OAK RIDGE National Laboratory

Final Deliverable:

E2C Expert Match Tama County, IA

Microlearning modules on residential energy efficiency- Module 6

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U.S. DEPARTMENT of ENERGY

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E2C: Technical Assistance Opportunities

EXPERT MATCH

E2C's Expert Match program connects energy experts with local governments, electric utilities, and community-based organizations to provide technical assistance to inform near-term energy decisions.

Expert Match offers:

- **Access to experts from the U.S. Department of Energy's national lab system.**
- **40–60 hours of support over 3 months from the first kickoff call.**
- **Focus on community-driven challenges or goals.**

For more information, visit:
www.nrel.gov/e2c/expertmatch

Scope

ORNL will develop a set of short microlearning modules to help Montour (Tama County) homeowners better understand and manage household energy use. The work focuses on creating clear, practical, and accessible content that guides residents toward cost-effective improvements and available incentives. Activities in this work may include:

- **Content Development:**
  ORNL will prepare seven (agreed upon) modules using plain language, relatable examples, and simple step-by-step guidance covering topics on home energy efficiency improvements.
- **Learning Management System on Website:**
  ORNL will use a simple WordPress website of learning management system (LMS) to support hosting the above modules and providing instructions for future updates.

Points of Contact

Community POC
Kent Scheid, CEDI-Tama County

Subject Matter Expert
Archana Ghodeswar, ORNL

E2C Team
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Microlearning modules on residential energy efficiency

Module 6. Health Benefits of Energy Efficiency Measures

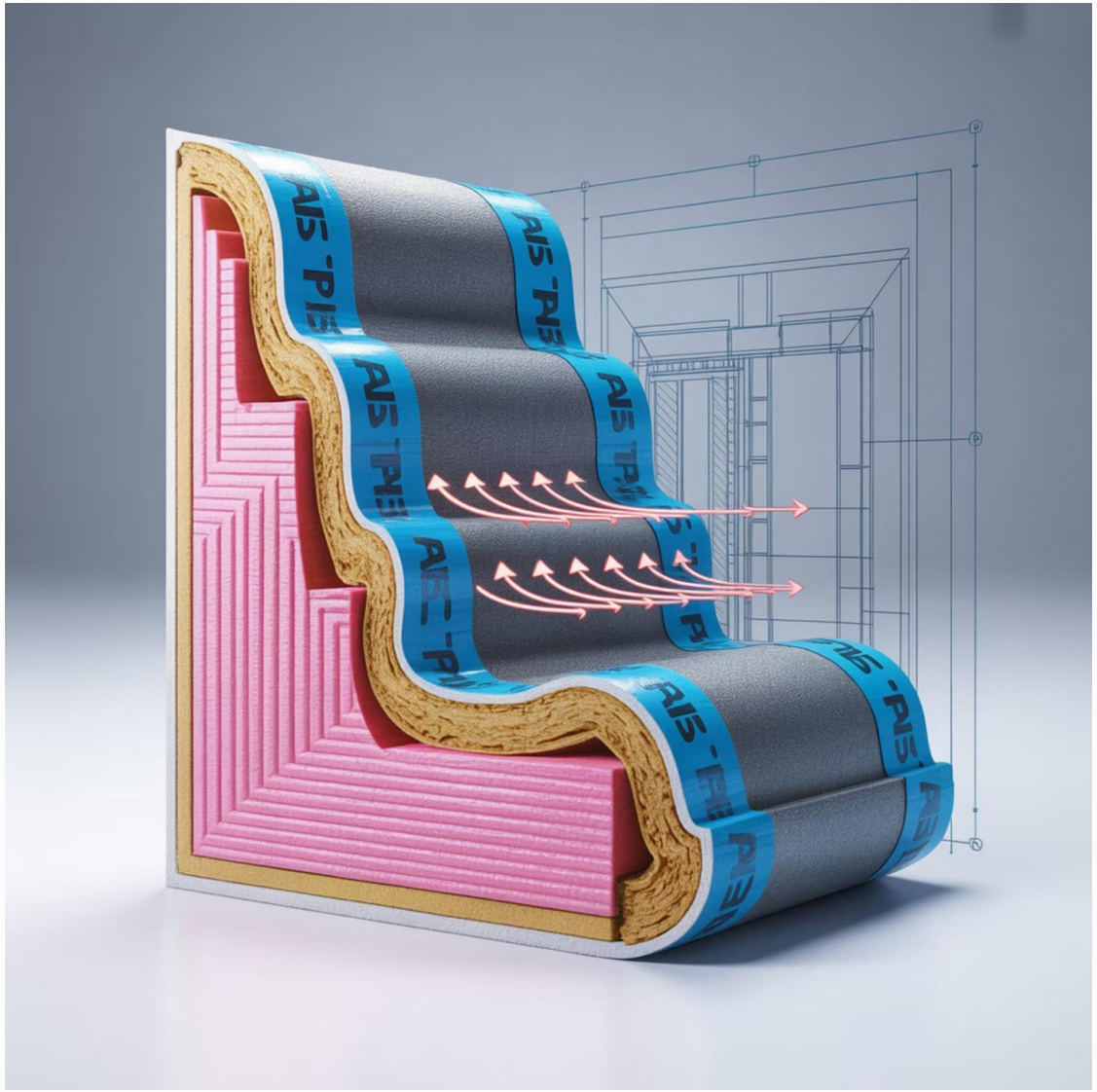
Energy efficiency measures not only reduce energy consumption and costs but also provide significant health benefits for occupants. The following slides explore how proper insulation, air sealing, and ventilation systems can improve indoor air quality while preventing exposure to harmful pollutants.

