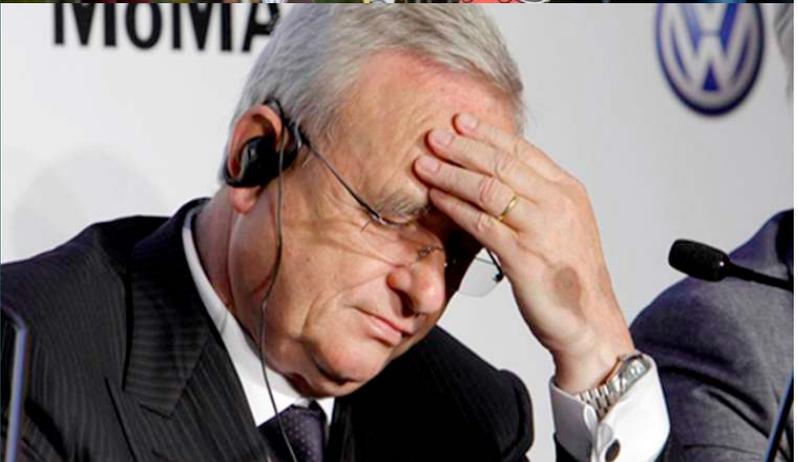


# The Volkswagen emissions scandal

Making better use of fossil fuels, or taking the public for a ride?



Dr James Palmer  
School of Geographical Sciences  
University of Bristol



40p

1

The essential daily briefing

FROM The INDEPENDENT

WEDNESDAY 23 SEPTEMBER 2015 Number 1506

**FASHION**  
**To die for**  
Garments that can maim

P24



# Toxic scandal on our roads

- » Millions may be driving UK vehicles that breach pollution targets
- » Transport Secretary demands EU-wide inquiry into car industry
- » VW sorry after world's largest car-maker is caught rigging tests



P6



**NEWS**  
**Pig-gate**  
PM's military record now under fire



**HEALTH**  
Entrepreneur hikes cost of life-saving drug by 5,500%



**MUSIC**  
Shang-A-Lang again? Return of the Rollers

**Sport** RUGBY WORLD CUP

Who can fill Joseph's big boots?

PLUS All the action from the League Cup

**Lifestyle lowdown**

Michel Roux Jr on his new television series, plus the latest designer must-haves for the season

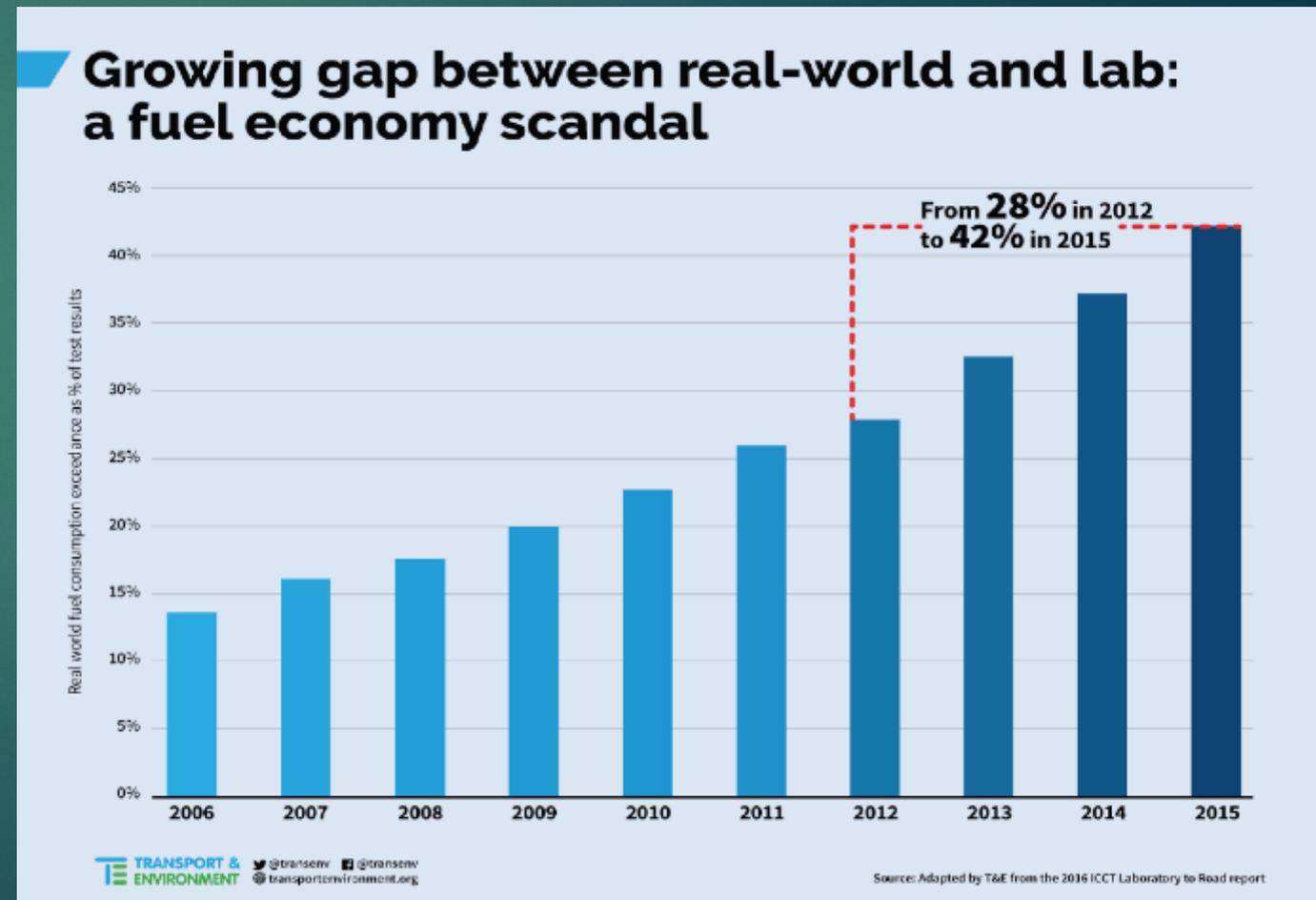
# The VW emissions scandal (#dieselgate)

