EGEA WG2 Meeting - Emissions
22nd of November 2016, Brussels

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EUROPEAN GARAGE EQUIPMENT ASSOCIATION

Initiatives on emissions at national level: round-up on state of affairs

Situation In France

LA TRANSITION ÉNERGÉTIQUE pour la CROISSANCE VERTE

Loi Transition Energétique

Energetic cross over Law

CO / CO2 / O2/ HC / λ /
Nox / **Particulates**
EOBD

Particulates
CO / **CO2** / **O2**/ **HC** /
Nox /EOBD

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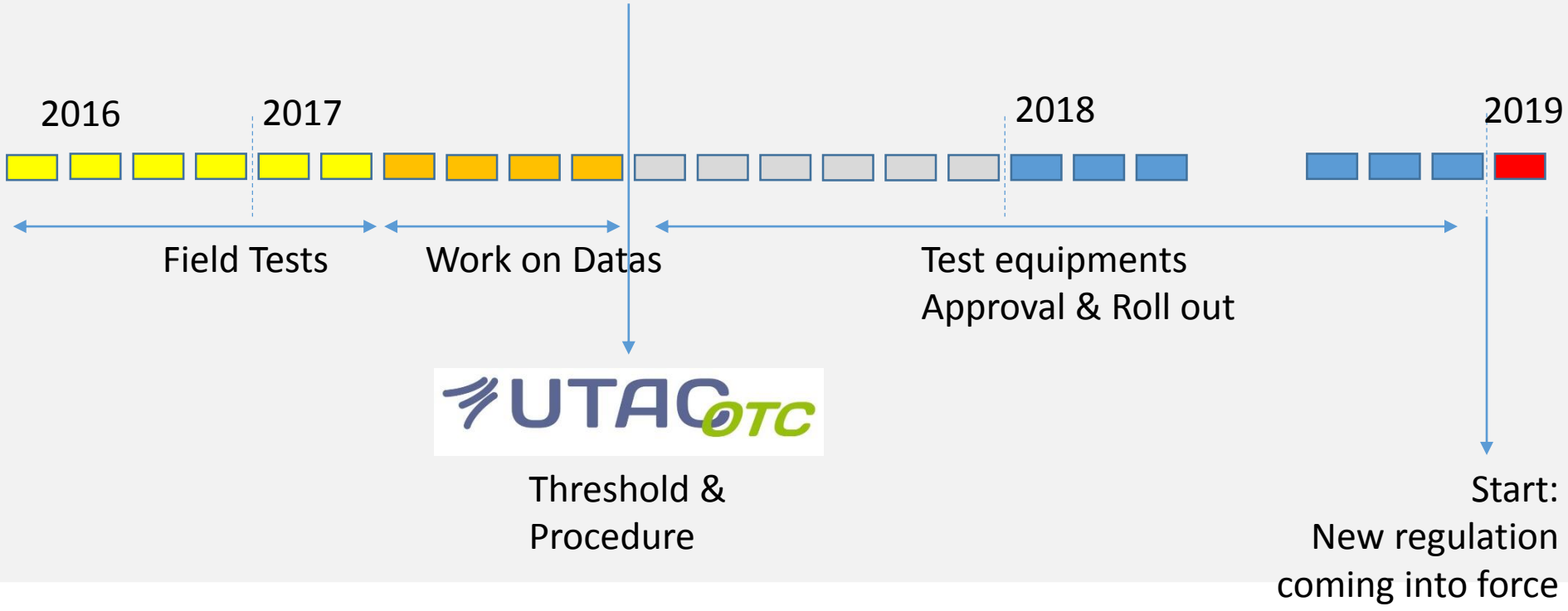
LA TRANSITION ÉNERGÉTIQUE pour la CROISSANCE VERTE



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LA TRANSITION ÉNERGÉTIQUE pour la CROISSANCE VERTE

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LA TRANSITION ÉNERGÉTIQUE pour la CROISSANCE VERTE

	Solution 1	Solution 2	Solution 3	Solution 4
	BOSCH AVL Sphere tech EUROPE	FOG AUTOMOTIVE	ACTIA MULLER	Capelec
	Infra red: CO / CO2 / O2/ HC / λ / Electrochemical: Nox EOBD **Procedure based on O2/CO2 ratio**	Infra red: CO/CO2 /O2/HC/λ Electrochimical: Nox EOBD **No procedure**	Infra red: CO/CO2/O2/HC /λ Electrochimical: Nox EOBD **Procedure:** ASM 5015/2525	Infra red: CO/CO2/O2/HC /λ Zirconium: Nox EOBD Ultra opacimeter: Particulates **Procedure: Idle/Fast Idle** **Procedure : free acceleration**
	Infra red: CO / CO2 / O2/ HC / λ / Electrochimical: Nox EOBD **Procedure based on O2/CO2 ratio**	☒	Infra red: CO/CO2/O2/HC /λ Electrochimical: Nox EOBD **Procedure:** ASM 5015/2525	Zirconium: Nox EOBD Ultra opacimeter: Particulates **Procedure: EGR function test** **Procedure : free acceleration**

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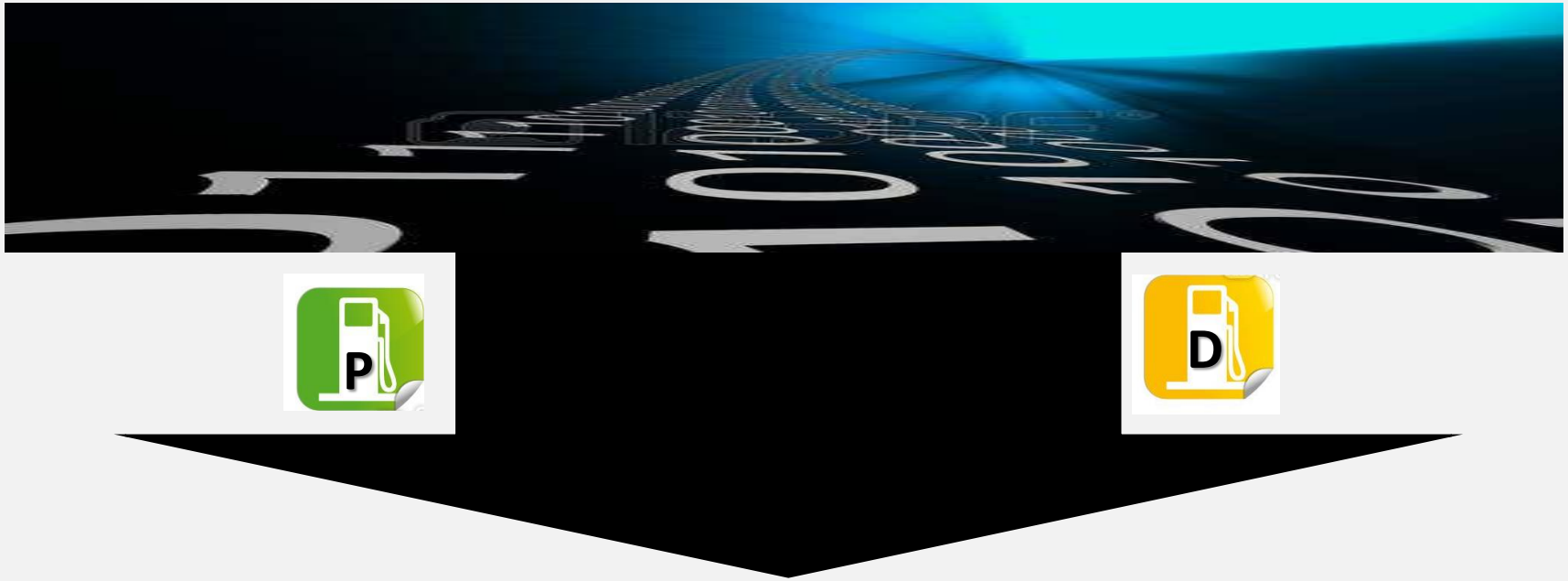
LA TRANSITION ÉNERGÉTIQUE pour la CROISSANCE VERTE

Solution 1	Solution 2	Solution 3	Solution 4
BOSCH AVL Spherotech EUROPE	FOG AUTOMOTIVE	ACTIA MULLER	Capelec



