

Gas Saving Tips

That Can Save You Hundreds of Dollars Per Year!

Gasoline	Self Serve		
REGULAR UNLEADED	A	R	M $\frac{9}{10}$
PLUS UNLEADED	L	E	G $\frac{9}{10}$
SUPER UNLEADED	B	o	th $\frac{9}{10}$

Kevin Pezzi, MD



Gas Saving Tips

That Can Save You Hundreds of Dollars Per Year!

4th EDITION

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CONTACT DR. KEVIN PEZZI

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Invented by Dr. Pezzi:



Burglar alarms are expensive, prone to false alarms, a minor deterrent at best, and not capable of doing certain things. For example, what if your wife or daughter is home alone and a thug comes to the door: can a burglar alarm protect her? No. But this innovative product can do that and more, even though its price is just over \$20. You've never seen anything like it, and neither have the criminals. You owe it to yourself and your family to buy one. Find out more at www.stop-burglars.com

Other ways to save energy

Before I present my gas saving tips, I want to mention other ways to save energy and discuss some of the political and business aspects of energy conservation.

After seeing that my propane supplier hiked its prices 44% in the past year, I decided to begin fighting back by converting my dryer so the clothes would be dried by solar energy rather than propane. Sound complicated? It's not. Your home probably already has the two most essential ingredients of this conversion: a roof and an attic.



That's right, you don't need any expensive high-tech solar collectors or other fancy equipment. All you need to purchase is a filter and an inexpensive metal duct (available from Home Depot, Menards, Lowes, etc.) to channel the warm, dry air in your attic into your dryer. My home is situated in a relatively shady area of cold, humid northern Michigan, yet my dryer conversion works very well. The conversion will work even better if you live in a warmer climate with less shade. I will post the details of this conversion and discuss this subject in more detail in one of my web sites. If you want more info about how you can dry clothes in a dryer without using any propane, natural gas, or electricity to heat them, [contact me](#).

Dryers are currently designed so their input air is supplied by the room in which they are situated. This is a dumb idea. When dryers are placed in a basement, they suck in cold, humid air¹. Dryers placed in *any* room (including the basement) will ingest huge quantities of air that you may have paid to heat (during the wintertime) or cool (during the summer). During a typical drying cycle, a standard dryer can pull thousands of cubic feet of air from your home and expel it outside. This creates a small vacuum inside your home that pulls an equal amount of air from the outside to equalize the pressure. If it is cold outside, your furnace will consume more energy to heat the incoming air. If it is hot outside, your air conditioner will consume more energy to cool the incoming air. Thus, you are wasting energy twice.

¹ Clothes dry faster when the air entering the dryer is warm and dry. Air that is humid (moist) and cool is less effective at drying.

Here's something else to think about: How does the air enter your home? If a door or window is open, it will preferentially enter that way. If the doors and windows are closed, air will enter via various vents (such as the bathroom exhaust vent) and small gaps in your walls. Those spots may be contaminated with mold, spores of which can spread through your home, pulled in by the incoming air stream.

Converting your dryer so its input air is supplied by the attic solves all of the problems mentioned above:

- You won't have to pay to heat the air in your dryer.
- You won't have to pay to heat or cool the air pulled into your home to replenish the air exhausted outside.
- You won't have an influx of mold spores from wall cavities, etc.



Like mold? Like to clean?

Furthermore, feeding attic air into your dryer helps to cool your attic, which reduces your summertime air conditioning expense². Your clothes might smell better, too. Why? Attic air is essentially outside air—just warmer and dryer. That fresh air is usually cleaner than the air inside the living space of your home, especially if your dryer is located in a musty basement.

With such compelling and obvious advantages, I am surprised that appliance manufacturers and builders design dryers and homes so they

² The rate at which heat flows (as from a hot attic into the living space of your home) is proportional to the temperature difference between the attic and the living space.

do not take advantage of a readily available source of air that is warm, dry, and free.

Refrigerators are one of the other big energy hogs, yet appliance manufacturers have failed to take advantage of cold winter air that could be easily piped in to slash their energy consumption. If we're really so concerned about global warming, carbon emissions, and the endlessly escalating prices of energy, why are appliance manufacturers so obtuse about this matter?

