

# Opportunities to Influence the International Energy Conservation Code (IECC) and Improve the Building Energy Code in MA

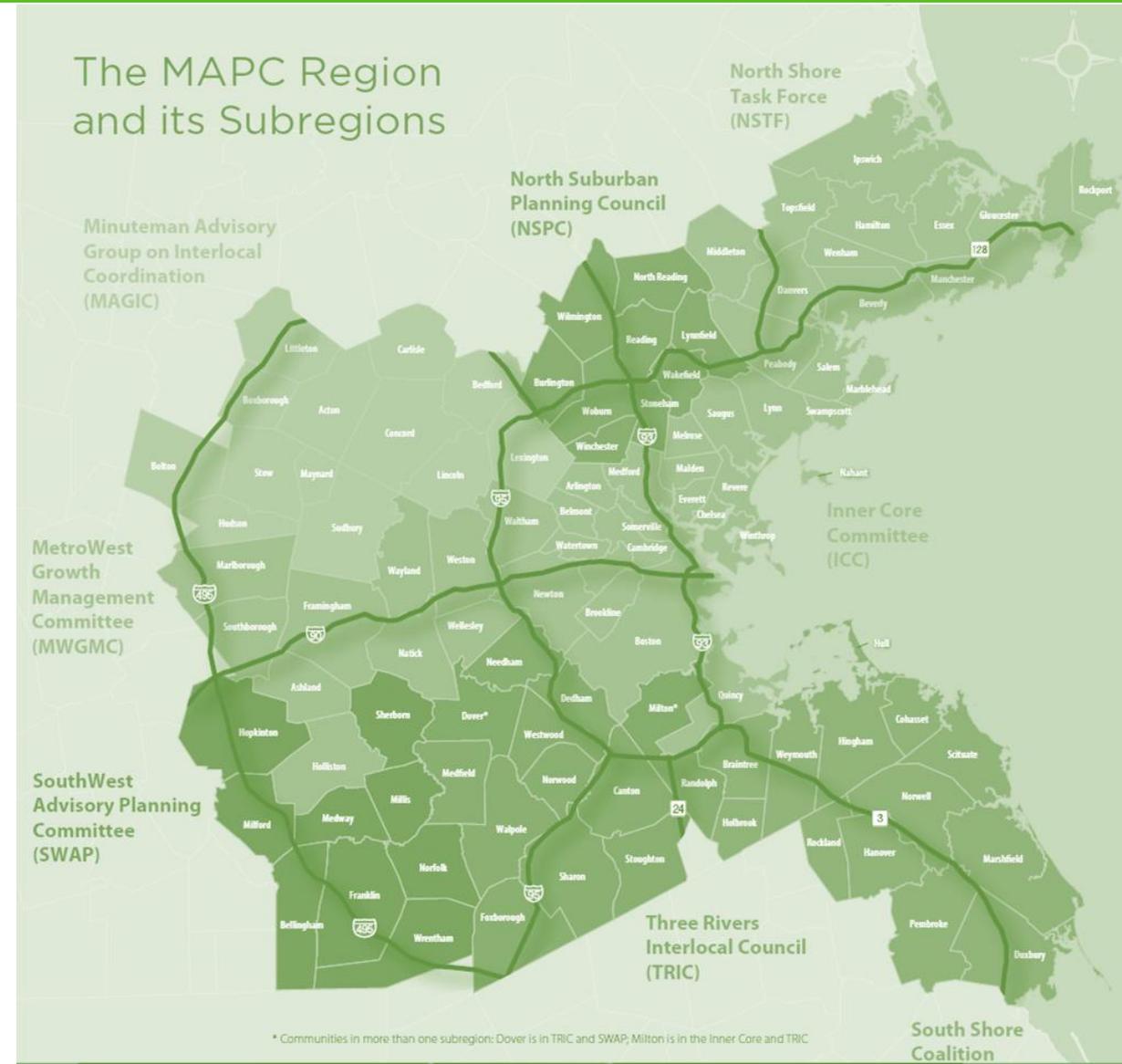
Metropolitan Area Planning Council (MAPC)

June 18<sup>th</sup> 2018



# MAPC: About Us

- Regional Planning Agency
- 101 cities and towns
- 80+ employees
- Wide range of planning expertise



# MAPC: Clean Energy

## Regional Projects

- **ESCO Procurement**
- **Regional Solar Initiative**
- **LED Streetlight Purchasing Program**
- **Community Electricity Aggregation**
- **Green Mobility Program**
- **Energy Resiliency**



## Climate and Energy Planning

- **Connecting municipalities with incentives + plug-and-play programs**
- **Community energy and climate baselining, planning, and strategizing**
- **Outreach programming and education**
- **Net Zero goal-setting and planning**



## Technical Assistance

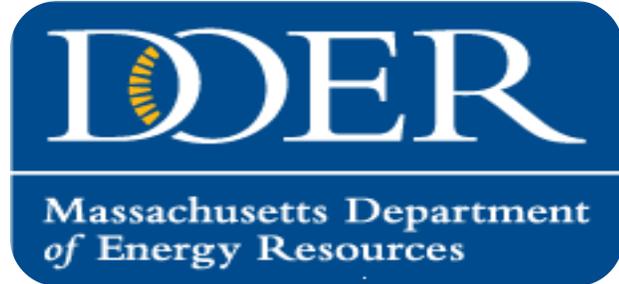
- **Grant Writing**
- **Green Communities Designation**
- **Methane Leaks**
- **Solar Permitting and Zoning**
- **State and Local Policy**
- **Net Zero Guidance & Education**



# Agenda

- 1 Welcome and Introduction
- 2 Orientation to the IECC and MA Process – Ian Finlayson, DOER
- 3 National Process around the IECC – Bill Fay, EECC
- 4 Next Steps – Cammy Peterson, MAPC
- 5 Q & A

# Orientation to the IECC and Massachusetts Process



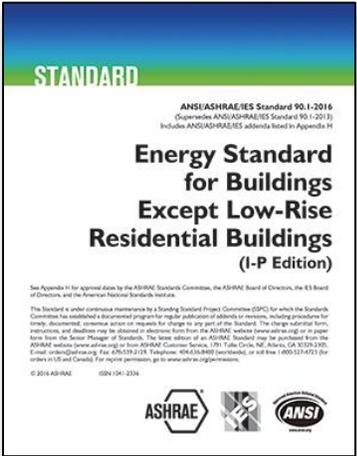
# **MA Building Energy Code 2018 update**

Ian Finlayson – Deputy Director,  
Energy Efficiency Division

# Outline

- MA Building Energy Code – overview
  - National Model codes (IECC & 90.1)
  - Relationship of Stretch code to Model codes
- Timeline of Model code
- Conclusion

# Model building energy codes



# MA Energy Code in Statute

- MGL CH143 Section 94:
  - “To adopt and fully integrate the latest **International Energy Conservation Code** as part of the state building code, together with **any more stringent energy-efficiency provisions that the board, in consultation with the Department of Energy Resources, concludes are warranted.**”

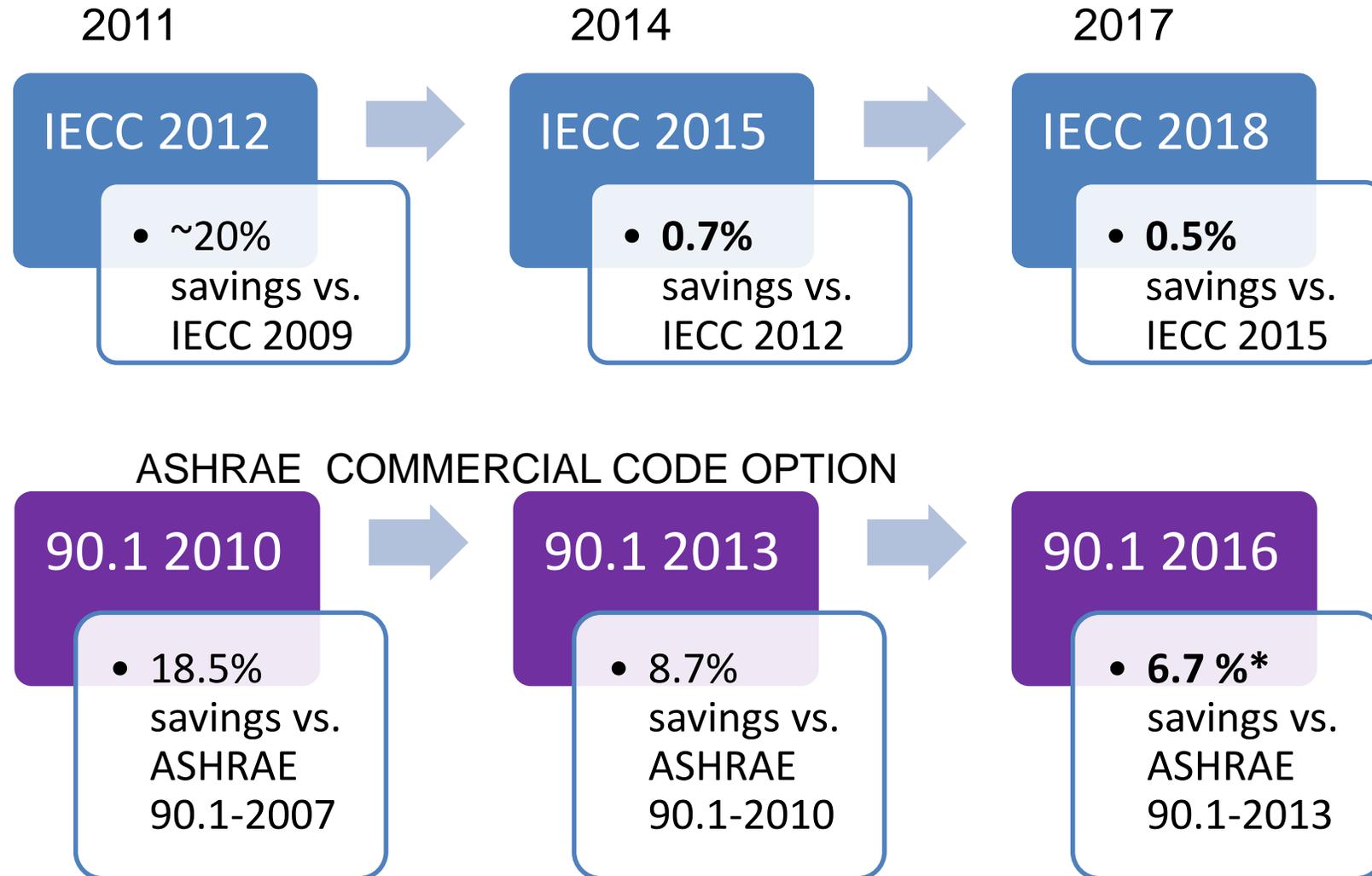


# Model code relationship to Stretch Code

Building Size	Residential new Units up to 4 stories	Residential Retrofits and additions	Commercial New up to 100,000 sq ft	New Over 100,000 sq ft (Labs over 40,000 sq ft)	Commercial Retrofits and additions
<b>2015 Stretch Code</b>	HERS ratings or Passivehouse	IECC	IECC or ASHRAE	10% better than ASHRAE	IECC or ASHRAE

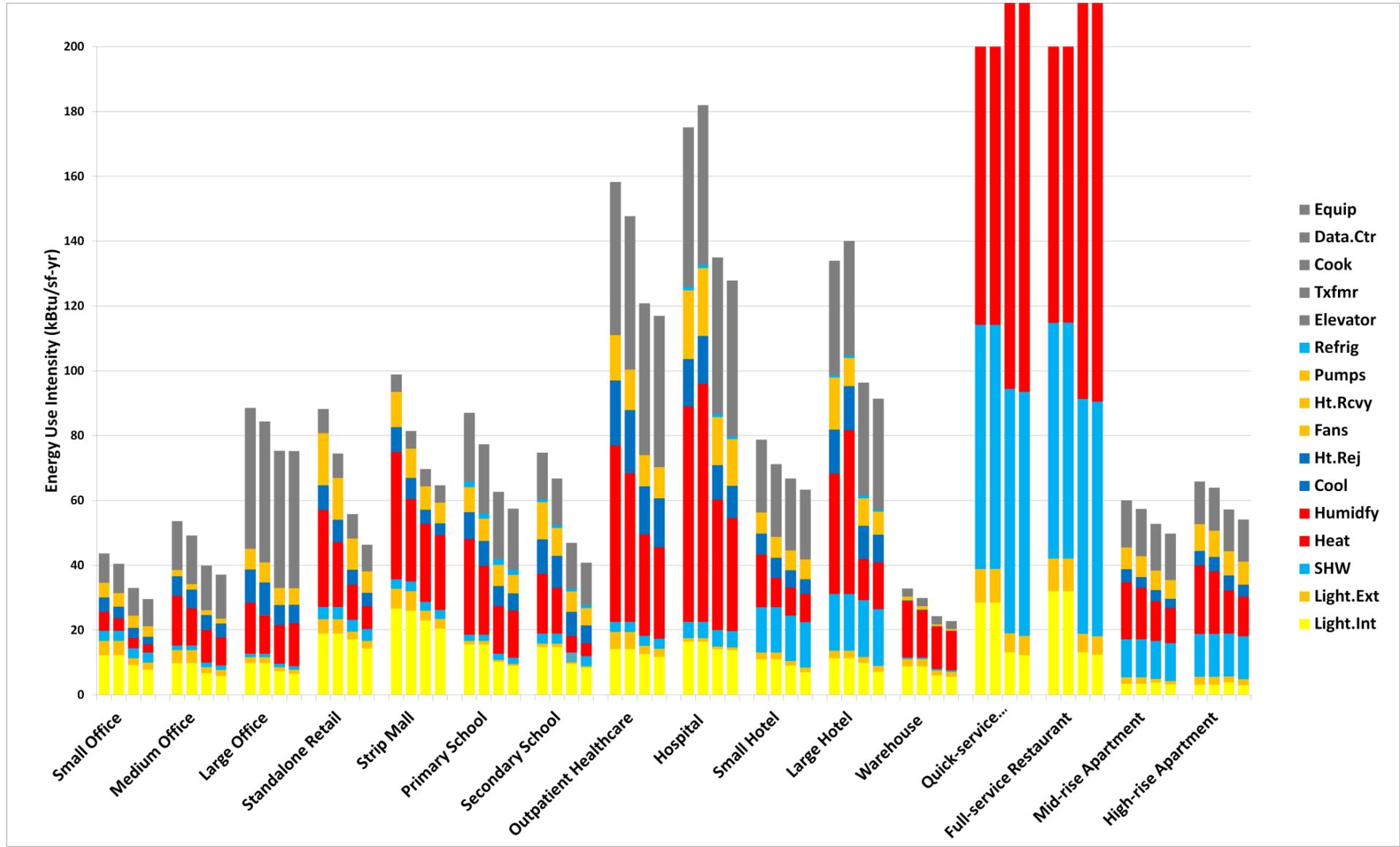
With the exception of new residential homes, the MA stretch code communities are essentially dependent on the IECC (and ASHRAE) model national codes

