, CO	1.06	2.13	3.19
Ann Arbor, MI	0.88	2.64	3.52
Burlington, VT	2.39	0.8	0.8
Minneapolis, MN	2.17	1.3	2.61
San Francisco, CA	0.74	1.35	2.21
Chicago, IL	0.23	0.16	0.39
Austin, TX	0.0	2.92	5.84

Participation

A sustainable neighborhood or district relies on the participation of individuals, neighborhood groups, businesses, government, and nonprofits to achieve its goals. In the Madison area, a number of innovative programs and certifications allow individuals, businesses, and groups to achieve better environmental performance. These programs include, but are not limited to:

- **LEED** (Leadership in Energy and Environmental Design), the market pioneer and leader in programs designed to certify new buildings, renovations, and even neighborhoods
- **MPower**, a program offered by Madison-based Sustain Dane that works with businesses to design, implement, and measure a customized sustainability strategy, connecting them to expert resources, proven methods and best practices, and support in their effort.
- **Travel Green Wisconsin**, a program from Wisconsin Environmental Initiative (WEI) that has recognized environmentally sensitive tourism and travel destinations
- **Main Street Green**, a new business certification program from WEI that focuses on businesses willing and able to move forward with cutting-edge sustainable practices
- **Focus on Energy**, a state program that helps people make energy efficiency and renewable energy improvements
- **Green Power Tomorrow**, a renewables purchasing option from Madison Gas & Electric
- **MadiSun**, a city of Madison program that incentivized solar installation
- **Green Madison**, a city-run energy efficiency consulting service
- **EnAct**, from Madison Environmental Group, which offers sustainable living support and advice to teams of individuals
- **Buy Fresh Buy Local,** a program by REAP Food Group in Madison that helps create networks between local restaurants and farmers
- **Sustainable Business Network**, a Sustain Dane-sponsored network of businesses that offers quarterly breakfast meetings, with peer-to-peer sharing of best practices, current information and resources, and skill-building opportunities.

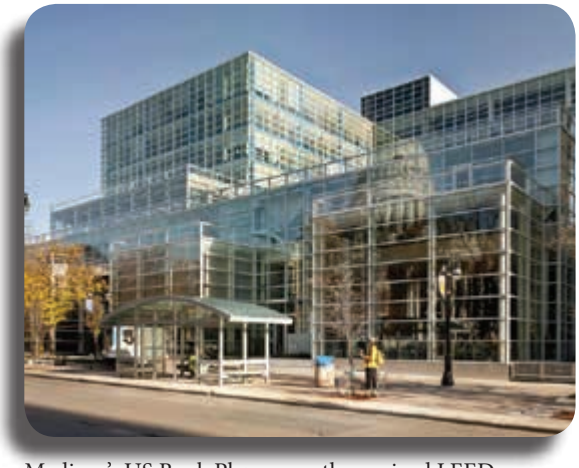
When examining participation rates in some of these programs, Downtown Madison fares well compared to the city as a whole. In particular, nearly half of the Madison area's Travel Green Wisconsin certified businesses are located downtown. This is unsurprising, given downtown's role as the city's primary tourist destination.

Travel Green Wisconsin Certified Businesses in Madison

Downtown area:	10
City as a whole:	21

LEED-certified and registered projects in Madison

Downtown area:	17
City as a whole:	68



Madison's US Bank Plaza recently received LEED Gold certification. Home to Graze and L'Etoile, two of Madison's sustainable food restaurant pioneers. Image courtesy of Urban Land Interests.

Participation

MPower Business Champion Program

Downtown area:	6
City as a whole:	31

Sustain Dane's sustainability program for businesses, MPowering Madison, is a one-year crash course in developing and implementing a sustainability strategy. Sustain Dane works with businesses to measure baseline carbon footprint, including energy audits and modeling from MG&E. It also includes a strong element of team building and team learning, with the end goal of creating a culture of sustainability at a given business.

