

Appendix E
Model Results

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This appendix provides mid-term projections for end-use prices and total supplies of ultra-low-sulfur diesel fuel (ULSD), based on the Energy Information Administration's (EIA's) National Energy Modeling System (NEMS) Petroleum Market Module (PMM). Historical data for 1999 prices and supplies of highway diesel (500 ppm sulfur) are also provided for comparison (Tables E1 and E2).

The projected end-use (pump) prices are lower than the current prevailing prices for highway diesel fuel for several reasons. The end-user prices include crude oil costs, processing costs, taxes, and marketing costs.¹⁶⁸ Therefore, variations in the costs and taxes affect the projected end-user prices. The reference case, the Regulation case, and all sensitivity cases were based on mid-term projections for world crude oil prices used in *Annual Energy Outlook 2001 (AEO2001)*. After the steep increase in world crude oil prices in 1999 and 2000, EIA projected that crude oil prices would decline initially (through 2003), then slowly increase through 2020.¹⁶⁹ EIA's *Weekly Petroleum Status Report* for March 23, 2001, estimated the February 2001 price at \$24.60 per barrel (\$0.577 per gallon) in 1999 dollars for U.S. imported crude oil. In comparison, NEMS projects a world crude oil price of \$21.37 per barrel (\$0.509 per gallon) in 2010

(in 1999 dollars). The lower 2010 oil price projections from *AEO2001* thus account for a difference of 6.8 cents per gallon in the projected end-use prices for ULSD.

In addition, the end-use diesel prices include a nominal Federal tax of \$0.24 per gallon in 1999, which decreases in value (in real terms) in the forecast years. The differential in Federal taxes between 1999 and 2010 is about 4 cents per gallon. The PMM reference case projects an end-use price of \$1.238 per gallon in 2010. After upward adjustment to account for the differentials in world crude oil price and Federal taxes (a total of 10.8 cents), the end-use price would be \$1.346 per gallon at the current world crude oil price level.

The U.S. prices of most petroleum fuel products fluctuate between seasons and in response to world crude oil prices. The higher-than-normal diesel prices in 2000 and in the early part of 2001 reflect the low distillate inventory and high world crude oil prices. Since February 2001, the average price of U.S. highway diesel has been dropping steadily, to a level around \$1.40 per gallon. According to the *Weekly Petroleum Status Report* for March 23, 2001, the average U.S. price of highway diesel was \$1.338 per gallon (in 1999 dollars), comparable to the price projection of \$1.346 per gallon from the PMM.

¹⁶⁸Energy Information Administration, *Annual Energy Outlook 2001*, DOE/EIA-0383(2001) (Washington, DC, December 2000), Figure 112.

¹⁶⁹Energy Information Administration, *Annual Energy Outlook 2001*, DOE/EIA-0383(2001) (Washington, DC, December 2000), Figure 88.

Table E1. End-Use Prices and Total Supplies of Highway Diesel, 1999 and 2007-2015, Assuming 5-Percent Return on Investment

