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EC02-459 Heating and Cooling Systems: Saving Energy and Keeping Safe (Home*A*Syst Worksheet 1)

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Home * A * Syst

WORKSHEET 1

Nebraska's System for Assessing the Environment of the Home

Heating and Cooling Systems: Saving Energy and Keeping Safe

Why should I be concerned?

Your house should be a safe, comfortable place that is affordable and durable. A house is affordable only when costs for heating and cooling are reasonable. Energy bills are lowest if a home is tightly air-sealed and properly insulated and if all mechanical systems are operating efficiently. When air-sealing your home for energy efficiency, it is critical to ensure that doing so will not cause air quality or moisture problems.

How will this worksheet help me assess the environment of my home?

- It will take you step-by-step through your current home energy management practices and conditions.
- It will evaluate your activities and conditions according to how they might affect energy use and human health.



- It will provide you with easy to understand "risk level scores" that will help you analyze the relative effectiveness and safety of your energy management practices and conditions.
- It will help you determine which of your practices and conditions are reasonably safe and effective, and which might require modification to better protect you and the environment.

How do I complete the worksheet?

Follow the directions at the top of the chart on page 2. It should take you 15 to 30 minutes to complete this worksheet and determine your risk level.

Heating and Cooling Systems: Saving Energy and Keeping Safe — Assessing the Environment of the Home

1. Use a pencil. You may want to make changes.
2. For each category listed on the left that is appropriate to your residence, read across to the right and circle the statement that best describes conditions and practices at your residence. There may not be a descriptive statement that exactly fits your situation; use your judgement to select the risk level that best applies. (Skip and leave blank any categories that don't apply to your residence.)
3. Then look above the description you circled to find your "risk number" (1, 2, or 3) and enter that number in the blank under "YOUR RISK."
4. Allow 15 to 30 minutes to complete the worksheet and figure out your risk for energy management.

	HIGH RISK (risk 3)	MEDIUM RISK (risk 2)	LOW RISK (risk 1)	YOUR RISK
COMBUSTION HEATING APPLIANCE VENTILATION SAFETY				
Vent system for combustion appliances	Unvented space heaters or gas logs are used. OR Vent pipes are showing signs of damage. OR Rust or carbon is present on top of an appliance or below draft hood.	Vent systems are inspected and serviced annually and show no signs of deterioration. Unvented space heaters or gas logs are not used.	All combustion appliances have sealed-combustion venting systems.	
Condition of chimney or flue	The chimney or flue has not been inspected, or the inspection record is unknown.	The chimney or flue has been inspected only once in the past five years.	The chimney or flue is inspected annually.	
Air for combustion (does not apply to sealed-combustion appliances)	Combustion equipment is in a small space (for example, a closet) and openings are blocked.	Combustion equipment is in a well-sealed basement. (This is a higher risk if an exhaust vent, such as from a clothes dryer, is in the same space.)	Combustion equipment is in a well-ventilated space such as a basement with adequate combustion air supplied	
Air for combustion, people and other living things.	Combustion appliances and no method of planned fresh air for people, combustion, etc.	Combustion appliances present with some fresh air leaks into the home but not managed.	Combustion appliances and Energy Recovery Ventilator or Heat Recovery Ventilator present to bring in fresh air.	
Carbon Monoxide (CO) alarm in home.	No CO alarm and no regular combustion appliance service and maintenance	One CO alarm and occasional combustion appliance service and maintenance.	Regular combustion appliance service and maintenance and several CO alarms located throughout the home.	



	HIGH RISK (risk 3)	MEDIUM RISK (risk 2)	LOW RISK (risk 1)	YOUR RISK
ENERGY COSTS				
Average monthly energy bill.	Average monthly energy bill is higher than the average for energy efficient houses with a similar design to yours.	Average monthly energy bill is equal to the average for energy efficient houses with a similar design to yours.	Average monthly energy bill is lower than the average for energy efficient houses with a similar design to yours.	
IMPROVING HEATING AND COOLING SYSTEMS				
Age of heating/cooling equipment	Equipment is older than 15 years.	Equipment is five to 15 years old.	Equipment is less than 5 years old	
Maintenance of heating/cooling equipment	Filters are not cleaned or changed or are rarely cleaned or changed, and the system is not maintained.	Filters are cleaned or changed occasionally but not according to manufacturers' recommendations, and the system is maintained on an irregular basis.	Filters are cleaned or changed as required during use, and equipment is serviced at least every year.	
Air-temperature thermostat	An older thermostat is in use. It is set to maintain a constant temperature.	A newer thermostat is installed, but it is not used to regulate temperatures at night or when the house is empty.	A newer thermostat with variable temperature set-back is installed. It is routinely used to minimize energy consumption.	
Duct location	All duct work is located in unheated space.	Some duct work is located in unheated space.	All duct work is located in heated/cooled space.	
Ductwork in unheated space (if applicable)	There is no insulation on ducts.	Some ductwork in unheated space is insulated.	All ductwork in unheated space is insulated.	
Return duct	There is one "central" air return. Bedroom doors are shut at night, and there is little space between the bottom of the doors and the floor.	There is one "central" air return. Bedroom doors are shut at night but there is a 2-inch or greater space under the doors.	There are air-return ducts in every room, or bedroom doors are left open.	
Air-sealing ducts and registers	Gaps are visible in the duct system or around room air registers. Tape and mastic are not used	There are no visible gaps in the duct system. Duct tape is used. Mastic is not used.	Seams in duct system are sealed with mastic and quality foil duct tape, including where registers enter rooms.	



