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The Energy Savings and Industrial Competitiveness Act: S. 385 and H.R. 1443

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Summary

Energy efficiency—providing the same or an improved level of service with less energy—has been of interest to some Members of Congress. Proponents of increased energy efficiency see an untapped "resource" that can mitigate the demand for additional energy supplies. Perceived benefits of energy efficiency include lowered energy bills, reduced demand for energy, improved energy security and independence, and reduced air pollution and greenhouse gas emissions. Challenges to energy efficiency include market barriers that do not incentivize builders or developers to invest in energy efficiency, customers' lack of information or awareness of energy saving opportunities and investment returns, and policy barriers that focus on energy supply rather than investment in energy efficiency.

S. 385—the Energy Savings and Industrial Competitiveness Act—and its House companion bill, H.R. 1443, address energy efficiency in buildings, industry, and federal agencies, and various regulatory measures. Energy savings through increased efficiency can be significant. Estimates by the Department of Energy (DOE) and the National Academies of achievable energy savings using available cost-effective technologies are about 20% for the buildings sector and range from 14% to 22% for the industrial sector. Combined, these sectors consume 72% of all U.S. primary energy. Further savings can be realized through efforts to improve energy efficiency across the federal government, which is the single largest energy consumer in the United States.

The Congressional Budget Office (CBO) estimated that S. 385 would increase direct federal spending by $17 million between 2017 and 2027. Enacting the bill would not affect revenues. CBO estimated that implementing the legislation would cost the government $198 million over the next five years, assuming appropriations actions that fulfill all provisions of the legislation.

Supporters of S. 385/H.R. 1443 state that the bills can improve competitiveness, save consumers money, and increase energy security while reducing air pollution and greenhouse gas emissions. Provisions identified as potentially controversial include directing DOE to establish aggregate energy saving targets for commercial and residential buildings, determining cost-effectiveness of conservation measures over the lifetime of the building, and removing the requirement to eliminate fossil fuel use by federal buildings.

S. 385 was reported without amendment by the Senate Committee on Energy and Natural Resources (SENR) on May 10, 2017. H.R. 1443 was referred in the House on March 9, 2017, to the following committees: Energy and Commerce; Budget; Financial Services; Science, Space, and Technology; Transportation and Infrastructure; and Oversight and Government Reform.

On June 28, 2017, S. 1460, the Energy and Natural Resources Act of 2017, was introduced. Title I of the bill addresses energy efficiency and includes many provisions related to S. 385/H.R. 1443. A comparison of the provisions identified several differences between S. 1460 and S. 385/H.R. 1443 that may be of interest to Congress.

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Introduction and the Role of Energy Efficiency

The Energy Savings and Industrial Competitiveness Act, S. 385/H.R. 1443, would introduce energy-efficiency policy reforms that according to the sponsors would "strengthen the economy and reduce pollution."[1] The bill addresses energy-efficiency policies for buildings, industry, and federal agencies, among other provisions. According to the U.S. Energy Information Administration, the building and industrial sectors collectively consume 72% of all U.S. primary energy.[2] The residential and commercial buildings sector accounts for 40% of all U.S. primary energy consumption, and the industrial sector accounts for 32%.[3] Increased adoption of energy-efficiency technologies by these sectors could potentially realize significant energy savings and reduce emissions to the environment. The U.S. Department of Energy (DOE) estimates that building energy use could be reduced by more than 20% through implementation of technologies that are known to be cost-effective.[4] Implementation of existing, cost-effective efficiency technologies in the industrial sector could reduce energy consumption by 14%-22% according to the National Academies.[5] Challenges to energy efficiency include market forces that do not incentivize investment in energy efficiency, a lack of information or awareness of energy saving opportunities and investment returns, and policy approaches that reward selling energy and discourage investment in energy efficiency. The bill proposes a national strategy to increase energy efficiency in the residential, commercial, federal, and industrial sectors; to reduce barriers to private-sector investment; to increase adoption of existing technologies; to increase energy independence; to improve economic competitiveness; and to reduce environmental impacts.[6]

This report describes the development of the Energy Savings and Industrial Competitiveness Act, S. 385/H.R. 1443; reviews select provisions in the bill; summarizes studies on the costs and benefits of the bill; and discusses potential issues for the 115th Congress. It also identifies differences that may be of interest to policymakers between S. 385/H.R. 1443 and relevant energy-efficiency sections of Title I of S. 1460, Energy and Natural Resources Act of 2017, which was introduced on June 28, 2017.

[1] Office of Sen. Portman, "Portman, Shaheen Introduce Energy Efficiency Legislation," press release, February 15, 2017, at https://www.portman.senate.gov/public/index.cfm/press-releases?ID=83DC94D0-57DB-4E03-9AE9-F773E26BAE3A.

[2] The *building sector* is an end-use energy consumption segment of the nation's energy system that is comprised of residential and commercial buildings. The *industrial sector* is an end-use energy consumption segment of the nation's energy system that is comprised of energy-intensive manufacturing, non-energy-intensive manufacturing, and nonmanufacturing activities.

[3] See Table A2 in U.S. Energy Information Administration, *Annual Energy Outlook*, 2017, at https://www.eia.gov/outlooks/aeo/section_appendices.cfm.

[4] U.S. Department of Energy (DOE), "Chapter 5: Increasing Efficiency of Building Systems and Technologies," *Quadrennial Technology Review*, September 2015, p. 2, at https://energy.gov/sites/prod/files/2017/03/f34/qtr-2015-chapter5.pdf.

[5] National Academy of Sciences, National Academy of Engineering, and National Research Council. 2010. *Real Prospects for Energy Efficiency in the United States*. Washington, DC: The National Academies Press, p.15, at https://doi.org/10.17226/12621.

[6] U.S. Congress, Senate Committee on Energy and Natural Resources, *Energy Savings and Industrial Competitiveness Act*, report to accompany S. 385, 115th Cong., 1st sess., May 10, 2017, S.Rept. 115-60, p. 2.

Bill Development

Senator Portman introduced S. 385 on February 15, 2017, and Representative McKinley introduced an identical bill, H.R. 1443, on March 9, 2017.[7] Both bills build upon congressional action from the 112th, 113th, and 114th Congresses. The first version of the bill, introduced as S. 1000 in the 112th Congress, was reported by the Senate Committee on Energy and Natural Resources but received no further action. In the 113th Congress, the bill was reintroduced in multiple forms including S. 2262, which contained additional provisions.[8] The provisions in S. 2262 were split into two Senate bills in the 114th Congress, S. 535/H.R. 1802 and S. 720, which was related but not identical to H.R. 2177. S. 535 became law (P.L. 114-11) and addressed the following five subjects:

- Energy efficiency in federal and commercial leased buildings,
- Separate spaces (leased or otherwise occupied spaces within a building) with high-performance energy-efficiency measures,
- Tenant Star Program,
- Grid-enabled water heaters, and
- Energy information for commercial buildings (e.g., benchmarking and disclosure requirements for federal agencies and the creation and maintenance of a database of public energy-related information for commercial and multifamily buildings).