Or why can't appliance manufacturers make a dishwasher that cleans dishes so well that prewashing them is unnecessary? I recently polled several appliance retailers and called various manufacturers saying that I was eager to buy a new dishwasher if it could eliminate the need for me to waste time (and who knows how much hot water) prewashing items to remove adherent food particles. How many could offer what I was looking for? None. A few had models that claimed to scrub pots placed at the very back of the bottom rack, but I want a dishwasher that cleans everything put into it, not just one item.



How many people smile while washing dishes?

So why can't appliance manufacturers make a dishwasher that actually washes dishes instead of just rinsing and drying them? Part of the blame goes to our government. In its quest to control almost every aspect of our lives, federal legislators enacted laws limiting how much energy and water could be consumed per cycle. Saving water and especially energy

are worthy goals, but there is a major flaw in the logic used in Washington: producing dishwashers with inadequate cleaning power compels people to wash items before placing them in a dishwasher. The inefficiency of that manual process leads to a net *increase* in the usage of energy, water, and detergent. Unfettered from government regulations, appliance manufacturers might stand a better chance of making a dishwasher that truly washed dishes.

Or perhaps not. If appliance manufacturers were truly innovative, why couldn't they produce a good dishwasher in the decades before the US government began regulating their products? The first dishwasher I made doesn't look as pretty as the gleaming stainless steel top-of-the-line commercial models, but it eliminates the need for prewashing, even items with "sticks like glue" goo, like baked-on cheese. So how can a doctor turn a small pile of spare parts in his home workshop into a dishwasher that can surpass the cleaning efficiency of products made by corporations worth billions of dollars?

For the answer to that, just look at the want ads. Buried in that bewildering variety of postings is a remarkable void: after decades of scouring them, I've yet to find a corporation looking for an inventor. Corporations rely upon their engineers to innovate, presuming that the ability to pass engineering courses in college somehow magically confers creativity, too. It doesn't. One can be a perfectly competent engineer and design products that work without necessarily being able to think of ways to make them better. For example, think of the scads of engineers who've worked in the past century designing tractor tires. They made tires that worked, so they were competent engineers. After being frustrated by the many limitations of a standard tire, I invented one that can quickly (in less than a second) morph from a tire into a track, or vice-versa. My device offers the benefits of a tire and a track in one unit, and it does several things that neither tires nor tracks can do.

In my opinion, the assumption that engineers can innovate is one of the most costly and pervasive blunders in history. This mistake has given us innumerable products that aren't as good as they could be, and are sometimes downright exasperating. Corporations occasionally purchase inventions from independent inventors, but a number of factors—such as fears of patent infringement lawsuits and the "not invented here" syndrome³—makes that the exception, not the norm. Result? Billion-dollar corporations are smugly proud of their second-rate products, such

³ The not invented here syndrome is manifested by a reluctance of corporations to consider inventions conceived by independent inventors. Underlying this syndrome is an egotistical assumption that people outside their corporation couldn't possibly think of better ideas.

as dishwashers that don't clean very well, tractor tires that don't have much traction, and clothes dryers that burn expensive energy to dry clothes even though most dryers are just a few feet away from an attic that can supply an essentially inexhaustible source of free energy.

While the USA is the most innovative nation ever, most of the good inventions conceived here are never turned into products that you can buy. Instead, most manufacturers give us second-rate products that aren't nearly as good as they could be.

In the past few months, as energy and other prices have skyrocketed, I've sensed an unprecedented angst developing as Americans realize that their standard of living will fall. If you're spending thousands more every year for energy and food, that's thousands less you can spend on the fun, discretionary things like boats, snowmobiles, vacations, computers, and whatnot. Goodbye, big luxurious SUV. Hello, econobox that rattles your teeth every time it passes over a tar strip.

Our position on the economic ladder is falling as prices rise and jobs move overseas. We cannot compete by working for less, but we can compete by being more innovative. However, transforming the vast untapped pool of American ingenuity into saleable products will require that American businesses be more open to outside ideas.

Some corporations are so afflicted with the not invented here syndrome that they won't even accept ideas given to them. For example, I contacted the president (I'll call him Mr. X) of the company that made my snowblower to discuss problems that I had with it. During that conversation, he mentioned that his company was debating whether they would begin manufacturing tractors. However, he did not want to be just another "me, too" producer of mediocre tractors because that market is already flooded with umpteen ones from many manufacturers who compete on price because they can't develop tractors that would truly stand out from the crowd—tractors that people would gladly pay more for, and hence tractors that would be more profitable to manufacture.

