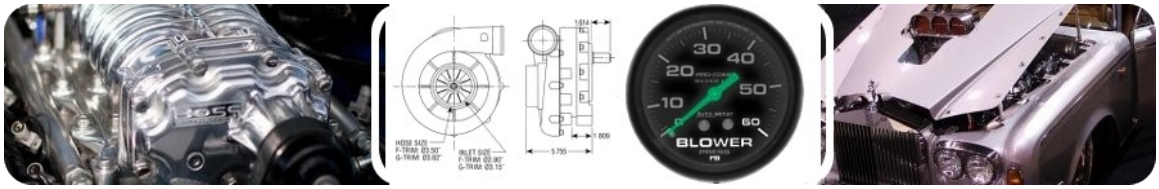

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Table of Contents

Introduction

The other day I had a thought about DIY modifications, possible fuel savers and other performance tricks and tips to increase gas mileage. See, although this is a performance oriented blog, as the cost of oil per barrel crosses the 70 dollars per barrel threshold once again, and as the economic depression in the USA (and thus in many other parts of the world) seems to be very much a mainstay till around 2012 according to analysts, I can't help but think about mileage and how so many people might want performance parts for their car, but they may also NEED better fuel mileage.

Automotive enthusiasts typically modify their cars for increased volumetric efficiency and higher performance in a specific rpm range of around 4000 rpms and higher. This is mainly due to the fact, that when you are racing, you spend a lot of your time on the eastern half of the tachometer in the higher end of the rev range and thus it makes sense that most performance products and tips are focused towards higher rpm efficiency. However, there are some performance modifications (and racer's secrets quite frankly) that we as enthusiasts may use to gain that power advantage, but can be utilized to effectively boost gas mileage.

The key here is to improve the performance of the vehicle with respect to efficiency rather than peak power and to do that there are two themes to this process:

1- Improving engine efficiency through the user of aftermarket performance parts.
2- Reducing motion resistance in the suspension, transmission, and other aspects of the vehicle.

These are tried and true modifications that are in fact used by car manufacturers as well. If you take a single manufacturer that is mileage conscious you can see a progression in parts similar to what we will point out later as their models progress through the years.

The beauty of these kinds of modifications is that they obviously pay you back with time, so if you start out with a horribly performing car, or if you put a lot of mileage on your vehicle, then this information will end up saving you money in the long run.

Furthermore, this is truly a universal guide that can be applied to any car because the suppliers of these parts have a very comprehensive part database so virtually any model car can be improved here.

Chapter 1: Engine Combustion Efficiency

Iridium Spark Plugs

Enthusiasts usually waste a lot of money upgrading perfectly fine parts of their factory ignition systems.

Here's how to avoid wasting money on unnecessary upgrades:

1- First thing to do is make sure your ignition system is fresh with good condition spark plug wires, distributor cap, rotors. These can be stock parts from a good company like NGK but don't need to be aftermarket upgrades.

2- The only thing I would upgrade on a HEALTHY ignition system is a set of iridium spark plugs:

Iridium plugs have lower resistivity than platinum plugs, which means it takes less voltage for them to create a spark, which means they are less likely to miss-fire because of a weak ignition coil, they are also more consistent spark and so have been proven to result in more consistent cylinder pressure resulting in a cleaner idle and smoother power band.

Iridium plugs have a finer electrode and a smaller and tapered ground strap, this means that the initial combustion at the spark tip, is free to expand directly downwards into the cylinder causing higher combustion pressures and more complete combustion (similar to the effects of a slight timing advance).

Lastly, iridium is a harder metal than platinum, and so it wears at a slower rate and thus iridium plugs (unless damaged or fouled by an unhealthy motor) are literally the last spark plug you ever need on your car.

How to find your spark plugs?

