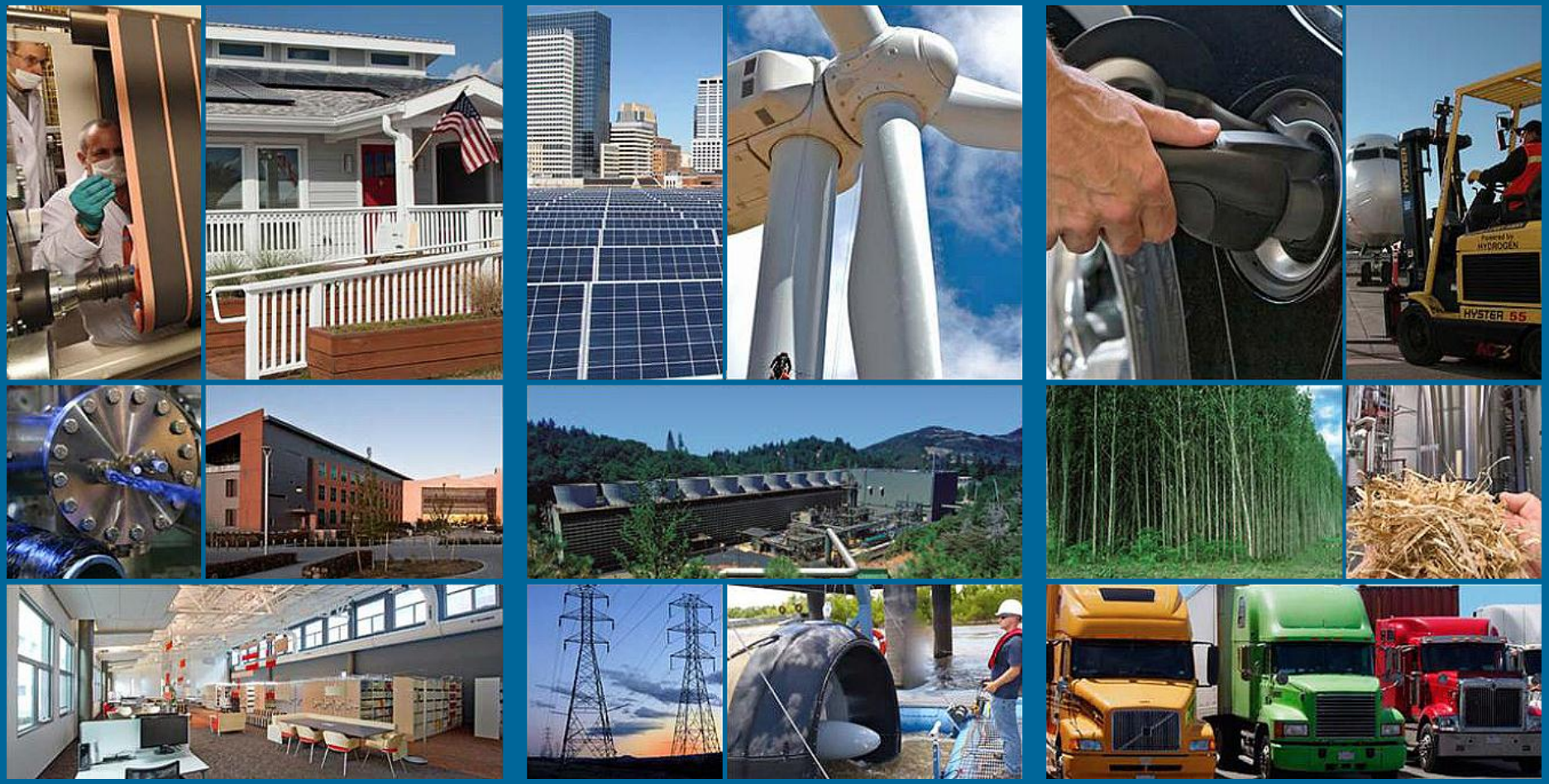
Building Energy Codes Program

U.S. Department of Energy Building Technologies Office



U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Jeremy Williams, *Project Manager*

