



# Home ENERGY MAKEOVER

## Fergus Falls, Minnesota

**Properly weatherizing your home will save you money.**

***But exactly how much money?***

Otter Tail Power Company decided to tackle that question by awarding seven customers free home energy makeovers. Each home presented different challenges, but the overall goals were the same:

- Make each home more energy efficient through weatherization and updated heating/cooling systems.
- Ensure heating safety.
- Maintain the integrity of each home.

# Here's what happened in Fergus Falls



**Home:** 1930s Tudor

**Owners:** Lance and Angie

**Makeover budget:** \$7,500

**Contractor:** Ed Newman Construction Services, Fergus Falls

## Pinpointing problems

Otter Tail Power Company and Fergus Falls contractor Ed Newman of Ed Newman Construction Services based their work on an energy audit, homeowner consultation, visual inspection, and blower door test. Blower door testing measures air infiltration into a home by depressurizing the home and simulating a strong wind blowing against all its surfaces.

Initial inspections revealed an inefficient heating system with a cracked heat exchanger, which could have caused a direct influx of deadly carbon monoxide into the home's living spaces. Fortunately, the homeowners were able to act quickly to replace the home's heating system.

## Before and after

### Estimated air leakage based on blower door test

**Before** makeover: 3,000 cubic feet per minute (cfm)

**After** makeover: 1,800 – 1,600 cfm

### Annual space-heating and water-heating costs adjusted for weather

**Before** makeover: \$1,294

**After** makeover: \$744

**Total annual savings: \$550**

## FYI: Importance of sealing leaks

- Properly sealing air leaks from living spaces into the attic will slow or prevent warm, moisture-laden air from passing into attic spaces, where moisture can condense on cold surfaces and cause water damage to ceiling and attic structures.
- Sealing attic bypass leaks, in conjunction with sealing leaks at the lower levels of the home, slows the "chimney effect" of cold air entering the home, becoming warmed with costly home heating fuel, and then escaping through leaks into the attic space.
- When warm air escapes through ceilings or walls and warms the roof from underneath, snow on the roof melts and runs down to outside roof edges. Because the roof edge is colder, the water freezes there. Over time this creates an ice dam, which can cause structural damage to the home.

## Insulation

### Problems:

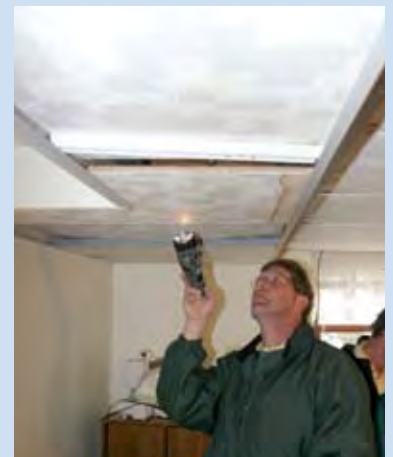
- Attic not insulated to recommended levels.
- Attic access door leaky and not insulated.

### Solutions:

- Brought attic insulation to R-40 with blown cellulose insulation where possible.

The higher the R-Value of a material, the greater its insulating properties and the slower heat flows through it.

- Sealed and insulated attic access door.



## Windows and doors

### Problems:

- Original doors uninsulated and leaky.
- Original windows old and leaky.
- Newer windows not properly installed, causing air leaks.

### Solutions:

- Installed new insulated-core steel entry doors and storm doors.
- Replaced old windows, including those in the basement, with insulated-glass windows.
- Corrected installation problems on previously replaced windows.



### FYI:

On average, the value of a weatherization improvement to your house is 2.2 times greater than the cost of the improvement itself.

— U.S. Department of Energy

## Foundation

### Problem:

- Air leaks around rim joists.

Sealing rim joists keeps warm air from making its way behind insulation, where it can come into contact with the cold rim joist, condense, and cause mold and structural problems.

### Solutions:

- Sealed rim joists with silicone caulk.
- Sprayed rim joists with 2 to 3 inches of urethane foam insulation.

## Water heater

### Problem:

- Old baseline efficiency gas water heater.

### Solutions:

- Replaced water heater with high-efficiency off-peak electric water heater, reducing water-heating expenses by 42 percent.
- Wired water heater to off-peak panel for additional energy-cost savings.



## Heating system

### Problem:

- Old inefficient heating system with cracked heat exchanger.

### Solution:

- Owner installed safer higher-efficiency forced-draft boiler.

A forced-draft boiler reduces the likelihood that a boiler will deplete the home of adequate air supply to continue burning fuel, subsequently drawing air down the chimney flue and back-drafting harmful gases into the home's living space.

## Extra benefits

In addition to saving on heating costs, proper weatherization:

- Increases your property value.
- Extends the life of your home.
- Reduces incidence of fire and enhances overall safety of your home.
- Makes your home more comfortable.
- Shrinks your family's carbon footprint.
- Reduces national energy demand.

Source: Oak Ridge National Laboratory



Home ENERGY  
MAKEOVER  
Winner

**OTTER TAIL**  
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**On**

**for conservation**

For more information about what you can do to make your home more energy efficient, call our **Idea Center** at **800-493-3299** or visit our web site at **[www.otpc.com](http://www.otpc.com)**.



Otter Tail Power Company is headquartered in Fergus Falls, Minnesota. It provides electricity and energy services to nearly a quarter million people in Minnesota, North Dakota, and South Dakota.