

U.S. DEPARTMENT OF
ENERGY

Office of
ENERGY EFFICIENCY &
RENEWABLE ENERGY

Updates from the Building Energy Codes Program

2021 National Energy Codes Conference

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Model Energy Code Determinations

> Every household in the U.S. should have the opportunity to benefit from the latest building codes and standards.

JUST ANNOUNCED: Model energy code Determinations:

- **Commercial:** 4.7% site energy savings based on Standard 90.1-2019
- **Residential:** 9.4% site energy savings based on the 2021 IECC

Adopting the latest building codes is a critical opportunity to increase energy efficiency in buildings, as well as to ensure modern standards for health, comfort, durability and resilience in their homes, businesses, and communities.

DOE is challenging states, local governments, and the design and construction industry to update their building energy codes based on the latest model codes and standards, and to help ensure all construction meets or exceeds these standards.

New Technical Assistance Supporting Energy Codes

> DOE is ramping-up efforts to support building energy codes and help states and local governments embrace the latest standards.

JUST ANNOUNCED: New technical assistance to support state and local adoption and implementation of building energy codes:

- State, regional and national partnerships to support energy codes
- Innovative “stretch” concepts, from PV and EV charging, to advanced EE, building performance standards for existing buildings, to smart homes and more!
- Workforce education and training initiatives that help workers take advantage of new technologies, construction practices, and evolving building standards
- Technical analyses to quantify the impacts on energy savings, cost-benefit, jobs and the economy, and related GHG impacts

New Technical Assistance Supporting Energy Codes

- > DOE and PNNL have just released **177 new technical reports, factsheets and other resources** to support the latest codes.
- National energy savings analysis for the 2021 IECC and Standard 90.1-2019
- National cost-effectiveness analysis for the 2021 IECC and 90.1-2019
- State cost-effectiveness analysis for the 2021 IECC and 90.1-2019
- State and city factsheets highlighting the benefits of the latest codes
- New *stretch code* concepts which can be adopted by states or local governments, or considered for future model codes (e.g., EV charging)
- Updated Impact Report quantifying the energy, cost and carbon impacts associated with the latest codes
- Plus, visit the brand new energycodes.gov

What are the Impacts?

Building energy codes are projected to result in (2020 through 2040):

\$138 billion in energy cost savings to homes and businesses

13 quads of primary energy savings

900 million metric tons of avoided CO₂ emissions

REFERENCE: <https://www.energycodes.gov/impacts>



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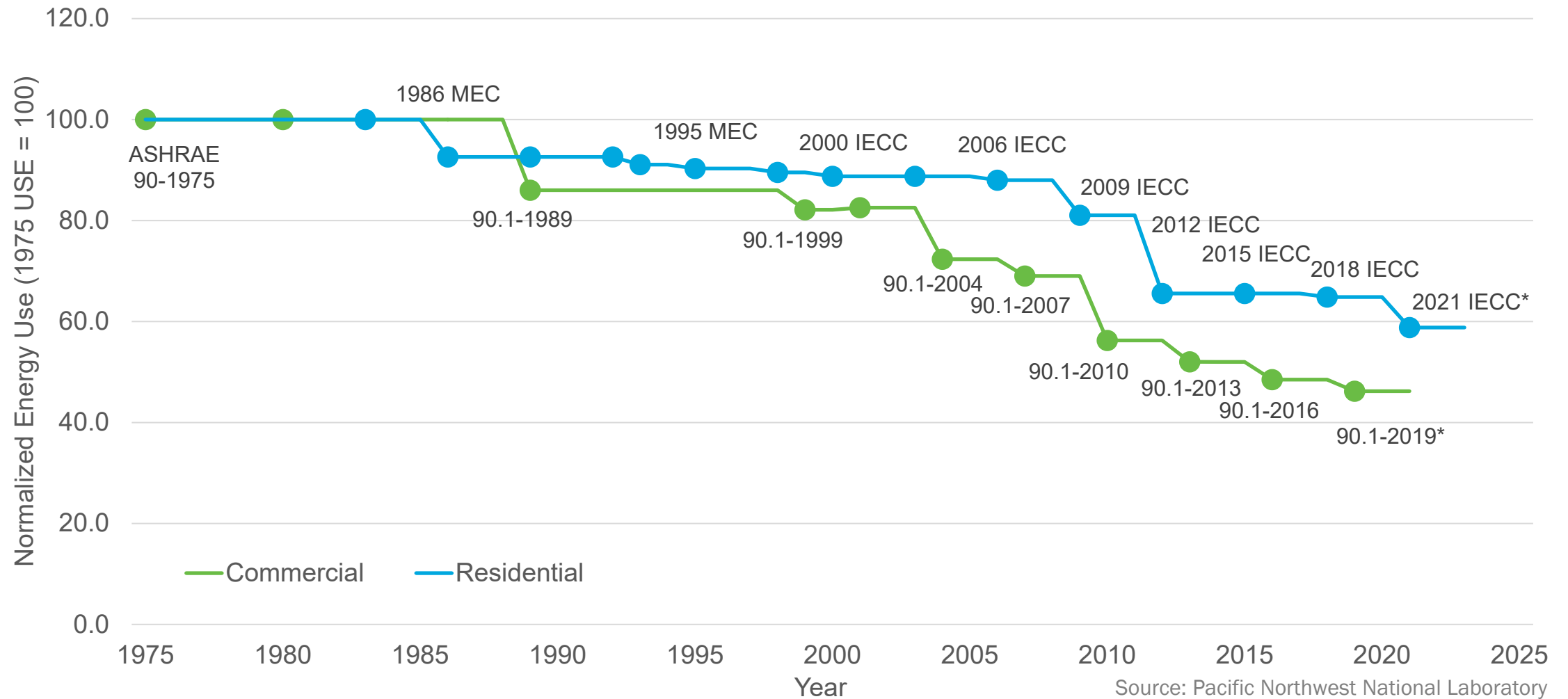
MAPS + INFOGRAPHICS

DOE Building Energy Codes Program

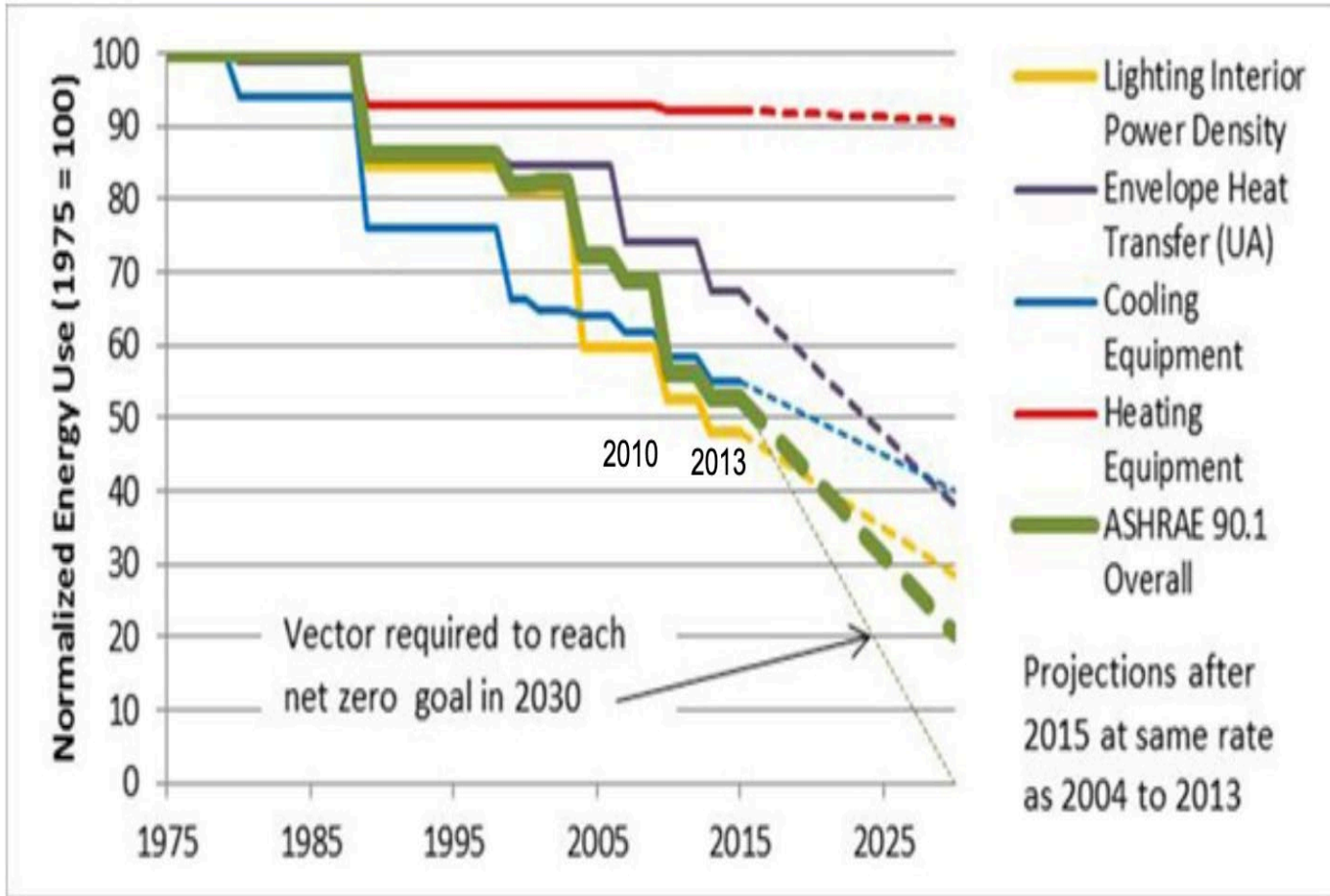
Historical Improvement: IECC and Standard 90.1

