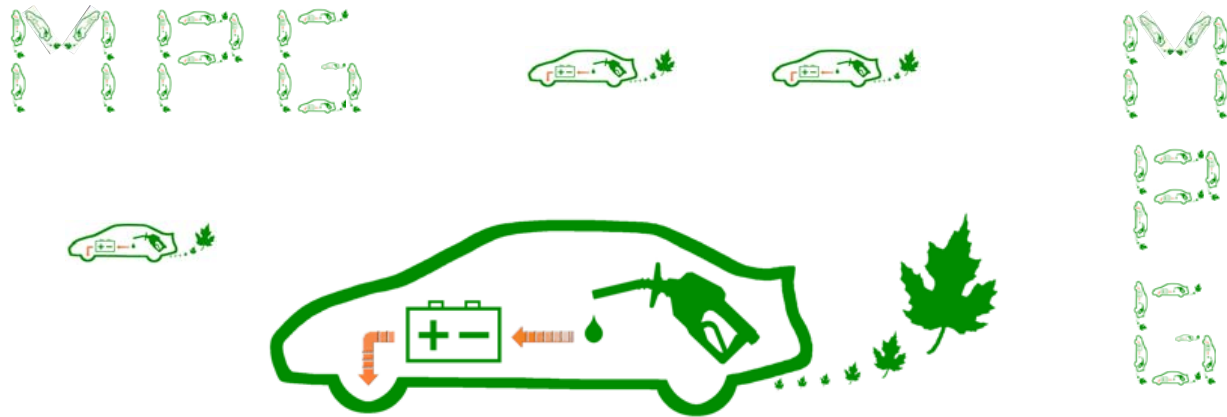


Efficiency Misconceptions



Do you know what the efficiency of your vehicle really is?

Many owners are shocked to find out the MPG they get is actually lower than they had thought... or were led to believe. There are lots of misconceptions. How many are you aware of?

The problem started decades ago when EPA estimates were first established. The purpose of those statistics was originally intended as just a basis of comparison. So, the fact that they were measured in ideal conditions didn't really matter. It was simply a consistent standard to help consumers with their purchase decision.

Unfortunately, the good intentions were misinterpreted. People didn't read the fine-print. They assumed the large MPG numbers shown were real-world expectations. Factors that have a profound efficiency influence, like speed & temperature, did not come to their attention and their incorrect beliefs were never questioned.

Starting in 2008, the estimates posted on new vehicle window-stickers were revised to now reflect a realistic expectation. A wider range of measurement criteria was taken into account, aspects of vehicle use that were previously not included. There is still fine-print though. The large MPG numbers only portray an average. There is still a range of results considered "normal". Your mileage may, and likely will, still vary.

This document highlights those influences you should be aware of, popular efficiency misconceptions.

Speed & Acceleration

The faster you drive, the less efficient the vehicle is. Think of it like a bicycle; pedaling harder to go faster requires more energy. MPG will be lower if you drive 70 MPH rather than 60 MPH. The assumption that highway travel was more efficient than city was based mostly upon engine power. Being underutilized at just 30 MPH and the absence of constant city driving speed causes a MPG penalty... a factor which hybrids have overcome.

Connect an aftermarket scanning device. You'll be surprised to observe just how much of an influence speed can make. Slowing down will increase MPG. Respecting speed limits on highways can be very rewarding.

The rate at which you accelerate makes a difference too. Modest acceleration was what those original EPA estimates depicted. Decades later, it is very clear that drivers merge onto highway and pull away from lights much faster. Overall MPG is lower as a result. Fortunately, the penalty of that is much less for hybrids than the traditional vehicles; electric motors compensate for the shortcomings of engines during acceleration.

Temperature & Moisture

Combustion within an engine is affected by both temperature & moisture. This is quite obvious (for those with a MPG monitor) during the winter, when air is colder & dryer. That's why the EPA measures were considered ideal conditions, since 68 F degrees was not the slightest bit representative of what drivers actually encounter during January in northern states. Higher temperatures and higher humidity will yield higher results, which unfortunately is the only time when some owners check efficiency... completely unaware how much it differs throughout the year.

Engine Warm-Up

Most people have no idea that all vehicles have a warm-up phase. If there's a tachometer available, with a traditional vehicle during the winter you can easily observe this. RPM will be higher for the first few minutes, even if your speed remains constant. Hybrids have something similar, though the electric motor will make the effect on RPM of the engine more difficult to detect. You'll certainly notice it on the MPG though, especially if the emission rating is SULEV or PZEV. Heat from the engine is required to cleanse exhaust. To be cleaner, more gas is used initially. Those that measure efficiency are often not aware of this, hence it being a source of many misconceptions. MPG is higher after warm-up.

