A 2003 Opel Astra 1.7DTI arrived with us last week with a complaint of no power and the customer had been told that the engine ECU was suspected of being faulty as it wasn't switching the boost control solenoid

On an initial test drive the car was indeed slightly low on power. We performed a fault code read but no faults were present

So the next step was to check the turbo boost pressure on live data with the Tecnomotor socio 600. The 1st check was to check the boost reading with the key on but engine off and it was reading 1001mbar, this proved the sensor was at the correct starting point.
Then the maximum boost pressure reading was checked when we were driving at full load and the max it was going to was 1400 mbar (or 0.400 mbar if you subtract atmospheric pressure of 1000 mbar). And the desired boost reading the socio 600 was showing was 1900 mbar so we were 0.500 mbar below what was desired

So the next step was to have a visual look around.
The 1st thing we noticed was that this engine had a waste gate controlled turbo and not the more popular variable geometry turbo.

And most waste gate controlled turbos normally had a small boost pressure pipe connected to the waste gate actuator which when the boost reached the maximum desired pressure the boost pressure would overcome the spring pressure in the actuator and open the waste gate and reduce the boost pressure.
But on the vehicle it did not work on boost pressure to open the waste gate instead it was controlled by vacuum, So It had a boost control solenoid and when full boost was required there was no vacuum sent to the actuator and the waste gate was closed and when the boost reached the maximum allowed the ECU would then operate the boost control solenoid and send a vacuum to the actuator and reduce the boost.

So we then checked the operation of the actuator to confirm the above and it was all working as It should and proved there was nothing wrong with the ECU or the boost control solenoid/circuit.

So now to see why the boost was low
The 1st thing we normally do in these cases is to check for boost leaks with a smoke machine filling the complete intake system with smoke and then looking for a leak, but there were no leaks visible externally and by viewing the flow meter on the smoke machine see (fig.1) proved that the EGR valve was also making a good seal, because if the EGR valve was stuck open there would be no visible external leaks in the intake system but the flow meter would be high as it would be escaping out the exhaust.

This is a great test that can be performed in about 5 minutes

Fig1

So we decided the next step was to check the actual boost pressure with our Digital turbo pressure tester. As there is nowhere to T into the turbo system on this car this tester is very useful as it works by inserting a small needle into the rubber turbo pipe. The needle is inserted in the direction of air flow (fig 2) through the pipe so that after the needle is removed the turbo pressure closes the hole that the needle made therefore eliminating any risk of causing a leak by the needle. When this test was performed we found that we were getting over 0.82 bar = 0.820 mbar or if you include atmospheric pressure = 1820 mbar (fig 3) actual boost in the system.

Fig 2

Fig 3

So we knew from this that the system was developing much more boost than the reading that we were getting on our diagnostic tool. The next step was to remove the turbo boost pressure sensor which on inspection (fig 3) was badly blocked with carbon as was the intake manifold. On cleaning the manifold and replacing the boost pressure sensor the full power was restored to the car.

Fig 3

Conclusion

Its very important to spend the time to study the system 1st and understand how it works before diving in and not to allow the customer pressure you into making a decision on what's wrong because they may not want to pay the diagnostic time
As 9 times out of 10 you will be saving the customer money but charging more time for diagnosing it fully and changing less parts