



# Code Compliance Toolkit

## Introduction

NEEP's Code Compliance Toolkit contains state, regional, and national resources developed to help achieve compliance with and enforcement of building energy codes and standards. This document provides an overview of the importance of complying with energy codes along with various resources and tools to help communities and states reach increased compliance rates.

Resources in this document include links to code training resources, inspection tools, field guides, code compliance assessments, exemplars, talking points, and more to help inform, develop, and support code compliance initiatives at local and state levels.

## Summary

Establishing and maintaining effective administrative mechanisms to support energy code compliance and enforcement is the best way to unlock deep energy and cost savings and greenhouse gas emission reductions. Adopting statewide or local codes is a vital undertaking (see NEEP's Energy Code Adoption Toolkit), but without compliance and enforcement, the associated benefits of energy codes cannot be fully realized.

There are many strategies states can employ to mitigate obstacles and improve their compliance rates. This Code Compliance Toolkit consolidates several resources to help manage and inform energy code compliance initiatives, including model code language, compliance studies, training resources, compliance materials, and examples of workforce development and incentive programs from states in the Northeast and Mid-Atlantic. These resources can help achieve high compliance rates and healthy, resilient, and energy efficient homes and buildings.

## Questions? Contact NEEP

This toolkit is updated regularly. Be sure to visit NEEP's [Building Energy Codes](#) page for the latest version and contact [Moses Riley](#) with any inquiries. See also NEEP's [Code Adoption Toolkit](#) for information on state-specific codes, cost analyses, code comparisons, code benefits, and case studies.

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## I. Code Compliance Checklist

Interested in improving your community's or state's compliance with energy codes? Follow this step-by-step guide to inform your process:

- ☐ **Form an Energy Code Compliance Collaborative** with diverse participation. This will help you holistically analyze your specific situation from several perspectives, set goals and how to achieve them, engage relevant industries and groups, ensure the outcomes are equitable and just, and inform strategies and best practices. Reach out to NEEP for support.
- ☐ **Expand energy code compliance capacity.** Many obstacles to code compliance can be attributed to a shortage of time, capacity, and resources. Growing and supporting the workforce via state programs is critical and can be accomplished through strategies such as integrating the use of third-party inspection services and developing training programs.
- ☐ **Implement electronic systems for permit processing, plan review, inspections, and fee collection.** As the code enforcement workforce continues to shrink, bandwidth and capacity are serious concerns. Digitizing this work as much as possible will not only help streamline inspections by eliminating the need for travel or following paper trails, it can also help expand the workforce by increasing accessibility to these administrative necessities.
- ☐ **Quantify code compliance with a field study** in sync with energy code adoptions. This will produce data on current compliance rates and cost-saving opportunities while exposing common areas of noncompliance that trainings can target.
- ☐ **Allow utility program administrators (PAs) to claim savings for energy code support activities.** By receiving credit for energy savings, program efforts become directed towards positively impacting code adoption and maximizing compliance.
- ☐ **Implement synergistic building policies, such as energy rating, transparency, benchmarking, and disclosure policies.** This will provide data on building energy use and drive the market by allowing it to properly appraise energy efficiency in homes and buildings.



## II.Challenges to Code Compliance

Though there can be challenges to achieving code compliance, including a lack of training and an aging and shrinking workforce, it is the only way to unlock deep energy and cost savings from energy codes.

### Lack of Resources and Training

All divisions of the workforce must be trained and supported to ensure compliance with and enforcement of energy codes. The home or building designer, architect, builder, and code inspector are all responsible for compliance and enforcement of the energy code, meaning they all must be trained on how to meet energy code requirements. It is important to remember that energy codes, unlike any other building code, [pay for themselves through energy and cost savings](#). This means investing in state or utility code compliance and workforce training programs will pay off in the long term by creating a skilled workforce that can adapt to future changes in industry standards in addition to saving home and building owners money through more efficient structures. Quality assurance and training must be balanced and integrated with conducting daily inspections; addressing this through transparent, uniform, and consistent administrative practices is paramount to achieving high rates of compliance.