In the 114th Congress, the remaining provisions of S. 2262, including model building codes, information coordination for energy-efficient school buildings, and federal-building energy-efficiency requirements, were incorporated into S. 720 and later into a broader energy and natural resources bill, S. 2012. A conference committee was unable to reach an agreement on S. 2012.[9] The evolution of the provisions is shown in **Appendix A**. The provisions in S. 385 and H.R. 1443 align closely with those in S. 720 (114th Congress). A voluntary verification provision for air conditioning, furnace, boiler, heat pump, and water heater products present in S. 720 (114th Congress) is not included in S. 385/H.R. 1443.

Provisions in the Bills

S. 385 (and the identical H.R. 1443) is divided into five titles. Title I addresses building energy efficiency and workforce training. Title II has provisions on industrial efficiency and competitiveness. Title III focuses on federal agencies and energy efficiency. Title IV has

[7] S. 385 may also be referred to as Portman-Shaheen bill as Sens. Portman and Shaheen have both introduced the bill in prior Congresses. Cosponsors at the date of introduction of S. 385 included Sens. Shaheen, Coons, Wicker, Franken, Collins, Manchin, Bennet, Warner, Heitkamp, and Heller according to Sen. Portman, "Introduction of Bills and Joint Resolutions," Senate, *Congressional Record*, daily edition, vol. 163, part 27 (February 15, 2017), pp. S1217-S1218. H.R. 1443 cosponsors at the date of introduction included Reps. Welch, Cartwright, and Eshoo according to Rep. McKinley, "Public Bills and Resolutions," House of Representatives, *Congressional Record*, daily edition, vol. 163, No. 41 (March 9, 2017), p. H2017. Reps. Kaptur and Schakowsky have since become cosponsors of H.R. 1443.

[8] In the 113th Congress, S. 761 and H.R. 1616 were introduced. Provisions of S. 761 were then revised and introduced as S. 1392. Provisions of S. 1392 were expanded and reintroduced as S. 2074 before the introduction of S. 2262. For further history of prior versions of the bill, see CRS Report R43524, *S. 2262, Shaheen-Portman Bill 2014: Energy Savings and Industrial Competitiveness Act*, by (name redacted)

[9] For further information, see CRS Report R44291, *Energy Legislation: Comparison of Selected Provisions in S. 2012 as Passed by the House and Senate*, by (name redacted) , and CRS Report R44569, *Energy Legislation: Comparable Provisions in S. 2012 as Passed by the House and Senate*, by (name redacted) and (name redacted)

regulatory provisions for the Energy Star program and federal buildings. Title V addresses budgetary effects and would require advance appropriations. **Table 1** summarizes the major provisions of the bill. A discussion of selected provisions follows.

Table 1. Summary of Major Provisions within S. 385 and H.R. 1443

S. 385 and H.R. 1443	Provision Description
Title I: Buildings	
Subtitle A: Building Energy Codes	§101. Greater energy efficiency in building codes. Would direct DOE to support updates of model building energy codes and establish energy saving targets for commercial and residential buildings. DOE would provide assistance to and encourage adoption of model building energy codes by States, Indian Tribes, and local governments. Would authorize $200 million until expended.
Subtitle B: Worker Training and Capacity Building	§111. Building training and assessment centers. Would direct DOE to provide grants to colleges and universities to establish building training and assessment centers, to promote building energy efficiency and environmental performance, and to coordinate with industrial research and assessment centers. Would authorize $10 million until expended.
	§112. Career skills training. Would direct DOE to award grants to pay the federal share of career skills training programs to train and certify students to install energy-efficient building technologies. Would authorize $10 million until expended.
Subtitle C: School Buildings	§121. Coordination of energy retrofitting assistance for schools. Would require DOE to coordinate and provide information on existing federal programs and provide technical assistance for energy efficiency, renewable energy, and energy retrofitting projects for schools. DOE would be required to report to Congress on the implementation of this section.
Title II: Industrial Efficiency and Competitiveness	
Subtitle A: Manufacturing Energy Efficiency	§202. Future of industry program. Would direct DOE to expand industrial research and assessment centers and improve coordination with the National Institute of Standards and Technology and within DOE. DOE would increase partnerships with the DOE National Laboratories, energy service providers, and technology providers, identify opportunities to reduce greenhouse gas emissions, and promote sustainable manufacturing. Funding would support outreach and coordination efforts. Would include workforce training and small business loans. Water efficiency efforts would also be included.
	§203. Sustainable manufacturing initiative. Would direct DOE to provide technical assessments to manufacturers to maximize energy efficiency, minimize waste, improve waste efficiency, and conserve natural resources. DOE would also coordinate with the private sector and carry out a joint industry-government partnership program for research and development in sustainable manufacturing and industry technologies and processes.
Subtitle B: Supply Star	§211. Supply Star. Would require DOE to establish a "Supply Star" program to incentivize highly efficient supply chains that conserve energy, water, and other resources. Would authorize $10 million for the period of fiscal years 2018 through 2027.
Subtitle C: Extended Product System Rebate Program	§221. Extended product system rebate program. Would direct DOE to establish a rebate program for qualified extended product systems with an electric motor and electronic control that reduce energy use. Aggregate rebates per entity would not exceed $25,000 per calendar year. Would authorize $5 million per year for two years, available until expended.

