

### **iii. Building Energy Codes**

#### **Description**

Building energy codes establish minimum efficiency requirements for new and renovated residential and commercial buildings. These measures are intended to eliminate inefficient technologies with minimal impact on up-front project costs. This can reduce the need for energy generation capacity and new infrastructure while reducing energy bills. Energy codes lock in future energy savings during the building design and construction phase, rather than through a renovation.

#### **Policy Mechanics**

##### ***Design***

Codes specify “thermal resistance” improvements to the building shell and windows, minimum air leakage, and minimum efficiency for heating and cooling equipment.

Based on provisions of the Energy Policy Act of 1992, the International Energy Conservation Code (IECC) is the prevailing national model code for residential buildings. Similarly, American

Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1 serves as the national model commercial code. The most current codes are ASHRAE Standard 90.1-2013 and 2015 IECC.<sup>102</sup>

Building code standards are revised every three years. The IECC codes are updated every 18 months using a prescribed process, and new editions are published every three years. The ASHRAE Standard 90.1 revision process occurs on a three-year cycle, but proposals for revisions are accepted at any time.<sup>103</sup> The Energy Policy Act of 1992 requires DOE to conduct determinations on each successive version of the IECC residential code provisions and ASHRAE Standard 90.1. For residential buildings, each state must consider adoption of each successive version of the IECC for which DOE makes a positive determination on energy savings, and report to DOE within two years on whether they have adopted the new version. For commercial buildings, state adoption of each successive version of ASHRAE Standard 90.1 is mandatory subject to the same DOE determination process; however, there are no penalties for states that do not comply.<sup>104</sup>

By locking in efficiency measures at the time of construction, codes are intended to capture energy savings that are more cost-effective than retrofit opportunities available after a building has been constructed. Energy code requirements are also intended to overcome market barriers to efficient construction in both the commercial and residential sectors, such as the complexity of advanced codes, lack of local-level implementation resources, and a shortage of empirical data on the costs and benefits of codes.

### ***Authority***

Model building codes are typically developed at the national or international level, adopted at the state and/or local level, and implemented and enforced locally.

### ***Obligated Parties***

Local parties, such as developers and property owners requiring building permits, are the most common obligated parties.

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<sup>102</sup> "Code Adoption Status: February 2016," Building Codes Assistance Project. Available at: [http://bcap-energy.org/wp-content/uploads/2015/11/code\\_status\\_february\\_20161.pdf](http://bcap-energy.org/wp-content/uploads/2015/11/code_status_february_20161.pdf).

<sup>103</sup> "Code Development," Online Code Environment & Advocacy Network, accessed March 11, 2016. Available at: <http://energycodesocean.org/research-topic/code-development#>.

<sup>104</sup> "Regulations & Rulemaking," Building Energy Codes Program, U.S. Department of Energy, Energy Efficiency & Renewable Energy, accessed March 11, 2016. Available at: <https://www.energycodes.gov/regulations>.

### ***Measurement and Verification***

Program implementation steps, including builder training, compliance assurance, and enforcement, are typically the responsibility of state and local governments. These steps, however, are often not fully or uniformly implemented for numerous reasons, including an emphasis on health and safety issues over the proper functioning of mechanical equipment, a lack of trained staff to review building plans and conduct onsite inspections, and limited funding to carry out key implementation activities. As a result, most jurisdictions do not have the capacity to analyze code compliance and to identify the measures and strategies that should be targeted for improved implementation.

### ***Penalties for Noncompliance***

In order to get building permits approved, the relevant developer or property owners must show they are in compliance with standards. Since permitting is done at the local level, the use of penalties and the ability to enforce standards vary significantly by region. DOE has been working with states and localities to improve compliance practice.

### ***Implementation Status***

As of September 2015, 25 states have adopted IECC 2009 residential energy codes, 10 states and Washington, D.C., have adopted the IECC 2012, while two states have gone further by adopting the IECC 2015. In the commercial sector, 21 states have adopted ASHRAE 90.1-2007, 18 states and Washington, D.C., have adopted ASHRAE 90.1-2010, and two states have adopted ASHRAE 90.1-2013. Currently, 12 states have outdated or no statewide residential energy code, and 11 states have outdated or no statewide energy codes for commercial construction.<sup>105</sup> The current status of state residential and commercial energy codes are shown below in Figure 6 and Figure 7, respectively.<sup>106</sup> Illinois is notable as a state that adopted the 2012 IECC on January 1, 2013, and has set up an aggressive system for implementing future updates to energy building codes. A provision in past legislation to adopt 2009 IECC and ASHRAE 90.1-2007 directed the state's Capital Development Board to adopt subsequent versions of the IECC within 9 months of publication. DOE expects Illinois's energy cost savings to reach \$270 million annually by 2030.<sup>107</sup>

