Utilities and Building Energy Codes:
Air Quality and Energy Savings Opportunities

Commercial and residential building codes hold vast energy savings potential. A May 2011 report by the Institute for Electric Efficiency finds that aggressive adoption, implementation, and enforcement of the 2012 IECC model energy code could reduce U.S. electricity consumption by up to 129 TWh and cut CO_2 emissions by 98 million tons in 2025.[1] The Alliance to Save Energy estimates potential annual savings of more than 1,026 TWh or $40 billion in energy costs, and annual CO_2 reductions of 780 million tons by 2030 from nationwide adoption and full compliance with the 2012 IECC.[2] Simply enforcing existing building energy codes could save American consumers an annual $10 billion and 89 million tons of CO_2 emissions by 2030 (see *figures* 2,3).[3]

Figure 1- Energy Cost Savings Potential from Energy Code Compliance[4]

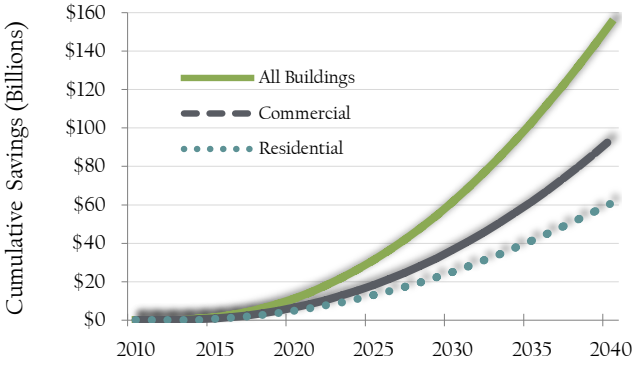
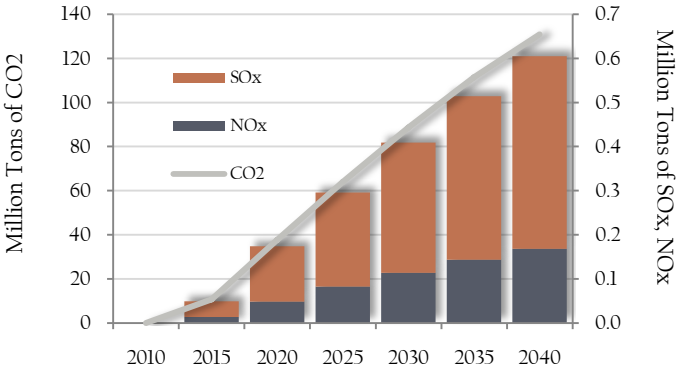


Figure 2 - Annual Emissions Savings Potential from Energy Code Compliance[5]



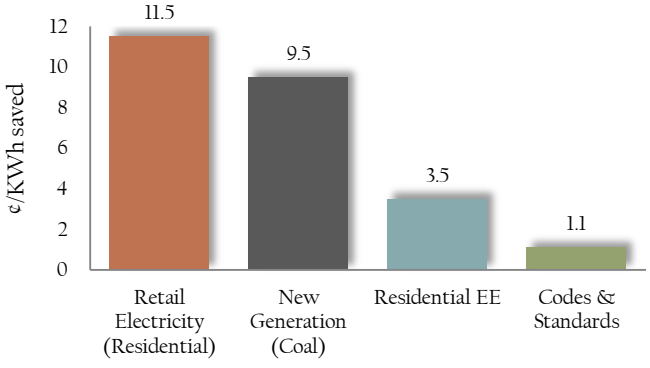
Cost Effectiveness

Building energy codes are one of the most cost-effective ways to save energy. In fact, at a cost of slightly more than 1 cent per KWh, building codes and standards achieve energy savings at one-third the cost of conventional residential energy efficiency programs and are roughly one-tenth the cost of retail residential electricity. A recent study by a task force of more than 30 organizations led by the Institute for Market Transformation found that **every $1 spent on enforcement of energy codes yields $6 in energy savings.**[6] Figure 3 illustrates the cost-effective advantage of pursuing building codes and standards as a resource relative to other conservation and generation options.

How Can Utilities Get Involved?

