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# Cummins Engine Company Light Truck Diesel Program



August, 2000

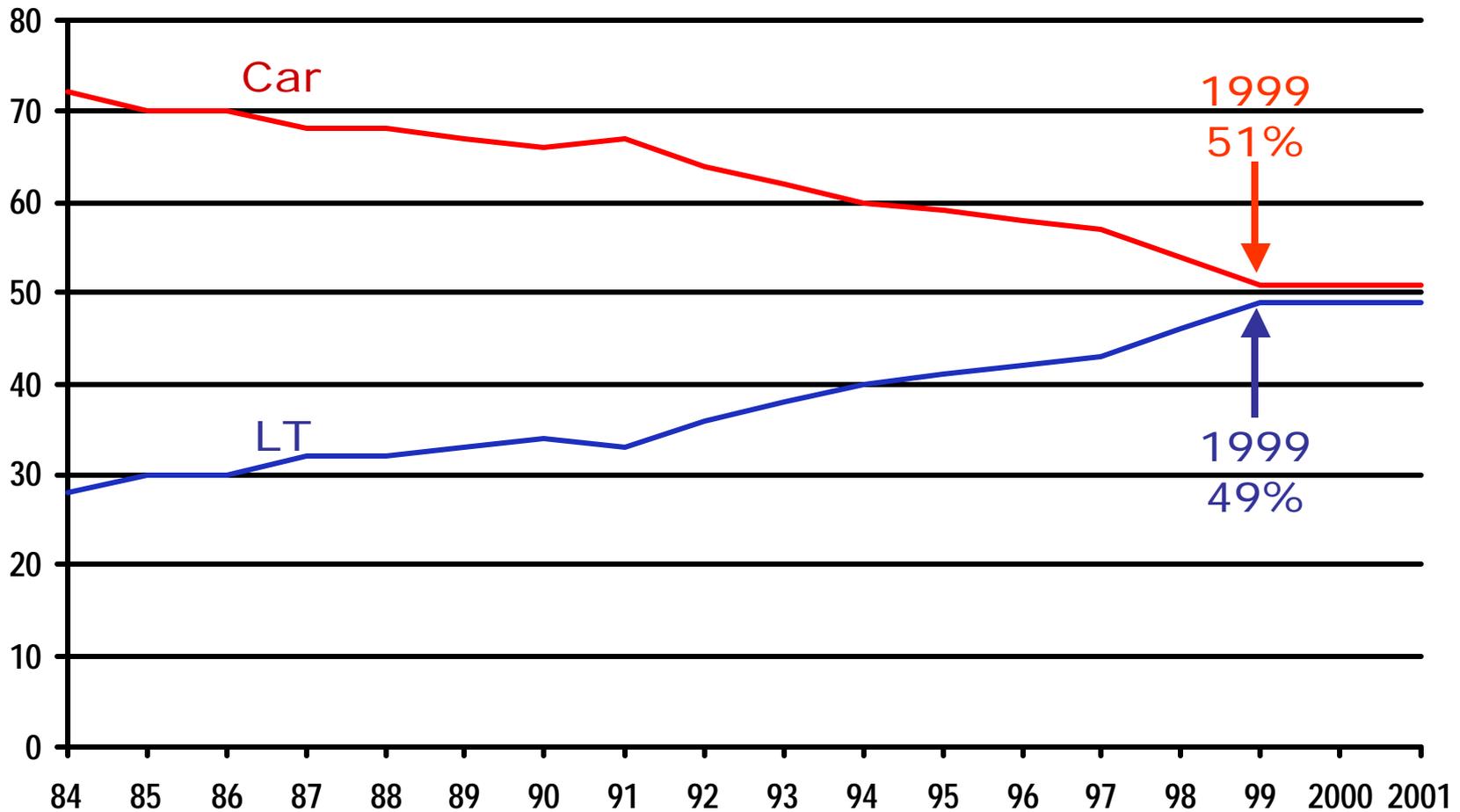


# Emission Goals

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- Emissions for 5751 - 8500 lb. GVW vehicle
  - NOx = 0.5 g/mile    Tier 2 - NOx = 0.07 g/mile
  - PM = 0.05 g/mile    **→** - PM = 0.01 g/mile
- Fuel economy
  - 50 percent MPG improvement over 1997 gasoline powered vehicle it replaces
- Cooperative development of technologies for high efficiency, very low emission diesel engines for light duty trucks