# National Model code development



# Variations by building type

EUI of major building types by ASHRAE code cycle



# 2016 Commercial Energy Code savings

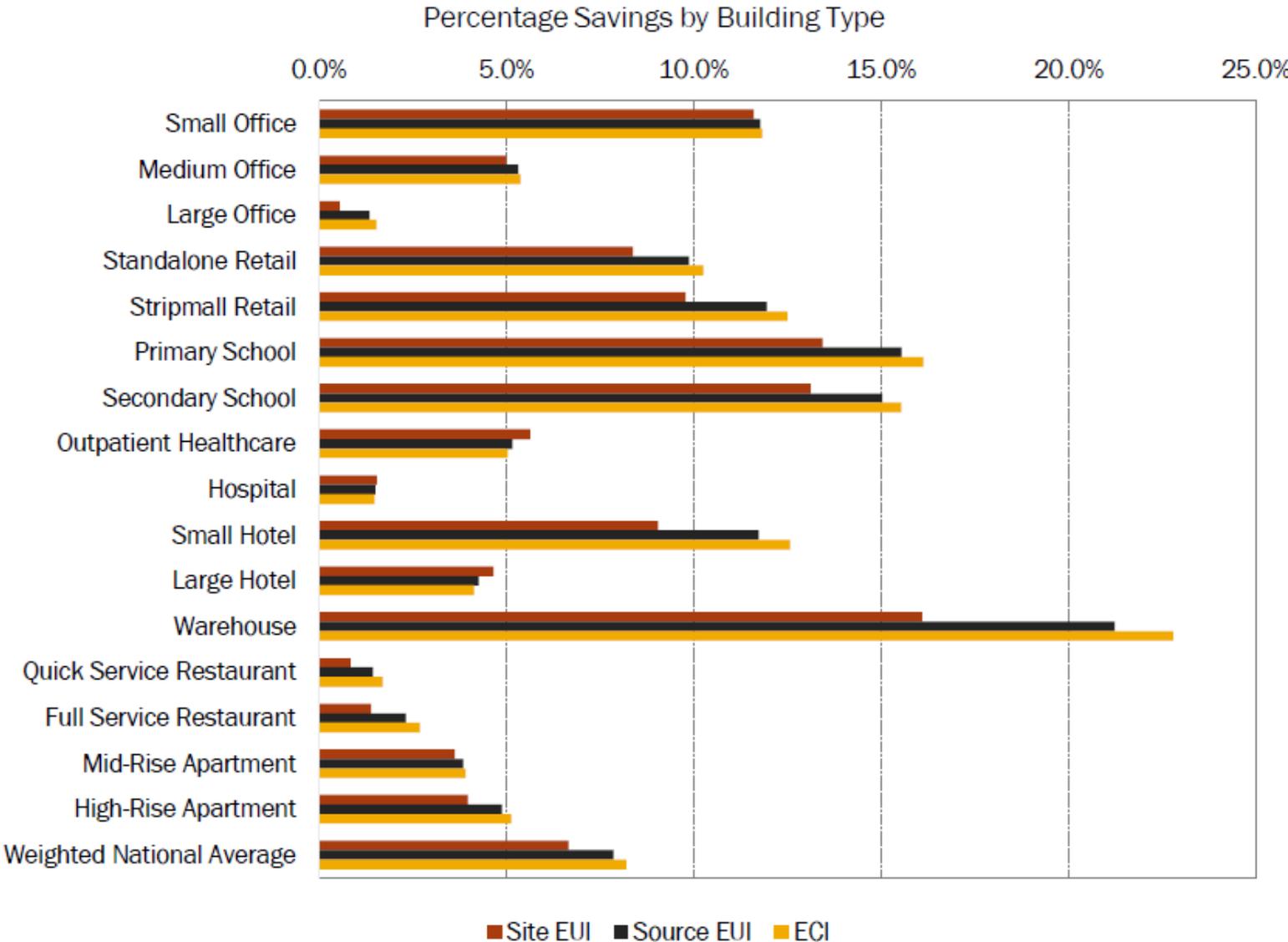
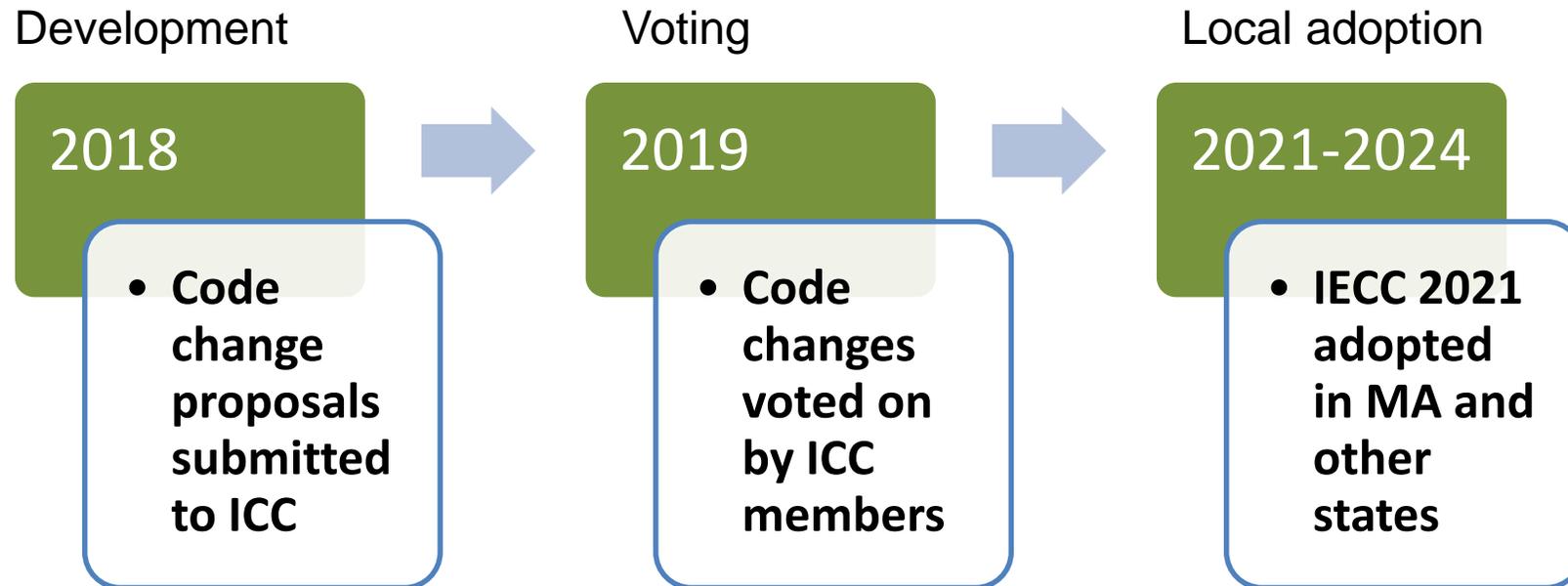
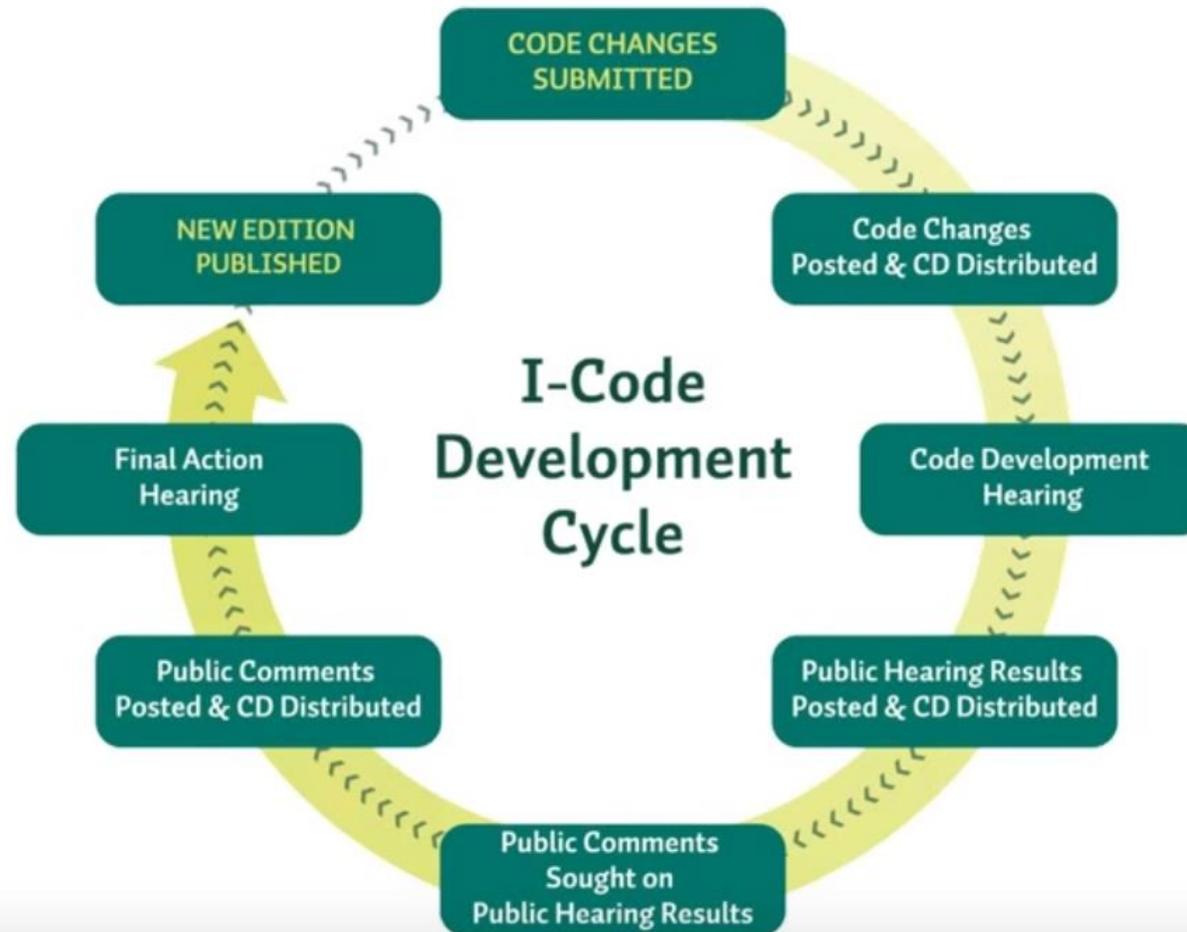


Figure ES.1. Percentage Savings by Building Type from 90.1-2013 to 90.1-2016

# 2021 IECC Model Code timeline





# Conclusion

- ICC National model energy code finalized by public sector members
- Incremental changes in recent code cycles
- Opportunity to improve the next national model codes (IECC2021)
  - Required energy code for MA
  - Sets baseline for stretch code
  - Leads to energy and GHG savings nationwide

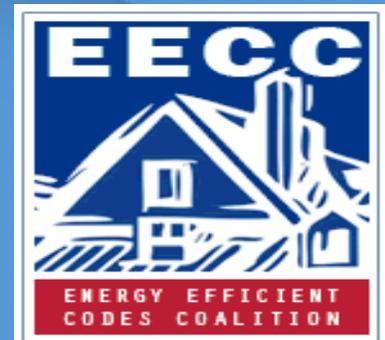
**National Process Around  
the IECC  
& Potential MA Impact**

# Putting America's Building Energy Code on a Glide Path of Steady Gains



**THE POWER IS IN YOUR HANDS!**

America's Building Energy Policy  
Determined by Local Government





# The CHALLENGE: Eliminate Energy Waste in Our Homes, Multifamily, & Commercial Buildings



# WHEN IT COMES TO NATIONAL ENERGY POLICY, BUILDINGS ARE THE “ELEPHANT IN THE ROOM”

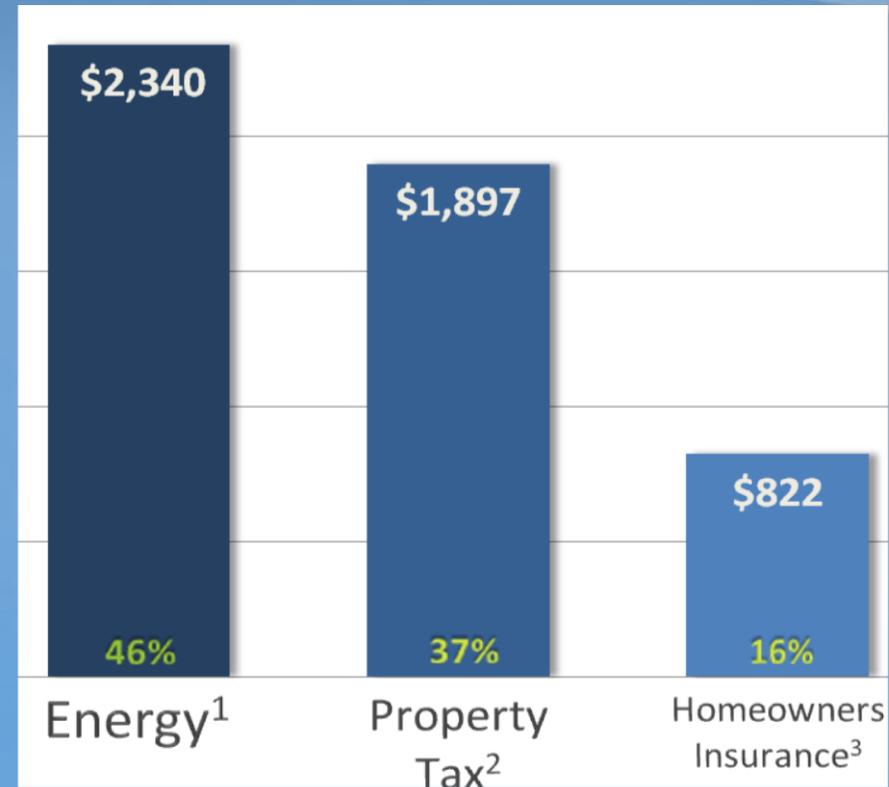
America's Homes &  
Commercial  
Buildings use:

