Building Energy Codes 101

April 2023

What are Building Energy Codes?

Building energy codes and standards set efficiency requirements for new and renovated buildings, **enabling reductions in energy use and emissions** over the building life.

States or local governments can choose to adopt one of the national model energy codes, a modified version of the model code, or **develop their** own state-specific code.

Energy codes are part of the broader set of building codes, including fire, electrical, structural, and plumbing.

Energy codes are different than appliance and equipment standards. However, there is some overlap between the two.

From 2010-2040, model energy codes are projected to save

$138 billion
energy cost savings

900 MMT
of CO^2 emissions

13.5 quads
primary energy

These savings equate to the annual emissions of

195 million passenger vehicles

227 coal power plants

108 million homes

Benefits of Building Energy Codes

The latest model energy codes are over 30% more efficient than many state codes.

Who benefits from energy codes?

Building Owners

Buildings constructed to the latest standards are more comfortable, cost-effective, and resilient.

Homeowners and Occupants

Homes have lower utility bills, are more comfortable and resilient, and have lower environmental impact.

Construction industry

Only buildings built to the latest codes represent the latest technologies and construction standards.

Building officials

The public is protected and benefits when buildings are constructed to the latest codes and building standards.

Utilities

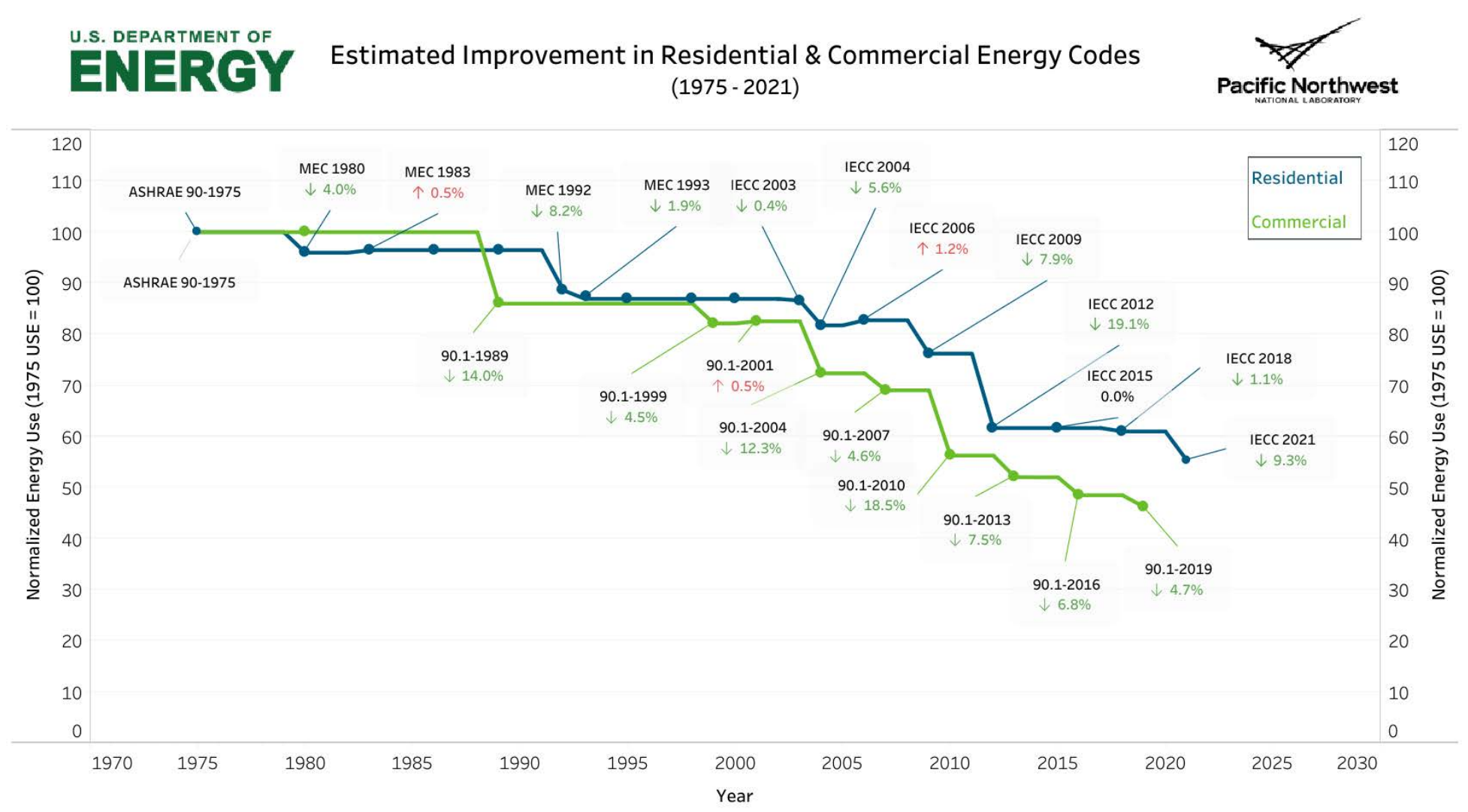
Cost-benefit data is accessible for attribution of savings to efficiency programs

State & Local governments

Codes help achieve reductions in energy demand and GHG emissions

Background and Historical Context

Building energy codes have reduced building energy use for over 40 years



Types of Model Building Energy Codes

National model energy codes are developed by **ASHRAE and ICC.**

DOE develops & **submits code change proposals** that strive to make cost-effective, energy efficient upgrades.