I have many ideas for improving tractors, from the tire mentioned above that can reversibly morph into a track to improvements that would allow a small tractor to do jobs that now require huge tractors, bulldozers, or even a heavy equipment front-end loader. Currently, manufacturers rely upon brute size and mass to give their products more powerful abilities, but this reliance upon more weight to do more work is an egregious waste of resources. I can make a 600-pound garden tractor do things that tractors weighing ten times as much cannot do, proving that bigger is not necessarily better.

I told Mr. X that I had several ideas that would enable his company to manufacture superior and more profitable tractors. I know that corporations are usually resistant to pay independent inventors for their ideas, so I offered to give him one idea free, or for a nominal sum (\$1). I also explained that I would sign any contract he gave me; a contract written by his legal staff prohibiting me from suing them for patent infringement. What did I ask in return? Only that he consider my other ideas—inventions that I would also supply to them without obligation. If he thought my inventions were valuable, I would accept any payment that he, in his sole discretion, deemed to be adequate compensation. Furthermore, I wouldn't just give him ideas; I would give him fully functional products that I developed at my own expense and proved to work. Did he jump at the chance? Hardly. He said that he would consider my offer, but—several months later—he still hasn't accepted it.

I was willing to make that offer because I don't have one good idea; I have so many that I can afford to give away some to get my foot in the door. However, when manufacturers won't accept free inventions that could give them a huge competitive edge, you really have to wonder if they're doing everything they could to improve their products and hence the American economy.

The answer is obviously no. Think of that every time you turn on your clothes dryer. Not only are you paying for the energy that heats your clothes, you're also paying for a hidebound reluctance to consider new ideas. You're paying a high price so manufacturers can keep patting themselves on the back, thinking that their products are fine the way they are. All too often, they're not. This lack of innovation forces people into using products that don't perform as well as they could. Those products may exasperate you, waste your time, or even kill you. Want a real-life example?

While building a shed last summer, I heard that a middle-aged woman in a nearby town died after falling off her ladder. Ironically, her family owns a hardware store. If ladder manufacturers cannot produce ladders that such a person can use safely, I thought, there is something fundamentally wrong with their products.

And there is. You might excuse her death as being just another statistic traceable to use of an inherently risky product. In my opinion, her death—and many others like it—are instead attributable to something else: an appalling and even shameful lack of innovation by ladder manufacturers. In the past century, what have ladder manufacturers done to substantially improve ladder safety?

Answer? Nothing. This amazes me, because there must be a small army of engineers working for the many ladder manufacturing companies in the world. What on Earth have they and their predecessors done every day for the past century? Construct ladders from fiberglass and aluminum instead of just wood? Wow, what did that take? A couple of days of engineering time? A week, max? So what did they do the rest of the past century?



See my www.lighthouse shed.com site for more pictures of this shed

While building my shed (pictured above), I was as careful as I could be while using various ladders but still had several near-misses with them that scared the bejesus out of me. Even when I wasn't on the verge of falling, the experience was much less pleasant than it could have been because I knew that I was always a split-second away from disaster. Does it have to be that way?

No. Those near-misses inspired me to conceive of several ways to make ladders safer and more convenient. Just one of my ideas makes ladders so safe that it is virtually impossible to tip one over (I am so certain of this that I'm thinking about offering a \$1000 prize to anyone who can do it). I invented another ladder so safe that a clumsy and intoxicated person couldn't fall off it, or be injured in any way by using it, even if he were offered a million-dollar prize for doing that.

If one person can generate so many ladder innovations after building just one shed, why can't ladder manufacturers drum up an original thought now and then?⁴

⁴ The lack of innovation exhibited by ladder manufacturers is particularly surprising when you realize that a substantial portion of the purchase price of a ladder goes to pay their legal expenses. Thus, they could spend more money to

The answer is obvious: Ladder engineers are competent *engineers* because their products don't fall apart when you climb them. However, they are highly incompetent when it comes to *inventing* and *innovation*. **Engineering and inventing are not the same thing!** That's obvious to me, and now to you, too, but it is a lesson that manufacturers in many fields have yet to learn. Their lack of innovation often does not penalize them in the marketplace, because their competitors are equally devoid of new ideas. Therefore, they don't pay a price for their laggard pace of innovation, but you—the consumer—do. You may be killed when you fall off a ladder, hit a tree while snowmobiling, or lose control of your car while driving on icy roads. Incidentally, I have solutions to all of those dangers (and many more), so I know that manufacturers in many industries could make much better products once they realize that relying upon engineers to innovate is truly a dumb idea that penalizes consumers.