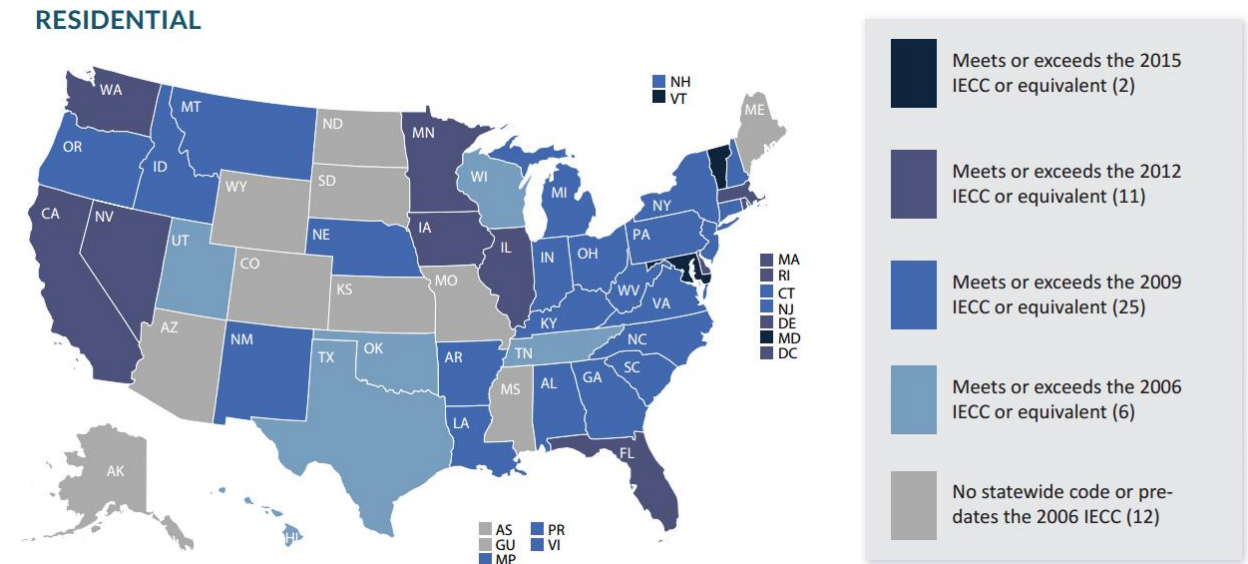
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<sup>105</sup> Building Codes Assistance Project, Code Adoption Status, September 2015. Available at: <http://energycodesocean.org/sites/default/files/code%20status%201%20pgr%20new.pdf>.

<sup>106</sup> "Code Development," Online Code Environment & Advocacy Network, accessed March 11, 2016. Available at: <http://energycodesocean.org/research-topic/code-development#>.

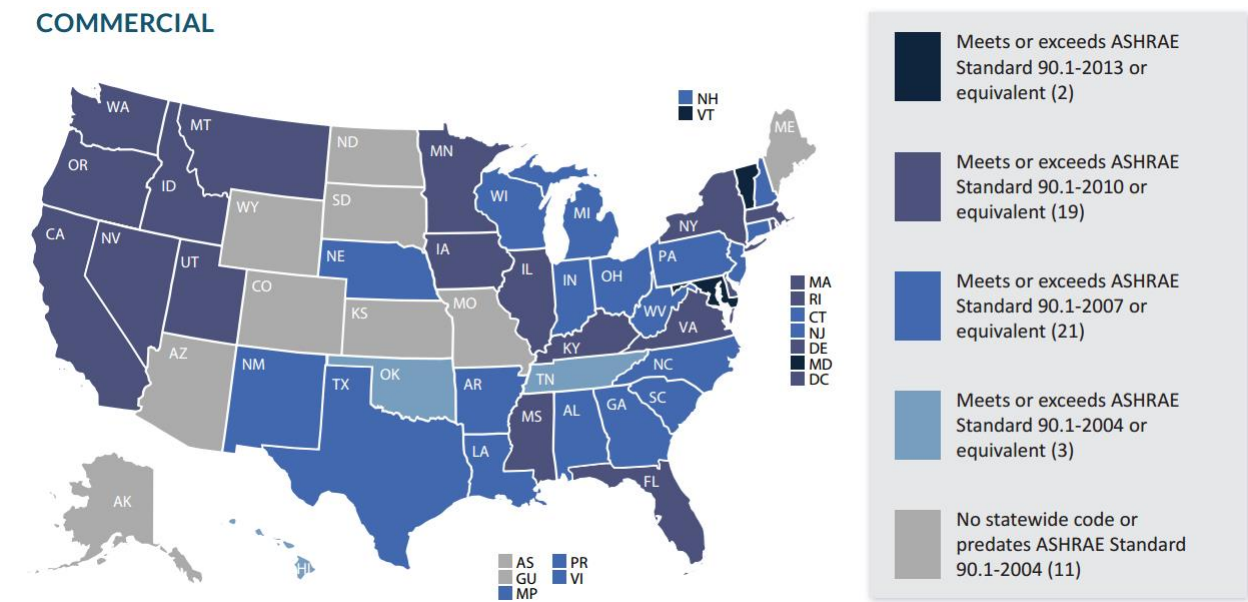
<sup>107</sup> U.S. EPA, *Clean Energy-Environment Guide to Action* (U.S. Environmental Protection Agency, 2015), accessed March 10, 2016. Available at: <http://epa.gov/statelocalclimate/resources/action-guide.html>.

Figure 6: Residential State Energy Code Status



Source: Building Codes Assistance Project. Code Adoption Status (September 2015). Available at: <http://energycodesocean.org/sites/default/files/code%20status%201%20pgr%20new.pdf>.

Figure 7: Commercial State Energy Code Status



Source: Building Codes Assistance Project. Code Adoption Status (September 2015). Available at: <http://energycodesocean.org/sites/default/files/code%20status%201%20pgr%20new.pdf>.