

# Construction Industry Focuses On Energy Efficiency, Related Cost Increases

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As building codes have evolved, they have shifted in focus towards energy conservation. New codes that apply to builders now require meeting specific requirements related to energy efficiency and these targets get reviewed and revised periodically. This development is far removed from a time when energy efficiency was not even a consideration in building standards.

Why the focus on building efficiency? The main reason is that buildings in the United States are the greatest users of energy – greater than manufacturing facilities, all transportation and any other sector. The building sector is responsible for 72 percent of electricity use and 36 percent of greenhouse gas emissions nationally and eight percent globally. No policy to reduce energy use and greenhouse gas emissions will be successful without addressing efficiency in the building sector.

While there has been some movement towards stricter energy codes, some builders have pushed back. The main reason is the increase in the cost of construction. Cost is more of a factor in the residential building sector, which has suffered greatly since the economic collapse in 2007-2008. Proponents of the enhanced codes cite the reduced cost of energy use in these homes, claiming that the new owner would get a return on their investment within a few years.

Nationally, the American Recovery and Reinvestment Act (ARRA) established the baseline energy standard for commercial buildings to be ASHRAE Standard 90.1-2007. States that wanted any of the stimulus money had to agree to enhance their energy code standards, so these codes have been improved for many states over the last few years. Focusing on three states, Michigan, Indiana and Ohio, we can identify what the code requires for residential and commercial buildings. Also, we can look to see what we can expect in future requirements related to improving the energy efficiency of buildings.

## MICHIGAN

Residential – On March 9, 2011, the Michigan Construction Code, Uniform Energy Code became effective. Under Part 10 of the Construction Code, the residential building code was amended to adopt 2009 International Energy Conservation Code (IECC) (with some sections excepted).

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The code applies to new construction for detached one- or two- family homes and multiple single-family homes. The specifics of the code are governed by the location of the construction and by dividing the state into three climate zones.

There are a variety of ways to comply with the code requirements in general. There are specific requirements for the thermal performance of walls, doors, roofs, slab or crawl spaces. One may also meet the requirements of the IECC standards for detached one- or two-family homes. Complying with the Energy Star Homes Program is another alternative. Finally, meeting a Home Energy Rating Systems (HERS) index of 85 also signifies compliance.

A 2009 U.S. Department of Energy (DOE) analysis of the effect of adopting the IECC standard in Michigan concludes that energy savings related to the new code will result in savings of \$256 to \$292 a year, based on 2009 fuel costs. This represents a 4.0- to 7.8-percent improvement in energy usage, depending on the climate zone in which the building is located.

Commercial – The commercial building code standard is found at Part 10a of the Construction Code. Under those rules, new commercial buildings must meet ASHRAE Standard 90.1-2007.

There are requirements for existing buildings related to new heating, ventilation and air conditioning (HVAC) equipment that replaces existing HVAC systems that must meet minimum efficiency requirements. Exceptions to this requirement are for equipment that is being modified or repaired (provided such modifications do not increase energy use), where such replacement requires extensive revisions to other systems or equipment in such a way as to make the replacement a “like-for-like” replacement, changes in refrigerants or relocation of existing equipment.

Depending on the climate zone in which the building is located, nonresidential buildings meeting the new standard should experience a 12.1- to 13.3-percent improvement on energy use when compared to the previous state standard, according to DOE.

## INDIANA

Residential – On April 5, 2012, Indiana amended its residential building code by adopting the 2009 International Residential Code (IRC) with amendments that make the code equivalent to the IECC 2009 standard. While not a state-wide requirement, local ordinances may provide that builders demonstrate compliance with the code, so it is important to confirm what the local jurisdiction requires.

There are two climate zones in Indiana that determine the level of insulation for construction. By adopting these changes, the DOE estimates, using 2009 fuel prices, that residential homeowners will save \$226 to \$250 annually.

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Commercial – Indiana's commercial building energy code is based on ASHRAE 90.1-2007. For those constructing commercial buildings, they must file plans with the Indiana Department of Fire and Building Services, which includes an Application for Construction Design Release. This application includes energy design data.

## OHIO

Residential – Ohio's residential energy code is the equivalent of the IECC 2006 Code. There are two climate zones in Ohio. Local certified building inspectors determine compliance with the code. There is no state level review for one-, two- or three-family dwellings.

However, a new code update was recently approved, which will go into effect on Jan. 1, 2013. The new code is modeled after the IECC 2009 standard, but with some modifications. According to some studies, the cost of an 1,800 square foot two-story home may cost between \$1,200 to \$1,800 more to construct because of the code changes, but it would save approximately \$230 per year in energy costs.

Commercial – The commercial building code in Ohio is based on the ASHRAE 90.1-2007 standard. If there is no local building department to review plans, the Ohio Department of Commerce Division of Industrial Compliance conducts the reviews and issues approvals for commercial construction.

## WHAT'S ON THE HORIZON

In addition to the codes referenced above, communities are looking to other means by which to enhance energy efficiency in buildings.

### Energy Transparency Laws

Some jurisdictions have opted to require owners of commercial buildings over a certain size to make their energy consumption public. For example, New York City requires the disclosure of energy benchmarkings and building energy ratings of buildings 50,000 square feet and larger to a Web site for public consumption. Developers of this policy expect that purchasers and potential tenants will review this data and provide some incentive for building owners to improve their performance.

### Outcome-based Energy Codes

Rather than focus solely on required methods, these codes would require meeting specific performance parameters and would allow the building owners to decide how to best meet those standards. Compliance would be determined in the post-construction period with annual reporting of actual energy consumption. The focus then becomes not only the building's construction, but its operational practices and tenant behavior.

## Small Construction Certification

The costs of certifying energy usage of certain building types, usually those less than 50,000 square feet, may exceed the benefits.

However, developers can avoid those costs by obtaining certification (under the U.S. Green Building Council's LEED standard) by having a standard building envelope certified and by repeating the construction of the same building (with small tweaks related to the final location of the building). This would be effective for developers with standard buildings, like big box retailers or restaurants. The developer would get the benefit of certification, but at a reduced cost compared to having each and every building certified on an individual basis.

## Life-cycle Analysis

Some have identified the traditional basis of determining the energy attributed to the construction and operation of buildings by focusing solely on energy use after construction. A trend has developed in which the entire building is reviewed, including the energy used to manufacture building materials, water use and specific designs.

The calculations include all energy costs related to the construction and the operation of a building.

## CONCLUSION

Codes, which once focused solely on safety and building quality, now are relevant to energy use. As a developer, a construction contractor or a subcontractor, you should become aware of the energy codes that apply in your jurisdiction.

If done correctly, compliance will result in lower energy costs for the building operator and its tenants. Lack of compliance may result in expensive retrofits. The best time to consider these requirements is during the planning and drafting phase, rather than after construction has already begun.

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