Do you love wild animals?
Do you care if they needlessly suffer and die during wintertime?
If so, [find out](#) how you can help.

www.shelteranimals.org

make safer ladders, sell them for less, and yet make even more profit (secondary to their reduced expenditures on lawsuits) if they incorporated my ideas for making safer ladders—or their ideas, which they seem incapable of generating.

Do I seem a bit bitter about this? I am! I am sick and tired of using products (or reengineering them) that were apparently conceived by people who seem to lack common sense, let alone a capacity for inventing. You, too, would be perturbed if you knew of the chasm that exists between the *products you could be using* and the *crummy stuff you put up with* because many manufacturers cannot innovate, or swallow their pride and look to someone who can.



Notice how warning labels always put the onus for safety on the consumer? A more accurate warning label would read: **FAILURE OF LADDER MANUFACTURERS TO HIRE PEOPLE WITH INNOVATIVE MINDS WILL RESULT IN MANY INJURIES AND DEATHS. GO AHEAD AND SUE US. WE DESERVE IT.**

After I wrote the paragraph above, I turned on the radio and heard that gasoline—which now costs about \$4 per gallon—may hit \$7 by the end of the year six months from now. In the past week, I learned that since the beginning of the year, our legislators in Washington held 40 meetings to address high gas prices and 60 meetings to investigate whether the terrorists and suspected terrorists held in the Guantanamo Bay detention camp are being treated nicely enough.

No matter where you fall on the political spectrum—Democrat, Republican, Libertarian, independent, conservative, liberal—if you dispassionately look at what the Federal government does and ignore their hot-air rhetoric about helping you, you'd have to conclude that our "leaders" are not very effective. Most of their energy goes into political posturing, not solving problems. If you were as effective in solving problems in your job as our politicians are, you'd be fired in a heartbeat. Politicians rarely solve problems; instead, they spend hundreds of billions of dollars trying to make us think they're doing something useful. Whatever good they do is trivial compared with the money they spend in the process.

Unless you are wealthy, you can't afford to wait for the government and industry to solve our energy crisis. We need outside-the-box solutions that work *now*, not decades from now. We CAN do that at the same time we do something else that may seem impossible: improve our lifestyle. Gloomy inside-the-box thinkers prognosticate that it will take decades to develop viable sources of alternative energy to supplant our current reliance upon crude oil, coal, natural gas, and propane. They dismally drone on about how the sky is falling and there's nothing we can do in the short term except tighten one's belt and suffer as the energy-exporting countries tighten the noose around our necks (interesting tidbit: most of those countries are ones that owe their continued existence to the United States, showing how ephemeral their gratitude is).

Two weeks ago, I knew less about knowing how to be self-sufficient in terms of energy than I did about getting a date with Miss America. However, in that short time frame, inspired by skyrocketing energy prices, I decided to begin converting my home and car to use energy that I produce—or, more precisely, extract from nature. It's all doable, and doable *now* . . . if you're willing to think outside-the-box. For example, if you want to tap wind energy, don't think of the conventional solution: a windmill. They're complex and so expensive that it takes years to recoup your capital investment. You can extract even more wind energy by a vastly simpler process that a Boy Scout could assemble using cheap and readily available materials. I can even tell you how to extract energy directly from trees—and without burning them, I should add.

Want to follow my journey to energy independence? I will post details in [my blog](#) and show you how to do what I've done.

More outside-the-box ways to save energy

Dr. Pezzi's [Electrical Plug Cleaner](#)

UPDATE: It is now April 17th 2011, and the ground is covered with snow, which began falling last October. It's been a cold winter, yet I was warmer than ever even though I did not turn my furnace on once. I discussed this in a [blog posting](#).

Gas Saving Tips

That Can Save You Hundreds of Dollars Per Year!



Before reading this book, please check for an updated version of it by visiting www.second-opinion-doc.com/gasbookcheck.php?book=gas&ed=4

Fuel density

Purchase fuel in the early morning, nighttime, or whenever it is coolest outside. Fuel is denser when it is cool. Fuel pumps measure fuel *volume*, not *density*, so you get more gas for the money by filling your tank during the cooler times of the day. According to one analysis, you could be shortchanged about 1 quart of gas per fill-up if you buy gas on a hot day. Only one state, Hawaii, mandates that gas sold in it be compensated for temperature.



