

DPF-Retrofit of Bogota and a City Alliance with Latin-American cities: “Climate and Clean Air Program in Latin-American Cities”



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**Secretaria Distrital de Ambiente – Bogota D.C.



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SECRETARÍA DISTRITAL DE AMBIENTE

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1. Overview of Bogota

2. Base line - Particle number and NO₂ at steady state

3. Base line – On-road emission factors

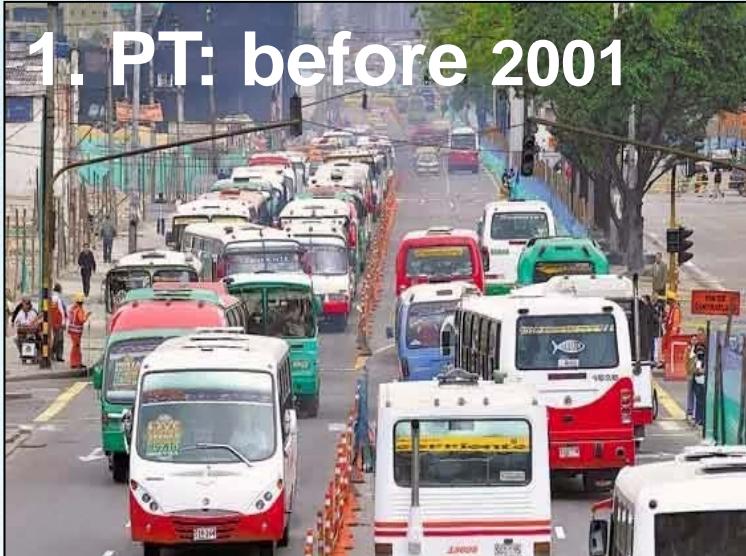
4. Upcoming steps



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1. OVERVIEW OF BOGOTA



1. PT: before 2001

Fuel: More than 1.200 ppm [S]



2. PT+ BRT (2001-2014)

Fuel: Less than 50 ppm [S] since 2010

3. SITP (Starting 2012 - 2014)



Source: Transmilenio, 2013.

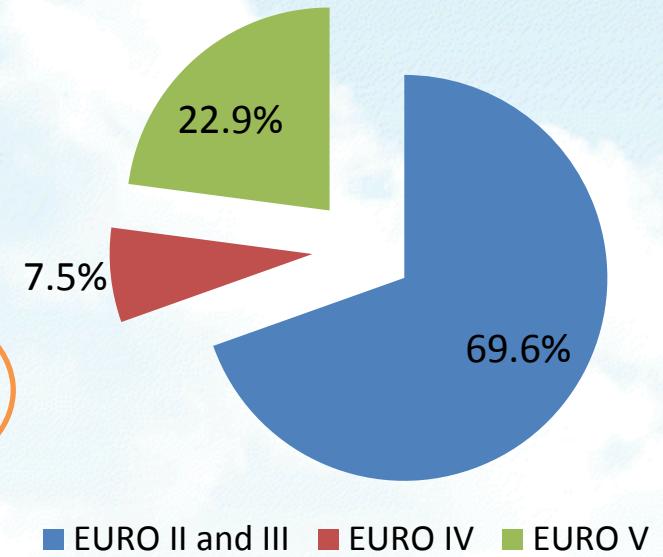


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1. OVERVIEW OF BOGOTA

Stage of the Public Transport		Vehicles/Year			
		2008	2012	2013	2014
SITP	Stage I				
	Stage II	1.070	2.213	5.565	12.416
	Stage III				
	Zonal				
Traditional public transport		16.168	15.389	11.160	0
TOTAL		17.238	17.602	16.725	12.416



Source: Compile SDA, 2014 by information from Transmilenio S.A, 2013

Goal.



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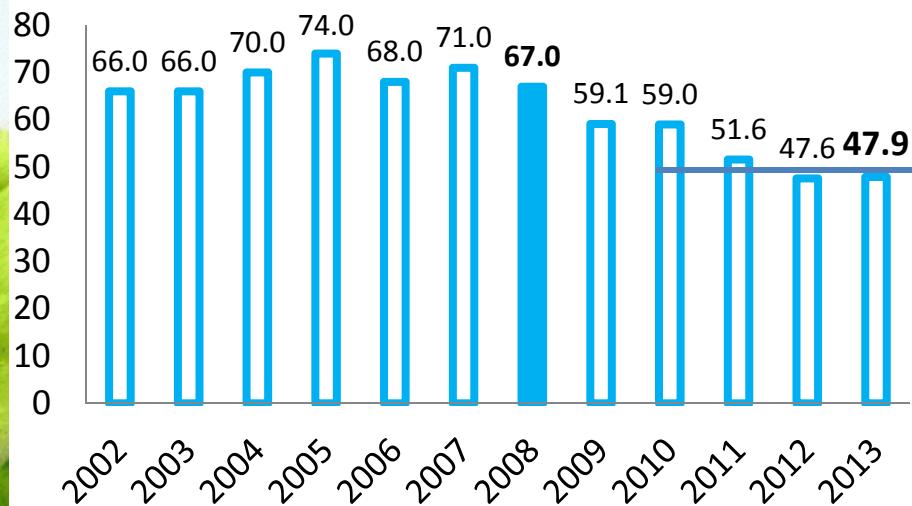
2

