



LET PETROL GO!

There was something wonderfully appropriate when Mark Wain showed us under the bonnet for our first view of one of his LPG conversions. It was fitted to a lightweight Land Rover of late 1970s vintage; technically simple, and easy to understand and appreciate, the conversion looked as though it was designed to be there. There was nothing add-on about it... apart from the fact that the LPG vaporiser was a

little bit cleaner and more shiny compared to the rest of the Land Rover's hard worked engine. A neat conversion and it had been completed by Mark's 14-year old son, Joseph.

It was appropriate as the origins of LPG-powered cars are thought to go back to the 1940s and the fuel was being used due to a shortage of petrol. Today, there's a similar shortage, not of petrol admittedly, but of the cash to pay for it. Not surprisingly therefore demand

Today, we have to cope with the ever-increasing cost of petrol, so if there was an alternative that was around half the price, shouldn't you consider it for your 4x4? We went to visit WCRLPG to find out the latest about this alternative fuel option

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Photography: Nigel Fryatt, WCRLPG

for LPG-conversions is keeping Mark Wain very busy, and most of that business is on 4x4 vehicles, which is why we were there to find out more. With petrol costs rising inexorably, is this the way you should go with your 4x4? Time for an admission here, this author has little experience of LPG-powered vehicles, so we went to Mark's Norfolk premises with an open mind, and a lot of questions. The time spent there was certainly eye opening and has convinced me that LPG-conversions and 4x4s go together pretty well, and that the number on our roads is likely to grow.

Mark Wain has been in the car conversion business since he was 15, working on classic cars. Interestingly, it was the change in fuelling that hit classic cars when petrol went unleaded that actually got him started with LPG. His business was classic car restorations and when the fuelling changed, taking the lead additives from standard pump fuel, a lot of his time was in doing 'unleaded' cylinder head conversions – which brings back memories, since I remember having just such a conversion done on my Ford crossflow engine in my Caterham Seven by the then well-known British engine specialist, Oselli. Those were the days.... The unleaded cylinder head conversion was certainly popular at the time and it seems that some members of the classic car fraternity, ►

Above: We took one of Mark Wain's conversions for a drive through a very snowy Norfolk countryside

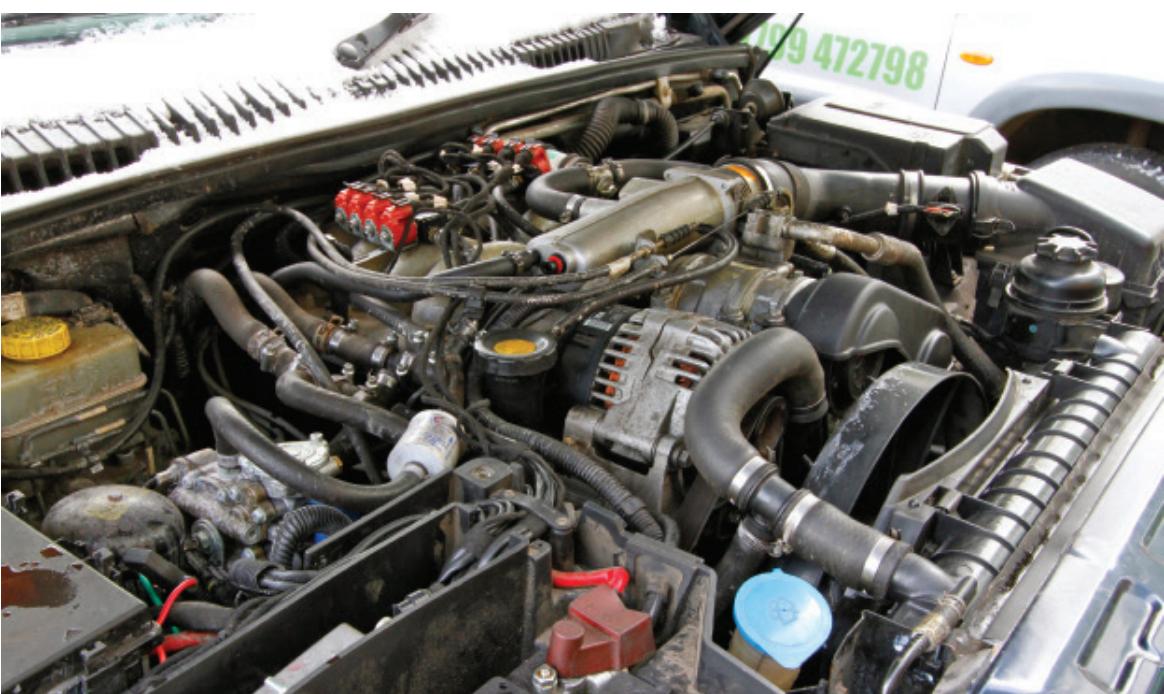
TECHNICAL

LPG conversions

Right: This is the basic LPG conversion, fitted to a 1978 Land Rover Lightweight. The vaporiser can be seen on the far right, alongside the washer bottle. It's warmed by the engine's coolant system, and then feeds the carburettor. This basic kit is likely to cost you around £850 fitted. £420 for the DIY option



