OPIS 2nd Annual ULSD & Biodiesel Supply Summit

ULSD Supply and Demand Overview

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Turner, Mason & Company
CONSULTING ENGINEERS

Turner, Mason & Company

- Engineering/management consultant to petroleum downstream industry for over three decades.
- Extensive work on clean fuels issues for individual companies as well as industry groups/associations.
- Studies of lead phase-out, RVP, sulfur reductions and RFG in the gasoline area.
- Several diesel studies including logistics, sulfur reductions, CARB diesel and current ULSD program.

Presentation Overview

- Simplified Regulatory Summary
- U.S. Distillate Supply and Demand
- Highway Diesel Supply and Demand
- Refinery Highway Diesel Supply
- Highway Diesel Imports
- U.S. Distillate Inventories
- Costs to Supply ULSD
- Distribution System

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Simplified Regulatory Summary

ULSD

- Diesel with a sulfur content up to 22 ppm may be sold as ULSD at the locations and up to the dates shown below:
  - » From terminals — September 1, 2006
  - » From retail — October 15, 2006
- The sulfur content for 80% of highway diesel must be less than 15 ppm at the locations and on the dates shown below
  - » Refinery — June 1, 2006
  - » Terminals — September 1, 2006
  - » Retail — October 15, 2006
- The sulfur content for all highway diesel must be 15 ppm by June 1, 2010

Other

- Sulfur limits and implementation dates for non-highway diesel are:

» All non-highway	500 ppm	June 2007
» Non-highway ex LM	15 ppm	June 2010
» All non-highway	15 ppm	June 2012

- Heating oil (typically 2,000-3,000 ppm sulfur) does not have a federally regulated sulfur limit, and we know of no pending legislation to limit sulfur

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U.S. Distillate Supply and Demand

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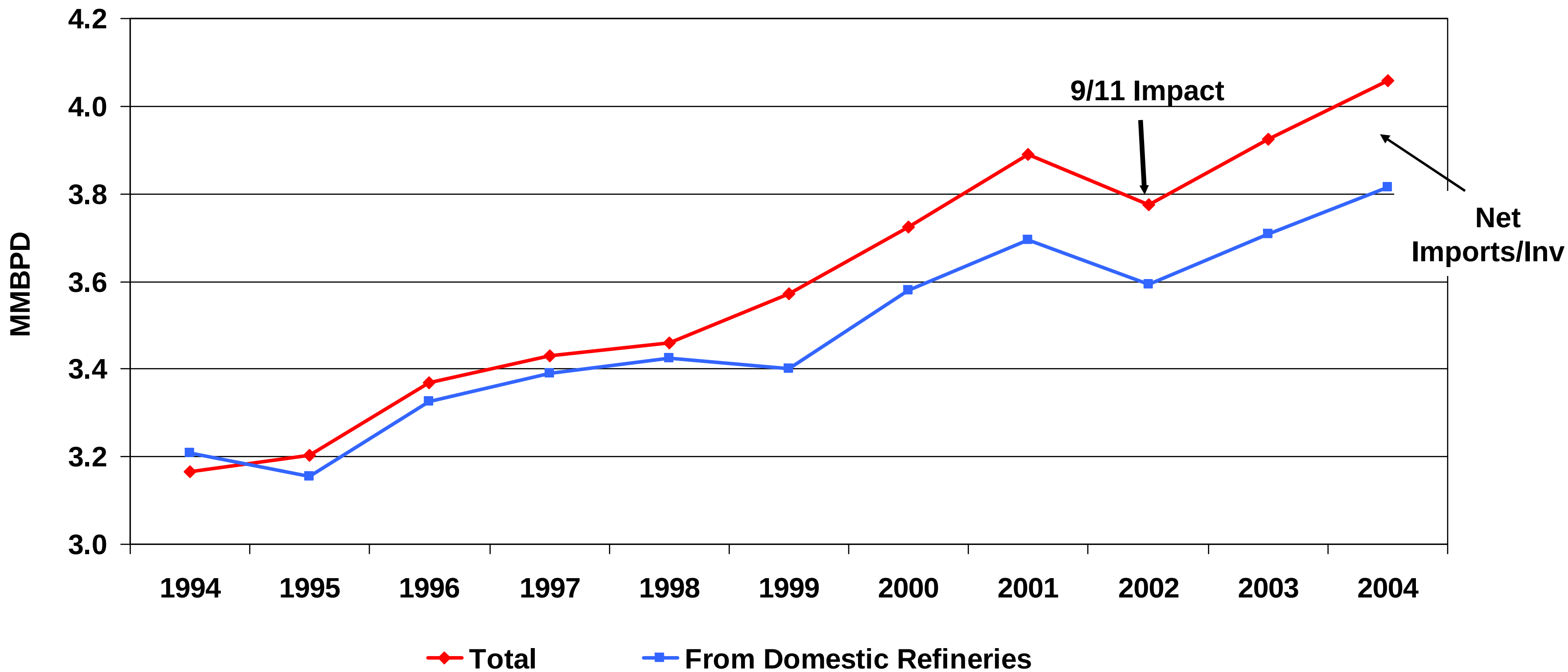
Historical U.S. Distillate Demand

- Historical distillate (diesel and heating oil) demand grew from 3.2 to 4.1 million BPD from 1994 to 2004, a growth rate of about 2.5% per year.
- Prior to 2001, when the economy felt the impact of 9/11, the demand growth rate was about 2.9% per year.
- Almost all of the distillate growth is due to growth in highway diesel, which grew about 4.3% per year.
- Net distillate imports have grown to about 225 MBPD in 2004.

Source: EIA/DOE

Historical Distillate Supply



Source: EIA/DOE

Regional U.S. Distillate Demand

- Total distillate demand was 4.1 million BPD in 2004
- Regional breakdown, MBPD:

PADD	Demand	Production
I	*1,542*	*445*
II	*1,146*	*854*
III	664	1,835
IV	170	168
V	528	512
Total	*4,050*	*3,814*
Net Imports/Inv		243

Source: EIA/DOE

2004 U.S. Distillate
Net Inter-PADD Movements
Pipeline, Barge and Tanker, MBPD

PADDs	Pipeline	Marine
III to I	673	131
III to II	212	31
I to II	97	(7)

Source: EIA/DOE

2004 US Distillate Use, MBPD

PADD	I	II	III	IV	V	Total
Residential	355	37	<1	1	3	396
Commercial	137	38	15	5	13	208
Industrial	47	47	30	16	17	157
Oil Comp	1	6	22	5	2	36
Farm	23	118	48	13	26	228
Electric	24	9	2	<1	12	48
Railroad	32	76	61	17	29	215
Marine	28	32	69	<1	23	151
Highway	763	768	428	109	348	2,415
Military	5	1	7	<1	11	23
Off-Highway	52	60	38	12	23	186

Sudoku

6				4			7	
		8			2			
				3				
	9					7		
		4		9				
								1
	4						8	
7				8				
		1						2

Rules

1. **1-9 across**
2. **1-9 down**
3. **1-9 in 3X3**

Warning:

Do not attempt to solve this puzzle.

It's just an example and probably does not have a solution.

2004 U.S. Distillate Use, MBPD

Difficult

PADD	I	II	III	IV	V	Total
Home			<1	1	3	
Comm	137					208
Ind	47				17	
Oil			22			
Farm		118				
Elec	24		2	<1		48
Rail			61		29	
Mar	28		69			151
High	763				348	
Mili						23
N-High	52			12	23	