1. OVERVIEW (AIR QUALITY)

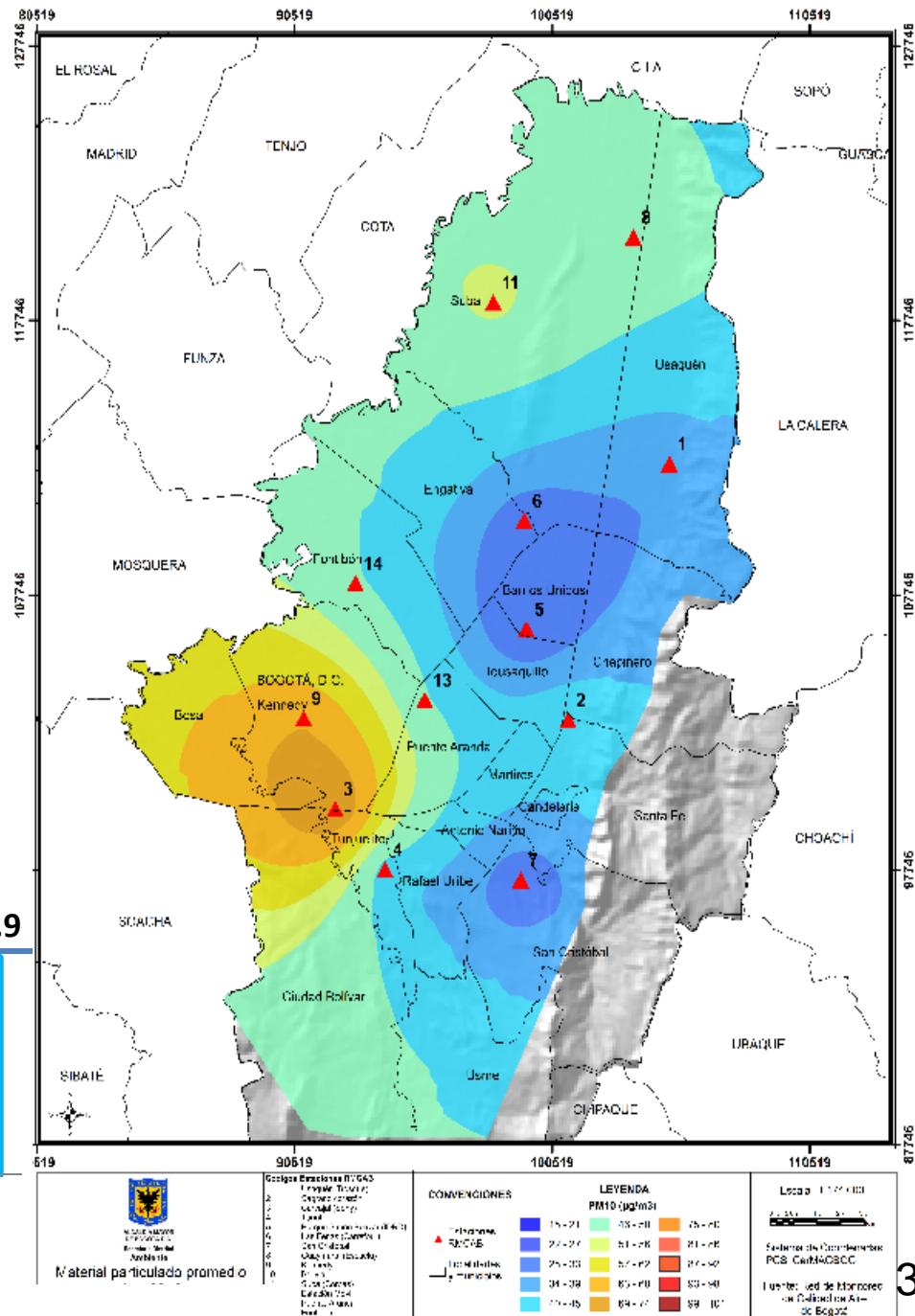
14 Monitoring stations

- ✓ particulate matter (PM_{10} , $PM_{2,5}$),
- ✓ sulfur dioxide (SO_2),
- ✓ carbon monoxide (CO),
- ✓ nitrogen dioxide (NO_2),
- ✓ ozone (O_3)

Annual average PM_{10} level ($\mu\text{g}/\text{m}^3$)



