Top Ten Steps to Cut Your Residential Energy Costs in Half

Bill Neukranz

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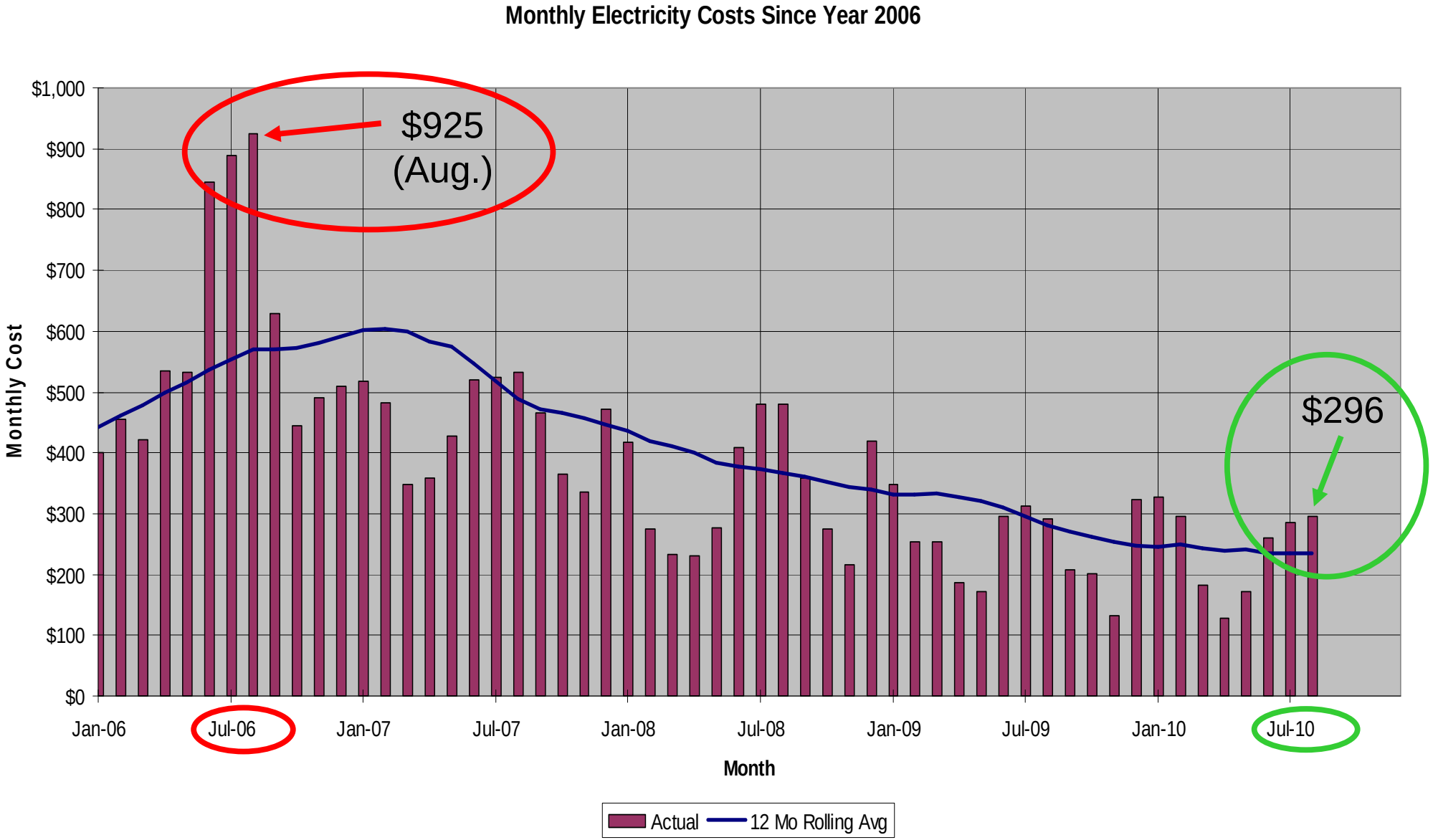
Ten Steps to Cut Your Energy Costs in Half

What Happened?



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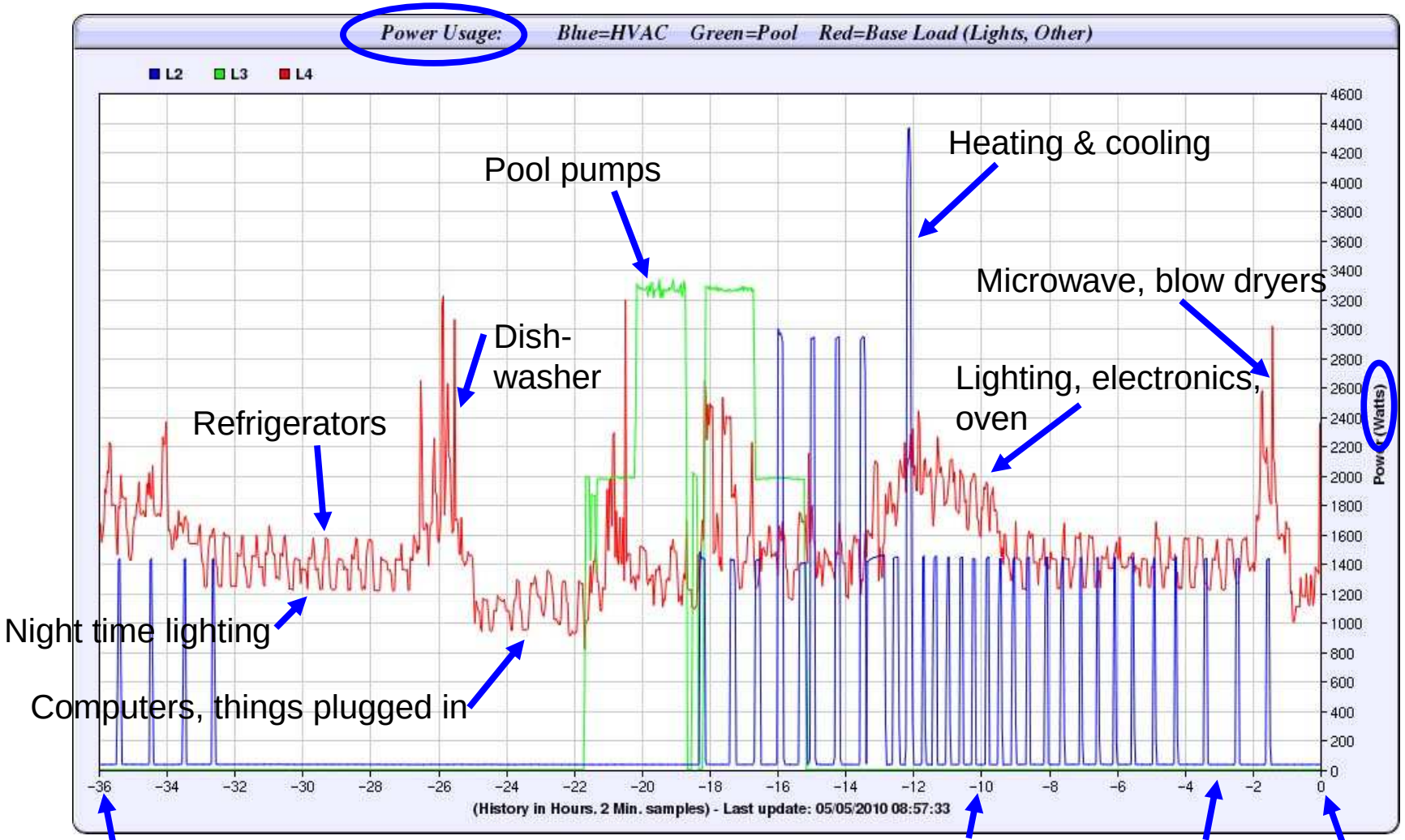
Opportunity Space: Electricity



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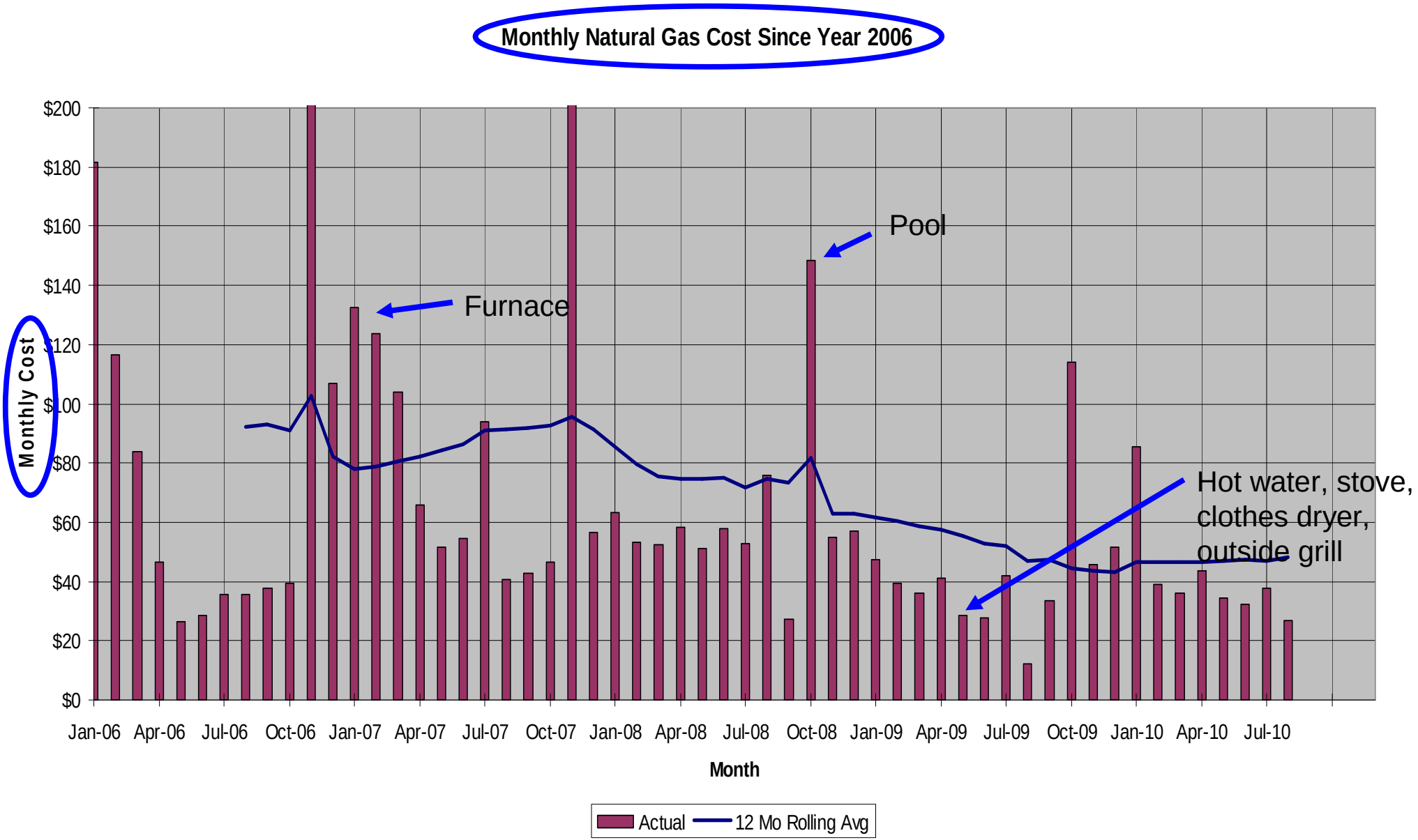
Opportunity Space: Natural Gas