ASHRAE Standard 90.1 Commercial Model Code

Application: Commercial buildings and multifamily buildings 4-stories or greater

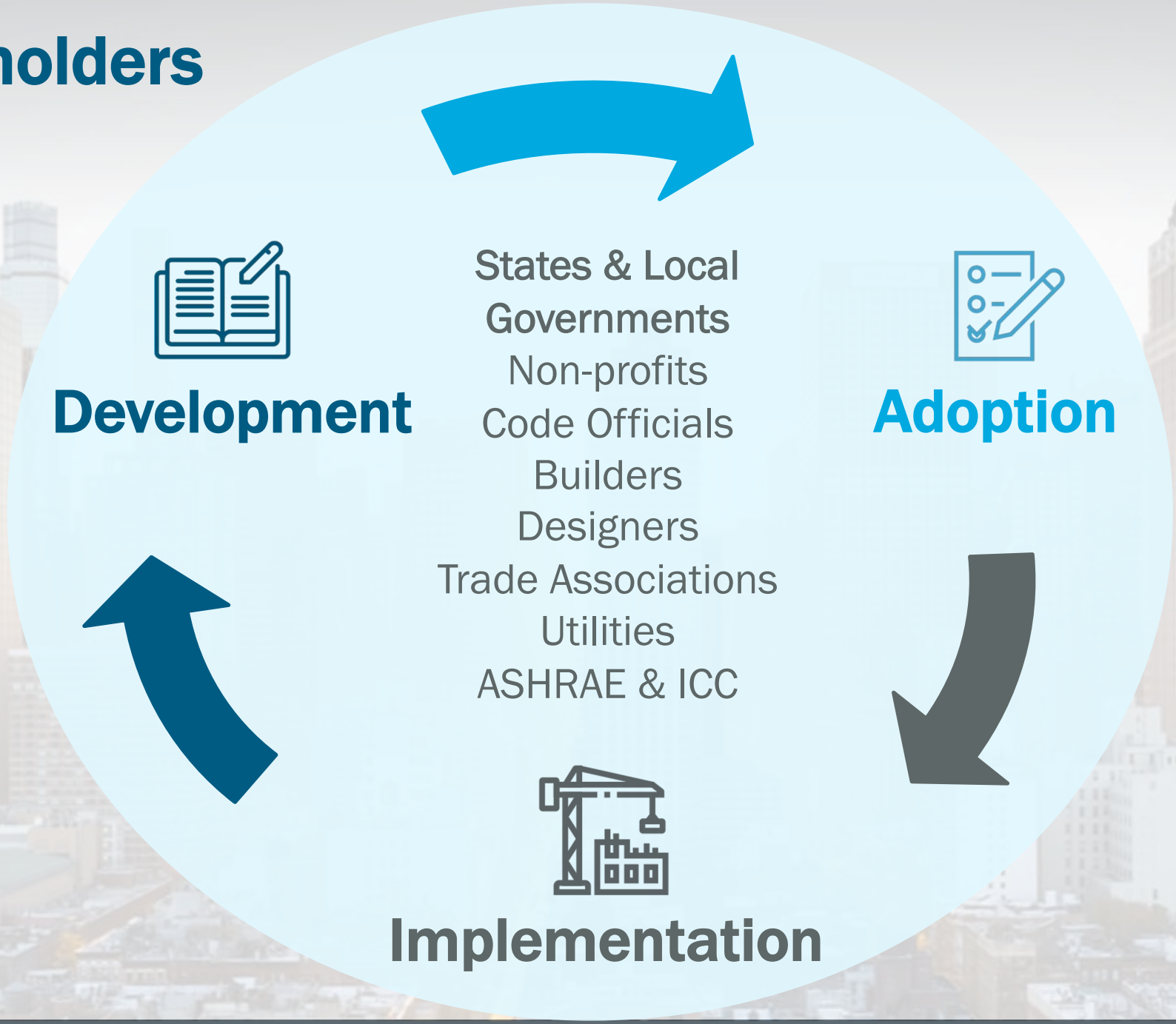
Development: Every three years approved addenda to the current edition are aggregated and incorporated into a new edition of Standard 90.1.

International Energy Conservation Code (IECC) Residential Model Code

Application: All residential buildings 3-stories or less

Development: The IECC is revised every three years through the ICC's standard development process.