S. 385 and H.R. 1443	Provision Description
Subtitle D: Transformer Rebate Program	§231. Energy-efficient transformer rebate program. Would establish a rebate program to incentivize the replacement of energy-inefficient transformers with energy-efficient transformers. Would authorize $5 million per year for two years, available until expended.
Title III: Federal Agency Energy Efficiency	
	§301. Energy-efficient and energy-saving information technologies. Would require federal agencies to develop implementation strategies for the maintenance, purchase, and use of energy-efficient and energy-saving information technologies. Federal agency performance goals would be established. The Chief Information Officers Council would supplement performance goals with best practices including requiring agencies to consider energy savings performance contracting and utility energy services contracting. Agency efforts and results would be reported and tracked.
	§302. Energy-efficient data centers. DOE and the Environmental Protection Agency (EPA) in consultation with stakeholders would carry out a voluntary national information program on energy-efficient data centers, including a study to assess progress in energy-efficiency improvement, and analyze the impact of information technologies, cloud platforms, and social media on energy usage. DOE would maintain a data center energy practitioner program to certify qualified practitioners to evaluate energy use in federal data centers; agencies would be required to consider having a practitioner evaluate data centers once every four years. Federal data center energy usage data would be made available and accessible to the public.
	§303. Budget-neutral demonstration program for energy-water conservation improvements at multifamily residential units. Would require HUD to establish a demonstration project to enter into budget-neutral performance-based contracts for energy or water-efficiency projects at no more than 20,000 residential low-income housing units. The term of any agreement would be limited to 12 years.
Title IV: Regulatory Provisions	
Subtitle A: Third-Party Certification Under Energy Star Program	§401. Third-Party certification under Energy Star program. Would direct DOE to revise certification requirements for program partners that have complied with all Energy Star requirements for 18 months such that third-party certification for listing a product would not be required (although other documentation may be required to facilitate product listing and performance verification). If it is determined that any Energy Star program requirements have been violated for two models within a two-year period, the exemption for the program partner would be terminated, and the resumption of third-party certification would be required for at least three years. This would not prevent EPA from using third parties for Energy Star program administration.
Subtitle B: Federal Green Buildings	§411. High-performance green federal buildings. DOE would review green building certification systems to encourage use of the most comprehensive and environmentally sound approach.
Subtitle C: Energy Performance Requirement for Federal Buildings	§421. Energy performance requirement for federal buildings. Would modify language for energy and water evaluations and commissioning to allow subsequent reevaluations and commissions to take place over a longer time period. Would require energy managers to explain why any lifecycle cost-effective measures were not implemented.

S. 385 and H.R. 1443	Provision Description
	§422. Federal building energy efficiency performance standards; certification system and level for green buildings. Would rescind a fossil energy elimination requirement for new federal buildings. Would set revised energy-efficiency standards. Criteria for certification systems would be based on technical data, would consider risks and impacts across lifecycle, and would reward continual improvement in lifecycle management. Criteria would include sourcing of grown, harvested, or mined materials and certifications of responsible sourcing.
	§423. Enhanced energy-efficiency underwriting. Would direct HUD to develop and issue guidelines for loan eligibility requirements for home mortgages that account for expected energy cost savings.
Title V: Miscellaneous	
	§501. Budgetary effects. Budgetary effects of this act would be determined by the latest statement of "Budgetary Effects of PAYGO Legislation" for this act.

Source: CRS analysis of S. 385 and H.R. 1443.

Title I

Title I includes subsections on building energy codes, workforce training, and school buildings. For building energy codes, DOE currently submits proposals to a third-party, consensus-based codes or standards development organization to make changes to the existing model code, conducts analysis of the potential energy-efficiency improvements of model energy codes, and determines whether the revised code would improve energy efficiency (see text box for additional information). Section 101, on greater energy efficiency in building codes, would direct DOE to support the model-code development process and to establish targets for aggregate energy savings. These targets would be established and revised by DOE through a rulemaking process. The bill would also direct DOE to encourage and support states, Indian tribes, and local governments to implement and adopt the model building energy codes; for the current status of state building energy codes, see **Appendix B**.

Subtitle C would direct DOE to act as the lead federal agency to coordinate and disseminate information on existing federal programs that could assist energy efficiency, renewable energy, and energy retrofit projects for schools.

Model Building Energy Codes: Development, Adoption, and Compliance

Model building energy code development is managed by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) and the International Code Council (ICC).[10] Each model code, or example standard, is updated every three years through a public consensus process.

DOE supports and participates in the model building energy code development processes administered by ASHRAE and the ICC. The development processes rely on stakeholder engagement to propose changes and provide feedback to the committees on proposed changes. These consensus standards are developed and published to define minimum performance values.

DOE activities include developing and submitting code change proposals, conducting analysis of building energy efficiency and cost savings, and formulating underlying evaluation methodologies.[11] Under the International Energy Conservation Code development process, proposed changes need not result in energy-efficiency improvements. However, according to DOE, "there must be improvement in energy efficiency in building energy codes that meet or exceed those in the prior code editions for DOE to make a positive determination about any code updates."[12]

Once a new version of the code is final, it may be adopted by state and local governments, generally as a component of building construction regulations. State and local governments are responsible for validation, compliance, and enforcement. Enforcement activities vary according to authority and resources. These activities may include a review of building plans and equipment specifications as well as an inspection of the building during construction or prior to occupancy.

Title II

Title II has four subsections: manufacturing energy efficiency, a new "Supply Star" program to incentivize more efficient supply chains, a rebate program for energy-efficient product systems with an electric motor and electronic control, and a rebate program for energy-efficient transformers. Several of the subsections address barriers to industrial energy efficiency identified by DOE in a 2015 report to Congress.[13] Provisions for Supply Star and for the rebate programs address the economic and financial barriers to energy-efficiency adoption identified by DOE, and the subsection related to manufacturing energy efficiency helps to address identified informational barriers to energy-efficiency technology adoption by providing technical expertise and assistance to manufacturers.

Title III

Title III addresses energy efficiency for federal agencies and has sections targeting efficiency improvements for information technologies and data centers. It also directs the Secretary of Housing and Urban Development (HUD) to establish a demonstration program at multifamily residential units for budget-neutral, performance-based agreements for energy and water conservation improvements.

[10] ASHRAE is responsible for maintaining standard 90.1, *Energy Standard for Buildings Except Low-Rise Residential Buildings*. The ICC is responsible for maintaining the *International Energy Conservation Code* (IECC), which contains separate provisions for commercial buildings and for low-rise residential buildings. For more information on the code and standard development process, see Cohan, D., *How are Building Energy Codes Developed?*, DOE, August 8, 2016, https://energy.gov/eere/buildings/articles/how-are-building-energy-codes-developed.

[11] DOE, EERE, Building Technologies Office, Building Energy Codes Program, *Statutory Requirements*, https://www.energycodes.gov/about/statutory-requirements.

[12] DOE, *DOE Position on Energy Efficiency and Renewable Energy in Residential Building Energy Codes During the 2018 IECC Code Development Cycle*, at https://www.energycodes.gov/sites/default/files/DOE%20Position%20Brief%20for%20the%202018%20IECC_10062016.pdf.

[13] DOE, *Barriers to Industrial Energy Efficiency: Report to Congress*, Washington, DC, June 2015.

Progress on Energy Efficiency in Federal Buildings

Energy-efficiency requirements for federal buildings under the Energy Policy Act of 2005 (P.L. 109-58, 42 U.S.C. §8253) set two energy conservation goals: (1) a 30% reduction in energy intensity (energy consumption per gross square foot) by fiscal year (FY) 2015 when compared to a FY2003 baseline, and (2) a 3% annual reduction in energy intensity from the previous year. Buildings where energy-intensive activities occur can be excluded. Federal facilities fell short of this goal in FY2015, achieving a total reduction of 22.7% in energy intensity since FY2003. Federal agencies also fell short of the annual reduction goal of 3% by reducing intensity on average only 2.2% from the previous year.[14] As the energy intensity metric includes not only total energy consumption but also gross square footage, efforts to reduce federal building space can lead to increases in the overall building energy intensity if consumption decreases do not match or exceed space reductions.

