

ACE

LEARNING SERIES


ADOPTION,
COMPLIANCE
& ENFORCEMENT

Building Energy Codes OVERVIEW



Building Energy Codes





Buildings account for almost 40% of the energy used in the United States and, as a direct result of that use, our environment and economy are impacted. Building energy codes and standards provide an effective response. The Building Energy Codes Program designed the Adoption, Compliance, and Enforcement (ACE) Learning Series for those in the building industry having the greatest potential to influence the adoption of and compliance with building energy codes and standards. Each toolkit in the ACE Learning Series delivers essential information to enable designers, specifiers, builders, building owners, policy makers, code officials, and others involved in building design and construction to understand the important role building energy codes play in helping us all address our energy, economic, and environmental challenges.



Building Energy Codes **OVERVIEW**

Prepared by:
Building Energy Codes Program

The U.S. Department of Energy (DOE) Building Energy Codes Program (BECP) is an information resource on building energy codes and standards, providing robust products and services to support adoption of, compliance with, and enforcement of those codes. The BECP works with other federal agencies, state and local governments, organizations that develop model codes and standards, those that design and construct buildings, and the building industry at large to promote codes that will address our energy, economic, and environmental challenges.

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For more than 35 years, DOE's Building Technologies Program (BTP) has championed the development of energy-efficient products and approaches to building design and construction—building technology—and fostered their application and use in the market.

As an integral part of BTP, BECP plays an important role in the acceptance and use of building technology by supporting the development and improvement of energy codes that, when adopted, implemented, and satisfied, create demand for their application and use. Advances in building energy efficiency such as cool roofs, new lighting technologies, and innovative design practices fostered by BTP have an increased impact due to BECP's support for the adoption of, compliance with, and enforcement of energy codes.

In the United States, residential and commercial buildings account for 40% of all energy use and 70% of electricity use. Energy codes that are adopted and satisfied result in less energy use, reduced environmental impacts, and a reduction in energy bills that accrue during the life of every building. In addition, they provide an increase in the resale value of buildings.

Over the last 20 years, BECP has assisted in reducing the nation's annual energy use by more than 0.3 quads and saving consumers more than \$15 billion.

The rate of new building construction and existing building additions or renovations does not allow us to be lax in applying energy codes as an integral tool to address our energy, economic, and environmental challenges. For that reason, the BECP has developed the ACE Learning Series and will continue to support enhancements to buildings through energy codes.



Building energy codes and standards are key to a clean and sustainable energy future.



Building energy codes and standards (hereinafter referred to as energy codes) are minimum energy-efficiency requirements for the design and construction of new buildings and additions and renovations to existing buildings. Energy codes are an integral part of what are called building construction regulations or, more generally, building codes that govern all aspects of buildings from structural integrity to electrical safety and fire protection.

The two most widely adopted energy codes are the International Energy Conservation Code (IECC) and ANSI/ASHRAE/IES Standard 90.1 (ASHRAE Standard 90.1). The IECC applies to all buildings. ASHRAE Standard 90.1 applies to commercial buildings, which are considered buildings other than single-family dwellings and multifamily buildings three stories or less in height above grade (e.g., residential buildings).

The IECC adopts ASHRAE Standard 90.1 by reference, allowing it to be used and, in some instances, requiring it to be used in lieu of the provisions in the IECC.

Once adopted, these codes are required to be satisfied as a condition for building approval and occupancy; those adopting them, generally state and local governments, will conduct activities to ensure compliance. When adoption of and compliance with energy codes is achieved, buildings will use less energy, helping to reduce our nation's dependence on foreign energy sources and bolstering our economy while addressing our increasing environmental challenges.

