# HOW TO SLASH YOUR GAS COSTS


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You've kept up with your vehicle's routine maintenance. You've made a few simple DIY tweaks. You've stopped speeding and changed your driving habits. But you still aren't getting the high MPG rating you would like from your trusty old car. If you aren't ready to shop for a new hybrid or fuel efficient compact, there are several devices and modifications that will improve your vehicle's fuel efficiency. These projects use advanced technology and a little garage mechanics know-how to slash your fuel costs, no matter what type of vehicle you drive.

We're going to start with projects that reduce your fuel costs by reducing your fuel requirements. If you are searching for ways to cut back on your dependence on oil and make the environment a little healthier while saving money at the pump, these projects will supply you with several fuel-saving options.

## DIY Biodiesel


The appeal of using leftover cooking grease to create cheap automobile fuel is too much to resist for many green driving enthusiasts. Rising gas prices have encouraged backyard chemists to mix-up homemade biodiesel from leftover vegetable oils. Look through your local classifieds for want ads requesting your used cooking oil and you'll be surprised at how many energy-conscious drivers are using this method to reduce their fuel costs. Backyard biodiesel operations boom after the Thanksgiving turkey-frying season is over because of the abundance of used peanut oil. If you think you've got what it takes to turn yucky used cooking oil into super-cheap fuel for your diesel engine, here are a few things to keep in mind:

- You can expect to spend approximately $1.00 to $1.50 per gallon of homebrewed biodiesel.

- Biodiesel is created by chemically separating vegetable-based oils into glycerin, which retains the oil's thick viscosity, and biodiesel that is safe to use in any diesel engine.

- A short list of items you'll need for biodiesel production: two liter bottles, buckets, candy cooking thermometer, electric (not gas) hot plate, small glass jars, Mason jars, gloves, funnel, measuring cup, safety glasses, eyedroppers that measure in milliliters, large cooking pot, and cheesecloth. Many of these things are probably lying around your house or could be purchased for a couple of bucks. Litmus paper is also recommended, but not required.

- You'll also need a few specific ingredients other than the used vegetable oil to make biodiesel: methanol gasoline treatment and isopropyl alcohol gasoline treatment (Heet and Pyroil are popular brands that can be found at most auto supply stores), lye (sodium hydroxide lye is easiest to find in the form of Red Devil Lye drain cleaner),phenolphthalein solution (try online chemistry suppliers), distilled water, and white vinegar.

- Producing homemade biodiesel involves working with flammable and poisonous ingredients and toxic fumes. Always work outside and wear a mask. Keep kids and pets out of your work area.

- Biodiesel's popularity has caused a number of tutorials, DIY videos, and ebooks to pop-up on the internet. You can also check out your local library for books about creating biodiesel.

- Most drivers use biodiesel in a mixture of regular purchased diesel fuel. This is a good idea especially if you have an older diesel engine as the methanol in homemade biodiesel may cause any natural rubber hoses to deteriorate.

- Do your research and slowly adjust your formula if you choose to power your diesel vehicle on biodiesel. While this is a safe and cost-effective fuel option for almost all diesel drivers, sloshing around some oil and dumping it into your tank could cause costly problems.

## DIY Ethanol

Flexible-Fuel Vehicles (FFVs or Flex-Fuels) are becoming the norm for many automakers. Even large SUVs and trucks are now designed to run on gasoline and ethanol. Ethanol, like biodiesel, is a renewable fuel that is made from plant-based ingredients. Most gasoline-powered engines can function on a mixture of up to ten percent ethanol without any modifications, so making your own ethanol is another great way to slash your fuel costs without any major mechanical modifications.

- If you've got a few acres or an unusually large backyard, growing your own plants to make ethanol makes this fuel incredibly cheap. Theoretically, you could produce over four hundred gallons of ethanol with the corn grown on one acre of land. Sugar beets are another high-yielding option. Homegrown soybeans and canola can also be used to make ethanol but will supply you with less than one hundred gallons per acre.

- Ethanol is a form of alcohol and the process to create it is very similar to the process of creating your favorite brew. Fermentation is a major part of the process. Don't taste-test your home-brewed fuel!

- Regardless of if you grew your own plants or what type you chose, you'll have to grind them and use the process of hydrolysis to convert the plants into sugar before you begin to make ethanol.

- If you have a flex-fuel vehicle, it most likely is designed to operate on E85 ethanol blend. To achieve this concoction, you will add 15% gasoline to your homemade ethanol.

## DIY Electric Car


Sure, this project will take a little time and some impressive mechanical skills, but the product of your hard labor will really cut your fuel costs. If you are serious about slashing your fuel bill and dependence on gasoline, creating a do-it-yourself electric car will allow you to make short trips around town without using any gasoline or diesel fuel. You'll be using electricity from your home to power the vehicle, but, in general, electrical power will be considerably less expensive than petroleum-based energy.

There are a few things that you need to consider when contemplating a DIY electric car project:

- Many drivers use forklift motors to power their homemade electric cars. Check with local junkyards or on sites like Craig's List and eBay for deals on used, high-quality motors.