Puzzle Challenged

PADD	I	II	III	IV	V	Total
Home	355	37	<1	1	3	396
Comm	137	38	15	5	13	208
Ind	47	47	30	16	17	157
Oil	1	6	22	5	2	36
Farm	23	118	48	13	26	228
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Mili	5	1	7	<1	11	23
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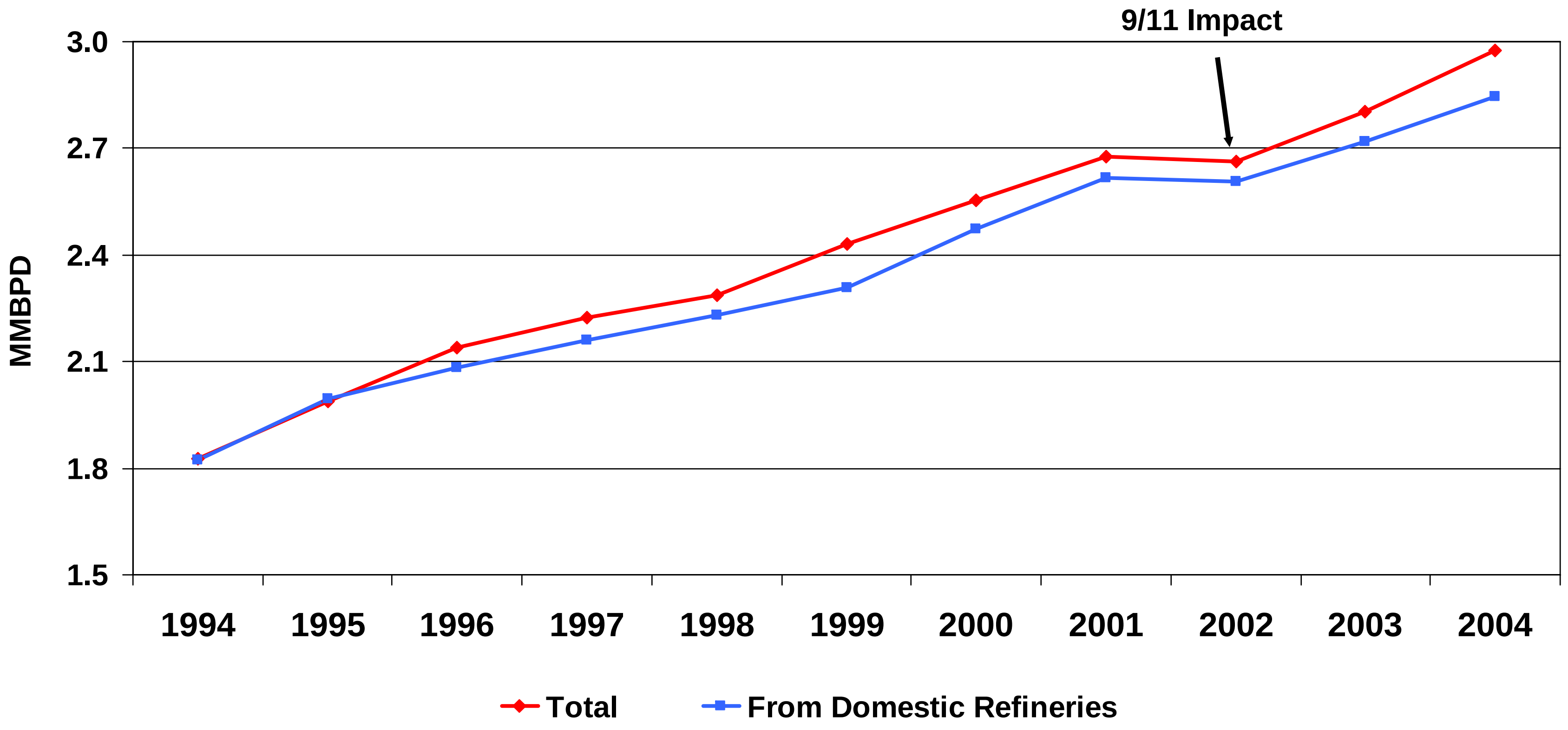
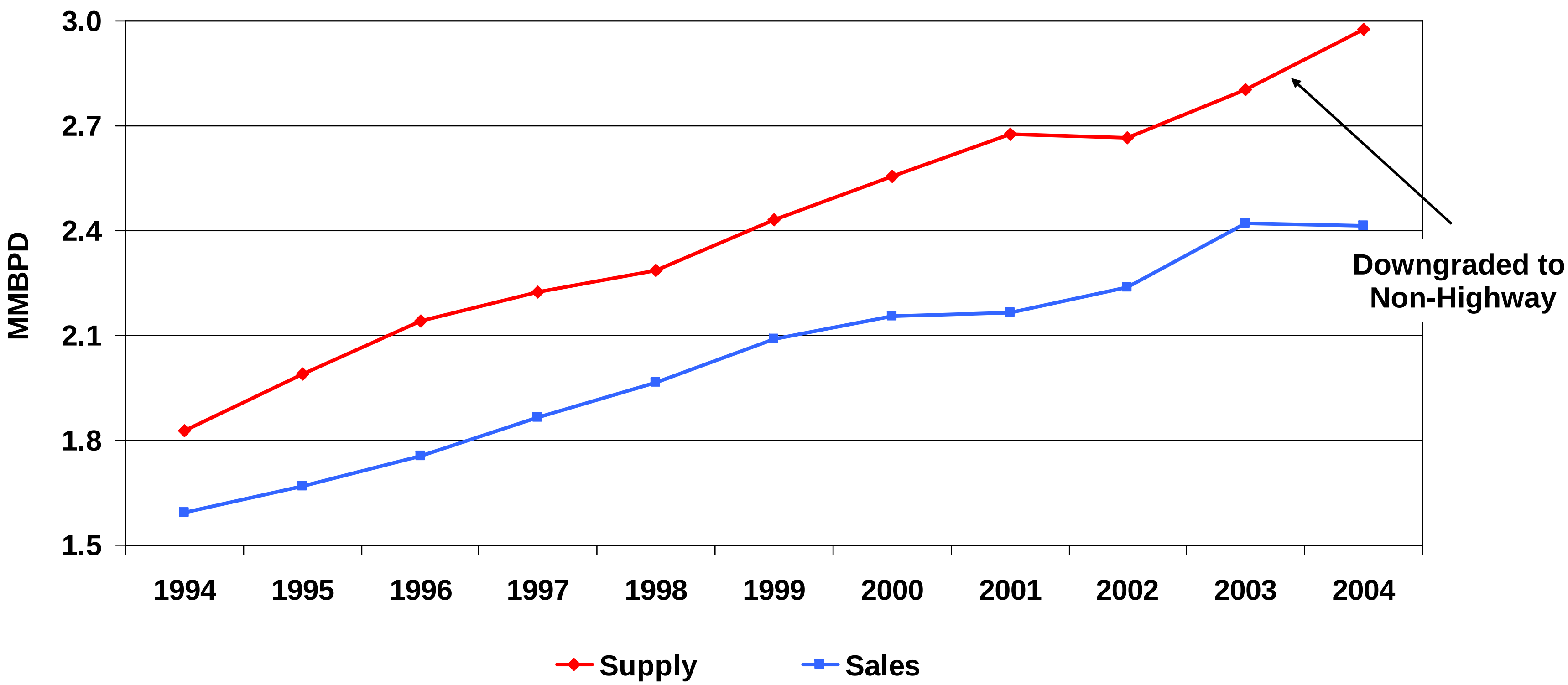
Highway Diesel Supply and Demand

Historical Highway Diesel Supply



Source: EIA/DOE

Historical Highway Diesel Supply vs. Sales



Source: EIA/DOE

U.S. Highway Diesel Demand

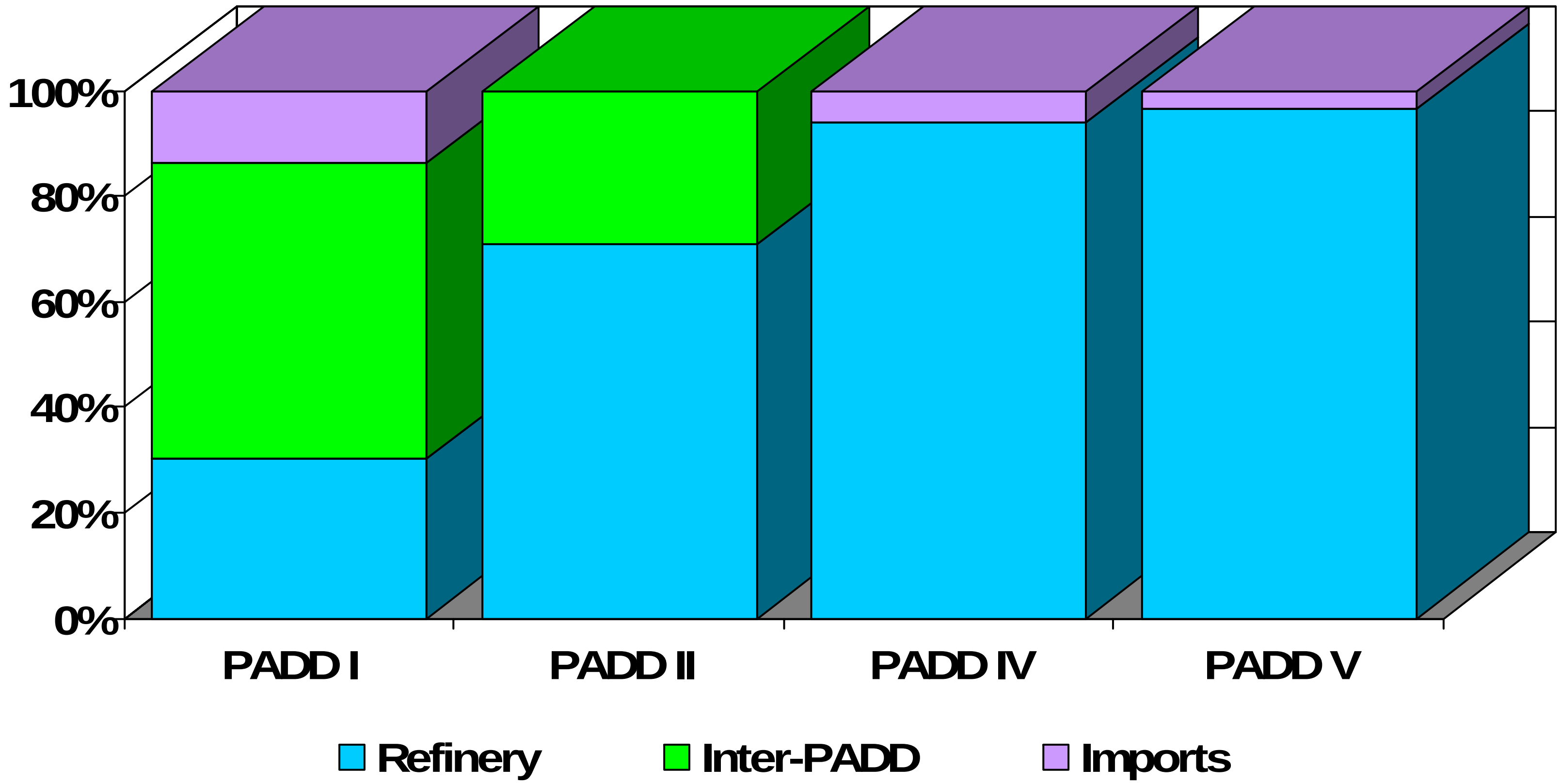
- Total highway diesel demand was 2.4 million BPD in 2004

- Regional breakdown:

PADD	Demand, MBPD	Production, MBPD
I	*763*	*248*
II	*768*	*693*
III	428	1,348
IV	109	142
V	348	416
Total	*2,416*	*2,847*