- ✓ 42% of all energy
- ✓ 54% of natural gas
- ✓ 71% of electricity

. . . And account for  
39% of US  
manmade GHGs



**AFTER MORTGAGE,  
PRINCIPAL &  
INTEREST,  
ENERGY IS THE  
HIGHEST COST OF  
HOME OWNERSHIP**



**Average U.S. Homeowner Costs  
2007-2008**

# Buildings Last 70, 80, Even 100 Years

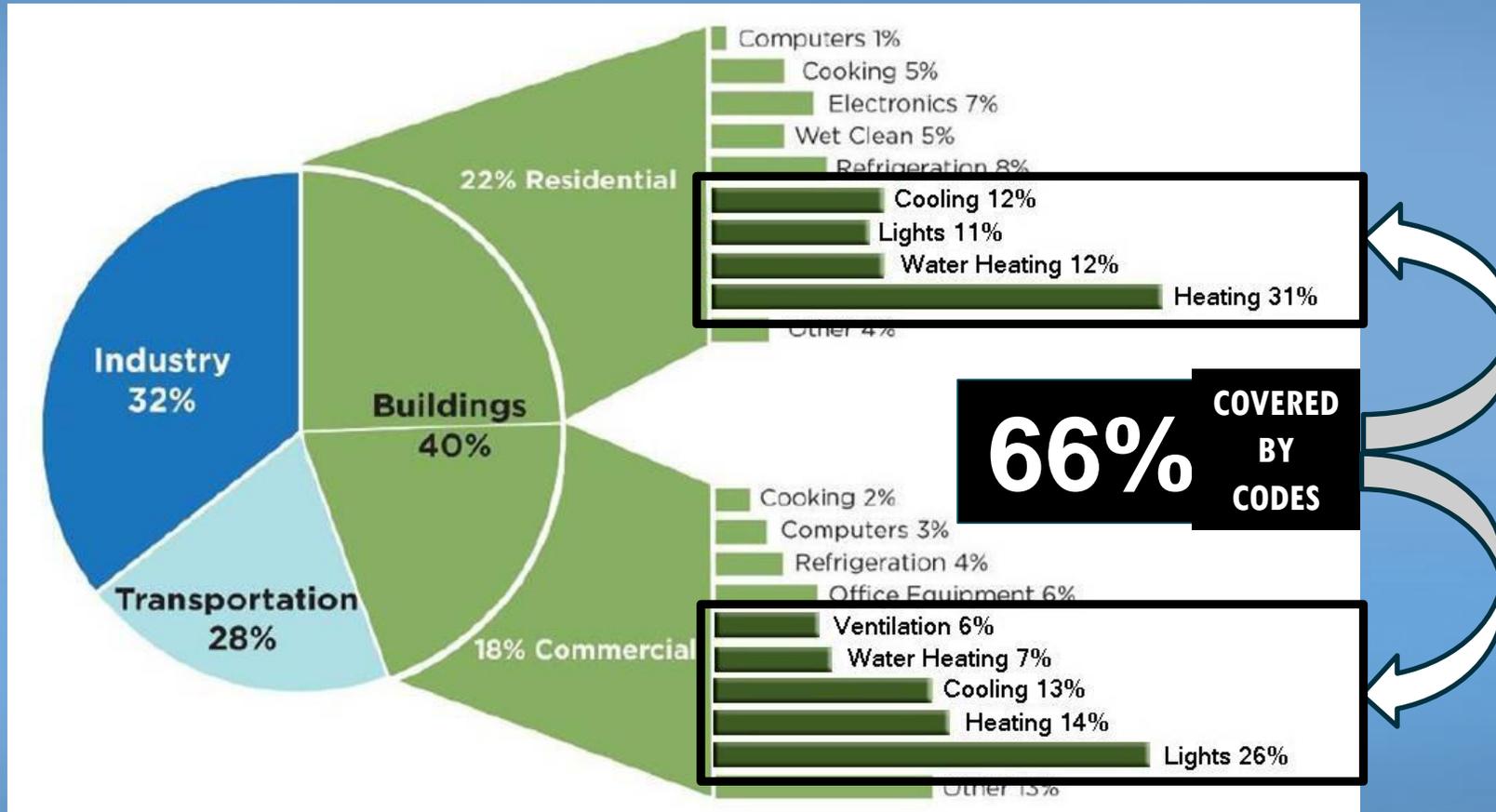
- “Build It Right the First Time” – Failing to construct efficient buildings will hinder sound energy policy for 4-5 generations.
- Efficiency retrofits far more costly than the same improvements at initial construction.
- At today’s energy costs, an average home’s 1,200 monthly energy bills will total \$170,000!!!



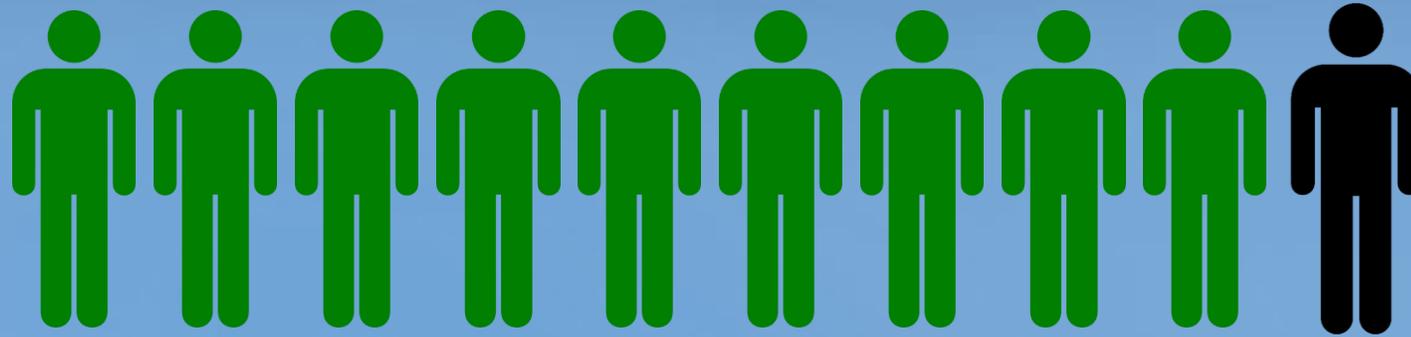
**The SOLUTION:**  
Energy Codes Are  
**THE Most**  
Effective Way to  
Reduce Waste In  
Buildings (. . . & CO2)



# The IECC: Essential to Building Efficiency



# Americans WANT – & Will Pay More For – Efficient homes



**Nine out of ten buyers**  
would rather buy an energy-efficient home...  
and they are willing to pay up to 3% more!

(Source: National Association of Home Builders)



# The RESULT of Eliminating Energy Waste in Our Homes



# Buyers Can't Tell If They're Choosing an Efficient New Home

**No evident difference to a new homebuyer, but...**



# These Homes Look – And Are – Identical ... Except for the Code They Meet!

No evident difference to a new homebuyer, but...

**2006 IECC**



**2012/2015 IECC**



This House Cost \$1,250 More  
...Far Less Than 2-3%!

# Which Home Would You Choose?

## Better Codes = Better Homes

**38%**  
more efficient

**\$10,081**  
in energy savings over a typical  
30-year mortgage *after fully*  
*recouping \$1,250 added cost.*

**Savings will continue**  
to accrue over the home's  
80- to 100-year life



# The IECC Puts Thousands in Homeowner Wallets in Just the 1<sup>st</sup> 30 Years

DOE study uses a life-cycle approach, balancing first costs against longer-term energy savings over typical 30-year mortgage – but savings continue for decades more

IECC Climate Zone	30-Year Life-Cycle Savings (\$US)		
	IECC 2009 vs. 2006	IECC 2012 vs. 2009	IECC 2012 vs. 2006
1	\$2,877	\$5,347	\$8,256
2	\$2,443	\$2,280	\$4,763
3	\$1,944	\$3,613	\$5,621
4	\$2,259	\$5,320	\$7,625
5	\$2,466	\$6,717	\$9,189
6	\$3,094	\$8,183	\$11,307
7	\$3,622	\$9,502	\$13,166
8	\$9,147	\$23,900	\$33,105

# Codes Stabilize Grids; Delay the Need For New Power Plants

The 2011 Prediction:

Continued savings of the magnitude of recent efficiency gains in building energy codes and appliance standards

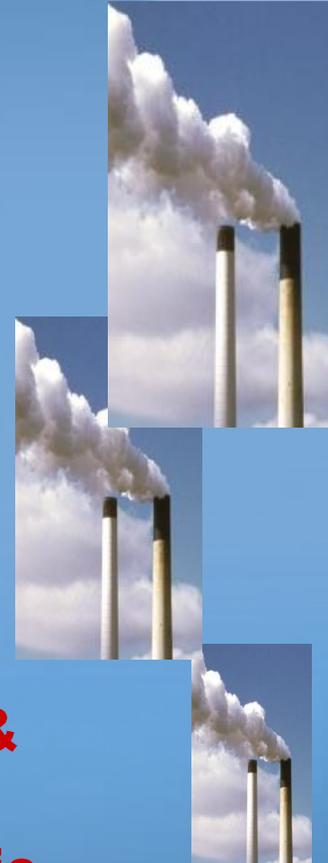
**“will completely offset the anticipated growth in demand in the residential, commercial, and industrial sectors combined, eliminating the need for additional power plants to serve these sectors through 2025.”**

*Institute for Electric Efficiency White Paper May 2011*

The 2014 Evidence:

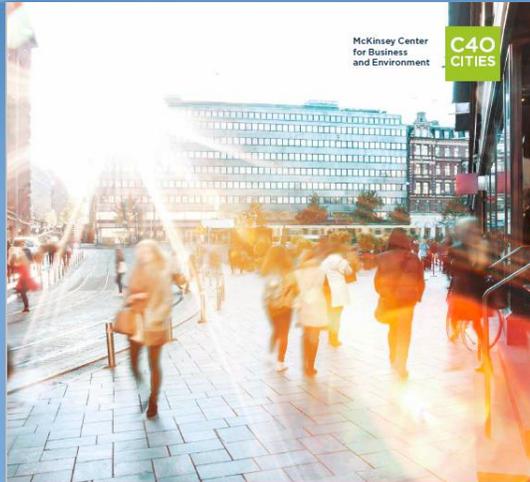
**“Improvements in energy efficiency for buildings & appliances appear to have broken the traditional connection between electricity demand & economic growth.”**

*Duke Energy CEO Lynn Good, 1/6/2014 Financial Times interview*





# McKINSEY: WHY CITIES & STATES CARE



## Focused acceleration:

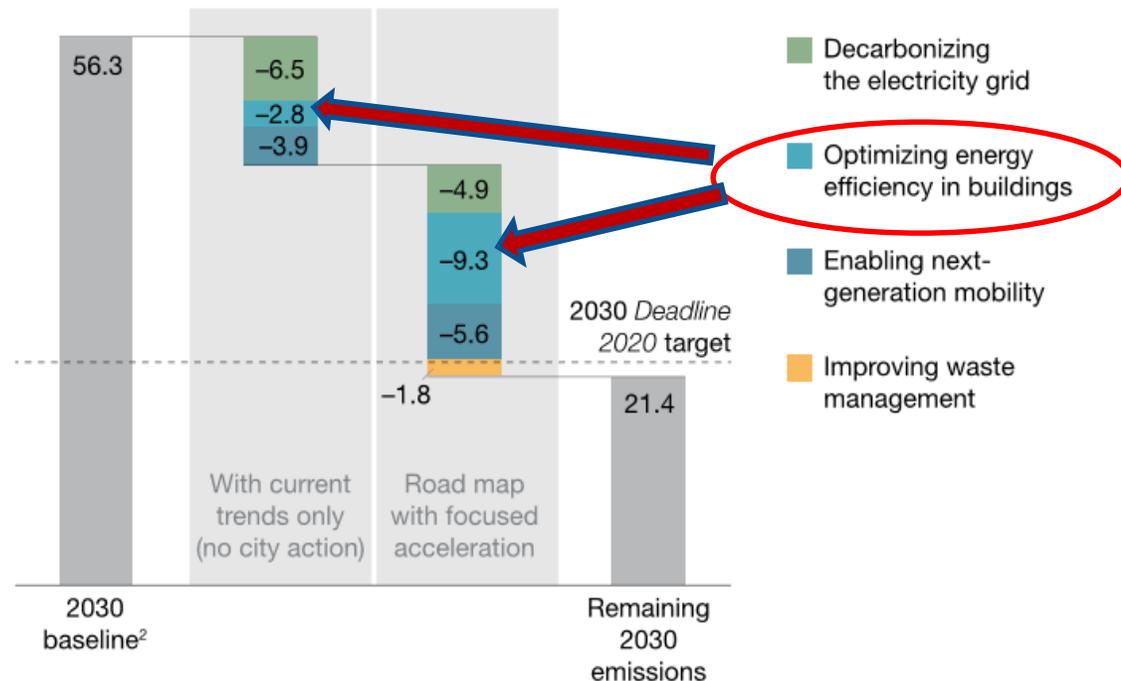
A strategic approach to climate action in cities to 2030

Optimizing energy efficiency in buildings could yield three times the reduction potential for cities following their strategic climate action road map with focused acceleration.

Cities that use a strategic approach targeting 12 opportunities could achieve their 2030 emissions targets.

### Emissions in 2030,<sup>1</sup>

metric tons of CO<sub>2</sub> equivalent (annual), average of six illustrative city types



<sup>1</sup>Figures may not sum, because of rounding.

<sup>2</sup>Assumes technologies and policies remain fixed from 2015.

# What Does It Mean to Our Nation

3.5 quadrillion Btu annual energy savings by 2030.