Since training, code books, and ongoing continuing education can be costly, it's vital that state programs provide support for continuous workforce development. Training programs take many forms and can be tailored to state-specific needs. Various mechanisms such as permit fees, systems benefit charge (SBC) on utility bills may be used to pay for training. As codes become increasingly oriented towards building science, enforcement will require more testing, quality assurance and control, and skilled workers to ensure parameters are met. State programs are the best way to prepare the workforce.

### Shrinking Workforce

Final enforcement of energy codes is the responsibility of code inspectors, an [aging and rapidly shrinking professional demographic](#). Understaffed code departments are called upon to do an increasing number of inspections with less and less staff. Occasionally, this means that code inspectors don't inspect for compliance with the energy code, prioritizing compliance with fire and life safety codes as they are perceived to have more impact on occupant well-being. As the workforce continues to shrink, addressing bandwidth issues is critical to ensure enforcement of the energy code.

### The Energy Code is a Life Safety Code

As mentioned above, there is a belief that fire and life safety codes should take priority over energy codes. But in addition to lowering utility bills, [energy codes have a huge influence over how we experience buildings](#). As updated codes require high-performance building envelopes, energy codes not only lower the energy use, carbon emissions, and utility costs of buildings but they also improve occupant health, safety, and comfort. The enhanced building envelope increases resilience against extreme weather events and allows occupants to shelter in place safely for longer. It also limits unwanted moisture, suppressing the growth of mold or mildew harmful to occupant health and the building's structural integrity. Energy codes don't just reduce energy consumption – [energy codes are life safety codes](#). Emphasizing these non-energy benefits of the energy code will increase enforcement in the field.

Many of the barriers to energy code compliance can be traced to a shortage of time, capacity, and resources suffered by building officials who enforce energy codes. This bottleneck can only be mitigated by state programs that support the workforce and encourage compliance. Whether it be leveraging third-party inspectors, implementing electronic permitting, plan review, and inspections, or developing utility training and attribution programs, improved code enforcement infrastructure should help to increase energy code compliance and make it easier to measure this progress.



### III. Best Practice Initiatives and Exemplars

From expanding code compliance infrastructure to targeting trainings on common areas of noncompliance, states and communities have several pathways to address challenges to code enforcement. Enforcement mechanisms vary across the region – Maryland and Delaware, for example, organize code enforcement at the county level, while Pennsylvania delegates enforcement of its residential energy code to each municipality. Forming a code collaborative can help organize and inform these efforts.

Below are some strategies and exemplars that will help you achieve steady levels of energy code compliance and empower building departments to take a more streamlined approach to code enforcement.

#### Code Compliance Assessments

**Code compliance field studies** are the best way to determine your code compliance baseline for both residential and commercial buildings. [The U.S. Department of Energy conducts these field studies](#), but states can also do them themselves. Performing energy code compliance assessments determines a state's code compliance level, identifies opportunities for increasing compliance and code savings, and reveals gaps in code knowledge and implementation that can be addressed through training and education. Conducting these studies simultaneously with energy code adoption cycles helps states identify trends in their code enforcement and continuously addresses common areas of noncompliance.

**Common areas of non-compliance** include air change rates (ACH), wall insulation, ceiling insulation, slab insulation, and duct leakage. These areas are specific to each state and often result from a lack of training. States should use the information acquired through field studies to **target workforce trainings** that address these areas of lower compliance rates. Since these studies investigate both residential and commercial buildings, addressing common areas of noncompliance in all trainings will improve energy code compliance across the board in both the short and long term.

[Many states, including several in the Northeast, have conducted energy code compliance studies.](#) Though field studies can be expensive and time intensive, they are the best way to determine your current state of compliance and identify where the industry must improve. They are also the first step to enable utility program administrators (PAs) to claim savings for energy code compliance activities. See below for some examples.

