



Dumping Dirty Diesels: The View From The Bridge

Richard Kassel
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The Natural Resources Defense Council is...

- **A US-based, non-profit environmental NGO founded in 1970**
 - More than 1.2 million members and “e-activists”
 - More than 250 environmental professionals working around the world
- **NRDC led the campaign to ban lead in the US in the 1970s—and helped spark global efforts to eliminate lead in the 1990s**
- **Since the early 1990s, NRDC’s “Dump Dirty Diesels” Campaign has helped clean up transit and school buses, trucks and nonroad engines in NY, CA, at the national level and overseas**



New York City Bus

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**Standing behind this bus
could be more dangerous than
standing in front of it.**

Diesel fumes can kill. Demand clean-fuel buses. Call 1-800-NICE-RIDE.



National Resources
Defense Council

NEW YORK
12285A

WARNING
DO NOT PASS
ON RIGHT

We've Come a Long Way Since Then...

- April 26, 1995: Bernie Williams says “Free bus fumes while you work out” is his favorite reason to play baseball in NYC
 - EPA NO_x/PM standards for new truck engines: 5.0/0.10 g/bhp-hr
 - NYC Transit Bus average emissions: 140 lbs./yr PM and 1.43 tons/year NO_x
- Today: Bernie Williams watches the Red Sox win the World Series on TV
 - Upcoming EPA NO_x/PM standards for new truck engines: 0.2/0.01 g/bhp-hr
 - NYC Transit Bus average PM emissions reduced by 97% and NO_x emissions reduced by 40%



