

Implementation of Green Technologies and Behaviors in Historic Districts



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SCARCE. "Rain Barrels." <http://www.scarcecoed.org/environmental-education/programs/rain-barrels.html>

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Executive Summary

Ever diminishing resources and the threat of global climate change has encouraged many municipalities to pursue more environmentally friendly, or “green”, development practices and programs. Historic preservation can be justified through social, ecological, and economic arguments, with benefits such as establishing a sense of place and character, reusing existing structures and materials rather than new resources, and acting as a catalyst for further revitalization⁷. Given that historic preservation and more environmentally friendly technologies and behaviors are beneficial, this report explores several questions:

Do historic districts have more restrictive code barriers than comparable non-historic districts within municipalities in respect to adopting green technologies and behaviors?

Do other barriers, such as elected officials or vocal citizens, act as barriers to adoption of green technologies and behaviors?

How can municipalities and property owners increase adoption of green technologies and behaviors without compromising the integrity of buildings that have been declared as historically significant, whether by a local, state, or national designation?

The following report attempts to answer these questions through:

- Analysis of an original survey on the topic of barriers to adoption of green technologies and behaviors in historic districts,
- A search of current efforts to update codes,
- Review of successful implementations of such technologies, and
- Development of a model ordinance

Survey results indicated that historic districts do not have significantly greater code barriers to adoption of such green technologies and behaviors, and that property owner interest and perceived need is likely the greatest current factor in limiting such adoptions.

1. Introduction

Ever diminishing resources and the threat of global climate change has encouraged many municipalities to pursue more environmentally friendly, or “green”, development practices and programs. In the United States, commercial and residential building operations account for 40% of primary energy consumption, 20 to 25% of landfill waste, and 5 to 12% of water consumption; the U.S. Green Building Council states green building can reduce energy use by 30%, carbon emissions by 35%, and water use by 30 to 50%⁶. In addition to green building, other behaviors can be modified to result in greater environmentally friendly households and businesses, such as on-site energy production and changes in yard maintenance and management practices.

Historic preservation can be justified through social, ecological, and economic arguments, with benefits such as establishing a sense of place and character, reusing existing structures and materials rather than new resources, and acting as a catalyst for further revitalization⁷. Bettina Drew concisely states the importance in an often attributed quote, “The past reminds us of timeless human truths and allows for the perpetuation of cultural traditions that can be nourishing; it contains examples of mistakes to avoid, preserves the memory of alternative ways of doing things, and is the basis for self-understanding...”¹⁰.

Given that historic preservation and more environmentally friendly technologies and behaviors are beneficial, this report explores several questions:

Do historic districts have more restrictive code barriers than comparable non-historic districts within municipalities in respect to adopting green technologies and behaviors?

Do other barriers, such as elected officials or vocal citizens, act as barriers to adoption of green technologies and behaviors?

How can municipalities and property owners increase adoption of green technologies and behaviors without compromising the integrity of buildings that have been declared as historically significant, whether by a local, state, or national designation?

2. Methods

2.1 Data Sources & Limitations

Data for this project is primarily from an original survey comprised of a relatively small sample size, 120 municipalities. Survey results should be interpreted as general guidance on identifying “green” technologies and behaviors that are more commonly restricted in local ordinances, rather than comprehensively identifying all limitations to such adoptions and implementations. These results will not be valid in areas with significantly differing regulatory frameworks than Wisconsin and Iowa.

Other resources consulted focus on recommendations and guidelines provided by recognized authorities on historic preservation, such as the Department of the Interior and the National Park Service. It should be recognized that the use of these guidelines is subjective; design reviews at the local level will remain a part of historic preservation even when general guidelines are adopted.

2.2 Survey

A survey to determine barriers to implementation of “green” technologies and behaviors was sent to municipalities in Wisconsin and Iowa that met a minimum population threshold of 10,000. The threshold was chosen based on an assumption that most municipalities with smaller populations would not have established historic districts. Des Moines, IA, Madison, WI, and Milwaukee, WI were excluded from the survey due to their substantially larger populations and concerns about valid comparability with the rest of the municipalities.

“Green” technologies and behaviors covered in the survey were compiled from a variety of municipal and county efforts found in case studies, as well as the Environmental Protection Agency’s *Sustainable Design and Green Building Toolkit*¹⁷. The chosen technologies and behaviors were grouped into categories of Energy, Yard Maintenance and Management, and Structures. The survey was administered online, through Qualtrics, during February 2014; the complete survey can be found in Appendix I.

Frequency counts of survey results for each topic were calculated for whether the activity was,

- Mandatory
- Allowed
- Require Review
- Never Allowed
- Not Considered

The frequency of topics in each category was taken into consideration in developing the model ordinance. Topics that were more often cited as “Require Review”, “Never Allowed”, and “Not Considered” became a higher priority for the model ordinance.

2.3 Code Updates

Communities that have recently or are currently rewriting codes to be more green were found through an internet search using the phrase “green zoning code”. This search was not intended to be exhaustive, but rather to give a brief overview of the diversity of places adopting zoning code amendments and some of the main issues of focus. Topics that were found to be frequently included in updates were incorporated in the model ordinance. Some of these code updates also informed language in the model ordinance.

2.4 Green Implementations & Guidelines

Guidance on and successful implementation of “green” technologies on historic structures and properties was sought from the National Park Service and the National Trust for Historic Preservation. These successful implementation examples were used to inform the design guidelines in the model ordinance.

2.5 Model Ordinance

A model ordinance was written to assist interested communities in adopting green practices. After survey analysis, a community that had both residential and commercial historic districts and indicated a willingness to be contacted with further questions was selected. This community’s existing codes were reviewed and sections related to topics in the survey were noted. In addition, code reviews and comparisons from other agencies were used, as well as model ordinances relating to relevant topics.

3. Results and findings

3.1 Survey

A total of 120 municipalities were sent a survey with responses received from 36 municipalities for a response rate of 30%. 20 (55%) municipalities indicated they did not have residential historic districts and 18 (50%) municipalities reported they did not have commercial historic districts. 17 (47%) of municipalities indicated they had neither residential nor commercial historic districts. Detailed response information can be found in Appendix II.

Communities with Residential Historic Districts

Community Ordinances

None of the municipalities with residential historic districts have mandatory requirements for any of the identified green technologies and behaviors in their community ordinances.

Few of the behaviors and technologies are frequently “Never Allowed” in the community. Conversion of residential accessory structures to dwelling units (6, 38%) and plantings in the right of way or terrace (4, 25%) were the most frequently indicated responses for “Never Allowed”, though both had responses of “Allowed” and “Require Review” greater than “Never Allowed” at a combined (9, 56%) and (9, 56%), respectively. Questions receiving at least one “Never Allowed” response include,

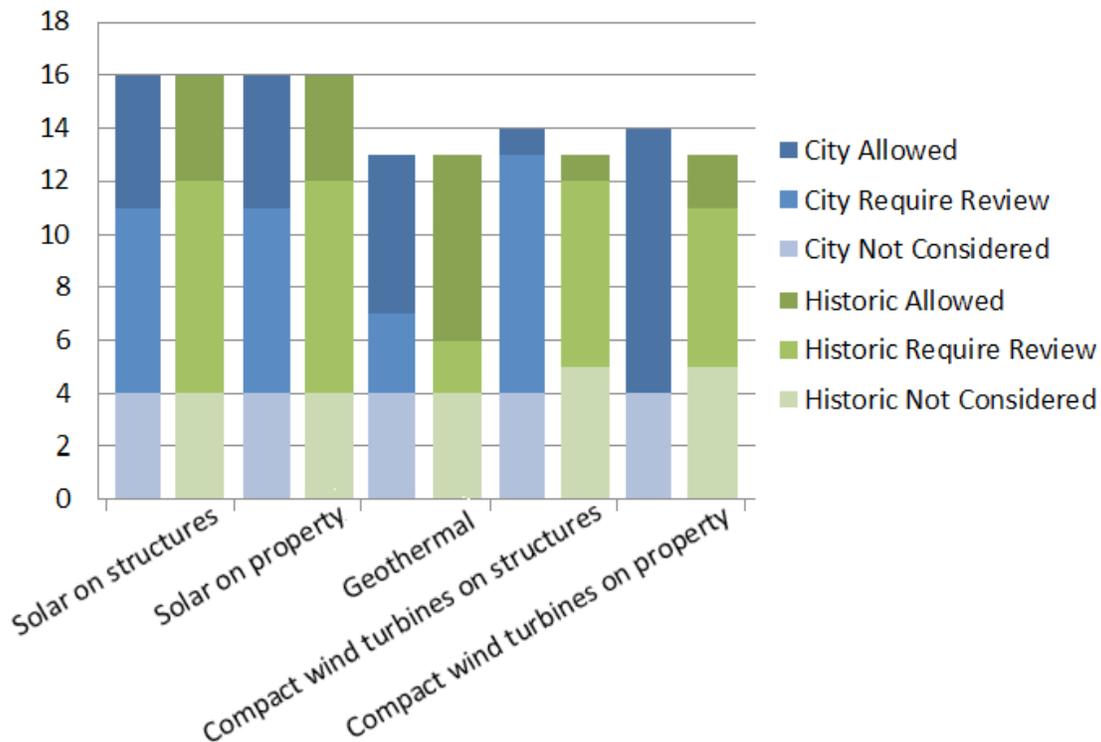


Figure 1. Comparison of “Allowed”, “Require Review”, and “Not Considered” responses for community ordinances and residential historic district ordinances for Energy topics.

Source: Original survey conducted February 2014.