- [Rhode Island Code Compliance Enhancement Initiative Attribution and Savings Study](#)
- [Massachusetts Code Compliance Baseline Study](#)
- [Maine Residential New Construction Technical Baseline Study](#)
- [New York Energy Code Compliance Study](#)

#### Utility Engagement

Allowing utilities to claim savings for energy efficiency supports stronger code compliance. PAs are in a strong position to support and influence markets because they typically run programs that operate in new construction and have knowledgeable staff and resources. With an incentive to support energy codes, PAs can shift their focus towards productive engagement with code officials, builders, developers, contractors, architects, and the market to increase energy savings. By receiving credit for energy savings, program efforts become directed towards positively impacting code adoption and maximizing compliance. Working with PAs and public utility commissions (PUCs) to develop an attribution framework and **refining this program with each code update and compliance study** will ensure compliance is prioritized and benefits are realized. These are some resources on attributing energy savings to energy efficiency programs, including examples.

- [NEEP Energy Code Compliance Attribution](#)
- [Attributing Building Energy Code Savings to Energy Efficiency Programs](#)

## Third Party Inspection Specialists

As the code enforcement workforce continues to shrink, states have increasingly turned to third party inspection services to help them meet demand. Third-party inspectors perform the energy code review and inspection when government resources are insufficient. This allows code inspectors to focus on non-energy codes as they can rely on energy code inspections by third-party specialists. This also helps grow the workforce by increasing the number of professionals specifically trained in energy code requirements.

Building departments do not directly hire these individuals – with the approval of the building department, they contract directly with the permit applicant (under the rubric of special inspector). This requires a government licensing program to review and report compliance as approved third parties, [like the one in New York City](#). Guidance on third-party specialist integration should be clear so municipalities can properly utilize them in their code enforcement process. Guidelines should:

- Specify the procedure within code/law that allows a municipality to establish a program that permits the use of third-party plan reviewer/specialist to supplement existing staff;
- Separately specify the qualifications that third parties must satisfy to be licensed to act as an agent in reviewing and recommending approval of construction;
- Specify the type of documentation required to determine a given project's compliance with the code, where not already in the currently implemented codes;
- Specify in the codes how a municipality will make its final determination as to the compliance of a building "approved" by a third-party specialist;
- Establish "no conflict of interest" criteria for the role of the third-party specialist.
- Design a process for quality control, code of ethics, and so on

[These programs have been growing in popularity](#) as housing booms have hit cities across the nation. [New York City has the TR8: Technical Report State of Responsibility for Energy Code Inspections form](#) that can be used for third-party code verification. [Colorado has a program](#) that allows municipalities to contract third-party inspectors, while [Norfolk, VA has a policy](#) regarding their use. While third-party inspectors can help with demand, it's important quality assurance can be verified. Below are some further examples of how states or communities contract third-party inspection services as well as some additional resources.

- [What is a Third Party Inspector and Why Do I Need One](#)
- [Department of Energy Third-Party Inspector White Paper](#)
- [District of Columbia Third Party Program Procedure Manual 2018](#)

## Implement Electronic Permitting, Plan Review, and Virtual Inspection

Transitioning workflow (permit intake, inspection assignments, processing fees) to digital platforms is one of the best ways to streamline production. [Some leaders in the region](#) have implemented electronic permitting and plan reviews, while some are beginning to look at virtual inspection options. [As code inspectors begin to retire](#), streamlining code inspections will be critical to keep up with demand while ensuring quality assurance. Digitizing as much of this work as possible is the best way to accomplish this and combat shrinking workforce.

The ICC has considerations surrounding virtual inspections, plan review, and permitting. The resources below can help you get started.

- [NEEP's Building Energy Codes for Carbon Constrained Era Page 45](#)
- [ICC Considerations for Virtual and Remote Inspections](#)
- [ICC Considerations for Moving Permitting and Plan Review Online](#)
- [ICC Considerations for Completing Certification and Training Online](#)



## IV. Synergistic Building Policies

Synergistic building policies, such as benchmarking, building energy performance standards (BEPs), and energy rating programs, can drive market demand for energy efficiency, encouraging energy code compliance in the industry. Below are some recommended initiatives.

### Benchmarking and Building Energy Performance Standards

Increasingly, states and cities are passing or considering benchmarking and building energy performance standards (BEPS) ordinances to ensure states are meeting energy code requirements and other policy goals (e.g. GHG emission reductions). These measures target existing public, commercial, and multifamily buildings and should be considered as a complementary strategy to model codes.

