



CITY
ENERGY

A JOINT PROJECT of NRDC + IMT

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ESTABLISHING A PLAN TO ACHIEVE ENERGY CODE COMPLIANCE IN CITIES



ABOUT CITY ENERGY PROJECT AND THE CITY ENERGY PROJECT RESOURCE LIBRARY

A joint initiative of the Institute for Market Transformation and the Natural Resources Defense Council, the City Energy Project supported bold yet practical ways to deploy energy efficiency at the city level to boost local economies, reduce pollution, and create healthier, more prosperous communities nationwide.

The project partnered with 20 local governments across the U.S. from 2013–2018 to design locally appropriate energy efficiency policies and programs. Building upon the past successes and innovation of cities, the City Energy Project established best-in-class practices for energy efficiency to be customized and replicated nationwide. Models and recommendations have been distilled into the City Energy Project Resource Library. This curated set of resources contains the necessary blueprints for a city government to craft and implement customized solutions to productively manage energy efficiency initiatives across commercial, multifamily, and public buildings in its jurisdiction.

For more information on the participating cities and counties in the City Energy Project, and to search the City Energy Project Resource Library, visit cityenergyproject.org.

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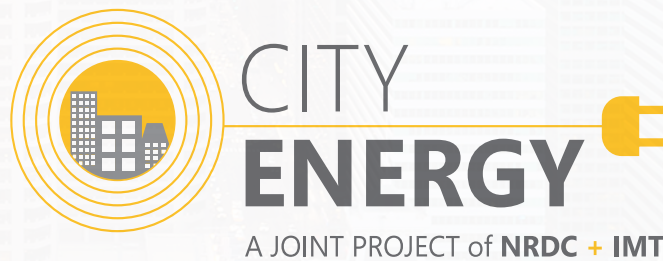




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BACKGROUND AND OVERVIEW

This document was developed as a resource for the City Energy Project. The purpose of this document is to guide city leadership and their building departments in working together to implement an effective strategy to achieve high levels of energy code compliance for new and renovated buildings.

This document will introduce the factors responsible for low compliance rates, followed by the process for implementing an improvement plan, and finally the details of the challenges and effective strategies for addressing each challenge. In an effort to provide solutions for varying administrative structures, a wide range of strategies and recommendations are presented.



WHY CITIES IMPROVE ENERGY CODE COMPLIANCE

A strong building energy code is one of the most affordable and effective mechanisms for advancing energy efficiency in buildings. The national model building energy codes have increased energy-saving potential by nearly 30 percent from 2006 to 2012. However, energy savings are only achieved when the code is enforced. While there has been a push to adopt the latest model energy codes in many jurisdictions in recent years, resources for training and enforcement have been lacking, and code compliance rates in many jurisdictions are low. Ensuring compliance with building energy codes is a simple, ready-made way for cities to realize energy savings without the passage of any new policies.



DID YOU KNOW

Assessing Code Compliance Progress and Improvements

For every dollar invested in energy code compliance, six dollars are saved. Learn more about code compliance benefits in the City Energy Project resource, [ASSESSMENT METHODOLOGY FOR CODE COMPLIANCE: ASSESSING PROGRESS AND IMPROVEMENTS FACT SHEET](#).

[VIEW FACTSHEET >](#)

Low compliance rates mean the consumer benefits of the energy code are not being realized. The direct result for building owners is higher utility bills. However, compliance with the energy code has many non-energy related benefits that often are overlooked. These benefits include improved occupant comfort, better indoor air quality, and a more resilient building stock.

In the realm of building, fire, and life safety codes, the energy code is a relative newcomer. Deadly building fires lead to the first organized fire prevention and life safety codes in the late 1800s. In comparison, it wasn't until the energy crisis of the 1970s that the U.S. began developing energy codes. As with any new code, it takes time to gain widespread adoption and subsequent enforcement. Since the 1970s, building energy codes have made their way into Federal legislation and have been slowly adopted in all 50 states. Over the past decade, the national model energy codes have advanced and gained more attention due to their role in mitigating the negative impact of building energy use on the environment, and their role in helping achieve energy security. After a significant increase in the stringency of the energy code from 2006 through 2012, even more attention has turned to ensuring those savings are realized through enforcement.