Key Stakeholders



Energy Code Adoption

How it Works

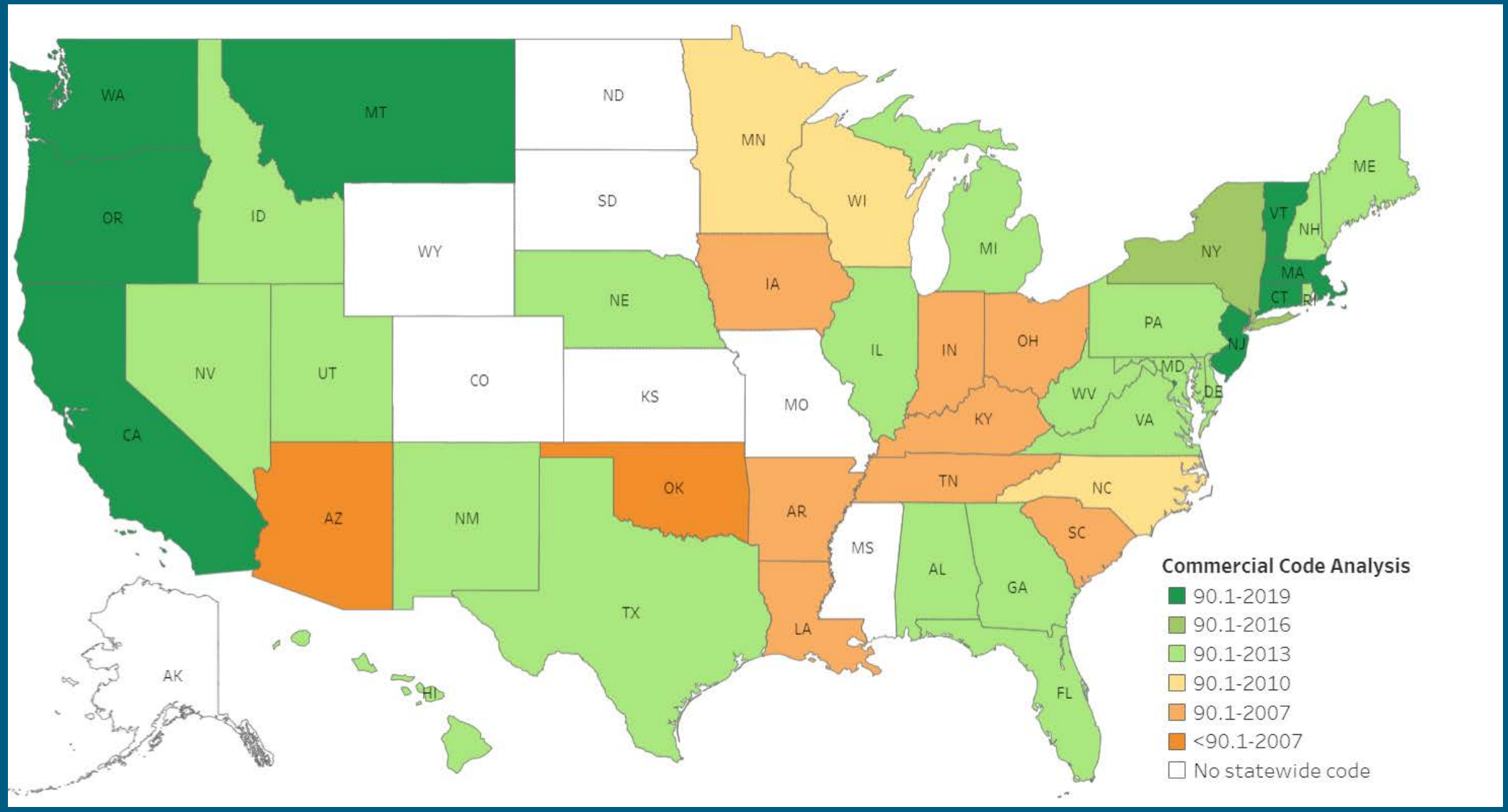
- Most codes are **adopted at the state level**, though, in about 10 states they are adopted by local jurisdictions.
- State adoption can occur **directly by legislative action**, or through regulatory agencies authorized by the legislature.
- Once adopted, the code **becomes law** within the particular state or local jurisdiction.