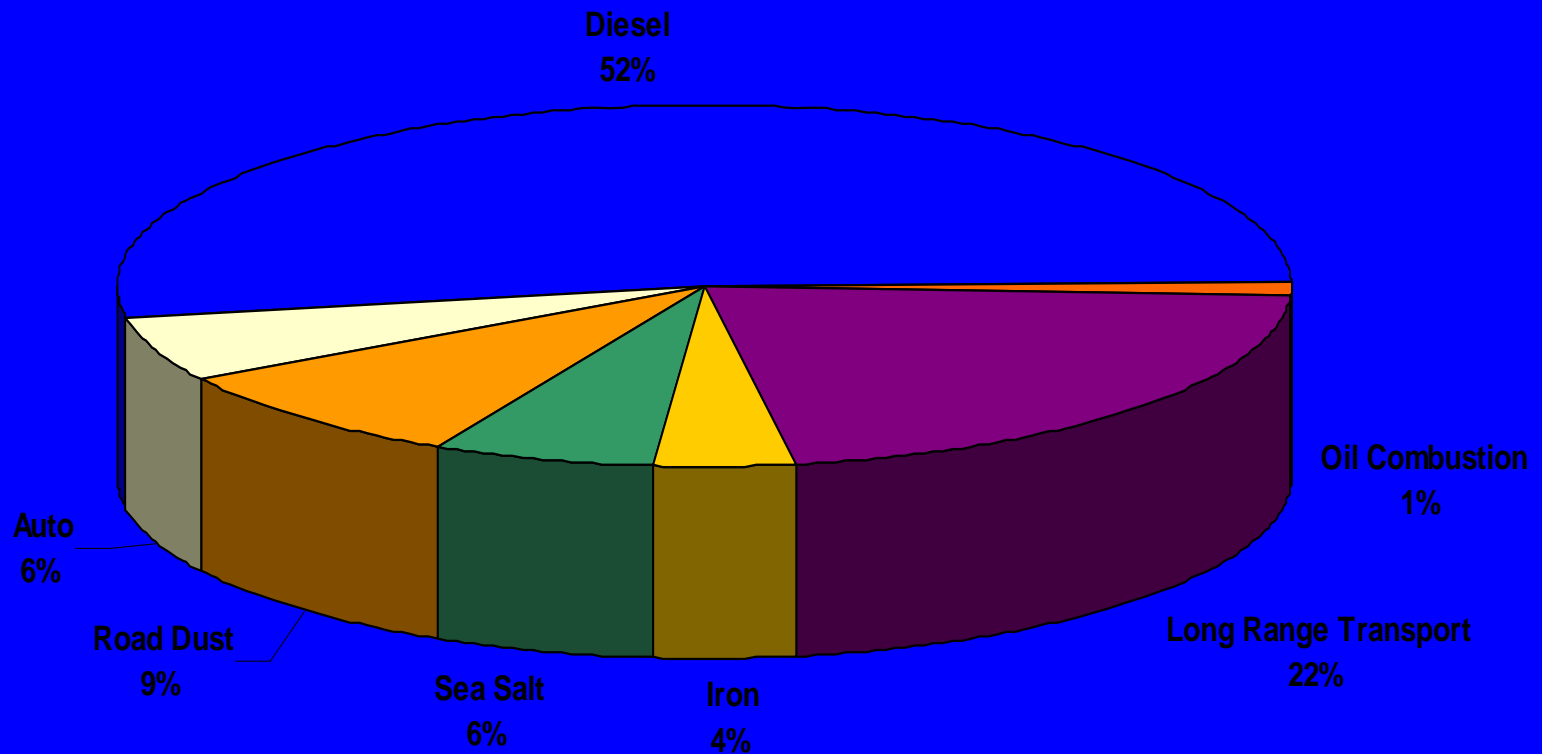


Why Continue to Focus on Dumping Dirty Diesels?

- Today's diesel engines still emit huge quantities of:
 - Particulate Matter (PM) that triggers asthma and related pulmonary impacts; cancer; heart disease; and even premature death
 - 21,000 premature deaths and 125,000 cancers in the U.S. annually
 - Most diesel PM is less than 1 micron in diameter
 - Nitrogen Oxides (NO_x) that contribute to ground level-ozone (summertime smog); acid rain; water pollution (nitrogen loading); crop and forest damage; and secondary PM formation
 - Diesels travel 12% of U.S. vehicle-miles, yet emit roughly 1/3 of NO_x emissions
 - More than 40 Toxic Air Contaminants and/or Hazardous Air Pollutants, according to US EPA and CARB
- Plus, diesel engines can last for decades—and the diesel sector is growing faster than gasoline sector in many places

Diesels Can Be Responsible for Disproportionately High PM Emissions

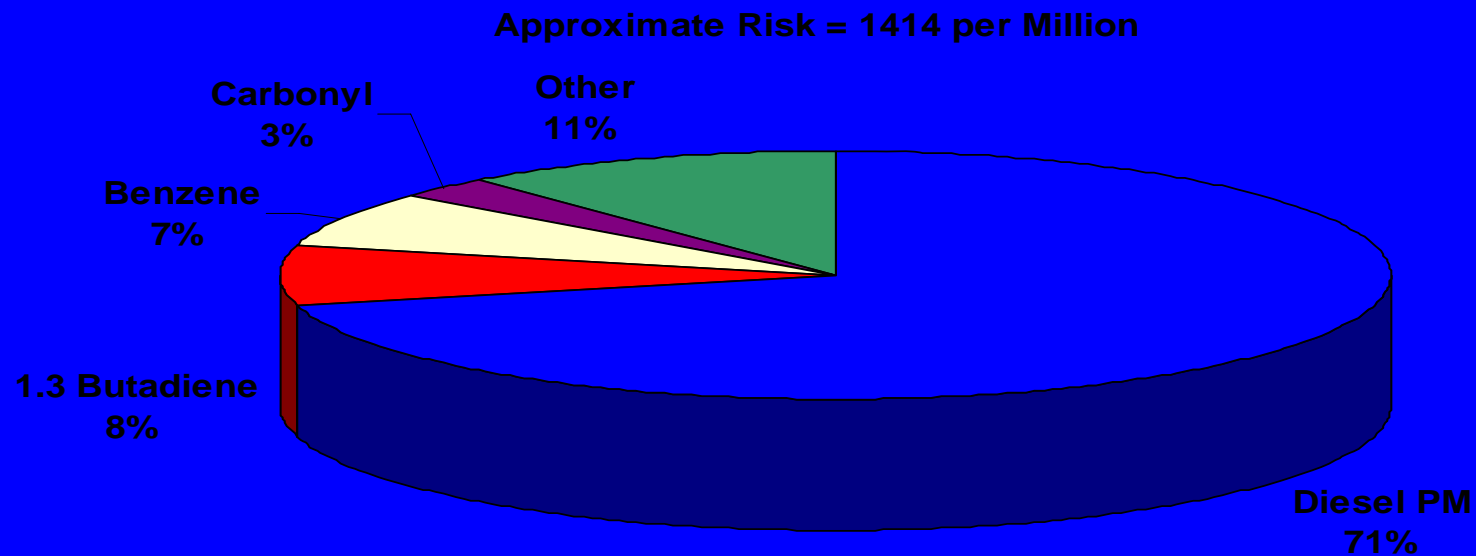
Average PM Source Contribution in Midtown Manhattan



Source: New York State PM₁₀ Implementation Plan, September 1995.

