

Energy Conservation Report for  
K-State Research and Extension Douglas County

The Douglas County Extension Office building had energy improvements made to it near the end of 2010.

- A 4.4 kW solar photovoltaic electrical system was installed on the roof, and turned on in January, 2011.
- A pre and post energy audit was done.
- Air leaks in the ceiling were sealed.
- The heating and air-conditioning duct work in the attic were sealed.
- An additional R 29 cellulose insulation was installed in the attic, which raised the attic insulation from an estimated R 19 to an estimated R 48.

The attic work was completed the second week of December.

To determine the benefit of these improvements, the natural gas and electrical bills for 2010 and 2011 for the Extension Office and the Dreher Family 4-H Building were compared. The Dreher Building is basically the same size as the Extension office, had no energy improvements made, and is considered a “check” to compare the Extension office to.

<b>Natural Gas Therms Consumed</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>Change in 2010-2011</b>
Dreher Building	936	936	1112	+ 18.8%
Extension Office	1312	1383	633	-54.2%

The Dreher Building was probably used a few more days in 2011, so the increase was adjusted to a 10% increase in gas used for 2011. With the Dreher Building going up 10% and the Extension office going down 54.2%, there was a savings of \$754 for the Extension office that is attributed to the energy saving work done in the attic. The cost per therm for 2011 was \$0.85.

<b>kWH Electricity Consumed</b>	<b>2010</b>	<b>2011</b>	<b>Change in 2010-2011</b>
Dreher Building	26400	26400	0
Extension Building	48120	35840	-25.5%

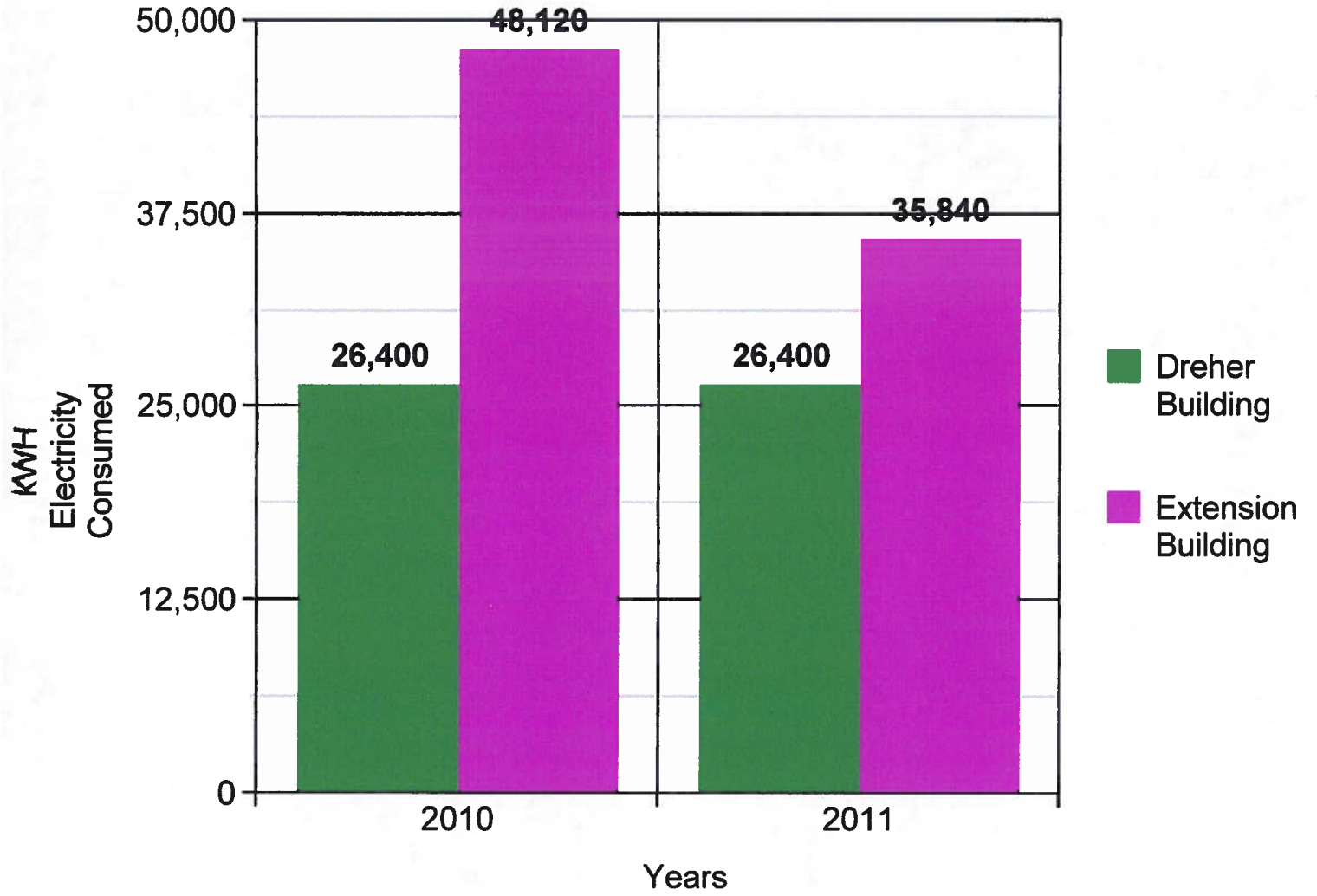
For 2011, the Extension Westar bill was 29840 kWH and our solar panels created 6000 kWH. The electricity cost was \$0.11 kWH, so the savings in electricity from 48120 kWH to 35840 kWH was \$1351. This savings is due to the insulation and sealing work in the attic. The solar photovoltaic system produced 6000 kWH, which was worth \$660.

