

### 3. Behind the Bottom Line

#### Upstream Income

The oil and gas production operations of the FRS companies in the United States fared worse in financial performance in 2002 than did the companies' foreign operations. Net income from U.S. oil and gas production, excluding unusual items, totaled \$16.2 billion in 2002, a 21-percent decline from prior-year results (Table 8). Foreign upstream operations registered a much smaller 2-percent decline. The difference in financial results is largely traceable to changes in revenues in 2002.

Revenues from U.S. upstream operations declined almost \$8 billion, largely due to lower natural gas revenues (Table 8). The realized natural gas prices of the FRS companies averaged \$3.07 per thousand cubic feet (Mcf) in 2002, a decline of 90 cents, or 23 percent, from the average price realized in 2001 (Table 9). This decline was less than the drop in the overall U.S. wellhead price of \$1.07 per Mcf. A contributing factor may be due to the FRS companies having some success in hedging their natural gas prices, or it may be that the FRS companies sold more of their natural gas when prices were higher. (EIA's average U.S. wellhead price excludes the effects of price hedges.) Nevertheless, the lower natural gas price more than offset the 10-percent increase in the FRS companies' U.S. upstream natural gas sales volumes.

Domestic oil revenues declined slightly between 2001 and 2002, as a 2-percent increase in FRS companies' average U.S. wellhead price (domestic production average sales price) was more than offset by a 4-percent drop in sales volumes (Table 9). Foreign oil production was up one percent as increased production from Canada, Africa, and South America more than offset lower North Sea and Former Soviet Union and Eastern Europe production.

The decline in domestic natural gas revenues was partially offset by lower operating expenses in 2002 (Table 8). Operating expenses were lower, in part, because the FRS companies' U.S. crude oil and natural gas production levels were each down 1 percent (Table 9). More important was the nearly \$2-billion decline in depreciation, depletion, and amortization (DD&A) between 2001 and 2002. DD&A was unusually high in 2001, up by \$7 billion from the prior year, because of writedowns of oil and gas assets. As noted in the previous edition of this report (*Performance Profiles of Major Energy Producers 2001*, January 2003):

“In 2001, the FRS companies charged \$5.3 billion against pre-tax income for asset writedowns in U.S. oil and gas production operations and \$2.7 billion in foreign upstream operations. Asset writedowns are usually included in depreciation, depletion, and amortization (DD&A). Higher expenses for DD&A were the main sources of increased operating costs in the FRS companies' upstream operations between 2000 and 2001.”<sup>54</sup>

Foreign upstream revenues of the FRS companies were less affected by lower natural gas prices in 2002. Natural gas is a smaller share of foreign oil and gas production than domestically, 42 percent vs. 54 percent, respectively, on an energy-equivalent basis. Accordingly, the impact of lower gas prices on foreign upstream revenues is less than on domestic upstream revenues. Also, the fall in domestic natural gas prices was much steeper than the fall in foreign prices in 2002 (Table 9). This decline more than offset higher oil and gas production and higher crude oil prices. Natural gas production from foreign

**Table 8. Income Components and Financial Ratios in Oil and Natural Gas Production for FRS Companies, 2001-2002 (Billion Dollars)**

Components of Income and Financial Ratios	Worldwide		United States		Foreign	
	2001	2002	2001	2002	2001	2002
Oil and Natural Gas Revenues						
Oil	NA	NA	31.6	30.9	NA	NA
Natural Gas	NA	NA	47.4	40.2	NA	NA
Total Revenues	141.7	132.5	79.0	71.1	62.7	61.4
Expenses						
Depreciation, Depletion, and Amortization	32.2	32.8	20.0	18.3	12.1	14.6
Lifting Costs	24.7	25.1	12.9	12.5	11.8	12.6
Exploration Expenses	5.2	4.7	3.0	3.1	2.2	1.5
General and Administrative Expenses	2.7	2.6	1.9	1.7	0.8	0.9
Raw Material Purchases	21.9	15.8	16.1	12.5	5.8	3.3
Other Costs (Revenues)	4.9	10.6	-0.2	3.8	5.1	6.8
Total Operating Expenses	91.2	91.1	53.3	51.4	37.9	39.7
Operating Income	50.5	41.5	25.7	19.7	24.8	21.7
Other Income (Expense) <sup>a</sup>	4.8	4.8	1.6	1.6	3.2	3.2
Income Tax Expense	23.1	18.3	9.6	6.3	13.4	12.0
Net Income	32.2	27.9	17.6	15.0	14.6	12.9
Less Unusual Items	-4.5	-4.0	-3.0	-1.2	-1.5	-2.8
Net Income, Excluding Unusual Items	36.7	32.0	20.6	16.2	16.1	15.7
Unit Values (Dollars Per Barrel of Production COE) <sup>b</sup>						
Direct Lifting Costs (Excluding Taxes)	3.49	3.58	3.53	3.56	3.45	3.60
Production Taxes	0.78	0.67	0.85	0.75	0.70	0.59
Ratios (Percent)						
Return on Investment <sup>c</sup>	12.2	9.9	13.1	10.5	11.2	9.2
Effective Tax Rate <sup>d</sup>	41.7	39.9	35.3	29.7	48.0	48.6

<sup>a</sup>Earnings of unconsolidated affiliates and gain (loss) on disposition of assets.

<sup>b</sup>COE = Crude oil equivalent. Dry natural gas was converted at 0.178 barrels of oil per thousand cubic feet.

<sup>c</sup>Net Income divided by net investment in place (Net investment in place = net property, plant, and equipment plus investments and advances).

<sup>d</sup>Income tax expense divided by pretax income.

NA = Not available.

Note: Sum of components may not equal total due to independent rounding.

Source: Energy Information Administration, Form EIA-28 (Financial Reporting System).

fields was up 11 percent between 2001 and 2002 vs. a 1-percent decline in the United States (Figures 8a and 8b).