# Car/Light Truck Share Converging



AutoPacific, J D Power, Ward's, Automotive News



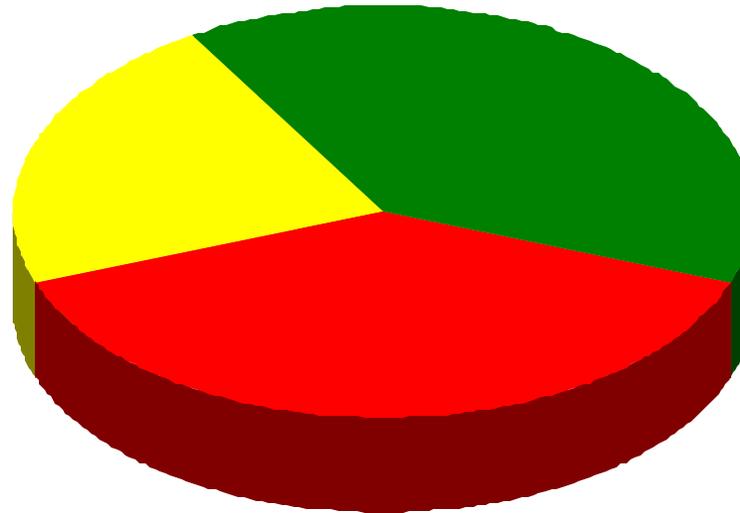
# Light Truck Major Segments

## 8.2M Vehicles

Vans 22%



Sport Utility Vehicles 39%



Pickup Trucks 39%

