October 2007

Economic Impact Analysis for the Gasoline Distribution Industry (Area Sources)

Final Report

Prepared for

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Office of Air Quality Planning and Standards (OAQPS)
Air Benefit and Cost Group
(MD-C439-02)
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CONTENTS

Section **Page**

LIST OF FIGURES

Number **Page**

LIST OF TABLES

Number **Page**

SECTION 1
INTRODUCTION

The U.S. Environmental Protection Agency (EPA) is developing standards to control toxic air pollutants from area sources in the gasoline distribution industry (North American Industry Classification System [NAICS] codes: 422710, 48691, 484220, 484230, 447110, and 447190 and private gasoline dispensing facilities).[1] As part of the regulatory process of preparing this area source standard, EPA is required to develop an economic impact analysis (EIA) and small entity impacts analysis for the gasoline distribution industry. To support EPA's development of these standards, the Air Benefit and Cost Group has conducted an EIA to assess the potential costs of the rule. This report documents the methods and results of this EIA.

1.1 Executive Summary

EPA estimates the program will result in very small increases in market prices and small reductions in output of gasoline. The economic approach and engineering cost approach yield approximately the same estimate of the total change in surplus[2] under the regulatory program. However, the economic approach identifies important distributional impacts among stakeholders. The key results of the EIA are as follows:

§ *Engineering Cost Analysis:* Total annualized costs measure the costs incurred by affected industries annually. The annualized costs for the regulatory alternative are estimated to be –$6.5 million (which includes $26.5 million in recovery credits).

§ *Market Analysis:* Changes in the average national price of retail gasoline will be well below a penny per gallon. Consumption responses to price changes are estimated to be small (less than 0.001% decrease, or less than 1 million gallons per year).

§ *Economic Welfare Analysis:* The economic analysis identifies important transitory impacts across stakeholders as gasoline markets adjust to higher production costs. Gasoline consumers see reductions in economic welfare as the result of higher prices and reduced gasoline consumption ($11 million). Although gasoline supply chain welfare losses are mitigated to some degree by higher gasoline prices, market conditions limit their ability to pass on all of the compliance costs. As a result, they also experience a loss in economic welfare ($9 million). These consumer and producer losses are offset by $26.5 million in recovery credit savings; this leads to a total surplus increase of $6.5 million (-$11 -$9 + $26.5 = $6.5).

§ *Small Business Analysis:* EPA performed a screening analysis for impacts on small businesses by comparing compliance costs to average company revenues. EPA's

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[1]The National Emissions Standards for Hazardous Air Pollutants (MACT) for Gasoline Distribution Facilities—Major Sources was promulgated on December 14, 1994.

[2]Throughout this report, changes in surplus reflect the social costs of the proposed rule. Welfare calculations exclude any environmental benefits associated with the proposed rule.

analysis found that the ratio of compliance cost to company revenue falls below 1% for small companies included in the screening analysis.

1.2 Organization of this Report

The remainder of this report supports and details the methodology and the results of the EIA:

- Section 2 presents a profile of the affected industries.
- Section 3 describes the estimated costs of the regulation.
- Section 4 describes the EIA methodology and reports market and welfare impacts.
- Section 5 presents estimated impacts on small entities.
- Appendix A provides an overview of the economic model equations.

SECTION 2
INDUSTRY PROFILE

Gasoline plays an important role in the American economy, and this profile provides an overview of the sectors affected by the standards to control toxic air pollutants from area sources in the gasoline distribution industry. Several sections rely heavily on industry background materials of the recent Federal Trade Commission (FTC) analysis of the gasoline industry (FTC, 2004).

2.1 Supply Side

Finished gasoline product leaves the refinery and reaches consumers through one or more bulk transport services. Pipelines, tankers, or barges typically transport gasoline from refineries or ports to terminals that provide storage and dispensing facilities. A variety of downstream gasoline marketing arrangements (i.e., wholesale and retail) ultimately deliver gasoline to the consumer. We provide a broad overview of these sectors of the gasoline supply chain.

2.1.1 Bulk Transport of Gasoline

The amount of gasoline being transported from refineries to ports or storage terminals within the United States has not changed significantly over the past 2 decades. The largest refinery center continues to be the Gulf Coast area. Large volumes of gasoline are shipped annually from the Gulf to the Midwest and East Coast. Bulk transport from the Gulf to the Rocky Mountain area is increasing as new pipelines are being built. More isolated areas, such as the West Coast, Alaska, and Hawaii, typically refine and store their own supply of gasoline.

Pipelines are by far the most important form of bulk transport of refined petroleum products within the United States (see Table 2-1). Transfer from refineries to storage terminals by pipeline has increased from 44% of ton-miles in 1979 to 61% of ton-miles in 2001. Other important forms of bulk transport include tankers and barges, especially in transport from Alaska to the contiguous United States. These forms of transport have declined in recent years, from 48% of ton-miles in 1979 to 30% of ton-miles in 2001. The overall significant decline in shipments between 1979 and 2001 is at least partly attributed to declines in residual fuel oil shipped by water transportation (FTC, 2004). Trucks and railroads accounted for the remaining 9% of bulk transport of gasoline to storage terminals in 2001.

2.1.2 Downstream Marketing Arrangements for Refined Petroleum Products

Once the refined petroleum products leave the refinery, they reach consumers through one or more marketing channels. This final step in the supply of refined petroleum products includes two components: wholesale distribution (from product terminals to

Table 2-1. Shipments of Refined Products within the United States (billion ton-miles)

	1979		2001	
Mode	**Shipments**	**Percent**	**Shipments**	**Percent**
Pipeline	236.1	44.2	299.1	60.6
Tankers/barges	257.4	48.2	145.9	29.6
Truck	27.8	5.2	29.7	6.0
Railroad	12.9	2.4	18.5	3.8
Total	534.2	100.0	493.2	100.0

Source: Federal Trade Commission. 2004. "The Petroleum Industry: Mergers, Structural Change, and Antitrust Enforcement." (Original source: Association of Oil Pipelines. 2003. "Shifts in Petroleum Transportation." Table 2.) Washington, DC: FTC.

retail outlets) and retail distribution (to final consumers). Truck transportation is the most common delivery method of gasoline to retail outlets.

There are four primary gasoline marketing channels for wholesale distribution. Three of these constitute direct distribution of product:

- Refiner-operated retail outlet: Refiners directly distribute gasoline to their own retail outlets.
- Lessee dealer: Retail outlets are owned by the wholesale distributor but leased to a gasoline dealer.
- Independent retailer: Retail outlets are owned and operated by independent "open" dealers.

The fourth channel comprises indirect distribution of product:

- Jobber: Distributors purchase directly from refiners and then sell products to retail outlets.

The variety of marketing channels illustrates that firms are not all vertically integrated; that is, they are not involved in all stages of gasoline production, distribution, and ultimate sales to consumers (see Figure 2-1). The pattern of wholesale distribution differs across Petroleum Administration for Defense Districts (PADD) groups. Table 2-2 shows recent data for refiner disposition of gasoline by volume to the co-op (direct supply to company-operated stations), dealer tankwagon (DTW) (DTW distributed to lessee and independent retailers), and rack (rack distributed to jobbers) levels.

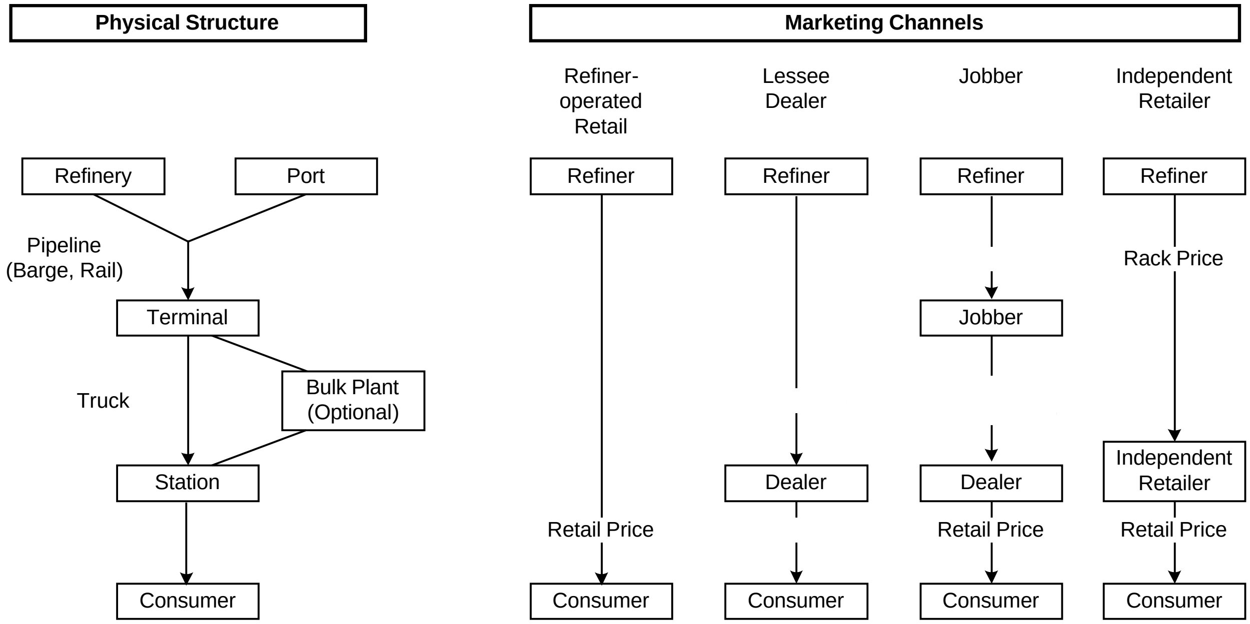

Figure 2-1. Gasoline Distribution Physical Structure and Marketing Channels

Source: U.S. Department of Energy, Energy Information Administration (EIA). 2003. "2003 California Gasoline Price Study: Final Report." Washington, DC: U.S. Department of Energy, Energy Information Administration.