*All the pictures in this presentation slides are generated through various AI tools and are added here for illustrative purpose. The pictures do not represent technical accuracy.

Indoor Air Quality and Efficiency

Indoor air quality is directly linked to the efficiency measures implemented in buildings. Proper insulation, air sealing, and ventilation work together to create healthier indoor environments.

These measures provide co-benefits that extend beyond energy savings, directly impacting the health and wellbeing of occupants.



Illustrative picture showing section of insulations for air sealing

The Co-Benefits of Energy Efficiency

Insulation Benefits

Temperature Regulation

Proper insulation maintains consistent indoor temperatures, reducing thermal stress on occupants and creating more comfortable living environments.

Noise Reduction

Quality insulation acts as a sound barrier, reducing external noise pollution which can impact sleep quality and overall wellbeing.

Moisture Control

Effective insulation helps prevent condensation within walls and ceilings, reducing the risk of mould growth and related health issues.

Air Sealing Benefits

Prevents Infiltration

Air sealing blocks uncontrolled air leakage, preventing outdoor pollutants, allergens, and pests from entering the home.

Improves Efficiency

Properly sealed homes require less energy for heating and cooling, reducing the combustion byproducts associated with heating systems.

Enables Controlled Ventilation

Air sealing allows for planned, controlled ventilation rather than random air exchange, ensuring fresh air without energy waste.

Ventilation Benefits

Proper ventilation is crucial for maintaining healthy indoor air quality in energy-efficient, well-sealed homes.

- Removes excess moisture, preventing mould growth
- Dilutes indoor pollutants and contaminants
- Introduces fresh, filtered air into the living space
- Reduces concentration of volatile organic compounds (VOCs)
- Helps maintain appropriate humidity levels

Avoiding Mould and Radon

Mould Prevention

Energy efficiency measures that control moisture (such as proper insulation, air sealing, and ventilation) reduce the risk of mould growth in homes.

Mould exposure can cause respiratory issues, allergic reactions, and exacerbate asthma symptoms

Radon Mitigation

Radon is a potential cause of cancer that can enter homes through foundation cracks and openings.