Besides asking your local auto store for what spark plug is compatible with your car. There is this technique that I use to find the correct spark plug part number for a customers car:

Go to NGK's website and lookup the spark plug that is correct for your car (through the part finder)

Now NGK will either list the equivalent Iridium part number (ending in IX for example BKR7AIX-11) or you will have to look it up using the lookup tables on clubplug

After you find the equivalent spark plug, add it to your shopping cart and you will see something like this: NGK-CR9EIX(3521)

The second number (3521) is the NGK 'stock' number. This number is very useful because this is exactly the number you will need if you need to order these plugs from anyone other than clubplug (such as ordering part number NGK-3521 on summitracing.com or ordering plugs from your local NAPA parts store.

Drop in K&N Filter

This is the single modification we did on my friend's 1996 Jeep Cherokee and he gained 2 mpg combined mileage. The stock filter on the car is made of multiple layers of paper filtration material which can is great for filtration in the most adverse possible weather conditions (which most of our cars don't see in normally highway driving since we don't drive through a Sahara and its fine dusted summer storms). K&N filters (and similar cotton gauze filters) use a cotton multilayered filtration material impregnated with filtration oil that helps capture even more particles through ionic attraction.

The difference between the paper filter and the cotton filter (if you were to try this yourself) is like trying to suck air in through a sheet of A4 paper vs. sucking air in through the fabric of your T-Shirt. Both filters will let air into the engine, but with paper filter the

engine wastes more power in terms of pressure drop (and thus reduced efficiency) to get the same amount of air in.

Full aftermarket intake systems that replace the factory air-box are designed to shift volumetric efficiency to the upper rpm ranges for racing. For fuel efficiency, you don't want to get a full aftermarket air intake system. Rather, we want to keep peak volumetric efficiency in the idle to 3500 rpms range (which is where most city and highway driving happens). The factory air-box system is typically well designed for those PRM's but the limiting factor is the air filter. Replacing the filter with a free flowing cotton gauze air filter further improves volumetric efficiency and thus mileage.

Don't worry about 'reduced filtration' due to the cotton filter. I live in Saudi Arabia, in Riyadh (in the heart of the Saudi dry lands with the dustiest possible civil weather and I've had a K&N filter on my car (a 'sensitive' Mercedes) since 2005 and to this day it still runs great and gets great mileage.

Furthermore, special vehicle manufacturers, like Ford SVT have produces special edition cars with cotton air filters on them from the factory with a factory backed warranty. Any rumors you hear about filtration with K&N is just that, a rumor.

Intake Manifold Spacer (Phenolic-resin, Garolite)

Intake manifold spacers gaskets provide a couple of advantages:

1- They increase the length of your intake manifold runners, which moves peak volumetric efficiency down lower in the rpm range which gives you an earlier torque peak making around town driving easier. This boosts fuel mileage as you are less in need to rev up your engine to grab the torque you need to get around.

2- If you have a carbureted car or a car with tuned port injection (with a single fuel injector feeding fuel into a wet intake manifold, or if you have your fuel injectors located in your manifold runners rather than injecting fuel directly into your cylinder) then having a spacer gives the air and fuel mixture more length and thus more time to better mix in the manifold before it reaches the cylinder. The better the air fuel mixture, the more even and efficient the combustion process, thus increasing mileage and fuel efficiency.

Engine internal rehabilitation

After miles and years of usage, engine internals are no longer shiny and clean aluminum parts. Rather, with miles of usage they become coated in carbon and oil deposits from the combustion process. Carbon buildup on the valves can prevent proper valve seal and reduces the peak combustion pressure as well as the overall combustion process efficiency.

Similarly, fuel injectors with miles and usage can become partially clogged or dirtied both by combustion byproducts (carbons and oils) as well as from fuel contaminants.

Typically people would recommend taking out your fuel injectors and having them cleaned, and taking off your engine head and having your valves check and clearances and tolerances checked with possible expensive replacements.

However, here are two 'tricks of the trade' that automotive enthusiasts (who typically own older sports cars and iconic era cars such as the turbocharged hard-hitters of the 90s (the supra, the 3000GT, the 300ZX…etc).