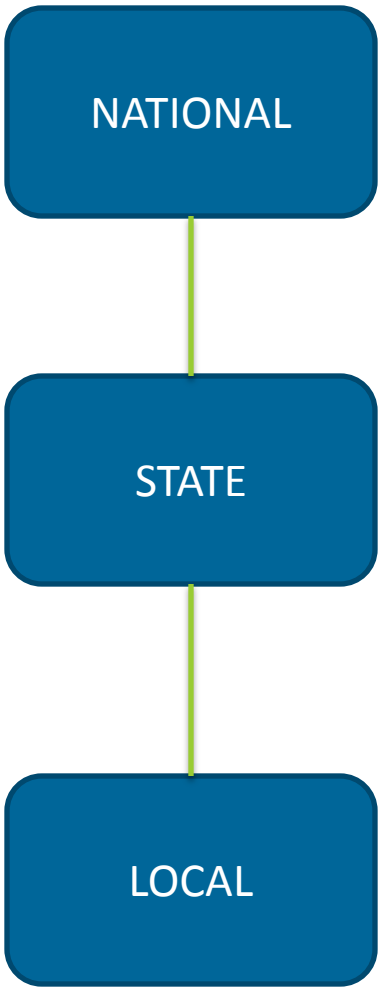
Building Technologies Peer Review

April 2014

Presentation Overview:

- Introduction
- Statutory Requirements
- Program Structure
- Recent accomplishments

Introduction: Background



Building codes are **developed** through national industry consensus processes with input from industry representatives, trade organizations, government officials, and the general public

Model energy codes are then **adopted** into law by state and local government to establish minimum energy efficiency requirements

Model energy codes are then **complied** with and **enforced** by local governments and market actors—architects, engineers, builders, manufacturers, and code officials.

Introduction: Savings to U.S. Homes & Businesses

The U.S. Department of Energy (DOE) **Building Energy Codes Program** drives energy efficiency through the development and implementation of building energy codes:

Residential[1]:

- Approximately 32 percent energy savings in residential buildings
- Equates to $500 in annual homeowner utility cost savings

Commercial[2]:

- Approximately 23 percent energy savings
- Average energy cost savings of $0.40 per square foot

[1]*PNNL Residential Cost Analysis TSD*: http://www.energycodes.gov/development/residential

[2]*PNNL Commercial Cost Analysis TSD*: http://www.energycodes.gov/development/commercial

Introduction: National Benefits

DOE assesses the impacts of its activities by estimating historical and projected impacts:

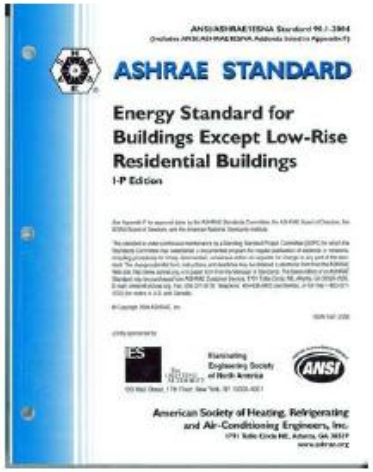
Historical (cumulative 1992-2012):

- 4 quads full fuel cycle (FFC) energy savings
- $44 billion consumer cost savings
- 36 million tons avoided carbon emissions

- **Projected** (cumulative 1992-2040):
  - 46 quads FFC energy savings
  - $230 billion consumer cost savings
  - 4 billion tons avoided carbon emissions

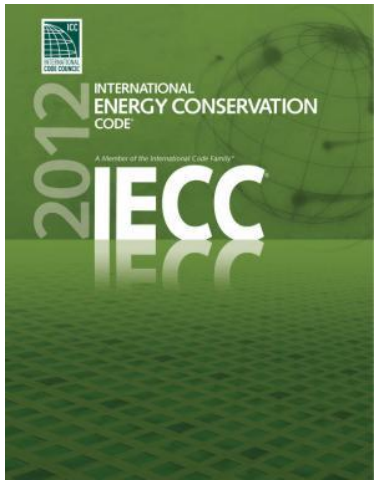
DOE Building Energy Codes Program Impact Analysis: http://www.energycodes.gov/about/results

Introduction: Model Energy Codes



ANSI/ASHRAE/IES Standard 90.1

- Current Version: 90.1-2013 (*published 10/2013*)
- 30% more efficient than 2004 edition
- Next Update: 90.1-2016
- Published by the *American Society of Heating, Refrigeration and Air-conditioning Engineers* (ASHRAE)