2.2 Demand Side

The Federal Highway Administration (FHWA) (DOT, 2005) reported that the United States consumed over 139 billion gallons of gasoline during 2003.[1] This was an increase of 1% over the previous year. FHWA distinguishes gasoline consumption by use: highway and nonhighway. As shown in Table 2-3, the overwhelming majority of gasoline (97% or 134 billion gallons) is consumed for highway use. The remaining 3% of gasoline consumption (4.5 billion gallons) is for nonhighway use (i.e., lawn and garden equipment and marine uses).

The Energy Information Administration (2005) provides additional information about the type of motor gasoline consumption in their "Annual Energy Outlook 2005." This use structure is consistent with the National Energy Modeling System used to generate forecasts for this publication. Motor gasoline consumption is classified by three end-use sectors:

- Commercial: Commercial-sector consumption encompasses business establishments that are not engaged in industrial or transportation activities.

[1] Analysis of fuel consumption from this source does not include exports or fuel purchased by the federal government for military use.

- Industrial: The industrial sector includes energy consumption for fuels and feedstocks for nine manufacturing industries and six nonmanufacturing industries. This includes agriculture, mining, construction, and manufacturing industries.

Table 2-2. Refiner Disposition of Gasoline by Class of Trade: 2000–2002 (percentage by class)

Total Gas Volume	U.S.	PADD				
		I	II	III	IV	V
2000						
Co-op	18.1	16.6	16.3	18.2	23.3	24.1
DTW	21.3	25.3	10.1	3.7	9.3	50.3
Rack	60.6	58.1	73.5	78.1	67.4	25.6
Total Volume (1,000 gallons per day)	326,435	108,883	98,845	49,736	—	—
2001						
Co-op	18.4	17.1	16.4	19.1	21.3	22.8
DTW	20.5	24.4	8.9	3.1	7.7	50.1
Rack	61.1	58.5	74.6	77.9	71.0	27.2
Total Volume (1,000 gallons per day)	328,844	109,735	98,382	50,194	11,808	58,725
2002						
Co-op	18.8	17.6	17.0	18.3	19.9	23.7
DTW	20.2	24.7	7.9	2.8	8.4	49.2
Rack	61.0	57.7	75.1	78.9	71.7	27.0
Total Volume (1,000 gallons per day)	330,594	110,150	98,238	51,156	—	—

Notes: Co-op (direct supply to company-operated stations); DTW (dealer tankwagon distributed); rack (rack distributed); 2000 annual DTW data withheld for PADDs IV and V; February 2000 data are used as a proxy. 2002 annual DTW data withheld for PADDS IV and V; June, August, and October 2002 data are used as a proxy.

Source: Federal Trade Commission (FTC), Bureau of Economics. 2004. “The Petroleum Industry: Mergers, Structural Change, and Antitrust Enforcement.” Washington, DC: FTC. Table 9-2.

Table 2-3. Motor Gasoline Consumption by Use and User: 2003

	Volume (billion gallons)	Share of Total
Highway Use	134.1	96.5%
Private and commercial	132.0	95.0%
Public	2.2	1.6%
Nonhighway Use	4.5	3.2%
Private and commercial	4.4	3.2%
Public	0.1	0.1%

Source: U.S. Department of Transportation. 2005. "Highway Statistics 2003." <http://www.fhwa.dot.gov/policy/ohim/hs03/index.htm>.

§ Transportation: The transportation sector includes consumption of transportation-sector fuels by transportation mode. The sector includes 6 car sizes; 6 light truck sizes; 63 conventional fuel-saving technologies for light-duty vehicles, gasoline, and diesel; 13 alternative-fuel vehicle technologies for light-duty vehicles; 20 vintages for light-duty vehicles; narrow and wide-body aircraft; 6 advanced aircraft technologies; medium and heavy freight trucks; and 37 advanced freight truck technologies.

As shown in Table 2-4, transportation-sector demand applications are the primary users of gasoline. In 2003, light-duty vehicles accounted for 93% of the transportation-sector consumption, followed by commercial light trucks (3%), recreation boats (2%), freight trucks (1%), and transit and school buses (less than 1%).

Table 2-4. Motor Gasoline Consumption by Sector (quadrillion Btus per year)

Sector	2003	Share	2010	Share	2025	Share
Commercial	0.04	0.2%	0.04	0.2%	0.04	0.2%
Industrial	0.31	1.8%	0.31	1.6%	0.37	1.5%
Transportation	16.64	97.9%	19.14	98.2%	24.04	98.3%
Light-duty vehicles	15.50	93.1%	17.88	93.4%	22.52	93.7%
Commercial light trucks	0.57	3.4%	0.66	3.4%	0.84	3.5%
Recreation boats	0.31	1.9%	0.33	1.7%	0.39	1.6%
Freight trucks	0.24	1.4%	0.24	1.3%	0.28	1.2%
Transit and school buses	0.01	0.1%	0.01	0.1%	0.01	0.0%

Source: U.S. Department of Energy, Energy Information Administration. 2005. "Annual Energy Outlook 2005 with Projections to 2025." Table A-2 and Supplemental Table 34. <http://eia.doe.gov/oiaf.aeo/>.

2.2.1 Factors That Influence Gasoline Consumption Choices

Transportation choices are a function of tastes, income, gasoline prices, and prices of related goods. The private automobile continues to be the dominant mode of urban travel in the United States (Pucher and Renne, 2003). As shown in Figure 2-2, travelers used the automobile for 86.4% of trips for all purposes. Transit accounted for 1.6% of all trips, and other (nonmotorized modes [e.g., bicycling and walking]) accounted for the remaining 12%.

Recent urban travel data show that daily travel increases with household income. In 2001, the average miles traveled per day per person ranged from 18 miles for households with incomes less than $20,000 to 32 miles for households with incomes over $100,000 (Pucher and Renne, 2003). According to the 2004 Consumer Expenditure Survey (BLS, 2004), approximately

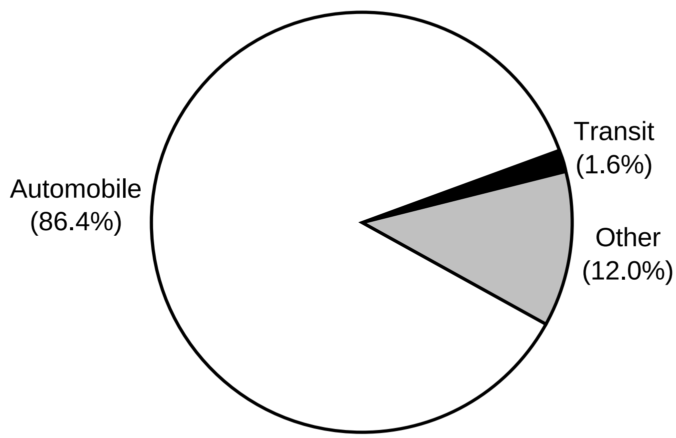

Figure 2-2. Automobile Trips by Mode of Travel: 2002

4% of Americans' average annual expenditures are used to purchase gasoline and motor oil (see Table 2-5). There is little variation in expenditure shares by geography or income class, and both groups have similar ranges. For example, expenditure shares range from a low of 3.0% in the Northeast where consumers use more public transportation to 4.1% in the South. There is little variation in expenditure shares by income class (3.1% for consumers reporting income of $70,000 and over to 4.3% for consumers with income between $30,000 and $40,000) (BLS, 2004).

Table 2-5. Gas and Motor Oil Expenditures as a Share of Consumer Income by Region: 2004

All Consumers, United States	3.7%
South	4.1%
Midwest	3.7%
West	3.7%
Northeast	3.0%

Source: U.S. Bureau of Labor Statistics. 2004. "Consumer Expenditure Survey (CEX), Tables Created by BLS." Tables 46 and 52. <http://www.bls.gov/cex/home.htm#tables>.

Consumers can respond to price changes in gasoline in two general ways. First, they may simply consider reducing the number of vehicle miles traveled. If the relative price of gas remains higher for longer periods, consumers might also consider adjusting their capital stock to mitigate the effects of higher prices. For example, they may purchase vehicles with better fuel economy or buy a home closer to work or shopping. They could also switch to alternative modes of transportation such as mass transit and/or switch to vehicles that use alternative fuels.

