Best Practices in Reducing Transportation Emissions: Adoption of Vehicle and Fuel Standards in Latin America

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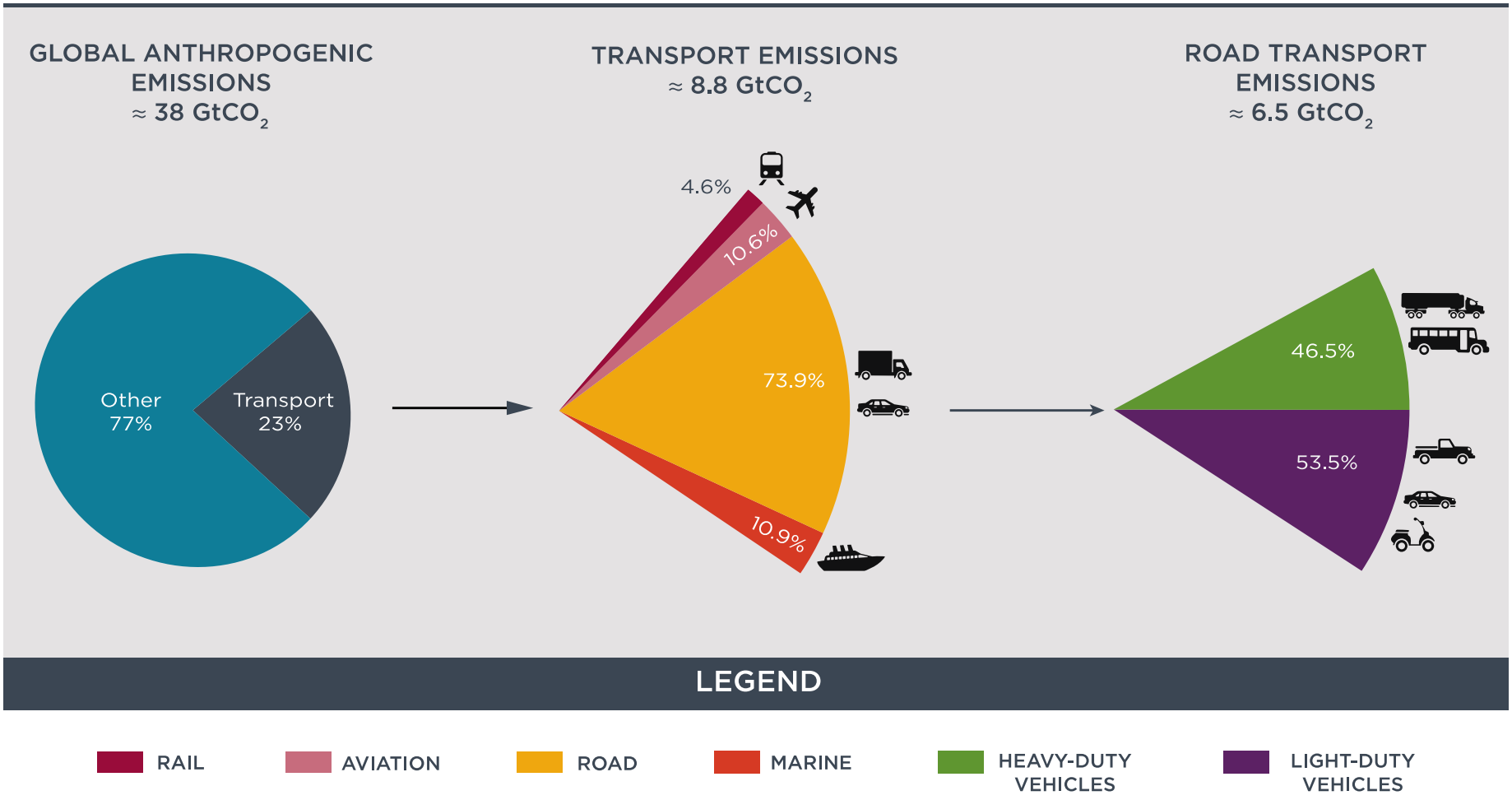
Why is it important to reduce emissions from the transportation sector?