Right: Fitted to a 1999 Range Rover, the bright red LPG injectors can be clearly seen. The vehicle's standard ECU has been moved behind the battery so the LPG ECU can be slotted in its place (bottom left). This conversion is around £1500



Right: The later 2003 Range Rover was our test drive for the day. To view the injectors it was necessary to remove the plastic engine cover. The LPG injectors here are silver. A conversion to this model Range Rover is likely to be £1800



GASSING IT BY RANGE ROVER

WE WERE ABLE to go for a test drive in Mark's 2003 Range Rover Autobiography. Starting on petrol, there was an almost imperceptible click when it was switched to run on LPG; and that partly because this vehicle had an extra fuel tank in the luggage space and the parcel shelf was folded back. You can fit an LPG tank in the space where the spare wheel goes, but the future owner of this vehicle – Mark Wain's accountant, Dave Woodrow – wanted the extra tank so that he could do significant mileage without the need to stop and fill up. The Range Rover ran as smoothly as you would expect, there was certainly no obvious drop in power or response. Switching from petrol to LPG and back again didn't interrupt the engine's tick over at all, and the switch itself was so small and incongruous that it's unlikely any passengers would even notice. The photograph (previous page) shows the

LPG injectors, but to do this we have had to remove the plastic engine cover. Admittedly, the rear luggage space is compromised with the additional tank, but if you only used the spare wheel well that wouldn't be the case. Mark at WCRLPG provides each conversion that uses the spare wheel well with a can of Holts TyreWeld emergency puncture repair spray. He also has covers that you can put the spare wheel in should you wish to carry it in the luggage area (for longer journeys or holidays). Admittedly that's a compromise, and something you should consider when making the decision. For this Range Rover's new owner, Dave Woodrow, LPG was an easy decision, as he explained: "When I purchased my first Classic Range Rover, I was shocked at the cost of fuel, and was persuaded to have the vehicle converted to LPG, and with the miles I was doing, from Norfolk to



Above: This Range Rover actually has two LPG tanks to increase its range. The first tank fits in the spare wheel well, the other in the rear luggage space. **Above right:** The only LPG addition inside is the petrol/gas switch



Hampshire every week, it did not take long to recoup the outlay. My first Range Rover had a range of around approx 200 miles, and I was upset that the last few miles had to be done on petrol, as there were not many LPG stations at that time. I remember Mark telling me that I could fit extra tanks, which then gave me a range of 340 miles, so I could always find a LPG station. Since then I have had four LPG vehicles, and every time I have either had two or three tanks, which give me the required range. One of the things I would like to thank Mark for, is his impartial advice and the after sales service and help that he gives, if I ever have a problem, it's always fixed quickly and in a friendly manner, even if it means the loan of a vehicle. I would certainly recommend LPG conversions, especially those done by WCRLPG!" **4x4**

◀ particularly those driving Rovers, then asked Mark as he was doing unleaded conversions, would it be possible to convert their classic Rovers to LPG? A few were done, and the whole thing snowballed and now after over 20 years in the business, Mark is concentrating on LPG conversions to 4x4s and after spending the day in the particularly windswept and frozen wilds of North Norfolk, we can fully understand why.

One of the reasons this has grown is the simplicity of the conversion; it's really nothing more than an alternative fuel for an internal combustion engine. On the Lightweight, all this meant was having a separate fuel tank, fitted under the seat, which held the Liquid Petroleum Gas. This is then piped to the vaporiser (clearly shown on the photograph, above left), which converts the high pressure LPG into atmospheric pressure. The vaporiser also needs hot water from the engine's existing cooling



Left: If you fit a tank into the spare wheel well, then Mark suggests a can of TyreWeld 'get you home' emergency puncture repair

system, to warm the fuel, and convert from liquid to a gas, before it feeds the carburettor. The Land Rover's carb has a separate 'gas' input ring fitted, but apart from that it's as standard. Inside the Land Rover there is a small switch, and in the side there is a new fuel flap to fill up. So simple it could be fitted by a 14-year old... Well perhaps, not unless your father runs an LPG conversion business, but it is simple and it's also not expensive. This whole kit is £850 fitted, this includes the necessary LPG conversion certificate, and a 1000 mile complimentary check up. All LPG conversions have to meet British Standards (BS EN 12805:2002).

