

US EPA ARCHIVE DOCUMENT

Repowers as Part of the Solution



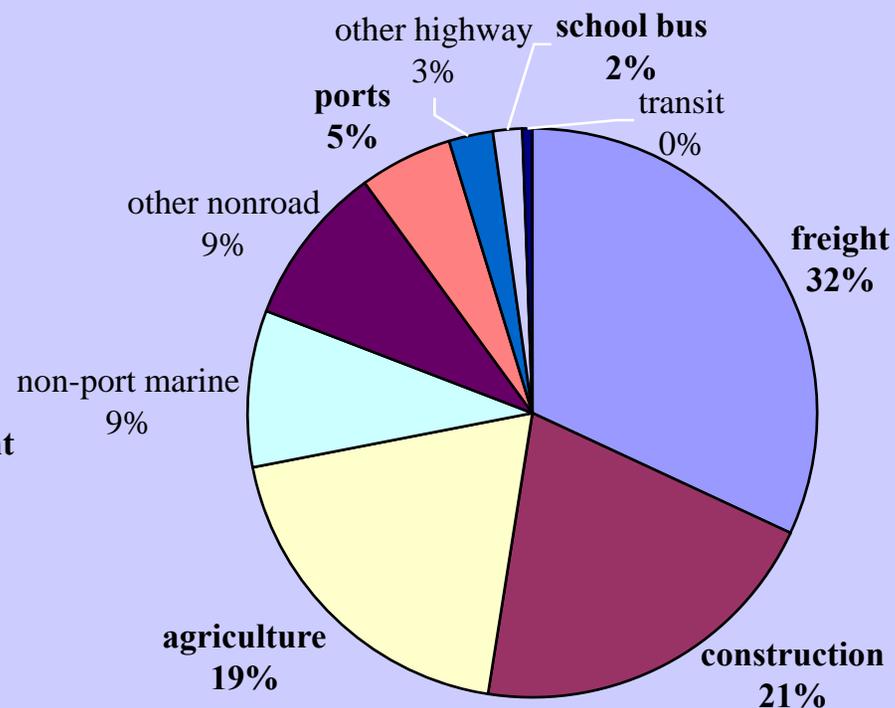
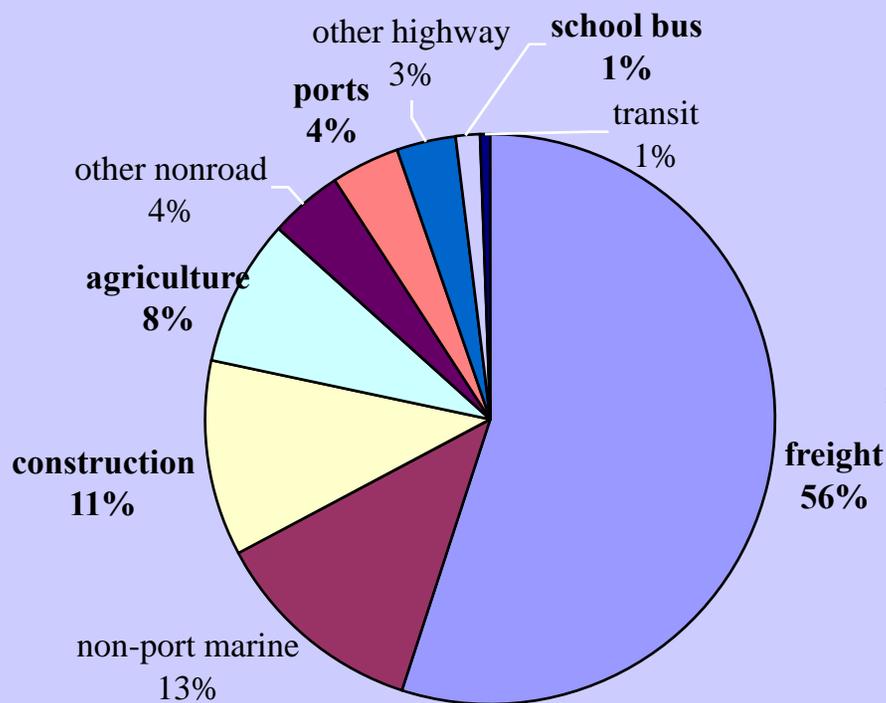
Francisco J. Acevedo

MCDI Webinar Series
September 22, 2010

Mobile Source Diesel Emissions Inventory by Sector (2004)