Energy Code Compliance

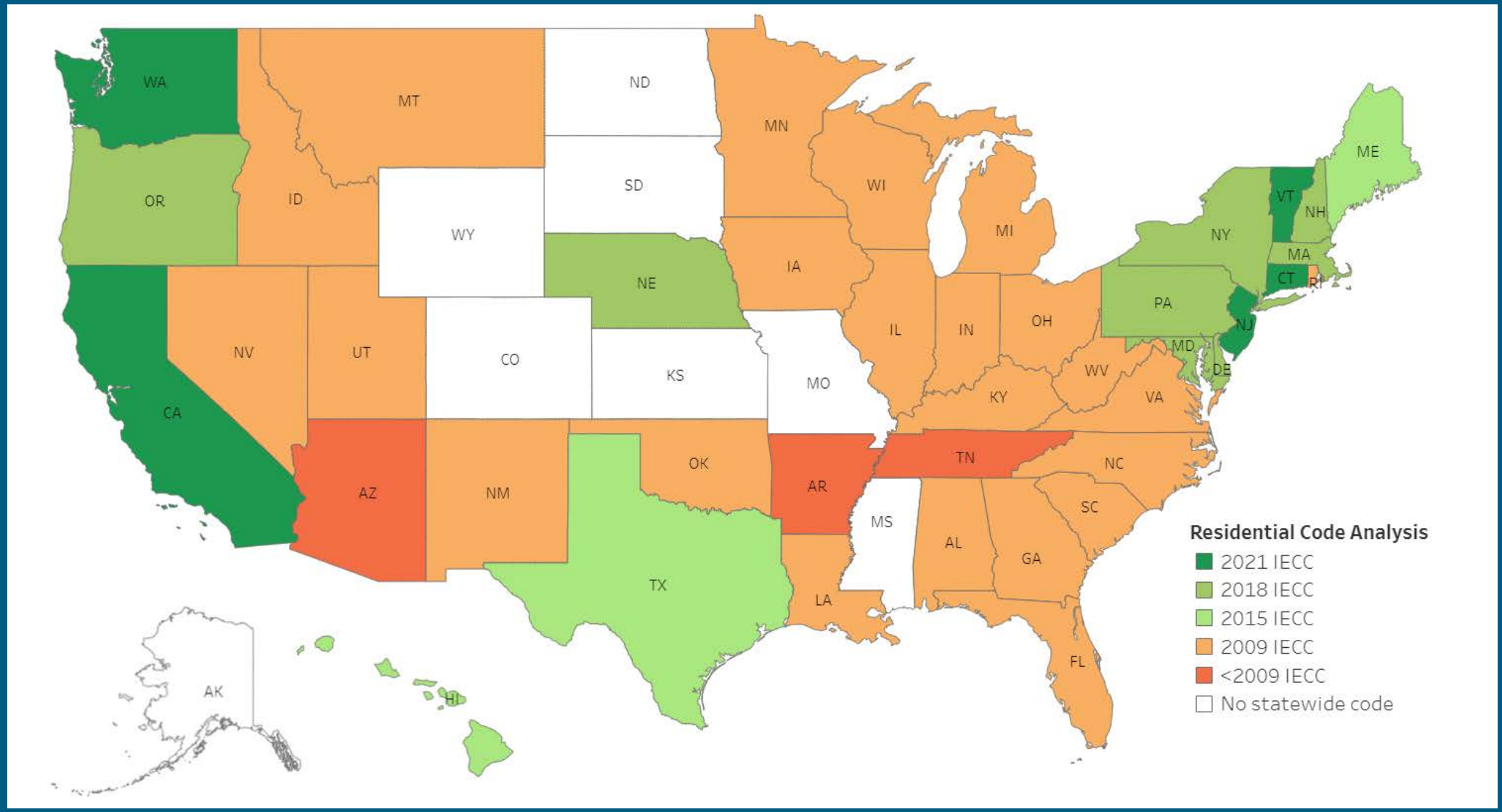
How it Works

- All new and renovated existing buildings are **required to achieve compliance** with the state/local energy code.
- **Education and training** supports code compliance among design and construction professionals, particularly after a new code is adopted.
- Enforcement is almost always done by **building permit office staff** at the local level who typically review plans first to ensure they are compliant and then conduct field inspections to verify that the plans are followed during construction.

Current State Adoption Status: Commercial



Current State Adoption Status: Residential



Stretch Codes

A stretch code is a locally mandated code or alternative compliance path that is more aggressive than base code, resulting in buildings that achieve higher energy savings.

DOE and PNNL are developing a series of technical briefs which can be incorporated as "plug-ins" to building energy codes. Many of these align with existing EERE programs and initiatives.

EV charging

Simplified HVAC system performance

Energy credits

Electric readiness

Grid-interactive efficient buildings

Plug-ins are available for adoption by state and local governments, as well as for incorporation into future model codes (editions of the IECC and Standard 90.1).

Building Energy Codes Program

Mission

To support building energy code development, adoption, implementation and enforcement processes to achieve the maximum practicable, cost-effective improvements in energy efficiency and decarbonization while providing safe, healthy buildings for occupants.

Directive

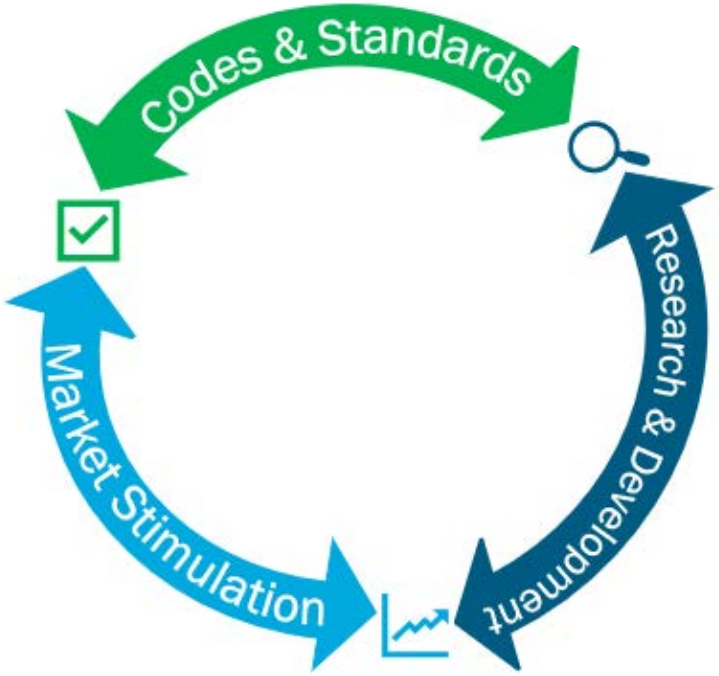
The Building Energy Codes Program is directed to:

- Participate in industry processes to develop model building energy codes
- Issue determinations as to whether updated codes result in energy savings
- Promulgate standards for federal buildings
- Provide technical assistance to states to implement their energy codes

How does BECP support the mission of BTO and EERE?

Increasing Energy Efficiency & Building Decarbonization

Developing advanced codes & standards built on cost-effective technologies



Leading By Example

Updating federal standards to ensure they're aligned with the latest design and construction practices