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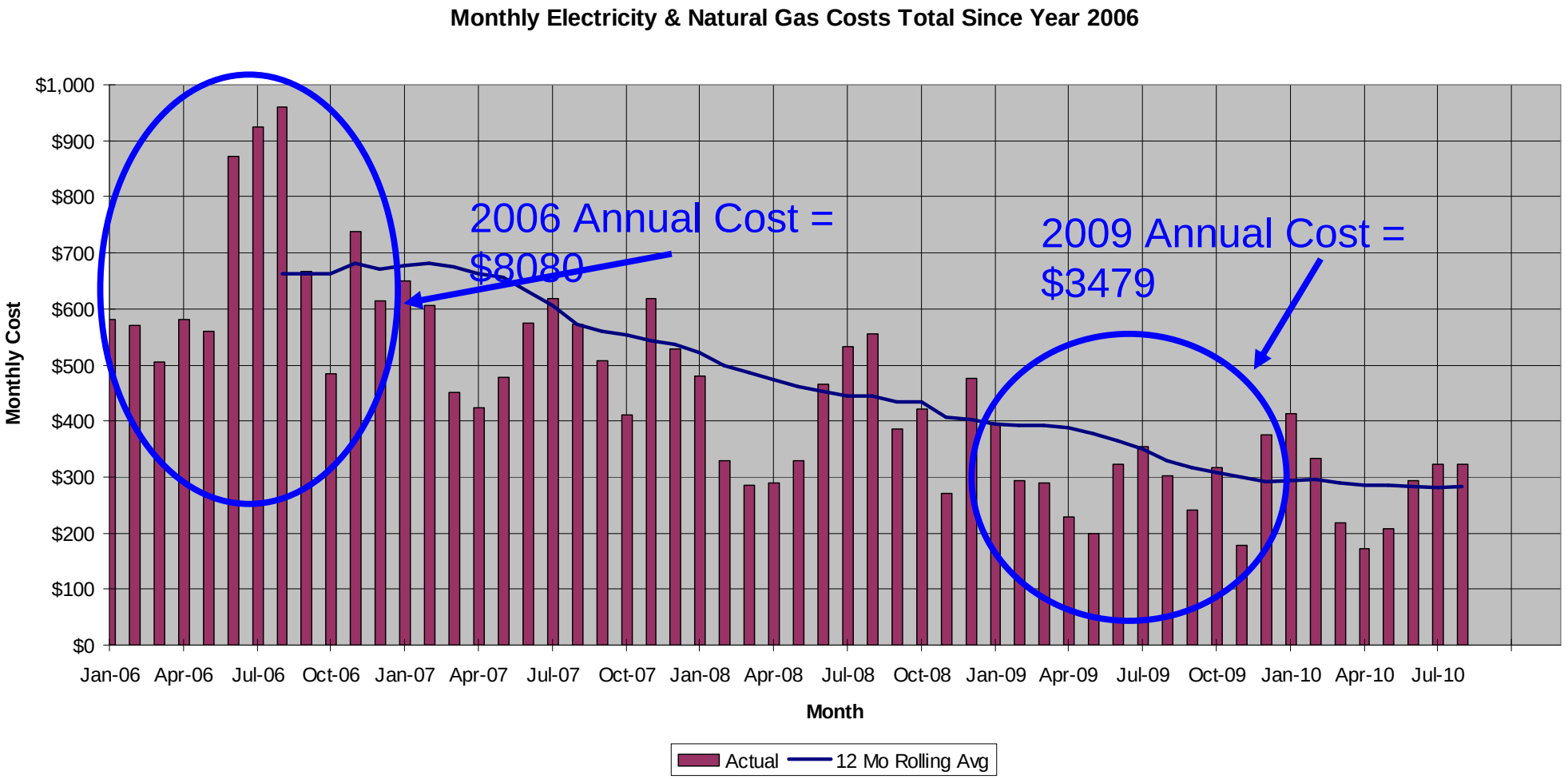
Summary of Mission: Continuously Reduce Costs

Bottom Line So Far = 57% reduction in 3 years



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Ten Steps to Cut Your Energy Costs in Half

1. Aggressively manage your electric utility rate

- ✓ Get comfortable with variable rate plans – no mess, no fuss

2. Replace every incandescent light bulb with CFL

- ✓ Get it down to everything except oven, refrig, microwave
- ✓ Say ‘no’ to ugly CFL bulbs
- ✓ Be careful what you buy – use amalgam technology bulbs for reliability

3. Change your living style

- ✓ Install programmable thermostats – set reasonable temperatures
- ✓ Turn on / install ceiling fans
- ✓ Turn off dishwasher ‘heated dry’ function
- ✓ Set hot water heater at Normal or cooler setting
- ✓ Use only detergents for ‘cold’ or ‘warm’ water for clothes washing

4. Turn stuff off

- ✓ Turn off workstations (use off-site backup service – Mozy, use laptops)
- ✓ Unplug stuff rarely used
- ✓ Implement power strips for rest of stuff plugged in
- ✓ Install switch timers and plug-in timers

5. Understand actual energy consumptions

- ✓ Purchase / borrow a Kill-A-Watt Meter
- ✓ Put in whole house energy monitoring capability: The Energy Detective (TED) (electricity only), or Web Energy Logger (WEL) (a lot more than electricity)

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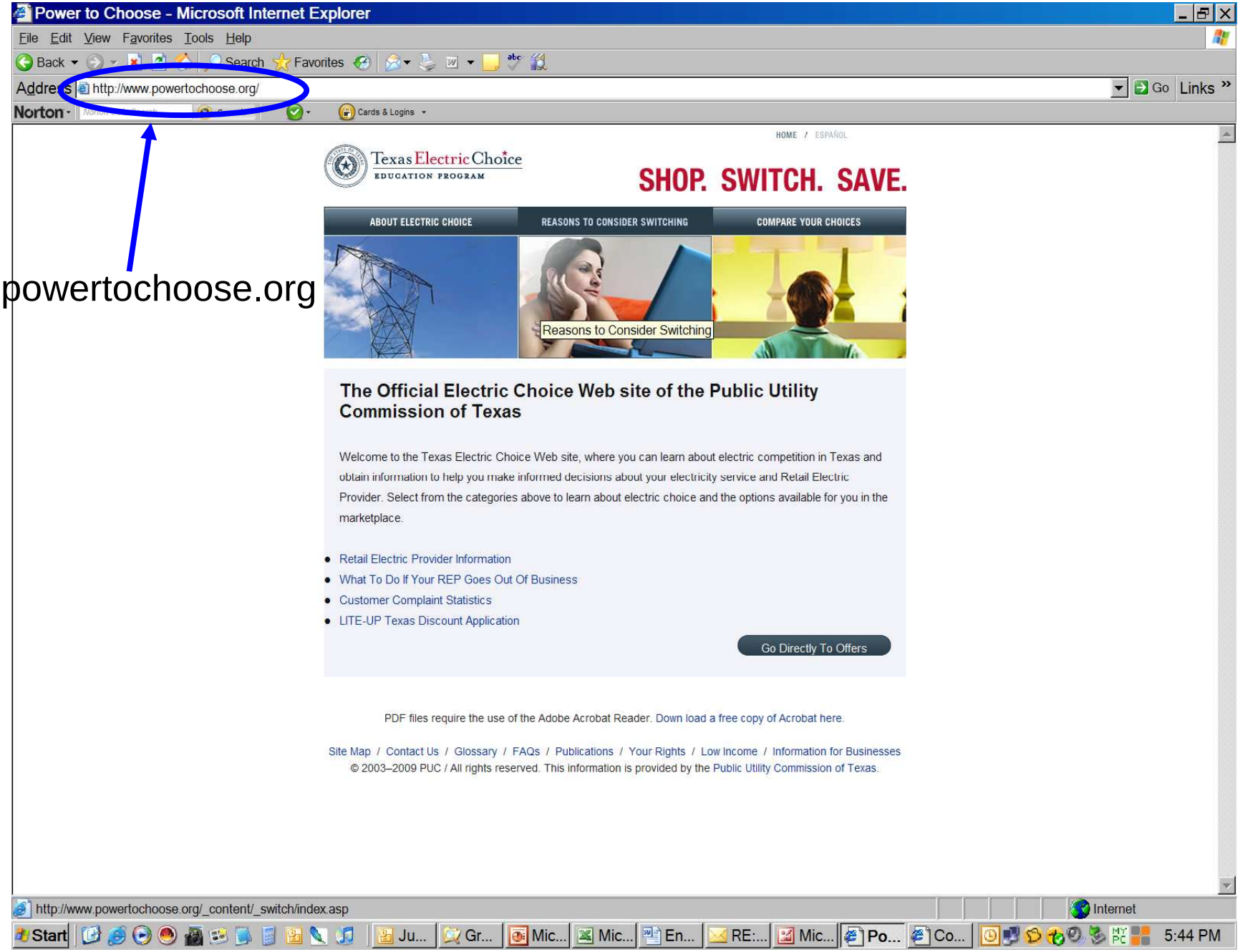
Step 1: Aggressively Manage Your Electric Utility Rate