The bulk of the increased foreign natural gas production was from Canada and Asia-Pacific locales. Canadian natural gas production increased 24 percent, with some of the companies that made acquisitions of Canadian producers in recent years (Devon Energy and Burlington Resources) accounting for most of the increase. The 17-percent increase in the FRS companies' Asia-Pacific natural gas production largely came from Exxon Mobil and, to a lesser extent, from ChevronTexaco. Exxon Mobil's 2002 production in Indonesia rebounded from a low in 2001 that had resulted from a shutdown in onshore operations "due to civil unrest,"<sup>55</sup> while ChevronTexaco's production in the Philippines grew because 2002 was its first full year of operation there.<sup>56</sup> Other regions registering notable increases in natural gas production were South America and Africa, as well as companies active in deepwater production off the west coast of Africa. South American natural gas production was up 16 percent, largely due to increased production from BP's Amherstia field in Trinidad-Tobago in order to

supply a second liquefied natural gas train there.<sup>57</sup> African natural gas production was also up, by 37 percent, largely due to BP's increased production from the Temsah field in Egypt,<sup>58</sup> and Marathon Oil's initiation of production in Equatorial Guinea.<sup>59</sup>

**Table 9. Average Prices, Sales, and Production in Oil and Natural Gas for FRS Companies, 2001-2002**

Prices, Sales, and Production	2001	2002	Percent Change 2001-2002
Worldwide Oil and Gas Production <sup>a</sup>			
Crude Oil and NGL (Million Barrels)	3,087	3,093	0.2
Dry Natural Gas (Billion Cubic Feet)	15,148	15,747	4.0
Total (Million Barrels COE) <sup>b</sup>	5,784	5,896	1.9
Domestic Oil and Gas Production <sup>a</sup>			
Crude Oil and NGL (Million Barrels)	1,363	1,346	-1.2
Dry Natural Gas (Billion Cubic Feet)	8,838	8,713	-1.4
Total (Million Barrels COE) <sup>b</sup>	2,936	2,897	-1.3
Domestic Oil and Gas Sales Volumes			
Crude Oil and NGL (Million Barrels)	1,498	1,433	-4.3
Dry Natural Gas (Billion Cubic Feet)	11,957	13,109	9.6
Total (Million Barrels COE) <sup>b</sup>	3,626	3,766	3.9
Domestic Production Average Sales Prices			
Crude Oil and NGL (Dollars Per Barrel)	21.11	21.59	2.3
Dry Natural Gas (Dollars Per Thousand Cubic Feet)	3.96	3.07	-22.6
Composite (Dollars Per Barrel COE) <sup>b</sup>	21.79	18.89	-13.3
Foreign Oil and Gas Production <sup>a</sup>			
Crude Oil and NGL (Million Barrels)	1,724	1,747	1.3
Dry Natural Gas (Billion Cubic Feet)	6,310	7,034	11.5
Total (Million Barrels COE) <sup>b</sup>	2,847	2,999	5.3
Foreign Production Average Sales Prices			
Crude Oil and NGL (Dollars Per Barrel)	22.04	23.05	4.6
Dry Natural Gas (Dollars Per Thousand Cubic Feet)	2.91	2.54	-12.8
Canada	3.63	2.68	-26.1
OECD Europe	3.18	2.93	-8.0
Other Foreign	2.25	2.33	3.6
Composite (Dollars Per Barrel COE) <sup>b</sup>	19.97	19.38	-2.9

<sup>a</sup>Production is on a net ownership basis. Sales are domestic production segment sales. See Appendix A for discussion of FRS reporting conventions.

<sup>b</sup>COE = Crude oil equivalent. Dry natural gas was converted at 0.178 barrels of crude oil per thousand cubic feet.

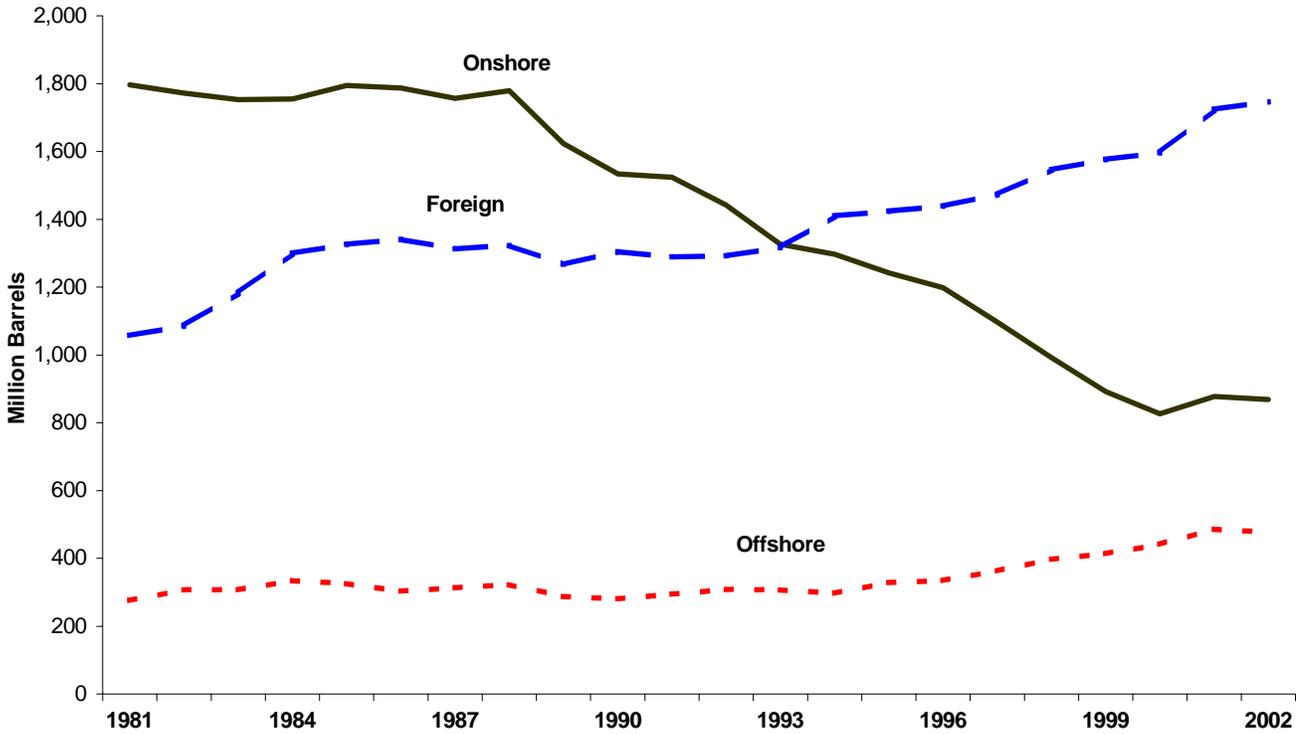
Sources: Energy Information Administration, Form EIA-28 (Financial Reporting System). Foreign production segment per unit sales values were compiled from information in FRS companies' filings of Securities and Exchange Commission Form 10-K, annual reports to shareholders, and supplements to annual reports.