UTAC OTC

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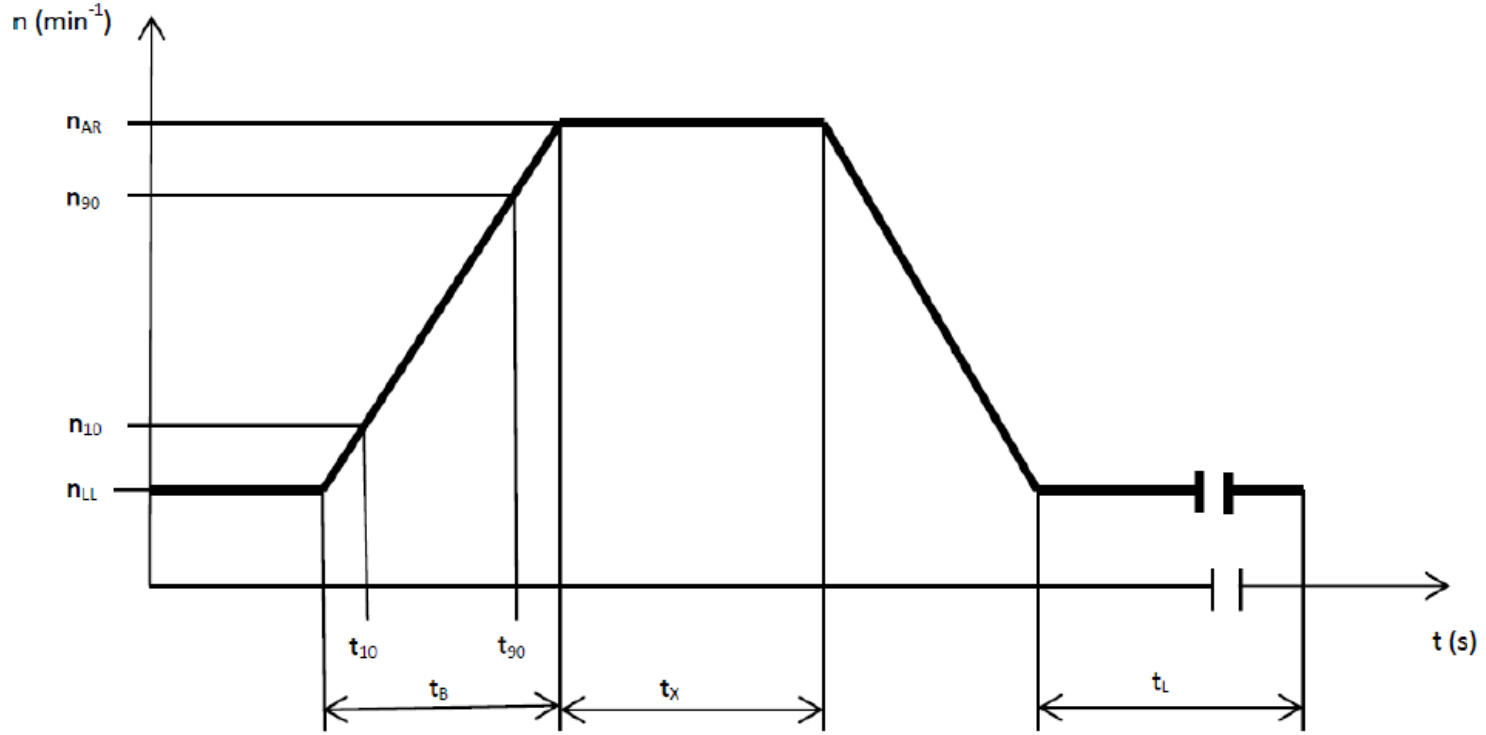
New NFR 10025: RPM trig and monitoring

- Oil temperature (LV only)
- RPM trigger + monitoring (1st acceleration is the reference)
- Rising time and rising slope
  - LV: $P_B \geq 2000$ tr/mn/s (min 2.5s)
  - HV: $P_B \geq 750$ tr/mn/s (min 4s)
- Execution for real
  - Smoke temperature monitoring (35 degrees min)
  - (3m heated probe for HV)

Free acceleration Profile



Légende

n_{LL} régime au ralenti	t_B temps d'accélération
n_{AR} régime de régulation	t_X temps de mesure
n_{10} n_{LL}+10%n_{LL}	t_L temps entre deux accélérations
n_{90} n_{AR}-10%n_{AR}	

Situation In France

- Presentation from ACTIA for emission testing at PTI which has been already tested under the leadership of French "Ministère de l’Ecologie"

Situation In Germany

Reinstatement of tailpipe testing as part of emission testing – updated news

Qualität – Effizienz – Sicherheit

Future of Emission Test in Germany

Harald Hahn

Head of working group emission and diagnostic

22. November 2016

Bruessels

Emission test Germany

What is planned at this moment?

- ***We have reached it!***

- Ministry of transport (BMVI) got the official order from the minister of tranport (Mr. Dobrindt) to re-install the tailpipe test on all vehicles as soon as possible
- A Directive is already existing as draft – end of October it was planned to circulate this draft
- Ministry of economic (BMWI) and environment (UBA) got this Directive already to make amendments
- Some things are under discussion, especially the situation with reference values

Emission test Germany

What is planned at this moment??

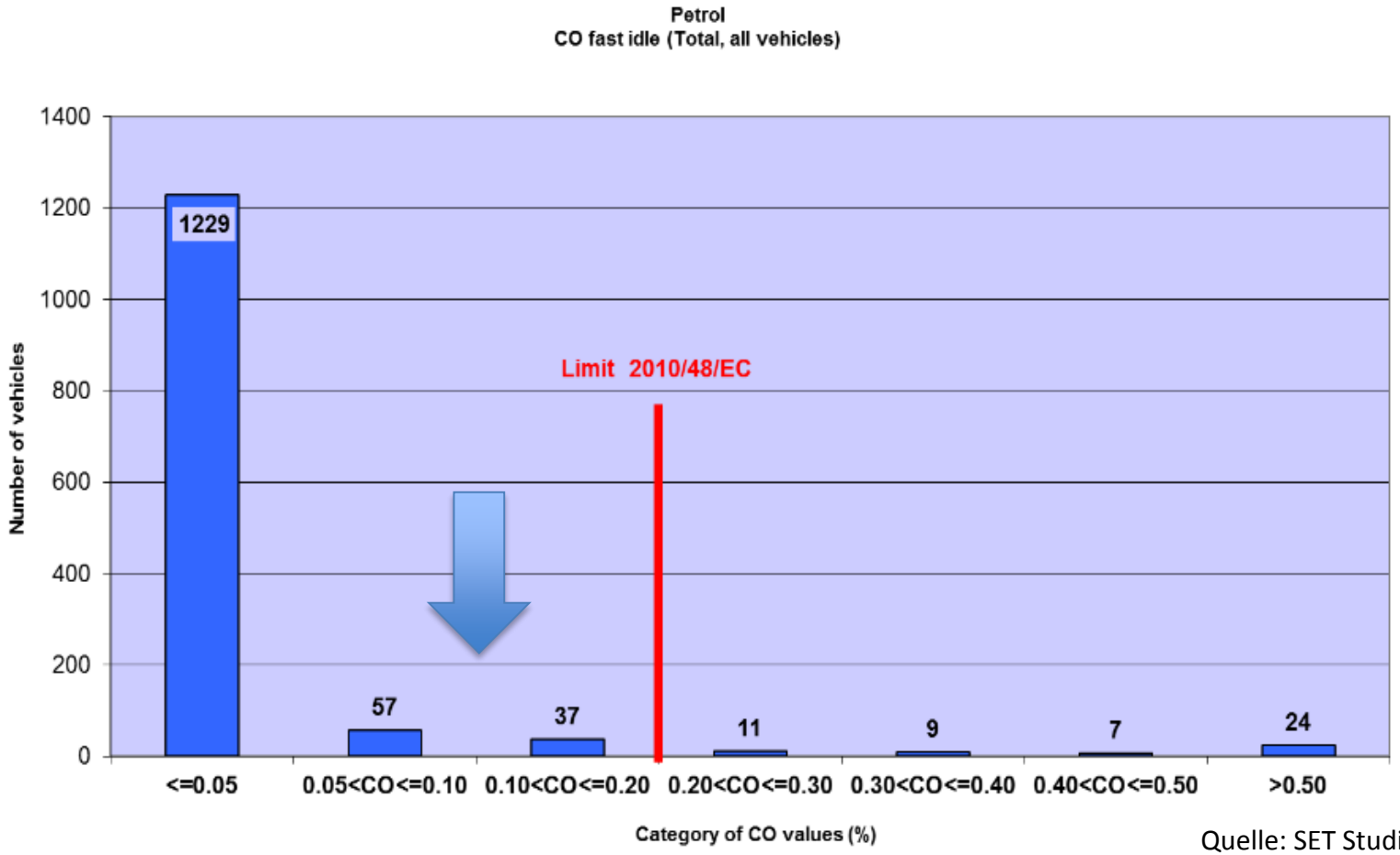
- Test procedure will be the same we use for vehicles before 01.01.2006 (complete tailpipe test using also information from OBD)
- The new procedure will be named Leitfaden 5 Version 01 (not Leitfaden 6) to demonstrate, that the changes are only minor

Reference values:

- In the directive for Petrol vehicles we propose 0,1 % vol.
- For Diesel vehicles we propose at least 0,2 m-1, compromise was fixed to 0,3 m-1, but there is a big discussion
- It seems that this is one of the reasons for the delay