Improvement in Residential & Commercial Energy Code

(Year 1975-2021)

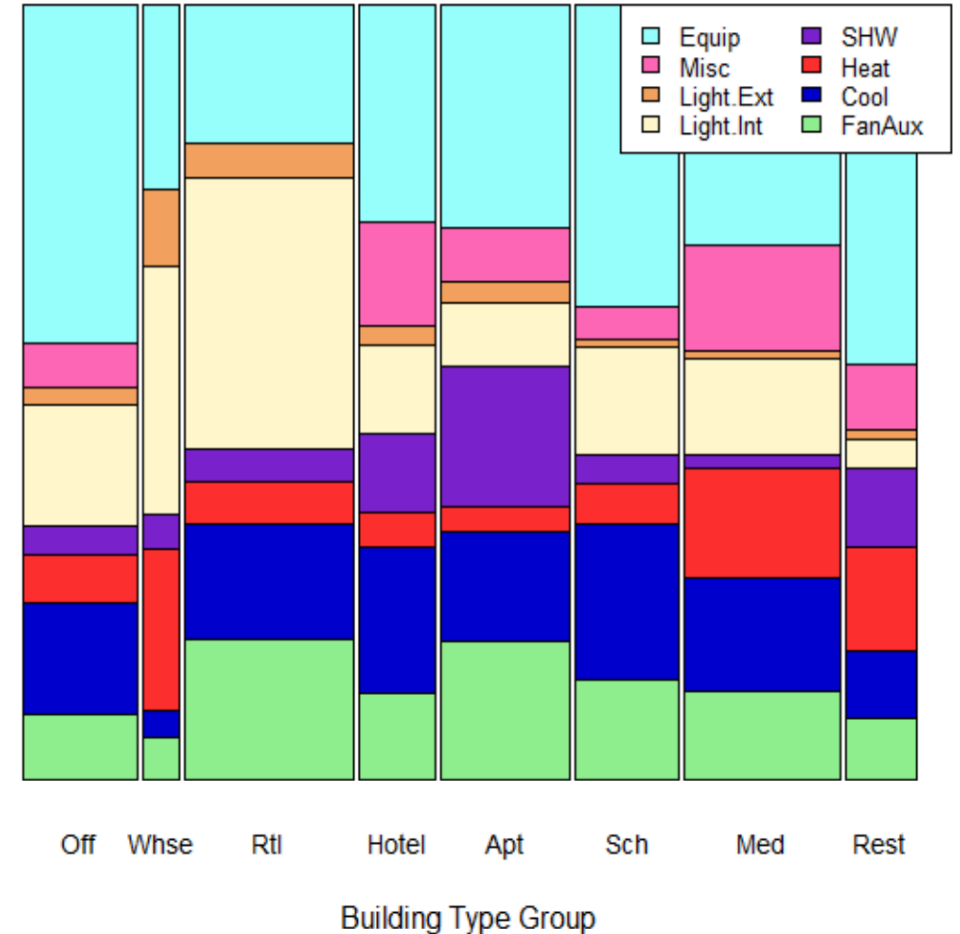


Source: Pacific Northwest National Laboratory



Improvement in ASHRAE Standard 90/90.1 (1975-2013) with Projections to 2030.
 Courtesy of Pacific Northwest National Laboratory.

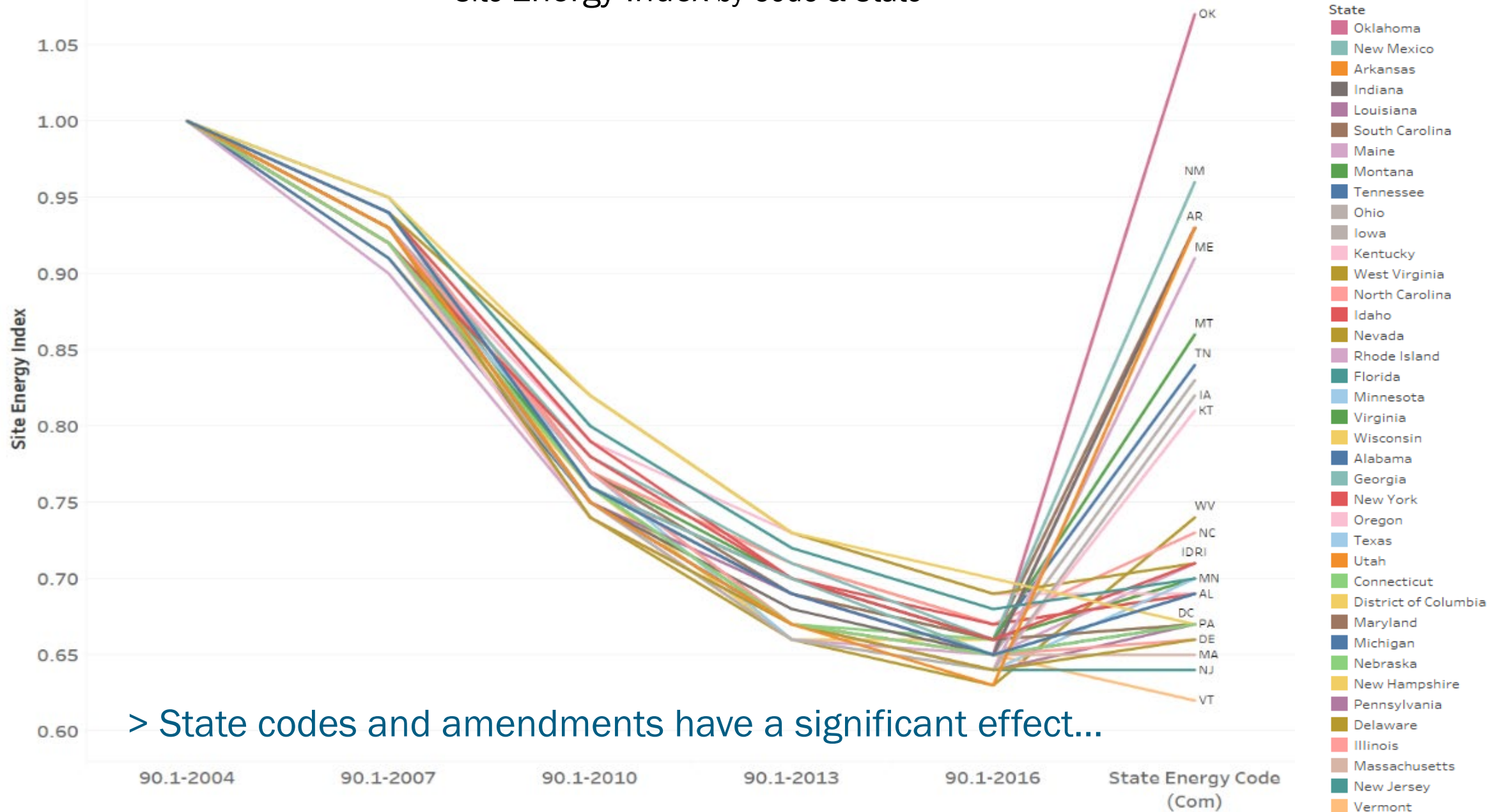
Commercial Energy Cost Impact by End Use US Weighted; After 90.1-2016



> Broken out by end use—envelope, heating, cooling, SWH, lighting, etc. (Standard 90.1)