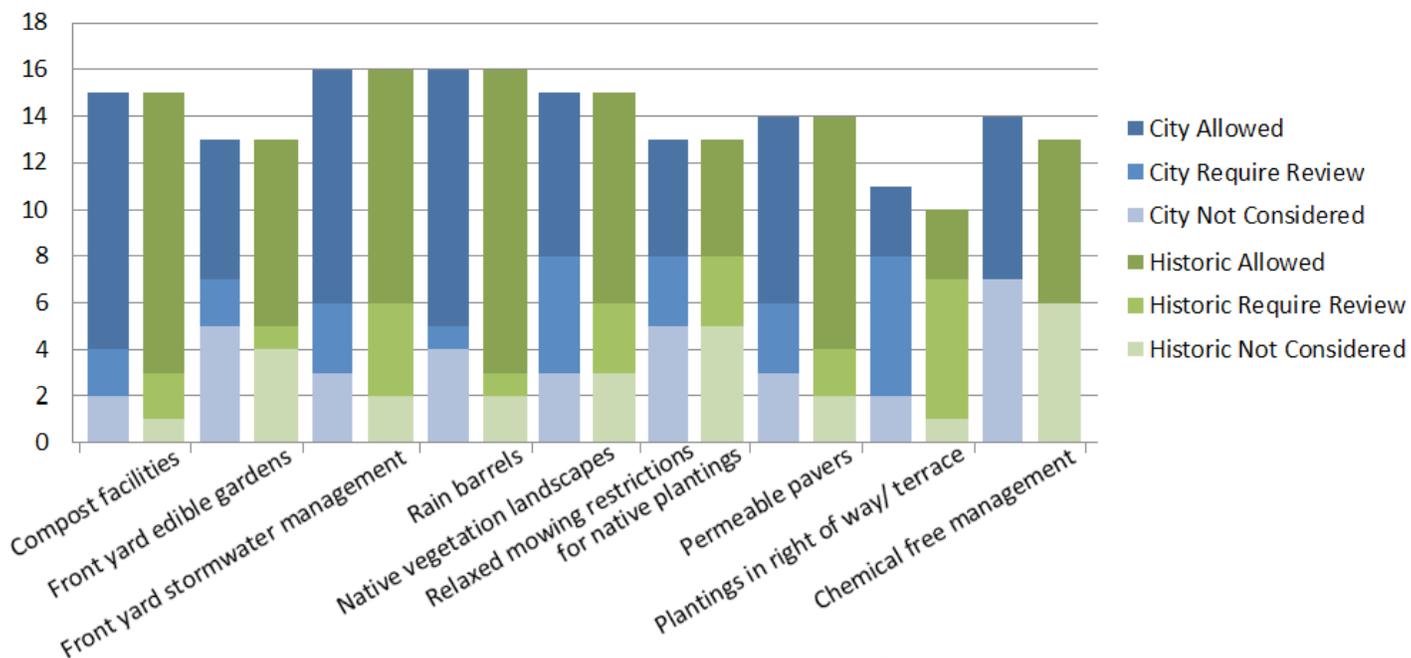


Figure 2. Comparison of “Allowed”, “Require Review”, and “Not Considered” responses for community ordinances and residential historic district ordinances for Yard Maintenance and Management topics.

Source: Original survey conducted February 2014.

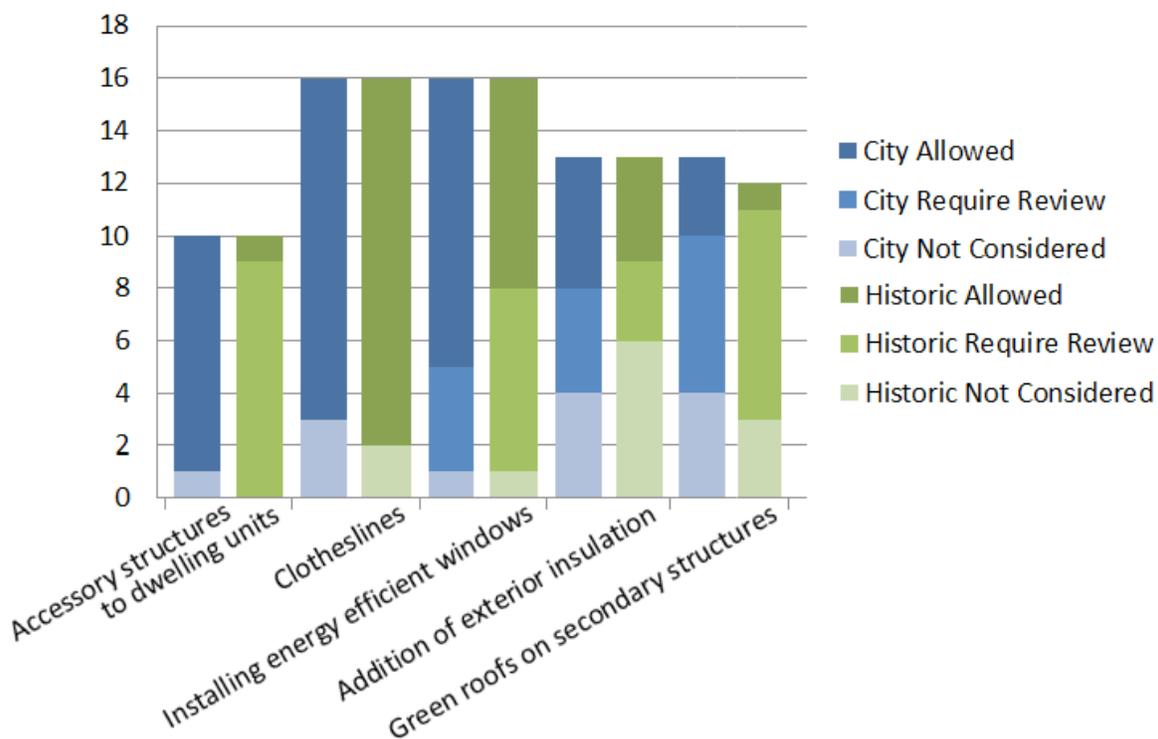


Figure 3. Comparison of “Allowed”, “Require Review”, and “Not Considered” responses for community ordinances and residential historic district ordinances for Structures topics.

Source: Original survey conducted February 2014.

- Compact wind turbines on structures (2, 13%)
- Compact wind turbines on property (2, 13%)
- Front yard edible gardens (2, 13%)
- Native vegetation landscapes (1, 6%)
- Relaxed mowing restrictions for native plantings (1, 6%)
- Permeable pavers (1, 6%)
- Plantings in the right of way/ terrace (4, 25%)
- Conversion of residential accessory structures to dwelling units (6, 38%)
- Addition of exterior insulation exempted from floor area and setback requirements (1, 6%)

For every technology or behavior, at least one community indicated that the topic was “Not Considered” in their community ordinances.

Residential Historic District Ordinances

“Never Allowed” was indicated slightly more frequently for installation and use of compact wind turbines on structure or on property (both at 3, 19%) within residential historic districts. The two most frequent responses remained the same, conversion of residential accessory structures (6, 38%) and plantings in the right of way/ terrace (4, 25%).

Survey results were not as anticipated. Very little change between what green behaviors and technologies are allowed in the community and those that are allowed in the historic district was indicated by participating communities. The most typical change was from “Allowed” to “Require Review”. Figures 1, 2, and 3 show the changes in “Allowed”, “Require Review”, and “Not Considered” for the community ordinances compared to the residential historic district ordinances for the topics of Energy, Yard Maintenance and Management, and Structures, respectively.

Some cities’ responses to the survey were unusual in that they indicated that certain activities “Require Review” in their community ordinances, but were “Allowed” in their historic districts. Follow-up questions with these communities verified, or clarified, the results.

Municipalities indicated that these items in their community ordinances “Require Review” because in some non-residential districts review is required, while in residential districts they are allowed. When asked the same about their residential historic districts they selected “Allowed”, which explains the unexpected increase in the Historic Allowed segments in Figures 1, 2, and 3 for,

- Geothermal
- Compost facilities
- Front yard edible gardens
- Rain barrels
- Native vegetation landscapes
- Permeable pavers
- Clotheslines

Separating survey question three (*The installation and/or use of _____ in my community ordinances are*) into two separate questions for non-historic residential and non-historic commercial would have eliminated this confusion.

Communities with Commercial Historic Districts

Community Ordinances

None of the municipalities with commercial historic districts have mandatory requirements for any of the identified “green” technologies and behaviors in their community ordinances.

Few of the behaviors and technologies are frequently “Never Allowed” in the community. Plantings in the right of way/ terrace (3, 17%) was the most frequently indicated response for “Never Allowed”, though both Allowed (5, 28%) and Require Review (7, 39%) received a greater number of responses. Questions receiving at least one “Never Allowed” response include,

- Compact wind turbines on structures (2, 11%)
- Compact wind turbines on property (2, 11%)
- Front yard edible gardens (2, 11%)
- Relaxed mowing restrictions for native plantings (1, 6%)
- Permeable pavers (1, 6%)
- Renovation of commercial second stories (1, 6%)
- Addition of exterior insulation exempted from floor area and setback requirements (1, 6%)

For every technology or behavior, at least one community indicated that the topic was “Not Considered” in their community ordinances.

Commercial Historic District Ordinances

“Never Allowed” was indicated slightly more often for,

- Compact wind turbines on structures (3, 17%)
- Compact wind turbines on property (3, 17%)
- Front yard edible gardens (3, 17%)
- Relaxed mowing restrictions for native plantings (2, 11%)
- Permeable pavers (2, 11%)

Survey results for commercial districts showed some change with most topics shifting from “Allowed” to “Require Review”, as was anticipated. Figures 4, 5, and 6 show the changes in “Allowed”, “Require Review”, and “Not Considered” for the community ordinances compared to the commercial historic district ordinances for the topics of Energy, Yard Maintenance and Management, and Structures, respectively.

