

BEYOND SAVINGS:

Building Energy Codes Drive Important Benefits to States and Cities

By Justin Koscher

Building energy codes set minimum requirements to support the construction and renovation of energy-efficient buildings. While energy codes can drive energy and cost savings during the operation of a building, their criteria also deliver a multitude of benefits that can improve the communities within which energy-efficient buildings sit or the lives of occupants who use these buildings each day. This article explores the benefits of building energy codes beyond energy and cost savings.

There's no hiding the fact that building energy codes represent a significant opportunity for consumers and business owners to reduce the amount of energy that is needed to power homes and buildings. The most well-known model building codes exemplify that very purpose in their names: The International Code Council's *International Energy Conservation Code* and ASHRAE's *Standard 90.1 - Energy Standard for Buildings*. (See Figure 1.)

And we are talking about huge energy savings. The U.S. Department of Energy¹ estimates that model energy codes for residential and commercial buildings are projected to save 12.82 quads² of primary energy from 2010 to 2040. How much cost savings does that represent? One hundred twenty-six



Figure 2 – Savings from Building Energy Codes. Image courtesy of PIMA.

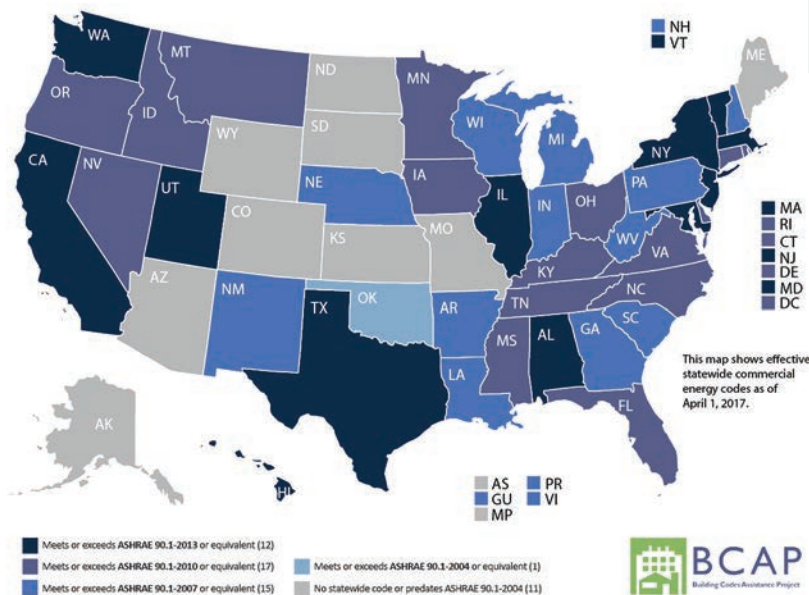


Figure 1 – Status of U.S. Commercial Building Energy Code adoption. Image courtesy of Building Codes Assistance Project.

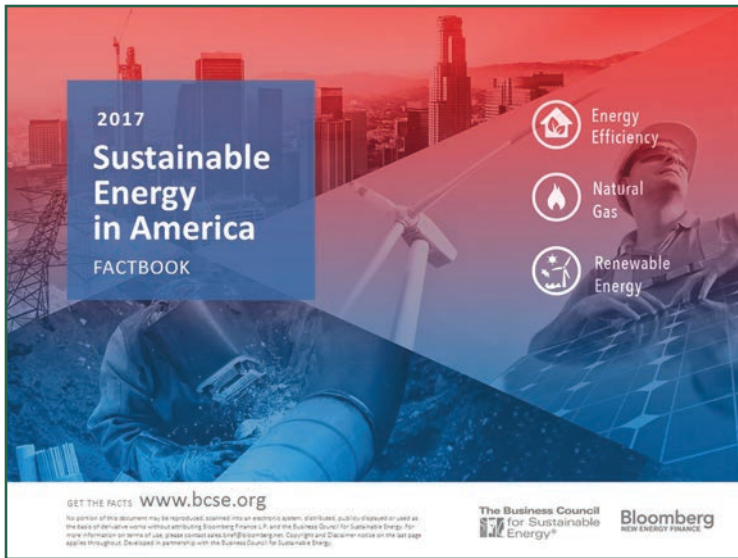


Figure 3 – 2017 Sustainable Energy in America Factbook.

billion dollars in savings at today's energy prices. Or to put these savings into a different context, model energy codes reduce annual CO₂ emissions in an amount equal to 177 million passenger vehicles or 245 coal power plants. (See Figure 2.)