Emission test Germany

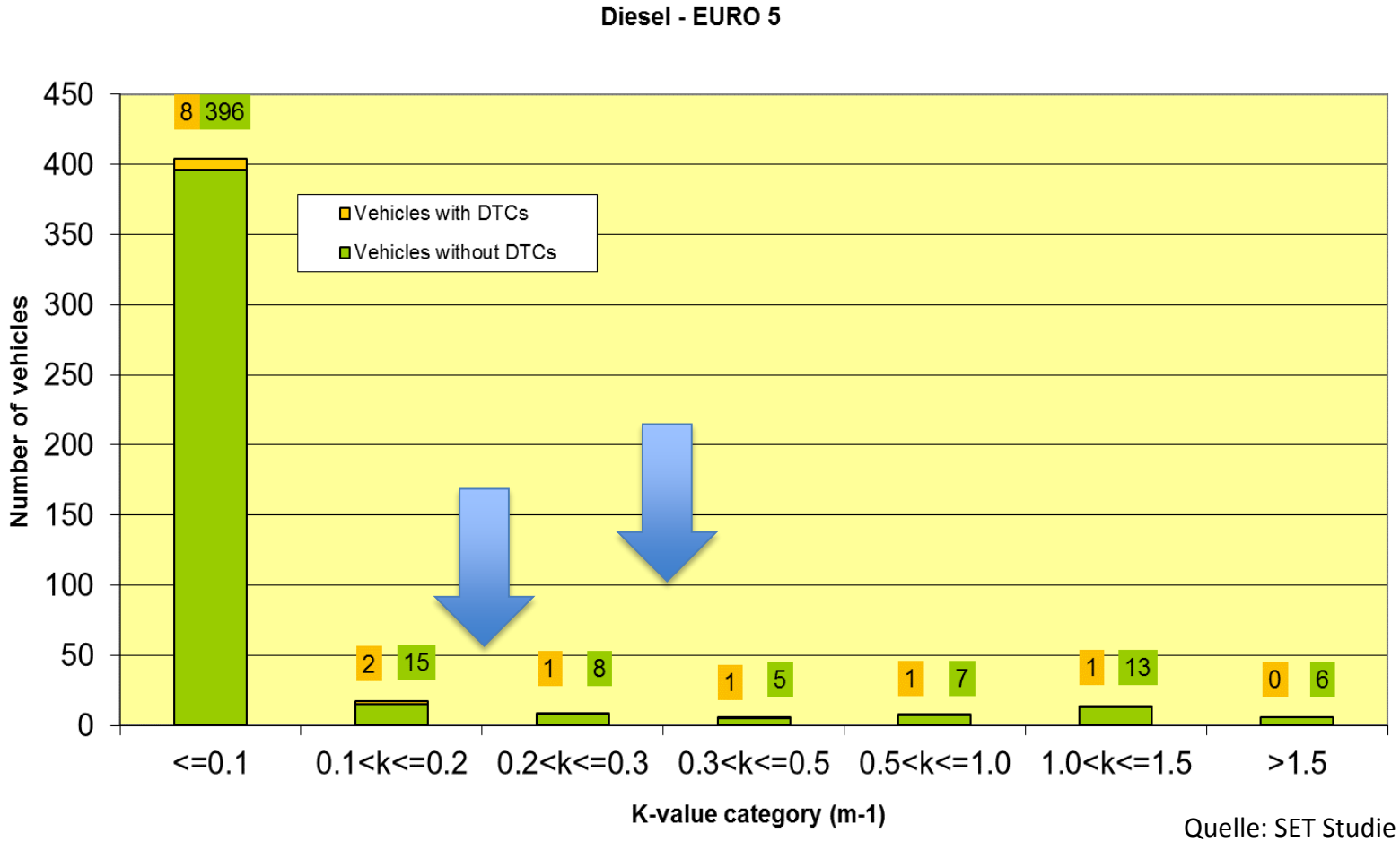
Grenzwerte beim Benziner



Quelle: SET Studie

Emission test Germany

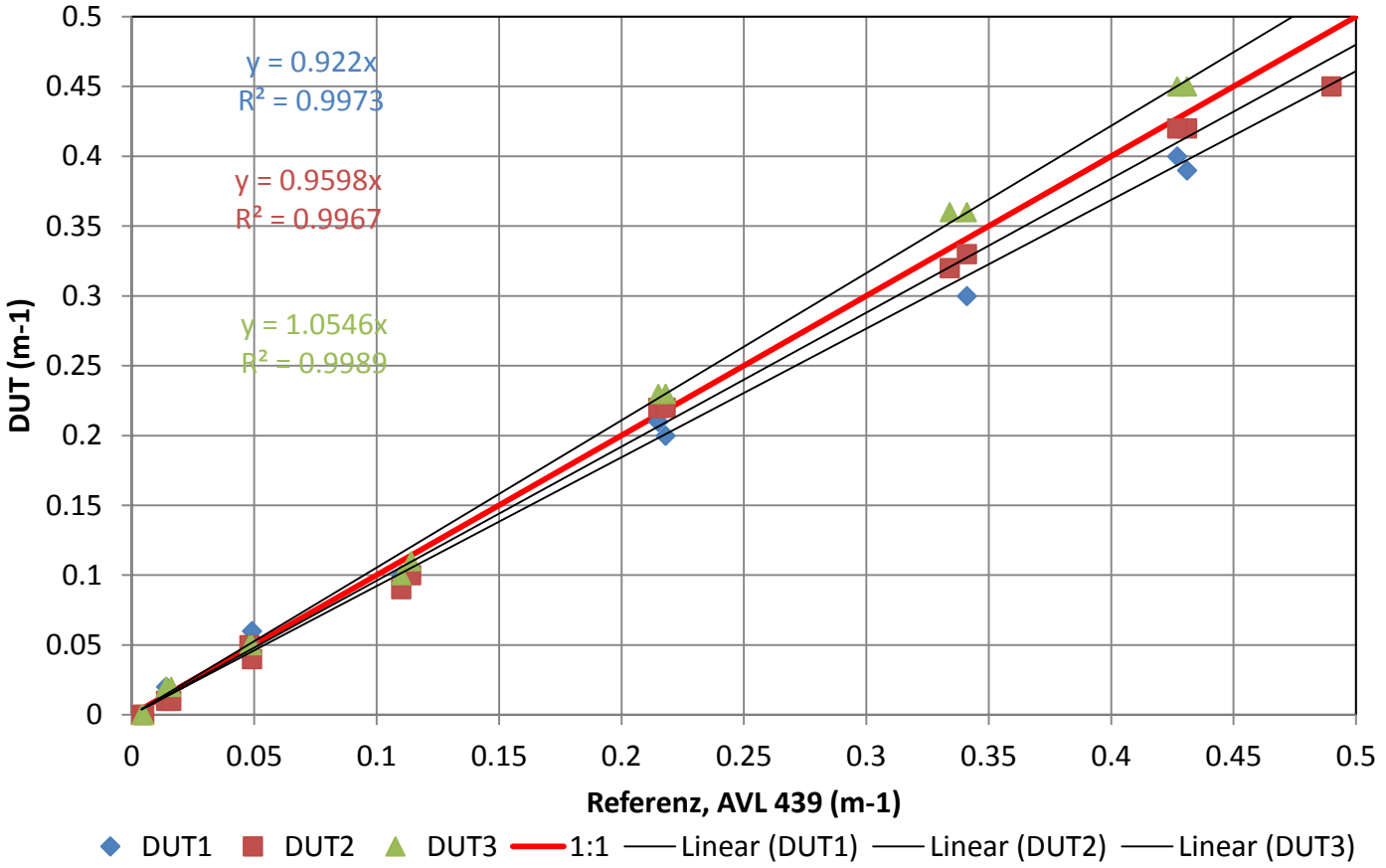
Grenzwerte beim Diesel



Quelle: SET Studie

Emission test Germany

Genauigkeit von Opazimetern im unteren Bereich



Qualität – Effizienz – Sicherheit

Danke, dass Sie zugehört haben

Situation In UK

Short presentation from Sykes-Pickavant on NOx at idle

Short report from UK

Sykes-Pickavant
Automotive Workshop Solutions

Expected Results @ Low Idle

CO = Less than 0.1%

HC = Less than 10 ppm

NOx = less than 150 ppm

CO2 = less than 2.5%

O2 = less than 15 %

For Healthy CR Engine
@ Working Temp
& Under No Load

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Short report from UK

Sykes-Pickavant
Automotive Workshop Solutions

Expected Results @ Fast Idle (2-2500 rpm)

- CO = less than 0.1 but slightly higher than @ idle
- HC = expect a decrease from idle reading
- NOx = 100 to 450 ppm (will often cycle as EGR position alters)
  (If open nearer 100ppm / if closed nearer 450ppm)
- CO2 = greater than 2.5%
- O2 = slight increase over idle reading if EGR closed. No EGR operation (fixed shut) would show a slight decrease over idle reading

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Situation In Spain

Introduction of Diesel test with plate value and NOx emission test campaign

Situation In Italy

CITA SET II Study

WG2 – CITA SET II Study

- Call for funding was sent to all members
- Interest expressed by several companies and national associations
- Following discussions with CITA, the total project costs will be 70.000€ (to be equally divided between CITA and EGEA)
- Financial contribution for each EGEA company: 3.000€
- Question: how to proceed if CITA and EGEA do not have the same understanding/opinion on a decision made. How to decide if both associations have 50% of the decision?
- Next steps: collect money + invoicing details → CITA will directly send all invoices

WG2 – CITA SET II Study

Direct Companies (FOG Automotive, Actia, Capelec, Hella, Maha, WOW Group, TEN Equipment, Opus Equipment, AVL, Bosch,…) will receive directly an invoice from CITA	35.000€
Associations (AICA & GEA confirmed 6.000€) will receive an invoice from EGEA	15.000€
EGEA will directly pay to CITA its symbolic contribution	1.000€
TOTAL	**51.000€**

WG2 – CITA SET II Study

- CITA had their Bureau Permanent meeting 2 weeks ago but official minutes are not yet ready
- First feedback from Eduard Fernandez:
  - CITA wants to keep their independence
  - CITA wants to keep the control of the decisions of the project
- And according to CITA, this makes our common agreement difficult
- Unofficial feedback: CITA would like to have either EGEA as member or all members interested in the CITA SET2 Study to become CITA members to be able to join the study
- Next steps? How to move forward?
- Next CITA SET II Study is scheduled on the 15th of November 2016 in Brussels to prepare the field tests →

SET2 NOx: Target

- **Problem definition:** The pollutants of greatest concern in terms of local air quality are NO_x and particulate matter. The current periodic emission test is not able to evaluate the emission behavior regarding NOx, gross polluters will not be detected
- **Solution:** Develop applicable test methods to test after-treatment systems (based on NO_x measurement) during periodic emission tests for petrol and diesel
- **Value Proposition**:
  - CITA can make a recommendation to the EC to improve the current periodic emission test and shape future legislation

