

Efficiency Kansas Qualified Energy Auditor Training

To ensure that energy auditors are receiving a comprehensive training, and are able to perform audits effectively upon completing training, the following curriculum is required to be addressed in training. Institutions wishing to be considered Qualified Efficiency Kansas Training Facilities should submit their curriculum to the Kansas Energy Office and identify how these requirements are met through their curriculum.

The Energy Office believes that training should include significant hands-on opportunities for each student with the equipment, and in the field. Students should be prepared upon leaving the course to enter into a home and perform an energy audit according to the Efficiency Kansas Program Manual.

Any questions about the requirements should be directed to Trayce Heidner at t.heidner@kcc.ks.gov, or 785-271-3329. To be considered as a training institution, curriculum should be submitted to Trayce Heidner at the above email address, or mailed to:

Trayce Heidner
Kansas Energy Office
1500 SW Arrowhead Road
Topeka, KS 66604

General Requirements

Whole house approach to improve residential type structures

Introduction to residential energy

The purpose of an Energy Audit

Communication with homeowners

Customer Interview questions: Determining the importance of the information received from the homeowner, their lifestyle, and how it impacts their environment.

Educating the average person about energy consumption, usage and efficiency

Principles of energy and assessing energy usage

Definition of Energy

Laws of Thermodynamics

Energy Transformation

Distinguish between climate and comfort

Types of residential energy usage

Identify electrical wiring, circuits and controls

Building construction:

Thermal boundary

Building shell and heat flows

Air leakage pathways

Building inspection and diagnosis

Insulation and Heat Transmission:

- Insulation Identification
 - Material identification and characteristics
 - R-values of various products
- Performance and density values of various insulation types
- Retrofit applications for insulation
- Thermal breaks
- Vapor barriers
- Air barriers

Window and Door construction:

- Evaluation of construction and characteristics of windows and doors
- Retro-fit window repairs
- When to replace a window and replacement process

Air-leakage and insulation characteristics:

- Identifying air-leakage points at exterior and interior of building
- Identifying air sealing methods and materials (Retrofit)
- Air sealing techniques and principles (Retrofit)
- Blower Door testing
- Introduction to Duct Blaster testing

Residential Mechanical Equipment:

- Types of systems available (Heat, Cool, Water)
- Describing air movement of heating and cooling systems
 - Ducting systems
 - Retrofit duct sealing practices
 - {Efficiency Kansas Duct system improvement requirements}
- Heating and cooling principles
- Heating and cooling controls
- Efficiency of units (Types and measuring efficiency)
- Heat loads
- Cooling loads
- Combustion safety
- Safety controls (and how to test safety controls)
- Draft
 - Building Performance Institute (BPI) Combustion testing standards
 - Standards for safe chimneys (NFPA)
- Water storage vs. on demand water systems
- Efficiency of water heating
- Maintenance and operation of water heaters
- Standby losses and how to prevent them

Health and Safety- identification and precautions

- Indoor air quality
 - Factors that impact IAQ

Moisture identification and management techniques
Mechanical ventilation
Humidifiers and Dehumidifiers
Pollutant controls
Retrofit applications for moisture and pollutant controls
Hazards of heating with unvented combustion fuel space heaters

Residential lighting and Appliances:

Lighting & illumination principles
Identify various types of lighting and efficiencies
Identify various types of appliances and efficiencies
Retrofit upgrades for residential systems

Introduction to business skills:

Listening skills
Communication skills to convey audit procedures and results
Performance home contracting options
Building a business model
Basic computer skills (using Word, Excel, REM Design/REM Rate, etc...)

In Field Analysis of residential structures:

Real world analysis of existing structures
Testing students on data gathering and analysis of existing residential structures
Use of REM Design/ REM Rate software to model existing home and recommended improvement measures

Recommended Textbook: Residential Energy Cost Savings and Comfort for existing buildings
John Krigger, Chris Dorsi

Recommended additional training resource books:

Efficiency Kansas Program Manual
Efficiency Kansas Material & Installation manual

Using measuring devices accurately

Ability to take measurements and work calculations for:

Square footage, volume, air-tightness limits
Solve problems using geometric formulas
Interpreting and using construction drawings for analysis of energy features and energy usage.

Understanding equipment measuring devices such as:

Manometers: Using DG700 and other pressure test gauges; understanding house pressure, fan pressure and flow rates. Room by Room pressure analysis,

Measuring levels and volumes when using Draft gauges, gas leak detectors and a variety of other testing equipment used during an audit process

Basic Drawing skills needed

Ability to draw plan views, building features and elevations of buildings

Basic digital photography skills needed

Photographing building components for identification of work locations

Photographing elevations and features of buildings

Specific Building Science education: A Systems Approach

The house system

Envelope, mechanical systems & occupants

The system is linked together by flows of heat, air moisture (Energy Flows).

Understanding how a change in one, changes another

Heat Flow methods

Air flow methods

Moisture flow methods

Indoor Air Quality Control

Building Tightness Limits

Blower Door Test Measurements:

The 50 Pascal Airflow Rate (CFM₅₀)

The 50 Pascal Air Change Rate (ACH₅₀)

Natural Air Change Rate (ACH_n or NACH)

Approximate Leakage Area

Building inspection:

Understanding and evaluation of solar exposure / shading features

Water shedding functions of the property

Roof observation

Defining thermal boundary

Assessment of building envelope: Exterior

Identify features, penetrations, conditions of structure, air-sealing opportunities

Writing contractor specifications

Assessment of building envelope: Interior

Identify features penetrations, conditions, air-sealing opportunities

Understanding and identifying opportunity for improvements for retrofit

Writing contractor specifications

Mechanical systems identification and testing -BPI- Requirement

Equipment performance referencing and testing

Orphaned water heaters

Venting requirements

Worst case Combustion Appliance Zone testing (BPI standards)

Moisture Control

Identifying hazardous conditions

Blower door/ Air-tightness testing
Testing- in / Testing- out

Application of Section 106 of the National Historic Preservation Act in EK
Davis Bacon Compliance for small business and commercial properties

Cost effectiveness of recommended Improvements
Utility usage and rate structures
Fuel switching