出國報告（出國類別：國際會議）

歐盟邀訪洽商車輛能源效率管理及相關檢測管理制度出國報告

服務機關：經濟部能源局
姓名職稱：薄校君專門委員
派赴國家：比利時及德國
出國期間：104 年 10 月 17 日至 10 月 24 日
報告日期：105 年 6 月 30 日

目　錄

一、內容摘要

(一)目的

本次出國主要係應「歐洲經貿辦事處」轉歐盟執委會(EU)邀訪，希就有關車輛能源效率管理相關議題，希與本局充分交換意見，有助於減少未來車輛貿易障礙，爰赴訪位於比利時布魯塞爾之歐盟總部，並赴德國實地參訪相關車輛檢測機構之檢測作業。

(二)參加人員

經濟部能源局　薄校君、

工研院　曾文丁

歐洲在台商務協會 林曉汶

(三)行程記要

日期	地點	工作內容
104.10.17 ~104.10.18	台北 -德國法蘭克福	搭機啟程
104.10.19	比利時布魯塞爾 (EU commission & ACEA)	1. 歐盟汽車二氧化碳排放管理制度與法規。(合併申報、優惠額度、少量車等制度) 2. 對於少量車申請文件、審查。(少量車標準、審查準則及二氧化碳目標設定等) 3. 歐盟對於「世界統一輕型車輛的測試程序（WLTP）」規劃時程及執行方式。 4. 相關車輛測試方式及法規調和(歐盟預計於2017年9月新增PEMS系統(Portable Emission Measurement system))。
104.10.20 -104.10.21	德國科隆 (TÜV Rheinland)	1. NEDC及WLTP測試程序討論。 2. 歐盟 RDE (Real Driving Emission) 相關發展規劃。 3. 歐盟輪胎標示制度說明 4. 其他車輛檢測相關議題
104.10.22	德國慕尼黑 (TÜV SÜD)	1. ECE R101 油電車及電動車測試程序討論。 2. GTR (Global Technical Regulation)測試程序討論。 3. 車載診斷系統 PEMS (Portable Emission Measurement System)相關法規應用現況。 4. 其他車輛檢測相關議題
104.10.23 ~104.10.24	德國法蘭克福-台北	搭機返台

(四)結論及建議：

（一）本次洽訪歐盟、歐洲車輛製造廠協會(ACEA)、德國車輛檢測機構(TÜV Rheinland 與 TÜV SÜD)等，歐洲負責車輛法規制定之政府單位、車輛製造廠協會及專業車輛檢測機構，針對車輛耗能管制標準及少量車耗能管理制度進行非常深入之探討及交換意見；且歐盟由歐盟執委會氣候行動總署(DG Climate Action)及成長總署(DG Internal Market, Industry, Entrepreneurship and SMEs)派出相關業務主管簡報，展現對本次邀訪之重視。

（二）歐盟法令 (EU No. 63/2011)對於少量車之規範，可由製造車廠提出二氧化碳減量目標之具體計畫，並由歐盟進行審查並評估確認是否批准，該等相關機制及實質審查方式與內容，可作為我國辦理少量車廠燃油效率提升改善計畫書時參考。

（三）聯合國各會員國目前正進行 WLTP 一致性調和，歐盟已準備正式將 WLTP 納入法規，預計將於 2017 至 2018 年針對型式認證車輛要求開始採用，最終導入的時間點仍需視各會員國態度再行確定。我國在車輛管理制度上，亦需與國際法規調和；爰此，在車輛管理政策與法規推動之期程，宜需儘速蒐集 WLTP 具體作法，提早準備並為因應。

（四）有關福斯汽車被美國政府認定有安裝減效裝置，涉及欺騙行為之事件，本次拜訪單位的回應各自不同，歐盟官員發言謹慎，除已積極調查相關情形外，並表示將再觀察後需發展；ACEA 站在車輛製造廠立場，儘可能淡化此事件的衝擊；車輛檢測機構則擔心檢測機構聲譽因此受損，並損及長久以來德國車之形象。以上歐洲各單位基於立場不同，而有不同之認知。我國對於車輛檢驗無論在制度上及法規上，相較歐盟，採取更為嚴格之作法，無論是進口車輛或國內各車廠，均認同並依據我國法規辦理車輛檢驗，政府未來應持續加強管理之深度與強度。

（五）歐盟對於實際道路排放測試(RDE)法規，雖然自 2011 年即展開相關研究，惟推動過程仍受車輛製造廠的意見影響，在福斯汽車事件發生後，

支持 RDE 法規的聲音變多了，預期 2017/2018 年原歐盟規劃導入的時間點非常有可能獲得會員國投票通過。我國在此議題上，雖僅止於起步階段，藉由此次歐盟參訪，將有助於未來 RDE 法規轉接納入我國內法規。

（六）歐洲車廠對於我國針對複合動力車貨物稅減半條件的調整，透過歐盟官員表達高度關切之意，雖經我方與會人員說明當時決策理由，歐盟委員會仍請我國政府正視歐洲車廠相關複合動力車在台喪失競爭優勢的情形，後續有關車輛能源效率說帖部分須預作準備，以備來自歐商的持續關注。

（七）我國進口車輛比例逐年提高，以往市場占有率從百分之三十，到 104 年超過百分之四十以上；進口車輛中又以歐系車輛占多數。換言之，歐盟及其車廠在我國市場有重要利益，歐盟及歐系車輛廠商希望我國在車輛管理制度上能與歐盟同步接軌。本次參訪獲得歐方口頭承諾針對相關法規釋疑可以電郵方式進行，確實對於國內未來在導入歐盟新法規時，有更便利及具權威的資訊取得管道。建議未來交流參訪活動應持續辦理，將有助於台歐雙方關係的提升，也利於國內車輛廠商開拓歐洲市場，活絡國內車輛產業。

二、行程及工作內容

我國已於 103 年 8 月 11 日發布修正「車輛容許耗用能源標準及檢查管理辦法 」部分條文，於 105 年及 106 年分別提升機車及小客(貨)車燃油效率標準，並規劃導入包括如整廠總量管理、少量車管理機制等過去國內並未採用的耗能管理手段。

由於歐盟委員會已於 2012 年起正式將小客車二氧化碳/油耗議題納入強制性管理，未達管制標準的車廠須接受罰款的處分。歐盟小客車二氧化碳/油耗管制標準係採整廠總量管理、少量車另訂管制標準、低碳排放車輛給予優惠納入總量計算等規定，雖已導入我國法規中，但由於上述相關耗能管理手段及測試方式，因屬新制度，國內尚無累積相關實務管制經驗，因此藉由至歐盟總部拜訪主管車輛二氧化碳/油耗業務的官員及拜訪歐洲車輛檢測機構人員，透過彼此間經驗意見交流，確保我國導入新制車輛耗能管制措施，符合國際慣例與作法。

另歐盟規劃將導入全新的汽車測試程序(WLTP)及實際道路駕駛污染管制標準(Real Driving Emission)，相關測試程序的改變及新增管制項目，對於我國車輛耗能管理法規，過去主要參考歐盟的作法，需提早因應避免未來法規轉換時造成衝擊。

。

本次出國訪察行程，承蒙歐洲在台商務協會協調安排，分別於拜訪歐盟總部(EU Commission)、歐洲汽車製造商協會(ACEA)、TÜV Rheinland 與 TÜV SÜD 時，相關車輛管制法規研究部門及驗證測試單位皆熱心接待，並就目前歐盟法規實施進程與背景意涵逐一解說、討論。以下就出國期間與洽訪單位交流情形，分別說明如下：

2. I. 訪問歐盟總部 (10 月 19 日上午)

本次拜訪歐盟委員會，歐盟非常重視我方的到訪，特別派出包括 Directorate-General for Climate Action 及 Directorate-General for Internal Market, Industry,

Entrepreneurship and SMEs 兩重要部門政府官員親自接待，並就我方訪前所預先準備的問題，以簡報方式進行說明(如附件一、附件二及附件三)：

(1) 有關車輛二氧化碳排放相關法規管理規範：

由歐盟執委會氣候行動總署(DG Climate Action)政策執行官 Ian Hodgson 作主要內容之報告：

i. 歐盟對於車輛排放的重視，主要係車輛排放 CO2 是僅次於發電之排放，約占歐盟地區 CO2 排放 1/5。

ii. 對於車輛 CO2 排放，歐盟現行規定係 2015 年前每公里不超過 130 公克；2020 年將降低至每公里 95 公克

iii. 目前對於車輛製造廠違法之罰則，超過第 1 公克罰 5 歐元、超過第 2 公克罰 15 歐元、超過第 3 公克罰 25 歐元、超過第 4 公克罰 95 歐元；並自 2019 年起每超過 1 公克罰 95 歐元

iv. 運用 Super-credits 、Eco-innovations、Alternative fuel vehicles 等機制促使減少車輛 CO2 排放，均於 EC No.443/2009 及 No.334/2014 進行完整說明。

v. 少量車機制：車廠每年銷售單一品牌少於 1 萬輛之車輛，可以不適用；車廠每年銷售 1 萬至 3 萬輛間之車輛，可以低於法規所定標準之 25%

vi. 更廣泛的措施，包括訂定輪胎、冷氣的標準、駕駛操控系統的指示、生質燃料的使用。

vii. 消費者在第一年可以節省 340 歐元的燃料費用，在車輛生命週期 13 年期間，共可減少 2904 至 3836 歐元(此價格將隨燃油價格變動，而有所不同)。

(2) 有關少量車管理相關事項：

i. 歐盟針對少量車廠(Small Volume Manufacturer)之定義，係以年銷售品牌車輛為 10,000 輛~300,000 輛廠商，得要求根據 2007 年某

代表廠商的平均 CO2 特定排放，放寬 25%的目標值，申請適用少量車二氧化碳管制標準；年銷售單一品牌車輛在 10,000 輛以下廠商得申請放寬特定 CO2 排放目標值許可。

ii. 歐盟針對少量車廠(Small Volume Manufacturer)申請適用少量車二氧化碳管制標準有制定管理準則(Commission Regulation (EU) No. 63/2011)，包含廠商所需提供的文件內容、二氧化碳減量目標的設定、委員會評估方式、民眾可閱覽的資訊限制等均有完整規範。

iii. 廠商基準年排放資訊：提供 2007 年該車廠平均二氧化碳排放數值，若無 2007 年資料則提供最接近 2007 年的全年該車廠平均二氧化碳排放數值。

iv. 廠商營運資訊:提供申請日期前一年度該車廠員工人數及生產廠房的佔地面積(平方公尺)、生產廠房的營運模式，包括設計及製造業務是否有外包；若有技術來自關聯性企業，須說明何部分為外來技術；申請日期前一年度的車輛銷售數、年營業額、淨獲利、研發經費支出、若有關聯企業參予經營，則移轉至母公司的財務報告； 該車廠銷售車輛市場特性說明;申請日期前一年度該車廠所有車型的售價及預計銷售車型的預估售價。

v. 廠商車輛技術潛力資訊:提供該車廠 2007 年(或最接近 2007 年)銷售車型所使用的二氧化碳減量技術清單；每一車型所使用減碳技術所額外增加的費用清單。此外，申請人須依該車廠減碳潛力提出減量目標值，減量目標值須以減量計畫書方式提出，減量計畫書須包括應用於該車廠車輛上減碳技術的時程規劃，預估每年各車型銷售數、預估每年平均二氧化碳排放值及平均車重。