Enough to heat 3.5 million average homes each year

\$40 billion annual energy cost savings by 2030.



Value of all 32 NFL teams = \$32.7 billion. (Forbes)

200 million metric tons of carbon dioxide emissions avoided annually by 2030.



Annual CO2 emissions from 39,215,686 cars

*or*

Annual CO2 emissions from 47.4 coal fired power plants (U.S. EPA)



# Why MAPC & Other Local Governments Must Be Involved



# Building Energy Codes



Who Develops America's Building Energy Code (the IECC)?

**Local and State Officials from Across America!**

Who Enacts Building Energy Codes?

**State & Local Governments**

Who Enforces Building Energy Codes?

**Mostly Local Governments**



# America's Big Unsung Secret:

Since 2008, Local Governmental  
Officials Have *(almost)*  
Singlehandedly Boosted the  
Efficiency of America's Home &  
Commercial Building Energy Code  
by **38%** and **35%** respectively.

# Mayors Strongly Support Dynamic IECC Efficiency Gains

Unanimously Adopt Resolutions in 2008, 2010, 2013, and 2016 that:

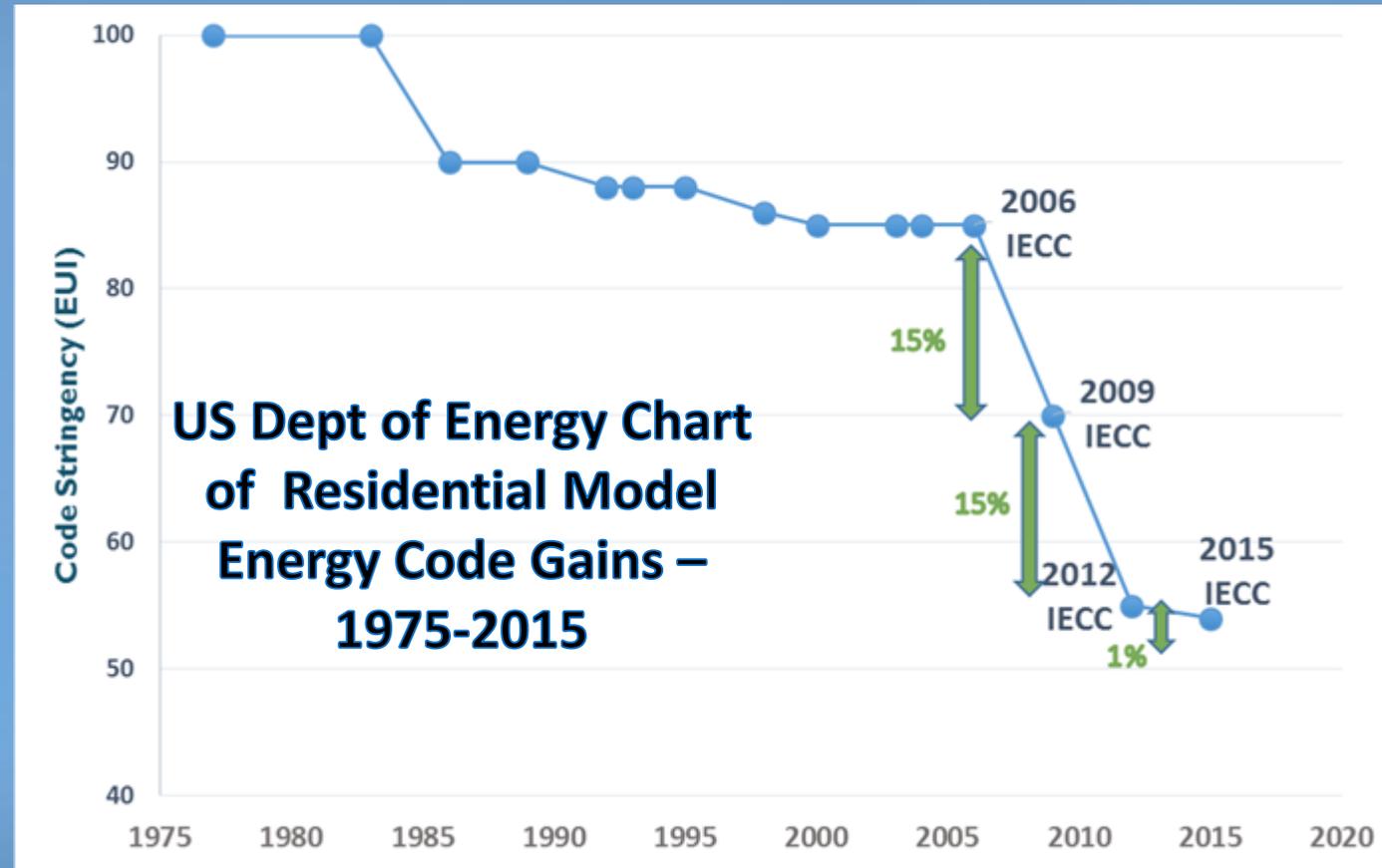
- **Endorsed “30% Solution” & Steady Gains to Net Zero Buildings Across America**
- **Oppose Rollbacks and Trade-Offs that Weaken the Stringency of Gains**
- **Encourage Municipal Support for All Eligible Code Officials to Vote**



**THE UNITED STATES CONFERENCE OF MAYORS**

*The Voice of America's Mayors in Washington, DC*

# Progress – 38-54% Efficiency Boost

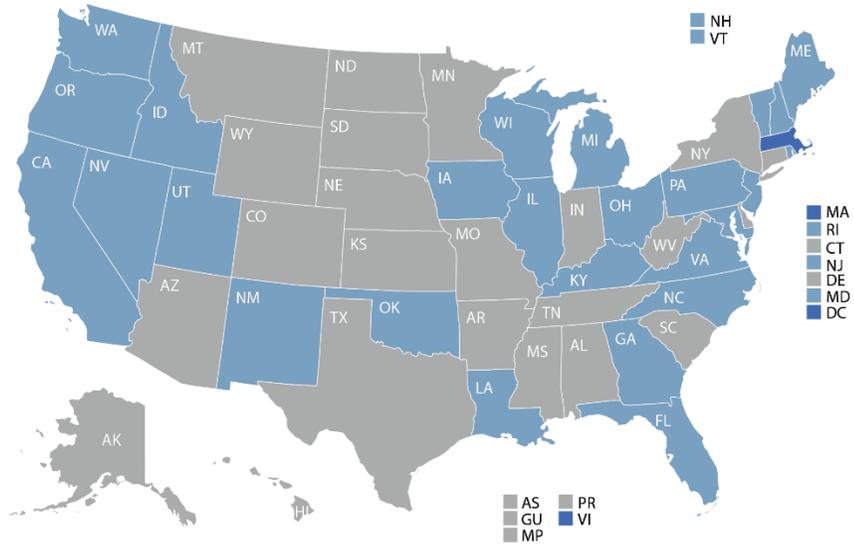




**But While The Model Energy  
Code Itself Doesn't Have Teeth  
. . . Just Look at What the Last  
Four IECC Updates Have Done  
for Our Nation**

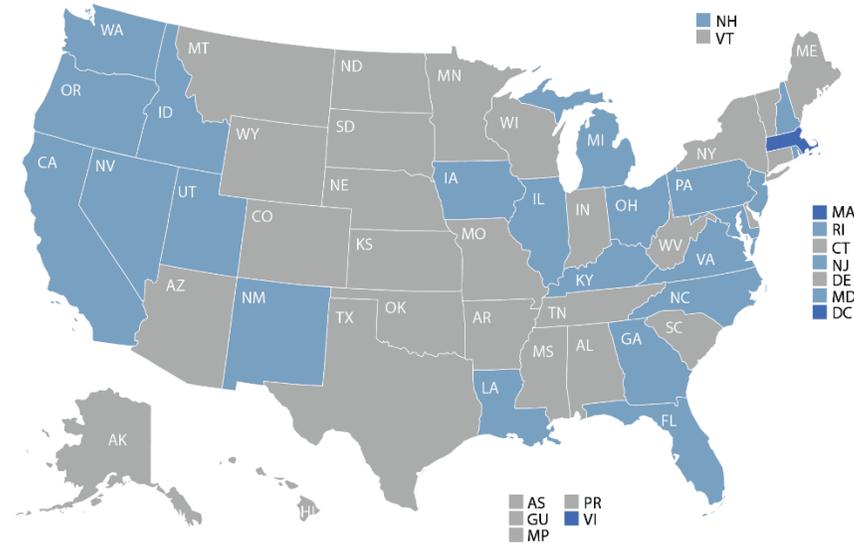


January  
2009



### Commercial State Energy Code Status

- 0 meets or exceeds ASHRAE Standard 90.1-2013 or equivalent
- 0 meets or exceeds ASHRAE Standard 90.1-2010 or equivalent
- 3 meets or exceeds ASHRAE Standard 90.1-2007 or equivalent
- 26 meets or exceeds ASHRAE Standard 90.1-2004 or equivalent
- 27 no statewide code or precedes ASHRAE Standard 90.1-2004

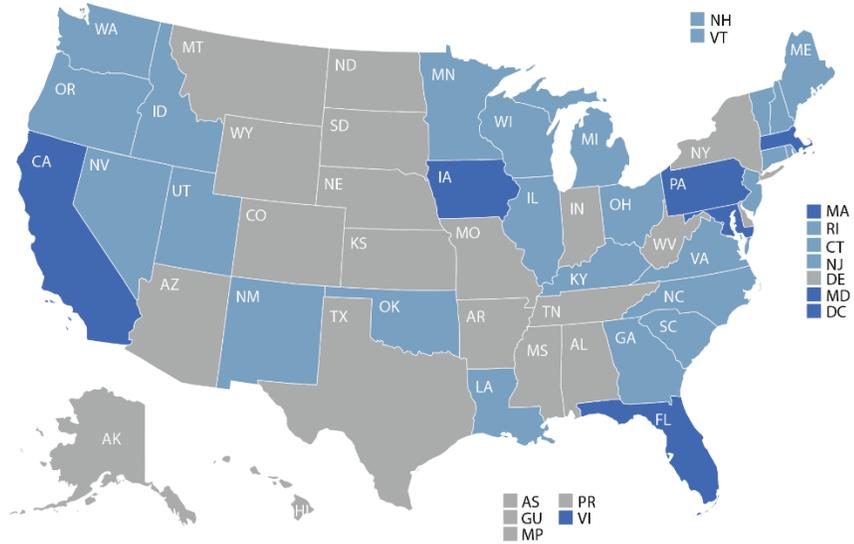


### Residential State Energy Code Status

- 0 meets or exceeds the 2015 IECC or equivalent
- 0 meets or exceeds the 2012 IECC or equivalent
- 3 meets or exceeds the 2009 IECC or equivalent
- 22 meets or exceeds the 2006 IECC or equivalent
- 31 no statewide code or precedes the 2006 IECC

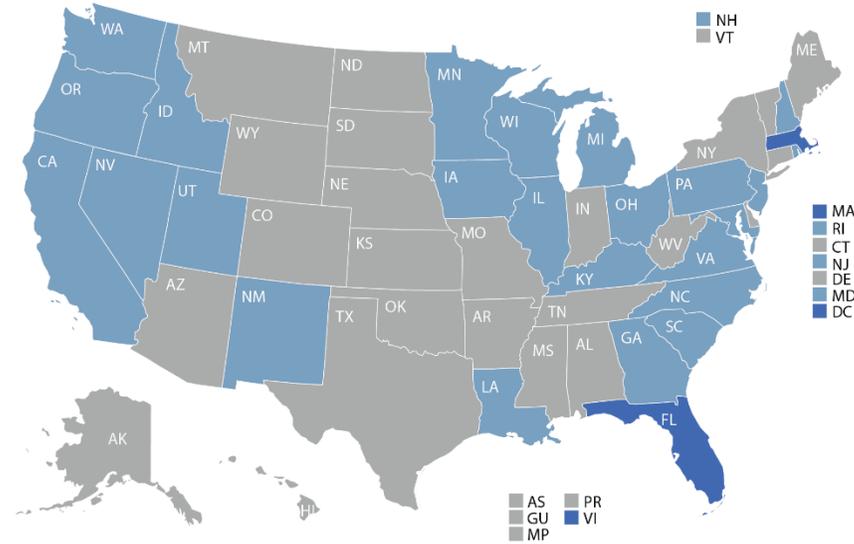


January  
2010



### Commercial State Energy Code Status

- 0 meets or exceeds ASHRAE Standard 90.1-2013 or equivalent
- 0 meets or exceeds ASHRAE Standard 90.1-2010 or equivalent
- 8 meets or exceeds ASHRAE Standard 90.1-2007 or equivalent
- 24 meets or exceeds ASHRAE Standard 90.1-2004 or equivalent
- 24 no statewide code or precedes ASHRAE Standard 90.1-2004