Source: SDA, 2014

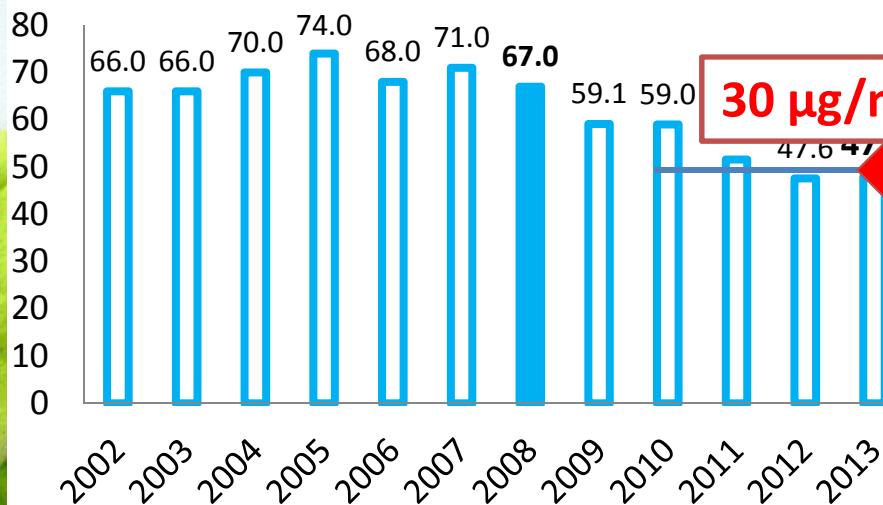


1. OVERVIEW (AIR QUALITY)

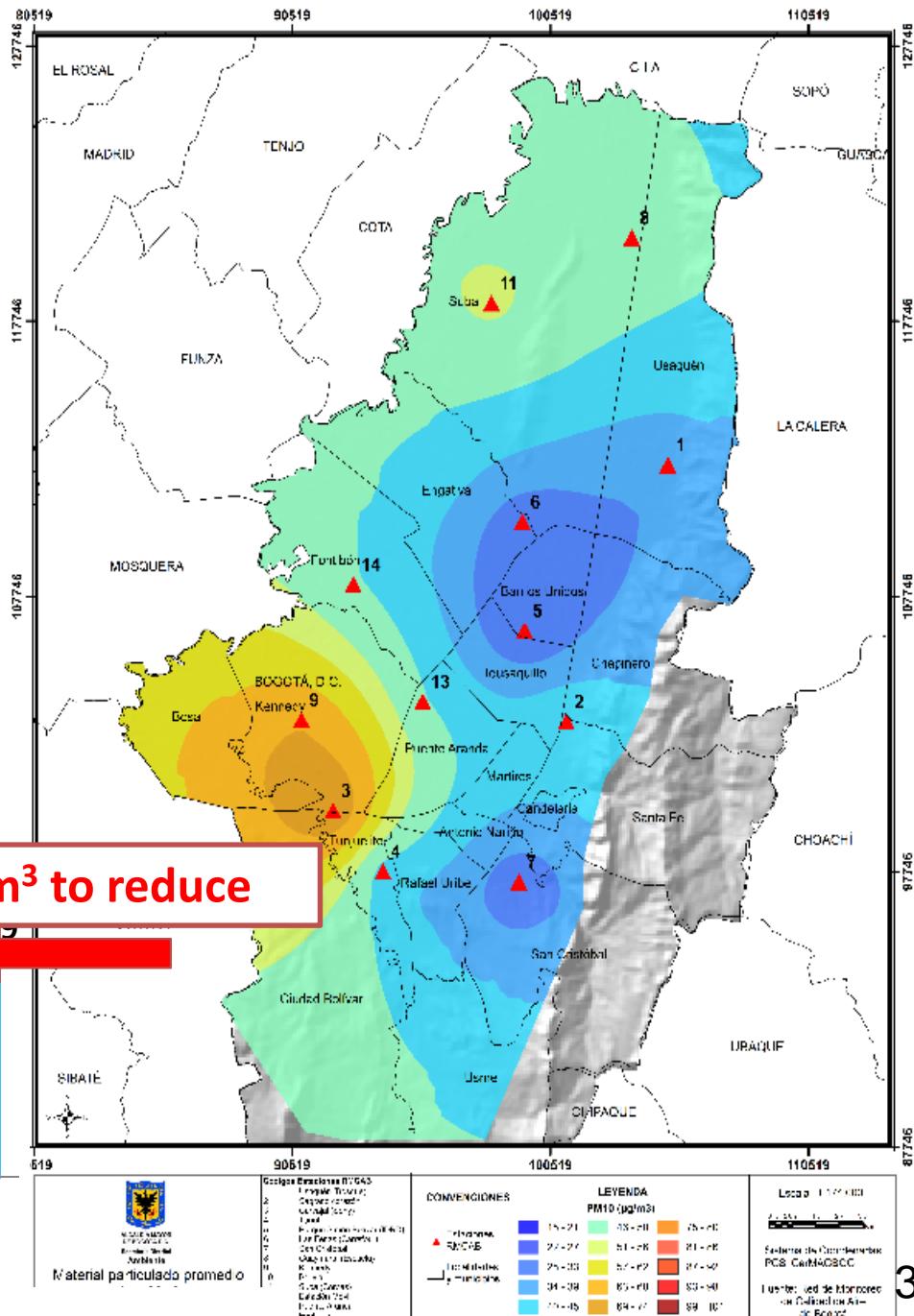
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Annual average PM_{10} level ($\mu\text{g}/\text{m}^3$)



Source: SDA, 2014

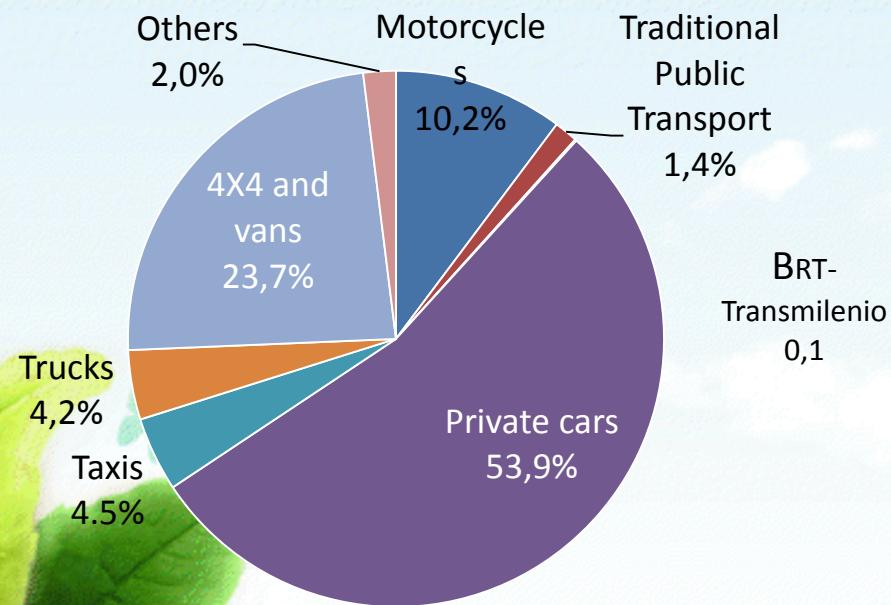


Source: RMCAB, 2013

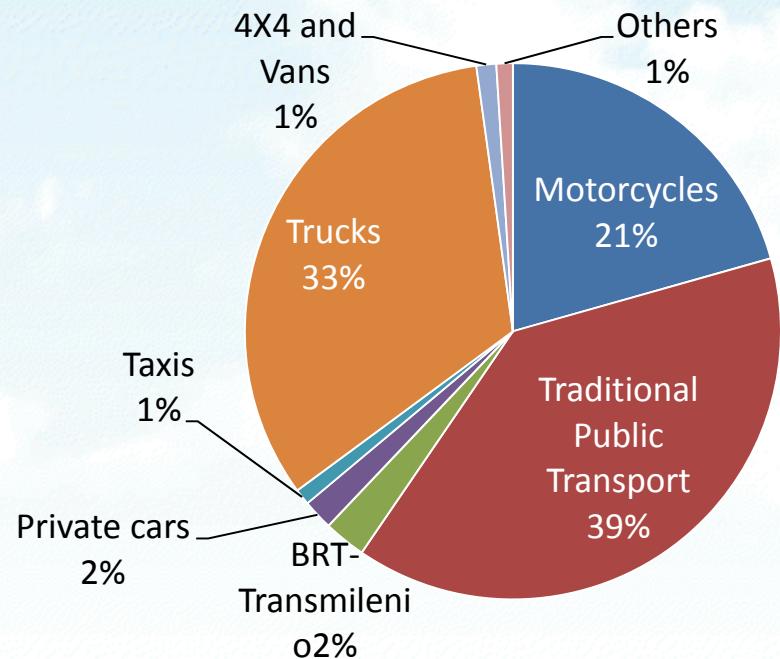
1. OVERVIEW: BOGOTA OBJECTIVES AND GOALS

Total PM Emission 2008: 2.500 Ton/year
Mobile source 2008: 1.400 Ton/year

Quantity of Vehicles



Contribution to PM pollution



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1. OVERVIEW: BOGOTA OBJECTIVES AND GOALS

- ✓ Reduce the causes of cardio-respiratory diseases
- ✓ Reduce PM_{10} by 10% and implementing the equipment for monitoring $PM_{2.5}$ in the city
- ✓ Reduce CO, NOx, THC and PM of public transport by 10%.