www.powertochoose.org



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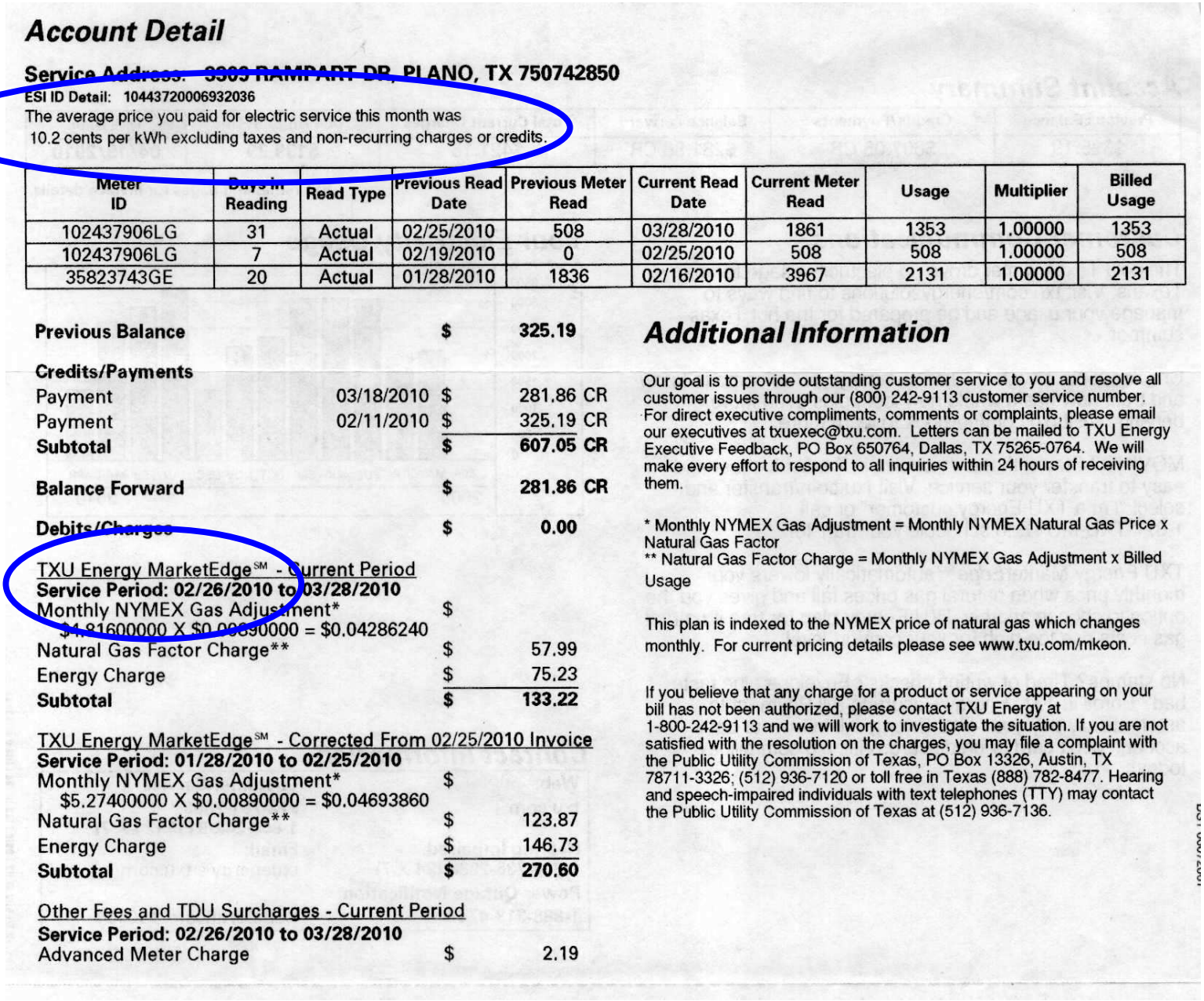

Account Detail

Service Address: 3309 RAMPART DR, PLANO, TX 750742850

ESI ID Detail: 10443720006932036

The average price you paid for electric service this month was
10.2 cents per kWh excluding taxes and non-recurring charges or credits.

Meter ID	Days in Reading	Read Type	Previous Read Date	Previous Meter Read	Current Read Date	Current Meter Read	Usage	Multiplier	Billed Usage
102437906LG	31	Actual	02/25/2010	508	03/28/2010	1861	1353	1.00000	1353
102437906LG	7	Actual	02/19/2010	0	02/25/2010	508	508	1.00000	508
35823743GE	20	Actual	01/28/2010	1836	02/16/2010	3967	2131	1.00000	2131

Previous Balance		$	**325.19**
Credits/Payments			
Payment	03/18/2010	$	281.86 CR
Payment	02/11/2010	$	325.19 CR
Subtotal		$	**607.05 CR**
Balance Forward		$	**281.86 CR**
Debits/Charges		$	**0.00**

TXU Energy MarketEdge℠ - Current Period
Service Period: 02/26/2010 to 03/28/2010

Monthly NYMEX Gas Adjustment* $4.81600000 X $0.00890000 = $0.04286240	$	
Natural Gas Factor Charge**	$	57.99
Energy Charge	$	75.23
Subtotal	$	**133.22**

TXU Energy MarketEdge℠ - Corrected From 02/25/2010 Invoice
Service Period: 01/28/2010 to 02/25/2010

Monthly NYMEX Gas Adjustment* $5.27400000 X $0.00890000 = $0.04693860	$	
Natural Gas Factor Charge**	$	123.87
Energy Charge	$	146.73
Subtotal	$	**270.60**

Other Fees and TDU Surcharges - Current Period
Service Period: 02/26/2010 to 03/28/2010

Advanced Meter Charge	$	2.19

Additional Information

Our goal is to provide outstanding customer service to you and resolve all customer issues through our (800) 242-9113 customer service number. For direct executive compliments, comments or complaints, please email our executives at txuexec@txu.com. Letters can be mailed to TXU Energy Executive Feedback, PO Box 650764, Dallas, TX 75265-0764. We will make every effort to respond to all inquiries within 24 hours of receiving them.

* Monthly NYMEX Gas Adjustment = Monthly NYMEX Natural Gas Price x Natural Gas Factor
** Natural Gas Factor Charge = Monthly NYMEX Gas Adjustment x Billed Usage

This plan is indexed to the NYMEX price of natural gas which changes monthly. For current pricing details please see www.txu.com/mkeon.

If you believe that any charge for a product or service appearing on your bill has not been authorized, please contact TXU Energy at 1-800-242-9113 and we will work to investigate the situation. If you are not satisfied with the resolution on the charges, you may file a complaint with the Public Utility Commission of Texas, PO Box 13326, Austin, TX 78711-3326; (512) 936-7120 or toll free in Texas (888) 782-8477. Hearing and speech-impaired individuals with text telephones (TTY) may contact the Public Utility Commission of Texas at (512) 936-7136.

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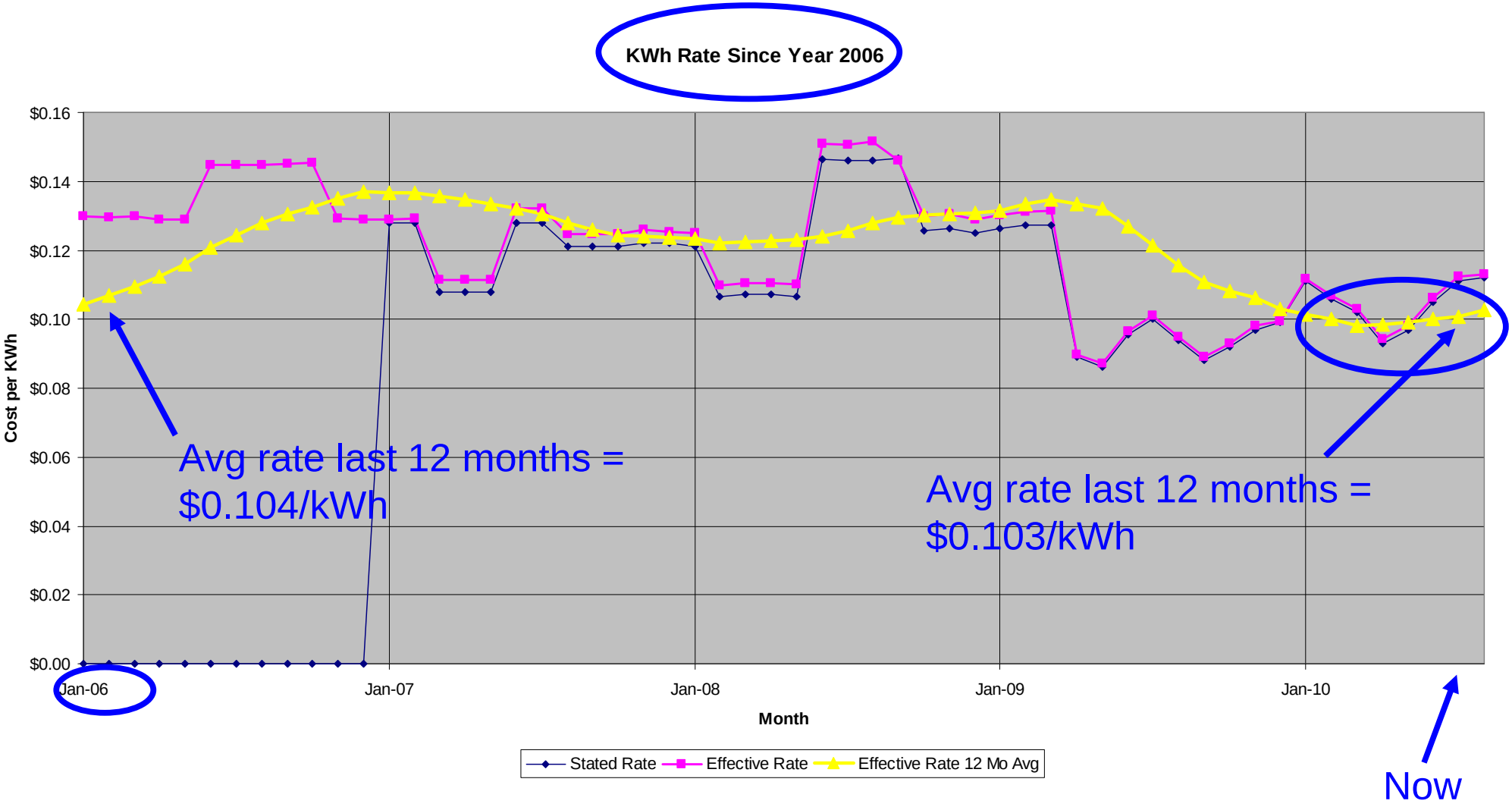