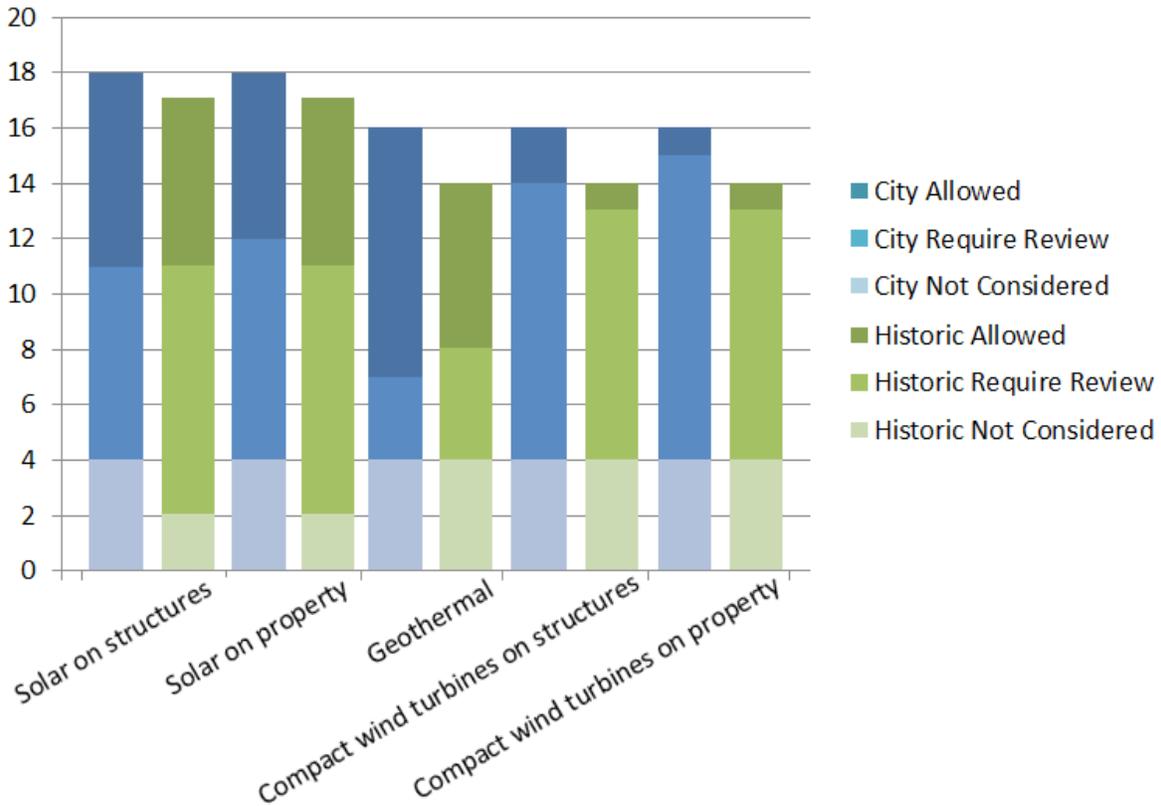


Figure 4. Comparison of “Allowed”, “Require Review”, and “Not Considered” responses for community ordinances and commercial historic district ordinances for Energy topics.

Source: Original survey conducted February 2014.

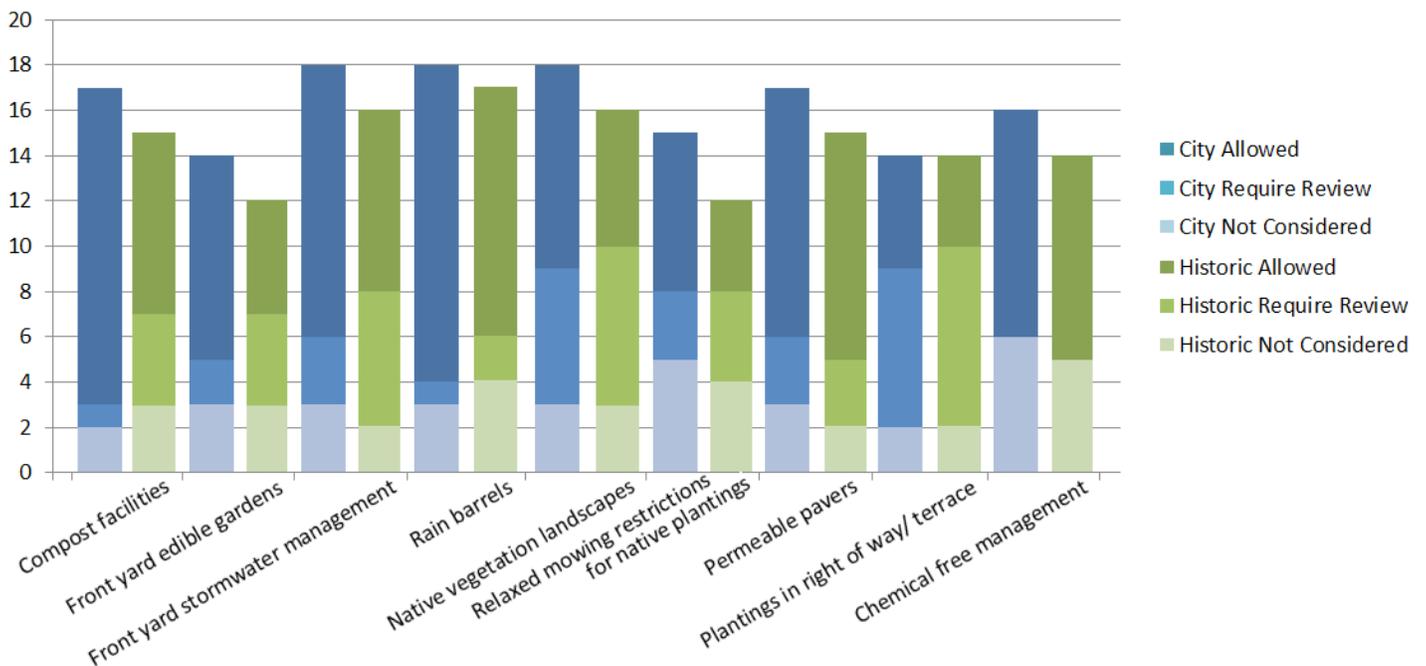


Figure 5. Comparison of “Allowed”, “Require Review”, and “Not Considered” responses for community ordinances and commercial historic district ordinances for Yard Maintenance and Management topics.

Source: Original survey conducted February 2014.

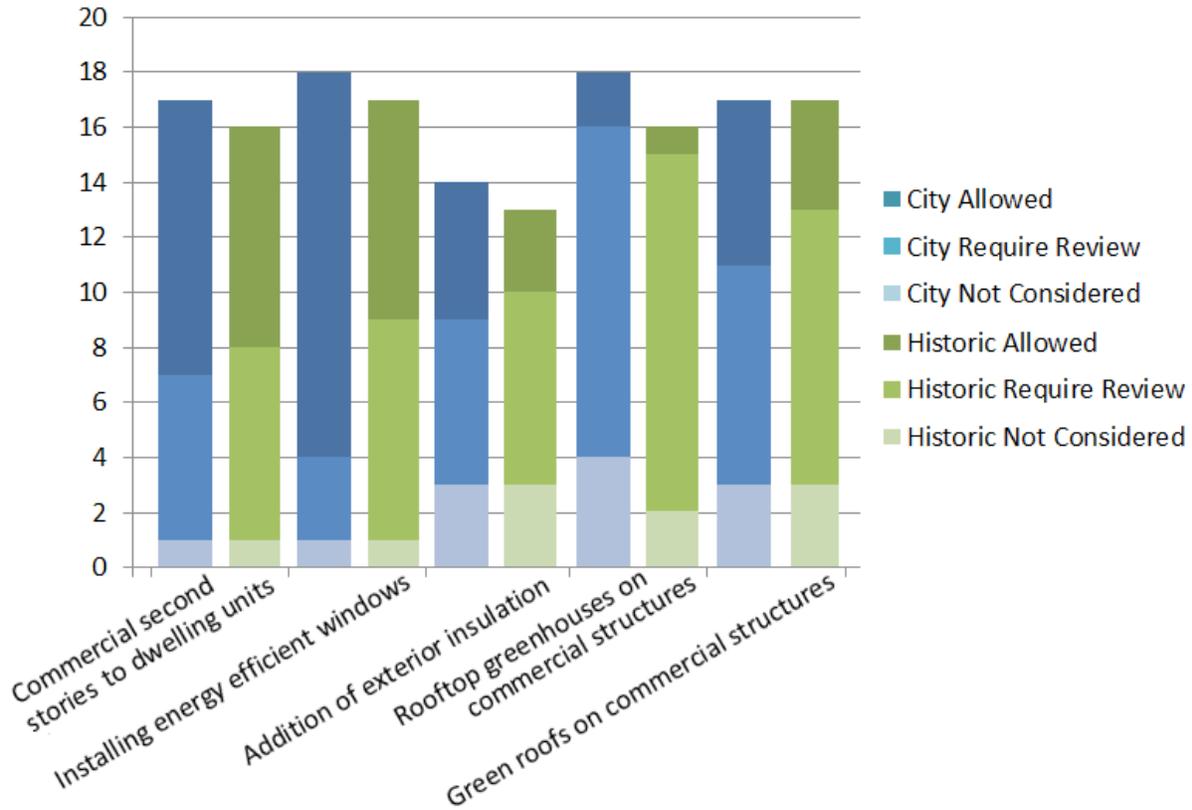


Figure 6. Comparison of “Allowed”, “Require Review”, and “Not Considered” responses for community ordinances and commercial historic district ordinances for Structures topics.

Source: Original survey conducted February 2014.

Barriers

The most common barrier cited was a perceived lack of interest and/or need; other comments touched on up-front costs of green updates, shown in Table 1. A complete list of cited barriers can be found in Appendix II.

Incentives

Few incentives were offered for implementation of green technologies and behaviors. Two communities offered TIF (tax increment financing) incentives. One municipality offers a loan program to companies wanting to upgrade to “Clean Energy”. A complete list of responses can be found in Appendix II.

Table 1. Summary of cited barriers in survey responses

| Barrier Theme | Comments |
|---------------------------------|-----------|
| Up-front costs | 4 |
| Lack of interest/Perceived need | 7 |
| Other | 4 |
| <i>Total</i> | <i>15</i> |

Source: Original survey conducted February 2014.

3.2 Code Updates

Many communities across the country are taking steps to remove barriers to green technologies and behaviors in their codes. A search of green code updates helped inform topics to include in the survey and model ordinance. A summary of a selection of current and recent green code update initiatives is detailed in Table 2.