2.3 Industry Organization

A description of the structure of the market (i.e., concentration, product differentiation, and entry barriers) often helps explain the firm's pricing policy that exists in the market. We also discuss firm characteristics such as firm revenue size.

2.3.1 Concentration

Market concentration within product pipelines is moderate, with more than 70 companies having pipelines that carry refined gasoline products in the United States. Table 2-6 lists the largest of these petroleum product pipeline companies. As shown in the table, Colonial pipeline is the nation's largest company, with over 740 billion barrel-miles carried in 2001. This is nearly five times that of the next largest competitor. The share of the market captured by the top five petroleum product pipeline companies was 64% in 2001; this is a slight decrease from the 66% in 1985.

Table 2-6. Largest Petroleum Product Pipeline Companies: 1985–2001 (billion barrel-miles carried)

Pipeline	1985	1990	1995	2001
Colonial	626.2	691.4	682.1	740.7
Explorer	107.7	107.7	126.5	154.8
Plantation	116.0	110.3	123.7	132.0
MidAmerica	43.8	53.4	68.2	105.7
TEPPCO	78.0	67.4	98.6	112.4
Williams	51.2	49.4	58.3	70.5
SFPP		44.3	50.0	61.6
Seminole			40.3	50.2
Buckeye	32.1	35.2	38.3	40.9
Chevron	56.3	45.0	33.7	10.3
Phillips	45.8	40.7	24.9	24.3
Total	1,499.8	1,608.9	1,719.6	1,939.2
Top 5	984.3	1,030.2	1,099.1	1,245.6
Top 5 Share (%)	65.6	64.0	63.9	64.2

Source: Federal Trade Commission (FTC), Bureau of Economics. 2004. "The Petroleum Industry: Mergers, Structural Change, and Antitrust Enforcement." Washington, DC: FTC. Table 8-2.

Publicly available data on terminal concentration can be found only at the state level. While this is not an economically relevant geographic market for gasoline, these data can provide information on general trends in concentration. In all PADD districts, the number of terminals declined between 1982 and 1997, the last year that data are available. Since the 1980s, terminal inventory has declined as a result of adopting just-in-time inventory methods and the development of in-line terminal blending practices (FTC, 2004). This has resulted in the closing of marginal terminals and increased joint ventures. As of 1997, refiner-marketer terminals had declined by 45%, and terminals owned by others had declined by 48%.

Similar to terminals, market concentration trends are unavailable for wholesale distributors at an economically relevant scale. State-level data from the Energy Information Administration, however, can provide an idea of general trends in concentration. The Energy Information Administration data combine branded and unbranded sales and report all sales by wholesaler within each state. Since 1994, state-level concentration measures have increased, but this increase has generally not resulted in a highly concentrated range. Exceptions to this are in Indiana, Kentucky, Michigan, North Dakota, and Ohio, where wholesale distributors have reached a highly concentrated range. While mergers have some influence on market concentration in a state, the fact that states are not relevant geographic markets makes it difficult to determine their effects.

Information on market concentration in branded products is available for retail distributors. At the state level, brand concentration has risen slightly since 1987 but remains moderate for most states. Mergers account for some of the changes in state-level concentration. Private-brand marketers also create changes in concentration levels. Table 2-7 shows brand concentration in 13 cities across the United States for 1990 and 2001. Concentrations increased somewhat between 1990 and 2001 but the Herfindahl-Hirschman Index remained below 1,500 in most cities. The table also lists the top five retailers in each market and the average monthly volume per retail outlet for the top five brands.

2.3.2 Entry Barriers

Entry into the pipeline business requires significant capital investments. In addition, it often takes years to acquire the necessary approvals and complete construction of a new pipeline. However, the number of new product pipelines has increased in recent years because of the conversion of crude oil and natural gas pipelines to refined gasoline pipelines. This conversion reflects the decline in domestic crude oil production and the increase in demand for refined products within the country.

An entrant into product terminals is faced with high capital costs. Once operating, however, terminals exhibit scale economies, because, as storage volume increases, the cost of operating declines. Other entry barriers for terminals include zoning and environmental permit issues, which can make the time span for opening a new terminal very lengthy. Today, one of the biggest deterrents to entry into product terminals is excess capacity. Existing capacity can meet periods of high terminal demand without large price increases for terminal service; incentives to invest in new terminal capacity tend to be reduced without these price signals.

Table 2-7. City Brand-Level Concentration

City	Year	Average Volume of Top 5 Brands (gal/mo)	HHI-Volume Share	Top 5 Retailers
Atlanta	2001	111,216	1,313	BP Amoco, Motiva, QuikTrip, Chevron, Citgo
	1990	80,843	722	Amoco, Texaco, Gulf, Shell, Chevron
Boston	2001	96,229	1,175	ExxonMobil, Motiva, Sunoco, Tosco, Citgo
	1991	70,726	1,127	Mobil, Shell, Sunoco, CF/Gulf, Texaco
Chicago	2001	128,481	1,289	BP Amoco, Equilon, Marathon-Ashland, ExxonMobil, Citgo
	1989	92,924	1,163	Amoco, Shell, Mobil, Unocal, Clark
Dallas/Fort Worth	2002	101,077	1,066	Motiva, Citgo, Chevron, ExxonMobil, RaceTrac
	1990	72,592	871	Texaco, Mobil, Chevron, Exxon, Citgo
Denver	2002	128,612	1,090	Conoco, Equilon, UDS, BP Amoco, Phillips
	1990	84,679	964	Amoco, Conoco, Vickers, Phillips, Texaco
Detroit	2001	119,971	1,491	Marathon-Ashland, ExxonMobil, BP Amoco, Sunoco, Equilon
	1993	113,832	1,172	Mobil, Shell, Amoco, Total, Speedway
Houston	2002	91,966	1,265	Chevron, ExxonMobil, Motiva, UDS, Conoco
	1989	68,112	1,131	Exxon, Chevron, Texaco, Shell, Stop N Go
Los Angeles	2000	160,810	1,829	Arco, ExxonMobil, Tosco, Chevron, Equilon
	1989	110,807	1,134	Unocal, Shell, Mobil, Arco, Chevron
New York	2002	118,803	1,425	BP Amoco, ExxonMobil, Hess, Getty, Sunoco
	1989	95,601	1,138	Amoco, Mobil, Merit, Getty, Shell
Philadelphia	2001	120,630	1,261	Sunoco, Tosco, BP Amoco, Motiva, ExxonMobil
	1990	85,740	1,184	Sunoco, Mobil, Atlantic, Exxon, Amoco
San Francisco	2000	146,459	1,943	Equilon, Chevron, Tosco, Arco, Olympian
	1989	105,017	2,035	Shell, Chevron, Unocal, Arco, BP
Seattle	2001	115,818	1,833	Equilon, Chevron, Arco, Tosco, ExxonMobil
	1991	118,506	1,685	Arco, Texaco, Chevron, BP, Exxon
DC	2002	126,680	1,324	ExxonMobil, Motiva, Tosco, BP Amoco, Citgo
	1991	117,392	1,293	Exxon, Amoco, Shell, Mobil, Texaco

Note: HHI refers to the Herfindahl-Hirschman Index.

Source: Federal Trade Commission (FTC), Bureau of Economics. 2004. "The Petroleum Industry: Mergers, Structural Change, and Antitrust Enforcement." Washington, DC: FTC. Table 9-8.

Similar to pipelines and terminals, entry into gasoline marketing at the wholesale or retail level requires considerable economies of scale and is subject to industry regulations. The most important steps to entry are acquiring reliable bulk supplies from terminals and sufficient outlets for the product. Access to terminal facilities varies by region and can be seasonal. In most cases, entry will be easier when a region is serviced by multiple independent pipelines or terminals than when a region is supplied by only a few propriety pipelines and terminals. Gaining access to retail distribution also differs across regions. An entrant must typically secure retail outlets through conversion. The success of this strategy depends on existing arrangements and relationships between outlets and their current providers. Another option for an entrant is to construct new retail sites. Construction of new convenience stores is estimated to cost between $1 and $1.5 million, and building a high-capacity gasoline store at an existing hypermarket[2] can be as low as $500,000. Differences in the ease of constructing new sites will vary according to local zoning and permitting restrictions. Branding costs will also be associated with entry into most geographic areas.

2.3.3 Firm Size

The chain of ownership of affected entities can be quite complex as shown in Figure 2-3. Traditionally, the legal entity of interest for small business analyses is the ultimate parent company (EPA, 1999). Pipeline ownership includes a significant share of joint ventures. For example, the FTC (2004) reports the Colonial and Plantation pipelines have five owners and two owners, respectively (see Table 2-8). EPA's review of Dun & Bradstreet's *America's Corporate Families* found that all of the ultimate parent companies listed under NAICS 486910 Pipeline Transportation of Refined Products were large companies (i.e., employed 1,500 or more employees). Census data firm-level statistics provide size data for the remaining companies and allowed EPA to approximate the number of small firms potentially affected by a regulatory program.[3] As shown in Tables 2-9 through 2-11, the average annual revenue for firms ranges from $60,000 to $1 billion.