Lifting costs decreased \$0.4 billion in the United States but increased \$0.8 billion abroad (Table 8). The decrease in the United States occurred because oil and gas production (Table 9) and production taxes per barrel fell, while the increase abroad resulted from increased oil and gas production and increased lifting costs per barrel, excluding production taxes. The next section of this chapter reviews lifting costs in more detail.

### ***Lifting Costs Little Changed -- Production Taxes Decline***

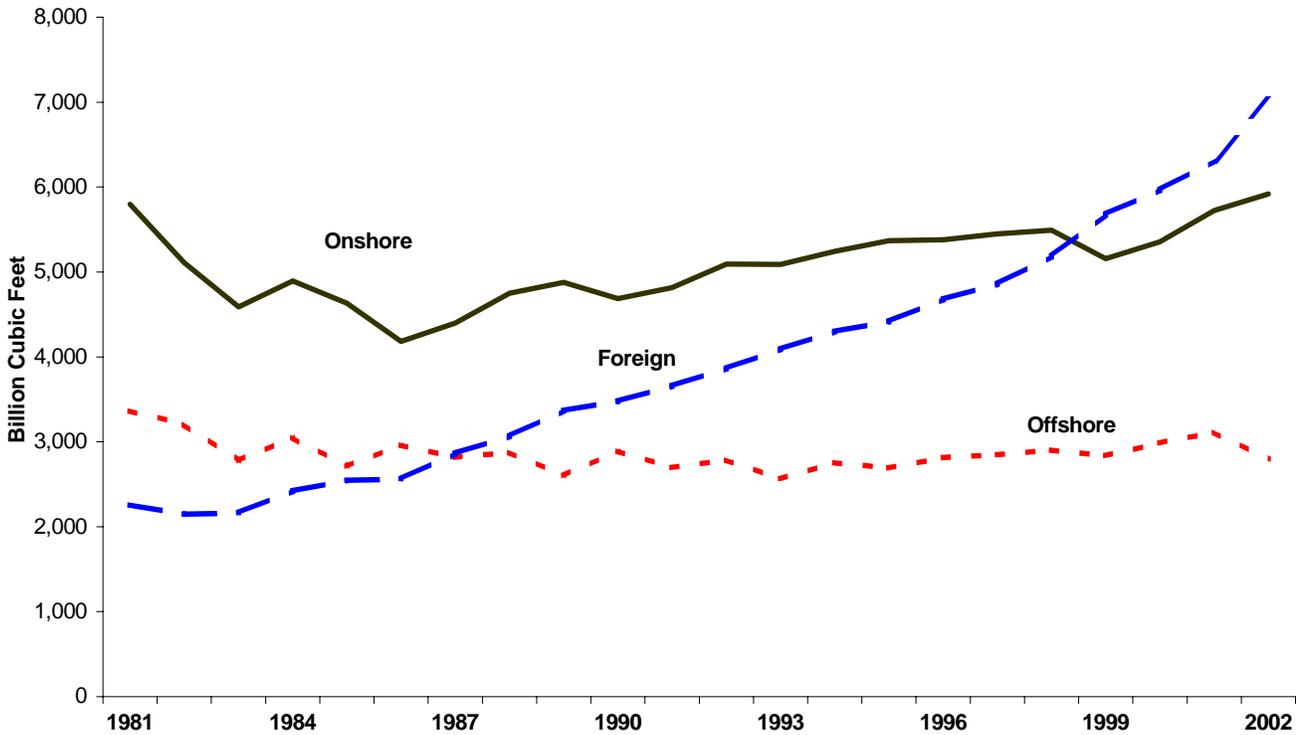
Worldwide lifting costs (including taxes) changed little in 2002, with a small decline in the United States offsetting a small increase in foreign regions (Table 10). Over the long term, lifting costs declined very slightly between 1994 and 2002, after declining faster in the early years of the 1990's (Figure 9). [Lifting costs (also called production costs) are the per barrel costs of producing oil and

**Figure 8a. Oil Production for FRS Companies, 1981-2002**



Source: Energy Information Administration, Form EIA-28, (Financial Reporting System).

**Figure 8b. Natural Gas Production for FRS Companies, 1981-2002**



Source: Energy Information Administration, Form EIA-28, (Financial Reporting System).

natural gas (measured on a barrel-of-oil equivalent basis). They include the costs to operate and maintain wells and related equipment and facilities after hydrocarbons (both crude oil and natural gas) have been found and/or acquired, and developed for production.] These per barrel costs include depreciation costs for capital equipment and facilities used in production. Total lifting costs are direct lifting costs plus production taxes.

**Table 10. Lifting Costs by Region for FRS Companies, 2001-2002**

(Dollars Per Barrel of Crude Oil Equivalent)

Region	Direct Lifting Costs			Production Taxes			Total		
	2001	2002	Percent Change	2001	2002	Percent Change	2001	2002	Percent Change
United States									
Onshore	--	--	--	--	--	--	5.19	5.02	-3.3
Offshore	--	--	--	--	--	--	2.93	2.93	0.0
Total United States	3.53	3.56	0.7	0.85	0.75	-11.5	4.39	4.32	-1.6
Foreign									
Canada	3.92	4.07	3.8	0.22	0.19	-13.8	4.14	4.26	2.9
OECD Europe	3.51	3.54	1.1	0.66	0.52	-20.3	4.16	4.07	-2.3
Former Soviet Union and Eastern Europe	3.85	3.21	-16.6	0.89	0.00	-100.0	4.74	3.21	-32.3
Africa	3.58	4.23	18.3	1.20	0.92	-22.9	4.77	5.15	8.0
Middle East	3.05	3.78	24.1	0.41	0.35	-15.9	3.46	4.12	19.3
Other Eastern Hemisphere	3.21	3.27	1.8	0.88	0.72	-17.4	4.09	4.00	-2.3
Other Western Hemisphere	2.75	2.57	-6.7	0.66	1.12	70.7	3.41	3.69	8.2
Total Foreign	3.45	3.60	4.6	0.70	0.59	-14.8	4.14	4.20	1.3
Worldwide Total	3.49	3.58	2.6	0.78	0.67	-13.3	4.27	4.26	-0.3

-- = Data not available.