(3) 有關車輛 WLTP(World-harmonized Light-duty vehicle Test Protocols)新制推動情形：

由歐盟執委會企業與產業總署(Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs) 車輛工業管理決策行政官 Alexandra SA Carvalho (Principal Administrator/Sustainable Mobility and Automotive Industry)作主要內容之報告：

i. WLTP(World-harmonized Light-duty vehicle Test Protocols)為聯合國在 2014 年所提出共同規範全球汽車產業的測試程序(UN Global Technical Regulation No 15 by UNECE WP.29)，整合目前所存在包括歐洲、美國、日本及印度等差異的行車型態，導入車輛族的概念，可減少廠商測試成本，對於動力計阻力模擬提供更佳的設定參數及更接近實際的測試車重。

ii. 歐盟已準備正式將 WLTP 納入法規條文，預計將於 2017/2018 年針對型式認證車輛要求開始採用，最終導入的時間點仍需視各會員國態度取得共識。未來在採用 WLTP 後，包括如二氧化碳管制標準及車輛燃油效率標示等資訊，均會配合進行 NEDC 與 WLTP 差異的轉換調整。

(4) 有關車輛實際道路排放測試(RDE，Real Driving Emission)新制推動情形：

為考量掌握車輛更接近實際路況行駛時的車輛污染排放情形所發展的全新測試方式，並與歐盟 6 期污染排放標準導入時程接軌，將於 2017/2018 起納入 RDE；初期將僅規範 PN(Particulate Number)及部分的氣狀污染物管制標準，並以歐盟 6 期污染排放標準乘以 conformity factor 作為 RDE 的排放標準。

歐盟官員也認為此次福斯汽車事件對於歐盟推動 RDE 相關法規上有正面助益，過去車廠對於 RDE 法規導入的時程有較多的意見，在福斯汽車事件後，RDE 法規可有效防止類似減效裝置的安裝，各車廠在此議題上，態度也較過去和緩許多。

2. 2. 訪問歐洲汽車製造商協會（ACEA） (10 月 19 日下午)

歐洲汽車製造商協會（ACEA）係由 15 個歐洲客車、貨車、卡車和巴士的製造商所組成的協會。ACEA 並與各種機構，如非政府組織、公民團體進行合作，且與多家有利益關係的行業協會保持互動。ACEA 與歐洲理事會所轄汽車研發機構（EUCAR）有著長久的合作關係。ACEA 與歐洲 29 個國家的汽車製造商協會保持密切關係，並與世界各地的汽車協會在國際議題上持續對話。

本次參與會談除我方全體成員，ACEA 人員包括 Emissions & Fuels 部門總監 Paul Greening 及 Mobility & Sustainable Transport 部門總監 Petr Dolejsi 兩位。雙方共同討論議題及意見，分述如下：

i. 對於 WLTP 實施的時間點，仍需等歐盟做最後的確認，以 ACEA 的立場，配合二氧化碳管制標準，2021 年後導入是較佳的時間點。

ii. ACEA 也針對歐盟有關小客車與小貨車二氧化碳總量管制標準不可相互合併計算提出看法，ACEA 認為各車輛製造廠規模差異非常大，若同意小客車與小貨車二氧化碳總量管制標準可相互合併計算，將造成僅生產小客車但無生產小貨車(反之亦然)廠商喪失競爭優勢。

iii. 對於運輸領域節能減碳之推動方式，ACEA 提出不同觀點，渠特別指出，若由交通號誌改善就可以達到運輸部門能源節約 5%，且所需投入成本相對便宜，為什麼需要車輛製造廠投入超過 200 位研發工程師及龐大研發資源，卻僅能提升新車燃油效率 5%，所以問題根本仍在於節能車輛的研發與推動。

iv. 由於 ACEA 為歐洲車輛製造廠所組成的協會，因此在發言的立場與觀點就偏向車廠，以本次福斯汽車事件而言，雖然 ACEA 認為作弊就是不對，

但也強調車上電腦會依車輛行駛狀況做各種可能的控制判斷，不可全歸為刻意規避法規要求，且現行法令也無明訂實驗室測試與實際路試不可以有不同的調校設定，未來主管機關若有具體的法令，車輛製造廠自然會遵守所有的規範。

2. 3. 參訪 TÜV Rheinland 歐洲總公司(位於德國科隆)及德國 Lambsheim 車輛實驗室 (10 月 20~21 日)

i. TÜV Rheinland 集團是全球技術服務的領先供應商，成立於 1872 年，總部設在德國科隆，集團員工數超過 19,000 人，在 69 個國家設有 500 個據點，年收入達 17 億歐元。集團的使命和指導原則是達成安全和品質的永續發展，以應對人、技術、環境之間的相互作用所帶來的挑戰。

ii. TÜV Rheinland 車輛實驗室設在 Lambsheim(圖一)，可執行歐盟最新 6 期排放標準測試，對於 WLTP 測試也有相當豐富經驗，RDE 也是該單位重點研究項目，針對市售不同品牌的 PEMS(Portable Emission Measurement System)進行深入的研究。

iii. 目前歐盟針對 RDE 法規初步規畫為納入 6 排氣法規(EC No.692/2008)中加以修正，測試過程區分為三個階段，分別為市區段(urban)、郊區段(rural)及高速段(motorway)，每段測試距離比率以各占 1/3 為原則，並以不超過正負 10%距離為測試路線規劃，每段測試距離至少須達 16 公里，測試時間需在 90-120 分鐘之間，測試時的環境溫度需介於 0~30℃，測試時車輛重量須包含駕駛重量、認證官重量與測試設備重量，車上空調系統則依環境條件適當開啟。

iv. TÜV Rheinland 也提供歐盟輪胎管理相關資訊，包括輪胎安全法規(R30、R54、R64、R75)，輪胎現值/標籤法規(R661/R1222/R117)等。

v. 目前歐盟對於輪胎性能分級和標籤依濕滑指數值(安全考量)、滾組係數值(能耗考量)訂有分級指數(由 A 至 G，A 最佳，G 最差)，並針對噪音量測

標示噪音分貝值(dB)，消費者可由此輪胎性能分級和標籤清楚了解購買的輪胎是否省能、環保低噪音及安全性佳。

vi. 由於參訪前適逢福斯汽車發生作假欺騙事件，因相關作假數據係經德國另一檢測機構所為，所以 TÜV Rheinland 對於福斯汽車事件表達無法理解，也認為德國車廠會做此事情將造成德國人的形象嚴重受損，尤其是檢測機構也可能受此事件波及而至名聲遭受打擊，雖然此作弊事件檢測機構也被蒙在鼓裡。

vii. TÜV Rheinland 非常重視我方的來訪，除就我方事先提出的問題進行準備與回覆(如附件四)，也安排參觀其位於 Lambsheim 實驗室內有關輪圈測試機台與車輛污染實驗室，並實地為我方參訪成員解說，該實驗室現有之車輛相關檢測先進設備與能力；俟後並安排於 10 月 21 日至該公司科隆總部參觀相關車輛安全測試設備；科隆總部可執行包含座椅強度、車輛底盤強度、輪圈檢測、安全帽強度、車輛內裝難燃性測試等各項被動安全測試項目及零組件測試項目。

圖一、TUV Rheinland 位在 Lambsheim 的車輛實驗室

2.4. 參訪 TÜV SÜD 位於德國慕尼黑總公司 (10 月 22 日)

i. 集團成立超過 150 年，總部設在德國慕尼黑，集團員工數超過 22,000 人，在全球設有 800 個據點。年收入達 20 億歐元。TÜV SÜD 集團志在建立更高的安全價值與提升經濟效益。憑藉著在工業領域完整與深入的知識，集團專家團隊提供各領域先期諮商與持續指導，在技術、系統和專業持續優化，期而強化集團客戶在世界各地的競爭力。該公司參與會談的人員包括 Homologation & Certification 部門經理 Bernd Jakob 及 Active Safety and Reliability 部門經理 Pascal Mast 兩位。

ii. 會談過程由 TÜV SÜD 人員先介紹集團簡介(如附件五)及車輛實驗室所在位置及檢測能量(如附件六)，並針對本次代表團事先提出之問題給予說明(如附件七)。

iii. 該公司目前共有三間車輛污染測試實驗室，分別坐落於德國 Frankfurt、Stuttgart 及捷克 Prague，提供六套汽車車體動力計服務，兩間密閉式 SHED 蒸發測試服務，及四套 PEMS 可進行 RDE 測試。

iv. 有關福斯汽車議題，Bernd Jakob 個人表達無法理解福斯汽車集團的動機，也提到過去幾年美國針對非美系車廠所宣布大規模召回改正計畫，認為福斯汽車事件也可能牽扯政治議題，並認為福斯汽車事件應非單一事件，後續可能有其他車廠會爆發類似情形。

v. 對於歐盟未來將實施之 WLTP，身為歐洲最大檢測機構之一的公司，他們表達將持續關注下列幾項事情的發展：

- 2014/03/12 UN/WP29 及其管理委員會第 162 會議通過 GTR15 法規，結束 WLTP 之測試循環與測試程序之 Phase 1a 期程，同時非正式工作小組採用日本與歐盟之建議提出 WLTP Phase 1b 之實際對比驗證之時程與議題。

- 建立校正公式，以便能將偏離標準狀況下(例如:車速偏離；溫度偏離等等)所量測到的數據正常化，換算成為標準狀況下的測試結果。
- 提供測定路阻程序時所使用風洞的規格需求。
- 發展補助測試來修正區域性環境溫度變異的影響。
- 解決電動車以及複合電動車的相關議題(例如: 決定計算方法中，車輛使用的電力產生來源不同，各有專屬的 CO2 排放係數)。
- 發展以氨氣、乙醇、醛類作為燃料時，量測 CO2 排放量的方法。
- 設定違反車速追蹤準則，以及決定測試車輛可能使用縮小比例(downscaling)的行車型態 (當測試車輛即使油門全開，仍無法維持行車型態所要求的車速時)。

vi. 由於本次安排拜訪的時間有限，雙方所要交流的議題仍有未能充分表達與理解的遺憾，Bernd Jakob 先生提出希望能於 104 年 11 月底回訪台灣相關機構，更進一步保持與台灣主要政府單位密切合作的機會

