Accelerating Energy Efficiency in the New Construction Market with Stretch Codes

Richard Faesy, Energy Futures Group
Ian Finlayson, Massachusetts Department of Energy Resources

ABSTRACT

"Stretch" or "reach" codes allow individual municipalities to adopt more stringent energy codes within a larger, usually statewide, jurisdiction. This initiative has served as an effective strategy to garner more energy savings, prepare the new construction market for the next generation of codes and reduce resistance to the adoption of the next round of more stringent codes. At the same time, the policy of stretch codes raises many questions for advocates and policy-makers which this paper addresses through descriptions of selected stretch codes, commentary on key issues and case studies from Massachusetts and California. Stretch code development, programmatic issues and lessons learned are discussed in order to provide an understanding of the background and experience for other states interested in pursuing this policy. Issues covered include the benefits of focusing on a statewide effort, the necessity of an established third party support infrastructure, and the supportive role that energy efficiency program administrators can play. The paper also covers how stretch codes can serve to accelerate the trend towards whole-building design and performance modeling in codes and reviews where different jurisdictions have set their standards, while addressing house size and its energy impacts in the process. Finally, the paper covers stretch code influence on national codes.

Definition of Stretch Codes

"Stretch" or "reach" codes[1] allow individual municipalities or jurisdictions to adopt more stringent energy codes within a larger, usually statewide, jurisdiction. With a statewide base energy code in place, progressive municipalities choose to adopt and then implement what is usually the next generation of the energy code one code cycle early. The stretch code has taken many forms[2], including: the ENERGY STAR Homes voluntary program standard, a HERS[3] energy rating at a level 10-15% more stringent than the base code, the New Buildings Institute "Core Energy Code" standards, or, in some locations green building elements along with the energy provisions.

In at least a few states, this initiative has served as an effective strategy to garner more energy savings, prepare the new construction market for the next generation of codes and reduce resistance to the adoption of the next round of more stringent codes. These issues are addressed in the summary table and in case studies of Massachusetts and California below.

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[1] For the purposes of this paper, we use "stretch" and "reach" codes interchangeably.
[2] The U.S. Department of Energy (DOE 2012) reports 300+ instances of stretch codes nationwide, in 2009.
[3] Home Energy Rating System, or "HERS", is the national standard for rating homes for energy efficiency using the system administered by RESNET. See www.resnet.us.

Description and Features of Selected[4] Stretch Code Jurisdictions

State or Jurisdiction	General Description	Applicability	Delivery Infrastructure	Local Baseline Energy Code	Stretch Code Level	Contact / Information
City of Boulder, CO	Ordinances 7620-7623 Residential: 30-75% energy savings relative to the IECC 2006 and 'Green Points' analogous to LEED homes. Commercial: 30% energy savings relative to IECC 2006/ASHRAE 90.1-2004	New residential construction and large residential additions	Independent HERS raters	IECC 2006	30% below IECC 2006 up to 3,000 sq ft, rising to 75% below IECC 2006 for over 5,000 sq ft	http://www.bouldercolorado.gov/files/PDS/green_points/7621.pdf
Boulder County, CO	Covers all residential new construction in unincorporated towns in Boulder County. All new homes over 3,000 sq. ft. and additions over 4,500 sq. ft. must have PV. Anticipating adopting IECC 2012 for all construction.	New residential construction, additions, remodels	Independent HERS raters	IECC 2009	HERS 60 for homes and additions <3,000 sq. ft., with sliding scale down to HERS 10 for homes (30 for additions) up to 8,000 sq. ft.	Doug Parker, Boulder County 720-564-2643 www.bouldercountybuildsmart.org
California	"Reach" codes evolved out of Title 24 and have become Part 11, or "CalGreen", which includes a mandatory base plus two more stringent tiers, adopted as the local code by some municipalities.	New residential and commercial construction	Independent HERS raters	Title 24, Part 6	Part 11, Tier 1 is 15% more efficient and Tier 2 is 30% more efficient than the base code	Jamy Bacchus, NRDC jbacchus@nrdc.org Mike Gable, mike@gabelenergy.com
Long Island, NY	In an effort to "out green" each other, 10 out of the 13 towns in Nassau and Suffolk Counties on Long Island, NY between 2007-2009 adopted ENERGY STAR Homes as code. With v.3 of ENERGY STAR Homes, towns are moving to adopt "Home Energy Rating Index" laws, based on a HERS rating, not ENERGY STAR.	New residential construction. In Southampton, better HERS score requirements for homes over 3,500 sq. ft.	Independent HERS raters, with support from the Long Island Power Authority (LIPA) providing QA of the raters	Energy Conservation Construction Code of New York State	Historically: ENERGY STAR Homes Starting in 2012: HERS 70 or better, combined with combustion safety test	Lisanne Altman, Long Island Power Authority laltmann@lipower.org

