An insight on the VW scandal and FIA policy guidance on the issue.

There is a long history of car manufacturers embellishing the efficiency results of their vehicles, yet this time Volkswagen admitted it deliberately cheated for years on US clean-air standards, making nearly half a million diesel cars appear cleaner-burning than they are. It was discovered that five diesel-powered VW and Audi vehicles that featured the defeat devices, which marks the true emissions only during testing. It is software that turns off emissions controls when driving normally and turns them on when the car is undergoing an emissions test. When the cars are on the road the emissions controls are ineffective and emit as much as 40 times the level of pollutants allowed under clean air rules meant to ensure public health is protected.

What happened exactly?

Researchers from the West Virginia University together with the International Council on Clean Transportation (ICCT), a non-governmental organization conducted an independent study questioning the emissions levels of diesel cars. The results from the particular Volkswagen and Audi models alarmed the researchers, who then decided to address California Environmental Protection Agency (EPA) and California Air Resources Board (CARB). The agencies have further investigated the issue and concluded the presence of the defeat device software, later confirmed by Volkswagen.

How come the scam worked everywhere, but the US?

While European tests are carried out in government-appointed facilities and incorporate laboratory readings[1], the US EPA relies on tests conducted by the manufacturers themselves, allowing them to effectively "self-certify" the test. The EPA has a limited budget and staff and it only tests around 15% of new vehicles. Similar situation makes easier for automakers to manipulates results.

There is a number of ways to cheat the consumption and exhaust emission tests, such as special low-friction oils and particularly low-friction tires, which seemed not to be enough to meet the environmental requirements of the United States. Therefore the Volkswagen has manipulated the software of the vehicles to show better results under test than in the real-drive mode. It is quite simple to trick the system: the on-board computer (telematics platform) needs to recognise that the car is put to the test-mode. It acknowledges that the engine is running and the wheels hasten, but there is no movement. Such tests are precisely defined and well known to the manufacturers, which makes it easier to determine when the car remains in place, how fast it accelerates, whether it is in the urban environment or on the highway. When the software detects the test program, it automatically switches to environmental mode, so it can perform up to the strictest emission standards. The high-results remain achievable only in the test mode, while the real-life driving is different, where real nitrogen oxide (NOx) emissions are up to 40 times higher than the standards set by the EPA. Therefore, the EPA accuses Volkswagen using the emissions control software in diesel vehicles sold in the United States between the model years 2009 and 2015, referred to as "defeat device" in the Clean Air Act.

The Clean Air Act obliges vehicle manufacturers to declare to EPA meeting the applicable federal emission standards to control air pollution as well as it requires that every vehicle sold in the USA

[1] More precisely, in Europe the tests are carried out on the exhaust gas test benches of the car manufacturers and need to follow regulated test protocols. Only upon the request, the Type-Approval-authority gets access to internal investigation of the automobile manufacturers.

must be covered by an EPA-issued certificate of conformity. Therefore the vehicles, which are equipped with defeat devices, which reduce the effectiveness of the emission control system during normal driving conditions, cannot be certified. Conclusively, Volkswagen violated two important provisions of the Clean Air Act, by manufacturing and selling vehicles with defeat devices that allowed for higher levels of air emissions than those that were certified

In the past

It has long been suspected that vehicle manufacturers use defeat devices and there are multiple examples uncovered in the past of not as good as fuel economy performance and greater NOx emissions that claimed. The defeat devices are only part of the wider scam used to bypass the tests. For example, earlier this month ICCT discovered that only one-third of the tested cars pass the NOx limit threshold in a tougher test regime.

Furthermore, the EPA and the US Justice Department have previously settled with several diesel engine companies over very similar charges: the truck manufacturers installed defeat devices which led to trucks passing federal emissions tests, but exceeded up to three times the legal limit of NOx when driven on the highway.

Emissions test results globally

Seeing how easily the emissions test can be cheated, one should assume that many other car brands manipulate the test results to comply with the emission regulations in Europe, as well as around the globe. Even in Europe, although vehicles are passing the tests, there is a strong evidence that vehicles, both diesel or petrol, in real driving situations perform differently from what claimed by the manufacturers. This also depends on the number of tricks that are potentially permitted under test condition, such as removing the components from the car in order to reduce weight, using special lubricants or overinflating tires and super-smooth testing tracks. Therefore, the recent scandal with Volkswagen cannot be attributed to a single manufacturer in the US, but rather concerns all car manufacturers worldwide.