- When looking for a vehicle to convert to an electric car, search for the most basic, lightest, smallest model available. No power windows, locks, sunroof, or any other option that will use unnecessary energy. You should be able to purchase an older sub-compact in relatively good condition for around $500.00. Remember that you'll be removing the gasoline engine, so being able to drive it off the lot isn't a requirement. A Geo Metro is a popular candidate for electric car conversions.

- This project will take some time and a variety of tools. Prepare to spend a minimum of a couple of weeks converting your vehicle.

- Unless you have a super short commute and can recharge at your workplace, don't expect to rely only on your homemade electric car. It may get you around town for cheap but you shouldn't be your only means of transportation.

- Do plenty of research before beginning an electric car conversion. There's no single set of instructions for this fuel-slashing endeavor, so you'll need to judge the videos and articles you encounter for reputability and clarity.

- The most inconvenient thing about electric cars is getting caught on the road with a dead battery. If you've created your DIY electric car but would like to make it a little more dependable, there are several methods of converting it into a hybrid that has two unique power sources. Some cost-conscious drivers have added propane generators to their electric vehicles to charge their electric batteries while on the go.

## Solar –Powered Electric and Hybrid Cars

Whether you have shiny new hybrid or have successfully built your own electric car, you can cut the costs of your fuel even more by charging its batteries with solar power. Energy from the sun is free, energy from your electrical outlet is not, so this is the next logical step in eliminating fuel costs from your budget.

- It's best to position your solar panels where ever your vehicle stays during daylight hours. If at home, put them on your roof or in a sunny location in your yard. If at work, investigate if your place of employment will allow you to safely set-up solar panels somewhere on your building. This is the tricky part about capturing the sun's energy to power your vehicle.

- Keep in mind that solar panels are quite pricey, usually several hundred dollars each. You'll need between two and six, depending on the wattage, to charge your electric vehicle's batteries.

- This project will require several expensive gadgets like a battery charger, charge controller, and inverter. Take into account the cost of this equipment. While fueling your electric car with solar energy is great for driver's who want to be more environmentally conscious, it can still be pricey.

## Performance Chips

Of all the products available for improving fuel efficiency, performance chips are arguably the most proven method, if not the most dramatic. Performance chips are designed for high-performance gasoline engines and some diesel engines, so not every vehicle will qualify for this fuel-saving modification. Another down side to performance chips is the cost. The chips themselves can be quite expensive, often costing two to three hundred dollars. Cost-conscious green drivers must also take into account that many chips must be installed by a professional mechanic who has knowledge of computerized automobile systems. Additionally, many chips are designed to be used with high-octane, high-grade fuel that costs more and could neutralize the fuel economy provided by the chip. While chips are a proven method of boosting your MPG rating, the increase is slight. The costs of this project are likely to outweigh the savings.

Performance chips enhance your vehicle's fuel efficiency by improving how your engine functions. Your engine works with less energy after adjustments are made to air/fuel ratio and the timing of ignition. Technologically-advanced performance chips squeeze more energy out of each drop of fuel your vehicle uses, creating a better ride and slightly higher miles per gallon. "Performance chips" is a general term for two types of devices. The first is a control module that is mounted under the hood. The second is a small device that plugs into your vehicle's OBDII port under your steering wheel, in other words, a much easier version for home-installation.

If you are searching for a quick way to boost fuel economy, this is probably it. But don't expect your muscle car to get the MPG rating of a hybrid. Before you decide to install a performance chip, calculate if the cost is going to be worth the improvement to your gas bill.

## The Debatables

These tricks and gadgets are often touted as scams or legends, but some drivers still claim that they contribute to better fuel efficiency. The United States Federal Trade Commission has tested many such products and found little or no improvement in fuel economy. Nevertheless, they're still on the market which means drivers are still purchasing them with hopes to pay a little less at the pump.

### HHO Gas Converter Kits and DIY Instructions

A *Popular Mechanics* senior editor debunked their usefulness and many claim that they're a product of fringe science, but HHO gas converters are still popular with car owners who are desperate for a way to cut their fuel costs. This strategy sometimes boasts improvements of 20-45% in fuel efficiency. Whether you use a kit or a homemade converter, the converter uses a technique developed by scientist Yull Brown to create a substance known as Brown's Gas. This substance turns water into a gas that contains two parts hydrogen and one part water. This gas is flammable and can be combustible if the right conditions are achieved. Brown's Gas is often used in welding and has been reported as a means of cleaning radioactive debris. While many professional chemists and mechanical engineers disagree, backyard auto mechanics have rigged up complex systems to use HHO conversion technology to improve their vehicle's gas mileage rating. If you look to amateur mechanic message boards and online forums, the usefulness of HHO gas conversion modifications is proclaimed by many energy conscious car owners.

If you're interested in HHO gas conversion, you have two options. If you have DIY ambition and a few simple tools, you can build your own converter using the abundance of manuals and ebooks on the web. YouTube features several videos that show the step-by-step process for creating a DIY converter for vehicles. If you're not up for a weekend project, you can cut your hands-on time in half by ordering a pre-made HHO conversion kit. There are many on the market, most of which are sold online.