Benchmarking requires building owners or representatives to annually track and report energy and water consumption and (if applicable) production, while BEPS require building owners to make actual improvements to their facilities over time. Benchmarking helps building owners and managers understand how their buildings use energy, helping them to best target investments in energy improvements to their structures.

Similar to codes, BEPS ordinances set a standard that buildings must meet for their energy use or greenhouse gas emission targets, and outline compliance pathways (prescriptive, EUI, emissions) to demonstrate achievement of these standards. Depending on the focus of the ordinance, they can help municipalities achieve goals related to energy use or carbon emissions, and are a great way to collect data on the energy use of the building stock.

These ordinances occur on the state and local levels and vary in scope. Below is a list of existing benchmarking ordinances in the NEEP region as well as some additional resources.

- [NEEP's Benchmarking Policy Tracker](#)
- [Benchmarking Toolkit](#)
- [Benchmarking to BEPS Blog](#)
- [Benchmarking Webpage](#)

### Building Energy Rating and Disclosure (BER&D) Policies and Home Energy Labeling

Building energy ratings allow owners and tenants to understand their home or building's energy use while providing the market with information that can drive appropriate valuation of energy efficiency in buildings. Existing BER&D policies require property owners to conduct either an operational or asset rating – operational being the actual energy performance of a building, and asset rating being the performance independent of occupant use. Energy rating policies also stipulate the timing and audience for disclosing rating results. [Energy rating and codes](#), in this way, are connected – if the energy code is the floor and the performance standards are the ceiling, an energy rating is the walls.

Implementing a voluntary building energy rating policy can drive the market to more efficient homes and buildings through greater energy code compliance. Having this information at the time of listing can be extremely powerful. Research shows that homeowners especially like knowing their expected annual energy use and utility bill levels before purchasing a home, even if it's not highly-energy efficient. Whether it's a U.S. DOE Home Energy Score (HES) or a RESNET Home Energy Rating Score (HERS), [energy rated homes sell faster and for more money than non-energy rated homes](#). This will drive the market as architects, builders, and contractors can better assign value to the energy efficiency features they incorporate into a home or building design, encouraging compliance with the energy code.

Energy ratings can even act as triggers for renovations. Requiring disclosure of a valid energy rating at the time of listing is a reasonable and effective way to address the energy use of existing homes and buildings – a much larger market than new construction. This can create market incentives for both builders and current owners to make energy saving improvements in both new and existing dwellings and commercial buildings and drive the market to encourage energy code compliance.

In the Northeast, NEEP's Home Energy Labeling Information eXchange (HELIX) project aims to auto-populate real estate listing with relevant energy ratings and data. [Visit NEEP's website](#) to learn more.

## V. Resources and Tools

### Training Materials and Compliance Pathways

Workforce training is vital to ensure compliance with energy codes. The U.S. DOE offers several training resources. Some states also offer trainings through their utilities or private companies. Having mandated trainings, continuing education, and certification for builders, design professionals, and code officials is paramount to ensure buildings are constructed to code. While classroom trainings are preferred for the interpersonal opportunities they provide, online training resources can be equally effective.

Following are some free, public resources on code training as well as some high-level information on different compliance pathways. States also promulgate their own training programs through their utilities or relevant state offices and have information available online.

#### State Specific Training Materials - Resources and Studies

- All states designate a department to administer building codes. Many of these departments also include trainings. Some trainings can be applied between states – as long as there aren't any major differences in the codes themselves. Reference [NEEP's Energy Code Tracker](#) and [NEEP's Code Adoption Toolkit](#) for high-level information on specific state energy codes, training, code department, and more.

#### 2018 IECC

- [DOE Residential](#)
- [DOE Commercial](#)

#### 2012 IECC

- [DOE Residential](#)
- [DOE Commercial](#)