Diesels Can Be Responsible for Disproportionately High Toxic Emissions Also

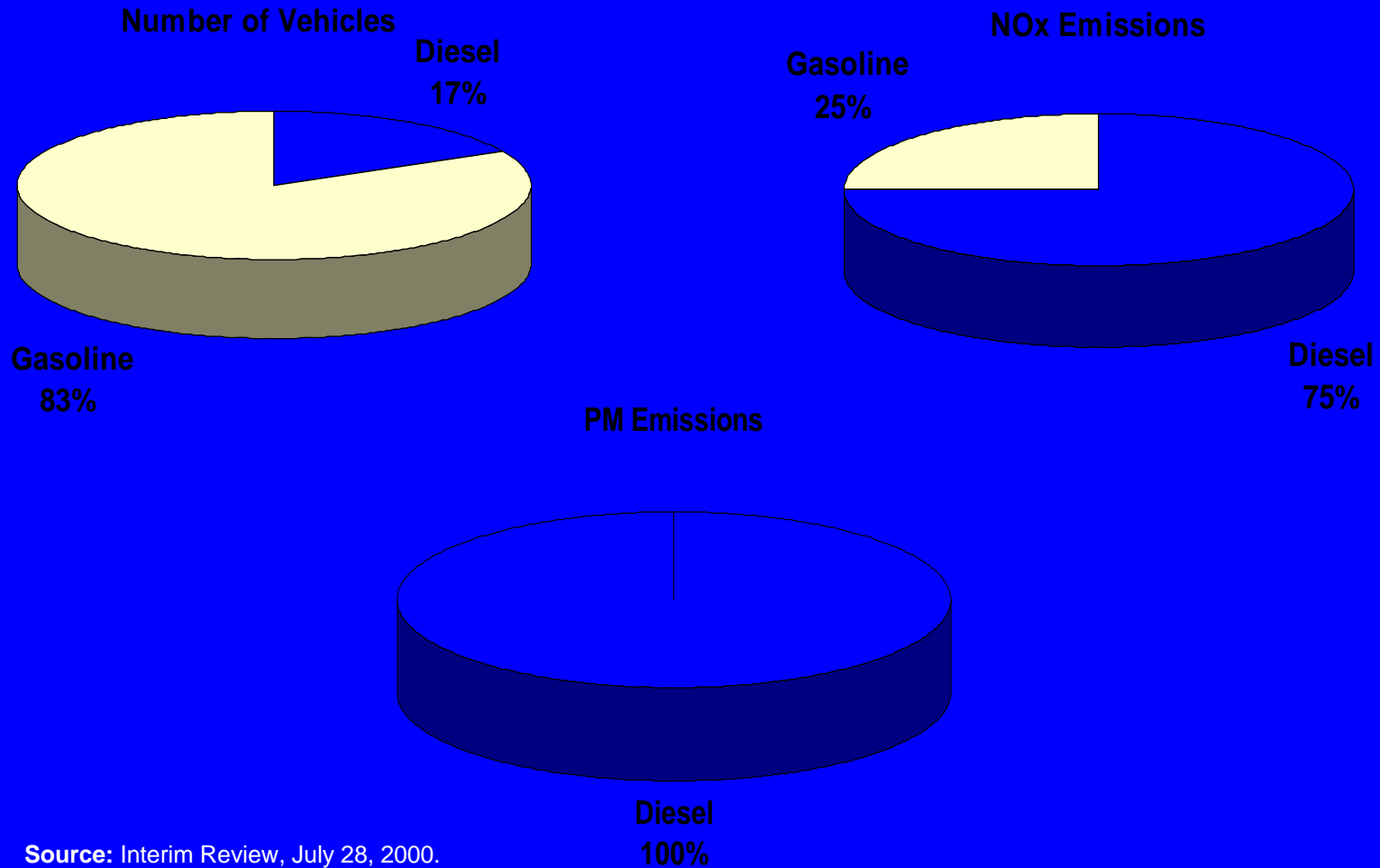
Average Los Angeles Basin Cancer Risk Apportionment



Source: California Air Resources Board.

Without Stringent Emission Standards, Switching To Diesel Cars Will Create New NOx Problems

Emissions From Vehicles in Japan



Source: Interim Review, July 28, 2000.



