

Cars of the future



The Toyota Hybrid X is just one of the concept cars that gives a glimpse of what the next 15 years may have in store for drivers and technicians

The motor industry has seen many changes over the past decade and a half. As Aftermarket celebrates its 15th birthday, Dave Garratt looks ahead to what the next 15 years could have in store for vehicle technology

REMEMBER the mobile phones of 15 years ago? They look pretty ridiculous compared to the micro-sized gadgets we use today.

Back in 1992, the cars we drove were also very different. They were almost certainly CAN-free and none of them utilised today's quiet common rail or pump injection diesel engines.

A few may have had CD players, but none had sat navs. And as for MP3, most people thought it sounded like a motorway junction.

We certainly have seen some changes. However, the giant leaps in motor vehicle technology have been forced on us through regulations.

Particulate emissions have gone down consistently as new sets of European regulations have been introduced.

So, it's a safe bet that technology over the next 15 years will be driven by regulations too.

We already know that the latest F-gas regulations will force vehicle designers to look for new refrigerants and design new air conditioning systems.

Furthermore, Euro V emission

laws will force more developments in EGR and Selective Catalyst Reduction systems. Perhaps we will even see AdBlue being used in diesel cars.

Voltage of the future

But what about the rest of the car? Most design engineers believe we will see a switch to a 42V electrical system within the next five years. This voltage has been chosen as the industry standard for several reasons.

Older readers, or admirers of classic automobiles, will remember the old 6V electrical systems that were common until the late 1950s.

At that time, the auto manufacturers switched to 12V systems for better reliability.

It made sense, as by the time half of a volt had been lost due to voltage drop on the supply line and a quarter of a volt had been lost on the earth, there wasn't a lot of voltage left for the actual component. So increasing to 12V was a good idea.

Using 12V has worked nicely for many years now, but the 12V system is beginning to fall short and it's basically down to the solenoid.

Solenoids are used all over the car; they are controlled by the ECUs to trigger injectors and ABS valves.

But with the processors used in ECUs becoming faster, it's often the solenoid that slows the system down.

For example, solenoid-switched injectors are being replaced with piezo units because of their superior switching times (see page 86).

The problem with solenoids is that they are electromagnetic devices and require a large current to actuate them.

Piezo operated injectors, on the other hand, only call for a low current and therefore open almost instantly.

However, there will be applications where piezo technology is not suitable due to the large distance that the switched device needs to move over in order to open and close.

The most obvious example of this is in the proposed electrically-opened cylinder valves.

To move the valves over the required distance calls for a solenoid, but the time it takes to build the current needed to push the valve open against its spring is far too

long when using a supply voltage of just 12V. By increasing the supply voltage to 42V, the solenoid's dead time is greatly reduced, which moves the valve against the spring instantly.

A 42V supply makes it possible to use solenoids to operate not just inlet and exhaust valves but other devices, such as brake pads.

Once we switch to a higher voltage, the door will open for numerous new systems.

Technology predictions

So, what is our prediction for the cars of 2022?

They could have:

- A 42-volt system
- LED head lamps
- Electronically applied service brake (brake by wire)
- Solenoid operated inlet and exhaust valves
- An air conditioning system using a non-global warming refrigerant
- All petrol engines will use stratified combustion
- All diesel engines will use a selective catalyst reduction process

It certainly will be interesting to look back at this in 15 years time to see just how good our crystal ball is.