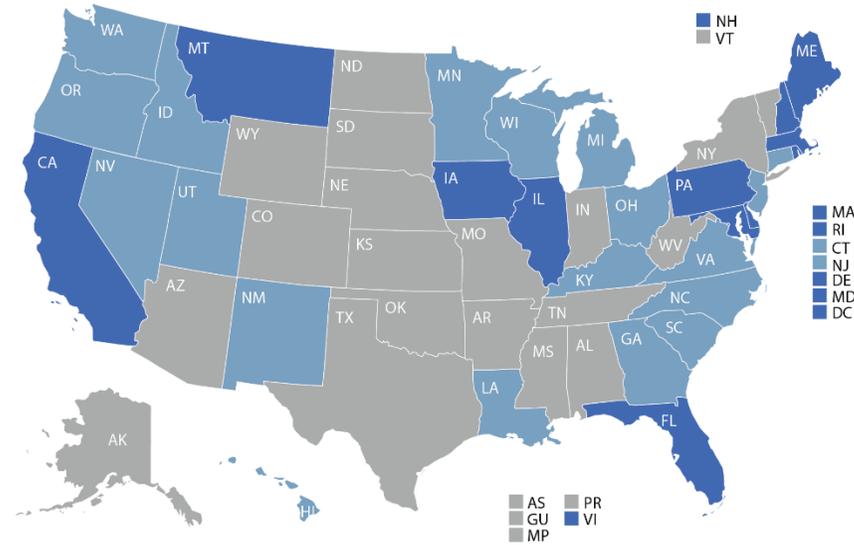
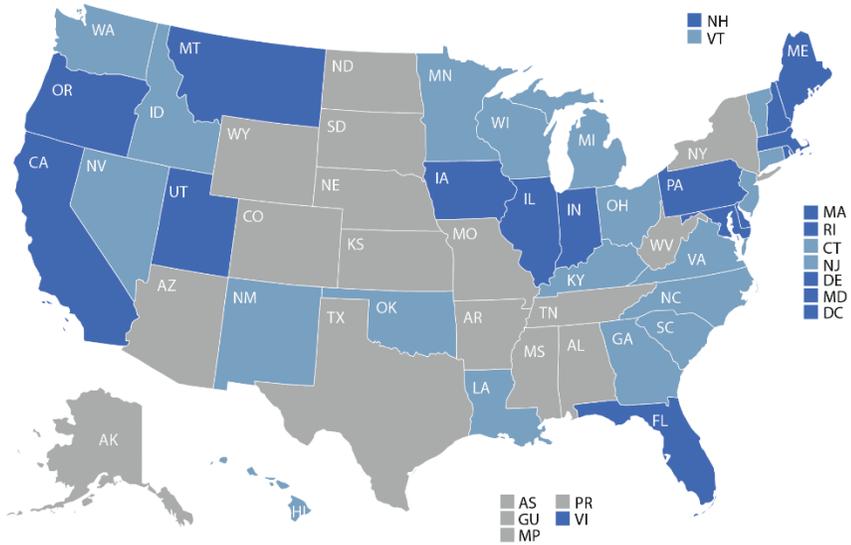


### Residential State Energy Code Status

- 0 meets or exceeds the 2015 IECC or equivalent
- 0 meets or exceeds the 2012 IECC or equivalent
- 4 meets or exceeds the 2009 IECC or equivalent
- 24 meets or exceeds the 2006 IECC or equivalent
- 28 no statewide code or precedes the 2006 IECC



July  
2010



### Commercial State Energy Code Status

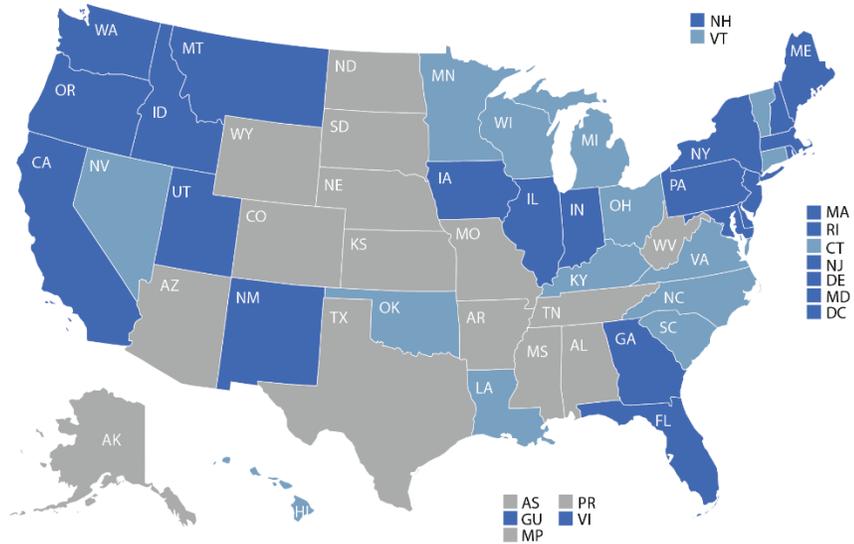
- 0 meets or exceeds ASHRAE Standard 90.1-2013 or equivalent
- 0 meets or exceeds ASHRAE Standard 90.1-2010 or equivalent
- 17 meets or exceeds ASHRAE Standard 90.1-2007 or equivalent
- 19 meets or exceeds ASHRAE Standard 90.1-2004 or equivalent
- 20 no statewide code or precedes ASHRAE Standard 90.1-2004

### Residential State Energy Code Status

- 0 meets or exceeds the 2015 IECC or equivalent
- 0 meets or exceeds the 2012 IECC or equivalent
- 14 meets or exceeds the 2009 IECC or equivalent
- 19 meets or exceeds the 2006 IECC or equivalent
- 23 no statewide code or precedes the 2006 IECC

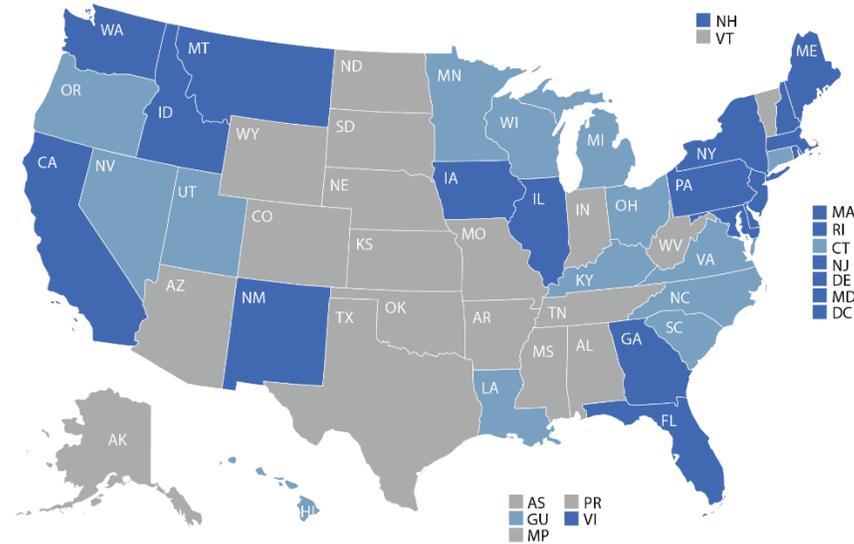


January  
2011



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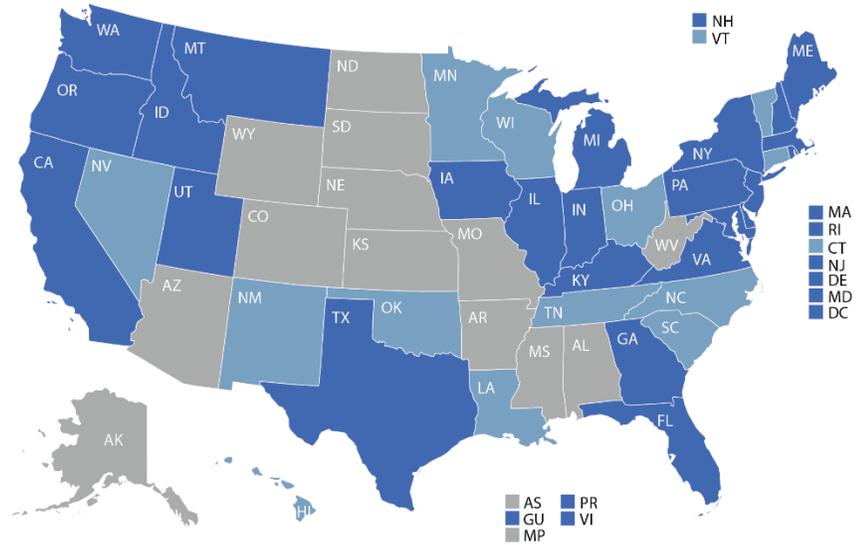
- 0 meets or exceeds ASHRAE Standard 90.1-2013 or equivalent
- 0 meets or exceeds ASHRAE Standard 90.1-2010 or equivalent
- 24 meets or exceeds ASHRAE Standard 90.1-2007 or equivalent
- 14 meets or exceeds ASHRAE Standard 90.1-2004 or equivalent
- 18 no statewide code or precedes ASHRAE Standard 90.1-2004



### Residential State Energy Code Status

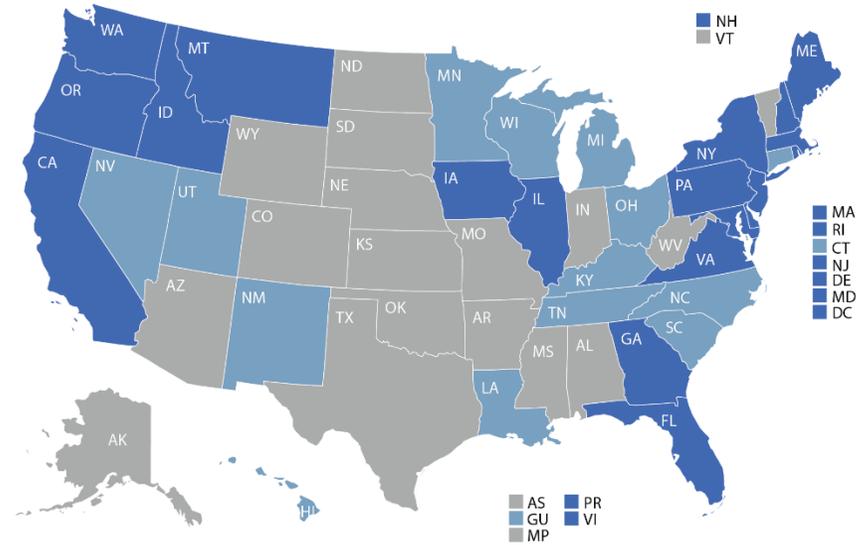
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- 0 meets or exceeds the 2012 IECC or equivalent
- 20 meets or exceeds the 2009 IECC or equivalent
- 14 meets or exceeds the 2006 IECC or equivalent
- 22 no statewide code or precedes the 2006 IECC

July  
2011



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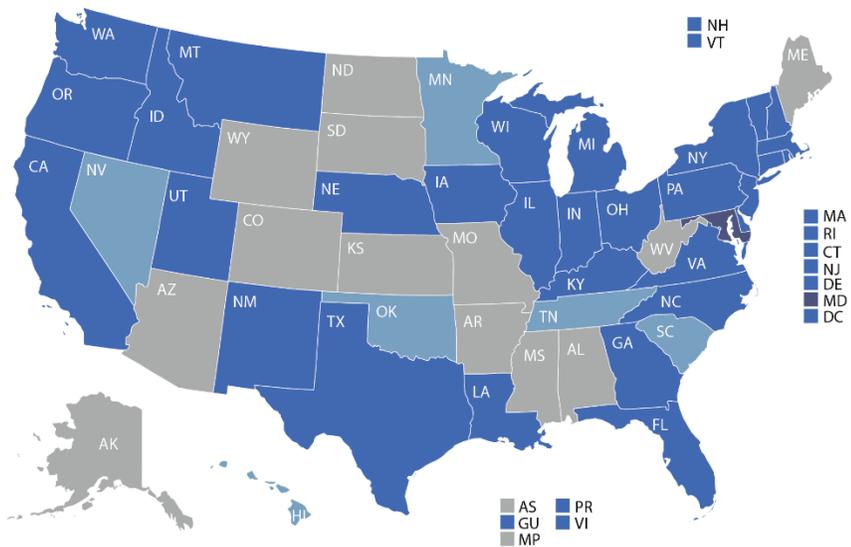
- 0 meets or exceeds ASHRAE Standard 90.1-2013 or equivalent
- 0 meets or exceeds ASHRAE Standard 90.1-2010 or equivalent
- 28 meets or exceeds ASHRAE Standard 90.1-2007 or equivalent
- 13 meets or exceeds ASHRAE Standard 90.1-2004 or equivalent
- 15 no statewide code or precedes ASHRAE Standard 90.1-2004



### Residential State Energy Code Status

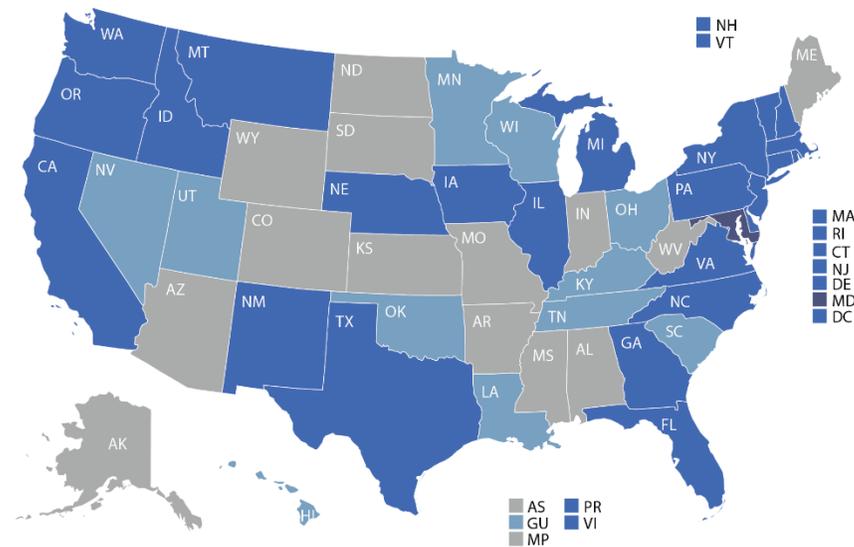
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- 0 meets or exceeds the 2012 IECC or equivalent
- 23 meets or exceeds the 2009 IECC or equivalent
- 14 meets or exceeds the 2006 IECC or equivalent
- 19 no statewide code or precedes the 2006 IECC

January  
2012



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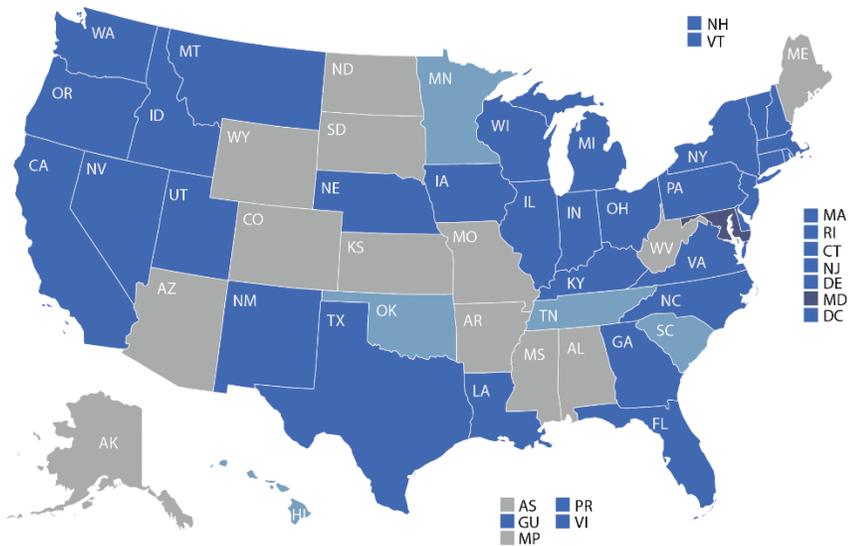
- 0 meets or exceeds ASHRAE Standard 90.1-2013 or equivalent
- 1 meets or exceeds ASHRAE Standard 90.1-2010 or equivalent
- 35 meets or exceeds ASHRAE Standard 90.1-2007 or equivalent
- 6 meets or exceeds ASHRAE Standard 90.1-2004 or equivalent
- 14 no statewide code or precedes ASHRAE Standard 90.1-2004



