

Potential solution to reduce PM pollution in a big city

Soot-free Tehran

International workshop on solutions for eliminating
Diesel and gasoline emitted soot from urban air

7th SEP 2016

Sharif University of Technology, Tehran, Iran



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Agenda

- **Isuzu Motors Limited , Isuzu Motors Germany**
- **What is PM2.5 ?**
- **Is DPF effective solution to reduce PM2.5 ?**
- **Key points for „DPF into market“**
- **Market experiences of Isuzu DPF technology**
- **Case study in a big city**
- **Summary**

Isuzu Motors Limited



Date of Establishment
9th APR, 1937

Sales
Consolidated 1,927 bn yen
FY2015-2016

Employee
Consolidated 32,418
As of MAR 2016

● Light- to heavy-duty trucks



● Pickup trucks



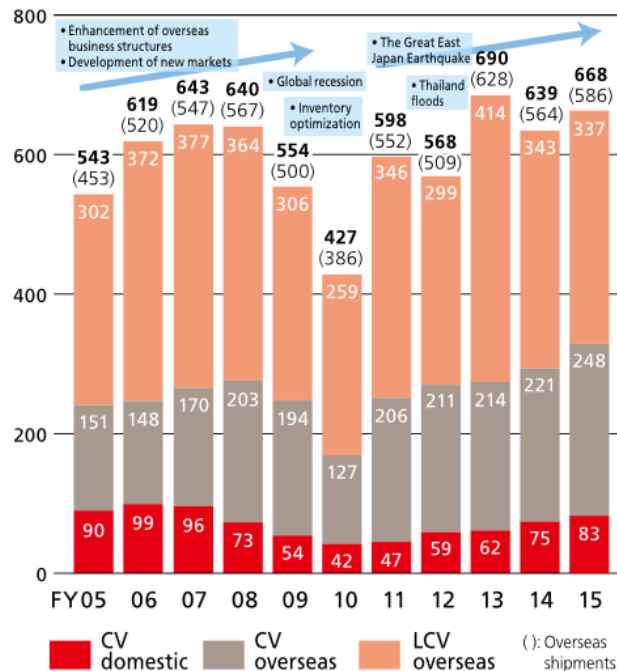
● Buses



● Industrial diesel engines

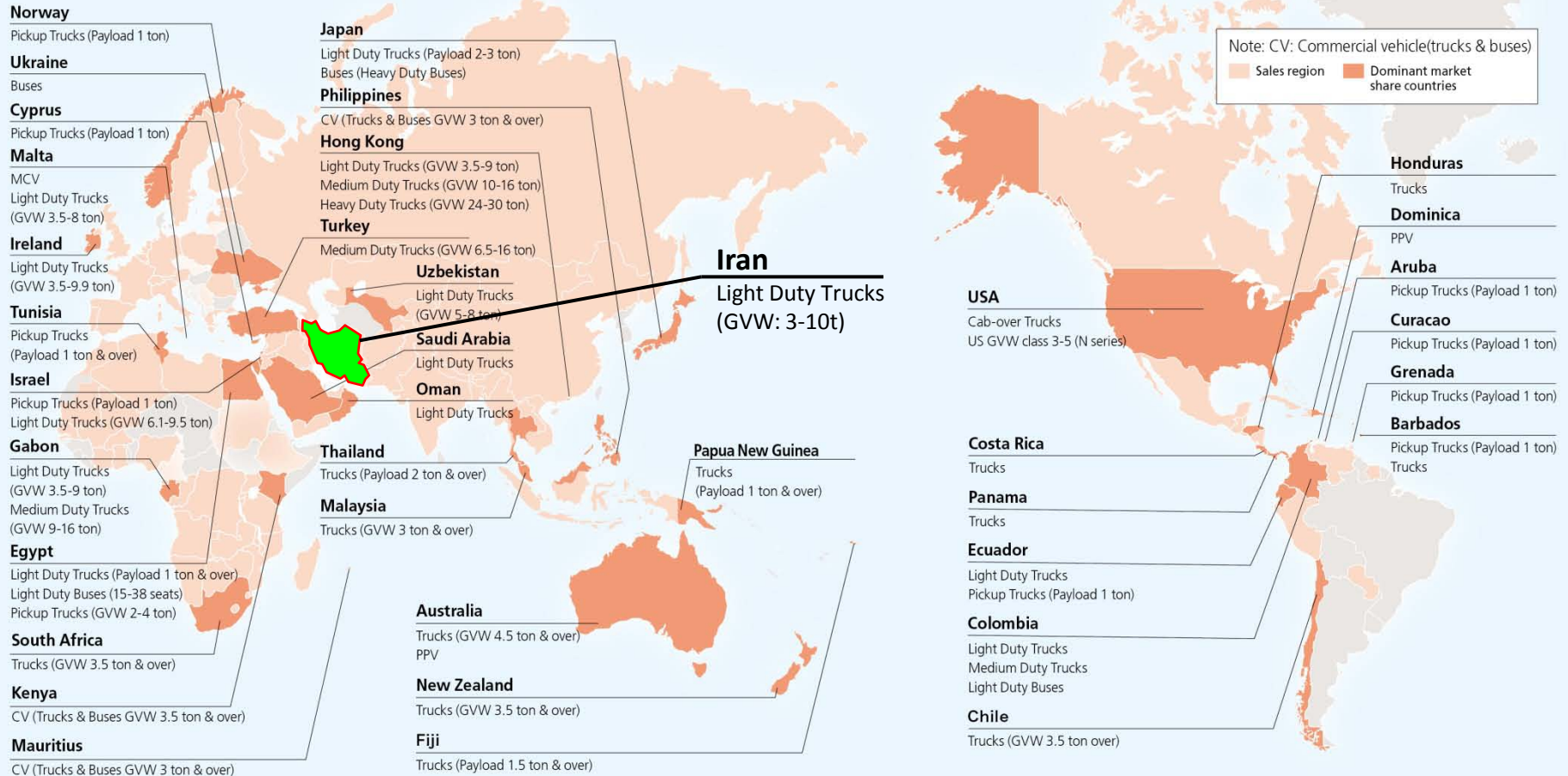


Global CV / LCV Shipments (K-units)
Finished vehicles, KD sets, and others



Isuzu Motors Limited

No. 1 Market Share in 2015 (Based on sales figures compiled by Isuzu) Source: Isuzu Motors