New York City's Zone Green

New York City's Zone Green modified zoning regulations to remove barriers for "green" new construction and retrofitting. Relevant barriers Zone Green addressed include¹⁵,

- Energy-efficient building walls by allowing additional exterior insulation
- Solar energy to make installations more easily approved
- Rooftop greenhouses
- Permeable pavers

Madison's Zoning Sustainability Meetings

Madison's Zoning Code Rewrite Advisory Committee looked for ways to enhance consideration and approval of sustainability in the City's zoning code. Public meetings were held in 2008 to collect citizen feedback and ideas of how to best increase and encourage "green" practices. Relevant ideas include³,

- Remove obstacles to renewable energy systems on buildings

- Allow water storage tanks, cisterns and rain barrels
- Allow for natural lawns and green space
- Allow permeable surface requirements
- Allow urban agriculture
- Permit dwelling units in accessory structures

Greater Des Moines' Tomorrow Plan

The Tomorrow Plan is a regional effort at ensuring sustainability in future development. Though not a code update, the Tomorrow Plan encourages further investigation and adoption of green technologies, such as²,

- Natural methods of stormwater management, such as native plantings and permeable pavers,
- Investigation of energy reduction through wind and solar

3.3 Green Implementations & Guidelines

Solar

The National Park Service offers guidance on determining the appropriate installation of solar panels on significant historic properties. Descriptions and images are provided to show successful implementations. Typically, if solar panels are not publicly visible once installed there is no concern, however the NPS recognizes an existing "grey area between out-of-sight and obviously obtrusive"¹². Options for appropriate installations include,

Table 2. Summary of recent and ongoing green code update initiatives

| Government | Year | Description |
|---------------------|-------------|---|
| Baltimore, MD | 2008 - 2013 | Zoning code updates to legalize 'hot-button' green issues, such as residential solar panels and wind turbines, as well as less controversial issues such as permeable pavers, rain barrels, compost, and greenhouses. |
| Buffalo, NY | 2011 - 2014 | Unified Development Ordinance simplifies regulations and removes barriers to 'greener' development. |
| Des Moines, IA | 2010 - 2013 | The Tomorrow Plan is a regional plan focusing on increasing sustainability and livability in Greater Des Moines. |
| Grand Rapids, MI | 2008 | Zoning code update adopted many features of LEED-ND |
| Madison, WI | 2008 | Zoning Code Sustainability Ideas public meetings to generate suggestions for improving sustainability in the City's zoning. |
| Manhattan Beach, CA | 2008 -2011 | Zoning code updates to allow for stormwater and grey-water retention, green decks and roofs, new landscaping requirements to reduce water usage, and solar and wind energy generation. |
| New York City, NY | 2012 | Zone Green to remove barriers for new construction and retrofits. |
| Will County, IL | 2012 | Zoning code update expedited review of many 'green' technologies and behaviors and adopted many features of LEED-ND. |

Source: Online Google search of "green zoning code" ^{1, 2, 3, 4, 9, 15, 18}

- On a new addition where character is not diminished
- On a flat roof where not visible or character is not diminished
- Pole-mounted on property where character is not diminished
- Rear porch roof where not visible or character is not diminished
- Main roof where not visible or character is not diminished

The NPS provides three residential examples, a low-slope gable, a cross-gable, and a rear porch roof. Even though in some cases the installed solar panels are visible from the public road, they are not a dominant feature that detracts from historic significance, and thus are considered to be appropriate, show in Figure 7.

The National Trust for Historic Preservation also offers design guidelines for installation of solar panels. In addition to recommendations from the National Park Service, suggestions include,

- Locate solar panels on accessory structures
- Require low profile solar panels
- On flat roofs set solar panels back from the edge
- Match the slope of the installation surface
- Avoid multi-roof installations

Both the National Trust for Historic Preservation and the National Park Service state that installation of solar panels should not be irreversible or cause structural damage in any way.

Wind Turbines

The Secretary of the Interior offers guidelines on installation of wind power for historic structures, however use of wind is only recommended after other energy efficiency improvements to the building have been completed¹⁶. Recommendations for wind power locations are similar to those offered for solar power:

- On a new addition or accessory structure where character is not diminished
- Pole-mounted on property where character is not diminished
- Main roof where not visible or character is not diminished

Significant advancements have been made to residential and small-scale commercial wind power generation in unit size, unit aesthetics, and noise. For example, the wind turbine on the garage pictured in Figures 8 and 9 is not obtrusive, nor does it diminish the residential character of the neighborhood. Many different styles of small-scale turbines are being developed and produced, and communities have the opportunity to proactively decide on a preferred wind aesthetic and adopt appropriate regulations.



Figure 7. Example of solar panel installation on historic structures that was considered to be appropriate by the National Park Service.

Source: National Park Service. "Solar Panels on Historic Properties: On a Low-Slope Gable." <http://www.nps.gov/tps/sustainability/new-technology/solar/low-slope.htm>



Figure 8. Close-up of a small scale residential wind turbine.
 Source: Solaripedia.. "Project: Chicago Residential Wind Turbine." [http://www.solaripedia.com/13/26/chicago_residential_wind_turbine_\(illinois_usa\).html](http://www.solaripedia.com/13/26/chicago_residential_wind_turbine_(illinois_usa).html)

Green Roofs

The National Park Service recognizes the benefits associated with installation of green roofs, such as reduction in energy consumption¹¹. Installation of green roofs on historic structures are considered appropriate when parapets or other architectural features block the view, low-growing plants are used, and most importantly, when the structure can handle the additional weight load.

The National Bohemian Brewery in Baltimore, Maryland included green roofs in their renovations, shown in Figure 10.



Figure 9. Street view of the small scale residential wind turbine show in Figure 8.
 Source: Google Maps. "1699 Edgewood Road Highland Park, IL"

Yard maintenance and management

The Secretary of the Interior’s guidelines encourage other site features such as permeable pavers, bioswales and rain gardens, rain barrels, and native vegetation as appropriate ways to green historic properties and districts¹⁶. The main caution provided in the guidelines is to deliberately utilize existing site features and topography when implementing constructed features.



Figure 10. National Bohemian Brewery in Baltimore, MD showing a non-obtrusive green roof on an historic structure.
 Source: National Park Service. "Green Roofs: Case Studies." <http://www.nps.gov/tps/sustainability/new-technology/green-roofs/natty-boh-case-study.htm>

3.4 Model Ordinance

Since the survey largely found that there is little difference between regulations in historic and non-historic districts, the model ordinance developed deals with residential districts as a whole, with specific considerations for historic properties and districts as appropriate. The model ordinance was limited to residential districts to be a manageable scope for this project. The design guidelines developed for the model ordinance for residential adoption of green technologies and behaviors will help communities allow implementation of green advancements, while not undermining historic significance, and avoiding future nuisance complaints.

Sections of the model ordinance include,

- Energy
 - Solar panels
 - Compact wind
- Yard maintenance and management
 - Compost facilities
 - Front yard edible gardens
 - Green stormwater infrastructure
- Structures and Accessory Uses
 - Clotheslines
 - Green roofs

Though conversion of accessory structures to dwelling units was one of the most cited “Never Allowed” topics from the survey, it was not included in the model ordinance because an extensive model ordinance published by the American Planning Association and sponsored by AARP was discovered, *Accessory Dwelling Units: Model State Act and Local Ordinance*. A reference to the *Accessory Dwelling Unit* ordinance is included in the model ordinance.

One responding community was chosen for a code review based on their survey responses that indicated they had both residential and commercial historic districts, many of the topics were “Not Considered” in their ordinances, and they were willing to be contacted with follow-up questions. This code review allowed identification of sections of the zoning ordinance that could be modified to guarantee property owners maintain the ability to install and use many of the green technologies and behaviors included in the survey.

The complete model ordinance is available in Appendix III.

4. Conclusion

Three questions were posed at the beginning of this report:

Do historic districts have more restrictive code barriers than comparable non-historic districts within municipalities in respect to adopting green technologies and behaviors?

Do other barriers, such as elected officials or vocal citizens, act as barriers to adoption of green technologies and behaviors?

How can municipalities and property owners increase adoption of green technologies and behaviors without compromising the integrity of buildings that have been declared as historically significant, whether by a local, state, or national designation?

Survey results largely indicated few differences in regulatory barriers between comparable non-historic and historic districts for implementing green technologies and behaviors. However, many topics of interest were frequently not considered in municipal codes. Municipalities across the country are reworking their regulations to allow for greater adoption of these environmentally conscious technologies. In response, communities should take a proactive stance to ensure property owners’ rights to adopt and implement green technologies and behaviors by incorporating specific language addressing such topics. Adoption of design guidelines will also help avoid future public health and safety, or nuisance concerns. As green technologies become more developed and widely used, communities should update their standards and design guidelines to reflect changes.

Similar to code barriers, few other barriers exist to adoption of green technologies and behaviors. The most frequently cited barrier was lack of property owner interest or perceived need for the use of such technologies and behaviors. As green technologies continue to develop, and become more economical to implement, these views will likely shift to support wider adoption.

Recognized authorities on historic preservation have already begun developing guidelines on how to appropriately adopt and adapt green practices to historic structures. These suggestions demonstrate that changes to promote greater energy efficiency, on-site energy production, and water quality are not counter to goals to preserve historically significant areas. Implementing new technologies will allow historic districts and structures to remain viable and attractive in a changing society with different concerns and expectations than when these buildings were constructed decades ago.

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Appendix I. Survey



My name is Amanda Jacobson and I am a graduate student at University of Wisconsin-Madison in the department of Urban and Regional Planning. For my professional project I am examining barriers to implementation of "green" technologies and behaviors in historic districts in Iowa and Wisconsin municipalities. Your community has been selected to participate based on population. I would greatly appreciate your help by completing the following online survey. If you are not the most appropriate person to complete the survey, I would appreciate you forwarding this information. I request that if you do not have historic districts in your community you take a moment to respond to the survey, as it will end after you indicate having no historic districts.

The following questionnaire will require approximately 10 minutes to complete. There is no compensation for responding, nor is there any known risk. Your name, contact information, and municipality's name will not be used in any way without further consent. Participation is strictly voluntary and you may refuse to participate at any time.

Thank you for taking time to assist in my research. The data collected will be compiled in a report and presented as part of the requirements for completion of a Master's degree at the University of Wisconsin-Madison. If you have any questions or would like a copy of the final report, please contact me at the information provided below.