International Energy Conservation Code (IECC)

Contains both commercial and residential requirements

- Current Version: 2012 IECC
- Published July 2011
- 30% more efficient than 2006 edition
- Next Update: 2015 IECC (expected publication June 2014)
- Published by the *International Code Council* (ICC)

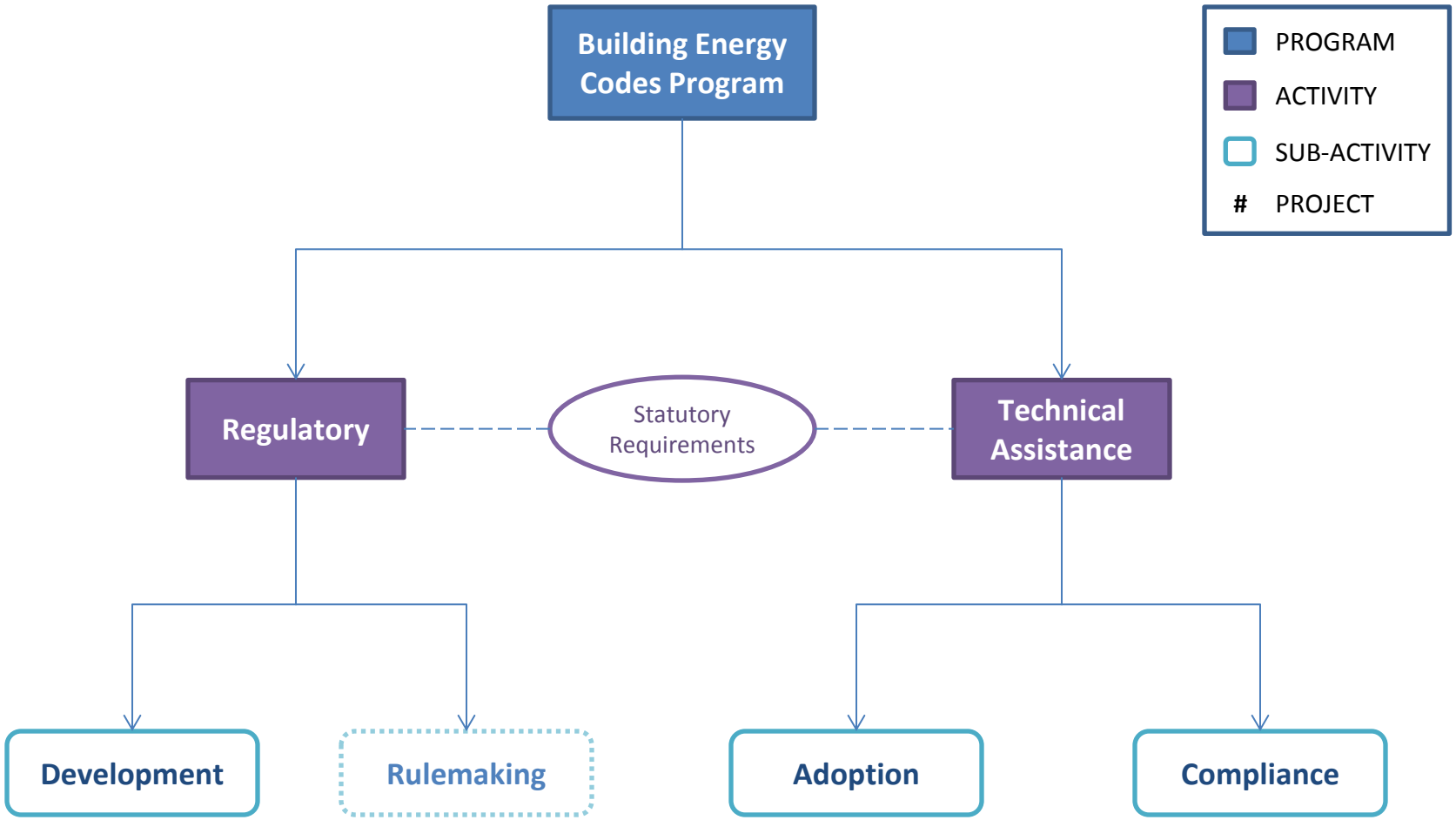
**ASHRAE Standard 90.1 for commercial buildings and IECC for residential buildings (42 USC 6833)*