Isuzu Motors Germany GmbH



Location

Ginsheim-Gustavsburg, Germany

Business units

Development

Aftersales

Training Center

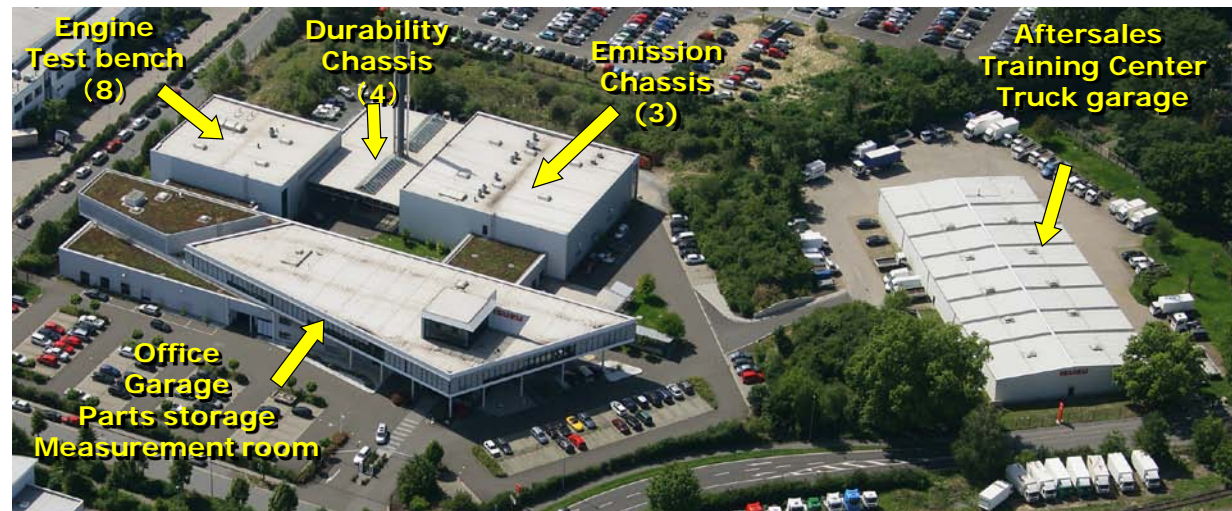
Employee

135

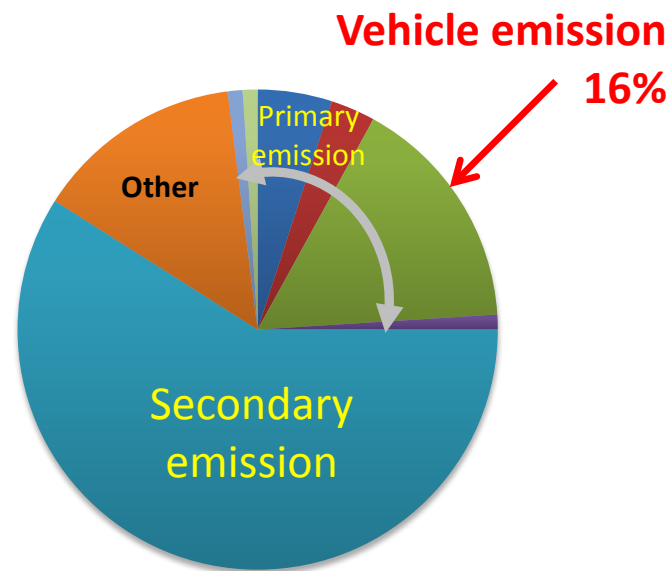
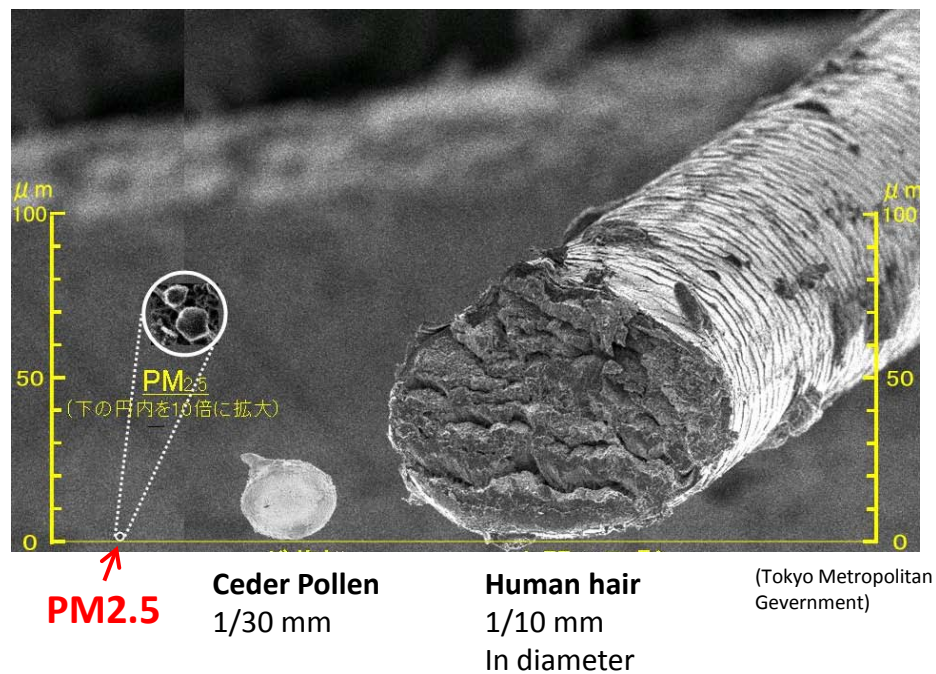
As of MAR 2016