- ▶ VW were exposed as having cheated in official emissions tests for new cars by the US Environmental Protection Agency in 2015
- ▶ Their CEO resigned, and millions of VW vehicles were recalled to be 'fixed'. One senior official based in the US was sent to prison for 7 years
- ▶ But the problem of cheating emissions tests extends beyond VW to other car makers too...



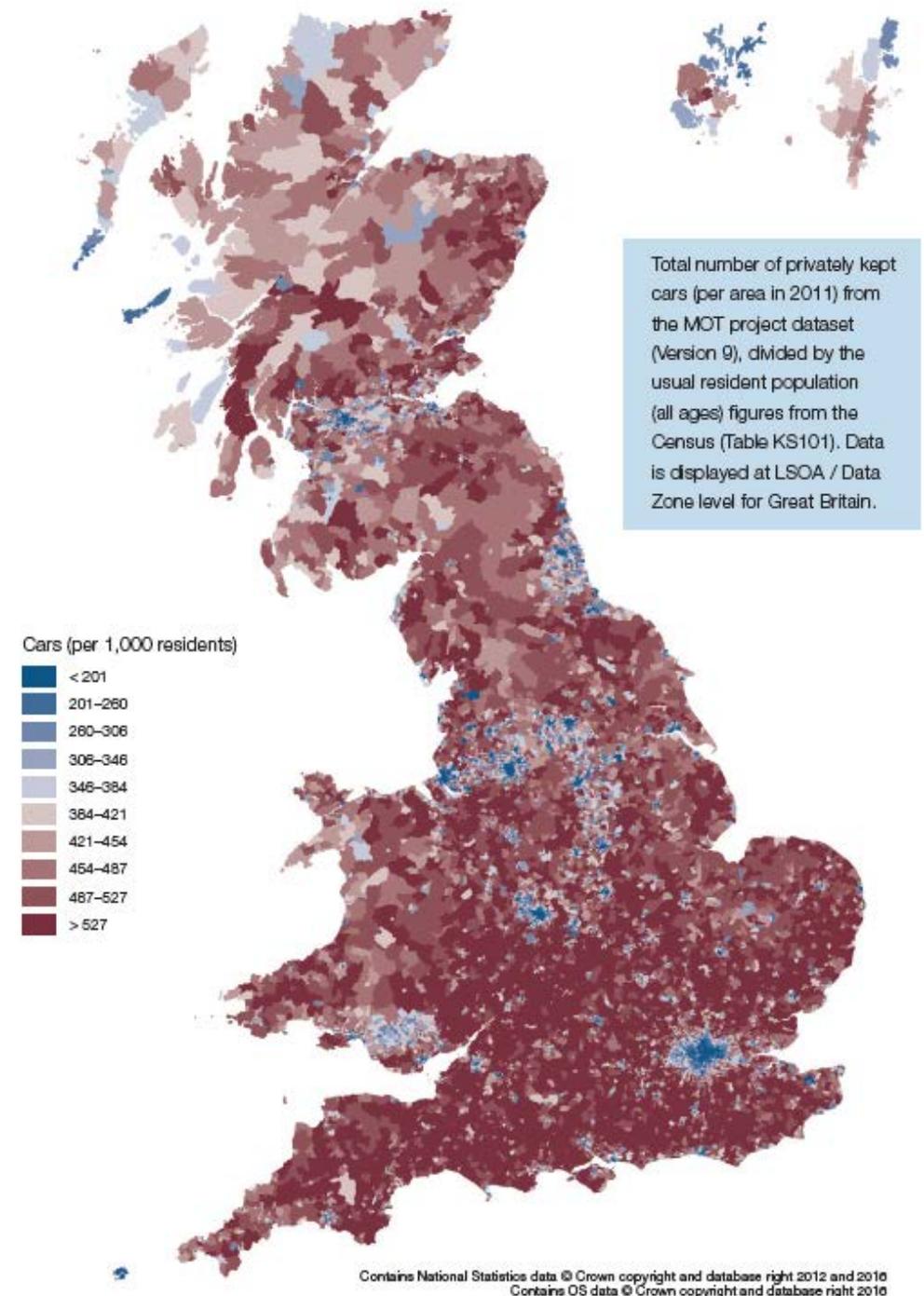
# How much of a scandal is it?