1- HEET and ISO-HEET are two cleaner products that are designed to remove water from your gas tank for cars that have been parked for a long time or have had a contaminated fuel fill.

   HEET is 99% methanol and ISO-HEET is 99% Isopropyl alcohol. Using a mix of fuel/alcohol in your gas tank has the performance advantage of boosting octane ratings slightly which is why we use it in motorsprots. However, from an emissions perspective, having a higher alcohol concentration in your gas tank, gives you a slightly leaner (yet higher octane) mixture to work with. This leaner mixture gives a higher burn temperature in your combustion chamber which helps burn off built-up carbon deposits and clean valves …etc. Furthermore, the alcohols work really well at cleaning clogs in fuel injectors and giving you a better spray pattern which gives better air fuel mixture and thus better mileage.

I've used this tricks many times on older cars and friend's cars that were failing emissions tests (which is a great measure of bad fuel efficiency because of a very fuel rich exhaust measurement and poor combustion). After a tank or two with 1 bottle of HEET added in there, their cars ran, idled and accelerated much better and they went on to pass their emissions test. It's literally like taking a few years off of your cars age.

2- SEAFOAM:

While heat works through the fuel system, SEAFOAM is another hot-rodder trick that works through the intake system. SEAFAOM can be poured into the intake of a running car as it cleans up and burns off carbon deposits in the intake system, intake manifold, and valves. Cars typically run smoother and idle cleaner afterwards and it is another great 'anti aging' product that is tried, proven, and sworn by.

Silicone Vacuum lines

Vacuum lines are the veins of the engine because they are used to send signals and to mechanize and operate so many auxiliary systems on the car. On older cars especially, it is not uncommon to find so many vacuum operated parts on the car such as the fuel pressure regulator reference port and the exhaust gas recirculation (EGR) valve.

Factory vacuum lines are made of harder rubber that can with time harden and crack. A leaky vacuum line preventing the proper operation of your EGR valve, or incorrect vacuum reaching your fuel pressure regulator reference port can cause your car to try to inject in as much as 25% more fuel than you need, which can cut your mileage by about 20% (~ 4 to 6 mpg).

Silicone vacuum lines are softer than factory rubber lines. They are new (so we're sure that they're not leaking) and they are flexible so that we know that they won't harden

and leak later. Use small zip-ties to secure these vacuum lines in place and try to run the lines as short as possible.

The larger the size of your vacuum line 'vein system' and the larger the leaks in the system the worse you will find your throttle response, and the less accurate your fueling will be during on throttle / off throttle transitions.

Like I said earlier, car manufacturers have applied some of the techniques mentioned here throughout the years. We can find nowadays most manufacturers replacing vacuum operated valves and adjusters with electrical actuated valves driven by an extra computer that helps manage these auxiliary systems. By doing so, they can remove all vacuum lines in the car (because the no longer need them all except for just 1 that goes to a sensor that feeds the computer to allow it to know the current vacuum level to drive all the other systems). Doing so they get a more reliable car (less likely to develop vacuum leaks and emissions problems) with better throttle response (due to having less overall intake volume).

Engine sensors

Engine sensors control what the ECU sees and therefore what it thinks is going on with your engine. There are a few main sensors that have a direct effect on fueling and mileage two of which are your Inlet Air Temp (IAT) sensor and your Coolant Temp sensor.

On two of the cars that I've worked on, we found that each of those sensors had come unplugged accidentally (the IAT probably when the last mechanic did the air filter change on the car, and the coolant temp sensor was probably forgotten disconnected when the radiator was changed on that car). Having the ECU not know exactly what the incoming air temperature or what the coolant temperature is makes it think that the car has still not warmed up, and that it is sitting in Alaska. The combination of which can cut your fuel mileage by as much as 50%.

Most electrical sensors are designed to be fail safe. What does this mean ?