NO_x
(6.3 million tons)

PM 2.5
(305,000 tons)





A New Approach to Clean Air Programs for Mobile Sources

- In the past, EPA created separate programs for vehicle emission standards and cleaner fuels
- The new 2007 diesel program and the nonroad diesel program take a systems approach (vehicle & fuel) to optimize costs and benefits
- Also considers the inter-relationship with other programs (like gasoline desulfurization)

National Clean Diesel Campaign

2 Components

- Regulations
 - Heavy-Duty Highway Engines
 - Nonroad Engines
- Voluntary Program to address existing diesel fleet
 - Voluntary Diesel Retrofit Program

Regulatory Strategy

New Standards for NEW diesels

Diesel engines in all mobile source applications--

- *Regulations adopted; now focused on implementation:*



**Heavy-duty
trucks &
buses**



**Nonroad
machines**



**Light-duty
vehicles**



Locomotives



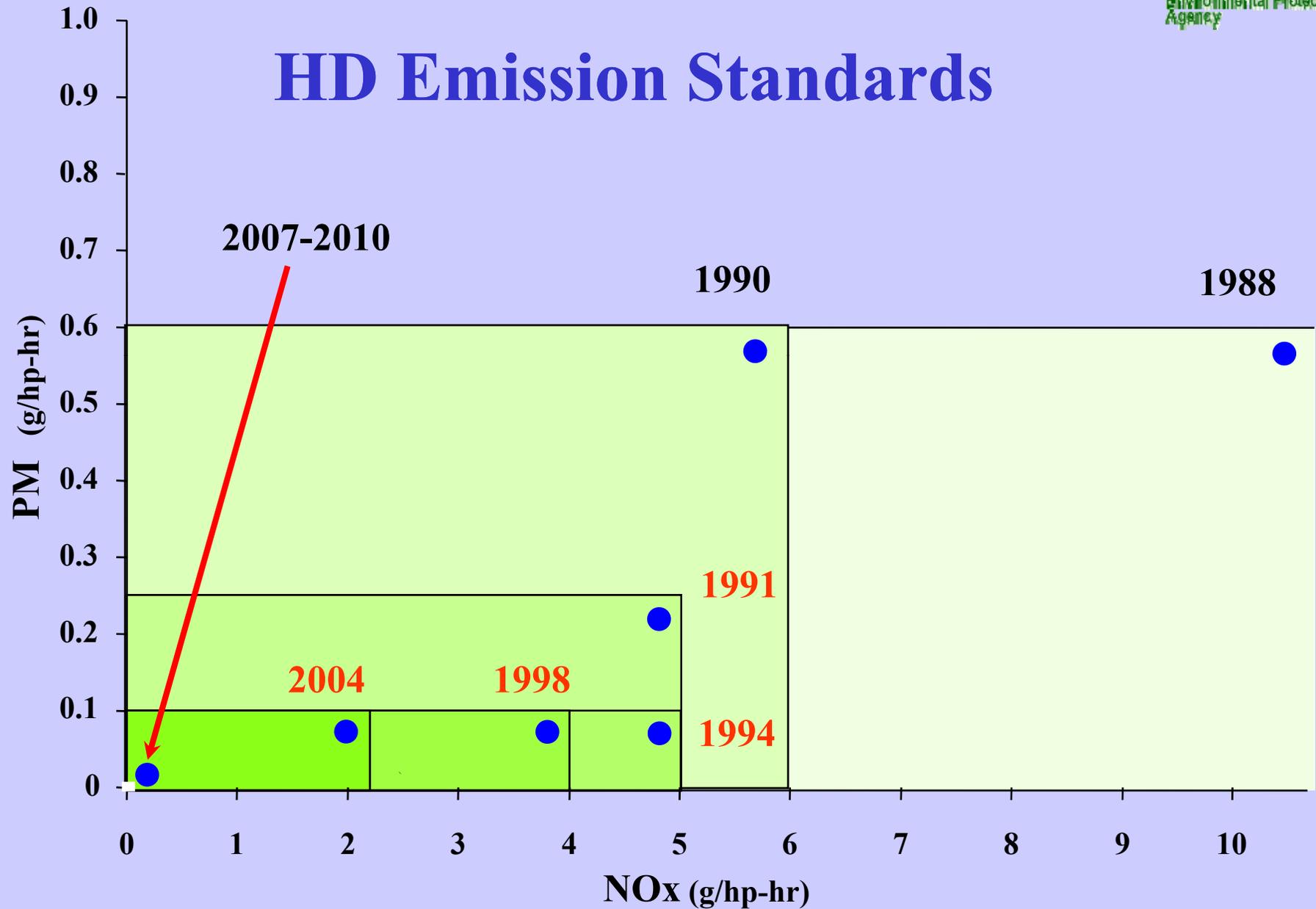
**Marine
vessels**



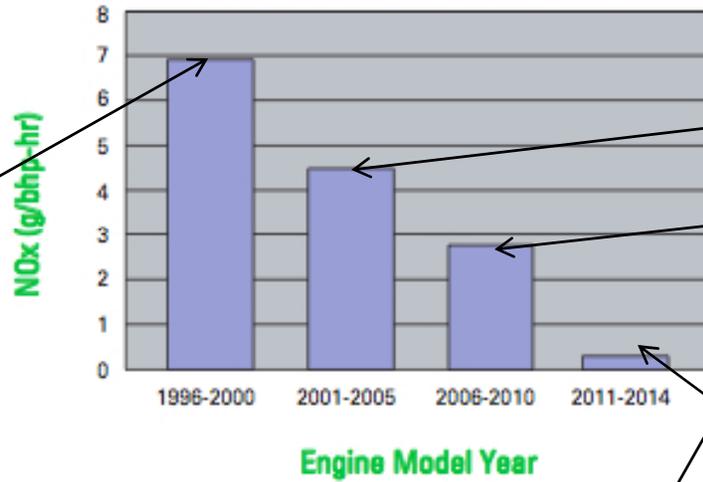
**Ocean-
going
ships**

- **Current Regulations**
 - **Very large public health and environmental benefits will result:**
 - By 2030, PM reduced by ~250,000 tons/year, NOx by ~4 million tons/year
 - Annual benefits expected to exceed \$150 billion, with a cost of approx. \$7 billion
 - **15 ppm sulfur cap gets immediate PM and SOx reductions from existing fleet of diesels**
 - Highway (2006)
 - Nonroad (500 ppm in 2007, 15 ppm in 2010)
 - Locomotive and marine (500 ppm in 2007, 15 ppm in 2012)

