



The Nexus of Energy Codes and Building Performance Standards

Introduction

Cities and states across the country have made commitments to reduce greenhouse gas (GHG) emissions according to stated timelines. The approach to reducing emissions, energy, and water use in new buildings is very different than the approach to do so in existing buildings. There are two separate but very related ways to approach these challenges: energy codes and building performance standards.

Energy codes apply to new buildings and major renovations. They are typically based on a national model code, and they are one of many building codes, such as fire codes, structural codes, plumbing and electrical codes. Building performance standards (BPS) apply to existing buildings that meet certain parameters, such as exceeding a specific square footage. Unlike energy codes, BPS are developed on a state or municipality level, and not by a national organization. BPS are standards designed to reduce energy and water use, and to reduce GHG emissions over time.

As soon as new buildings are built, they become existing buildings. While there may be a grace period, those buildings are soon subject to BPS. A building can be built to meet its jurisdiction's energy code, but might not be in a good position to meet BPS requirements. At the very least, there may be misalignments in metrics and unnecessary retrofits down the line. Considering energy codes and building performance standards together can avoid the missed opportunity to build more energy efficient buildings from the outset.



photo credit: Alena Darmel / Creative Commons



Energy Codes

Overview

Energy codes apply to new buildings and major renovations, and regulate lighting, HVAC (heating, ventilation, air-conditioning), and building envelopes. They are typically based on a nationally recognized model code like the International Energy Conservation Code (IECC) and/or ANSI/ASHRAE/IES. Energy codes are set by each state, and sometimes by individual municipalities. The model IECC is released every three years, and different states may utilize different release years.

Depending on the jurisdiction, states may have two or more levels of codes. The first is the base energy code, which is the minimum code requirement all new buildings must meet. The second is the stretch energy code, which is usually an optional, stricter opt-in code that local governments may adopt and implement. There may be a yet more stringent opt-in code, or a step code, as is found in British Columbia. This means, that like BPS, energy codes are constantly updated every few years. Depending on local statutes, however, a jurisdiction may reference outdated model codes and miss out on energy savings.

Zoning Ordinances

There are other ways besides energy codes to address energy, water usage, and GHG emissions in new construction. Boston's use of zoning ordinances to address these issues dates back to 2007, when the city's zoning code required high performance, sustainable building practices according to the US Green Building Council's Leadership in Environmental and Energy Design (LEED) Rating System. A zoning ordinance is a local law enacted to regulate the use and development of land. Particulars can range from building types and heights, to placements on lots, to sustainability objectives. Boston recently adopted the Zero Net Carbon Building Zoning Initiative. This initiative will evaluate strategies to use green building zoning requirements to reach a zero net carbon standard. Priorities include: low carbon building, onsite renewable energy, renewable energy procurement and embodied carbon.

Building Performance Standards

Overview

BPS are relatively new and, as mentioned above, apply to existing buildings that fall within certain parameters, such as size and building type. BPS are developed on a state or municipality level. Each jurisdiction establishes building types that are covered by BPS, typically commercial and multi-family. BPS are policies that require building owners to meet city or state mandated targets by improving the performance (such as energy use, water use, emissions) of their buildings within the timeline specified. Usually a series of milestones will need to



be met over several years. For instance, a compliance cycle might be every five years, with each new cycle featuring improved performance targets.

Benchmarking is a process that measures building energy usage and compares it to a reference such as the energy usage of comparable buildings, or a defined performance level. Some cities have had benchmarking programs already in place, and now they are upgrading those policies to BPS. For other cities, starting a benchmarking program is the first step in developing BPS.

Equity

In the past, existing building owners were typically exempt from catching up with new energy codes. Building performance standards have changed that by putting a new obligation on owners whose existing buildings meet the stated parameters. These owners are obligated to benchmark and report their annual energy use and implement measures to improve performance such as upgrading mechanical systems, improving thermal efficiency through insulation, and/or installing on-site renewable energy.

In implementing BPS, equity and affordability are important. This is especially true for building owners of affordable multi-family buildings. These building owners and managers should receive education, technical assistance, and financial assistance. Utility programs and state funding mechanisms can help building owners access incentives to make building retrofits more affordable. Retrofitting existing buildings will create new jobs, and training should be provided to students and contractors to create a diverse workforce to tackle new opportunities and challenges. Additional consideration should be given to maintain transparency in the process and information for building occupants. Jurisdictions must listen to the groups directly affected by BPS, and understand the needs of underserved groups. Efforts must be made to ensure that the cost of compliance with BPS are not passed on to building occupants in the form of higher rent and commercial leases.

U.S. jurisdictions where BPS legislation has been enacted include Washington, D.C.; New York City; Washington State; Colorado State; St. Louis, Missouri; Boston, Massachusetts; and Reno, Nevada.

Metrics

There are different metrics used to measure building energy performance that are commonly used in both energy codes and BPS, including:

- Energy use intensity (EUI), which measures the energy consumption per unit of conditioned floor area (kBtu/sf).
- Emissions intensity limits, which measure GHG emissions, are measured in metric tons of carbon dioxide emissions per square foot.

The U.S. Environmental Protection Agency (EPA)'s ENERGY STAR Score, which is a 0 - 100 score that adjusts for key drivers of energy use by property type



The Nexus

Energy codes and BPS are usually developed and managed independently of each other, and therefore are often not aligned. This is because while energy codes are typically based on the IECC, BPS are developed independently by each jurisdiction based on specific needs, metrics and other variations. Additionally, energy codes and BPS are typically developed and managed by completely different departments. Energy codes are typically managed by building departments of a given jurisdiction while building performance standards are handled by a Department of Energy, or similar office.

However, jurisdictions are finding ways to better align energy codes and BPS. In Washington D.C., BPS and energy codes have been designed to build off each other. Staff have concluded that without both, carbon neutrality by 2050 per their climate plan would be out of reach.

The Future

For building owners, developers, architects and engineers, the time to consider the long-term performance of a new building is during its design. There is a real opportunity to align building energy codes and building performance standards for greater impact in reaching climate goals and ensuring an equitable energy future. This includes anticipating future upgrades to BPS within a given jurisdiction. For example, in the long-term, the minimum square footage of buildings subject to BPS typically drops, so while a new building today is not yet subject to BPS, it may become subject to BPS in five or 10 years.

For jurisdictions yet to adopt BPS, they have an opportunity to enhance their existing or future energy codes with BPS informed by lessons learned from other jurisdictions.

For jurisdictions that have already enacted BPS, now is the time to facilitate inter-departmental collaboration. This will not only avoid misalignment of building energy codes and BPS, but also actively use them together to accelerate progress in the quest to mitigate climate change, create local jobs, and provide affordable, healthy homes for everyone.