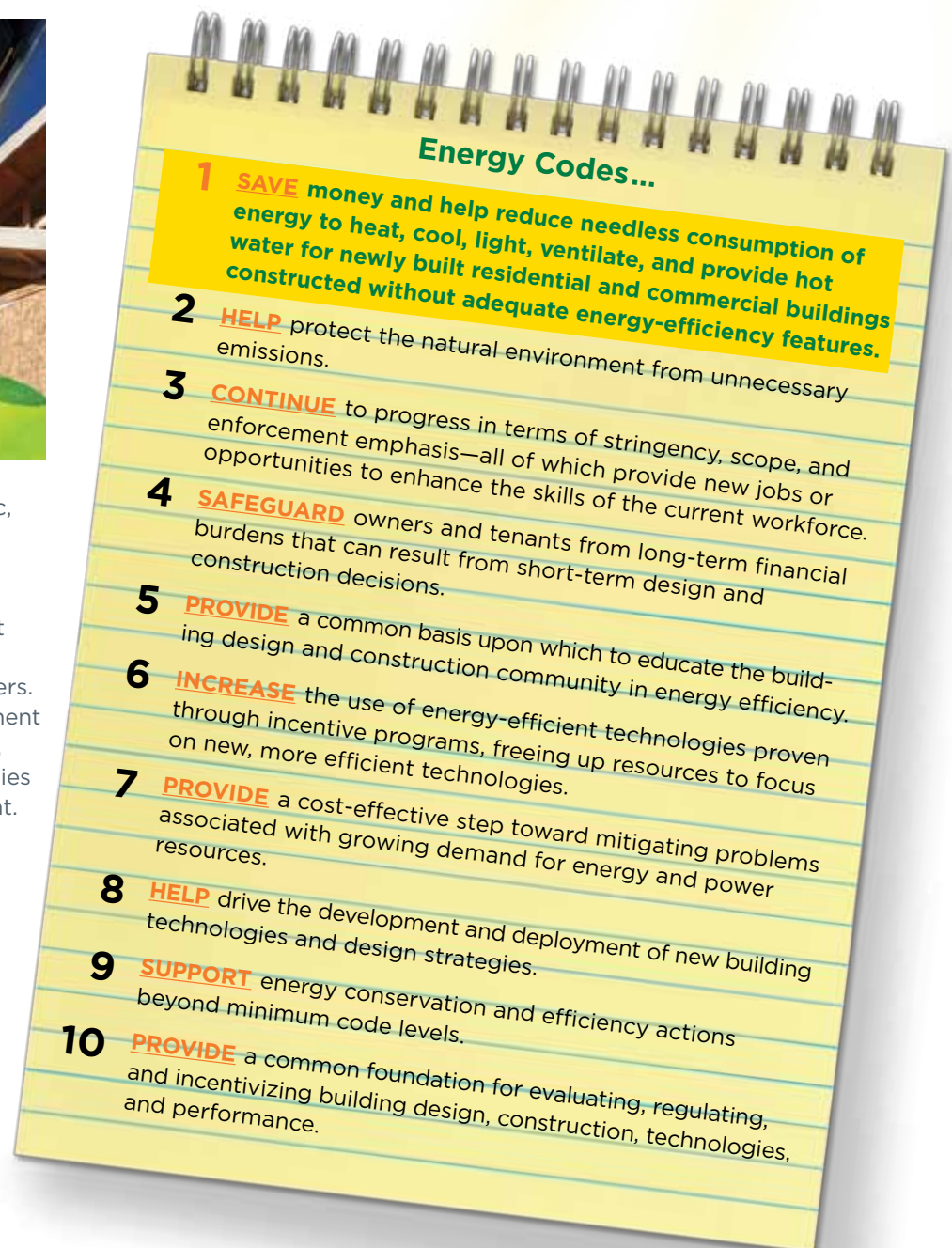
This ACE Overview provides a high-level view of energy codes—what they are, their value, and their application. It also serves as a starting point from which to secure additional details on adoption, compliance, and enforcement from ACE toolkits focused on those topics. Whatever your role with buildings—designer, specifier, builder, contractor, product developer, policy maker, elected official, code official, building owner or developer, or consumer—having a firm grasp of energy codes is fundamental to ensuring buildings meet our needs while concurrently using less energy.