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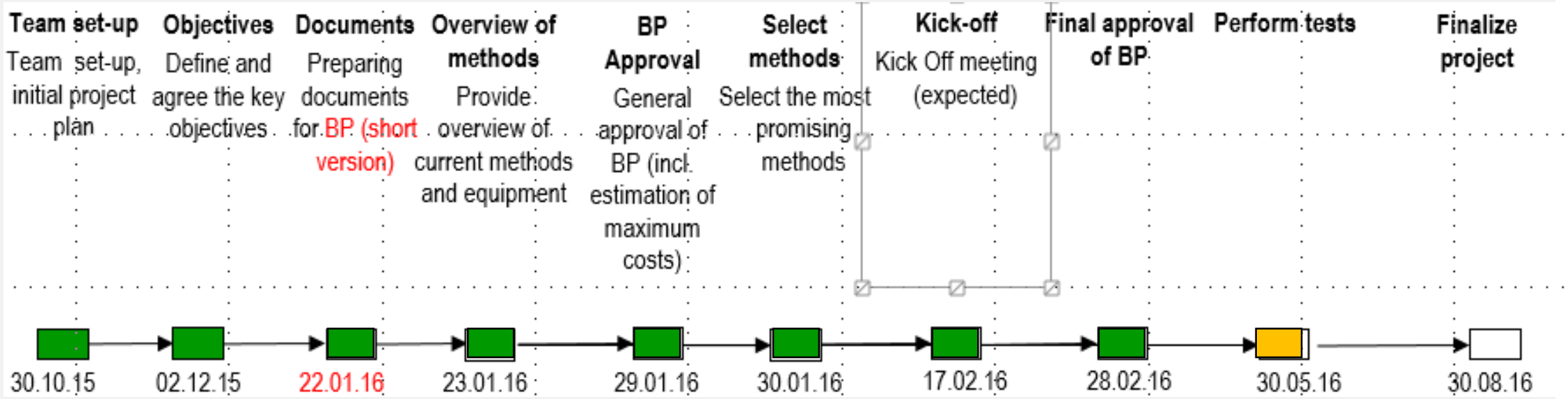
SET2 NOx: Project Road Map



Equipment available: **12**

Equipment manufacturer ready to participate: **12**

Procedure dedicated for NOx measurement: **2 dynamic + 3 static**

1.07.17

LabTest **1.04.17**

1.02.17 **1.04.17**

Field Test **2 dynamic + 2 static**

(2 have been merged in 1)