10 Year Plan of Air Quality Improvement in Bogota

2015

Air Quality Monitoring

Control to Mobil and Industrial Sources of emissions and Control to Automotive Diagnostics Centers

Design an Early Warning System



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“Bogotá Diesel Particle Filter Project –BDPF”

Bogotá as part of CALAC,
through joint technical
cooperation activities
between Bogota and SDC

- The Santiago de Chile DPF Follow-Up
Project [SFU]
- **BDPF Project**
- The City Alliance for DPF [CA]



Schweizerische Eidgenossenschaft
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Confederazione Svizzera
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Embajada de Suiza



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Confederaziun svizra

Agencia Suiza para el Desarrollo
y la Cooperación COSUDE



ALCALDÍA MAYOR
DE BOGOTÁ D.C.

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1. OVERVIEW OF BOGOTA

The Bogota DPF Project

Time line December/2013-Jun/2015

Stage 1

**DPF retrofit pilot tests
(18 buses)**

- 1. DPF Retrofit Pilot Tests
- 2. Local approval scheme
- 3. Implementation targets and modalities for a future massive implementation
- 4. Emission factors
- 5. Divulgation of Results

Stage 2

**Extended pilot
(the first 300 buses)**

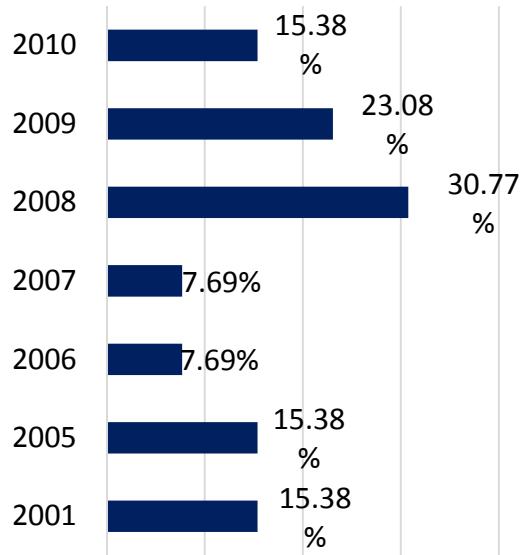


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Stage 1 DPF retrofit pilot tests (18 buses)

1. Vehicle Selection

Model Year

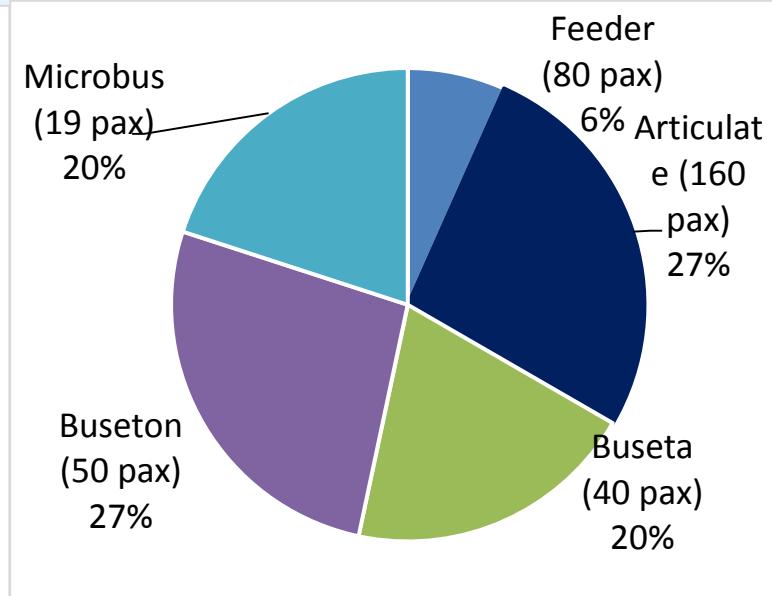


2. Data-loggin and Fuel consumption measurement

- Dynamometric testing
- Route testing

3. DPF Installation

4. DPF and Bus Monitoring (2.5 months)



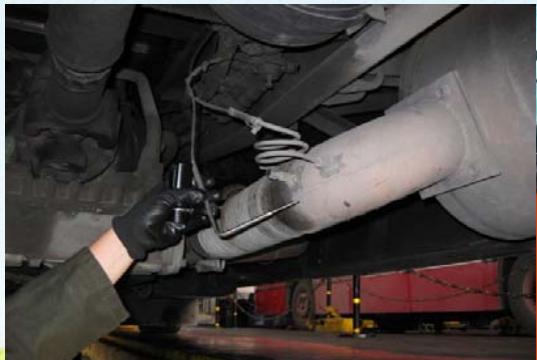
- Opacity
- Oil and fuel leaks
- Cylinder compression
- OEM fuel systems
- OEM chassis



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Stage 1 DPF retrofit pilot tests (18 buses)

1. Vehicle selection



2. Data-loggin and Fuel consumption measurement

- Dynamometric testing
- Route testing



3. DPF Installation



4. DPF and Bus Monitoring (2.5 months)

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Stage 1 DPF retrofit pilot tests (18 buses)

