HHO car adaptation

by **Jalakahops** on June 26, 2008

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intro: HHO car adaptation

HHO is the gas resulting from electrolysis of water. Two H's and an O when seperated are very flamable. On top of being abundant it is cheap and cleaner burning than gasoline. Operating on purley HHO requires lots of modifications to a car but suplementing your gasoline with HHO requires little. There are a million sites out there on HHO car conversion kits. All of them are building plans for anywhere between 50 to 500 dollars. It seems odd that there is no instructable on it. So here, for free, is my attempt at making one. The text at the top is my first try and the text under the "-" line is my second try.

Image Notes
1. money saved

step 1: Tools and Materials

This page ended up changing through the process and can vary depending on how you choose to improve upon the design I used.
Tools:

knife or strippers
soddering iron(not essential but saves time)
screw driver
voltage tester(depends)
*drill
*#7 bit
*1/4" tap
*may change depending on the electrode you use and how you connect it to the wire
Materials:(Keep in mind all the materials I used are "borrowed" from work or I had around the house so they won't be the most effective solutions. Be creative with what you use)

Plastic container (I used a grape juice bottle)
High temperature silicone sealant <-expensive; regular silicone sealant MAY work
Wire (I used some left over wire from the amp that went in my wife's car, 14awg)
Teflon tape
Plastic tubing (I had to siphon gas once to change the fuel pump and had this hose from it, not sure why I kept it but I'm glad I did)
salt (for an electrolyte in the water)
Stainless Steel Electrode(update: THIS WILL NOT WORK)
I put this one on bottom because it will have the biggest explination. I am told stainless isn't esential but will not corrode like other metals. I also read that coiled wire would be the best type(i.e. pipe, plate, wire).Platinum would be your number 1 choice but who can afford that? I used some pipe I found at work.

-updates-
-I ended up using the graphite from 2 pencils as my electrodes

Image Notes
1. didn't use
2. If you don't hate this stuff yet, you will.
3. mmmm....juice
4. grar

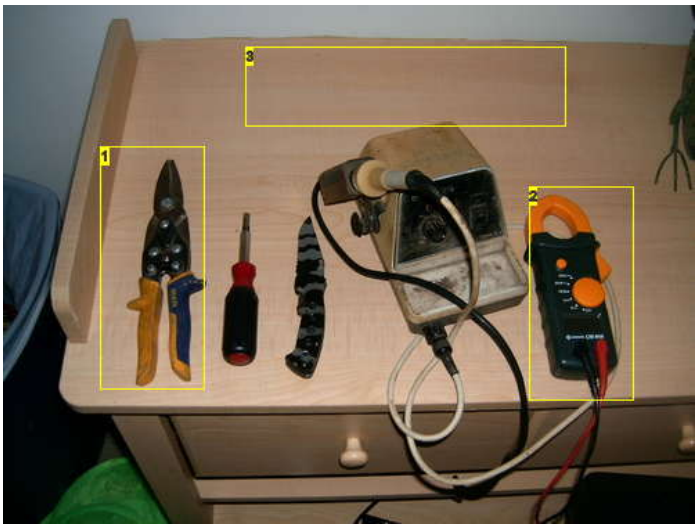

Image Notes
1. didn't use
2. didn't use
3. changing table converted to a bench!

Image Notes
1. Jumbo kid's pencils
2. still a mess from trying trying again

step 2: Plan your build

Before you start cutting into your own grape juice containers and sealing be sure it fits in your car. Find a spot to cram your plastic container into. It needs to be away from direct conact to the motor. Near the battery or air filter is preferable. I got lucky that my battery is directly beside my air filter and there is a huge space under the air intake piping. Also, when you have cramed it in there....be sure to close the hood and make sure that it really fits ;P. Chances are you will not be able to use the huge bottle I did.
The bottle size will help you determine what kind of electrode you will be using and how much of it you need to obtain.
The location will determine how much wire and plastic hose you will need.

-updates-
-In my picture you may see the plastic container is bent a little where the plastic hose comes into it. I didnt just start bashing it. I aplied gradually increasing preassure until it bent to the shape I desired.

Image Notes
1. money saved

step 3: Building your electrodes

I originaly intended to sodder my wire to the stainless steel. Go ahead and try if you like but it wont stick. So then I decided to drill and tap a hole in the pipe. I feel a clamp on connector would work better but I didn't have one. I did have a 1/4" bolt though. Wrap one wire around the bolt and screw it in tight. The bolt I used was very short and did not go through to the inside of the opposite side of the pipe. The screw in method I used probably saves more space than a clamp on.

-updates-
-Ok, so apparently regualr stainless steel does not work as an electrode. It lasted for 8 operational hours. People have said that 316L stainless will work better but I have my doubts. Instead I made them out of graphite. I give complete credit to hooloovoo33 for the suggestion in his instructable here(http://www.instructables.com/id/Separate-Hydrogen-and-Oxygen-from-Water-Through-El/). It is a very long and tedious prcoess the way I did it. I bought 2 jumbo sized kid's pencils(78 cents) and carved them down to the graphite core. I originally thought "I will just carve down one side and lift it out of the wood". WRONG. Pencil companys must use glue in their process becuase it dosnt come out easy. Even thin solitary pieces of wood clung to the graphite. What you can do is type in to google "buy graphite rod" and the machine shops that sell it will pop up(along with fishing poles). I found it as cheap as $5.86 for a single 1/2" by 10" rod, which would be enough when cut in half.
To connect the wire to the pencil lead I stripped back a long section of wire wrapped it around the lead twice and then twisted the wire back on itself and twisted like crazy with pliers. At this point I broke open the tube of sealant and dipped the end of the grapite with the wire in sealant. It gave me a great seal doing it that way rather than going over and over it with the tube's end. This was more a matter of frustration than technique. You need two conductors so do this twice.
After it dried I wrapped a big thick tye wrap around the top and bottom of each piece of graphite. Then wrap another tye wrap to hold them together. They should still be the width of a thick tye wrap apart. This is to allow the electrodes to be as close as possible without touching.