Development functions

- Engine calibration(LCV&CV)
- Various road tests
- Advanced development
- Type approval tests (Euro regulation)
- Benchmark activities
- Design & project management



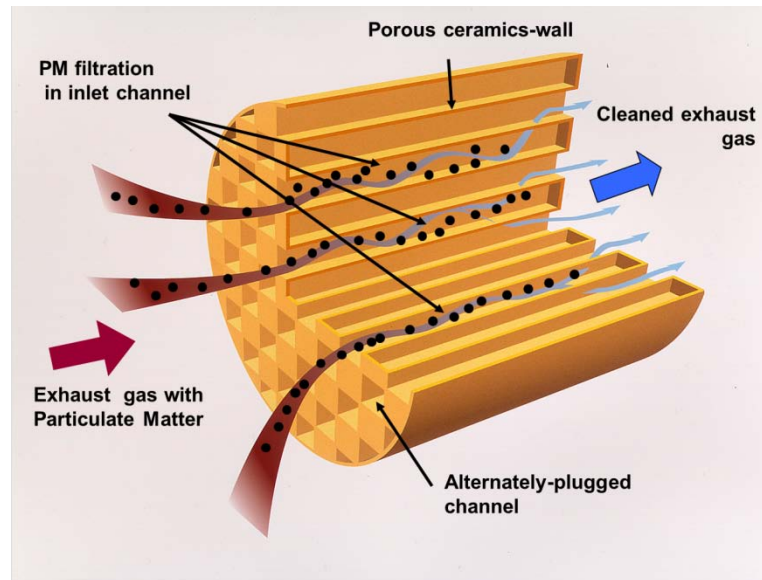
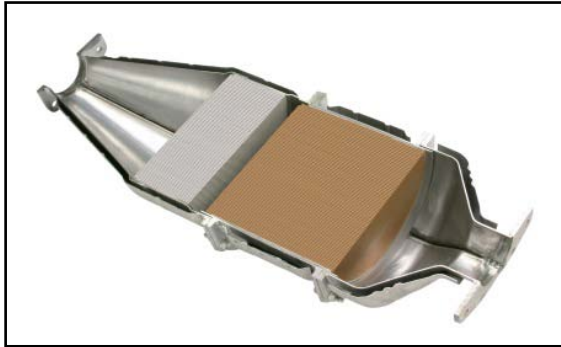
What is PM2.5?



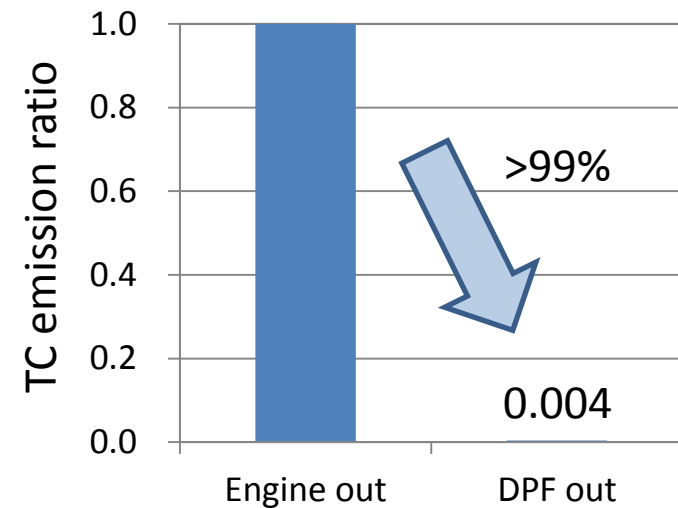
**Apportionment of
emission sources in
2007-2008**

(Nakajima et al, 2009)

Is DPF an effective solution?



NGK INSULATORS, LTD.