Analysis Case	1999	2007	2008	2009	2010	2011	2015	2007-2010 Average	2011-2015 Average
End-Use Prices of Highway Diesel (1999 Cents per Gallon)^a									
Reference (500 ppm)	114.0	121.6	122.3	123.0	123.6	124.1	124.3	122.6	124.3
Regulation (ULSD)	NA	128.6	129.0	129.5	130.4	131.3	129.4	129.4	129.7
Higher Capital Cost (ULSD)	NA	129.4	129.9	130.5	131.2	132.2	130.1	130.3	130.5
2/3 Revamp (ULSD)	NA	128.9	129.2	129.9	130.7	131.7	129.7	129.7	130.0
10% Downgrade (ULSD)	NA	129.0	129.4	129.9	130.8	133.2	130.0	129.8	130.7
4% Efficiency Loss (ULSD)	NA	128.6	129.0	129.5	130.5	131.4	129.6	129.4	130.0
1.8% Energy Loss (ULSD)	NA	128.9	129.3	129.6	130.5	131.5	129.5	129.6	129.8
Severe (ULSD)	NA	130.4	130.7	131.4	132.2	134.8	131.1	131.2	131.7
No Imports (ULSD)	NA	130.2	130.4	130.8	131.6	132.9	130.5	130.8	131.1
Total Highway Diesel Supplied (Million Barrels per Day)									
Reference									
Total (500 ppm)	2.43	3.09	3.15	3.21	3.27	3.32	3.55	3.18	3.43
Regulation									
500 ppm	2.43	0.70	0.71	0.72	0.26	0.00	0.00	0.60	0.00
ULSD	0.00	2.40	2.45	2.50	3.02	3.40	3.63	2.59	3.51
Total	2.43	3.10	3.16	3.22	3.28	3.40	3.63	3.19	3.51
Higher Capital Cost									
500 ppm	2.43	0.70	0.71	0.72	0.26	0.00	0.00	0.60	0.00
ULSD	0.00	2.40	2.45	2.50	3.02	3.40	3.63	2.59	3.51
Total	2.43	3.10	3.16	3.22	3.28	3.40	3.63	3.19	3.51
2/3 Revamp									
500 ppm	2.43	0.70	0.71	0.72	0.26	0.00	0.00	0.60	0.00
ULSD	0.00	2.40	2.45	2.50	3.02	3.40	3.63	2.59	3.51
Total	2.43	3.10	3.16	3.22	3.28	3.40	3.63	3.19	3.51
10% Downgrade									
500 ppm	2.43	0.70	0.71	0.72	0.26	0.00	0.00	0.60	0.00
ULSD	0.00	2.40	2.45	2.50	3.02	3.61	3.85	2.59	3.72
Total	2.43	3.10	3.16	3.22	3.28	3.61	3.85	3.19	3.72
4% Efficiency Loss									
500 ppm	2.43	0.70	0.71	0.72	0.26	0.00	0.00	0.60	0.00
ULSD	0.00	2.40	2.45	2.50	3.03	3.42	3.65	2.59	3.53
Total	2.43	3.10	3.16	3.22	3.29	3.42	3.65	3.19	3.53
1.8% Energy Loss									
500 ppm	2.43	0.71	0.72	0.73	0.26	0.00	0.00	0.60	0.00
ULSD	0.00	2.42	2.47	2.52	3.06	3.45	3.68	2.62	3.55
Total	2.43	3.13	3.19	3.25	3.32	3.45	3.68	3.22	3.55
Severe									
500 ppm	2.43	0.71	0.72	0.73	0.26	0.00	0.00	0.60	0.00
ULSD	0.00	2.42	2.47	2.52	3.07	3.67	3.92	2.62	3.79
Total	2.43	3.13	3.19	3.25	3.33	3.67	3.92	3.22	3.79
No Imports									
500 ppm	2.43	0.70	0.71	0.72	0.26	0.00	0.00	0.60	0.00
ULSD	0.00	2.40	2.45	2.50	3.02	3.40	3.63	2.59	3.51
Total	2.43	3.10	3.16	3.22	3.28	3.40	3.63	3.19	3.51

^aHighway diesel prices (both 500 ppm and ULSD) include Federal and State taxes but exclude county and local taxes.

NA = not available.

Sources: **1999:** Energy Information Administration, *Petroleum Supply Annual 1999*, Vol. 1, DOE/EIA-0340(99)/1 (Washington, DC, June 2000).
Projections: National Energy Modeling System, runs DSUREF.D043001B, DSU7PPM.D043001A, DSU7HC.D043001A, DSU7INV.D043001A, DSU7DG10.D043001A, DSU7TRN.D043001A, DSU7BTU.D043001A, DSU7ALL.D050101A, and DSU7IMP0.D043001A.

Table E2. End-Use Prices and Total Supplies of Highway Diesel, 1999 and 2007-2015, Assuming 10-Percent Return on Investment

Analysis Case	1999	2007	2008	2009	2010	2011	2015	2007-2010 Average	2011-2015 Average
End-Use Prices of Highway Diesel (1999 Cents per Gallon)^a									
Reference with 10% Return on Investment (500 ppm)	114.0	121.9	122.5	123.3	123.8	124.4	125.4	122.9	124.8
Regulation with 10% Return on Investment (ULSD).	NA	129.8	130.0	130.9	131.5	132.4	131.1	130.6	130.8
Total Highway Diesel Supplied (Million Barrels per Day)									
Reference with 10% Return on Investment									
Total (500 ppm).	2.43	3.10	3.16	3.22	3.27	3.33	3.56	3.19	3.44
Regulation with 10% Return on Investment									
500 ppm	2.43	0.70	0.71	0.73	0.26	0.00	0.00	0.60	0.00
ULSD	0.00	2.41	2.46	2.50	3.02	3.41	3.64	2.60	3.52
Total.	2.43	3.11	3.17	3.23	3.28	3.41	3.64	3.20	3.52

^aHighway diesel prices (both 500 ppm and ULSD) include Federal and State taxes but exclude county and local taxes.

NA = not available.

Sources: **1999:** Energy Information Administration, *Petroleum Supply Annual 1999*, Vol. 1, DOE/EIA-0340(99)/1 (Washington, DC, June 2000).

Projections: National Energy Modeling System, runs DSUREF10.D043001A and DSU7PPM10.D043001A.