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Step 2: Replace Every Incandescent Light Bulb with CFL

Example bulbs (none burned out since 4Q07; none 'ugly'):

R20: GE FLE11/2/R20XL (80892) reflector

- 10,000 hours
- 400 initial lumens
- 11 watts – replaces incandescent 45 W

R30: GE FLE15/2/R30XL (80893) reflector

- 10,000 hours – 7 years guaranteed
- 800 initial lumens
- 15 watts – replaces incandescent 65 W

R40: GE FLE26/2/R40XL (80894) reflector

- 10,000 hours
- 1400 initial lumens
- 26 watts – replaces incandescent 90 W

PAR38: GE FLE26/2/PAR38XL (80895) reflector (outdoor rated)

- 10,000 hours
- 1350 initial lumens
- 26 watts – replaces incandescent 90 W

A19 Bulb Style: Philips 15700-8 soft white

- 8000 hours
- Equivalent to 800 lumens
- 14 watts – replaces incandescent 60 W

Candelabra: GE FLE7/2/CAC (16103) candle shape

- 6,000 hours
- 370 initial lumens
- 7 watts – replaces incandescent 25 W

Post Light: GE FLE11/2/T14XL (89631) (outdoor rated)

- 10,000 hours
- 500 initial lumens
- 11 watts – replaces incandescent 40 W

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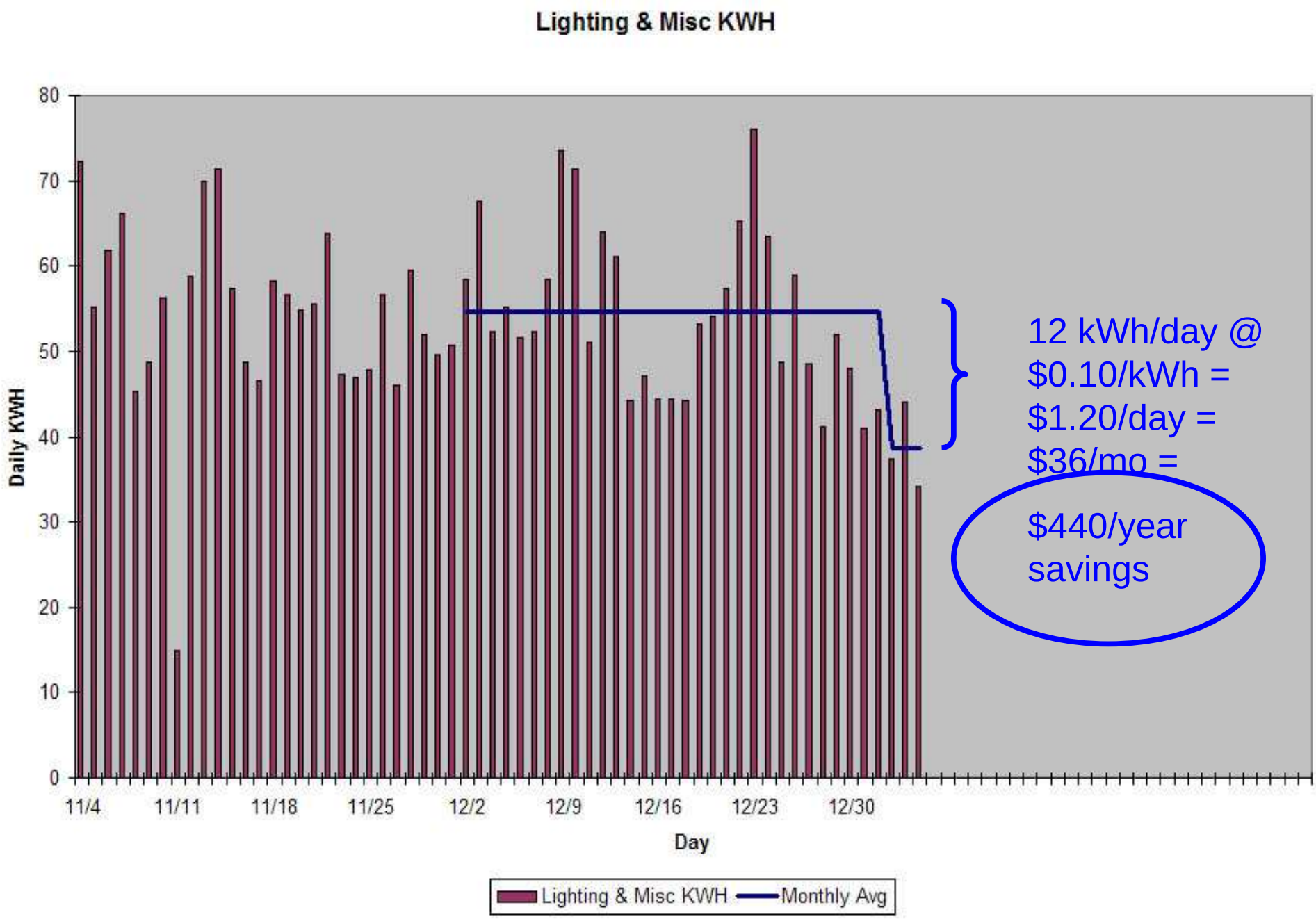
Step 2: Replace Every Incandescent Light Bulb with CFL



Step 3: Change Your Living Style

Install programmable tstats – set reasonable temperatures

Turn on / install ceiling fans

Turn off dishwasher ‘heated dry’ function

Set to Normal or cooler

Use only detergents for cold/warm water

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Step 4: Turn Stuff Off

✓ Turn off workstations - use off-site backup service (Mozy) and laptops

✓ Unplug seldom used items

✓ Put stuff on power strips to make turning off easy

✓ Install switch timers and plug timers

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Step 5: Understand Actual Energy Consumptions

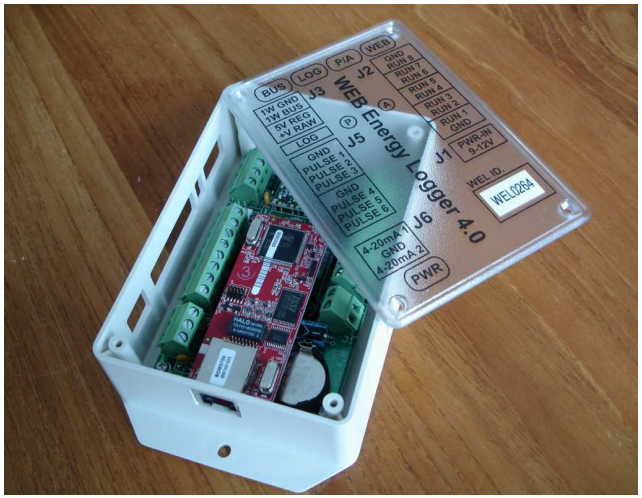
✓ Purchase / borrow a Kill A Watt meter

http://www.p3international.com

Put in whole house energy monitoring capability:

• The Energy Detective (TED) (electricity only)

✓ Web Energy Logger (WEL) (a lot more than electricity)



http://www.welserver.com

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Energy Monitoring – Why?

1. Optimize decision making - provides feedback where energy related costs are:
   - Provides 'base line' to compare future actions to.
   - Helps identify what to work on next – facilitates pareto analysis
   - Offers data for informational and analysis purposes – perform accurate ROI analysis

2. Confirm actions result in real savings:
   - Verified geothermal performance after installation, CFL performance after replacement, etc.
   - Ensures results occur, surprises don't happen, promised savings materialize.