With everything else being equal, you can save a bit of money by refueling at stations paved with concrete rather than asphalt. The latter is darker and absorbs more solar

radiation, which keeps the ground below it warmer. That warmth slightly increases fuel expansion in the station's underground tanks, which reduces fuel density.



Fuel type

Purchase gas with the octane rating recommended in your owner's manual⁵. Using a higher-octane fuel will not boost the performance of your automobile. Octane functions to control engine knocking. If your engine doesn't knock on regular (87 octane) gas, switching to premium won't help—you cannot cure a problem that doesn't exist.



Tire pressure

Keep your tires inflated at the tire pressure recommended in your owner's manual or on the driver's door sticker. Underinflation will reduce mileage and tire life span, possibly causing tread separation and blowouts. Check tire pressure with a gauge, not by looking at the tire and estimating whether its pressure is low. Use an accurate tire pressure gauge. Generally, digital tire pressure gauges, or mechanical ones with a dial and needle, are more likely to be accurate than the pencil-shaped slide-type gauges. Check tire pressure during the cooler times of the day before driving your car when its tires are at the ambient temperature. If you have a heated garage, check tire pressure in wintertime at least a few hours after letting your car sit in the cold. Always check tire pressure whenever the temperature plummets, such as during the fall or early winter; otherwise, check it at least once per month. If you purchase new tires, have your tire dealer use rim sealant, which can minimize how often you must add air by reducing air leakage.



Check tire pressure with a gauge, not by looking at the tire and estimating whether its pressure is low. Use an accurate tire pressure gauge. Generally, digital tire pressure gauges, or mechanical ones with a dial and needle, are more likely to be accurate than the pencil-shaped slide-type gauges. Check tire pressure during the cooler times of the day before driving your car when its tires are at the ambient temperature. If you have a heated garage, check tire pressure in wintertime at least a few hours after letting your car sit in the cold. Always check tire pressure whenever the temperature plummets, such as during the fall or early winter; otherwise, check it at least once per month. If you purchase new tires, have your tire dealer use rim sealant, which can minimize how often you must add air by reducing air leakage.



⁵ However, some older vehicles may require more octane to control engine knocking (the pinging sound that results when the fuel-air mixture detonates in the engine's cylinder). Note that knocking may not be apparent because most vehicles manufactured since the mid-1980s automatically adjust ignition timing to prevent detonation, which can damage the engine. If detonation occurs, ignition timing is retarded (delayed). That protects the engine, but reduces fuel economy. Bottom line: You can increase your fuel economy by using higher-octane fuel if your car requires it. Otherwise, you will save money by using regular gas.

Consider inflating tires above their recommended pressure if you take short trips only, drive in cold weather only, or never drive fast. Here's the logic behind this tip: Tires inflated to higher pressures have less rolling resistance, thereby offering greater fuel economy. Tires become hotter when used in warm weather (that's obvious), when used for long trips rather than short ones, or when driven faster. Tire and auto manufacturers know that air expands when it becomes warmer (if you've had a class in chemistry, you are probably familiar with the PV/T equation that specifies exactly how much pressure changes with temperature variation). When air is trapped in a confined space such as a tire, expansion increases its pressure.



Cognizant of the maximum safe peak operational pressure of a tire, manufacturers make allowance for the pressure increase that occurs in tires during use. They know that some of their customers will take long trips when the atmospheric temperature is 110° F or more, so they reduce the recommended inflation pressure to a level that won't exceed the maximum safe peak operational pressure during those extreme conditions. If you don't take long trips when it is blazing hot outside, your tires will not become that hot, so their pressure will not reach their maximum safe peak operational pressure.

Bottom line: People who subject their tires to less extreme conditions could inflate their tires to a higher “cold” pressure and never exceed the maximum safe peak operational tire pressure. Essentially, what manufacturers do is to reduce the recommended pressure for everyone because they think people are too stupid to individualize their pressures for their driving conditions. If you are bright enough to utilize this tip safely, you could save money on gas. However, tire overinflation can be hazardous, so stick with the manufacturer's recommended pressure if you don't know enough to figure out how much extra air can be safely added to a tire. **You should never exceed the maximum inflation pressure molded on the tire sidewall.**



I will give some advice that will assist you in determining the optimal inflation pressure in a future edition of this e-book, so you may wish to [check for an updated edition](#).





