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Testing times

The unfolding Volkswagen saga highlights the need for better funding of regulatory science — and should prompt regulators to keep a closer eye on whether their rules are working.

Among the questions raised by the scandal that allowed the German car maker Volkswagen to sell 11 million vehicles containing software that cheats emissions tests, many will ask why the regulators failed to notice and halt the practice. The answer is not complicated. Regulated industries exert massive, discreet pressure on regulators such as the US Environmental Protection Agency (EPA), to stop them doing their jobs properly.

The research community has an opportunity here. It must use the Volkswagen crisis to highlight a broader problem: how regulatory science is funded, conducted and used. Long a poor relation of more prestigious investigations, this brand of applied science plays a crucial but much-neglected part in enforcing rules and saving lives.

It was a small academic team led by Daniel Carder, an engineer at West Virginia University's Center for Alternative Fuels, Engines and Emissions at Morgantown, that did the real-world 2012 emissions tests which brought the Volkswagen case to light. The work was paid for by a small grant from the International Council on Clean Transportation (ICCT) in Washington DC, a non-profit outfit of the type that many in the scientific and political establishments are inclined to disdain.

The ICCT was set up in 2001 "as a counterweight to the influence of the global automobile and energy industries in policy debates" and is staffed by several former employees of the EPA, the regulator responsible for policing car emissions in the United States. The EPA has a research and development budget of US\$537 million this year. The US National Institute of Environmental Health Sciences, part of the National Institutes of Health, has a budget of \$665 million. The budget of the European Union's Joint Research Centre — which, to be fair, had already published work highlighting flaws in emissions-testing regimes — is about €330 million (US\$371 million).

Why, then, does it take a \$50,000 grant from an obscure non-profit organization to expose what seems to be a systematic and widespread effort by Volkswagen, going back at least to 2009?

Almost every public discussion about industry regulation and the regulatory science that supports it concerns 'regulatory reform': a euphemism, in far too many cases, for the relentless process whereby those who are regulated push back against the regulator.

With exquisite timing, for example, Jeb Bush, the former governor of Florida and possible Republican nominee for next year's US presidential election, published an opinion piece on 22 September — perhaps written before the Volkswagen scandal broke — promising to regulate the regulators. He singled out EPA rules on clean water and carbon dioxide for repeal. "We are a nation of free men and women who are capable of achieving far more than liberals and regulators believe possible," Bush grandly declared.

It would be wrong, however, to suggest that only conservatives such as Bush encourage regulators to be bullied. Everyone has been at it. In Europe, for example, successive governments in France, the United Kingdom and Germany have each been lobbying the European

Commission for years, to block the planned introduction of more-realistic emissions tests for diesel engines.

Since the findings went public, it has emerged that the EU Joint Research Centre had already conducted tests that produced damning indictments of the existing regulations — if not of the vehicle companies. The EU is now moving ponderously towards more rigorous, on-road testing of car emissions, due to be introduced in 2016.

"The EPA is not ensuring the efficacy of its own regulations. That can and should change."

Who is best placed to conduct important regulatory science? It is not going to be done by the regulated industries or by academics who want to pursue friendly relations with those industries. (One positive side effect of the scandal could be to highlight the extent to which even companies with good public reputations, such as Volkswagen, carry agendas.)

Work that second-guesses the regulators is also unlikely to be supported by 'pure' science agencies, such as the US National Science Foundation. These agencies tend to avoid regulatory science because it is politically risky, as well as being prone to dismissal by programme managers as routine, or uninteresting.

There are two possible solutions. Basic-research agencies could open up more funding calls devoted expressly to regulatory science. Most politicians would resist that, but given recent events, some might support it. And regulators themselves need to ask tougher questions about how their rules are being implemented. The serendipitous nature of the Volkswagen case — in which the problem was brought to the attention of California and federal regulators by the Carder team's investigation — suggests that, for whatever reason, the EPA is not ensuring the efficacy of its own regulations. That can and should change.

This unfolding saga should, at least, lend regulators more heft and political support in the never-ending battle with their crafty and well-resourced charges. ■

Variety of life

An effort to sequence thousands of people's genomes reaches the end of the beginning.

"Nature is an endless combination and repetition of very few laws," said the nineteenth-century US poet Ralph Waldo Emerson. "She hums the old well-known air through innumerable variations."

Modern science has a good grip on most of those very few laws that drive life forward, most tellingly on how genetic material copies itself