Sincerely,

Amanda Jacobson
amjacobson3@wisc.edu
515-402-9803

Does your community have at least one **residential** historic district?

- Yes
 No

0%  100%

<< >>

Does your community have at least one **commercial** historic district?

- Yes
 No

0%  100%

<< >>

Please mark the appropriate response for each of the following.

The installation and/or use of _____ (see table) in my community ordinances are:

| | Mandatory | Allowed | Require Review | Never Allowed | Not Considered | Not Sure |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Energy | | | | | | |
| Solar on structures | <input type="radio"/> |
| Solar on property | <input type="radio"/> |
| Geothermal | <input type="radio"/> |
| Compact wind turbines on structures | <input type="radio"/> |
| Compact wind turbines on property | <input type="radio"/> |
| Yard Maintenance and Management | | | | | | |
| Compost facilities | <input type="radio"/> |
| Front yard edible gardens | <input type="radio"/> |
| Front yard stormwater management, e.g. rain gardens, bioswales | <input type="radio"/> |
| Rain barrels | <input type="radio"/> |
| Native vegetation landscapes, e.g. prairie | <input type="radio"/> |
| Relaxed mowing restrictions for native plantings | <input type="radio"/> |
| Permeable pavers | <input type="radio"/> |
| Plantings in right of way/ terrace | <input type="radio"/> |
| Chemical free management | <input type="radio"/> |
| Structures | | | | | | |
| Conversion of residential accessory structures to dwelling units | <input type="radio"/> |
| Renovation of commercial second stories to dwelling units | <input type="radio"/> |
| Clotheslines | <input type="radio"/> |
| Installing energy efficient windows | <input type="radio"/> |
| Addition of exterior insulation exempted from floor area and setback requirements | <input type="radio"/> |
| Rooftop greenhouses on commercial structures | <input type="radio"/> |
| Green roofs on commercial structures | <input type="radio"/> |
| Green roofs on residential secondary structures | <input type="radio"/> |

0%  100%

Please mark the appropriate response for each of the following.

The installation and/or use of _____ (see table) in residential historic districts in my community are:

| | Mandatory | Allowed | Require Review | Never Allowed | Not Considered | Not Sure |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Energy | | | | | | |
| Solar on structures | <input type="radio"/> |
| Solar on property | <input type="radio"/> |
| Geothermal | <input type="radio"/> |
| Compact wind turbines on structures | <input type="radio"/> |
| Compact wind turbines on property | <input type="radio"/> |
| Yard Maintenance and Management | | | | | | |
| Compost facilities | <input type="radio"/> |
| Front yard edible gardens | <input type="radio"/> |
| Front yard stormwater management, e.g. rain gardens, bioswales | <input type="radio"/> |
| Rain barrels | <input type="radio"/> |
| Native vegetation landscapes, e.g. prairie | <input type="radio"/> |
| Relaxed mowing restrictions for native plantings | <input type="radio"/> |
| Permeable pavers | <input type="radio"/> |
| Plantings in right of way/ terrace | <input type="radio"/> |
| Chemical free management | <input type="radio"/> |
| Structures | | | | | | |
| Conversion of residential accessory structures to dwelling units | <input type="radio"/> |
| Clotheslines | <input type="radio"/> |
| Installing energy efficient windows | <input type="radio"/> |
| Addition of exterior insulation exempted from floor area and setback requirements | <input type="radio"/> |
| Green roofs on residential secondary structures | <input type="radio"/> |

0% 100%

<< >>

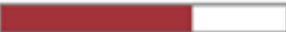
Please mark the appropriate response for each of the following.

The installation and/or use of _____ (see table) in commercial historic districts in my community are:

| | Mandatory | Allowed | Require Review | Never Allowed | Not Considered | Not Sure |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Energy | | | | | | |
| Solar on structures | <input type="radio"/> |
| Solar on property | <input type="radio"/> |
| Geothermal | <input type="radio"/> |
| Compact wind turbines on structures | <input type="radio"/> |
| Compact wind turbines on property | <input type="radio"/> |
| Yard Maintenance and Management | | | | | | |
| Compost facilities | <input type="radio"/> |
| Front yard edible gardens | <input type="radio"/> |
| Front yard stormwater management, e.g. rain gardens, bioswales | <input type="radio"/> |
| Rain barrels | <input type="radio"/> |
| Native vegetation landscapes, e.g. prairie | <input type="radio"/> |
| Relaxed mowing restrictions for native plantings | <input type="radio"/> |
| Permeable pavers | <input type="radio"/> |
| Plantings in right of way/ terrace | <input type="radio"/> |
| Chemical free management | <input type="radio"/> |
| Structures | | | | | | |
| Renovation of commercial second stories to dwelling units | <input type="radio"/> |
| Installing energy efficient windows | <input type="radio"/> |
| Addition of exterior insulation exempted from floor area and setback requirements | <input type="radio"/> |
| Rooftop greenhouses on commercial structures | <input type="radio"/> |
| Green roofs on commercial structures | <input type="radio"/> |

0%  100%

Do you have any thoughts you would like to share about barriers to "green" technologies and behaviors in your community? For example, citizen concerns, lack of city council support, etc.?

0%  100%

<< | >>

Does your community offer any incentives to achieve implementation of "green" technologies and behaviors? If so, please describe them here.

0%  100%

<< | >>

Are you willing to be contacted with further questions? If so, please list your preferred contact information.

0%  100%

<< | >>

Appendix II. Survey Results

Question 1. Does your community have at least one residential historic district?

| | |
|------------|----------|
| Yes | 16 (45%) |
| No | 20 (55%) |

Question 2. Does your community have at least one commercial historic district?

| | |
|------------|----------|
| Yes | 18 (50%) |
| No | 18 (50%) |

Question 3. The installation and/or use of _____ in my community ordinances are:

| | Mandatory | Allowed | Require Review | Never Allowed | Not Considered | Not Sure |
|---|-----------|----------|----------------|---------------|----------------|----------|
| Energy | | | | | | |
| Solar on structures | 0 (0%) | 7 (19%) | 8 (22%) | 0 (0%) | 4 (11%) | 0 (0%) |
| Solar on property | 0 (0%) | 6 (17%) | 9 (25%) | 0 (0%) | 4 (11%) | 0 (0%) |
| Geothermal | 0 (0%) | 9 (25%) | 3 (8%) | 0 (0%) | 4 (11%) | 3 (8%) |
| Compact wind turbines on structures | 0 (0%) | 2 (6%) | 11 (31%) | 2 (6%) | 4 (11%) | 0 (0%) |
| Compact wind turbines on property | 0 (0%) | 1 (3%) | 12 (33%) | 2 (6%) | 4 (11%) | 0 (0%) |
| Yard Maintenance and Management | | | | | | |
| Compost facilities | 0 (0%) | 14 (39%) | 2 (6%) | 0 (0%) | 2 (6%) | 0 (0%) |
| Front yard edible gardens | 0 (0%) | 9 (25%) | 2 (6%) | 2 (6%) | 3 (8%) | 2 (6%) |
| Front yard stormwater management, e.g. rain gardens, bioswales | 0 (0%) | 13 (36%) | 3 (8%) | 0 (0%) | 3 (8%) | 0 (0%) |
| Rain barrels | 0 (0%) | 14 (39%) | 1 (3%) | 0 (0%) | 4 (11%) | 0 (0%) |
| Native vegetation landscapes, e.g. prairie | 0 (0%) | 9 (25%) | 6 (17%) | 1 (3%) | 3 (8%) | 0 (0%) |
| Relaxed mowing restrictions for native plantings | 0 (0%) | 7 (19%) | 3 (8%) | 1 (3%) | 6 (17%) | 2 (6%) |
| Permeable pavers | 0 (0%) | 11 (31%) | 3 (8%) | 1 (3%) | 3 (8%) | 1 (3%) |
| Plantings in right of way/ terrace | 0 (0%) | 5 (14%) | 7 (19%) | 4 (11%) | 2 (6%) | 1 (3%) |
| Chemical free management | 0 (0%) | 10 (28%) | 0 (0%) | 0 (0%) | 7 (19%) | 2 (6%) |
| Structures | | | | | | |
| Conversion of residential accessory structures to dwelling units | 0 (0%) | 0 (0%) | 11 (31%) | 7 (19%) | 1 (3%) | 0 (0%) |
| Renovation of commercial second stories to dwelling units | 0 (0%) | 10 (28%) | 7 (19%) | 1 (3%) | 1 (3%) | 0 (0%) |
| Clotheslines | 0 (0%) | 16 (44%) | 0 (0%) | 0 (0%) | 3 (8%) | 0 (0%) |
| Installing energy efficient windows | 0 (0%) | 14 (39%) | 4 (11%) | 0 (0%) | 1 (3%) | 0 (0%) |
| Addition of exterior insulation exempted from floor area and setback requirements | 0 (0%) | 5 (14%) | 6 (17%) | 1 (3%) | 4 (11%) | 3 (8%) |
| Rooftop greenhouses on commercial structures | 0 (0%) | 2 (6%) | 13 (36%) | 0 (0%) | 4 (11%) | 0 (0%) |
| Green roofs on commercial structures | 0 (0%) | 6 (17%) | 9 (25%) | 0 (0%) | 3 (8%) | 1 (3%) |
| Green roofs on residential secondary structures | 0 (0%) | 6 (17%) | 9 (25%) | 0 (0%) | 3 (8%) | 1 (3%) |