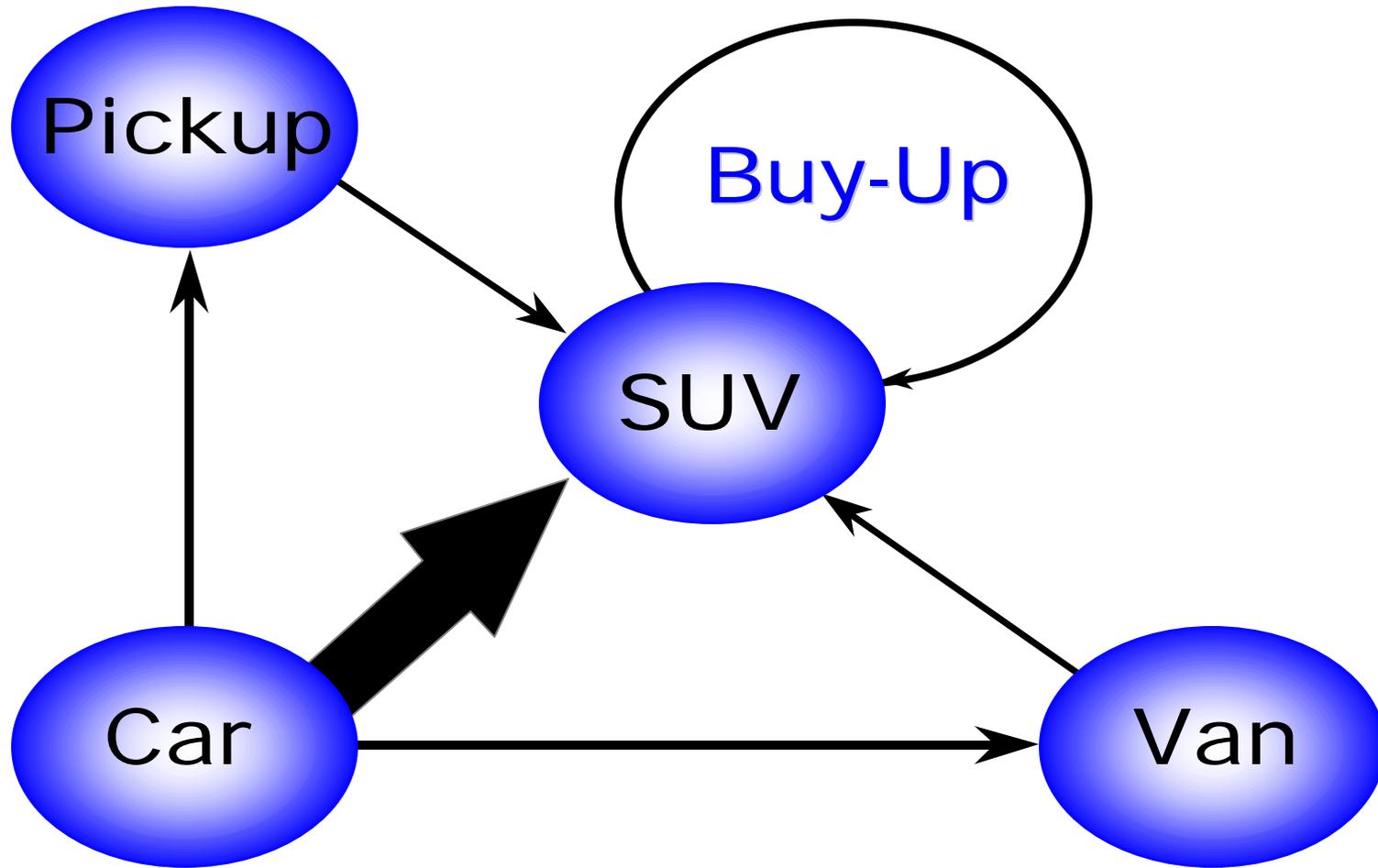


1999 Sales, "Automotive News"



# Migration to SUVs

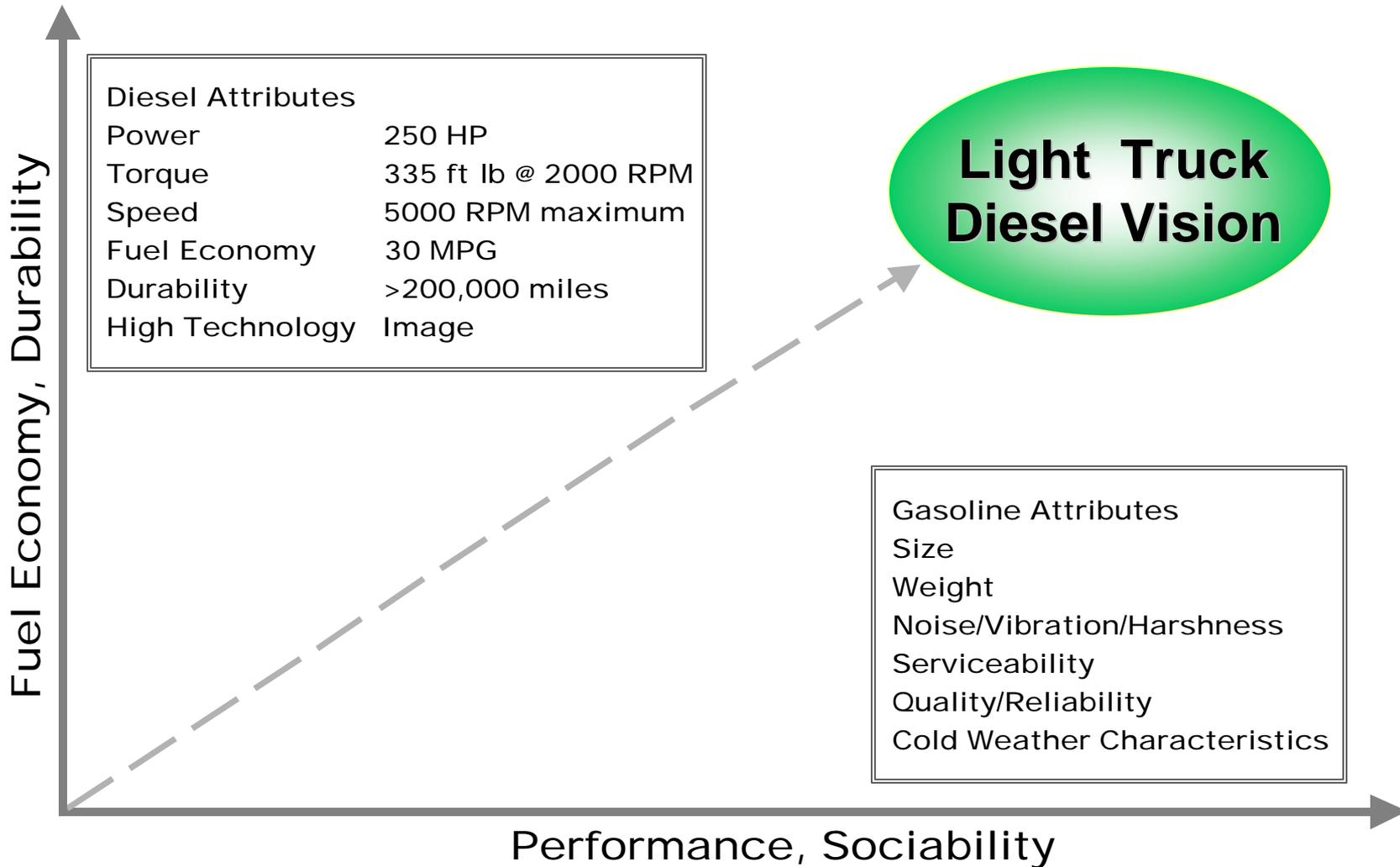
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Internal Analysis and Chrysler Marketing