Realizing the Benefits of Codes

Supporting states and local governments to implement updated energy codes

Ensuring Environmental Justice

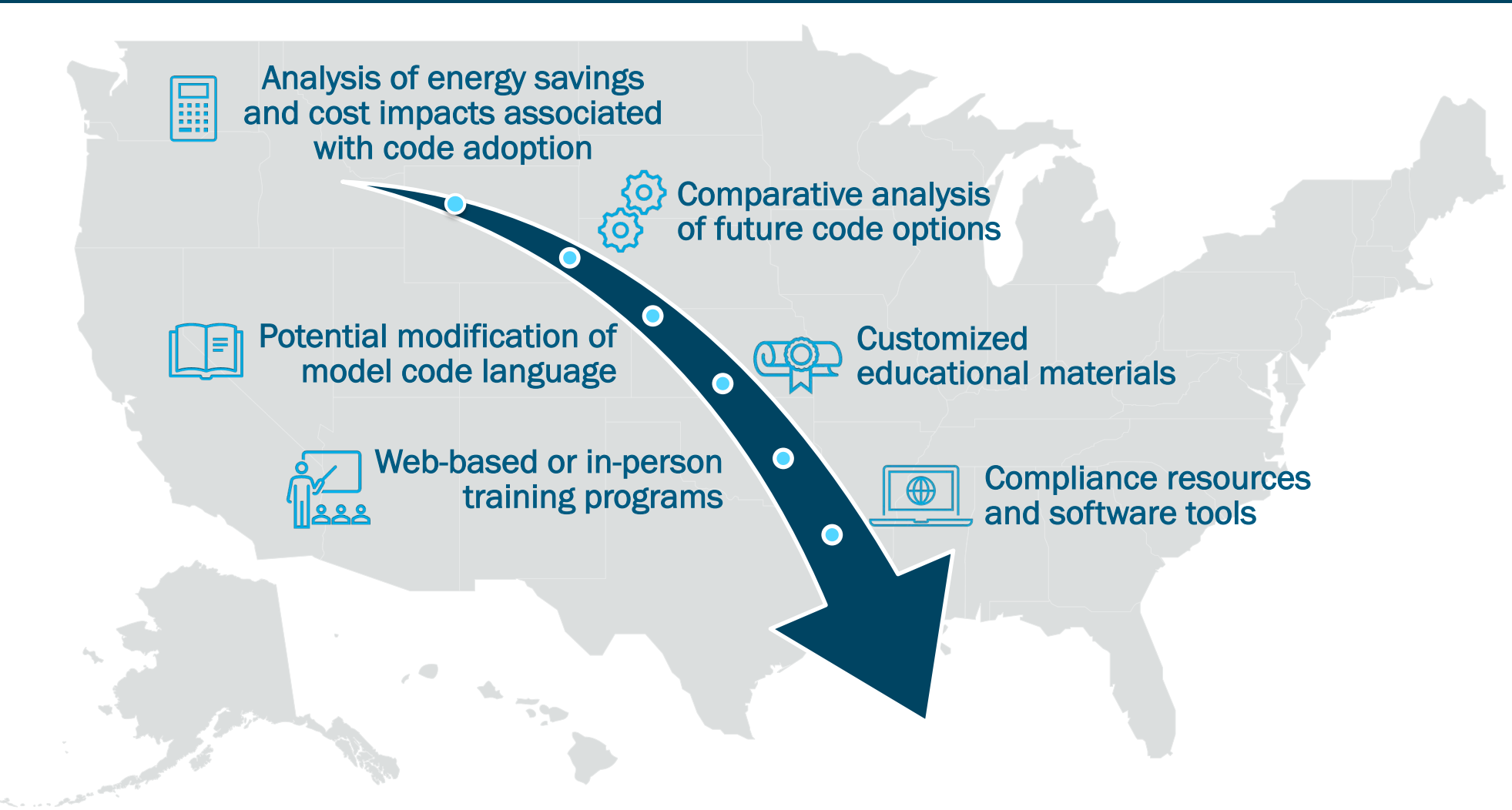
Exploring how building energy codes can enable more equitable outcomes

Developing Workforce

Helping the design and construction industry embrace the latest building codes & standards