When an engine runs rich, it has a higher ratio of fuel to air than it needs for complete combustion. In this case, the engine is wasting some fuel, at the expense of producing

peak power and using the excess fuel to slightly cool down the combustion to allow it to continue to produce peak power for a sustained period of time (For example if you were racing it). When an engine runs lean, it has a lower ratio of fuel to air than it needs for complete combustion. This means that there is more than enough oxygen to burn all the fuel in the cylinder and produce a clean emitting car and a fuel efficient car that consumes all of its fuel. The problem with a lean burn is that it happens at a higher temperature than a rich burn and produces less peak power. Because lean burning cars run at higher temperatures, the car can NOT be run lean indefinitely or the engine will burn. Using throttle based enrichment the computer (or carburetor) takes care of transitioning the car from a lean burn condition (good for mileage) to a rich burn condition (required for safe sustained acceleration and peak power) to operate the car safely in both conditions.

Now if a sensor fails, the engineers have decided that it is safer to let the sensor fail in a way that makes the computer think that the car is running lean. To compensate, the computer will go ahead and run as rich as it can to try to get things back to normal , but since the sensor has failed , it will always keep telling the computer that the engine is lean, and the computer will stay in maximum enrichment mode. This fail safe operation has been designed into most modern cars such that if a sensor fails you can never blow the engine from going full throttle on a lean mixture, this however happens at the expense of having your mileage drop to about 70% to 50% your original mileage because the ECU is running in fail safe mode.

This is true for almost all fueling sensors (oxygen sensor, coolant temp sensor, intake air temp sensor …etc) and so if you are seeing a dramatic drop in your cars mileage you should get your computer scanned with a proper scanner tool to determine which sensors have failed and replace them. Replacing a faulty oxygen sensor on my uncles Cadillac doubled his mileage bringing it back to stock levels.

Oxygen and Air to Fuel Ratio sensors

Oxygen sensors help the ECU adjust the exact amount of fuel that the engine needs by measuring the exhaust gas oxygen concentration to figure out how oxygen rich the previous combustion cycle was. This measurement happens after the fact and so it helps the computer figure out if it's assumptions, calculations, and decided amount of fuel

injection was correct or if it needs to 'trim' fuel injection up or down by a slight margin to get a more exact air fuel mixture.

The duty of the oxygen sensor is to tell the ECU weather the mixture is rich (having too much fuel) or lean (having a lot of oxygen and barely any fuel). Whereas the ECU's duty is to do the opposite of what the oxygen sensor tells it:

Example: The oxygen sensor tells the ECU that the mixture is lean; the ECU will add more fuel to compensate trying to make it rich. After several more combustion cycles, the mixture now becomes too rich, the oxygen sensor tells the ECU that the mixture is now rich, the ECU starts to subtract fuel to compensate trying to make it lean again.

This rotation of too rich / too lean combustion is called closed loop and is a continuous oscillation between the ECU and the oxygen sensor and so it becomes apparent that the oxygen sensor failure into a fail-safe 'always lean' report would force the ECU to go into a fail-safe full enrichment mode as described earlier.

There are 3 types of oxygen sensors that can be fitted to a modern automobile:

1- Narrow band oxygen sensors:

    a. Non-Heated narrow band oxygen sensors

    b. Heated narrow band oxygen sensors

    Narrow band oxygen sensors switch between 0 volts and 1 volts telling the ECU one of two things:

        i. The mixture is too lean (sending 0 volts out to the ECU).

        ii. The mixture is too rich (sending 1 volt out to the ECU).

    This type of 'switching' sensor doesn't have the resolution or the ability to know exactly how rich or how lean the mixture is, and so it roughly (and cheaply) controls the mixture but it's not exactly accurate.

    The non-heated type sensor is heated by the exhaust gases rather than being heated by an external electrical heater circuit. The non-heated sensors don't produce any voltage until they warm up and so they are less fuel efficient on cold starts than 4 wire sensors (heated narrow bands).