SET2 NOx: LAB TEST

✓ Spain

✓ TÜV Sud

☒ TÜV Nord

☒ DEKRA

Real road condition

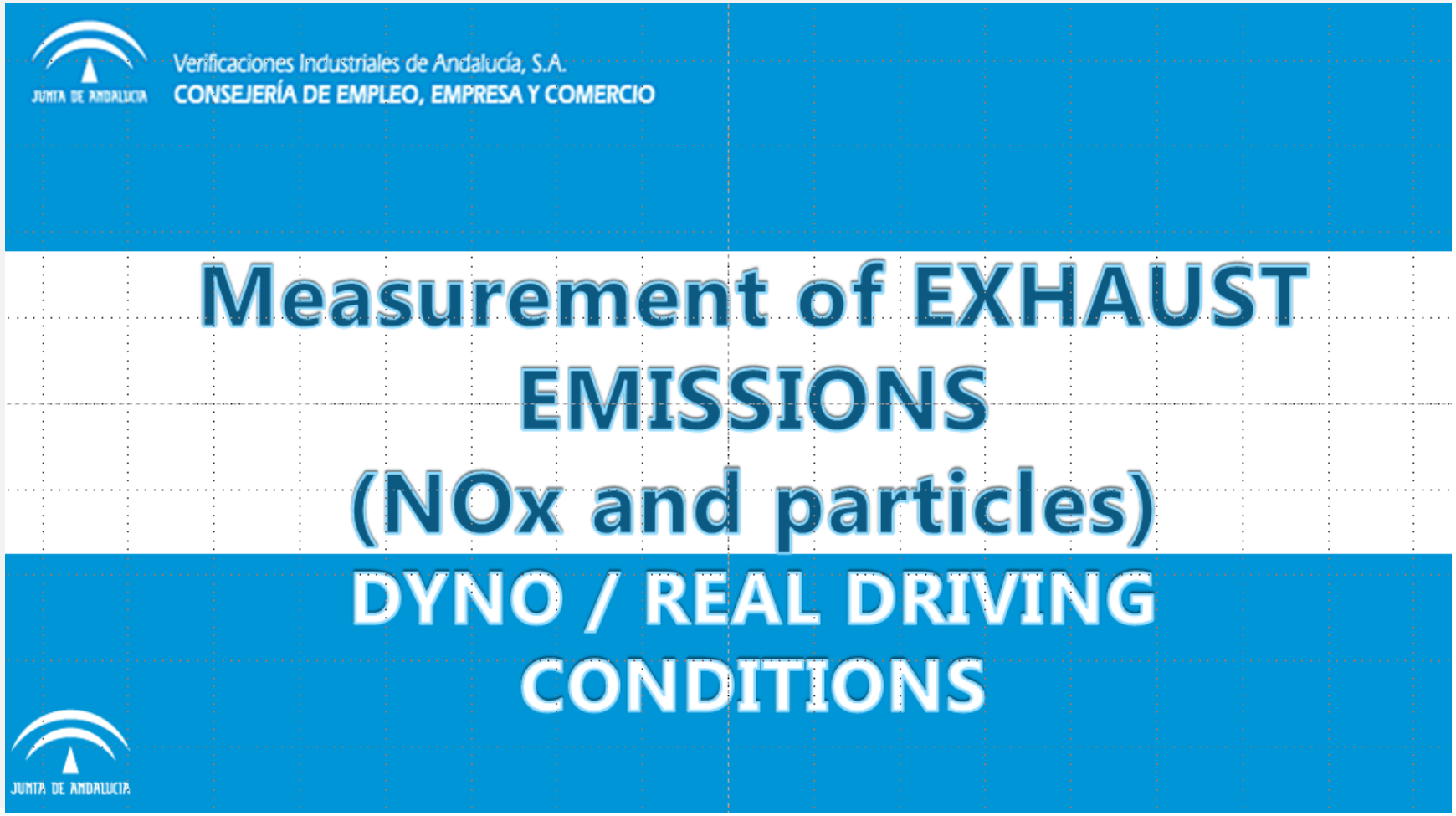
Dynamic Procedure

Static Procedure

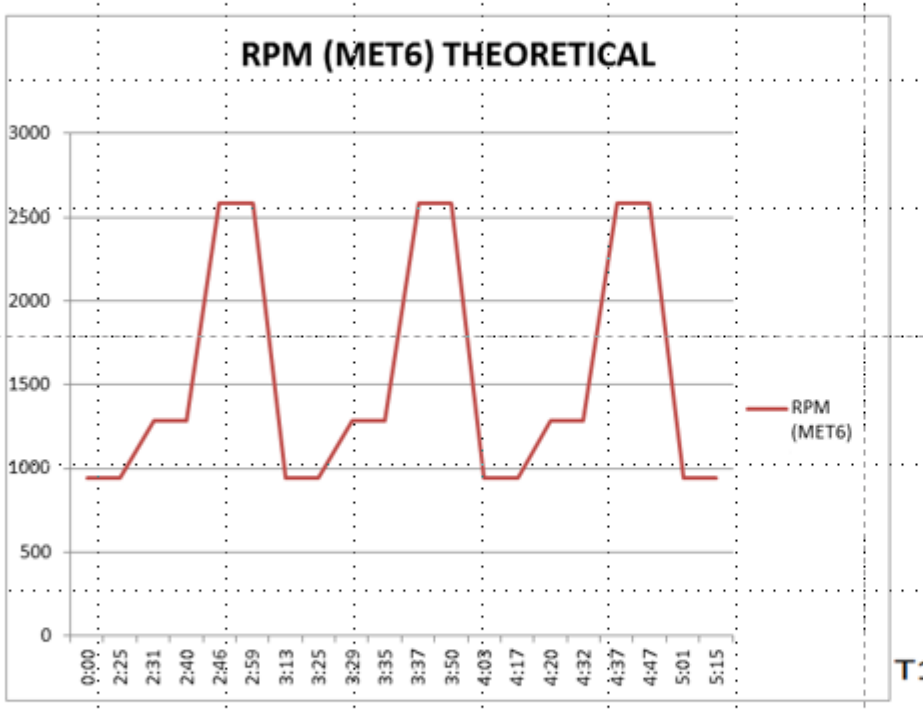
Vehicle in good shape

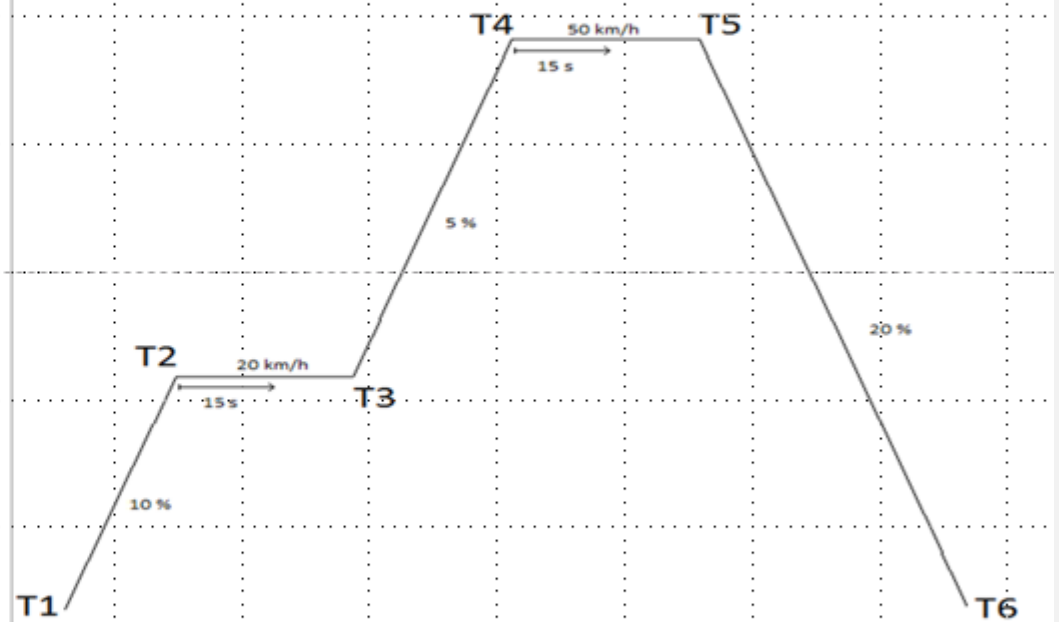
Vehicle in bad shape

SET2 NOx: Spain



THEORETHICAL MODEL





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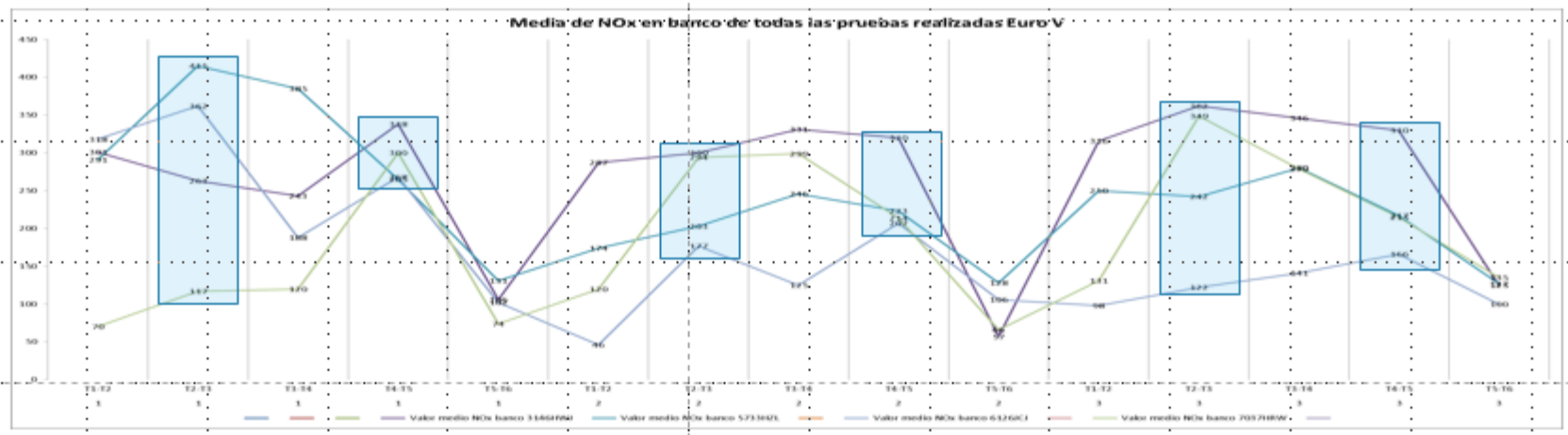
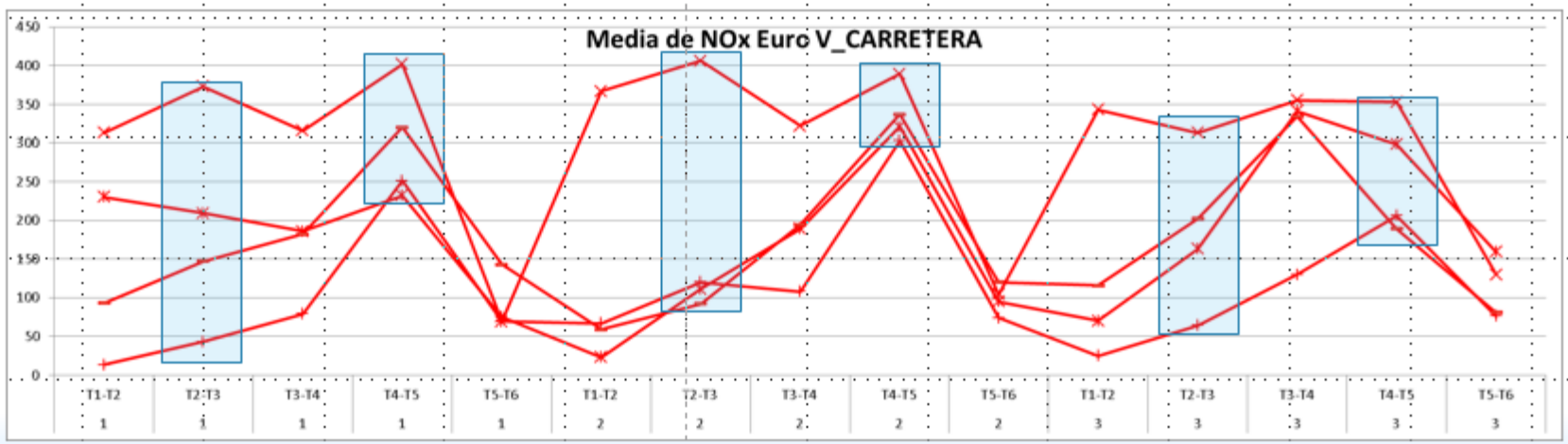
RANGE OF EMISSION LEVELS MEASURED

NOx EURO V DYNO



NOx EURO V DRIVING CONDITIONS



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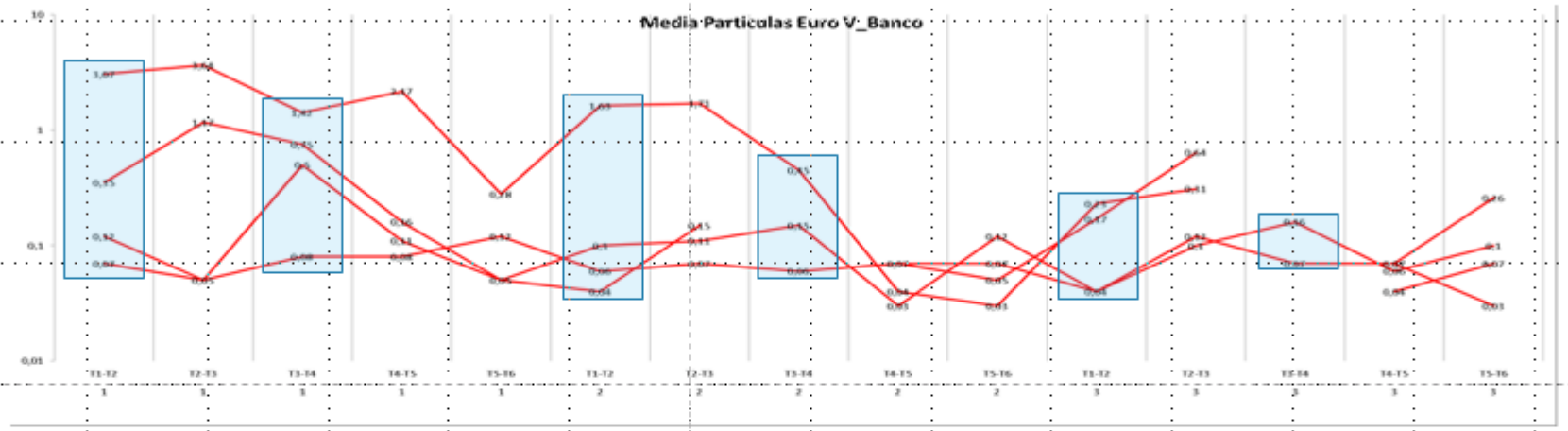
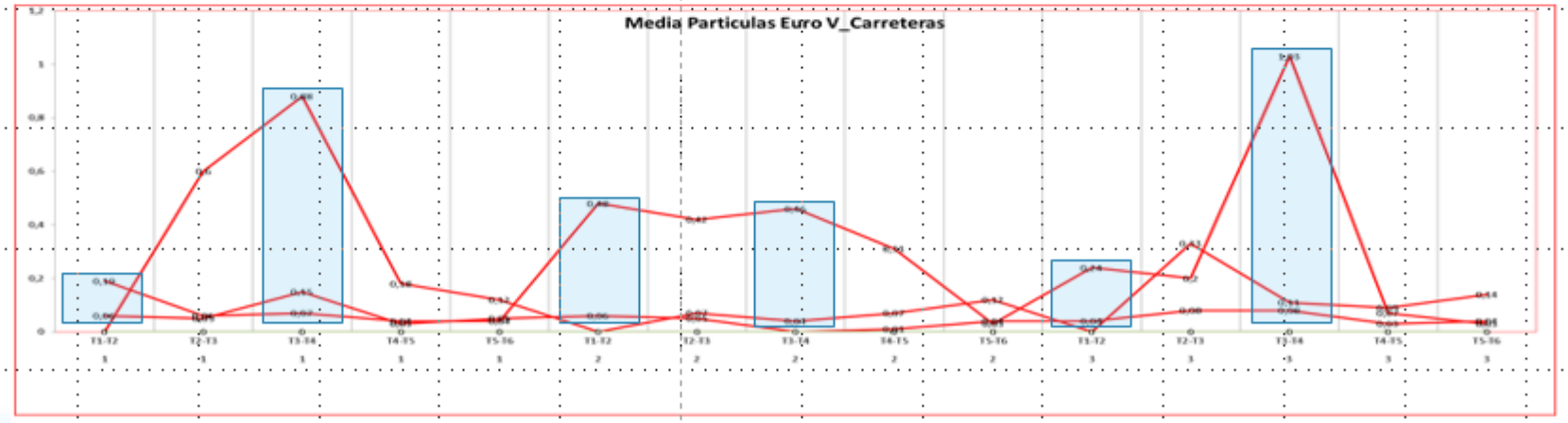
RANGE OF EMISSION LEVELS MEASURED

PARTICLES EURO V DYNO



PARTICLES EURO V DRIVING CONDITIONS



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LEARNED LESSONS: new challenges

- ✓ It is necessary to define a dynamic cycle that faithfully reproduces the real circulation conditions of vehicles. As it has been reflected in the tests performed, **emission levels obtained at dyno and in real conditions are not comparable.**

- ✓ With the obtained results, it´s not possible to know in which stage of the cycle we should make the measurement. For **NOx**, the **evaluation should be done in the T2-T3 and T4-T5 stages**, but the experimental results at the bank don't ratified it. However, in road tests, it has been shown that the mentioned stages should be used to assess the NOx levels. Similarly, **particles** should be evaluated at the **T1-T2 and T3-T4 stages.**

- ✓ Finally, in order to establish a first approximation for thresholds values, it would have been required to work with a **bigger data sample**. Therefore, there´s no possible to set a conclusion on this subject.