Statutory Directives

- Annually review the technical and economic basis of the national model building energy codes, and participate in the industry process for review and modification [42 USC 6836]
- Support adoption of all technologically feasible and economically justified energy efficiency measures [42 USC 6836]
- Perform a determination of energy savings for updated editions of Standard 90.1 (commercial) and the IECC (residential) to initiate state code updates and certifications [42 USC 6833]
- Provide technical assistance to states implementing building energy codes, including increasing and verifying compliance to ensure intended savings [42 USC 6833]
- Promulgate energy efficiency standards for federal buildings [42 USC 6835-6] and manufactured housing [42 USC 17071]

More information on statutory requirements surrounding DOE's role in building energy codes is available at: http://www.energycodes.gov/about/statutory-requirements.

Program Structure



Program Structure: Development

DOE supports and participates in the model code development processes administered by the ICC and ASHRAE—sample development activities include:

- Conducting analysis of energy and cost savings, and formulating underlying evaluation methodologies
- Acting as a convening entity, disclosing proposals and associated data to stakeholders, soliciting feedback, and encouraging others to present justification for their proposals
- Providing objective, transparent and reproducible analysis to support DOE policy positions and code change proposals

DOE strives to make cost-effective, energy efficient upgrades to model codes for residential and commercial buildings.

Program Structure: Regulations

DOE is required by statute to:

Following the publication of an updated edition of the IECC or Standard 90.1, make a *determination* whether the revised code will result in increased energy savings [42 USC 6833]

Promulgate energy efficiency standards for federal buildings [42 USC 6835-6] to ensure these facilities lead by example

- Federal Commercial Buildings (based on Standard 90.1)
- Federal Residential Buildings (based on the IECC)
- Sustainable Design
- Fossil Fuel

Promulgate energy conservation standards for manufactured housing [42 USC 17071]

Program Structure: Adoption

The Building Energy Codes Program provides technical assistance to states as they implement energy codes and standards—sample adoption activities include:

- Coordination among stakeholders—providing clear policy and direct support through national and regional organizations
- Conducts national and state-level energy and economic analysis
- Tracking state energy code adoption and implementation

DOE supports updated editions of the national model building energy codes where there exists an affirmative determination.

