

ABMARC Response November 2016

ACCC New Car Retailing Issues Paper



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INTRODUCTION

ABMARC welcomes the opportunity to respond to the ACCC's "New Car Retailing Industry – a market study by the ACCC. Issues Paper" and commends the approach to evaluate concurrently all aspects of the new car retailing industry, including fuel consumption, CO₂ and noxious emissions.

In our response, we have provided background information about real world fuel consumption and emissions, in addition to our responses to questions 24 and 25 from the issues paper.

ABMARC is an independent Australian Company and is unique in that we provide policy and regulatory analysis or development, transport modelling, business planning and market insight in addition to comprehensive test, research and evaluation services covering a range of areas including automotive, heavy commercial vehicles, rail, aviation, marine fuels, energy and mining.

ABMARC has Australia's only Portable Emissions Measurement System, or PEMS, which complies with US EPA (EPA 1065 2007) and European Commission (EC 595 2009 and Regulation 49) standards for the testing of light and heavy duty vehicles and non-road engines under real world conditions (Real Driving Emissions, In-Service Conformity and Not to Exceed).

PEMS testing is used to provide highly accurate information for compliance, environment, air quality, certification, regulation, product development and marketing purposes. It was a PEM system that detected the recent non-compliance issues in the United States by VW.

We have developed Australia's only in-depth research reports (The Powertrain Series) covering trends in vehicle technologies and fuels in Australia and globally. Our most recent research has been:

- New Vehicle CO₂ Emissions study for the Department of Infrastructure (2016)
- Engine and Emissions System Technology, technical report for the FCAI (2016)
- Australian Transport Technology and Activity Trends to 2035 for the Department of Environment (2016)
- Emissions and fuel consumption measurement of new Australian vehicles in the real world for the AAA (2016 – on-going)

In addition:

- ABMARC staff have worked predominately in the field of transport emissions calibration, data measurement and verification, modelling and reporting and we have Principals with expertise across all transport sectors.
- We research and evaluate global and Australian government policies and trends as they relate to transport emissions and fuel consumption regulation in addition to working with regulatory and standard setting organisations such as the US EPA, CARB and the EC JRC across the entire transportation sector
- We measure the impact of current and emerging technologies on emissions across the transport sector utilising Australia's only Portable Emissions Measurement System, capable of meeting Euro 6 standards for clients such as the NSW EPA, peak motoring associations and energy companies
- Utilise our significant knowledge of transport technology and policy trends to model vehicle uptake, technology impacts, fuel consumption and greenhouse gas emission abatement opportunities with previous work including:
 - GHG emissions reduction from implementation of alternative fuels or technologies such as electric powertrains and gaseous fuels
 - Light duty CO₂ standards and the impact of CO₂ regulation on vehicle availability
 - Economic costs
 - Resource trends
 - Pricing trends
 - Uptake of autogas vehicles based on a range of scenarios
 - Electric vehicle demand on the power grid
- We constantly invest in research to remain on the cutting edge of trends (for example our significant investment in PEMS)

ABMARC'S FOUR PILLARS

ABMARC's services can be summarised into four key areas:



REAL WORLD ECONOMY & EMISSIONS

- Australia's only Portable Emissions Measurement System compliant to EPA 1065 2007 & EC 595 2009 Regulation 49
- On road or in field emissions & fuel consumption measurement
- Development of engines & exhaust after treatment systems
- Gaseous & particulate emissions
- Laboratory quality emissions data



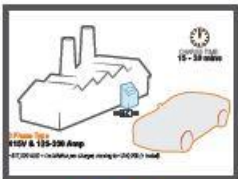
RESEARCH, BENCHMARKING & MARKETING

- Market insight & product demand studies
- Economic modelling
- Product planning
- Policy development for regulation or corporate
- Alternative fuels
- Vehicle & engine technologies
- Benchmarking & competitor analysis