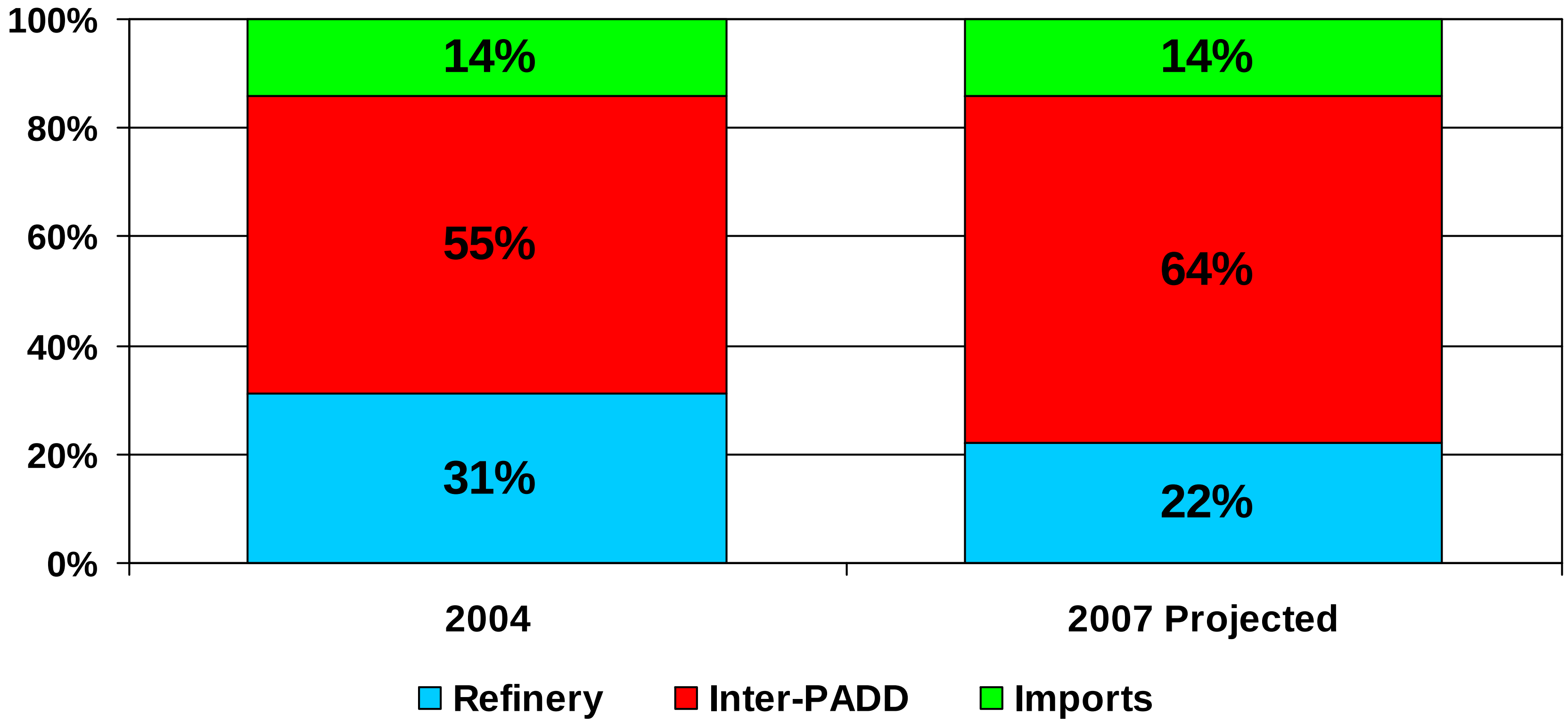
Source: EIA/DOE

2004 Highway Diesel Supply Origin



* Source: EIA/DOE

Highway Diesel Supply Origin, PADD I

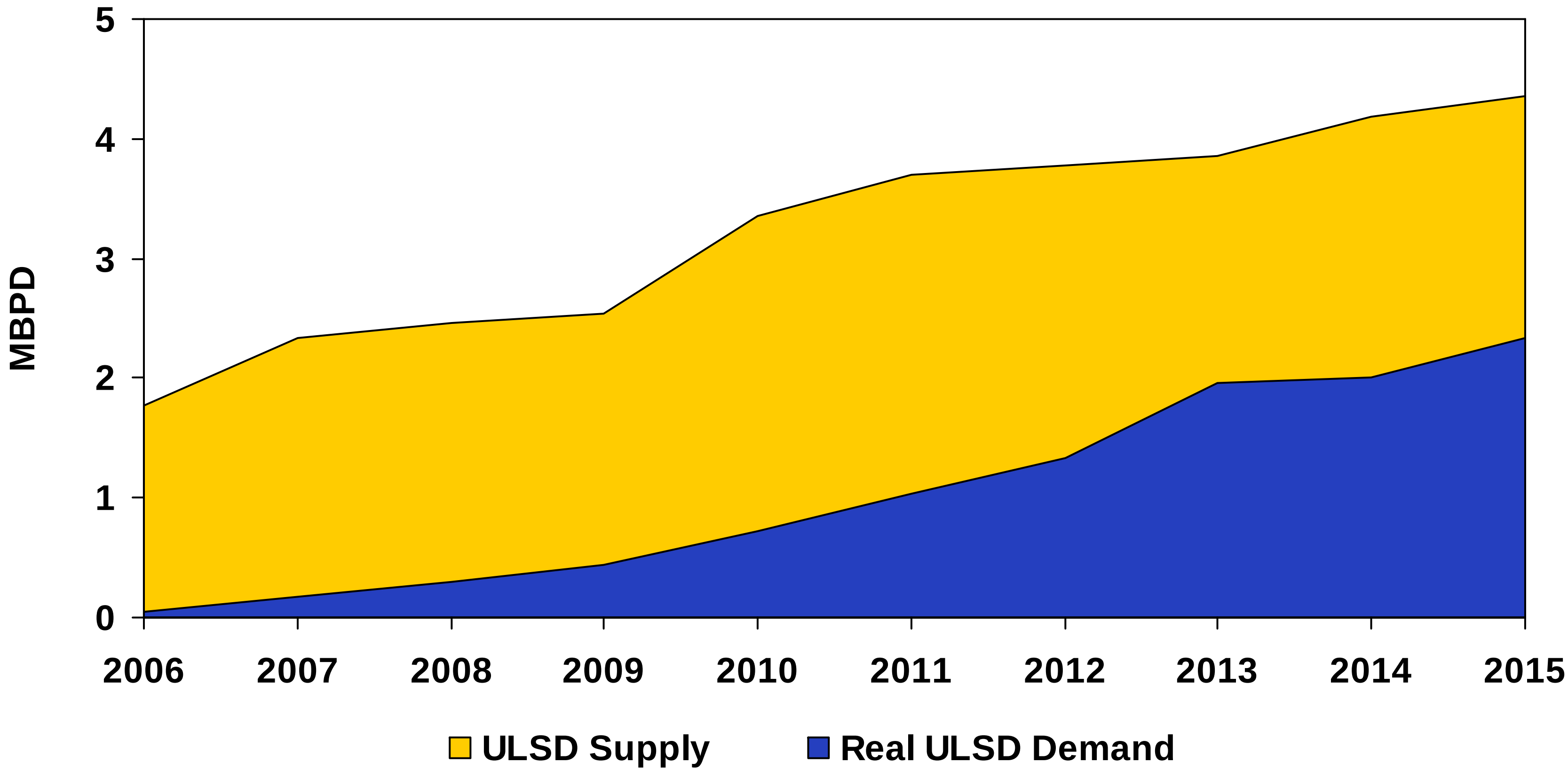


* Source: EIA/DOE, TM&C estimate

ULSD Demand

- "Real" demand for ULSD
  - » Government fleets
  - » Special applications
  - » Mandated retrofits
  - » New 2007+ engines
- Little "real" demand for ULSD in 2006
- EPA has mandated 80% of highway diesel supply be ULSD by June 2006
- ULSD "real" demand projected to be ~25% of all highway diesel when the temporary compliance option (TCO) period expires in 2010 and 50% by 2015

Expected ULSD Demand vs. ULSD Supply



U.S. Refinery Highway Diesel Supply

Current Status of ULSD Preparations

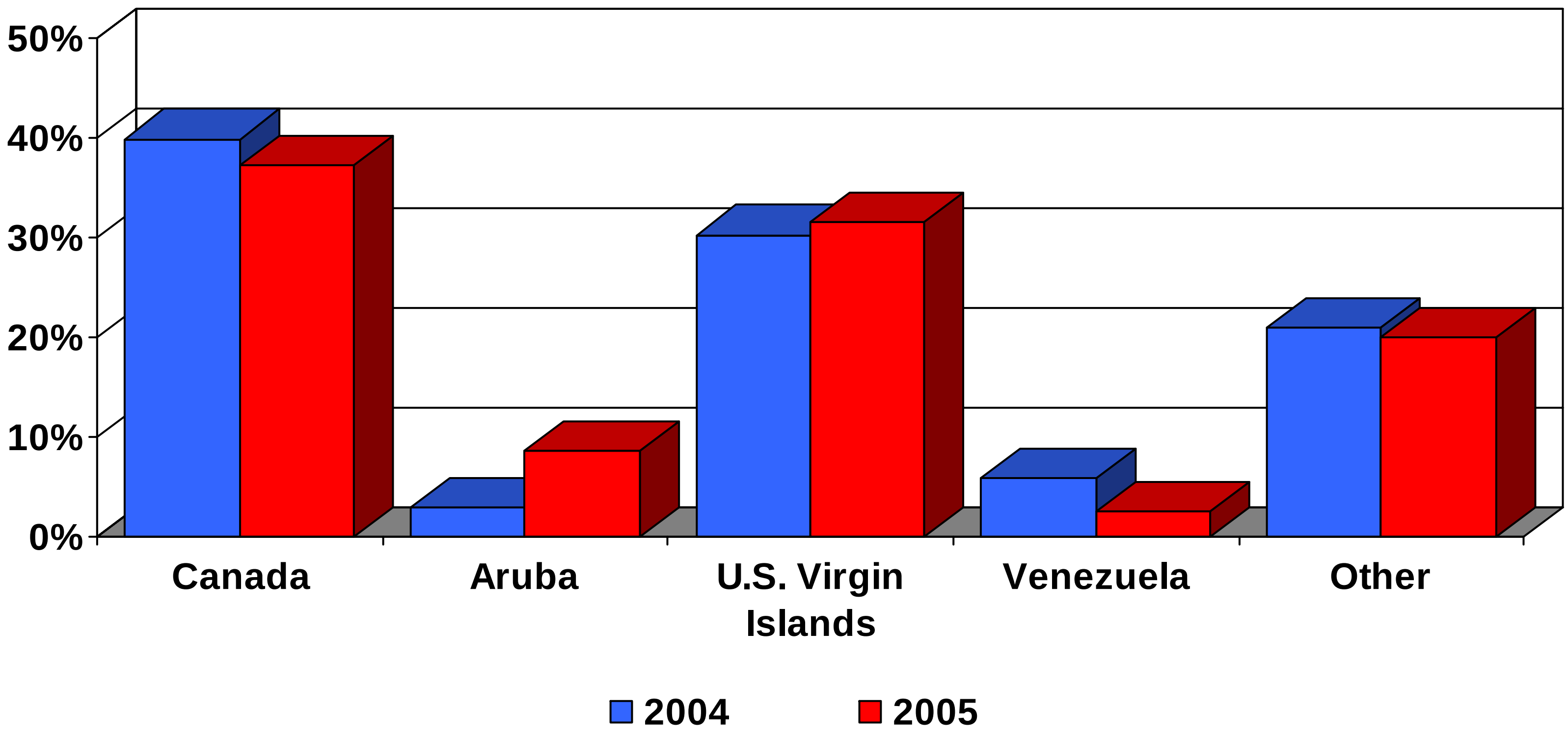
- U.S. refiners are expected to be on time for the roll-out of ULSD by June 2006.
- Supply capabilities will be far greater than forecast demand in 2006-2010, the TCO period.