圖二、與會人員在 TÜV SÜD 合影

三、心得與建議

（一）本次赴歐拜訪 EU commission、ACEA、TUV Rheinland 與 TÜV SÜD 等歐洲負責車輛法規制定的政府單位、車輛製造廠代表的協會及專業的車輛檢測機構，針對國外少量車耗能管理制度及車輛耗能管制標準推動作法進行非常深入而且有意義的探討及交換意見，深信這樣的交流，對於雙方日後的業務推展，具有非常大的效益與幫助。

（二）這次參訪 TÜV Rheinland 與 TÜV SÜD 等歐洲知名車輛檢測機構，了解各檢測機構對應 WLTP 及 RDE 等新興測試程序時所投入的龐大資源與深入程度，且讓我方了解許多測試程序細節、法規解釋與執行方式，這對目前國內相關工作推動上幫助很多；另外對於國外車輛實驗室的設備、人員工作態度及精神，希望透過本次的技術交流，能增加國內車輛實驗室未來不管在設備上、人員訓練及測試程序的能力提升。

（三）此次與歐盟間的交流，歐盟派出主管此業務的負責官員，就我方關切問題以簡報方式具體回應，充分釐清部分國內過去並未完全掌握的執行細節，展現 EU 對我國政府到訪的重視與誠意。

（四）我國在相關少量車耗能管理方式，亦係以歐盟制度為主要參考依據；對於少量車之定義係以廠牌全球生產量在 10,000 輛以下，且國內年度銷售量在 300 輛以下；對於少量車油耗管理，則以該廠牌車輛燃料效率提升改善之計畫書，向中央主管機關申請同意，並依中央主管機關核定事項辦理車輛燃料效率提升。由於少量車在於其稀少性，未來適用亦將以世界知名之歐系廠牌車輛為對象，相關少量車管理機制與作法與歐盟同步接軌，將可減少我國與歐盟間之貿易紛爭，並有利於雙方關係之發展。

（五）車輛製造相關技術為科技整合應用的體現，歐洲車廠近年來加速發展電動車輛相關技術，並持續提升傳統油氣動力車輛能源使用效率；我國由於市場規模有限，自行研發相關技術並不具成本效益，國內車廠多係引進國外技術，未來如再提升我國車輛能源使用效率到每公升 20 公里，歐盟現

行整體配套措施，如 Super-credits 、Eco-innovations、Alternative fuel vehicles 等機制促使減少車輛 CO2 排放等作法，尤應預先研析並予轉化成適合我國國情之作法。

四、附件及參考資料

（一） 歐盟委員會就歐盟二氧化碳管制法規簡介
（二） 歐盟委員會就歐盟準備實施 WLTP 管制法規簡介
（三） 歐盟委員會就準備實施 RDE 管制法規簡介
（四） TUV Rheinland 就我方赴訪所提問事項之回覆說明
（五） TÜV SÜD 公司簡介
（六） TÜV SÜD 車輛實驗室檢測能量說明簡報
（七） TÜV SÜD 就我方赴訪所提問事項之回覆說明

附件一

歐盟委員會就歐盟二氧化碳管制法規簡介

European Commission

Reducing CO_2 emissions from road vehicles

Climate Action

European Commission

Vehicle CO_2 emission regulation in EU (now and future)

Climate Action

The EU regulations and policy instruments: the main legal acts

*1. Regulation (EC) **No 443/2009** – CO_2 emissions from passenger cars and amending Regulation (EU) **No 333/2014** to define the modalities for reaching the 2020 target to reduce CO_2 emissions from new passenger cars*

*2. Regulation (EU) **No 510/2011** – CO_2 emissions from light commercial vehicles (vans) and amending Regulation (EU) **No 253/2014** to define the modalities for reaching the 2020 target to reduce CO_2 emissions from new light commercial vehicles*

Climate Action

The EU regulations and policy instruments: light duty vehicles

***Cars** - fleet wide average targets:*

- **130g** CO_2/km in 2015 (phased in from 2012)
- **95g** CO_2/km from 2021

***Vans** - fleet wide average targets:*

- **175g** CO_2/km in 2017 (phased in from 2014)
- **147g** CO_2/km in 2020

Targets based on NEDC test measurements

Climate Action

The EU regulations and policy instruments: light duty vehicles – Main elements

- Utility based approach using mass
- Manufacturer specific targets
- Derogations for small volume and niche manufacturers
- Incentives for CO_2 reducing innovations not measured in the test procedure
- Incentives to stimulate marketing of ultra-low emission vehicles
- Allows manufacturer pools
- Penalties for non-compliance
- Annual monitoring of new vehicle test emissions

Climate Action

Evaluation of Regulation 443/2009

Some key findings:

- Car CO2 Regulation is likely to have accounted for **65-85% of the reductions in tailpipe emissions** achieved following the introduction of the Regulation; an estimated rate of annual improvement in CO2 of 3.4 to 4.8 gCO2/km compared to 1.1 to 1.9 gCO2/km before.
- Car CO2 Regulation has generated **net economic benefits** for society with overall cost savings of €6.4 billion
- **Costs to manufacturers** have been much lower than originally anticipated, because emissions abatement technologies have, in general, proved to be less costly than expected.

Climate Action

Evaluation of Regulation 443/2009

Main weaknesses:

- Test procedure – *doesn't accurately represent real driving, increasing discrepancy*
- Well to tank emissions – *production of energy used*
- Embedded emissions – *emissions from vehicle and component production*

Potential weaknesses:

- Super credits
- Phasing-in of target

http://ec.europa.eu/clima/policies/transport/vehicles/docs/evaluation_ldv_co2_regs_en.pdf

Climate Action

The EU regulations and policy instruments: what next?

- Introduction of the Worldwide harmonized Light vehicle Test Procedure (WLTP)
- LDV regulations post 2020
- Monitoring rules for HDVs

Climate Action

LDV regulations post 2020

- Current Regulations request review and new proposals
- Regulations contain specific requests for analysis
  (e.g. utility parameter, WTT and embedded emissions, ambition level)
- Extensive analysis being carried out
- Extensive technical interaction with stakeholders
- Some analysis already published
  (e.g. downweighting, mileage, competitiveness, regulatory metric
  http://ec.europa.eu/clima/policies/transport/vehicles/studies_en.htm)
- Energy Union Communication stated 2016/17 as target for new proposals
- Large meetings with stakeholders (23/05/2014, 09/12/2014)

Climate Action

LDV regulations post 2020

Further analytical work:

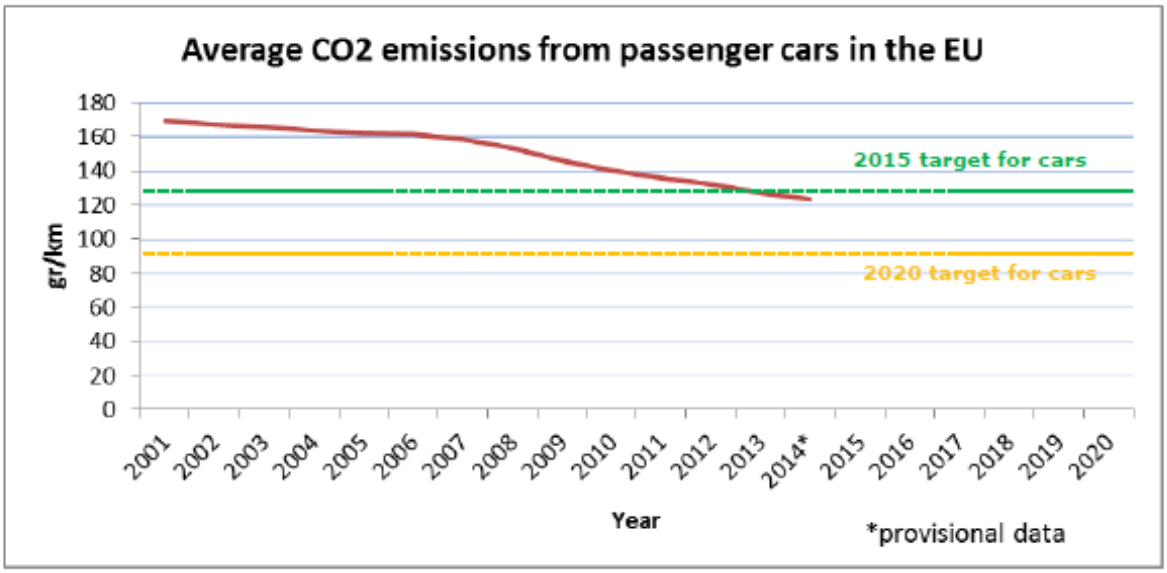
- Technologies and costs
- Modalities for future Regulations
- Causes of test : real-world CO_2 divergence
- Second hand market
- Leasing
- Speed limiters for light commercial vehicles
- Scrappage scheme
- Pricing of optional extras

Climate Action

The EU regulations and policy instruments: implementation

1. *Monitoring*
2. *Pooling*
3. *Eco-innovations*
4. *Supercredits*
5. *Derogations for small volume and niche manufacturers*

1. Monitoring EU new car CO_2 emissions

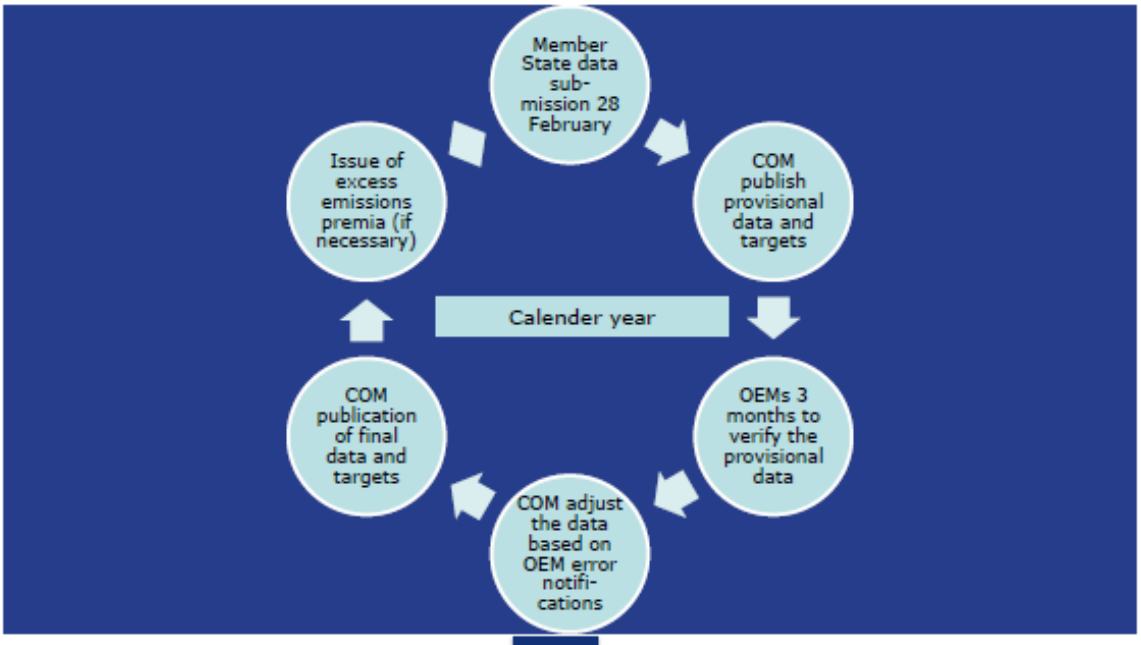


Progress in reducing CO_2 emissions

	CO2 emissions target (average-g/km)										(prelim.)
Cat/year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
M1	163,4	162,4	161,3	158,7	153,6	145,7	140	135,7	132.2	126.7	123.4
N1									180.3	173.3	169.2

