Energy Related Repair (ERR) Program

• Provides emergency repair or replacement of heating systems for Energy Assistance clients

• Runs October 1 – May 31

• To qualify:
  – Must be approved for Energy Assistance
  – Own home
  – Have a non-functioning heating system
Different from LIHEAP & WAP

• Low Income Home Energy Assistance Program (LIHEAP)
  – Helps homeowners and renters with payment of home heating costs
  – Grant is based on household size, income, fuel type and energy usage
  – Federally funded

• Weatherization Assistance Program (WAP)
  – Helps income-qualified households permanently reduce their energy bills by making homes more energy efficient
  – Services include: Energy audits, insulation, sealing, replacing mechanical systems, occupant education
  – Federally funded
Happy Customers
Easy Questions First

• Is the gas or fuel oil turned on?
  – ON/Off valve closed

• Is there ice or snow covering the chimney exhaust or intake?
Ask if there is fuel in the tank.
One & Two Pipe
Snow can cover the exhaust PVC

Source: Star Tribune 12/12/2010
Frost & Snow Build up
Basic HVAC System
Thermostat Check

1. Is the system selector switch in the "HEAT" and “ON” position?

2. If your thermostat is electronic, are the batteries working? Is the display showing?

3. Listen to the furnace fan. If you cannot hear the fan, check if any air is coming out of the ducts. If the fan is not running, there may be no power to the furnace.
Thermostat
New and Old Set Back Types
MH Type
If the thermostat is set properly, next step is to check to see that there is power to the furnace.

- ELECTRICAL CHECK – Furnace Switch
Emergency Switch

• Emergency shut-off switch for the furnace. Locate it and make sure it is turned on. In most homes the emergency shut-off switch looks just like a regular light switch and will be located on the side or close to the furnace.
In Mobile Homes

• In mobile homes the switch is behind the removable cover and in front of the blower motor.
MH Switches
Emergency Cabinet Switch

• Some heating systems also have emergency cut-out switches that are activated when a door or service panel is removed.

• Check to make sure all access doors are properly secured and fitted.
Cabinet Switches are Behind a Cover
Inducer Motor
Draft Problems

Inducer and Sensor

Inducer
What to Check Next

• It is quite common for this switch to be turned off accidentally.

• If the switch is ON, but the fan still doesn't operate, proceed to the ELECTRICAL PANEL CHECK.
Circuit Breakers
Fuses
Fuse Types
Switches on Mobile Home Furnace
90%+ MH Furnace
Mobile Home Furnace Gas 80%
Bad Chimney

Bad chimney no liner

High smoke from burner
Chimney Problems

Wall hanging chimney

Cracked
Problems

Animals

Iced up
Chimney
Types

B vent

MH
Mobile Home Chimney
Entire Mobile Home System
Double Wide MH Ducts

Typical Air Leakage Locations

- Furnace Connection
- Duct Termination
- Crossover Duct
- Branch Duct
- Register Boot
Needs to be Included on an Installation
MH Duct in Factory
Electric Furnace Element
Electric Furnace Diagram
Plenum Electric Heater
Electric Baseboard Thermostats
Electric Baseboard
Clearance and Safety

**Outlets should not be above electric baseboard heaters**

cords plugged into outlets above electric baseboard heaters could overheat if accidentally draped over the heater
outlets should be located at either end of the heater

[Diagram of outlets and baseboard heater]

[Image of a damaged baseboard heater]
Radiator Key
Radiators
Boilers
Boilers
Gas Valves
Check Breakers or Fuses

- Locate the breaker or fuses in your home's main electrical panel for the furnace.
- Make sure the breakers are not tripped and the fuses are not blown.
- If a breaker has been tripped it will be in a position that is between ON and OFF. Reset the breaker (turn all the way OFF, then back ON).
- If the fuse is blown, replace it with the SAME SIZE AND TYPE of fuse.
Breaker Continued

- **WARNING:** If a breaker keeps tripping or a fuse keeps blowing, you should contact a qualified service technician to inspect your system to determine why you are having problems.
Ignition Check

• If your heating system seems to be operating, but is not producing any heat, the furnace may not actually be firing.
If this is the case, check the following:

- Do you have fuel? If your unit is oil or propane fired, check the level of fuel in the tanks.
- If you ran out of fuel and got more fuel, and now your furnace will not start, your furnace may have to be reset.
Resetting Some Systems

• Some systems have a red reset button on the burner. These systems can be reset with this button.