Source:
Isuzu Advanced Engineering Center
Test cycle: JE05

Yes, However



Key points for „DPF into market“

- ✓ **Fuel quality**

- Low sulphur fuel is mandatory

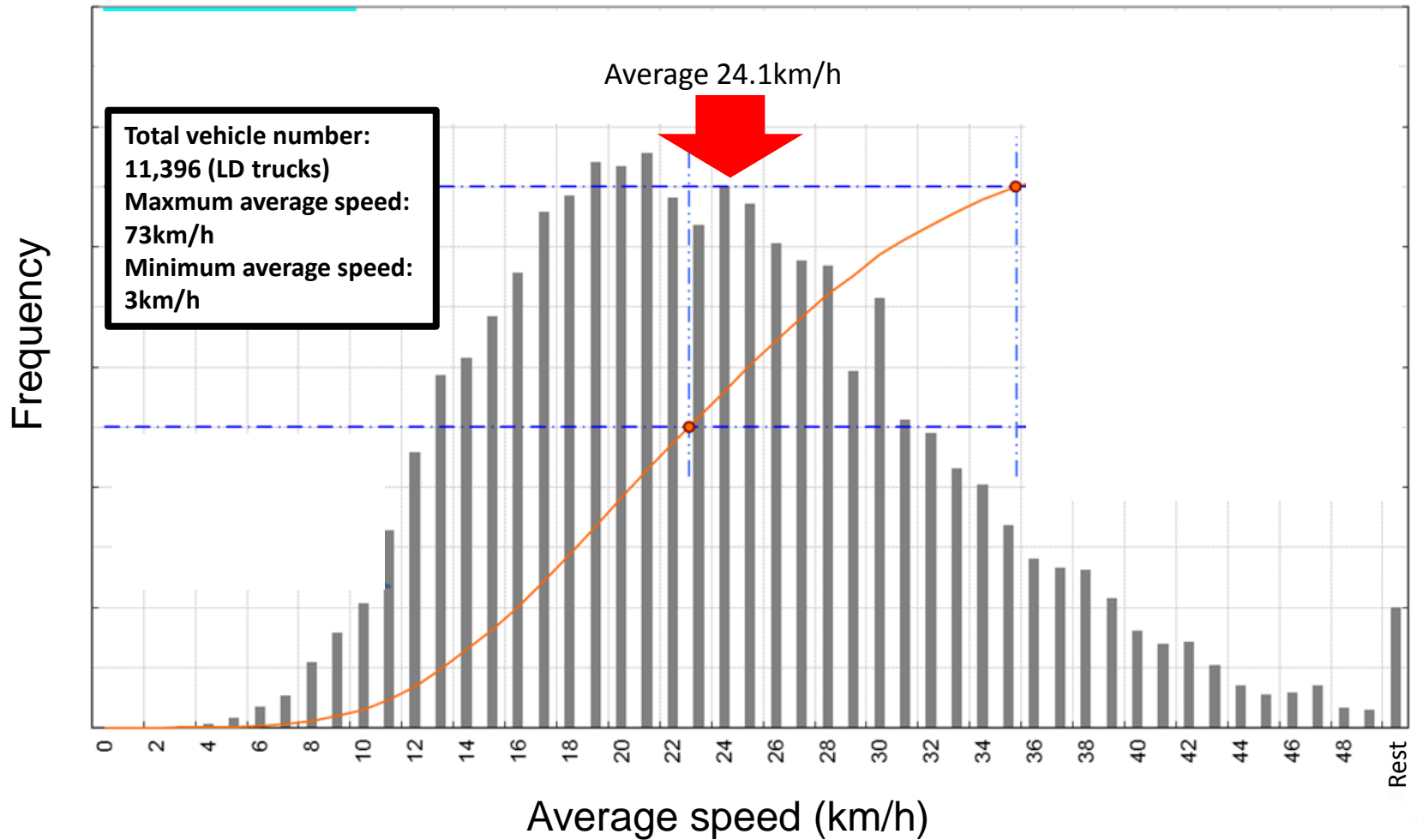
- ✓ **Low ash engine oil**

- ✓ **Low speed, low load operation
and frequent engine stop**

- ✓ **DPF system information to market**

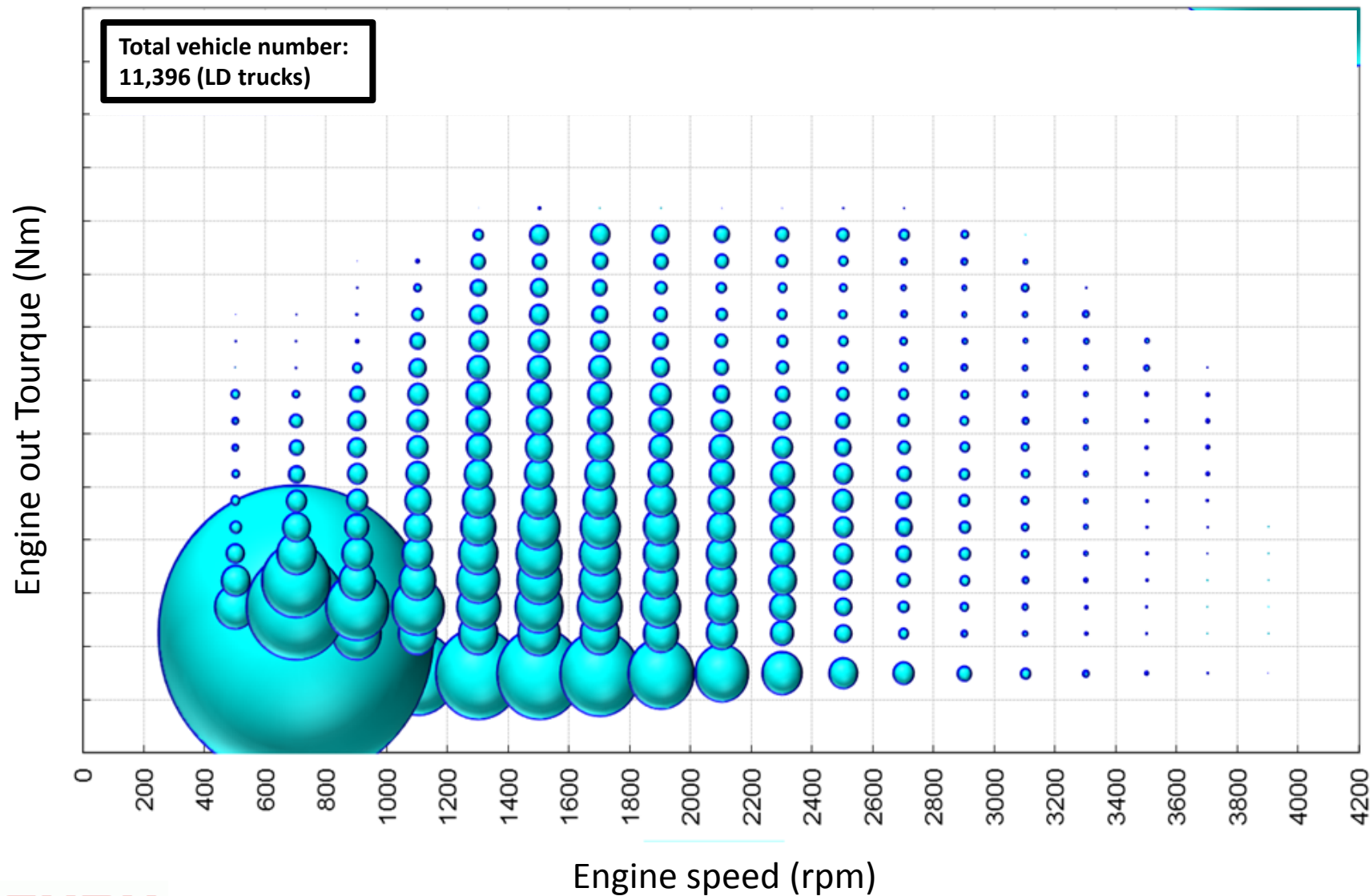


Driving profile