[4] The US DOE maintains a list of stretch codes, (DOE 2012)

State or Jurisdiction	General Description	Applicability	Delivery Infrastructure	Local Baseline Energy Code	Stretch Code Level	Contact / Information
Massachusetts	HERS Ratings and ENERGY STAR Thermal Bypass Inspection Checklist (TBIC) required for new residential, some provisions for additions and renovations. Commercial requirements only for new construction above 5,000 sq ft, 20% better than ASHRAE 90.1 modeling required for above 100,000 sq ft.	Residential construction: new, additions and renovations Commercial new construction above 5,000 sq ft.	Independent HERS raters and normal code official review. Statewide training required for code officials	IECC 2009	HERS 65 >3,000 ft2, HERS 70 <3,000 ft2 15% better than IECC 2009 prescriptive or 20% better than ASHRAE 90.1 modeled.	Ian Finlayson, Mass. Department of Energy Resources ian.finlayson@state.ma.us
Santa Fe, New Mexico	Allowances for local codes that are "better" than statewide code. Albuquerque had adopted IECC 2006 + 30%, but rolled back. Santa Fe in only city with higher code.	New residential construction	Independent HERS raters and BPI contractors (since state inspectors won't inspect better than state code)	IECC 2009	HERS Index 20% better than IECC 2009	Tammy Fiebelkorn, SWEEP tfiebelkorn@swenergy.org
Oregon	The 2011 "Oregon Commercial Reach Code" incorporates energy-related provisions of the 2012 International Green Construction Code with Oregon-specific amendments for builders, owners or design professionals that chose to adopt them.	Commercial properties only at this time, with residential provisions adopted at a later time.	Code officials or third party special inspectors	Commercial & Residential: State-Developed Code (meets or exceeds IECC 2009)	International Green Construction Code (v.2.0, published 11/10) with Oregon-specific amendments from IECC 2012 and ASHRAE 90.1.	Robert Delmar, Energy Trust of Oregon, robert.delmar@energytrust.org

Issues

There are a number of issues surrounding the consideration, development, adoption, implementation, and updating of stretch codes. Stretch code development, jurisdiction size, code officials and third party enforcement, program administrators, whole building design, where to set the bar, additions and renovations and influencing national codes are each addressed below with a description of the issue, followed by commentary based on experience. The discussion focuses on residential stretch codes as they are more common than commercial.

Stretch Code Development

Stretch codes have been initiated at both the local and state levels in the U.S. and internationally[5]. Their origin can influence how they are structured and what form they take. By necessity, stretch codes that originate out of a municipal jurisdiction tend to take the simplest form given the relative lack of resources to develop much new. In many cases in the US, an independent HERS rater infrastructure is already available to tap. Without this potential delivery infrastructure, stretch codes would not be feasible without significant additional development. As a result, at the local level, most stretch codes take the form of requiring ENERGY STAR Homes labeling or specifying a particular HERS rating, sometimes with some additional requirements (e.g. the ENERGY STAR Homes Thermal Bypass Inspection Checklist, or TBIC).

When the state takes the initiative to develop a stretch code option for municipalities to adopt, they generally have the resources to put in place an approach that can be somewhat more complex. State originated stretch codes have included commercial energy codes where municipal initiatives typically do not. On the residential side, state developed stretch codes may take on additional standards or requirements based on the next version of the energy code, or include tiered levels of stringency based on house size.

On Long Island, towns competed to “out green” their neighbors and began adopting ENERGY STAR Homes labeling as code. The local utility, the Long Island Power Authority (LIPA) recognized the energy savings benefits and provided a $25,000 incentive to enable each town to follow suit. Within a few years, ten out of the thirteen towns on Long Island had adopted ENERGY STAR as code. While towns were interested in adopting the stretch code, LIPA’s incentives certainly helped motivate them.