The heated sensors are a little better in that they get up to operating speed sooner and that can save you some gas right after a cold startup, certainly more so if you live in a very cold climate.

2- Wideband oxygen sensors

Wideband oxygen sensors have a 0 to 2.5 volts or 0 to 5 volt swing that is exactly representative of the air to fuel ratio. For example a 16:1 lean air fuel ratio would show up as 0.5 volts, where a 14:1 (less lean) air fuel ratio would show up as a 1.5 volts, and a rich 12:1 air fuel ratio will be seen by the ECU as a 2.0 volts… etc

With ECU's that use this type of sensor the ECU knows exactly how rich or how lean the previous combustion was, and so it knows EXACTLY how much to trim the fuel injection for the next cycle so that no fuel is wasted and that the mixture is perfect.

Modern German cars are moving towards this type of sensor for Euro level 4 emissions standards although it was first used in late 80s and early 90s Honda Civic and Honda City to break a then unheard of 40mpg.

What you want to do here is upgrade your 1 wire oxygen sensor to a 4 wire heated if you can. Or even better replace your narrowband oxygen sensor with a wideband kit that has a 'simulated narrow band output'. With this type of kit you can see your exact air fuel ratio on your wideband gauge, but you can send a simulated narrow band signal to your ECU. The trick here is that we are using a higher quality sensor that knows exactly how rich and how lean the mixture is, so even the simulated narrow band signal is much faster to respond (so that you spend less time being too rich or too lean) than the chemically generated signal from a narrowband sensor. Reacting faster to a rich condition helps the ECU pull out fuel sooner thus improving mileage.

One thing to note here is that oxygen sensors have a useful lifespan of 40,000 to 60,000 miles. Once they get older, even if they don't completely fail, they do get 'lazy' a lazy sensor due to its age is slower to transition from lean to rich than it is from rich to lean. This means that even after the ECU has injected enough fuel to make the mixture fuel rich, the sensor lags on its transition and continues to tell

the ECU (falsely) that the mixture is lean. The ECU then continues to add fuel (wastefully) waiting for the lazy sensor to respond (chemically) to the excess fuel in the exhaust gasses. This lazy sensor can cause a mileage reduction of some 15 to 25%.

Replacing the narrowband with a wideband and a simulated narrowband output solves this problem because wideband sensors never become 'lazy' since they are designed differently and to higher standards.

Electric radiator fans

If you have a car with a belt driven engine fan, make sure to replace it with an electrical fan. There is no need to have the fan weight dragging on the motor for the entire time that you are driving (especially in situations like highway cruising where there is enough air being forced into the radiator to cool it without the need of a fan). Replacing the radiator mechanical fan with an electrical fan that can be shut off when not needed reduced engine load, and thus reduces injected fuel, and thus increases mileage.

Again this is a trend that we've seen within car manufacturers between different model year cars.

Chapter 2: Rolling Resistance and Drive Train Losses

While chapter 1 was about having the most efficient combustion process possible to extract as much power out of our engines with the least amount of fuel, chapter 2 is about making sure as much of that power is transmitted to the wheels as possible.

Oils: Transmission, engine, differential. (Redline, Mobil1)

When enthusiasts take their cars to a dynamometer to test power figures we typically find that anywhere between 15 (front wheel drive) and 25% (all wheel drive) of the engine's power has been wasted in turning the gears and differentials in the car before the power even reached the wheels. To improve your mileage you need to make sure

there is the least possible friction resistance in your drive-train (transmission, engine, and differential). This can be achieved by using the lightest weight engine oil allowable for that part weather it is the engine, the transmission, or the differential. Also, make sure to use a fully synthetic oil such as Redline or Mobil1 oils because they have a higher viscosity which will reduce frictional losses, and a better lifespan with reduced breakdown.

Obviously if your car is 2 years old you may not need these oils replaced, but if you have a 13 year old car and don't know the last time that the differential had its oil changed, then it would be very likely that replacing that oil will make the car run smoother and easier, while increasing mileage.

