

Residential Energy Comparison for St Louis County, Missouri: Adoption of 2015 IECC w/ Building Code Review Committee (BCRC) Amendments vs. 2015 International Energy Conservation Code (IECC)

The St. Louis County Building Code Review Committee (BCRC) recently finished reviewing the proposed amendments provided by the Home Builders Association of St. Louis County and Eastern Missouri to the 2015 IECC. The recommendations agreed upon by the BCRC will significantly weaken the 2015 IECC and cost homeowners more energy and money than the current St. Louis County Building Code. An analysis was conducted by MEEA comparing the current building code (2009 IECC w/ amendments) to the proposed code (2015 IECC w/ BCRC amendments), and the current building code to the 2015 IECC as written.

Comparison of Current St. Louis County Code against the 2015 IECC as Written

- If the 2015 IECC were passed as written, a future homeowner could expect to save **\$436 and 44.4 MMBTU per year** on energy bills.
- If the 2015 IECC were passed as written, the **local economy could expect to gain \$361,880 per year**, based on an average of 830 new residential construction building permits per year.³

	Annual Energy Usage Per Home	Annual Energy Cost Per Home ¹	Potential Annual Savings Per Home	Net Positive Cash Flow ²	Simple Payback Period ²
Current St Louis Code (2009 IECC w/ amendments)	123 MMBTU (Heating, Cooling, Lighting)	Lighting: \$178 Heating: \$932 Cooling: \$268	\$436/yr 44.4 MMBTU/yr	<1 year	4 - 5 years
Potential Code Update (2015 IECC as written)	78.6 MMBTU (Heating, Cooling, Lighting)	Lighting: \$140 Heating: \$570 Cooling: \$230			
County-wide Economic Gain³: \$ 361,880/yr					36,852 MMBTU/yr

Modeling Software used: REM/Design; House Specs: 2,400 Square Foot Home with Conditioned Basement – St Louis, MO (Climate Zone 4)

Significant Energy Efficiency Improvements of the 2015 Residential Energy Code as Written:

- **Air Infiltration:** Tighter building envelope and reduced air leakage rate
 - Must be verified by diagnostic blower door test. Difficult to meet requirement and realize energy benefits without testing.
- **Duct Tightness:** Tighter duct systems and reduced leakage rate
 - Must be verified with diagnostic duct leakage test when ducts and air handler not entirely within conditioned space.
- **Lighting:** Increased requirements for efficient lighting
- **Windows:** Increase in efficiency requirements for windows
- **Wall and Ceiling Insulation:** Increased insulation requirements

1. Using current Ameren utility rates for electricity and Natural Gas
2. Based on \$1,973 total construction cost increase from 2009 IECC to 2015 IECC in the Department of Energy Cost Effectiveness Analysis: https://www.energycodes.gov/sites/default/files/documents/2015IECC_CE_Residential.pdf
3. Based on 830 reported average new construction building permits per year. Source: U.S. Census data, 10 year average of new single up to R-4 reported building permits in St Louis County from 2005 – 2014: <http://censtats.census.gov/cgi-bin/bldgprmt/bldgdisp.pl>

Comparison of Current St. Louis County Code against the Proposed 2015 IECC w/ BCRC Amendments

- If the BCRC proposed 2015 IECC were passed as written, **a future homeowners costs and energy use could increase by \$152 and 12 MMBTU**, compared to a home built to the 2009 St. Louis County Code.
- If the BCRC proposed 2015 IECC were passed as written, **the local economy could expect to lose \$126,160 per year**, based on an average of 830 new residential construction building permits per year.³

	Annual Energy Usage Per Home	Annual Energy Cost Per Home ¹	Potential Annual Costs Per Home
Current St Louis County Code (2009 IECC w/ amendments)	123 MMBTU (Heating, Cooling, Lighting)	Lighting: \$178 Heating: \$932 Cooling: \$268	\$152/yr 12MMBTU/yr
Proposed St Louis Code by BCRC (2015 IECC w/ amendments)	135 MMBTU (Heating, Cooling, Lighting)	Lighting: \$253 Heating: \$988 Cooling: \$288	
			County-wide Economic Loss³: \$126,160/yr 9,960 MMBTU/yr

Modeling Software used: REM/Design; House Specs: 2,400 Square Foot Home with Conditioned Basement – St Louis, MO (Climate Zone 4)

Significant BCRC Amendments that Weaken the 2015 Residential Energy Code:

- **Air Infiltration:** No requirement to limit or test home air leakage - (2009 St. Louis Code: requires listed measures be sealed)
 - No requirement to limit air leakage through recessed lighting – (2009 St. Louis Code: requires these are sealed)
- **Duct Tightness:** No requirement to test duct work – (2009 St. Louis Code: Ducts tested in unconditioned space)
 - Building cavities can be used as ducts or plenums – (2009 St. Louis Code: Does not allow this)
- **Lighting:** No requirement to install any high efficacy lamps – (2009 St. Louis Code: Minimum 50% high efficacy lamps)

Incremental Cost and Payback (DOE definitions):²

- Length of payback depends on increased construction cost and energy savings for homeowner
- Simple payback
 - *Number of years required for energy cost savings to exceed the incremental first costs of a new code*
- Lifecycle cash flow analysis
 - *Full accounting over a 30-year period of the cost savings, considering energy savings, the initial investment financed through increased mortgage costs, tax impacts, and residual values of energy efficiency measures*
- Time to Positive Cash Flow
 - *Cash Flow: Net annual cost outlay (i.e., difference between annual energy cost savings and increased annual costs for mortgage payments, etc.)*

1. Using current Ameren utility rates for electricity and Natural Gas

2. Based on \$1,973 total construction cost increase from 2009 IECC to 2015 IECC in the Department of Energy Cost Effectiveness Analysis: https://www.energycodes.gov/sites/default/files/documents/2015IECC_CE_Residential.pdf

3. Based on 830 reported average new construction building permits per year. Source: U.S. Census data, 10 year average of new single up to R-4 reported building permits in St Louis County from 2005 – 2014: <http://censtats.census.gov/cgi-bin/bldgprmt/bldgdisp.pl>