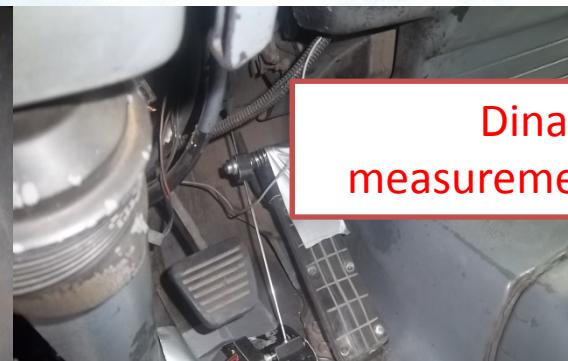
1. Vehicle selection



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- Route testing



3. DPF Installation

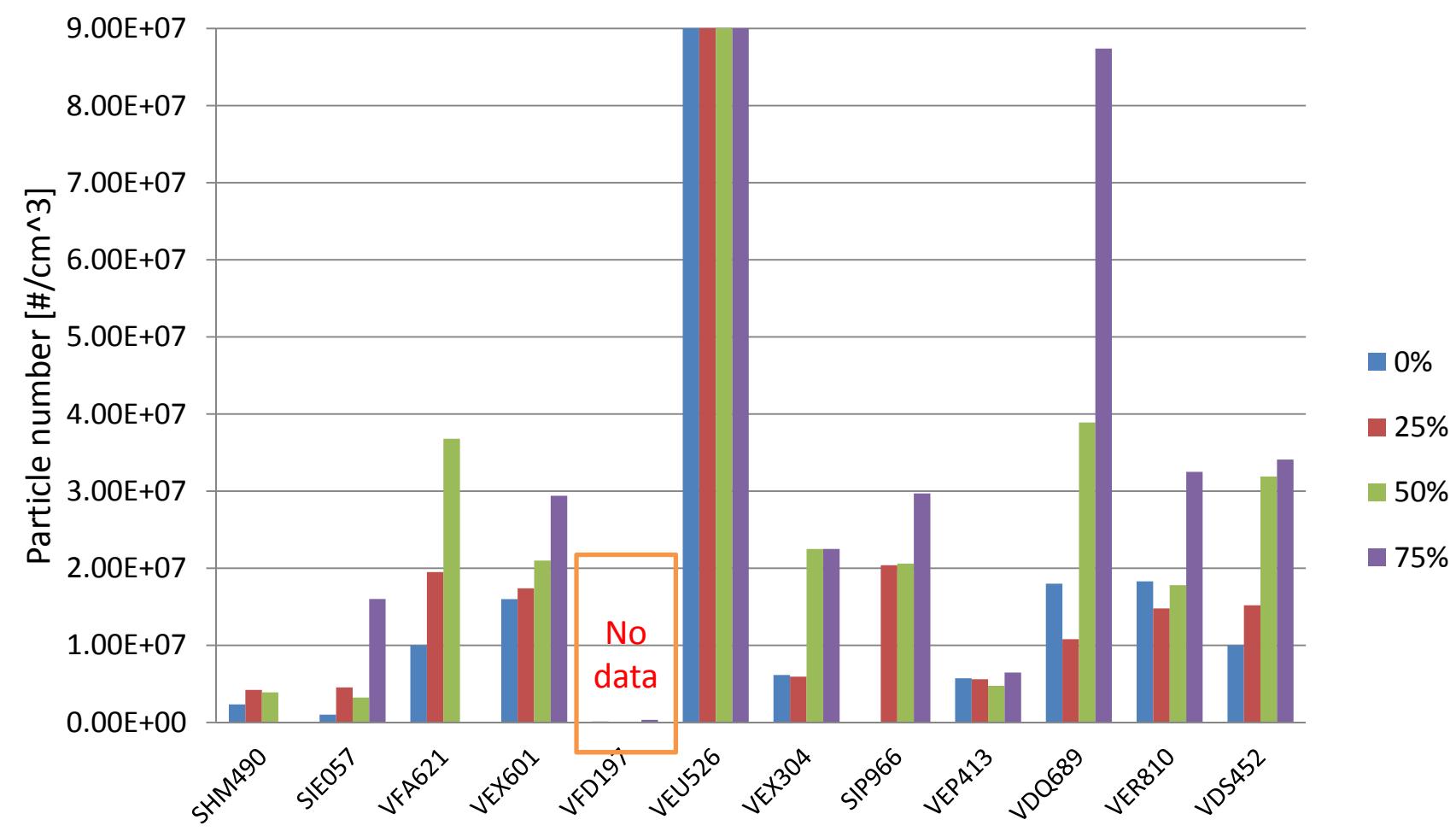


4. DPF and Bus Monitoring (2.5 months)



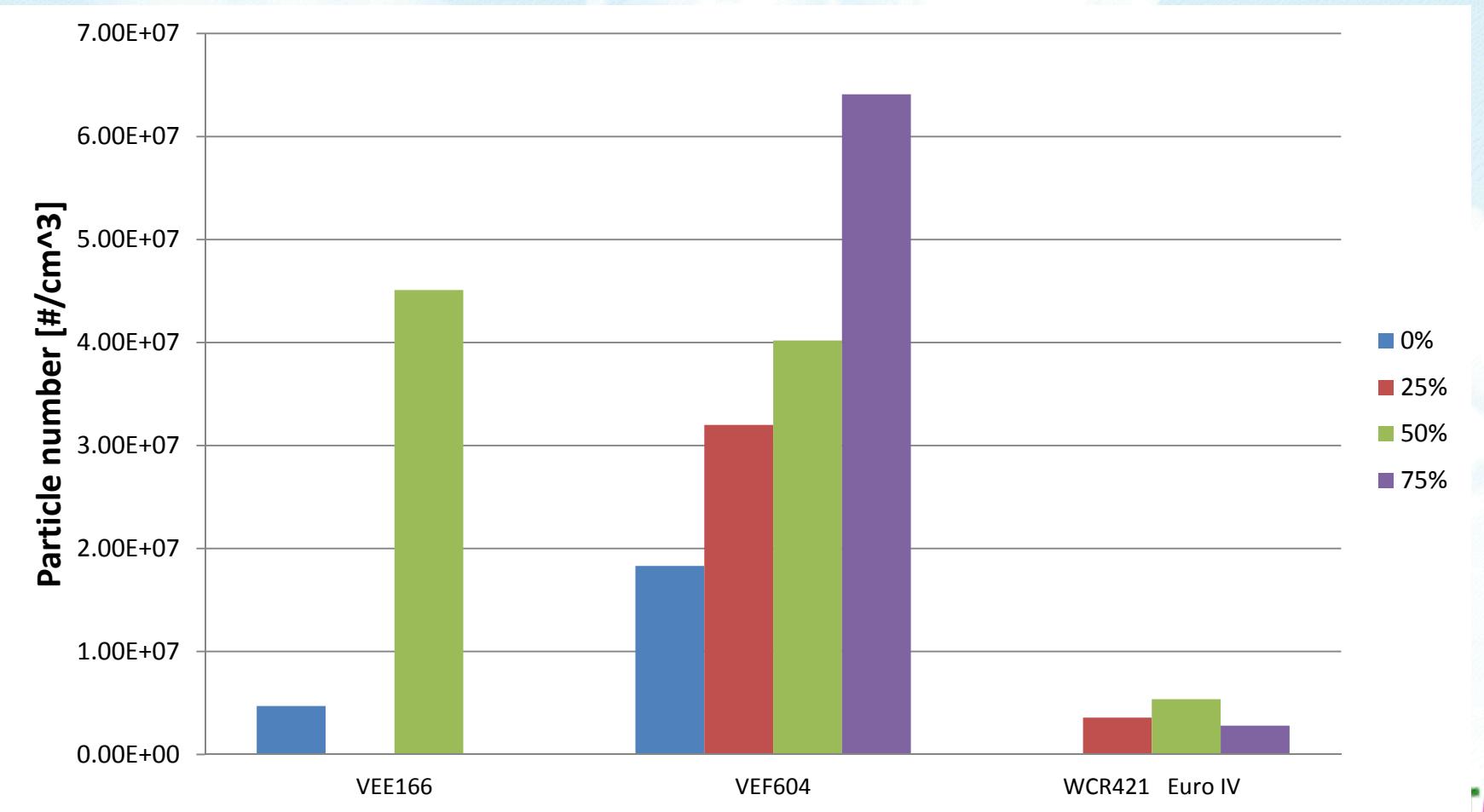
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2. Base line results – Euro II (Steady State)