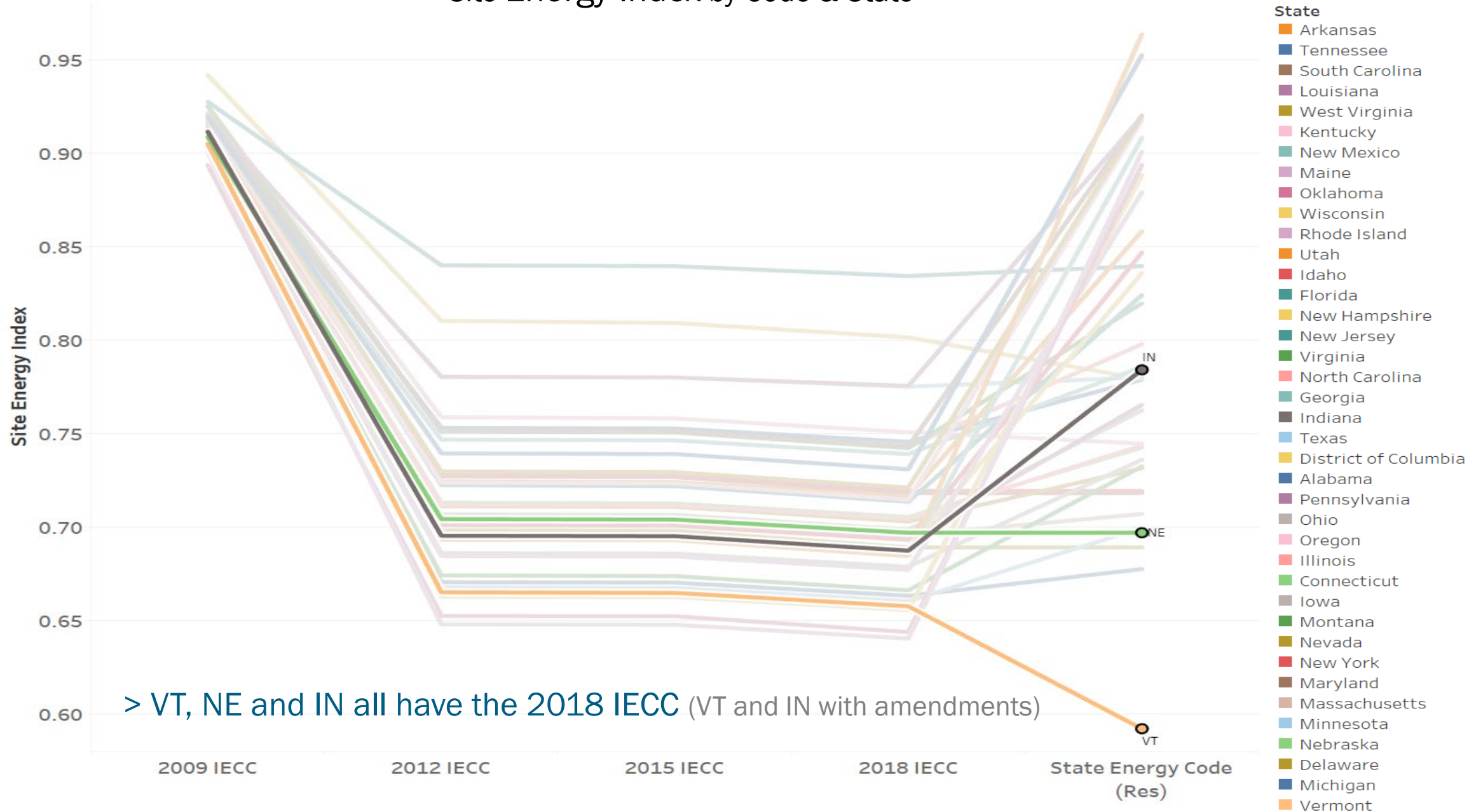
Commercial Buildings

Site Energy Index by Code & State



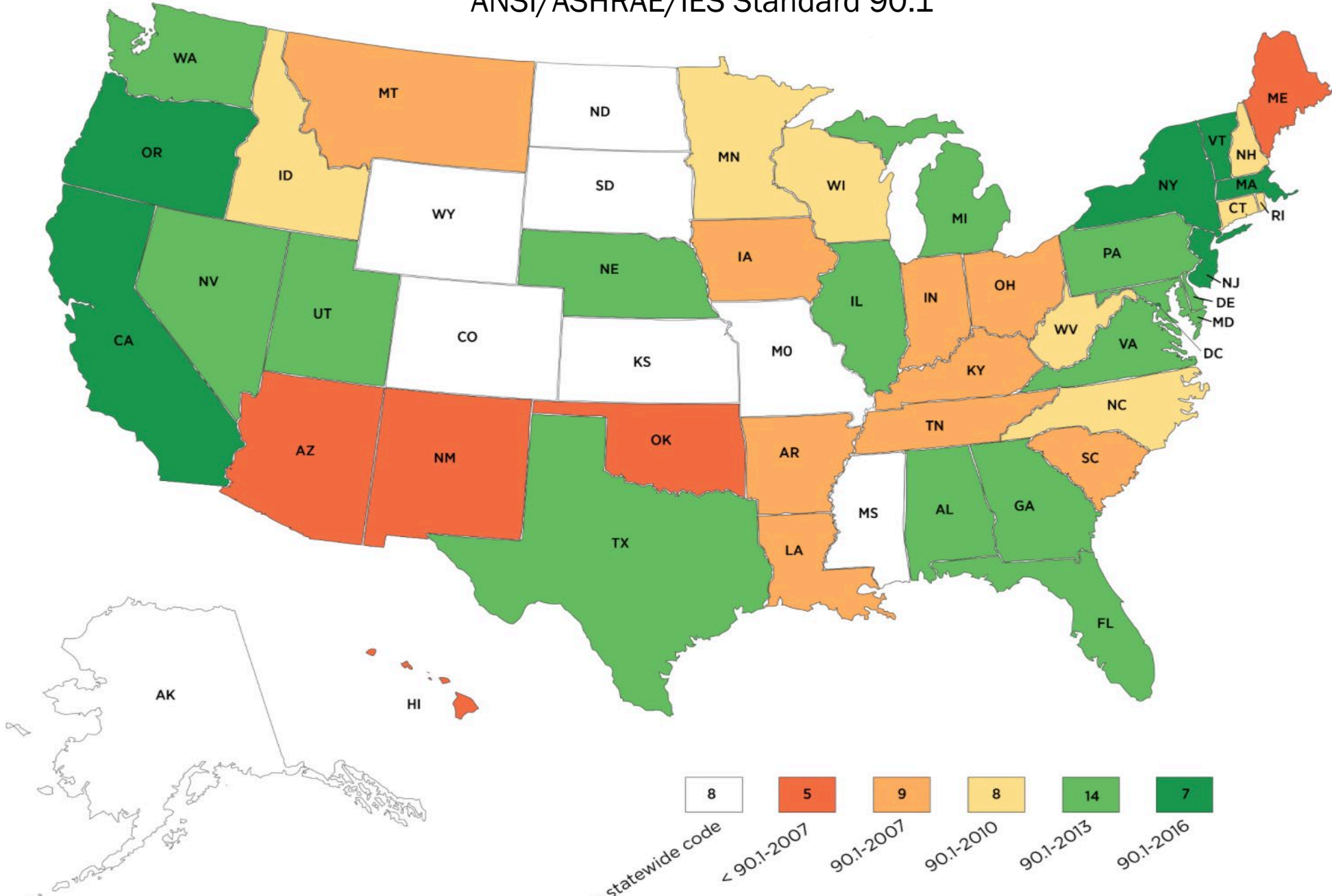
Residential Buildings

Site Energy Index by Code & State

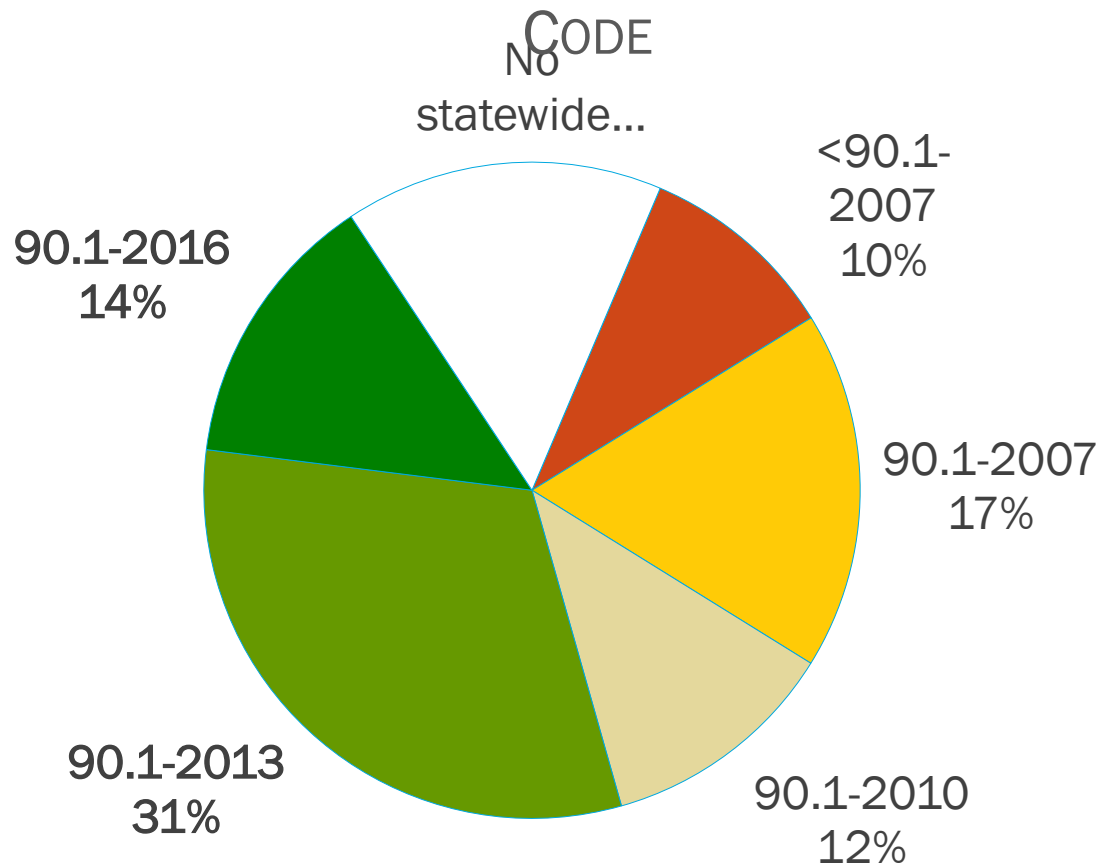


Commercial Buildings

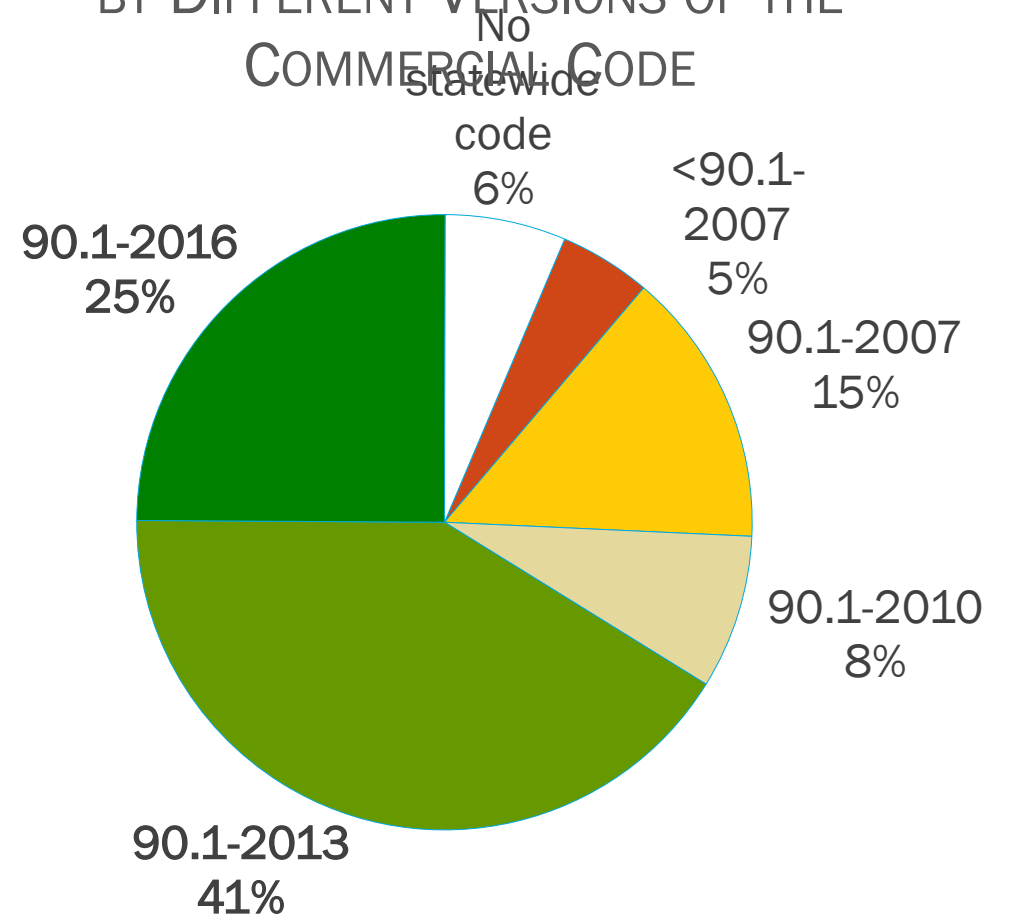
ANSI/ASHRAE/IES Standard 90.1