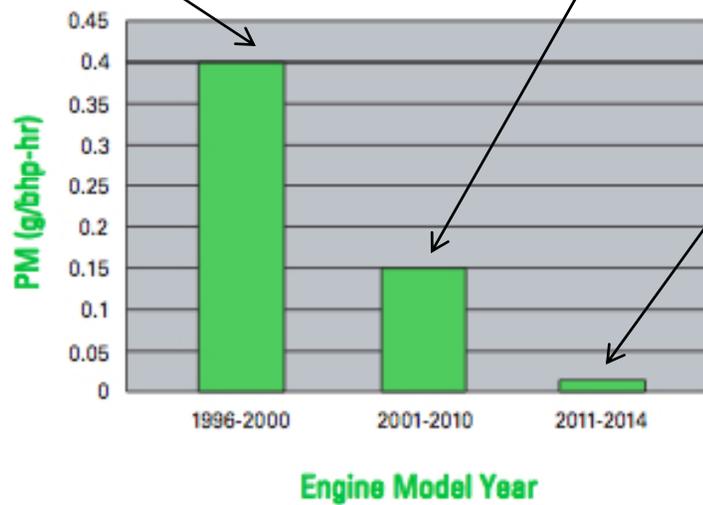
HD Emission Standards



Nonroad Diesel Engines (175-750 hp) NOx Emission Standards



Nonroad Diesel Engines (175-750 hp) PM Emission Standards



Tier 1

Tier 2

Tier 3

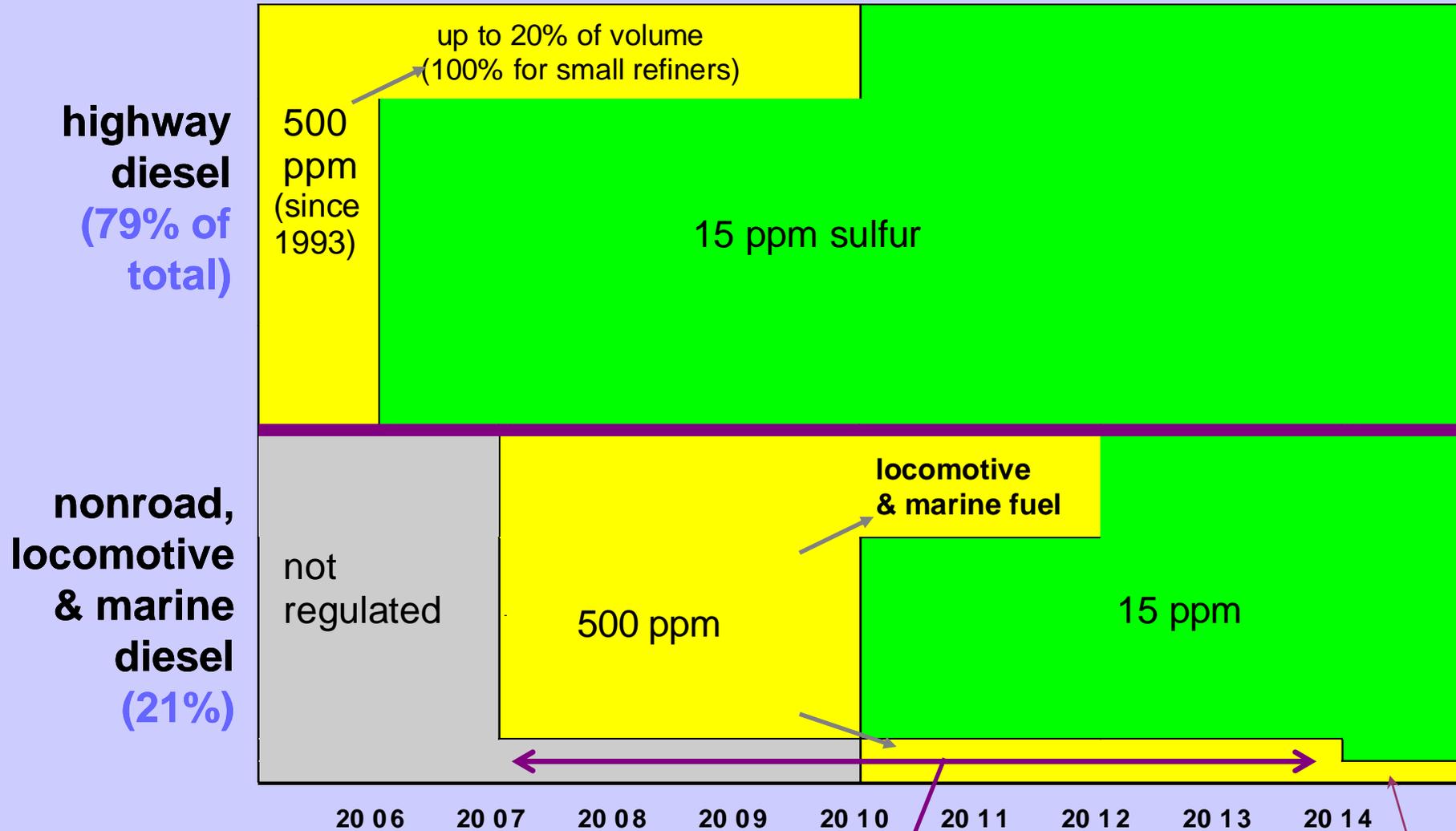
Tier 4

Nonroad Program Requirements

Rated Power	First Year that Standards Apply	PM (g/hp-hr)	NO_x (g/hp-hr)
hp < 25	2008	0.30	-
25 ≥ hp < 75	2013	0.02	3.5*
75 ≥ hp < 175	2012-2014	0.02	0.30
175 ≥ hp < 750	2011 - 2013	0.01	0.30
hp > 750	2011 - 2014	0.01	0.30

Sulfur in Diesel Fuel

Regulations apply June 1 at refinery, Aug 1 at terminal, Oct 1 at retailer



for transmix, small refiner fuel, and thru use of credits, except in Northeast & Alaska
 (expiration date not yet set for 500 ppm locomotive & marine transmix)

Repowers are part of the 5 R's

- **Refuel**- Use of cleaner diesel fuels, renewable fuels
- **Retrofit**- Installation of exhaust after treatment devices such as Diesel Oxidation Catalyst (DOC), Diesel particulate filters (DPF), etc on existing engines
- **Repair/Rebuild**- regular engine maintenance plays a critical role in maintaining emissions performance while engine rebuilding can upgrade emissions performance of older engines.
- **Repower** – replacing older engines with newer cleaner engines in existing equipment or chassis to meet a cleaner certified configuration (Certificate of Conformity).
- **Replace**- replacing the entire equipment to ensure that your new purchase utilizes the most cost effective emission reduction technology