Whenever possible, inflate tires when the ambient humidity is low. Why? Air is a mixture of various gases. The primary ones are nitrogen and oxygen, but some water vapor is also present. The amount of water vapor depends on your climate. In deserts, the air is generally dry (less humid), which reflects the fact that it contains little water vapor. In many other areas, air contains a substantially greater amount of humidity, and therefore water. The problem with water is that it can turn from a gas to a liquid (or even a solid) at temperatures commonly encountered during automobile operation. Furthermore, this problem is compounded when air is compressed,

because compressing air reduces its ability to hold water.

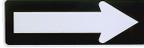
If you are familiar with the concepts of *relative humidity* and *dew point*, you know that as air cools, some of its water vapor may change from a gas to a liquid because cool air can hold less moisture than warm air (you've seen proof of this when you see water droplets condense on the outside of a cold glass or soft drink can). Once it does that, the pressure exerted by that water plummets because a given amount of water occupies much less volume when it changes from a gas to a liquid. If there is little water vapor in the air, cooling it will not appreciably change its pressure. However, air that is hot and humid can be 6% water vapor. If most of that condensed, you could lose 1 or 2 psi (pounds per square inch) of tire pressure. That may not seem very significant, but this problem can be cumulative as air leaks out of the tire and more air is added.

Note that any condensed water will not leak from a tire; the water may cling to the inside of the tire or rim, or pool at the bottom of the tire. Over time, this selective sequestration of water inside the tire can cause various problems in addition to affecting tire pressure. Incidentally, tires with condensed water in them experience a greater pressure expansion when they heat up during use because the temperature increase permits some of the condensed moisture to become a gas again. This factor is especially important to consider if you inflate tires above their recommended pressure as discussed in the above tip.



Aerodynamic drag

Drive more slowly. Once your car is in its highest gear, the faster you go, the more fuel you'll consume. Air resistance increases disproportionately with increases in speed. When your car is traveling at 75 mph, for example, most of its power is wasted overcoming air resistance.



Purchase a vehicle without a roof rack unless you need that accessory. Roof racks—even when empty—increase aerodynamic drag.



Keeping your car washed and waxed will reduce its aerodynamic drag, thereby improving fuel economy.



At speeds below 40 mph, you burn less fuel by opening your windows rather than using your air conditioner. However, above that speed, you typically consume less fuel by closing the windows and using the air conditioner. Of course, you consume even less fuel if your windows are closed and your AC is off. To reduce the need for air conditioning, purchase a light-colored vehicle (white is best) and leave the windows cracked open and/or park in the shade whenever possible. Reflecting sun shades are another option to keep your vehicle cooler.



Continues on the next page

Miscellaneous fuel-saving tips



Remove unnecessary items from your car. Golf clubs, books, magazines, and other stuff adds extra weight that reduces your gas mileage. Remember that fuel adds weight, too, so you can increase your mileage slightly by not filling your tank. Two caveats:

- You should keep your tank near full during the cold winter months to reduce condensation inside it.
- Don't let your tank get near empty.

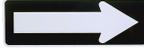


Want another way to reduce fuel consumption? Lose weight. Automobiles burn less fuel transporting lighter people. I know what you're thinking: "It's very difficult to lose weight and keep it off. Why even try?"

When I got out of my residency program, I was so fat that I could not see my feet when I stood up. Although I am now 20 years older, I have a better body than most teenagers. How did I get in such good shape — *and stay that way?* Probably not in the way you think. My work is primarily sedentary, I eat sweets, and I never starve myself. In fact, I usually eat until I am totally full, and I usually "pig out" at least once per

week. I don't use any drugs or herbs to lose weight. I exercise occasionally, but the workouts are brief and not too strenuous.

So how did I lose weight easily, and keep in great shape without torturing myself? I described these tips in my book, [How to Lose Weight Without Dieting, Drugs, Herbs, Exercise, or Surgery](#). You can read it in an afternoon, and be on your way to having a great body — easily.



Use your cruise control whenever possible when driving on mostly flat roads. Engines consume less fuel when they operate at a fixed speed. However, while ascending hills, cruise controls typically have more of a “lead foot” than humans do as they react to maintain the vehicle's preset speed.