#### 2015 IECC

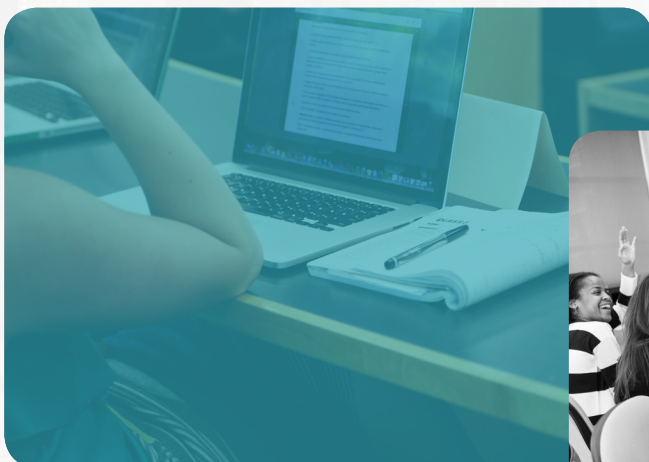
- [DOE Residential](#)
- [DOE Commercial](#)

DOE: [ASHRAE and Other Codes](#)

### Compliance Software

REScheck and COMcheck are U.S. DOE software programs that can be customized for state-specific codes, as long as the state has not weakened the energy provisions of the adopted energy code.

- [REScheck](#) is used to calculate different ways to comply with the residential provisions of the IECC.
- [COMcheck](#) can be used to determine the options for compliance with the requirements of the commercial provisions of the IECC or ASHRAE 90.1.





## Compliance Pathways Overview

There are different ways to comply with each energy code. With each new iteration, there are more options for design professionals and home builders to meet code requirements. Below is information on the different pathways builders can follow that show up in many of the energy codes.

**Prescriptive Path** - Prescriptive energy code requirements must be done in all buildings, “by the book,” meaning they follow the guidelines outlined in the code during construction. There is no performance testing for this pathway.

**Performance Based Compliance** - based on simulated energy performance. The proposed design must show, through energy modeling, that the annual energy use of a building is less than or equal to its annual energy use of the standard reference design.

- For commercial buildings, this could mean complying with actual energy use intensity (EUI).
- A compliance-based software report is prepared and submitted to the local code official.
- Other performance options may include Energy Star, LEED, Living Building, or Zero Energy Certifications.

**Total UA Alternative** - A method for performing conductive energy tradeoffs based on the area weighted average U-factor for the home or building (U), and the total area of the building envelope (A). To comply, the designer must demonstrate that the area weighted average U-factor for the entire home or building is less than that prescribed by the prescriptive method. This path allows the designer to trade off building insulation, for example, with window U-factor, although there are backstops with respect to the window U-factor trade off<sup>1</sup>. This path is for residential construction only.

**Energy Rating Index Compliance Alternative (ERI)** - is a numerical score where 100 is equivalent to the 2006 IECC and 0 is equivalent to a zero energy home or building. Each number on the scale is a one percent change in energy use of the rated design relative to the total energy use of the ERI reference design (RESNET, U.S. DOE). A table indicating the required ERI Index for each climate zone is within the energy code.

- Verification of ERI compliance is completed by an approved third party, a RESENT certified Home Energy rater that provides the local code official a compliance report.

**Alternative Compliance Pathways** - some states offer alternative compliance pathways such as building to or obtaining Passive House or Energy Star certification, using a “package” system with efficiency “points” thresholds. See [NEEP's Code Tracker](#) to learn more about state-specific codes and compliance pathways.



<sup>1</sup>Alternate Compliance Path Added to 2015 Energy Code By Julie Ruth, [http://www.aamanet.org/upload/file/Codes\\_GM0515.pdf](http://www.aamanet.org/upload/file/Codes_GM0515.pdf)



## Other Resources

### NEEP:

- [Model Progressive Building Energy Codes Policy](#)
- [Bulletin Board](#)
- [Blog](#)
- [Energy Codes are Life Safety Codes](#)
- [Construction Codes: Myths and Realities](#)
- [Connecting Compliance to Building Energy Rating](#)
- [PNNL Building America Compliance Guides](#)
- [ICC Tools for Virtual Permitting, Plan Review, and Inspections](#)
- [IMT Commercial Energy Policy Factsheet](#)
- [2021 IECC Outlook](#)

### U.S. DOE:

- [Compliance](#)
- [2018 IECC DOE What to Know about 2018 IECC Residential Provisions](#)
- [2018 IECC BECP Commercial Scope and Requirements](#)
- [2015 IECC DOE Energy Code Compliance Paths](#)
- [DOE Compliance Resource Guides](#)