- ▶ Officially, GHG emissions from new cars have decreased by 30% since 2001 (from 170gCO<sub>2</sub>/km to 118gCO<sub>2</sub>/km)
- ▶ But studies of a whole range of cars being driven on the road suggest actual figures in 2016 are closer to 155gCO<sub>2</sub>/km – only a very modest improvement over 15 years
- ▶ A long way off the target of 95gCO<sub>2</sub>/km by 2020!



# What has this got to do with energy and resources?

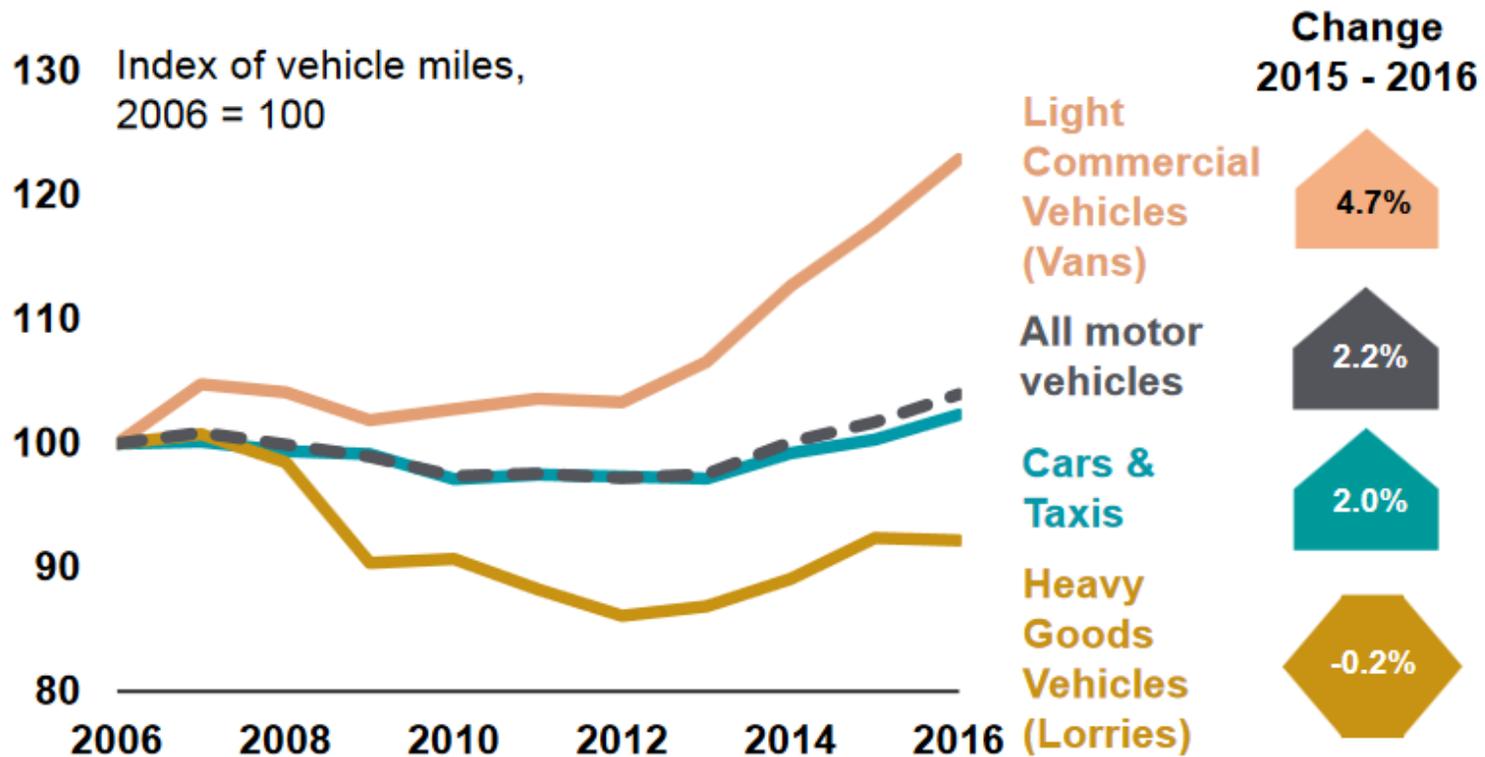
- ▶ Whether we like it or not, modern transport systems still revolve around the private car, and most of them still run on petrol or diesel
- ▶ If we are serious about tackling climate change, its important that we use fossil fuels in the road transport sector as carefully and prudently as possible