Key Issues for the Coming Decade

- ❑ **Implementing the US EPA Tier 2, Highway Diesel and Nonroad Diesel Rules**
 - Promulgating a comparable locomotive/marine diesel rule
- ❑ **“Fast-forwarding” the benefits of these rules**
 - Incentives for early retirements, retrofit/rebuild programs
 - Developing in-use compliance and enforcement mechanisms (I/M, OBD, etc.)
- ❑ **What role will light-duty diesels play?**
- ❑ **Will the rest of the world clean up its dirty diesels?**

Issue 1: Implementing the EPA Rules

- **Implementing the Tier 2, Highway Diesel and Nonroad Diesel Rules will eliminate more than 24,000 premature deaths annually by 2030**
 - \$175B/yr in health benefits vs. \$11B/yr in costs
- **Engine makers appear to be on track for 2007, with customer fleet testing beginning this year**
 - Much progress towards 2010 NOx technology, but urea infrastructure is nowhere in sight
- **ULSD supply shouldn't be a problem next summer, despite some pipeline issues that have been raised**
 - EPA's 45-day extension for terminals and retailers should not become a slippery slope that jeopardizes the 2007 model year
- ***Conclusion: Implementation seems to be on track, but vigilant oversight is still required***



Issue 2: How to Fast-Forward Clean Diesel's Benefits?

- ❑ Full benefits of EPA diesel rules don't come until 2030
- ❑ With lower sulfur fuels, many diesels on the road (and off) can be effectively retrofitted
- ❑ Robust in-use compliance and enforcement mechanisms don't exist yet
- ❑ In urban corridors, personal exposure to diesel pollution is an increasingly important local air pollution and public health issue
 - Diesels are more than half of all PM in New York, Mexico City, Rio de Janeiro and other mega-cities
- ❑ ***The solution is obvious: Retire, Replace, Retrofit!***



Picking the Right Targets for Cost-Effective Urban Retrofit Programs

- ❑ **Significant public health benefits**
 - High ambient pollution and/or personal exposure
 - Sensitive populations: Children, Elderly, etc.
- ❑ **Centralized fueling**
 - Sulfur-sensitive emission controls require a guaranteed, unadulterated, low-sulfur fuel
- ❑ **Sophisticated maintenance practices**
 - Smoke-free buses require advanced diagnostic and maintenance practices
- ❑ **Government funding, contracting, or licensing**
 - Using public funds for cleaner diesels makes policy sense
- ❑ **Publicly-visible fleets help build public support for the program**



“3 R’s” Approach Will Maximize Emissions Reductions and Cost-Effectiveness

- **RETIRE** the oldest and dirtiest diesels as soon as possible
 - Two-stroke highway diesels should be eliminated ASAP
- **REPLACE** with the cleanest fuels and technologies, using a “systems approach”
 - Match the sulfur level with the emissions control technology to yield the most cost-effective emissions reductions
- **RETROFIT** remaining diesels with PM controls
 - Match the technology to the engine, available fuel, duty cycle, level of maintenance, etc.
 - Retrofit the dirtiest vehicles first – a 50% reduction on a 0.07 gram engine cuts more pollution than a 90% reduction on a 0.01 gram engine
 - Repowers are expensive in most older highway vehicles, but are more prevalent in nonroad sector