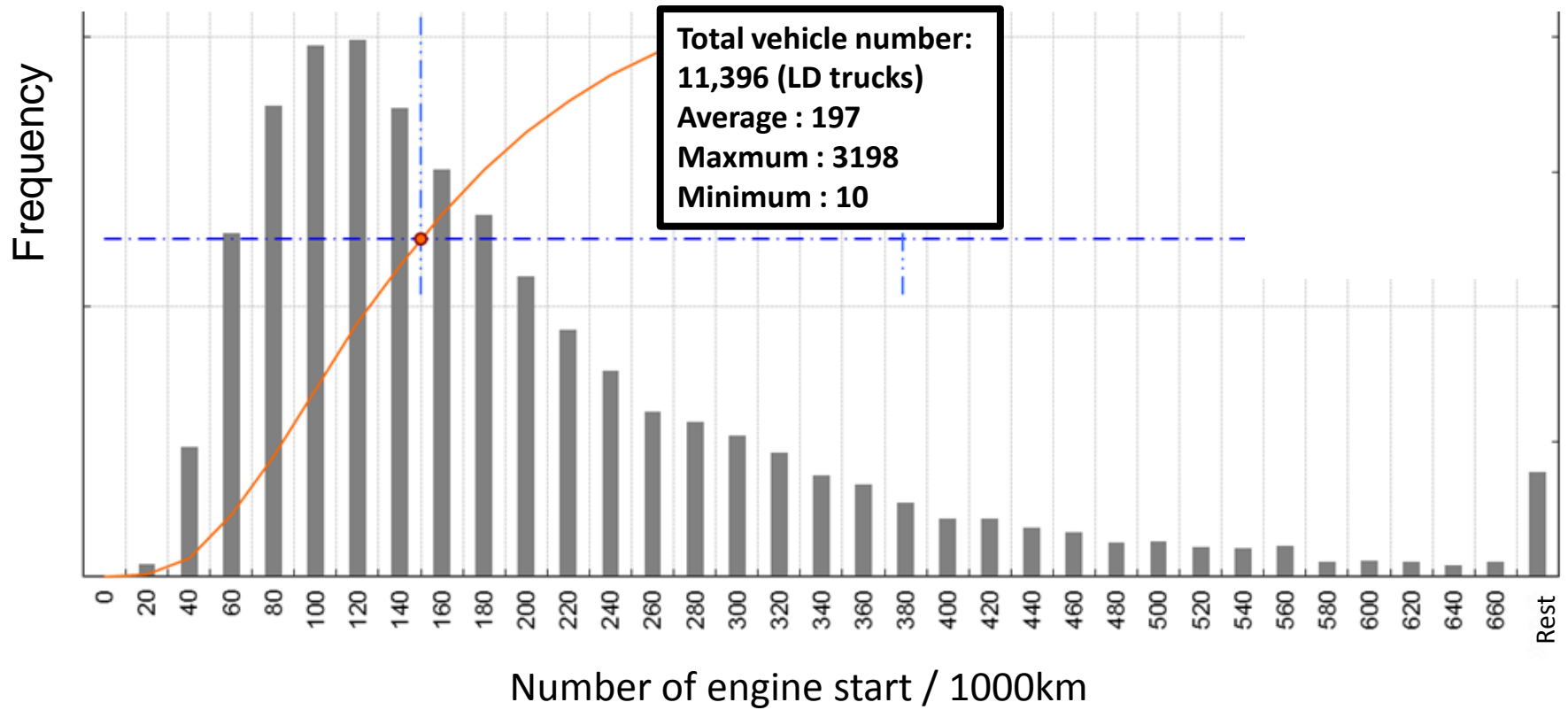


Driving profile





Driving profile

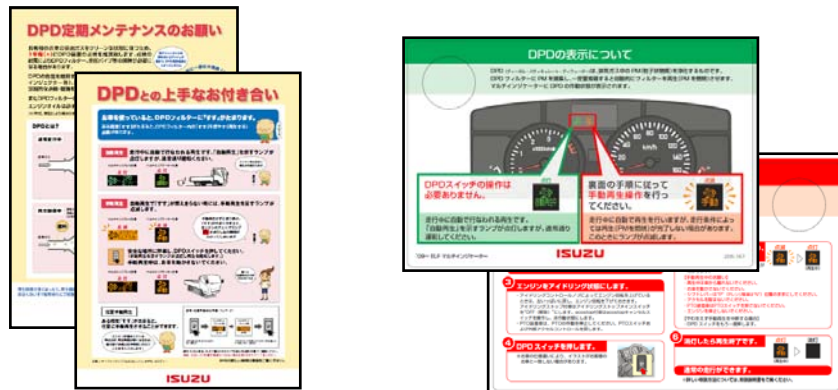


Further cares for market

Provided VIDEO about DPF



Provided information on HP and brief instruction in vehicle



Futher trainings for mechanics





Market experiences of Isuzu DPF technology



Since MY2005

With DPF



Since MY2006

With DPF



Since MY2007

With DPF

2000

2005

2010

2015