The total savings that can be attributed to the attic work was  $\$754 + \$1351 = \$2105$   
Savings from the solar system was \$660. The total energy bill saved in 2011 came to \$2765.

The insulation was donated by Central Fiber, located in Wellsville. ReThink Energy of Kansas City did the audit and attic work. Some of the labor was donated. The estimated full cost of the insulation and attic work was \$10,000. The payback for the attic work would be a little over 4 years when an annual inflation rate for utilities is calculated in. The cost of the solar system, which was installed by Cromwell Solar of Lawrence, was \$19,800. With an estimated annual inflation rate for electricity of 5.5%, the payback on the solar system is just under 19 years.

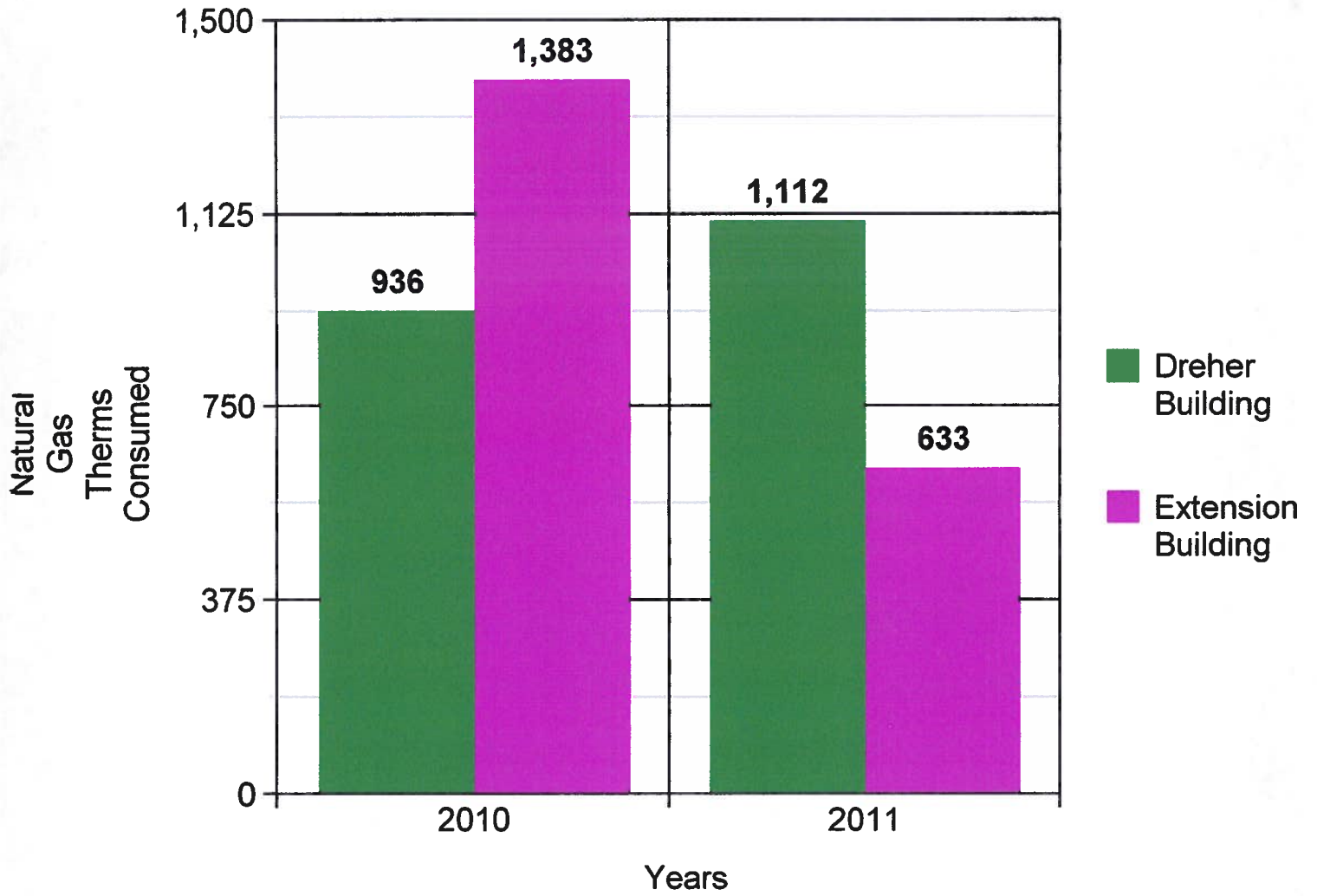
Report prepared February 1, 2012 by Bill Wood, County Extension Director.

### Energy Conservation Demonstration



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