CHALLENGES FACING BUILDING DEPARTMENTS

Low compliance rates are not simply caused by building departments not doing their jobs, but are the result of numerous different challenges. Some of these challenges can be overcome by the building department and some are outside of its control. The most common challenges are:

LIMITED RESOURCES

Building departments are typically funded by permit fees and often these fees are not sufficient to ensure the department can do a thorough job. At departments where the budget comes from a general fund, there typically isn't enough funding to ensure appropriate energy code compliance.

LOW PRIORITY

Energy codes are seen as not having a direct impact on health and life safety that building codes historically addressed. Therefore, they are given a lower priority when resources are stretched thin.

INADEQUATE TRAINING

Building department staff do not always receive enough training on energy code compliance. To stay up to speed on changes to energy codes, technology, and other helpful innovations in the industry, it is critical for department staff to have regular trainings.

LACK OF AWARENESS

Departments typically do not know what compliance issues exist when it comes to the enforcement of the energy code and therefore cannot address them.

This report addresses how cities can develop a plan to overcome these challenges and implement an effective energy code compliance program.





GET STARTED: UNDERSTAND THE COMPLIANCE PROCESS

When developing a strategy to improve energy code compliance it is important to follow a process that will lead to the greatest opportunity for success.



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Report Linking Building Energy Codes and Benchmarking

For more information on the important links between energy codes and other building energy performance policies, read the report [LINKING BUILDING ENERGY CODES WITH BENCHMARKING AND DISCLOSURE POLICIES.](#)

[VIEW REPORT >](#)

BUY-IN FROM THE MAYOR'S OFFICE AND BUILDING DEPARTMENT

A city's building department is the agency responsible for the enforcement of codes and standards related to the construction and renovation of buildings. The building department is ultimately responsible for implementing a plan to improve energy code compliance, but the mayor's office and potentially the city council play a crucial role in supporting high-level buy-in. Of the challenges listed above, low priority is often due to a lack of political will. If the mayor and other city leadership do not support a solid energy code compliance program, one is not likely to succeed.

The desired support includes the mayor's office establishing a goal for improving compliance. The recommended goal should be between 90–100 percent compliance within a specific timeframe (recommended to be no longer than five years), and ensuring accountability for achieving that goal. In support of this goal, the mayor's office should also assist with securing additional funding, staffing, coordination with other agencies, or other resources to support the building department in implementing a compliance plan. In some instances, the mayor's office may even develop the specific strategies for the building department to implement.

The mayor's office and elected officials also need to realize the important role that energy codes play in relation to other building energy policies, such as energy benchmarking and transparency policies. While benchmarking policies entail a building's energy use to be shared annually, compliance with the energy code during the time of construction can have a large impact on that building's energy use over its lifecycle.

CONDUCT A BASELINE ASSESSMENT

To put it simply, if you don't know what's broken, you can't fix it. A thorough baseline assessment consists of both a quantitative and qualitative evaluation of energy code compliance. The qualitative assessment may uncover issues with documentation, processes, communication, industry knowledge, training, or political priorities. A qualitative assessment should include a review of the building department processes and also engage industry stakeholders to understand what problems they may be facing. The recommendations for improvement from both assessments should be used to develop a phased implementation plan. Refer to [Training and Technical Assistance Challenges section](#), of this document for specific guidance on conducting a training needs assessment.

The quantitative evaluation involves the review of plans and on-site inspections to determine the level of compliance and potential energy savings achievable from improvement. The quantitative assessment typically leads to a piece of the overall compliance score, and a calculation of cumulative increased energy use due to non-compliance in the jurisdiction. Cumulative increased energy use is based on data collected in the field and building trends in the jurisdiction. It reflects the true cost of non-compliance and providing a tangible objective for improved compliance.

A standard methodology to assess statewide code compliance was created by the U.S. Department of Energy (DOE), but it is not appropriate for cities. A modified methodology needed to be developed for use by cities, with an affordable, appropriately sized sampling set that better reflects city processes and construction types. CEP began conducting citywide compliance assessments in 2013, and working with a code compliance expert. Since then, CEP has created the [Assessment Methodology for Code Compliance in Medium to Large Cities](#), which has been peer reviewed, and is available for use by cities. To date 10 cities have implemented the methodology with initial compliance scores ranging from 64 to 92, which indicates considerable room for improvement.



METHODOLOGY

Assessment Methodology for Code Compliance in Medium to Large Cities

To get started on a baseline assessment, be sure to review the City Energy Project resource, [ASSESSMENT METHODOLOGY FOR CODE COMPLIANCE IN MEDIUM TO LARGE CITIES](#), a guide focused on providing cities with the detailed information needed to conduct both a qualitative and quantitative codes assessment.