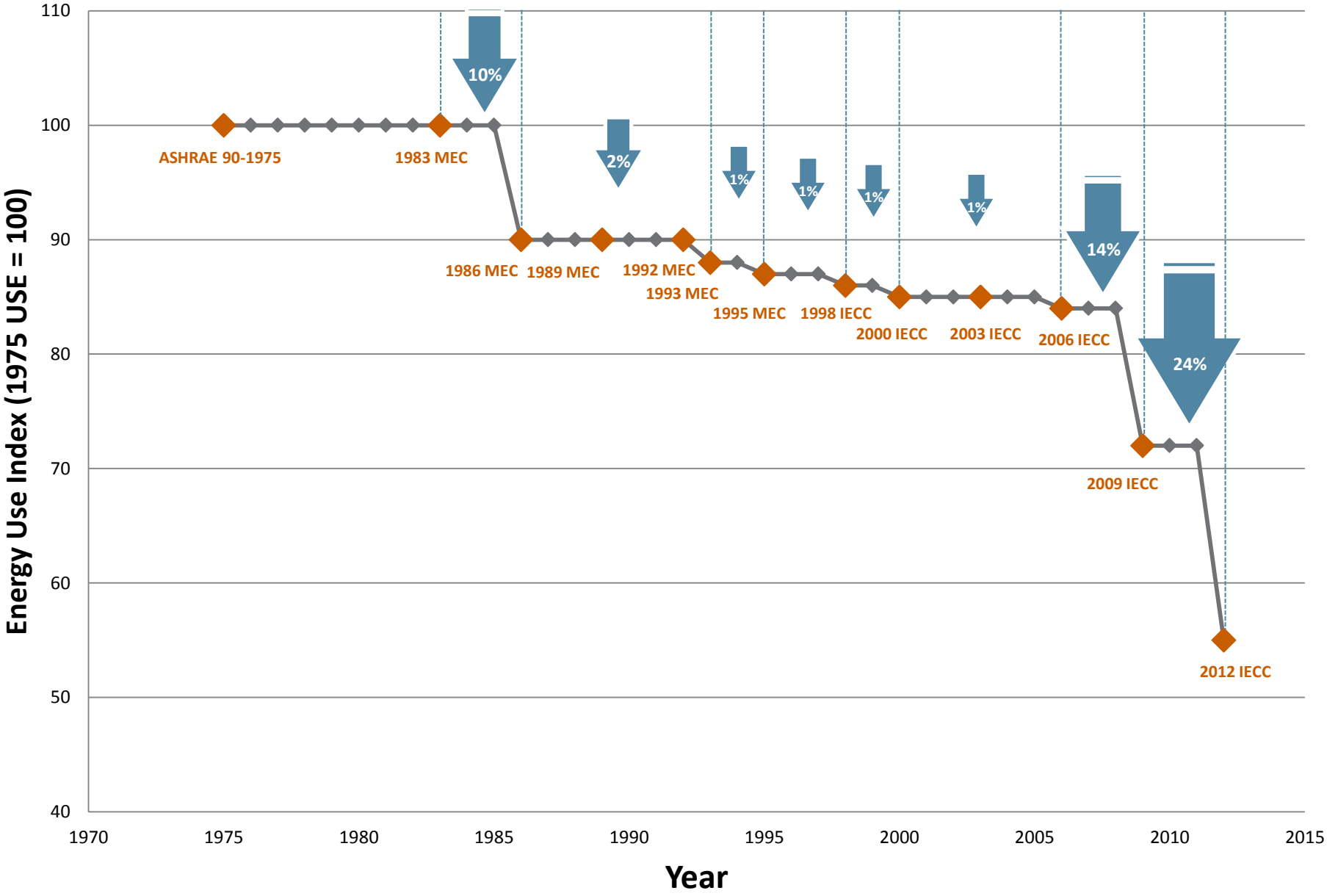
Program Structure: Compliance

The Building Energy Codes Program provides technical assistance to states as they implement energy codes and standards—sample compliance activities include:

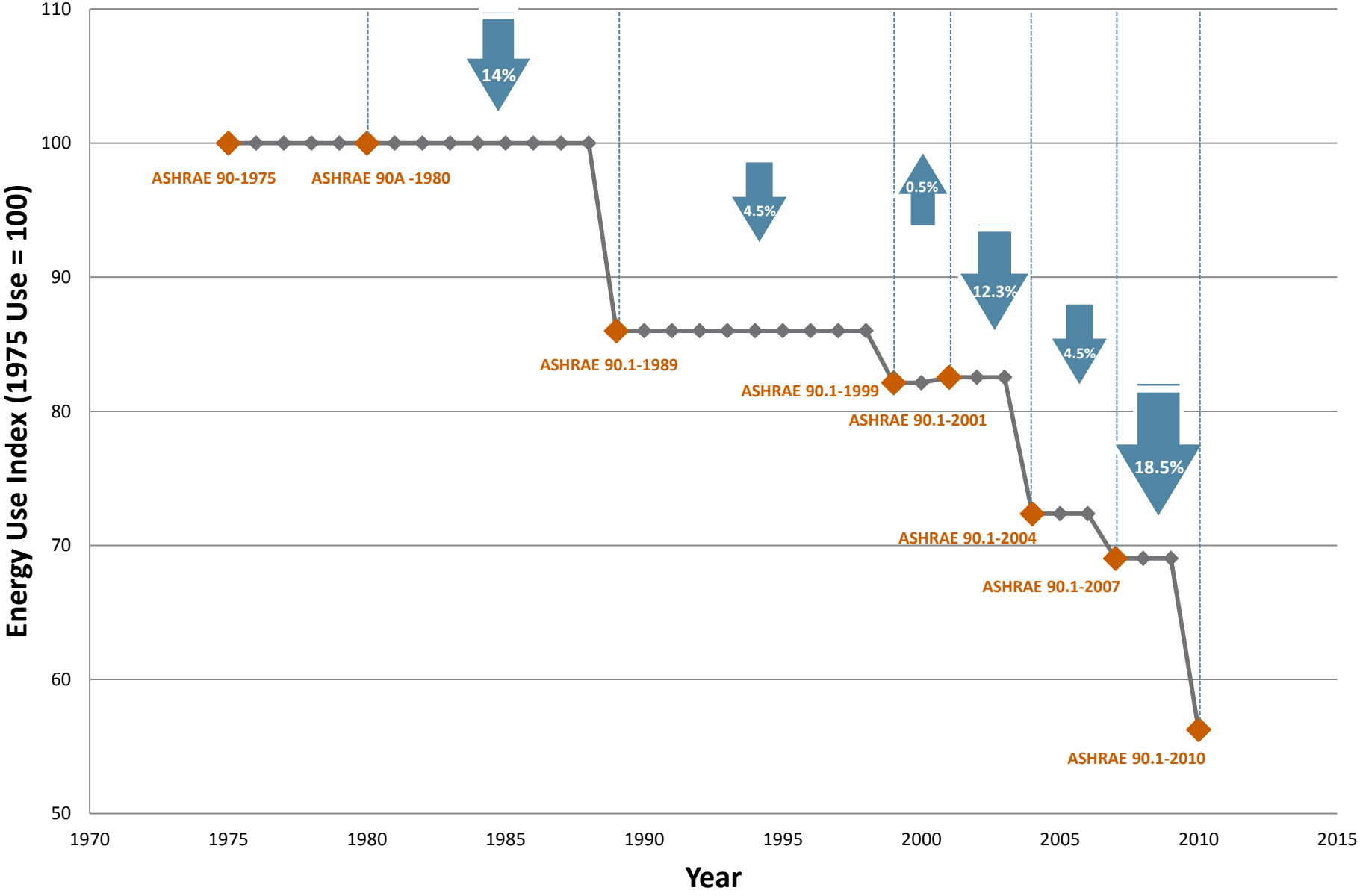
- Provide state assistance to improve code compliance
- Develop and disseminate compliance software to streamline and automate compliance and enforcement processes
- Issue guidance on evaluating and measuring compliance
- Publish a collection of training and technical assistance resources to assist designers, builders and code officials

Energy code compliance is the key to realizing intended code benefits and associated savings.