Question 3. The installation and/or use of _____ in my community ordinances are: (only communities with Residential Historic Districts)

| | Mandatory | Allowed | Require Review | Never Allowed | Not Considered | Not Sure |
|---|-----------|----------|----------------|---------------|----------------|----------|
| Energy | | | | | | |
| Solar on structures | 0 (0%) | 5 (31%) | 7 (44%) | 0 (0%) | 4 (25%) | 0 (0%) |
| Solar on property | 0 (0%) | 5 (31%) | 7 (44%) | 0 (0%) | 4 (25%) | 0 (0%) |
| Geothermal | 0 (0%) | 6 (38%) | 3 (19%) | 0 (0%) | 4 (25%) | 3 (19%) |
| Compact wind turbines on structures | 0 (0%) | 1 (6%) | 9 (56%) | 2 (13%) | 4 (25%) | 0 (0%) |
| Compact wind turbines on property | 0 (0%) | 0 (0%) | 10 (63%) | 2 (13%) | 4 (25%) | 0 (0%) |
| Yard Maintenance and Management | | | | | | |
| Compost facilities | 0 (0%) | 11 (69%) | 2 (13%) | 0 (0%) | 2 (13%) | 0 (0%) |
| Front yard edible gardens | 0 (0%) | 5 (31%) | 2 (13%) | 2 (13%) | 5 (31%) | 1 (6%) |
| Front yard stormwater management, e.g. rain gardens, bioswales | 0 (0%) | 10 (63%) | 3 (19%) | 0 (0%) | 3 (19%) | 0 (0%) |
| Rain barrels | 0 (0%) | 11 (69%) | 1 (6%) | 0 (0%) | 4 (25%) | 0 (0%) |
| Native vegetation landscapes, e.g. prairie | 0 (0%) | 7 (44%) | 5 (31%) | 1 (6%) | 3 (19%) | 0 (0%) |
| Relaxed mowing restrictions for native plantings | 0 (0%) | 5 (31%) | 3 (19%) | 1 (6%) | 5 (31%) | 2 (13%) |
| Permeable pavers | 0 (0%) | 8 (50%) | 3 (19%) | 1 (6%) | 3 (19%) | 1 (6%) |
| Plantings in right of way/ terrace | 0 (0%) | 3 (19%) | 6 (38%) | 4 (25%) | 2 (13%) | 1 (6%) |
| Chemical free management | 0 (0%) | 7 (44%) | 0 (0%) | 0 (0%) | 7 (44%) | 2 (13%) |
| Structures | | | | | | |
| Conversion of residential accessory structures to dwelling units | 0 (0%) | 0 (0%) | 9 (56%) | 7 (44%) | 0 (0%) | 0 (0%) |
| Clotheslines | 0 (0%) | 13 (81%) | 0 (0%) | 0 (0%) | 3 (19%) | 0 (0%) |
| Installing energy efficient windows | 0 (0%) | 11 (69%) | 4 (25%) | 0 (0%) | 1 (6%) | 0 (0%) |
| Addition of exterior insulation exempted from floor area and setback requirements | 0 (0%) | 5 (31%) | 4 (25%) | 1 (6%) | 4 (25%) | 2 (13%) |
| Green roofs on residential secondary structures | 0 (0%) | 3 (19%) | 6 (38%) | 0 (0%) | 4 (25%) | 3 (19%) |

Percentages are out of 16, the number of municipalities that indicated having Residential Historic Districts.

Question 3. The installation and/or use of _____ in my community ordinances are: (only communities with Commercial Historic Districts)

| | Mandatory | Allowed | Require Review | Never Allowed | Not Considered | Not Sure |
|---|-----------|----------|----------------|---------------|----------------|----------|
| Energy | | | | | | |
| Solar on structures | 0 (0%) | 7 (39%) | 7 (39%) | 0 (0%) | 4 (22%) | 0 (0%) |
| Solar on property | 0 (0%) | 6 (33%) | 8 (44%) | 0 (0%) | 4 (22%) | 0 (0%) |
| Geothermal | 0 (0%) | 9 (50%) | 3 (17%) | 0 (0%) | 4 (22%) | 2 (11%) |
| Compact wind turbines on structures | 0 (0%) | 2 (11%) | 10 (56%) | 2 (11%) | 4 (22%) | 0 (0%) |
| Compact wind turbines on property | 0 (0%) | 1 (6%) | 11 (61%) | 2 (11%) | 4 (22%) | 0 (0%) |
| Yard Maintenance and Management | | | | | | |
| Compost facilities | 0 (0%) | 14 (78%) | 1 (6%) | 0 (0%) | 2 (11%) | 0 (0%) |
| Front yard edible gardens | 0 (0%) | 9 (50%) | 2 (11%) | 2 (11%) | 3 (17%) | 1 (6%) |
| Front yard stormwater management, e.g. rain gardens, bioswales | 0 (0%) | 12 (67%) | 3 (17%) | 0 (0%) | 3 (17%) | 0 (0%) |
| Rain barrels | 0 (0%) | 14 (78%) | 1 (6%) | 0 (0%) | 3 (17%) | 0 (0%) |
| Native vegetation landscapes, e.g. prairie | 0 (0%) | 9 (50%) | 6 (33%) | 0 (0%) | 3 (17%) | 0 (0%) |
| Relaxed mowing restrictions for native plantings | 0 (0%) | 7 (39%) | 3 (17%) | 1 (6%) | 5 (28%) | 2 (11%) |
| Permeable pavers | 0 (0%) | 11 (61%) | 3 (17%) | 1 (6%) | 3 (17%) | 0 (0%) |
| Plantings in right of way/ terrace | 0 (0%) | 5 (28%) | 7 (39%) | 3 (17%) | 2 (11%) | 1 (6%) |
| Chemical free management | 0 (0%) | 10 (56%) | 0 (0%) | 0 (0%) | 6 (33%) | 2 (11%) |
| Structures | | | | | | |
| Renovation of commercial second stories to dwelling units | 0 (0%) | 10 (56%) | 6 (33%) | 1 (6%) | 1 (6%) | 0 (0%) |
| Installing energy efficient windows | 0 (0%) | 14 (39%) | 3 (17%) | 0 (0%) | 1 (6%) | 0 (0%) |
| Addition of exterior insulation exempted from floor area and setback requirements | 0 (0%) | 5 (28%) | 6 (33%) | 1 (6%) | 3 (17%) | 3 (17%) |
| Rooftop greenhouses on commercial structures | 0 (0%) | 2 (11%) | 12 (67%) | 0 (0%) | 4 (22%) | 0 (0%) |
| Green roofs on commercial structures | 0 (0%) | 6 (33%) | 8 (44%) | 0 (0%) | 3 (17%) | 1 (6%) |

Percentages are out of 18, the number of municipalities that indicated having Commercial Historic Districts

| Question 4. The installation and/or use of _____ in residential historic districts in my community are: | | | | | | |
|---|-----------|----------|----------------|---------------|----------------|----------|
| | Mandatory | Allowed | Require Review | Never Allowed | Not Considered | Not Sure |
| Energy | | | | | | |
| Solar on structures | 0 (0%) | 4 (25%) | 8 (50%) | 0 (0%) | 4 (25%) | 0 (0%) |
| Solar on property | 0 (0%) | 4 (25%) | 8 (50%) | 0 (0%) | 4 (25%) | 0 (0%) |
| Geothermal | 0 (0%) | 7 (44%) | 2 (13%) | 0 (0%) | 4 (25%) | 3 (19%) |
| Compact wind turbines on structures | 0 (0%) | 1 (6%) | 7 (44%) | 3 (19%) | 5 (31%) | 0 (0%) |
| Compact wind turbines on property | 0 (0%) | 2 (13%) | 6 (38%) | 3 (19%) | 5 (31%) | 0 (0%) |
| Yard Maintenance and Management | | | | | | |
| Compost facilities | 0 (0%) | 12 (75%) | 2 (13%) | 0 (0%) | 1 (6%) | 0 (0%) |
| Front yard edible gardens | 0 (0%) | 8 (50%) | 1 (6%) | 2 (13%) | 4 (25%) | 1 (6%) |
| Front yard stormwater management, e.g. rain gardens, bioswales | 0 (0%) | 10 (63%) | 4 (25%) | 0 (0%) | 2 (13%) | 0 (0%) |
| Rain barrels | 0 (0%) | 13 (81%) | 1 (6%) | 0 (0%) | 2 (13%) | 0 (0%) |
| Native vegetation landscapes, e.g. prairie | 0 (0%) | 9 (56%) | 3 (19%) | 1 (6%) | 3 (19%) | 0 (0%) |
| Relaxed mowing restrictions for native plantings | 0 (0%) | 5 (31%) | 3 (19%) | 1 (6%) | 5 (31%) | 2 (13%) |
| Permeable pavers | 0 (0%) | 10 (63%) | 2 (13%) | 1 (6%) | 2 (13%) | 1 (6%) |
| Plantings in right of way/ terrace | 0 (0%) | 3 (19%) | 6 (38%) | 4 (25%) | 1 (6%) | 2 (13%) |
| Chemical free management | 0 (0%) | 7 (44%) | 0 (0%) | 0 (0%) | 6 (38%) | 2 (13%) |
| Structures | | | | | | |
| Conversion of residential accessory structures to dwelling units | 0 (0%) | 1 (6%) | 9 (56%) | 6 (38%) | 0 (0%) | 0 (0%) |
| Clotheslines | 0 (0%) | 14 (88%) | 0 (0%) | 0 (0%) | 2 (13%) | 0 (0%) |
| Installing energy efficient windows | 0 (0%) | 8 (50%) | 7 (44%) | 0 (0%) | 1 (6%) | 0 (0%) |
| Addition of exterior insulation exempted from floor area and setback requirements | 0 (0%) | 4 (25%) | 3 (19%) | 1 (6%) | 6 (38%) | 2 (13%) |
| Green roofs on residential secondary structures | 0 (0%) | 1 (6%) | 8 (50%) | 0 (0%) | 3 (19%) | 4 (25%) |

Percentages are out of 16, the number of municipalities that indicated having Residential Historic Districts.

