



Kentucky Energy Code Field Study: Energy Savings Opportunities



OVERVIEW

The Southeast Energy Efficiency Alliance (SEEA) conducted a study of 140 new single-family homes under construction in Kentucky to determine the level of compliance with the building energy code using an accepted methodology.

The study was conducted in three phases: Phase I collected baseline data beginning in April 2015; Phase II included 15 months of targeted training based on the findings from Phase I; and Phase III collected data after the training, concluding in September 2017. During this time, the residential code in Kentucky adhered to the 2009 International Energy Conservation Code (IECC) with additional state-specific amendments. This snapshot presents results from Phase III.

Significant savings opportunities for improving compliance in **six high-impact areas** were identified. Each year, this has the potential to cut household energy costs by **\$928,585**. The full report can be found [here](#).

AT A GLANCE

Goal

Assess energy efficiency and energy savings potential

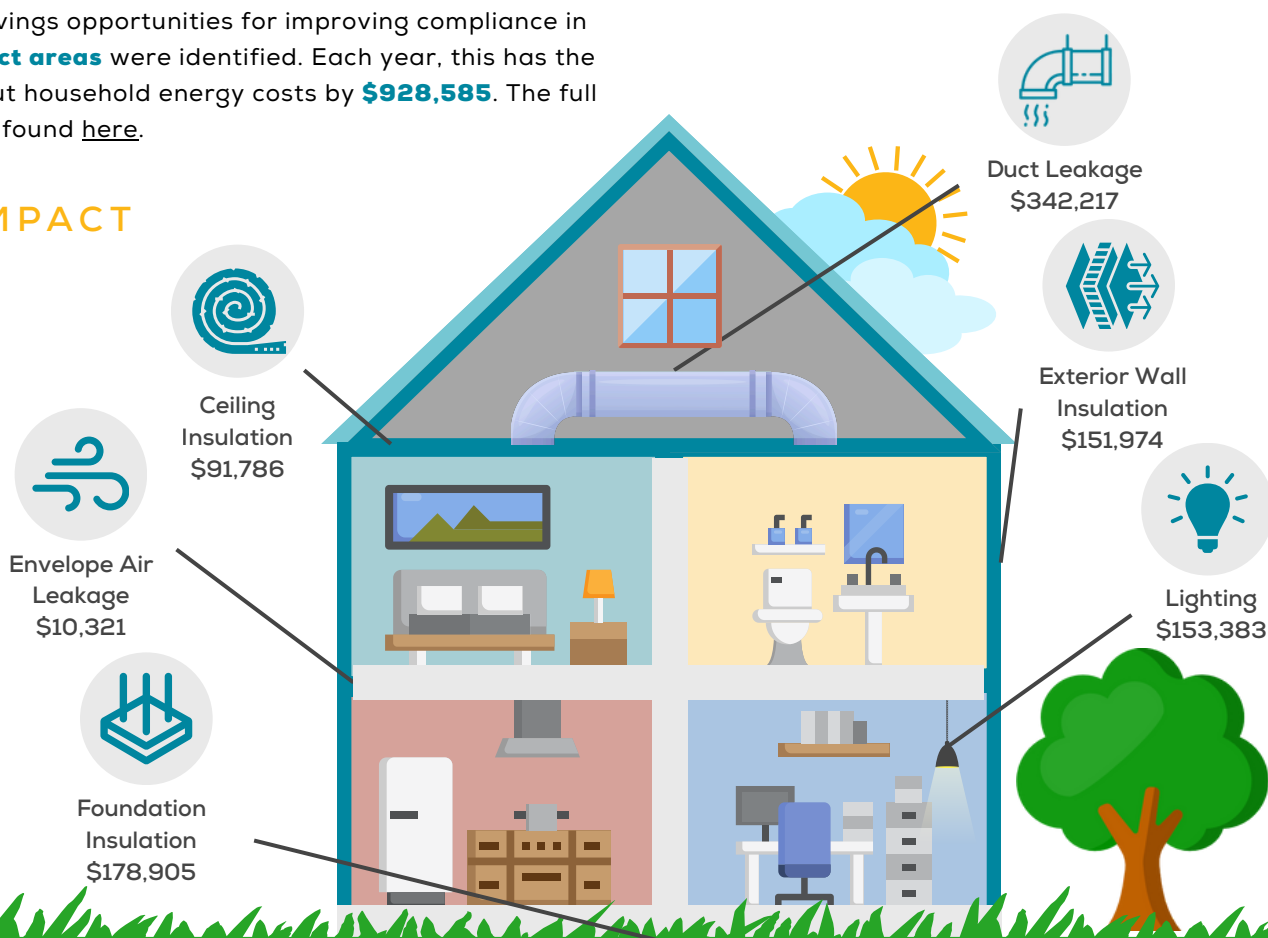
Annual Savings Potential

\$928,585

Largest Savings Impact

Duct Leakage

HIGH-IMPACT AREAS



CEILING INSULATION

- Compliance with the R-value requirement decreased slightly from 90% in Phase I to 88% in Phase III.
- U-Factor compliance improved from 41% in Phase I to 71% in Phase III, reflecting an improvement in insulation installation quality (IIQ) after targeted training.
- Although the percentage of Grade I insulation increased from 40% to 75% from Phase I to Phase III, IIQ remains a concern leaving significant energy and energy cost savings on the table.