PERCENT OF U.S. STATES SERVED BY DIFFERENT VERSIONS OF THE COMMERCIAL

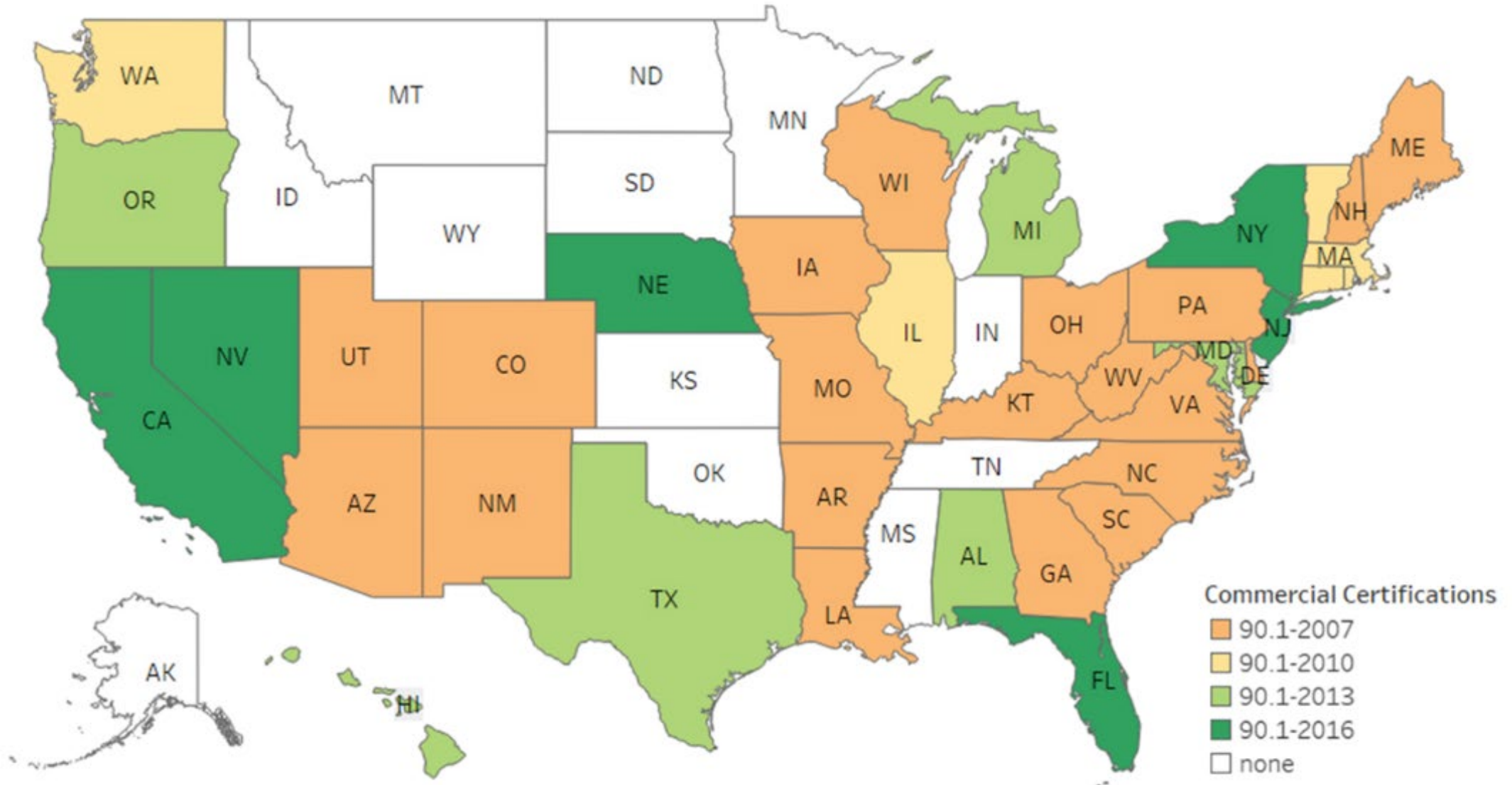


PERCENT OF U.S. POPULATION SERVED BY DIFFERENT VERSIONS OF THE COMMERCIAL CODE

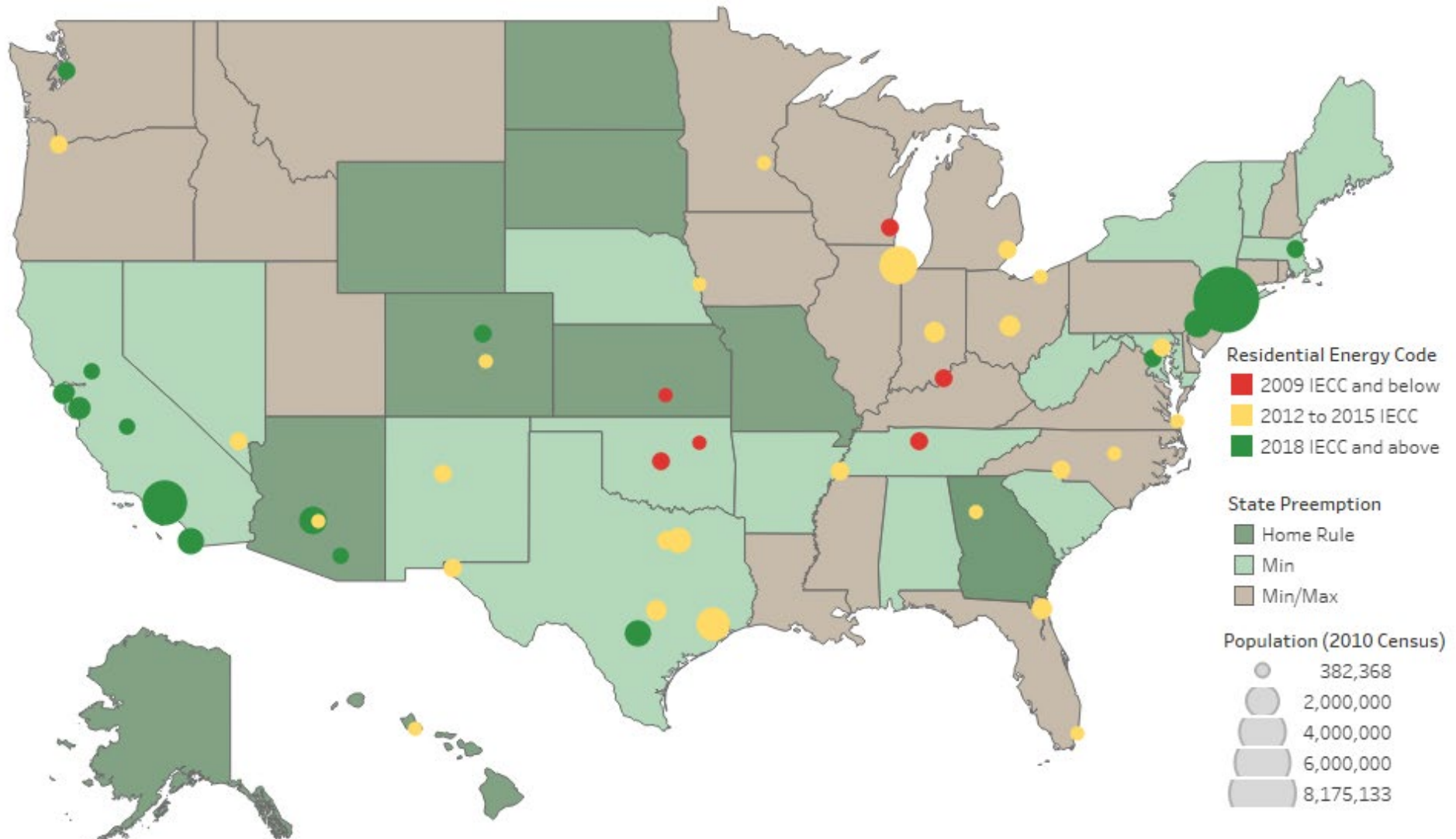


> A greater portion of the U.S. is subject to newer codes when measured by population (vs. state counts)