MPower is in its fourth year, and for the last two years it has been narrowed down to 17 businesses per year, indicating the success of the program.

REAP Buy Fresh, Buy Local Partners

Downtown area:	13
Madison area:	46

Madison's Buy Fresh, Buy Local program, run by area nonprofit REAP Food Group, supports sustainability-minded restauranteurs by helping connect them with local farms and suppliers as well as marketing them to like-minded customers. The program continues adding restaurants, and as the map at left demonstrates, the vast majority of participating restaurants Downtown are clustered around the capitol square.

Sustainable Business Network

Downtown area:	11
Madison area:	62

In addition to operating the MPower program, Sustain Dane organizes a network of sustainability-minded businesses in Dane County. This group, the Sustainable Business Network, is membership-driven and offers its members quarterly meetings, brown bag lunches on sustainability topics, information and resource sharing, and skill-building opportunities.

Plans

No urban sustainability effort is possible or practical without community planning, regardless of scale (county, metro area, city, corridor, or neighborhood). In Downtown Madison, neighborhood sustainability is inextricably linked with the Downtown Plan and the city's Sustainability Plan, in addition to other areas of planning and policy (like the Clean Lakes initiative, community gardens and urban agriculture policy, and more). This section will draw connections between some of the goals and objectives of many of these documents and the metrics of a sustainable urban center presented here.

Downtown Plan

The city's recently-completed iteration of its Downtown Plan contains a section entitled, "Become a Model of Sustainability."

The Downtown Plan recognizes that sustainability is not something that happens in a vaccuum, but rather is a concept that is inextricably linked to the other elements of urban life, including transportation, public health, economic growth, tourism, and more.

The Downtown Plan is the culmination of recommendations by the Downtown Advisory Report and the 2006 Comprehensive Plan, which called for the creation of a downtown plan to address the specifics of this complicated district. Below are the categories into which the City of Madison groups its recommendations in the 2012 Downtown Report.

- **Celebrate the Lakes**
- **Strengthen the Economic Engine**
- **Ensure a Quality Urban Environment**
- **Maintain Strong Neighborhoods and Districts**
- **Enhance Livability**
- **Increase Transportation Choice**
- **Build on Historic Resources**
- **Expand Recreational, Cultural, & Entertainment Offerings**
- **Become a Model of Sustainability**

Sustainability Plan

The City of Madison's Sustainability Plan, adopted in 2011, is the most direct way in which the city contributes to overall sustainability. The city's Sustainability Blueprint, published in 2004, and its membership in The Natural Step both contributed to the current document. While many of its components are intended to reduce the environmental impact of the city's direct operations, the plan does overlap with the concerns of neighborhood-scale sustainability outlined in this research.

The Sustainability Plan is an adjunct to the Comprehensive Plan and acts as a guidance and priority-setting, rather than prescriptive, document. Below are the categories in which the city groups its sustainability efforts. These categories are derived from The Natural Step and the objectives and recommendations within are identified as short-, medium-, or long-term.

Other Plans

Isthmus 2020 (1998)
Transport 2020 (2008, ongoing)
Neighborhood Plans - Bassett (1997), First Settlement (1995), Fourth District-Old Market (1983), Mansion Hill (2009, draft)

There is at least one connection between the city's Sustainability Plan and each of the metrics analyzed in this report. In particular, the Plan addresses community completeness, walkability, and transportation from a wide variety of different angles.