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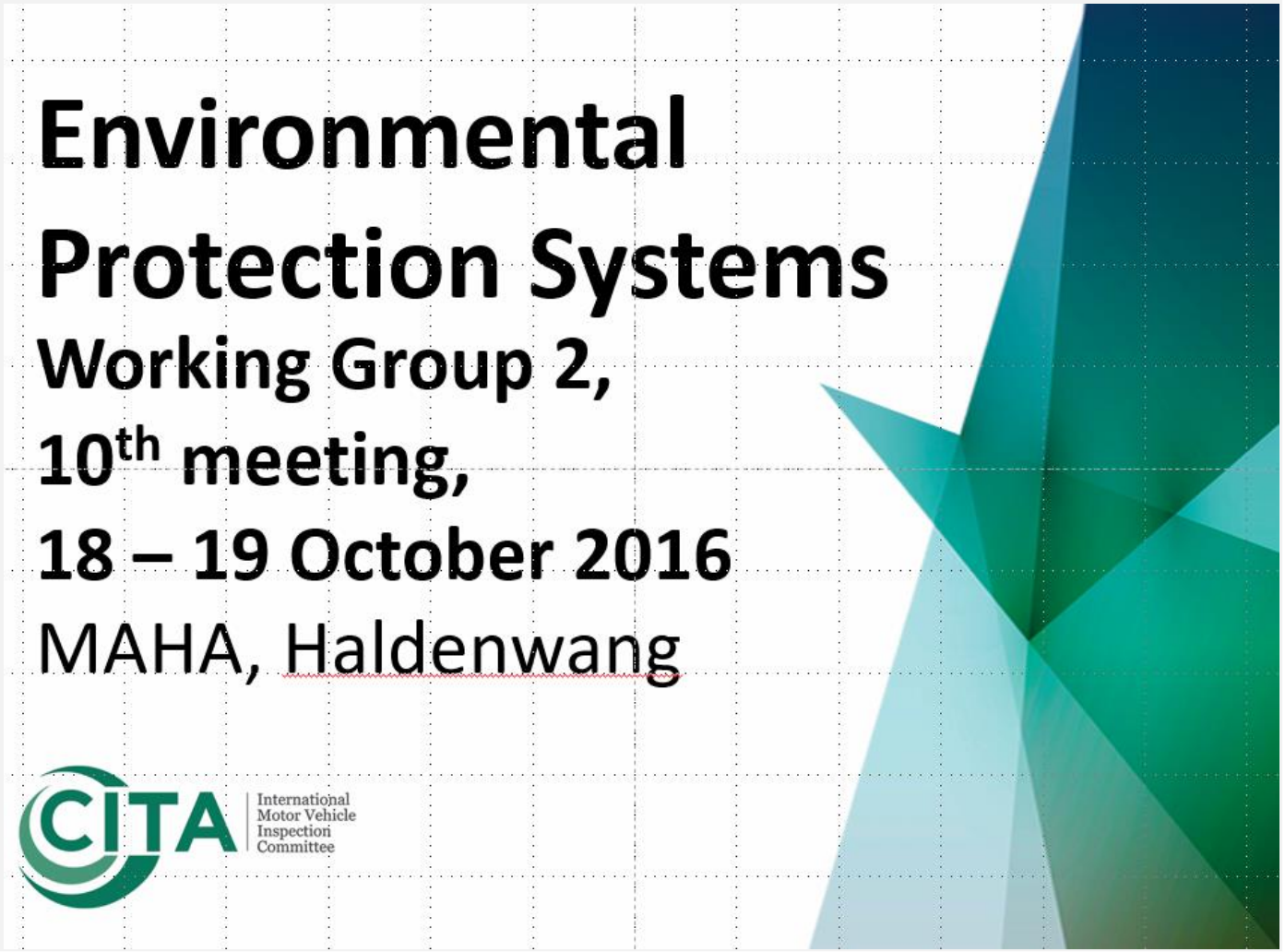
SET2 NOx: TÜV Sud

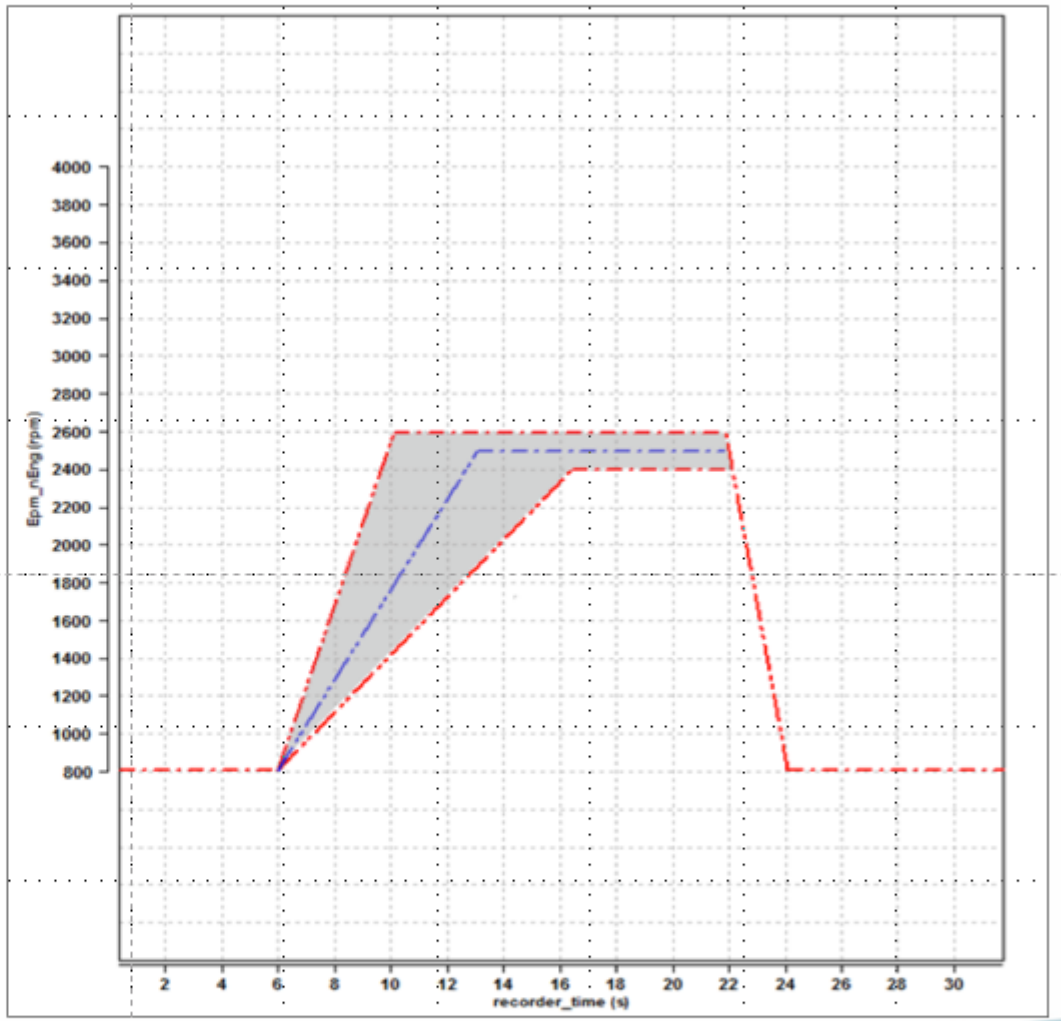


9. Laboratory tests TÜV SÜD

1. AVL

- **AVL testing procedure:**
  - Accelaration up to 2500 RPM within 4 to 11 seconds
  - Keeping approx. 2500 RPM for 5 to 6 seconds
  - Installing failures