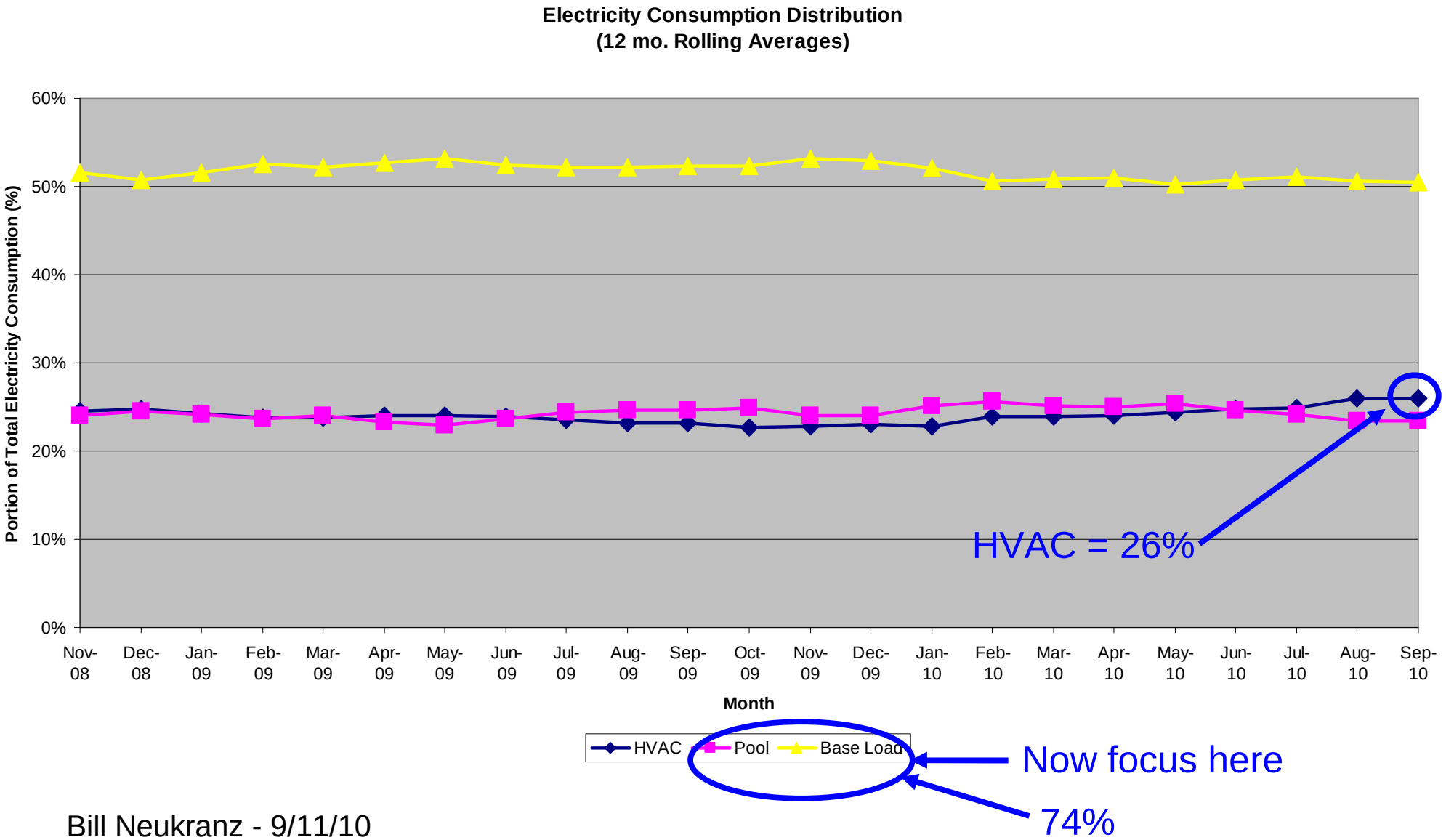
3. Affirm major systems are performing as advertised:
   - Lowers operating costs by providing feedback information to adjust design parameters or maintenance settings.

4. Anticipate repair needs in advance of more catastrophic expenses:
   - Lowers maintenance costs by having ability to anticipate repair needs in advance of more catastrophic expenses.

Step 5: Understand Actual Energy Consumptions

Energy Monitoring – Why?

Optimize decision making



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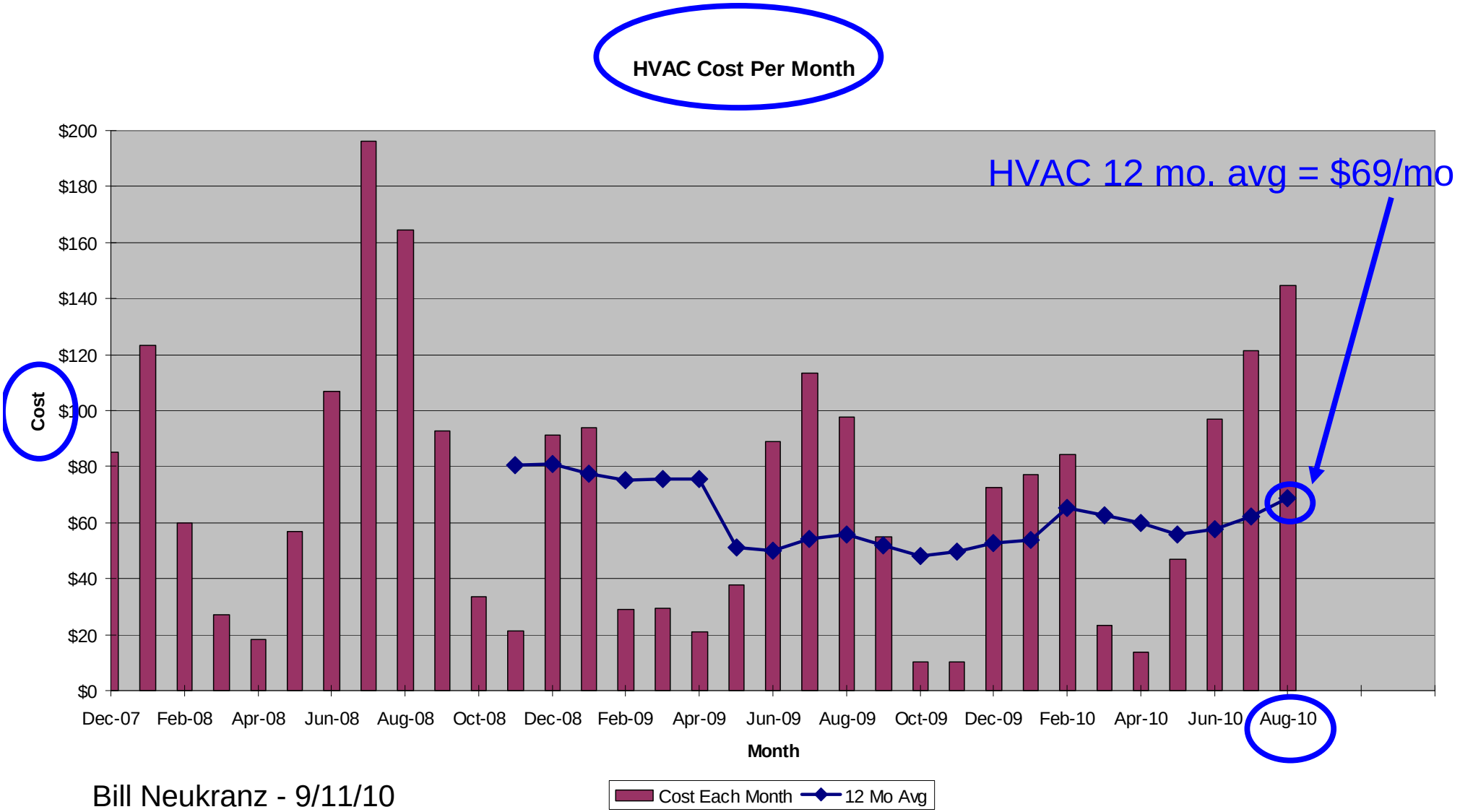
Step 5: Understand Actual Energy Consumptions

Energy Monitoring – Why?

Confirm actions result in real savings



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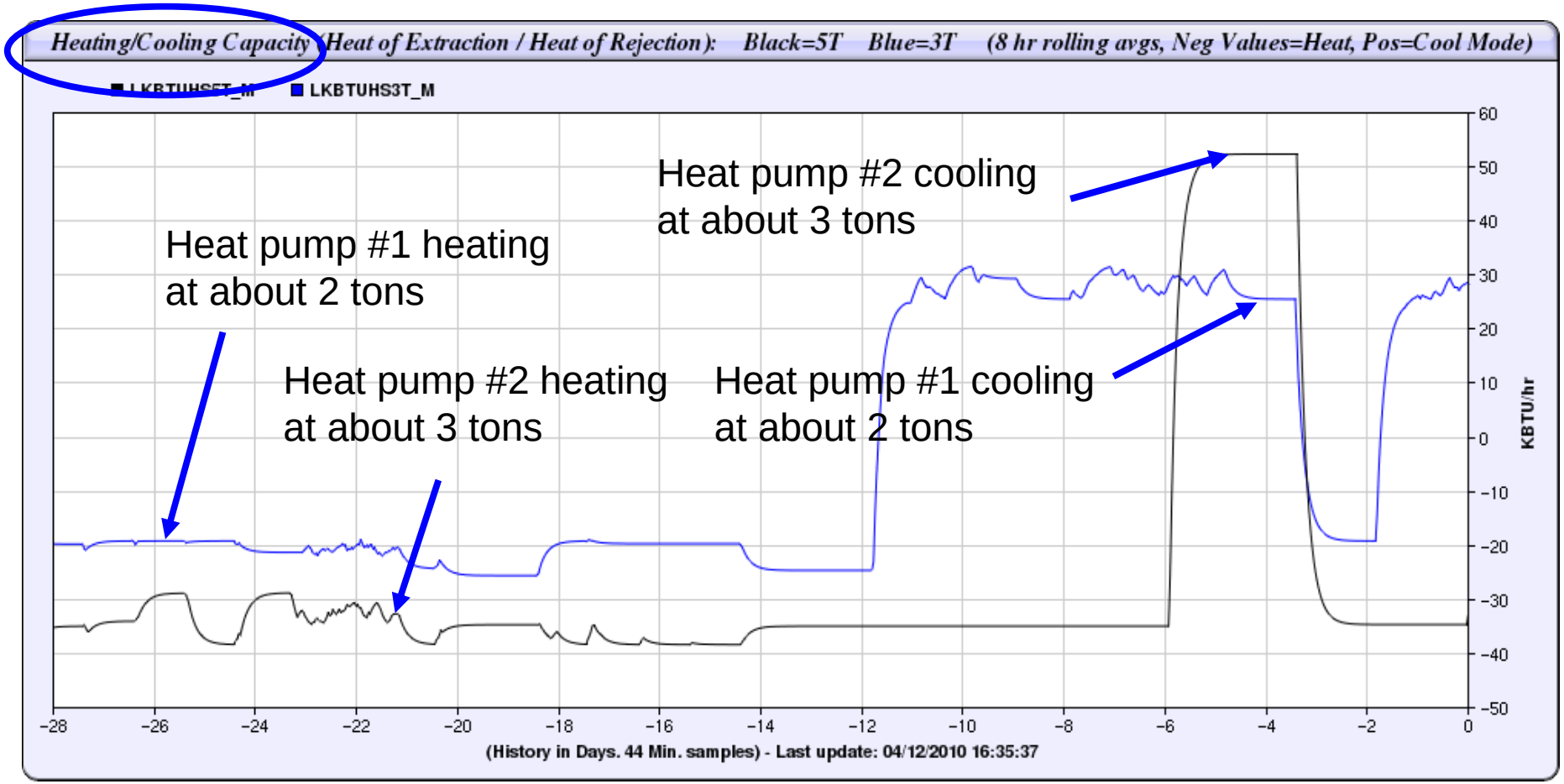
Step 5: Understand Actual Energy Consumptions

Energy Monitoring – Why?