Climate Action

CO_2 monitoring process



Climate Action

2. Pooling 1/2

- *Manufacturers may form a pool to meet the mandatory emission targets jointly.*
- *When forming a pool, manufacturers must respect the rules of competition law; the information they exchange should be limited to average specific emissions of CO_2, their specific emissions targets, and their total number of vehicles registered.*

Climate Action

4. Pooling 2/2

- Joint target for a pool of OEMs based on average emissions/average mass of the pool members
- 14 pools notified for cars (53 OEMs)
- 8 pools notified for Vans (35 OEMs)

Climate Action

3. Eco-innovations - cars

- Manufacturers can reduce their average specific emissions by maximum 7gCO2/km by fitting their vehicles with eco-innovations
- *Commission Implementing Regulation (EU) No 725/2011 establishing a procedure for the approval and certification of innovative technologies for reducing CO 2 emissions from passenger cars*
- *Technical Guidelines*

Climate Action

4. Supercredits [1/2]

Super-credits *for vehicles emitting less than 50 g CO_2/km- each*

For instance, for cars, such vehicle shall count as:

- **3,5 cars in 2012 and 2013**
- **2,5 cars in 2014;**
- **1,5 cars in 2015;**
- **1 car from 2016.**

Climate Action

4. Supercredits [2/2]

Super-credits for 95 g CO_2/km target:

— 2 passenger cars in 2020,

— 1,67 passenger cars in 2021,

— 1,33 passenger cars in 2022,

— 1 passenger car from 2023,

subject to a cap of 7,5 g CO_2/km over that period for each manufacturer

Climate Action

5. Derogations 1/2

De minimis

- **The very smallest manufacturers registering less than 1000 vehicles per year are exempt from meeting the targets.**

Small Volume manufacturers

- **Up to 10 000 registrations in the EU/year**

Niche manufacturers

- **10 000-300 000 vehicles/year**
- **25% reduction compared to 2007 emissions**
- **45% from 2020**

Climate Action

5. Derogations 2/2
Commission Regulation (EU) No 63/2011

Small-volume manufacturers (below 10 000 vehicles/year)

- **New targets that must be consistent with the reduction potential and should take into account the market characteristics of the vehicle type produced**

Climate Action

Derogation application (Small Volume Manufacturer)

Application documents requirement for
http://ec.europa.eu/clima/policies/transport/vehicles

1. *Standard format (Excel sheet)*
2. *Declaration on ownership*
3. Official certified accounts (for>100 registrations)
4. *A cover letter (not obligatory)*

Climate Action

Application documents-standard format

Implementing legislation for 2015

Adjustment of M_0

- 07/01/2015 - Commission Delegated Regulation (EU) 2015/6 amending Annex I to Regulation (EC) No 443/2009 in order to take into account the evolution of the mass of new passenger cars registered in 2011, 2012 and 2013

Derogations

- 26/01/2011 - Commission Regulation (EU) 63/2011 laying down detailed provisions for the application for a derogation from the specific CO2 emission targets pursuant to Article 11 of Regulation (EC) 443/2009 of the European Parliament and of the Council
- Further information on derogations from specific CO2 emission targets, including FAQs on the application process
- Derogation application form for small-volume manufacturers – Public section (77 kB)
- Derogation application form for small-volume manufacturers – Confidential section (52 kB)
- Derogation application form for niche manufacturers – Public section (45 kB)
- Derogation application form for niche manufacturers – Confidential section (23 kB)
- Privacy statement for applicants (144 kB)
- Applications for derogations in 2011-2015

Climate Action

Application documents-standard format

1. **Name, address and contact**
2. **Eligibility criteria**

2.1. Is the applicant part of a group of connected manufacturers?

3. **Requested duration of the derogation**

Number of calendar years (maximum 5)

4. **Proposed specific emissions target/annual targets**

Climate Action

5. Company specific information

5.1. Average specific emissions of CO 2 in 2007
5.2. Number of employees
5.3. Size of the production
5.4. Sales volumes for five years preceding the date of application
5.5. Yearly turnover for five years preceding the date of application

Standard format of the application

- for five calendar years preceding the date of application, the sales volumes, yearly turnover, net profit, and R & D spending [..]

  When an application is submitted by a manufacturer responsible for more than 100 cars per year, the information referred to in point (d) shall be accompanied by the official certified accounts, or shall be certified by an independent auditor.

5.6. Characteristics of the market

Information on planned products in the confidential section of this application.

(a) the vehicle characteristics;

(b) the names and price ranges of directly competing vehicles in the year preceding the date of application

(c) the price list of vehicles that are to be covered by the derogation

Climate Action

CONFIDENTIAL SECTION OF THE APPLICATION

5.8. Net profit for five years preceding the date of application Year

5.9. R & D spending over five years preceding the date of application Year

5.10. Net financial transfers to the parent company in case of connected undertakings during five years preceding the date of application

Climate Action

CONFIDENTIAL SECTION OF THE APPLICATION

6. **Details of the passenger cars to be launched on the Union market for which the applicant will be responsible**

6.1. Characteristics of the market

6.1.1. Vehicle characteristics;

6.1.2. Names and price ranges of directly competing vehicles in the year preceding the date of application;

6.1.3. Expected price list of vehicles to be covered by the derogation.

Climate Action

CONFIDENTIAL SECTION OF THE APPLICATION

7. **Applicant's technological potential**

7.1. List of CO 2 reducing technologies deployed in the applicant's fleet in 2007;

7.2. Where the list referred to in point 7.1 is not available, the list for the following year closest to 2007;

7.3. In case of applicants planning to enter the Union market, the list referred to in point 7.1 should be provided for the first year of the derogation.

Climate Action

CONFIDENTIAL SECTION OF THE APPLICATION

8. **Applicant's reduction programme**

8.1. Timetable for deployment of CO 2 reducing technologies in the fleet;

8.2. Expected fleet average during the period of derogation:

8.2.1. Union registrations per year

8.2.2. Expected average mass of vehicles

8.2.3. Expected average specific CO 2 emissions of vehicles to be launched on the Union market

Climate Action

CONFIDENTIAL SECTION OF THE APPLICATION

8.3. CO 2 reducing technologies to be deployed in the applicant's fleet under the reduction programme;

8.4. The additional costs per vehicle version of the technologies to be deployed as part of the programme;

8.5. In the case of yearly targets, yearly improvement of specific CO 2 emissions of the vehicle versions for which CO 2 reducing technologies are introduced.

Climate Action

Review process for small volume derogations

- *The current scheme is valid up to 2020/2021 including*
- *A change of test cycle (NEDC/ WLTP)*
- *Further reductions are expected*

Climate Action

More information on:

http://ec.europa.eu/clima/policies/transport/vehicles

Climate Action

附件二

歐盟委員會就歐盟準備實施 WLTP 管制法規簡介

World-harmonised Light-duty vehicle Test Protocols (WLTP): Status

DG for Internal Market, Industry, Entrepreneurship and SMEs (GROW)
Unit Automotive and Mobility Industries

World-harmonised Light-duty vehicle Test Protocols (WLTP)

1. What?
2. Why?
3. Status ?
4. Main achievements
5. Next steps:
   - in the EU
   - on global UNECE level

WLTP: What ?

- Whole set of emission certification test procedures and requirements in a UN Global Technical Regulation
- 3 phases: 2008 – 2014 (I), 2015 – 2018 (II), 2019 – 2022 (III) agreed by GRPE
- UNECE WP.29 provided formal mandate for the first phase that is later prolonged until 2016 to WLTP IWG

=> Phase I: development of a new, more realistic test cycle (WLTC) including test procedures focusing on CO_2 emissions

WLTP: Why ?

- Global harmonisation of tests and requirements => Industry interest

  Existing NEDC, perceived as outdated and unrealistic. The WLTP modelled on real driving should provide:

- Better information on and comparison of fuel consumption => Consumer interest
- Incentives for developing the most efficient technologies to improve fuel consumption also in real driving (and not the most efficient technologies on an artificial test cycle) => Consumer interest

WLTP: Status ?

- Adopted as UN Global Technical Regulation No 15 by UNECE WP.29 in March 2014: "Phase Ia WLTP" => complete certification tailpipe emission test cycle (WLTC)
- Now: further "nice-to-have" elements being added: road load determination, electrified vehicles, reduce the number of tests by calculation,… being developed by WLTP Informal Working Group : "Phase Ib WLTP".
- Mandate WLTP IWG on Phase Ib, refer to UN WP29 website: ECE-TRANS-WP29-2014-AC3-39e , expires in 2016

WLTP: Status ?

- In parallel: WLTC being transposed into EU law with administrative and some technical elements being added

WLTP: Main achievements

Tailpipe exhaust emission test cycle

(1) Determine road loads

↓

(2) Test vehicle in the lab on chassis dyno

↓ ↓

(2a) Driving pattern (2b) Test procedures

WLTP: Main achievements

Road load testing:

- Develop equivalent methods: coast down or torque meter or wind tunnel & flat belt
- Close loopholes by better defining certain issues, e.g. tyre pressure, brake conditions
- Road load families => reduced # of tests
- Alternative routes: default road load values from table and calculation

WLTP: Main achievements

Driving pattern:

- Collection of driving data from EU, US, Japan and India => WLTP database
- Low, Medium, High, Ex-High speeds parts
- Identification of relevant dynamic parameters for CO2 emissions (RPA, v*a,…)
- Construct WLTC drive trace by combining short trips for a "best fit" of these parameters to WLTP database

WLTP: Main achievements

Test procedures:

- Interpolation vehicle families => limitation of tests by interpolations for effects of options
- Various corrections, e.g. battery charging
- Better setting of chassis dyno parameters
- More realistic test masses (consideration of options, pay loads)

Next steps

In the EU:

- Preparation of legal text ongoing
- Various additional technical elements, such as corrections for European ambient temperatures and violations of driving trace are being added
- Administrative elements, e.g. conformity of production statistics & rules
- Vote in TCMV feasible by the end of 2015 (08 Dec 15)
- Application at type approval intended as from 2017/18, political decision on date of application still open

Next steps

In the EU:

- CO_2 monitoring Regulations (EC) 443/2009 (cars) and 510/2011 (vans), NEDC <=> WLTC
  - CO_2 emission targets to be adapted
  - Until 2020/21: WLTC results to be "translated back" into equivalent NEDC values
  - Complex mathematical model
  - 2020/21+: manufacturer-specific targets on WLTC
- CO_2 labelling: WLTP offers much more comprehensive information than NEDC

Next steps

On global UN level:

- Phase II (until 2018)
  - mandate by WP.29 in November 2015
  - some more "left-overs" for WLTC
  - "feed-back" approach for re-assessing/challenging road load values determined by manufacturer at type approval (?)
  - other elements of emission certification: evaporative emissions, durability,…
- Phase III (2019 – 2022): details still to be defined

Thank you for your attention!