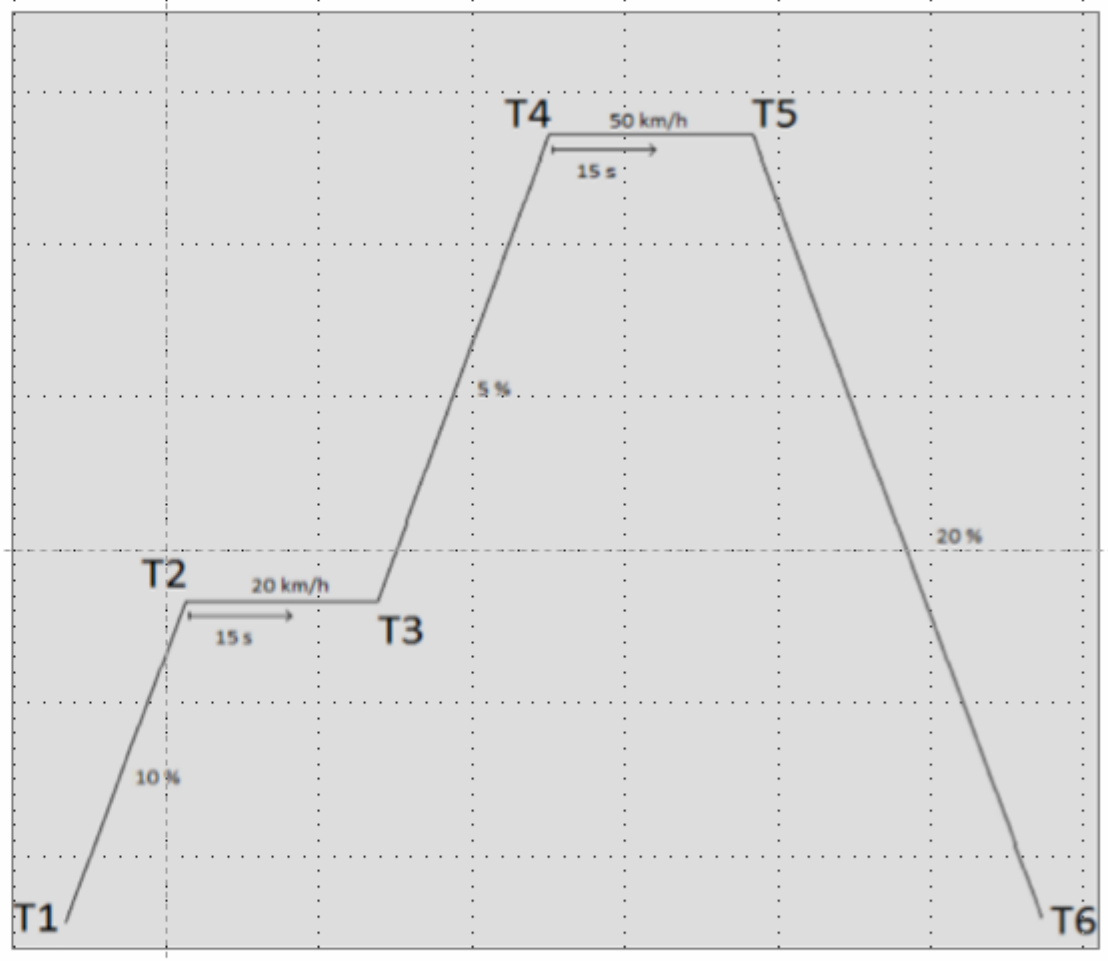
- **Open Questions:**
  - Do the NO_x emission increase during the test?
  - How do the NO_x emission increase with failures ?



Laboratory tests TÜV SÜD

2. ASM 2050

- **ASM 2050 testing procedure:**
  - 20 km/h and 50 km/h
  - Variants with
    - 1./2. gear
    - 1./2./3. gear
    - Automatic in “D”
  - Installing failures
- **Open Questions:**
  - Do the NO_x emission increase during the test? depending on the variant
  - How do the NO_x emission increase with failures ?



Tested vehicles:

Vehicle:	Transmission:	Cubic capacity/ cylinder	Emission class:	Drive:	Failure:
1: Audi A4	Automatic	1.968/4	Euro 5	4WD	without
2: Audi A3	Manuel	1.598/4	Euro 6	Front	Air-mass sensor plug removed
3: Opel Meriva	Manuel	1.598/4	Euro 6	Front	EGR-Valve plug removed
4:BMW 530d	Automatic	2.993/6	Euro 6	Rear	EGR-Valve plug removed

Summary laboratory tests TÜV SÜD

AVL

NO_x ppm

Vehicle:	Without failure	Air-mass sensor plug removed	Deterioration factor
2	101,8	229,0	2,3
Vehicle:	Without failure	EGR plug removed	
3	121,5	177,0	1,5
4	114,3	141,0	1,2

Main findings:

Failures lead to slightly higher NO_x concentration (max. 120%) on a low level between 120 ppm and 230 ppm

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Summary laboratory tests TÜV SÜD

ASM 2050
NO_x ppm

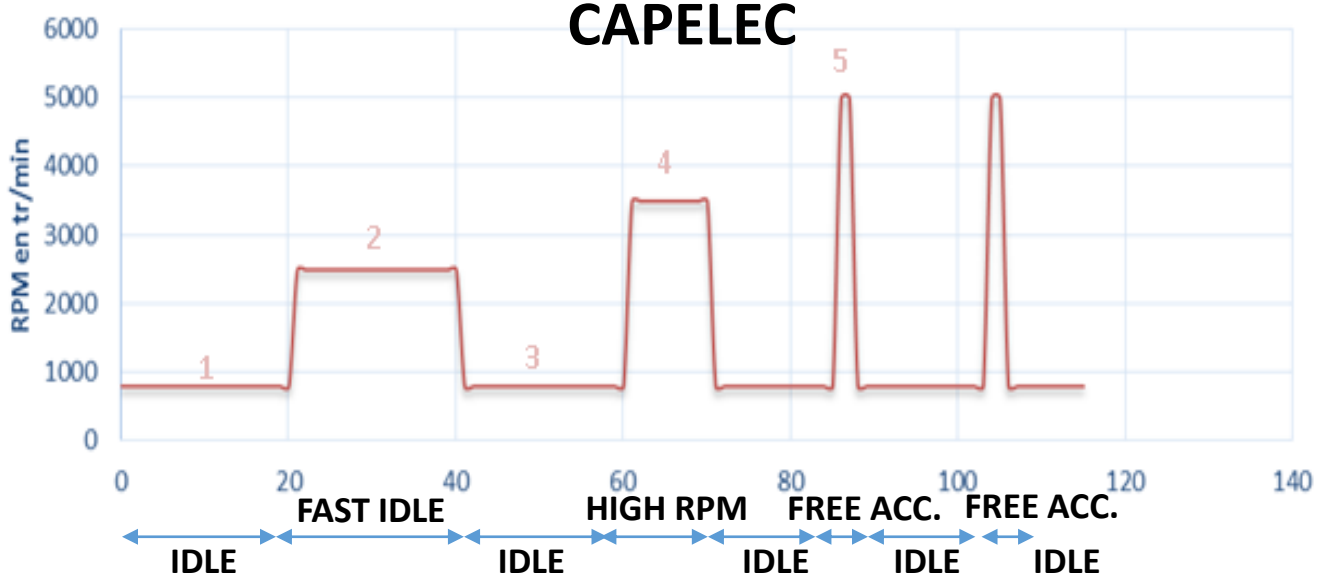
Vehicle	Without failures		Air-mass sensor plug removed		Deterioration factor	
	20 km/h	50 km/h	20 km/h	50 km/h	20 km/h	50 km/h
2	112,5	693,4	534,2	725,6	4,8	1,1
			EGR plug removed			
3	31,6	358,9	335,5	707,4	10,6	2,0
4	115,2	365,8	345,8	556,3	3,00	1,5

Main findings:

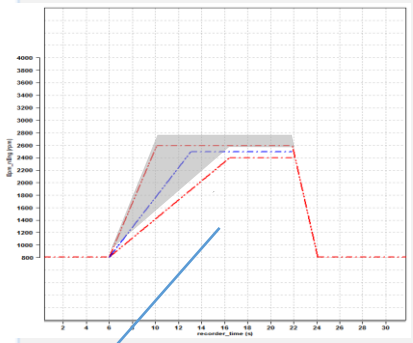
Failures lead to higher NO_x concentration (max. 1000%) already after an acceleration up to 20 km/h on a significant level between 340 ppm and 530 ppm

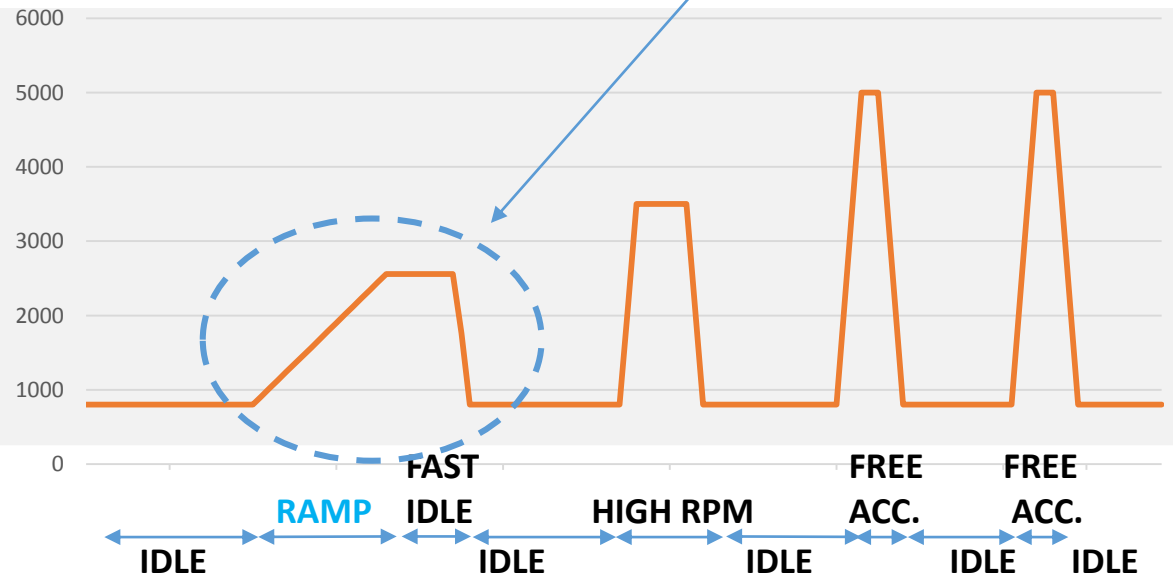
Timing of the procedure

CAPELEC



AVL





SET2 NOx: FIELD TEST

EQUIPMENTS :

2 dynamic (ACTIA, MAHA)

2 static (AVL + CAPELEC, BOSCH)
(2 have been merged in 1)