U.S. Refining Industry Plans

- **Planned ULSD capacity by June 2006 is >2.5 million BPD, 2004 LSD demand was 2.4 million BPD.**
- **More than one-third of refineries we surveyed who plan to produce ULSD are pre-investing in capacity for ULS off-road diesel.**
- **90% of the refineries we surveyed have designed HDS units to produce ULSD with 7-10 ppm sulfur.**

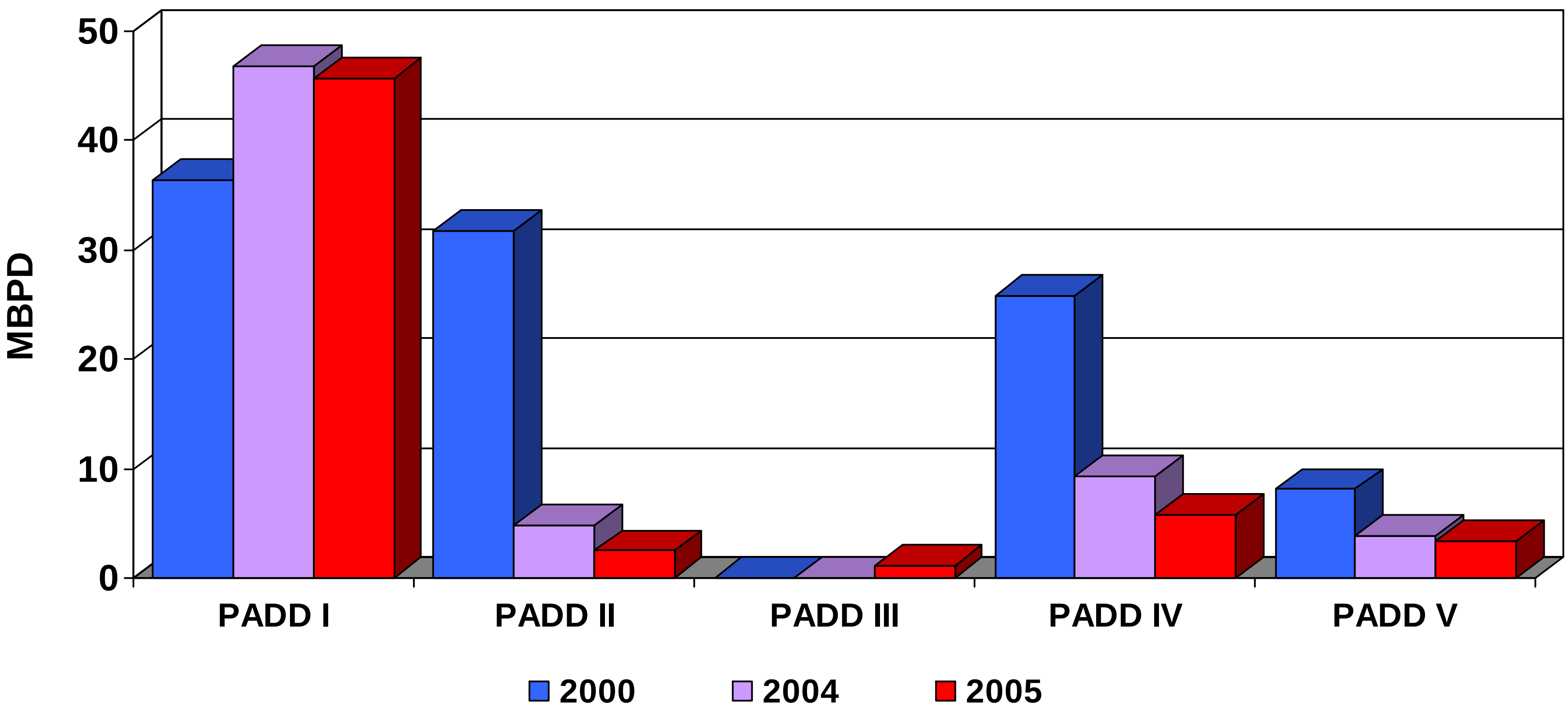
Highway Diesel Imports

Origin of Highway Diesel Imports to U.S.



* Source: EIA/DOE, 2005, January-November

2005 Highway Diesel Imports from Canada



Source: EIA/DOE

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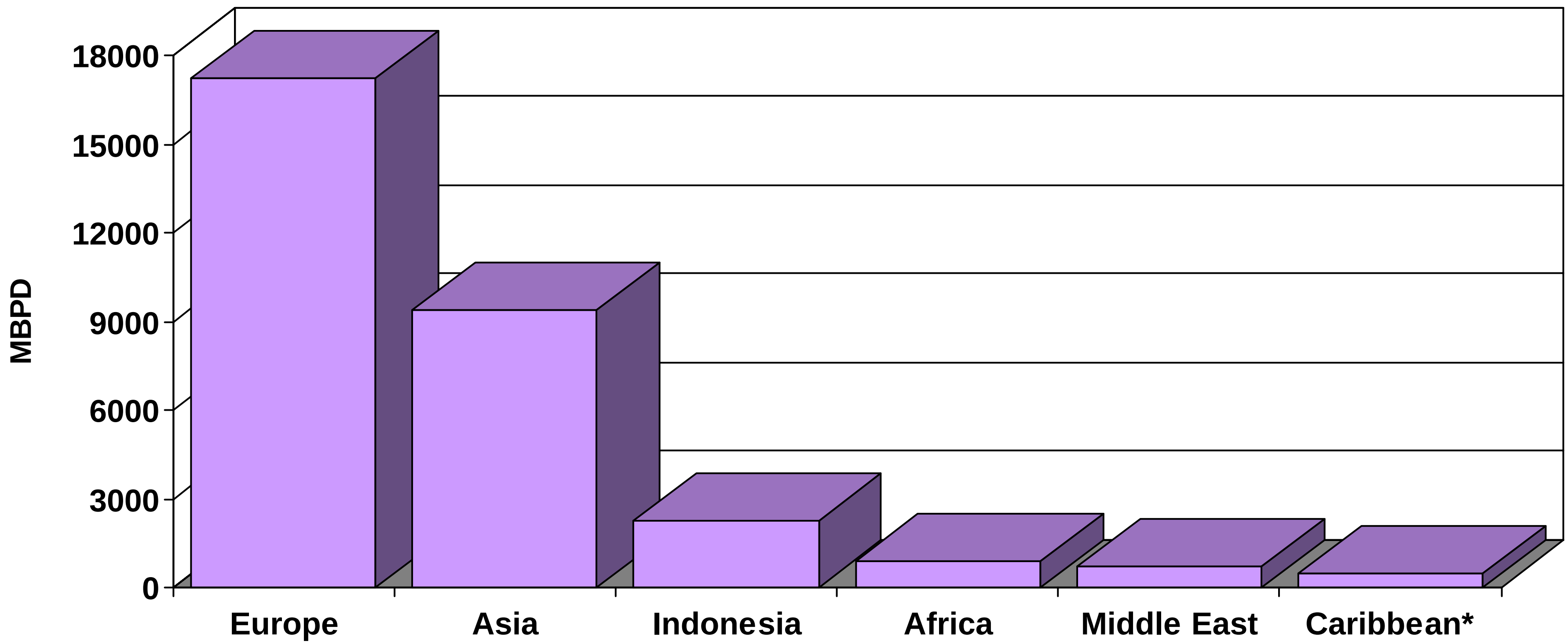
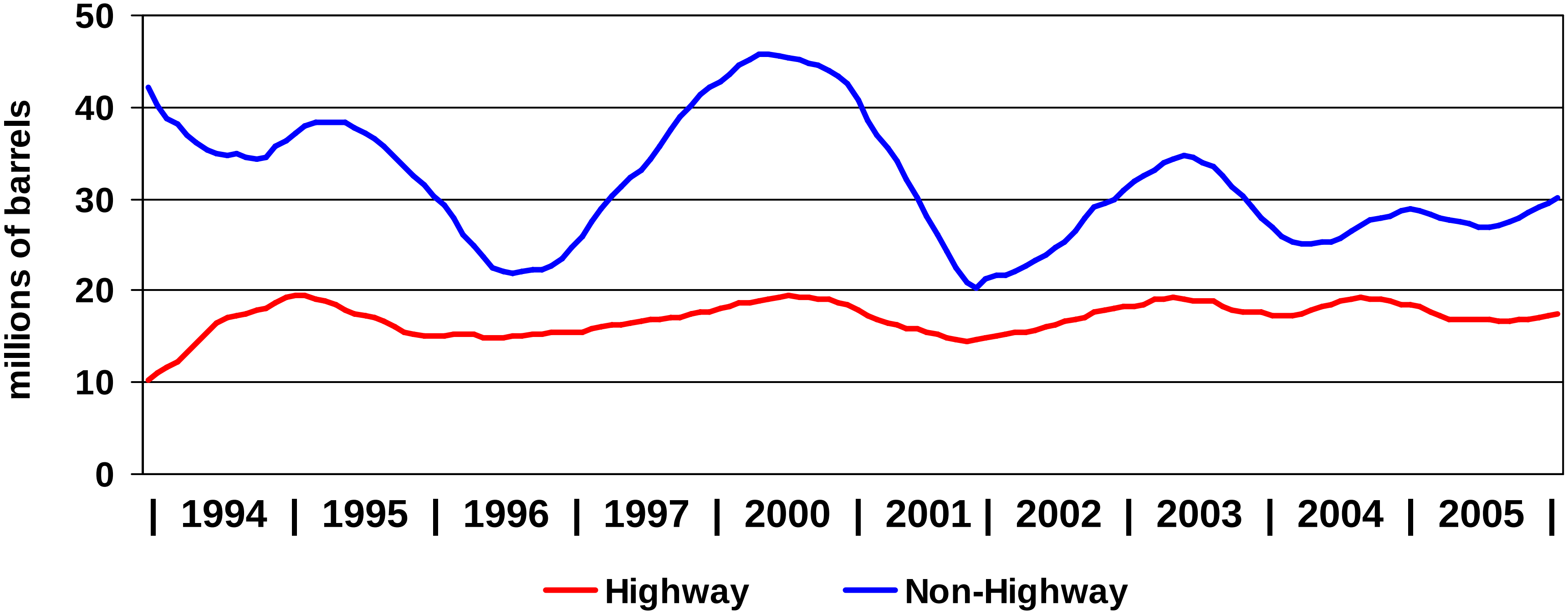
2005 Highway Diesel Imports – Other Detail