Transport is a growing sector and important source of emissions detrimental to climate and public health



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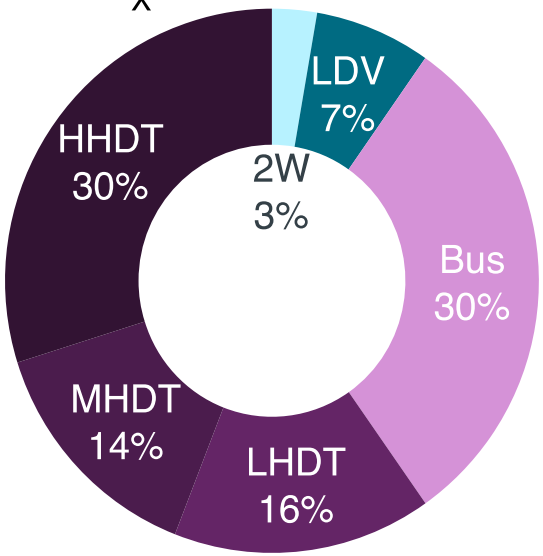
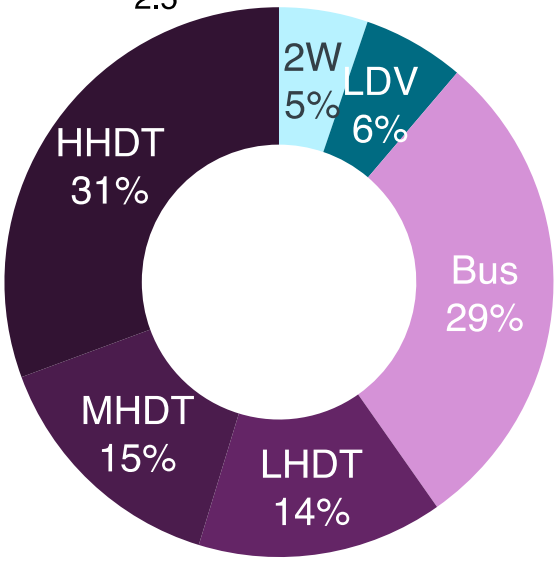
3.7M deaths annually are attributed to air pollution with local pollutants from HDV particularly to blame

NO_X Emissions in Latin America, 2015



$PM_{2.5}$ Emissions in Latin America, 2015



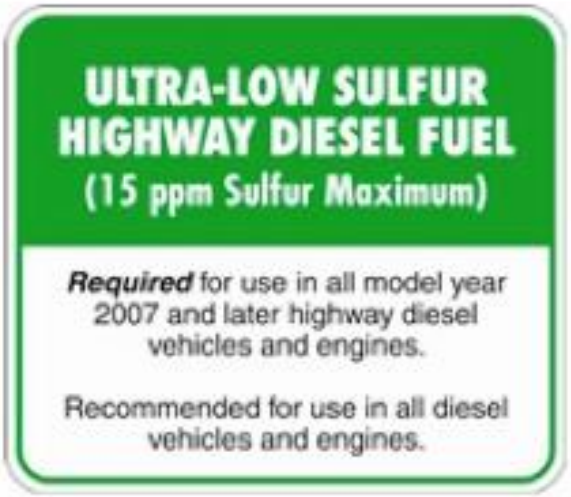
- Trucks and buses represent 90% of particulates, NOx and fine particulates ($PM_{2.5}$)
- These pollutants are are linked to chronic illness – heart disease and stroke (80% of health burden) as well as lung cancer and chronic pulmonary diseases
- Black carbon (e.g. soot from diesel engines) is the second most important contributor to man made climate change

Mitigating transport emissions has important productivity and equity implications in urban settings

- In Latin America, transportation accounts for 20% of all CO_2 emissions and is the main source of GHG emissions in most countries
- Equity implications in the improvement of public transportation towards zero emission vehicles given exposure in urban settings
- Adoption of new technologies can lead to economy wide productivity gains – particularly for ZEVs in conjunction with smart city applications

How do we reduce emissions from the transportation sector?

Emission reduction strategies must be systemic – focusing on fuel and vehicle improvements