Metric	Sustainability Plan
GHG Emissions Per Capita	C&E 1 - 6
Solar Installations and Potential	C&E 3 - 6
Public Perception of Energy and Sustainability	C&E 4, 6
Perceptions of Community Completeness	P&D 1, 2, 4; Trans 2, 4, 5; EcD 4, 6, 7; Housing 3, 4; Health 1
Bike Infrastructure	Trans 2, 5; Health 4, 6
Commute Modes	P&D 1, 2; Trans 4 - 6; C&E 6; Housing 3, 4; Health 1
Multi-Modal Accessibility	P&D 1, 2; Trans 2; EcD 4; Health 1, 6
Vehicles and Bicycles Per Household	Trans 2, 4;
Employment Access	P&D 1; Trans 2; EcD 1 - 5; AH 3
Walk Score, Walk Appeal	NatS 1, 4; P&D 1; Trans 2; C&E 1; Health 1, 4, 6
Impervious Surface	NatS 2 - 4
Underutilized Land and Infiltration Enhancement Potential	NatS 2 - 4; P&D 2, 3
Rain Gardens	NatS 2 - 4, 7; P&D 3; Health 1
Green Roofs	NatS 2 - 4; P&D 2, 3
Farmers Markets	P&D 4; EcD 1, 3, 6, 7; Health 5
Food Waste Composting	NatS 6, 7; EcD 1, 3
Community Gardens and CSA Dropoff Sites Per Capita	P&D 2 - 4; Health 1, 4 - 6
Participation Rates in Sustainability Programs	C&E 4; EcD 1, 3 - 5; WD 2; Education 3, 4

Key
C&E = Carbon and Energy
P&D = Planning & Design
Trans = Transportation
EcD = Economic Development
NatS = Natural Systems
WD = Workforce Development
AH = Affordable Housing

Plans - Downtown

Madison's Downtown Plan is broken down into "keys," or goals, objectives, and specific recommendations. Objectives and recommendations are marked with green leaf graphics throughout the plan if they contribute to sustainability goals, although the plan's somewhat narrow reading of sustainability fails to take into account the sustainability relevance of some of its recommendations. Absent from the Plan is consideration of the food system from a sustainability perspective.

Metric	Downtown Plan
GHG Emissions Per Capita	Objective 9.1
Solar Installations and Potential	
Public Perception of Energy and Sustainability	Objectives 6.7, 9.1
Perceptions of Community Completeness	Objectives 2.3, 2.5, 2.6, 3.2, 5.3, 5.5, 6.3, 6.7, 8.1, 8.3
Bike Infrastructure	Objectives 3.4, 6.3, 6.5
Commute Modes	Objectives 4.6, 6.2, 6.4, 6.8
Multi-Modal Accessibility	Objectives 3.2, 3.4, 4.6, 6.2, 6.3, 6.5
Vehicles and Bicycles Per Household	Objectives 6.3, 6.5
Employment Access	Objectives 2.1, 2.2, 5.1, 6.8
Walk Score	Objectives 2.5, 3.4, 5.3, 6.3, 6.6, 6.7. 8.3
Walk Appeal	
Impervious Surface	Objectives 3.5, 8.1, 9.1
Underutilized Land and Infiltration Enhancement Potential	Objectives 8.1, 9.1
Rain Gardens	Objectives 3.5, 8.1, 9.1
Green Roofs	Objectives 8.1, 9.1
Farmers Markets	
Food Waste Composting	
Community Gardens and CSA Dropoff Sites Per Capita	
Participation Rates in Sustainability Programs	Objective 9.1

What's Next?

Above: artist's rendering of Living City Block in Denver's historic LoDo district. Living City Block is an innovative effort to "create and implement a replicable, exportable, scalable and economically viable framework for the resource efficient regeneration of existing cities, one block at a time."

Downtown Madison, the center of economic, institutional, and cultural life of the region, can rightfully claim to be the most sustainable neighborhood in the city of Madison. However, serious challenges and opportunities remain. It will have to confront issues that plague all urban city centers as they aim to become more environmentally, economically, and socially sustainable, in addition to its own unique challenges of geography, infrastructure, and institutional structure.