Source: EIA/DOE ***Not Including U.S. Virgin Islands**

U.S. Distillate Inventories

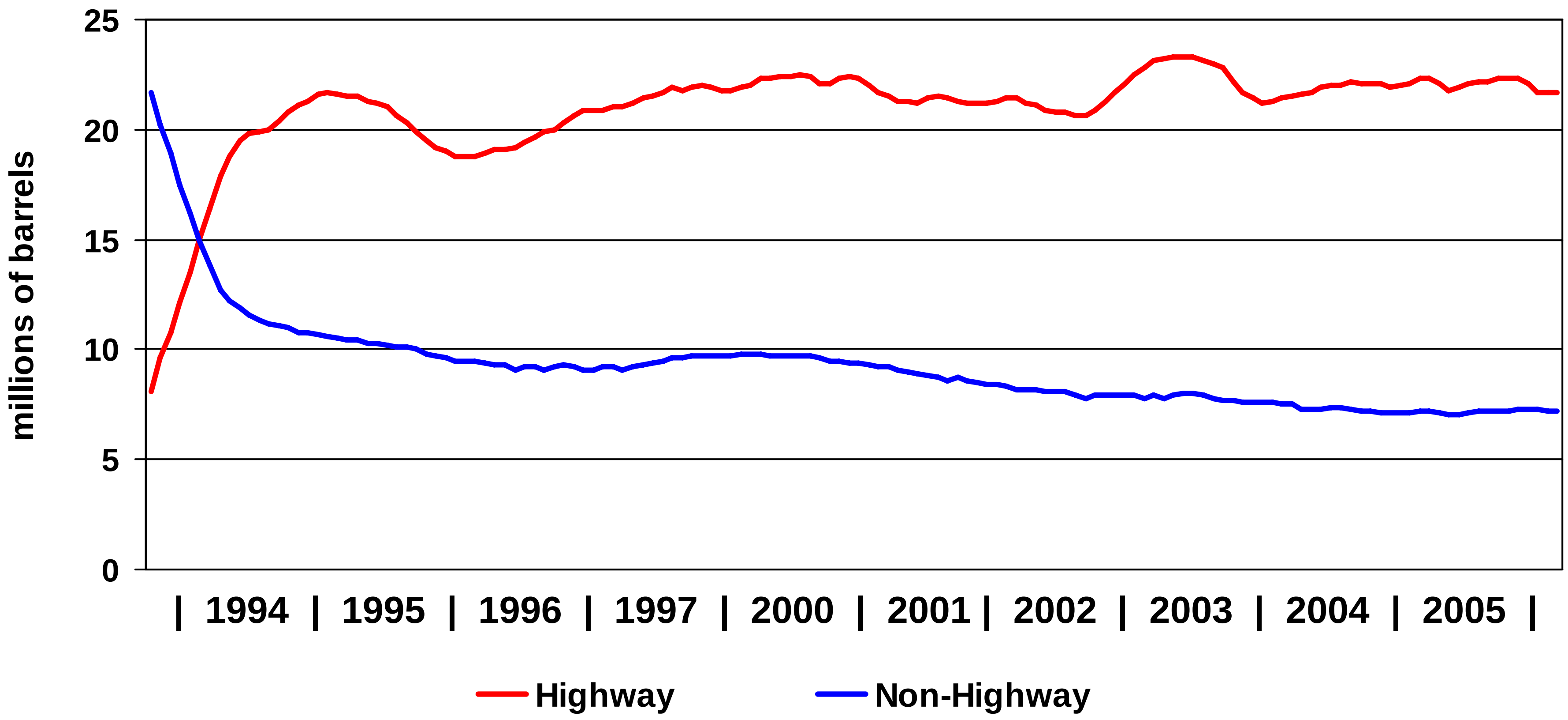
Distillate* Inventory PADD I
1993-2005 – 12-Month Rolling Average