By making conscientious efforts to reduce building energy use through energy codes, we help improve the economy and U.S. competitiveness and reduce the impact of buildings on the environment.

The projected energy savings attributable to energy codes translates into an estimated cumulative savings of 800 million metric tons of carbon dioxide by 2030—that's equivalent to removing 145 million vehicles from our nation's roadways. Here are the top 10 reasons for adopting and implementing energy codes.



Today's global energy, economic, and environmental challenges necessitate a U.S. strategy identifying a suite of energy-efficiency-related initiatives that is implemented by the building industry and relevant stakeholders. Energy codes are a core component of that strategy and, in addition, have an impact on other strategies to improve our built environment.



Both the IECC and ASHRAE Standard 90.1 are maintained and updated in open public forums. The openness and transparency of these processes is critical to widespread acceptance of the resulting IECC and ASHRAE Standard 90.1. Stakeholders representing a cross section of interests are involved in maintaining these documents and include:

- The design community, including architects, lighting designers, and mechanical and electrical engineers
- The code enforcement community, including code officials, plan reviewers, and inspectors from state and local building regulatory agencies
- Policy makers
- Builders and contractors
- Building owners and operators
- Industry and manufacturers
- Utilities
- Energy advocacy groups
- The academic community
- Federal agency staff, including DOE.

IECC

The IECC is developed by the International Code Council (ICC) using a government consensus process. Anyone is eligible for service on the IECC residential or commercial committees, can submit proposed changes to the IECC, and can actively participate in public hearings and public comment processes from which a newer edition of the IECC is created. As a governmental consensus process, the final vote on all code changes is made by the governmental member representatives and honorary members.



The IECC is one of 15 codes developed by the ICC that represent a complete set of building construction regulations. ICC codes are updated every 3 years, providing a model code that jurisdictions can adopt as is or modify. Because the IECC is written in mandatory, enforceable language, state and local jurisdictions can easily adopt, implement, and enforce the IECC as their energy code.

ASHRAE

ASHRAE Standard 90.1 is developed jointly by ASHRAE and the Illuminating Engineering Society (IES) using a consensus process that meets the requirements of the American National Standards Institute (ANSI).

Anyone may participate in the process by submitting a continuous maintenance proposal, addressing the committee or its subcommittees during their deliberations, or submitting comments on proposed changes to the standard during the public review process. The final vote as to the acceptability of a change to ASHRAE Standard 90.1 is made by the committee responsible for updating and maintaining the standard. Revisions to the standard occur on an ongoing basis and are not approved without a favorable vote of the ASHRAE Standard 90.1 committee and confirmation of conformance with procedures by the ASHRAE Standards Committee. Publication of the standard occurs every 3 years.