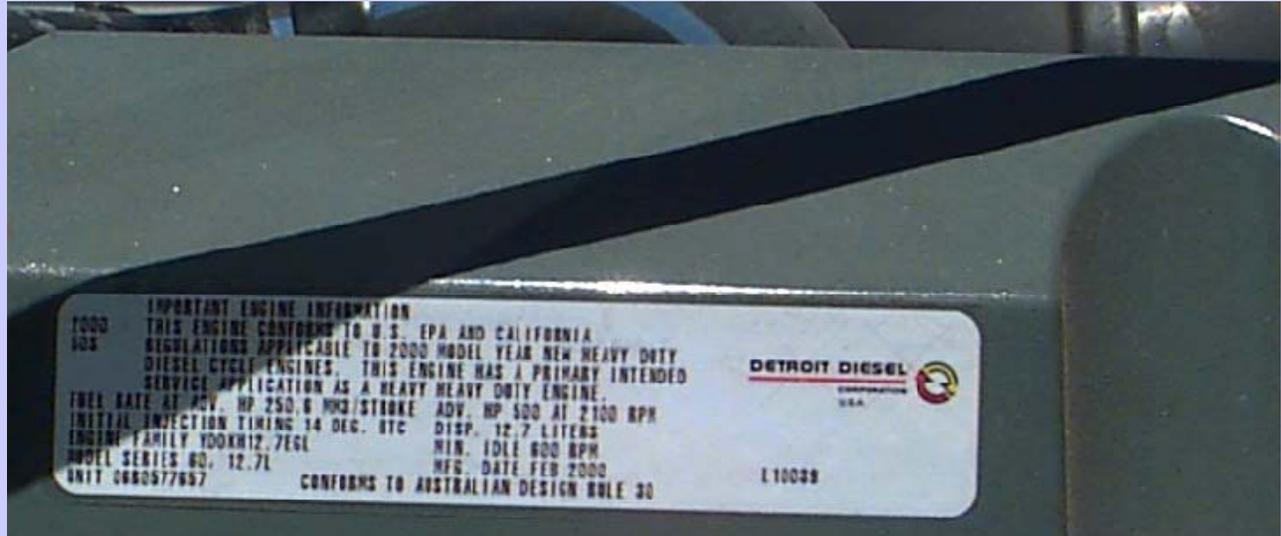


Certified Engine Repowers

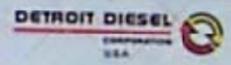
- Repower refers to the removal of an existing engine and replacing it with a newer, cleaner engine that is certified to a more stringent set of engine emissions standards.
- Includes, but is not limited to, diesel engine replacement with an engine certified for use with a cleaner fuel and/or the replacement of a non-road engine with a highway engine.
- Certification vs Verification
- Meets EPA certification requirements:
 - 40 CFR Part 86 (On-Highway Heavy-Duty Engines)
 - 40 CFR Part 89 (Nonroad CI Engines)

Certified Engine Repowers

- Ideal for specialty high cost equipment
- Vehicle/equipment condition < value of new engine
- Extended machine life