Commercial Buildings State Code Certifications

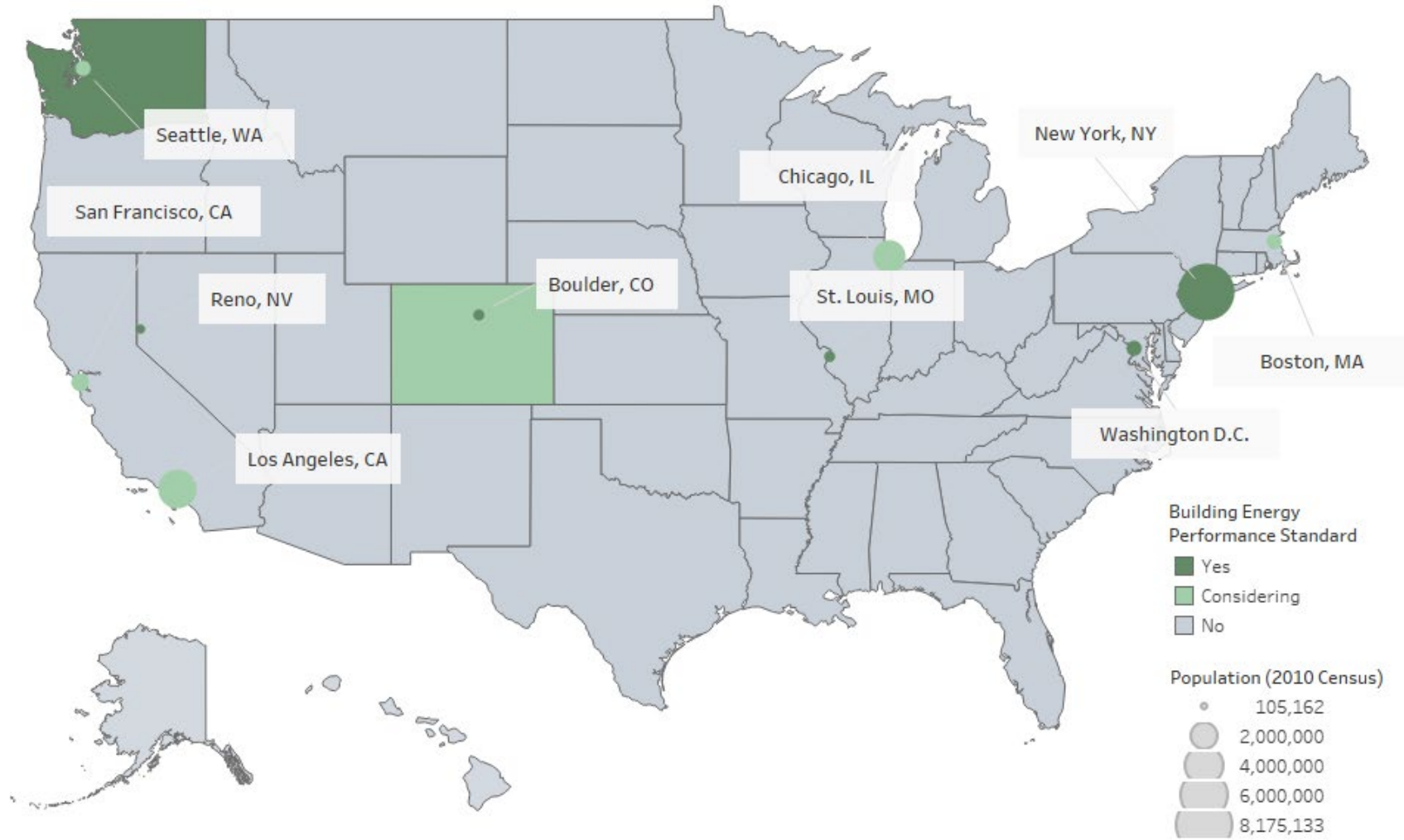


Stretch Codes: State and Local Perspective



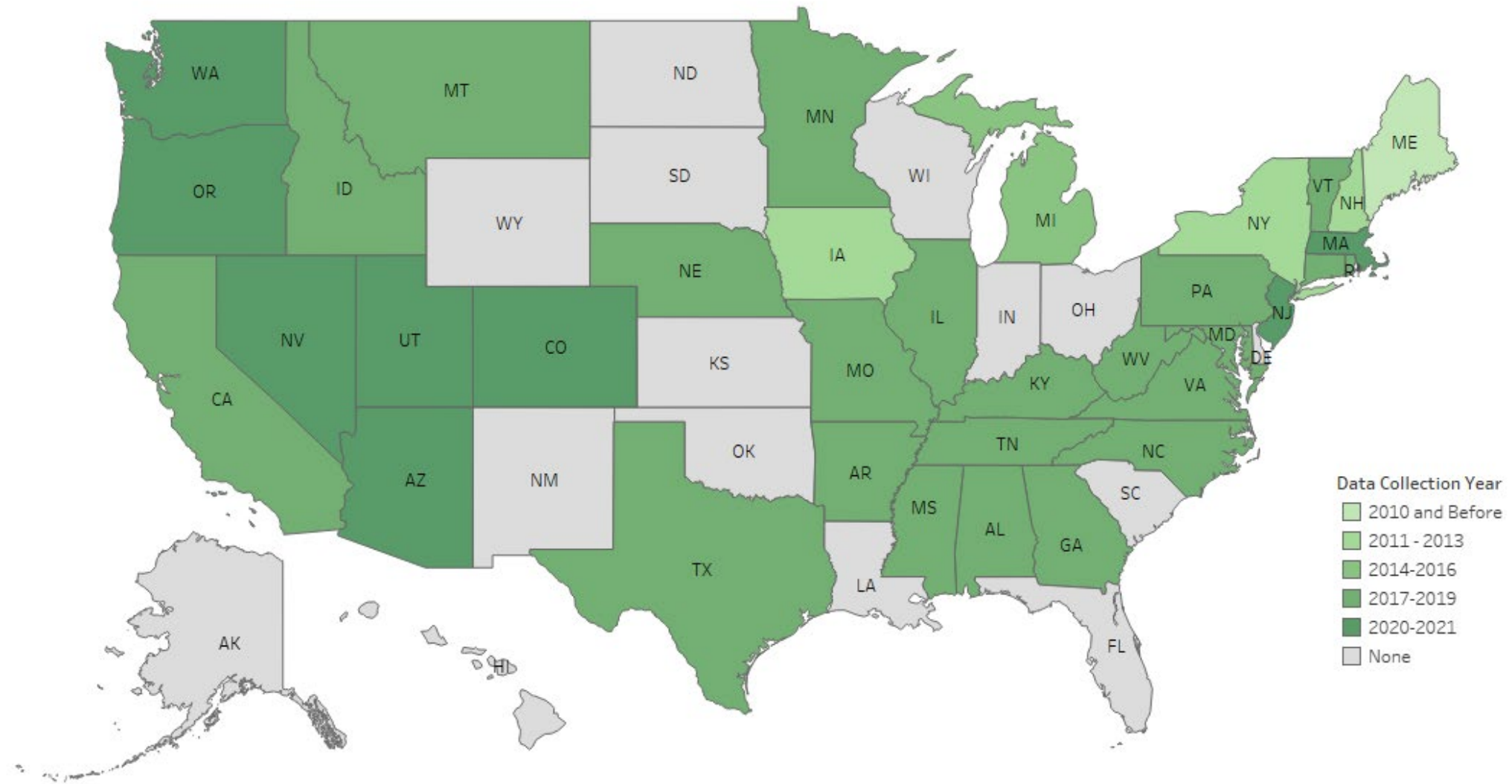
Data Source: ACEEE 2020 City Clean Energy Scorecard

Building Performance Standards (BPS)



Data Source: ACEEE 2020 City Clean Energy Scorecard

Single Family Field Studies

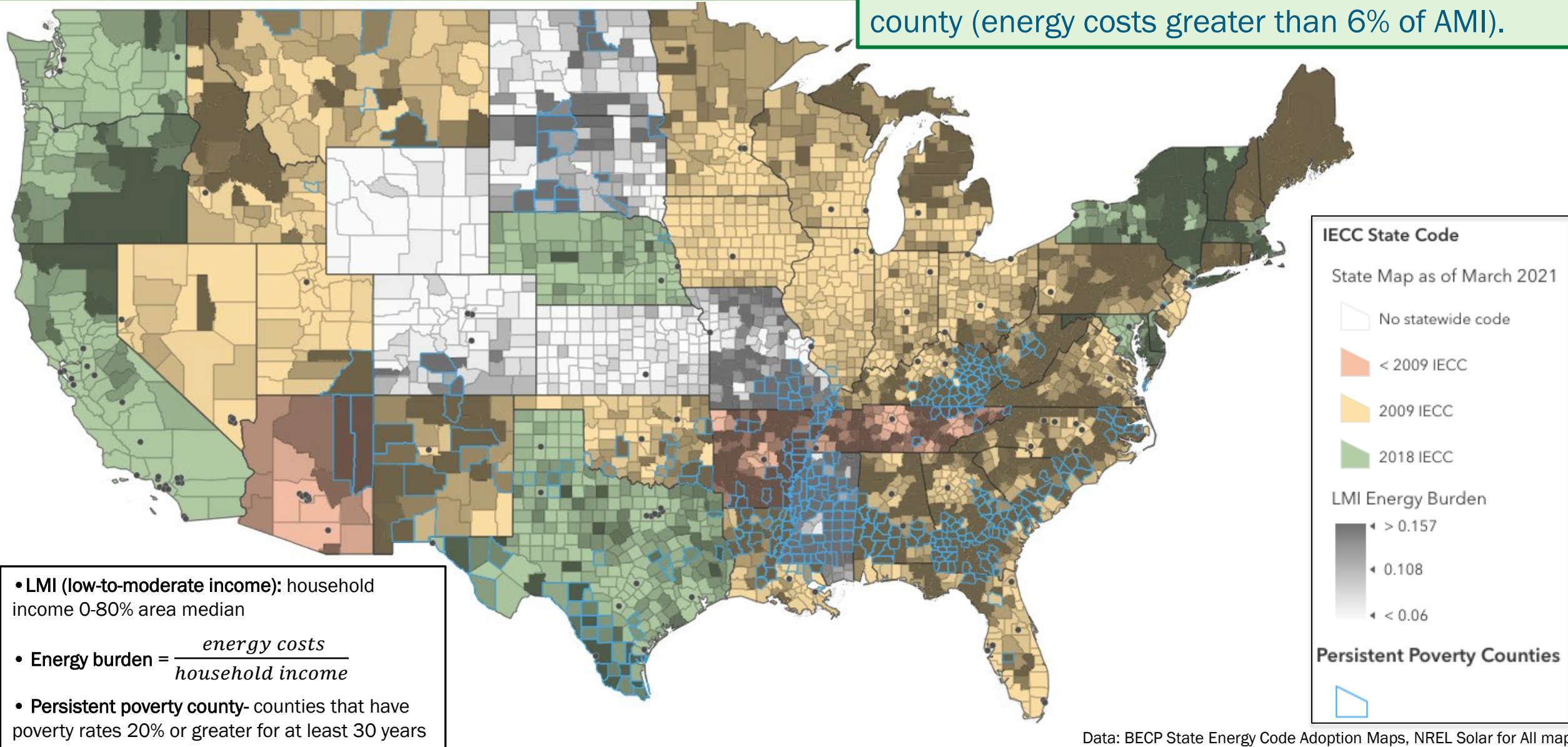


Updated as of 6/17/2021

State	Annual Energy Cost Savings Potential (\$)	10 Year Energy Cost Savings Potential (\$)	30 Year Energy Cost Savings Potential (\$)
