

Emerson Environmental
Tune Up Your House™

Prioritizing Home Energy Efficiency Improvements

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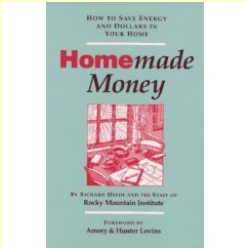
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Where Do We Start?

- So many good ideas for energy efficiency improvements.
- The most cost-effective home energy efficiency improvements are listed here, sorted by cost.
- List based upon Richard Heede, *Homemade Money: How to Save Energy and Dollars in Your Home* (Rocky Mountain Institute)



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Free Measures to Save Money (and Energy)

Turn off lights and electronics when leaving a room. Put electronics on a timer or easily-accessible power strip to turn off power when not in use.

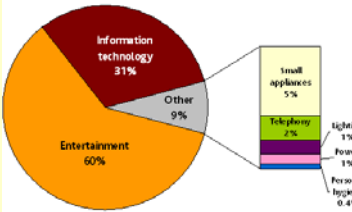



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Plug Loads – Typical CA Home

- Electronic products cost approx. \$150 per year to power.
- Plug loads account for more than 15% of the energy used by the home.
- Entertainment and information technology account for over 90% of the electricity used by plug load devices.

PRODUCT	NATIONAL ANNUAL COST	P95E Tier 5 ANNUAL COST
20-cu.-ft. refrigerator (a new or top-freezer)	\$50	170
25-cu.-ft. refrigerator (a new or side-by-side)	65	220
32-inch picture-tube	40	140
36-inch picture-tube	50	170
37-inch LCD	50	170
40-inch LCD	55	180
56-inch rear-projection	65	220
42-inch plasma, 720p	70	240
52-inch LCD	80	270
50-inch plasma, 720p	80	270
50-inch plasma, 1080p	110	380





Based on Consumer Reports, "Power Play: What It Costs to Run a Big Screen TV" (March 2006) (national cost Dept. of Energy 2007 retail avg price 10.65c/kwh).

Data and Figure: Ecos Consulting, <http://www.efficientproducts.org/updates> (2006)

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Free Measures to Save Money (and Energy)

- Turn down water heater so tap water is no hotter than 120°F.
- Set thermostats to 68°F in winter when you're home, and down to 55°F when you go to bed or when you're away. (Programmable thermostats do this automatically.) But – if you have to choose between a shorter nighttime set-back or a larger furnace, go with the smaller furnace.

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Free Measures to Save Money (and Energy)

- Use energy-saving settings on washing machines, clothes dryers, dishwashers, and refrigerators.
- Wash clothes in cold water and only full loads.



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Free Measures to Save Money (and Energy)


- Don't waste water, hot or cold, inside or outside your home.
- Clean your refrigerator's condenser coils once a year.



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Free Measures to Save Money (and Energy) (cont.)

- Air-dry your clothes outside or in the garage.
- Repair leaky faucets and toilets.
- Close drapes and windows during sunny summer days and after sunset in the winter.



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Simple & Inexpensive Ways to Lower Your Energy Bill in 1 Year

- Install a standard 2.5-gallon-per-minute (or less) showerhead. (\$5-15)
- Install water-efficient faucet heads. (\$2 each)

Product	Inefficient Product (gpm) ¹	Standard Product (gpm)	Gallons of Water Saved per	
			per Minute	per Day ² per Year ³
Kitchen Aerator	3.5	2.5	1	8
Sink Aerator	3.5	2.2	1.3	10.5
Showerhead	5	2.2	2.8	14.84
Total:			33	12,217


Product	Standard Product (gpm) ¹	Low-Flow Product (gpm)	Gallons of Water Saved per	
			per Minute	per Day ² per Year ³
Kitchen Aerator	2.5	2	0.5	4.05
Sink Aerator	2.2	1	1.2	9.72
Showerhead	2.2	1.75	0.45	2.34
Total:			16	5,897

¹ gpm – gallons per minute
² based on a total household use of 5.3 minutes per capita per day for showers and 8.1 minutes per capita per day for kitchen and sink aerators
³ based on use for 365 days per year
Based on Metropolitan North Georgia Water Planning District (2008)

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Simple & Inexpensive Ways to Lower Your Energy Bill in 1 Year

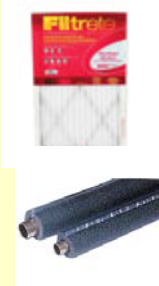
- Install a programmable thermostat and use it. (\$25-75)
- In the attic and basement, seal the air leaks a cat could crawl through, and replace and reputty broken windowpanes. (~\$40)
- Install an R-7 or R-11 water heater wrap if your water heater isn't pre-insulated. (\$15-25)



Emerson Environmental Based on R. Heede, *Homemade Money* (Rocky Mountain Inst. 1995) Prioritizing Energy Efficiency Improvements 11

Simple & Inexpensive Ways to Lower Your Energy Bill in 1 Year (cont.)


- Clean or change the air filter on your warm-air heating system during winter and on air conditioning units in the summer. (\$4-15) But don't use an "ultra pure" filter, as it may negatively impact your furnace's efficiency.
- Insulate the first three feet of hot and inlet cold water pipes. (\$6)



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Simple & Inexpensive Ways to Lower Your Energy Bill in 1 Year

(cont.)




Install compact fluorescent light bulbs in the fixtures you use most. (\$6-30)

	100w Incandescent	23w CFL
Watts	100 w	23 w
Hours used	8000 hrs	8000 hrs
# of bulbs required	8	1
Cost per bulb	\$0.63	\$2.00
Total bulb cost	\$5.04	\$2.00
Energy used	800 kWh	184 kWh
Energy cost per kWh	\$0.12	\$0.12
Energy cost total	\$96.00	\$22.08
Total Cost	\$101.04	\$24.08
Savings with CFL		\$76.96

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Getting Serious: Measures that Cost More, with 1-3 year Pay Back

Get a comprehensive energy audit, including a blower door test to identify sources of air leaks.



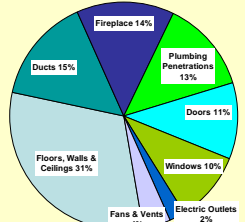
Graphics: Energy Star

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Getting Serious: Measures that Cost More, with 1-3 year Pay Back

Caulk and weatherize all leaks identified by the test. Start with the attic and basement first (especially around plumbing and electrical penetrations, and around the framing that rests on the foundation), then weatherize windows and doors.

Primary Air Infiltration Locations




Data: David Johnson, What's Working for Build It Green (2007); graphics © Emerson Environmental, LLC

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Getting Serious: Measures that Cost More, with 1-3 year Pay Back (cont.)


Seal and insulate air ducts.




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Getting Serious: Measures that Cost More, with 1-3 year Pay Back (cont.)

- Have heating and cooling systems tuned up every year or two and determine if a replacement is needed. Don't oversize.
- Install insulating shades for your windows, or add insulating storm windows; shade sunny windows or add solar gain control films.
- Insulate hot water pipes wherever they are accessible.



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Going All the Way: Expensive Measures Taking 3-15 Years for Pay-Back


- Attic: increase attic insulation to R-38 in mild climates. (Better yet, go all the way to R-50.)
- Walls: adding wall insulation is more difficult and expensive, but is effective.
- Consider installing occupancy sensors with lights to automatically turn lights off when the room is unoccupied.



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Going All the Way: Expensive Measures Taking 3-15 Years for Pay-Back (cont.)

- Replace exterior incandescent lights with compact fluorescents and put them on a timer or motion sensor if they're on more than a couple of hours a night.
- Convert to solar water heating, especially if you do not have natural gas as a heating source.
- Remodel utilizing passive solar design elements.





Based on R. Heede, *Homemade Money* (Rocky Mountain Inst. 1995)

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Going All the Way: Expensive Measures Taking 3-15 Years for Pay-Back (cont.)



- Upgrade your water heater, furnace/boiler, air conditioners, and appliances to more efficient models. Newer units may be far more efficient. Also, if you've weatherized and insulated, you'll be able to downsize the heating and cooling system.
- Upgrade to double-pane, low-emissivity windows, if replacement is needed.

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Going All the Way: Expensive Measures Taking 3-15 Years for Pay-Back (cont.)

- Replace high-flow toilets with modern water-efficient toilets.
- Install awnings or build trellises over windows that overheat your home in the summer, especially on west or south windows.
- Plant a tree to shade your largest west window in summer. You won't save any money for years, but you'll get an A+ for long-range vision.

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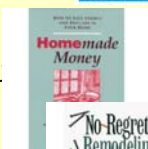

Resources

- PG&E on-line audit: SmartEnergy Analyzer™
http://www.pge.com/res/energy_tools_resources/energy_tools.html
- Home Energy Saver on-line audit:
<http://hes.lbl.gov/>
- Dept. of Energy Do-it-Yourself Energy Audit:
http://www.eere.energy.gov/consumer/your_home/energy_audits/index.cfm/mytopic=11170

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Resources

- Web sites, including Energy Star
- Books:
 - Richard Heede, *Homemade Money*
 - *No-Regrets Remodeling: Creating a Comfortable, Healthy Home That Saves Energy*
- Professional Energy Auditors, such as
 - Suzanne Emerson, Emerson Environmental

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Questions?

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