### Residential State Energy Code Status

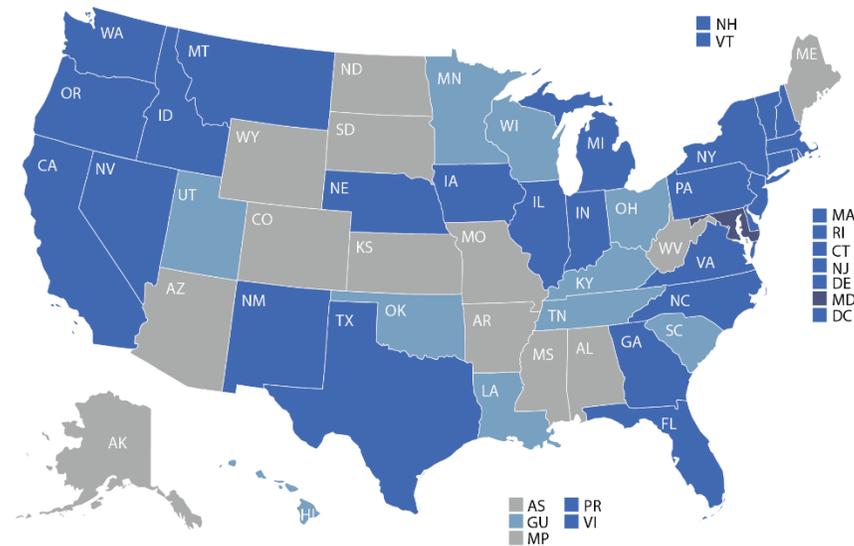
- 0 meets or exceeds the 2015 IECC or equivalent
- 1 meets or exceeds the 2012 IECC or equivalent
- 27 meets or exceeds the 2009 IECC or equivalent
- 12 meets or exceeds the 2006 IECC or equivalent
- 16 no statewide code or precedes the 2006 IECC

July  
2012



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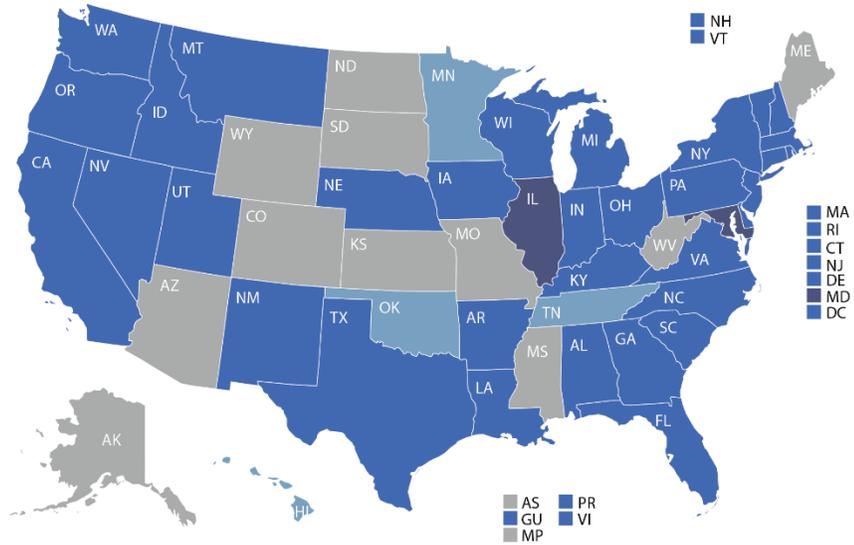
- 0 meets or exceeds ASHRAE Standard 90.1-2013 or equivalent
- 1 meets or exceeds ASHRAE Standard 90.1-2010 or equivalent
- 35 meets or exceeds ASHRAE Standard 90.1-2007 or equivalent
- 5 meets or exceeds ASHRAE Standard 90.1-2004 or equivalent
- 15 no statewide code or precedes ASHRAE Standard 90.1-2004



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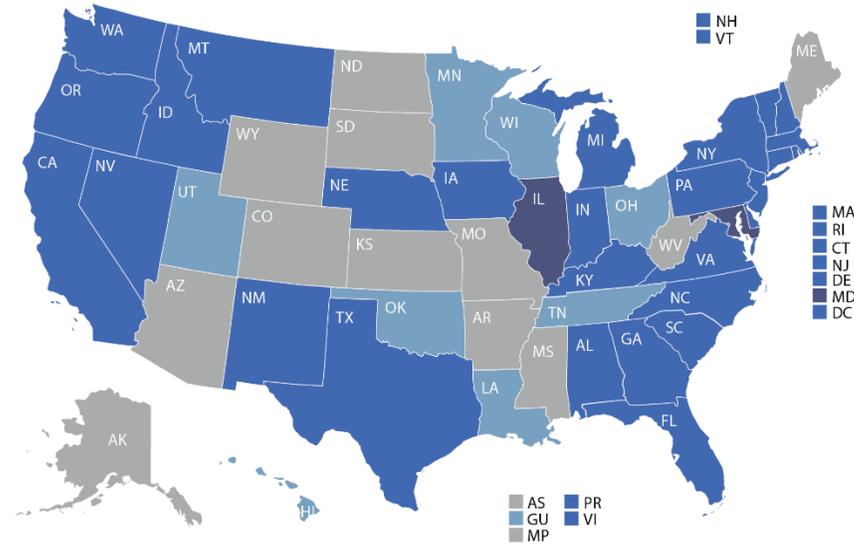
- 0 meets or exceeds the 2015 IECC or equivalent
- 1 meets or exceeds the 2012 IECC or equivalent
- 29 meets or exceeds the 2009 IECC or equivalent
- 11 meets or exceeds the 2006 IECC or equivalent
- 15 no statewide code or precedes the 2006 IECC

January  
2013



### Commercial State Energy Code Status

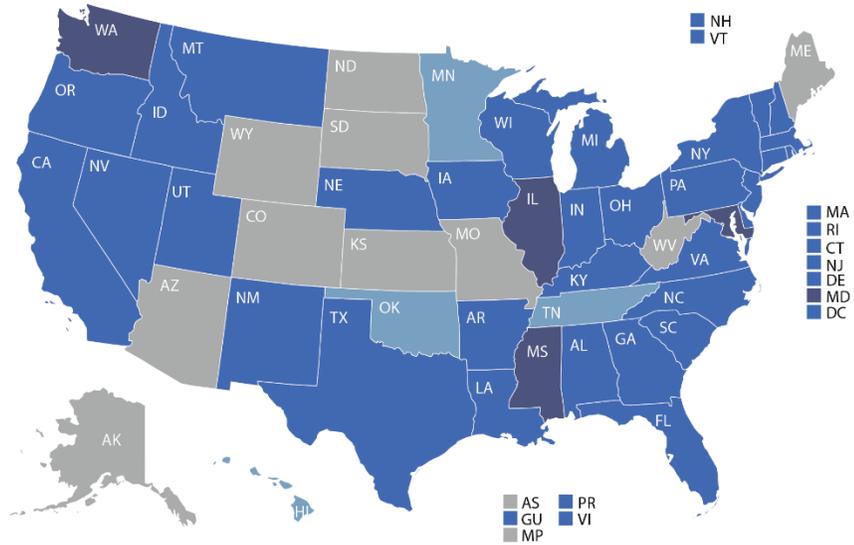
- 0 meets or exceeds ASHRAE Standard 90.1-2013 or equivalent
- 2 meets or exceeds ASHRAE Standard 90.1-2010 or equivalent
- 37 meets or exceeds ASHRAE Standard 90.1-2007 or equivalent
- 4 meets or exceeds ASHRAE Standard 90.1-2004 or equivalent
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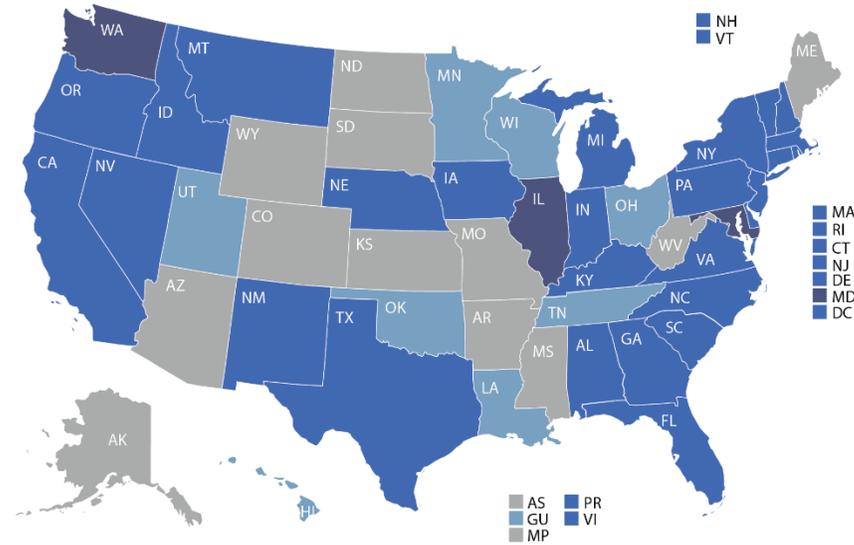
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July  
2013



### Commercial State Energy Code Status

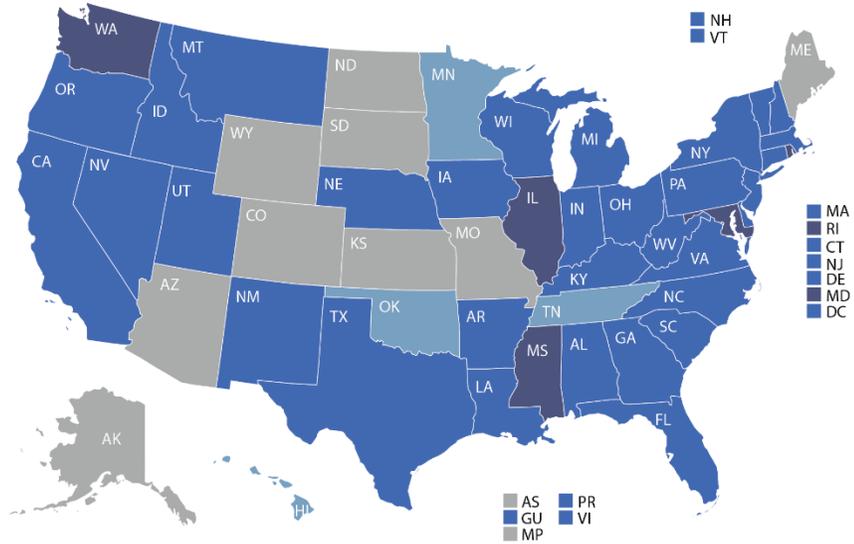
- 0 meets or exceeds ASHRAE Standard 90.1-2013 or equivalent
- 4 meets or exceeds ASHRAE Standard 90.1-2010 or equivalent
- 36 meets or exceeds ASHRAE Standard 90.1-2007 or equivalent
- 4 meets or exceeds ASHRAE Standard 90.1-2004 or equivalent
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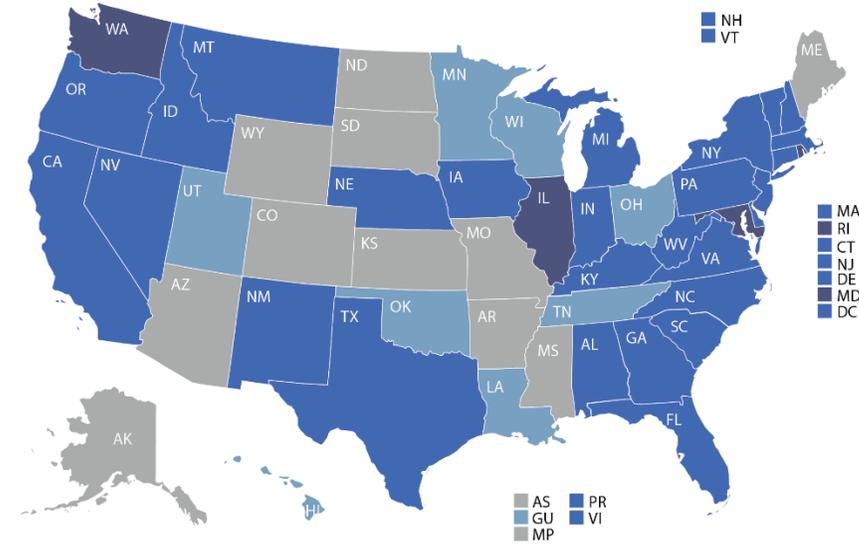
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- 31 meets or exceeds the 2009 IECC or equivalent
- 8 meets or exceeds the 2006 IECC or equivalent
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January  
2014



