

Frequently Asked Questions

Question

Improve my fuel economy

Answer

I'm no expert but with 20yrs of driving top weight HGVs I'll happily pass on my thoughts on economical driving.

There are lots of things to consider with fuel economy:

- » Aerodynamic resistance.
- » Rolling resistance.
- » Engine resistance.
- » Turbo kick in rpm.
- » Built in fuel computer errors.
- » Traffic Conditions.
- » Weight.

The biggest factor on fuel economy in the cruise condition is aerodynamic drag. Drag is the force encountered by your car making a hole in the still air it encounters when moving forwards. This, not surprisingly, increases with speed so you need to find a speed that is a balance between minimising drag and making progress. You can help yourself here on long journeys by following (not too closely) something large.

There is a large area of low pressure behind large vehicles on the move and the air for some considerable distance behind them is travelling in the same direction as the vehicle that caused the low pressure. If you sit your car in that moving air you reduce the dynamic pressure (drag) that your car is encountering. It might only be 20mph difference in relative air speed but at 55-60mph that's over a third of the total drag. At 60mph, on level ground it's possible to sit behind a larger vehicle and see the instant mpg figures hovering around 150-200mpg!!!!

Rolling resistance. The only factor you can control is resistance through tyres. Don't under estimate the punitive effects of under inflated tyres. The accepted road transport figures, IIRC are that a 4% reduction in

air pressure will lead to a 20% reduction in tyre life and a 10% increase in fuel burn. Those figures are for HGVs which have more tyres so the effect won't be quite so much on a 4 wheeled car but you can see what's going on.

Engine Resistance and turbo kick in. When an engine is running there are lots of things on the move like pumps, alternators, air-con compressors and valve gear etc. All of these items require energy to make them move and the faster the engine is revving the more energy is required to keep all the bits moving. Its more efficient therefore, to select the highest gear and the lowest revs possible for any given situation. With a turbo engine though you have to consider that below certain revs the engine won't be producing enough exhaust gases to spin the turbo in it's efficient range.

You have to find the balance point then for the revs that keep the mechanical resistance at a minimum whilst at the same time producing enough exhaust gas to spin the turbo. Thankfully with Citroen HDi engines this is surprisingly low and 1800-2500rpm is the range the engine is happiest at. Torque is at the lower end of the rev range and power is at the top. Only operate the engine in higher revs if there is a requirement for the higher power available.

Fuel computer errors. When you are rolling the car with the accelerator fully off there is a big error present in the fuel economy calculations in the computer. In this condition the modern diesel engine shuts off fuel supply completely so it isn't using any fuel at all. The limitations of the computer software though limit the indicated economy to no more than 999mpg which is vastly different to the true figure: infinity.

There is a way round this. When you are slowing down because there is a gaggle of slower vehicles ahead, rather than pressing on until you have to lift your foot completely you will get a much more accurate computed economy if you ease the accelerator up but maintain enough power to overcome some but not all of the vehicles total drag (aerodynamic, rolling and mechanical resistance). If the power provided is less than total drag the car will slow down.

Traffic conditions. This is where the driver can make the biggest difference to fuel figures. If you are in traffic that is running at a steady speed then you will have an easy time of driving efficiently. It's when the traffic is changing speeds that your road craft skills will make the biggest difference.

If you stick rigidly to the up/down speeds of the prevailing traffic you are wasting fuel.

If you are so close that you have to accelerate and brake to maintain your desired distance from the vehicle in front then all you are doing is using fuel to heat up your brake discs! It's far better to sit further back, watch what's happening in front of you and try to even out the changes in speed occurring ahead.

If you see the vehicles ahead slowing then lift your right foot slightly and start the car slowing. When the gap starts to open up then gently ease the power on in the highest gear you can to keep the engine at the lower end of it's turbo operating range.

Weight. Its simple isn't it? The heavier the vehicle the more power you need to move it. With cars there is another thing to consider. The relatively soft tyres on a car mean that extra weight compresses the tyres

and in turn this increases rolling resistance.

The answer would be to inflate your car tyres to truck tyre proportions (125psi) and minimise tyre distortion and rolling resistance but in a car you don't have the weight required to press the tyre onto the road to create grip. This is why we run softly inflated tyres on a car. The tyre deforms and literally grabs hold of the road surface.

In a nutshell then: Use a light right foot for accelerating and think ahead to avoid using brakes. Use the lowest revs possible to keep the turbo spinning. Use your skills to minimise unnecessary changes in speed. Use someone else's fuel to minimise aerodynamic drag. and don't fill your car with heavy stuff!

In the slow speed urban environment filled with traffic lights, roundabouts and queueing traffic you're pretty much stuffed. All you can do to maximise fuel efficiency is accelerate and decelerate gently in a hope that whatever is in front of you moves off.

Oh yeah, one last thing. Drive with the instant mpg figure on display. This will teach you how to operate the engine as efficiently as you can.

Details

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