*** Does not include Northeast Home Heating Oil Reserve**

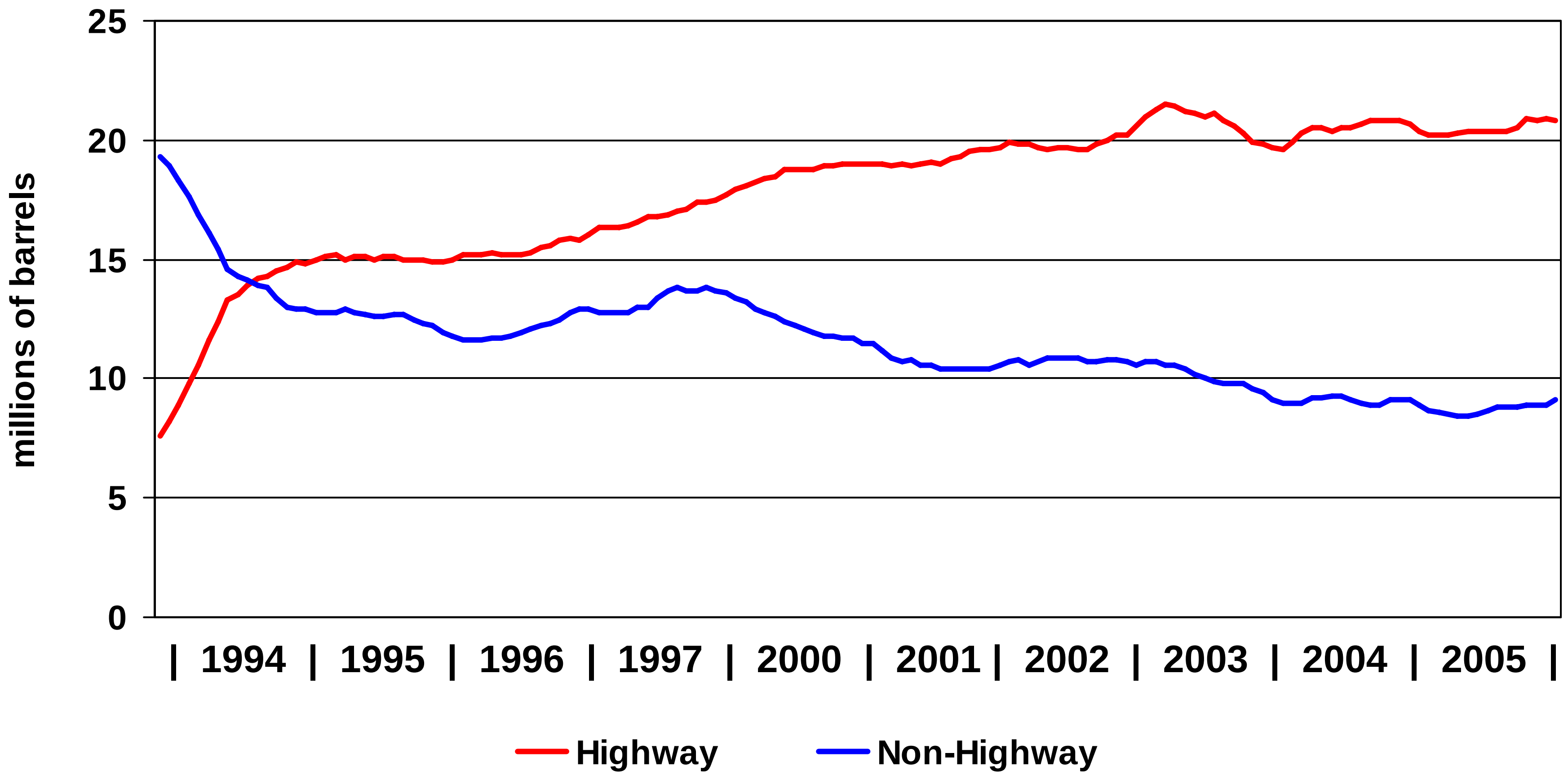
Source: EIA/DOE

Distillate Inventory PADD II
1993-2005 – 12-Month Rolling Average



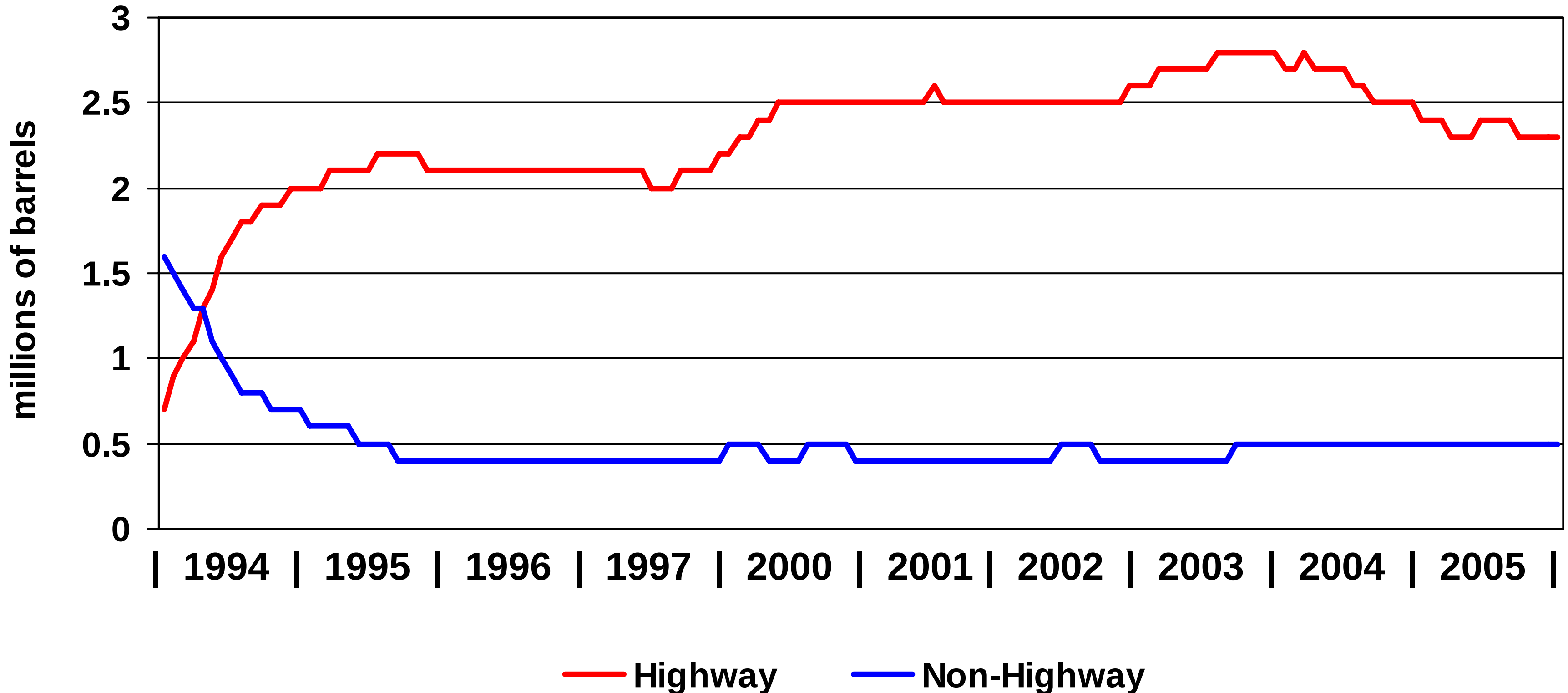
Source: EIA/DOE

Distillate Inventory PADD III
1993-2005 – 12-Month Rolling Average



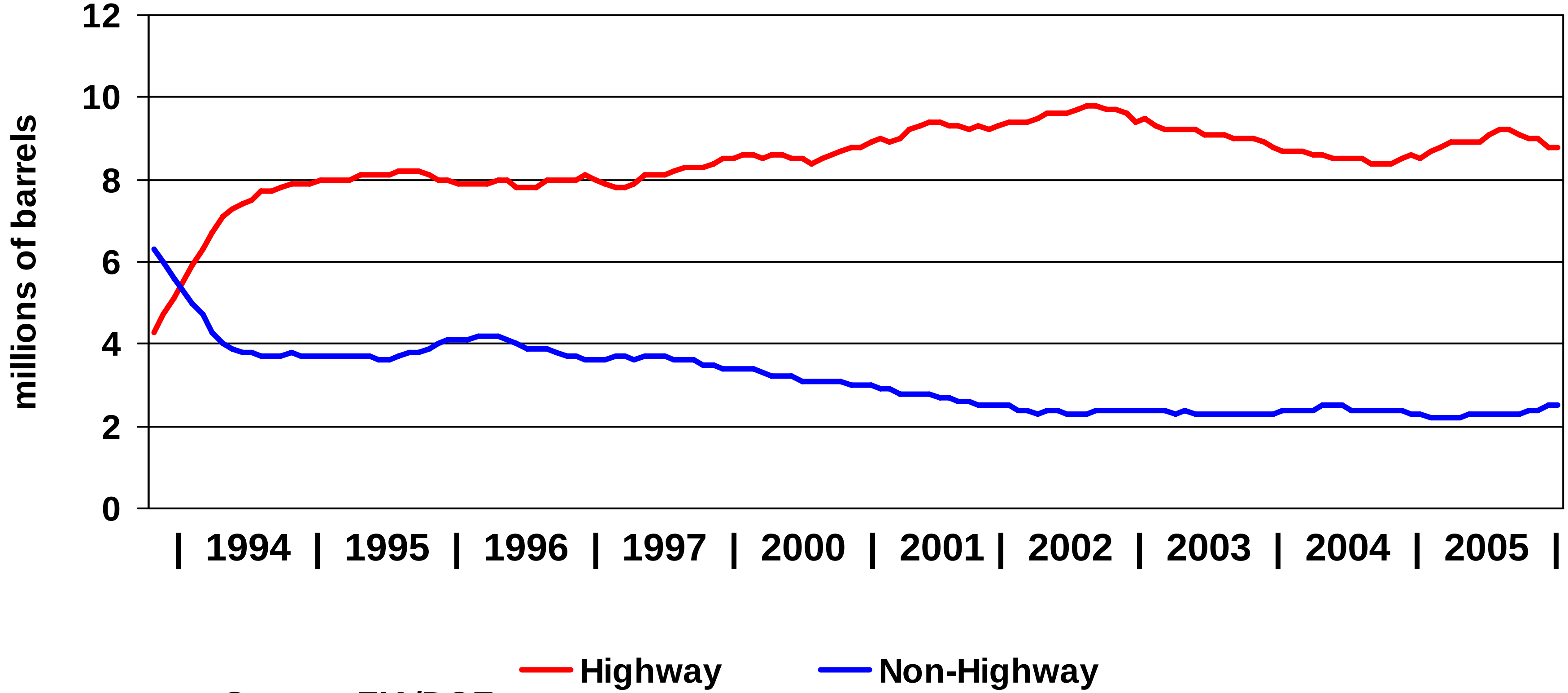
Source: EIA/DOE

Distillate Inventory PADD IV
1993-2005 – 12-Month Rolling Average



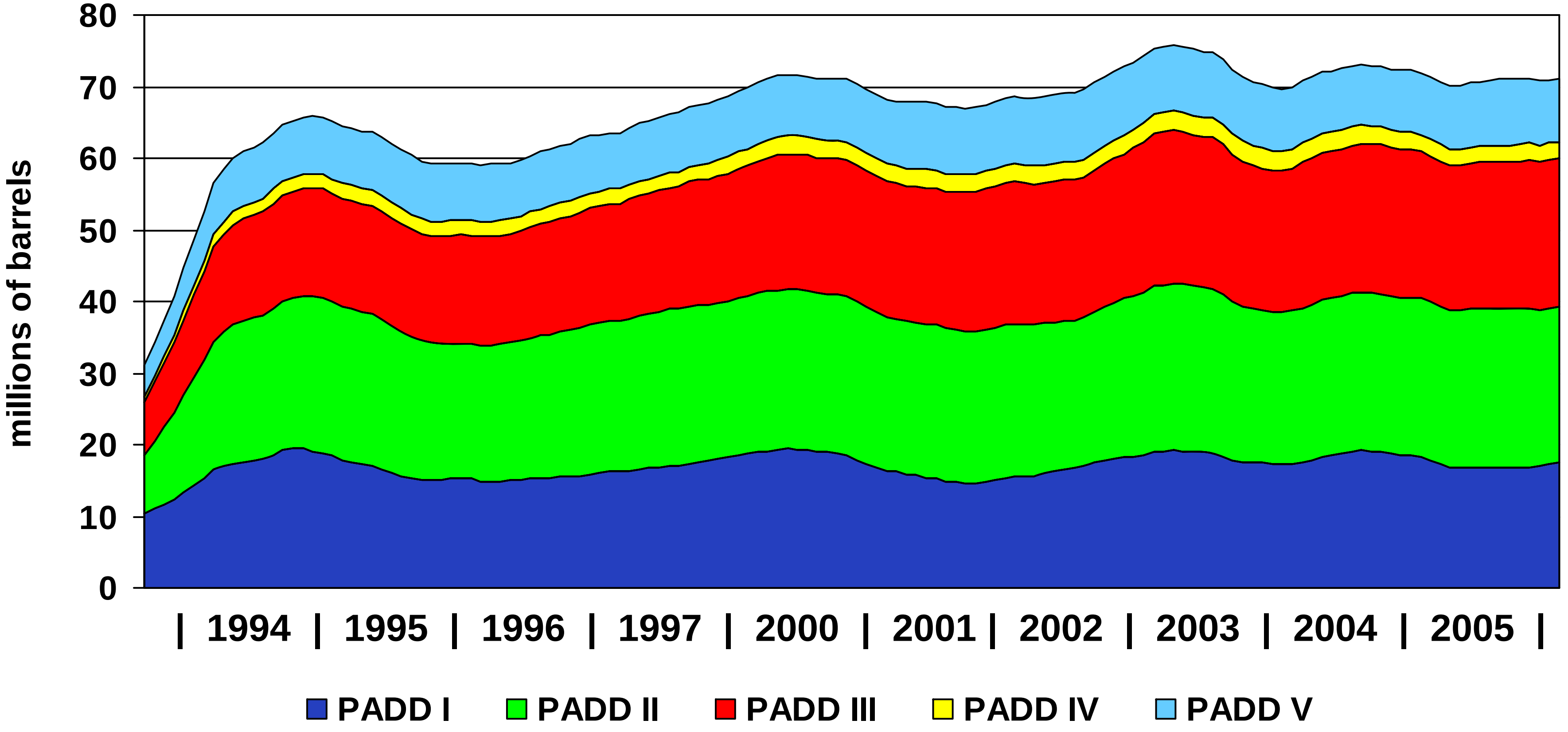
Source: EIA/DOE

Distillate Inventory PADD V
1993-2005 – 12-Month Rolling Average



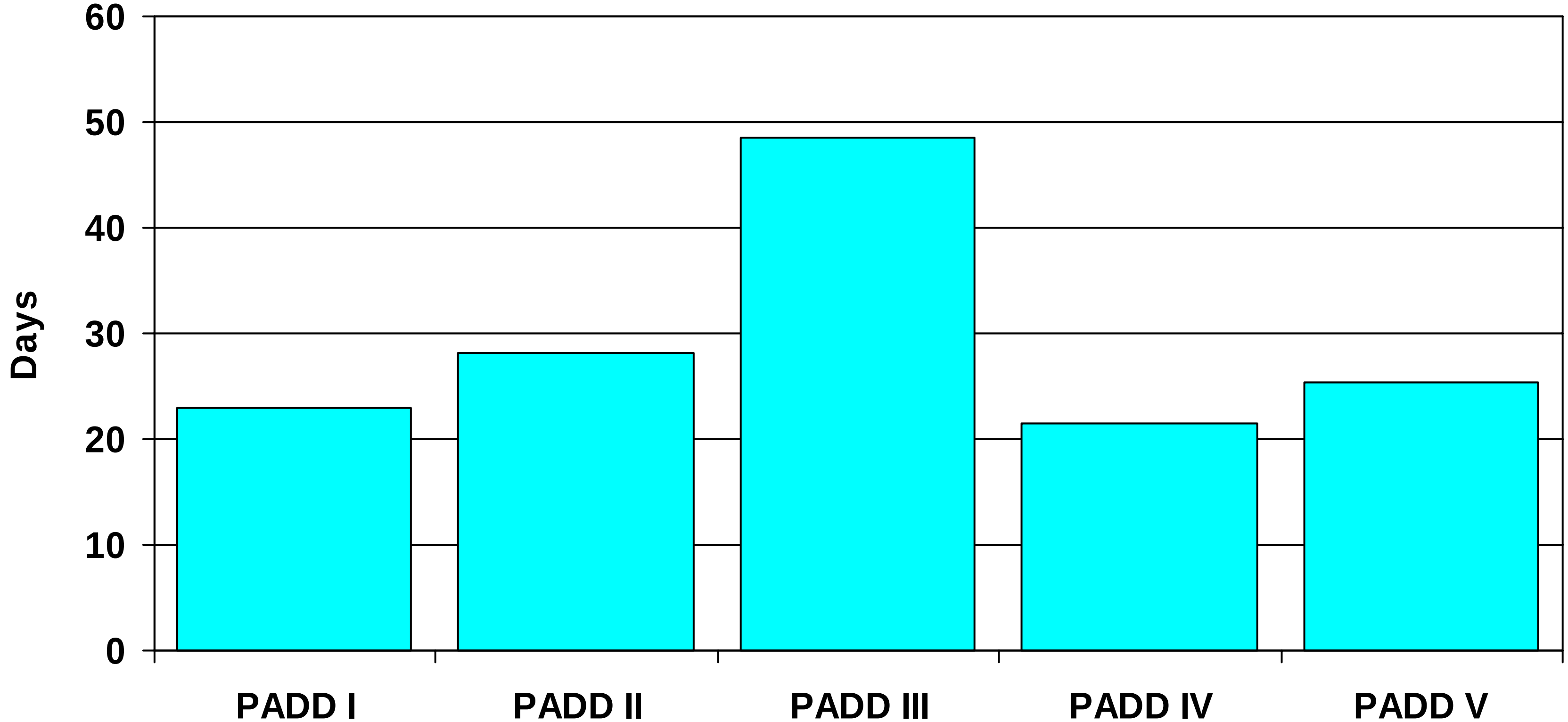
Source: EIA/DOE

U.S. Highway Diesel Inventory
1993-2005 – 12-Month Rolling Average



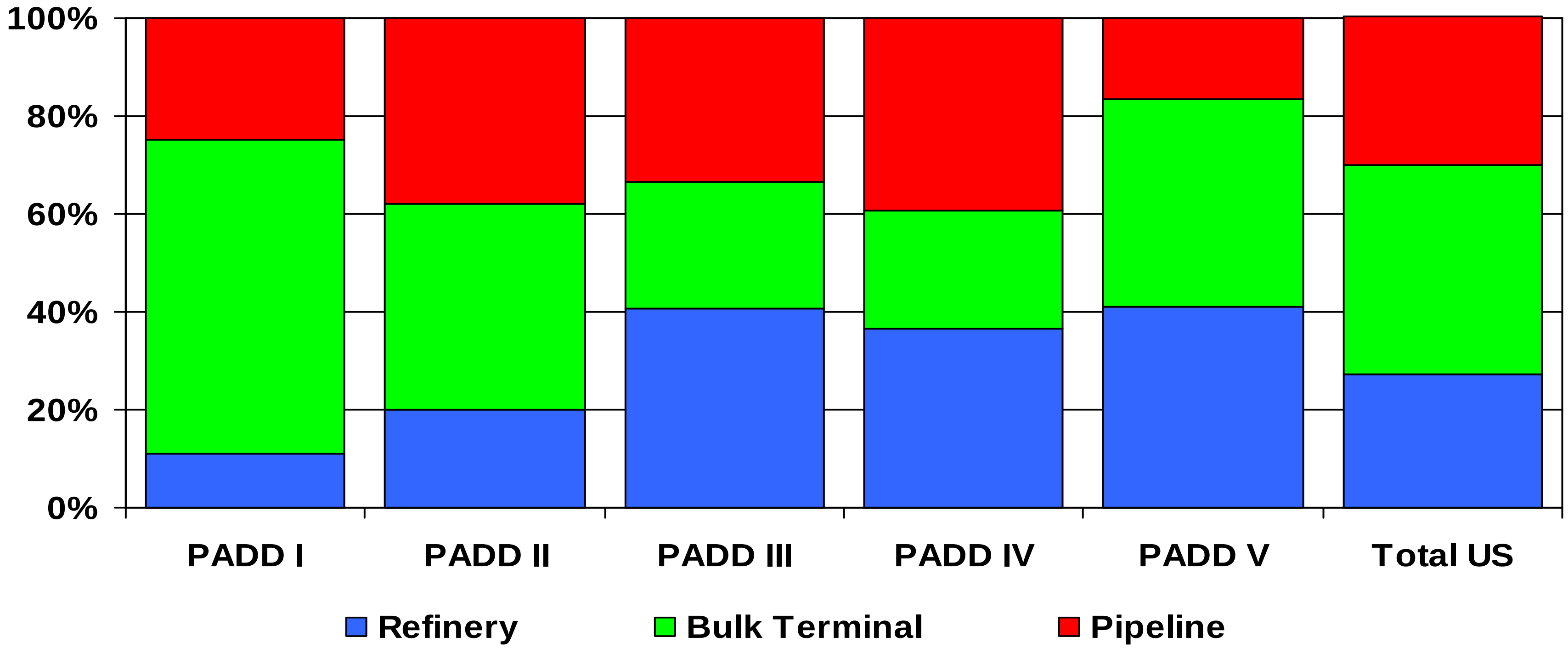
Source: EIA/DOE

U.S. Highway Diesel Inventory vs. Demand November 2005 – Days of Storage



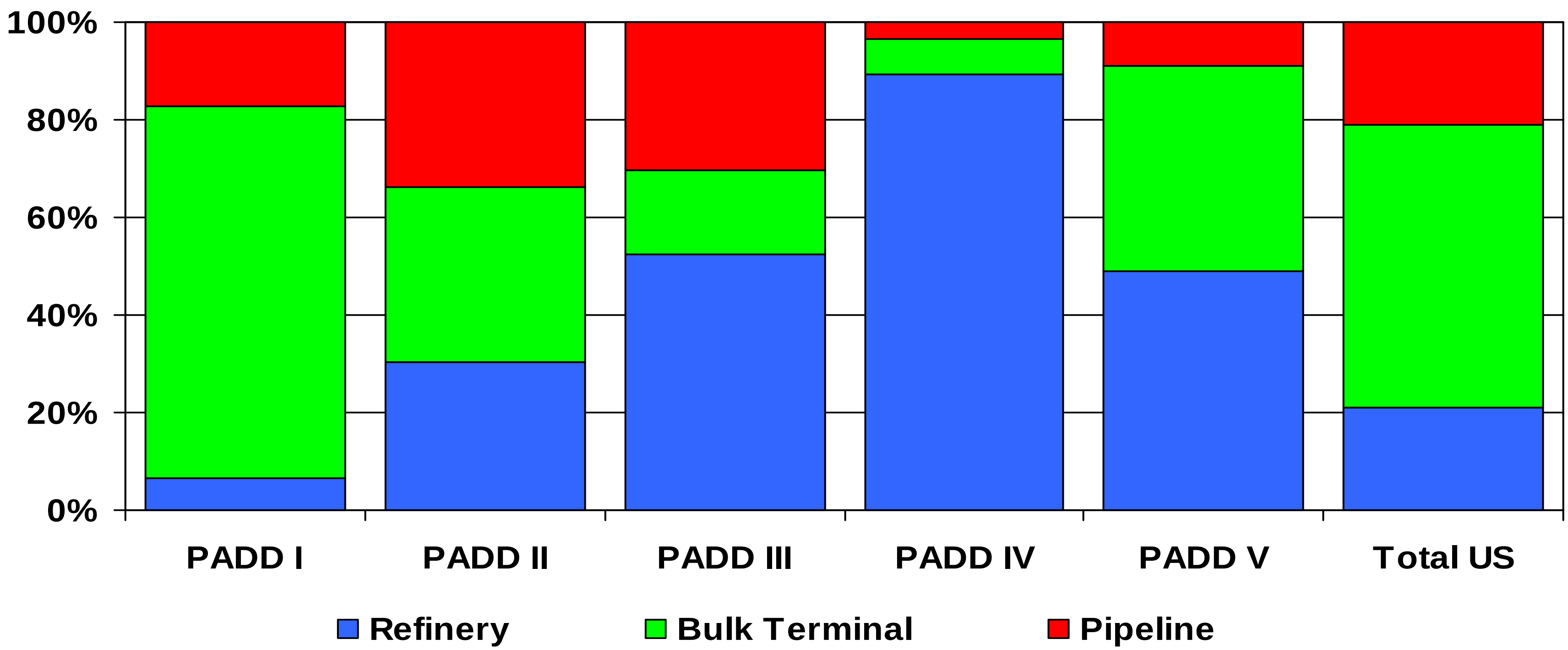
Source: EIA/DOE

U.S. Highway Diesel Inventory
End of 2004



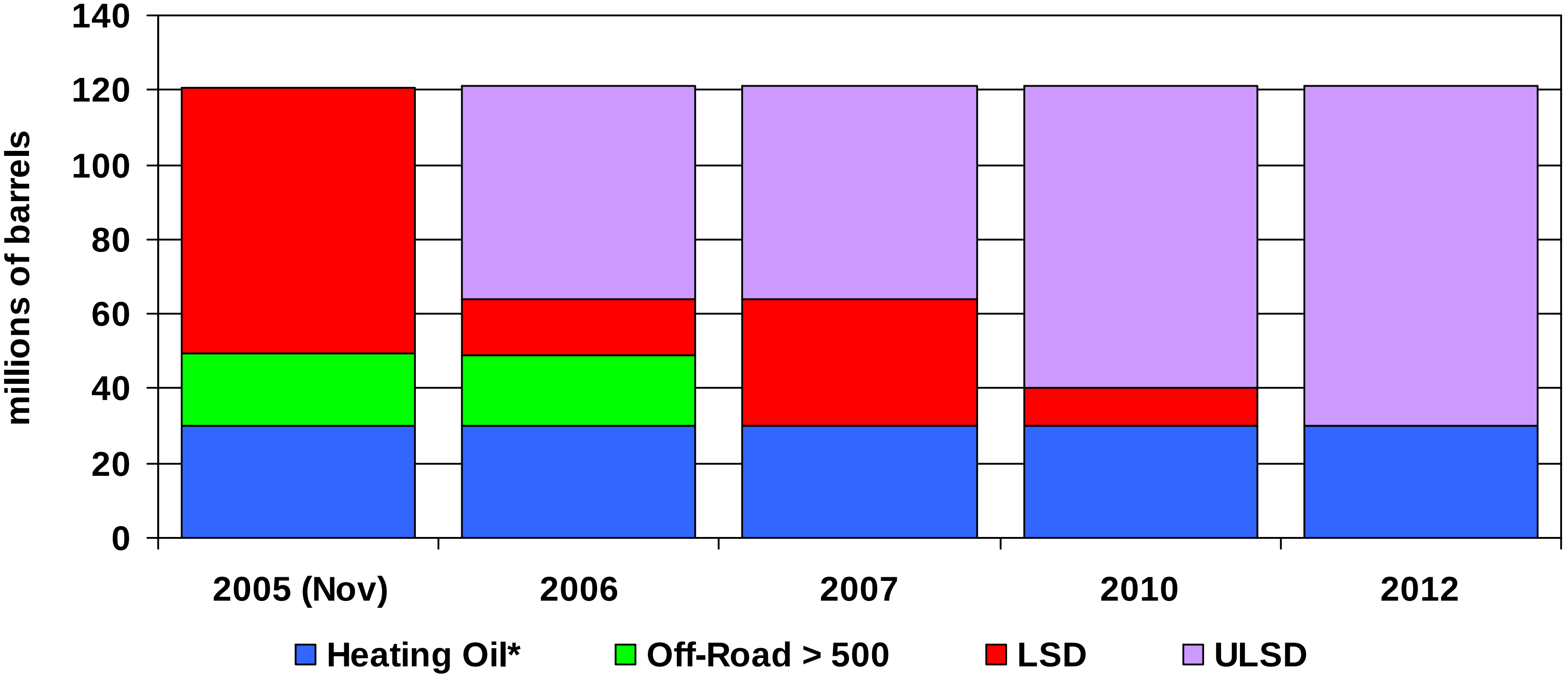
Source: DOE/EIA

U.S. Non-Highway Distillate Inventory* End of 2004



* Does not include Northeast Home Heating Oil Reserve
Source: DOE/EIA