PTI ORGANISATION

	Company	Country	Responsable	e-mail
1	Bilprovningen	Sweden	Eva Morger	eva.morger@bilprovningen.se
2	Opus Bilprovning AB	Sweden	Thomas Nilsson	thomas.nilsson@opusbilprovning.se
3	Applus+	Spain	Salvador Esquius	salvador.esquius@applus.com
4	CVH	Republic of Croatia	Tomislav Škreblin	tomislav.skreblin@cvh.hr
5	Grupo Itevelesa	Spain	Juan Ramón González Rojo	jrgonzalez@itevelesa.com
6	Certio ITV	Spain	Ismael Herrera	iherrera@certio.com
7	RDW	The Netherlands	Dennis Ipenburg	dipenburg@rdw.nl
8	GOCA	Belgium	Pascal Buekenhoudt	buekenhoudt.p@goca.be
9	AMSS-CMV	Serbia	Olivera Djordjevic	olivera@cmv.rs
10	ITVASA	Spain	Celestino Pérez Rodríguez	celestinopr@itvasa.es
11	SYC	Spain	Enrique Taracido	jdrodriguez@sycitv.com
12	FSD	Germany	Ralph Schröder	Ralph.Schroeder@fsd-web.de
13	Motor Transport Institute	Poland	Wojciech Jarosinski	wojciech.jarosinski@its.waw.pl
14	TÜV NORD	Germany	Roger Eggers	REggers@tuev-nord.de
15	Veiasa	Spain	Macarena Fernández Rivera	mfernandez@veiasa.es
16	Euro-lab	Kosovo	Kumbim ShaLa	kumbim.shala@euro-lab.org

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Updated news from Brussels

Remote Sensing

Remote Sensing

- Vehicle type-approval legislation is currently being revised
- Main goal for this revision is to address the ‘Dieselgate’ and shortcoming of type-approval legislation for emission testing
- RMI provisions have been migrated to this piece of legislation
- Strong lobbying regarding remote sensing as a solution to detect faulty cars exceeding emission thresholds
- Various amendments have been tabled at European Parliament –> **how to proceed from EGEA side?**

EU Decision making process

EU – Commission

- 28 Commissioners
- Directorates General
  -DG GROW-

Commission proposal sent for decision to:

EU - Parliament

- 751 Members
- 3 Committees involved
  (IMCO, ENVI, TRAN)

IMCO	TRAN	ENVI
(leading cttee): MEP Dalton rapporteur - ECR	(opinion cttee): MEP Karima Delli rapporteur - Greens	(opinion cttee): MEP Christofer FJELLNER rapporteur - EPP

EU – Council of Ministers

- 28 Minister Councils
- Council Working Party on Tech Harmonisation

Remote sensing – a threat or an opportunity? (1/2)

- **New definition**: ***(47a) 'remote sensing' means scanning and measuring pollutant levels in a vehicle's exhaust while the vehicle is in motion using sensor-equipped instruments positioned roadside with the purpose of collecting performance data required to monitor the average on-road fleet emissions and identify excessive polluters;***

- **Task for the new EU Agency:** ***The Agency shall develop, in close corporation with the Member States, an EU wide remote sensing network, to monitor the real world emissions of the car fleet and to identify the excessively polluting vehicles in order to focus in-service conformity checks.***

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Remote sensing – a threat or an opportunity? (2/2)

- **Proposal also that market surveillance authorities check (am. 417 & 433):**

  - "by means of documentary checks***, real-driving emissions tests, including on-road remote sensing as well as portable emissions measurement systems,*** and laboratory tests ***of vehicle emissions*** on the basis of statistically relevant samples.

  - ***For verifying emissions of vehicles, market surveillance authorities may make use of remote sensing technology to help identify highly polluting vehicle models for further investigation. In doing so, the authorities shall cooperate and coordinate their activities with authorities responsible for periodic technical inspections pursuant to Directive 2014/45/EU on periodic roadworthiness tests for motor vehicles.***

Other rumours

EGEA Position Paper on EU Emission Testing

Report from Transport & Environment activities in Brussels – possible future collaboration

TRANSPORT & ENVIRONMENT

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Dieselgate 1st anniversary:
Impacts on emission approval test and regulations

#Dieselgate

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Industry changes

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New EU initiatives - The need to change!

Some key discussions in Brussels…

- Digital Single Market
- Industry 4.0
- The Internet of Things (IoT)
- Electric Vehicles
- Digitalization of Industry
- Robotics
- Cloud-based computing
- Digital Platforms
- Free flow of Data
- C-ITS
- Autonomous driving

Digitalisation & Connectivity – what changes?

- Consumer expectations are increasing due to the remote connectivity, prognosis/predictive maintenance and diagnostics
- Focus is not on the repair side anymore but on the use of digital data, creating third party cross-sectoral services offered in and around the vehicle, this will increase with autonomous vehicles
- Not anymore speaking about ‘consumer goods’ but SERVICES.
- Innovation is taking place in the OBD dongles (e.g. for repair services, PTI testing, gathering vehicle data) but only possible if the OBD port remains open!
- Direct access to real-time in-vehicle data is key!

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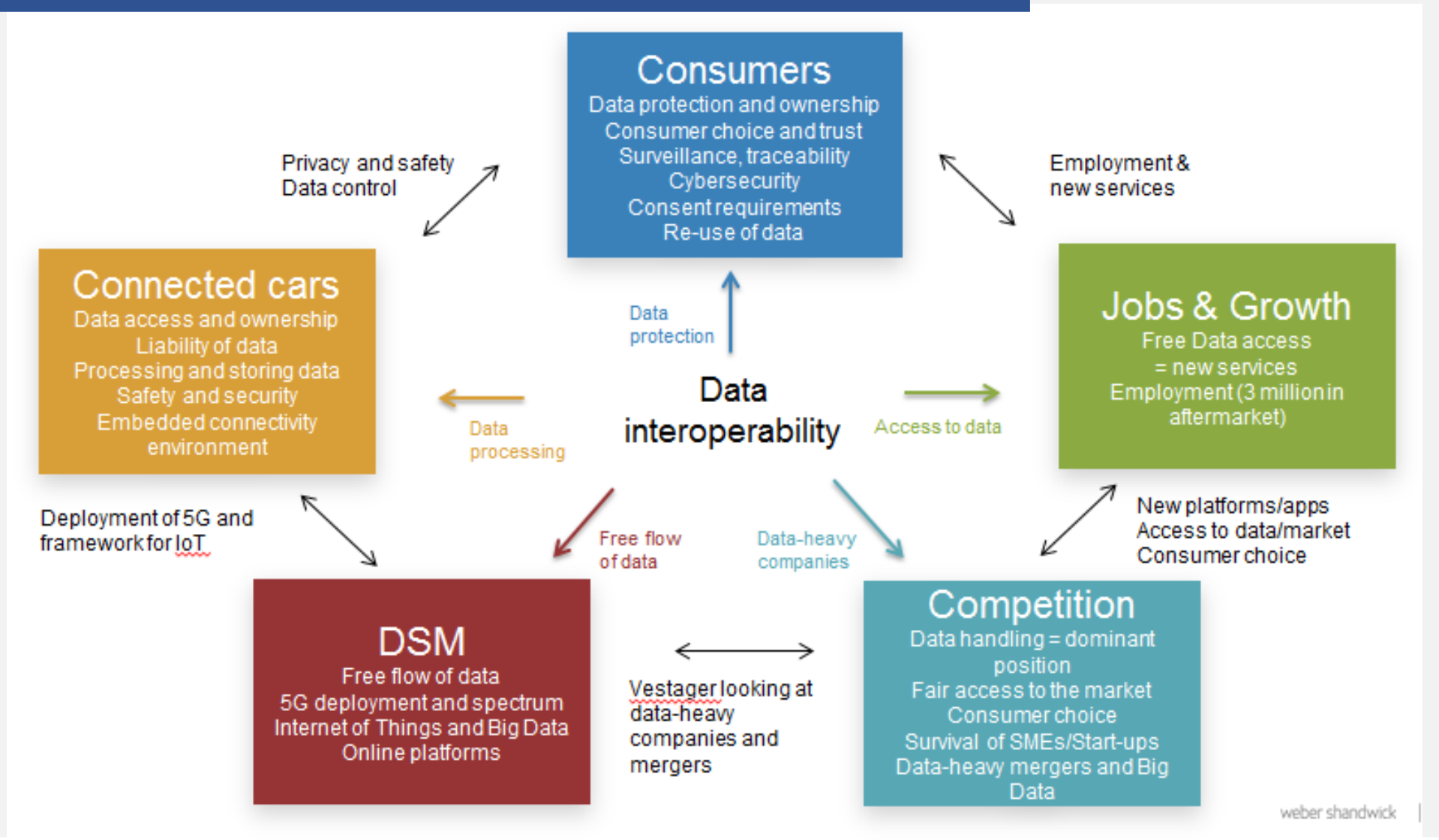
It's all about data control and functionalities



Access to data is the key!

New requirements for innovation and competitiveness:

- Capacity to perform an early detection of malfunctions to alert the driver before a breakdown or damage occurs!
- Innovative services such as ‘prognostics and predictive servicing’, based on analysis of dynamic in-vehicle data or GPS related services support new business models and have raised customer expectations.

➔ **This needs to be reflected in legislation!**

Industrialisation – what does that change?

- Equipment for the manufacturing is not sold anymore but more and more leased/rented → new service provided!
- Multitask hybrid equipment will be created (the connected workshop)
- New training needed for human capital (technical comptence)
- Increased level of intelligence in the process (artifical intelligence)
- Questions:
  - Are there new composants/materials?
  - How will you ensure transition from ‘old products’ to the new digital products generation?
  - What about having sufficient human capital?
  - Any direct impact on emission testing?

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Thank you!


THANK
YOU
GRACIAS
ARIGATO
SHUKURIA
TASHAKKUR ATU
YAQHANYELAY
SUKSAMA
EKHMET
MEHRBANI
GRAZIE
BOLZÏN
MERCI
JUSPAXAR
KOMAPSUMNIDA
GOZAIMASHITA
EFCHARISTO
SPASSIBO
SNACHALHUYA
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CHALTU
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MAITEKA
SPASIBO
DENKAUJA
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MERASTAWHY
GAEJTHO
TAVTAPUCH
MEDAWAGSE
AGUYJE
FAKAAUE
MAAKE
PALDIES
SIKOMO
MAKETAI
MINMONCHAR