# Engine Design Proposal





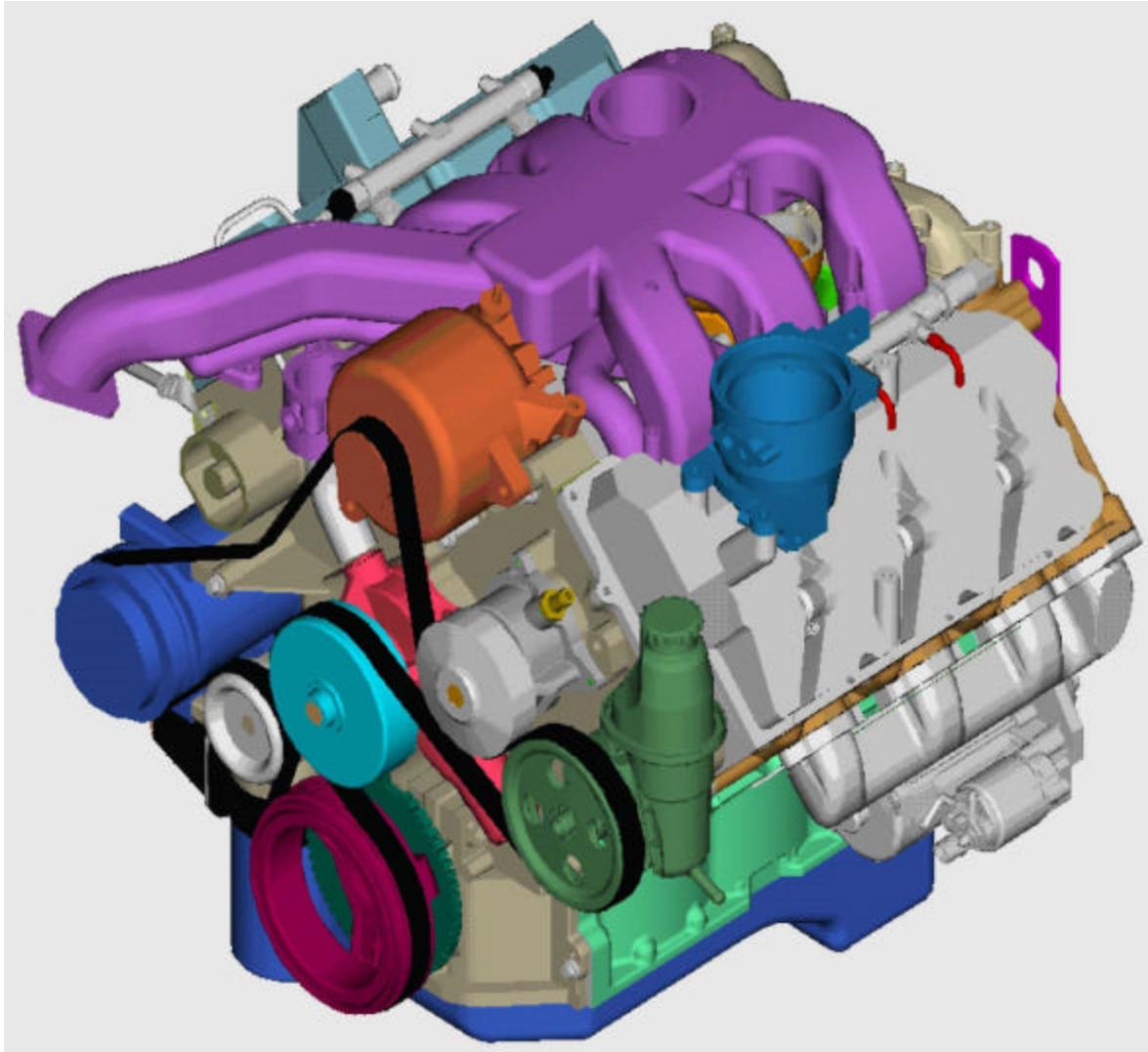
# Light Truck Diesel Features

Attribute	Proposal	Comment
Power	250 hp, 185 kW	Equivalent to small V-8 gasoline
Torque	335 ft-lb at 2000 rpm, 455 Nm	Held to this low level to allow usage of commonly available drivetrain components
Speed	5000 rpm (max.)	Flexible application and driver usage
Fuel Economy	30 MPG	General highway usage
Durability	200,000 miles (typical), 325,000 km	Generally greater than other vehicle components
Image	'High Tech'	Reinforce notion of new technology
Size	L-652,W-685,H-730 mm	Fit space also used by small V-8 gasoline engines
Weight	550-600 lb, 250-275 kg	Similar to small V-8 gasoline
Noise/Vibration/Harshness	71 dB at idle, hood open	Similar to small V-8 gasoline
Serviceability	Equal to gasoline	Diesel fuel filter an exception
Quality/Reliability	Equal to gasoline	Includes diesel injection system