[VIEW REPORT >](#)



EVALUATE RESULTS AND RECOMMENDATIONS FROM THE ASSESSMENT

A thorough baseline assessment should uncover where compliance challenges exist, as well as why they exist, and provide recommended strategies for how to improve compliance. A careful evaluation of the results and recommendations from the assessment should be conducted to inform a compliance improvement strategy. Refer to the [Five Common Compliance Challenges and Solutions section](#), for an analysis of the most common problems that impede effective energy code compliance.

DEVELOP A PLAN TO IMPLEMENT IMPROVEMENT STRATEGIES

After a careful review of the results and recommendations from the assessment, a plan to implement improvement strategies needs to be developed. The plan should prioritize strategies using a phased approach. Strategies that are quick and easy to implement should be done first, followed by strategies that may take time or require several layers of approval to get started. The plan should be realistic about the time it will take to effectively implement each strategy and not be too aggressive about trying to implement many strategies at once. The plan should be drafted by the building department in consultation with the city leadership. Before the plan is finalized, it should receive buy-in from the mayor's office and city leadership. Once finalized, the plan should be communicated to industry stakeholders to make them aware of any new expectations or requirements for energy code compliance.

PROVIDE ONGOING QUALITY ASSURANCE

Another critical step in the compliance improvement process is the need to verify progress through ongoing quality assurance. This will allow a building department to verify how well a compliance improvement strategy is working and change course if needed. For more information about on-going quality assurance, refer to the [The City Energy Project Assessment Methodology for Energy Code Compliance in Medium to Large Cities](#). Also refer to the [Ongoing Quality Assurance and Improvement section](#), for a broader discussion of how ongoing quality assurance is a compliance improvement strategy.

INFORM MAYOR'S OFFICE ON PROGRESS AND NEEDS

The building department should keep the mayor's office updated on the progress of compliance improvement. This will help to maintain the mayor's support for the improvement program and allow him or her to understand and anticipate future needs that may arise in order to maintain high levels of energy code compliance.

5 COMMON COMPLIANCE CHALLENGES AND SOLUTIONS

The purpose of the baseline assessments is to illuminate the areas that need to be addressed in order to improve compliance rates. There are five common compliance challenges and solutions with various elements that may be identified during the assessments as areas needing improvement, followed by potential improvement strategies.

STAFFING

With limited resources being identified as one of the most common challenges facing building departments, it is only logical to consider staffing levels as a means of addressing low compliance rates. Appropriate staffing levels for building departments is a multi-faceted issue, with the following areas being the most common:

- Revenue
- Qualifications of existing staff
- Processes



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What type of funding do you have?

Cities typically use either an enterprise fund (self-funded through permit fees) or the general fund to run their building departments. Addressing revenue issues will first start by understanding your fund type.

Revenue is an obvious issue, tied directly to staffing levels. Addressing revenue issues requires an understanding of the building department's funding structure. Most building departments are funded through permit and other fees (enterprise fund), through the city's general fund, or a combination of the two. Raising fees can be a contentious issue, but a city should evaluate its fee schedule against similarly-sized or neighboring jurisdictions. By doing so, a city can determine whether or not its fees are in line with other cities.

Even if a city's permit fees are in line with other cities, it may still make sense to raise fees to cover the cost of enforcing the energy code. One reason for this is that other cities might not be allocating sufficient resources to enforce their energy codes. Also, permit fees will not need to be raised significantly in order to properly enforce the energy codes. Refer to the [Staffing: Challenges and Improvement Strategies section](#), for specific information on the cost of enforcing the energy code.



LEARN MORE

Engage with Utilities to Implement Energy Performance Policies

Cities and utilities often share common goals and can find many ways to work together to implement strategies that make it easier for building owners to meet the requirements of energy performance policies. Learn more in the City Energy Project resource, [ENGAGE WITH UTILITIES TO IMPLEMENT ENERGY PERFORMANCE POLICIES](#), a guide with information on how cities and utilities can work together on energy code attribution and compliance.

[VIEW GUIDE >](#)

Although permit fees often make up a large source of revenue, some cities will also charge plan review fees as well as re-inspection fees. If it is determined that raising fees is not an option to increase building department resources, the city should consider other funding sources to support energy code compliance efforts, including whether the local utility might be willing to help fund plan review and site inspection activities. Regardless of how a city decides to increase resources for energy code compliance, it should first consider the next two issues before throwing additional staffing behind compliance improvement.