Fuel Variations

Refining formulas change as the seasons change. Winter requirements are quite different from summer. The purpose for this varies. But primarily, it is to better deal with emission pollution caused by different driving conditions. (This includes the use of ethanol as an additive.) Efficiency is directly impacted as a result. Were you aware that your fuel changes? Do you know how much it affects your MPG?

Tire Pressure, Type, Break-In

Unfortunately, most people have no idea how much tire pressure influences MPG. Softer tires, for a more comfortable & quiet drive, reduces efficiency. Too soft allows tires to wear out faster and decreases safety. EPA estimates are performed using the automaker's minimum pressure recommendation. Most tires support significantly higher pressure. If your vehicle is quiet anyway and offers good quality suspension, there's no reason not to increase PSI in the tires.

PSI naturally decreases over time too, due to both minor imperfections in the seal and the influence from temperature drop. Pressure will drop below the minimum if it is not routinely checked; this will degrade efficiency... something commonly overlooked when dealing with MPG.

More aggressive tire tread for better traction has a negative effect on efficiency. There is a trade off, though some types are better than others. This is true for the noise they produce as well. Consider all those factors carefully when choosing a tire. Also, keep in mind the heightened awareness to this you'll have when driving a hybrid, due to having a MPG display always informing you of current efficiency.

Did you know initial MPG will lower for new tires? There is a break-in period. Until the tiny rough edges of the new tread wear down, efficiency will be impaired a little bit.

Heater & A/C

Often forgotten is the negative effect personal comfort has on efficiency. MPG will drop the greater demand is on heating & cooling of the vehicle's interior. This is especially important when considering statistics that are published. Ideal conditions are usually when measurements are taken; this misrepresents what to expect in actual real-world driving. Results can be much lower during winter & summer peaks when Heater & A/C use is highest.

Fortunately, some hybrids offer a cooling advantage over traditional vehicles. They provide electric A/C. This allows it to be powered by the battery-pack, so the engine can still shut off at times. The result is a noticeable efficiency improvement.

Heater use will cause the engine in a hybrid to run more often. But for "full" hybrids (like Prius), that extra engine activity results in more electricity being generated than usual... which reduces the efficiency penalty from the need to keep warm.

Vehicle Differences

All vehicles, even those of the same model, are not created equally. The efficiency outcome from minor manufacturing variations can be rather noticeable sometimes. Detecting what component is to blame is often difficult. But with so many moving parts involved, it shouldn't be a surprise... though the influence usually not realized.

Factors appear later on too, like when alignment needs to be readjusted from striking too many road hazards.

Oil Level, Weight, Type

Many places that provide oil changes purchase their supply in bulk. That means the oil is often pumped directly from a large barrel straight into your engine, which makes careful measure very difficult. The common problem of overfilling (oil above the “full” indicator) is often the result. That extra oil causes unnecessary internal drag of the engine. It lengthens the warm-up time too. Both end up reducing MPG. Lower efficiency from wasting oil is a penalty for many. Check the level. Don’t tolerate overfill.

Weight also makes a difference; too heavy of requires the engine work harder. This particular efficiency factor is especially important during the winter, when oil becomes thick from the cold. Fortunately, unlike the past, many vehicles now allow for thinner oil all year long.

Type has an influence as well. Synthetic provides a minor efficiency advantage over real oil. It will also better protect the engine against wear.

Measurement

The most confusing aspect of efficiency is the measurement itself. Abundant misconceptions prevail because of this. Factors which can influence the results are plentiful. Aspects, such as weather, are totally beyond your control. Driving conditions and duration vary dramatically. Even the act of tank filling has an element of inaccuracy, never knowing exactly where the “full” level truly is. Each contributes to the margin-of-error. Avoiding that simply isn’t possible, unless you take the time.

Collecting real-world data for an entire year (so all 4 seasons are accounted for) is the only proper way to represent the true MPG for a vehicle. Unfortunately, few expend that effort to actually do this. The result is feeding misconceptions. People assume a brief measure is representative of what to expect all the time, not realizing just how much efficiency can fluctuate under different circumstances.

To further complicate matters, computers displaying efficiency average are only approximations. The amount of fuel injected is only an estimation, usually based on a single cylinder. And with thousands of pumps taking place within the engine every minute, rounding of seemingly insignificant amounts get amplified over the course of many miles. In short, the value depicted is typically off by a MPG or two.