These numbers are impressive, but can overshadow other important benefits of building energy codes. All too often, we become singularly focused on the “payback” of building energy codes in terms of energy or cost savings. For example, if the thermal insulation requirement for commercial roofs is increased from R-15 to R-30, how many years will it take to pay back the investment for the additional insulation? Return on investment is an important question that

PRODUCTIVITY

The U.S. Gross Domestic Product (GDP) grew 12% since 2007, while total energy use fell 3.6% over a comparable time (Figure 3), according to Bloomberg New Energy Finance and the Business Council for Sustainable Energy's 2017 Sustainable Energy in America Factbook.³ In other words, the energy productivity of the U.S. economy grew 16% over the past decade (Figure 4). Given that buildings account for approximately 40% (2016)⁴ of total energy use, we know that improved building energy codes played an important role in growing U.S. energy productivity. This should jump off the page for states and cities (or the folks in Washington, DC, for that matter) that are interested in spurring

can be answered through building energy modeling and energy cost analysis. However, when jurisdictions are undertaking the process to modernize their building energy codes, they should take care to calculate the other positive contributions energy codes make to states and cities.

economic activity in their areas. Less money spent on energy means more money invested in local communities and jobs.

AFFORDABILITY

Energy-efficient homes can help households on fixed incomes avoid disruptive spikes in energy bills during the sweltering summer months or frigid winter months. In fact, a study by the University of North Carolina's Center for Community Capital found that default risks are, on average, 32% lower in energy-efficient homes.⁵ This statistic is important to the homeowner and bank, but is also telling for communities that have been hit hard by mortgage defaults. Energy efficiency, by controlling energy use and the associated monthly bills, can have a real impact on the quality of life in communities across the country.

RELIABILITY

Buildings are energy hogs. As stated earlier, residential and commercial buildings use approximately 40% of total U.S. energy and consume 75% of all electricity produced in the country. Add on top of these numbers the fact that our aging energy grid has left Americans vulnerable to blackouts and security threats. You don't have to be a policy wonk to see the connection (and opportunity) between buildings that use less energy and improving the reliability of the electric grid. States and utilities should utilize building energy codes as a policy option to lessen the burden on already overworked electricity grids.

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RESILIENCY

Flip on the news, and you will hear coverage of the most recent weather disaster. In 2017, there were 16 weather and climate disaster events with losses exceeding \$1 billion each in the U.S. (including two floods, one freeze event, eight severe storm events, and three tropical cyclone events).⁶ Extreme weather exacts tolls on buildings like homes, schools, and hospitals that we rely on for safety and protection. Energy efficiency—achieved through the adoption and enforcement of energy codes—can make buildings less susceptible to failure and quicker to recover after the storm passes.

For example, an energy-efficient building will be able to maintain a more comfortable indoor environment than an under-insulated building in situations where power for heating and cooling is limited or unavailable. Proper building envelope design can also mitigate the impacts of severe weather events by avoiding the crippling effects of moisture intrusion. Buildings built today will be with us for 40, 50, or 60 years, or maybe longer. These buildings represent an opportunity, but also a huge sunken cost if built without