Questions ?

GROW-C4@ec.europa.eu

附件三

歐盟委員會就準備實施 RDE 管制法規簡介

Latest EU regulations and future path for emission control

DG for Internal Market, Industry, Entrepreneurship and SMEs (GROW)
Unit Automotive and Mobility Industries

Table of content

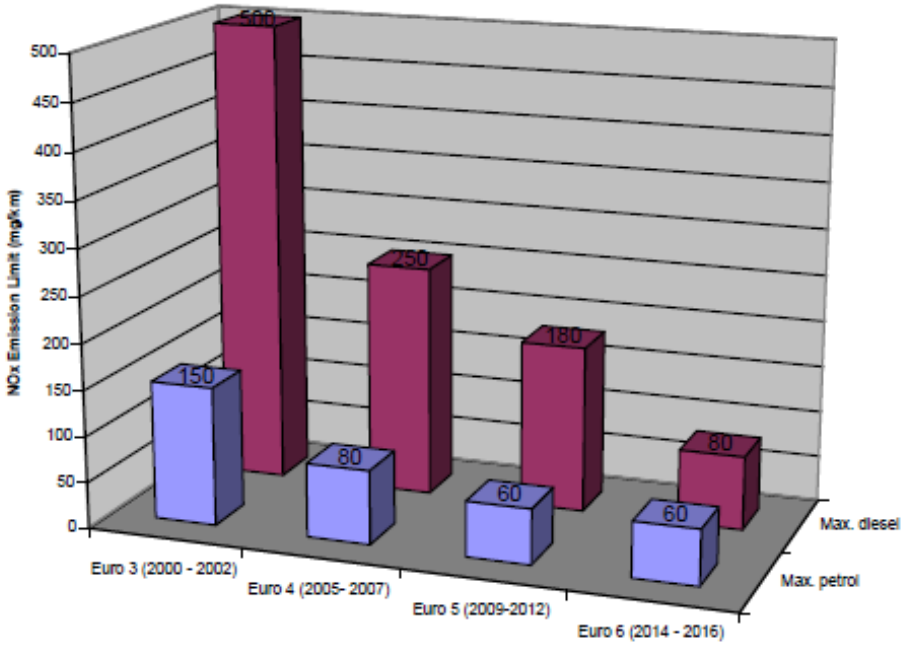
The emissions' strategy in Europe: a success story

In the last 20 years the European Union has determined a gradual reduction of emissions from road transport.

These are an important factor to improve air quality in urban areas: air quality limit values are often exceeded in densely populated areas close to major roads.

The Euro 6 Regulation has been the latest step in this process.

Evolution of NOx emission limits



The emissions' strategy in Europe:

The EU current strategy has two principles:

1) Implementation of the Euro 6 emission regulation (1st step as from 2014/2015, 2nd step as from 2017/2018)

2) The introduction of new testing procedures for assessing real life emissions.

This strategy will provide for the most stringent control of pollutants in the world.

Overview of the Euro 6 emission legislation in the EU

Legislative framework and the timeline of the Euro 6 in the European Union

- **Regulation 715/2007 and implementing Regulation 692/2008: Euro 5 and Euro 6**
- **Euro 6 entry into force: 1 September 2014 for new types and for 1 September 2015 for all types**
- **Euro 6c entry into force: 1 September 2017 for new types and for 1 September 2018 for all types**

Main features of Euro 6

- *Approach towards harmonization of diesel and petrol emission requirements for most critical pollutants – NOx and particulate matter (PM/PN)*
- *Introduction of a particulate number (PN) limit also for positive ignition direct injection vehicles*
- *No link to a specific test cycle but an emphasis on the emissions under 'normal condition of use'*

Main features of Euro 6

International harmonization:

- *Implementing regulation transposed into and referenced from UNECE Regulation No. 83*

Euro 6 contributes to the reduction of the emissions for the pollutants from the positive ignition vehicles

Euro 6 – emissions from light-duty vehicles

- *Objectives of the Euro 6 standard:*

To achieve a robust emission performance of light-duty vehicles focused on:

- Lower regulated emission limits
- Low emissions in normal condition of use over the entire vehicle useful life
- Efficient OBD system

Euro 6 – emissions from light-duty vehicles

Regulatory emission limits for positive ignition vehicles cat M.

pollutant	emission limit
CO	1000 mg/km
NOx	60 mg/km
THC	100 mg/km
NMHC	68 mg/km
PM	4,5 mg/km
PN	6*10^11 #/km

PM and PN limits apply only to gasoline direct injection engines

Euro 6 – emissions from light-duty vehicles

OBD requirements for the positive ignition vehicles have been progressively strengthened especially for NOx and PM:

pollutant	OTL limit - Euro 5 (as from 2009/2011)	OTL limit - Euro 6 (as from 2014/2015)	OTL limit - Euro 6c (as from 2017/2018)
CO	1900 mg/km	1900 mg/km	1900 mg/km
NOx	300 mg/km	150 mg/km	90 mg/km
NMHC	250 mg/km	170 mg/km	170 mg/km
PM	50 mg/km	25 mg/km	12 mg/km

Next challenges

- *"Traditional" test cycles do not deliver real driving emissions of criteria pollutants (CO, HC, NOx, PM/PN)*
  - Limited duration, no "full" coverage of real driving conditions
  - "Idealised" test conditions for the sake of high repeatability & reproducibility, least challenging for emission control
  - Fully pre-defined test conditions, cycle beating, i.e. emission control less effective at real driving than on test cycle

Real driving emission project

- *Launched by the Commission in 2011 in order to develop a testing procedure which will enable to measure emissions of vehicles in real life conditions*
- *Procedure with an application of PEMS and "not-to-exceed" limits has been selected as most robust solution*
- *Main principles:*
  - "full" coverage of real driving conditions
  - Test conditions not predefined, limited repeatability & reproducibility
  - Certain boundary conditions, trip requirements (e.g. engine loads)
  - Statistical evaluation of test results
  - Compliance factors (>1) reflecting lower measurement accuracy & statistical uncertainties of results with respect to real driving emissions

Real driving emission project

- *Preliminarily developed with a focus on diesel vehicles however it will be applied to all vehicle types including petrol vehicles*
- *Main concern from the perspective of the positive ignition vehicles:*
  - **direct injection technology (high PN emissions)**
  - **lean burn technology (high NOx emissions)**

RDE - Real driving emission project

Timeline (proposal)

- 2016 – beginning of the monitoring period (no not-to-exceed limits)
- As from 2017 (new types) and 2018 (new vehicles) RDE procedure will apply PN and gaseous emissions from gasoline direct injection vehicles. Regulatory limits (not-to-exceed limits) - Euro 6 limits multiplied by a conformity factor (>1)
- As from 2019 (new types) and 2020 (new vehicles) RDE procedure will apply PN and gaseous emissions from gasoline direct injection vehicle. Lower conformity factor.

Light-duty vehicles emission legislation – future developments

- Stricter emission limits do not seem to solve the problem

  => No 'Euro 7' envisaged in a short term

- Two principal reasons:
  - weaker fleet renewal
  - High off-cycle emissions

Light-duty vehicles emission legislation – future developments

- Further focus on the test procedures to make them more robust and better reflecting real life conditions of use
- When PEMS (portable emission measurement system) based procedure has been well established, further strengthening of the emission requirements will most likely take place within the RDE framework

Thank you for your attention!

附件四

TUV Rheinland 就我方赴訪所提問事項之回覆說明

Discussion issues:

testing scheme and related issues

- ✓ Does the EU consider to release information related to electricity consumption and travel range for EVs on its official website? How could we obtain the above information?
- ✓ Sorry, I do not have any information about this item.
- ✓ Is there any schedule being set out to implement CO2 emissions targets for Heavy-Duty Vehicles? Are there any flexibility measures consider to be adopted as light-duty vehicles (such as: phase in period; low carbon vehicle credits; eco-innovation credits etc.)
- ✓ So far I have no information that there is a plan to introduce CO2 emission targets to heavy duty vehicles.
- ✓ Can you list the main differences between ECE Regulation 101 NEDC test and GTR 15 WLTP test? Except driving cycle, how about the road load simulation; gear shifting point for manual transmission; testing equipment; etc.?
- ✓ The basic test equipment is the same as for the NEDC test. But it is necessary to verify if the new tolerances can be kept, like the temparartur of 23+/-5 °C during the complete test, the road load setting within a tolerance of +/- 3%, … The gear shifting points have to be calculated by the official calculation tool.
- ✓ As to the prescribed gears and shifting points for manual shift vehicles, besides the calculation of gear selection in accordance with ECE/TRANS/180/Add.15 ANNEX 2 of WLTP, is that possible for manufacturers to declare their own gear shifting points?
- ✓ So far no.
- ✓ Do they have to provide the related description documents?
- ✓ Yes, according to the requirements in the Regulation.
- ✓ The road load simulation data provided by manufacturer when conducting the NEDC test, this data is still valid for WLTP test or not?
- ✓ The procedure for road load determination on the test track is more detailed for WLTP, so it has to be checked in detail if the road load determined for NEDC is still within the tolerances for WLTC. Please consider also that for WLTC the road load is necessary until 130 km/hr.
- ✓ Is there any specific requirement for road load simulation data when we conduct the WLTP test? Any guideline for accredited testing agency to accept the data provided by vehicle manufacturer?
- ✓ The determination of the road load data is a part of the Emission test as it has a strong impact on the result. It should not be determined by the manufacturer alone without a witnessing of the technical service, same as the emission test itself.
- ✓ Where can we get the complete information (testing procedure; standard limits, etc.) about the RDE(real driving emission)?
- ✓ On the website of the European Union.
- ✓ Is there any specific requirement for Portable Emission Measurement System when we conduct the real driving emission test? Shall this testing equipment be accredited by the authority?
- ✓ The Equipment for RDE testing should be covered by the accreditation same as the emission roller bench in the emission test laboratory.
- ✓ Please describe the management system and implementation process for N2O and NO2 emissions in the WLTP tests.
- ✓ The NO2 emissions can be measured with the common NOx-analyzers (CLD). In

this case two CLDs are necessary, one for NO and one for NO2 measurement. For the N2O measurement an additional analyzer with a different measurement principle is necessary (cost about 40.000 Euro). So far it is not sure if the N2O measurement will be implemented in the European Regulation.