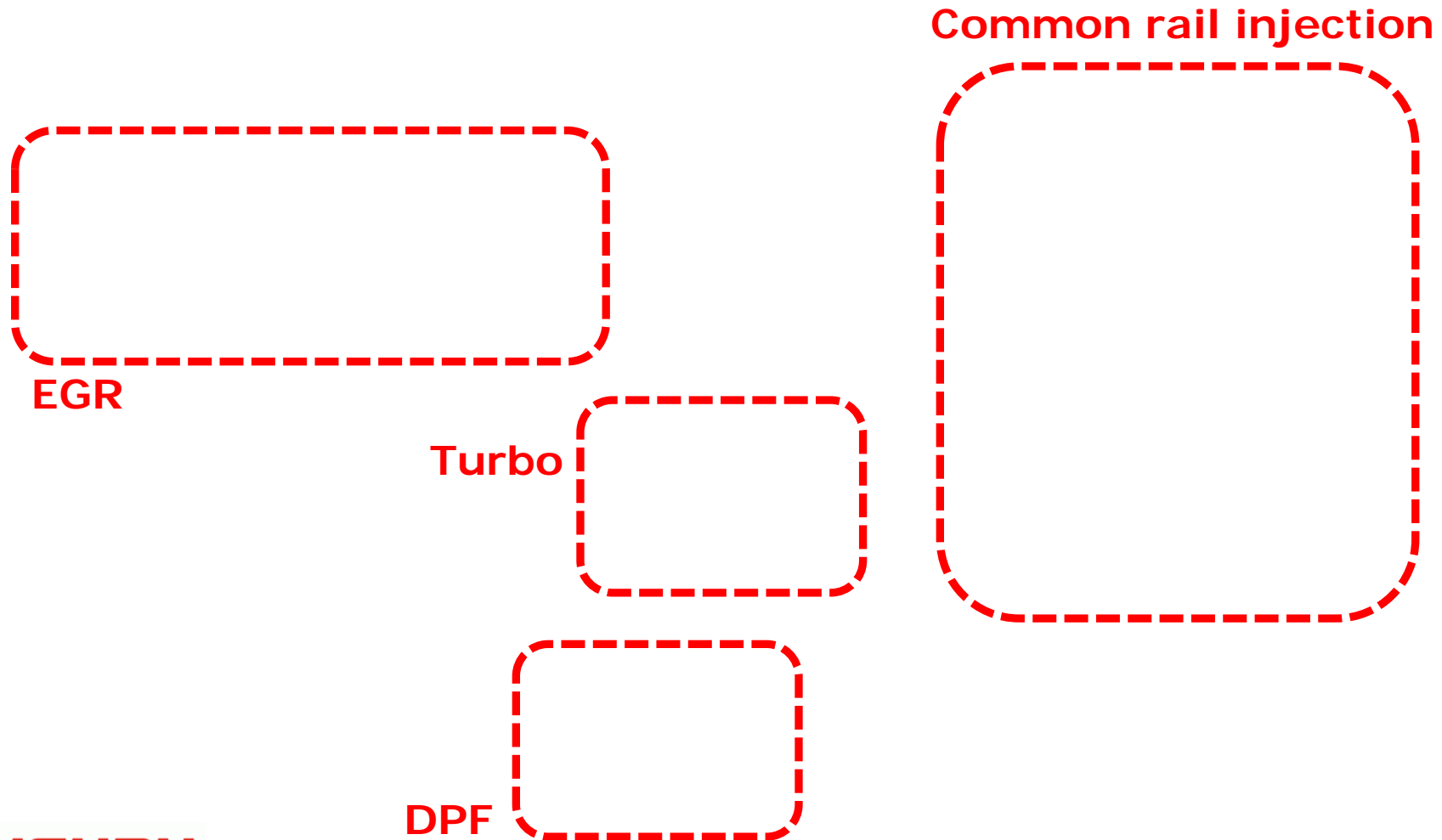
Model Year

More than 10 years market experiences

ISUZU

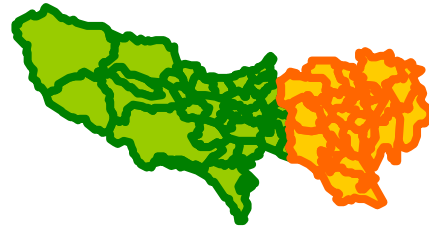


Potential system for proposed Iran IVa





Case study for a big city

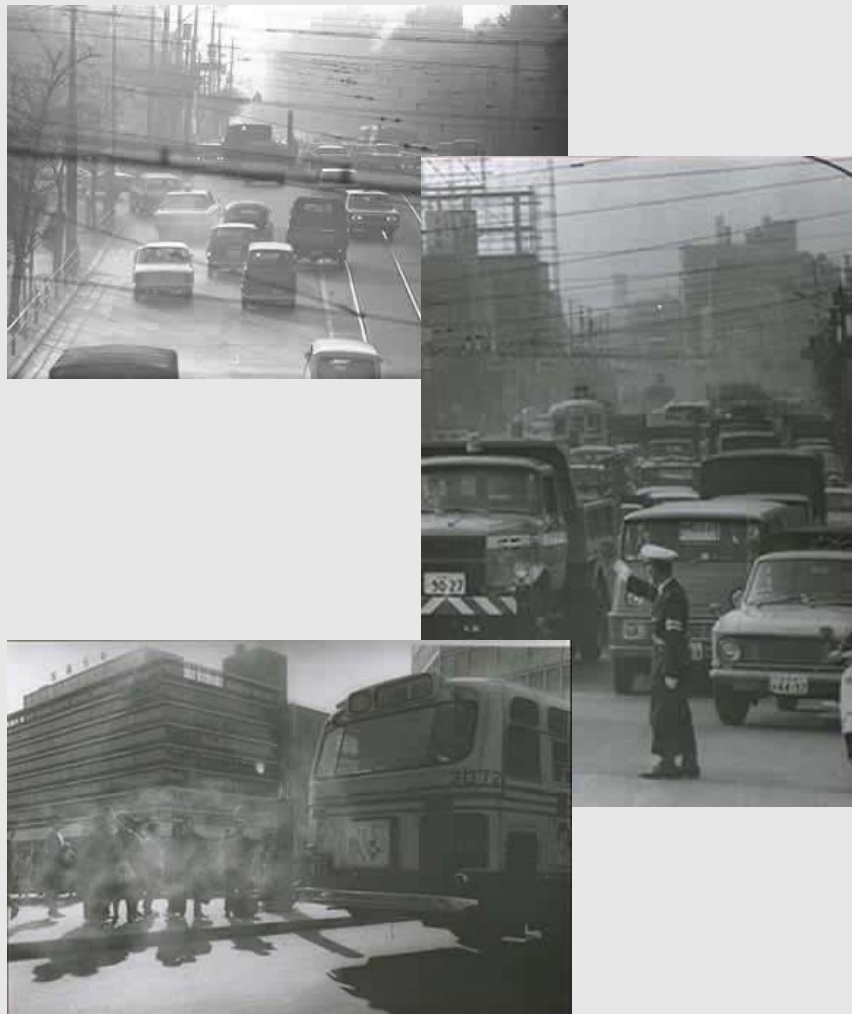


	Tokyo	Tokyo	Tehran
	Whole area	Urban, 23wards	Urban
Area (sq. km)	2,188	626	730
Population (Mil. persons)	13.6	9.35	8.85
Density (persons / sq. km)	6,225	15,048	12,119