Cold Weather Characteristics	Equal to gasoline	Includes starting and warm-up



# Light Duty Automotive Engine

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# Light Truck Diesel Subsystem Desc.

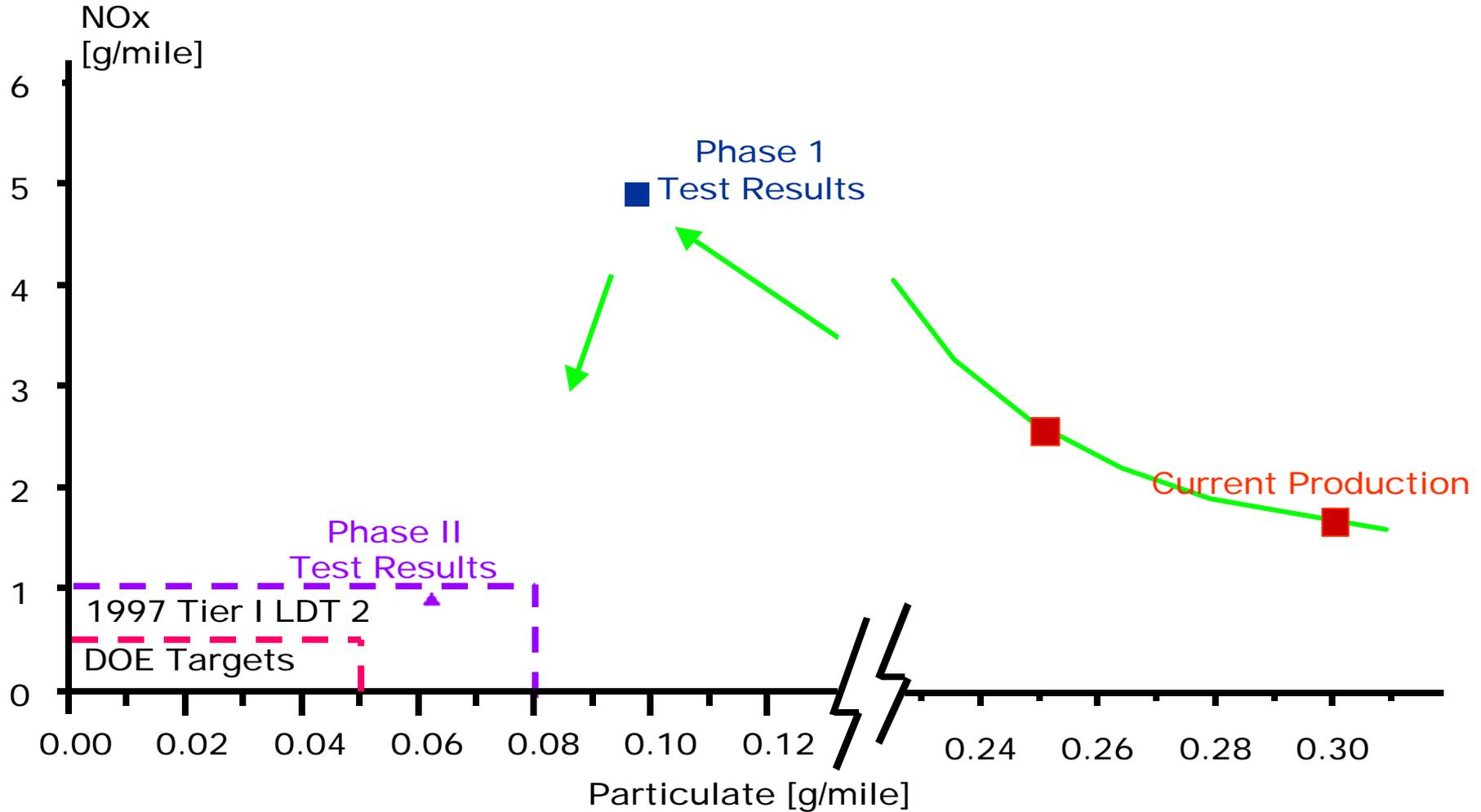
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<u>Subsystem</u>	<u>Description</u>
Configuration	90° V-6
Displacement	4.2 L
Bore and stroke	94 X 100 mm
Valvetrain and drive	Single overhead cam, chain-driven
Valve system	Four valves per cylinder with hydraulic lash adjustment
Fuel system	High-pressure common rail (HPCR)
Control system	Full electronic
Emissions control	Modulated-cooled EGR plus deNOx catalyst
Aspiration	Wastegated turbocharged
Intercooling	Vehicle mounted air-to-air
Block	Cast iron, thin-walled
Head	High temperature alloy aluminum
NVH control	Deep skirted block, with bedplate
Accessories	Common automotive V-8 gasoline
Accessory drive	Single serpentine belt, self-adjusted