Case Study: New York Retrofit Programs

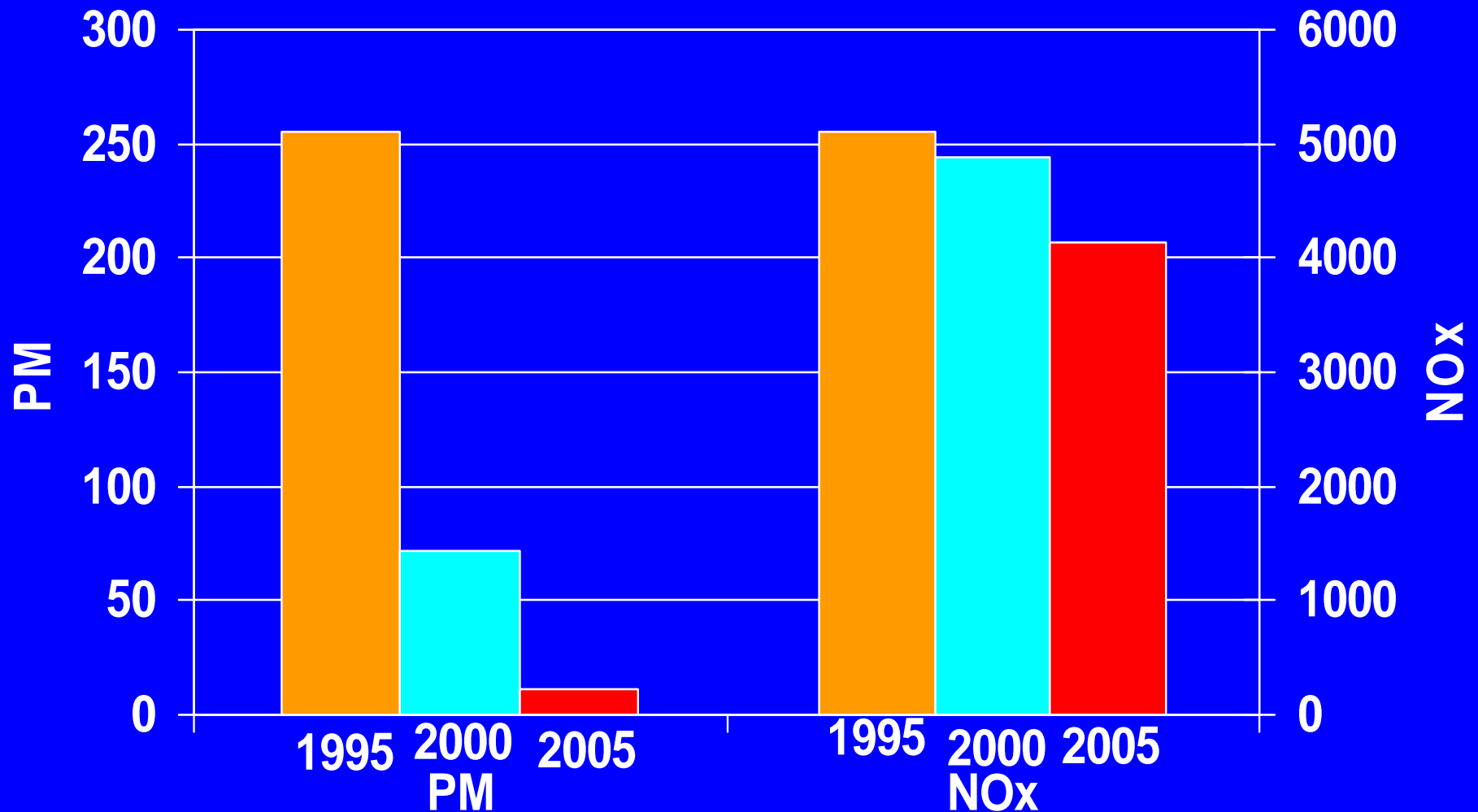
- **MTA Clean-Fuel Bus Plan (2000)**
 - 5-year plan to reduce emissions from the nation's largest transit bus fleet
 - 2 million weekday customers, more than 4,500 buses
- **Local Law 77 (2003)**
 - Requires construction equipment retrofits for all equipment used on NYC public works
 - ULSD + “best available retrofit technology” (BART)
 - Implementing regulations still a work in progress
- **Intros. 414-417, 428 (2005)**
 - Expands LL77 to school buses, non-MTA transit buses, tour buses, sanitation trucks and other publicly-owned diesel vehicles
 - Also requires fuel economy improvements in light-duty public fleet



NYC Transit's Clean-Fuel Bus Program: Using Every Strategy To Cut Emissions

- ❑ Fleet Basics:
 - Largest Transit Fleet in U.S.—2 million weekday customers
 - Grew from 3,559 Buses in 1995 to 4,759 in 2005
- ❑ Early Retirement
 - No “uncontrolled” engines by 2004—some retired 6 years ahead of schedule
- ❑ Cleanest Replacements Possible
 - Required ULSD (30 ppm), beginning in Fall 2000
 - More than 3,200 new buses purchased
 - ~600 CNG, 325 hybrid-electric, and more than 2,900 EGR- and DPF-equipped diesels
- ❑ Retrofits
 - ~3,600 DPF retrofits by end of 2004

NYC Transit Reduced PM by 85% Since 2000—While Expanding Service Overall





Issue 3: What Role Will Light-Duty Diesels Play in the Coming Decade?