In Massachusetts, calls for a stretch energy code came initially from municipal initiatives, and was greatly supported by legislation[6] enacted in 2008 that called for establishment of a ”Green Communities Program”. The Act included an effective requirement for local adoption of stretch energy codes for residential and commercial buildings. The State was able to leverage resources to analyze, develop and adopt a system built on HERS ratings for residences and the New Buildings Institute’s Core Performance Guide for non-residential buildings. Significant work went into researching and creating the standards but the parallel national model code development cycle provided much of the raw material for this work.

In California, their stretch code grew out of reviewing measures that didn’t quite pass their state cost-effectiveness test to make it into the base code. These discarded measures were

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[5] The South Australian government introduced a stretch code for the Lochiel Park development to deliver near net zero energy.

[6] The Mass. Green Communities Act, http://www.mass.gov/legis/bills/senate/185/st02pdf/st02768.pdf

compiled into CalGreen with two tier levels at 15% and 20% better than code and serves as an "incubator" for the next version of the energy codes portion of Title 24, California's statewide building code. In 2008, CalGreen was completely voluntary, but in 2009 it became effective as a "voluntary standard" which was adopted by some municipalities as their stretch code. Unfortunately, development of Title 24, Cal Green and the energy codes have been on different development cycles which makes them challenging to coordinate and reference. There is currently movement to align them to move together in lock-step cycles to make it easier for the building community to plan their projects.

While developing and initiating a stretch code can be challenging the first time out, it can generally build upon the voluntary energy efficiency programs offered by the utility or program administrator and the work being done to develop future energy codes at the national level through the ASHRAE and ICC processes. However, this is an intrinsically dynamic process, for when it comes time to update the statewide base energy code to something approaching what has been the stretch code, then that triggers the need for the next version of the stretch code to be developed in order to stay one step ahead of baseline. This can be a challenging moment since it can now appear quite daunting to builders and developers to see a new stretch code effectively at two code cycle steps ahead of what is currently being built. It is key to do the analysis and homework and coordinate with key stakeholder and advocacy groups as the next stretch code cycle is developed, while moving code development cycles for the base and stretch codes together at the same time.

Jurisdiction Size – Municipal vs. State

Small jurisdictions such as municipal or county governments can generally move more quickly to adopt advanced energy codes, and in progressive communities it is generally easier to find the political support at the local level than at the state level. At the same time, there are tradeoffs to shifting the focus of building energy codes towards a municipal jurisdiction. For many states, there must first be state support or at least acquiescence to allow municipal leadership, and hence, a break with uniformity on statewide energy codes. Where municipal government has an advantage in moving to adopt codes quickly, states provide the economies of scale that the construction sector needs to bring up standards across the board. Arguably, all building energy codes should be simpler and easier to apply and inspect in the field, but this is more particularly the case in smaller jurisdictions where builders have to adapt to differing regulations, and local training and enforcement capacities may be lower than in larger state institutions.

One recommendation for success is the cultivation of a collaborative and symbiotic relationship between municipal and state levels of government. Acting in concert, stretch codes can allow for municipal leadership. The support of statewide training and capacity building infrastructure by the state provides a clear link between current stretch codes and future statewide codes, strengthening both jurisdictions. As a result, it becomes worthwhile to the local construction industry to invest in understanding and adapting to municipal stretch codes, if they see that the larger state or regional trend is to adopt the same or very similar building energy code language. At the same time, the advance adoption of improved energy codes enables states to better make the case for advancing their baseline codes over time based on prior success at the local level.

Code Officials & Third Party Enforcement

Layering the increase in energy code requirements in a stretch code on top of the incremental improvements in the IECC and ASHRAE codes adds to an already high burden on municipal code officials. Both anecdotal and survey data suggest that energy code compliance has suffered for many years from a lack of time, resources and training for code officials to properly oversee and enforce the energy portions of the building code in many jurisdictions[7]. The opportunity presented by stretch codes – particularly those leaning on the existing HERS rater infrastructure -- is to add additional oversight to the construction process. This has to be done in a way that doesn't delegitimize the role of the code official, as their role and enforcement authority is quite different from the HERS rater who is working on behalf of the builder. Nonetheless, to date it appears that the insertion of a HERS rater role in between the builder and the code official has benefits for both parties. Builders have guidance on what is needed to meet the energy code from the plan review stage through construction to final testing, while the code official has the support of an energy professional's eyes, the HERS rating output files to help ascertain whether projects are designed to meet energy code requirements, diagnostic test results and a final rating to guide and inform their decision to award a certificate of occupancy.