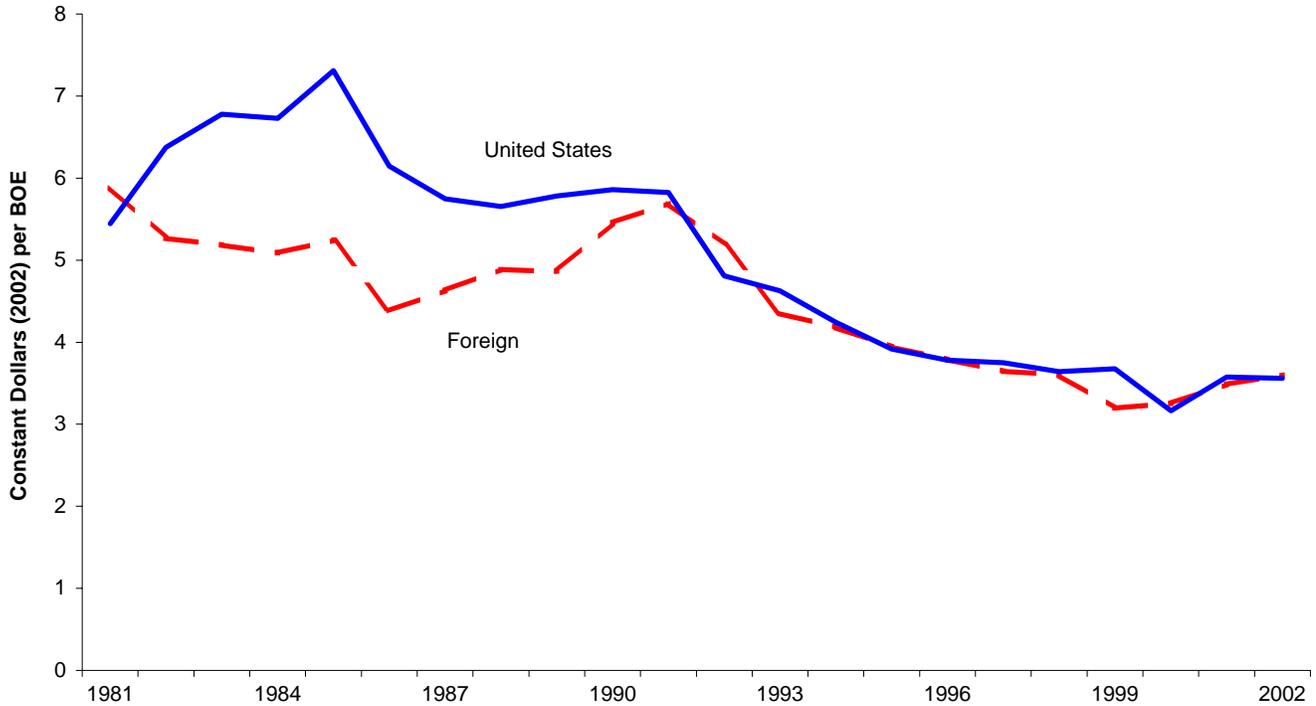
Note: Sum of components may not add to total due to independent rounding.

Source: Energy Information Administration, Form EIA-28, (Financial Reporting System).

One of the most notable changes in lifting costs in 2002 was the decline in both domestic and foreign production taxes (Table 10).<sup>60</sup> Production taxes increased only in the Other Western Hemisphere region (primarily Latin America), which experienced a fairly large increase.<sup>61</sup> In the United States, production taxes (also called severance taxes) are largely levied by State governments, largely against production in the U.S. Onshore and usually in the form of a percent of the value of the oil and gas produced.<sup>62</sup> In the first half of the 1980's, domestic production taxes per barrel-of-oil equivalent (boe) for the FRS companies fell sharply from their 1981 high of \$10 per boe (in real 2002 dollars), reflecting in large part a substantial decline in crude oil prices and, to a lesser extent, natural gas prices over that period (Figure 10). However, in 2000 and 2001, when crude oil and natural gas prices reached highs not seen since the mid-1980's, domestic production taxes remained below \$1 per boe.

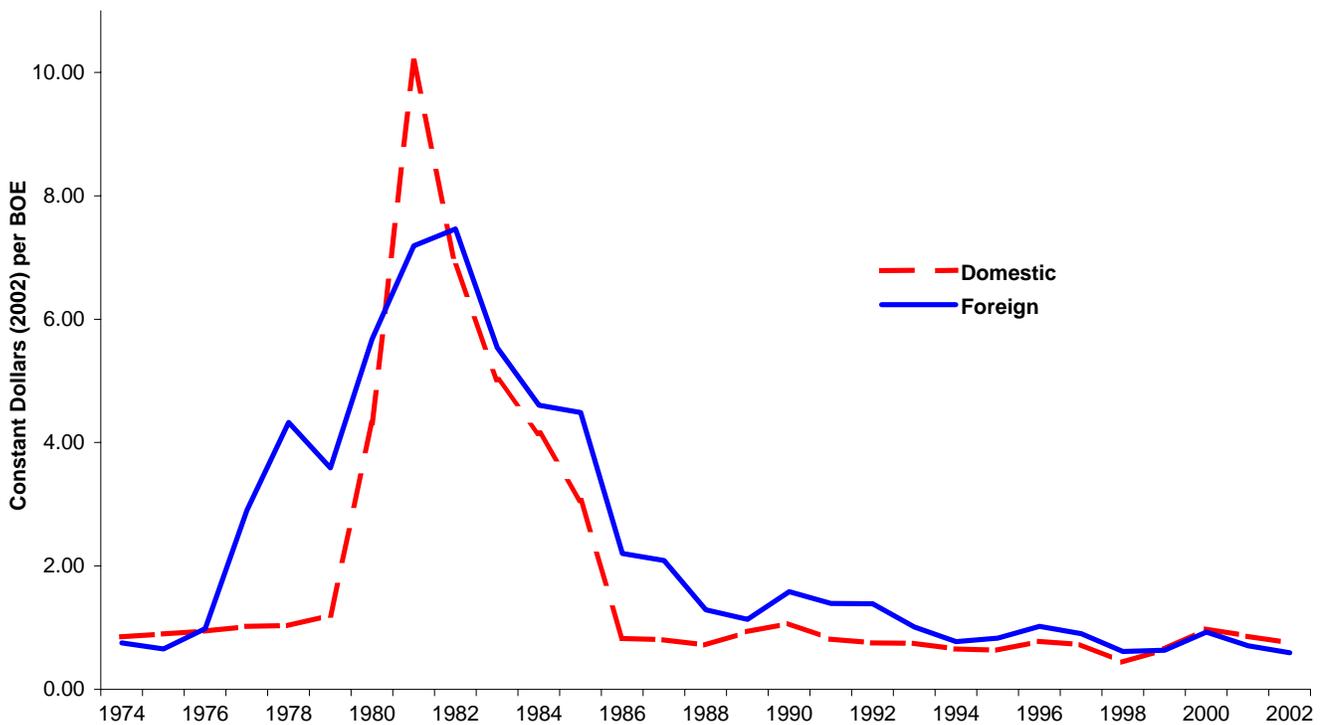
One reason that domestic production taxes for the FRS companies did not respond more dramatically to increased prices in 2000 and 2001 is the movement of domestic production from onshore to offshore. In 1985, 31 percent of the FRS companies' domestic oil and gas production (on a boe basis) came from the Offshore region. By 2002, production from the Offshore reached 51 percent of the domestic total. Since production from Federal Offshore areas is not subject to State severance taxes, the share of production exposed to severance taxes for the FRS companies has been falling. Inexplicably, production taxes paid by the FRS companies on foreign production, which is subject to multiple tax schemes, have historically moved in tandem with domestic production taxes (Figure 10).<sup>63</sup>

