Low Cost Home Energy Improvements
Part 1: Getting the Info

Andy Robinson, SEDAC
Workshop Timeline

• **Sunday 9/11: Low Cost Part 1: Getting the Info**
  — Andy Robinson, SEDAC

• **Sunday 9/18: Low Cost Part 2: Simple Projects**
  — Don Fournier, SEDAC

• **Sunday 9/25: Home Energy Audit**
  — Kevin McCoy [www.greenhomeinspections.net](http://www.greenhomeinspections.net)

• **Sunday 10/2: Building the Energy Efficient Home**
  — Ty Newell, Newell Instruments

• **Sunday 10/9: Touring the Energy Efficient Home**
  — Ty Newell, Newell Instruments
Which is your motivation?

- A. Comfort
- B. Cost Savings
- C. The Environment
- D. A combination
CURRENT STATE OF ENERGY IN THE U.S.

Energy Flow, 2008 (in quadrillion Btu)

Source: EIA/DOE Annual Energy Review 2008
Windows vs Air Sealing

• Windows are people’s first thought but they can be the most expensive thing to do
  — (even if you do the cheapest possible)
  — (There’s a reason they call them “replacement windows.”)

• Air sealing is invisible but greatly affects both comfort and energy savings for little cost

• Why not do both?
Do We Need Technology to Save Us?
Or can we do (some of) it ourselves?

• For example:
  — Solar PV costs ~$24,000 for a 3kW system
    • That would offset $360/yr (1/3 of my electric bill)
  — But taking out my laundry to dry is free
    • And so is biking (sort of)
Benchmark Tools: Microsoft Hohm

My Hohm Center

1 S Prospect Ave
Champaign, Illinois 61820-5044

Year Built: 1921
Bedrooms: 3
Bathrooms: 1.5
Sq Ft: 1750
Air conditioning: central air conditioning
Heating: central gas furnace

53
What is a Hohm Score?
Estimated Hohm Score†

Double-click on a home to compare

Your Annual Energy Usage Comparison†

<table>
<thead>
<tr>
<th>This House</th>
<th>$2,031</th>
<th>53</th>
</tr>
</thead>
<tbody>
<tr>
<td>Averages in 61820</td>
<td>$2,167</td>
<td>61</td>
</tr>
</tbody>
</table>

Find a House
Enter new address to compare
Or double-click on the map

† Energy estimates are based on publicly available data for each home and typical usage data for households in your area.
Your Annual Energy Usage Comparison

This House
Yr:1921, Bed:3, Bath:1.5, Sq Ft:1780
$2,031
53

Averages
Homes built from <1950 and 1950-1750 Sq Ft
$2,167
61

Find a House
Enter new address to compare
Or double-click on the map

† Energy estimates are based on publicly available data for each home and typical usage data for households in your area.

Energy Costs

Average per year:
$842

Highest Month:
July, 2010

Lowest Month:
October, 2009

Average per month:
$70

Average cost per kWh:
$0.113

View more Energy Charts

Your Energy Breakdown

- Heating: $1,030
- Cooling: $411
- Lighting: $139
- Appliances: $205
- Water Heating: $127
- Other: $139

Total: $2,031

View your Energy Breakdown

Top Ways to Save

You could save up to $673 per year

- Potential: $1,357
- Estimated: $2,031

$323 Slipping Through the Cracks
Hidden air leaks can add up to as much air loss as an open window! You could save
Your Energy Score

You scored 26 points lower than efficient homes in Champaign, IL. Your home has a huge potential for efficiency improvements and significantly reduced utility bills.

There are very easy and cost effective ways to make your home more comfortable and efficient. EnergySavvy experts can help you improve your score and give you the most bang for your buck.

Improve my Score

Your Customized Action Plan

Air seal and control ventilation to eliminate drafts

Sealing up leaks in your home’s exterior is often one of the most cost-effective ways to improve home energy efficiency by significantly reducing the loss of conditioned air. (More info)

Upgrade attic insulation to modern standards

Upgrade to efficient lighting

Consider a higher efficiency heating system

Upgrade to a modern high efficiency refrigerator

Typical 3 Year Savings: $2,889

www.energsavvy.com/estimate/
Dear Andy,

I received your request on EnergySavvy.com. Thanks for contacting us!

It sounds like you're in the research stage right now. Based on your online energy report, it looks like the top recommendations we had for you were to:

- **tackle air sealing**,  
- **attic insulation,** and a  
- **lighting upgrade.**

Is that what you had in mind, or do you have other specific interests?

Do I have your contact information correct (217-766-), just in case we need to follow up by phone later?

Thanks and we look forward to helping you with your project!

Kim Guilbault
[support@energysavvy.com](mailto:support@energysavvy.com)
Energy Star: Home Energy Yardstick

Your Home contributes to the quality of the environment.
U.S. Environmental Protection Agency - U.S. Department of Energy

Assess Your Home

Getting a handle on your home's energy use is an important first step to improving efficiency. You can do a simple assessment yourself using our on-line tools, or have a professional energy auditor perform a more thorough audit. Then, use ENERGY STAR resources to get guidance on home improvement projects to enhance energy efficiency, lower utility bills, and increase comfort.