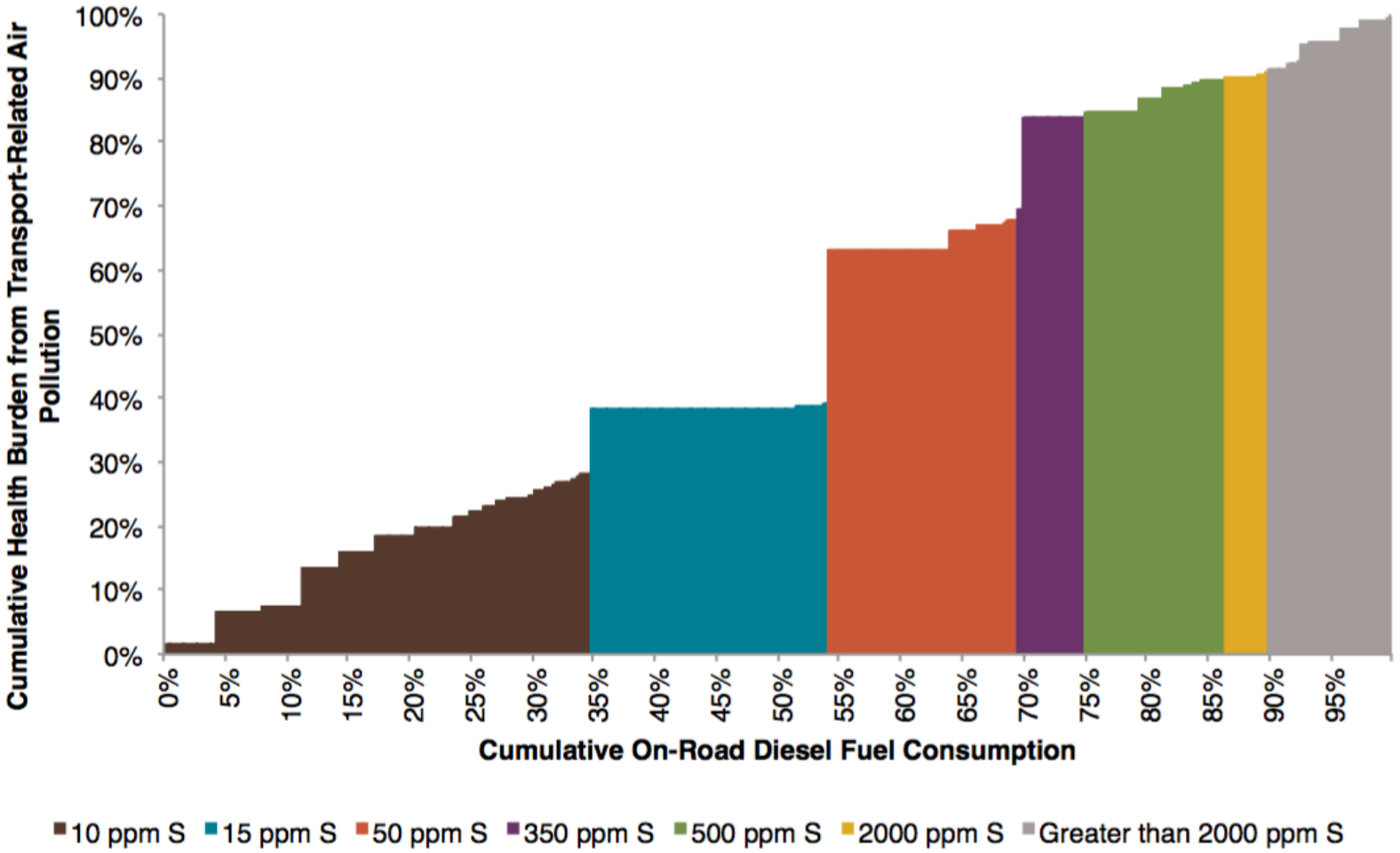


Diesel particulate filter

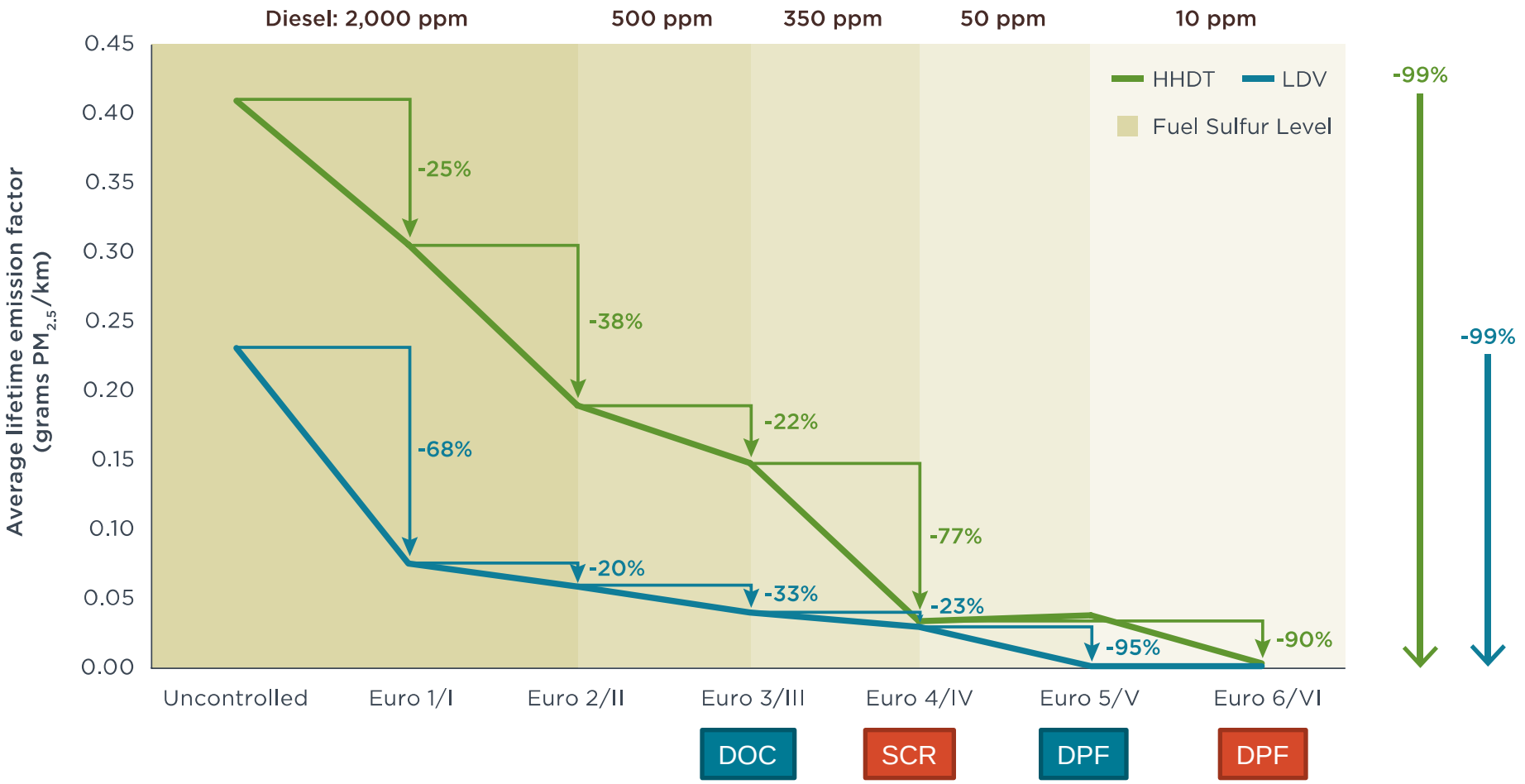
50 ppm sulfur is necessary for diesel filters to function ….