2.4 Market Conditions

To perform the EIA, we compared baseline market conditions for affected markets with conditions produced under a new policy. This comparison required developing a dataset for markets for the time horizon of the economic analysis. In this section, we describe elements of the dataset and include information about gasoline consumption, prices, and forecasts.

2.4.1 Consumption

American consumption of gasoline has steadily increased over the past 6 years (see Table 2-12). Approximately 138 billion gallons of gasoline were consumed in 2006. We discuss regional consumption trends using data for PADDs. PADDs are collections of geographically proximate states and are often the basis for petroleum-related studies. PADD I (East Coast) is consistently the largest consumer of gasoline, followed by PADD II (Midwest), PADD V (West Coast), PADD III (Gulf Coast), and PADD IV (Rocky Mountains).

[2] Hypermarkets refer to large retailers of general merchandise and grocery items.

[3] The Economic Census provides the following definition of the firm: "A firm is a business organization or entity consisting of one domestic establishment (location) or more under common ownership or control. All establishments of subsidiary firms are included as part of the owning or controlling firm." For the economic census, the terms "firm" and "company" are synonymous. EPA comparisons of census data and detailed analysis of ownership configurations in affected industries suggest the Census data likely overstate the number of small ultimate parent companies.

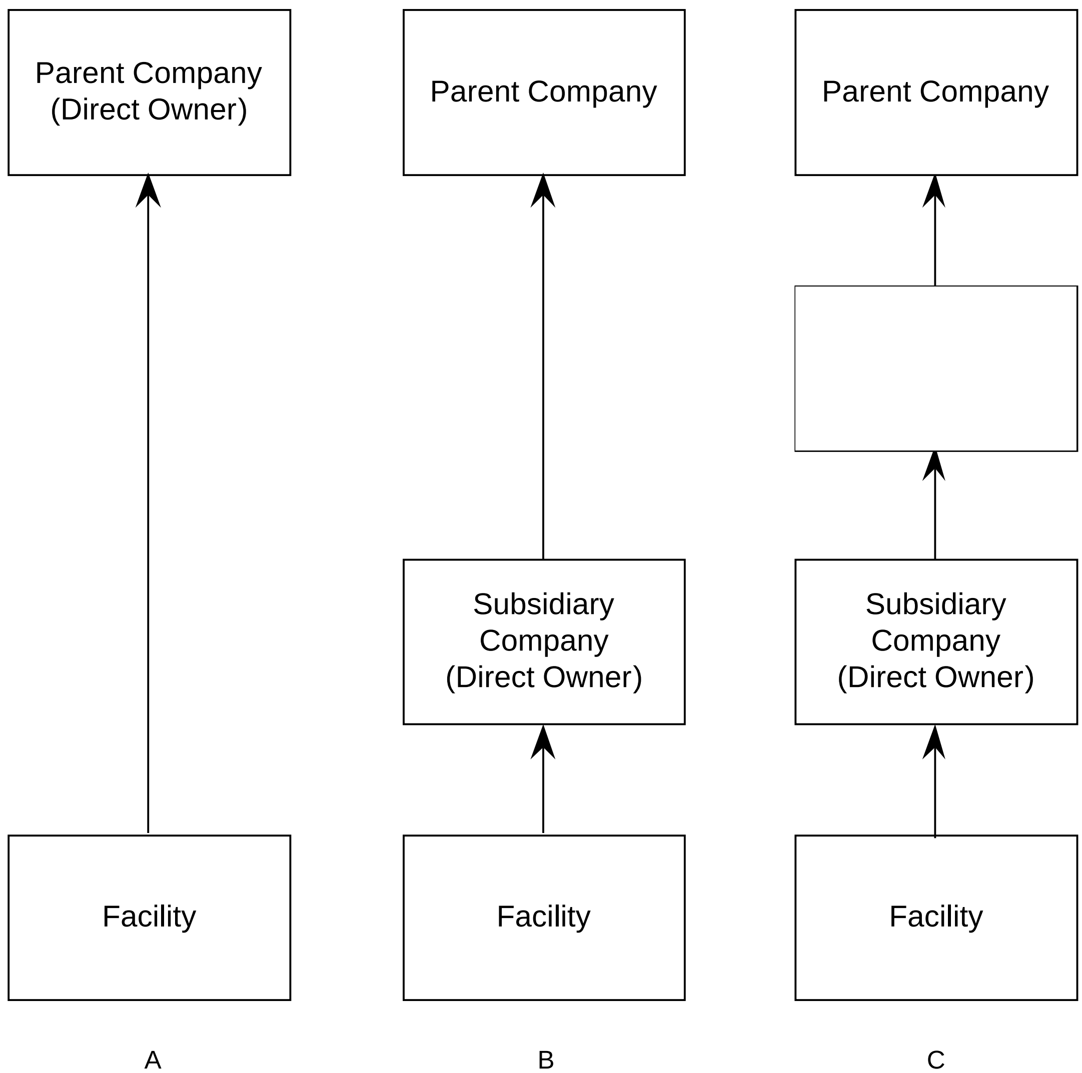

Figure 2-3. Possible Ownership Configurations in U.S. Industries

Table 2-8. Current Stockholders and Ownership Percentages for Colonial and Plantation Pipelines

Colonial Pipeline Stockholders	Ownership Percentage	Plantation Pipeline Stockholders	Ownership Percentage
Koch	28.09	KinderMorgan	51
HUTTS	23.44	ExxonMobil	49
Shell	16.12		
Citgo	15.80		
ConocoPhillips	16.55		

Source: Colonial Pipeline Company. <http://www.colpipe.com/ab_oc.asp>.
Plantation Pipeline Company from KinderMorgan Energy Partners LP. 2001. Form 10-K, 12.

Table 2-9. Average Annual Revenue for Petroleum Bulk Stations and Terminals: 2002

NAICS Code	Employment Size of Firm	Firms (number)	Sales ($1,000)	Average Annual Revenue ($1,000)
42471011	Petroleum bulk stations (except LP)			
	All firms	2,865	$41,567,670	$14,509
	Firms operated for the entire year	2,747	D	
	Fewer than 5 employees	714	$1,832,239	$2,566
	5 to 9 employees	733	$5,032,022	$6,865
	10 to 19 employees	641	D	
	20 to 49 employees	472	$11,662,934	$24,710
	50 to 99 employees	133	$6,694,078	$50,331
	100 employees or more	54	$8,837,035	$163,649
	Firms not operated for the entire year	118	D	
42471012	Petroleum bulk terminals (except LP)			
	All firms	386	$165,471,978	$428,684
	Firms operated for the entire year	377	D	
	Fewer than 5 employees	65	$598,788	$9,212
	5 to 9 employees	73	D	
	10 to 19 employees	79	D	
	20 to 49 employees	82	$23,284,567	$283,958
	50 to 99 employees	43	$15,717,654	$365,527
	100 employees or more	35	$112,932,657	$3,226,647
	Firms not operated for the entire year	9	D	

Notes: D—Information withheld to avoid disclosing data of individual companies.

Source: U.S. Census Bureau. 2005. “Establishment and Firm Size: 2002.” 2002 Economic Census Wholesale Trade Subject Series. Washington, DC: Census Bureau.

Table 2-10. Average Annual Revenue for Gasoline Stations: 2002

NAICS Code	Revenue Size of Firm	Firms (number)	Sales ($1,000)	Average Annual Revenue ($1,000)
447110	Gasoline stations with convenience stores			
	All firms	44,361	$186,735,177	$4,209
	Firms operated for the entire year	37,437	$182,509,978	$4,875
	Less than $250,000	2,231	$343,292	$154
	$250,000 to $499,999	3,777	$1,424,548	$377
	$500,000 to $999,999	7,574	$5,623,993	$743
	$1,000,000 to $2,499,999	13,684	$22,302,538	$1,630
	$2,500,000 to $$4,999,999	6,670	$22,785,809	$3,416
	$5,000,000 to $9,999,999	2,036	$13,602,439	$6,681
	$10,000,000 to $24,999,999	876	$13,321,447	$15,207
	$25,000,000 to $49,999,999	307	$10,661,118	$34,727
	$50,000,000 to $99,999,999	145	$9,928,028	$68,469
	$100,000,000 to $249,999,999	79	$12,289,846	$155,568
	$250,000,000 or more	58	$70,226,920	$1,210,809
	Firms not operated for the entire year	6,924	$4,225,199	$610
447190	Other gasoline stations			
	All firms	23,542	$62,406,235	$2,651
	Firms operated for the entire year	19,822	$60,419,444	$3,048
	Less than $250,000	2,911	$423,596	$146
	$250,000 to $499,999	3,055	$1,114,805	$365
	$500,000 to $999,999	3,833	$2,811,889	$734
	$1,000,000 to $2,499,999	5,824	$9,421,978	$1,618
	$2,500,000 to $$4,999,999	2,480	$8,496,707	$3,426
	$5,000,000 to $9,999,999	1,040	$7,129,467	$6,855
	$10,000,000 to $24,999,999	502	$7,362,118	$14,666
	$25,000,000 to $49,999,999	114	$3,778,049	$33,141
	$50,000,000 to $99,999,999	38	$2,578,612	$67,858
	$100,000,000 to $249,999,999	14	$2,088,907	$149,208
	$250,000,000 or more	11	$15,213,316	$1,383,029
	Firms not operated for the entire year	3,720	$1,986,791	$534

Source: U.S. Census Bureau. 2005. "Establishment and Firm Size: 2002." 2002 Economic Census Retail Trade Subject Series. Washington, DC: Census Bureau.