Start with our Home Energy Yardstick.

If you have five minutes and your last 12 months of utility bills, use the Home Energy Yardstick to compare your home's energy use to similar homes across the country and see how your home measures up. Then, use our HomeAdvisor to get recommendations for energy-saving home improvements for typical homes in your area.

Energy Star Home Energy Yardstick

What's Your Score?

Compare your household’s energy use to others across the country and get recommendations for improvement.

What you need to know to get started

- Your energy use and costs for the last year: You’ll need your last 12 months of utility bills OR a 12-month summary statement from your utility company.
- Energy sources for your home: natural gas, electricity, fuel oil, propane, coal, wood and/or kerosene?
- The square footage of your home.

Your Home

What is your 5-digit zip code?

How many people live in your home?

What is the square footage of your home, including the basement?

Your Fuel Types

In addition to electricity, which fuel type(s) does your home use? Select no more than 2.

- Natural Gas
- Fuel Oil
- Propane
- Kerosene
- Coal
- Wood

Need an Expert?

To get specific recommendations for improving the efficiency of your home, contact a professional home energy auditor who can use specialized equipment to find the energy problems in your home and recommend customized solutions. Start by contacting your local utility to see if they offer free or discounted energy audits to their customers. If not, consider hiring a home energy professional, such as a certified Home Energy Rater or Building Performance Analyst.

Find a Home Energy Rater in your area.

Home Performance with ENERGY STAR

In more than 30 locations across the country, you can take a whole-house approach to improving efficiency and comfort through Home Performance with ENERGY STAR. A participating Home Performance contractor can evaluate your home using state-of-the-art equipment, recommend comprehensive improvements that will yield the best results, and help you get the work done.

Find out if Home Performance with ENERGY STAR is available in your area.
The Home Energy Yardstick compares a household’s energy use to similar homes and gives it a score between 0 and 10 (10 being the most energy efficient). An average household scores a 5.

Yardstick Score: 3.1*

Annual pollution resulting from energy use in this household is 14 MtCO2eq of greenhouse gas emissions - the equivalent of 3 cars.

About Your Home (edit)
Zip code: 61820
People living in your Home: 2
Square Footage: 2,500
Heating Degree Days: 5389
Cooling Degree Days: 1484

Energy Use (edit)
Electricity Use: 10,040 kWh Cost: $1,168
Natural Gas Use: 1,102 Therms Cost: $1,078
Total Source Energy Consumption: 229,796 kBtu

Set a Goal
Reduce Your Energy use by:
Electricity: 25
Goal Electricity Use: 7530.00 kWh
Natural Gas: 25
Goal Natural Gas Use: 826.50 Therm

Set Energy Use Goal
Goal Energy Use Results:
New Yardstick Score: 6.6
Total $ Savings: $561.50
Avoided Emissions: 3.50 MtCO2eq

*How you operate or use your home may lower your score. Activities and equipment that often impact a household’s score include: a home office or home business, swimming pool, spa, sauna, pottery kiln, or well pump, as well as a thermostat setting above 72°F for heating or below 76°F for cooling.

Heating Degree Days (HDD)
HDD is the number of degrees per day that the daily average temperature is below 65 degrees Fahrenheit. Total HDD is the cumulative total for the year/heating season. The higher the HDD for a location, the colder...
Where Does My Money Go?

The annual energy bill for a typical single home is approximately $2,200.

- 29% Heating
- 17% Cooling
- 14% Water Heating
- 13% Appliances (includes refrigerator, dishwasher, clothes washer and dryer)
- 12% Lighting
- 11% Electronics (includes computer and monitor and TV and DVD player)
- 4% Other* (includes external power adapters, telephony, set-top boxes, ceiling fans, vent fans and home audio)


Average price of electricity is 11.3 cents per kilo-watt hour. Average price of natural gas is $13.29 per million Btu.

* "Other" represents an array of household products, including stoves, ovens, microwaves, and small appliances like coffee makers and dehumidifiers.
But Always Check Your Bills

- One of my colleagues lives in an old house
- He said they were using $250/month in the spring for electric alone
- When he investigated, Ameren was reading the meter wrong and he had no charge for 3 months
My Home’s Bills

[Graph showing Elec Cost, Cooling Degree Days, Gas Cost, and HDD over time from Jul 08 to Jul 11]
**My Bill Breakdown**

- **Electric**
  - AC, $449, 21%
  - Lights, Dryer, Electronics, $612, 29%
  - Hot Water, Cooking, $420, 20%

- **Gas**
  - Heat, $654, 30%
  - Hot Water, $454, 30%
  - Cooking, $420, 20%

<table>
<thead>
<tr>
<th>Year</th>
<th>Electric</th>
<th>Gas</th>
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<tbody>
<tr>
<td>2009</td>
<td>$653</td>
<td>$1,205</td>
</tr>
<tr>
<td>2010</td>
<td>$1,068</td>
<td>$1,062</td>
</tr>
<tr>
<td>2011</td>
<td>$1,061</td>
<td>$1,074</td>
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</table>
The Energy Label

GE® ENERGY STAR® 25.9 Cu. Ft. French Door Refrigerator with Icemaker
Model #: GFS55KKYSS

MSRP
$2299

“Oh, but it’s more efficient.”