10-15ppm sulfur is necessary for them to work well

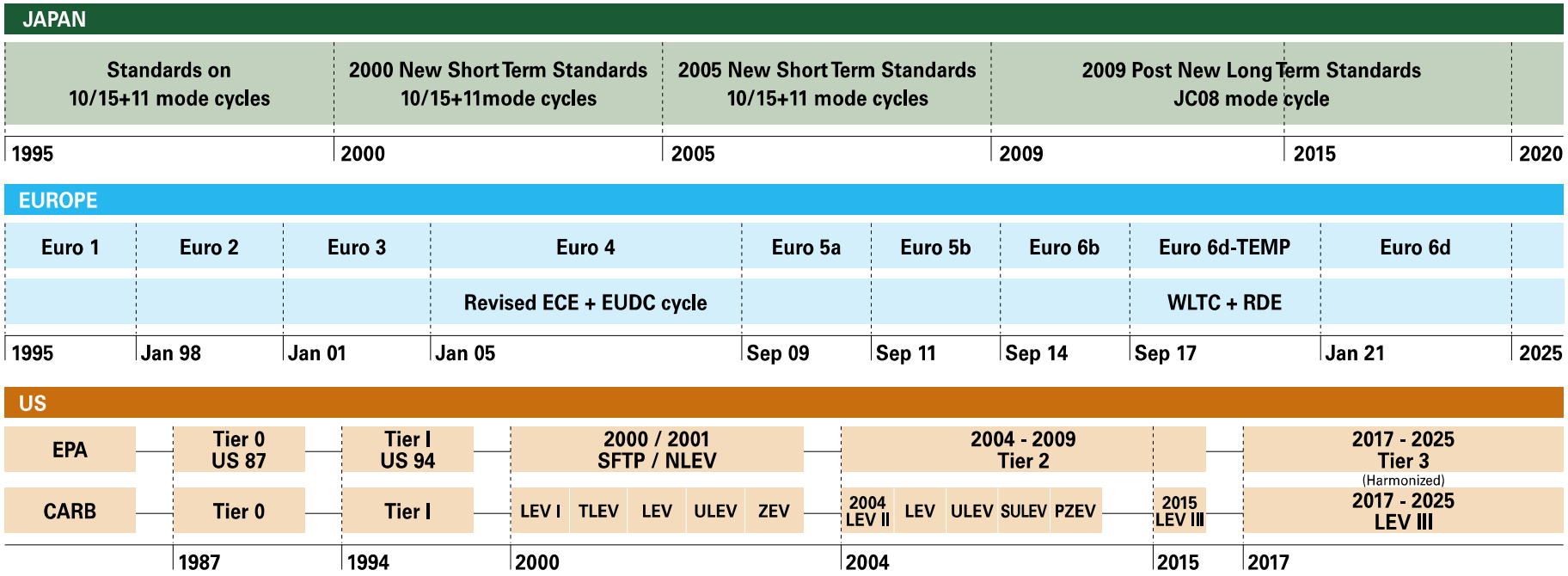
There has been a global convergence towards higher quality fuels - led by major markets