AL	\$1,300,000	\$71,466,010	\$604,212,630
GA	\$4,520,000	\$165,391,600	\$1,398,310,800
KY	\$1,220,000	\$67,092,095	\$567,233,170
MD	\$1,540,000	\$84,853,395	\$717,396,885
NC	\$2,030,000	\$83,742,652	\$708,006,057
PA	\$3,200,000	\$148,466,353	\$1,255,215,531
TX	\$4,850,000	\$906,790,775	\$7,666,503,825

Energy Burdens across the US

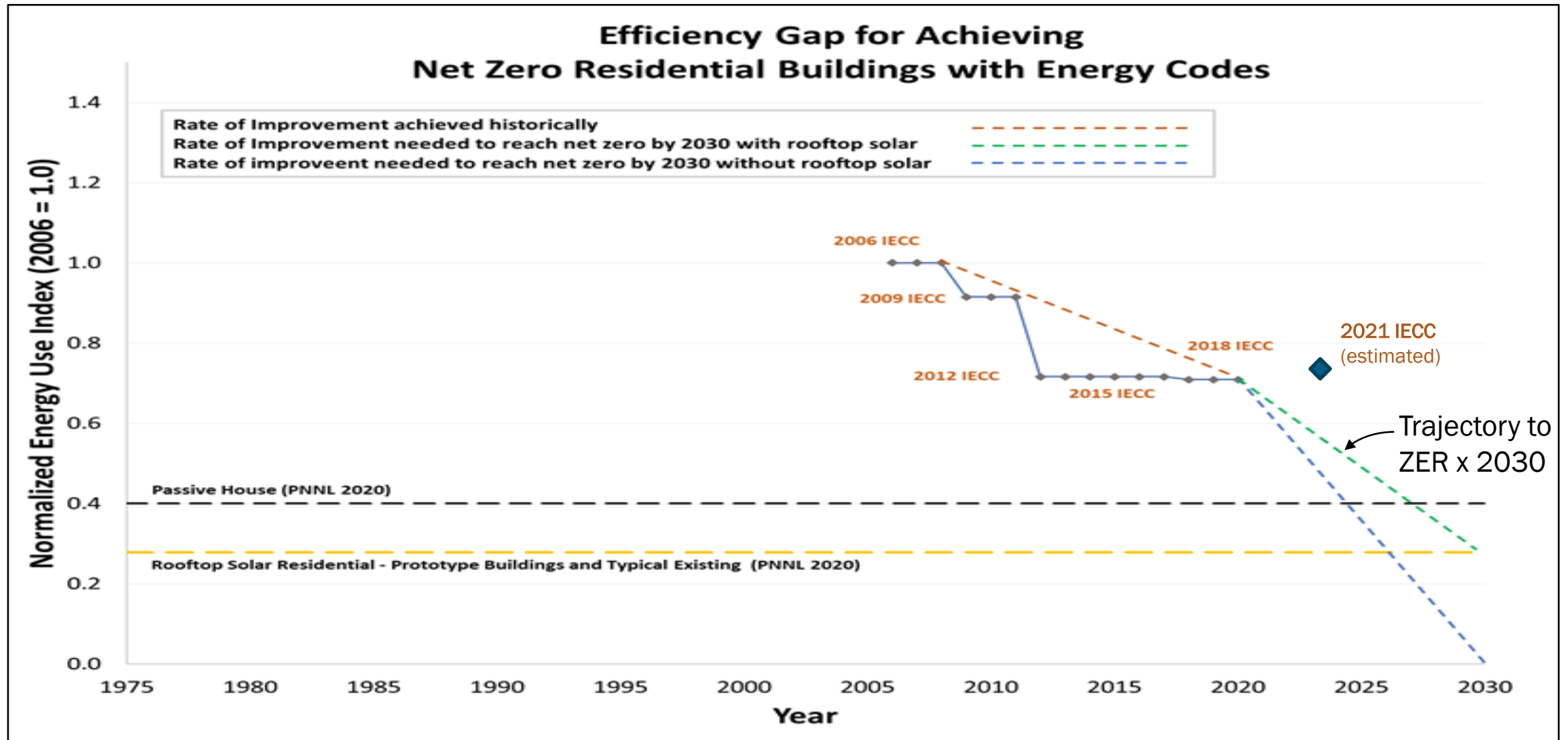
In states with 2009 IECC or worse, over 65% of LMI households live in an energy-burdened county (energy costs greater than 6% of AMI).