Tires and Alignment: Excessive Toe In/Out

All the power harnessed from the engine and transmitted through the drive-train needs to be applied to the ground through your wheels as efficiently as possible. Excessive toe settings for your wheels (toe in where the fronts your wheels point towards each-other / \ or toe out where the fronts of the wheels point away from each other \ /) will cause an increase in the wheels drag against the ground and reduce your mileage.

Furthermore, reduced tire pressure from around 35-45 psi (typically recommended range for fully inflated tires) down to about 25psi will increase your rolling resistance by about 16% as studies have shown. Make sure you keep your tire pressure at the recommended setting by your manufacturer or even 2-4 psi higher all around (while not exceeding the maximum tire pressure indicated on your tire's sidewall). This over-inflated tire setting will give you an increase in mileage over-stock and is safe as long as you stay close to the highway speed limits. If you plan on doing aggressive high speed racing from time to time, then keep your tire pressure at the manufacturer recommended level and don't over inflate them to allow room for growth when the tire heats up under extreme stress and racing.

Lighter rims

This is also something we've seen manufacturers do on their cars. Lighter rims have less inertia and so they have less resistance to changing their rotational speed. Lighter rims are therefore easier to accelerate and decelerate which can increase mileage in stop and go traffic conditions but doesn't have any significant affect on fixed-speed cruising mileage. If you're mileage problems are mostly from inner city driving, then a cheap used set of aluminum alloy wheels that are lighter than your factory steel wheels will show a good gain in acceleration, in city mileage, and breaking distance due to lower rotational inertia.

Final drive

The engine's final drive ratio determines the cruising rpm of the car at the highway speed limit. For example, increasing the final drive by 10% means that the engine rpm at cruising speeds will be lower by 10%. If you do a lot of highway driving then having a tire that is 5 to 10% larger in radius (and thus 5 to 10% larger in circumference) will give you 5 to 10% more distance traveled per tire revolution. This means that when cruising on the highway your rpms will be 5 to 10% lower than before your tire change, at the same cruising speed. Therefore your mileage will increase by 5 to 10%.

Shocks: Koni FSD

MIT studies have proven that up to 10% of the car's mileage can be increased using a new age shock system that generates power from the shock motion.

A poor or aged shock absorber reduces mileage in 3 ways:

1- Engine power rather than being transmitted to the ground is rather wasted in shifting the car's weight around during acceleration, braking and turning. Controlling this weight transfer with healthy shocks, sends more power to the ground and reduces these losses.

2- In extreme situations (such as extremely bumpy conditions) a poor shock absorber will not be able to keep the tire controlled and in contact with the ground. When the tires lift off or bounce under a weak under-damped shock, the

engine power is wasted spinning a tire in air rather than propelling the car forwards.

3- Lastly, shock absorbers help control body roll and dampen weight transfer in the car. If these oscillations and motions are not damped we often find ourselves having to get off the gas (to steady the car) then back on the gas to re-accelerate again back to our cruising speed. This excessive modulation of the gas pedal due to a bad shock absorber, and our need to re-accelerate back to speed rather than maintaining a constant and smooth cruising rpm means that gas has been wasted.

The shocks I'm recommending here Koni's new frequency selective dampers that rather than having two or three oil valves in them (to have 2 or 3 different damping settings depending on the type of surface), have a newly designed valve system that senses the speed and frequency of the changes in the road's surface and automatically adjusts the shock damping to achieve the best possible damping. These shocks are both soft on smooth roads and stiff on typically jarring repetitive small bumps (high frequency bumps). One more merit to these shocks is that they are the factory OEM equipment installed on the Lamborghini Gallardo and have gone a long way in making that car both a subtle cruiser as well as an aggressive bruiser.