Cleaner fuels are a prerequisite to technologies that can virtually eliminate tail-pipe emissions

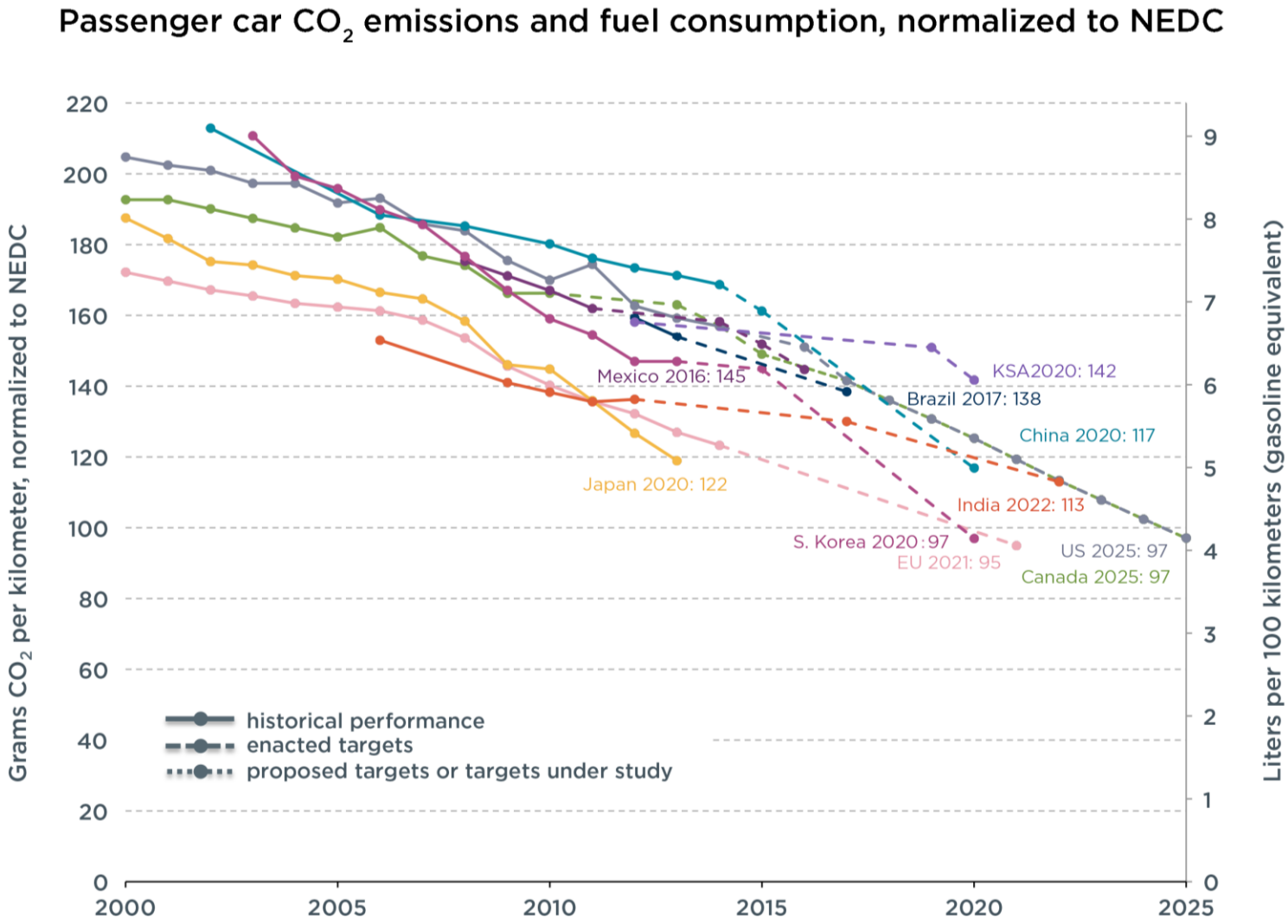


Major vehicle markets have seen a progression in stringency on vehicle emission standards