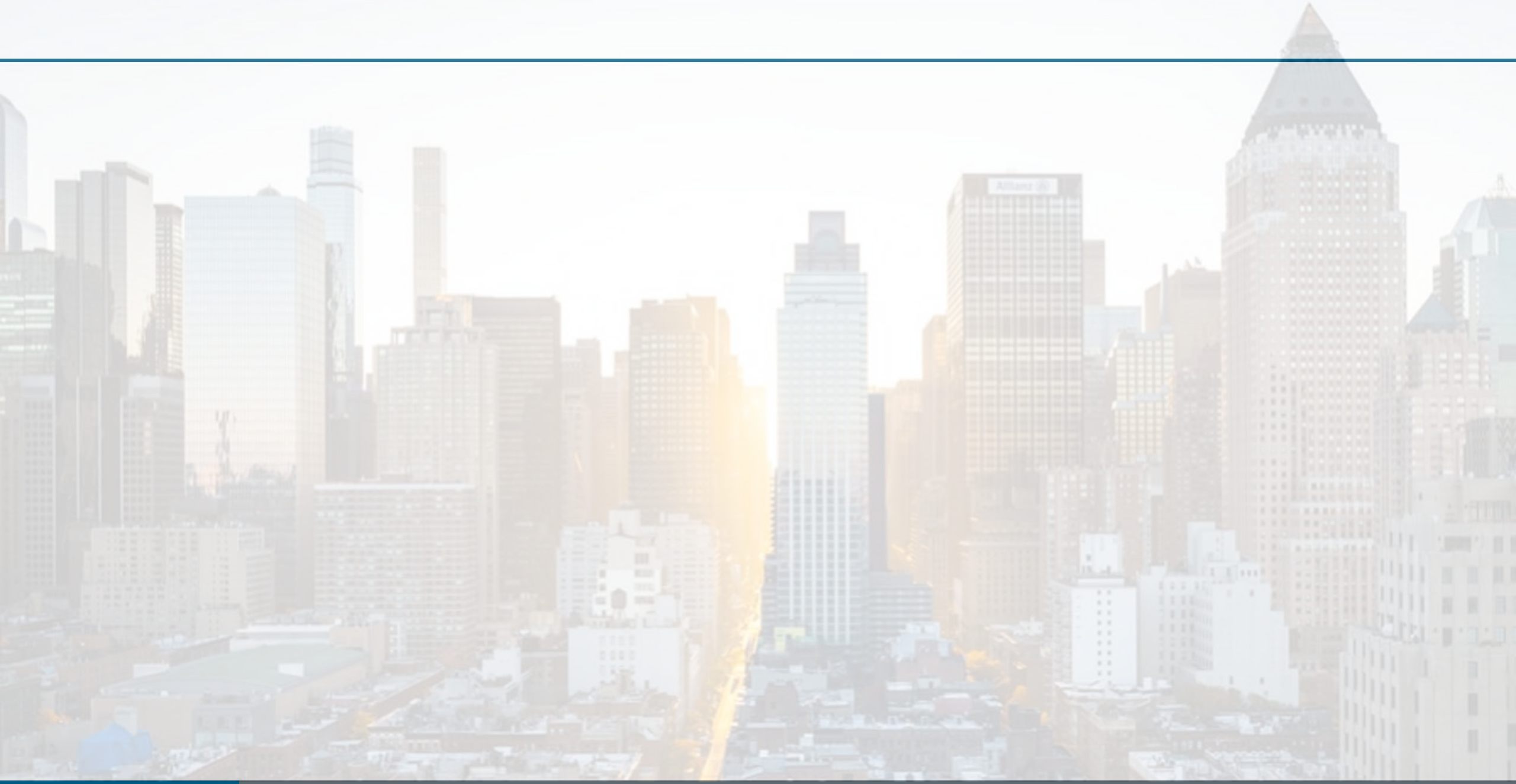
DOE's Technical Assistance

BECP offers a comprehensive collection of information, resources, and technical assistance to answer questions and address issues related to energy codes.



Stakeholders

- State & Local Governments
- Energy Efficiency Organizations
- Code Development Bodies
- Building Design And Construction Representatives
- The Code Enforcement Community



Thank you

Contacts

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Building Energy Codes Program

https://www.energycodes.gov/

BECP Help Desk

https://www.energycodes.gov/technical-assistance/help-desk

Other Options

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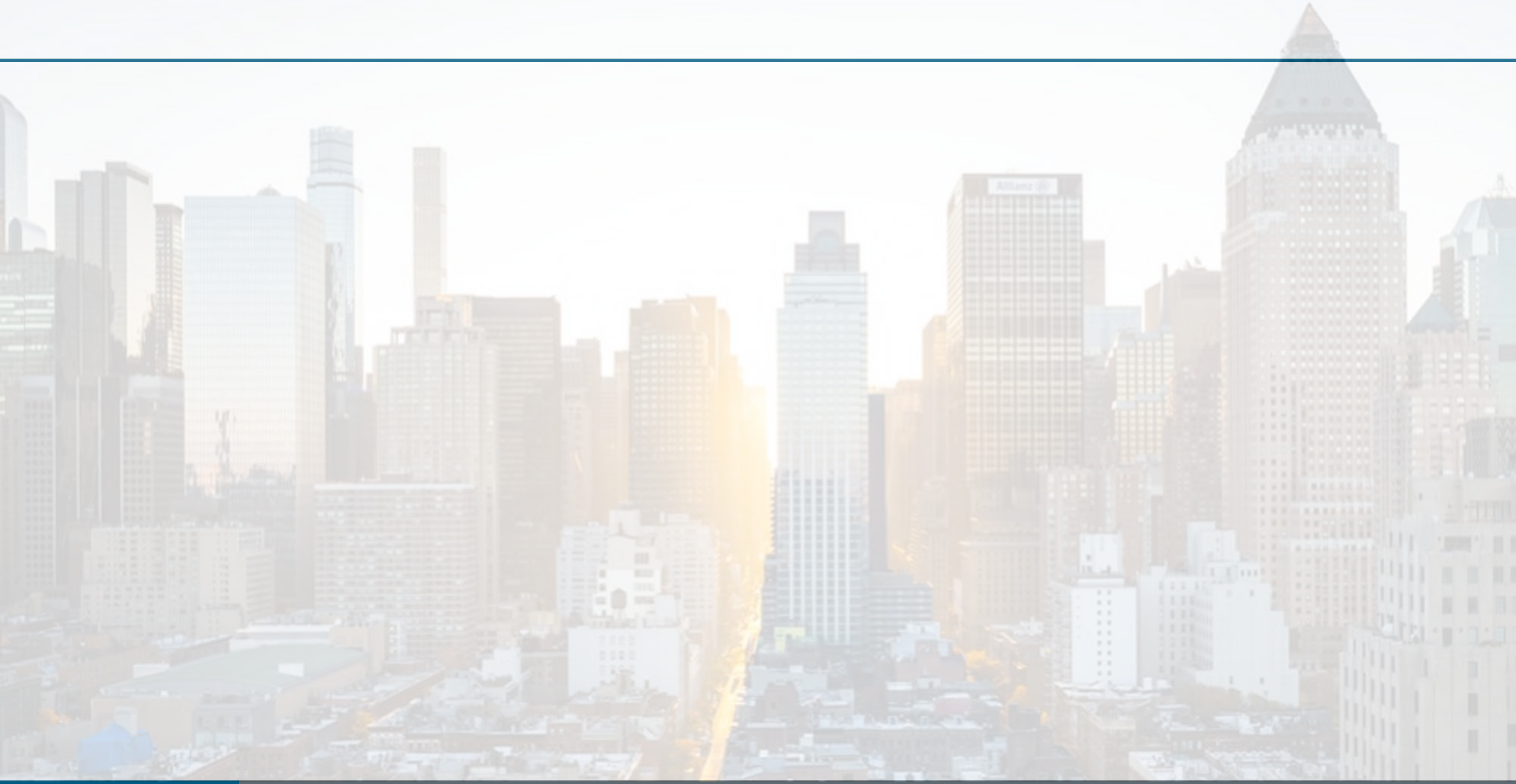