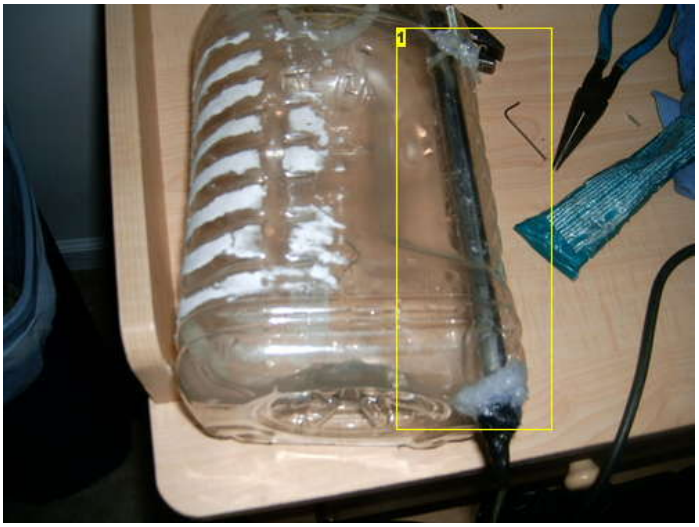

Image Notes
1. Stainless pipe your average pipefiter would use

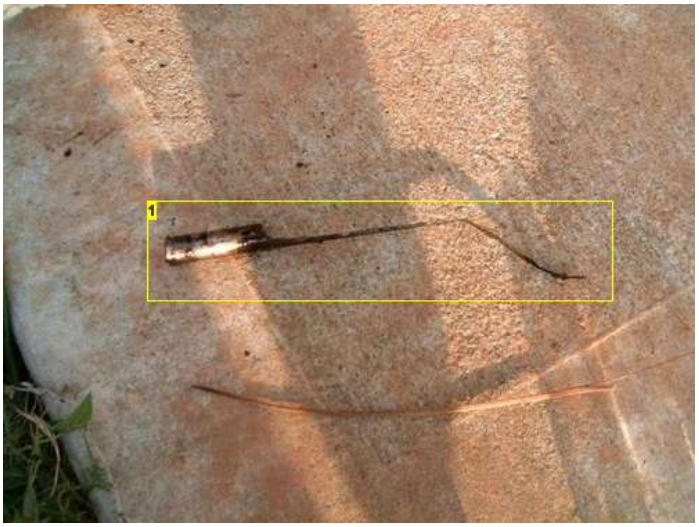

Image Notes
1. How's that stainless working out?

step 4: Inserting your electrodes

I did this all wrong at first. I was cutting holes in the plastic with my knife. It is so much better to use a soddering iron to melt a hole in your grape juice bottle and then using a circular motion widden it it to fit your electrode. I had to seal over and over again on the knife cuts but the soddering holes sealed in one try.
Now you ask where do I put these holes at? I placed my electrodes on opposite sides of the container. I was thinking that the further apart they were the more water the current would pass through and create more HHO. I later read that having them closer together is actually more preferable as the electricity is "burned up" in the resistance rather than actually doing work on seperating the molecules. Please post if you think you know how it really works.(update: not necessary. Put them very close together)
However it works, it is very important to know that the electrodes are NOT continuous. That means they do not touch anywhere and they need to be secured so that while driving they do not run into each other. To secure my electrodes I soddered two holes next to it while it was in the container and fed some wire sheathing through to tie it down. It is likley this step will frustrate you unless you plan on big holes and more sealant. I would not recomend using any sort of metal(tie wire)because it will corrode inside the container. A tie wrap would probably be nice though.
The wire and connector on the electrode need to be on the outside of the container. Then you can begin the sealing. Generously apply sealant to anywhere water may leakout. Let it dry for 24 hours(so says the tube) then fill it with water. If it leaks drain it and put more sealant where it was leaking.
Advice from a big dummy: If your electrode is hollow like mine seal one or both ends. I will let you think why.(there's 24 hours wasted)

-updates-
-the graphite I used is much much smaller than the original electrodes but produces almost the same ammount of gas because they are so close. Holding the graphite down inside the container isn't as necessary because the tye wraps will always hold them a certain distance apart.

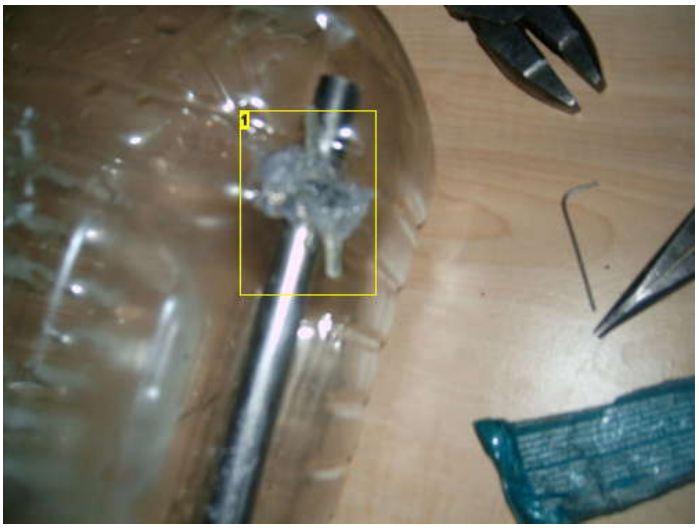

Image Notes
1. Blurry picture of the pipe tied to the side

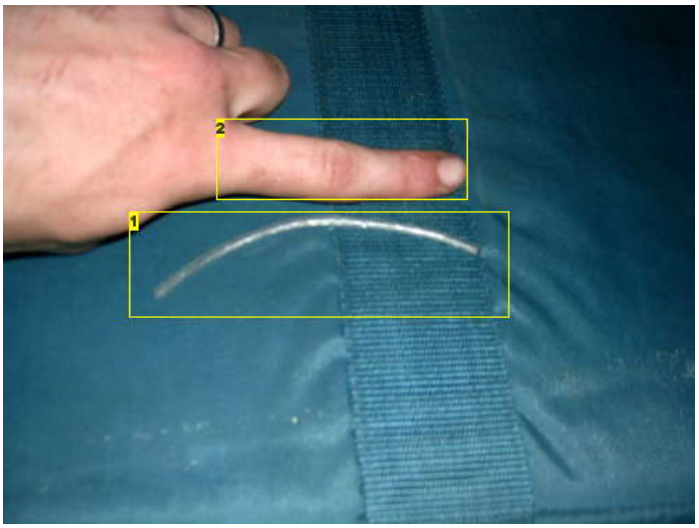

Image Notes
1. Wiresheathing(no wire in it)
2. My finger; to show you how long I made it