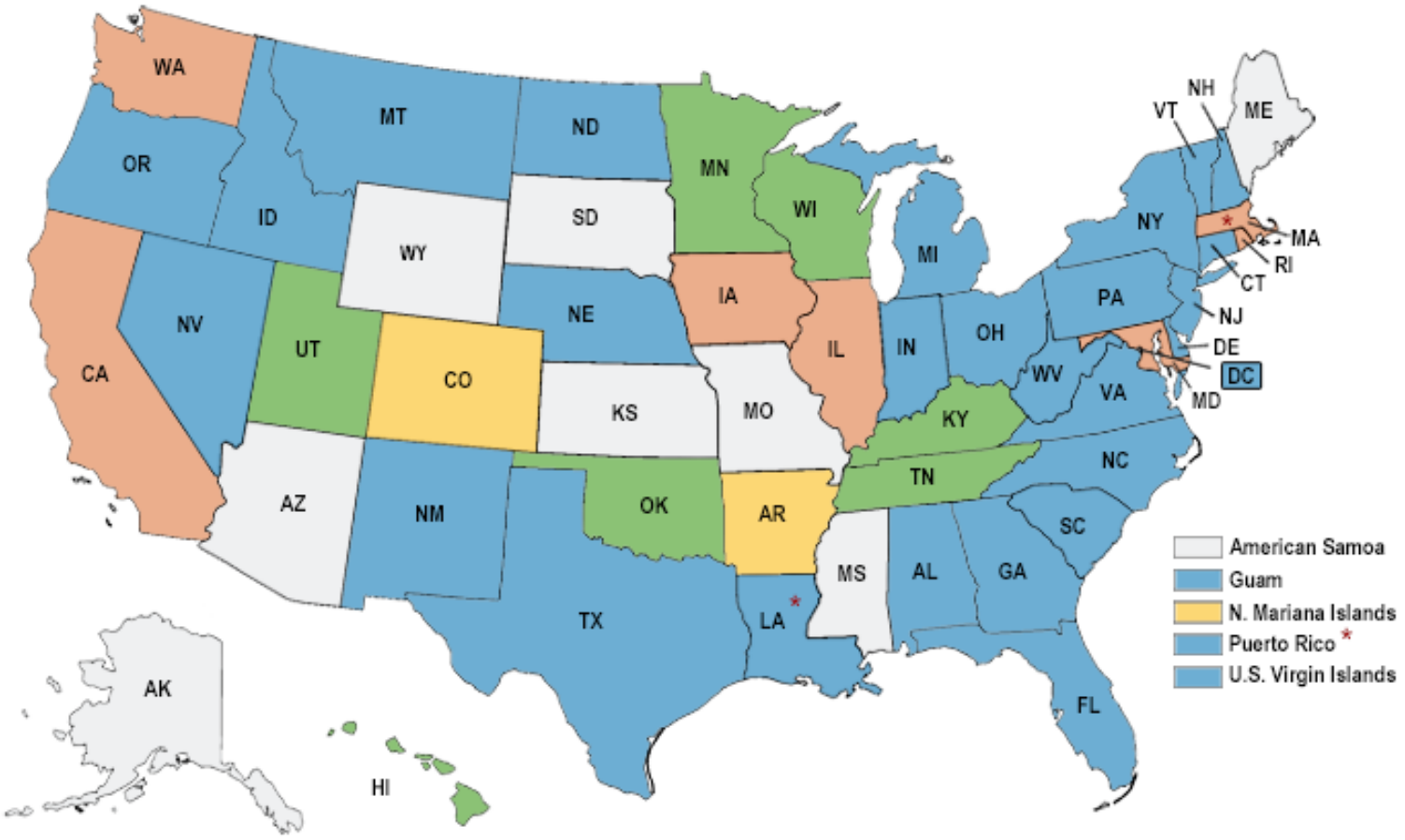
Recent Residential Code Advancement



Recent Commercial Code Advancement



Residential Energy Codes: Current Adoption Status

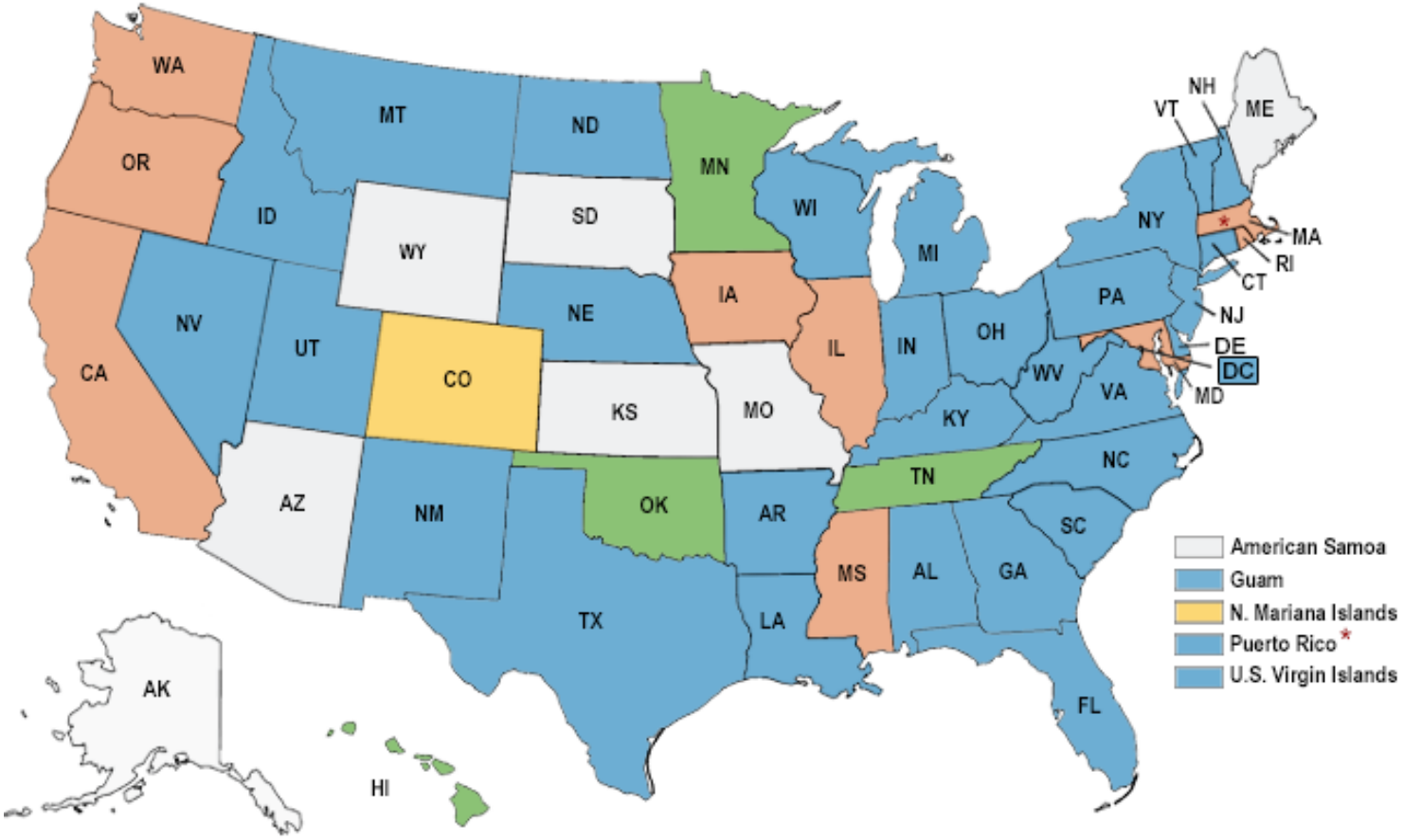


7 IECC 2012, equivalent or more energy efficient	29 IECC 2009, equivalent or more energy efficient	8 IECC 2006, equivalent or more energy efficient
	3 IECC 2003, equivalent or less energy efficientt	9 No Statewide Code

* Adopted new Code to be effective at a later date

As of March 2014

Commercial Energy Codes: Current Adoption Status



9	ASHRAE 90.1-2010/2012 IECC equivalent or more energy efficient	33	ASHRAE 90.1 - 2007/2009 IECC equivalent or more energy efficient	4	ASHRAE 90.1 - 2004/ 2006 IECC equivalent or more energy efficient
		2	ASHRAE 90.1 - 2001/2003 IECC equivalent or less energy efficient	8	No Statewide Code

* Adopted new Code to be effected at a later date

As of March 2014

Recent Accomplishments: Development

Residential Determination indicating 34 percent energy savings (2012 IECC compared to 2006):
http://www.gpo.gov/fdsys/pkg/FR-2012-05-17/pdf/2012-12000.pdf

Commercial Determination indicating 23 percent energy savings (90.1-2010 compared to 2004):
http://www.gpo.gov/fdsys/pkg/FR-2011-10-19/pdf/2011-27057.pdf

Participation in the 2015 IECC Committee Action Hearings (April 2014) and Public Comment Hearings (October 2014) :