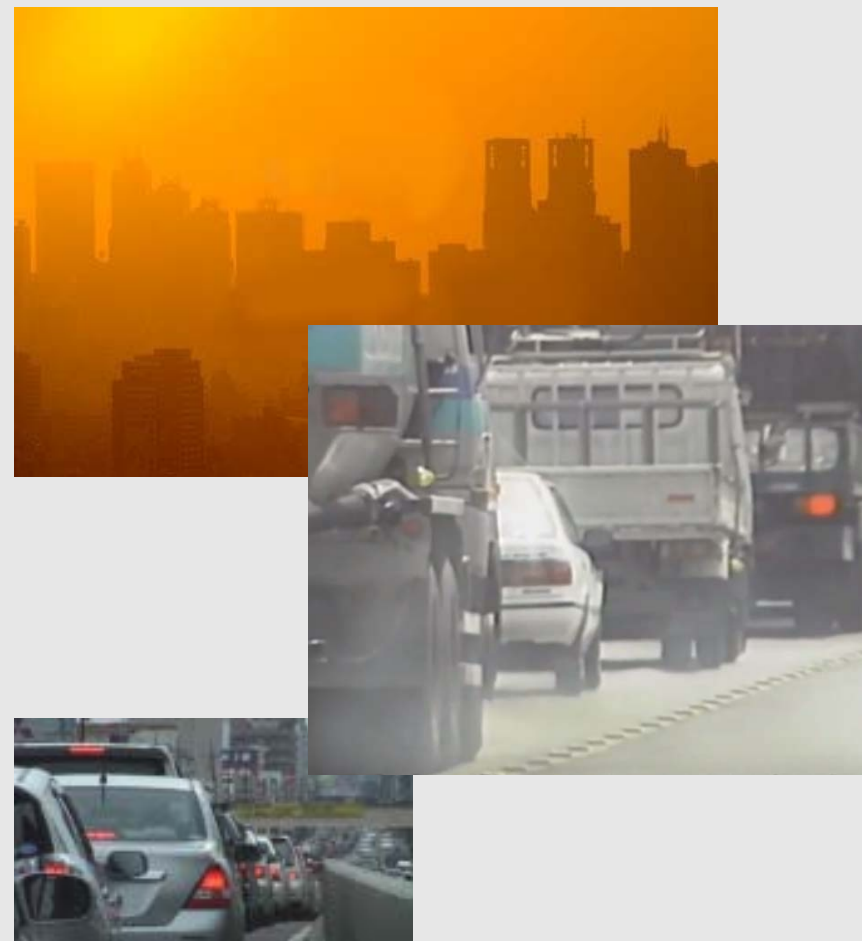
Source:
Tokyo Metropolitan Government. Retrieved January 17, 2015
Statistical Center of Iran. Retrieved 23 January 2015