- Euro VI equivalent standards will be applicable nationwide in China by 2019 and India by 2020
- In 2015, 47% of new LDV sales globally met Euro VI and 83% were subject to fuel economy standards

Standards have spurred technology improvements, reduced emissions and improved fuel economy



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The incremental costs of meeting new vehicle emission standards are marginal for LDVs & HDVs

- Per vehicle incremental cost for LDVs

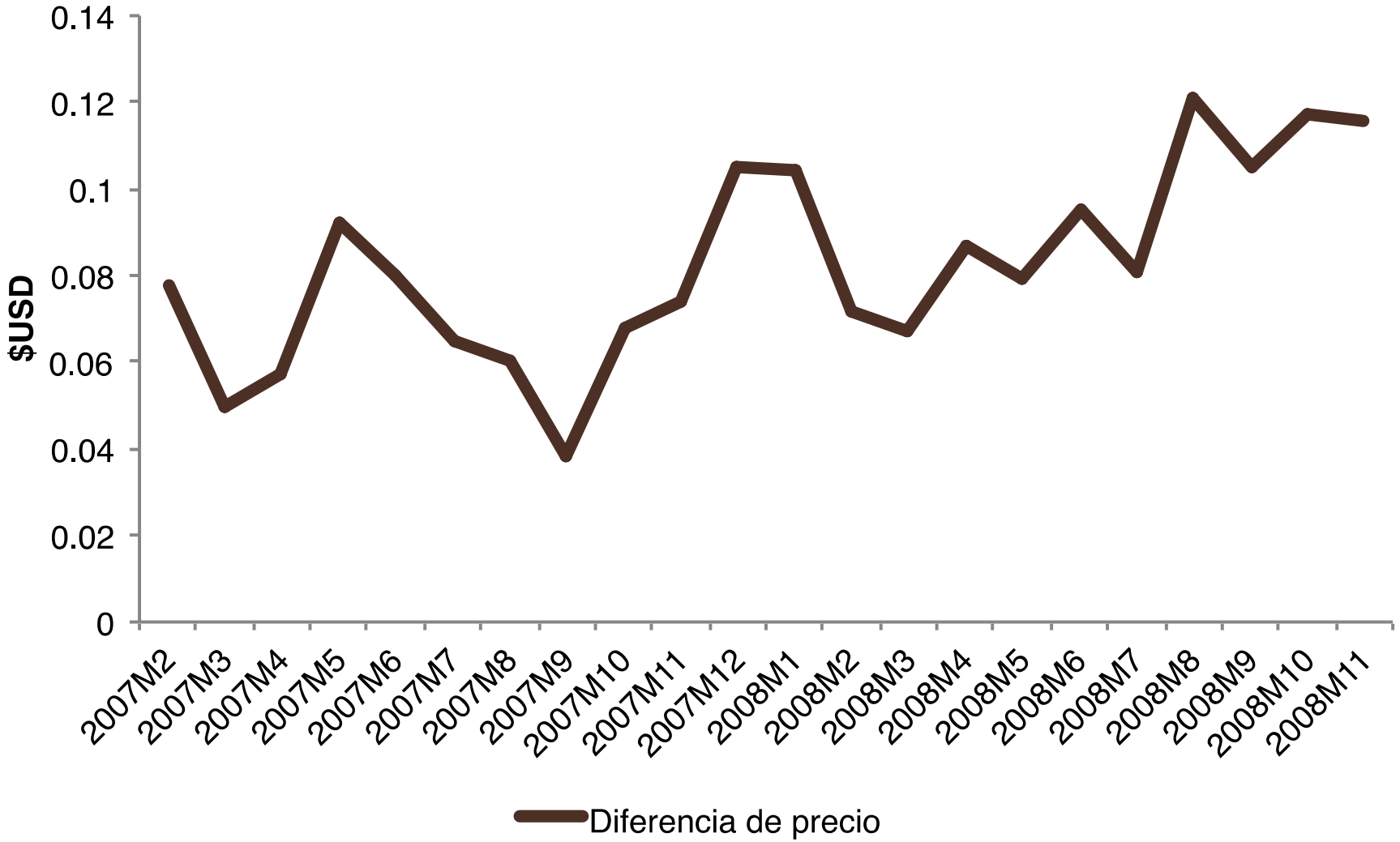
ENGINE TYPE	VEHICLE CLASS	EURO 1 (BASELINE)	EURO 1 TO EURO 2	EURO 2 TO EURO 3	EURO 3 TO EURO 4	EURO 4 TO EURO 5	EURO 5 TO EURO 6	NO CONTROL TO EURO 6
Gasoline	4 cylinders Vd= 1.5 L	$142	$63	$122	$25	$10	--	$362
Gasoline	4 cylinders Vd = 2.5 L	$232	$3	$137	$15	$30	--	$417
Diesel	4 cylinders Vd = 1.5 L	$56	$84	$337	$145	$306	$471	$1,399
Diesel	4 cylinders Vd = 2.5 L	$56	$89	$419	$164	$508	$626	$1,862