• Other systems can be reset by turning system power off then back on.

• If the furnace is oil-fired, the fuel pump may need to be primed.

• After a fill of fuel let the system’s oil tank settle.
Reset Button Oil
Oil Burner Keeps Tripping the Reset Button

• If your oil burner stops running, the first thing you should check is the reset button.
• If you press it and the burner fires up, then that was the problem.
• If the button trips again, then there is a definite problem.
• Do not keep resetting the button and ignoring the problem. Fuel is sent in the fire pot every time.
Puff Backs
Pedestal Type Burner

Figure 1-3  Gun-type oil burner firing into furnace combustion chamber. (Courtesy U.S. Department of Agriculture)
MH Oil Furnace

- Flue
- Heat Exchanger
- Combustion Air
- Blower
- Burner
What the Red Button Does

• It is a safety device.
• It shuts the burner down when it thinks there is a problem.
• It is on the primary control and is hooked up to a cad cell -- a light sensor (Like an outside light that turns off and on at dusk/dawn).
Why There is a Problem with Starting the Burner

- Bad or dirty cad cell
- Faulty primary control
- Bad or weak ignition transformer
- Bad burner motor
- Bad fuel pump
- Blocked oil filter, strainer or nozzle
Filter Pump & Oil Lines
Cracked Electrodes
Nozzles Can Cause High Smoke
Electrode Alignment
Oil Nozzle in Burner
Burner Flame
Where the Air Line is Bled
Oil Pump on Burner
Bleeder Valve
Bleeding the Pump
Problems with Furnaces

- Burner running with a very high smoke, can be seen from outside the home.
- Burner sooted up
- Loose electrical connections
- Damaged flexible coupling
- Water in oil tank, sediment from running dry.
- Chimney blocked -- Have it cleaned
Gas Furnace/Space Heater with a Standing Pilot

• If you have a standing pilot (one that is on all the time), look inside your furnace to see if it is on.

• If it is not on, follow the instructions on the furnace to re-light the pilot.

• If the pilot will not light or stay lighted, this may be a bad thermocouple.
Mechanical Problems

- Broken or extremely loose fan belt.
- Bound or tight blower motor (large motor) -- With power OFF, try to turn blower shaft (should spin freely).
- Bound gas inducer motor (small motor) -- If the furnace isn't working but the inducer is very hot, it could be stuck. Also makes a grinding noise before it stops working.
- Broken gas ignitor (looks like a spark plug).
Ribbon Burners
Burners Lighting Up
Ignitor and Sensor Location
MH Ignitor
Why High Electric Bills?

• Check the obvious things first.
• Open window for example. This is for the most part a winter-time heating complaint.
• Stuff placed in front of radiators or register.
• Register closed.
Duct Problems & Heat Bills

Branch duct leakage

Large holes

Photo courtesy of MN Wright
Bad Ducts Cause High Heat Bills
Dirty Blower
High Heat Bill Continued

• Many things can cause high electric bills
• A mistake on the electric bill
• A poorly insulated home
• Open windows, not latched windows
• Inefficient appliances like electric water heaters, refrigerators and freezers
• Trying to heat areas that are not living areas
• Not knowing how to conserve energy
Old Boiler
Old Boiler with Oil Retrofit
MH Gas Burner
Cracked Heat Exchanger
Another Cracked Heat Exchanger
Forced Air Blowers
Space Heaters
Problems with Portable Space Heaters

They said a space heater would save me money.
Space Heaters

[Images of space heaters]
Vented and Non-vented Heaters
Clearances Needed
Portable Space Heater

PLUGGED INTO WALL, NOT AN EXTENSION CORD

ZONE KEPT CLEAR
Water Heaters
Leaning WH Tank

A tank that got away!
WH Leak

[Image of a water heater with a leak at the base, causing water to spill on the floor]
Leaking WH
Oil WH
WH Leaks – Do not Stand in Water
WH Elements Location

![Diagram of a water heater with labeled parts: Upper Heating Element, Thermostat (typical), Insulation (typical), Cover (typical), Lower Heating Element, and Thermostat Cover (typical).]

![Image of a voltage sensor indicating a red glow, with a note: Voltage sensor. Red glow indicates the wire is HOT, don't touch it.]

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Electric WH Elements
Anode Rods
Bad Flue

- quick turn at draft hood
- backpitched vent connector
Resources

• Minnesota Department of Commerce
  www.mn.gov/commerce

• What else???
Questions
Thank You!

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