- **“Can a diesel car be clean” is no longer the key question**
 - Several cars have hit Tier 2 Bin 5
 - Industry seems to agree with this target—and CA and northeast will require it
 - Fuel-neutral, technology-neutral approach to policy-making continues to make sense
- **The real question is: “what role will clean diesels play in breaking the chain to imported oil?”**



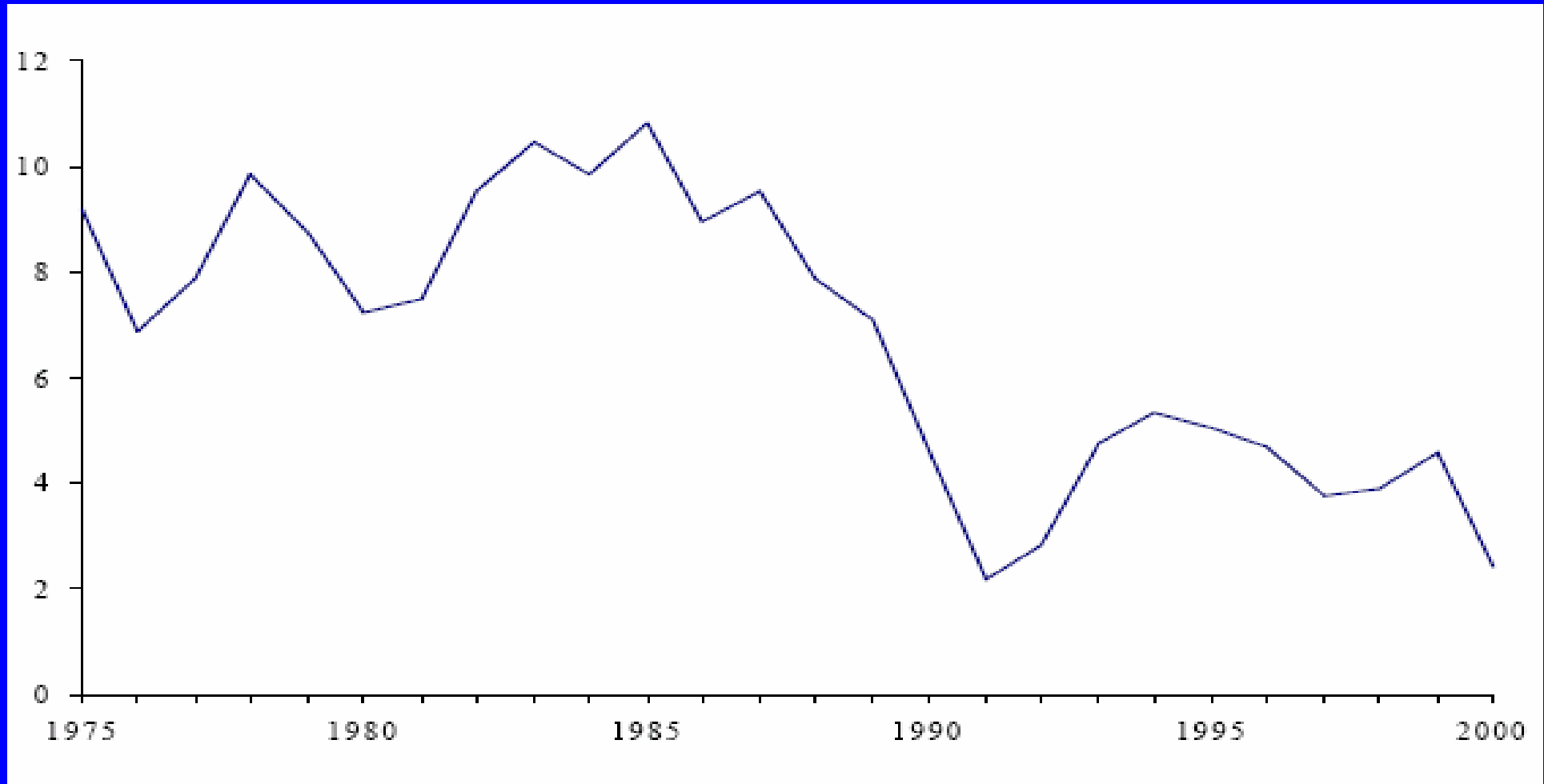
A Quick Reminder of Where We've Been— And Where We Are Today

