



Home ENERGY MAKEOVER

Oakes, North Dakota

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 Oakes

Home: 100 years old, 1½ stories, 1,300 square feet

Owner: Janna

Makeover budget: \$7,500

Contractor: Brandon Swanson Construction, Oakes

Pinpointing problems

Otter Tail Power Company and Oakes contractor Brandon Swanson of Brandon Swanson Construction based their work on an energy audit, visual inspection, homeowner consultation, 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.

Complaints from the homeowner included high energy bills and temperatures upstairs that were extremely hot in summer and cold in winter.

Before and after

Air leakage based on blower door test

Before makeover: 3,250 cubic feet per minute (cfm)

After makeover: 1,600 cfm

Annual heating cost adjusted for weather

Before makeover: \$1,576

After makeover: \$753

Total annual savings: \$823



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

Windows and doors

Problems:

- Old and leaky upstairs windows.
- Leaky newer windows that didn't lock due to improper installation.
- Wood hollow-core entry doors with no insulation and inadequate weather stripping.

Solutions:

- Replaced leaky window assembly in upstairs bedroom; removed and properly installed other leaky windows in the home.
- Replaced both entry doors with insulated steel doors.
- Added storm doors to both entries.



Insulation

Problems:

- Little or no insulation or air sealing in upstairs ceiling and attic. Only four inches of insulation in some places.
- No insulation in the upstairs slant walls or behind knee walls (the short upstairs walls in one-and-a-half story houses).
- No roof ventilation in spots. Without proper ventilation, warm air and moisture can be trapped beneath the roof, creating moisture problems in the attic and ice dams on the roof surface.
- Significant air leaks around furnace flue and attic access doors.



Solutions:

- Added blown cellulose insulation to attic and slant walls.
- Sealed unconditioned spaces between floor joists in attic space behind knee walls with 2-inch extruded polyurethane and sprayed urethane foam insulation.
- Added R-11 insulation to knee walls. The higher the R-Value of a material, the greater its insulating properties and the slower the heat flows through it.
- Added roof ventilation over attic spaces.
- Sealed leaks around furnace flue according to appropriate fire safety methods.
- Insulated and weather-stripped access doors in knee walls.

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.

Foundation

Problem:

- Significant air leakage along rim joists (where house rests on foundation walls). Only barrier to outdoor air was 1½-inch board.

Solution:

- Insulated rim joists and foundation with sprayed urethane foam.



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.

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



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**.



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.