Furthermore, cruise controls don't have the brains to slow down before descending a hill, which is something everyone should do. By slowing in advance, you can obviate the need to brake on the way down to limit your speed. That saves fuel and brake wear. If you are one of the many people who crest a hill at the speed limit and then let gravity accelerate your car on the way down, you may be ticketed by police, who often park at the base of the hill to target drivers ignorant of gravity. Many people grumble that such tickets are not fair, but speeding down a hill is far riskier than an equivalent speed on flat ground because your brakes are less effective while descending hills.



Accelerate gently. Automobile engines are less fuel-efficient during rapid acceleration.



Take your foot off the accelerator and coast before using your brakes to stop. By coasting for several seconds, you reduce fuel consumption and brake wear. You also reduce the risk of not being able to stop in snowy or icy conditions.



Stop your engine if you must idle for 30 seconds or more if it is safe to do so and legally permissible.



Do not overfill your fuel tank. Stop adding fuel once the tank is nearly full and the auto-fill nozzle clicks off. Overfilling can cause immediate or delayed fuel spillage. Fuel typically expands somewhat after entering your tank, which is generally warmer than the station's in-ground tank. Overfilling can also damage your vehicle's vapor collection system, which can be expensive to replace (driving with a damaged vapor collection system can reduce fuel mileage). Furthermore, by topping off your tank, you may pay for gas that is fed back into the station's tanks. In certain areas (those with ozone nonattainment), gas station pumps are equipped with vapor recovery systems that feed back gas vapors into their tanks to prevent vapors from escaping into the air.



Fully tighten your gas cap to prevent gas vapor from evaporating into the atmosphere.



Gently tap the fuel pump nozzle before withdrawing it from your car to help release fuel contained within it.



Keep your vehicle properly tuned. You will get fewer miles per gallon if you drive with fouled spark plugs, a dirty air filter, a clogged fuel filter, or a malfunctioning oxygen sensor.

Air filters typically deteriorate gradually over thousands of miles, but they can rapidly become clogged by driving in extremely dusty conditions, or if a mouse nests in them (female mice are often attracted by engine heat to build what they think is a cozy little home).

The September 2007 issue of *Popular Mechanics* magazine included a “Scam Alert” listing these unnecessary maintenance procedures:

- Engine flushes (unless your engine has unusual sludge deposits)
- Fuel-injection cleaning (if your vehicle is running OK)
- Oil additives
- Long-life antifreeze
- Gadgets that claim to improve mileage, such as water injectors

While almost all gas-saving gadgets do not work, I am surprised that *PM* included water injectors in their list. Perhaps the currently available water injectors for automobiles do not boost performance (which translates into better fuel economy), but water injection is an old technology that unquestionably *does* work. For example, at least one World War II American fighter plane used water injection to substantially boost its horsepower. As a poor student struggling to stretch every dollar, I built such a system from scratch and installed it on my first car.



Change your oil to one with less viscosity during the wintertime if you drive in cold weather and your manual specifies it. Thicker “summer” oil increases frictional losses inside your engine, which increases fuel consumption.



Calculate your fuel mileage at least once every few months, or keep an eye on your vehicle's average mileage if its trip computer includes that figure. If your mileage is declining and there isn't an obvious explanation for it (such as pulling a



trailer or more stop-and-go city driving), it can be a symptom of problems that require servicing.



Depending on your vehicle's mileage and the distance you must travel, driving out of your way to purchase cheaper fuel (or other products) may or may not save you money. Let's say that your car gets 20 mpg. If you drive 10 miles to a station (20 miles round trip), you'll burn an extra gallon of fuel. If you put 20 gallons in your tank, and the fuel costs \$3.00 per gallon, you will spend \$60 for the fill-up. Had you purchased that same amount of fuel at a station selling it for \$3.10/gallon, it would cost \$62. Assuming that you did not have to drive out of your way to purchase the more expensive fuel, you would save a dollar by buying it because you would not need to burn a gallon of fuel to get it. In reality, you would save even more, because there is less wear and tear on your car by driving it less. Additionally, you'll save time.



Some stations offer a discount for customers who pay with cash, while other stations offer a substantial rebate (2 to 5% is typical now) for purchasing gas with their brand of credit card. You can compare cards at www.cardratings.com.



Avoid a gas station when its tanks are being filled by a tanker truck. This process agitates sediment in the tank, which, if pumped into your vehicle, can clog its fuel filter.