Question 5. The installation and/or use of _____ in commercial historic districts in my community are:

| | Mandatory | Allowed | Require Review | Never Allowed | Not Considered | Not Sure |
|---|-----------|----------|----------------|---------------|----------------|----------|
| Energy | | | | | | |
| Solar on structures | 0 (0%) | 6 (33%) | 9 (50%) | 0 (0%) | 2 (11%) | 0 (0%) |
| Solar on property | 0 (0%) | 6 (33%) | 9 (50%) | 0 (0%) | 2 (11%) | 0 (0%) |
| Geothermal | 0 (0%) | 6 (33%) | 4 (22%) | 0 (0%) | 4 (22%) | 2 (11%) |
| Compact wind turbines on structures | 0 (0%) | 1 (6%) | 9 (50%) | 3 (17%) | 4 (22%) | 0 (0%) |
| Compact wind turbines on property | 0 (0%) | 1 (6%) | 9 (50%) | 3 (17%) | 4 (22%) | 0 (0%) |
| Yard Maintenance and Management | | | | | | |
| Compost facilities | 0 (0%) | 8 (44%) | 4 (22%) | 0 (0%) | 3 (17%) | 2 (11%) |
| Front yard edible gardens | 0 (0%) | 5 (28%) | 4 (22%) | 3 (17%) | 3 (17%) | 2 (11%) |
| Front yard stormwater management, e.g. rain gardens, bioswales | 0 (0%) | 8 (44%) | 6 (33%) | 0 (0%) | 2 (11%) | 1 (6%) |
| Rain barrels | 0 (0%) | 11 (61%) | 2 (11%) | 0 (0%) | 4 (22%) | 0 (0%) |
| Native vegetation landscapes, e.g. prairie | 0 (0%) | 6 (33%) | 7 (39%) | 0 (0%) | 3 (17%) | 1 (6%) |
| Relaxed mowing restrictions for native plantings | 0 (0%) | 4 (22%) | 4 (22%) | 2 (11%) | 4 (22%) | 3 (17%) |
| Permeable pavers | 0 (0%) | 10 (56%) | 3 (17%) | 2 (11%) | 2 (11%) | 0 (0%) |
| Plantings in right of way/ terrace | 0 (0%) | 4 (22%) | 8 (44%) | 2 (11%) | 2 (11%) | 1 (6%) |
| Chemical free management | 0 (0%) | 9 (50%) | 0 (0%) | 0 (0%) | 5 (28%) | 3 (17%) |
| Structures | | | | | | |
| Renovation of commercial second stories to dwelling units | 0 (0%) | 8 (44%) | 7 (39%) | 1 (6%) | 1 (6%) | 0 (0%) |
| Installing energy efficient windows | 0 (0%) | 8 (44%) | 8 (44%) | 0 (0%) | 1 (6%) | 0 (0%) |
| Addition of exterior insulation exempted from floor area and setback requirements | 0 (0%) | 3 (17%) | 7 (39%) | 1 (6%) | 3 (17%) | 3 (17%) |
| Rooftop greenhouses on commercial structures | 0 (0%) | 1 (6%) | 13 (72%) | 0 (0%) | 2 (11%) | 1 (6%) |
| Green roofs on commercial structures | 0 (0%) | 4 (22%) | 10 (56%) | 0 (0%) | 3 (17%) | 0 (0%) |

Percentages are out of 18, the number of municipalities that indicated having Commercial Historic Districts

Question 6. Do you have any thoughts you would like to share about barriers to “green” technologies and behaviors in your community? For example, citizen concerns, lack of city council support, etc.?

Up-front Costs

Expense, for some issues

Cost--benefit is not realized by developers or many policy makers. They often see a higher cost and then do not wish to proceed due to that factor

It is hard to sell long range benefits with short term costs

1. Additional or perceived additional initial costs for development or redevelopment.
2. Reluctance to change from 'this is the way we have always done it' procedures.
3. Uncertainty of future maintenance costs and responsibilities.

Lack of interest/Perceived need

Our residents have shown preference to conventional residential subdivisions

As a city we are doing some green infrastructure; LED lighting, hybrid vehicles. As a community there is some interest in "green"; but not to the extent that the public is requesting more from the City Council

Lack of interest and support

Most owners of commercial historic buildings would not consider green roofs, solar, wind turbines and the like. They are mostly concerned with getting the upper floors filled

It is our understanding that local codes cannot prohibit alternative energy sources (solar, wind turbine, etc.) but may review. We have many successful installations of solar units in both residential and commercial applications; we have had no wind units. Citizen concerns have been minimal and our Council supports alternative sources; one alderman is a strong proponent of solar

There is little support or incentives for people to convert their technologies to "green" tech. Beloit is a very "if it isn't broke, don't fix it" type of city, so there is little concern for residential upgrades. Specifically for historic homes, we try to maintain the original structure as much as possible. Adding things like roof gardens, energy efficient windows, and fitting stormwater gardens into front yards without disturbing the porch or setback requirements can be difficult

General lack of support, EXCEPT "green" as applied to consumption, energy conservation as a prime example. "Green" as applied to choice of construction materials has FAR less impact than the extreme wastefulness of resources in "daily living". Buildings CAN easily last for decades, if not amortized and discarded as is often the case due to marketing. Packaging, on the OTOH, is a constant waste of resources on almost a daily basis, often for the sole purpose of marketing as a prime example--over-sized for the actual product to project value or be noticed, over-done to project perception of quality, intermingling of materials that make the packaging VERY difficult if not impossible to recycle. LOTS of plastic throw-away. Not to mention multi-item/volume packaging, wherein 1 or 2 items are typically needed at any one time but the packaging holds an odd number that doesn't coincide to common utilization, whatever it may be. That sells more product and costs the consumer more, and at the same time is wasteful because the extra items generally expire or have been misplaced/forgotten when needed at some future date

Other

I don't believe such a concept makes for good public policy. It is better determined by private industry and commerce as they see fit to invest in such manners while still maintain a strong financial performance

Our City is very committed to sustainable practices, even going as far to use TIF to encourage developers to implement green practices. All changes to commercial properties in the City require design review whether or not the property has landmark status

Solar panels, larger windows for passive solar, wind fans and any item that is on the outside of the building or in the yard take from the historic look. Also changes in the landscape ie: water garden, rain barrels, can also impact. Design is the issue and there is note guide to help or codes. Codes do not support historic or new tech

Concerns regarding aesthetics as well as noise and other nuisances always come up

Question 7. Does your community offer any incentives to achieve implementation of "green" technologies and behaviors? If so, please describe them here.

Tax increment financing funding

In some Tax Increment Districts we have incentives that may be tied to the provision of green infrastructure

The City offers Property Assessed Clean Energy loans for companies looking to make energy efficient improvements or install renewable energy facilities

We try to work with the developers to minimize the costs of green technologies - hopefully at or below traditional development costs

State offers some incentives/rebates for energy efficiency, and requires utility "by back" of energy produced by renewables such as small wind and solar. Building codes require more insulation/energy efficiency than the private market would otherwise supply

Yes. Curbside recycling. Hometown Rewards program to encourage green practices

Yes, but it does not fit the historic buildings and sites. Rain barrels, trees, HPC review, lights,...

Appendix III. Model Ordinance for Residential Adoption of Green Technologies and Behaviors

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Introduction to the Model Ordinance

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Preparation of this Ordinance and Additional Resources

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2. DEFINITIONS

3. GREEN TECHNOLOGIES AND BEHAVIORS DESIGN GUIDELINES

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3.1.1 Solar panels

3.1.2 Compact wind

3.2 Yard maintenance and management

3.2.1 Compost

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3.2.3 Green stormwater infrastructure

3.3 Structures and Accessory Uses

3.3.1 Clotheslines

3.3.2 Green roofs

Introduction to the Model Ordinance

This publication includes the text of the model ordinance for residential adoption of “green” technologies and behaviors, with special consideration for adoption in historic districts, submitted in partial fulfillment of the requirements for the degree of Masters of Science in Urban and Regional Planning. The publication begins with a brief overview of the principles and objectives of “green” technologies and behaviors. These principles and objectives should be used to guide municipalities in the development of local ordinances for adoption of “green” technologies and behaviors. The ordinance is meant to function as a guide and is not intended to be adopted as is; each community must adapt the language and concepts of the ordinance to fit their unique circumstances.

“Green” technologies and behaviors is a broad statement which needs clearer definition for this model ordinance. Topics addressed in this ordinance have been categorized into Energy, Yard Maintenance and Management, and Structures. These topics were included in a survey distributed to municipalities in Wisconsin and Iowa with populations greater than 10,000 to determine how certain activities within community ordinances are regulated, and if they differ in residential and commercial historic district ordinances. The survey explored whether topics were,

- Mandatory,
- Allowed,
- Require Review,
- Never Allowed, or
- Not Considered

Survey findings indicated limited differences in regulations between community ordinances at large and ordinances regulating historic districts. These findings should not be interpreted to mean all communities have few regulations for historic districts and properties. For responding cities, many of the topics covered in the survey are typically allowed or are permitted with review. In light of these findings, the model ordinance shall address the community at large, offering specific considerations for historic districts and properties where appropriate.

Principles and Objectives of Adoption of Green Technologies and Behaviors

Though there is no single definition or model of adoption of green technologies and behaviors, the concept largely focuses on improving energy efficiency and protecting water quality. Understanding the variety of options for improving energy efficiency and water quality is essential for communities implementing an ordinance to increase adoption of green technologies and behaviors in order to utilize the most suitable methods for that community. As cities and villages modify the model ordinance to meet the unique circumstances found within their communities, the ordinances developed should seek to address energy, yard maintenance and management, and structures.

Energy

Improving energy efficiency comes from both reducing the amount of energy consumed by a property, as well as finding alternative ways to produce energy. Topics considered will include,

- Solar panels
- Compact wind

Yard Maintenance and Management

Components of yard maintenance and management can address both water quality concerns and reduce energy consumption. Topics considered will include,

- Compost facilities
- Front yard edible gardens
- Green stormwater infrastructure
 - Rain barrels
 - Native landscapes
 - Constructed retention
 - Permeable pavers
 - Plantings in the right of way or terrace

Structures and Accessory Uses

In the United States, according to the U.S. Green Building Council commercial and residential building operations account for 40% of primary energy consumption. Seemingly small changes in behaviors and structures can have a large cumulative impact on energy use. Topics considered will include,

- Clotheslines
- Green roofs

Creation of Accessory Dwelling Units (ADUs) is an important component of allowing socially, economically, and environmentally friendly housing options. The American Planning Association and AARP have published *Accessory Dwelling Units: Model State Act and Local Ordinance*, so this topic will not be included in this model ordinance.

Preparation of this Ordinance and Additional Resources

In developing this ordinance, relevant ordinances, design manuals, and literature on “green” technologies and behaviors were considered. Many of the ideas and concepts from these resources were used in the preparation of this ordinance.