The updates to the IECC in 2009 and 2012 require a shift to diagnostic testing but do not explicitly require a 'qualified' tester. This creates an enforcement problem for code officials that the required use of HERS raters can help mitigate. For this reason alone it seems as though residential energy codes are increasingly moving in the direction of professional third party energy code guidance, while the enforcement remains with the jurisdiction. In this respect the US residential codes are following the path of commercial codes which require engineering stamps, and residential models from other countries such as the UK and Australia which allow sign-off from a third party as part of the enforcement of several portions of the building code.

Program Administrators

Utilities and other entities responsible for operating energy efficiency programs (collectively termed "Program Administrators" or "PAs") are in a good position to play key roles in many aspects of stretch codes.

In most locations where stretch codes have been adopted, PAs have facilitated the development of an infrastructure of energy raters, engineering firms and others who understand and have energy modeling, building assessment, inspection and testing capabilities to enable effective implementation of stretch codes. PA support of voluntary programs, such as ENERGY STAR Homes or the USGBC LEED for Homes program, has, in many cases, enabled the adoption of stretch codes.

On the other hand, locations without a history of PA engagement and support of new construction programs may lack the infrastructure necessary to provide stretch code support services. Without HERS raters and energy-savvy engineering firms in the market, it will be challenging to legislate and then implement stretch codes. PAs should be very interested in supporting stretch codes as means of increasing participation in their programs. In a sense, stretch codes can be viewed as free marketing and promotion for new construction programs and as a strategy for market transformation. In many instances, the stretch code levels of energy performance are at or close to program tier levels. This situation is a win-win-win for all; the PA

[7] http://www.energycodes.gov/publications/research/documents/codes/Massachusetts_rpt.pdf, p. 6-6

gains with increased program participation, stretch code advocates have an easier time selling the stretch code to municipalities knowing that there will not be any undue financial burden on builders, and builders/contractors receive compensation when building to the higher stretch code level.

However, while PAs are happy with increased participation in their programs, there are at least two issues that may be cause for PA consternation. The first issue regards payment of incentives. In some jurisdictions, the regulators have ruled that since the stretch code is the base code in those towns that have adopted it, then the PA cannot pay out incentives for building "to baseline code." In these instances (e.g. towns on Long Island, NY), builders need to build to the next tier higher in the program (above the stretch code level) in order to receive any incentives. This may be an effective way to drive increased participation at higher tier levels. However, in other jurisdictions (e.g. Massachusetts and California), the regulators have ruled that to avoid dissuading municipalities from adopting the stretch code, the PAs must pay the same incentives in all towns in the state. This baseline can be a statewide average level of performance.

The second issue is related to the first: claiming savings. In general, the paying of incentives aligns with the claiming of savings for building beyond the baseline energy code. On Long Island this acts as a disincentive to the utility to promote the stretch code, whereas in Massachusetts there is an incentive for the PAs to encourage adoption of the stretch code as a means to increase participation rates in the new construction programs from which the PAs can claim savings.

Whole Building Design

Within the relatively short lifespan of building energy codes – since their rise to national prominence in the wake of the oil crises of the early 1970's - there has been the steady transition towards building energy modeling. This trend from individual component prescriptive values to system level trade-offs through ResCheck and ComCheck and more recently to whole building performance standards such as HERS ratings and LEED modeling has the possibility of radically reshaping future energy codes.

Building energy performance modeling presents the opportunity to greatly simplify the code language by transferring the complexity inherent in meeting performance requirements out of the code language and into modeling software tools as has been implemented internationally[8].

Stretch codes can and arguably should play a major role in pushing for this innovation as computer modeling becomes increasingly ubiquitous and robust. Energy modeling, when done effectively, retains improved energy performance as the focus but preserves more design and engineering flexibility for the construction industry. Done well, it allows new technologies and design paradigms to compete on a more level playing field than has historically been the case with prescriptive codes developed and perpetuated by the industries that grow around them, as is evidenced by the level of support to the IECC process provided by insulation manufacturers.