Downtown Madison performs well on the following measures of neighborhood sustainability:

- Greenhouse gas emissions per household
- Commute mode
- Jobs and housing co-located
- Bicycles-to-cars ratio
- Multi-modal accessibility
- Walk score
- Underutilized land and infiltration enhancement potential
- Food deserts
- Farmers markets
- Participation

Downtown Madison performs less well on the following measures of neighborhood sustainability:

- Solar energy utlization
- Community completeness (especially groceries)
- Frequency of use of alternative transportation
- Walk Appeal and streetscape
- Rain gardens
- Green roofs and green infrastructure
- Number of community gardens
- Number of CSA sites

What's Next

Collaborative energy efficiency and sustainability initiatives in dense urban areas

For businesses, individuals, and municipalities alike, the key to infrastructure investments that are more environmentally sustainable is making them economically sustainable as well. For many, this means projects with a short return on investment period that do not endanger the balance sheet. Unfortunately, with state and federal subsidies for renewable energy and energy efficiency upgrades less certain than ever, such investments are increasingly difficult for individuals and organizations to make. This is particularly true in dense urban areas, where whole blocks are complicated mosaics of land ownership and occupancy.

For buildings and properties in dense urban areas that are physically tied to each other and the surrounding streetscape, it may not be profitable to engage in sustainability-related upgrades and investments that benefit only individual owners, landlords, and tenants. However, because of their tightly interwoven relationships with adjacent owners, landlords, and tenants, there are myriad opportunities for collaboration that address sustainability challenges while distributing risk and cost.

Collaborative Sustainability

For the upcoming year of Green Downtown funding from MG&E, we propose two major steps to address the project's goal of advancing our understanding of the sustainability benefits that density and proximity in urban environments confer.

First, we will partner with other organizations to host a one-day **downtown business workshop on sustainability initiatives**. The goals are threefold:

1. Provide informational and educational material for businesses on potential of engaging in sustainability practices with proximate businesses;
2. Gather input from these businesses regarding the opportunities and barriers to engaging in collaborative sustainability; and
3. Foster networking and sharing among likeminded businesses to lay the groundwork for future initiatives.

We hope to learn from participating businesses what they envision as far as sustainability practices are concerned, but potential topics of conversation may include:

- Sharing the up-front cost of renewable energy installations and conservation activities
- Joint food waste composting for adjacent restaurants
- Bulk purchasing of sustainable supplies, appliances, cleaning products, etc to bring down costs
- Car-sharing account for business employees
- Pooling resources for bike facilities to encourage biking to work
- Sharing the cost of infrastructure improvements, like green roofs or pervious paving on sidewalks, at contiguous businesses

This effort to engage businesses will also include an **online survey** that builds off of the lessons learned from conducting the resident survey in 2012.

Education and Demonstration

One of the chief sustainability advantages of a dense urban area, we argue, is the density of ideas and innovation and the rapid rate at which ideas can spread. Indeed, this is one of the primary reasons people have been drawn to cities for centuries and is the basis for the demonstration and education component of Green Downtown.

First, we propose designing and organizing a sustainability walking tour of downtown Madison. This tour would highlight MG&E's solar power installations, downtown's green roofs and LEED-certified buildings, and effective public spaces.

This tour would stop at the locations shown on the map at right, including the state capitol, the Madison Children's Museum, the new Central Library, Monona Terrace, and State Street. The purpose of the tour would be to make downtown's sustainability a major highlight of visitors to downtown. In particular, we will seek to emphasize the educational and demonstrational aspects of high-visibility sustainability efforts downtown. For example, MG&E's state capitol installation is as important for its educational kiosk as for its energy production.

We also hope to partner with Madison Children's Museum to bring interactive public art installations to various public spaces around downtown that would highlight sustainability in creative and captivating ways while also attracting families and children to the area.