VEHICLE & FLEET ENGINEERING SERVICES

- Durability & environmental (hot weather) test programs
- Captured fleet programs
- Telematics & analytics for validation & certification
- Dynamic vehicle testing
- Forensic engineering



TECHNICAL WRITING & ILLUSTRATIONS

- Reports
- Technical report writing, editing & illustrations
- Maintenance and service manuals
- Sales materials for suppliers selling to OEMs
- Job procedures

Issue of Real World Emissions and Fuel Consumption Versus the Lab

Official fuel consumption figures reported for vehicles are often not reflective of what a motorist is able to achieve. This is because the drive cycle the official data is based on, is not reflective of real world conditions.

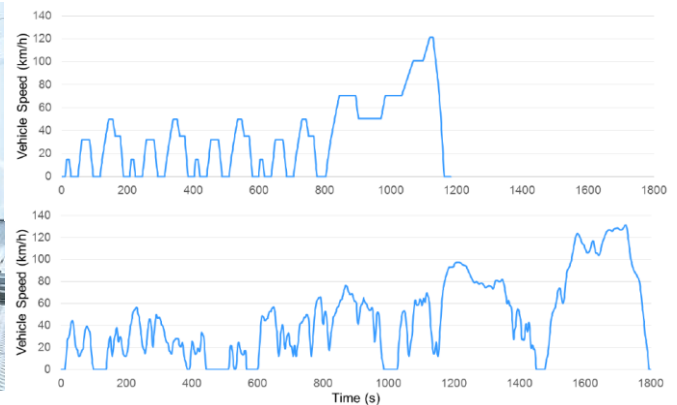
Partly as a result of global regulation mandating reductions of CO₂ from vehicles, the discrepancy between figures achieved in the laboratory and the real world fuel consumption has been increasing; as manufacturers prioritise reduced fuel consumption on the drive cycle to minimise non-compliance costs. This has also resulted in high real world NO_x emissions as diesel cars are preferred over petrol.

The fuel consumption and emissions discrepancy between laboratory and the real world is often higher when the vehicle is equipped with fuel saving technologies, which may include downsized engines, hybrid drive or stop/start. Consumers may be paying more for technology that does not deliver the claimed benefits in the real world.

From analysis ABMARC has conducted and comparison to global research, the introduction of the new drive cycle from Euro 6c in Europe, will only partially close the gap between the real world and laboratory.

BACKGROUND

The emissions drive cycle is a simulated flat road, conducted in a laboratory, on a chassis dynamometer and typically at 23°C.



Carbon monoxide, carbon dioxide, nitrogen oxide, hydrocarbons and particulates are measured.

ABMARC has measured significant variation between the real world fuel consumption and official test results during tests we have conducted. Official fuel consumption figures reported for vehicles are most often not reflective of what the motorist is able to achieve. This is due to parts of the New European Drive Cycle (NEDC) being developed in the 70's and not being reflective of driving conditions today. The following two charts show the difference between the urban portion of the drive cycle under laboratory conditions and real world road conditions in Brisbane.

Chart NEDC Urban versus Real World Driving – Brisbane

Note the significantly higher rates and frequency of acceleration in the real world (blue line) compared to the NEDC urban (red).