Examples of modeling led innovation have their origins in voluntary programs like ENERGY STAR Homes and LEED standards for both residential and commercial buildings. However, stretch energy codes have the ability to bridge the gap between these programs and the national model codes and standards of the ICC and ASHRAE. Massachusetts – one state that has

[8] Internationally, the UK Code for Sustainable Homes and Australian Nationwide House Energy Rating Scheme software are both used in building code applications.

been explicit about pursuing a more ‘whole building performance’ approach – has similarly extended the building modeling requirements to commercial buildings and in their stretch code currently requires energy modeling based on the ASHRAE Appendix G above code modeling guidelines for new buildings over 100,000 sq ft.

This broad transition to performance metrics for the energy use of buildings may become a necessary step if we are to continue to find energy savings through the building energy code. The conceptually simpler ‘atomistic’ approach of prescriptive codes fails to account for the interaction between design elements in a building that can allow for dramatic improvements in energy performance. As a result, prescriptive energy codes are viewed by some as a barrier to achieving the level of energy savings enabled by a whole systems approach exemplified by the Passivehaus standard or the ‘cost-tunneling’ approach of Amory Lovins et al, at the Rocky Mountain Institute.

Where to Set the Bar

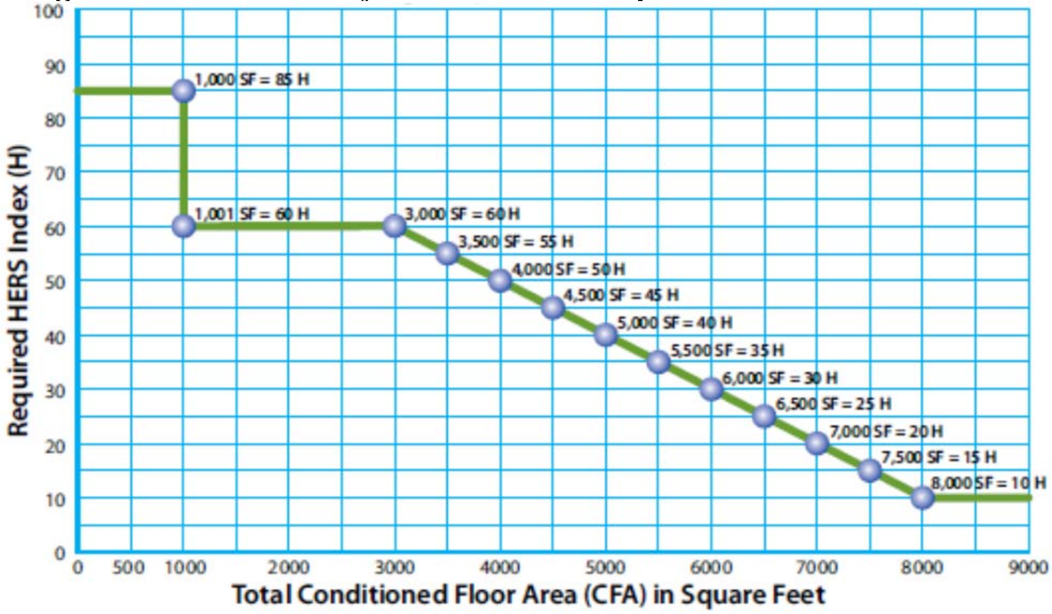
It is important to establish the stretch code level at the right point when developing the stretch code in the first place, and then at each subsequent code cycle update. What is “the right point?” Local priorities and emerging technologies that may be included in subsequent codes are obvious areas for stretch codes to show leadership in. For instance, Massachusetts has chosen to include the TBIC and Long Island a combustion safety test in addition to the HERS rating. Massachusetts is now prioritizing indoor air quality with measures such as requiring sealed combustion of HVAC equipment in response to the increased air tightness required by the IECC 2012.

Modeling of representative house types and sizes will help inform policy makers and towns about the costs and benefits of improving the stretch code concurrently with base codes. Presenting not only the energy savings, but also the costs of the improvements and the impact on buyers assuming the incremental costs are rolled into the home costs will help defray skepticism, assuming that the figures show positive cash flow if financed as part of the mortgage.

In many jurisdictions[9], larger homes require a lower (better) HERS rating. Determining the house size threshold at which to require better ratings and then the rating level ends up being a balancing act based on local politics and goals. In Boulder County and Boulder City, they require a graduated requirement; the larger the home, the lower the HERS Index, as shown in Figure 1.