Fuel is generally less expensive in mid-week. Gas stations often raise prices Friday through Monday to take advantage of weekend travelers and people who must buy gas to get to work that week.





Keep abreast of the international news. If there is a crisis in the Middle East or even just the possibility of one, oil companies and gas stations often use that as an excuse to jack up their prices



a day or two later (of course, once that threat passes, it may take months for the price to fall). If you hear news that may affect fuel prices, buy fuel *now* and consider filling enough gas cans to supply your vehicle for the next month. Fuel older than that may deteriorate, but its shelf life can be prolonged by adding a fuel stabilizer such as Sta-Bil®.



Whenever possible, plan your trip to combine several shorter trips into one longer trip. With intelligent planning, you can often travel fewer total miles. Because cold engines consume more fuel per mile than warm engines, combining errands can also improve mileage because your engine will be warm a greater percentage of the time.

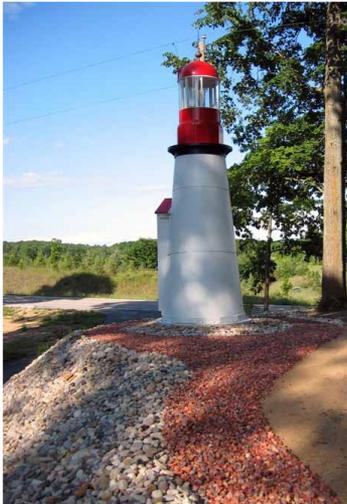


Shop online rather than driving around town, or take advantage of local stores that offer free delivery.



Want even more ways to save energy?
Read [Microhome Living](#).

If you love lighthouses and need a shed, why not have one shaped like a lighthouse? Here is one that Dr. Pezzi designed and built:



For more pictures and information, see www.lighthouseshed.com

Custom Laser Engraving & Cutting

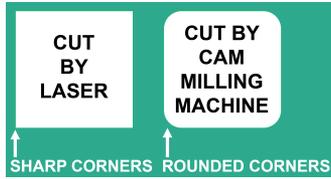


Sample laser engraving on pine

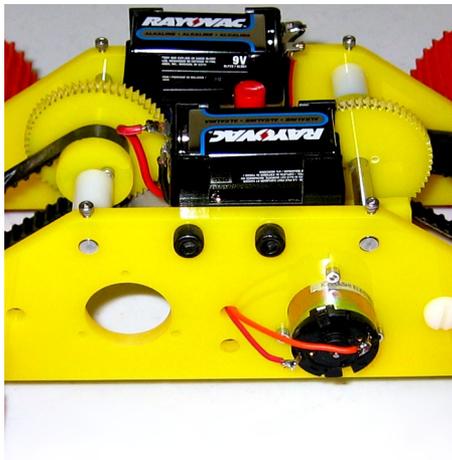
I have a device that uses a high-powered laser beam to cut and engrave a variety of materials. My primary use for the cutter/engraver is to make parts for various invention prototypes, but I can (if you're willing to pay!) also use it to make parts, crafts, and other projects for you. In addition to cutting and engraving flat stock materials, I can engrave images onto various boxes and many 3-D objects, including ones with a round cross-section (cylindrical or tapering, like a wine glass). Give someone a unique customized present she will never forget!

The laser cuts and engraves at 1000 dpi (dots per inch), so it can produce parts with much greater resolution than standard CAM (Computer-Aided Manufacturing) machines, which typically use mechanical cutters (milling bits, etc.) to machine materials. (Incidentally, the wood engraving shown above is from a 300-dpi file, so it does not show the true capability of the laser.) Furthermore, the laser can produce parts that cannot be manufactured by CAM milling machines. For

example, imagine trying to cut a square hole: you can't do it, because the finite width of the bit rounds every corner (see below).



A few of the plastic parts I made with the laser



A device I built with parts made by the laser cutter



Laser-engraved wood plaque of certificate

Laser processing capability		
Material	Engraving (text and images)	Engraving and cutting
Wood	Yes	Yes
Plastic	Yes	Yes
Leather	Yes	Yes
Foam	Yes	Yes
Fabric/cloth	Yes	Yes
Rubber	Yes	Yes
Paper	Yes	Yes
Cardboard	Yes	Yes
Glass	Yes	No
Ceramic	Yes	No
Stone	Yes	No
Metal	Yes (marking only)	No

If you have any questions, or if you wish to obtain an estimate for a project, [contact me](#).