nbi new buildings institute

Media Backgrounder:
Fast Tracking Energy Savings Through Stretch Codes

Buildings are responsible for 40% of the total carbon emissions and 70% of the electricity consumption in the United States. Commercial and residential buildings that do not adopt the most current energy saving technologies and best practices can waste copious amounts of energy over their lifetimes, resulting in higher energy bills for both owners and tenants. Carbon emissions and energy waste are essentially "locked in" to these buildings for years to come unless steps are taken to improve their energy efficiency through the design and construction process.

The Problem with Today's Building Codes

However, new buildings can be made energy-smart from the start if they are constructed using the latest energy-saving strategies and technologies, which are widely available today and proven money savers. Unfortunately, most new buildings are constructed to meet only the minimum energy efficiency requirements set forth by state or local building codes that are often based upon national model building codes (the International Energy Conservation Code and ASHRAE 90.1). National building codes, which establish baseline standards for energy efficiency and other construction practices, are only updated every three years and can easily fall behind best practice when it comes to the latest design strategies and technology application.

Some states enforce codes that are up to three development cycles back representing design and construction practices circa 2009, rather than taking advantage of new advancements. In addition, many cities don't have the authority to adopt their own building codes apart from what the state mandates, and are stuck with outdated codes.

See the map at the Building Codes Assistance Project Website showing the era of building codes followed by each state for both residential and commercial construction.

Stretch Codes Offer a Better Way Forward

Increasingly, states and cities are making commitments to significantly reduce greenhouse gas emissions from the building sector and accelerate building energy

efficiency. Local jurisdictions such as those involved in the 2030 Challenge, City Energy Project, Carbon Neutral Cities Alliance, and other efforts have set forth ambitious goals for reducing carbon emissions over the next two decades. For these cities, following the latest building codes may not represent rapid enough progress toward meeting these goals.

Stretch codes offer a lever for pushing local building requirements above and beyond the energy-saving standards of national building codes, and help move buildings faster toward reduced energy use and carbon emissions. The 20% Stretch Code, developed by New Buildings Institute (NBI), is the first of two such stretch codes being introduced by the organization in the coming months. These codes provide a set of building strategies that work to squeeze every bit of waste out of building energy performance, even to the point of making them "zero energy-ready" – meaning, buildings that are so energy efficient, energy needs could be met with on-site or nearby renewable energy resources.

NBI's 20% Stretch Code has been developed as an "overlay" to existing national codes to make it easier for states and cities to adopt them. They can also be adopted as voluntary codes or policies, and by working with local utilities cities and states can often offer designers and builders incentives to abide by them.

Stretch Codes in Action

Several cities and states have already adopted stretch codes. Below are some examples.

Massachusetts Green Communities. Massachusetts was one of the first states to adopt a stretch code that went into effect in 2009. The code was unique in that it was based more on energy performance than prescriptive measures. In other words, if a building's energy performance was high enough, it met the code requirements regardless of how it was constructed, although certain common sense construction practices were required such as proper insulation, sealing & ventilation, lighting, etc. The stretch code was last updated in in 2016 and 2017 to ensure it remained more stringent than national building energy standards established in 2015.

Cities have the option of adopting the stretch code, and if they do, can be designated a "Green Community" and receive additional support from the state as well as take advantage of utility rebates and other incentives to help the building community comply with the code. As of October 2017, 214 municipalities have adopted the stretch code. For more information, visit the Massachusetts Department of Energy and Environmental Affairs website.

State of New York-NYSERDA NYStretch. In 2015, Governor Andrew Cuomo helped the State of New York establish a roadmap toward a clean, resilient and affordable energy system for the state. The plan includes three quantifiable targets to achieve by 2030, at which time the state hopes to have a zero energy code in place:

1. A 40% reduction in greenhouse gas emissions from 1990 levels,
2. 50% energy from renewable sources, and
3. A 23% decrease in building energy consumption from 2012 levels.

To help achieve these ambitious goals, New York State Energy Research and Development Authority (NYSERDA) led an effort to develop NYStretch-Energy, a voluntary locally adopted stretch energy code which offers municipalities a more energy-efficient alternative to the minimum state energy code. NYStretch-Energy 2015, set to publish by the end of 2017, aims to provide a straightforward, flexible path to achieve approximately 10% energy savings beyond current code minimum (2015 IECC) for all building types. It is designed to be one cycle ahead of the baseline code and addresses envelope tightness, HVAC controls, water sense fixtures, lighting controls, lighting power density, whole building metering, plug load controls, air barrier and energy compliance. This would apply to both new construction and retrofits in municipalities that choose to implement the stretch code.

Santa Monica, California, ZNE Residential Stretch Code.
Santa Monica is leading the charge to meet California's statewide zero energy (ZE) goal for residential buildings by 2020. In October 2016, the Santa Monica City Council adopted a ZE ordinance and stretch code (referred to as a "reach" code) that requires all new single-family homes to be constructed to use 15% less energy than what the state mandates under the 2016 California Energy Code.

The ordinance also requires homes to achieve a ZE design

rating, meaning that it is designed to meet its remaining energy needs on an annual basis through rooftop solar, which is also required by the city since it passed its solar ordinance in May 2016. Santa Monica is also working to ensure larger buildings meet the state's ZE goals for commercial construction by 2030. The October 2016 stretch code requires that all new high-rise residential and non-residential, hotels, and motel buildings are constructed to use 10% less energy than what is required under the state's building code. Both the single-family residential and non-residential codes went into effect in May 2017. For more information, visit the city of Santa Monica's Office of Sustainability and the Environment's website.

British Columbia Energy Step Code. By 2032, British Columbia aims to achieve zero energy-ready status in all new construction and by 2020 will cut the expected increase in electricity demand by 66% and reduce greenhouse gas emissions to 33% below 2007 levels (80% by 2050). To help actualize these goals, British Columbia in April 2017 published the BC Energy Step Code, an incremental stretch code which will ultimately lead the province to zero energy construction. Jurisdictions may choose to replace the performance section of the Building Code with the Energy Step Code.

The code includes multiple steps, the first being just above code minimum, and the final being zero energy-ready. Jurisdictions can choose any step to adopt or incentivize, and builders may voluntarily comply with any level. In contrast to a prescriptive code, the Energy Step Code specifies measureable, performance-based energy efficiency requirements which compliant builders must meet through any means of construction. This innovative approach treats the building as a whole system. Only ventilation, sub-metering, and lighting power density remain as prescriptive requirements in the step code. A required pre-construction energy model review, and a post-construction air-tightness test and commissioning, confirm compliance. For more information, visit the Province of British Columbia's Energy Step Code website.

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