[9] At least Massachusetts, Boulder County, Boulder City, and Southampton, NY all have requirements for better HERS scores for larger homes.

Figure 1. Boulder County's HERS Index Requirements Based on House Size



For homes larger than 3,000 square feet, a HERS Index lower than 60 is required. This drops steadily down to a HERS Index of 10 for homes over 8,000 square feet. In general, it is challenging to achieve a HERS Index less than about 40 or 50 without adding renewables. In Boulder County, if one chooses not to follow the HERS Index performance path to compliance, there are additional photovoltaic requirements based on house size, in addition to a set of prescriptive energy efficiency standards.

In other locations, fewer size threshold steps are typical. For instance, in Massachusetts, there is currently one step at 3,000 square feet from HERS 70 to 65, but with the adoption of the IECC 2012, the stretch code may increase to two steps in the range of HERS 55 to 65.

In Oregon, they have gone as far as establishing the Passive House standard[10] as part of their new stretch code. While requiring this level of construction in most US communities may push them beyond their current comfort zone, for those that do adopt it, it can serve as a testing ground for state-of-the-art and next-generation construction practices.

Additions and Renovations

Following suit with the national IECC model codes, many stretch code jurisdictions also have separate standards for renovations/remodels and additions in addition to the new construction requirements. In Boulder County, a graduated HERS Index requirement is in place for additions, with ratings better than a HERS 80 required for additions over 3,000 square feet, following a similar trajectory as shown above in Figure 1 for new construction. In Massachusetts, renovations have easier HERS standards to meet than new construction or additions, and, for both additions and renovations an easier prescriptive path is offered.

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[10] MA allows the use of the Passive House modeling software:PHPP in both the base energy code and the stretch energy code, it does not require meeting the Passive House standard

Influencing National Codes

As has been mentioned already, the advent of stretch energy codes can inform and influence the willingness of the ASHRAE and ICC membership to advance the national model energy codes: IECC and ASHRAE Standard 90.1. Practical demonstration of higher energy code performance in different jurisdictions around the country raises the bar for builders, designers and manufacturers alike and provides experience with the new codes. In addition, while other OECD countries generally have higher building energy code standards than the U.S., there is typically little cross-pollination into the ICC and ASHRAE code process, so local demonstrations within the US are critical.

While California energy codes have provided a rich source of code language for national model codes for many years, the reach codes in California now inform the Title 24 statewide codes. More recently other state initiatives are starting to play a role, with the Massachusetts commercial stretch energy code forming the basis for the IECC 2012 update, and Oregon and Washington codes also playing a role in the development of the IGCC[11]. It is fair to assume that stretch codes will continue to play an important demonstration role.

Case Studies

While a number of states and municipalities have adopted stretch codes, the two that have been at it the longest are Massachusetts (developed in 2008, adopted in 2009) and California, having adopted their "voluntary standard" in 2009. Additional detail on each follows.

Massachusetts

History. Massachusetts began down the path of a stretch energy code in the spring of 2008 when the state's Board of Building Regulations and Standards (BBRS) put out a request for comments on the idea of a stretch code in response to the requests of a number of towns and cities to adopt bylaws or other ordinances that required beyond code energy requirements for new commercial and residential construction. This initial impetus was then greatly strengthened by the passage in July, 2008 of the Green Communities Act – itself two years in the making.

In order to minimize the risk of a plethora of local energy codes, the 2009 stretch energy code was developed by the state with critical support from NEEP[12] and others to bring national code expertise to bear. The 2009 Massachusetts stretch energy code was passed by the BBRS in July 2009 as an appendix to the newly adopted IECC 2009 base energy code. It has grown quickly from two early adopters in January 2010 to 115 stretch code communities by May 2012, representing around a 1/3 of the communities, and close to half the Massachusetts population.