Affirm major systems are operating as advertised/claimed



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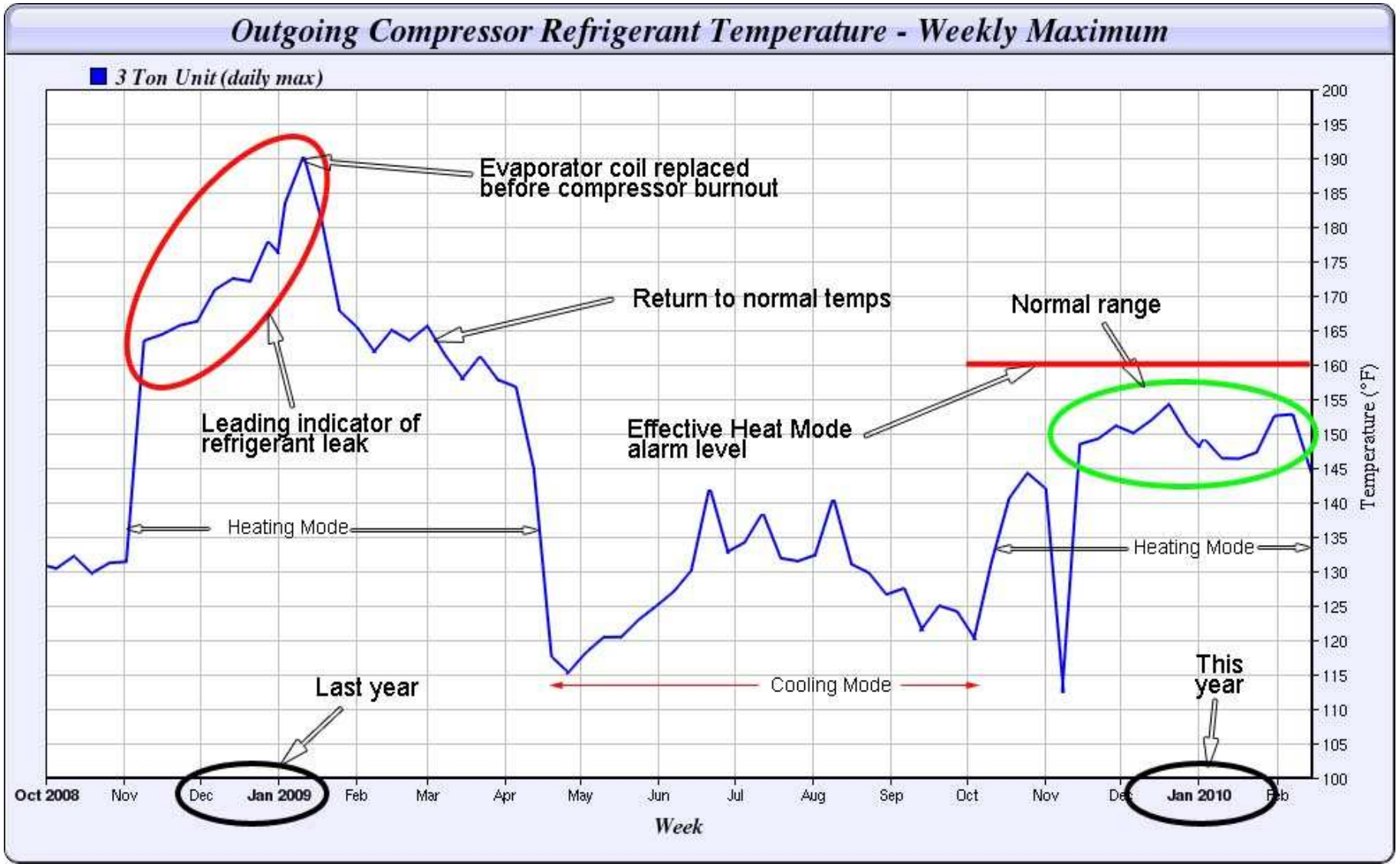
Step 5: Understand Actual Energy Consumptions

Energy Monitoring – Why?

Anticipate repair needs in advance of more catastrophic expenses



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Energy Monitoring – Why?

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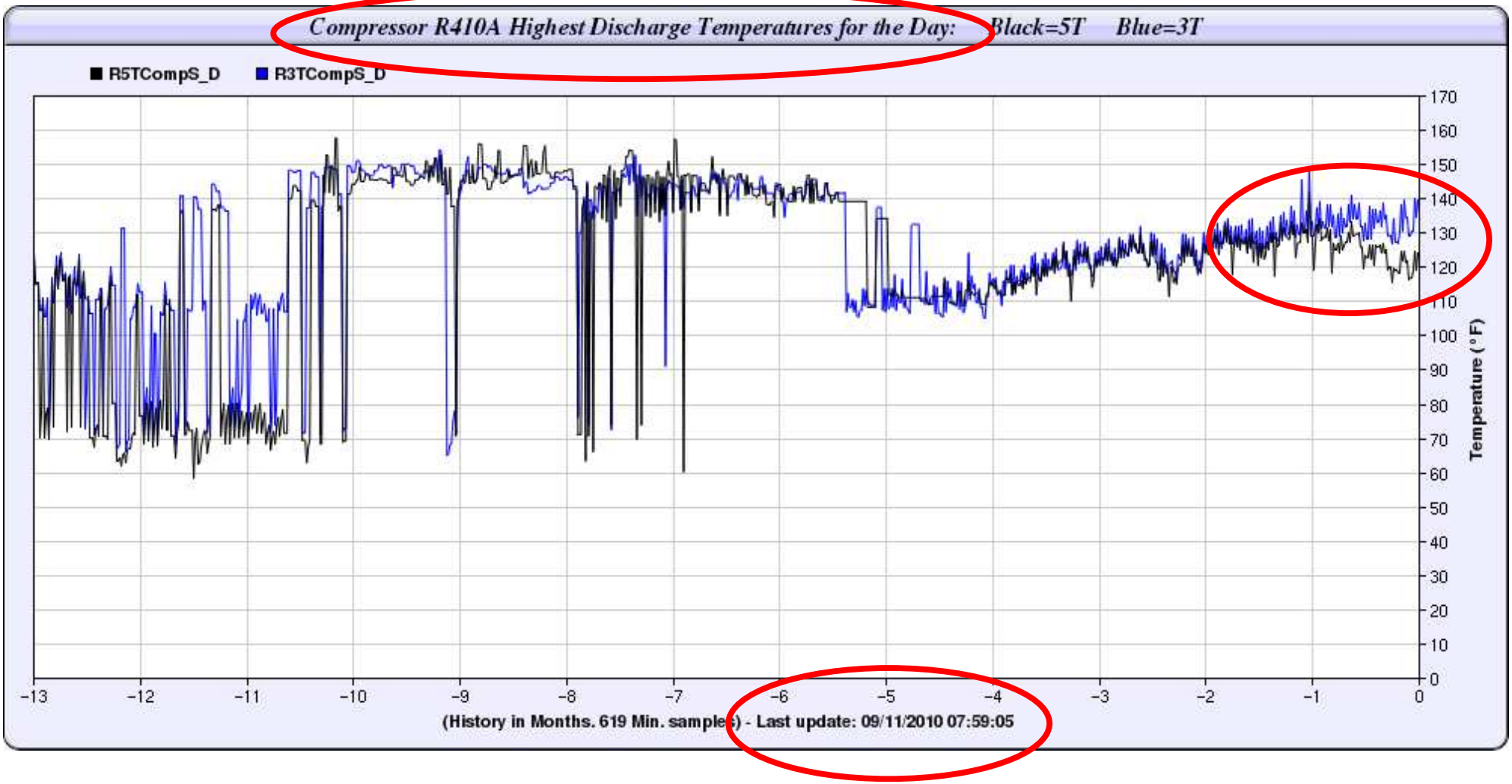