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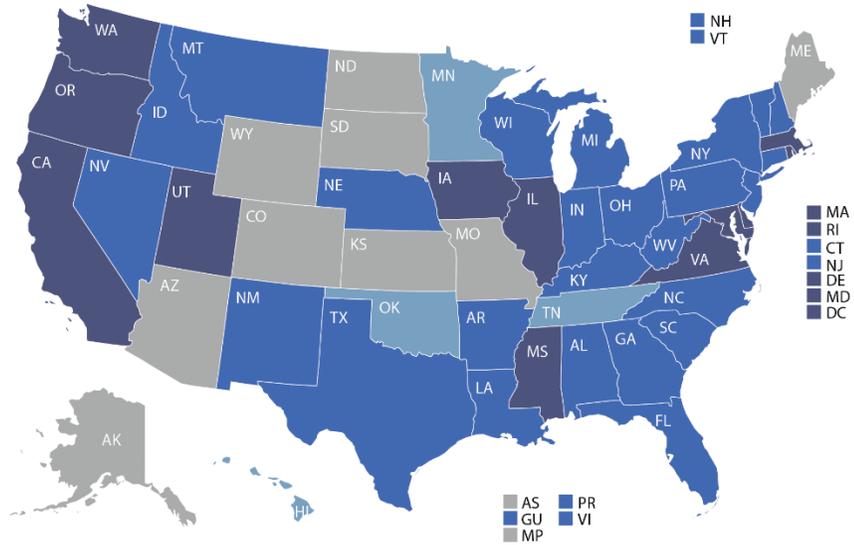
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- 11 no statewide code or precedes ASHRAE Standard 90.1-2004



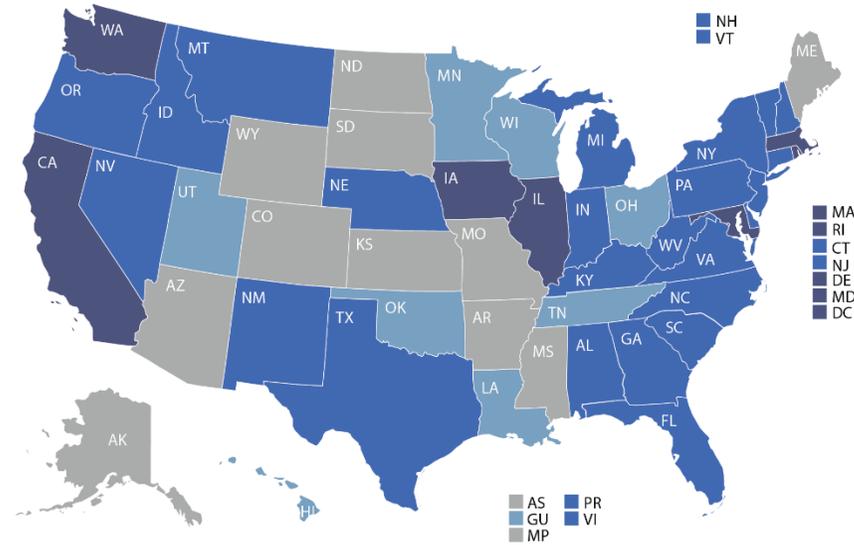
### Residential State Energy Code Status

- 0 meets or exceeds the 2015 IECC or equivalent
- 4 meets or exceeds the 2012 IECC or equivalent
- 30 meets or exceeds the 2009 IECC or equivalent
- 9 meets or exceeds the 2006 IECC or equivalent
- 13 no statewide code or precedes the 2006 IECC

July  
2014

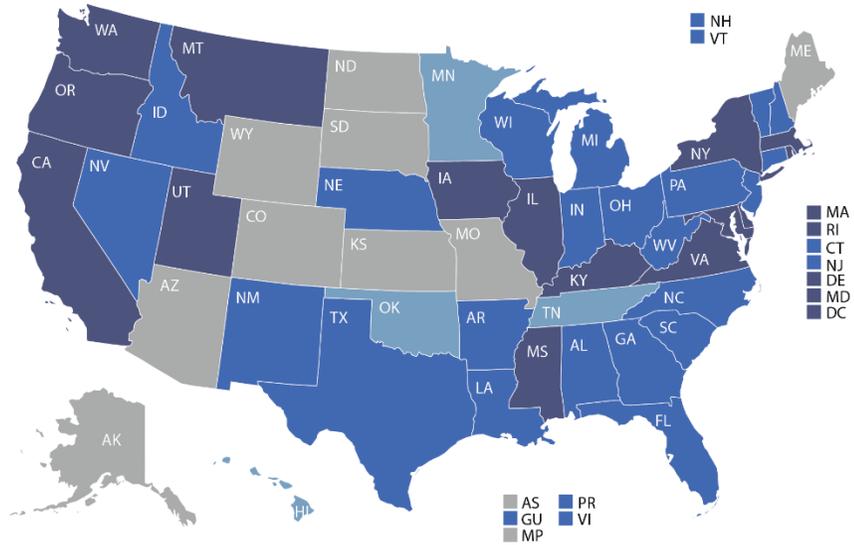


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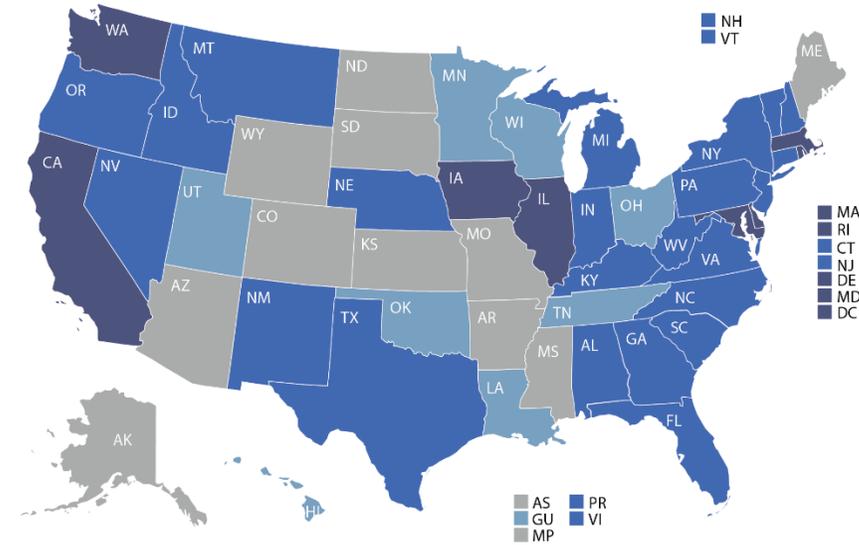


### Residential State Energy Code Status

January  
2015

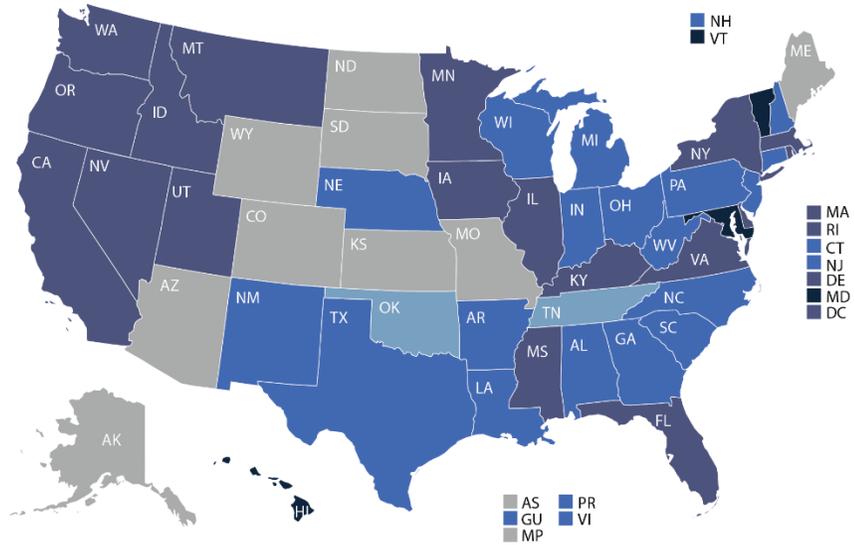


### Commercial State Energy Code Status



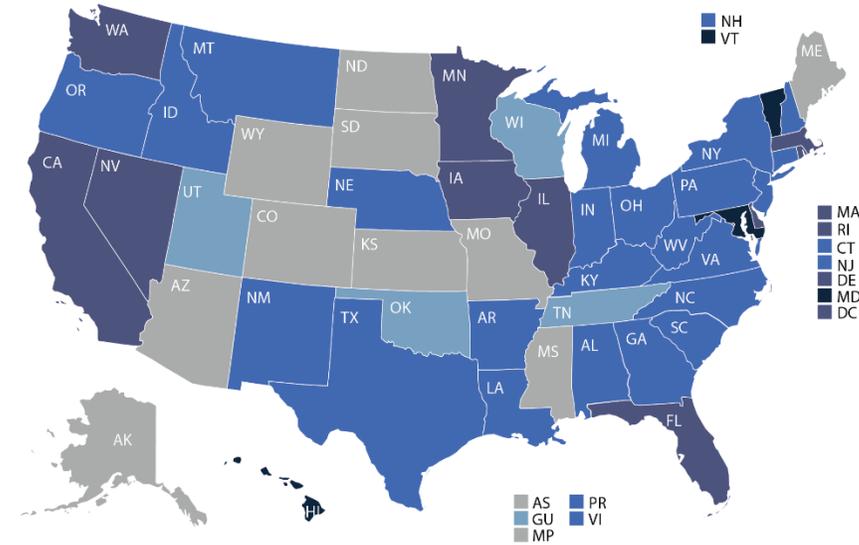
### Residential State Energy Code Status

July  
2015



### Commercial State Energy Code Status

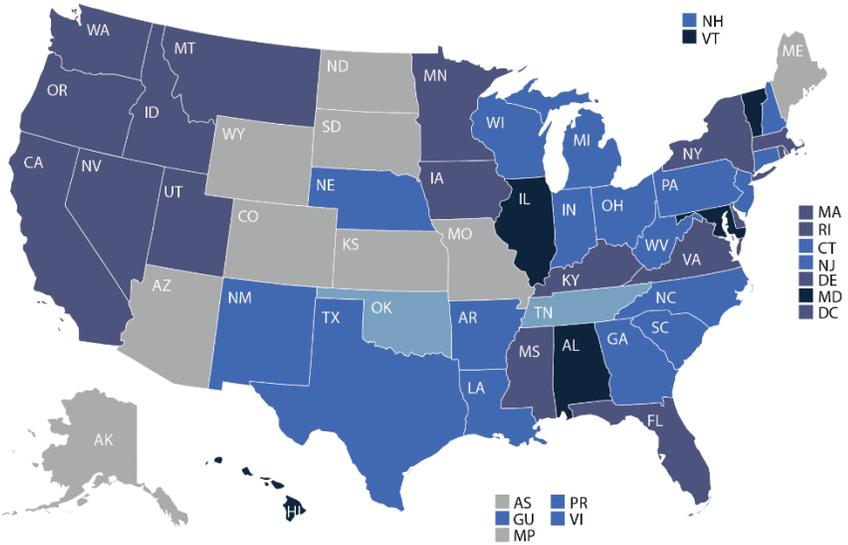
- 3** meets or exceeds ASHRAE Standard 90.1-2013 or equivalent
- 19** meets or exceeds ASHRAE Standard 90.1-2010 or equivalent
- 21** meets or exceeds ASHRAE Standard 90.1-2007 or equivalent
- 2** meets or exceeds ASHRAE Standard 90.1-2004 or equivalent
- 11** no statewide code or precedes ASHRAE Standard 90.1-2004



### Residential State Energy Code Status

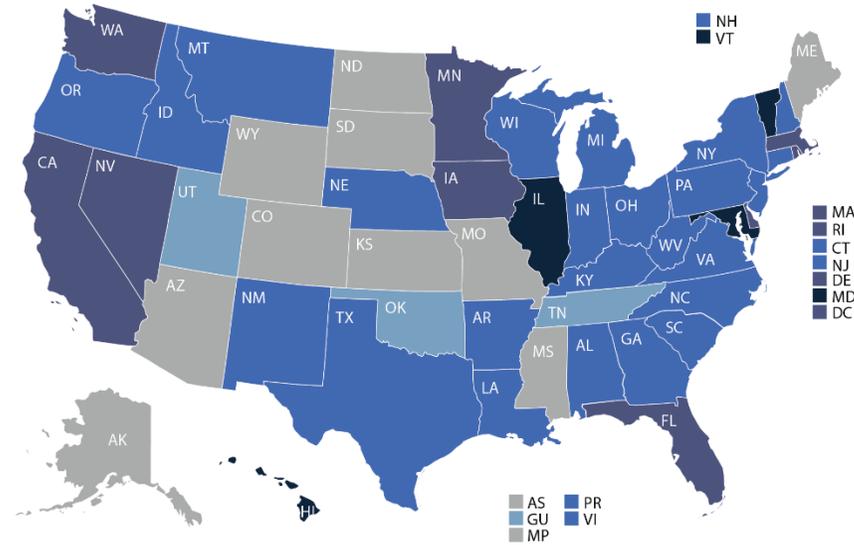
- 3** meets or exceeds the 2015 IECC or equivalent
- 11** meets or exceeds the 2012 IECC or equivalent
- 25** meets or exceeds the 2009 IECC or equivalent
- 5** meets or exceeds the 2006 IECC or equivalent
- 12** no statewide code or precedes the 2006 IECC

January  
2016



### Commercial State Energy Code Status

- 5 meets or exceeds ASHRAE Standard 90.1-2013 or equivalent
- 18 meets or exceeds ASHRAE Standard 90.1-2010 or equivalent
- 19 meets or exceeds ASHRAE Standard 90.1-2007 or equivalent
- 2 meets or exceeds ASHRAE Standard 90.1-2004 or equivalent
- 12 no statewide code or precedes ASHRAE Standard 90.1-2004

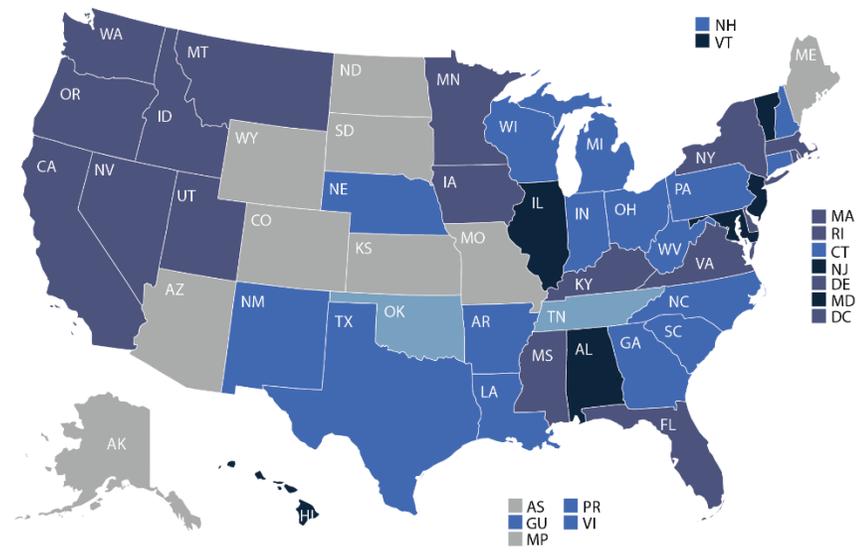


### Residential State Energy Code Status

- 4 meets or exceeds the 2015 IECC or equivalent
- 12 meets or exceeds the 2012 IECC or equivalent
- 24 meets or exceeds the 2009 IECC or equivalent
- 4 meets or exceeds the 2006 IECC or equivalent
- 12 no statewide code or precedes the 2006 IECC