- **LMI (low-to-moderate income):** household income 0-80% area median
- **Energy burden** = $\frac{\text{energy costs}}{\text{household income}}$
- **Persistent poverty county-** counties that have poverty rates 20% or greater for at least 30 years

Data: BECP State Energy Code Adoption Maps, NREL Solar for All map

Model Energy Codes: Looking to the Future



SOURCE: PNNL Feasibility Study (publication pending)



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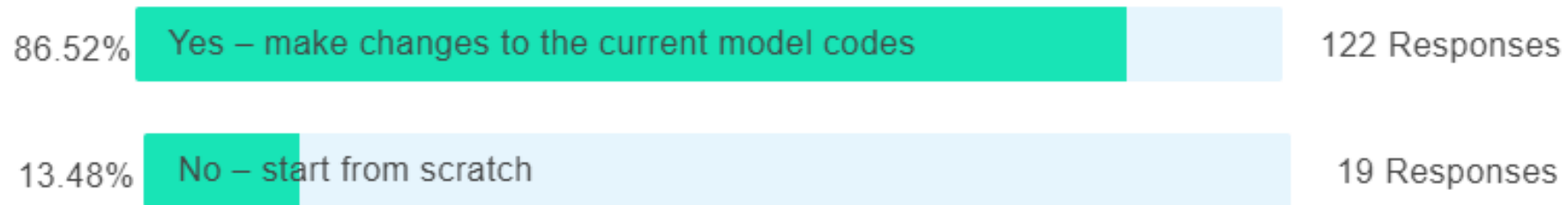
FUTURE OF ENERGY CODES WORKSHOP

DOE Building Energy Codes Program

Future of Energy Codes Workshop

1 of 12. Should the IECC 2021 and ASHRAE 90.1-2019 model energy codes serve as the basis for future energy code development?

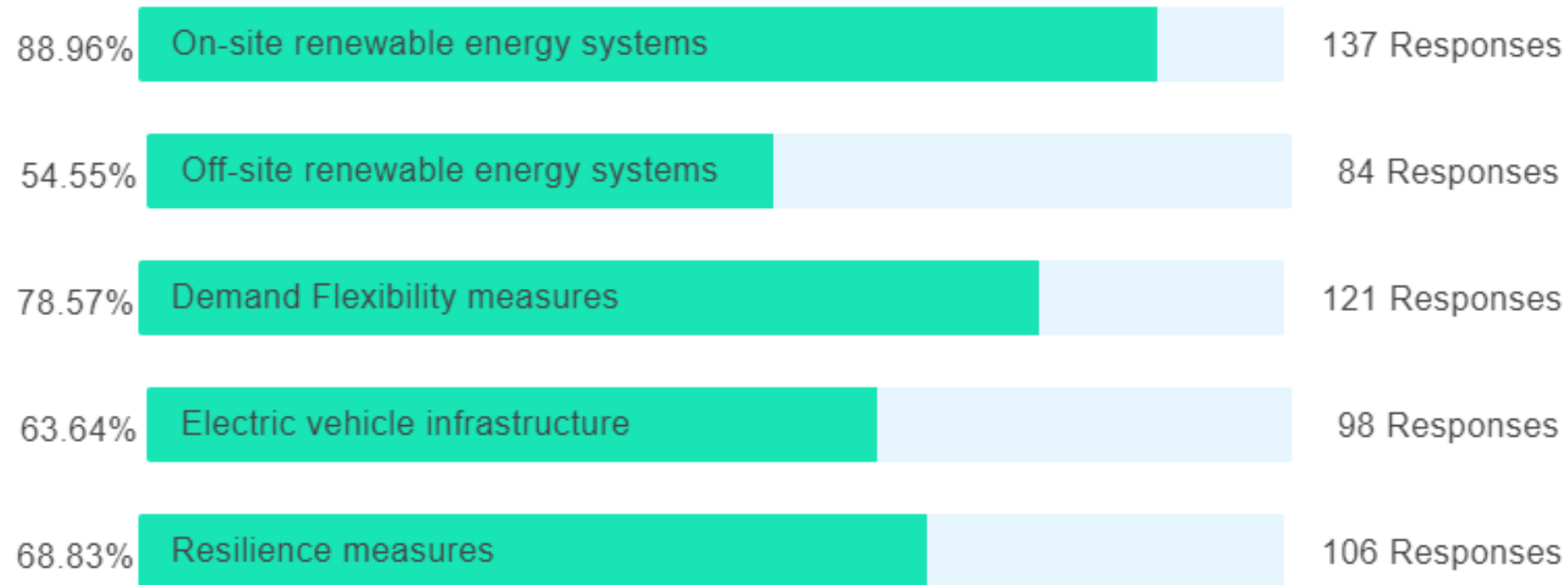
Multiple choice with single answer



Future of Energy Codes Workshop

2 of 12. As energy codes continue to evolve there is a role for including the following systems and measures, (select all that apply).

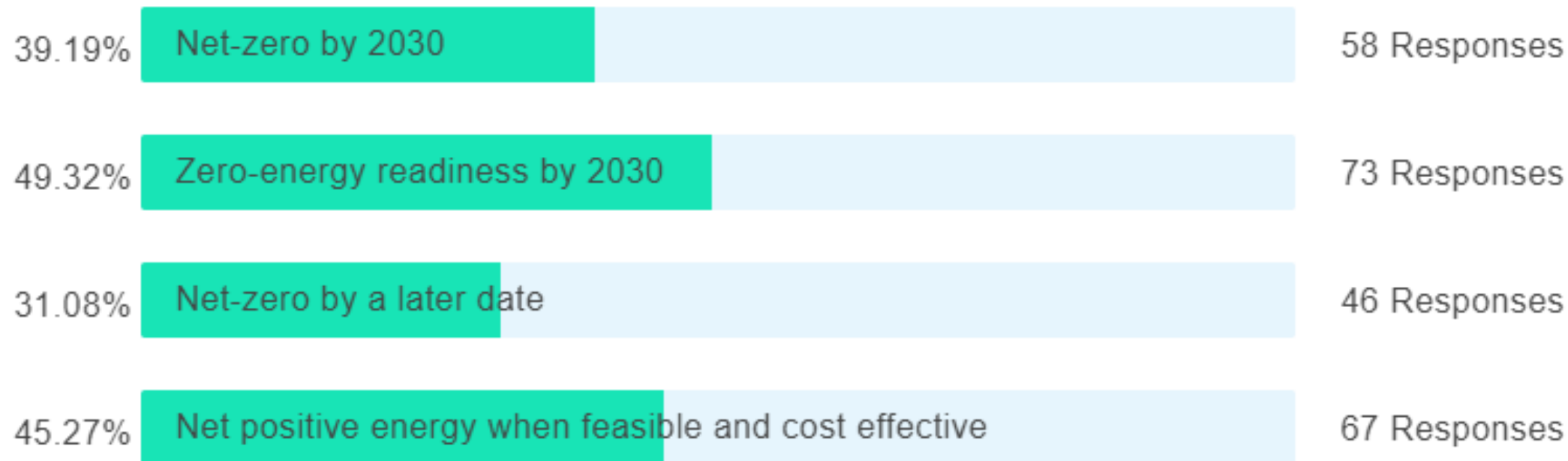
Multiple choice with multiple answers



Future of Energy Codes Workshop

3 of 12. What zero-energy goals are appropriate for energy code development? (select all that apply)