DOE's Building Code Tools & Resources

Compliance

- Tools: RESCheck & COM Check
- Compliance Field Studies
- Training Courses

Code Analysis

- Code Impacts & Cost-Effectiveness Reports
- Prototype Models

State & Local Energy Codes

- State Energy Code Portal
- State Pages
- State Fact Sheets

Innovative Approaches

- Stretch Code Modules
- Building Performance Standards

Direct Technical Assistance

- BECP Help Desk
- Program Resources Guide

DOE's Building Code Tools & Resources

COM*check*

Simplifies commercial building energy code compliance by offering a flexible compliance computer-based alternative to manual calculations

RES*check*

Simplifies residential building energy code compliance by automating the trade-off calculations for this approach

Help Desk

Submit technical questions about building energy codes, RES*check* or COM*check* projects, or BECP website content

State Energy Codes

Look up details of each state's building energy codes and their process for adoption, enforcement, and compliance

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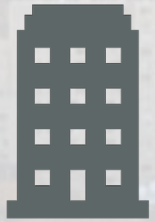
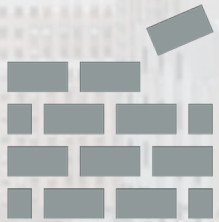


Energy codes are just one of many building codes, such as fire, electrical, structural, or plumbing.

Energy codes are different than appliance and equipment standards. Energy codes cover the building itself—for example, the walls/floors/ceiling insulation, windows, etc.



DOE's Technical Assistance & Stakeholder Partners

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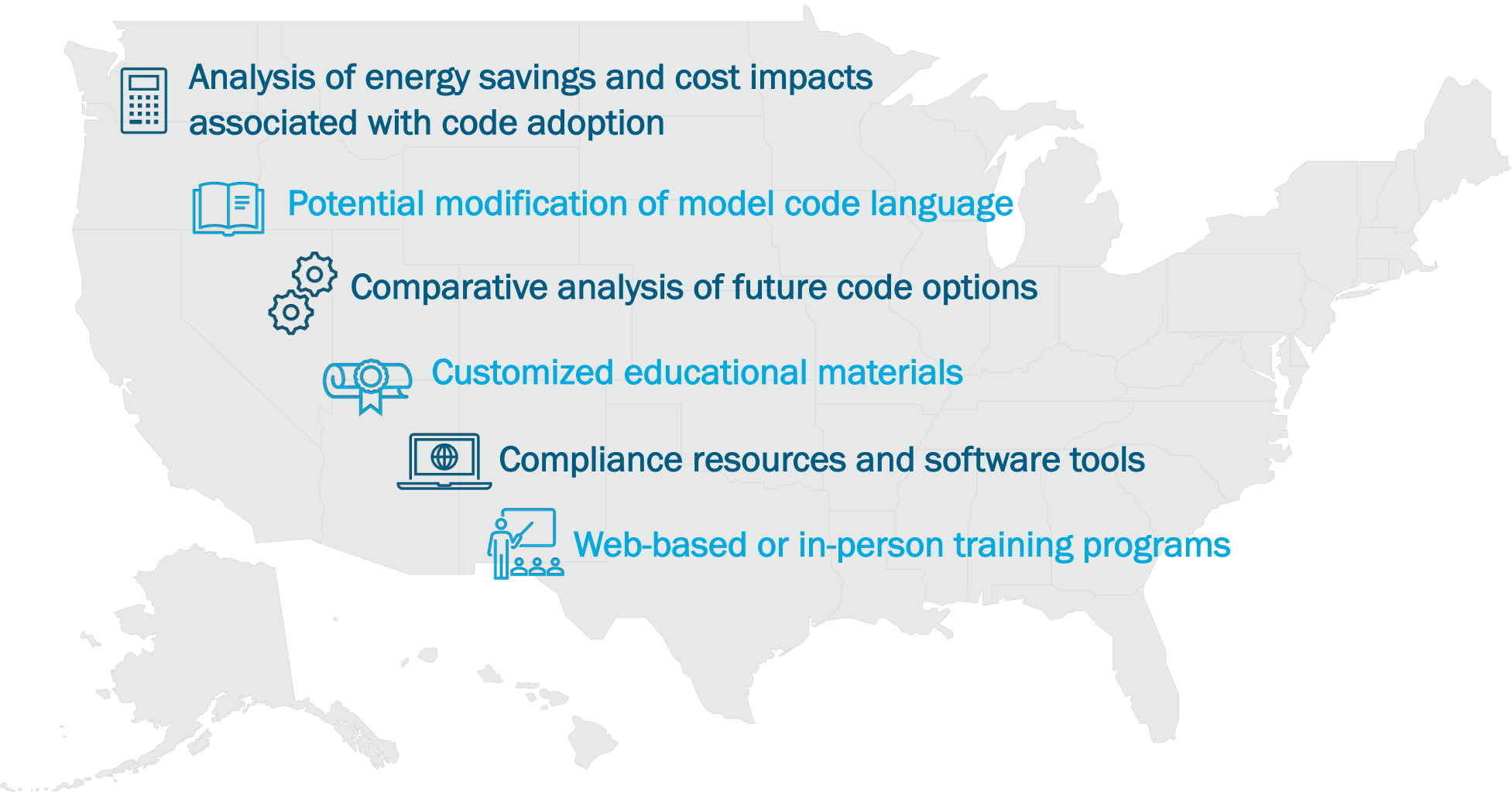