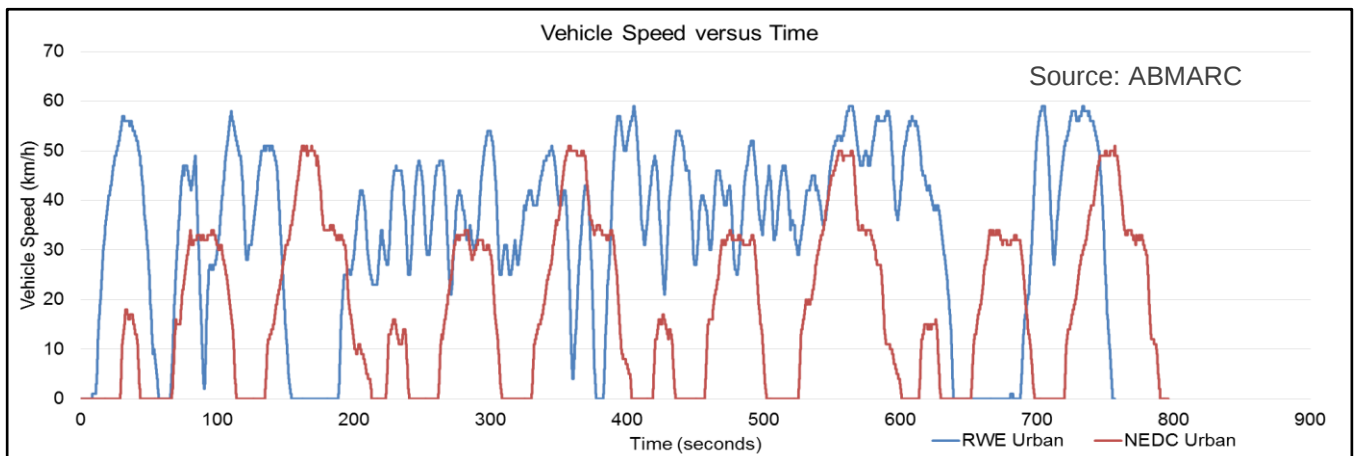
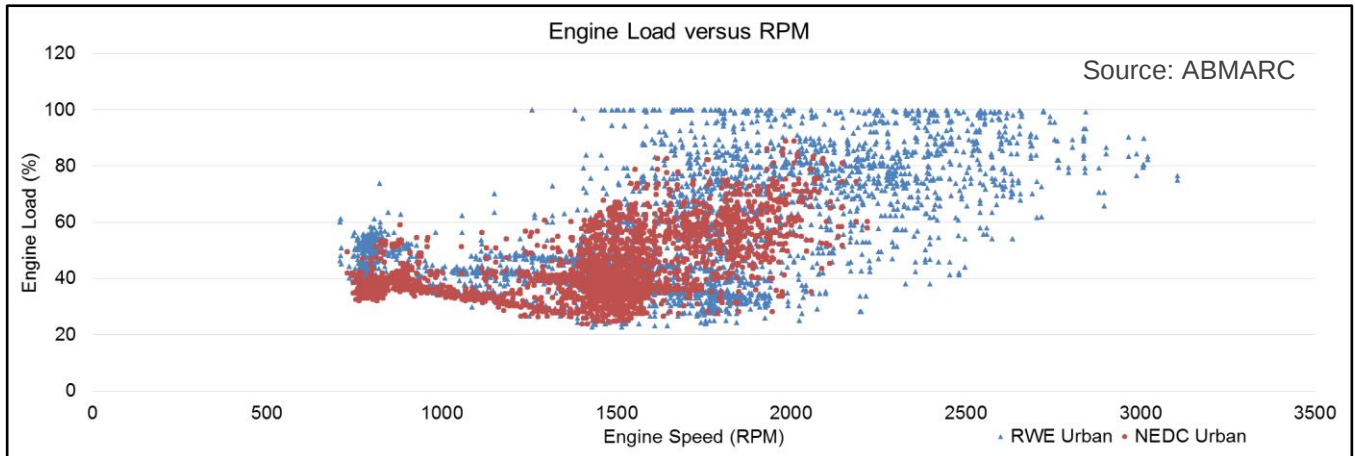


Chart Engine Speed versus Load – NEDC to Real World Driving – Brisbane

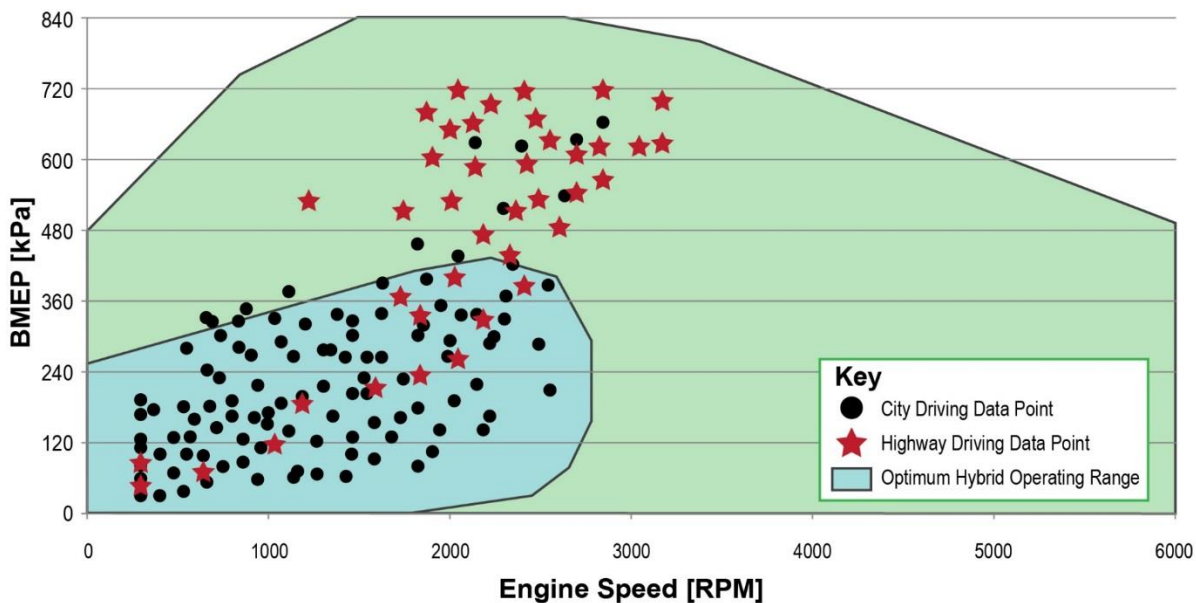
Note the significantly higher engine RPM, load and variation of speed and load experienced under real world conditions (blue dots). The operating envelope in the real world is significantly larger than experienced in the laboratory.



Due to global regulation mandating reductions of CO₂ from vehicles, the discrepancy between figures achieved in the laboratory and the real world has been and will continue to increase, as manufacturers prioritise reduced fuel consumption on the drive cycle to minimise non-compliance costs.

Chart: Hybrid Operating Range, Optimum Range and Test Points

Note the area of hybrid optimisation. The area of hybrid optimisation often coincides with the regulated drive cycle. This results in excellent on cycle fuel consumption and a marked difference in real world conditions.



VEHICLE EMISSIONS and FUEL CONSUMPTION

The importance of real world emissions testing is to ensure emissions compliance and that manufacturers have not implemented an emissions or fuel saving defeat device on their vehicles.

When VW's vehicles were tested under laboratory conditions they met the legislated limits. However, when those vehicles were driven on the road, software algorithms were activated that provided the car with more power, at the expense of emissions – resulting in high NO_x.

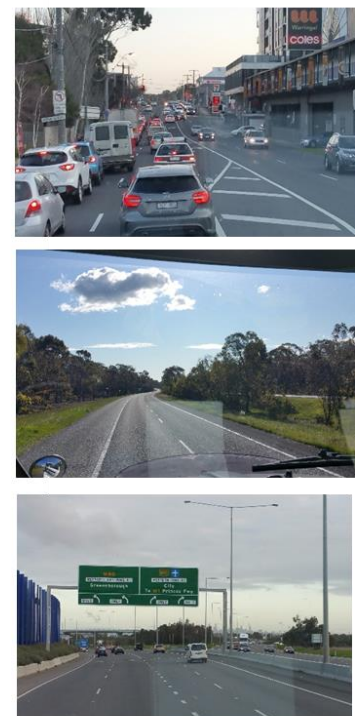
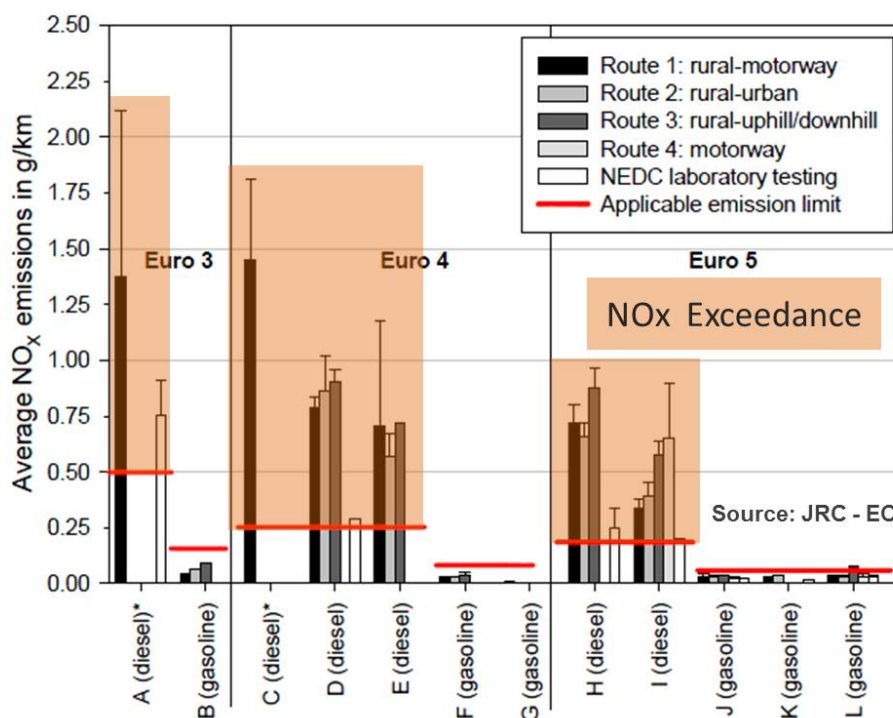
Many vehicles sold in the Australian market are not sold in Europe, and so the risk of non-compliance if there is no test regime in Australia is high. Our discussions with the US EPA in March 2016, indicated that they are in the process of developing a significant test program of light duty vehicles in the real world in the USA for compliance purposes.

In Europe, there was an expectation that more stringent vehicle emissions standards would result in improved air quality and in reality this was not the case, with NO_x increasing (NO₂ in particular). In 2011 the Joint Research Council (the research arm of the EC) conducted testing on a number of light duty vehicles on the road with PEMS and found that NO_x emissions were significantly higher than expected. These results were the catalyst for the Real Driving Emissions regulations using PEMS that are being implemented in Europe today.

Real world testing of heavy duty vehicles with PEMS has been required in the USA since 2007 and in Europe since 2013. These regulations call for the provision of PEMS results for compliance and on-going field testing of vehicles by the manufacturers to ensure compliance over the life of the engine.

Chart: JRC PEMS Testing of Vehicles 2011 – NO_x Exceedances

Note the number of exceedances by diesel light duty vehicles. NO_x is regularly 4 to 8 times greater than the legislated limit.

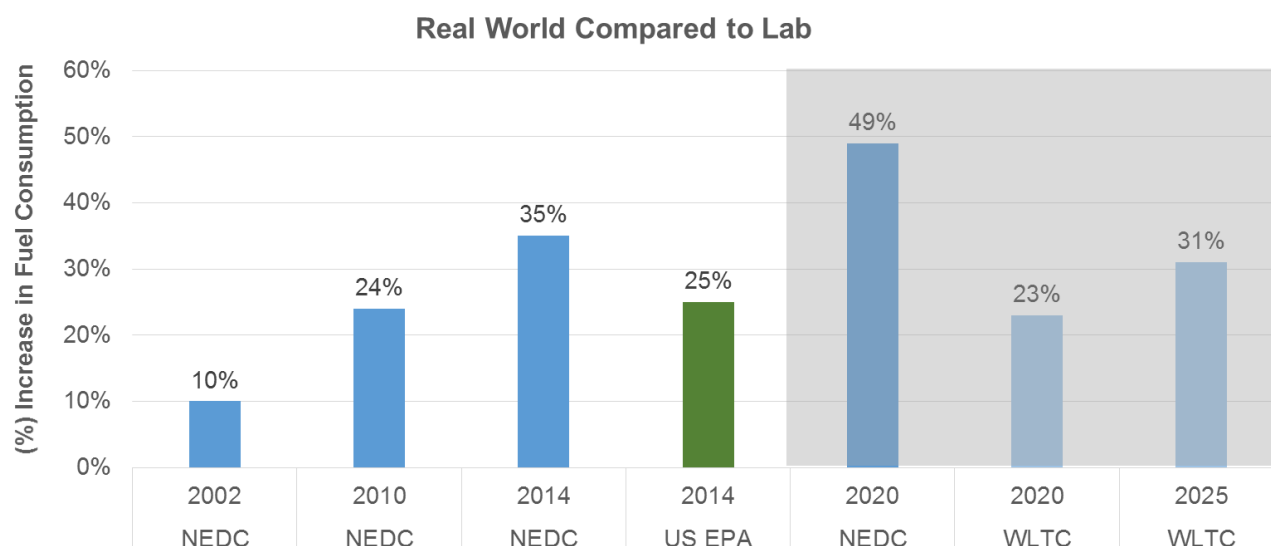


Source: JRC and ABMARC

The experience in Europe has been a significant shift to diesel vehicles in order for manufacturers to comply with CO₂ regulations. The adverse impact of this has been little to no improvement in air quality of NO_x, whilst emissions regulations continue to legislate lower levels of NO_x emissions. Another consequence from the significant number of diesel powertrains is higher levels particulate matter than there would be otherwise. PM is widely recognised as being harmful to human health.

Diesel engine exhaust emission control technologies to reduce NO_x have increased the levels of NO₂ in the real world in addition to ammonia. The US EPA has regulated to control ammonia emissions from diesel vehicles due to the use of Selective Catalyst Reduction (SCR) technologies that are installed on vehicles to control NO_x. SCR systems inject ammonia or urea into the exhaust. Ammonia (NH₃) is toxic and produces secondary formation of particulate matter in the atmosphere.

Chart: Real World to Laboratory Fuel Consumption Differential



Source: US EPA and ICCT

The difference between official results and the real world has increased in Europe from 10% in 2010 to 35% in 2014. The USA has experienced a similar trend and their average differential between the laboratory result and the real world was 25% in 2014. The fuel consumption discrepancy between laboratory and the real world is often higher when the vehicle is equipped with fuel saving technologies, including downsized engines, hybrid drive or stop/start.

The range (distance the vehicle can travel) of electric vehicles under real world driving conditions varies significantly to the official figures, which consumers may find misleading or fleet managers find that vehicles do not meet their operational requirements.

Table: ABMARC Light Duty Real World Fuel Consumption Test Summary Comparison to NEDC

In testing that ABMARC has conducted, we have measured a significant variation in fuel consumption to official data across powertrain types.

Powertrain Type		Official Fuel Consumption (L/100km)	Actual Achieved	% Difference
Petrol		10.0	11 - 13.5	+10% to +35%
Diesel		7.0	7.5 - 8.8	+7% to +25%
Hybrid		4.7	5.9 - 6.1	+25% to +30%
Powertrain Type		Official Range (km)	Actual Achieved	% Difference
EV		150	75 - 110	-50% to -25%

Source: ABMARC

REAL DRIVING EMISSIONS (RDE)

Real driving emissions are measured with equipment of the same accuracy and specifications on the road in the real world. From 2017 (Euro 6c), testing new vehicles on the road as part of the homologation process is required in Europe.

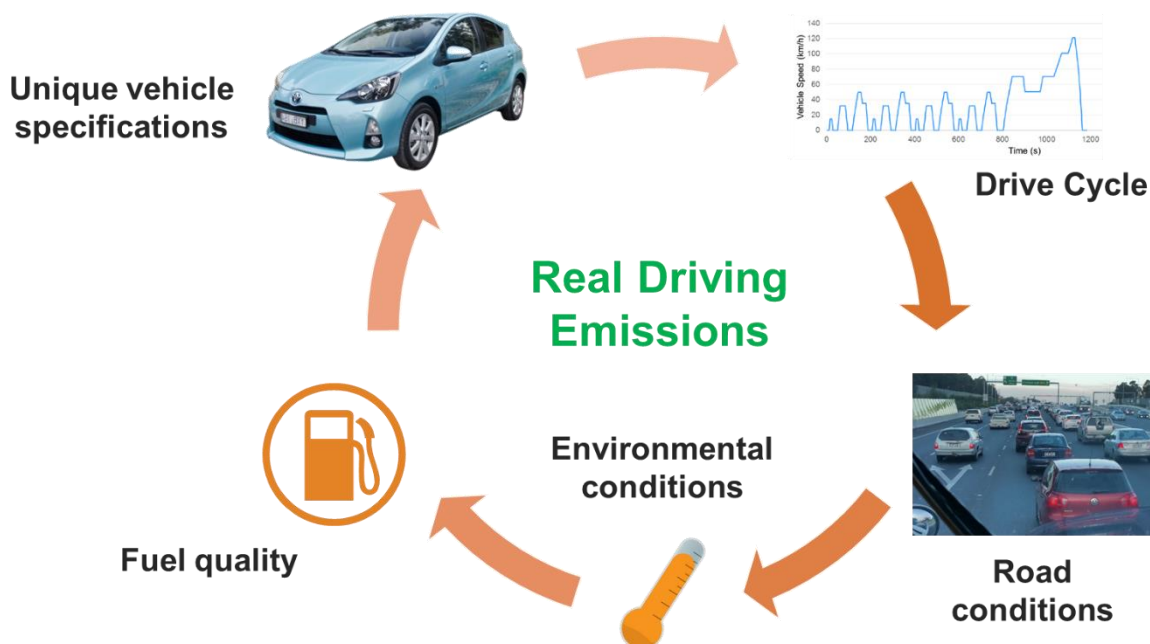


Source: ABMARC

Testing in the real world under the RDE legislation will:

- Reduce real world emissions
- Reduce the differential in fuel consumption between the real world and the laboratory
- Minimise the ability of manufacturers to implement defeat devices or strategies

Adoption or reliance on European testing to RDE only will not be satisfactory for Australia due to the many market differences to Europe, including:



Source: ABMARC

Response to ACCC Questions on Fuel Consumption, CO₂ emissions and Noxious Emissions

Q24. In Australia, information provided to consumers is based on the official drive cycle results for fuel consumption and CO₂ only. This information will be found in promotional material, such as brochures or on websites. The official results are also often reported in news articles. Some sales staff will provide an indication of real world fuel consumption to potential customers.

No consumer information is provided or available relating to noxious emissions and it is assumed that the vehicle complies with all required regulation and that its performance in the real world is adequate. Testing overseas and in Australia shows this assumption to be false, and the order of magnitude of noxious emissions exceedance can be up to 20 times the legislated limit.

Q25. A comparative fuel consumption number, such as that provided on mandatory labelling, becomes irrelevant to consumers when it varies so greatly, depending on the vehicle technology deployed or base fuel type of the vehicles under comparison. It is not possible to provide a generalisation, at the individual vehicle level, of a difference between real world and official fuel consumption or CO₂ results.

Q26. No response.