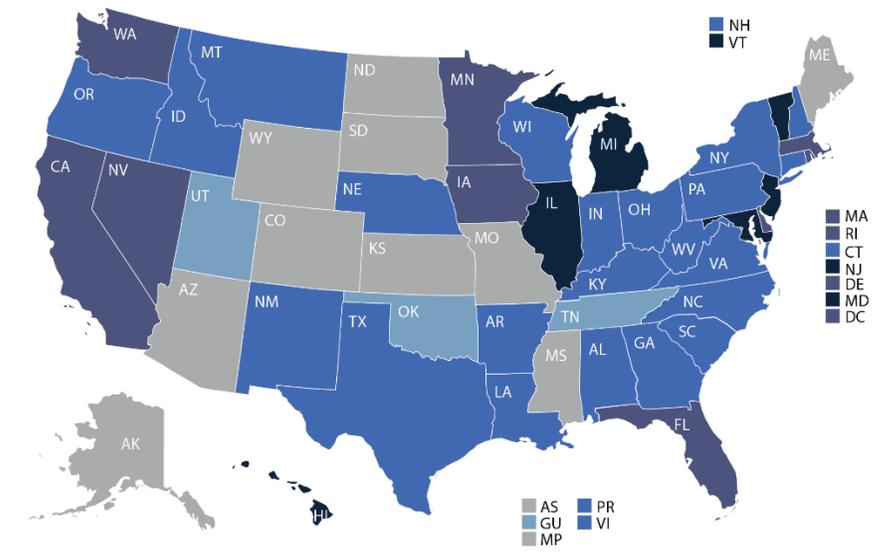


June  
2016



### Commercial State Energy Code Status

- 6 meets or exceeds ASHRAE Standard 90.1-2013 or equivalent
- 18 meets or exceeds ASHRAE Standard 90.1-2010 or equivalent
- 19 meets or exceeds ASHRAE Standard 90.1-2007 or equivalent
- 2 meets or exceeds ASHRAE Standard 90.1-2004 or equivalent
- 11 no statewide code or precedes ASHRAE Standard 90.1-2004



### Residential State Energy Code Status

- 6 meets or exceeds the 2015 IECC or equivalent
- 10 meets or exceeds the 2012 IECC or equivalent
- 24 meets or exceeds the 2009 IECC or equivalent
- 4 meets or exceeds the 2006 IECC or equivalent
- 12 no statewide code or precedes the 2006 IECC





# Can We Expand on Our Success in 2019?

## Putting the 2021 and Future IECCs on a Glide Path of Steady Progress



# Your Window of Opportunity



The Power Is in Your Hands to Put the 2021 and Future IECC Updates on a Glide Path of Steady Building Efficiency Gains

# Our Simple 2019 Goals for the 2021 IECC

**Achieve a minimum 10% efficiency boost in the 2021 IECC over the 2018 IECC**

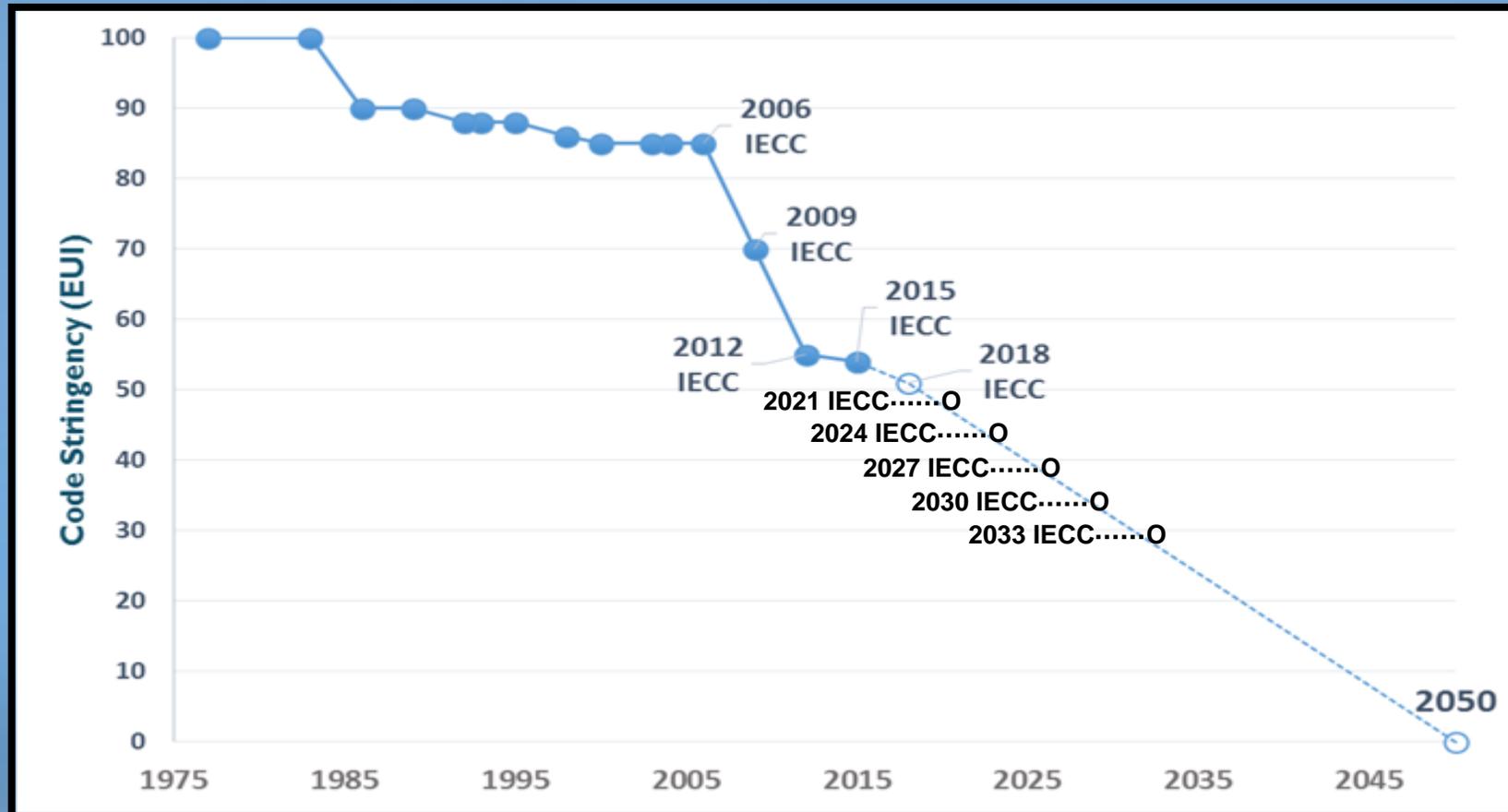
- *Put 2021 and future IECCs on a glide path of steady efficiency improvements*
- *Defeat efficiency rollbacks and trade-offs*

**Increase *cdpACCESS* voting participation by local and state governments**

**Urge elected officials to link code official voting to their jurisdiction's energy and environmental policies**

# A 5% Glide Path to Net Zero by 2050

Modest 5% Gains Every 3 Years . . .  
No Rollbacks; No Trade-Offs





It's Easy for Local  
Governments to  
Vote for Building  
Energy Efficiency!



# Only “Governmental Members” Vote on the 2021 IECC

# of Eligible “Voting Representatives (GMVRs)”  
Each Governmental Member Can Have Is Based  
on the Jurisdiction’s Population:

## Population

0-50,000

50,001-150,000

150,001+

## # of Eligible Votes

Four (4)

Eight (8)

Twelve (12)

# BUT a Jurisdiction Can Have Multiple “Governmental Members!”

The International Code Council defines a  
“**Governmental Member**” as a “**governmental unit,  
department, or agency** engaged in the  
administration, formulation, or enforcement of  
laws, ordinances, rules, or regulations relating to  
the public health, safety & welfare:

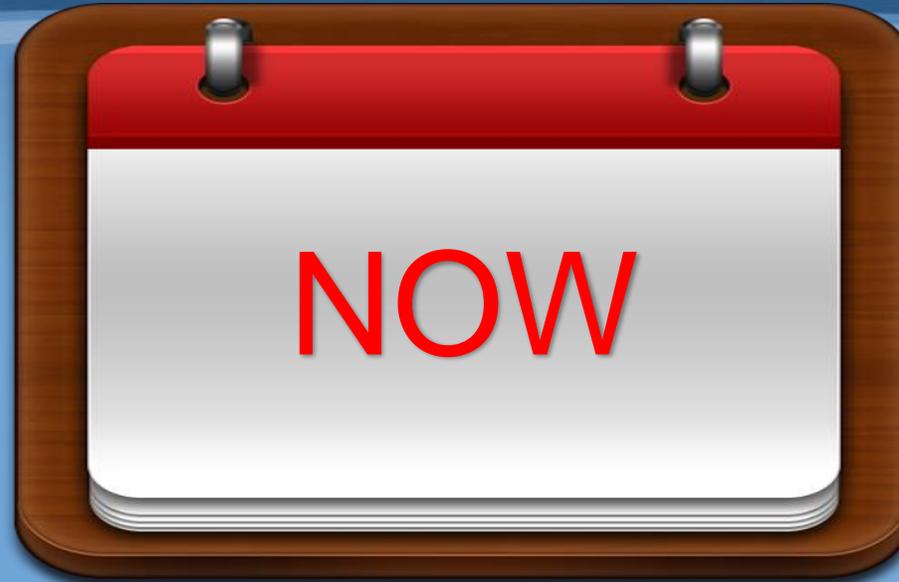
- The Village of Bloomingdale, IL (pop. 22,075) has 2 ICC memberships – the Village & the Fire District
- Fort Collins, CO (pop. 164,207) plans to have 3 ICC memberships – Bldg. Code Officials; Sustainability Office, & City’s Public Light & Power

# How You Can Take Action

Minimal  
Pain . . .  
**HUGE  
GAIN**

**The  
Power  
Is In  
Your  
Hands!**

# Check List – ITEM 1



**Determine the Number of Governmental  
Memberships Your Jurisdiction Can Have**

**Send a Top-Down Message Supporting 10%  
Boost for 2021 IECC**

## Check List – ITEM 2



**Last Day for Each Govt. Member to  
Join/Renew ICC Membership to  
Ensure Voting Eligibility**

# Check List – ITEM 3



Last Day to Submit Your Roster of  
Voting Representatives (GMVRs) to  
ICC

# Check List – ITEM 4



Make sure all GMVRs cast their pro-efficiency votes online using [cdpAccess!](#)

We suggest a pizza voting party

# A Simple, USCM Endorsed Yardstick for EECC Voting Recommendations

**SUPPORT** Proposals that Boost Efficiency Using Readily Available Technology.

**OPPOSE** Proposals that Roll Back or Trade Off Efficiency Gains.

**Energy Efficient Codes Coalition – Public Comment Hearing RE Recommendations**

Prop. #	Standing Motion	EECC Recommended Action	Original Proposal Summary	EECC Evaluation & Summary of Public Comments with Modifications	EECC Notes
RE7	D	Support D	Replaces specific interior design temperatures with a reference to ACCA manual J, allowing additional flexibility in design.		Current code language promotes better equipment sizing than the proposed change.
RE8	D	Oppose D	Requires all new 1- and 2-family and multifamily dwellings with roofs oriented between 110°-270° to have <i>solar ready zone</i> of ≥300 sq ft or ≥150 sq ft for homes under 2000 square feet. Exceptions for buildings with on-site renewables or roof areas shaded >70% of the time. Construction documents must indicate the zone and pathways for conduit, pre-wiring, or plumbing chase and the electrical service panel must reserve space for a breaker. Exception for buildings with installed pre-plumbing or chase from zone to water heating system.	PC – Removes requirement to have solar ready zone and to reserve space in electrical service panel, but maintains requirements to document solar-ready portions of the roof, keep these zones free of obstructions, and document conduit pathways and roof loads.	Agree
		Support AM PC			
RE9	D	Oppose D	Requires all new 1- and 2-family and multifamily dwellings with roofs oriented between 110°-270° to have <i>solar ready zone</i> of ≥300 sq ft or ≥150 sq ft for homes under 2000 square feet. Construction documents must indicate the zone and pathways for conduit, pre-wiring, or plumbing chase and the electrical service panel must reserve space for a breaker. Exceptions for buildings with on-site renewables or roof areas shaded >70% of the time.	PC1 – Moves solar ready provisions into a new appendix; adds an exception for buildings with <600 sq. ft. of solar ready zone that is unshaded for more than 70% of daylight hours. PC2 – Move solar ready provisions into a new appendix; adds a scoping exception for buildings with <600 sq. ft. of solar ready zone.	Agree  NR
		Support AM PC1			

# **WE WILL PROVIDE SUPPORT!**

**Develop outreach materials**

**Host advocacy meetings and webinars**

**Training on use of cdpAccess**

**Provide voting guide**

**Organize Voting Parties**

# THANK YOU!

<http://energyefficientcodes.org/POWER>



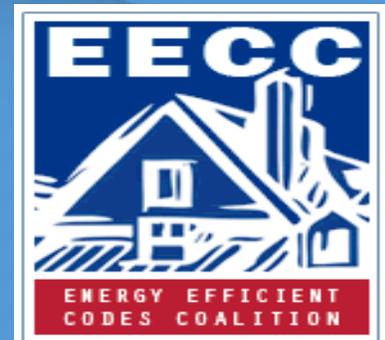
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# Next Steps

# Questions and Answers

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