- Analysis of energy savings and cost impacts associated with code adoption
- Potential modification of model code language
- Comparative analysis of future code options
- Customized educational materials
- Compliance resources and software tools
- Web-based or in-person training programs

Stakeholders

- State & Local Governments
- Energy Efficiency Organizations
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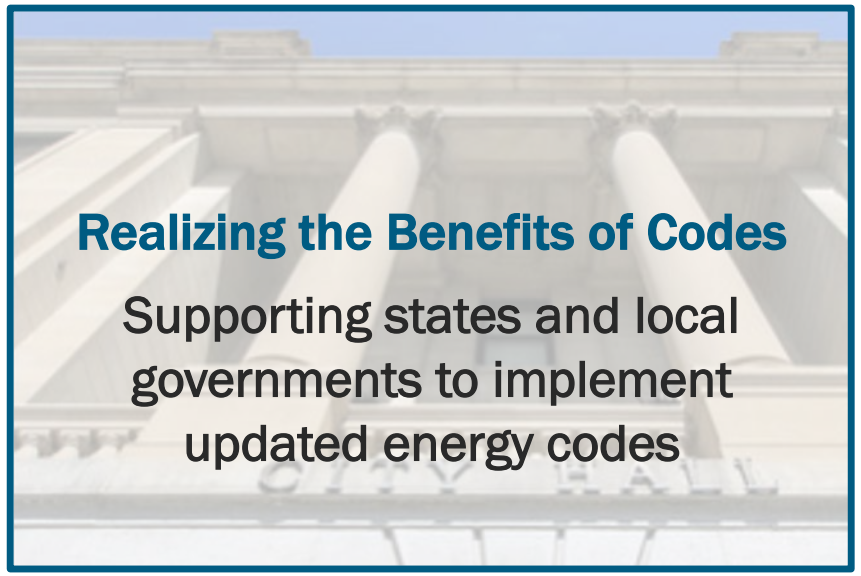

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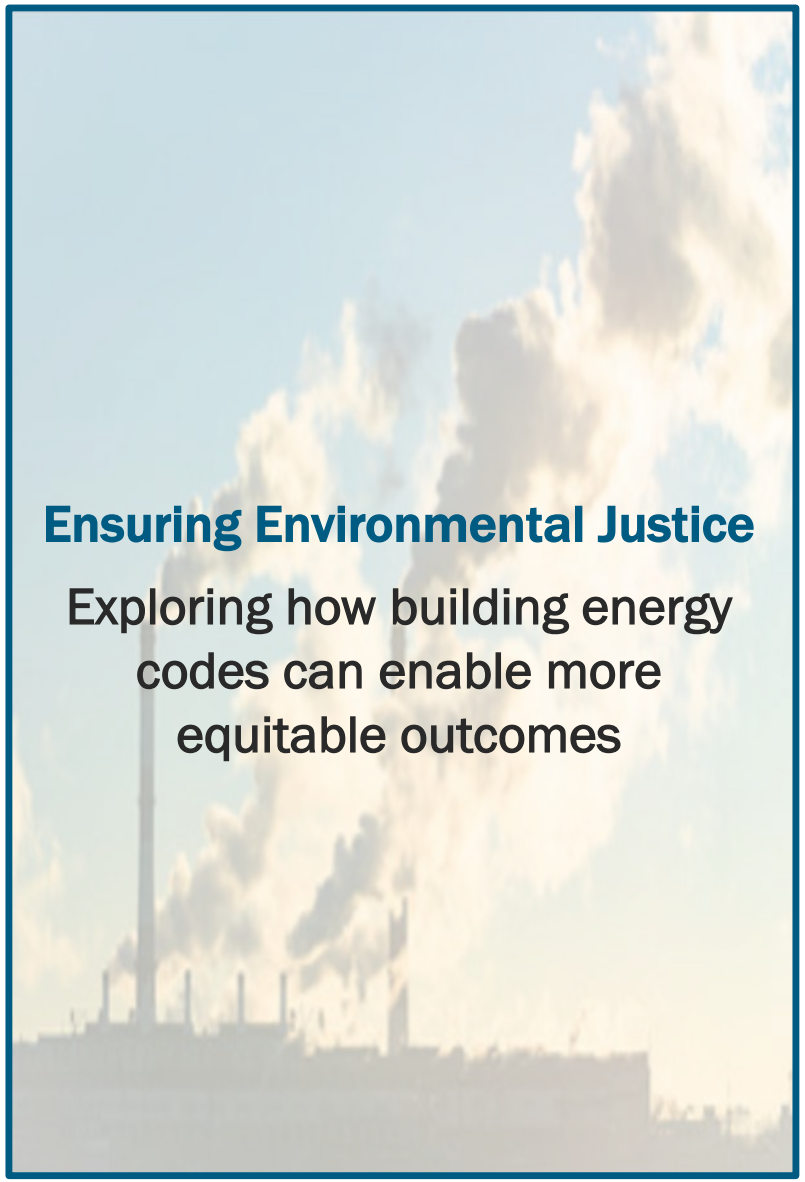

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Stakeholders

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