



WLTP – OUR VIEW OF A COMPLEX SET OF DYNAMICS

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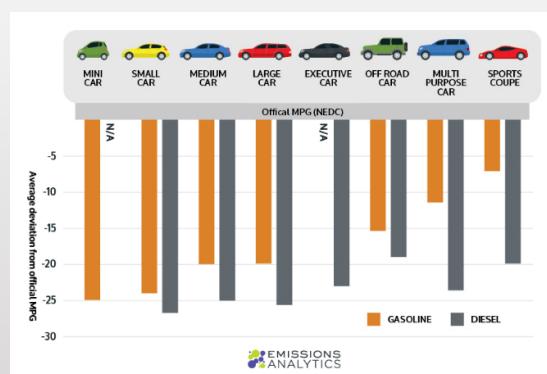
OVERVIEW

- › WLTP – A Reminder
 - What, why and when
- › Data Flow
 - Approach and current position
- › Impact of WLTP Introduction
 - Changes in model strategies
- › Next Steps

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WLTP - A REMINDER

- › WLTP is the Worldwide harmonised Light vehicles Test Procedure
- › It's designed to more adequately reflect real world driving conditions
- › The current NEDC testing procedures for fuel consumption and CO₂ emissions no longer reflect the latest technology
- › Figures are provided for specific vehicles with options fitted



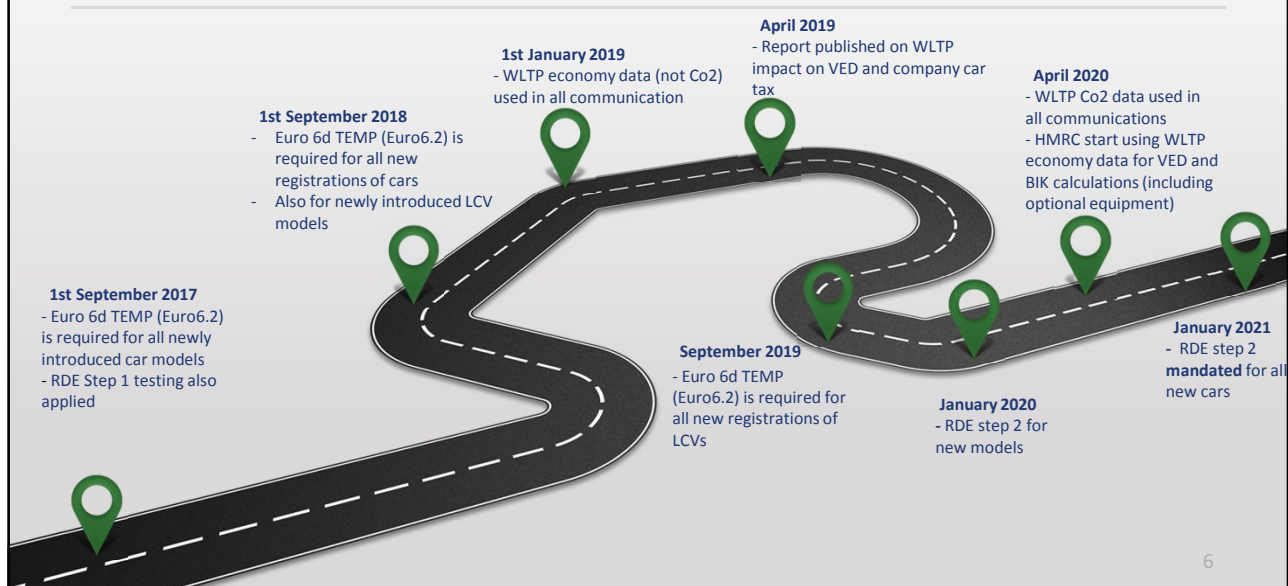
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REAL DRIVING EMISSIONS (RDE) TEST

- › RDE does not replace the WLTP laboratory test, but complements it
- › RDE aims to confirm WLTP results in real life, with a focus on NOx emissions
- › RDE testing uses a car fitted with specialist testing equipment driven on public roads in different climatic conditions, at different road speeds, with different payloads and at multiple altitudes
- › More stringent RDE standards are on the horizon
 - RDE step 2 mandated for all models from Jan 2021
 - Step 3 and Step 4 to include cold start and a lower conformity factor

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THE WLTP TIMELINE



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THE WLTP TIMELINE

- › Currently manufacturers still at different stages in the transfer to Euro6d Temp or Euro 6d
- › Both of these are called Euro 6.2 which has led to some confusion over their certification

Emissions Standards	OBD Standard	Vehicle Category and Class	Engine	Implementation date: New Types	Implementation date: New Vehicle	Last Date of Registration	Commentary
Euro 6d TEMP	Euro 6-2	M, N1 class I	PI, CI	1st September 2017	1st September 2019	31st December 2020	RDE Step 1 Testing on a 2,1 conformity factor. This is listed as "2.5,1" to allow for the .5 complimentary conformity factor of using PEMS for RDE Testing. Based upon 80mg/km of NOx.
Euro 6d TEMP	Euro 6-2	N1 class II	PI, CI	1st September 2018	1st September 2020	31st December 2021	
Euro 6d TEMP	Euro 6-2	N1 class III, N2	PI, CI	1st September 2018	1st September 2020	31st December 2021	
Euro 6d	Euro 6-2	M, N1 class I	PI, CI	1st January 2020	1st January 2021		RDE Step 2 Testing on a 1,1 conformity factor. This is listed as "1.5,1" to allow for the .5 complimentary conformity factor of using PEMS for RDE Testing. Based upon 80mg/km of NOx.
Euro 6d	Euro 6-2	N1 class II	PI, CI	1st January 2021	1st January 2022		
Euro 6d	Euro 6-2	N1 class III, N2	PI, CI	1st January 2021	1st January 2022		

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DATA FLOW AND CURRENT POSITION

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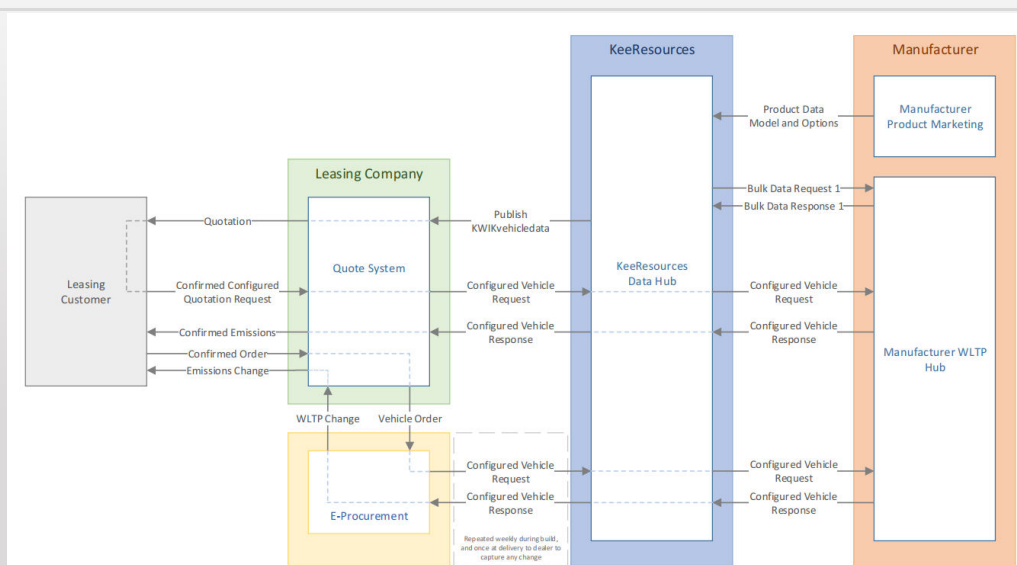
SO WHERE ARE WE?

- › KeeResources began to build the necessary data infrastructure in 2016
- › Speed of participation from car brands in WLTP data provision has been varied
- › Delivery methods still in development
 - 'Flat File' data delivery or API call
- › Currently no data has been supplied on the potential impact of options to emissions values

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WLTP HUB



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WHAT'S GONE WELL?

First brand to deliver NEDC2 data:



- › BMW X5 data received Sept 17
- › +16% average increase in Co2
- › Process used to reduce complexity
- › Clear, concise and customer friendly

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WHAT'S GONE WELL?

First brand to deliver NEDC2 & WLTP data:

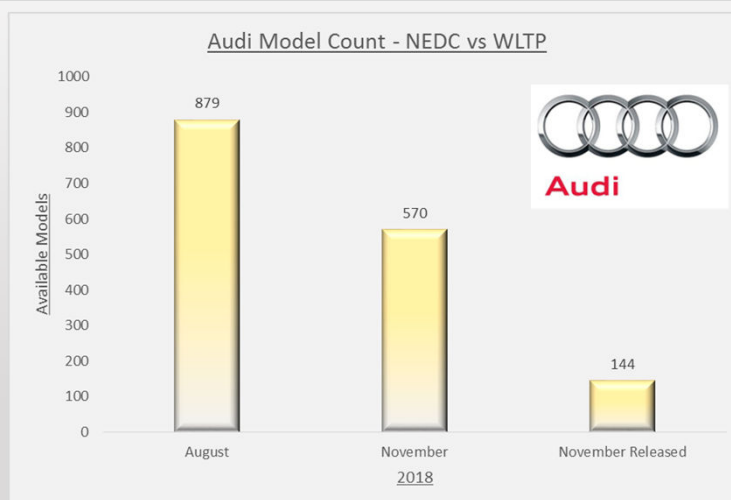


- › New Hyundai i20 received April 18
- › +19% average increase in Co2
- › Customers able to make an informed choice

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WHAT'S GONE WELL?

- › Not an easy process
- › Large product ranges, lots of model complexity means lots of data



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IMPACT OF WLTP INTRODUCTION

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IMPACT OF WLTP

- › Car registrations -7.2% YTD end Oct 2018 vs 2017
- › Diesel share of market -30.7% YTD
- › General fear of significant increase in Co2 values?
- › Less attractive hybrid proposition?
- › More significant changes for smaller capacity petrol engines

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IMPACT OF WLTP



- › Kia Rio 1.0T 99ps manual
 - NEDC – 102g/km
 - NEDC2 – 114g/km
 - WLTP – 132g/km

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› Kia Niro 1.6 Hybrid 139ps auto

- NEDC2 – 86g/km
- WLTP – 110g/km

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› Kia Stinger 3.3 V6 365ps auto

- NEDC – 225g/km
- NEDC2 – 221g/km
- WLTP – 233g/km

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WLTP IMPACTS

- › Reduced availability of individual options
 - Reversal of personalisation trend?
- › Option packs with increased content (many not MVRIS coded)
- › Increased number of trim levels?
 - Total model id count August 18 – 8447
 - Total model id count November 18 - 8546

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WLTP IMPACTS

- › Impact of WLTP will be different for the new and used markets
- › Leaner production and more manageable new car stocks
- › Simplified model ranges and an easier buying journey for the customer
- › But there may be less consumer choice in used market
- › A greater volume of similar models may affect values

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NEXT STEPS

- › Small derogated volumes – insufficient for YE objective
- › A significant increase in August registrations?
- › Best practise and lessons learned, passed to LCV colleagues?

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THANK YOU FOR LISTENING

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EURO 6 AND RDE TESTING

RDE Tests are run in parallel with WLTP, but apply a different set of test procedures. RDE 1 and 2 also focus on NOx emissions, as opposed to CO2.

- **RDE 1** – Defines the RDE Test procedure for NOx to a conformity factor of 2.1
- **RDE 2** - Defines the RDE Test procedure for NOx to a conformity factor of 1 (with a 0.5 allowance)
 - › The 0.5 error margin is also subject to ongoing annual review and change.
 - › This is 80mg/km for Diesel and 60mg/km for Petrol
- **RDE 3** – PN (Particle Numbers) Conformity Factor, and inclusion of RDE Cold Starts.
 - › The 0.5 error margin is to be reviewed for PN.
- **RDE 4** – Market Surveillance, Refining of Test Procedures, and Normalisation against CO2
 - › This includes the review of all vehicles in production and the conformity factor reducing (to 1.43)

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