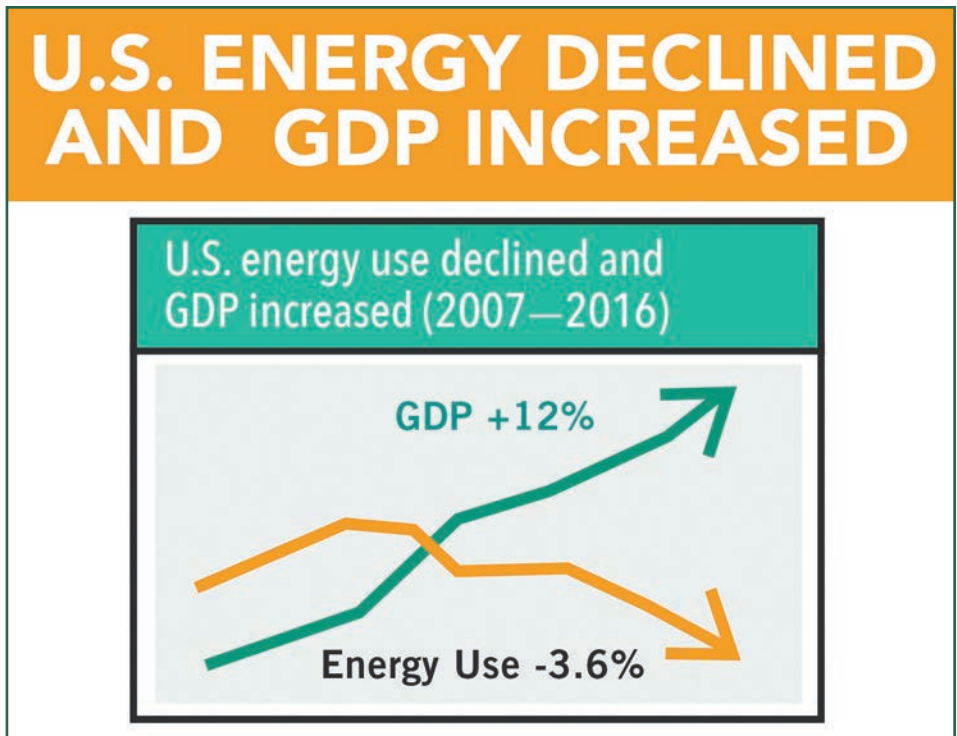


Figure 4 – U.S. energy productivity has grown 16% since 2017. Image courtesy of Business Council for Sustainable Energy.

the future in mind. Building energy codes can help ensure we build to withstand the challenges of tomorrow.

PRODUCTIVITY (AGAIN)

We are all trying to do more with less time. Whether it's juggling a job, family,

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or school, everyone could use a leg up to be more productive. You guessed it: energy efficiency has a role to play in human productivity, too. Energy efficiency is a cornerstone of green or sustainable construction. A recent study⁷ conducted at the Harvard School of Public Health and SUNY Upstate Medical demonstrated that working in high-performing, green-certified buildings can improve decision-making in the workplace. Green buildings tend to be “better” buildings, which may positively impact building occupants. However, the study also noted that the indoor environments of green buildings operated within the thermal comfort zone as defined by ASHRAE. This resulted in higher cognitive function scores for the study participants. Building energy codes incorporate ASHRAE standards to control thermal efficiency, as well as ventilation, which can lead to improved indoor air quality.

It’s time we start thinking about building energy codes in broader terms. As a low-cost policy option, energy codes should be paramount for leaders looking to make

their states and local jurisdictions more competitive and attractive to businesses and residents. 

REFERENCES

1. <https://www.energycodes.gov/about/results>
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4. <https://www.eia.gov/tools/faqs/faq.php?id=86&t=1>
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7. Joseph Allen et al. “Associations of Cognitive Function Scores with Carbon Dioxide, Ventilations, and Volatile Organic Compound Exposures in Office Workers: A Controlled Exposure Study of

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able and energy-efficient construction. Before joining PIMA in January 2017, he served as a director at the American Chemistry Council’s Center for the Polyurethanes Industry. Justin obtained his B.A. from Illinois Wesleyan University and J.D. from DePaul University College of Law.

CHRIST CHURCH MOSAIC ROOF RECOGNIZED

An interesting mosaic on the former Christ Church in Hillier, Prince Edward County, Ontario, has received recognition by the Asphalt Roofing Manufacturers Association (ARMA). Al Anthony Roofing of Consecon, ON, was granted an honorable mention in ARMA’s annual Quality Asphalt Roofing Case-study (QARC) Awards for its installation. The mosaic was designed by Helga Boelen and inspired by the Hospice de Beaune in Burgundy. The church, built circa 1840, was reconstructed in 1947 following a lightning strike and served the community until 1969. It was moved in 2006 from 2 kilometers away to the vineyards of the Closson Chase Winery, where it now serves as housing for winery workers.



Photo by thecitiot.com

Unemployment Continues to Fall

The number of Americans filing for unemployment benefits fell to its lowest level in nearly 45 years in February, raising expectations of faster wage growth in 2018, according to the Labor Department. Initial claims decreased to a seasonally adjusted 221,000 for the week ending February 3, the lowest level since January 1973. This marked the 153rd week that claims remained below the 300,000 mark, which is associated with a strong labor market.

Overall unemployment is at 4.1 percent, and beginning to exert upward pressure on wage growth. This supports the Federal Reserve’s belief that inflation will increase to the U.S. central bank’s 2% target this year.