U.S. Distillate Inventory* Actual/Projected End of Year



* Does not include Northeast Home Heating Oil Reserve
Source: DOE/EIA

Cost to Supply ULSD

Refinery ULSD Costs

Capital Cost, $/BPD ULSD produced

Method	Range	Typical
Revamping	400-3,300	1,000
Grass Roots	1,600-10,000	3,500

Total Investment @ 2.5 MMB/D is about $5 billion

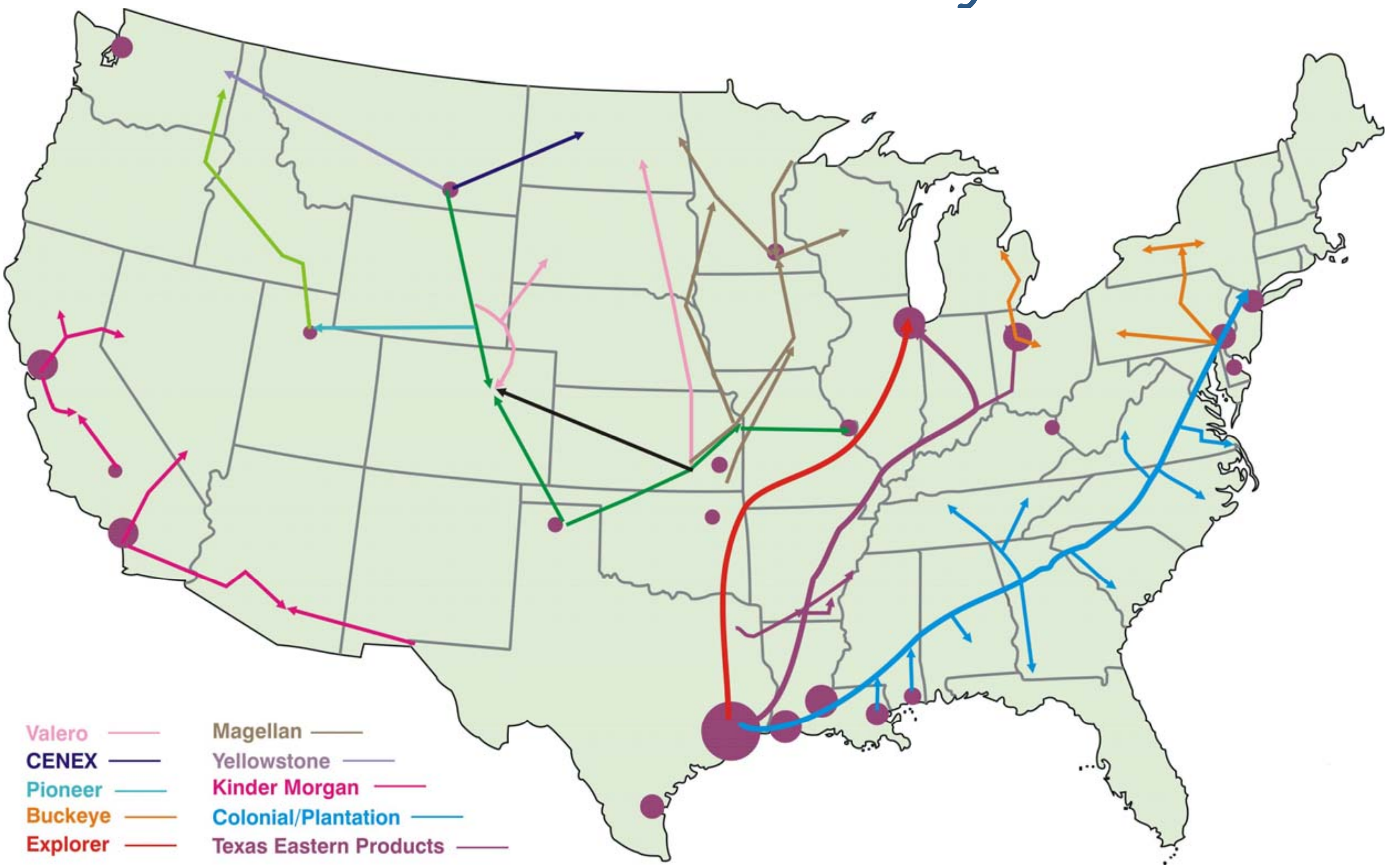
Added Operating Costs, ¢ per gallon of ULSD produced

Variable	Fixed	Total
0.9	0.3	1.2

Capital Recovery: 2-4¢ per gallon of ULSD produced

Distribution System Issues

Product Distribution System



Pipeline Issues

- Some pipelines will no longer handle distillate in excess of 500 ppm (with the exception of jet fuel).
- The ULSD sulfur specification required by pipelines ranges from 7-10 ppm with most pipelines' limit being 8 ppm.
- Initially, Colonial Pipeline will not deliver ULSD beyond Fairfax, Virginia and will expand deliveries north as their experience increases.
- Pipeline expenditures are expected to increase dependent on the additional investment required to transport ULSD.

Refiners Have Few Alternatives to ULSD

- **Heating oil is a viable alternative for PADD I.**
- **Off-road diesel, which EPA will lower to 500 ppm in 2007 and 15 ppm in 2010 and later, is the dominant HS distillate outside PADD I.**
- **The nature of the supply chain dictates some off-road demand will be supplied "on-road quality" product.**
- **Loss of fungibility between heating oil and off-road diesel will limit or eliminate HS diesel supply in certain regions.**

Conclusions

- ULSD is expected to be widely available in all markets.
- Refiners' added costs, excluding capital recovery, for ULSD supply are expected to be 1.0-1.5¢ per gallon plus any added tariff for ULSD.
- Refiners' capital costs will range from 2-4¢ per gallon of ULSD produced.

Conclusions (cont.)

- Areas at the most risk for high prices/ disruptions are:
  - At the end of long pipelines – New England, Chicago
  - High heating oil inventory/demand – New England
  - Limited inventory diversity – PADD IV
  - Limited alternate supply sources – e.g., Atlanta
- We expect disruptions to be short lived and generally limited to the TCO period.

For more information, contact :

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