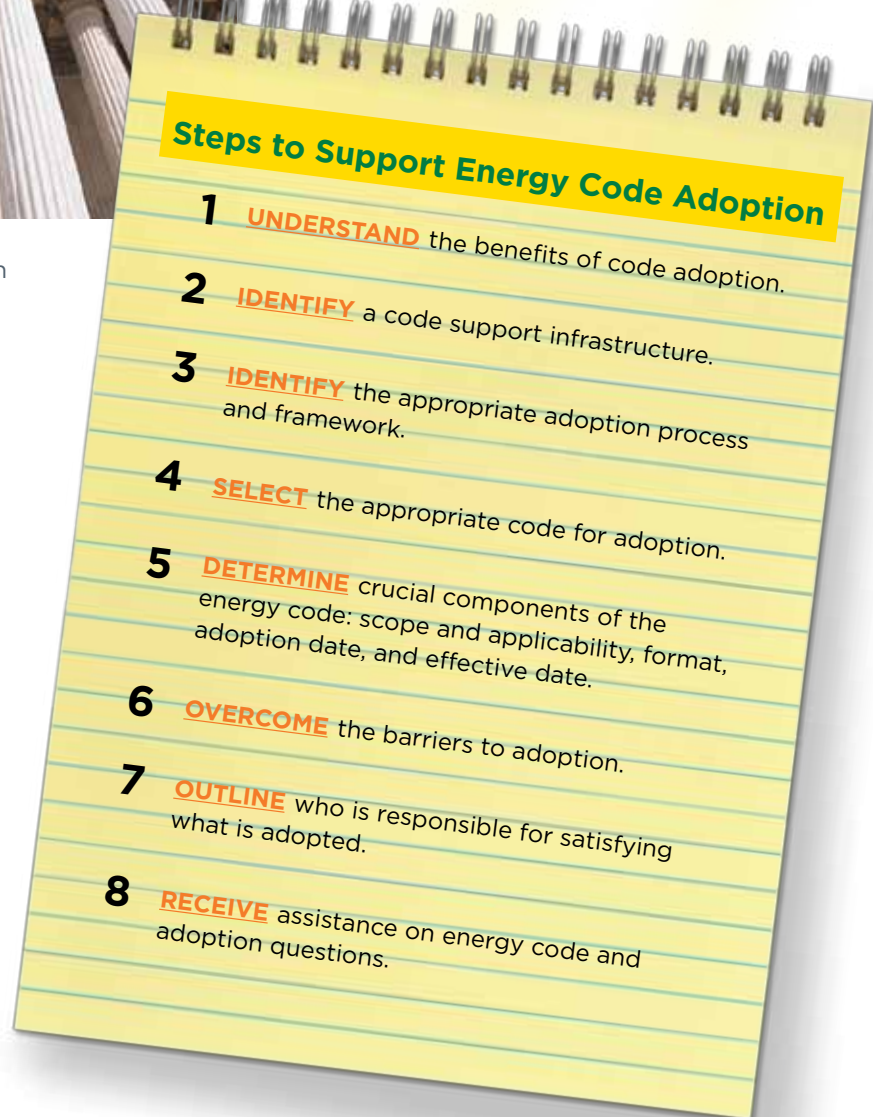
Before adopting the IECC or ASHRAE Standard 90.1, state and local governments often make changes to reflect regional building practices or state-specific energy-efficiency goals.



Adoption of energy codes can occur directly through legislative action or by regulatory action through agencies authorized by the legislative body to oversee code development and adoption.

BECP focuses primarily on adoption by states and jurisdictions. The program provides technical assistance and support to assist with the adoption of energy codes and ensure that, once adopted, those documents can be readily complied with and enforced.

Successful code adoption occurs when a variety of political, economic, and technical challenges are overcome. One key component is ensuring the use of suitable code language. Easily understood and enforceable language not only contributes to successful code adoption but also influences compliance and enforcement efforts.



Energy code compliance must be achieved to realize the considerable benefits inherent in energy codes. BECP supports successful compliance by making no-cost compliance tools, REScheck™ and COMcheck™, and other resources widely available to everyone. BECP has also developed several

resources to help states uniformly assess the rate of compliance with their energy codes for residential and commercial buildings. It is important to note that regardless of the level of enforcement, as a law the building owner/developer is ultimately responsible to comply with the energy code.

Steps for Compliance

- 1 **KNOW** which energy code is applicable to a particular project.
- 2 **CHOOSE** a compliance path within the applicable energy code.
- 3 **KNOW** the requirements of the applicable energy code.
- 4 **DESIGN** a building to meet the requirements of the applicable energy code.
- 5 **DOCUMENT** the design of the building in plans and specifications.
- 6 **CONSTRUCT** the building to meet plans and specifications.
- 7 **DOCUMENT** the “as-built” building in plans and specifications.
- 8 **MAKE SURE** the building operates as intended by the designer.
- 9 **PROVIDE** energy code compliance documentation to the code official and building owners.
- 10 **GET** assistance on energy code and compliance questions.



Compliance will be increased if the adopting agency prepares the building construction community to comply with the energy code and provides resources to code officials to enforce it.