The one wo/ the door ice was $51
Metering

- kW meter
  - Available from the library

- Reading the meter outside
  - Free, but tricky
  - Can be done for the AC, or dishwasher

- Whole House Meters
  - TED, eMonitor
# Common Appliances

<table>
<thead>
<tr>
<th></th>
<th>Watts</th>
<th>Hours/day</th>
<th>$/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigerator</td>
<td>180</td>
<td>10</td>
<td>$65 (ES=$41-$59)</td>
</tr>
<tr>
<td>TV</td>
<td>100</td>
<td>4</td>
<td>$15</td>
</tr>
<tr>
<td>Cable Box (DVR)</td>
<td>30</td>
<td>24</td>
<td>$35 (x 2 or 3?)</td>
</tr>
<tr>
<td>Computer</td>
<td>75</td>
<td>24 (or 8)</td>
<td>$65 (or $21)</td>
</tr>
<tr>
<td>Dehumidifier</td>
<td>200</td>
<td>20 x 150 days</td>
<td>$60</td>
</tr>
<tr>
<td>Washer</td>
<td></td>
<td>8 loads/wk</td>
<td>$30 (ES=$15)</td>
</tr>
<tr>
<td>Dryer (electric)</td>
<td></td>
<td></td>
<td>$200?</td>
</tr>
<tr>
<td>Dishwasher</td>
<td></td>
<td>4 loads/wk</td>
<td>$29</td>
</tr>
<tr>
<td>Space Heater</td>
<td>1500</td>
<td>8 x 80 days</td>
<td>$96</td>
</tr>
<tr>
<td>Heating Blanket</td>
<td>50</td>
<td>8 x 80 days</td>
<td>$3</td>
</tr>
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## Phantom Loads?

<table>
<thead>
<tr>
<th></th>
<th>Watts</th>
<th>Hours/day</th>
<th>$/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell Phone Chargers</td>
<td>0.5 (x 4)</td>
<td>24</td>
<td>$0.40 ($1.75)</td>
</tr>
<tr>
<td>TV</td>
<td>2</td>
<td>24</td>
<td>$2</td>
</tr>
<tr>
<td>DVR</td>
<td>30</td>
<td>24</td>
<td>$26</td>
</tr>
<tr>
<td>Nightlight</td>
<td>5</td>
<td>24</td>
<td>$4</td>
</tr>
</tbody>
</table>
New incandescent are available that meet the 25% savings requirement
  • e.g. Phillips Ecovantage

CFLs get about 75% energy savings
  • Note color temperature
  • Dimming is flakey

LEDs get about 75-80% energy savings
  • Still very costly
  • Buyer beware with quality
  • May work with dimmers better
Ameren $25 Walk-through Audit

Home Energy Performance Audit

A Home Energy Performance Audit is often the first step toward a more comfortable and energy-efficient home. Many efficiency measures your Energy Advisor may recommend are eligible for special discounts through ActOnEnergy®.

Advisor will:
- Perform a thorough visual inspection
- Conduct a computer analysis of your home
- Generate a custom report that pinpoints problem areas and improvement measures

Plus, depending on eligibility, your Energy Advisor(s) could install:
- High-performance shower heads
- New faucet aerators
- Compact fluorescent light bulbs (CFLs) in high-use areas of your home

These products alone could be worth more than $80!

Call today to schedule your HEP Audit: 1.866.838.6918 Mon - Fri., 8 a.m. - 5 p.m.

Don’t wait! You could realize significant savings by following your Energy Advisor’s recommendations. They’ll tell you which ActOnEnergy discounts you may qualify for.
Electric Choice

• Ameren will always deliver the electricity
  — Ameren’s average generation rate is 5.9 c/kWh
  — ($0.11/kWh total with delivery and tax)
• Electric supply can come from others (see cub.org)
  — Blue Star Energy
    • 5.175 c/kWh (but 12 mo contract, $10/mo left)
    • (Renewable option ~6.2 c/kWh)
  — Ameren Real Time Pricing
    • CNT (Center For Neighborhood Technology)
CNT: Real Time Pricing

- $0.09/kWh 1pm
- $0.01/kWh 1am
- Over 2 years:
  - 7% Savings
Questions?

Smart Energy Design Assistance Center
1 East St. Mary’s Road
Champaign, IL 61820

www.sedac.org
info@sedac.org
(800) 214 - 7954