	HIGH RISK (risk 3)	MEDIUM RISK (risk 2)	LOW RISK (risk 1)	YOUR RISK
Air intake or air handler	The air intake/handler is located in a garage*	The intake/handler is located in unheated space such as a crawl space or attic.	The intake/handler is located in a heated space.	

*SAFETY NOTE: If your air handler is in your garage, NEVER leave your car running in the garage. The air handler can pick up car exhaust fumes and distribute them to the house through the duct system.

Efficiency of heating/ cooling equipment	The energy guide or other label indicates a lower efficiency rating.	The energy guide label indicates moderate efficiency.	The energy guide label indicates high efficiency, or the equipment has the Energy Star® label.	
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PREVENTING LOSS OF HEATED OR COOLED AIR

Attic	Most potential leak points are not sealed.	Some potential leak points are sealed.	All potential leak points are sealed.	
Windows and doors	Windows are older and not sealed. Storm windows are absent.	Some windows and doors are caulked and weather-stripped. Older or leaky storm windows are used. Some windows are sealed in winter with plastic sheets.	All windows and doors are sealed with caulk and weather-stripping, and tested for leaks. Newer, well-sealed, double-paned windows are installed.	
Basement or crawl space	No sealing has been attempted.	Leaks have been detected but are not fully sealed.	Sill plates, service entrances, windows, and wall cracks are sealed with caulk, foam, or gaskets.	
Attic insulation	Insulation is well below the level recommended for the region OR attic not insulated.	Insulation is present, but is below the recommended amount for the region OR has settled, moved, or has been damaged by moisture.	Insulation is equal to or greater than levels recommended for the region.	
Insulation in walls above ground	There is no insulation in wall cavities.	Insulation is present, but is below the recommended amount for the region OR has settled, has been disturbed by remodeling, or has been damaged by moisture.	Wall cavities are insulated equal to or greater than levels recommended for the region.	



	HIGH RISK (risk 3)	MEDIUM RISK (risk 2)	LOW RISK (risk 1)	YOUR RISK
Insulation in walls in heated basements	Walls are not insulated.	Insulation is present, but is below the recommended amount for the region OR has settled, has been disturbed by remodeling, or has been damaged by moisture.	Walls are insulated equal to or greater than levels recommended for the region.	
Foundation in crawl spaces, slab on grade, or unheated basements	Not insulated.	Insulation is present, but is below the recommended amount for the region OR has settled, has been disturbed by remodeling, or has been damaged by moisture.	Insulated equal to or greater than levels recommended for the region.	

INCREASING EFFICIENCY OF DOMESTIC HOT WATER SYSTEMS

Thermostat setting	Thermostat is set at 140 degrees F. or higher.	Thermostat is set at 130 degrees F.	Thermostat is set at 120 degrees F. OR a programmable thermostat is used to raise and lower the water temperature as needed.	
Insulation	An older water heater with no added blanket is in use.	An older water heater with some insulation is in use.	A new, high efficiency water heater is in use OR an older water heater with an insulation blanket is in use.	
Water conservation	There are leaking faucets, and no low-flow fixtures are installed.	There are no leaking faucets. Some effort is made to minimize hot water use.	There are no leaking faucets. Low-flow shower heads and aerators on faucets are installed. Efforts are made to conserve hot water.	
Pipe insulation	There is no pipe insulation.	Some accessible hot water pipes are insulated.	All accessible hot water pipes are insulated.	
Water level and temperature settings (clothes washers, dish washers, etc)	Highest water level is used OR appliances temperature settings are adjusted for the highest energy demand.	Amount of water used and temperature settings are sometimes adjusted for the load size and soil to be removed.	Amount of water used and temperature settings are routinely adjusted for the load size and soil to be removed or newer water conserving front-loading washer or water efficient top loader is used.	

<p>Technical reviews were provided by:</p> <p><i>This publication is based on Home*A*Syst: An Environmental Risk-Assessment Guide for the Home developed by the National Farm*A*Syst/Home*A*Syst Program in cooperation with NRAES, the Northeast Regional Agricultural Engineering Service; chapter 10, Heating and Cooling Systems: Saving Energy and Keeping Safe, written by Lori S. Marsh, Associate Professor and Extension Engineer, Department of Biological Systems</i></p>	<p><i>Engineering, Virginia Polytechnic Institute and State University. Permission to use these materials was granted by the National Farm*A*Syst/Home*A*Syst Office.</i></p> <p><i>This project was coordinated by Shirley Niemeyer at the Department of Textiles, Clothing, and Design, and Sharon Skipton, Cooperative Extension Division, Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln. Team members included Community and Residential Environment Action Team Healthy Homes Work Group</i></p>	<p><i>members Lorene Bartos, Extension Educator; George Haws, Extension Assistant; Shirley Niemeyer, Extension Specialist; Sharon Skipton, Extension Educator; Rebecca Versch, Extension Educator; and Carroll Welte, Extension Educator. Acknowledgments: Bruce Hauschild, PE, Technical Advisor, NE Energy Office; Lori Marsh, Extension Engineer, Virginia Polytechnic Institute and State University.</i></p> <p><i>Printed on recycled paper.</i></p>
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NOTES

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