# And the problem is still growing

**323.7 billion miles were driven on Great Britain's roads in 2016, a 2.2% increase from the previous year.**

Vehicle miles travelled by selected vehicle types in Great Britain, 2006-2016



# But why would a geographer be interested in the VW emissions scandal?

Two main questions to think about

- ▶ How did VW (and other companies) manage to convince the world that their cars were performing so much better than they actually are?
  - ▶ ...and what does this tell us about the relationship between geography and science?
- ▶ What do we miss if we focus our attention solely on reductions in greenhouse gas emissions?
  - ▶ ...and what does this tell us about how we decide to measure and quantify sustainability?



# How did VW cheat the official test?

Disconnecting the alternator prevents the battery from charging, and reduces energy use.

LABORATORY

Carmakers can optimise the engine controls to reduce emissions.

LABORATORY

Careful lubrication and use of special lubricants help the car run more efficiently.

ROAD LABORATORY

Altering wheel alignment reduces rolling resistance

ROAD LABORATORY

Fitting special tyres with a lower rolling resistance.

ROAD LABORATORY

Overinflating the tyres reduces rolling resistance

ROAD LABORATORY

Using higher gears can allow the engine to operate more efficiently than normal.

LABORATORY

Taping over indentations or protrusions on the body reduces aerodynamic drag.

ROAD

Pushing the brake pads fully into the callipers reduces rolling resistance.

ROAD LABORATORY

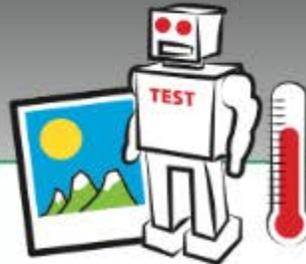
The rolling road is programmed with the minimum weight or inertia class.

LABORATORY



Laboratory instrumentation

LABORATORY



Optimising the test drive & ambient conditions

ROAD LABORATORY



Taking advantage of test tolerances and adjusting the results

ROAD LABORATORY

CO<sub>2</sub> results declared by the manufacturer can be up to 4% below the actual test results.

LABORATORY



# Trust in science – a question of geography?

- ▶ Evidence that car manufacturers are cheating official tests comes from **crowdsourced data** uploaded to the internet by thousands of people across Europe (e.g. *spritmonitor.de*, which has 440,000 users)
- ▶ The strength of this data is its **diversity** – it documents how cars perform under all different kinds of driving situations and styles
- ▶ But, it is also **impossible to reproduce** this data, since it is uploaded voluntarily, and no one can be sure of exactly when, where or how the cars in question were being driven...
- ▶ So, this data is rejected for **lacking representativeness**



# Trust in science – a question of geography?

- ▶ Meanwhile, data from **laboratory tests** remains trusted because it is generated under **standardised, controlled conditions**, and so can be successfully reproduced
- ▶ However, many of the things that determine how cars behave in the real world are not present in the lab (e.g. the driver, traffic, changing weather conditions, road works etc...)
- ▶ ...and vehicle emissions testing centres (like all scientific laboratories) are still private spaces, accessible only to relevant experts, so there is room for bending the rules



# Trust in science – no, really, it is a question of geography!

- ▶ Just because data can be **reproduced in one place**, does that make it **representative of all places**?
- ▶ Does scientific data always have to come from experiments conducted in the **laboratory**?
- ▶ What if we think about the **real world** itself as a space for experimenting?
- ▶ **Who has control** over the production of data about sustainability?
- ▶ In sum, what is the **geography of science**?



# Sustainability – managing what we measure?

- ▶ Dieselgate scandal has been very high profile, but there are bigger questions to explore!
- ▶ Focusing on how green new cars are already assumes that someone has taken the decision to buy a car, get behind the wheel, and turn on the engine
- ▶ If we really want to tackle the sustainability of the road transport system, we need to think about how emissions are produced not just by the *act* of driving...
- ▶ ...we also need to think about how emissions are produced by the *culture* of driving