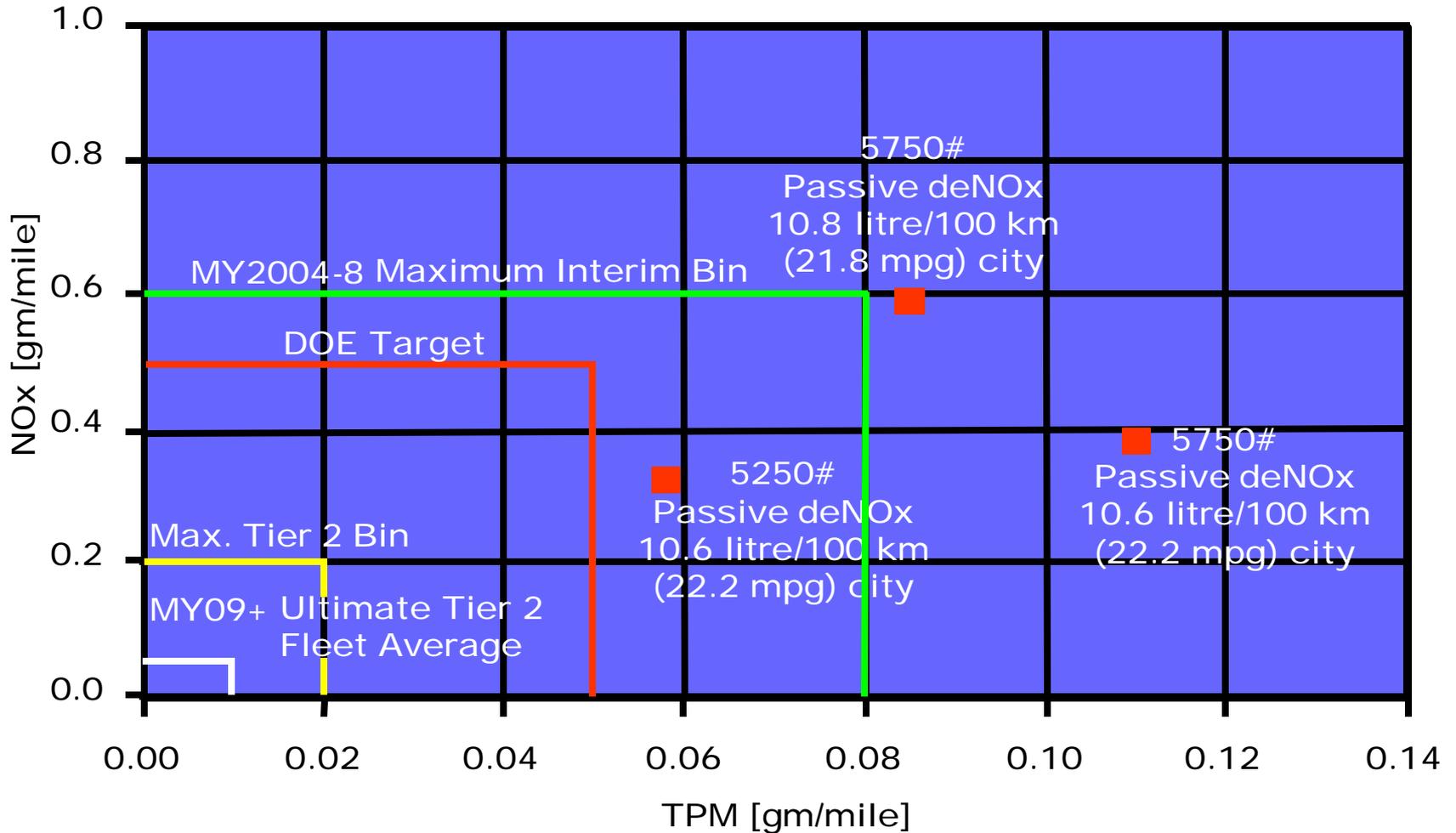
# Emissions Progress Summary

## Test Results for the U.S. Light Duty Drive Cycle



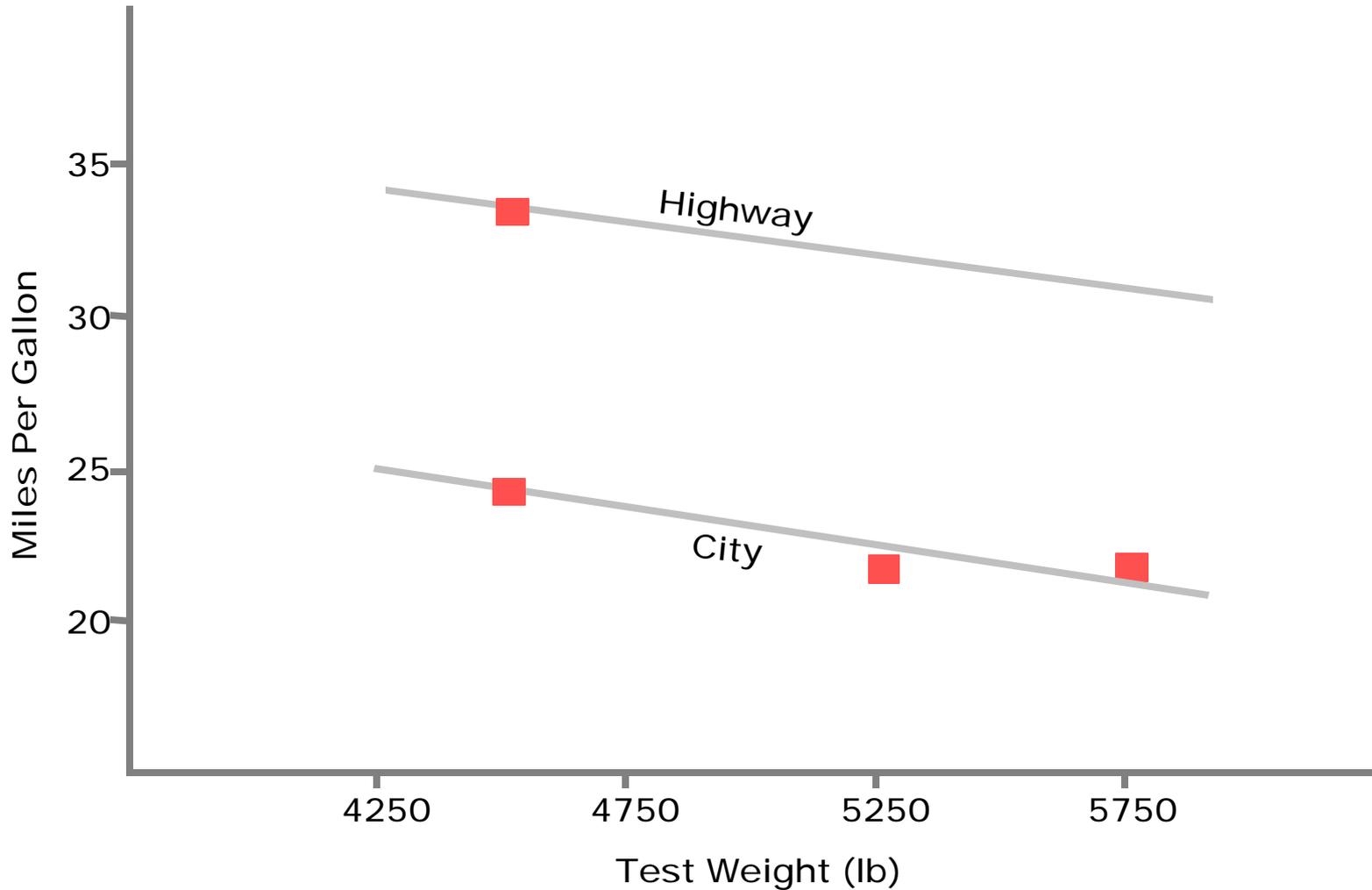