Qualifications of existing staff can also have a very direct impact on staffing needs. If existing staff do not have the certifications or expertise to conduct efficient energy code plan reviews or inspections, it has an immediate negative impact on compliance rates. Not having staff with deep knowledge of the energy code will lead to much slower plan review and inspection times, or it may lead to a complete lack of verification.

Processes that are duplicative, unclear, or inefficient can have the most dramatic impact on building department resources. One area that can lead to inefficiencies is poor internal and external communication. Internal communication involves how efficiently a permit application can move through the review and approval process. Approval of an application often requires coordination with various internal staff as well as with other city departments. External communication involves how well a building department communicates needed information to its customers. For example, if a website doesn't contain basic requirements such as what codes are in effect or what inspections are required, an architect or builder will likely call the department for this information; pulling staff away from their essential duties to answer basic questions.

✓ STAFFING: IMPROVEMENT STRATEGIES

Staff Qualifications

When it comes to improving compliance rates related to staffing concerns, the first step should be a review of current staff qualifications. Cities should require their plans examiners and inspectors to obtain International Energy Conservation Code (IECC) certifications, at a minimum; the best practice is to have dedicated staff that reviews for energy code compliance. If the state or city has a higher standard of certification or licensing available, that should be used instead. If current staff does not have a deep knowledge of the energy code, training can be considered as a means of improvement. Refer to the [Training and Technical Assistance Challenges section](#), for a discussion on training strategies. For details on how to conduct a qualitative review of staff knowledge, see the City Energy Project resource, [Assessment Methodology for Energy Code Compliance in Medium to Large Cities](#).

Streamlined Processes

After staffing qualifications have been considered, cities should explore what opportunities exist to streamline their compliance processes. Streamlining is the practice of improving building regulatory processes to remove overlap and duplication and create more efficient administrative procedures. Streamlining the energy code compliance process should be the first step, and involves the use of forms, checklists, and communication to industry stakeholders ([refer to the Submittal Documents and Plan Review section](#)). By communicating clearly what documentation is expected, the building department can ensure a more efficient compliance verification process.

A more thorough streamlining process should also be considered and will often include numerous city departments involved with construction approvals, and therefore must have

buy-in from city leadership. The benefit of a more thorough streamlining process is that it often identifies more efficient ways of conducting the construction approval process. A more efficient construction approval process can free up precious staff time to focus on compliance verification.

Streamlining has impacts that extend far beyond energy code compliance. A 2010 report from the National League of Cities and the International Economic Development Council called [The Role of Local Elected Officials in Economic Development: 10 Things You Should Know](#), identifies the “regulatory environment” as one area to consider in a local economic development strategy. The report states: “For business leaders, time is money; they want to know that the regulatory process provides for timely, reliable and transparent resolution of key issues. If your city’s regulatory policies are riddled with delays, confusing and redundant steps and multiple approval processes, a prospective business may very well choose to locate or expand in another community.”

Additional strategies for addressing staffing issues during plan review and on-site inspections are discussed in the [Submittal Documents and Plan Review section](#), and the [On-site Inspection: Challenges and Improvement Strategies section](#).

Increase Resources

The above strategies can be effective at improving compliance with a relatively small financial investment, but building departments should look for ways to increase revenue in order to provide the best infrastructure for energy code enforcement. Where permit and other fees directly fund building department activities, an increase in those fees should be considered. As a reference point, a [study](#) conducted by the Lawrence Berkley National Laboratory found the average cost of enforcing the energy code to be \$139 per commercial building and \$49 per single-family home. These figures are based on a survey of 23 local building departments with an average time to conduct plan review and on-site inspections of five hours for commercial projects and 1.9 hours for residential projects. The authors of the study acknowledge that the cost estimates are only representative of personnel time and are exclusive of overhead, benefits, or travel cost (for on-site inspection), which could triple or quadruple the figures.

Since CEP cities are all considered medium to large cities and will typically have higher overhead and labor costs, they should estimate \$400–\$500 per new commercial building and \$150–\$200 per new single-family residential home as the full cost of enforcing the energy code.

To put this in perspective, since the national average cost to construct a 2,400-square-foot single-family home is \$268,000, energy code enforcement would increase costs by 0.06 to 0.075 percent. The relative cost increases in the commercial sector are even less. At construction costs of roughly \$181 per square foot, a 100,000-square-foot office building would cost about \$18 million to build; to cover energy code enforcement, permit fees would need to be raised by \$400–\$500, an increase of 0.0022 percent to 0.0027 percent in the total cost of construction.