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Wisconsin Department of Natural Resources. “Home Composting: The Complete Composter.” PUB-WA-182 (2005). <http://dnr.wi.gov/files/PDF/pubs/wa/wa182.pdf>

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1. General Provisions

1.1 Statutory Authorization This ordinance is adopted pursuant to authority granted by Wisconsin Statute § 60.61 or 60.62 and 62.23(7) or 60.22(3) and 66.0401

1.2 Purpose. The purpose of this ordinance is to ensure that optional adoption of “green” technologies and behaviors in residential districts, including residential historic districts and properties, remains consistent with local ordinances. A “green” technology and behavior ordinance should allow, and possibly encourage,

1. Energy production on-site
2. Yard maintenance and management to reduce energy use and protect water quality
3. Structural improvements that reduce energy consumption

1.3 Applicability. The “green” technology and behavior ordinance is applicable to residential districts within [Municipality], with special considerations for historic districts and properties.

2. Definitions

The following definitions are intended to add to or clarify definitions within existing community ordinances. Words used in the singular form shall include the plural form. Words used in the plural form shall include the singular form.

2.1 Accessory structure – A detached subordinate structure which is clearly incidental to, and customarily found in connection with, the principal structure to which it is related and which is located on the same lot as that of the principal structure.

2.2 Bioswale - A method of green stormwater infrastructure that uses a broad, shallow channel with native plants and grasses covering the side slope and base to capture and infiltrate stormwater runoff.

2.3 Clothesline – A line used for drying clothes and other linens outside. A clothesline can be strung between two poles, or be attached to existing structures.

2.4 Compact wind – Wind turbines that can be pole or structure mounted and produce less than 40 dB(A) of noise.

2.5 Distributed wind– *see Compact wind turbine.*

2.6 Edible garden - The use of food plants as design features in a landscape or garden, not including food products grown for sale.

2.7 Edible landscaping – *see Edible garden.*

2.8 Front yard – An open space extending the full width of the lot and with a depth to the nearest line of the main building.

2.9 Green stormwater infrastructure – Natural and engineered systems that use soil and vegetation to capture stormwater runoff, and filter suspended solids and pollutants.

2.10 Green roof – Roof of a structure that is partially or completely covered with vegetation and a growing medium.

2.11 Living roof – *see Green roof.*

2.12 Native landscape – Use of plants in landscaping or gardening native or naturalized to the region. Native landscapes are specifically adapted to grow under local conditions, and thus require less consumption of water and fertilizers.

2.13 Permeable pavers – A green stormwater infrastructure method that uses range of materials and techniques that allow stormwater to infiltrate through the surface material.

2.14 Rain barrel – A method of stormwater management that collects and stores rainwater runoff into barrels or cisterns that would otherwise be diverted off-site.

2.15 Rain garden – A method of green stormwater infrastructure that uses a shallow depression planted with native plants and grasses to capture and infiltrate stormwater runoff.

2.16 Residential compost facilities – Compost facilities sized to accommodate on-site residential production of yard clippings and other organic waste, not including production of compost for sale.

2.17 Residential wind– *see Compact wind turbine.*

2.18 Solar energy system – Equipment structure or pole mounted which directly converts and then transfers or stores solar energy into usable forms of thermal or electrical energy.

2.19 Secondary structure – *see Accessory structure.*

2.20 Stormwater – Rain and melted snow that runs off streets, lawns, and other sites.

2.21 Vegetated swale – *see Bioswale.*

3. Green Technologies and Behaviors Design Guidelines

3.1 Energy Production. Allowing property owners to adopt and install on-site energy production technologies will improve long-term sustainability of households and communities.

3.1.1 Solar panels. Wisconsin Statute § 66.0401 protects property owners' rights to use of solar energy systems. Any restrictions placed on solar energy systems must either (a) serve to preserve or protect the public health or safety; (b) not significantly increase the cost of the system or significantly decrease its efficiency; or (c) allow for an alternative system of comparable cost and efficiency. In light of these regulations,

(a) Solar panels shall be permitted on all residential structures.

(b) In the case of historic districts or structures, when possible, placement of solar panels should,

(i) be located on a new addition or accessory structure where historic character is not diminished

(ii) be located on a flat or low-sloped roof where not visible from a public right-of-way, or where historic character is not diminished

(iv) be located on rear roof where not visible from a public right-of-way, or where character is not diminished

(iii) be pole-mounted on the property where historic character is not diminished

(c) In the case of historic districts or structures, solar panels should be installed to match the slope of the installation surface to decrease visibility, and not diminish historic character

3.1.2 Compact wind. Wisconsin Statute § 66.0401 regulates restrictions municipalities and counties may place on installation of wind energy systems, but primarily applies to large wind turbines. As the wind energy field continues to mature, improvements are being made for small scale residential turbines, also called distributed wind, that can be pole- or roof-mounted.

(a) Wind energy systems shall be permitted on all residential structures.

(b) Wind energy systems installed in residential areas shall not exceed noise levels of 40 dB(A), which meets World Health Organization recommendations for night-time noise levels that do not disrupt sleep.

(c) Wind energy systems shall have a matte finish to prevent a 'disco effect' of light reflecting onto nearby homes.

(d) Wind energy systems are exempt from height limitations indicated elsewhere, but should not exceed the height of the principal structure by greater than 15feet, whether pole- or roof-mounted.

Many of the commercially available residential wind energy systems range from 6 to 10 ft in diameter or height, making 15 ft a reasonable height limitation.

(e) In the case of historic districts or structures, wind energy systems should,

(i) be located on a new addition or accessory structure where historic character is not diminished

(ii) be located on rear roof where not visible from a public right-of-way, or where character is not diminished

(iii) be pole-mounted on the property where historic character is not diminished

3.2 Yard Maintenance and Management. Allowing flexibility in vegetation and ground cover will allow property owners to make more affordable, less maintenance landscaping decisions while improving water quality and providing micro-habitat for some species.

3.2.1 Compost. Home composting can improve water quality by reducing the amounts of synthetic fertilizers applied to lawns and gardens, while diverting some organic food wastes from landfills.

Wisconsin already does not allow for disposal of lawn and garden debris in landfills and burning of such debris poses pollution, fire hazard, and nuisance concerns.

(a) Residential compost facilities shall be considered an accessory use.

(b) Any compost facilities equal to or less than 75 sq ft shall not require a permit.

A common three-bin compost system is typically made up of 3-5 ft x 3-5 ft x 3-5 ft boxes placed next to each other, resulting in a maximum size of 75 sq ft.

(c) A fenced yard shall not be required for installation and use of compost facilities.

(d) Compost generated may be distributed off site, but shall not be sold on-site for a profit.

3.2.2 Edible gardens. Edible gardens, also known as edible landscaping, have been controversial in some parts of the country when located in front and side yards, with claims such as reduced aesthetics and attraction of garden pests. These claims lack supporting evidence; front- and side-yard gardens do not attract any more garden pests than backyard gardens, and many feature aesthetically pleasing designs incorporating both edible and ornamental plants. Planting in the front- and side yard may be necessary due to soil, lighting, and slope conditions of a parcel. Front yard production of food crops is not new; for example, Victory Gardens during the World Wars were planted wherever they would grow, including front yards.

(a) Sufficient ground cover shall be provided to prevent soil erosion. If necessary, filter strips and edging shall be used to prevent movement of soil.

(b) A fenced yard shall not be required for edible gardens.

(c) Food grown may be distributed off site, but shall not be sold on-site for a profit.

(d) In the case of historic districts or structures, if landscape style is a contributing factor to a property's significance, restrictions on front- and side-yard edible gardens may be appropriate. However, the significance of the landscape should be documented and remain intact to support such restrictions.

3.2.3 Green stormwater infrastructure. Green stormwater infrastructure helps improve water quality by decreasing impacts from stormwater runoff; allowing greater infiltration, storage of runoff, and filtering of pollutants and suspended solids. Collected stormwater may be reused for garden irrigation and other purposes, which may reduce household water consumption.

(a) Rain barrels shall be allowed as accessories in required front-, side-, and back yards.

(b) Native landscapes shall,

(i) allow for appropriate modifications to mowing requirements and plant height restrictions that will not constitute a nuisance.

(ii) be allowed in required front-, side-, and back yards.

(iii) not include any of the plant species defined as "noxious weeds" under Wisconsin Statute § 66.96 or 23.235(1)(a)

(iv) not be considered unmanaged as long as it is wholly contained within the parcel on which it was planted and maintained.

(v) not obstruct any portion of a sidewalk or public walkway.

(c) Constructed retention, such as bioswales and vegetated swales, shall,

(i) be allowed in required front-, side-, and back yards.

(ii) be designed to allow for proper drainage that prevents standing water for longer than 48 hours, so as not to pose a risk to public health and safety.

(d) Permeable pavers shall,

(i) be allowed for construction or replacement of driveways, patios, and walkways.

(ii) be maintained so as not to pose an obstacle to individuals with disabilities on publicly accessible surfaces. Necessary repairs and replacement, such as missing or buckling pavers, shall meet minimum Americans with Disabilities Act (ADA) standards.

(e) Plantings in the right of way or terrace by adjacent property owners,

(i) shall be approved by [Department] before planting

(ii) should be permitted as long as they do not obstruct utilities or limit mobility

(iii) shall not be replaced by city government or at city government's expense if disturbed or destroyed

(iv) shall not obstruct any portion of a sidewalk or public walkway.

3.3 Structures and Accessory Uses.

3.3.1 Clotheslines. Clotheslines provide a low-cost and energy neutral option for households. Clotheslines should be considered a permitted accessory use in residential districts, and shall not require a permit.

3.3.2 Green Roofs. Green roofs, also called living roofs, provide many potential benefits, including stormwater retention, reduction in heating and cooling costs and energy use on the associated structure, and moderation of surrounding air temperatures.

(i) Installation of green roofs shall adhere to current minimum International Building Code, state building codes, and local building codes.

(ii) A permit shall be obtained from [Department] before installation of a green roof. Permit applications shall include information about,

- (a) landscape materials
- (b) accessibility
- (c) live loads
- (d) dead loads
- (e) snow loads
- (f) maintenance plan