- ❑ Early 1970s: led to CAFE in 1975
- ❑ Late 1970s: Prices hit \$85/bbl (2005 dollars) after Iranian oil workers on strike took 2 mb/d off the market
- ❑ 1981: Another 5.6 mb/d lost during Iran/Iraq War
 - Detroit lost 12% market share between '78 and '81—and never regained it
- ❑ Today: high oil prices, geopolitical tensions, rapid erosion of domestic auto share...
 - Gas averaging close to \$3/gallon around the nation—and over \$3/gallon in many places

High Oil Prices Are Possible – Or Likely for the Next 5+ Years

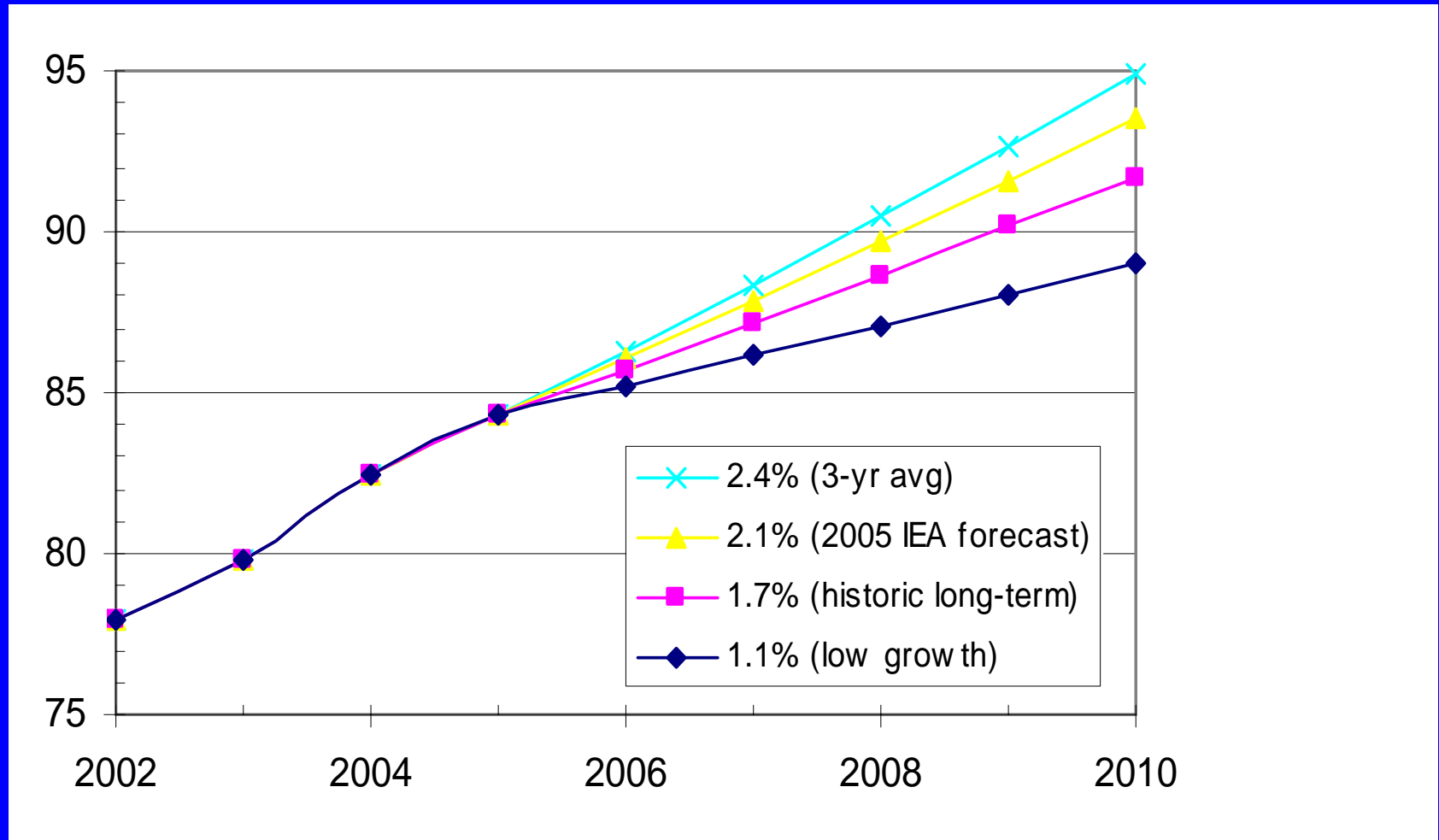
- ❑ Experts are confounded—oil demand growing steadily despite price increases
 - Since 2003, 10% demand growth, despite doubling of prices
 - Unexpected demand growth, especially China
- ❑ Spare capacity mostly gone
 - Especially in Saudi Arabia
- ❑ Precarious supply/demand balance + risk of terrorist attack = great risk of supply disruptions and sharp price increases
 - More than 200 attacks against Iraqi oil infrastructure or personnel in 2003
 - *The Economist*: Saudi oil attack could create \$100/bbl oil, or \$3.37/gallon
 - *Prices would persist until new supplies available, demand falls or geopolitics change*

