



Systemic Barriers to Building Energy Code Adoption

Introduction

States adopt building energy codes to set minimum energy efficiency levels and baseline requirements for new commercial and residential buildings. Buildings produce almost 40 percent of all total U.S. carbon emissions per year, so regulating the energy use of buildings through adopting building energy codes is essential to reducing greenhouse gas emissions. The United States does not have a consistent federal standard that all states must adopt, so codes must be adopted at the state or municipal level. Most states adopt new building energy codes through either legislative action or regulatory agency action authorized by the state legislature, executive order, or other mechanisms.

Energy code adoption procedures vary by state. [Federal statute](#) requires governments to develop their building energy codes based on model codes set by the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) and the International Code Council (ICC). ASHRAE develops model energy codes for commercial buildings that are four stories or higher. The ICC develops the International Energy Conservation Code (IECC), which include the model codes for both commercial and residential buildings. Both organizations update their codes every three years, with the newest amendments being added to the [90.1-2019 ASHRAE Standard](#) in 2021 and the ICC releasing the [2021 IECC](#) earlier this year.

States, and municipalities in states without a statewide code, are required to have an adopted building energy code, but the version a state has implemented varies drastically because of ongoing systemic barriers to the adoption process, such as costs, stakeholder resistance, and the state adoption processes. These barriers limit successful adoption of newer, more energy efficient versions of building energy codes, which are essential to decrease carbon emissions from the building sector, save consumers' costs, and provide healthy, more resilient buildings.

Systemic Barriers to Code Adoption

Since the building energy code adoption process is different in every state, each faces different challenges within the adoption process. Most of the common systemic barriers, however, are experienced universally during the code adoption process. The barriers to successful building energy code adoption can be grouped into two main categories, costs and politics. However, they are often intertwined and therefore compounded. For this brief, the barriers will be discussed individually, but it's important to note that costs influence politics and politics influence costs in the building energy code process.



Costs

Building Construction Costs. One of the most significant systemic barriers to building energy code adoption is the disagreements about costs, such as the impact of newer versions of the codes on building construction costs and therefore home sales. Many key players in the construction industry, especially the residential construction industry, are opposed to adopting newer versions of building energy codes because codes increase building construction costs, even if the new version of the code projects only modest energy savings. This cost can force builders to internalize these additional costs and lost revenue or pass these costs onto buyers. Building trade advocates believe that the costs associated with updated building energy codes negatively impact the construction industry, especially in states with a lower construction rate, because homebuyers cannot spend an increasing amount of money on more energy efficient homes.

COVID-19 and Building Supply Chains

The Coronavirus (COVID-19) pandemic disrupted global supply chains around the world when manufacturing and shipping routes were halted for a period of time in 2020. These shut downs impacted numerous building material supply chains such as: copper wire, steel, and most notably, lumber. Material shortages, in addition to labor shortages and a housing shortage, have increased costs for builders and disrupted their construction schedules, which often further increases their project costs. The effects of COVID-19 on supply chains and building costs are expected to be felt by the construction industry for years to come.

The U.S. Department of Energy (U.S. DOE) and other advocates for adopting newer code versions, however, believe that homeowners want more energy efficient homes and are willing to pay more for them to save money on energy bills and reduce their environmental impact. Many building code advocates use formulas, surveys, and tools, such as the [DOE Methodology for Evaluating Cost-Effectiveness of Residential Energy Code Changes](#) to show that people want more energy efficient homes, even if they are expensive, because they will save more money in the long run. This disconnect between new building and home costs associated with a state updating their building energy codes causes tension between stakeholders, leading to disagreements and confusion about the actual costs of new codes. The images below show some of the arguments commonly heard at state code board hearings and other public forums when discussing the costs of adopting new building energy codes.

“I am in the construction field, I see costs first-hand, while you come up with estimates using a formula.”

“Home buyers are not buying more energy-efficient homes because they cost more.”

“Research shows that people are willing to pay more for a more efficient home.”

“More energy efficient homes save home buyers more money in the long run as their energy bills are lower.”



Cost to Implement and Enforce New Codes. In addition to disagreements about how codes impact new building prices, another cost concern when adopting building energy codes is implementing and enforcing new codes. Once a state or a municipality adopts a new code, they must spend money on the extensive code review process (i.e., full-time staff time, coordinating meetings, and meeting materials), purchasing codebooks and other enforcement materials, and updating their existing compliance tools and training programs. These costs can prevent governments from beginning the code adoption process because they will be unable to pay for the required changes once they are adopted. These costs can also hinder the code adoption process because if the newer version only projects modest energy savings, the upfront costs can outweigh any future benefits. States will also sometimes adopt new codes, but not enforce them due to costs.

Building Energy Code Workforce. Cities and municipalities employ building energy code officials to: manage the local building code adoption and ramp-up process, review new building plans, and inspect buildings to ensure compliance with the state code. Often code departments in local governments are small, meaning one person could be responsible for every essential role. Communities are responsible for employing their code professionals and do not always get funding for this work from the state. However, the in-the-field code workforce is under extreme pressure as building code professionals around the U.S. are retiring and younger employees are not filling jobs. [The ICC estimates](#) that more than 80 percent of the existing code official workforce is planning on retiring within the next 15 years, which would cause catastrophic impacts to the entire building code industry if not addressed now.

Experts believe that code positions are not and will not be filled in the future because of small building department sizes, inconsistent salaries, and the increasing building science knowledge needed for a growing list of responsibilities under each new iteration of the codes. Sometimes, local governments cannot even afford one code professional to inspect buildings. Multiple areas must share them within a state, so losing just one professional can impact large areas. Without code professionals, municipalities will not be able to adopt, implement, and enforce building codes. This decreasing workforce is a cause for concern for the entire building industry.

Politics

Local and state politics can significantly impact the building energy code adoption process because new building energy code adoptions are usually passed through bills enacted by state legislatures. Since codes are dependent on the political process, they often become polarized and sometimes even contentious.

Stakeholder Resistance to Change. One of the main reasons politics are a systemic barrier to building energy code adoption is that building stakeholders can resist any code changes within their state. There are a large variety of stakeholders in the building industry, like local utilities, building developers, building material suppliers, and energy efficiency advocates, in addition to the local and state policymakers enacting the codes. Some reasons why stakeholders are against states adopting newer versions of building energy codes include but are not limited to:

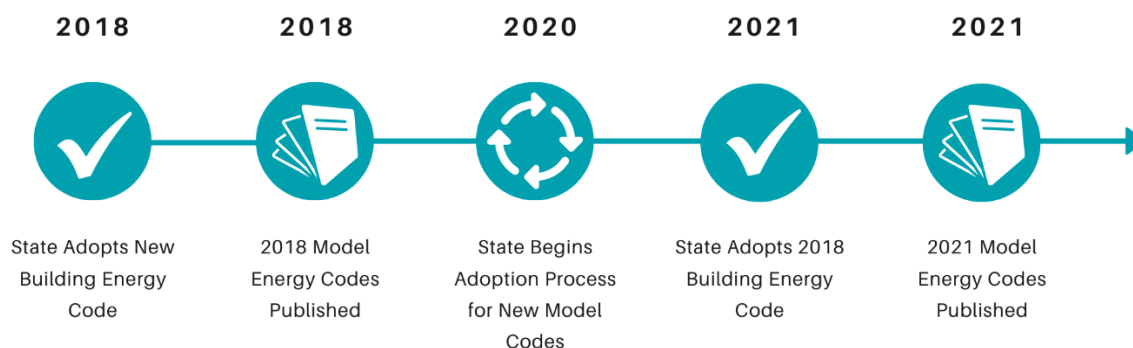
- Complexities in complying with new codes;
- Having to change existing practices;
- Feeling unheard during the adoption process;
- Concerns about how new codes impact building costs; and
- General opposition to regulations.

[Research shows](#) that there is also resistance to building code changes because there can be issues with how codes are adopted at the state level and implemented at the local level. Stakeholders at the local level often feel left out of the adoption process because the development work is happening at the state level. Local stakeholders are not always looped in or consulted until the codes have been adopted. Once these new codes are adopted, however, local players in the building industry are responsible for the education, costs, and labor necessary to enact and enforce the codes.

COVID-19 and the Meeting Process

In response to the COVID-19 pandemic, states implemented virtual hearings instead of in-person hearings to continue the code adoption process. Some states, however, have returned to in-person hearings at the end of 2021. While there are benefits to both in-person hearings and virtual ones, many stakeholders benefitted from virtual hearings because they were able to attend without having to drive far distances, miss work, or find childcare. Virtual hearings allowed individuals who were never able to participate in hearings before have the opportunity to voice their opinions to their elected officials about building energy codes. States must continue to think about how virtual hearings create a more equitable, transparent code process which fosters more buy-in for updated codes by including more stakeholders throughout the adoption process.

State Adoption Cycles. States vary on their building energy code adoption process, which can impact how easily new versions of the code are adopted since a state can be limited by how often they are able to adopt codes. Some states are able to review and adopt new codes anytime. Most states, however, are restricted to adopting a new building energy code within a certain time frame like every three, four, and even six years. This adoption delay often causes states to be an iteration or two behind the newest model energy codes. The below image illustrates an example of how most states adopt new codes using a three-year adoption requirement, how the adoption process takes multiple years, and how the timeline of model energy codes fits into the adoption timeline.