Once upon a time in Tokyo



1960s-1970s



1980s-1990s

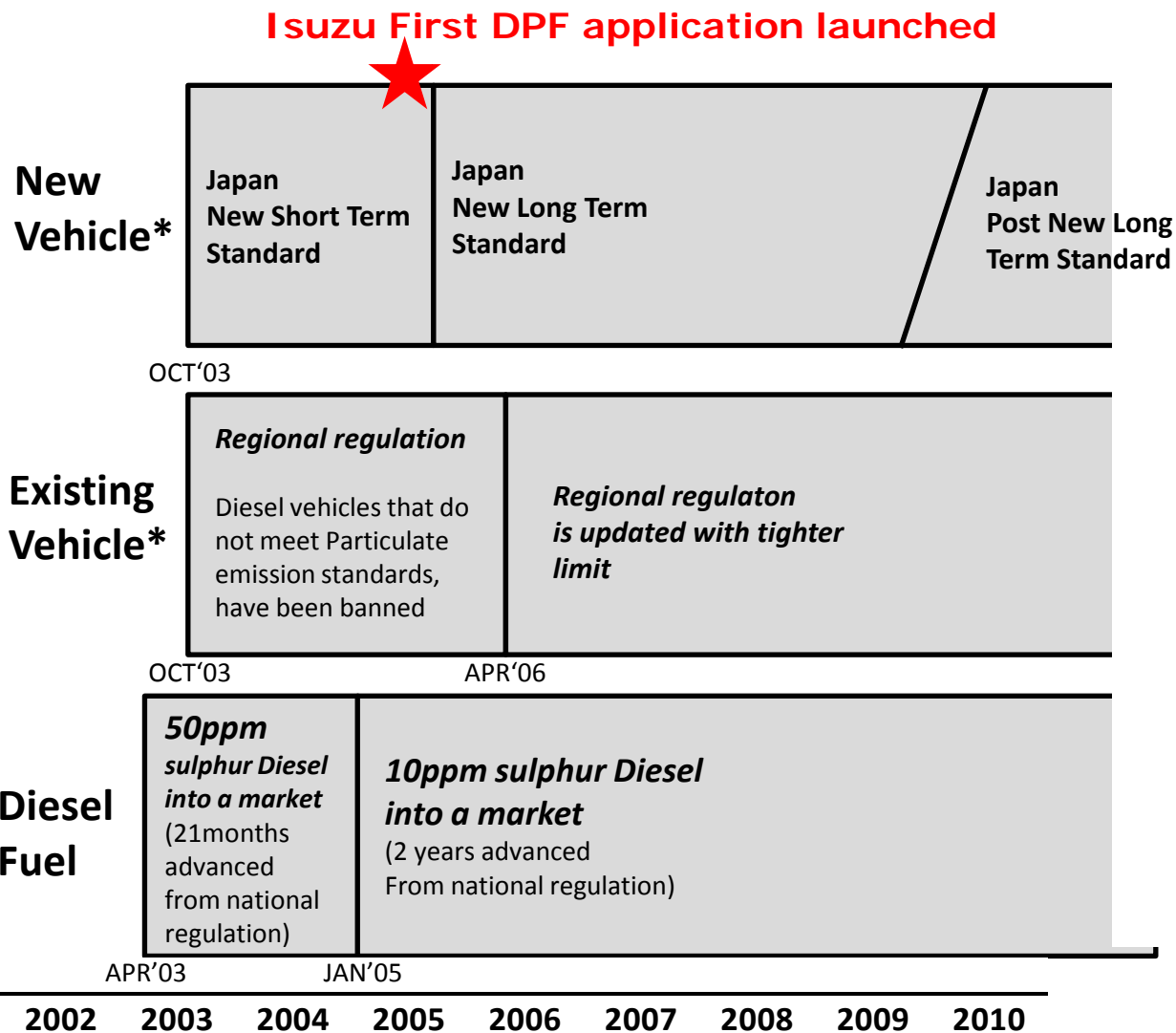
History of major regulations



AUG'99

Governor of Tokyo in a memorable press conference

Source: Tokyo Metropolitan Government



Action package by Tokyo city

Development cooperation for retrofit DPF

Obligation to use low emission vehicle on larger fleet users

Deployment of diesel quality investigators

Monitoring of emissions in various places

Hotline for report from Tokyo residents



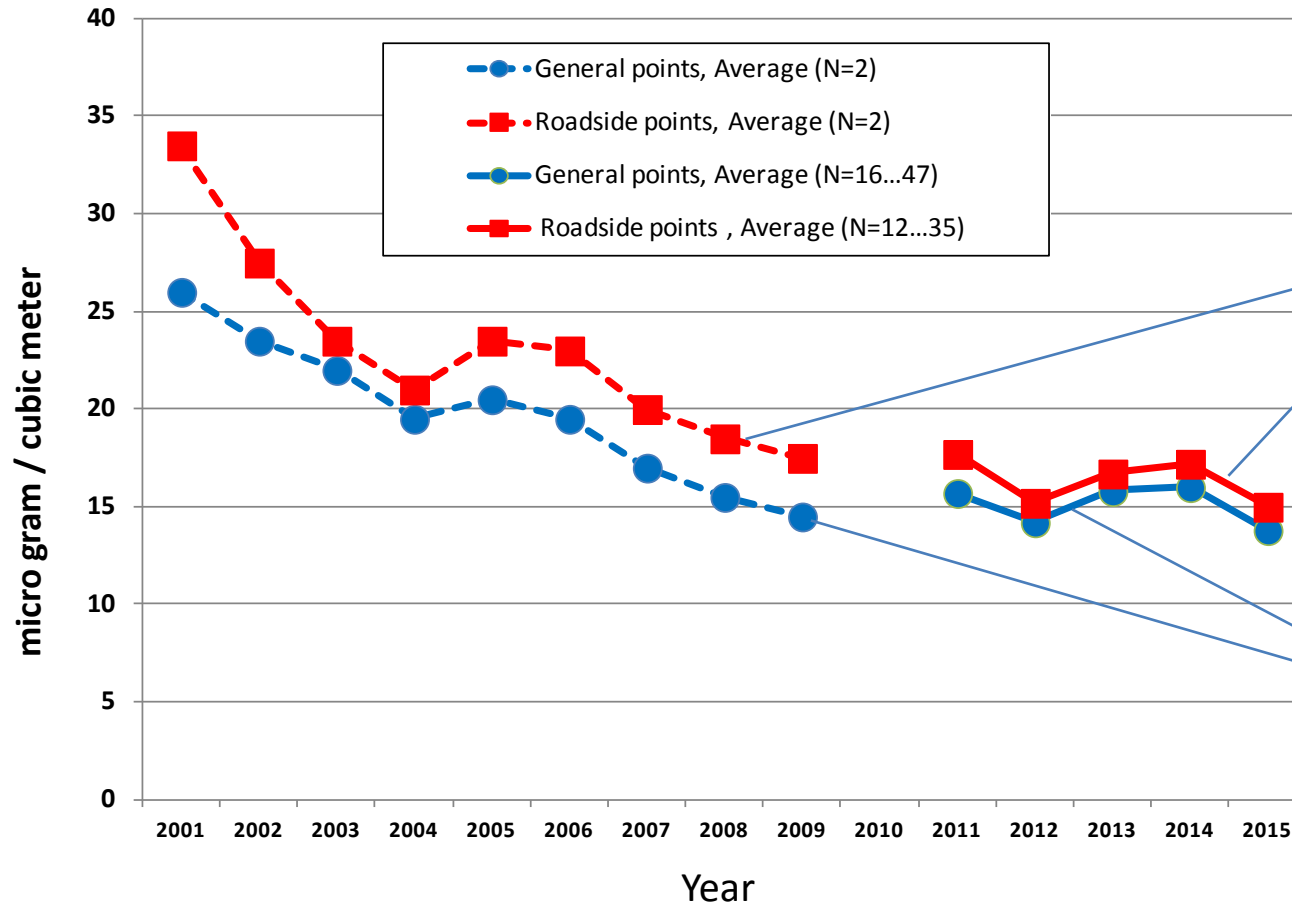
Road inspection to crack down on an illegal vehicle



Monitoring by fixed & mobile camera to crack down on an illegal vehicle



PM_{2.5} in Tokyo



Roadside measurement point



General measurement point



Data source: Tokyo metropolitan Government
 Picture source: Ministry of Land, Infrastructure, Transport and Tourism, Shinagawa city, Tokyo



View from Tokyo



Source: Tokyo Metropolitan Government



Summary

- **DPF is one of effective solution to reduce particulate emission if requirements are fulfilled**
- **Isuzu has long experience at various markets concerning the DPF technology**
- **Potential system is available for proposed IranI Va emission standard**
- **Experiences in Tokyo Metropolitan Government would be a good example for further challenges in Tehran**



Technology

Thank you for your attention