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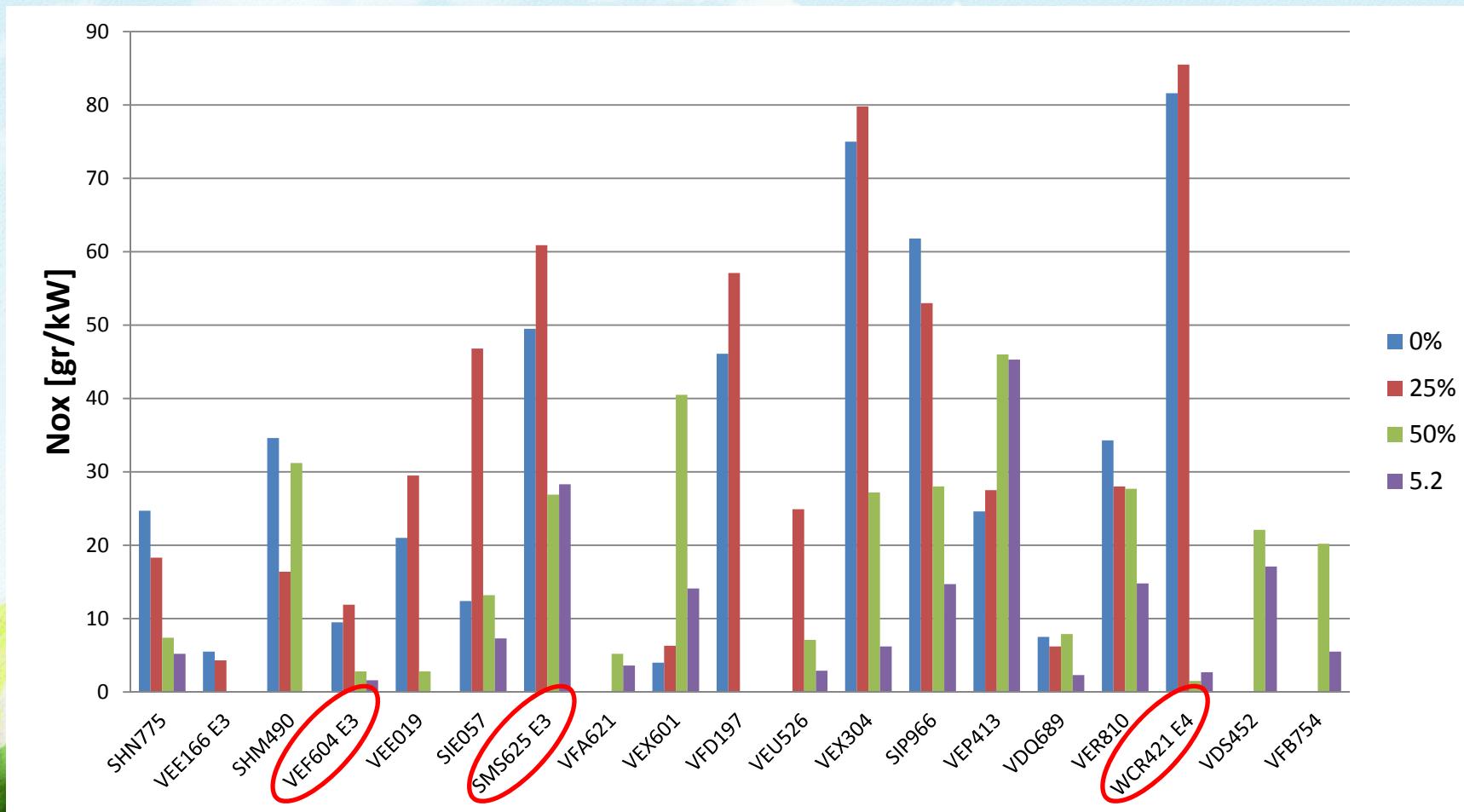
2. Base line results – Euro III and IV (Steady State)



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Nox (Steady State)