Note that the numbers quoted above are rough numbers meant to add perspective. In each city, the buildings department will need to assess its prospective staffing needs and the associated costs.

Cities that have been most successful at enforcing the energy code are those with dedicated staff reviewing plans and conducting on-site inspections for energy code compliance. In cities where building department functions are funded through the general fund, city leadership should look for ways to provide adequate staff for energy code enforcement. Ensuring the proper enforcement of the energy code is one of the most basic ways for



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Using Technology for Codes Compliance

For more information on [STREAMLINING COMPLIANCE](#), review this case study.

[VIEW CASE STUDY >](#)

For ways cities can use technology to improve compliance, read this case study: [STREAMLINING COMPLIANCE PROCESSES](#).

[VIEW CASE STUDY >](#)



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Case Study

For more information on holding design professionals accountable for codes compliance read [DESIGN PROFESSIONAL ACCOUNTABILITY](#).

[VIEW CASE STUDY >](#)

cities to achieve their building energy efficiency goals. Where additional city funds are not available, cities should look for other potential funding mechanisms, such as the local utility.

Holding design professionals more accountable for ensuring code compliance is another way to relieve some pressure on staffing constraints. For more information, read the case study: [Design Professional Accountability](#).

SUBMITTAL DOCUMENTS AND PLAN REVIEW

Submittal documents are those that are required to be submitted to obtain a permit for a construction or renovation project. The submittal documents should contain all the information necessary to verify that the design of the project is in compliance with the city's building energy code. Submittal documents may include building plans, specifications, compliance software reports, and other evidence supporting compliance. The first course of action for ensuring the appropriate documentation is to clearly communicate what is required to be submitted. The required submittal documents should be clearly outlined on the building department's website.

During the plan review process, most of the submittal documents are checked to determine compliance with the energy code. A thorough plan review process is critical to ensuring that any compliance issues with the building design are identified and corrected before construction commences. This is the first line of defense for ensuring energy code compliance. However, all of the challenges listed in the [Challenges Facing Building Departments section](#), can derail an effective plan review process. In particular, limited resources and inadequate training can have a significant impact. If building department staff members are stretched thin, they often don't have adequate time to do a thorough plan review. Similarly, if they don't have the appropriate training, they may not catch building elements that are non-compliant.

✓ SUBMITTAL DOCUMENTS AND PLAN REVIEW: IMPROVEMENT STRATEGIES

Improved and Standardized Documentation

Cities should conduct a plan of all new construction and major renovation projects for energy code compliance. This can be done either by city staff or by third parties. The time it takes to review plans for compliance can be greatly reduced by standardizing the way energy code compliance is documented.

The most critical improvements to make for submittal documents and plan review are clearly articulating, on the building department's website, what is required on the building plans and what documents need to be submitted to verify energy code compliance; and creating a documentation strategy that locates all of the essential energy code information in one place, so that the plan reviewer can find it more easily.

The lack of such clear documentation requirements is one of the most significant impediments to documenting or improving energy code compliance rates.

Utilizing Third Parties



CASE STUDY

Use of Third Parties

For more information on using third parties for plan review, view the Insitute for Market Transformation case study, [THIRD-PARTY PLAN REVIEW](#), on residential performance testing.

[VIEW CASE STUDY >](#)

Although having dedicated in-house staff to conduct energy code compliance reviews is typically the first option, another alternative strategy that has proven effective at addressing the challenges of a thorough plan review is [the use of third parties](#). Because construction volumes within any city often ebb and flow, third parties can act to relieve building department staff when volumes are high. The strategies for utilizing third parties are as follows:

- The city contracts directly with a third-party provider for all or some energy code plan review, or
- The city simply approves third-party providers that a developer or design professional can contract directly.

Cherry Hills Village, Black Hawk, and the City of Central, cities in Colo., each contract with a private third party to handle plan review, permitting, and inspection. In contrast Washington, D.C. approves third parties directly. In doing so, Washington D.C. approves third parties to provide plan review services directly to design professionals and developers, which relieves the building department from doing a full plan review, thereby expediting the approval process. When using this type of third-party program, the city should ensure that it conducts annual quality assurance audits on plans reviewed by third parties. Additionally, third parties can be utilized for complex plans or for the review of projects using an energy modeling approach to demonstrate compliance because these types of projects often take longer to review and may require specific expertise.