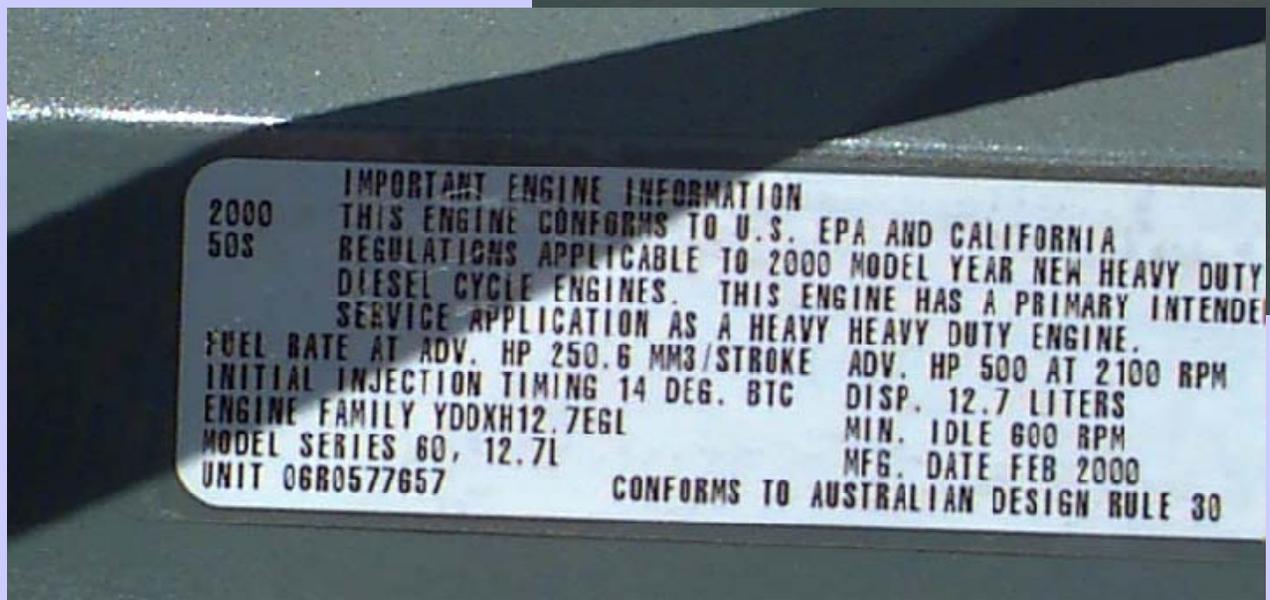


IMPORTANT ENGINE INFORMATION
2000 THIS ENGINE CONFORMS TO U.S. EPA AND CALIFORNIA
50S REGULATIONS APPLICABLE TO 2000 MODEL YEAR NEW HEAVY DUTY
DIESEL CYCLE ENGINES. THIS ENGINE HAS A PRIMARY INTENDED
SERVICE APPLICATION AS A HEAVY HEAVY DUTY ENGINE.
FUEL RATE AT ADV. HP 250.6 MM3/STROKE ADV. HP 500 AT 2100 RPM
INITIAL INJECTION TIMING 14 DEG. BTC DISP. 12.7 LITERS
ENGINE FAMILY YDDXH12.7EGL MIN. IDLE 600 RPM
MODEL SERIES 60, 12.7L MFG. DATE FEB 2000
UNIT 06R0577657