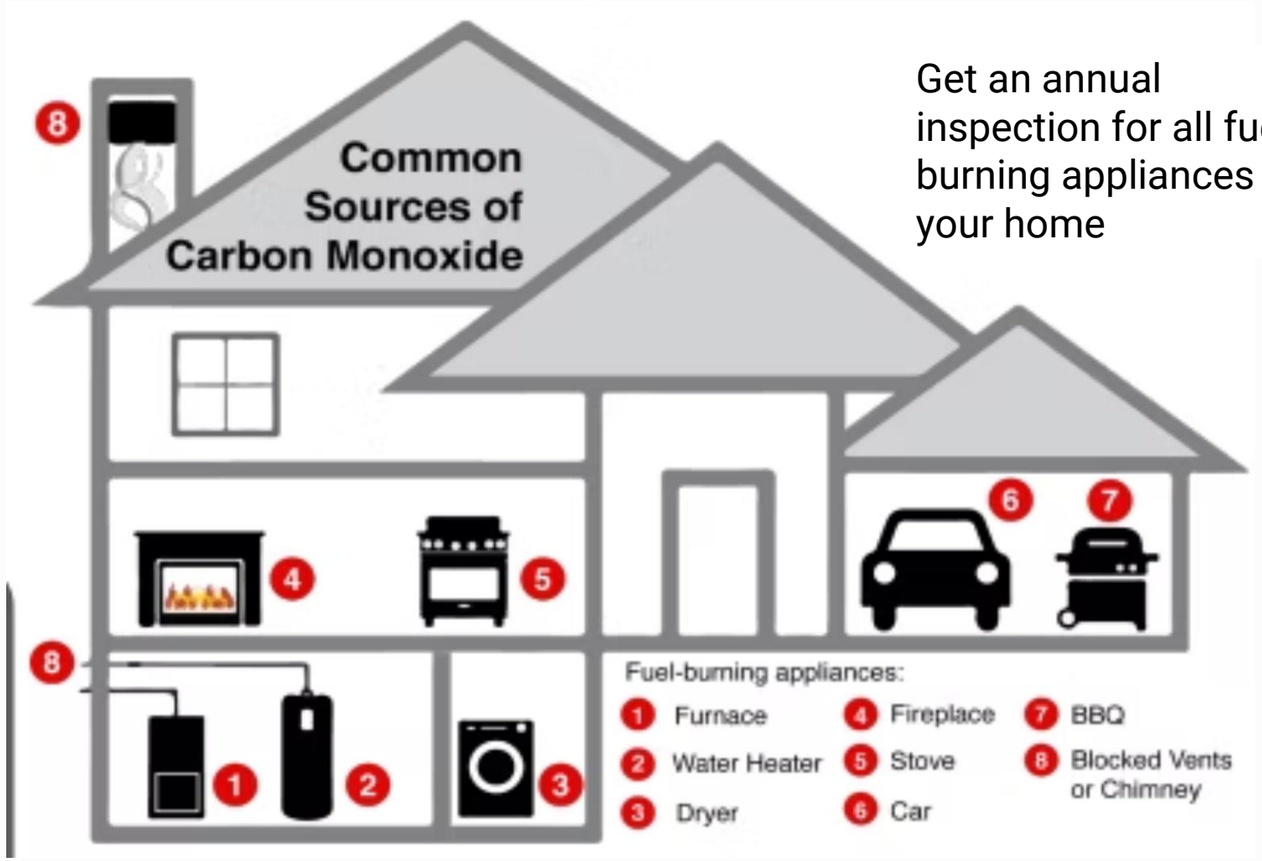
Proper air sealing combined with specific radon mitigation systems can significantly reduce radon concentrations in indoor air.

The average cost to lower radon levels in a home is approximately $1200*

*Reference for more reading- https://sosradon.org/Mitigation-basics?utm

Carbon Monoxide Hazards

Carbon monoxide (CO) is a colorless, odorless, tasteless gas produced when fuels (natural gas, wood, propane, charcoal, gasoline) burn incompletely.



Get an annual inspection for all fuel-burning appliances in your home

Use a Carbon Monoxide detector that follows UL2034 standards for CO alarm

Carbon Monoxide Prevention by Regular Maintenance

Fuel-burning appliances: Have them inspected annually by certified technicians.

Ventilation: Keep chimneys, flues, and vents clear

Never run cars, generators, or grills in garages or enclosed spaces.

Replace alarm batteries twice a year and follow manufacturer replacement dates (typ. every 5–7 years).

Preventing Asthma Triggers and Indoor Pollutants

Asthma Triggers

Efficient ventilation and air filtration systems reduce common asthma triggers such as dust mites, pet dander, and pollen, creating healthier environments for asthma sufferers.

Carbon Monoxide (CO)

Proper ventilation and regular maintenance of combustion appliances help prevent dangerous CO buildup, which can cause headaches, dizziness, and even death.

Vermiculite & Asbestos

Energy retrofits provide opportunities to identify and safely remediate older insulation materials that may contain asbestos, such as vermiculite.

Lead

Window replacements and other efficiency upgrades can reduce exposure to lead dust from old paint, particularly in homes built before 1978.

Comprehensive Approach to Healthy, Efficient Homes

Energy efficiency measures and indoor air quality improvements should be approached holistically for maximum health benefits:

1. ## Assessment

   Conduct comprehensive home assessments to identify both efficiency and health concerns

2. ## Integration

   Implement insulation, air sealing, and ventilation as an integrated system

3. ## Monitoring

   Regularly monitor indoor air quality and system performance

4. ## Maintenance

   Establish ongoing maintenance protocols for ventilation systems and filters

A healthy home is an efficient home