**Figure 9. Direct Oil and Gas Lifting Costs for FRS Companies, 1981-2002**



Note: Direct lifting costs are the costs of extracting oil and gas, excluding production taxes.  
 BOE = Barrels of crude oil equivalent.  
 Source: Energy Information Administration, Form EIA-28 (Financial Reporting System).

**Figure 10. Production Taxes for FRS Companies, 1974-2002**



Note: Foreign production taxes include royalty payments while domestic production taxes do not.  
 BOE = Barrels of crude oil equivalent.  
 Source: Energy Information Administration, Form EIA-28 (Financial Reporting System).

The small decline in worldwide production taxes was offset by an increase in per barrel direct lifting costs in 2002 (Table 10). Africa was the largest contributor to the increase in worldwide direct lifting costs. This is because production by the FRS companies in Africa increased only 6 percent, while total expenditures on production (excluding production taxes) increased 25 percent, which resulted in an 18-percent increase in direct lifting costs. Worldwide direct lifting costs of the FRS companies also were notably influenced by increases in Canada and the Middle East, but because of relatively less production there, were not as significant as those of Africa.<sup>64</sup>

One cause of higher direct lifting costs can be a decline in oil and gas production, with fixed costs spread over less production. Another possible cause of higher lifting costs is related to the launching of new projects, such as bringing new production online or initiating enhanced recovery programs, which often have higher costs initially.

With an increase of 15 percent, Canada led all regions for increased production in 2002 (Table B25). Production in Africa also increased, by 3 percent, while production in the Middle East declined slightly. In contrast, the Other Western Hemisphere was the only region making a substantial contribution to lower worldwide direct lifting costs; oil and gas production there grew twice as fast as direct production spending.

While 2002 worldwide total lifting costs (i.e., direct lifting costs plus production taxes) were virtually unchanged, although the Middle East region and the Former Soviet Union and East Europe region had relatively large changes in total lifting costs in 2002. In the Middle East, production taxes declined, and an increase in direct lifting costs was the only cause of the increase in total lifting costs. In contrast, the Former Soviet Union and East Europe was the only region to exhibit a decline in both direct lifting costs and production taxes, which resulted in a large relative decline in total lifting costs for the region. The FRS companies have just begun substantial production in the Former Soviet Union and East Europe, with production there much less than in any other region. Increased production at established projects also may lead to falling lifting costs because fixed costs are spread over more production.

## **U.S. Refining and Marketing**

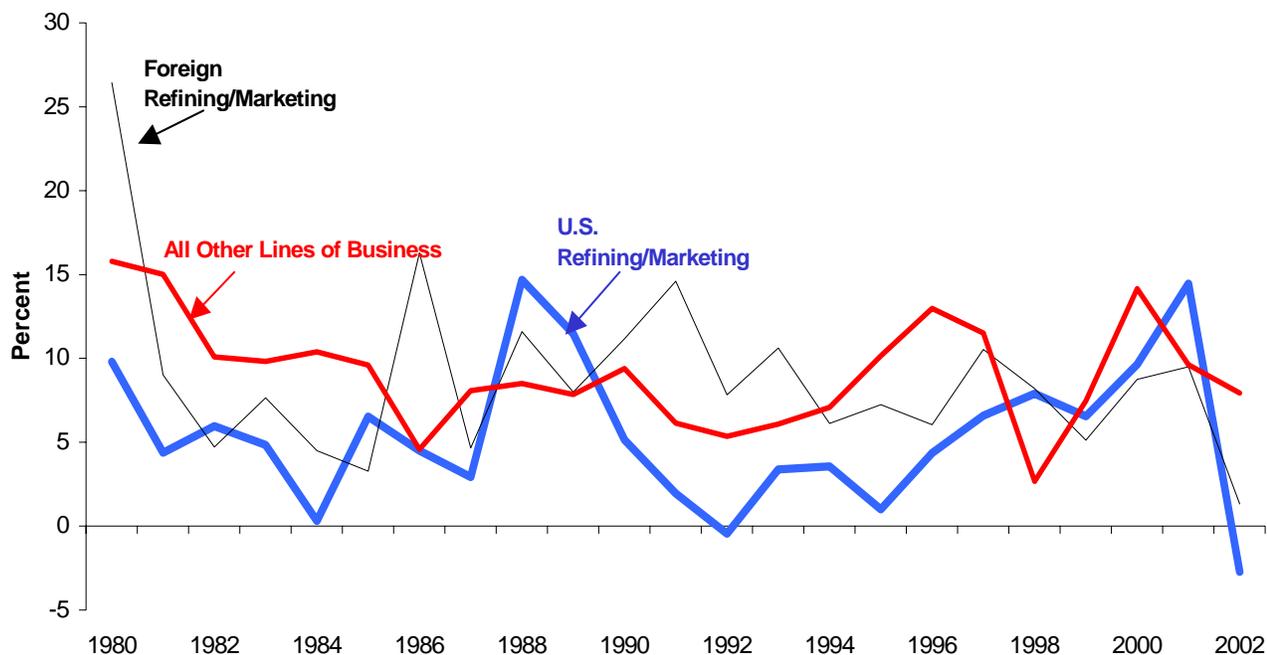
### ***Profitability of U.S. Refining/Marketing Operations Lowest in Survey History***