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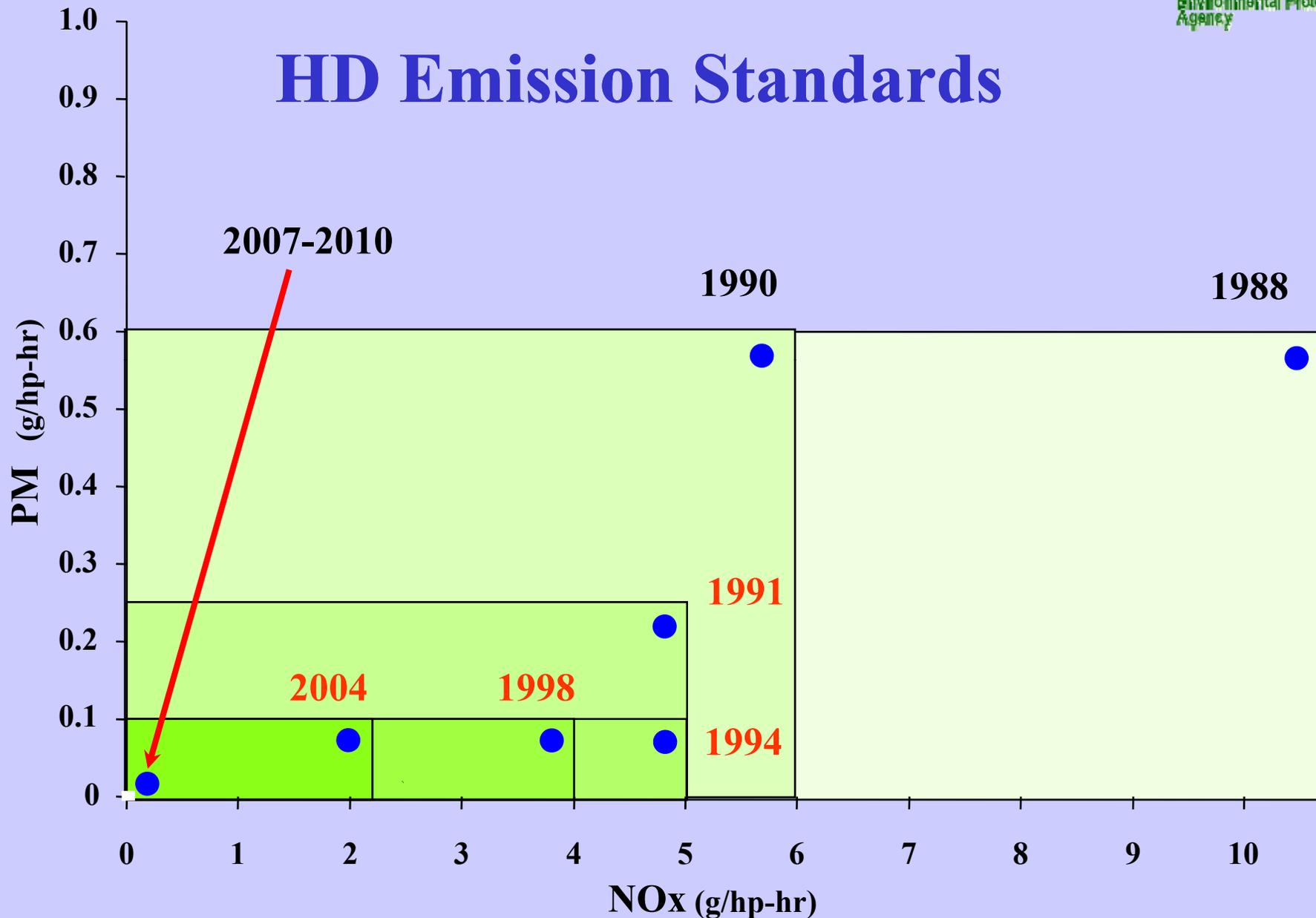
CONFORMS TO AUSTRALIAN DESIGN RULE 30



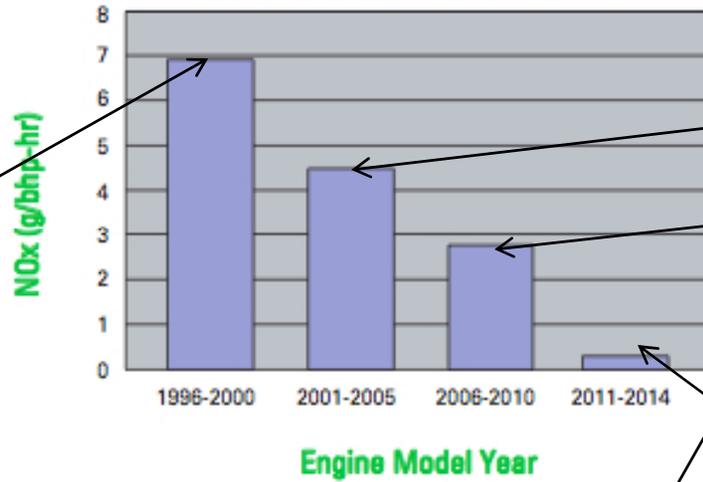
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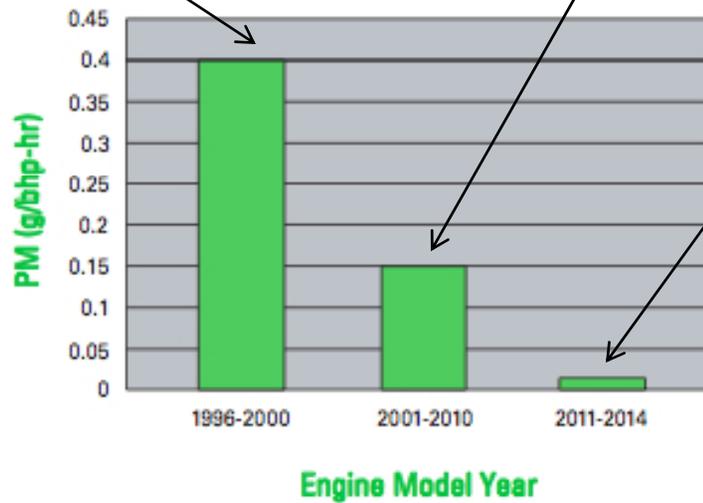
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