

Worcester Polytechnic Institute
Green Building Policy Team

Recommendations for Newton's Green Building Policies

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1 Research Summary

In the period from 2007-2009, the City of Newton adopted the Stretch Code and a zoning ordinance that address conservation of natural resources and energy, for the purpose of promoting greener building. While these actions are significant, there are still some gaps in Newton's green building policies:

- Zoning Ordinance 30-24(g) requires applications for special permits for projects 20,000 or more square feet to provide evidence that the project “contributes significantly to the efficient use and conservation of natural resources and energy”.
 - Newton currently does not have any guidelines defining what would constitute a significant contribution.
 - The ordinance does not promote greener building for projects smaller than 20,000 square feet.
- The Stretch Code requires more energy efficiency than the base state energy code for different types of buildings.
 - The code only applies to specific buildings and does not promote greener building for smaller commercial buildings.
 - The Stretch Code only considers energy efficiency in buildings but there are more aspects of green building than energy efficiency.

Tables 1-3 present which buildings the Stretch Code covers, and what HERS index they need to attain in order to satisfy the code. The HERS index scores 100 on buildings which follow the standards of the 2006 version of the building code, and zero for buildings which do not consume any energy, also known as zero-net-energy buildings. The score is based on the percentage of energy savings between the new building and a building with similar dimensions that followed the 2006 version of the building code standards.

Table 1 – Application of the Stretch Code to Commercial Buildings*

	Construction	Renovation
Smaller than 5,000 sq ft	x	x
Medium sized buildings, 5,000-100,000 sq ft	x	x
Large buildings of any type over 100,000 sq ft	80 HERS or less	x
“Specialty” buildings (supermarkets, laboratories, and warehouses), below 40,000 sq ft	x	x
“Specialty” buildings over 40,000 sq ft	80 HERS or less	x
Medium sized buildings, but less than 100,000 sq ft	Optional**	x

* Sources: (Q&A for MA Stretch Energy Code, 2009); (Stretch Energy Code, 2009).

** *“First, they can use the same modeling as for buildings above 100,000 square feet, and meet the same standard of 20% below ASHRAE 90.1 2007. Alternatively, they can choose a set of “prescriptive” requirements for particular efficiency measures, based on the new base energy code for commercial buildings (International Energy Conservation Code 2009), supplemented by cost-effective energy saving enhancements taken from the Core Performance program developed by the New Buildings Institute.”* (Q&A for MA Stretch Energy Code, 2009)

Table 2 – Application of the Stretch Code to New Residential Construction*

3 Stories or less	3,000 sq ft or above	65 HERS or less
	3,000 sq ft or less	70 HERS or less
4 Stories or more	100,000 sq ft or less	Follow commercial buildings standards**
	100,000 sq ft or above	

* Sources: (Q&A for MA Stretch Energy Code, 2009); (Stretch Energy Code, 2009)

** Refer to Table 1

Table 3 – Application of the Stretch Code to Residential Renovation*

3 Stories or less	2,000 sq ft or above	80 HERS or less
	2,000 sq ft or less	85 HERS or less
4 Stories or more	100,000 sq ft or less	Follow commercial buildings standards **
	100,000 sq ft or above	

* Sources: (Q&A for MA Stretch Energy Code, 2009); (Stretch Energy Code, 2009)

** Refer to Table 1

1.1 Goal and Objectives

The goal of this project was to recommend modifications to Newton’s zoning law as well as additional policy components that would promote green buildings. In order to achieve this goal, we completed two objectives:

1. ***Investigate how other green cities similar to Newton develop and apply zoning laws to promote green building.*** We conducted interviews with representatives of five other cities recognized for green building. We sought information on the implementation, limitations, and effectiveness of policies the cities use to promote green building. We chose some cities that are have similar zoning restrictions to Newton and others that cover a broader spectrum of green building policies. The cities that we investigated are: Arlington County, VA, Boston, MA, Cambridge, MA, Santa Monica, MA, and Seattle, WA. We selected these cities because they are known to be leaders in promoting green development.
2. ***Consider the limitations in Newton’s zoning ordinances as well as the most feasible changes that can be made.*** We conducted interviews with various officials in Newton about the feasibility and potential success of the various green building polices of the cities we investigated. We discussed the financial, social, political, and legal limitations of each policy modification as well as what could best complement the existing zoning ordinance and Stretch Code.

1.2 Findings

Our research revealed a variety of ways that cities use zoning laws, building codes, incentive programs, and other strategies to promote green building practices.

- **Zoning:** We found that most cities use their zoning laws to regulate energy efficiency and environmental impact in large building projects through open-ended clauses, similar to Newton’s Ordinance 30-24(g), that allow for flexibility in addressing green building standards. We also found that some cities incentivize green buildings through their zoning laws by placing less specific requirements on certain green technologies in order to encourage their use in the design of green buildings.
- **Green Building Evaluation Standards:** All cities that we investigated utilize LEED standards to define green buildings. Each city uses the standards of LEED somewhat differently, spanning from the base level of certifiable to LEED Silver certified. Officials from these green cities also recognize that additional third party certifiers such as Built Green and Green Point provide equally suitable standards for green buildings.
- **Green Municipal Buildings:** Most of the cities we investigated incorporate sustainable design into the construction and renovation of their municipal buildings. They apply LEED standards to their municipal buildings in order to lead by example for private contractors.
- **Zoning Incentives:** Most green city officials in our sample agree that zoning incentives are effective in encouraging the development of green building. Many have found that contractors will build according to a specific green standard if they are allowed to increase the Floor Area Ratio (FAR) or the height of the building.
- **Support and Education:** We found that community support was a major contributing factor in the successful progress towards greener buildings. All of the exemplary green cities we studied had support from their community in favor of green building. Many of these green cities also provide educational outreach materials for developers on green building practices in order to encourage greener building within their cities.

2 Recommendations

The purposes of these recommendations are as follows: 1) to suggest implementation guidelines for Ordinance 30-24(g) so that it reaches its full potential in promoting green building for special permit projects; and 2) to suggest additional policy components that will address buildings not covered by Ordinance 30-24g or the Stretch Code.

2.1 Guidelines for Zoning Ordinance 30-24(g)

We recommend that Newton create guidelines that define measures to meet the “significant environmental contribution” requirement that is presented in Ordinance 30-24(g) for special permit projects. We recommend that Newton offer multiple guidelines so that

developers will have several different options to choose from. Several options are listed below that could be used as guidelines for the significant contribution:

- **LEED Certified/Certifiable** – We recommend Newton utilize the standards for LEED Silver to determine if projects make the significant contribution. The standards set by the Stretch Code will typically be exceeded by buildings that meet LEED Silver standards. We recommend certifiable over certified due to the cost and time involved with certification, but developers should not be discouraged from officially certifying their buildings.
- **LEED Checklist** - We also recommend that adhering to certain sections found in the LEED 2009 Project Checklist for New Construction and Major Renovation qualify for completion of the significant contribution. Building developers should focus on five out of the seven categories in which LEED points can be earned. These categories are “Sustainable Sites”, “Water Efficiency”, “Energy and Atmosphere”, “Materials and Resources”, and “Indoor Environmental Quality.” These categories are considered to be the main categories in LEED’s evaluation, and contain the most points in the LEED system (Leadership in Energy and Environmental Design, 2009). Newton can adopt its own scoring system based on this checklist that would determine if projects adequately address the five categories.
- **Newton Checklist** – We present an example checklist that focuses on energy conservation, water conservation, and indoor-air quality, and specifically on items not required by the Stretch Code, in order to avoid redundancy. Newton stakeholders may wish to develop checklist of green features that reflect Newton’s goals and values. Newton Aldermen would examine the criteria met by a developer when deciding whether or not to give a special permit. Example criteria that we identified are:
 - Inclusion of an insulating envelope on the exterior of the building
 - Installation of solar panels
 - Water efficient toilets/sinks/urinals
 - Installation of an air lock for front entrance
 - Drain water heat recovery system
 - Building layout designed to promote indoor air quality
 - Refraining from using an entire lot designated for parking space
 - Dedication of land as green space for public use – to meet this criterion, developers could be asked to set aside at least 20% of the lot to be a public access area. The qualities of the area should be aesthetically pleasing, support multiple botanical species, and provide habitat for local wildlife.
 - Protection of sunlight access for existing and future solar energy systems.

- **Historic Buildings Guidelines** - We also recommend that Newton provide a separate guideline specific to historical buildings and districts, since they are exempt from the Stretch Code. When renovations of historic buildings meet the applicability of zoning ordinance 30-24 (g), they will also be required to make a significant contribution to the environment. The historic building guidelines will describe procedures that can or cannot be done in order to increase the energy and resource conservation and not negatively impact the historic aesthetics of any historic buildings or surroundings in a historic district.

2.2 Municipal Buildings

We recommend that Newton lead by example by committing to incorporate sustainable design into municipal buildings. By doing this, Newton will directly increase green building in the city as well as lead by example for contractors and homeowners. This new policy will allow Newton to fill the gap in that Ordinance 30-24g does not apply to municipal buildings. We recommend that Newton initially focus on incorporating sustainable design into major renovations then eventually progress towards all municipal building projects. We recommend that Newton adopt LEED standards and commit its buildings to be at least LEED Silver certifiable. We suggest that Newton commit their municipal buildings be certifiable at the Silver level because more than half of the exemplary green cities, Arlington County VA, Boston MA, and Seattle WA use this level. We also feel that it is important for Newton to aspire to the Silver level so they will lead by example in taking a large positive step for the city. The reasons why we recommend Newton to utilize the LEED standards, but not necessarily certify its municipal buildings are:

- The City of Boston does not commit its municipal buildings to be certified.
- The cost of going through official LEED certification can be avoided.
- Time can be saved by not certifying buildings.