Euro III and IV

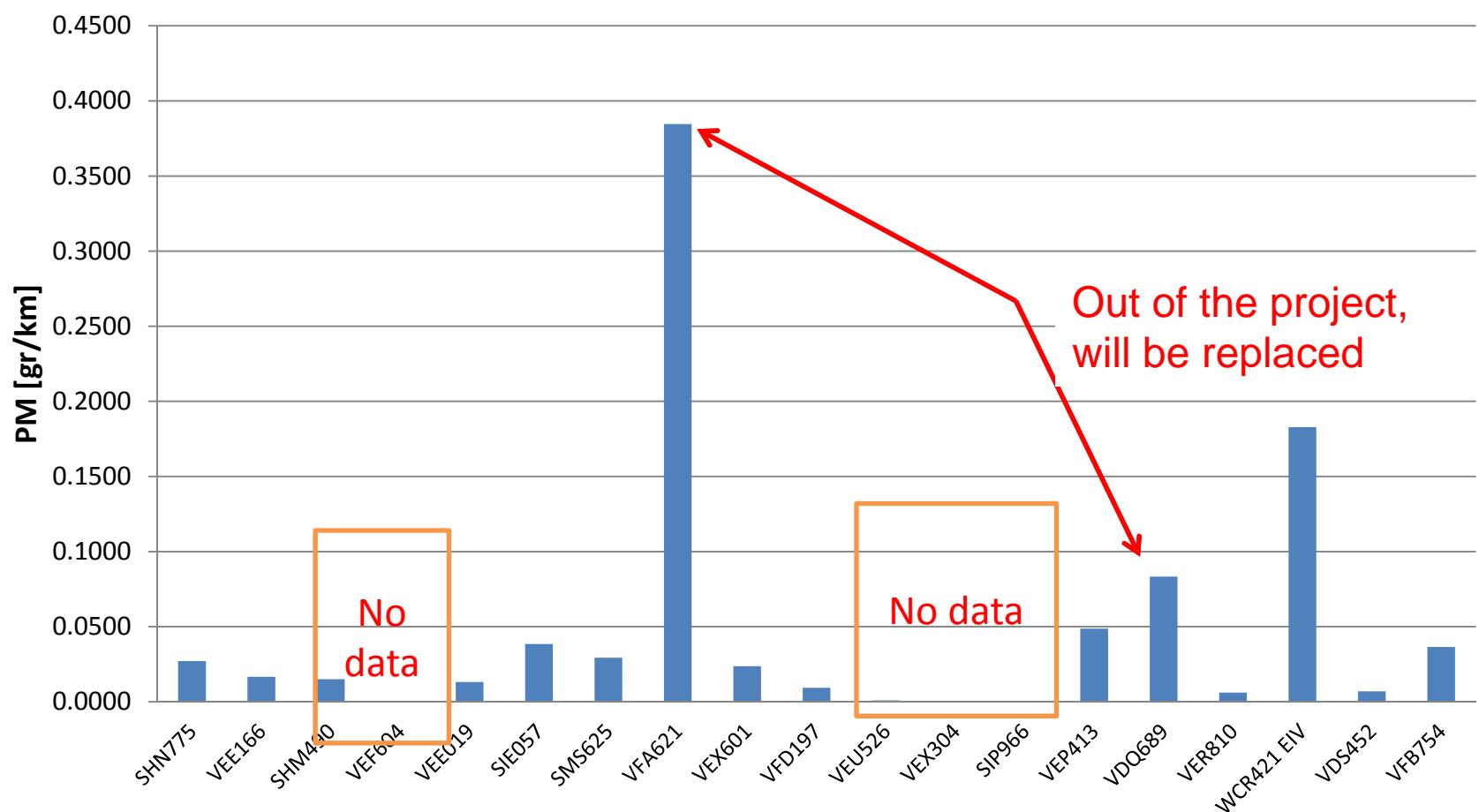


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3. Base line results PM10 (Emission Factor – Onroad Testing)

Average: 0.039 [gr/km]

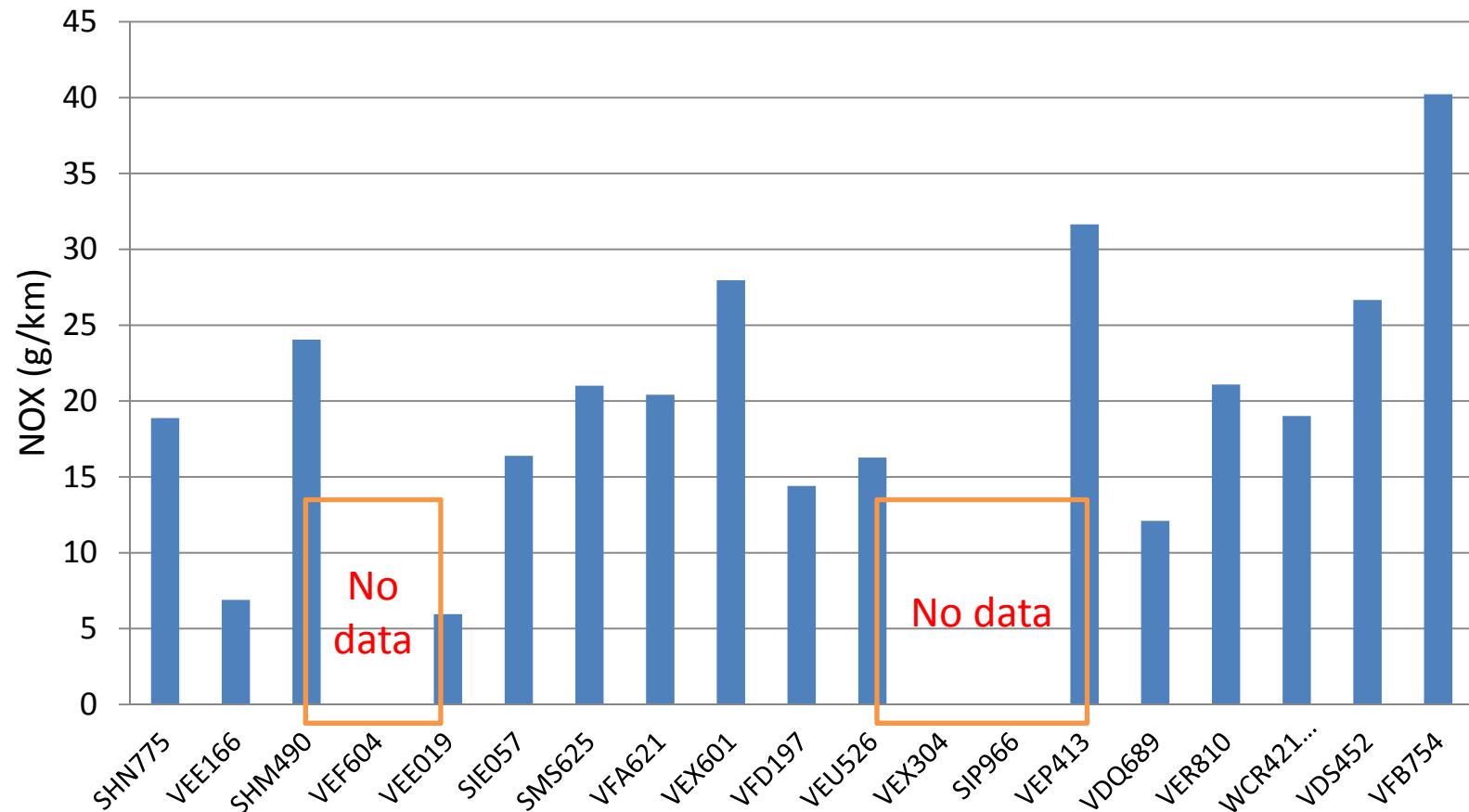


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3. Base line results NOx (Emission Factor – Onroad Testing)