What's Next

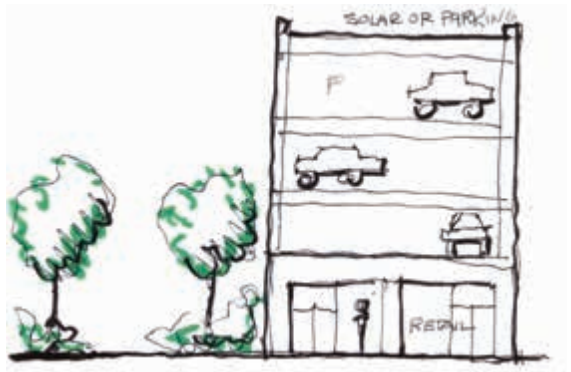
Based on the argument that Downtown Madison needs more collaborative, neighborhood- and district-scale sustainability action, an essential question for planners, businesses, advocates, and other stakeholders is: **What organizational form should such action take?** Existing examples can help point the way.

Ecodistrict

One model of neighborhood- or district-scale sustainability that has gathered traction is the Ecodistrict, created at the Portland Sustainability Institute. Portland currently has five Ecodistricts, and Washington D.C. recently created one. Ecodistricts are neighborhoods or urban districts with a broad commitment to accelerating neighborhood-scale sustainability. The key to the Ecodistrict model is the engagement of stakeholders from the beginning to create and implement the sustainability plan. This recognizes that each city, district, and neighborhood have their own strengths and weaknesses when it comes to sustainability.

Business Improvement District and Business Association

Business Improvement Districts (BIDs) are a system whereby locationally related property owners or businesses agree to collaborate to address common issues and interests funded by a special assessment on themselves. Traditionally, BIDs have focused on economic development, marketing, and streetscape improvements, to name a few. Madison's BID, which encompasses State Street and the capitol square (top right), involves a voluntary special self-assessment by businesses that funds these marketing and streetscape efforts. However, the BID could also be used to fund sustainability improvements. Restaurants, bars, bakeries, and coffee shops could use the BID structure to invest in bulk purchasing of sustainable supplies to drive down costs. Spatially connected businesses could use the business association to work with the city to invest in pervious pavement along a stretch of sidewalk.



The Wilshire Center BID, in Los Angeles, CA, has undertaken a project to become the nation's first "Cool District," in which the tools available to the BID are used to achieve reductions in GHG emissions of 2% per year for 40 years. The BID provides district-wide energy audits and helps conduct deep building retrofits, and its community fora have yielded innovative designs, including mixed-use development that includes a parking structure (above) and a proposal to use BID governance to negotiate on retrofit materials.

Sustainable Food District

Madison is home to a robust local food scene. Many of its restaurants have gained fame not only because of their recipes but also because of their sincere desire to work with local farmers and develop deep relationships with suppliers. Additionally, the rural fabric of southern Wisconsin is replete with small- and medium-scale sustainable farms, many of which seek to tap the burgeoning market for sustainable food in Madison. This combination of locally and sustainably minded chefs, customers, and farmers, especially Downtown, seems a ready-made recipe for branding and promoting Downtown Madison as a sustainable food district. Among all the "green" programs and certification available to Madison individuals and organizations, however, no such program for food exists.

The Green Restaurant Association certifies restaurants in the categories of water efficiency, waste reduction and recycling, sustainable furnishings and building materials, sustainable food, energy, disposables, and chemicals and pollutants reduction. Madison's own REAP Food Group runs a "Buy Fresh, Buy Local" program that aims to create a network of restaurants and other buyers and the farmers that supply them. Buy Fresh, Buy Local restaurants in Madison all have a commitment to building strong local connections that make the food system more just and sustainable. As you can see from the map at right, BFBL restaurants are clustered downtown and at high density around the capitol area square, but the program does not distinguish among the locations of its partner restaurants. Given Madison's status as a food systems innovator, combining aspects of Green Restaurant certification and local purchasing recognition may yield positive results for these restaurants and may incentivize others to join.