- Per vehicle incremental cost for 12L diesel HDV

	Euro III	Euro IV	Euro V	Euro VI	TOTAL
European standards	$426	$3,771	$460	$2,280	**$6,937**
	US 1998	**US 2004**	**US 2007**	**US 2010**	**TOTAL**
U.S. standards	$50	$1,421	$1,650	$3,816	**$6,937**

- For a US truck with a retail price of $157k, cumulative incremental costs represent ~ 4% of price

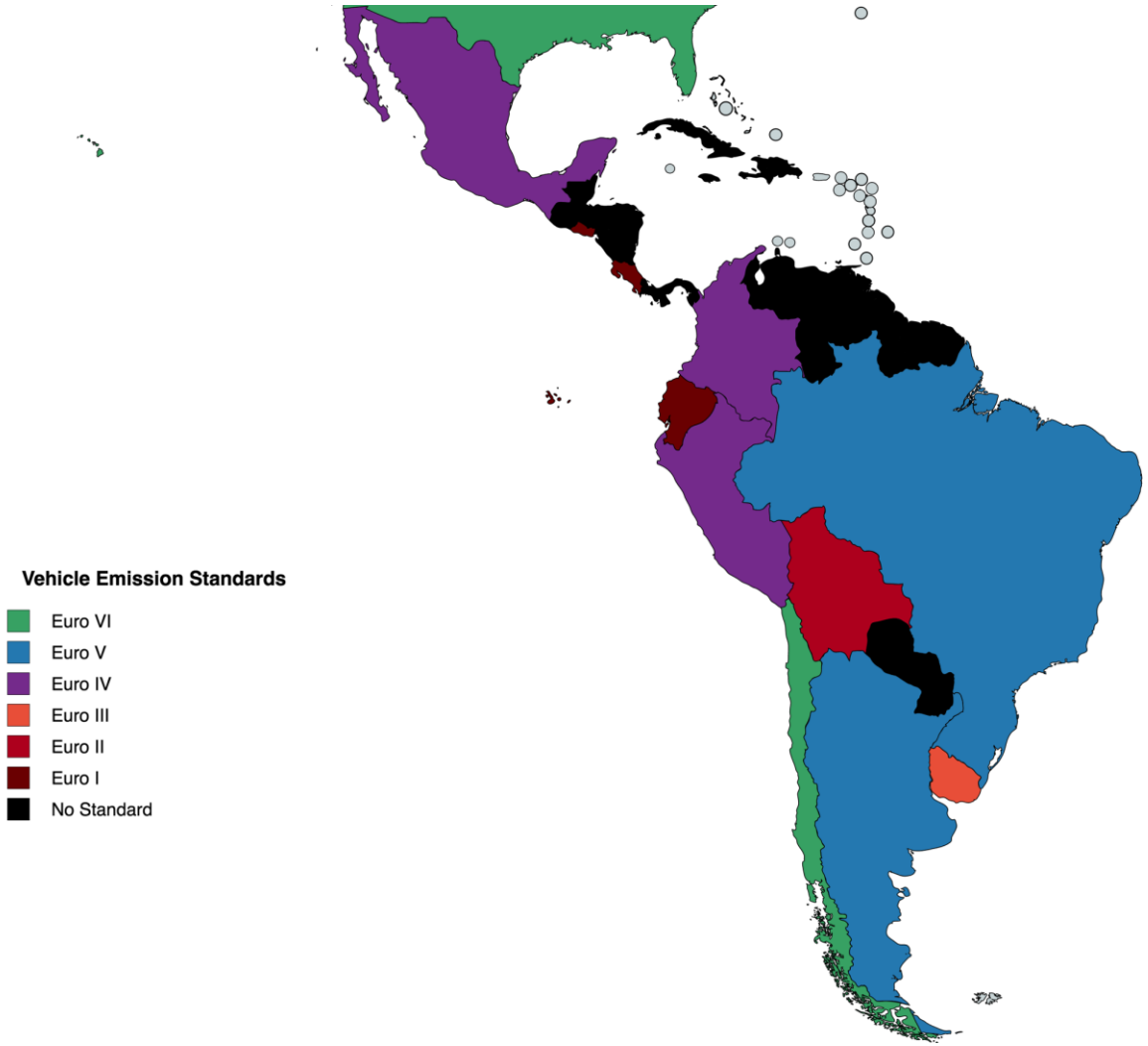
Incremental cost for ULS diesel is also small (USA 2007/8; 500ppm to 15ppm ~$3.5 per gallon)