In addition to required adoption cycles, some states are even required by law to be one or two code cycles behind the model codes. These required time lags can be a systemic barrier to code adoption because they prevent states from editing, reviewing, or updating their codes when they deem necessary. While governments need time between code adoptions to prepare for a new set of codes, they can quickly fall behind emerging technologies and will have to make more drastic changes to their codes in the future as every iteration of model codes further increases building efficiency and decreases carbon emissions. More significant leaps are especially true for states that must be one to two code cycles behind the model codes or adopt new codes every six years. States with renewable energy standards and other pledges to reduce carbon emissions must consider how their code adoption process impacts reaching those goals.

NEEP Recommendations

States must adopt the most recent versions of model energy codes because they are essential to decreasing the built environment's carbon emissions, ultimately helping states reach their climate goals. Here are three ways to improve the building energy code adoption process for states nationwide through increased economic incentives, stakeholder engagement, and education and training.

Economic Incentives. Many states and local governments struggle with funding all of the requirements for adopting and eventually implementing and enforcing new building energy codes. This lack of funding causes states and building industry stakeholders to resist adopting newer versions of the model codes because they do not want to bear the costs themselves. U.S. DOE and other federal agencies should provide increased financial incentives to states to help them specifically fund the work needed to adopt new energy codes. Some states, like Massachusetts, provide direct funding to their municipalities to incentivize them to adopt stretch-codes through their [Green Communities Program](#). The federal government can mirror this direct funding to incentivize and help states adopt more efficient energy codes. In addition to direct funding, U.S. DOE should offer more technical assistance during the code adoption process so states do not have to bear all of the costs themselves. Finally, some states take a percentage of a new building permit fees to fund code official trainings and new books, and this could be implemented in other states to help offset the costs of adopting new codes.

Stakeholder Engagement. The second way to overcome the systemic barriers to energy code adoption is for states to diversify how they include stakeholders in the adoption process. If more stakeholders are engaged and included in the process, there will be less resistance once new codes are adopted, implemented, and eventually enforced, especially on the local level. Code hearings are often scheduled during the week and during working hours, which prevents people from attending. Hearings notices can also be challenging to find on government websites and are usually not advertised to the public.

States must incorporate different outreach strategies to create adoption processes that have more buy-in from those impacted once new codes are adopted. [Some of these strategies](#) to ensure all voices are heard include sending hearing notices to professional organizations that address the building sector, advertising code hearings throughout the government website, and creating and fostering stakeholder working groups for those unable to contribute during routine hearings.



Finally, states and those who want to increase the adoption of newer codes should consider diversifying the stakeholders engaged in the adoption process. Newer building energy codes impact architects, fire marshals, and insurance professionals. Still, they are not always included or aware of the process until the state legislature adopts the new codes. Advocates of adopting newer versions of the codes must figure out ways to engage these harder-to-reach stakeholders because they can be critical advocates for more efficient codes.

Education and Training. [According to the ICC](#), most code officials found their jobs through education and training programs. These programs can be administered by state agencies, trade associations, and private companies. With the aging code professional workforce and its impacts on the building industry, U.S. DOE and states themselves must implement and maintain education and training programs to encourage more people to join the industry. Without an active workforce, states and local governments will have issues adopting new codes, implementing them, and ensuring their compliance. The federal government must begin to work with states to ensure the continued existence of code professionals as the workforce continues to decrease at a drastic rate. States must partner with high schools and community colleges to reach out to students to attract younger generations of students interested in becoming code officials. States can also think about providing incentives to people who want to become code professionals by offering funding to help them pay for the required education, books, and training needed to become licensed code professionals.

Conclusion

States must adopt, implement, and enforce newer versions of the IECC to decrease greenhouse gas emissions from the building sector. The costs and politics associated with adopting new model energy codes, however, create systemic barriers that complicate and sometimes even halt the adoption process. These barriers exist in every state's code adoption process and continue to hinder the code adoption process nationwide. Proponents of states adopting more efficient codes must consider implementing economic incentives, diversifying stakeholder engagement efforts, and increasing education and training to create a smoother code adoption process for states.



Resources

[How Are Building Codes Adopted? | Department of Energy](#)

[ICC-NBIS-Future-Of-Code-Officials.pdf \(iccsafe.org\)](#)

[Overview of Stakeholders Participation in Adoption and Implementation of Building Energy Codes \(Webinar Presentation\) \(cleanenergysolutions.org\)](#)

NEEP Resources

[E-Permitting](#)

[Remote Virtual Inspection Report](#)

[Code Adoption Toolkit](#)

[Code Compliance Toolkit](#)

[Energy Code Adoption and the Economic Effects](#)

[IECC 2021 Resources](#)

[Equitable Workforce Best Practice Guidance](#)