The results of 2002 established a new record as the most unprofitable year for the FRS companies' refining/marketing operations in the 26-year history of the FRS. These disappointing results came after a 6-year period of almost continuously increasing profitability, which had resulted in returns from the FRS domestic refining/marketing operations becoming competitive with all other lines of business (Figure 11) and was referred to just a year ago as a "sort of 'golden age' of U.S. refining and marketing."<sup>65</sup>

In addition, perhaps one of the most unsettling aspects of the historical losses reported in 2002 is that they came on the heels of the second-most profitable year in the history of the FRS. Thus, in view of the apparently tenuous nature of profitability gains in this line of business, it appears that the urgency of the ongoing cost-cutting efforts that characterized the domestic refining/marketing operations of the FRS companies throughout the 1990's will continue unabated through this decade.

The change in the profitability of U.S. refining/marketing operations can easily be explored by examining the net refined product margin (net margin), which is highly correlated with profitability.<sup>66</sup> The net margin is the gross margin (refined product revenues minus purchases of raw materials input to refining and refined product purchases) minus out-of-pocket operating costs per barrel of refined product sold. The net margin measures before-tax cash earnings from the production and sale of refined products.<sup>67</sup> The \$0.19 per barrel net margin of 2002 was the lowest since 1984 (when the net margin, after adjusting for inflation, was \$0.01 per barrel) and the second lowest in the history of the FRS (Figure 12), barely surpassing the \$0.21 per barrel (also adjusted for inflation) achieved in 1987.

**Figure 11. Return on Investment in U.S. and Foreign Refining/Marketing, and All Other Lines of Business for FRS Companies, 1980-2002**



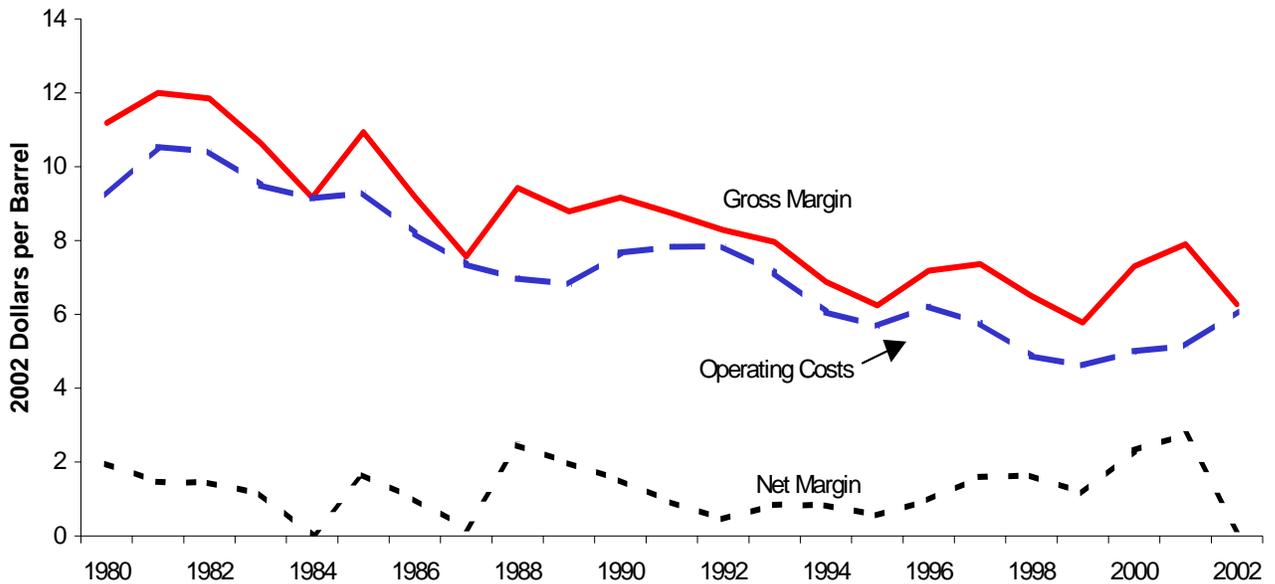
Source: Energy Information Administration, Form EIA-28 (Financial Reporting System).

### **Lower Product Prices Reduce Product Sales Revenue**

The 7-percent decline in petroleum product sales revenues (Table 11) was partially due to lower prices received, which fell 4 percent in 2002 compared to 2001 (Table 12). Declines in the average price received for motor gasoline (falling 6 percent) and distillate (falling 8 percent) were somewhat offset by small gains (6 percent) in the average price for other petroleum products. Revenue from other sources (e.g., non-petroleum sales at convenience stores) also fell while operating cost increased slightly. The combination was disastrous and resulted in an operating loss of \$1.5 billion and a net loss of \$2.2 billion (\$1.0 billion excluding unusual items).

Economic growth (2.4 percent), cooler winter weather (2.2 percent more heating degree-days), and warmer summer weather (11 percent more cooling degree-days) in 2002 compared to 2001<sup>68</sup> ameliorated the downward trend in prices. However, these factors were insufficient to overwhelm the dampening effect of unusually high end-of-2001 product stock levels (and continuing through the first part of 2002) brought on by events in 2001, including the worldwide economic downturn and the impacts of the terrorist attacks of 9/11.

**Figure 12. U.S. Refined Product Margins and Costs per Barrel of Petroleum Product Sold for FRS Companies, 1980-2002**



Note: The gross margin is refined product revenues less raw material cost and product purchases divided by refined product sales volume.

Source: Energy Information Administration, Form EIA-28 (Financial Reporting System).