Enforcement of Energy Codes

CHAPTER 6

Adopting energy codes is important, but enforcement is critical. Without mechanisms to ensure and verify compliance, the benefits associated with energy codes will not occur. Enforcement strategies vary according to the regulatory authority, resources, and manpower of a state or jurisdiction.

STATE ENFORCEMENT

States generally enforce the energy code for state-owned or state-financed construction, although in some states the energy code is enforced by a state agency for certain building types or locations. Where states enforce the energy code, state resources determine the extent to which plans are reviewed and actual construction is inspected for compliance.

LOCAL ENFORCEMENT

Where adopted by local government or when the state adoption process delegates enforcement to local government, local building regulatory agencies will generally conduct plan review and construction inspection.

However, as with states, the availability of resources determines the extent and degree of scrutiny to which plan reviews and construction inspections can be

performed. Because jurisdictional resources and construction types and amounts vary, the rates of compliance may vary across a state.

Enforcement ensures compliance with the code and is critical to securing the energy, environmental, and economic benefits inherent in the code.

Steps to Enforcement

- 1 **KNOW** the requirements.
- 2 **IDENTIFY** which code and compliance path were used.
- 3 **REVIEW** the design.
- 4 **INSPECT** the building during and after construction.
- 5 **OBSERVE, REVIEW, AND ENSURE** testing, commissioning, and owner documentation.
- 6 **GET HELP** when you need it.



Beyond the energy codes are stretch, green, or sustainable codes and associated labeling programs.

Codes are written to lend themselves to mandatory enforcement as regulations, while rating systems are written to lend themselves to being adopted and applied in a voluntary manner. However, in recent years, stretch, green, or sustainable codes or rating programs have been adopted as either mandatory or voluntary by local jurisdictions, states, or federal agencies. Building energy is an important feature of these codes and programs and may include design elements such as green roofs, orientation, siting, and hardscape features.

Progressive states and local jurisdictions with a focus on energy efficiency and/or sustainability are increasingly building upon the baseline energy codes and adopting beyond-code programs either as their minimum codes or

as a component of a program that provides incentives to those who comply. The programs are referred to in various terms—green building programs or codes, stretch codes, above-code programs, and beyond-code programs.

Four key components are associated with going beyond the energy code. These aspects can be increased beyond the minimum code: the scope of the buildings covered, the minimum requirements, the scope of building components covered, or the timeframe within which compliance is verified.