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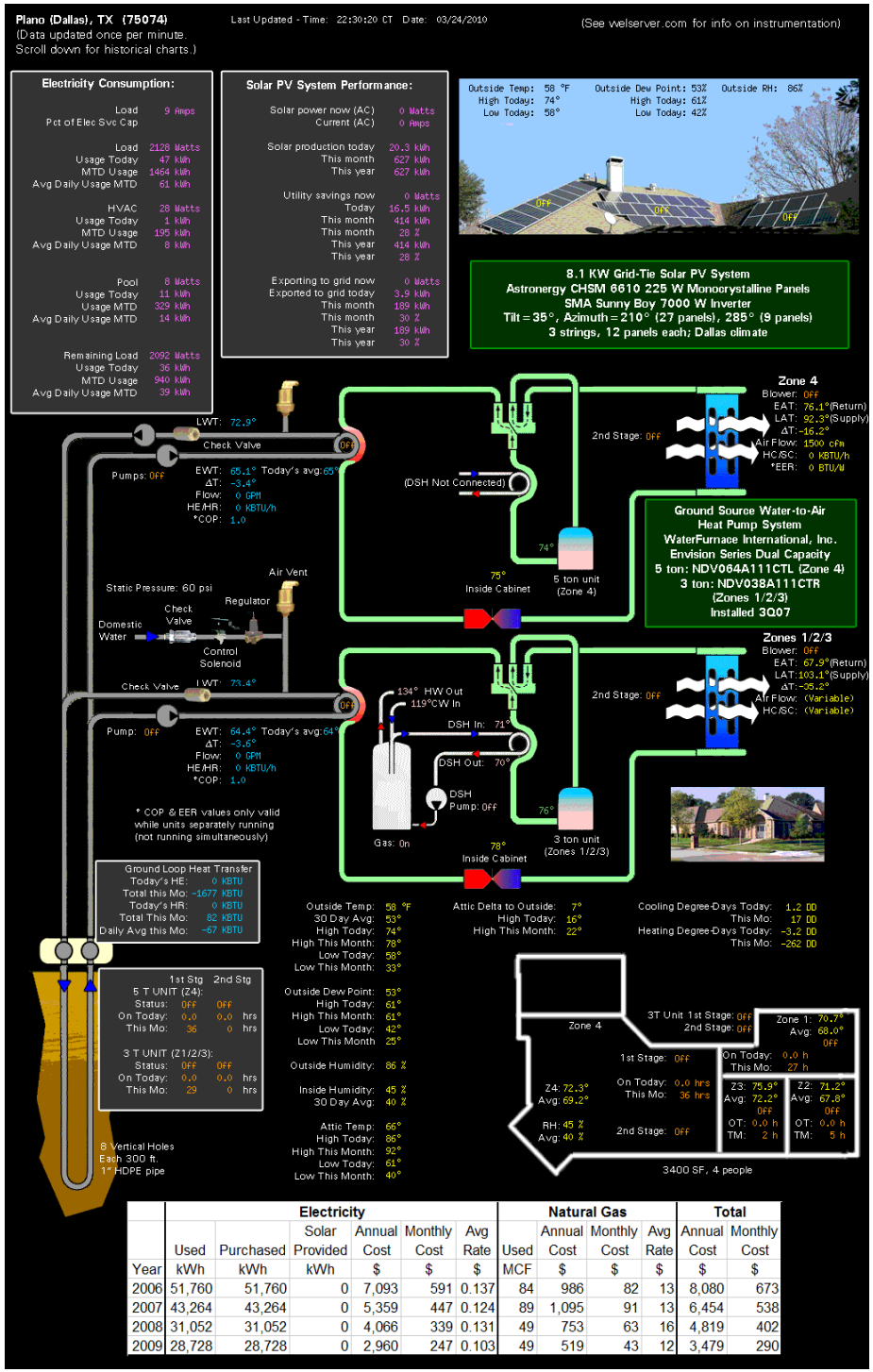
Energy Monitoring Example

http://welserver.com/WEL0043



	Electricity						Natural Gas				Total	
	Used	Purchased	Solar Provided	Annual Cost	Monthly Cost	Avg Rate	Used	Annual Cost	Monthly Cost	Avg Rate	Annual Cost	Monthly Cost
Year	kWh	kWh	kWh	$	$	$	MCF	$	$	$	$	$
2006	51,760	51,760	0	7,093	591	0.137	84	986	82	13	8,080	673
2007	43,264	43,264	0	5,359	447	0.124	89	1,095	91	13	6,454	538
2008	31,052	31,052	0	4,066	339	0.131	49	753	63	16	4,819	402
2009	28,728	28,728	0	2,960	247	0.103	49	519	43	12	3,479	290

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Step 6: Research What Your Government and Utilities Are Offering

Examples:

1. Federal:
   - ✓ Tax credits for solar (2010)
   - ✓ Tax credits for geothermal heating/cooling
   - • Tax credits for insulation

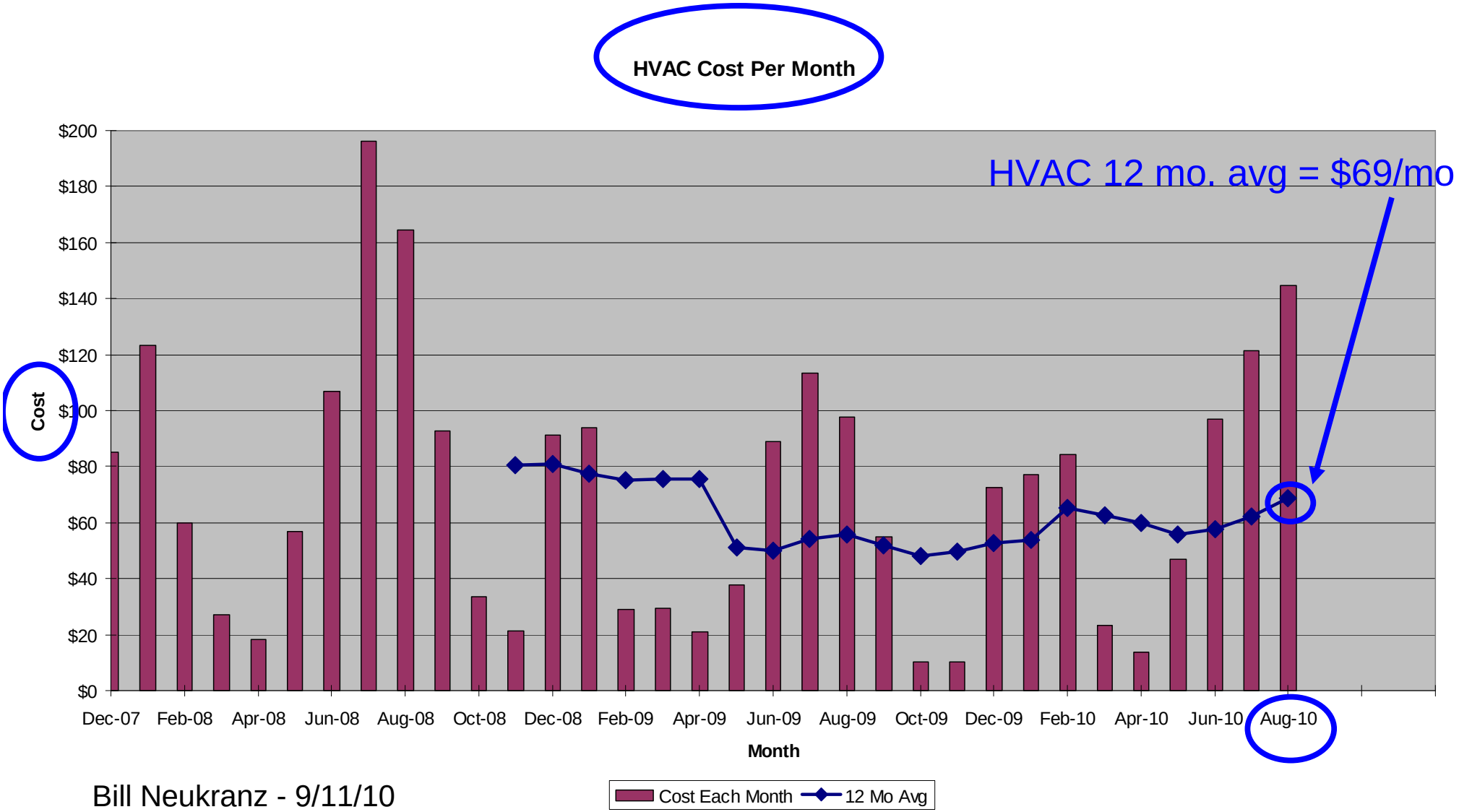
2. State:
   - – Rebates for Energy Star rated appliances

3. Local:
   - – Plano (coming): HERS audit & weatherproofing
   - – Plano (coming): Revolving Energy Efficiency Load Fund