What's Next

Collaborative Streetscape Runoff Mitigation

In Madison, the Storm Water Utility charges property owners fees to operate, maintain, and improve the stormwater infrastructure. The owner of every parcel pays about $0.013 per square foot of impervious surface every six months and about $0.0009 per square foot of pervious surface every six months. Downtown business owners could work with property owners, the Greater State Street Business Association, the Business Improvement District, and the Storm Water Utility to establish a system whereby properties next to each other could receive a reduction in impervious surface fees if that money goes toward paying for pervious paving, green roofs, or other stormwater mitigation techniques.

Photo courtesy of Reimagining Cleveland

Pervious paving can work well for parking lots, sidewalks, and plazas, but it may work less well for busy thoroughfares. Another collaborative strategy for improving watershed health in urban areas is the use of rain garden gutters. In Spokane, Washington, the city faced a choice: build another water treatment plant, or attempt to handle runoff closer to the source. Under pressure from activists, the city chose to include rain garden gutters when repaving Lincoln Street, a north-south arterial popular with commuters from the city's residential South Hill area.

Green Mile

While Downtown Madison is already home to a number of green roofs, the amount of flat roofspace in the area, combined with the vantage points afforded by landmarks like the state capitol building, the Overture Center, Bascom Hill on the UW campus, and numerous buildings downtown, make a concerted green roofs push an admirable goal for stakeholders in the downtown area. Just as the city of Chicago has received national accolades for its green roofs push in recent years, so can Madison--another lakeside city--call attention to its own sustainability initiatives. One can imagine a visitor standing on the balcony at the Capitol looking west toward the UW campus and seeing a swath of rooftops covered in grasses, edibles, and attractive public space and understanding the connection between green roofs and the health of the lakes just beyond.

Image and Information Credits

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PDX Institute (ecodistricts.org/wp-content/uploads/2013/05/EcoDistricts-Framework.pdf; ecodistricts.org/wp-content/uploads/2013/05/101411_Gateway-EcoDistrict-Assessment-FINAL-Report.pdf); Living City Block (www.livingcityblock.org/); Watthead - Energy News and Commentary (www.watthead.org/2010/05/webinars-district-energy-efficient.html)

Page 8

National Capital Planning Commission SW Ecodistrict Vision Plan (www.ncpc.gov/plans/swecodistrict.pdf); The Brewery Historic Redevelopment (www.thebrewerymke.com).

Page 9

Fort Zed, Zero Emissions District (www.fortzed.com)

Page 10

Des Moines Bicycle Collective (www.dsmbikecollective.org/faces-of-the-des-moines-bicycle-community/)

Page 11

fifelgoeswest.wordpress.com/2012/08/22/quick-fix-of-madison-wi/; University of Wisconsin (www.news.wisc.edu/384); Dane County Farmers Market (www.dcfm.org)

Page 12

Center for Neighborhood Technology, H+T Index (www.htaindex.org/map/)

Page 13

City of Madison, MadiSun Solar Map (solarmap.cityofmadison.com/madisun/); UW-Madison University Communications, Campus Photo Library (photos.news.wisc.edu/photos/2233/view); Phys.org science news aggregator (phys.org/news/2013-04-untapped-energy-potential-cities.html, phys.org/news/2012-09-feasibility-effectiveness-urban-rooftop-turbines.html#inlRlv); Information and data from Madison Gas & Electric (www.mge.com/environment/green-power/solar/)

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Madison Gas & Electric (www.mge.com/environment/green-power/solar/)

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Streets Wiki (streetswiki.wikispaces.com/Mode+Shift); www.myimprov.com/things-to-do-in-a-traffic-jam/; Madison Metro (www.cityofmadison.com/metro/); Madison B-Cycle (madison.bcycle.com)

Page 16

Visit Milwaukee (www.visitmilwaukee.org/member.php?mid=26117)

Page 17

Madison B-Cycle (madison.bcycle.com); Walk Score (www.walkscore.com)

Page 18

Mapnificent (www.mapnificent.net/madison/); Madison Metro (www.cityofmadison.com/metro/); Center for Neighborhood Technology, H+T Index (www.htaindex.org/map/)