Energy-intensity reductions have not occurred uniformly across federal agencies. According to the Federal Energy Management Program, total agency energy-intensity reductions achieved between FY2003 and FY2015 varied widely. The requirements apply to all agencies, including the Department of Defense, which reduced energy intensity by 19.9% and used approximately 77.6% of the total energy consumed by federal agencies in FY2015.[15] Other agencies ranged from a 6% reduction in energy intensity at the Department of State to a 56% reduction in energy intensity at the Nuclear Regulatory Commission (NRC). Ten federal agencies exceeded the energy-intensity reduction goal under 42 U.S.C. 8253: NRC, Department of Justice, National Archives and Records Administration, Department of the Interior, Environmental Protection Agency, Tennessee Valley Authority, Social Security Administration, Department of Agriculture, Department of Energy, and General Services Administration.

Title IV

Title IV also has provisions related to federal agencies and energy efficiency. Specifically, this title contains subtitles related to the Energy Star program, federal green buildings, and energy performance of federal buildings. The current version of this title differs from proposals in prior Congresses. One change in the current version from previous versions is the addition of language supporting sustainably sourced materials. In Title IV, Subtitle B—Federal Green Buildings, Section 411(3)(E), the bill adds the following language to the basis for certifying high performance buildings:

> [A] finding that, for all credits addressing the sourcing of grown, harvested, or mined materials, the system rewards the use of products that have obtained certifications of responsible sourcing, such as certifications provided by the Sustainable Forestry Initiative, the Forest Stewardship Council, the American Tree Farm System, or the Programme for the Endorsement of Forest Certification.[16]

In contrast to rewarding responsibly sourced products, S. 720 (114th Congress) stated that the "high-performance green federal buildings" certification system should "not discriminate against" the use of such responsibly sourced domestic products.

This change from not discriminating against selection to rewarding certain characteristics is also reflected in Section 422 of S. 385/H.R. 1443, which states that the criteria should be based on relevant technical data, including an evaluation of the health, safety, and environmental risks and impacts across the product lifecycle. Criteria used to support the selection of building products or materials should also give preference to performance standards versus prescriptive measures, and reward continual improvements in lifecycle management. In S. 720, this provision would have specified which selection criteria should not be included—namely those that are prohibitive,

[14] DOE, Federal Energy Management Program, *Federal Progress Toward Energy/Sustainability Goals,* August 4, 2016, at https://energy.gov/sites/prod/files/2016/09/f33/fy15_facility_sustainability_goals.pdf.

[15] DOE, Federal Energy Management Program, *Comprehensive Annual Energy Data and Sustainability Performance*. at http://ctsedwweb.ee.doe.gov/Annual/Report/Report.aspx.

[16] This language amends 42 U.S.C. §17092(h)(2).

discriminatory, or disfavoring based on technically inadequate information on risk. Both current and previous versions of this section would give preference to criteria that are performance-based versus prescriptive measures.

Legislative Action

Senate

S. 385—The Energy Savings and Industrial Competitiveness Act—was introduced on February 15, 2017. On March 30, 2017, the Senate Energy and Natural Resources Committee approved the bill without amendment as part of an advancement of 65 bills en bloc and by voice vote.[17] The committee reported it on May 10, 2017, accompanied by S.Rept. 115-60.

Senator Collins introduced a related bill, S. 383, Streamlining Energy Efficiency for Schools Act, on February 15, 2017. It is identical to Title I, Subtitle C, of S. 385. The House passed a bill, H.R. 627, with the same title as and provisions similar to S. 383, on June 12, 2017. (See description below under House action.)

On June 28, 2017, Senators Murkowski and Cantwell (chair and ranking member, respectively, of the Senate Energy and Natural Resources Committee) introduced S. 1460, the Energy and Natural Resources Act of 2017. The next day, the bill was read a second time and placed on the Senate calendar. The bill has two divisions, Division A—Energy, and Division B—Natural Resources. Division A, Title I, focuses on energy efficiency.[18] Most topics addressed by S. 385/H.R. 1443 described in **Table 1** are found within Title I of S. 1460, although the provisions are not identical. S. 1460 would not establish a voluntary Supply Star program for industrial efficiency. There are several potentially important differences within the comparable provisions of S. 385/H.R. 1443 and S. 1460. These issues are discussed further in "Possible Issues for Congress."

House

H.R. 1443—The Energy Savings and Industrial Competitiveness Act—was introduced on March 9, 2017, and referred to the following committees: House Energy and Commerce; House Budget; House Financial Services; House Science, Space, and Technology; House Transportation and Infrastructure; and House Oversight and Government Reform. On March 10, 2017, the House Energy and Commerce Committee referred it to the Subcommittee on Energy, and the House Transportation and Infrastructure Committee referred it to the Subcommittee on Economic Development, Public Buildings and Emergency Management. On April 25, 2017, the House Science, Space, and Technology Committee referred it to the Subcommittee on Energy.

On January 24, 2017, H.R. 627—the Streamlining Energy Efficiency for Schools Act of 2017—was introduced in the House and referred to the House Energy and Commerce Committee. Similar to S. 383, this bill would amend the Energy Policy and Conservation Act (EPCA) for energy retrofitting assistance for schools (42 U.S.C. Chapter 77, Subchapter III, Part E). The

[17] Senate Committee on Energy and Natural Resources, "Business Meeting," Committee Meeting, *Congressional Record*, March 30, 2017, pp. D370-D372, and "Energy and Natural Resources Committee Advances 65 Bill," Republican News, at https://www.energy.senate.gov/public/index.cfm/republican-news?ID=3100B80B-C7EF-4F06-AFA2-1C1E86BC8601.

[18] For more information on S. 1460, see CRS Insight IN10736, *S. 1460: A New Energy and Resources Bill for the 115th Congress*, by (name redacted) and (name redacted) .

language in the two bills differs; H.R. 627 would direct the establishment of a clearinghouse of information, while S. 383, in addition to an informational website, would require technical assistance, a recognition process for schools, and a report to Congress regarding implementation. H.R. 627 was reported by the House Committee on Energy and Commerce without amendment on June 12, 2017, and the House suspended the rules and passed the bill on the same day.

On May 4, 2017, H.R. 2361—Energy Savings and Building Efficiency Act of 2017—was introduced in the House and was referred to the House Committee on Energy and Commerce. The following day, it was referred to the Subcommittee on Energy. Similar to H.R. 1443, the bill also would promote energy savings in residential and commercial buildings and industry, but it has several key differences in language. Specifically, H.R. 2361 would

- limit the time period for estimating energy savings to a 10-year time frame for simple payback,
- not require certification for states or tribes that do not update a model building energy code, and
- create voluntary aggregate energy savings targets instead of mandatory targets for the baseline model building energy codes.