Indeed, you could fit it yourself, and Mark will sell you all the necessary for a carburettor conversion for a staggeringly competitive £420. Some LPG convertors will tell you that it's not a DIY option, but you feel that's to ensure they get your business doing the

TECHNICAL

LPG conversions



job for you. Mark is certainly not like that and he will talk you through the conversion so you fully understand what you are doing. And Mark can certainly talk... When completed, you need to get a certificate from a UKLPG approved specialist like WCRLPG. There is a cost of this inspection and Mark will again let you know what needs doing, so you can do it yourself and return, or he will obviously correct any errors to get your 4x4 'legal' and make sure it's safe.

Of course, fewer 4x4s these days are carburettor based and that's where we start looking at having to have a new separate set of injectors for the LPG, and its own computer-controlled electronics. This is also where it moves

away from an easy DIY job, and you want an expert to look at it for you. The Range Rover Classic has become a particularly popular model for conversion, either the earlier carburettored 3.5-litre Rover V8 models, or the later fuel injected models. Mark actually had two Range Rovers for us to look at, an later 1999 model, and a later 2003 model (see separate panel). It was obvious looking at both, the conversion is very professional and that it certainly doesn't look like it's an 'add-on'. Sharp eyes on the 1999 model, however, will be attracted to the red LPG injectors. The ones on the later model are just as impressive but are hidden under the plastic engine cover! Interestingly, and

Top: The Suzuki Jimny is a very popular LPG conversion at £1000

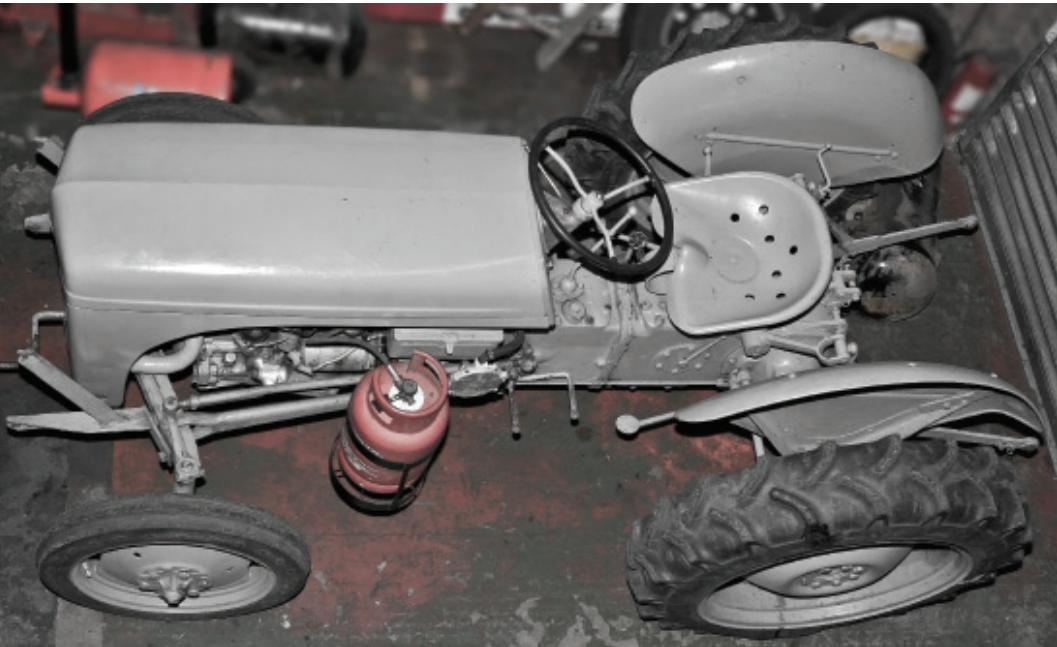
Above: Should you decide to DIY, then Mark will supply a full kit for a competitive £420

perhaps sadly, neither of these injector kits, or indeed any of the equipment needed for the conversion is British. As Mark explains, he'd use British if he could, but since Europe is in fact ahead of us in the fitting of LPG, the products used by WCRLPG come from Holland, Turkey, Poland and Italy. Quality, and the all important supply and delivery of orders seems to work perfectly, even if some of the products have confused the customs officers at Norwich airport on occasion.