Table 2-11. Average Annual Revenue for Local and Long-Distance Trucking: 2002

NAICS Code	Revenue Size of Firm	Firms (number)	Sales ($1,000)	Average Annual Revenue ($1,000)
4842201	Hazardous materials trucking, local			
	All firms	1,319	$2,019,176	$1,531
	Firms operated for the entire year	1,061	$1,971,882	$1,859
	Less than $250,000	165	$9,944	$60
	$250,000 to $499,999	256	$40,788	$159
	$500,000 to $999,999	177	$64,349	$364
	$1,000,000 to $2,499,999	170	$116,658	$686
	$2,500,000 to $$4,999,999	153	$239,258	$1,564
	$5,000,000 to $9,999,999	75	$270,792	$3,611
	$10,000,000 to $24,999,999	32	$222,081	$6,940
	$25,000,000 to $49,999,999	20	$272,369	$13,618
	$50,000,000 to $99,999,999	7	D	
	$100,000,000 to $249,999,999	4	D	
	$250,000,000 or more	2	D	
	Firms not operated for the entire year	258	$47,294	$183
4842301	Hazardous materials trucking, long-distance			
	All firms	1,144	$2,630,290	$2,299
	Firms operated for the entire year	885	$2,557,337	$2,890
	Less than $250,000	111	$7,001	$63
	$250,000 to $499,999	256	$40,445	$158
	$500,000 to $999,999	112	$39,608	$354
	$1,000,000 to $2,499,999	114	$83,157	$729
	$2,500,000 to $$4,999,999	129	$195,705	$1,517
	$5,000,000 to $9,999,999	60	$209,004	$3,483
	$10,000,000 to $24,999,999	45	$300,995	$6,689
	$25,000,000 to $49,999,999	38	$581,112	$15,292
	$50,000,000 to $99,999,999	9	$289,888	$32,210
	$100,000,000 to $249,999,999	10	D	
	$250,000,000 or more	1	D	
	Firms not operated for the entire year	259	$72,953	$282

Notes: D—Information withheld to avoid disclosing data of individual companies.

Source: U.S. Census Bureau. 2005. "Establishment and Firm Size: 2002." 2002 Economic Census Transportation and Warehousing Subject Series. Washington, DC: Census Bureau.

Table 2-12. Gasoline Consumption: 2000–2005 (billion gallons)

	2000	2001	2002	2003	2004	2005	2006
PADD I (East Coast)	45	47	49	49	49	49	49
PADD II (Midwest)	38	38	38	38	39	38	38
PADD III (Gulf Coast)	19	20	20	20	21	21	21
PADD IV (Rocky Mountains)	4	5	4	4	5	5	5
PADD V (West Coast)	22	23	24	23	23	24	25
Total	129	132	135	135	136	138	138

Source: U.S. Department of Energy, Energy Information Administration. Selected Years. Petroleum Marketing Annual. Table 48. <http://www.eia.doe.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma_historical.html>.

2.4.2 Prices

The price of gasoline includes the cost of crude oil, processing costs, marketing and distribution costs, and finally the retail station costs and taxes (see Figure 2-4). The Energy Information Administration (2006) reports that crude oil in 2005 averaged $50.23 per barrel. Crude oil accounted for about 53% of the cost of a gallon of regular-grade gasoline.

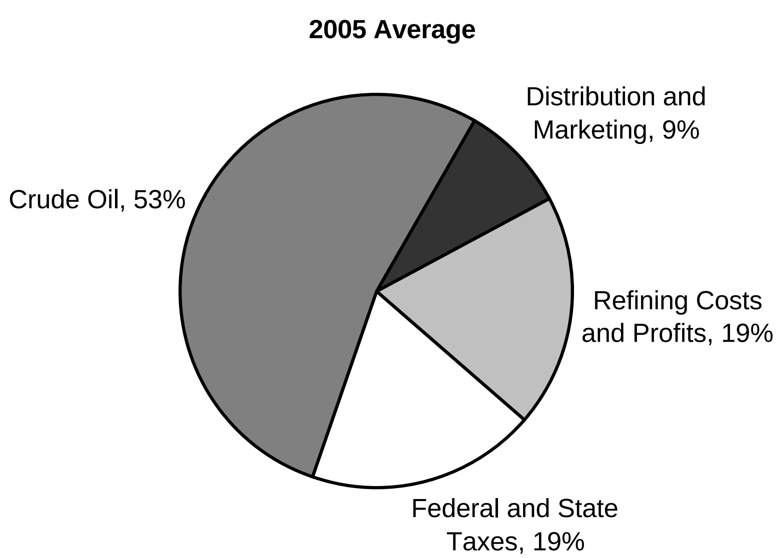

Figure 2-4. Components of the Retail Price of Regular Grade Gasoline

Source: U.S. Department of Energy, Energy Information Administration. 2006. “A Primer on Gasoline Prices.” <http://www.eia.doe.gov/bookshelf/brochures/gasolinepricesprimer/eia1_2005primerM.html>.

The Energy Information Administration (2007) reports that federal excise taxes are 18.4 cents per gallon of gasoline and state excise taxes average about 21.3 cents per gallon. In total, these taxes account for approximately 19% of the average retail price of gasoline. Refining costs and profits, distribution, marketing, and retail dealer costs and profits combine to account for the remaining 30% of the cost of gasoline.

The type of supply-side marketing arrangement used affects the wholesale price of the gasoline products. Refiner-operated stations receive a co-op price—an unobserved, internal transfer price. Lessee and independent retailers receive a DTW price—this price is offered under contract by the wholesaler. Jobbers receive what is known as the rack price (FTC, 2004).

As shown in Table 2-13, the average price of gasoline (excluding taxes) in 2006 was 212.1 cents per gallon. Prices varied by region, with PADD V paying the most per gallon and PADD II paying the least per gallon. The Energy Information Administration cites several reasons for regional price differences, including proximity of supply, differences in refinery operating costs, and variations in environmental programs (Energy Information Administration, 2007).

Table 2-13. Average Gasoline Prices, All Grades: 2006 (cents per gallon, excludes taxes)

	Average Price
PADD I	211.3
PADD II	207.8
PADD III	208.3
PADD IV	213.6
PADD V	226.1
Total	212.1

Source: U.S. Department of Energy, Energy Information Administration. 2007. "Petroleum Marketing Annual 2006." Table 31. <http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_marketing_annual/current/pdf/pmaall.pdf >.

2.4.3 Trends and Projections

The "2005 Annual Energy Outlook" estimates that the average annual growth rate for gasoline consumption will be 1.7% from 2003 to 2025 (EIA, 2005). As shown in Table 2-14, the transportation sector (1.7%) will lead this growth, followed by the industrial sector (0.9%) and the commercial sector (0.2%). Within the transportation sector, growth is dominated by vehicle and commercial light truck demand (1.7% each). Recreation boats are expected to grow by 1.0%, transit and school buses by 0.8%, and freight trucks by 0.7%.

Table 2-14. Growth Rates for Motor Gasoline by Sector: 2003 to 2025

Sector	Average Annual Growth Rate
Transportation	1.7%
Commercial light trucks	1.7%
Light-duty vehicles	1.7%
Recreation boats	1.0%
Transit and school buses	0.8%
Freight trucks	0.7%
Industrial	0.9%
Commercial	0.2%
All	1.7%

Source: U.S. Department of Energy, Energy Information Administration. 2005. "Annual Energy Outlook 2005 with Projections to 2025." Table A-2 and Supplemental Table 34. <http://eia.doe.gov/oiaf.aeo/>.

Since 2002, real and nominal gas prices have increased to over $2.50 per gallon. The latest Energy Information Administration short-term monthly forecasts (August 2006) suggest the pump price for self-service regular grade gasoline will remain near $3.00 per gallon over the coming year (see Figure 2-5).

2.4.4 Market Trends: The Retail Distribution of Gasoline

The type of retail outlet that distributes gasoline products to consumers has changed considerably over the last few decades. Prior to the 1980s, most gasoline service stations exclusively sold gasoline and offered an array of automotive repair and maintenance services. The market share of these traditional service stations has declined in recent years because of competition from independent convenience stores that can provide higher-volume and lower-priced products to consumers (see Table 2-15). These independents are often referred to as "pumpers" because they house multiple fuel islands and have many gasoline-product dispensers.

Building on the concept of distributing gasoline at large convenience stores is the emerging trend of gasoline at hypermarkets. Hypermarkets refer to large retailers of general merchandise and grocery items, such as Wal-Mart and Safeway. Recently, these retailers have also begun to sell gasoline. Because of their economies of scale, they can sell large volumes of gasoline at cheaper prices than their competitors. In 2002, hypermarkets accounted for 5.9% of total retail gasoline sales in the United States; they are expected to capture 13.1% of the market by 2007 (FTC, 2004).

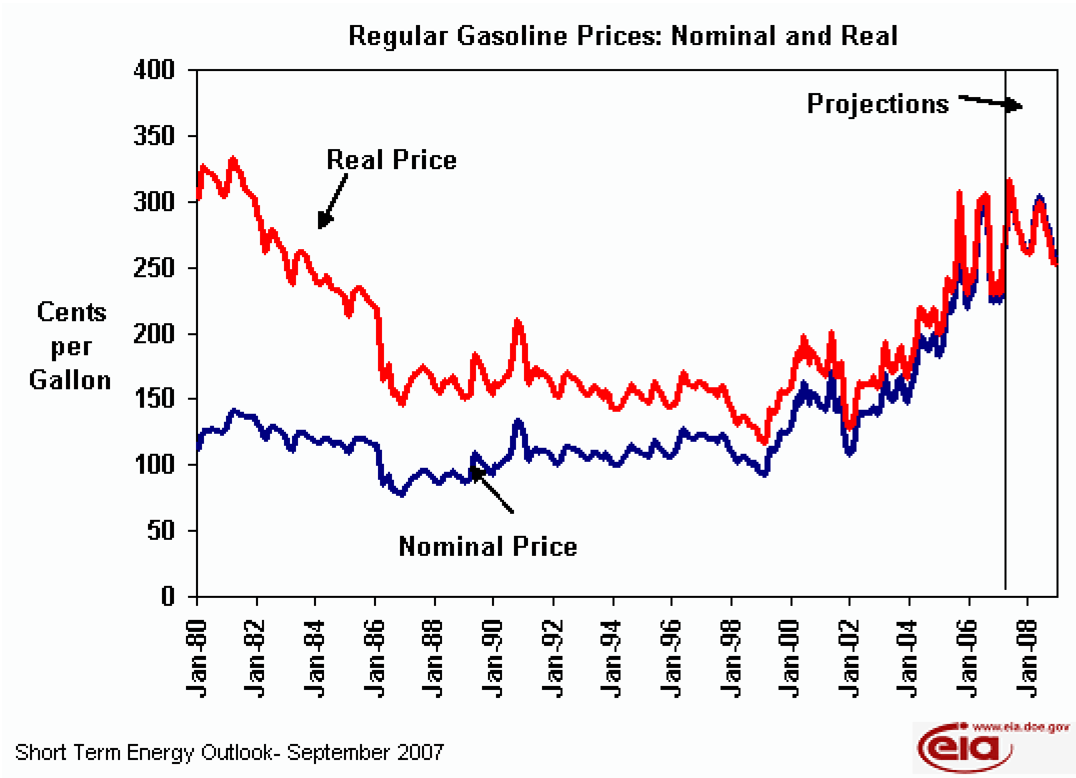

Figure 2-5. Regular Gasoline Prices: Nominal and Real

Source: http://www.eia.doe.gov/emeu/steo/pub/fsheets/gifs/2-gas-mon.gif

Table 2-15. Retail Format Comparison

	Service Station			Convenience Store and Pumpers			Total
		Market Share (%)			Market Share (%)		
Year	Volume (gal/mo)	Sites	Volume	Volume (gal/mo)	Sites	Volume	Volume (gal/mo)
1989	61,669	39.8	37.7	84,017	49.7	59.7	70,023
1991	68,972	380.	35.6	86,245	52.4	62.0	73,255
1993	71,660	36.5	34.4	88,856	54.4	63.4	76,098
1995	75,850	33.4	30.8	95,230	58.1	67.4	82,129
1997	77,603	30.8	27.7	99,573	61.2	70.5	86,360
1999	83,048	26.9	23.7	106,834	66.0	74.6	94,559

Note: Convenience store and pumper volume data represent site-number-weighted average of volumes reported separately by *National Petroleum News* for convenience stores and pumpers. Shares reported herein do not add to 100% because of omission of data from other minor retail formats such as automobile dealers and parking garages.

Source: Federal Trade Commission (FTC), Bureau of Economics. 2004. "The Petroleum Industry: Mergers, Structural Change, and Antitrust Enforcement." Washington, DC: FTC. Table 9-5.

SECTION 3
REGULATORY PROGRAM COST ESTIMATES

The real-resource costs associated with the regulatory program include the cost of installing, maintaining, and monitoring new air pollution control equipment. However, EPA anticipates there will be annual savings from the program as the result of fuel recovery that will offset these costs.[1]

The majority of the regulatory costs are associated with capital control equipment. As shown in Table 3-1, annualized capital costs are $74.6 million. Other costs include annual operating and maintenance costs ($4.1 million) and annual monitoring, reporting, and record-keeping costs ($8.4 million). Annual fuel savings under the regulatory program are estimated to be $26.5 million. The total annual real-resource costs for the regulatory program represent a net benefit of $6.5 million.

[1]EPA is not modeling the application of control technologies absent of the regulation because it is beyond the scope of this report. Therefore, EPA cannot determine in this report if, without the regulation, the affected industries would have eventually implemented the related control measures. However, research conducted by *MIT Joint Program on the Science and Policy of Global Change* (Hyman et al., 2002) has identified reasons why firms do not adopt seemingly beneficial regulatory options. One reason is that the engineering cost analysis may not fully account for a variety of overhead and transactions costs associated with the regulatory option. A second reason states that unobserved site or firm characteristics might increase the costs of the regulatory alternative. Finally, according to the MIT report, firms may believe other higher-return activities may exist and decide to devote investment resources to these activities instead. EPA would also like to add that the $26.5 million in recovery credits represent an expected value or an average of the aggregate fuel savings for the six gas distribution industry categories and are expected to be relatively small when distributed among all of the affected facilities. Since these credits are "expected" but not "certain" values and are relatively small compared with revenues on a per-facility basis, it is possible that these control measures would not have been implemented without the regulation.

Table 3-1. Summary of Total Costs of Regulatory Program ($million)

Type	Value
Capital control cost	74.6
Annualized capital cost[a]	7.5
Annual operating and maintenance	4.1
Annual monitoring, reporting, and record keeping	8.4
Annual fuel savings (recovery credits)	–26.5
Total annualized cost	–6.5

[a] The engineering analysis used the following life of capital and discount rates to annualize capital costs: storage tanks at PBSs and bulk terminals: 20 year life @ 7% interest; Loading racks at bulk terminals: 10 year life @ 7% interest; controls at GDFs: 15 year life @ 7% interest; controls at bulk plants: 15 year life @ 7% interest; tank trucks: no capital costs, all costs are annual costs of testing and O&M. The discount rates used were obtained from the *Gasoline Distribution Industry (Stage I)—Background Information for Proposed Standards* (EPA, 1994).

SECTION 4
ECONOMIC IMPACT ANALYSIS: METHODS AND RESULTS

The EIA is designed to inform decision makers about the potential economic consequences of a regulatory action. The analysis consists of estimating the social costs of a regulatory program and the distribution of these costs across stakeholders. As defined in EPA's (2000) *Guidelines for Preparing Economic Analyses*, social costs are the value of the goods and services lost by society resulting from using resources to comply with and implement a regulation and reductions in output.

With the model described below, we conducted a market analysis in which we estimated how the regulatory program affects prices and quantities of gasoline. We also conducted an economic welfare analysis that estimates the total social costs associated with the regulatory program. In addition, we identify how the social costs are distributed across two broad classes of stakeholders (consumers and firms).

4.1 Market Analysis

EPA used a single-market partial-equilibrium analysis of a national gasoline market to measure the economic consequences of the regulatory program. The model uses a common analytic expression to analyze supply and demand in a single market (Berck and Hoffmann, 2002; Fullerton and Metcalf, 2002) and follows EPA guidelines for conducting an EIA (EPA, 1999; EPA, 2000). Appendix A explains in detail how this expression is derived, using the following steps:

1. Specify a set of nonlinear supply and demand relationships for the market.
2. Simplify the equations by transforming them into a set of linear equations.
3. Solve the equilibrium system of equations.

Using the expression below, we estimated the market price change in terms of the market's supply and elasticity parameters and the regulatory program's per-gallon cost.

$$\Delta\text{price} = \frac{\text{Supply Elasticity}}{\text{Supply Elasticity} - \text{Demand Elasticity}} \times \text{Per-Gallon Cost.} \tag{4.1}$$

Using the results of the market analysis, we provide estimates of the social costs using the methodology and expressions reported in Appendix A.

4.2 Model Baseline

Standard EIA practice compares and contrasts the state of a market with and without the regulatory policy. EPA selected 2006 as the baseline year for the analysis and collected gasoline consumption and price data for this year from the Energy Information Administration. Table 4-1 provides an overview of the markets in the model. Baseline data are reported in Table 4-2.

Table 4-1. Markets Included in Economic Impact Model: Gasoline

Geographic scope	National
Product groupings	Single gasoline market
Firm/consumer behavior	Perfect competition
Baseline gasoline consumption	See Table 4-2
Baseline year	2006
Supply elasticity	0.24 Considine (2002)
Demand elasticity	–0.20 FTC (2001)

Table 4-2. Baseline Gasoline Market Data: 2006

Market	Value
Quantity (billion gallons)	137.8
Retail price ($/per gallon)	$2.52

Source: Consumption Data: U.S. Department of Energy, Energy Information Administration. 2007. "Petroleum Marketing Annual 2006." Table 48. <http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_marketing_annual/current/pdf/pmaall.pdf >.

Price and Tax Data: U.S. Department of Energy, Energy Information Administration. 2007. "Petroleum Marketing Annual 2006." Table 31 and Table EN-1. <http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_marketing_annual/current/pdf/pmaall.pdf >.

4.3 Model Parameters

Economic theory suggests consumers will bear a higher share of the economic welfare losses if the supply of gasoline is more responsive to price changes than is the demand for gasoline. Numerous studies generally agree that over short periods of time, demand for gasoline is quite price inelastic. Our choice for the primary analysis is a short- to mid-term run elasticity of –0.2, a figure used by other federal analyses (FTC, 2001). This value is also consistent with recent surveys of the gasoline demand literature (Graham and Glaister, 2002; Espey, 1998).

Using this value, a 10% increase in the price of gasoline would only lead to a 2% reduction in gasoline consumption. A recent study estimates that the supply elasticity for refinery products is 0.24 (Considine, 2002).

Recent applied work on the incidence of gas taxes (Chouinard and Perloff, 2004) confirms our parameter selection by suggesting that the national demand elasticity should approximately equal the negative of the national supply elasticity. Therefore, we used the demand elasticity of –0.2 found in the literature and the supply elasticity of 0.24 reported by Considine (2002).

4.4 Results

Market-level changes in the gasoline market are projected to be insignificant. The economic model projects very small changes in the average retail price of gasoline (well below a penny per gallon) and very small gasoline consumption changes under all regulatory alternatives (see Table 4-3).

Table 4-3. Summary of Economic Impacts: 2006

	Market-Level Impacts
Change in price	0.003%
	less than a penny per gallon
Change in quantity	–0.001%
	(less than 1 million gallons per year)
	Welfare Impacts ($million)
Change in consumer surplus	–$10.9
Change in producer surplus	–$9.1
Recovery credit savings	$26.5
Change in total surplus	$6.5

Note: The change in consumer surplus is derived using Eq. (A.6) in Appendix A. Similarly, the change in producer surplus is derived using Eq. (A.7).

The national compliance cost estimates are often used to approximate the social cost of the rule. However, in cases where the engineering costs of compliance are used to estimate social cost, the burden of the regulation is typically measured as falling solely on the affected producers, who experience a profit loss exactly equal to these cost estimates. Thus, the entire loss is a change in producer surplus with no change (by assumption) in consumer surplus, because no changes in price and consumption are estimated. This is typically referred to as a “full-cost absorption” scenario in which all factors of production are assumed to be fixed and firms are unable to adjust their output levels when faced with additional costs.

In contrast, EPA's economic analysis builds on the engineering cost analysis and incorporates economic theory related to producer and consumer behavior to estimate changes in market conditions. Gasoline producers can make supply adjustments that will generally affect the market environment in which they operate. As producers change levels of gasoline supply in response to a regulation, consumers are typically faced with changes in prices that cause them to alter the quantity they are willing to purchase. These changes in price and output from the market model are used to estimate the total surplus losses/gains for two types of stakeholders: gasoline consumers and producers.

As shown in Table 4-3, gasoline consumers see $11 million reduction in surplus as the result of higher prices and reduced consumption while producer surplus was reduced $9 million. However, total surplus is $6.5 million as a result of the $26.5 million recovery credit savings, which offsets consumer and producer surplus reductions.

4.5 Limitations

Ultimately, the regulatory program will increase the costs of supplying gasoline to consumers, and the model is designed to evaluate behavioral responses to this change in costs within a market equilibrium setting. However, the results should be viewed with the following limitations in mind. First, the national competitive market assumption is clearly very strong because the gasoline markets in this analysis are regional. Regional price and quantity impacts could be different from the average impacts reported below if local market structures, production costs, or demand conditions are substantially different from those used in this analysis. Second, the model uses a *market* supply function and analyzes supply behavior at or near a single market baseline equilibrium using a supply elasticity parameter. Therefore, it does not address facility-level impacts such as closures or changes in employment. Although developing a facility-level model could potentially provide these outputs, this type of model requires substantial amounts of detailed data for individual facilities and a level of effort beyond the scope of this analysis.[1] Finally, we do not evaluate supply-side welfare losses by segments of the gasoline supply chain. EPA relied on the cost-to-sales ratio analysis to make inferences about the relative impacts across producers within this chain (see Section 5).

[1]One of the best examples of this class of models is described in the economic analysis performed for the pulp and paper industry (EPA, 1993). The study highlights the substantial data requirements for facility-level market models.

SECTION 5
SMALL BUSINESS ANALYSIS

The Regulatory Flexibility Act (RFA) generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions.

For purposes of assessing the impacts of the rule on small entities, a small entity is defined as

- a small business whose parent company has less than $25 million in revenue (NAICS 447110, Gasoline Stations with Convenience Stores);
- $23.5 million in revenue (NAICS 484220 and 484230, Hazardous Materials Trucking [except waste], local and long-distance);
- $8.0 million in revenue (NAICS 447190, Other Gasoline Stations), and fewer than 100 employees (NAICS 424710, Petroleum Bulk Stations and Terminals), and 1,500 employees (NAICS 486910, Pipeline Transportation of Refined Petroleum Products);
- a small governmental jurisdiction that is a government of a city, county, town, school district, or special district with a population of fewer than 50,000; and
- a small organization that is any not-for-profit enterprise, which is independently owned and operated and is not dominant in its field.

5.1 Data Sources

To identify the number of small businesses in affected industries, we reviewed two data sources:

- Dun & Bradstreet's *America's Corporate Families*: NAICS 486910, Pipeline Transportation of Refined Petroleum Products
- *2002 Economic Census*: NAICS 447110, Gasoline Stations with Convenience Stores and NAICS 447190, Other Gasoline Stations, NAICS 424710, Petroleum Bulk Stations and Terminals, and NAICS 4842201 and 4842301, Hazardous Materials Trucking (except waste), local and long distance

5.2 Number of Small Businesses

Using these data sources, we identified a substantial number of small businesses (primarily gasoline stations). The total number of small businesses in all affected sectors is approximately 60,000. The distribution of the number of small firms across the industries is given in Table 5-1. The *Economic Census* likely overstates the number of small firms potentially affected in each industry.[1] We also overstate the true small business population because of limitations associated with reported sales and employment categories used by the Census. For example, we used a $25 million size category instead of a $21.5 million size standard for the hazardous trucking industry because this sales category most closely matches the size standard.

Table 5-1. Number of Small Businesses by Affected Industry

2002 NAICS	Industry Description	Number of Small Businesses
486910	Pipeline Transportation of Refined Petroleum Products	0
424710	Bulk Stations	2,700
424710	Bulk Terminals	300
447110	Gasoline Stations with Convenience Stores	37,000
447190	Other Gasoline Stations	18,000
4842201	Hazardous Materials Trucking (Except Waste), Local	1,100
4842301	Hazardous Materials Trucking (Except Waste), Long Distance	900
Total		60,000

Source: Data come from Section 2. Data have been rounded in this presentation.

5.3 Results of Screening Analysis

Given the substantial number of small businesses in these industries, sales information for individual ultimate parent companies was not readily available for the analysis. Therefore, EPA developed a representative entity analysis for each industry using data presented in Section 2 of this report (Tables 2-9 through 2-11). Assessments of the financial impacts of the rule use the ratio of compliance costs to the average ultimate parent company revenue (cost-to-sales ratio or CSR).[2] We used the following equation to compute the CSR:

[1]The Economic Census provides the following definition of the firm: “A firm is a business organization or entity consisting of one domestic establishment (location) or more under common ownership or control. All establishments of subsidiary firms are included as part of the owning or controlling firm.” For the economic census, the terms “firm” and “company” are synonymous. EPA comparisons of Census data and detailed analysis of ownership configurations in affected industries suggest the Census data likely overstate the number of small ultimate parent companies.

[2]This approach assumes affected firms absorb the control costs, rather than pass them onto consumers in the form of higher prices.

$$CSR = \frac{\sum_{i}^{n} TACC}{TR_j} \tag{5.1}$$

where

TACC	=	total annual compliance costs,
i	=	indexes the number of affected plants owned by company j,
n	=	number of affected plants, and
TRj	=	total annual revenue of a representative ultimate parent company j in each industry

5.4 Conclusions

The RFA generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions. The economic impacts of the program are expected to be insignificant. As shown in Table 5-2, all gasoline distribution industry categories that contain small business entities are expected to have an average annual cost to sales ratio of less than 1 percent with cost impacts for all regulated small entities ranging from a cost savings to less than 0.61 percent of sales..

Table 5-2. Summary of Small Business Impact Analysis

NAICS Industry Description	Number of Small Businesses	Annual Control Cost[a] per Facility	Control Cost to Sales Ratio (%)[b]
Pipeline Transportation of Refined Petroleum Products	None	NA	NA
Bulk Stations	2,700		
Incoming		–$1,268	–0.05
Outgoing		$940	0.03
Bulk Terminals	300		
Storage tanks		–$14,214	–0.15
Submerged fill		–$1,466	–0.02
Gasoline Stations	55,000		
Submerged fill, convenience stores		–$383	–0.23
Submerged fill, others		–$383	–0.25
Vapor balance, convenience stores		$948	0.58
Vapor balance, others		$948	0.61
Hazardous Materials Trucking (Except Waste), Local	1,100	$400	0.2
Hazardous Materials Trucking (Except Waste), Long Distance	900	$400	0.2
Total	60,000		

[a] Control costs are weighted for the different sizes and numbers of facilities and include annualized capital and annual operation, maintenance, monitoring, reporting, and record-keeping costs.

[b] Ratios when assuming the different sizes of facilities are also below 1%.

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APPENDIX A
OVERVIEW OF ECONOMIC MODEL EQUATIONS

We illustrate our approach for addressing conceptual questions of market-level impacts using a numerical simulation model. Our method involves specifying a set of nonlinear supply and demand relationships for the affected markets, simplifying the equations by transforming them into a set of linear equations, and then solving the equilibrium system of equations (see Fullerton and Metcalf [2002] for an example).

A.1 Discussion and Specification of Model Equations

First, we consider the formal definition of the elasticity of supply with respect to changes in own price:

$$\varepsilon_S = \frac{dQ_S / Q_S}{dp / p} \qquad \text{(A.1)}$$

Next, we can use “hat” notation to transform Eq. (A.1) to proportional changes and rearrange terms:

$$\hat{Q}_S = \varepsilon_S \hat{p} \qquad \text{(A.1a)}$$

where

$\hat{Q}_S$ = percentage change in the quantity of market supply,

g_s = market elasticity of supply, and

$\hat{p}$ = percentage change in market price.

As Fullerton and Metcalf (2002) note, we have taken the elasticity definition and turned it into a linear behavioral equation for our market.

To introduce the direct impact of the regulatory program, we assume the per-unit cost associated with the regulatory program (t)[1] leads to a proportional shift in the marginal cost of production. Under the assumption of perfect competition (price equals marginal cost), we can approximate this shift at the initial equilibrium point as follows:

[1]The per-unit costs (c) are computed by dividing the total annualized costs (annualized capital cost, annual operating and maintenance, and annual monitoring, reporting, and record keeping) reported in Table 3-1 by the baseline consumption of gasoline (136 billion gallons). Note the annual fuel savings are not included in the supply shift. However, fuel savings are included in the welfare calculations.

$$\hat{MC} = \frac{t}{MC_o} = \frac{t}{p_o} . \tag{A.1b}$$

The with-regulation supply equation can now be written as

$$\hat{Q}_s = \varepsilon_s (\hat{p} - \hat{MC}) . \tag{A.1c}$$

Next, we can specify a demand equation as follows:

$$\hat{Q}_d = \eta_d \hat{p} \tag{A.2}$$

where

$\hat{Q}_d$ = percentage change in the quantity of market demand,

η_d = market elasticity of demand, and

$\hat{p}$ = percentage change in market price.

Finally, we specify the market equilibrium conditions in the affected markets. In response to the exogenous increase in production costs, producer and consumer behaviors are represented in Eq. (A.1a) and Eq. (A.2), and the new equilibrium satisfies the condition that the change in supply equals the change in demand:

$$\hat{Q}_s = \hat{Q}_d . \tag{A.3}$$

We now have three linear equations in three unknowns ($\hat{p}$, $\hat{Q}_d$, and $\hat{Q}_s$), and we can solve for the proportional price change in terms of the elasticity parameters (ε_s and η_d) and the proportional change in marginal cost:

$$\overbrace{\varepsilon_s (\hat{p} - \hat{MC})}^{\hat{Q}_s} = \overbrace{\eta_d (\hat{p})}^{\hat{Q}_d} \tag{A.4}$$

$$\varepsilon_s \hat{p} - \varepsilon_s \hat{MC} = \eta_d (\hat{p})$$

$$\varepsilon_s \hat{p} - \eta_d (\hat{p}) = \varepsilon_s \hat{MC}$$

$$\hat{p} (\varepsilon_s - \eta_d) = \varepsilon_s \hat{MC}$$

$$\hat{p} = \frac{\varepsilon_s}{(\varepsilon_s - \eta_d)} \times \hat{MC}$$

$$\hat{p} = \frac{\varepsilon_s}{\varepsilon_s - \eta_d} \times \hat{MC} . \quad \text{(A.5)}$$

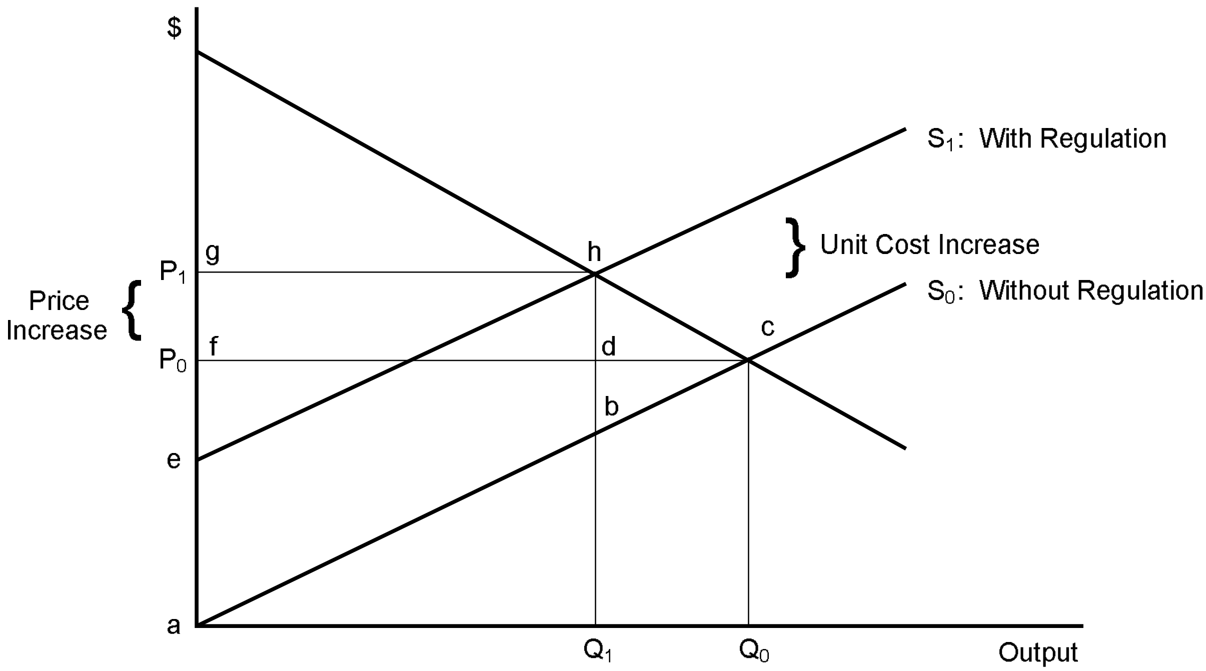
Given this solution, we can solve for the proportional change in market quantity using Eq. (A.2).

A.2 Consumer and Producer Welfare Calculations

The change in consumer surplus in the affected markets can be estimated using the following linear approximation method:

$$) CS = -[Q_1 \times) p] + [0.5 \times) Q \times) p]. \quad \text{(A.6)}$$

As shown, higher market prices and reduced consumption lead to welfare losses for consumers. A geometric representation of this calculation is illustrated in Figure A-1.



) consumer surplus = –[fghd + dhc]

) producer surplus = [fghd – aehb] – bdc

) total surplus = –[aehb + dhc + bdc]

Figure A-1. Welfare Calculations

For affected supply, the change in producer surplus can be estimated with the following equation:

$$) PS = [Q_1 \times) p] - [Q_1 \times t] - [0.5 \times) Q \times ( ) p - t)]. \quad \text{(A.7)}$$

Increased regulatory costs and output declines have a negative effect on producer surplus, because the net price change ( ) p – t) is negative. However, these losses are mitigated, to some degree, as a result of higher market prices. A geometric representation of this calculation is illustrated in Figure A-1.