ON-SITE INSPECTION

On-site inspection occurs at various intervals during the construction project. The purpose of on-site inspection is to verify that what is being constructed complies with the approved design and the city's construction codes. On-site inspections are the second and typically the last line of defense in ensuring compliance with the energy code.

Limited resources and inadequate training often make identifying code violations difficult. Limited resources mean inspectors have less time to conduct inspections and may only verify a limited number of code requirements. Inadequate training often means inspectors are not up to speed on the most recent code requirements and therefore cannot verify compliance. Because on-site inspections require multiple visits to construction sites, often by multiple inspectors, they require careful coordination and planning. Building departments don't typically have an "energy code inspector," but rather the various requirements in the energy code are split among the existing inspector disciplines. (For small-scale residential projects, it is more common to have multi-discipline inspectors.)

Inspector disciplines typically include mechanical, electrical, plumbing, and structural. Under this type of inspection regime, the structural inspector may be expected to inspect for the air-sealing and insulation provisions in the energy code; while the mechanical inspector would be expected to look for duct insulation; the plumbing inspector for hot water pipe insulation and the electrical inspector for the lighting requirements. This type of single-discipline regime requires careful coordination among different inspectors to make sure it is clear what each is responsible for inspecting. It also requires a targeted training program that is specific to the code requirements of each discipline. Refer to the [Training and Technical Assistance section](#), for more information.

✓ ON-SITE INSPECTIONS: IMPROVEMENT STRATEGIES

The strategies for improving energy code compliance with on-site inspections are very similar to those for plan review. It is critical to communicate what inspections are required and when in the construction process they are required. As for plan review, it is ideal to have in-house staff conducting on-site inspections, but third parties can take on varying roles.

Clearly Communicate Required Inspections

A critical best practice for improving compliance with on-site inspections is to provide very clear direction on what inspections are required, when in the construction process they are to be conducted, and what energy code provisions will be verified. Clearly communicating this information to builders and trades will make it more likely that the items to be verified are complete and the inspector is called at the right phase of construction. Additionally, listing the most common and frequently cited code violations on the building department website is a great way to save the inspector a second trip to a job site for re-inspection.

Clearly communicate to the builder what inspections are required, when in the process they are required, and what energy code provisions will be verified.

Options for Conducting Inspections

There are three common options for cities to conduct on-site inspections of construction projects for energy code compliance. The options are:

- City staff conduct inspections
- Third parties working on behalf of the city conduct inspections
- Third parties working on behalf of the building owner conduct inspection

The third-party inspection options are the most common, but cities should be aware that there are many other hybrid variations. One role that third parties are commonly filling during on-site inspection is performance testing and commissioning. Building commissioning as well as air leakage testing of the building envelope and ductwork are time-intensive activities that require specialized equipment and knowledge making them an ideal candidate for third-party verification. Where third parties are utilized for all or some energy code inspections, the building department should ensure it provides periodic quality assurance on the third parties. Quality assurance checks are recommended on an annual basis and can be funded by charging third parties a small fee to be registered as a third-party provider in the city.

RENOVATION PROJECTS

Nationally, renovations, alterations, and additions to existing buildings contribute 86 percent of building construction expenditures. It is forecasted that 150 billion square feet, approximately half of the current building stock in the United States, will be renovated by 2035.

It's important to note that all of the elements already discussed also pertain to renovation projects. Renovation projects need clear guidance on what submittal documents are required, a thorough plan review, and on-site inspections. However, many compliance issues associated with renovation projects come from a lack of clarity in how the energy code applies. Aside from thorough plan review and inspections, improving compliance of renovation projects should involve the clarification of what the requirements are and when they apply.



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Third-Party Performance Contracting

For more information on third party performance testing, view the [GEORGIA CASE STUDY](#) on residential performance testing.

[VIEW CASE STUDY >](#)

For the third party performance testing, view the [CASE STUDY ON AUSTIN, TEXAS](#).

[VIEW CASE STUDY >](#)

✓ RENOVATION PROJECTS: IMPROVEMENT STRATEGIES

As mentioned above, clarifying what energy code requirements apply to renovations, and how they apply, is key to improving compliance rates. One of the main issues to be clarified is the compliance trigger for various types of renovations. For discrete components, such as windows, the answer is simple: if you replace a window, the new one has to meet the current energy code. Where things get complex is for continuous systems, such as roofs or HVAC systems. If, for example, you are replacing 100 square feet of roofing on a 10,000-square-foot roof, do you have to insulate that small section to meet the energy code? And if you are replacing half of the roofing or more, is there a point at which you would be required to bring the whole roof up to meet the energy code?