Of course, the fitting of an LPG injector system has to run in parallel to the standard fuel injection. LPG vehicles start up using petrol, and run that way for a short time or distance before switching over; the LPG fuel needs to warm up before it's used as the main fuel. The vehicle's ECU has to be 'convinced' not to shut everything down when the petrol is switched off. The LPG conversion has its own ECU, which mirrors the car's original computer set-up. When this is all fitted, it is a case of plugging in the computer and setting it up correctly. The switch from petrol to gas is imperceptible (see separate panel) and although it is likely that the vehicle's engine will now deliver slightly less power than when on petrol, you are unlikely to notice. We certainly didn't in the Range Rover featured here. The conversion for the later 1999 Range Rover was £1500 the 2003 model conversion would be £1800 with

TECHNICAL

LPG conversions



a single tank. Supercharged models using the Jaguar engine are a little more expensive as the ECU fuelling set-up is different, but the basic LPG conversion is similar.

Besides Range Rovers, the market in Norfolk for LPG conversions includes Suzuki Jimnys, Toyota Land Cruisers and Volkswagen Touaregs. It also includes tractors, although Mark admits there is limited demand. We did smile at the smart grey tractor in his workshop, carrying its own gas cylinder – just like the one you have for your garden BBQ – in a neat cradle on one side. The conversion is even simpler than the

Lightweight in that it doesn't need to have the engine coolant system to warm the vaporiser, which is fitted closer to the engine itself. For more details about this particular Massey Ferguson LPG conversion, you should check out our sister publication *Classic Massey and Ferguson Enthusiast*, as they are doing an article on this model. Editor Scott Lambert reliably informs me, that it's a Ferguson TE-A 20, apparently – but only two-wheel drive. Nevertheless, we did like the straightforward nature of the conversion.

Besides 4x4s, and tractors, LPG

Above: OK, so it's not a 4x4 tractor, but we couldn't resist showing you this recent conversion!

Below: Is LPG a suitable conversion for serious off-roading? For one of Mark's customers, it's the ideal choice for his Jimny, better known as 'Wilfred'

conversions are available for forklift trucks and stand alone generators. All this driven by cost, of course, for those using their engines for business, whether it is a long distance driving Range Rover, or a generator powering a stand-alone catering unit, the cheaper nature of the fuel quickly balances the original cost of the conversion. At present, a litre of LPG is around the 75p mark, which depending on where you live is about half the cost of petrol. LPG has a lower energy density to petrol and so will burn quicker, meaning that the vehicle's fuel consumption will be higher, but given it's half the price, there are still significant savings that can be made.

The concern could be, however, that if a significant number of people start to convert, our dear friends in the Government might then decide to increase the duty on LPG, which could then make the savings less significant. It would seem that if you are thinking of converting to LPG, the sooner the better. The other advantage of course, is that it is also simple to remove the LPG conversion should you wish to revert to petrol only, or if you feel selling a second-hand LPG vehicle to be a disadvantage. Take everything off, sell the vehicle, and then convert the new one. Worth talking in detail to a UKLPG-approved supplier on this, but in theory that's all possible.

So, the next time you fill up and see that petrol pump price gauge spinning round at speed, and your wallet making strange wheezing sounds, just consider you could be filling up with a fuel that's around half the price! **4x4**



MYTHS AND MUDDLES

Some of the FAQ regarding LPG vehicle conversions

CAN ANY 4X4 BE CONVERTED?

If it's a petrol engine model then the answer is likely to be yes. Diesel models are not suitable. As it happens, some of the leading supermarkets are converting their diesel-powered lorry fleets (worth remembering when you hear them bleat that they have to increase prices because of fuel costs!) but commercial diesels are different to the engine in your 4x4.

HOW LONG WILL THE CONVERSION TAKE?

Obviously depends on the vehicle, Mark takes a day for the simpler carburettor-engined conversions and up to three days for the later Range Rover shown here. This involves all the physical fitting, and the computer set-up. You'll also want to go back after 1000 miles for everything to be checked over.

IS THERE A WARRANTY?

Depends on whom you get to convert your vehicle, so shop around, call and ask questions. A 12-months/10,000 miles labour and parts warranty on the LPG system is likely. Do remember, however, that if your vehicle is still covered by a manufacturer's warranty, then this will almost certainly be affected by the conversion. A tricky area perhaps, but vehicle manufacturers can only void their warranty in respect of the parts affected by the conversion and UKLPG approved installers provide additional warranties to cover these areas. Another thing to check with your installer.

WHAT HAPPENS IF I RUN OUT OF LPG OR PETROL?