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1000 Friends of Wisconsin

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Joel Meyerson, Colorful Revolution Media 2011 (colorfulrevolution.com/blog/colors-madison-wi); 1000 Friends of Wisconsin

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1000 Friends of Wisconsin

Page 22

Capital Area Regional Planning Commission, Infiltration Map Project (www.capitalarearpc.org/infiltration.html); City of Madison, 2012 Downtown Plan (www.cityofmadison.com/neighborhoods/downtownplan/)

Page 23

City of Madison Engineering Division (www.cityofmadison.com/engineering/stormwater/raingardens/1000raingardens.cfm); Madison Children's Musuem (www.madisonchildrensmuseum.org); Harford Community College (www.harford.edu/GreenHCC/WaterLandProjects.asp?FA=); Danna Olsen, Greening Madison (greeningmadison.com)

Page 24

Public Health Madison and Dane County and The Capital Times (www.publichealthmdc.com/, host.madison.com/news/local/grassroots/soglin-calls-for-city-wide-food-policy-to-curb-problem-of/article_0b2ebb90-cacc-11e1-9f43-001a4bcf887a.html); Deb Rossi, Portland Urban Sketchers (urbansketchers-portland.blogspot.com/2010/06/rainy-day-at-king-farmers-market.html); Scoop OTP, Atlanta, GA (scoopotp.com/farmers-market-time/)

Page 25

Community Growers of Milwaukee (www.milwaukeerenaissance.com/CommunityGrowers/HomePage); Community Action Coalition of South-Central WI (www.cacscw.org); Fair Share CSA Coalition (www.csacoalition.org/our-farms/pickup-locations-map/)

Page 26

Phil Busse/The Isthmus (www.thedailypage.com/isthmus/article.php?article=37450)

Page 28

Urban Land Interests (uli.com/commercial/properties/us-bank-plaza)

Page 29

Sustain Dane (www.sustaindane.org)

Page 30

City of Madison: Sustainability Plan (www.cityofmadison.com/sustainability/documents/SustainPlan2011.pdf); Downtown Plan (www.cityofmadison.com/neighborhoods/downtownplan/pdf/Downtown_Plan.pdf); other plans (www.cityofmadison.com/planning/plan.html)

Page 33

Living City Block (www.livingcityblock.org)

Page 36

Portland Sustainability Institute (www.pdxinstitute.org); Downtown Madison Business Improvement District (www.visitdowntownmadison.com/about/index.

php?category_id=4408); Wilshire Center Cool District (www.wilshirecenter.com/cooldistrict/infrastructure.htm)
Page 38
John Covert, Citizens for Sensible Transportation Planning (http://jandtcovert.fatcow.com/)
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1000 Friends of Wisconsin advocates and promotes uses of land, water and air that shape healthy communities where people want to live, work, and play. Our work focuses on helping communities make the connection between our everyday land use and transportation decisions and our state's economic, environmental and cultural health.

A Wisconsin comprised of livable, environmentally friendly, compact, healthy and prosperous communities through three main strategies:

1. Promote and advocate beneficial land, water and air use policies.
2. Evaluate and update implementation of Smart Growth Law.
3. Educate and market Smart Growth concepts through Green Tier Communities.

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Sustainability Statement
The actions we take today determine the legacy we leave for our children. MGE Energy is investing in the technologies and opportunities to create a cleaner, smarter and brighter energy future for the next generation.

Sustainability Accomplishments Include:
MGE's Green Power Tomorrow program gives customers the option to support renewable energy from the sun and wind. Nearly 10% of MGE's customers buy green power.

MGE is the first utility in Wisconsin to join the Department of Natural Resources' Green Tier program at its highest level. This voluntary program recognizes performance that exceeds requirements related to health, safety and environment. MGE earned this top designation because of its demonstration of superior environmental performance.