The potential issues related to these differences are discussed further in "Possible Issues for Congress."

Potential Costs and Benefits

The Congressional Budget Office (CBO) estimated costs for S. 385.[19] Cost estimates from CBO are limited to federal outlays and revenues that would change if the legislation were enacted and fully implemented, and do not extend to the microeconomic costs and benefits that would be incurred by industry or consumers. According to CBO, S. 385 would increase direct spending by $17 million for 2017-2027 and cost $198 million over five years to implement, assuming that appropriations would be consistent with the authorizing legislation. Increases in direct spending would arise from provisions that direct federal agencies that guarantee mortgages to take into account energy-efficiency improvements when evaluating a borrower's ability to repay a mortgage.[20] CBO expects that the requirement, if enacted, would increase the total volume of mortgages insured by federal entities by less than 0.1%.

As the requirements for the proposed federal energy-efficiency goals are largely consistent with existing statute and administrative policy, CBO does not anticipate them to significantly add to federal spending. Additionally, federal agency spending on renewable energy certificates (RECs) would decrease, as current requirements to reduce the consumption of energy generated from fossil fuels would be modified.[21] These findings are consistent with the analysis done by CBO for S. 720 (114th Congress).[22]

[19] U.S. Congressional Budget Office, "S. 385 Energy Savings and Industrial Competitiveness Act as reported by the Senate Committee on Energy and Natural Resources on May 10, 2017," *Cost Estimate*, June 20, 2017, at https://www.cbo.gov/system/files/115th-congress-2017-2018/costestimate/s385.pdf.

[20] This refers to the provisions within "Enhanced Energy Efficiency Underwriting" (§423 in the current version of the bill, S. 385).

[21] This refers to the provisions within "Energy Performance Requirement for Federal Buildings" (§421 in the current version of the bill, S. 385).

[22] U.S. Congressional Budget Office, "S. 720 Energy Savings and Industrial Competitiveness Act of 2015 as reported (continued...)

S. 385 would impose an intergovernmental mandate by requiring states and tribal governments to certify to the DOE whether or not they have updated residential and commercial building codes to meet the latest building energy-efficiency standards. CBO estimated the cost of this intergovernmental mandate, as defined in the Unfunded Mandates Reform Act of 1995 (UMRA).[23] CBO determined that the cost of the mandate would be well below the threshold established in UMRA for 2017.[24] Additionally, S. 385 would authorize funding and technical assistance to state, local, and tribal governments to implement the certification requirement.

In 2013, the American Council for an Energy-Efficient Economy (ACEEE) evaluated similar energy-efficiency legislation benefits (113th Congress, S. 1392).[25] ACEEE's analysis determined that the bill and selected amendments would create jobs, save consumers money, reduce energy use, and avoid greenhouse gas emissions. ACEEE found that the majority of potential energy savings in the bill could be realized through implementation of building energy codes. The provisions in S. 1392 responsible for the largest energy savings, according to ACEEE, are identical (with a minor conforming change for authorization of appropriations) with the provisions in S. 385/H.R. 1443. However, comparing the results for energy or cost savings estimates by ACEEE from S. 1392 would overestimate the benefits of the current bills within a 2020 or 2030 time frame, as the ACEEE analysis quantified potential energy savings beginning in the year 2015.[26] Further, the analysis included benefits of provisions previously enacted in P.L. 114-11.

Possible Issues for Congress

Support and opposition to S. 385/H.R. 1443 are likely to parallel those for S. 720 (114th Congress) and its predecessor, S. 2262 (113th Congress). Several companies and organizations have stated their support for S. 385/H.R. 1443.[27] These organizations generally support the promotion of energy-efficient technologies; efforts to promote job creation in the energy-efficiency sector; measures to save energy in buildings, industry, and the government; and financing assistance for home energy-efficiency improvements. The ACEEE states that the bill "would help consumers, workers, businesses, states, the economy, and the environment."[28] The

(...continued)

by the Senate Committee on Energy and Natural Resources on September 9, 2015," *Cost Estimate*, October 19, 2015, at https://www.cbo.gov/publication/50906.

[23] For additional information on the Unfunded Mandates Report Act, see CRS Report R40957, *Unfunded Mandates Reform Act: History, Impact, and Issues*, by (name redacted) .

[24] For 2017, the annual threshold is $78 million, adjusted for inflation.

[25] Rachel Young, Sara Hayes, and Steven Nadel, et al., "Economic Impacts of the Energy Efficiency Provisions in the Energy Savings and Industrial Competitiveness Act of 2013 and Select Amendments," Washington, DC, September 2013, http://aceee.org/white-paper/shaheen-portman-2013. The calculated benefits are not comparable for S. 385 as reported savings began in 2014.

[26] According to Appendix D of Young et al. 2013, ACEEE assumed increased adoption of standards over time beginning with 10% in 2015 and increasing to 80% in 2020 for 2010 reference codes with 30% electricity and natural gas savings. Although the baseline model building energy codes remain the same (2009 IECC for residential buildings and ASHRAE Standard 90.1-2010 for commercial buildings), assessing energy savings of the current bills would likely necessitate changing the percentages to account for changes in state building energy codes.

[27] Letter from Air-Conditioning, Heating, and Refrigeration Institute, Alliance for Industrial Efficiency, and Alliance to Save Energy, et al. to The Honorable Lisa Murkowski, The Honorable Maria Cantwell, The Honorable Greg Walden, and The Honorable Frank Pallone, March 30, 2017, at https://www.ase.org/sites/ase.org/files/support_for_portman-shaheen_and_mckinley-welch_letter_033017.pdf.

[28] ACEEE, "ACEEE Supports Bipartisan Portman-Shaheen Energy Efficiency Bill," 2017, at http://aceee.org/press/ (continued...)

American Chemistry Council (ACC) also supports the bill, particularly the section on enhanced energy-efficiency underwriting (§423).[29] According to ACC, the energy underwriting provisions would recognize the benefits of energy-efficient technologies and reduce annual mortgage expenses and utility bills for consumers.

The bills may face opposition from groups focused on market-based policy. For example, the Heritage Foundation and its affiliated advocacy group, Heritage Action, opposed S. 2262 in the 113th Congress. They stated that the bill "would burden taxpayers and consumers alike," and that "removing mandates and subsidies removes impediments to market efficiency."[30] Instead of creating efficiency standards or providing incentives as included in Title I, these groups support providing information through voluntary programs. The Heritage Foundation has previously stated support for improving federal energy efficiency through energy savings performance contracts so long as there is sufficient oversight, transparency, and cost-savings verification.[31] While S. 385/H.R. 1443 has provisions addressing these issues, it is yet unknown if the provisions will draw support for the legislation.

