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What a Gas - Part 1

Rick Luff

The reaction was of open-mouth horror. Unspoken thoughts such as “You did what to a what”? “Deviant”. “Heretic”. “Iconoclast”. Yes, it’s true; I have fitted LPG to my Jaguar.

My 1983 XJ6 Vanden Plas to be precise. So why the reaction? Perhaps it’s the bucket-size filler tap located in the middle of the bonnet, or the gas tank neatly strapped to the roof with steel cables. Perhaps it’s not aesthetics at all. It might be the shocking drop in power or all that extra junk crammed into the engine bay.

Over the next few issues of the magazine I’ll describe LPG, what really happens when it is fitted, the cost, some pictures and a bit of economics so that you can be the judge as to whether I’m mad or not.

Put simply, internal combustion engines work by burning a hydrocarbon (Petrol, diesel, gas) in an oxygen rich atmosphere (air). Petrol and diesel need to be vaporized before they are mixed with air in order for relatively efficient combustion to take place. The advantage of gas, be it Liquid Natural Gas (LNG) or Liquefied Petroleum Gas (LPG) is that it is already in that state. LPG is made up of about 60% propane and 40 % butane depending on the season. An odorant, ethanethiol or ethyl mercaptan is added to help detect any leaks. LPG is not the new kid on the block either. It was invented in 1910 and has been in use in cars since the 1940s. It can be refined from crude oil and also exists naturally in a gaseous state. Its energy content is similar to petrol.

Now we know what it is, let’s see how it’s applied to vehicles.

Storing petrol in a vehicle is simple. All you need is a container with a hole in the top to pour the fuel and a hole in the bottom to send said fuel off to the engine. While there are a few other bits and pieces involved, that’s basically it. The container can be made to fit any shape and be tucked neatly out of the way. LPG is naturally a gas so a conventional tank would not be suitable for a variety of reasons. Instead the gas is compressed by a ratio of 250:1 to become a liquid. Because it is under a pressure of about 120 psi, a fuel pump is not required. The down side is that because of this pressure the tank can’t be any old shape. For cars, one or more cigar shaped cylinders are often used. Alternatively, lozenge shaped units can be fitted in the spare wheel well. In most cases the original petrol tank(s) are retained.

So, the tank is no longer strapped to the roof but inside.

You’ll also be pleased to know that the filler nozzle need not be in a prominent position either. On my car I scrounged a spring loaded number plate holder from the wreckers and located the nozzle

behind that. Don't let the fitter tell you its illegal and can't be done. It isn't and it can be (see pics). Another neat solution for an XJ6 is to remove one of the side petrol tanks and use the conventional filler cap to disguise the nozzle. Chances are you won't miss that tank as you'll be left with 47 liters of petrol along with about 53 liters of gas which totals 6 litres more than your pre conversion capacity.

Now that we've solved how to store the fuel, what happens next? The gas, still in its liquid state, needs to get to the engine and does so through a shielded copper tube run along the underside the vehicle. Liquid gas injected into an engine would ruin your day, not to mention your engine so a small device about the size of a breakfast bowl converts the liquid back into a gas. This unit is plumbed into your heater system. Gas then flows through a tube to a device that, to me, looks like a gas hot plate burner turned inside out, which is installed between the air filter and the air box. Incoming air is blended with the incoming gas and heads off to the cylinders to be burned in the usual manner, much the same way as in a carburetor engine. There is a bit of electronic gadgetry along the way, a raft of devices to ensure safety, and that's about it. Gas levels and petrol/gas switching is handled by a 20mm button-sized device that I have had subtly fitted on the ski slope in front of the ash tray.

Apart from the red diamond logos riveted to the number plates, the car looks the same as before. Next issue I'll tell you about installation costs, fuel economy and estimated pay back time for the conversion. We'll also find out about valve seat recession and how to avoid it.

Rick Luff

What a Gas

Part 2

Last month we went through anatomy of an LPG conversion. This time we'll answer other questions, the most common one being, how much did it cost?

The price you pay will depend on a number of issues including kit type and cost, where and how it is fitted and by whom. My set up cost \$2,950 including a tank of gas. After the LPG rebate of \$2,000 I'm out of pocket by \$950. Or am I? Even before we get into savings in running costs, I would suspect that with current petrol prices an LPG equipped daily driver would command a premium over a petrol only car. By how much, I don't know. Perhaps you could ask yourself, all else being equal, how much more would *you* be willing to pay?

The next concern people have is whether LPG will stuff up the engine. The short answer is, no. Gas gives about the same bang as petrol, is purer and is better for the environment. What it doesn't have is a lubricant for valves stems and seats. The lubricant in leaded petrol was, you guessed it, lead. With the advent of unleaded petrol only being available after 1988, manufacturers built engines with hardened valve seats to combat the lack of lead. All jaguar engines built from 1968 had hardened valve seats so as to comply with the introduction of unleaded fuel in the USA, which was Jaguar's biggest market. So your post 1968 Jaguar will not suffer valve damage from using unleaded petrol and probably not from using LPG. Want to take a chance? Well I don't, so I use an upper cylinder lubricant (UCL).

An upper cylinder lubricant, according to the blurb on the box "Protects valves and valve seats from recession, lubricates and cleans the entire upper cylinder area and improves economy". Is this true or just marketing mumbo jumbo? From twenty years personal experience I'd say it's true. Recently I had the head gasket changed on my Landcruiser, which has run on LPG for the past eleven years. The mechanic said that the head and underside of the rocker cover looked as though it had been built yesterday and sprayed with light machine oil (as opposed to the usual black grotty appearance of an older motor). This was probably due to a combination of running on LPG, regular quality oil and filter changes and the use of an UCL. You can add UCL to the petrol tank at a rate of 1ml per litre of petrol or install a kit that draws fluid from a small bottle using a venturi effect. At the very least it will improve your mileage.

Next up is running costs (or savings to be more precise). I won't bother you with the details, however with gas costing 80 to 95 cents per litre *less* than petrol it doesn't take long to recoup your investment. At 250 kilometers per week I estimate that I will break even after 5,000 to 6,000 kilometers or five or six months. After that - well its just pure profit.

Lastly, power should be a little less on LPG than with petrol but not so much that you would notice, especially with an automatic transmission.

So there you have it. Cheap to install, cheap to run, neat installation and potentially higher resale value. Would you do this to an E-type (there's no room), a Mk 2 (why not if you drive it a lot?) or a V12 XJS? (you want economy then buy a Barina). Really it would be up to the owner and how they use their car.

Next month I'll update you on how accurate my economy predictions have been

Rick Luff