Weight

This one goes without saying, racers reduce their cars weight by taking out useless items to increase our power to weight ratio. By increasing our power to weight ratio we can achieve faster acceleration and braking. From a mileage point of view, the more needless weight you have in your car, the more load you place on your engine during acceleration (think of what would happen if you were towing a jet-ski or some quads behind your car). Most car ECU's are programmed to run richer under higher loads because richer mixtures produce more power and are safer under sustained high loads as we've mentioned in our section on oxygen sensors.

Reducing the weight of your car by taking out junk in the trunk, your subwoofer box, or even your rear seats if you don't use them at all reduces engine load and gives better mileage.

Battery (odyssey, Optima)

Another racer trick used to reduce weight without sacrificing much comfort is to replace the car's battery with a lighter sealed gel cell battery in place of the heavy lead acid traditional batteries. These batteries can be either full sized batteries or even smaller sized compact batteries that are enough for starting the car (in case you never spend long hours idling around in traffic and are mostly worried about highway mileage). A lighter batter can be 30 to 40 lbs lighter in some cases and will work just as well as a larger full size lead acid battery.

Aerodynamics

If you do a lot of highway driving then the aerodynamic profile of your car will greatly affect your mileage. Typically easy things that you can remove to reduce your car's drag coefficient are mud-flaps, large roof racks, and rear spoilers.

Spoilers for example even if they are properly designed don't have much of an effect on traction till past 100mph and so in most operating conditions, they are useless (functionally).

If you have a large 5 foot antenna, make sure you replace it with a smaller stubby antenna or even remove it completely for an in-care antenna.

Other aerodynamic modifications that can improve your car's drag profile include more extensive modifications like:

1- A lower front bumper lip to prevent air from travelling under the car

2- Lower side skirts to reduce air flow under the car

3- Front under-trays or air splitters that close the seal off the area under the engine with a sealed sheet preventing turbulence under the hood of the car.

4- Lowering the car's ride height by even a small amount 1" to 1.5" can prove a dramatic reduction in drag coefficient.

Conclusion

In this guide we have:

1- Presented 15 proven upgrades and modifications to regain or increase your car's mileage.

2- We have presented a list of manufactures and suppliers that we recommend for the best performing and most efficient parts.

3- We have provided with a complete 'check-list' of actionable items that can be customized for maximized in-city driving, highway driving, or both depending on your typical drive routes.

4- We have also explained how some of these technologies are becoming original equipment on many of the newer cars released today.

The beauty of these upgrades is that unlike performance upgrades, these modifications are completely independent. So, you perform as many or as little of them as you would like or can afford, and with time, as the opportunity presents itself you can do even more towards saving more money. These upgrades can increase your mileage up to 5mpg over stock figures and will pay for themselves eventually.

Mileage booster checklist

Item	Recommended for City Driving	Recommended for Highway Driving	Completed?
Iridium Spark Plugs NGK , Club Plug	**YES**	**YES**	
Cotton Gauze Filters K&N	**YES**	**YES**	
Silicone Vacuum Lines Hose Techniques	**YES**	**YES**	
Intake manifold spacers Outlaw Engineering	**YES**	**YES**	
Fuel system cleaner HEET & ISO-HEET	**YES**	**YES**	
Intake carbon cleaner Sea-Foam	**YES**	**YES**	
Wideband Oxygen Sensor AEM UEGO	**YES**	**YES**	
Drive-Train Oils Redline, Mobil 1	**YES**	**YES**	
Tire alignment and inflation check	**YES**	**YES**	
Lightweight Battery Optima, Odyssey	**YES**	**YES**	
Lightweight Rims Enkei	**YES**		
Shocks Koni FSD	**YES**		
Electric Radiator Fan Spal		**YES**	
Oversized Tires Tire rack, tire calculator		**YES**	
Aerodynamics – Antenna Delete		**YES**	
Aerodynamics – Spoiler Delete		**YES**	
Aerodynamics – Mud-flaps Delete		**YES**	

This guide is prepared by http://www.superchargerperformance.com/

If you are interested in performance as well as mileage, be sure to check out our power guide and supercharger power calculator: