

WAYS TO SAVE MONEY THROUGH CONSERVATION (changing behavior) AND EFFICIENCY (using better technology)

1. *Try to refrain from buying bottled water. Instead, buy a reusable bottle. This saves money and keeps plastic out of landfills.*

Americans consume an average of 91 liters of bottled water per person annually (7.58 Liters per month). A 1 liter bottle of bottled water consumes 0.944 kWh (944 watts for 1 hr, more energy than it takes to power a Panasonic 42" plasma TV for 2 hours) and two liters of water to manufacture. You can instead buy a filter that attaches to your faucet which is still a better alternative to bottled water. **As for your monthly savings:**

Family of 4 people: 30L/month

One 1 liter at Costco (2 ½ L bottles): \$0.58=

\$17.40 per month for whole family

Monthly Savings: **\$17.40, 38.80 lbs of CO₂, equal to monthly intake of 36 trees.**

2. *Use Cold-cold wash cycles instead of warm-cold or hot-cold.*

It is estimated that 90% of energy use for a washing machine goes to heat the water. By switching from Hot-Cold to Warm-Cold, you can save 45% on washing energy use costs. By switching all the way to Cold-Cold, you can save 90 %, or about **\$60 a year**. Many detergents available now are effective in cold water. Save hot-cold cycles for very stained items only. Warm and cold will be sufficient to keep clothes clean. Always have cold water to rinse at least, as a hot rinse doesn't make much difference. **Monthly Savings: \$5, 47.57 lbs CO₂**

3. *Keep Your Tires Inflated at the Proper Pressure*

According to the Bureau of Transport Statistics, the average car fuel efficiency is 22.4 mpg. If tires are deflated by even 10psi, that decreases the efficiency by 1.3 mpg. If one drives a car 10k miles/year, one would have to purchase an extra 27.5 gallons, costing an extra \$97.09 (assuming price is \$3.53/gal) and 530.8 lbs of CO₂ per year, Which is the amount of CO₂ that 40 trees absorb in a year and the same pollution as burning 27 gallons of gasoline. **Your Monthly savings:**

Average Car (22.4 mpg) driven 10,000 miles: 446.5 gallons

Car with deflated tires (22.1 mpg) driven same: 474 gallons

Difference: 27 gallons, or \$97.09 a year (gas at \$3.53/gal)

Monthly Savings: \$8.09, 44.2 lbs of CO₂, equal to monthly intake of 40 trees.

4. *Unplug electronics when not in use.*

Do you have a DVD player that has replaced a VCR but the VCR is still plugged in? An average VCR consumes 4.5W when plugged in but not in use because it has to power its clock and the receptor waiting for remote control signals that rarely come. For that, you pay \$5.67 a year. New TVs use an average of 4.8W. A boombox used 1 hr/day costs \$4.84 per year (\$0.403 per month, 3.83lbs CO₂) when plugged in and not in use. Average TV in CNet review costs \$0.34 per month and 3.2 lbs CO₂. **Your Monthly Savings:**

VCR: \$0.47, 4 lbs of CO₂

Boombox: \$0.403, 3.83 lbs of CO₂

TV: \$0.34, 3.2 lbs CO₂

Monthly Savings: \$1.21, 11.03 lbs CO₂

5. *Turn off the computer at night.* Using power saving features like sleep mode on desktops and monitors saves energy, but the single most important thing you can do is to make sure that your computer (desktop and monitor) is turned off every night. This is easily done by flicking the switch on the surge protector that most computers are attached to (but the surge protection will still work). **Monthly savings (if computer used to be left on all the time):**

\$11.89, 113.07 lbs CO₂, equivalent to planting 8.7 new trees every month

6. *Change the Thermostat*

Bringing it down to 68 from 72 saves 8% on heating costs. Bringing it up to 76 in summer months (May-September) saves another 8% **Monthly savings:**

For Winter (November-March)

- 72 degrees 24/7: 178.6 therms, \$207.18, (baseline cost)
- 68 degrees 24/7: 148 therm, \$171.68,

? \$35.50, 1,228 lbs CO₂ in savings- equal to monthly CO₂ intake of 1137 trees.

For Summer (May-September)

- 72 degrees: 583.6 kWh, \$84.04 (baseline cost)
- 76 degrees 24/7: 326.2 kWh, \$46.97

? savings: \$37.07, 352.64 lbs CO₂- equal to monthly CO₂ intake of 327 trees

7. *Always turn off incandescent bulbs when not in room.*

The amount of energy spent warming them up is negligible, and 90% (54 out of 60W) goes towards heat, not light.

8. *Reduce water temperature from 140 to 120**

Each 10 degree drop saves 5% on water heating costs. The average BG&E home @ 72 degrees 24/7 we've been using would save \$2.78 per month just by dropping the temp to 120. **Monthly Savings: \$2.78**

* Unless your dishwasher does not have a way to heat its own water (then 130 should suffice).

If one average household does the following:

- **refrains from buying 30L of bottled water**
- **switches to cold-cold wash cycle**
- **keeps their tires properly inflated,**
- **unplugs their TV, boombox and VCR if not in use,**
- **turns off their computer & monitor at night,**
- **brings the temperature down to 68 Nov-March and up to 76 May-Sep,**
- **and reduces their water heater temp to 120**

that household's monthly savings will be:

\$81.87 in winter, 83.44 in summer months

1483 lbs CO2 in winter, 607.31 in summer

Annually savings will be: \$826.55, 10,452 lbs (over 5 tons) of CO2- Equivalent to monthly CO2 intake of 1935 trees

SOURCES

- *Bottled Water*: www.costco.com, <http://www.worldwater.org/data20062007/Table13.pdf>, and the Pacific Institute http://www.pacinst.org/topics/water_and_sustainability/bottled_water/bottled_water_and_energy.html
- *Cold Wash*: Consumer Reports October 2008
- *Tire Pressure*: Bureau of Transport Statistics www.bts.gov, http://www.gasbuddy.com/Gas_Prices/Maryland/index.aspx (for gas prices by ZIP code)
- *Unplugging Electronics*: Consumer Electronics [http://www.ce.org/pdf/Energy%20Consumption%20by%20CE%20in%20U.S.%20Residences%20\(January%202007\).pdf](http://www.ce.org/pdf/Energy%20Consumption%20by%20CE%20in%20U.S.%20Residences%20(January%202007).pdf),
CNet http://reviews.cnet.com/4520-6475_7-6400401-3.html?tag=rb_content;rb_mtx
- *Turn Off the Computer*: http://www.energystar.gov/index.cfm?c=power_mgt.pr_power_management (calculator available on right side of page)
- *Turn Down Water Temperature*: Rocky Mountain Institute www.rmi.org, Baltimore Gas & Electric Home Energy Calculator <http://bge.apogee.net/homesuite/calcs/rescalc/>

SMALL AND MEDIUM INVESTMENTS

1. *Switch from regular incandescent bulbs to CFLs.*

PEPCO is currently offering a \$1.50-\$3 discount on select CFL bulbs (a range of wattages available that equal existing 40W, 60W, 75W and 100W bulbs). We went to Home Depot in Gaithersburg, MD, where a 6-pack of n:Vision 14W CFLs (rated highly by Consumer Reports) costs \$4.12 including tax, or \$1.03 per bulb. Including power, the lifetime cost of this bulb (10000 hrs) is \$21.18. A 60W incandescent from a 6 pack costs \$0.59, plus its lifetime (2000 hr) power costs of \$17.73. It will take 5 of these bulbs to last as long as 1 14W CFL bulb. **Monthly Savings:**

1 14W CFL bulb + 10000 hrs power: \$21.18

5 60W bulbs + 10000 hrs power: \$88.65

Lifetime savings (assuming 4 hrs use/day): **\$67.47**

Savings per month (assuming 4 hrs use/day): **\$0.83**

The average house has about 16 bulbs that they use regularly. So the savings could be **\$13.28 per month and 122 lbs CO2**.

2. *Buy a programmable thermostat*

These can be had for as little as \$35 from Home Depot and allow you to preprogram temperature settings for days and nights (some also allow different settings on weekends). It would pay for itself in month if you turned the temp down to 68 or up to 76 depending on the month. Assuming 178.6 therms/month November-March, and that lowering the temp 1 degree saves 2% on costs. If you programmed the 'stat to 62 at day (10am-6pm) and 68 other times (6pm-10am) when no one's home, you would save 12% on heating costs in winter and 10.67% in summer if you turned it up to 80 during the day and 76 the rest of the time.

Winter month costs: 133.07 therms, \$154.36,

Winter month savings (vs. 72 all the time): \$52.82, 1828 lbs CO2 = intake of 1693 trees

Savings for 5 months: \$229.10 (minus cost of thermostat)


Summer month costs: 262.27kWh, \$37.77

Summer month savings (vs. 72 all the time): \$46.27, 440.2 lbs CO2 = intake of 408 trees.

3. *Use ceiling fans instead of A/C*

Ceiling fans can lower the ambient temperature in a room by 4-7 degrees, allowing you to turn the A/C up to 79 degrees and have the room feel 72. Larger ceiling fans only cost 1.45 cents an hour to run. Central Air, in contrast, can draw 3000 W in an hour (3kW), which costs \$0.43 an hour. Assuming you have six ceiling fans operating @ 100kWh each, the difference is 2.4 kW per hour, the costs of these fans for the hours you're home is: **48.64kWh, \$7, 66.64 lbs CO2**.

4. Choose LCD over Plasma TVs.



The above graph shows the wattages for the models CNet tested over 37". Plasma TVs tend to consume more power when on than LCDs. If you take the average wattage of CNet's study for Plasmas and LCDs, the LCD uses 96.12W less. Medium sized Plasma and LCDs (37"-44") are about the same price now- Best Buy sells LG and Dynex 42" 720p Plasma and LCD TVs at the same prices (\$1000 and \$700 respectively).* Over a year (assuming 8 hrs/day), that's **23.39 kWh per month, which costs \$3.37 and 32 lbs CO2**

5. *Buy an insulation jacket for your water tank*

This costs around \$15-\$30. This reduces costs by 4-9%. The average BG&E home we've been using (temp constant 72) would **save \$1.50-\$2.81** per month if the water tank were properly insulated, which would also raise the temperature by 2-4 degrees w/o having to pay for it.

In summary, if one average household does the following:

- **Exchanges its 16 commonly used incandescent bulbs for CFLs**
- **buys and use a programmable thermostat and change it to 62/68 and 80/76 as mentioned above**
- **uses ceiling fans instead of central air**
- **chooses an LCD screen over plasma**
- **insulates the water tank and visible pipes.**

**That household's monthly savings will be:
\$70.97 in winter, \$48.92 (- cost of ceiling fan operation)
1982 lbs CO2 in winter, 527.56 lbs CO2 in summer**

Total it will save each year:

\$599.45, 12,548 lbs (more than 6 tons) of CO₂, equal to planting 965 trees

SOURCES

- *CFLs*: Home Depot, 15740 Shady Grove Road
Gaithersburg, MD 20877
(301) 330-4900

PEPCO: <http://www.pepco.com/energy/conservation/cfl/>

- *Programmable Thermostat*: www.homedepot.com, Baltimore Gas & Electric Home Energy Calculator <http://bge.apogee.net/homesuite/calcs/rescale/>
- Rocky Mountain Institute www.rmi.org, Mazenti research (contact us if interested)
- *LCD vs. Plasma TVs*: www.bestbuy.com, CNet http://reviews.cnet.com/4520-6475_7-6400401-3.html?tag=rb_content;rb_mtx
- *Insulate Water Tank*: www.homedepot.com, Rocky Mountain Institute www.rmi.org

BIG IMPROVEMENTS & INVESTMENTS

1. *Hybrids*

There are few hybrids that payback within 5 years. The cost payback isn't significant enough to warrant the extra cost of hybrids. *Excluding Ownership Costs (insurance, repairs, etc.), and if one drove 12k miles/year w/ gas price of \$3.53:*

A '08 Toyota Prius will take 4.9 years to pay back **\$3708 premium** (vs. '08 Camry).
You'll save **\$753 and 4183 lbs of CO₂ per year**.