**Table 11. U.S. and Foreign Refining/Marketing Financial Items for FRS Companies, 2001-2002**  
(Million Dollars)

	2001	2002	Percent Change 2001 - 2002
<b>Domestic Refining/Marketing Operations</b>			
Refined Product Sales Revenue	291,609	272,190	-6.7
Other Revenue <sup>a</sup>	19,301	16,600	-14.0
Operating Expense <sup>a, b</sup>	294,536	290,282	-1.4
Operating Income <sup>b</sup>	16,374	-1,492	-109.1
Net Income, excluding unusual Items	12,829	-1,011	-107.9
Unusual Items	-878	-1,153	--
Net Income	11,951	-2,164	-118.1
<b>Foreign Refining/Marketing Operations</b>			
Refined Product Sales Revenue	142,949	142,227	-0.5
Other Revenue <sup>a</sup>	14,249	6,300	-55.8
Operating Expense <sup>a, b</sup>	152,420	147,298	-3.4
Operating Income <sup>b</sup>	4,778	1,229	-74.3
Net Income, excluding unusual Items	3,239	564	-82.6
Unusual Items	-124	-112	--
Net Income	3,115	452	-85.5

<sup>a</sup>Raw materials revenues are netted against total operating expense.

<sup>b</sup>Excludes unusual items.

-- = Not meaningful.

Source: Energy Information Administration, Form EIA-28 (Financial Reporting System).

**Table 12. Sales, Prices, Costs, and Margins in U.S. Refining/Marketing for FRS Companies, 2001-2002**

	2001	2002	Percent Change 2001-2002
Refined Product Sales (Million Barrels per Day)	23.6	23.0	-2.5
	(Nominal Dollars per Barrel)		
Gasoline Average Price	36.96	34.87	-5.6
Distillate Average Price	32.96	30.49	-7.5
Other Products Average Price	26.30	27.81	5.8
All Refined Products Average Price	33.88	32.43	-4.3
Less: Raw Materials Costs and Product Purchases	26.07	26.16	0.3
Equals: Gross Refining Margin	7.81	6.27	-19.7
Less: Direct Operating Costs	5.09	6.08	19.5
Equals: Net Refining Margin <sup>a</sup>	2.72	0.19	-93.0
Reseller/wholesaler spread (dealer price - wholesale price)	3.05	2.32	-24.1
Retailer spread (company-operated price - dealer price)	3.16	4.27	35.1

<sup>a</sup>See Appendix B, Table B32, for the components to calculate the refined product margin.

Source: Energy Information Administration, Form EIA-28 (Financial Reporting System).

Industry-wide petroleum product stocks were 9 percent higher in 2002 than in 2001 over the first quarter, falling to 4 percent over the second quarter and 2 percent over the third quarter (Figure 13), which exerted substantial (and declining) downward pressure on petroleum product prices compared to a year earlier.<sup>69</sup> Industry-wide stocks of motor gasoline also were higher during the first part of 2002 compared to 2001, but were much more similar to the average over the period of 1996 through 2000 (Figure 14) than was the case for petroleum products in general. The accompanying decline in motor gasoline prices received by the FRS companies also was somewhat smaller at 6 percent.

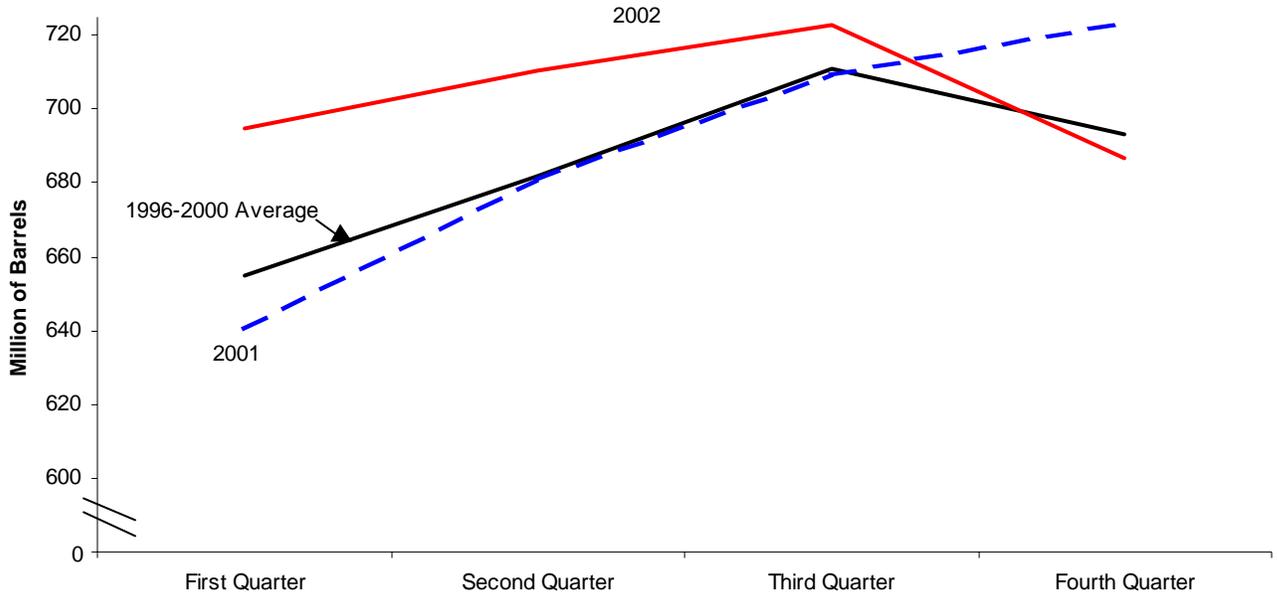
### **Lower Product Sales Magnify Downward Pressure on Revenue**

The downward pressure on revenues created by lower product prices was magnified by lower product sales in 2002 relative to 2001. Sales fell a relatively slight 0.6 million barrels per day against the 2001 level of almost 24 million barrels for a 3-percent decline in 2002 relative to 2001 (Table 12), largely due to a 12-percent decline in the sales of the amorphous category of “other products” (i.e., petroleum products other than motor gasoline and distillate) (Table 13). Motor gasoline sales were essentially flat while distillate sales fell a slight 2 percent. Thus, sales of the more highly valued products did little to offset the effects of the product price declines.