WINDOWS

- Although there was no SHGC requirement in Climate Zone 4, the observed SHGC values in both Phases I and III were similar and nearly met the prescriptive requirement for more stringent climates (Climate Zones 1–3).
- Fenestration products showed a high compliance rate; nearly all observations met or exceeded code requirements, representing one of the study's most significant findings.

LIGHTING

- In Phase I, only 31% of field observations met lighting requirements; despite targeted education and training in Phase II, compliance increased to just 35% in Phase III.
- Lighting remains a continued opportunity for energy savings.

ENVELOPE AIR LEAKAGE

- In Phase I, reducing envelope air leakage rate was identified as an area for improvement; this became a focus of Phase II education and training activities.
- Minimum observed envelope air leakage rate increased from 0.51 ACH50 in Phase I to 1.85 ACH50 in Phase III; the average improved from 5.6 ACH50 to 4.1 ACH50, meeting the state requirement of 7 ACH50.
- Compliance improved from 70% to 97%; this suggests that Phase II activities were successful.

DUCT LEAKAGE

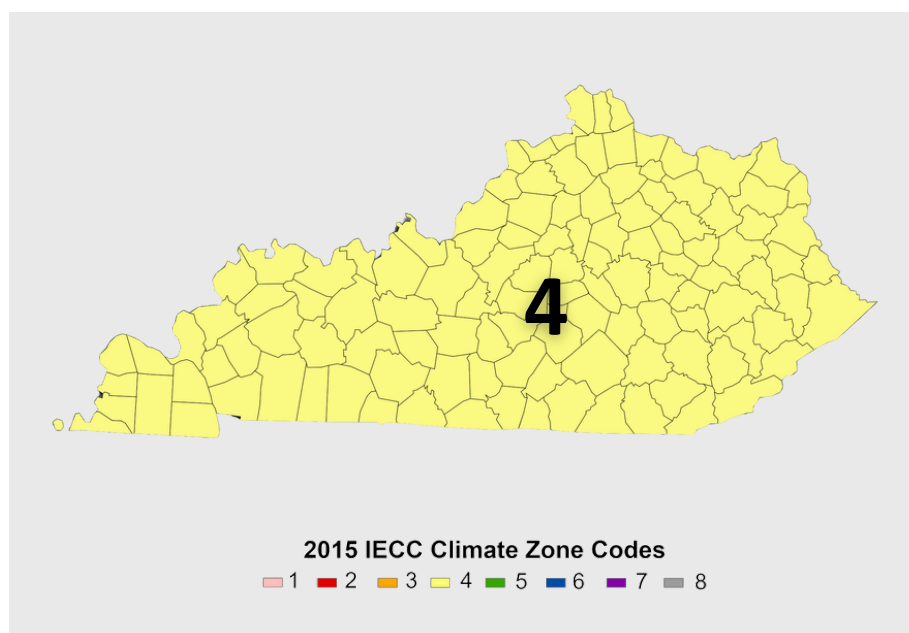
- Reducing duct leakage was a key focus of Phase II education and training activities.
- Duct leakage compliance improved in Phase III; however, average duct leakage increased in Phase III leading to increased measure-level savings potential and energy use intensity (EUI).
- Overall compliance increased as more ducts were installed within conditioned spaces; however, compliance for ducts located outside conditioned space decreased.

WALL INSULATION

- Nearly every home in both Phase I and Phase III complied with the code R-value (99%), with the majority using R-13 cavity insulation.
- Despite Phase II education and training efforts, insulation installation quality (IIQ) remains a concern; U-Factor compliance improved slightly from 28% in Phase I to 38% in Phase III leaving significant energy savings potential.

FOUNDATION & FOUNDATION INSULATION

- Basements:
 - In Phase I, none of the basement walls with continuous insulation met the requirement (12 observations); the majority of the walls with cavity or combined cavity and continuous insulation did comply (34 observations), indicating insufficient thickness of continuous insulation.
 - Eighty-two percent (82%) of observations did not meet the U-Factor requirement in Phase I; this was primarily due to R-13 cavity insulation paired with Grade II or III installation quality, highlighting IIQ issues.
 - In Phase III, the overall compliance improved significantly (59%) , but the average basement wall U-Factor worsened; remaining challenges include an increase in uninsulated walls and continued challenges with IIQ.
- Floors:
 - For under floor insulation, both R-value and U-Factor compliance rates decreased from Phase I to Phase III.
 - In Phase I, nearly all homes met the R-value requirement, while in Phase III nearly ½ did not, including several homes with no insulation.
 - In Phase III, cavity insulation compliance declined and the average U-Factor increased from 0.05 in Phase I to 0.13 in Phase III; this indicates a deterioration in floor insulation performance.
- Slabs:
 - In Phase I, 80% of slab edge insulation observations did not comply; this included several cases with no slab insulation present. Slab insulation was a focus of Phase II education and training.
 - In Phase III, average slab insulation levels decreased and the compliance rate was cut in half to 10%, indicating that slab insulation remains a significant challenge and savings opportunity.
- Crawlspace Walls:
 - The study collected data on 4 homes with crawlspace wall insulation in Phase I and 8 homes in Phase III. Within these data sets, continuous insulation was the prevalent insulation type.
 - In Phase I, 50% of the observations complied with R-value code requirements; this decreased to 38% in Phase III. The ranges are large in both Phases, leading to a focus on general trends rather than savings values.



For additional information, please contact fieldstudy@seealliance.org

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