Other groups have raised concerns about specific provisions in the bill. While the American Institute of Architects (AIA) supports the consensus-based model building energy codes in Title I, AIA opposes language in Title III of the current bill that would repeal the part of the Energy Independence and Security Act 2007 (P.L. 110-140) that requires new and renovated federal buildings to phase out fossil fuel power by 2030.[32]

Title I, Subtitle A—Building Energy Codes—has several provisions that have previously raised opposition. It directs DOE to establish energy savings targets in the code development process and to consider the lifecycle cost-effectiveness of model building energy codes for those targets. Opponents to targets state that greater transparency in DOE's technical support of code development is needed to avoid concerns of an "inappropriate advocacy role."[33] Furthermore, they state that DOE's role should be to serve as "technical advisor" and not push for specific goals, products, or technologies.[34] DOE has a role in certification of energy-efficiency codes.

(...continued)

2017/02/aceee-supports-bipartisan-portman.

[29] American Chemistry Council, "ACC Commends Senators Portman and Shaheen for Reintroducing Energy Efficiency Bill," press release, 2017, at https://www.americanchemistry.com/Media/PressReleasesTranscripts/ACC-news-releases/American-Chemistry-Council-Commends-Senators-Portman-and-Shaheen-for-Reintroducing-Energy-Efficiency-Bill.html.

[30] Heritage Action, "'No' on the Shaheen-Portman Energy Efficiency Bill," May 2, 2014, at http://heritageaction.com/key-votes/shaheen-portman-energy-efficiency-bill/. Loris, N. "The Shaheen-Portman Energy Efficiency Bill: A Costly, Inefficient Use of Taypayer Money," 2013, at http://www.heritage.org/environment/report/the-shaheen-portman-energy-efficiency-bill-costly-inefficient-use-taxpayer-money.

[31] Loris, N. "The Shaheen-Portman Energy Efficiency Bill: A Costly, Inefficient Use of Taypayer Money," 2013, at http://www.heritage.org/environment/report/the-shaheen-portman-energy-efficiency-bill-costly-inefficient-use-taxpayer-money.

[32] Geof Koss, "Building Code Fight Draws Renewed Interest," *E&E Daily*, June 14, 2017, https://www.eenews.net/eedaily/2017/06/14/stories/1060055989. Christa Marshall, "Sens. Portman and Shaheen Roll Out 'Win-Win' Bill ," *E&E News PM*, February 15, 2017, at https://www.eenews.net/eenewspm/2017/02/15/stories/1060050134, and Caroline Massie, "AIA Opposes Reintroduced Shaheen-Portman Energy-Efficiency Bill," *Architect Magazine*, March 11, 2015, at http://www.architectmagazine.com/practice/aia-opposes-reintroduced-shaheen-portman-energy-efficiency-bill_o.

[33] House Committee on Energy and Commerce, Subcommittee on Energy and Power, *Hearing on Draft Energy Bill*, April 30, 2015, printed statement of John Somerhalder of AGL Resources, p. 5. Available at https://www.aga.org/sites/default/files/sites/default/files/media/aga_somerhalder_testimony_final_4-30-15.pdf.

[34] National Association of Home Builders (NAHB), *Building Energy Codes*, at http://www.nahb.org/advocate/~/media/
(continued...)

Under 42 U.S.C. 6833, states are required to certify to DOE that they have compared a new building energy code standard to their current code. For residential building energy codes, the certification includes a determination as to whether it is appropriate to revise the state's current code to meet or exceed the revised code. For commercial building energy codes, the certification confirms that the state's building code has been updated appropriately.[35]

Regarding cost-effectiveness, some prefer the simple payback approach limited to 10 years,[36] as is proposed within H.R. 2361. Proponents consider such an approach effective in communicating the payback for consumers in easily understood terms and meeting consumers' expectations for short-term returns on investment. Supporters of H.R. 2361 contend that the current model code process requires costly products and materials, which could be corrected by requiring a shorter payback period.[37] Opponents of a simple payback limited to 10 years state that the approach neglects benefits that occur after the period, ignores the benefits beyond the initial investor, does not account for mortgage financing, and thus does not accurately measure the full benefits and overall profitability.[38]

The lifetimes of major building components generally exceed a 10-year time frame and often exceed the time span of 15-year and 30-year mortgages. The average residential building lifetime in the United States is 61 years, and typical building component (e.g., insulation, windows, roof) lifetimes exceed 10 years.[39] For example, the warranty period for windows is often 20 to 25 years depending upon the type and can last throughout the building lifetime with maintenance.[40] Products with shorter lifetimes such as water heaters or refrigeration equipment are not typically included when determining building energy code cost-effectiveness, as they have separate energy-efficiency standards.[41]

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[35] 42 U.S.C. 6833 (a) and (b).

[36] NAHB, Construction Codes and Standards Committee, "Cost-Effective and Affordable Energy Codes and Standards," *NAHB Resolution No. 5*, adopted June 2008 and reaffirmed June 2012, https://www.nahb.org/en/advocate/policy-resolutions/energy/cost-effective-and-affordable-energy-codes-and-standards.aspx

[37] Office of Rep. Blackburn, "Blackburn, Schrader Introduce Energy Savings and Building Efficiency Act," press release, March 13, 2015, at https://blackburn.house.gov/news/documentsingle.aspx?DocumentID=397697. Statement of John Floyd, Principal of Ole South Properties in Nashville, TN.

[38] ASE, 2015, *Building Energy Codes Fact Sheet*, at http://www.ase.org/resources/building-energy-codes-fact-sheet-0. ICF International, Methodological Comparison of Cost-effectiveness of IECC Residential Energy Codes, July 21, 2015, at http://bcap-energy.org/wp-content/uploads/2015/12/ICF-Comparison-of-Cost-effectiveness-Methodologies.pdf.

[39] Average lifetime of residential buildings is increasing linearly. The average lifetime is 61 years with a standard deviation of 25 years according to the 2009 American Housing Survey as determined by Can B. Aktas and Melissa M. Bilec, "Impact of Lifetime on US residential Building LCA Results," *Int J Life Cycle Assess*, vol. 17 (2012), pp. 337-349. Measure lifetimes provided via personal communication between the author and Z.T. Taylor, Pacific Northwest National Laboratory, May 18, 2017.

[40] Stephanie Carlisle and Elizabeth Friedlander, "The Influence of Durability and Recycling on Life Cycle Impacts," *International Journal of Life Cycle Assess*, vol. 21 (2016), pp. 1645-1657.

[41] For analysis purposes, energy-efficiency improvements through DOE Appliance and Commercial Equipment Standards are not attributable to code changes as they would improve independently of the model building energy codes. See J. Zhang et al., *Energy and Energy Cost Savings Analysis of the 2015 IECC for Commercial Buildings*, Pacific Northwest National Laboratory, PNNL-24269 Rev. 1, August 2015, p. 2.5, at https://www.energycodes.gov/sites/default/files/documents/2015_IECC_Commercial_Analysis.pdf.