4. Utilities
   - ✓ Rebates for solar (2010)

Step 7: Look Very Hard at Heating & Cooling the Structure

Why? The Big Picture: Cost



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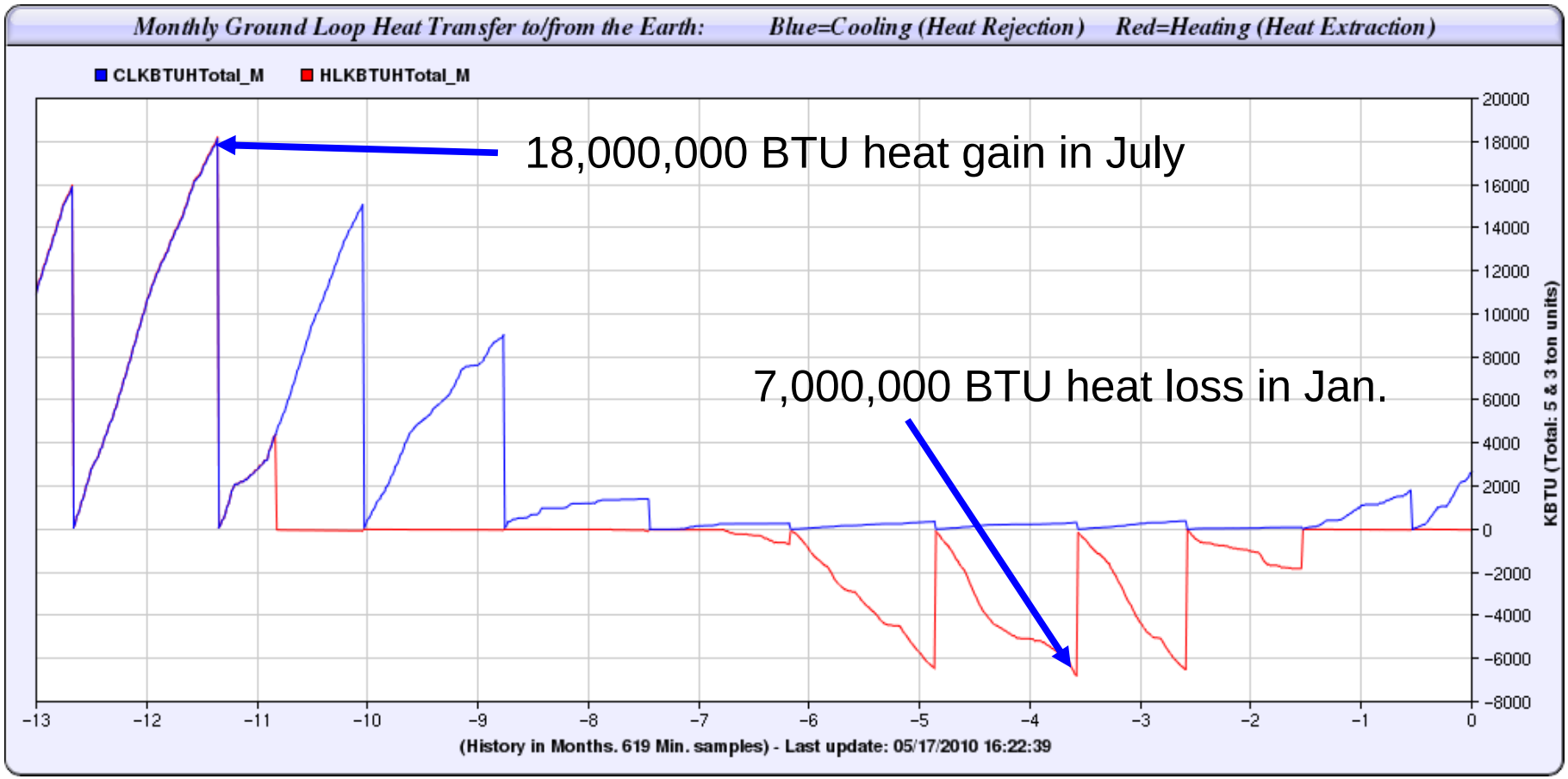
Step 7: Look Very Hard at Heating & Cooling the Structure

Structures have continual heat gain (Summer) / loss (Winter).

Mission:

1. **Reduce / eliminate heat gains / losses – air infiltration and _____ insulation actions**
2. **Make HVAC system as efficient as possible**



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Step 7: Look Very Hard at Heating & Cooling the Structure

Choose air infiltration actions to remedy:

- Attic ventilation
- Recessed ceiling light fixtures
- Windows/doors weather sealing
- Plumbing pipe penetrations
- Electrical outlet holes
- Room exhaust fans
- Fireplace flue

Choose insulation actions to remedy:

- Insulation itself
- Attic (foam)
- Windows/doors glass high-R
- Shading / heat rejection:
  - Window film/screens
  - Radiant barriers
  - Yard trees

HVAC system:

- Good repair
- Appropriate replacement time point
- Air distribution performance
  - Leaks
  - Adequate airflow
  - Zoning beneficial

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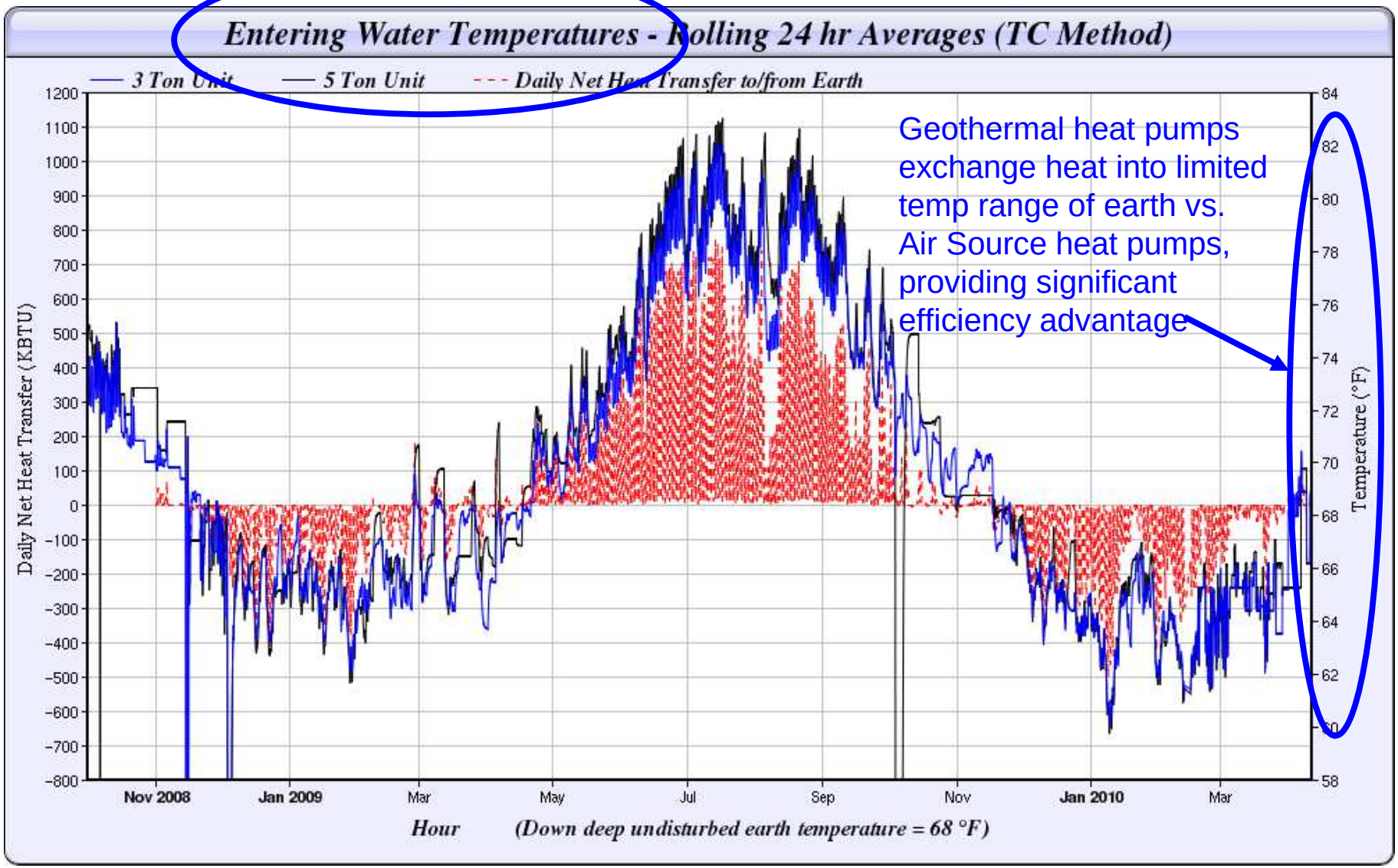

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Step 7: Look Very Hard at Heating & Cooling the Structure

Geothermal HVAC Installation

Needs good design, availability of land, comfortableness with water pipes in attic

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Ten Steps to Cut Your Energy Costs in Half

6. **Research what your governments and utilities are offering**
   - ✓ Rebates
   - ✓ Credits
   - • Gifts
7. **Look very hard at heating & cooling the structure**
   - ✓ Do an energy audit
   - ✓ Ask critical questions:
     - ✓ HVAC system: in good repair? Time to replace?
     - ✓ HVAC air distribution performance: Leaks? Adequate airflow? Zoning beneficial?
     - • Insulation performance: Adequate? Foam attic? Windows/doors glass high-R?
     - • Air infiltration performance: Attic ventilation, recessed ceiling light fixtures, windows/doors weather sealing, plumbing pipe penetrations, electrical outlet holes, room exhaust fans all OK?
     - • Shading / heat rejection: Window film/screens, radiant barriers, yard trees in use?
8. **Replace appliances with Energy Star or lower power versions**
   - ✓ UPS units
   - • Refrigerators, dish washers, televisions, satellite/cable boxes
9. **Put in home automation system to save even more**
   - ✓ Become a ‘don’t worry about turning off the light switch’ family
10. **Put in solar PhotoVoltaic (PV) system to make your own power (2010)**
    - ✓ Estimated $1000 utility expense savings this year
    - ✓ Stay cash flow positive

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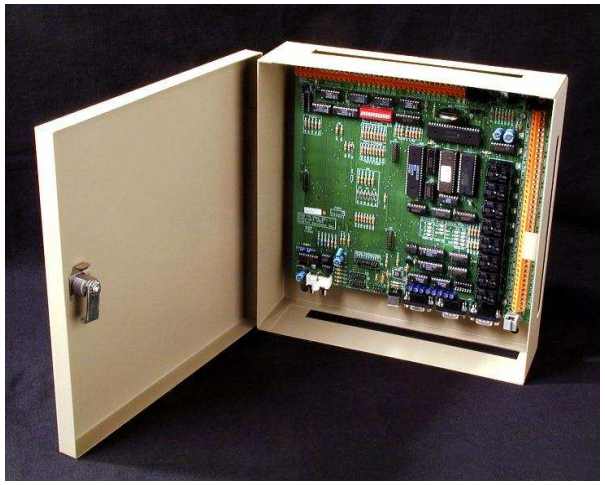
Step 9: Put in Home Automation to Save Even More



HomeVision controller

+

Occupancy sensors

+

X10 technology switches

=

✓ Lights, ceiling fans, exhaust fans, entertainment items turned off automatically when nobody is in a room.

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Step 10: Put in Solar PhotoVoltaic System to Make Your Own Power

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Ten Steps to Cut Your Energy Costs in Half

Summary

No cost,
or low cost;
small effort

Higher cost;
larger effort

1. **Aggressively manage your electric utility rate**
2. **Replace every incandescent light bulb with CFL**
3. **Change your living style**
4. **Turn stuff off**
5. **Understand actual energy consumptions**
6. **Research what your governments and utilities are offering**
7. **Look very hard at heating & cooling the structure**
8. **Replace appliances with Energy Star or lower power versions**
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