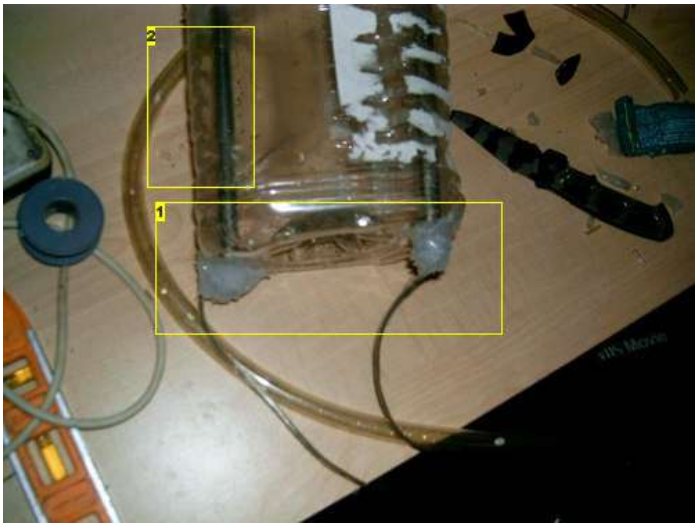

Image Notes
1. Wow, thats far apart
2. Both pieces of graphite went in this hole

Image Notes
1. This is what liquid stainless steel looks like...kindda
2. The inside top would not clean out

step 5: From container to car

Now do the same for your plastic hosing as you did for the electrodes. Melt(or cut) a hole IN THE TOP and seal your hose into it. The hose needs to be long enough to reach the outlet coming from your air filter in your car. Melt(or cut) a hole in the hose leaving your air filter and seal in the hose coming from your HHO container. Ouch, I hated to do that step. Willful destruction of car parts. It helps a lot if you have an easily removable piece like I did.
I wanted to mention it somewhere and I thought the inserting your electrodes step was already to long, wrap some teflon tape around the teeth that hold the cap on. This will cause LESS HHO to leak out the top. I don't think its possible to completly stop hydrogen from leaking out of a container while allowing easy access to pour more water in.
The water you put in this container needs to have baking soda mixed in. I read that using salt will produce chlorine gas. That seems likley to me as salt is NA CL. Sodium and chloride on their own are deadly to you but combined they sure taste good. In other words don't use it.

-updates-
-I was going to use baking soda origianly but I later read that it lets out solutions that are corossive to aluminum. Chances are your car's engine is made out of it. Furthermore, the chlorine will be coming out of your tail pipe. Who breathes in car emissions that wants to live anyway? The chlorine released is small ammounts too.

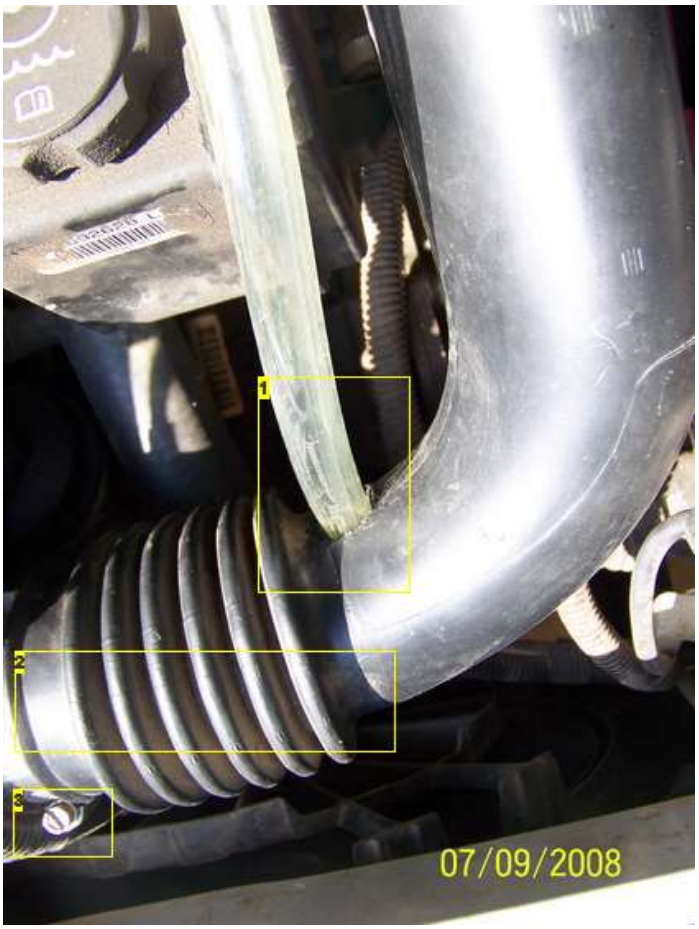

Image Notes
1. The hole is a tight pinch for my tubing, just the way I want it.
2. This whole piece pops out with that screw
3. that screw

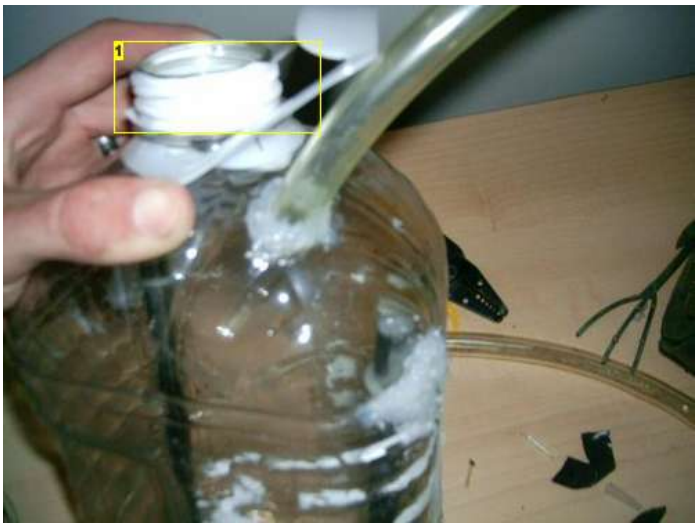

Image Notes
1. teflon tape

step 6: Giving life to your monster

This is going to be the scetchiest part of my instructable. I am still searching on a good way to power it only when the car is on without having to drill through the fire wall, without having to connect some wires, or flip a switch everytime I get in the car. A wire from one electrode needs to go to negative and the other to positive of your car battery. I just ran the wires up to the top of the hood so I can connect them when I get to my car and tuck them in neatly the rest of the time.

-updates-
-Going through the firewall wasn't as bad as I thought. I just looked under the steering wheel and saw all the wires running through a rubber stopper. I rammed a fishtape through there and caught it inside the hood. I pulled 1 wire through and cut it. To turn it on simply connect that 1 wire back together. For now I am using wire nuts but it shouldn't be a problem to connect it to a button or switch. I took apart my dash because I was going to connect it to the rear defrost button(I have used it maybe twice in 3 years) but there was all kinds of circuit board wiring hooked up to it so I said forget it.

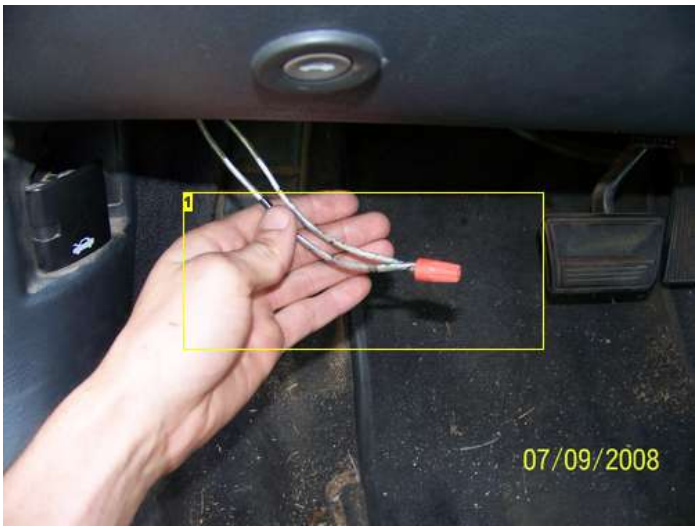

Image Notes
1. I am so high tech

Image Notes
1. wire is fed through here
2. An oh-so-convenient place to mount a button later
3. Black stripe of tape indicates the lead going directly to a battery terminal

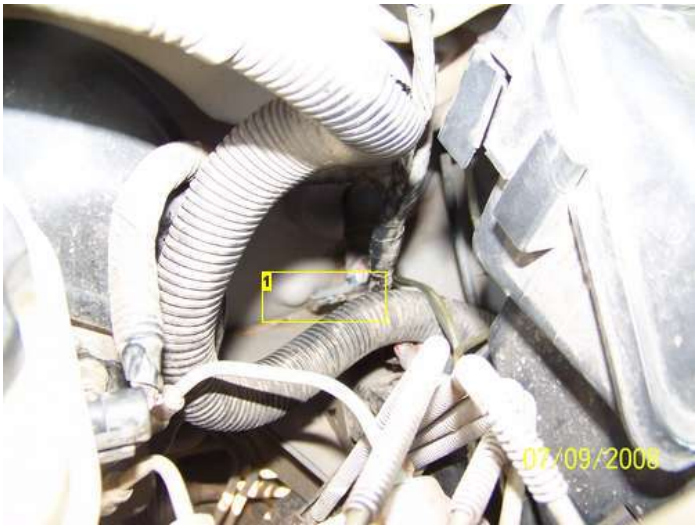

Image Notes
1. You have to use a machette to find where the wire feeds through at....now to put it all back together....

step 7: Results

I have a 2003 Cavalier. The worst mpg I ever calculated was 28. I was purposfully flooring it every where I went just to see what the worst case scenario was. The best I have ever calculated was 45 while following closley behind truckers(they sure hate that). On average I fill my tank up and go 400 to 420 miles before my "pull over and get gas" light comes on. When my light comes on I am able to put 13 gallons in the tank.
400/13=about 31
The electrodes lasted for half a tank and I got 500 miles out of it. Assuming I got 200 miles out of the other half as usual: 500-200=300 300miles/6.5gallons=46mpg
46/31=1.48 thats a 48% increase in fuel economy!

-updates-
-With the graphite I got 510 miles out of a tank. 510/13=39
39/31=1.25 a 25% increase in fuel economy. I'm sure that if I increased the size of the electrode the mpg would increase. The pencil lead is just so small. I will update again.

P.S. My wife ran off with the camera to a florida vacation in the middle of my build. Thats why there are no pictures of the graphite electrodes. When she came back the camera wasn't working.

Related Instructables

The Comprehensive Guide To Saving Money on Gas by RickO5

Tips on how to improve gas mileage by LinuxH4x0r

Increase Miles Per Gallon Instantly by Putzer

Money in your pocket (and help the enviornment too) by Hougashucka

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Comments

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AK_Frost says: Nov 5, 2008. 9:24 AM REPLY
HOT TIP: There are FOUR thick and sturdy carbon rods in a Lantern Battery (the big square batteries that are similar in size to a Large can of soup) These work great! I tore a battery apart, and hooked the rods up to a $45 Black&Decker battery booster and had some furious bubbles rising from the carbon rods - they seem nearly indestructable, I didn't notice any corrosion after hours of use. They would work great in your application. Great Effort and thanks for the DIY :-)

foxy1paco says: Sep 27, 2008. 10:51 PM REPLY
what about HHO added to a moped? would that do anything such as raise their already high gas milage?

NRen2k5 says: Oct 24, 2008. 5:19 AM REPLY
Just as useless as on a car.

Yeasayer says: Oct 30, 2008. 3:53 PM REPLY
Let me muddy up your view of the universe.!
A tanker full of gasoline would not move your car out of the driveway!
Oh! my mistake, I see you have added a spark plug to your engine.! Well now "thats different."

Potential Energy :
Potential Energy versus obtainable Energy equals efficiency.This is the case of the Hydrogen - Oxygen electrolyzer debate.

Dynamics of combustion. This is exactly why they work. It has nothing to do with alternator
load and the fuel value (heat) of a small quantity of hydrogen, a vehicle with a normal fuel usage of 20 miles per gallon gasoline

will go 20 miles +(Example,1000 ft.) highway driving when using a Hydrogen booster, but only when a separate battery
is used for the Hydrogen booster's power source .If the booster uses the alternator then a
1/3 horse power penalty will be invoked. causing a reduction in original economy.(conservation of energy and mechanical losses

and alternator efficiency) The above has no violations of scientific laws The real life fact is , A hydrogen booster as a extra source

of fuel is a loosing argument. anyone who tells you an alternator can produce power without
requiring extra effort from the engine does not know. You can be certain of that.
Grand Coulee Dam was built because its pretty and the 90 ton turbine that drives a 1,000,000 horse power Alternator," Well that was to show off our capabilities in machine work". http://en.wikipedia.org/wiki/Image:Water_turbine_grandcoulee.jpg

Why Do They Work?. Combustion dynamics. We've heard many times, engines are not efficient, the greatest loss to
efficiency is heat loss, the cylinder head and engine block as well as pistons soak up extreme quantities of (BTU.Heat Units)
The cooling system removes about 27% (guess) of the total heat produced from the fuel you use, about 49% goes out the

exhaust pipe,and 24% is converted to power at the drive wheels. The mechanical losses are included in the heat loss.
Why is so much heat wasted ?. Time.(1) Time to burn at high engine speed,(2) Time for the piston to travel at low engine speed .

Hydrogen injection modifies the whole dynamics of the common fuel burn program. (1) The burn rate of gasoline/diesel must be

coordinated to exert maximum pressure on the piston when it's crankshaft position is 15-20 degrees after top center of the

compression stroke. At high engine speed it is necessary to begin the fuel burn before the piston has ended its compression

stroke, " Before top center," this adds a braking resistance to the forward dirrection of the engine. At some point down the

cylinder, the fuel completes its burn, often
after the exhaust valve has opened releasing potential energy to the exhaust pipe. The cylinder
wall has been exposed to burning fuel through out the full length. Now that the exhaust valve is open, the hot gas remains in the

cylinder because of back pressure from the exhaust system, more time to store heat in the engine metal.This is not a bad thing

for the next power cycle, as a hot cylinder will better vaporize the gasoline. But energy is wasted on the exhaust
stroke because the piston must force the burned gases out the valve port.
All the above will transfer an exceptional amount of heat to the coolant system.
(2) Slower engine speed at high load demand, accelerating from a stop, Near full load at low
engine speeds.
The high rate of fuel being burned behind a slow piston transfers its energy to the cylinder wall.
So- what does hydrogen change ?-- Time.! It is claimed by booster makers
that hydrogen in the fuel charge serve as millions of miniature spark plugs that energize the hydrocarbon molecules that surround

it, in so doing the fuel charge has many flame fronts.and is consumed in much less time which increases combustion temperature

and therefor higher
pressure to drive the piston.
What would be the impact on an engine that could begin fuel burn at 0 degrees, top dead center at 2400 rpm. and also have the

fuel burn complete at 18 degrees of power stroke, at
maximum pressure. The piston has moved less than 1/8 inch down the cylinder. Due to the extreme burn rate the temperature of

combustion will be higher, the pressure will also be higher. there is no negative braking force from advanced spark timing
Pressure is what drives your engine.and the early burn allows the expanding gases to push the piston at higher pressure through

nearly a full stroke, the early burn also reduces the exhaust temperature which means that more energy was converted to work

The low pressure exhaust requires less energy to purge the cylinder. (Exhaust stroke)
In newer lean burn engines with variable valve timing and fuel injection you should not alter your fuel to air ratio,
In winter this could cause hard starting and rough running, alcohol in gasoline requires a richer ratio.
The one thing you must do is retard the spark timing, if you do not, then fuel burn will happen on the compression stroke with a

high tendency to drive your engine backward .
A note about Boosters;
I do not Sell them I do not make them for sale.
I have built one for testing (SMACKS) and have designed a more efficient model I plan to build. Do the boosters really work?

"I don't Know". But spark plugs Do.

NRen2k5 says: Nov 4, 2008. 9:49 PM **REPLY**

Yes, hydrogen injection can improve performance.

But onboard electrolysis is and always will be a losing proposition.

blacknkhak says: Jul 26, 2008. 3:02 PM **REPLY**

I *do* think that introducing hydrogen into the engine intake helps achieve more complete gasoline combustion. why would it not?

I *don't* think that electrolysis uses more energy than the hydrogen creates when burned in the engine.

with out data to back up the gains versus losses ratios , we could debate this boring crap until our jaws crack.

mrxavia says: Aug 1, 2008. 3:30 AM **REPLY**

Last I heard the laws of thermodynamics forbids over unity, so you cannot get more energy out of burning the hydrogen than it took to create it...

That is unless your tapping into some alternate energy sauce....

blacknkhak says: Aug 1, 2008. 3:43 PM **REPLY**

my understanding of the laws of thermal dynamics is surely lacking.
is "creating" hydrogen the same as removing the oxygen molecule from water?
it would seem that in a purely pedantic abstract that we are not *creating* hydrogen merely liberating it... clearly different. so correct me if i'm wrong but no one here seems to have data concerning the gains/losses ratio of hydrogen "creation " and like so many other instructables debates, hearsay poops on the parade without anything too factual ever being established.
(as in "i actually did some testing and discovered ...")
so unless you want to try to teach me something i can promise you i will certainly never understand; due to chronic thickness, do the research for your self or come up with some real evidence before announcing the "facts".

mrxavia says: Aug 2, 2008. 3:39 AM **REPLY**

Now trust me on this, it is very basic, at 100% efficiency, it would take the SAME energy to split water as you get back from burning it.

But the key thing is, you cannot get out more than you put in, so because you are converting the H2O to H2+O2, then back to H2O, there is no way you can achieve over unity, it is impossible.

Over Unity=getting more out than you put in, this is not possible.

blacknkhak says: Aug 2, 2008. 4:14 PM **REPLY**

AS YOU LIKE.

Justin83NJ says: Aug 6, 2008. 7:50 AM **REPLY**

I'm a mechanical engineer and I work in the energy industry. No offense, blacknkhak, but mrxavia is right. You cannot get more energy out of the hydrogen than you put in to separate it from oxygen in water by electrolysis.

If you electrolyze the water using an energy source thats cheaper per kilowatt than burning gasoline (like household electricity at night), you can SAVE MONEY -- but not conserve energy.

Jalakahops says: Aug 6, 2008. 3:23 PM **REPLY**

You are correct. You cannot get more energy out of the water than you put into it. In fact you lose 28% of it. But you, like many others, fail to recognize that the energy is not totaly coming from the gasoline.
You are wrong in saying you cannot conserve energy. Why does a modern HVAC system take less energy than one produced 30 years ago? Magic? It's about efficency. Good job Mr. Engineer.

Justin83NJ says: Aug 6, 2008. 8:18 PM **REPLY**

When I said you can't conserve energy, I meant you can't get more energy out of the hydrogen than you put into electrolyzing it. I didn't mean anything other than that.

I don't know what you're telling me that I failed to recognize. I understand the car engine in your system is burning gasoline and hydrogen gas. I was just saying that you consume more energy creating that hydrogen gas than you get out of burning it.

Did I insult you somehow?

I'm not even saying you can't get better gas mileage with your setup! If the car's alternator is putting out power even when the battery is fully charged, then that is a waste of energy. If you are getting more out of the battery by electrolyzing water -- yet the alternator is putting out the same power -- you could see increased gas mileage when you burn that hydrogen.

In my other post, I wasn't judging whether your system improves gas mileage or not. I was just confirming what someone said earlier: that more energy is used electrolyzing the water than is gained burning the hydrogen!

frontier says: Nov 2, 2008. 12:54 AM **REPLY**

im confused now.

im not an engineer or some physicists, but theres something i just dont understand.

imagin a normal car, with no modifications at all, just a plain normal gaseline combustion engine.
such an engine cant run without electricity, it uses electricity to ignite the gasoline in the form of a spark, the following gas explosion then generates ALOT more energy, than was used to ignite it, enough to supply electricity to the battery for the next ignition, and to keep the car rolling.
but how can this be? that is overunity and perpetual motion, how can the engine generate more eletricity than it used? simple, because another element is introduced, the gasoline, the eletricity simply is used to utilize the main fuel?

but why dosent the same principle apply here to hydrogen?
the electrolysis it self dosent provide the additional mileage(just as the electricity from the engine dosent run it), its simply used to utilize the energy from another primary fuel source ,water in this case.

Jalakahops says: Aug 9, 2008. 10:12 AM **REPLY**

Sorry, my mistake. Then we are in agreance that it takes more energy to create hydrogen than you receive from burning it.
I just get so frustrated that every one else here posts so matter-of-factly that the system does not give you better gas milage not even having tryed it. They are the ones that fail to see you can conserve energy in other areas to contribute to better gas milage.

mrxavia says: Aug 6, 2008. 4:38 PM **REPLY**

So if the energy is not coming from the gas where is it coming from?

Jalakahops says: Aug 6, 2008. 8:19 PM **REPLY**

From wasted heat that the alternator would create in trying to charge a full battery. From more efficent combustion of the gasoline.

bernyzilla says: Aug 7, 2008. 11:16 PM **REPLY**

Also it should be noted that if you have a manual transmission and compression brake that will charge the battery with the energy that would have been wasted heating up your brake pads similar to regenerative brakes found on modern hybrids except you are using your engine and alternator to produce electricity instead of fancy brakes.

blacknkhak says: Aug 6, 2008. 1:29 PM **REPLY**

now I will stay stuck on stupid and say... why then can more energy be gotten from atomic bomb than is *used* to make it go boom...?! surely no more energy can be gotten from splitting the atom than it takes to split the atom.

sorry i'm not trying to be argumentative but understand that im confused by this purportedly obvious process, the conclusion that is takes energy to create the release of energy is not all that clear to me.

Justin83NJ says: Aug 6, 2008. 7:37 PM **REPLY**

That's a very good point. I can see how it's not obvious that electrolyzing takes more energy than you get out of burning the resulting hydrogen.

With an atomic bomb, when you split an atom, you are releasing energy that was already stored within its nucleus. It's similar if you burn oil... it takes much less energy to pump oil out of the ground and get it to burn than the energy you get out of it.

With electrolyzing water, though, you consume energy to cause one chemical reaction and create the hydrogen. Then, when you burn it, it undergoes the exact opposite reaction and turns back into water. It's different than just taking something and burning it (or splitting its nucleus).

I hope I did a decent job of explaining it, but I get your point.

blacknkhak says: Aug 7, 2008. 4:12 PM **REPLY**

that will do

mrxavia says: Aug 6, 2008. 4:38 PM **REPLY**

The key point is when you burn hydrogen with oxygen you get water, so you have what you started with, meaning you cannot get more out of it...
In nuclear power, you change one material into another...
Uranium into plutonium etc....
Each time it looses energy...

drhealthnutty says: Oct 29, 2008. 2:39 AM **REPLY**

My husband built one of these and there is an issue you have to address: the water vapor going into your engine. Not GOOD! He built a dryer that the HHO goes into before the engine. He uses a glass container and containers! You have to modify your computers settings. In our case our computer is broken and has adjusted just fine. Here's the brass tax:
98 Park Ave normally gets 24mpg. With Bioperformance gets 32mpg with HHO system gets 68 mpg. So skeptics can say ll they want, it works.
These people who are complaining and giving ridiculous physics lessons are simply filled with fear and disbelief. They think if it really worked, everyone would have one and every news station would be reporting it! We'll, it's thier loss. We have used this for over a year, no problem. Car runs better than it ever has before. However electrodes only last a week, so we are saving up to buy some premade components. Please, make some sort of drying system to run your main HHO line into before it goes into your car. You dont need rust in your engine!
This system has nothing to do with the alternator or battery. You cannot get 50%+ gas mileage increase by any changes you could ever make to the electrical system. It simply is the addition of HHO to you gas vapor. Maybe its the oxygen that works, who cares?

panstar1 says: Sep 21, 2008. 9:30 AM **REPLY**

a car's alternator is only making just enough power for the load it has on it. all alternators are regulated to only turn on when the battery voltage drops lower then 14 volts. This who concept from what I have read is they are trying to give a boost by using both but the hydrogen is is unregulated and you need a large amount of power to make the hydrogen but the internal combustion engine is not really that efficient so all this work is really for nothing alternators don't produce power unless they are hooked to an engine and the engine needs gasoline to run ,even trying to supplement buy using two different fuels is not really a gain the primary source of energy comes from gasoline. you would be better off trying to make inprovments to the gear train lighting the frame and so on.

NRen2k5 says: Oct 24, 2008. 5:20 AM **REPLY**

This is exactly right. I don't think I could possibly have said it better myself.

sypher says: Oct 15, 2008. 3:56 AM **REPLY**

how are you getting a 25% increase?

sypher says: Oct 15, 2008. 3:57 AM **REPLY**

http://www.instructables.com/id/Hydroxy-Gas-Generator

a much better version of what you have here and it seem safer.

NRen2k5 says: Sep 25, 2008. 7:55 PM **REPLY**

This is completely worthless.

1) There's no such thing as HHO. Water is HOH, and it's H2 and O2 that are being produced.
2) The energy you're using to breakdown the water into hydrogen and oxygen is more than the energy you get back, and ultimately that energy is coming from gasoline.
3) The amount of hydrogen produced is tiny.
4) The salt isn't just boosting hydrogen production. It's also producing sodium hydroxide and chlorine. Yummy. Like those are things you really want in your engine.

Derinsleep says: Sep 6, 2008. 11:03 PM **REPLY**

checkvalve,maybe?

uglymike says: Aug 24, 2008. 10:53 PM **REPLY**

The arguments regarding needing more gas to produce the hydrogen (citing the 1st law of thermodynamics) simply are not valid, the extra energy is already there. The truth is an alternator produces an excess of energy and the power for the electrolysis process simply comes from that excess. The engine does not need more power to run the alternator. It's like to myth that driving with your lights on reduces your MPGs, just not true. (don't bring up an AC unit, the engine turns the compressor, that's whats putting the load on the engine, not an alternator)
The bigger concern I would worry about is with increasing the chances of detonation or pre-ignition. I've seen professional kits using this principle, and they do work for improving mileage, but when installed professionally the Fuel-Injection computer is remapped to compensate for the altered air/fuel mixture (actually reducing the amount of fuel injected into the engine but retaining the same level of power due to the increase of oxygen and combustibles IE hydrogen). I was wondering if you've experienced anything like this, or possibly a hotter running motor?

PS. for a better graphite supply, look for 2mm lead for mechanical drafting/architectural pencils. They are the same size as wooden pencil leads, but without the wood casing. Also try different hardnesses to see if they last longer. Let us know what you find.

RickO5 says: Aug 26, 2008. 8:30 PM **REPLY**

The argument is perfectly valid. The alternator does not put a constant load on the engine. The more load you put on the alternator, the more load it puts on the engine. The more current you pull from the alternator, the harder it is for the engine to spin it.

Turning on your lights does -slightly- decrease your mileage, but not enough that anyone would notice. Car headlights take around 10 or 15 amps, lets say 150 watts, or 0.2 horsepower. An air conditioner in the car takes 5 or 6 horsepower, so it makes a much larger impact.

Also, remember that compared to the amount of energy your putting into the car with gasoline, the amount of energy in the hydrogen oxygen mix is minimal. (it would be the load on the alternator* the efficiency of electrolysis * the efficiency of burning hydrogen and oxygen)

The only out I will give these sorts of designs is the -possibility- that the presence of pure hydrogen and additional oxygen in small amounts in the combustion process could increase the efficiency of the process as a whole. That is a legitimate claim, and it could be tested. It would account for any gains that this system yields.

uglymike says: Aug 27, 2008. 5:36 PM **REPLY**

An alternator usually produces more power than the car uses so there's no additional load on the alternator, there for no additional load on the engine. It's like if the alternator is putting out 2000 watts (made up numbers for example only) and the car is using 1500, the extra 500 is shorted to ground or the field coil is weakened. If you add an additional 100 watts or even 400 watts to your system, the alternator is still producing the same 2000 watts, no additional load. It's not until you start adding a lot of extra components (speakers, tv's, trail lights) that you start to strain the system. That is when you need to go with a higher output alternator.
As far as the possibility of this type of system working or not? There are several commercial systems out there and many have been independently tested. While they may fall short of the 50% MPG increases the manufactures claim, most have a 25% to 35% increase in mileage. A classmate of mine worked in a shop here in Phoenix that started installing them and as soon as they started, all the news programs had their "consumer protection teams" out to see if it was real or B.S. and they all said the same thing. It does work. Of course the system they were installing was about $1,000 including labor so it wasn't cheap. Also the system doesn't really start having a significant effect until the car is at proper running temperature, so going anything less than 10 or 15 miles means you really don't see much of an improvement.
One thing I found interesting is that these systems actually works better with a carburetor as opposed to fuel injection.

RickO5 says: Aug 27, 2008. 8:48 PM **REPLY**

An alternator does not produce more than the car can use. The load on the alternator is what governs how much power its taking off of your engine. The more load, the more strain it puts on your engine. You can test it really easily by putting a current meter in line with the feed off your alternator. The alternator will draw 7 or 8 amps right after you start to recharge the battery, then die down to just enough to supply the car. Since alternators are pretty efficient (say 80% just for the sake of things?) you'll use 1.25 times as much power off the engine as you use. So just running the car? maybe 70 watts. Running the car and a 200 watt stereo? 320 watts. ect. Those number directly correlate to strain on the engine. No alternator set up would just waste the extra current and spit it out constantly to ground, aside from the huge load it would put on the alternator it would be a more complicated design for a negative result.

That aside, I would believe that it would benefit carburetor cars more, since they are less efficient to start with then their fuel injected brethren. The tend to run rich, so the extra 02 would benefit even more. I could also see it helping more after 10 or 15 miles.

Also, I've yet to see any believable claims from any company offering a product like this. Again, not saying they don't exist, but I haven't seen any. Could you post a kit or name that you've had personal success with?

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uglymike says: Aug 28, 2008. 7:11 AM **REPLY**

You are 100% right in the results of your example, but for the wrong reason. When a battery is charging it is pulling extra amperage from the alternator, the drop you see after a while is when the battery is fully charged and doesn't need the extra amperage. The drop comes from the voltage regulator shunting the extra power to ground, not from the alternator generating less power. If it's still spinning at the same speed it is still generating the same amount of power. How can it not?
Let me try explaining it differently. A generator spinning at a specific RPM will always produce a specific amount of electricity. In order to get more you would need to increase the RPM's, if you need less than you reduce the RPM's. Therefore if you are correct then at idle every time I turn on the radio, lights or when a low battery starts charging then the engine RPM would increase, correct? This doesn't happen in my truck so where does the extra electricity come from?
Since auto designers do not wan to increase engine RPM to increase electrical output from an alternator then the solution it to engineer an alternator that has enough power to run the electrical system at a it's anticipated, greatest demand. It's easy to lower output from a generator, but to increase output, the only way is to increase RPM, of physically change the alternator. Not very desirable in a car.

As far as a kit that works, The my friend was installing came from www.ArizonaFreeGas.com. I don't know if the company was purchasing from someone else or manufacturing their own. They don't actually install the produce, they sell to independent shops who do the installation. The shop my friend worked at has had a few come back, most were from people who were only making quick trips and not seeing an improvement. So now they screen their customers more carefully to make sure it will work for them. Also, if a vehicle is fuel injected with a MAP sensor and a mass airflow sensor, it doesn't work. Now sure why though.

RickO5 says: Aug 28, 2008. 8:38 AM **REPLY**

This is actually turning into a decent and long conversation. heh.

Anyway, to put things simply, power output on an alternator doesn't correlate to engine speed. I know it might be a little counter intuitive at first but bear with me. The voltage coming out of an alternator is always around 14.4 volts. The current going through the alternator will be 14.4 divided by the resistance of the system attached to it. Power will be that current multiplied by 14.4.

It's pretty easy to see if you ever have a motor or generator in your hands. If you connect the leads on the motor, it gets very hard to turn at any kind of speed. Think about it like a motor in reverse (which it is). If you have a motor with no load on it, it barely takes any power to spin it up to full speed. The back emf increases the resistance of the system and limits the power you put through. If you put a load on the motor, it wants to slow down, the resistance drops, so the current rises.

The engine RPM on your truck probably does change a tiny bit. The only difference is that while your alternator doesn't just dispose of its extra power, your engine does. Just idling it probably has 30 or 40 horsepower just wasting away.

My guess for the MAP sensor issue is that, among other things, a map sensor is used to calculate the density of air in the manifold. Hydrogen and oxygen are both less dense than regular air, so perhaps a weird reading would cause the engines computer to react in a funny way. Just an idea.

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uglymike says: Aug 28, 2008. 8:21 AM **REPLY**

Actually there is 1 thing I wasn't taking into account, On a EMS charging system (one using a electromagnetic alternator) the voltage is regulated by altering the strength of the field coil. I'm surprised noone has brought this up, but in order to increase the output of the alternator the strength of the field coil is increased, thereby increasing the magnetic resistance within the alternator. This does increase the load on an engine, but it doesn't have a significant effect on MPG as we are discussing here.
After talking with someone who installs the consumer HHO system I mentioned earlier, he said the draw on the electrical system for their HHO system is under 10 amps, or less than 120 watts. This is equivalent to adding a pair of nice speakers. If anyone has added 500 watts in speakers (usually about 100 watts nominal) and has seen their MPG go down I'd like to hear about it.

RickO5 says: Aug 28, 2008. 8:47 AM **REPLY**

Absolutely right, unless you're drawing a megawatt or two from the alternator, you'll never notice a change in mpg. A ten amp system would not be a noticeable addition. I do have a 2800 watt stereo I installed on one of my cars, which made a pretty noticeable dent on my mileage when I ran if at half power all the time.

(I was about to post this helpful link where people explain things very well, but you've got the concept, oh well, for anyone else reading.... http://www.physicsforums.com/archive/index.php/t-57164.html)

I'll look into that link you posted. Im wondering stoichometricly how much h2 and o2 that would produce at 10 amps.

NRen2k5 says: Oct 24, 2008. 5:35 AM **REPLY**

Wow, this uglymike guy is almost as bad as 9/11 Truthers. You correct his errors, misconceptions, and outright lies, and he just brings up new ones.

Jalakahops says: Aug 28, 2008. 5:21 PM **REPLY**

Tell me how I can measure an ammount of gas I produce and I can tell you. It's not quite the same as filling up a glass of water.

uglymike says: Aug 28, 2008. 10:39 AM **REPLY**

Unless you alter the carb or FI system, your air/fuel ratio will always remain the same. The H2 and O2 simply inter as the air part of the ratio. This is actually where you can vastly improve the system. In a rich running condition (anything less than the 14.7 Stoichiometric ratio) then the benefits of a HHO system are lost. This means when a car is cold, accelerating or running fast, you get very little benefit from the system. There is simply more gas than oxygen and the HHO system is being what is referred to as overrun. You will either exhaust the extra hydrogen or extra unburned hydrocarbons.
However, while cruising at normal operating temp, your car runs lean, meaning more oxygen than fuel, so the additional hydrogen actually has something left over to burn and produces slightly more power. By leaning out the air/fuel ratio across the board you will see the most benefit from this system. Carburetors are generally jetted lean across the board for emissions reasons while fuel injection systems are tuned on the fly by the on-board computer. This is why the gains on carburetted cars are usually higher.
I suspect the 50% increases some manufactures claim occur only after a number of rejetting attempts have been made, and the test loop included extended periods of cruising.
The Stoichiometric air/ratios of gasoline and hydrogen are
Gas - 14.7:1
Hydrogen 34:1
Even though, you can see, the same amount of Hydrogen (by weight) requires considerably more air(oxygen) than the same amount of Gasoline, in a lean running condition, the Hydrogen, because of it's light weight, can maximize the little remaining oxygen in the combustion process.

Jalakahops says: Aug 25, 2008. 2:30 PM **REPLY**

I have done no modification to the computer or sensors on my vehicle. I will try to modify my O2 sensor next and see if my mileage doesn't increase. My engine does not run hotter but it is possible my cooling system is working harder.
P.S. I have already built another system with graphite shading sticks found at an arts and crafts store. They are about 1/2 inch thick and about 3 inches long.

heyzuphowsitgoin says: Aug 25, 2008. 6:26 AM **REPLY**

hahaha about 2 minutes ago i was writing pretty much the same thing as you and then my session expired when i tried to post so i lost everything. crap.

from my understanding, the alternators power goes through a voltage regulator, and all excess power is sent to ground, because the alternator is always spinning. so pretty much, you are just tapping into that excess power, so less of it is sent to ground. correct?

uglymike says: Aug 25, 2008. 8:19 PM **REPLY**

If it's a permanent magnet system then the excess power gets grounded out, if it's a electro-magnetic alternator then power is cut to the fielding coil, but yes, you are correct. I know on motorcycles, unregulated voltage is usually around 20 to 30 volts at idle and can climb to 100 volts (unregulated) at speed on some systems.

Jalakahops says: Aug 25, 2008. 2:26 PM **REPLY**

That's about as well as I can guess. I am not sure on the science of it I just can tell you my experiences with it. Others have hypothesised about how hydrogen allows the gasoline to combust more completly. I don't know how much I beleive that but I certainly do know that the alternator wastes a lot of energy.

bernyzilla says: Aug 7, 2008. 11:18 PM **REPLY**

Have you noticed anything wrong with your exhaust system? Other hydrogen hybrid systems I have heard about required stainless steel or ceramic exhausts because the amount of water vapor given off of this system rusts out traditional exhausts quickly.

Jalakahops says: Aug 25, 2008. 2:36 PM **REPLY**

I havn't even looked at it. I am sure it will rust out a little faster but you have to realise that driving in rain your exhaust gets soaked. It's not as though it has never gotten wet before.

heyzuphowsitgoin says: Aug 25, 2008. 8:06 AM **REPLY**

couldn't you just hook the electrodes up to the battery? you wouldn't be able to disconnect it whenever you want to, but it might be easier.

also, have you considered messing with the voltage and amperage? you may be able to make more hydrogen... although i'm not sure.

Jalakahops says: Aug 25, 2008. 2:33 PM **REPLY**

You can't leave the system running while the car isn't on. It will drain the battery. Not to mention the build-up of combustible gases. Running the wires inside the car wasn't as hard as I expected it to be.

j0nes says: Aug 10, 2008. 1:55 PM **REPLY**

why not just power your device from the red power wire(accessory wire) on the back of your car stereo? It is the one that supplies 12 volts when the cars accessory is activated you could still ground to the battery although any metal under the hood would work and your hot lead to the stereo, turn on the key and presto. only problem is if you listen to the stereo with the car not running while smoking a cigarette and it leaks out of the air cleaner and boom.

Jalakahops says: Aug 25, 2008. 2:23 PM **REPLY**

Because your stereo is on a fuse that would blow if you used both at the same time. Good try though.

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