'08 Altima Hybrid will take 5.4 years to pay back \$1879 premium (vs. '08 Altima).
You'll save \$350 in gas per year and 1915 lbs of CO₂ per year

'08 Civic Hybrid will take 8.7 years to pay back \$3601 premium (vs. '08 Civic). You'll save \$412 in gas per year and 2252 lbs of CO2 per year.

'08 Ford Escape Hybrid will take 8.4 yrs to pay back \$4622 premium (vs. '08 Escape). You'll save \$551 on gas and 3009 lbs of CO2 per year.

IF gas prices rise or one drives more miles, the payback time will lower. If the price goes up to \$4/gal, the Prius recoups in 4.3 years, the Altima in 4.7 and the Civic in 7.7 years and the Escape Hybrid in 7.4 years.

Study from Edmunds.com, cited in WSJ.

2. *Insulate Your Attic and Basement Properly*

According to Energy Star, sealing air leaks in your house with caulk and weatherstrips and insulating your attic properly (R-38 in MD) and basement (R-11) can save 20% on your heating and cooling costs, or 1 **entire month of winter heating costs and entire month of summer cooling costs**. Ace Hardware has 64 square feet of R-38 insulation for \$70. The savings would pay for 256 sq. ft of this insulation per year, and 4 packs of DAP 10.1oz caulk.

3. *Photovoltaic (Solar) Panels*

PV Cells are still somewhat expensive. BP Solar (in Frederick, MD) is charging \$9000 per 1kW panel, which will produce 1kWh every hour of optimal sunlight.* Depending on how many you buy, including rebates and incentives, here's how long it takes for the investment to pay off.



However, if one gets 4 kWh average per day per panel, they'll save about 121.6 kWh per month (1157 lbs CO₂), or **\$17.50 per panel per month** off your electric bill, and take away the equivalent of 1071 trees' monthly CO₂ consumption

*Source: <http://www.bp.com/modularhome.do?categoryId=8050&contentId=7035481>

4. *Geothermal Pumps (for Heating & Cooling)*

Geothermal pumps use the ground's ambient temperature (which is usually warmer than the air in winter and cooler in summer) to exchange heat to or from the house when needed. They are expensive (between \$7500 and \$15000), but Maryland has a \$1000-\$3000 rebate program. They can save as much as 70% on heating costs and 50% on cooling costs.* Which means per month they can save \$145.03 per month (= 5020 lbs of CO₂) on heating and \$42.02 (=400 lbs CO₂) on cooling, which equals \$935.25 per year and 27100 lbs of CO₂ per year, which is the pollution of 2.6 cars.

*Source: Rocky Mountain Institute

5. *Windows*

Energy Star Windows cost \$20-\$50 more than regular windows, because of their better insulation and gas fill between panes, but they save at least \$126 a year over single pane windows and \$27 per year over double-pane, clear glass, according to WSJ, which used rate of \$0.1077 per kWh. For Pepco's rates, it would save \$168.46 over a single-pane window and 1602 lbs of CO₂ a year, and \$36.10 and 343 lbs of CO₂ over double-pane.

If one average household does the following:

- **gets a geothermal pump (top performance)**
- **buys a Prius**
- **buys a single 1kW solar panel**
- **replaces a single pane window w/ an Energy Star window**

That household will spend: **\$20,208**

Its annual savings will be: **\$2066.71**

It will take about 10 years to recoup the costs of these investments.

That household will also **save per year: 34,042 lbs of CO₂**

Equivalent to having planted: **2618.6 new trees.**

SOURCES

- *Hybrids*: <http://seekingalpha.com/article/81260-hybrid-cars-it-finally-makes-economic-sense-to-buy-one>, www.edmunds.com, www.wsj.com
- *Insulation*: Energy Star (http://www.energystar.gov/index.cfm?c=home_sealing.hm_improvement_methodology)
- *Solar cells*: BP Solar USA (<http://www.bp.com/modularhome.do?categoryId=8050&contentId=7035481>)
- *Geothermal Pumps*: Rocky Mountain Institute (www.rmi.org)
- *Windows*: The Wall Street Journal, 2 October, 2008.