Newton will be able to regulate its own buildings without relying on a third party organization. Although we recommend certifiable, LEED certified is also a viable option with several advantages. The City of Newton will save money in a long-term period by avoiding staff training for LEED accreditation. Certification may also better encourage citizens and developers to adopt greener practices due to the added value of increasing the number of LEED certified buildings in the city.

2.3 Green Building Friendly Zoning

We recommend that Newton draft a new zoning ordinance that will encourage the use of green technology and design techniques. This new ordinance should define all new and emerging technologies so that they can receive special height and Floor Area Ratio (FAR) exemptions. These recommendations reflect similar changes that the City of Cambridge intends

to apply to its own zoning laws. We recommend that the zoning ordinance defines the following green technologies and design techniques and exempts them from FAR calculations:

- **Green roofs:** These rooftops that contain soil and vegetation retain rainwater, cut down on storm water runoff, and provide natural cooling effects in the summer. Functional green roofs not intended for recreational access should be excluded from calculation of FAR. Green roofs that are accessible could be excluded from FAR calculation by special permit.
- **Energy efficiency mechanical systems:** These systems include solar energy machinery, small wind turbines, and geothermal ventilation systems and any other equipment that is related to alternative energy. All energy efficiency machinery even if not necessary for the building's operation should be excluded from calculation of FAR.
- **Extra thick outer insulation:** Adding an additional layer of insulation to the outside wall of a building can dramatically diminish energy consumption on heating and cooling. All or some portion (possibly up to six inches) should be excluded from the calculation of the FAR, but setback regulations would still apply.
- **Double – skin facades:** This type of construction creates a ventilated intermediate space between the inner and outer walls that improves insulation and reduces solar heat gain. The air space between the walls should be excluded from the FAR calculation if the space is no larger than a specified length (possibly one foot), but setback regulations would still apply.
- **Awnings:** These overhanging elements on a building can be incorporated in passive solar cooling of the interior and help conserve energy. The area under any awnings or overhangs that do not exceed a specified length (possibly three feet) should be excluded from the calculation of FAR.

We also recommend that this zoning ordinance exclude rooftop-mounted energy efficiency machinery from the maximum height requirement for the building as long as the machinery meets certain dimension, safety, and aesthetic specifications. Some of this machinery may include:

- Solar energy systems
- Wind turbines
- Energy efficient ventilation systems

By allowing solar energy systems to be mounted higher on rooftops, their access to sunlight will be protected from future development of surrounding structures and landscaping.

In addition to the height restrictions for energy efficient machinery, we also recommend that Newton should consider promoting taller buildings through zoning in some districts that would not sacrifice community aesthetics. Taller buildings are greener in that less materials are used to construct a given usable floor area and less heat is transferred through the exterior walls

from the increased volume to surface area ratio. Newton should promote taller building by extending certain height restrictions by an additional story.

2.4 Incentive-Based Policy

We recommend that Newton develop zoning incentives to further promote green building. This zoning incentive would involve granting FAR bonuses for LEED certified/certifiable buildings of all types. This would consist of a certain amount of FAR bonus to be given out, on a case-by-case basis, for each level of LEED that a project is certified/certifiable for. This approach would extend green building practices to buildings not covered by the Stretch Code for Ordinance 30-24(g). The ability to construct larger buildings may entice contractors to use the incentive and build green. Newton will also be able to collect more revenue from property taxes due to the larger buildings. We recommend that Newton adopt an incentive program similar to that of Arlington County, VA, which distributes on a case-by-case basis incrementally higher FAR bonuses to each higher level of LEED that a building achieves. Arlington County is more urban than Newton, so we also recommend that Newton lower these FAR bonuses to adequately fit their city. A considerable amount of discussion may be necessary to agree upon bonus FAR levels for particular areas of the city that would not be viewed by residents as damaging the aesthetics of Newton. We recommend that Newton select either LEED certified or LEED certifiable for this policy. As a point of reference, we show in, Table 4 the FAR bonuses that Arlington County uses for their Green Building Policy.

Table 4 – FAR Bonuses in Arlington County, VA*

LEED Level	Prior to March 14, 2009	After March 14, 2009	
		Office Buildings	High-Rise Residential Complexes
Certified	0.15 FAR	0.05 FAR	0.10 FAR
Silver	0.25	0.15	0.20
Gold	0.35	0.35	0.40
Platinum	0.35	0.45	0.50

* Source: (Arlington: Green Building Incentive Program, 2009)

We recommend that Newton provide educational material to promote green building within the city. This educational outreach should be directed towards developers of small-scale projects as well as homeowners interested in renovations. We recommend that Newton provide this education in the form of a website or biannual conferences/roundtables. Because of resource and staffing constraints, we also recommend that Newton identify a third

party partner, such as Nexus Green Round Table, the Conservation Services Group, or LEED, to deliver these educational outreach programs.

More details on all of these recommendations are outlined in Chapter 5 of the report. While adoption of any of these recommendations will require additional discussion and refinement within the community, we hope that they serve as feasible ideas for advancing Newton's aspirations to be a leading green city in the Commonwealth and the nation as a whole.

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