- **Development**—design of code language and cost effectiveness testing of proposed code
- **Adoption**—support and promotion of the adoption of new efficiency standards
- **Training**—technical assistance, workshops, training, and testing for builders, contractors, architects, and code officials
- **Compliance** —building plan review and field inspections or support for third party inspection; measurement of baseline compliance rates
- **Awareness**—proactive communication with stakeholders about training programs, key code provisions, incentives, compliance options

Figure 3-Average Resource Cost[7]



Legislative and Regulatory Framework

Creating the right policy environment to encourage utility involvement in the full spectrum of building codes is crucial to harnessing large energy and emissions savings from buildings. Currently, fewer than 10 states have legislative or regulatory approval to count savings from building codes towards energy efficiency resource standards, utility filed energy efficiency programs, or air quality goals and regulations:

- **Arizona**: utilities can count the savings from codes and standards programs towards 1/3 of the annual energy efficiency resource standards target
- **California**: verified energy savings from utility involvement in code and standard "programs" are credited towards energy efficiency targets; such savings amounted to 4 percent of total energy efficiency program savings at a cost of less than 1 percent of total energy efficiency program expenditures.
- **Idaho, Montana, Oregon, Washington**: the Northwest Energy Efficiency Alliance (NEEA)manages the building code programs for several utilities as part of the region's market transformation efforts
- **Massachusetts**: process underway to develop protocols for measuring energy savings from increased code compliance and upgraded stretch codes supported by utilities
- **Minnesota**: Next Generation Act of 2007 allows utilities to credit energy savings from building codes towards the annual energy savings target of 1.5 percent of annual retail electricity sales. Working group developing protocol for verifying and attributing savings
- **New York**: NYSERDA leveraging ARRA funding to increase code compliance

Claiming Savings from Building Energy Codes

All efforts to credit energy or air quality benefits of building codes require some level of measurement and verification work. Establishing a baseline level of energy use prior to treatment from improved compliance or development of above minimum code buildings is needed for evaluation. Once a baseline is developed a verification protocol can be used to identify savings from compliance enhancements, development of greater than minimum code buildings, or both.

The Pacific Northwest National Laboratory has developed detailed procedures[8] to help states and jurisdictions accurately measure compliance with building energy codes. DOE is piloting these guidelines through statewide compliance evaluations in, Georgia, Iowa, Massachusetts, Montana, Oregon, Idaho, Utah, Washington, & Wisconsin.[9] These compliance evaluation protocols will support and standardize the EM&V process and help estimate the potential and realized energy savings from enhanced code compliance.

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[1] Institute for Electric Efficiency, 2011. "Assessment of Electricity Savings in the U.S. Achievable through New Appliance/Equipment Efficiency Standards and Building Efficiency Codes (2010-2025)." http://www.edisonfoundation.net/iee/reports/IEE_CodesandStandardsAssessment_2010-2025_UPDATE.pdf. Annual savings in 2020 of 59 TWh end use electricity. Non-baseload output emission rate of 1520.11 lb/MWh from EPA eGRID2010.

[2] Alliance to Save Energy, 2010. "Nationwide Savings from Adoption of the 2012 IECC." CO2 savings calculated using Non-baseload output emission rates. http://www.imt.org/files/FileUpload/files/Codes/2012%20IECC%20savings%20estimates%20ASE.pdf.

[3-6] Institute for Market Transformation, 2010. "$810 Million Funding Needed to Achieve 90% Compliance with Building Energy Codes." Findings from an IMT-led task force analysis. http://imt.org /files/FactSheet-EnergyCodeComplianceFunding.pdf.

[7] Codes and Standards (C&S) Programs Impact Evaluation, Final Evaluation Report, CPUC, April 9, 2010; IEE; EIA Average Retail Price of Electricity to Ultimate Customer: Total by End-Use Sector.

[8] DOE Building Energy Codes Program (BECP), 2010. "Measuring State Energy Code Compliance." Prepared by Pacific Northwest National Laboratory. http://www.energycodes.gov/arra/documents/MeasuringStateCompliance.pdf.

[9] See http://www.energycodes.gov/states/maps/stateComplianceActivities.stm.