- ✓ Are there any management system modifications for Pure and Hybrid Electric Vehicles after the adoption of WLTP tests comparing to R101?
- ✓ So far we did not check this item.
- ✓ Are there any testing cases for WLTP tests and what is the current implementation status for Pure and Hybrid Electric Vehicles in your lab?
- ✓ We are running regular WLTP tests in our lab for R&D. For the testing of the electric and hybrid-electric vehicles we are now missing only one component, the electric energy consumption measurement equipment. It should be present in a few weeks.

附件五

TÜV SÜD 公司簡介

Choose certainty.
Add value.

TÜV SÜD Group
Business Segment Mobility

Testing, inspection, certification and training solutions for business success

Choose certainty. Add value.

The world's number one brand of choice for premium quality, safety and sustainability solutions that add tangible value to our clients.

TÜV SÜD Overview – Facts & figures

TÜV SÜD - Segments and Results 2013

MOBILITY

- Employees: 5,494
- Sales Revenue: € 647.4 million
  - Auto Service: 91.8 %
  - (Life Service: 8.2 %)

INDUSTRY

- Employees: 7,271
- Sales Revenue: € 789.8 million
  - Industry Service: 64.8 %
  - Real Estate: 27.9 %
  - Rail: 7.3 %

CERTIFICATION

- Employees: 5,615
- Sales Revenue: € 501.4 million
  - Product Service: 64.2 %
  - Management Service: 24.3 %
  - Academy: 11.5 %

Increasing international performance

A partner for the whole vehicle lifetime

Organisation Technical Service/Type Approval Test Department

Auto Service GmbH Type Approval Test Department — *Puls*
Head of Technical Service

BU Automotive — *Auto Service GmbH*

- Environment & Emissions EVE
- Certification & Regulatory Compliance, Safety CRCS
  - Components & Systems
  - Vehicles
  - Safety
- International Project Management ISO

- TÜV SÜD Product Service
- TÜV SÜD Industrie Service
- TÜV SÜD Czech s.r.o.
- TÜV SÜD Greater China (GCN)
- TÜV SÜD TGK Ltd.
- TÜV SÜD Japan Ltd.
- TÜV SÜD Italia s.r.l.
- TÜV SÜD PSB Ltd. ASEAN

Operational Authority

BU PTI — *Auto Service GmbH*

- BWN
- BWS
- BYN
- BYS
- Region Nord

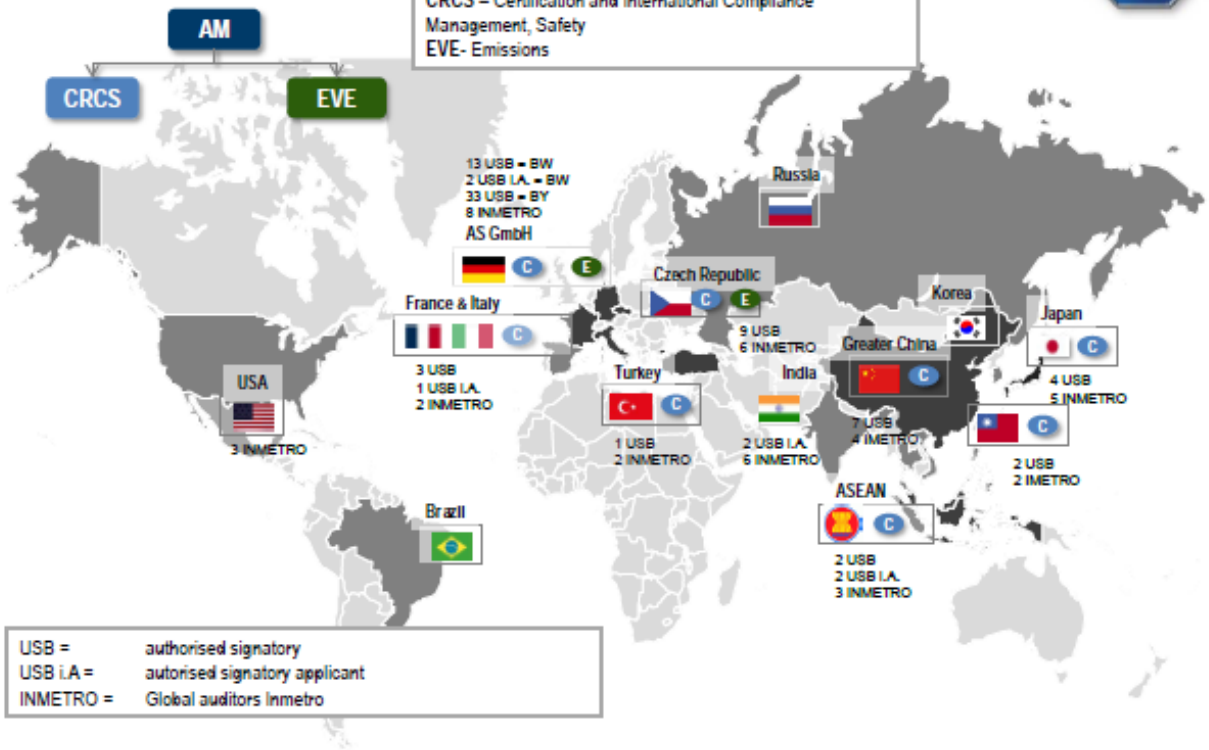
- Hanse GmbH
- Auto Partner GmbH

Central Units QMB
Straberger

TUV SUD Auto Service Technical Service

CRCS – Certification and International Compliance Management, Safety
EVE- Emissions

AM
CRCS
EVE



USB = authorised signatory
USB i.A = autorised signatory applicant
INMETRO = Global auditors Inmetro

Designation - TUV SUD Auto Service Technical Service

TÜV SÜD

附件六

TÜV SÜD 車輛實驗室檢測能量說明簡報

TÜV SÜD Auto Service

Mehr Sicherheit. Mehr Wert.

TÜV SÜD Emission Network 3 Labs – 1 Partner

- 3 Labs
- 6 Chassis Dynos
- 3 Engine Dynos
- 2 SHED
- 4 RDE /PEMS
- 1 Driving Robot

Heimsheim (Germany) · TÜV SÜD Auto Service · member of affiliate emission network TÜV SÜD · Prag (Czech) · Pfungstadt (Germany)

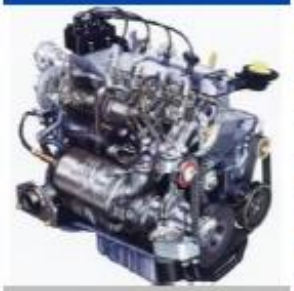
TÜV SÜD Emissions network - Overview

Product / Location				
	- **Motorcycle** emission tests - Euro3, GTR2	**Passenger cars** - Alternative fuels and powertrains - e.g. DPF, Hybrid, Electric vehicles, LPG, CNG, COP	- Emission tests **Commercial** - Engine certification DPF, CAT, CR-System - EU6, COP	- Emissions **Mobile Maschinery** - ISC, IUC
Heimsheim	1 Roller dynamometer	- (2 x) 2 axles-roller dynamometer - (1x) 1 axle-roller dynamometer - EU5/6 measurement system - -7°C cold chamber - 1 SHED chamber	- Micro Soot	
Roztoky	1 Roller dynamometer	- (1x) 4WD roller dynamometer - 4x 100kW, 200km/h - EU5/6 Emission measurement system (Sept. 14)	- 1 Engine dyno - Heavy Duty - 400kW, 2500Nm - 1 Engine dyno - Medium Duty - 330kW, 1400Nm - EU5/6 measurement system - Full-flow tunnel160m³/h	Fuel consumption: - SORT - CUNA
Pfungstadt	1 Roller dynamometer	- (1x) 4WD roller dynamometer - (1x) 1 axle-roller dynamometer - Driving robot - EU5/6 measurement system - Road simulator „InMotion" - Engine power - 1 SHED chamber	- 1 Engine dyno - Heavy Duty - 660kW, 4600Nm - EU5/6 measurement system	PEMS Portable Emission Measurement System

TÜV SÜD „Emissionsnetzwerk“ - Standorte

❶❷❸ Emission Labs

Products in the field of Emission

Homologation	Engineering Services	Control of Series	CO_2 Reduction
			
• EU & Japan • AT- Components • „Blauer Engel“ (Blue Angel) • Eco Credits • Individual approvals • Range determination • PEMS	• Dyno rental • Application tests • Roller/Engines/RDE • Endurance tests • E- Mobility • Engine bench Application • PEMS	• COP Tests • Check of components • SHED tests • Witness Testing • In Use Testing	• Release tests • Comparison tests • Utilization tests • Development tests • -7°C tests

Testing facilities in Heimsheim

AP1

- 4 WD Double-roller
- - 18°C / + 38°C
- PM / PN
- Motorcycles
- Range measurement

AP2

- 4 WD Single-roller
- Trias registration
- PM / PN
- Engine power
- Micro Soot

AP3

- 2 WD Single-roller
- PM / PN
- N_2O

SHED

- SHED measurement
- EU / Japan / USA

Testing facilities in Pfungstadt

Roller dynamometer

- Passenger cars, light duty vehicles, 2-wheels
- Exhaust emissions
- Simulation from real driving conditions, including curves, etc
- Powertrain, engine power measurements

Engine dyno

- Emissions of pollutants
- Engine power and fuel consumption
- DPF, SCR, catalysts
- CNG, LPG, Dual Fuel
- Fuel additives, oils

RDE / PEMS

- In-Use-Compliance (US EPA)
- In-Service-Conformity (e.g. Euro 6)
- VERT- Certification 2.000 engine hours
- CO_2 und fuel consumption

Driving Robot

- Emission tests
- Fuel consumption tests
- Endurance tests
- Correlation tests
- Hybrid and electric vehicles

Testing facilities in Roztoky / Prague

Roller dynamometer	Engine dyno 1	Engine dyno 2	Road Tests
			
• 4 WD Double roller • PM / PN • EU 6 from 9-2014 • Motorcycles • Range measurements	• Emission CO, CO2, THC, NH4, O2, NO, NO2, NOx, NH3 • 400 kW, 4000 rpm, 2500 Nm	• Opacimeter • 330 kW, 8000 rpm, 800 Nm	• SORT • CUNA

Services for Emission

- **Testing in our lab (EU / US / Japan/ ..)**
- **Homologation and Type approval**
- **RDE Testing on own routes or customer routes**
- **Witnessing of Tests (worldwide)**
- **Consulting and Training**
- **Technical Workshops (Theory and Practice)**
- **Technical Buy Off and Round Robin testing**
- **Interface to European Comission**

WLTP IMPLEMENTATION

New types mm/yyyy | All types mm/yyyy | mm / yyyy

CO2/Exhaust Emissions Type Approval

NEDC → WLTP for new types → WLTP for all types

- Workable EU legislation for type approval on WLTP (based on UNECE GTR 15)
- Development of new content / requirements for manufacturers, Technical Services and Type Approval Authorities (processes, documents such as Certificate of Conformity, Test Reports, Manufacturer's Information Document)
- Adjustment of cross-linked regulations such as Maximum Speed Testing, On-Board-Diagnostics Regulation, Evaporate Emissions Regulations, Low Temperature Testing, Durability Test, ...
- Identification of all references & links to other regulations and modifications
- Adjustment / Consistency of definitions in various regulations

On-going discussions with EU-COM, Technical Services and Type Approval Authorities

CO_2 fleet compliance

NEDC → NEDC (WLTP to NEDC correlated) → WLTP CO_2 target line

- Identification of adequate transformation methodology (comparable stringency)
- Finalization of correlation factors in due time
- Translation methodology and date

On-going discussions with EU-COM

- Treatment of Super-Credits, Eco-Innovations, CO2-Penalties
- Definition of Monitoring Rules and adjustment of national Monitoring Systems

Nowhere discussed

Labeling

NEDC → ?? → WLTP for all types

- Should both values on the label (NEDC, WLTP)? How to avoid consumer irritations?
- Which figure is linked to taxation?

Nowhere discussed

Taxation

NEDC → ?? → WLTP for all types

- Implementation of WLTP based taxation schemes in Member States

Nowhere discussed

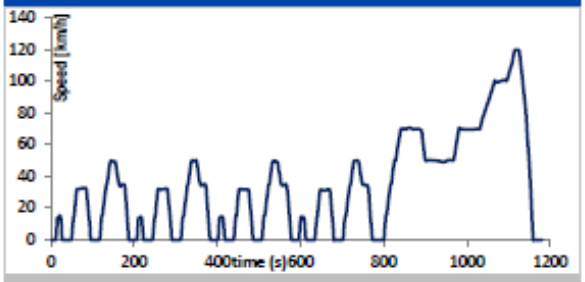
Certificate of Conformity (CoC)

NEDC → Transition period (1 – 3 phases tbd) → WLTP

Comparison WLTP / NEDC

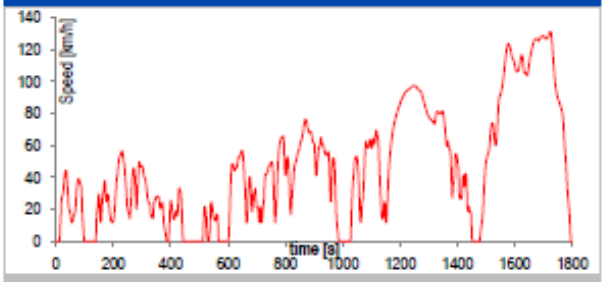
Process comparison

NEDC



- Only one cycle version for all vehicles
- 20 min non dynamic cycle (constant speed)
- Fixed gear shift points for all cars
- Car technical specifications not required
- Same gas and FC formulas

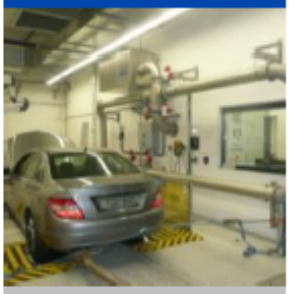
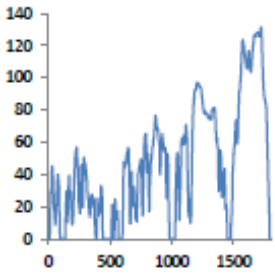
WLTP



- 3 Classes + Subclass + downscaling possible
- 30 min dynamic cycle based on real driving data
- Gear points is different for each car
- Many technical spec. required for Gear pts
- Same gas and FC formulas
- New Test Mass definition (for bench inertia simul.)

Process

Procedure

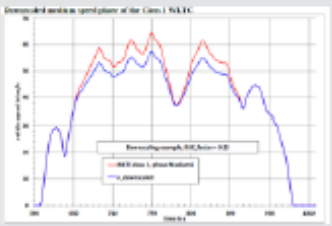
Dyno settings	Test conditions	Cycle	Formulas
			$f(x) = \sum_{k=0}^{n} x^k A_k$
• New specific Test Mass definition: **TM** = Curb Weight (incl. driver) + Optional Equipt. + 25 + 0,15* (LM - CW - OE - 25)	• Soak area: 23°C ±3°C • Soak time: 6 h ≤ t ≤ 36 h until oil, coolant ± 2°C target • Force cooling allowed • Test cell: 23°C ± 5°C 5,5 ≤ Ha ≤ 12,2 (g/kg)	• WLTC as preconditioning cycle • More WLTC possible if needed to stabilize • Speed tol.: ± 2 km/h <1s less than 10 times	• Fuel Consumption, Dilution Factor, Mass of each gas,... ➔ formulas same as EU (4,5,6)

Process

Vehicle class

Vehicle classification

- Based on the Power / Unladen mass ratio (W/kg)
- Each class has it's own cycle
- Maximum laden mass ≤ 3,500 kg
- Downscaling procedure for vehicle with insufficient power



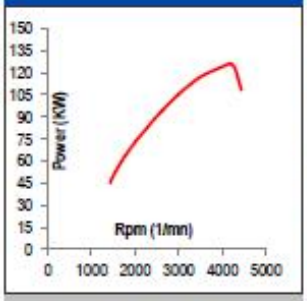
Class 1
- Low power vehicles
- PWr ≤ 22 W/kg
- 3 Phases: Low_1 + $Medium_1$ + Low_1

Class 2
- 22 W/kg < PWr ≤ 34 W/kg
- 4 Phases: Low_2 + $Medium_2$ + $High_2$ + $Extra\text{-}High_2$

Class 3
- 2 Subclasses: V_{max}>120 km/h and V_{max}<120 km/h
- PWr > 34 W/kg (Most EU cars)
- 4 Phases: Low_3 + $Medium_{3x}$ + $High_{3x}$ + $Extra\text{-}High_3$

Process

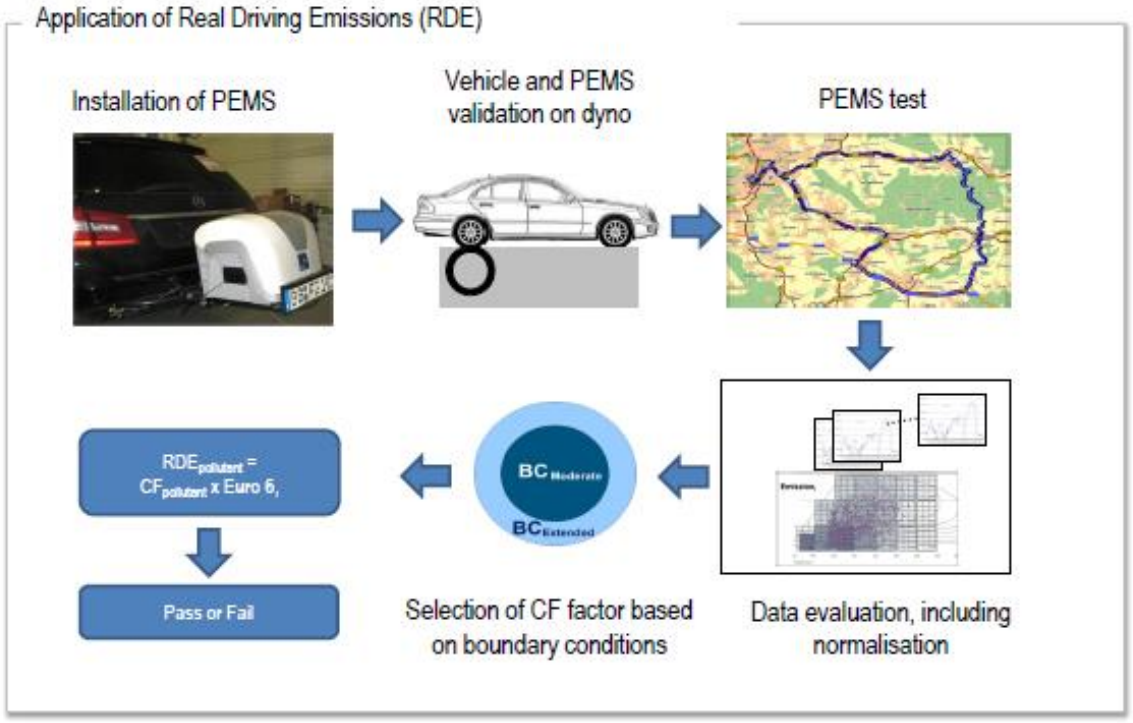
Gear point selection for manual cars

Required datas	Principle	More preparation / car
• **Prated** : max rated power • **s** : engine speed @ Prated • **Nidle** : idling speed • **TM** (mass) + **f0,f1,f2** (driving resistance) • **Ndvi** : engine speed to car speed ratio for each gear ➔ need: gear transmission ratios, dynamic radius of tire, final reduct° ratio • Full load power curve to engine speed • …	 • Gear points calculation based on balance betw. **power required** and **power available** by engine in each gear • Maximum possible gear must be used	 • Datas search (power curve for specific car, transmission ratios,…) • Gear pts calculation ➔ **Room for errors !**

TÜV®

Real Driving Emissions - Introduction

Application of Real Driving Emissions (RDE)



附件七

TÜV SÜD 就我方赴訪所提問事項之回覆說明

Auto Service

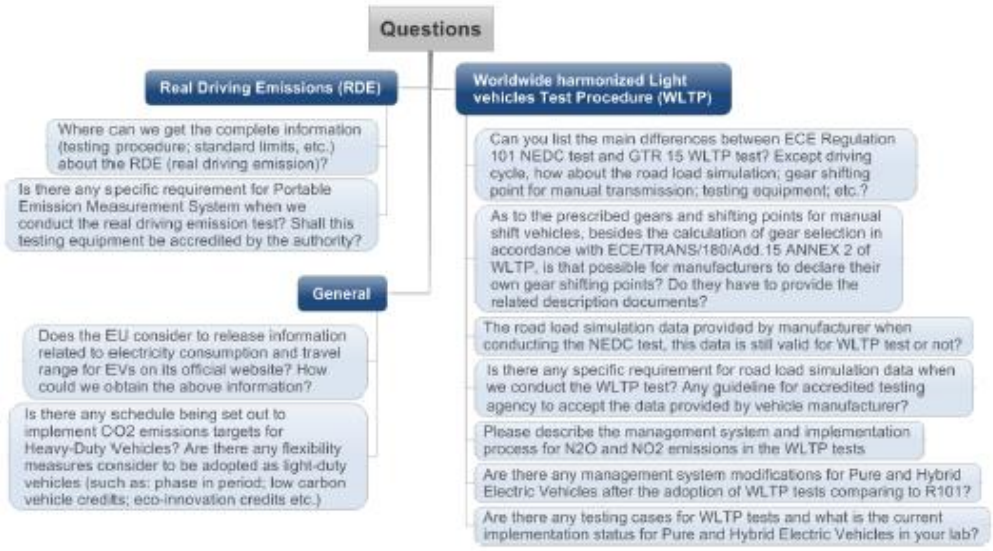
Industrial Technology Research Institute of Taiwan
European Chamber of Commerce Taiwan

Discussion issues on October 22nd in our TÜV SÜD Group headquarter in Munich: Fuel economy related regulation and vehicle testing procedures in Europe

Pascal Mast, 19.10.2015

Auto Service

Questions

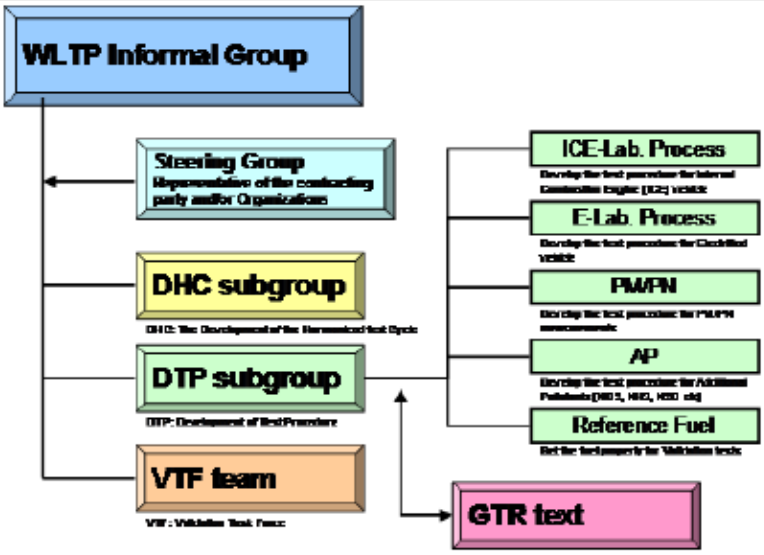


Pascal Mast, 19.10.2015

Auto Service

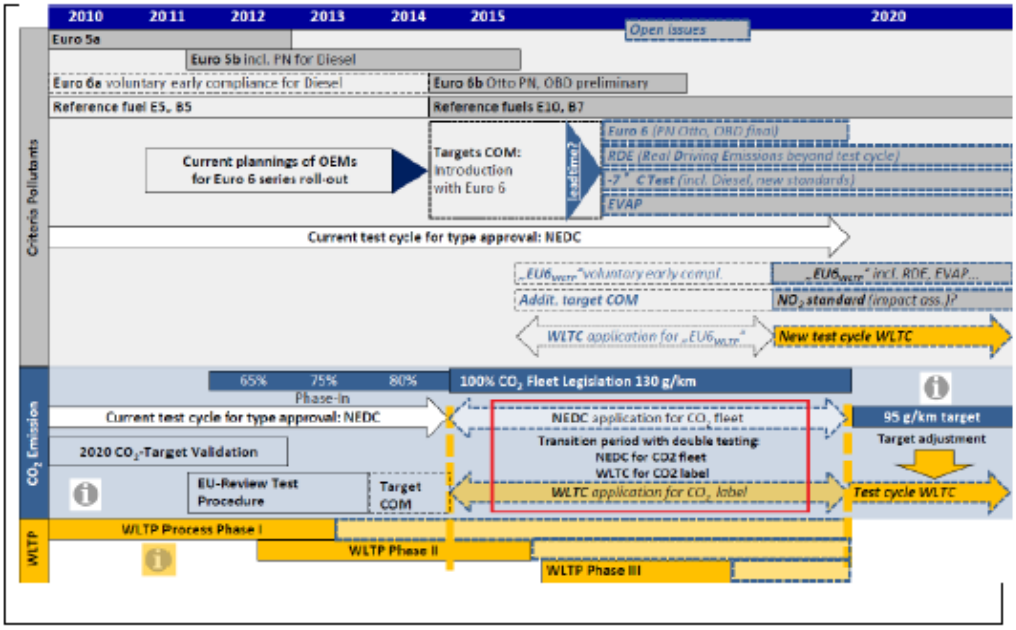
Answers TÜV SÜD Auto Service GmbH

General
Does the EU consider to release information related to electricity consumption and travel range for EVs on its official website? How could we obtain the above information?
Today all information about EV's are in draft version available on the official UNECE website. *Link: http://www.unece.org/trans/main/wp29/wp29regs81-100.html*
Is there any schedule being set out to implement CO_2 emissions targets for Heavy-Duty Vehicles? Are there any flexibility measures consider to be adopted as light-duty vehicles (such as: phase in period; low carbon vehicle credits; eco-innovation credits etc.)



Pascal Mast, 19.10.2015

Auto Service



Real Driving Emissions (RDE)

Where can we get the complete information (testing procedure; standard limits, etc.) about the RDE (real driving emission)?

You can get documents (information about boundary conditions, trip requirements etc.) from the CIRCABC (Communication and Information Resource Centre for Administrations, Businesses and Citizens, European Commission). CIRCABC is a collaborative platform, which offers an easy distribution and management of documents.

Approach:

https://circabc.europa.eu/ → European Commission → Internal Market, Industry, Entrepreneurship and SME's → Automotive Industry Committees and Working Groups (Public Access) → Library → Comitology Committees → TCMV - Technical Committee - Motor Vehicles

- **DRAFT Commission Regulation RDE for light passenger and commercial vehicles (Euro 6)**

  46th meeting on 24 March 2015 → Document: 07.1. Draft Commission Regulation amending Regulation (EC) No 692/2008 as regards emissions from light passenger and commercial vehicles (Euro 6)

  Link: https://circabc.europa.eu/d/a/workspace/SpacesStore/ab637cea-3a30-41e1-b5fd-b0281a32e2c4/RDE%20test%20procedure%20-%20act%20for%20TCMV%20-%20clean.pdf

Pascal Mast, 19.10.2015

Auto Service

Is there any specific requirement for Portable Emission Measurement System when we conduct the real driving emission test? Shall this testing equipment be accredited by the authority?
There are requirements for Portable Emission Measurement System specified in the DRAFT Commission Regulation RDE for light passenger and commercial vehicles (see above). For example: - ANNEX IIIA, 3. GENERAL REQUIREMENTS, 3.1 PEMS → components specified in points 3.1.1 to 3.1.5

Worldwide harmonized Light vehicles Test Procedure (WLTP)

Can you list the main differences between ECE Regulation 101 NEDC test and GTR 15 WLTP test? Except driving cycle, how about the road load simulation; gear shifting point for manual transmission; testing equipment; etc.?

Subject	NEDC	WLTP
Test temperature	20 °C – 30 °C	23 °C ± 3 °C
Test mass	Mass in running order + 25 kg (OEM data)	TM_H additionally TM_L (instead of TM_L also NEDC-inertia-class may be used)
Rechargable Energy Storage System (RESS)	Legislation does not require monitoring or correction	Monitored and the delta energy balance is taken into account for fuel consumption
Gear shift strategy (MT)	Fixed speed	Obtained from engine speed and power curve of the vehicle
Battery charging	Batteries are charged during soak time	Batteries must not be charged during soak time
Optional equipment	Not relevant	Weighted average needed for weight, rolling resistance, aerodynamics. To be provided by OEMs
Speed profile	NEDC	WLTC class 1 WLTC class 2 WLTC class 3a (v_{max} < 120 km/h) WLTC class 3b (v_{max} > 120 km/h) (there are also cycle modification possible if drivability problems occur → downscaling)
Preconditioning test	1 NEDC + 1 EUDC (gasoline) 3 EUDC (diesel)	WLTP (with WLTC 5.3)

Link: https://circabc.europa.eu/d/a/workspace/SpacesStore/d8d466be-3f64-4e99-9bde-ebac75e2e4a0/NEDC-WLTP_test%20procedure%20comparison_31-March-2015%20(3).xls

Pascal Mast, 19.10.2015

Auto Service

As to the prescribed gears and shifting points for manual shift vehicles, besides the calculation of gear selection in accordance with ECE/TRANS/180/Add.15 ANNEX 2 of WLTP, is that possible for manufacturers to declare their own gear shifting points? Do they have to provide the related description documents?
They also have to calculate the shifting points for manual shift vehicles according to the GTR 15
The road load simulation data provided by manufacturer when conducting the NEDC test, this data is still valid for WLTP test or not?
There is a calculation tool to determine the Road Load Coefficients for WLTP (best case Vehicle L and worst case Vehicle H) derived from NEDC Road Load coefficients - Input data needed (information of OEM needed): unladen mass min / max, maximum laden mass, difference in rolling resistance between best-case-tyre and worst-case-tyre, difference in c_d*A between best-case-vehicle L and worst-case vehicle H, F0 + F1 + F2 (NEDC) *Link: https://circabc.europa.eu/d/a/workspace/SpacesStore/d8d466be-3f64-4e99-9bde-ebac75e2e4a0/NEDC-WLTP_test%20procedure%20comparison_31-March-2015%20(3).xls (sheet WLTP road load calculator)*
Is there any specific requirement for road load simulation data when we conduct the WLTP test? Any guideline for accredited testing agency to accept the data provided by vehicle manufacturer?
Based on the current regulation ECE R83 the basic requirement is the same for NEDC and WLTP. *Link: http://www.unece.org/trans/main/wp29/wp29regs81-100.html*
Please describe the management system and implementation process for N_2O and NO_2 emissions in the WLTP tests
There was a list of pollutant components, for which measurement procedures had to be defined. It was not content of the project to add new or delete components. All components are already included in a legislation, somewhere and at any engine application. Sample method: - All mass based emission results must be done via CVS, Bag or continuous diluted, depending on component. - Only concentration based results, like NH3 can be measured from undiluted exhaust NO/NO_2: Bag versus continuous diluted sampling since NO/NO_2 ratio shift in Bags (discussions with Japan) - Calc. / CVS cont. - NDUV, QCL N_2O: Bag sampling - CVS Bag - GC–ECD, IR-Spectr, FTIR, NDIR

Pascal Mast, 19.10.2015