As we have said, a converted car starts up on petrol so you'll need to keep some petrol in the tank or you won't be going anywhere! If you run out of LPG while driving, the vehicle will automatically switch back to running on petrol. One important point is that the LPG tanks don't seem to have that accurate fuel gauges, and these are actually on the tank, not on your dashboard. Most owners work on mileage knowing when to fill up. It's also worth remembering that an LPG tank when 'full' only uses around 80% of the tank's capacity to allow for the expansion of the LPG.

WILL THE TANK BLOW UP IN AN ACCIDENT?

It is a myth that you are driving around with something that will blow up! Get a conversion

from a UKLPG approved supplier and the LPG tank and all fuel pipes will be fitted with numerous safety devices. The gas flow will automatically stop if the pipes are damaged or the engine is not running. Should your 4x4 vehicle catch fire, the gas tank pressure is controlled via safely venting excess pressure which will prevent the tank from rupturing and causing further damage. Tanks are usually about 10mm thick steel and have been crash tested to prove that in the instance of a severe impact, they will deform and not split. Mark Wain has had personal experience with this, having had a bad accident with an idiot in a van on the wrong side of the road hitting him head-on. He tells the story of explaining that the wrecked 4x4 was safe and the LPG was not about to explode while they all stood in the petrol that had leaked from the vehicle's standard fuel system...

CAN I TAKE MY LPG 4X4 THROUGH THE CHANNEL TUNNEL?

Despite lobbying from the UKLPG, at present, LPG converted vehicles are not permitted in the Channel Tunnel. Annoyingly, this is because installation standards are not as high in some parts of Europe as in the UK, so those operating the tunnel have to work to the lowest common denominator – which is a frustrating fact of life. You can, however, take your LPG 4x4 on the ferries – which has the added advantage of allowing you the chance to get out, have a walk about and enjoy the view – that's not allowed in the tunnel, either which is a bonus.

IS LPG HERE TO STAY?

Difficult to answer categorically, but according to Autogas LPG: "is currently the most viable option as an alternative vehicle fuel in the UK. The LPG industry, together with the government and drivers using LPG, has invested around £1/4 billion in creating a healthy market for

vehicle LPG. The industry has a total annual turnover in excess of £500 million and employs around 15,000 people. There are approximately 160,000 LPG powered vehicles in the UK (out of a vehicle population of over 30 million) and more than 12 million worldwide." However, it's possible that the Government will look to add some more fuel duty in the future...

HOW MANY LPG FUEL SITES ARE THERE?

If you go to the Autogas website you can check all supplied stations. There's also a 'site finder' app for Android and iPhone devices and you can download a free map leaflet detailing all 225 plus outlets. For more information check www.autogas.ltd.uk. There are around 1300 automotive LPG outlets in the UK and if you go to the UKLPG site on www.drivelpg.co.uk you can search for the nearest LPG stations to where you live. It was amusing to note that in the area around WCRLPG, seven of the 12 nearest stations had an LPG pump – and one didn't actually sell petrol!

SO WHO ARE THE UKLPG?

UKLPG is the trade association for the LP Gas industry in the UK, representing companies who are producers, distributors, equipment and service providers, and vehicle convertors. The UKLPG was formed by the merger of the LP Gas Association (LPGA) and the Association for Liquid Gas Equipment and Distributors (ALGED) in January 2008. Its roots are well established, with LPGA and ALGED established in 1947 and 1975 respectively. Our advice would be to only consider a conversion from a company registered by the UKLPG.

WILL IT AFFECT MY INSURANCE?

As you would expect, converting a vehicle to run on LPG is classed as an engine modification and so you will need to notify your insurer. Most insurance companies will insure an LPG converted vehicle provided the vehicle is listed on the online UKLPG Vehicle Register and that you have the necessary safety certificate. You should always check with your insurance company before having your 4x4 converted. It should not be a problem – if it is, change insurers!

DO I NEED TO INFORM THE DVLA?

When converted, you must notify the DVLA that your vehicle now runs on LPG, because it is a 'mechanical change' from when the vehicle was first registered. By registering the vehicle with the DVLA as alternatively fuelled, you may be entitled to a reduction in Vehicle Excise Duty.

Advice courtesy of www.autogas.ltd.uk



GET GASSING

Many thanks to Mark Wain at WCRLPG for taking the time to explain all the details about LPG – and stand outside in the freezing cold while we took pictures of various engines! If you contact Mark, do say 4x4 Magazine sent you.

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OTHER USEFUL LINKS

www.uklpg.org

www.autogas.ltd.uk

www.drivelpg.co.uk