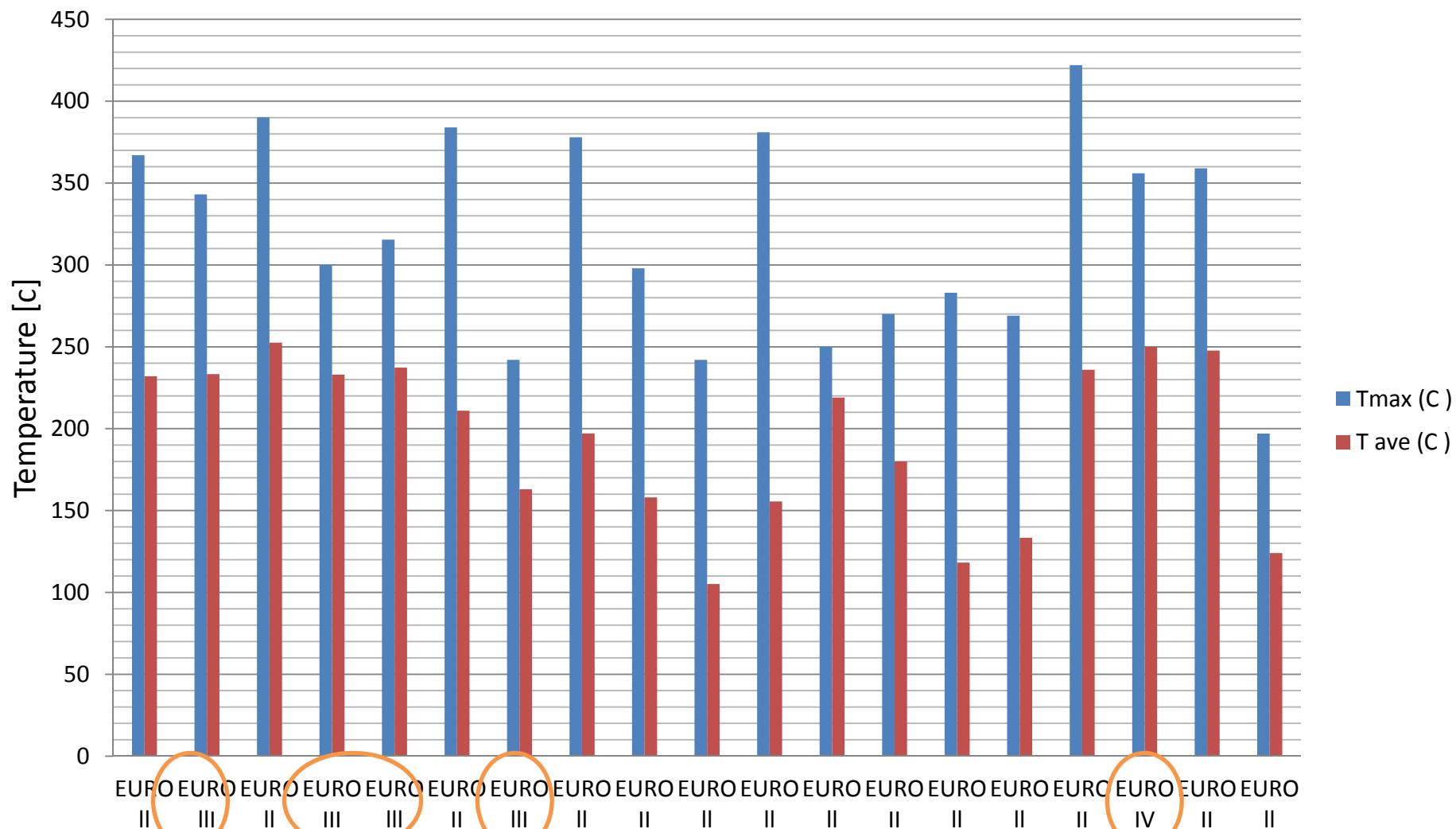
Average: 33.32 [gr/km]



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Pre dataloggin temperatures



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4. What's Next

The Bogota DPF Project

Time line December/2013-Jun/2015

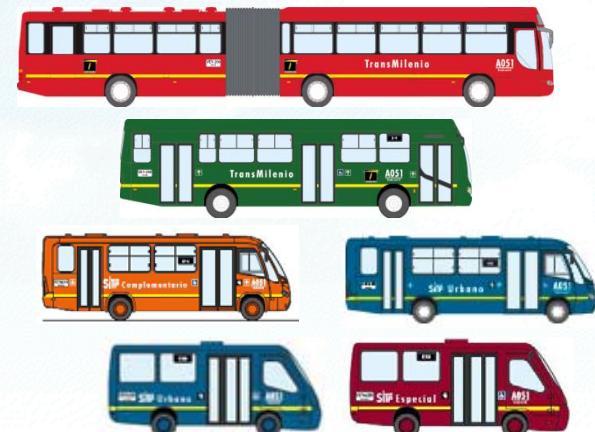
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Stage 2

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Thank you...!

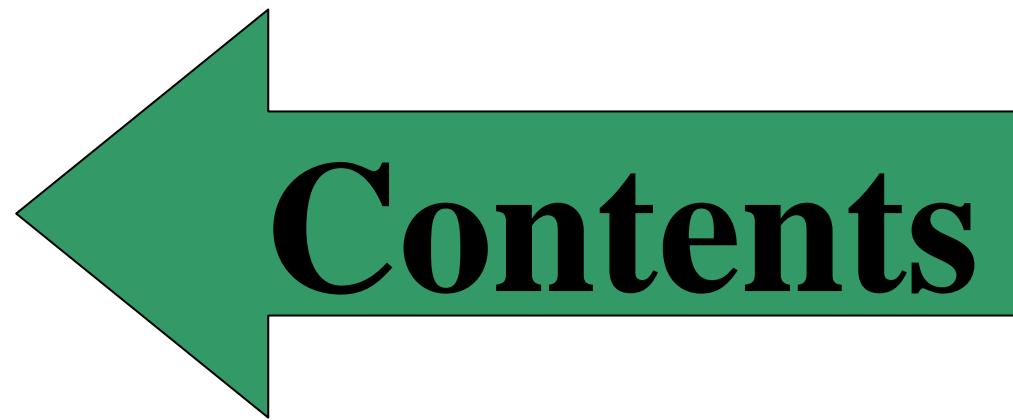
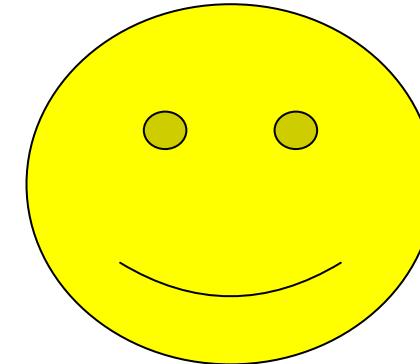


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