Congress might consider whether to prioritize affordability for the first building owner relative to realizing larger building energy savings that may benefit multiple owners or occupants throughout the lifetime of a building.

Possible Issues to Consider in S. 1460

S. 1460 is a comprehensive energy and natural resources bill. Title I of the bill addresses energy efficiency, and many of the sections within Title I align with the contents of S. 385/H.R. 1443 (see table in **Appendix A** for similar provisions). It contains several differences that may be of interest to Congress.

Many of the differences between S. 385/H.R. 1443 and S. 1460 address building energy codes, and Congress might consider how these differences may affect the energy-efficiency goals of the legislation. While S. 385/H.R. 1443 use the term "model building energy code," S. 1460 uses the term "voluntary building energy code," which is currently in Section 303 of the Energy Conservation and Protection Act (ECPA) (42 U.S.C. 6832). S. 1460 would further emphasize the voluntary aspect of the building energy codes by adding the following to Section 304 of ECPA (42 U.S.C. 6833):

> (a) VOLUNTARY BUILDING ENERGY CODE.—Nothing in this section or section 307 makes a voluntary building energy code established under this section or an updated voluntary building energy code under section 307 binding on a State, local government, or Indian tribe as a matter of Federal law.

S. 1460 also emphasizes that the energy-savings targets that DOE would establish are "consensus-based," which is consistent with the definition of "model building energy code" used in S. 385/H.R. 1443.

S. 385/H.R. 1443 and S. 1460 expand the current certification requirements for states and Indian tribes regarding reviewing and updating building energy codes. Under current law, states are required to certify that they have compared new model building energy codes with their existing building energy codes within two years of a determination by DOE that the updated version of a model building energy code is appropriate. While the model building energy codes are different for residential and commercial buildings, both bills set consistent certification requirements for residential and commercial building energy code reviews and updates. Both bills also require states and Indian tribes to certify whether they have achieved compliance with the applicable building energy code standard. However, S. 1460 does not include language requiring repeat certifications for those who have certified progress toward achieving compliance but not full compliance. For those states that do not achieve compliance, federal support is available per both bills. However, S. 385/H.R. 1443 authorize support for "code adoption and compliance activities" while S. 1460 authorizes support for "technical assistance."

Federal incentive funding is available in both bills; however, there is a change in word choice in S. 1460 to deemphasize "enforcement." In S. 385/H.R. 1443, incentive funding could be used to improve and verify compliance and to train "state, tribal, and local building code officials to implement and enforce the codes." S. 385/H.R. 1443 would also permit states to "share grants under this subsection with local governments that implement and enforce the codes." In S. 1460, the enforcement language is replaced such that incentive funding could be used to improve and verify compliance and train "state, local, and tribal building code officials, or other entities identified by the Secretary." Language permitting grant sharing in S. 1460 is simplified to "states may share grants under the subsection with local governments."

S. 1460 does not contain the following energy-efficiency provisions present in S. 385/H.R. 1443:

- A requirement for DOE to establish stretch codes and advanced standards, which refer to building energy codes or standards that are adopted by state, tribal, or local governments that exceed the expected energy-efficiency performance of a building energy code target ahead of schedule by three to six years;
- Studies on code procedures that consider the lifetime of energy-efficiency measures in trade-offs and performance calculations; S. 1460 instead would call for studies on code procedures that adopt energy-efficiency measures that are "technologically feasible and economically justified";
- Energy-efficient targets that are "technologically feasible and life-cycle cost effective"; S. 1460 instead would direct DOE to establish targets that are "technologically feasible and economically justified"; and
- A paragraph that calls for economic considerations for achieving proposed building energy-efficiency targets that would include potential costs and savings for consumers and building owners and include a return on investment analysis.

S. 1460 uses the term "economically justified." At the end of the proposed language for Section 307 of ECPA (42 U.S.C. 6836), this term is expanded to explain that DOE shall "determine whether the benefits of the building energy code exceed its burdens," considering the impact on manufacturers and building owners, estimated savings in operating costs, total projected amount of energy or water savings, any reduction or increase of the utility or the performance of the buildings, the need for national energy and water conservation, and other relevant facts.

S. 385/H.R. 1443, H.R. 2361, and S. 1460 present three approaches to the consideration of the costs and benefits of energy-efficiency improvements to building energy codes. S. 385/H.R. 1443 would direct DOE to support building energy codes that consider building energy savings over the lifetime of a building. H.R. 2361 would direct DOE to support building energy codes that consider the initial affordability for the building owner. Congress might consider whether the use of the term "economically justified" in the energy-efficiency provisions of S. 1460 presents a middle path that would direct DOE to consider building energy codes that balance both the lifetime energy savings and the initial affordability of a building.

Appendix A. Evolution of Provisions

The sections in S. 385/H.R. 1443 can be traced back to congressional action on a sequence of bills that were considered in the 113th and 114th Congresses. **Table A-1** shows the evolution of those provisions. The relevant sections within S. 1460 that pertain to efficiency are also included in the table for comparison.

Table A-1. S. 385, Evolution of Bill Provisions

	115th Congress		114th Congress			113th Congress	
Policy Provision	**S. 385 and H.R. 1443**	**S. 1460**	**S. 2012 [Senate]**	**S. 2012 [House]**	**S. 720[a]**	**S. 2262**	**S. 1392 [b]**
Model Codes	§101	§1101	§1001	§3141	§101	§101	§101
Worker Training	111 and 112	1107 and 1108	1007 and 1008	9001	111 and 112	111 and 112	111 and 112
Schools	121	1103	1003	3131	121	121	NA[c]
Industry	202 and 203	1301	1201	NA	202 and 203	202 and 203	202 and 203
Supply Star	211	NA	NA	NA	211	211	211
Motor Rebate	221	1201	1101	NA	221	221	221
Transformer Rebate	231	1202	1102	NA	231	231	231
Federal Agency Information Tech	301	1109	1009	3111	301	301	301
Federal Agency Data Centers	302	1110	1011	3112	303	303	303
Multifamily Buildings	303	1102	1002	NA	304	304	NA
Energy Star Certification	401	1203	1104	NA	401	401	NA
High Performance Green Federal Buildings	411	1118	1019	NA	411	411	NA
Energy Performance Requirement for Federal Buildings	421	1116	1015	3116	421	431	NA
Federal Building Efficiency Standards	422	1115	1016	3117	422	432	NA
Underwriting	423	1501-1506	1502	NA	423	433	NA
Voluntary Verification	NA	NA	1106	3122	431	441	NA
Budget Offset	NA	NA	NA	NA	NA	501	401

Source: Adapted from CRS Insight IN10664, *S. 385: The Energy Savings and Industrial Competitiveness Act of 2017 (Portman-Shaheen Bill)*, by (name redacted)

Notes: S. 1460 and House and Senate versions of S. 2012 only show provisions related to S. 385.

a. Five provisions in S. 2262 that did not appear in S. 720 were in S. 535, which became P.L. 114-11.