http://www.energycodes.gov/development/residential/2015IECC

Recent Accomplishments: Adoption

A total of 36 U.S. states and territories have adopted the 2009 IECC (or better); and 42 have adopted Standard 90.1-2007 (or better): http://www.energycodes.gov/status-state-energy-code-adoption

National and state-level residential energy & cost analysis for the 2012 IECC: http://www.energycodes.gov/development/residential/iecc_analysis

National and state-level commercial energy & cost analysis for 90.1-2010: http://www.energycodes.gov/development/commercial/cost_effectiveness

National energy savings analysis for the 2012 IECC commercial requirements : http://www.energycodes.gov/sites/default/files/documents/PNNL-22760.pdf

Recent Accomplishments: Compliance

Over 250,000 projects have been entered into DOE RES*check* & COM*check* building energy code compliance software (since 2010): http://www.energycodes.gov/software-and-web-tools-0

DOE training curriculum & supplemental resources based on the 2012 IECC & Standard 90.1-2010: http://www.energycodes.gov/resource-center/training

Solicited stakeholder feedback via an RFI published in the *Federal Register* in preparation to update DOE compliance methodology: http://www.gpo.gov/fdsys/pkg/FR-2013-08-06/pdf/2013-18952.pdf

Building Energy Codes: Team Contacts

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