Clarifying what energy code requirements apply to renovations, and how they apply, is key to improving compliance rates.

TRAINING AND TECHNICAL ASSISTANCE

Training is often viewed as the most effective way to achieve higher compliance rates. Inadequate training is listed as one of the challenges in achieving successful compliance rates, but considering the other challenges with improving compliance it should be obvious that training alone cannot solve the problem. The failure of most training programs hinges on their inability to provide appropriate information to a targeted audience. For example, single-discipline inspectors, as discussed above, are typically only interested in the requirements for their specific discipline and should therefore receive training targeted only to their discipline. Training also needs to extend beyond building department staff to cover industry as well.

Targeted training programs helps improve compliance, but technical assistance is also a valuable resource. Having an expert energy code resource available to building department staff gives them a place to turn when they have difficult compliance questions.

It's important to note that before embarking on an extensive training program for industry, building department staff should be trained and enforcing the code. Enforcement is much more effective at achieving compliance and having a good enforcement infrastructure in place will drive demand for, and attendance at training events. If the city is not enforcing the code, it often won't matter that the design professionals are trained on the code requirements.

✓ TRAINING AND TECHNICAL ASSISTANCE IMPROVEMENT STRATEGIES

Training Assessment

During a baseline assessment, the evaluator should be able to gauge the level of energy code knowledge among building department staff and industry. Recommendations from the assessment report should be used in developing a training plan. If the baseline assessment report did not include recommendations for training, the building department should conduct a survey of training needs within the department and among industry stakeholders.

A training assessment should include the traditional groups of builders, designers, plans examiners, inspectors, and trades since these are the professionals that need to have an in-depth technical knowledge of the energy code requirements. However, the training assessment should also involve the often overlooked stakeholders, including city officials (elected and administrative), realtors, building material suppliers, manufacturers, utilities, system benefit providers, and community groups. The assessment should determine where each group needs to be educated, and what methods of delivery would be most effective, (i.e., in the field, classroom, or online).

Technical energy code training that covers design and construction requirements will not be appropriate for groups such as city officials, realtors, utilities, and community groups that often are not concerned with detailed technical requirements. The assessment should take into consideration the differences and needs among the technical and non-technical stakeholders and develop strategies accordingly.

Funding, Developing, and Delivering an Effective Training Program

After the assessment of training needs has been completed, the building department should consider strategies for funding the training activities. One of the major barriers to developing effective training programs is the cost involved in developing and delivering the training. Building departments should consider the following strategies for delivering cost-effective training:

- There is no need to develop new energy code trainings from scratch. The U.S. Department of Energy (DOE) has energy code training modules that can be downloaded and modified for local conditions as required.
- Have appropriate department staff develop and deliver training to other staff members.
- Engage manufacturers, building suppliers, or industry associations such as local chapters of the International Code Council, American Institute of Architects, U.S. Green Building Council, ASHRAE, or local nonprofits with a focus on energy efficiency in buildings to provide training.
- Engage one or more local utilities to provide the training or funding for training sessions.
- Consider other municipal funding sources such as the Department of Environment or similar city agency with an interest in energy efficiency.
- Contact the state energy office to determine whether the state's energy program funding can be used to provide training within your jurisdiction.

Building departments should ensure that the training provided to staff is targeted to their needs. The same should also be done for industry stakeholders. Building departments should also consider having staff conduct industry trainings. Doing so allows industry stakeholders to see code officials as authorities on a subject and interact with them outside of just issuing code violations.

If a baseline compliance assessment identifies numerous areas in need of training, building departments should consider phasing in the areas that need attention, so staff and industry have time to learn and properly implement just a few new requirements at a time. This successful strategy was used in Parker, Colo. Parker set delayed enforcement dates for more complex code requirements, which allowed the city time to provide training prior to enforcement. Once the enforcement date passed, the building department strictly enforced the requirements.



ENFORCEMENT

Cities often question whether enforcement or training and outreach are more effective at driving high compliance rates. Although training is very important to get code officials and industry stakeholders informed on the code requirements, enforcement is much more effective at driving change. Cities need to be prepared to use their enforcement authority to ensure energy code compliance is achieved. For example, an [article in Crain's](#) on August 18, 2014 stated: “[New York City’s] Department of Buildings began auditing thousands of architectural plans for new and renovated office and residential buildings. The results have been staggering: nine of every 10 have failed to meet the energy code, a set of standards that have been on the books for more than 30 years but are only now being enforced in earnest.” This finding comes despite many years of training and outreach on New York City’s energy code requirements.