Huge Excess Capacity Caused by Second Oil Shock Now Gone



Source: IEA

Uncertainty in Demand Makes Investments in New Capacity Risky



Source: Historic data, IEA

Why is Everything So Uncertain?

- ❑ How much demand growth will there be in China, India, other emerging nations? Will US consumption patterns change?
- ❑ No new US refining capacity in 30 years—and little reason to expect this to change
- ❑ Historical growth rate assumptions (1.7%/yr) requires additional 7.4 mb/d by 2010—1.5 mb/d of increased capacity *per year*
- ❑ Current growth trend (2.1%/yr) requires additional 9.2 mb/d—1.85 mb/d of increased capacity *per year*
- ❑ IEA expects 1.75 mb/yr of additional capacity through 2010
 - *Only 1.4 mb/d of spare capacity under the “historical” scenario, and none under if current trends persist*



So, What Does This Mean For Light-Duty Diesels...

- ❑ Increased light-duty diesels are likely, although no consensus on U.S. market demand exists
- ❑ Automakers should reach Tier 2 Bin 5, but light-duty diesels are not expected to be as clean as the cleanest gasoline or hybrid-electric models
- ❑ Without any change to fleetwide fuel economy standards or performance, increased light-duty diesels will not alter our petroleum addiction significantly
- ❑ Some mix of improved gasoline, increased hybrids, and increased diesel could save millions of barrels/day
 - NRDC's goal: 2.5 mb/d—equivalent to our mideast imports!
- ❑ *Conclusion: Are the auto makers willing to use their diesel cars to help reach our goal?*



Issue 4: What's Happening Around the World?

- **By 2010, 68% of the world's new vehicle sales will be in countries that require ultra-low sulfur levels and >90% emission reductions**
 - U.S., E.C. and Japan—and Mexico may join the list soon
- **More than half of the world's population lives in countries with rapid urbanization, fast-growing vehicle populations, and serious pollution/health concerns**
 - China, India, Korea, Thailand, Taiwan, South Africa, Chile, Brazil, and Mexico—more than 20% of new vehicle sales
 - 350-500 ppm has become the *de facto* first step, and most are considering ULSD fuel with US/EC standards
 - Retrofit programs for polluted mega-cities are becoming more common
- **Approximately 10% of new car sales are in regions with low vehicle volumes, less urban pollution concerns, no domestic vehicle industry (e.g., Africa).**
 - Sulfur and diesel discussion just beginning—sulfur levels can be >10,000 ppm!



Why Cleaner Diesels Are Important Everywhere

- **Diesels overseas tend to be dirtier than in the US**
 - Less stringent emission standards and/or technologies in use
 - Maintenance practices often less sophisticated
 - Like the US, no real in-use emissions compliance/enforcement
 - Huge number of people affected!
- **Increasing concerns about transboundary pollution makes diesel pollution overseas a US concern also**
- **Great opportunity for cost-effective emission reductions and public health benefits**
 - Cost-benefit ratio for clean Mexico City buses: 40:1
- **Potential opportunity for exporting clean fuel and vehicle emission technologies**
- *Conclusion: The “Dirty Diesel Gap” should be closed as quickly as possible*

Conclusions and Recommendations

- Clean Diesels will happen over the course of the coming decade—but how quickly can we clean up the existing fleet and fleets overseas?
- On the key issues, we need:
 - Full and timely implementation of its Tier 2, Highway Diesel and Nonroad Diesel Rules
 - Plus a comparable locomotive/marine diesel rule
 - Increased EPA, State and Local programs to retire, replace and retrofit the existing “dirty diesel” fleet
 - Need improved compliance and enforcement mechanisms
 - Tier 2 Bin 5 light-duty diesels that help break the chain to imported oil—and reach our 2.5 mb/d goal
 - To close the “Dirty Diesel Gap” between the developed and developing nations



***NRDC is eager to work with you to Dump
Dirty Diesels!
Contact Richard Kassel at
<rkassel@nrdc.org>***