Top Ten Steps to Cut Your Residential Energy Costs in Half

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Ten Steps to Cut Your Energy Costs in Half

What Happened?

Monthly Electricity Costs Since Year 2006

$925 (Aug.)

$296

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Opportunity Space: Electricity

- Pool pumps
- Heating & cooling
- Microwave, blow dryers
- Lighting, electronics, oven
- Refrigerators
- Dishwasher
- Night time lighting
- Computers, things plugged in
- Last 36 hours

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Opportunity Space: Natural Gas

Monthly Natural Gas Cost Since Year 2006

Steps to Cut Costs:

1. Hot water, stove, clothes dryer, outside grill
2. Pool
3. Furnace

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Summary of Mission: Continuously Reduce Reduce Costs

Bottom Line So Far = 57% reduction in 3 years

Monthly Electricity & Natural Gas Costs Total Since Year 2006

2006 Annual Cost = $8080

2009 Annual Cost = $3479
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](http://example.com)
   ✓ Put in whole house energy monitoring capability: [The Energy Detective (TED)](http://example.com) (electricity only), or [Web Energy Logger (WEL)](http://example.com) (a lot more than electricity)
Step 1: Aggressively Manage Your Electric Utility Rate

www.powertochoose.org
Step 1: Aggressively Manage Your Electric Utility Rate

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<th>Meter ID</th>
<th>Day in Month Reading</th>
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<th>Previous Meter Read</th>
<th>Current Read Date</th>
<th>Current Meter Read</th>
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</table>

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* $4.9160000 x $0.009990000 = $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* $5.2740000 x $0.009990000 = $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

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

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 txuxexec@txu.com. Letters can be mailed to TXU Energy Executive Feedback, PO Box 690764, Dallas, TX 75265-0764. We will make every effort to respond to all inquiries within 24 hours of receiving them.

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 charge, you may file a complaint with the Public Utility Commission of Texas, PO Box 13328, Austin, TX 78711-3328; (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.
Step 1: Aggressively Manage Your Electric Utility Rate

Avg rate last 12 months = $0.104/kWh

Avg rate last 12 months = $0.103/kWh

Now
Ten Steps to Cut Your Energy Costs in Half

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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)
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
Step 2: Replace Every Incandescent Light Bulb with CFL

12 kWh/day @ $0.10/kWh = $1.20/day = $36/mo = $440/year savings
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
Step 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)

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

http://www.p3international.com

http://www.welserver.com
Step 5: Understand Actual Energy Consumptions

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

Electricity Consumption Distribution
(12 mo. Rolling Averages)

HVAC = 26%

Now focus here

74%
Step 5: Understand Actual Energy Consumptions

Energy Monitoring – Why?

Confirm actions result in real savings

HVAC Cost Per Month

HVAC 12 mo. avg = $69/mo
Step 5: Understand Actual Energy Consumptions

Energy Monitoring – Why?

Affirm major systems are operating as advertised/claimed

![Graph showing energy consumption of heat pumps](image)

<table>
<thead>
<tr>
<th>Heating/Cooling Capacity (Heat of Extraction / Heat of Rejection):</th>
<th>Black=5T</th>
<th>Blue=3T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat pump #1 heating at about 2 tons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heat pump #2 heating at about 3 tons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heat pump #2 cooling at about 3 tons</td>
<td></td>
<td></td>
</tr>
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Energy Monitoring – Why?

Anticipate repair needs in advance of more catastrophic expenses
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Energy Monitoring – Why?

Anticipate repair needs in advance of more catastrophic expenses
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

HVAC Cost Per Month

HVAC 12 mo. avg = $69/mo

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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

18,000,000 BTU heat gain in July
7,000,000 BTU heat loss in Jan.
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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Step 7: Look Very Hard at Heating & Cooling the Structure

Geothermal heat pumps exchange heat into limited temp range of earth vs. Air Source heat pumps, providing significant efficiency advantage.
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
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
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

One-third utility bill reduction

Able to use 69%
Ten Steps to Cut Your Energy Costs in Half

Summary

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
9. Put in home automation system to save even more
10. Put in solar PhotoVoltaic (PV) system to make your own power

No cost, or low cost; small effort

Higher cost; larger effort