The strategy of phasing in energy code requirements, discussed above, can be an effective way to implement a comprehensive enforcement program, but enforcement must be taken seriously by the building department to drive higher compliance rates. The building department must reject building plan submittals that do not meet energy code requirements and fail inspections that are not in compliance. When design professionals, builders, and trades know the city is serious about enforcing the energy code, they will get serious about ensuring their designs and construction practices are in compliance.



U.S. DEPARTMENT OF ENERGY CODES RESOURCES

Visit DOE’s Building Energy Codes Program training catalogue for a full collection of energy code training modules. These modules can be used as a starting point for developing simple energy code training presentations. Since these training modules are based on the national model codes (IECC and ASHRAE 90.1), they can be easily modified to reflect state or city amendments to those codes. To be most effective, it’s important for training programs to be as specific as possible to the local construction context and code requirements.

In addition to providing training for staff, building departments should also consider a technical assistance resource. This service can be offered through the organization that conducts the training or through other mechanisms such as the state codes office, state energy office or other organization with expertise in energy codes. DOE’s Building Energy Codes Program also has a [HELP DESK](#) that can be used to answer energy code questions. Providing a technical assistance resource allows building department staff to call on someone with deep expertise in energy codes to answer code compliance questions.

ONGOING QUALITY ASSURANCE AND IMPROVEMENT

Ongoing quality assurance is critical to confirming that compliance improvement activities are working. Quality assurance should include regular audits of plans and inspections and be conducted in accordance with the City Energy Project resource, [Assessment Methodology for Energy Code Compliance in Medium to Large Cities](#). These ongoing audits should be used to evaluate the effectiveness of previous training activities and inform future training efforts.

The International Accreditation Service (IAS), a subsidiary of ICC, offers a [Building Department Accreditation Program](#) (BDAP) which provides an independent verification that a building department operates under the highest ethical, legal, and technical standards. The IAS BDAP provides several criteria for quality assurance. Section 3.2.10 of the BDAP says the [building] department shall provide evidence of a comprehensive quality assurance program which shall contain, at a minimum, the following components:

- Frequent quality assurance activities
- Annual, or more frequent, internal quality audits
- Management review meetings

Furthermore, the criteria define a quality assurance plan as: “documents which set forth the policies and practices aimed at ensuring the quality of the organization’s services through the observation of work in progress or sampling of completed work.” And a quality assurance program is defined as: “the agency’s system for maintaining minimum quality levels of service through a collection of self-imposed standards through activities such as internal quality audits, document creation and control, management reviews, etc.”

Building departments are encouraged to follow these requirements and should consider accreditation through IAS.



CONCLUSION

Improving energy code compliance is a highly cost-effective and practical strategy to improve the energy efficiency of a city's building stock. Low compliance rates mean the consumer benefits of the adopted energy code are not being realized and building owners are slapped with years of higher utility bills and structures built below standard. Although building departments face many challenges that inhibit better compliance rates; these challenges can be overcome when building department staff and city leadership work together to develop and implement a plan for improvement. City leadership should realize that achieving high energy code compliance is a simple and smart way to improve building energy efficiency and achieve the city's energy and sustainability goals.



ABOUT THE INSTITUTE FOR MARKET TRANSFORMATION AND THE NATURAL RESOURCES DEFENSE COUNCIL

ABOUT THE INSTITUTE FOR MARKET TRANSFORMATION

The Institute for Market Transformation (IMT) is a national 501(c)(3) nonprofit organization that catalyzes widespread and sustained demand for energy-efficient buildings. Founded in 1996 and based in Washington, D.C., IMT specializes in driving the intersection of real estate and public policy to make buildings more productive, affordable, valuable, and resilient. A trusted, non-partisan leader, IMT focuses on innovative and pragmatic solutions that fuel greater investment in energy-efficient buildings to meet local market priorities. IMT offers hands-on technical assistance and market research, alongside expertise in policy and program development and deployment and promotion of best practices and knowledge exchange. Its efforts lead to important policy outcomes, widespread changes in real estate practices, and lasting market demand for energy efficiency—resulting in greater benefits for all people, the economy, and the environment. Visit us at www.imt.org and follow us on Twitter [@IMT_speaks](https://twitter.com/IMT_speaks).



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