## Air Bleed Devices

The majority of fuel-saving devices on the market are variations of the air bleed device. This gadget has been around since the early 1970s and claims to improve fuel economy by allowing outside air into the intake manifold. Air bleed devices function by allowing the engine management system to maintain a normal fuel to air ratio while inserting more air into the mixture at a location past the air intake meter. The fuel to air ratio is lower and the vehicle uses less gas to operate. These devices do improve fuel efficiency in older vehicles with carburetors, but new cars with catalytic converters and lambda sensors automatically correct any changes to the fuel to air ratio that the device might cause.

If you're interested in an air bleed device for your older car or what to know more about how they function in newer vehicles, check out these popular brands: Ecotek, Mark II Vapor Injector, Power Jet USA, and Mini-Compressor.

## Fuel Additives

There are hundreds of fuel additives that claim to boost your vehicle's fuel efficiency when added to the gas tank. This seems like a simple way to get better mileage out of your vehicle, but most have not been very successful. Many of these products claim to readjust the fuel to air ratio like air bleed devices, only by way of chemically changing the gasoline. Cars built within the past fifteen years or so have air intake meters that will render the fuel additive's effects useless. However, if you drive an older vehicle and are looking to cut your fuel costs, these products might make a slight improvement. If anything, they will help clean older fuel injectors to assist your engine in running more efficiently. At five to ten dollars at bottle, you do need to compare the cost of the fuel additive to any savings you might notice at the pump. Johnson's RXP Gas Kicker, Fuelon Power, and Star Tron are widely available fuel additives that claim to boost fuel economy.

## Anti-Idling Systems

The FTC found that some brands of this gadget "indicated a very small improvement in fuel economy." Autotherm No-Idle Cab Heating System saves fuel in large vehicles in cold climates by keeping the windshield clear to prevent drivers from idling while defrosting. The devices also controls the cool-down of the engine. These items might do what they claim, but may cost more than the money you'll be saving on your fuel bill. Do your research before investing in any of these.

## Hypermiling

There's a difference in watching your speed and making calculated and precise adjustments to your driving strategies to get unbelievable gas mileage. Hypermiling in the extreme can improve fuel efficiency by up wards of thirty-five percent! That's a huge savings in your fuel costs, but there's a convenience factor to consider. True hypermiling takes patience and a considerable amount of effort. If you are looking for the most trustworthy way to slash your fuel costs without creating homemade fuel or purchasing products that may or may not work, hypermiling is definitely the way to go. Here are the basics of pump-defying hypermiling:

- Avoid using your breaks. Having to slow or stop your vehicle wastes fuel that has already been burned to create motion. Create larger distances between your vehicle and the cars in front of you so that you can reduce your acceleration instead of using the breaks.

- Coasting equals free mileage. While the safety of coasting is arguable, most hypermilers swear by rolling their cars down declines without their foot on the brake. In newer vehicles with manual transmission, fuel injectors automatically stop functioning when the car is in gear but the accelerator is not being applied. This means you'll save more fuel if you coast in gear than if you coast while idling in neutral.

- Be easy with acceleration. Use the gas pedal gingerly and remove your foot at the first sign of needing to slow down or stop. If you need to speed up, get to your target speed quickly then cruise for optimal gas mileage. Avoid stopping on inclines. Accelerating to go from a dead stop to full speed while travelling uphill is a worst-case scenario for fuel efficiency.

- Maintain a speed of around fifty-five to sixty miles per hour on the interstate. You may get some dirty looks from hurried commuters, but you'll get drastically better gas mileage than vehicles travelling at or about the seventy mile per hour speed limit.

- Don't "warm-up" your vehicle. Idling means zero miles per gallon. If you are hypermiling, gentle driving strategies don't require engine warm up anyways.

- Use cruise control on level roadways not on roads with hills or multiple turns.

- Choose parking spots for fuel efficiency, not convenience. Park on an incline, if possible, to allow your vehicle to coast upon departure. Driving around to find a good spot is wasted fuel. Hypermilers can usually be found at the end of the row.

- Travel roads with less traffic to reduce braking and acceleration.

- Avoid drive-thru windows. Again, idling equals zero MPG. Parking your vehicle and going inside the business will save fuel.

- Don't drive in bad weather. Rain, snow, high winds, and icy roadways can make hypermiling strategies impossible and unsafe and lead to lower a MPG rating.

- When shopping, drive to the destination at the highest elevation first and work your way downhill. As you add more cargo, your vehicle will be able to coast, neutralizing the effect of the added weight.

Hypermiling might not get you to your destination quickly, but it will do wonders to your fuel bill. If you already have a fuel efficient vehicle, incorporating hypermiling strategies into your driving routine will make a noticeable difference.


Whether you have a brand new hybrid or an old clunker, there are plenty of options for drivers who are willing to take drastic measure to reduce the amount of money they spend on fuel. Consider it a challenge to use the least amount of gasoline, diesel, or ethanol possible to travel to your daily destinations. Not only will you be saving fuel, you'll also be reducing emissions and making your car a little greener.