The current state of emission standards and fuel quality in Latin America and the Caribbean

In Latin America and the Caribbean, the experience with low sulfur fuels is mixed

This has delayed progress in adopting more stringent vehicle emission standards



Low sulfur fuels are increasingly available in select locations across the region and growing


Lessons for Latin America in the pursuit of clean air, fuels and vehicles

Vehicle and fuel standards can virtually eliminate emissions while driving technology improvements

- Low sulfur fuels are necessary for successful emission controls in conventional vehicles
- LAC countries should adopt a low sulfur fuels strategy as the foundation of a comprehensive emissions control program
- Global adoption of Euro 6/VI fuels and vehicles can eliminate 75 percent of future deaths caused by vehicle emissions
- Globally, the NPV of health gains to 2050 is $18 trillion. Total costs of desulfurization and emission controls are estimated at around $1.1 trillion

Stringent standards are only as good as their compliance and enforcement – importance of RDE

New low carbon technologies have the potential to substantially reduce transport emissions

Thank You!

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Additional Slides

Importance of complimentary policies that can help reap the full benefits of cleaner fuels and vehicles

New vehicle standards

Must consider emissions from all mobile sources

Limit values only as good as:

- Compliance and enforcement
- Real-world performance

Fuel quality standards

High fuel quality (especially low sulfur levels) enables advanced emission control technologies.

Compliance programs critical to prevent damage to engines and misfueling

"Systems Approach"

In-use vehicle emission control

Measures include:

- Catching gross-emitters (I/M, remote sensing, maintenance) - Cleaner fuels
- Fleet renewal
- Retrofit programs
- Complementary strategies (low emission zones, driver training, etc.)

Resources for Effective Policy Action:

- **Global Fuel Economy Initiative** (http://www.globalfueleconomy.org/)
- **Partnership for Clean Fuels and Vehicles – Regulatory Toolkit** (http://www.unep.org/Transport/new/PCFV/RegulatoryToolKit/index.html)

Alternative Fuels

- Promotion of EVs
- 2nd & 3rd generation biofuels

Timeline of policy action to reduce transport sector emissions in Chile

Policy Action	2010	2011	2012	2013	2014	2015
Fuel Economy (FE)	FE Baseline Study	FE Labeling Proposal	Feebate Proposal	Obligatory FE Labeling	Tax on road emissions - NOx	Efficiency Standard Proposal
Fuel Quality	Diesel 15ppm Santiago and 50ppm nationwide		Gasoline 15ppm Nationwide	Diesel 15ppm Nationwide		
Emission Standard	Euro IV Santiago Euro III nationwide	Euro V discussions begin		Euro V Diesel Nationwide	Euro V Gasoline Nationwide	Euro VI in Santiago by 2017, Nationwide 2018

References

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- Slide 4: http://www.theicct.org/global-transportation-roadmap-model
- Slide 8: http://www.unep.org/transport/New/PCFV/pdf/11gpm/11gpm_Elisa_CCAC_HDDI.pdf
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- Slide 11: http://www.theicct.org/state-of-clean-transport-policy-2014
- Slide 12: http://www.theicct.org/sites/default/files/publications/ICCT_LDVcostsreport_2012.pdf and http://www.theicct.org/sites/default/files/publicatio ns/ICCT_costs-emission-reduction-tech-HDV_20160229.pdf
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