# Demonstrated Emissions

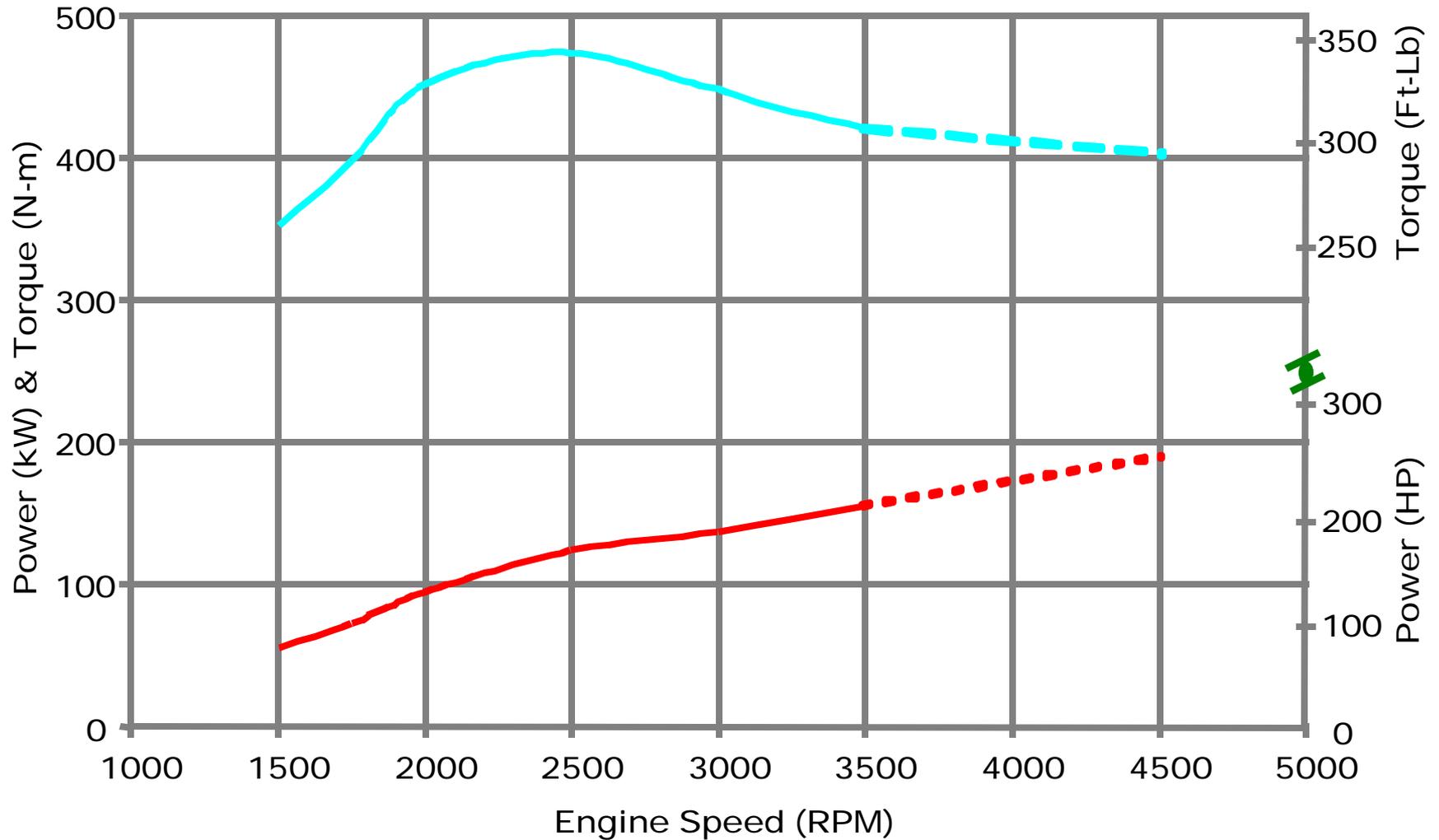




# Demonstrated Fuel Economy

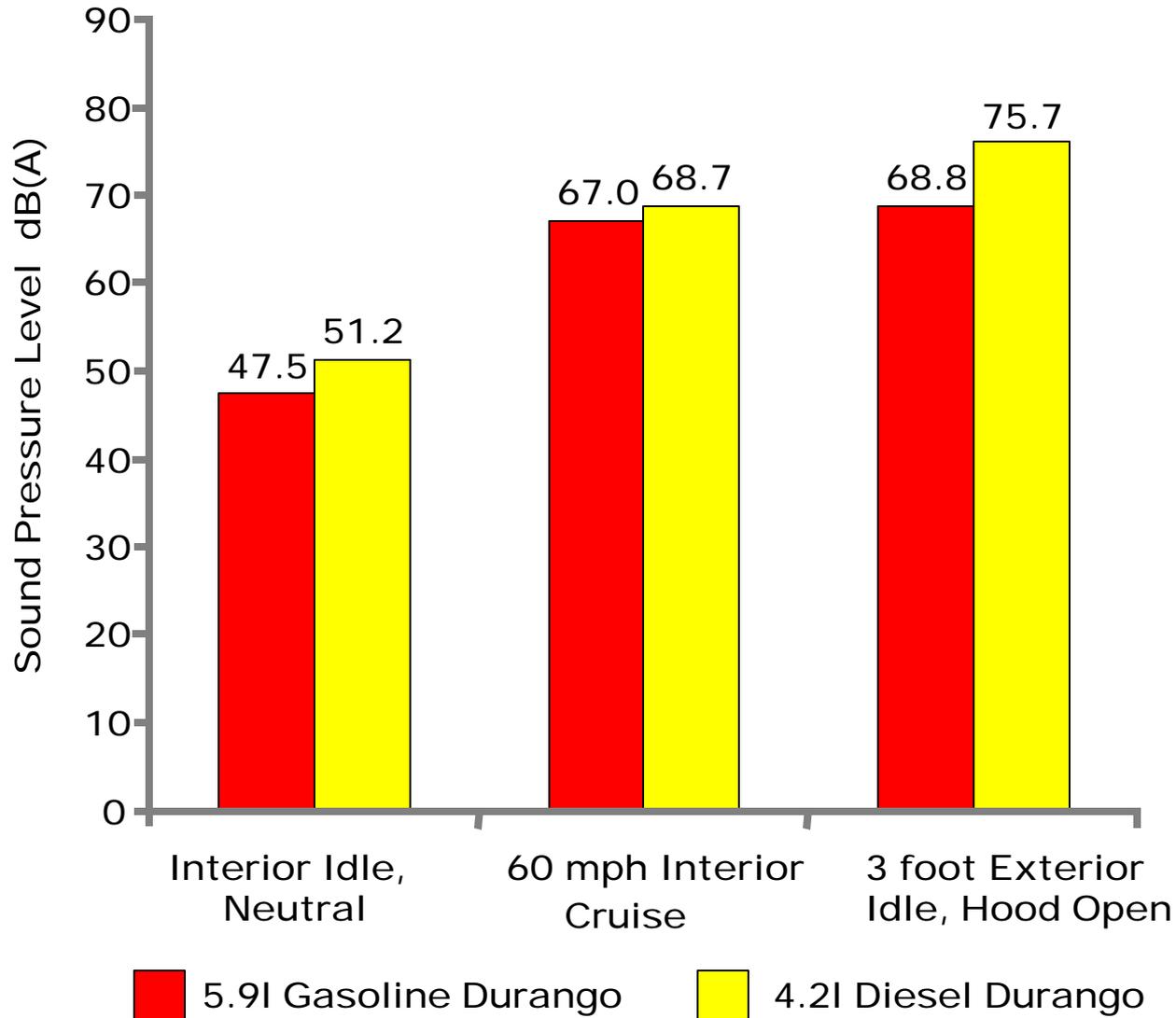