Implications

Trust is a precious capital and it comes from ensuring a transparent relationship with consumers

In the mobility landscape many of our future challenges are shaped by people's values, behaviour and preferences. Consumers can contribute and play a crucial role in defining consumption patterns and everyone needs to think about ways to influence mass behaviour and social norms to promote low-carbon, healthier urban lifestyles. This is why engaging with consumers is key to promoting sustainable patterns. When consumers are put in a position to embrace new technology, then public policy, technological progress, and market success will be mutually reinforcing. Breaking this link can undermine consumers' trust and compromise the effectiveness of the policy intervention.

From the consumers' point of view, the practices used in the VW case are likely to not be limited to diesel cars and to the emissions, and thus might be used by other car manufacturers. This conclusively results in mis-information of consumers and in deteriorating their trust.

1. **Digital technology and the internet are changing society in some fundamental ways, including how we act as consumers. Consumers value transparency, their expectations are high and tend to grow as the connectivity increases. The automotive industry needs to strengthen trust among consumers, promoting more transparent practices, and work closely with governments to achieve the best outcomes in terms of environmental performance. More transparency leads to more sustainable consumption.**

The need for independent consumer programs

The practice of self-regulation within the industry does not contribute to narrowing this trust-gap with consumers. Independent consumer testing programmes have proven to be extremely effective in improving industry standards and the overall quality of the products on the market. The experience of NCAPs in improving vehicle safety and iRAP for road infrastructure safety is unmistakable and has led to impressive improvements in passive safety. Several FIA clubs around the world perform demonstration programmes and independent tests to inform their members about the divergence between real-world and claimed fuel consumption/CO2 emission performance as measured by the official test.

This kind of programmes, in combination with fuel efficiency labelling schemes, provide consumers with the necessary information not only on the fuel economy measured in testing, but also on the fuel costs associated with operating the vehicle. These can effectively contribute to building consumer trust, as well as to encourage them to purchase the most sustainable products on the market and to stimulate the car manufacturers to provide higher standard.

2. **Governments should either create or encourage the establishment of independent consumer assessment programmes, as a key element for building trust in vehicle emissions and efficiency performance.**

A more consistent regulatory framework for the industry

Industry collaboration needs to increase with regards to common ways of improving vehicle energy efficiency and emissions performance, both for heavy duty vehicles and for passenger cars. The G20 group adopted the G20 Energy Efficiency Action Plan during the Australia Summit in 2014, which includes the development of recommendations for strengthening domestic standards in G20 countries in as many areas as possible related to the clean fuels, vehicle emissions and vehicle fuel

efficiency and green freight. In this respect, international conventions should promote creation of a more consistent framework for industry players and, at the same time, establish better protection mechanisms for consumers.

The Worldwide harmonised Light vehicle Test Procedure (WLTP), for example, which has been recently adopted within the UNECE framework, thanks to the work of experts from the European Union, Japan, and India, defines a global harmonised standard for determining the levels of pollutants and CO_2 emission, fuel and energy consumption for passenger cars. The WLTP can better simulate real driving conditions, with more modern and realistic driving scenarios that contribute to increase fuel consumption. A harmonized approach will also make it easier to compare fuel efficiency and emission standards across regions and countries. Over time, this is expected to improve the effectiveness of air quality targets and CO2 reduction policies.

3. **Governments should implement the WLTP as soon as possible, to ensure that the difference between values measured under test conditions and real life values experienced by consumers on the road is reduced.**

The end of diesel technology?

Another more general implication emerges from the VW case. Regardless of which technologies are considered to reach worldwide emissions reduction goal, there is a general agreement that most emission reductions by the year 2050 will be achieved by improving the Internal Combustion Engines (ICE). It is crucial to strengthen emission control on ICE, while simultaneously looking at new low-carbon technologies to retain significant market shares and consumer confidence. Although diesel vehicle represents a niche at a global scale (about 1 out 7 cars sold is fuelled with diesel), in the European Union that share reaches 50% on average. In Europe, in fact, diesel cars have been promoted as a low carbon and cheap to run alternative to petrol and, in many countries, make up half of the new car market. Over the last 15-20 years, consumers embraced this technology, believing they were more environmentally friendly, and under the promise of saving on pump prices. Now, after several years and the evidence that diesel cars emit tiny particles of dust (PM 2.5 and PM10) and nitrogen dioxide (NO2), which are dangerous for the health, many cities started considering banning diesel vehicles from city centers to meet air quality legislation. The new VW case now coming to light will for sure put diesel technology under additional pressure.