



Objectives

Course Title: Energy – Cost of energy and measuring heat loss

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Below are the learning objectives for this course. Each objective outlines the specific, measurable outcomes that learners are expected to achieve upon completion of the relevant module or section.

- **Energy 1.1:** The objective of this module is to introduce Minnesota contractors to the fundamentals of energy efficiency in residential construction. It covers how a house functions as a system, the importance of preventing energy loss, managing moisture, understanding energy costs, and identifying practical ways to improve a home's energy performance. The goal is to help contractors make informed decisions that enhance both energy savings and building durability.
- **Energy 1.2:** The objective of this module is to help learners understand how energy is measured and compared across different fuel sources, using the British Thermal Unit (BTU) as a standard. It explains the energy content and cost-effectiveness of fuels such as fuel oil, natural gas, electricity, propane, and wood. The module also introduces the three main methods of

heat transfer—conduction, convection, and radiation—and demonstrates how to calculate heat loss in a building, including the impact of air leakage. By the end, learners should be able to assess fuel choices and identify ways to improve building energy efficiency, with a particular emphasis on the importance of sealing air leaks for maximum cost savings.

- **Energy 1.3:** The objective of this module is to explain the building envelope and its role in energy efficiency. This module, “Energy 1.3,” aims to help learners understand the concept of the building envelope—what it is, how it separates indoor and outdoor environments, and why its proper design is crucial for controlling heat, air, and moisture flow. The lesson emphasizes the importance of aligning thermal and pressure boundaries to prevent energy loss and moisture problems, discusses common issues in residential construction, and introduces the role of mechanical ventilation in maintaining healthy, energy-efficient homes. The overall goal is to provide foundational knowledge for making informed decisions about insulation, air sealing, and ventilation in building design and retrofits.

- **Energy 1.4:** The objective of this module is to explain the importance of thermal and pressure boundaries in residential energy efficiency. This module aims to help learners understand how the thermal boundary in a home restricts or slows the flow of heat, separating conditioned from unconditioned spaces. It highlights the impact of insulation gaps, air leakage, and poorly sealed ductwork on energy loss and comfort. The lesson emphasizes the need for proper air sealing and insulation placement to reduce energy waste, prevent moisture problems, and ensure a more efficient, comfortable, and durable home. By the end, students should recognize key areas of weakness in building envelopes and the critical role of air sealing in energy-efficient construction.

- **Energy 1.5:** The objective of this module is to teach how to evaluate and improve home energy efficiency. This module guides learners through the process of conducting a home energy evaluation, focusing on practical steps to identify and address energy inefficiencies. It emphasizes understanding a homeowner's concerns, reviewing utility bills, and performing a thorough inspection of the home's structure, appliances, and systems. The goal is to equip participants with the knowledge to recommend cost-effective improvements, prioritize upgrades, and ultimately help clients reduce energy costs and increase comfort in their homes.