# V6 Performance



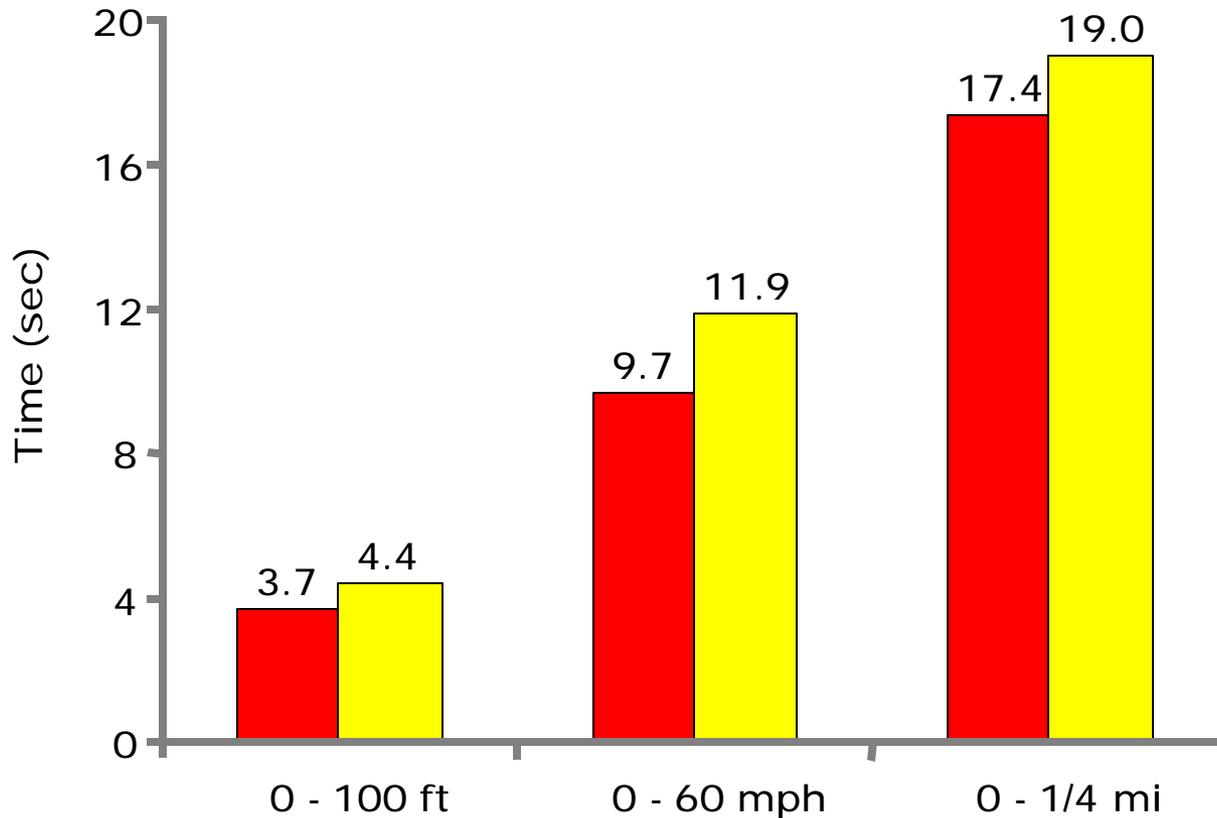


# Noise Test Results





# Acceleration Test Results



 5.9L Gasoline Durango @ 5220 lbs  4.2L Diesel Durango @ 5373 lbs