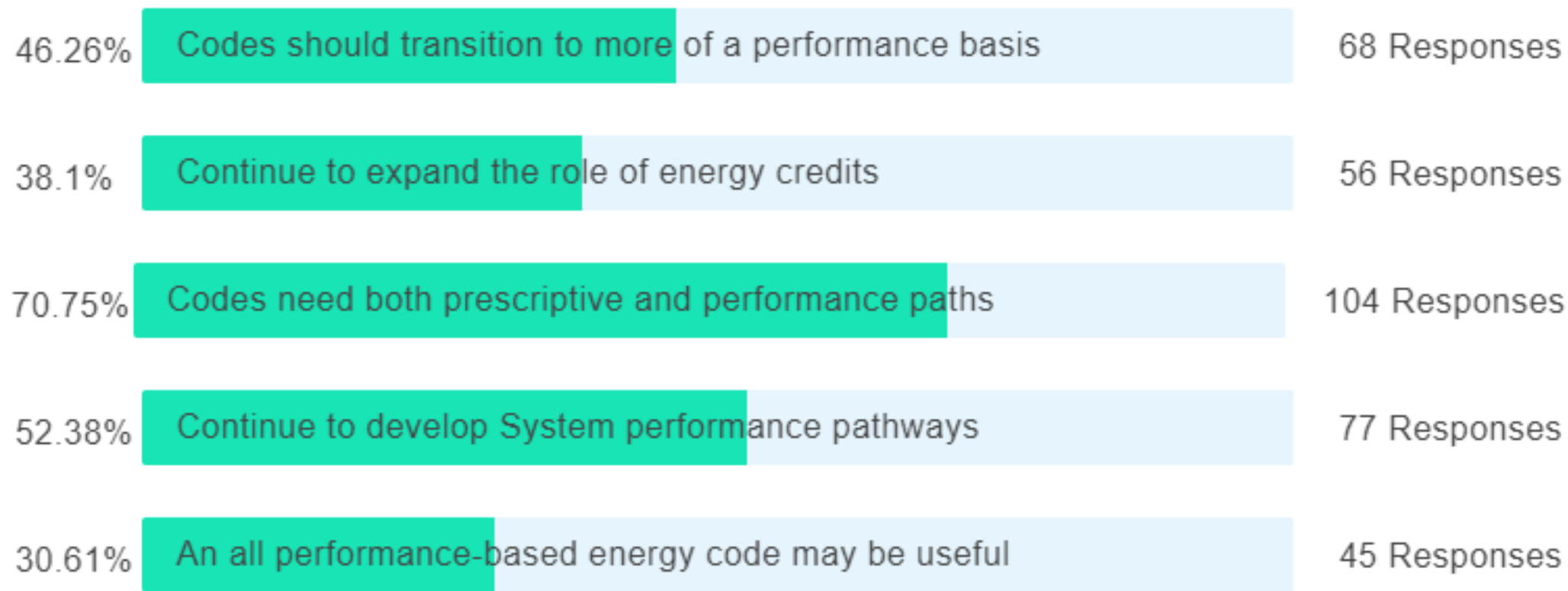
Multiple choice with multiple answers



Future of Energy Codes Workshop

4 of 12. Which of the following do you agree with? (select all that apply)

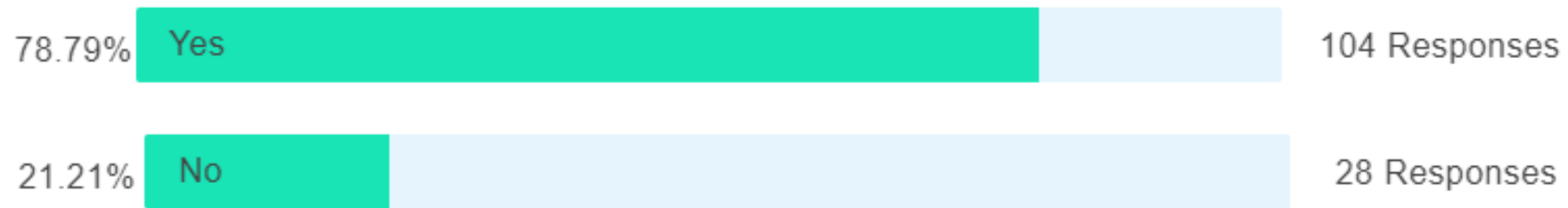
Multiple choice with multiple answers



Future of Energy Codes Workshop

8 of 12. Should DOE evaluate the impact of more stringent codes on LMI households using more representative economic metrics?

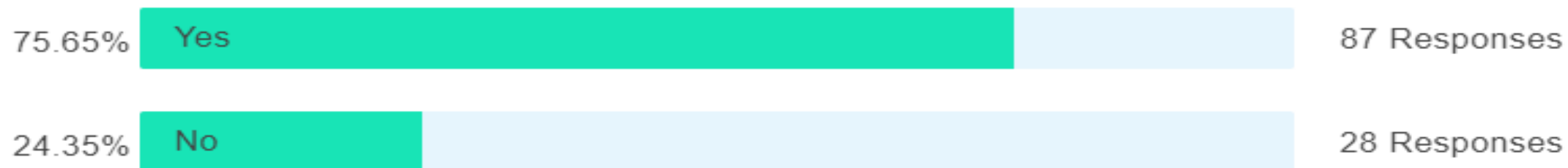
Multiple choice with single answer



Future of Energy Codes Workshop

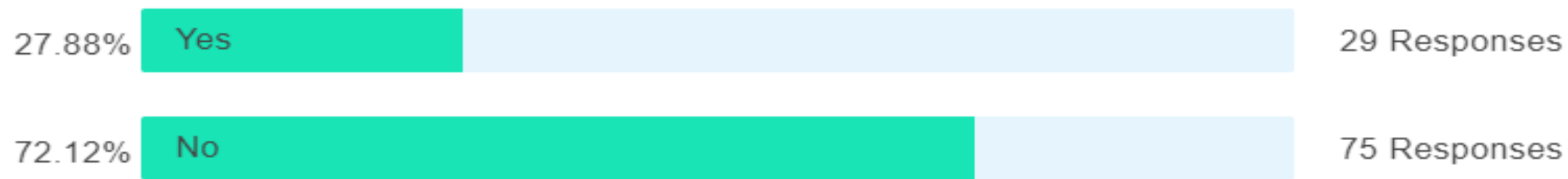
3 of 7. Should the model energy codes address building decarbonization?

Multiple choice with single answer



5 of 7. Is your jurisdiction, industry or company prepared for a zero-code?

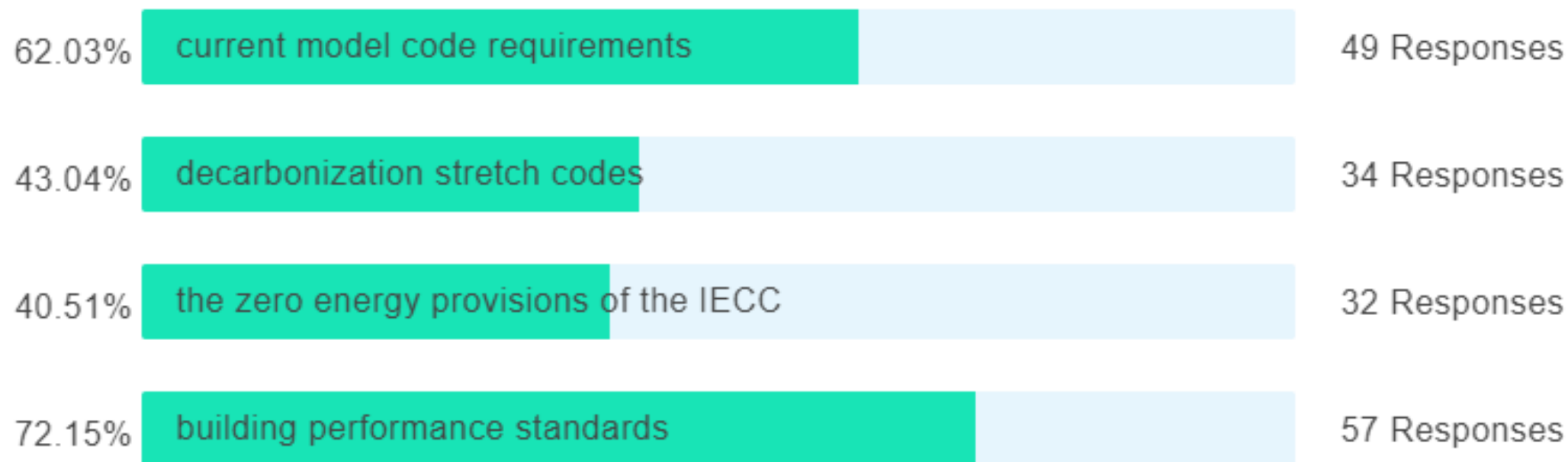
Multiple choice with single answer



Future of Energy Codes Workshop

6 of 7. What technical assistance can best support states and local governments? (choose all that apply)

Multiple choice with multiple answers



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