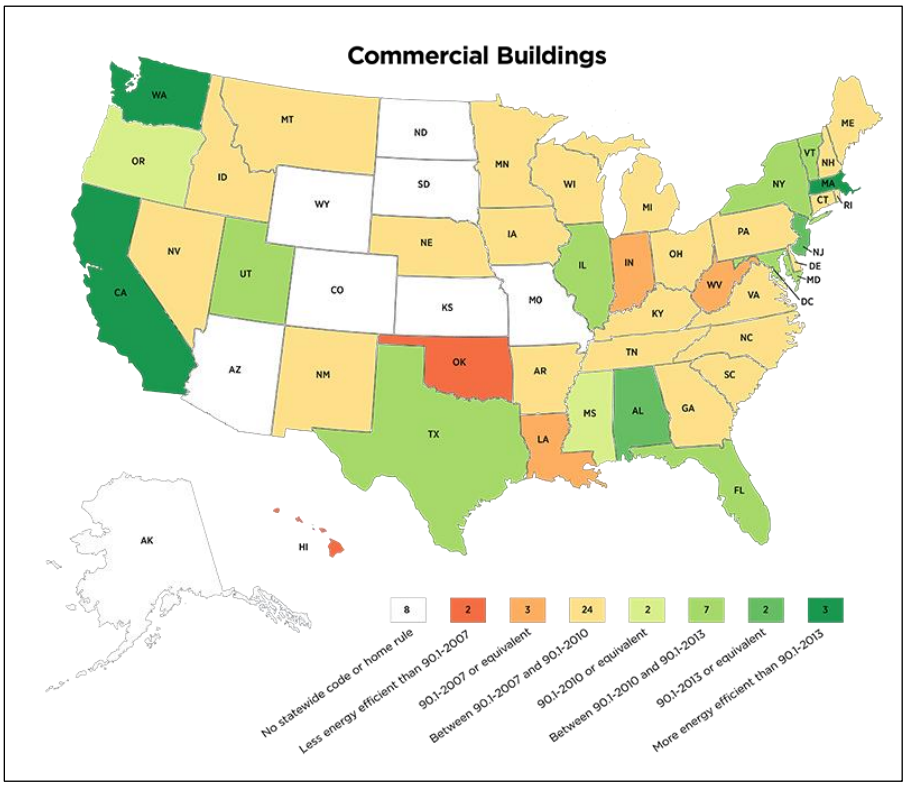
b. S. 1392 was a trimmed-down version of S. 761 (113th Congress), which was a trimmed-down version of S. 1000 from the 112th Congress.

c. *NA* or *not applicable* means that there was no directly equivalent provision in a bill, even though there may have been a related provision.

Appendix B. Status of State Building Energy Codes

Building energy codes are adopted by states, Indian tribes, and local governments in the United States. DOE tracks the adoption of building energy codes; the status of commercial and residential energy code adoption at the state level is presented in **Figure B-1** and **Figure B-2**.

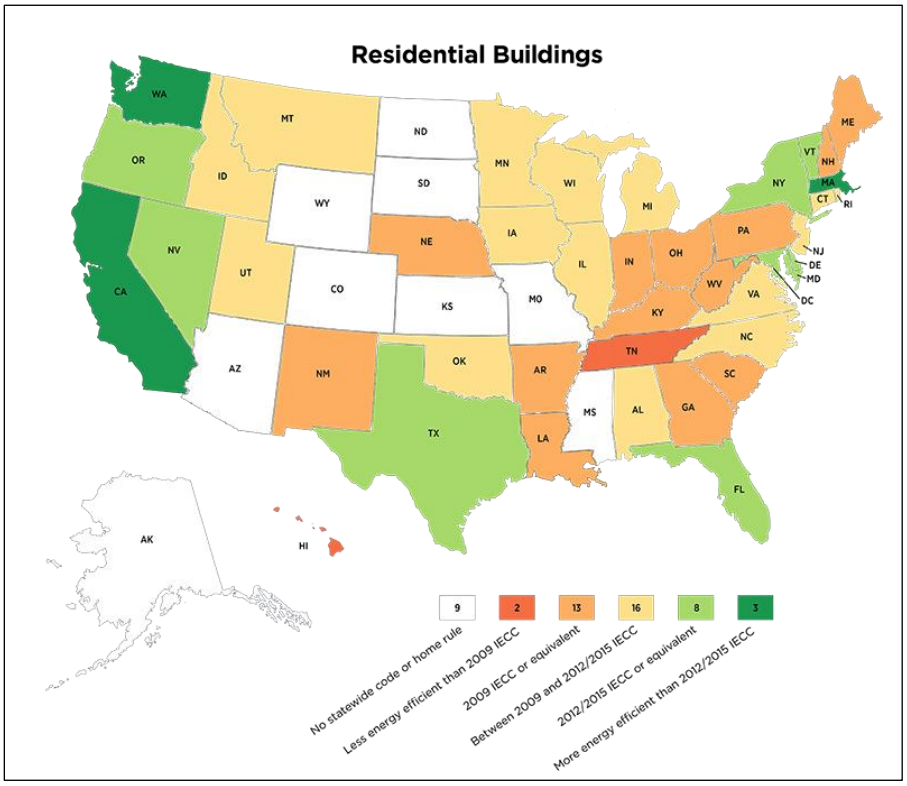
Figure B-1. Status of Commercial Building Energy Code by State



Source: DOE, *Status of State Energy Code Adoption: Commercial Buildings*, January 1, 2017, https://www.energycodes.gov/adoption/states.

Notes: Current as of January 1, 2017. "90.1" refers to ASHRAE Standard 90.1, *Energy Standard for Buildings Except Low-Rise Residential Buildings*. A new standard is released on a three-year cycle with the most recent version released for 2016. For those states categorized as "no statewide code or home rule," the state may not have a statewide energy code or adoption of a statewide energy code is determined by local governments.

Figure B-2. Status of Residential Building Energy Code by State



Source: DOE, *Status of State Energy Code Adoption: Residential Buildings*, January 1, 2017, https://www.energycodes.gov/adoption/states.

Notes: Current as of January 1, 2017. "IECC" refers to the *International Energy Conservation Code*. A new standard is released on a three-year cycle with the most recent version released for 2015. For those states categorized as "no statewide code or home rule," the state may not have a statewide energy code or adoption of a statewide energy code is determined by local governments.

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Insert Acknowledgments Here