RELATIONSHIP BETWEEN BEYOND-CODE PROGRAMS AND THE BASELINE ENERGY CODES

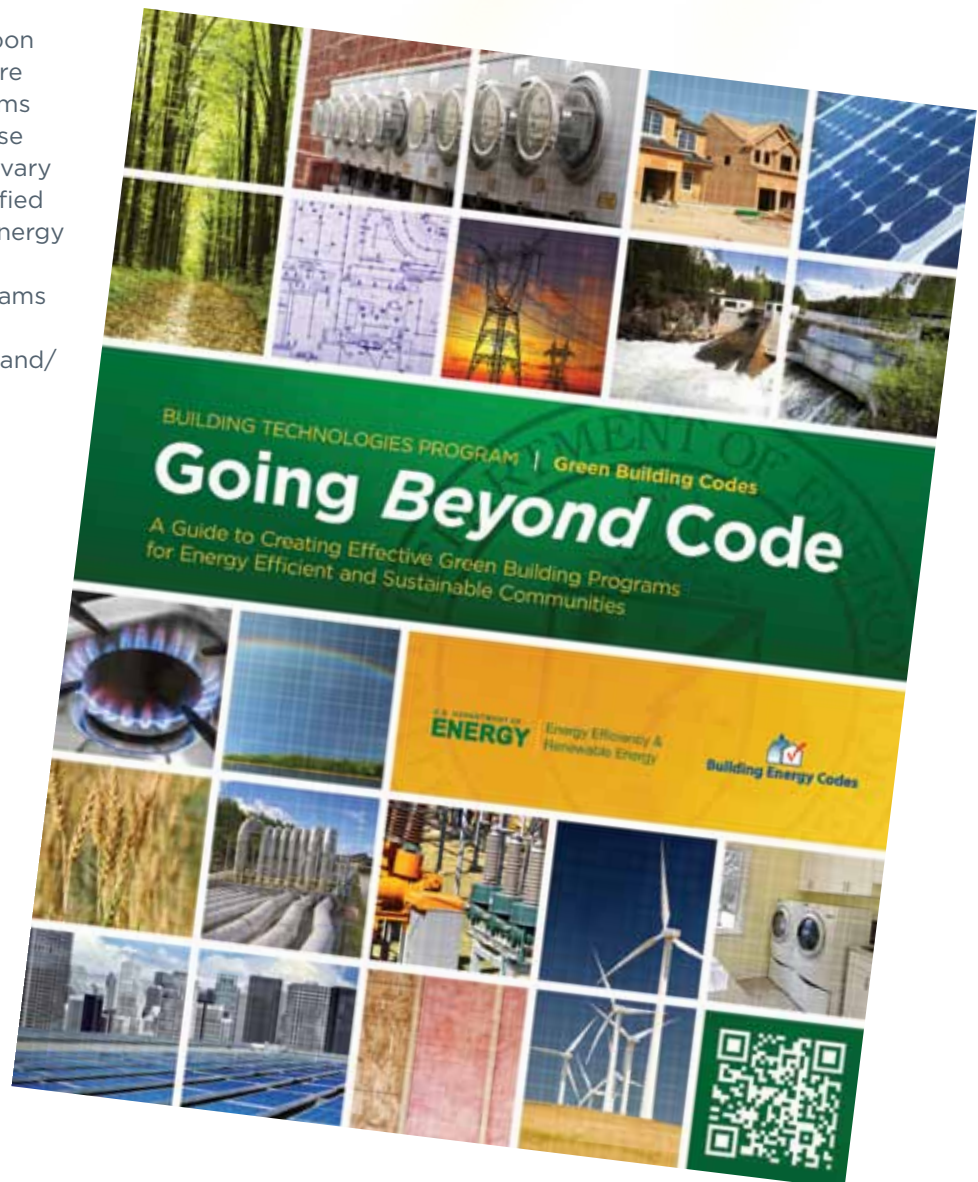
Designers, builders, plan review and inspection staff, and all interested parties still need to thoroughly understand the requirements of the underlying baseline energy codes when working with a beyond-code program.

Most beyond-code programs use the IECC and/or ASHRAE Standard 90.1 as a baseline upon which to build. Jurisdictions are both mandating these programs and offering incentives to those who voluntarily comply. They vary widely in scope—from a specified percentage improvement in energy efficiency above the baseline code to comprehensive programs that outline specific design, construction, commissioning, and/or operational requirements.

Beyond-code programs can serve as a proving ground to make efficiency improvements in the baseline codes. Building energy-efficient materials and methods that are included in beyond-code programs are often submitted as

proposed enhancements to the IECC or ASHRAE Standard 90.1. BECP's *Going Beyond Code* resource guide provides recommendations and guidance for the successful adoption and implementation of beyond-code programs.

The guide is available online at:
www.energycodes.gov/sites/default/files/documents/GoingBeyondCode.pdf



The impact of energy codes on our future is apparent. From environmental and resource conservation to national security, energy concerns, and our economic challenges, energy codes will continue to be a key component of a sound public policy.

For further information on building energy code adoption, compliance, and enforcement, review the ACE toolkits:

Adoption:

www.energycodes.gov/sites/default/files/documents/AdoptionToolkit.pdf

Compliance:

www.energycodes.gov/sites/default/files/documents/ComplianceToolkit.pdf

Enforcement:

www.energycodes.gov/sites/default/files/documents/EnforcementToolkit.pdf



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