Requirements. The 2009 Massachusetts stretch code (a 2012 update is expected in the fall of 2012) requires HERS ratings and the TBIC for all new residential construction, with a maximum index of 70 for homes less than 3,000 sq. ft. or 65 for homes 3,000 sq. ft. or larger. There are modest requirements for residential renovations and additions. For commercial new construction, energy modeling based on ASHRAE 90.1 -2007 Appendix G is required for all buildings over 100,000 sq. ft. and for certain uses as small as 40,000 sq. ft. Commercial buildings less than

[11] International Green Construction Code: http://www.iccsafe.org/cs/igcc/pages/default.aspx
[12] Northeast Energy Efficiency Partnerships: http://www.neep.org

100,000 sq. ft. may also elect to follow a prescriptive path (the New Buildings Institute ”Core Energy Code” which was developed with input from Mathis consulting and NEEP), to codify and extend the NBI Core Performance voluntary program.

Implementation. The BBRS adoption of the stretch code as an appendix to the IECC enables any town or city in Massachusetts to opt into, or out of, the stretch code by adopting it as a municipal bylaw. The stretch code is one of 5 criteria for becoming a ‘Green Community’[13]

California

History. California’s stretch code came about through the process of updating the Title 24 building code in the late 2000s. Proposed measures that did not pass the cost-effectiveness test were put in Part 11 of Title 24, under the “CalGreen” section and considered a voluntary incubator of future code provisions. This Part 11 has a base mandatory requirement, but then offers two higher tiers. In the Title 24 2008 version, this section was completely voluntary, but in 2009, it was offered as a “voluntary standard” and some municipalities adopted it locally as their minimum reach code standard.

Requirements. Title 24, Part 11 Green Building Standards requires that newly constructed low-rise residential buildings must meet prescriptive and performance requirements. The prescriptive requirements include a HERS rating, quality insulation inspection, high-efficacy indoor and exterior lighting, and ENERGY STAR appliances. On the performance side, homes must meet either Tier 1 (15% savings plus no more than 1,000 kWh/year) or Tier 2 (30% savings and less than 8,500 kWh/year). Additions and alterations have similar requirements, but without the HERS requirement.

Implementation. With CALGreen in Part 11 of Title 24, California now offers both flexibility for any municipality wishing to adopt a higher code, along with consistency to allow the building and codes community a consistent understanding of these higher stretch codes statewide. At this time, more than 40 California communities have adopted reach codes, which a number more in process. With approximately 500 jurisdictions, California is approaching 10% having adopted.

Recommendations

Based on the authors’ experience in Massachusetts and conducting the research for this paper, we recommend consideration of the following set of emerging ‘best practices’ to states and municipalities interested in adopting a stretch code:

- Offer simplified code language with a focus on energy performance.
- Setting a bar is as important as where it is set. Performance metrics are needed if energy codes are to continue to enable innovation, and the act of setting a performance metric serves to reorient builders in their approach to energy code compliance.

[13] The MA Green Communities Program was created to recognize and reward municipalities that elected to show leadership on energy efficiency and renewable energy policy. Among the five qualification criteria for green community status is a requirement to find all life-cycle cost-effective energy efficiency in new construction

- A third-party role for trained energy specialists (or HERS raters) takes some regulatory burden off of public safety focused code officials, provided roles are clear.
- Coordinate stretch code initiatives with utility energy efficiency incentive programs.
- Emphasize public outreach and engagement to build support for, energy codes[14].
- Provide recognition and other incentives for adopting communities.
- Provide training and technical assistance for the construction industry, code official community, local officials and interested citizens.
- An existing infrastructure of market-based professionals (HERS raters, energy-focused engineering firms, etc.) typically supported by energy utility new construction programs would seem to be a prerequisite for successful adoption.

Conclusion

Stretch codes have an increasingly important role to play in the development and adoption of building energy codes. They allow the level of innovation and field testing that will be required if we are to continue to make steady improvements in building energy performance and provide cost-effective means of achieving societal beneficial goals towards zero energy building. While stretch codes are currently a relatively niche offering of some of the more progressive states and communities, they provide a potent testing ground for future state and national model energy codes. If future versions of IECC and ASHRAE included a discretionary stretch code component as the IGCC already does, jurisdictions could have a ready-made choice to implement. However, until that time, stretch codes are always an available policy option for jurisdictions seeking more savings, and leadership on energy security and climate change mitigation in the new construction market.

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Xenergy. *Impact Analysis of the Massachusetts 1998 Residential Energy Code Revisions.* http://www.energycodes.gov/publications/research/documents/codes/Massachusetts_rpt.pdf

[14] New Hampshire has a good recent energy code compliance public awareness campaign: http://www.nhenergycode.com/live/index.php