Meanwhile, refinery capacity reported by the FRS companies fell slightly (less than 1 percent)<sup>70</sup> (Table 14) as small expansions in the capacity of many refineries largely offset Precor’s closing of its Hartford, Illinois refinery in October 2002<sup>71</sup> and BP’s sale of its Yorktown, Virginia refinery to Giant Industries.<sup>72</sup> A few intra-FRS transactions (all of which occurred during 2002) shifted assets around among the FRS companies. For example, Tesoro acquired Valero’s Golden Eagle refinery,<sup>73</sup> Shell purchased Texaco’s share of Equilon and subsequently consolidated the Equilon assets,<sup>74</sup> and Phillips acquired Conoco via merger.<sup>75</sup> Additionally, all of these transactions contributed to the 25-percent increase in net investment in place between 2002 and 2001. This is because an asset is carried on a company’s books at its purchase price less the depreciation, depletion, and amortization (DD&A) reductions taken over a

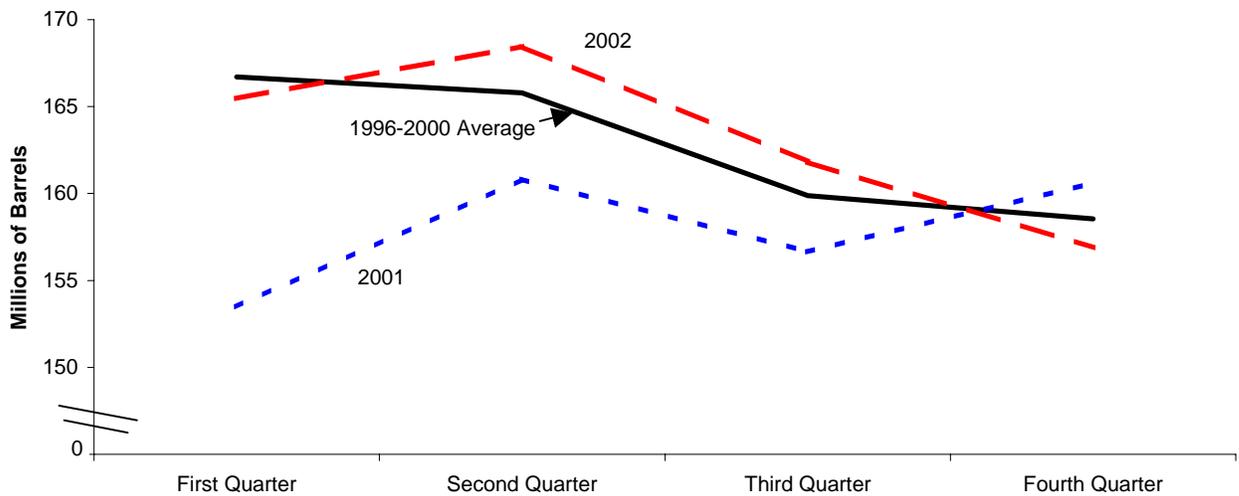
number of years, but then, when sold, this same asset is carried on the new owner's books at the new purchase price, before the DD&A process begins anew with the purchasing company. Further, upgrading of refineries continued to occur during 2002<sup>76</sup> and also contributed to the increase.

**Figure 13. Quarterly U.S. Commercial Petroleum Product Stocks, 1996-2000 Average, 2001, and 2002**



Source: Energy Information Administration, *Petroleum Supply Monthly*, DOE/EIA-0109 (Various issues, Washington, DC), Table 51.

**Figure 14. Quarterly U.S. Motor Gasoline Stocks, 1996-2000 Average, 2001, and 2002**



Source: Energy Information Administration, *Petroleum Supply Monthly*, DOE/EIA-0109 (Various issues, Washington, DC), Table 51.

**Table 13. U.S. Refined Product Margins and Costs per Barrel Sold and Product Sales Volume for FRS Companies, 2001-2002**

	2001	2002	Percent Change 2001 - 2002
	(Dollars per Barrel)		
Gross Margin	7.81	6.27	-19.7
- Marketing Costs	1.59	1.57	-1.1
- Energy Costs	1.32	1.21	-8.4
- Other Operating Costs	2.19	3.31	51.2
= Net Margin	2.72	0.19	-93.0
	(Million Barrels)		
Product Sales Volume			
Motor Gasoline	12,435	12,469	0.3
Distillate	6,958	6,822	-2.0
Other Products	4,185	3,701	-11.6
Total	23,579	22,991	-2.5

Source: Energy Information Administration, Form EIA-28 (Financial Reporting System).

**Table 14. U.S. and Foreign Refining Investment and Operating Items for FRS Companies, 2001-2002**

	2001	2002	Percent Change 2001-2002
	(Billion Dollars)		
U.S. Refining Additions to Investment in Place	12.1	15.1	25.1
U.S. Marketing Additions to Investment in Place	7.2	3.8	-47.4
Foreign Refining/Marketing Additions to Investment in Place	4.6	5.0	9.7
	(Thousand Barrels per Day)		
U.S. Refining Capacity	14,682	14,557	-0.9
U.S. Refinery Output	14,936	14,676	-1.7
Foreign Refining Capacity	5,572	5,642	1.3
Foreign Refinery Output	4,766	4,873	2.2
	(Percent)		
U.S. Refinery Utilization Rate <sup>1</sup>	95.2	91.0	(2)
Foreign Refinery Utilization Rate <sup>1</sup>	83.9	85.2	(2)

<sup>1</sup>Refinery utilization rate is calculated by dividing runs to stills at own refineries by the average of the year beginning and year ending crude oil distillation capacity.

<sup>2</sup>Not meaningful.

Source: Energy Information Administration, Form EIA-28 (Financial Reporting System).

## **Gross Margin Squeezed As Product Prices Fall**

Industry-wide gross refining margins in 2002 were consistently lower than in 2001 for almost the entire year and fluctuated around the average level for the 1996 to 2000 period (Figure 15) throughout the year. Only over the last quarter of 2002 (when the gross margin collapsed) was the gross refining

margin similar to 2001. Higher motor gasoline stocks than a year ago (Figure 14) and higher petroleum product stocks in general (Figure 13) put downward pressure on the industry-wide gross margins. Meanwhile, U.S. crude oil stock levels were at historically high levels during the first half of 2002 before consistently falling over the latter half of the year (Figure 16), resulting in an increase in the price of crude oil<sup>77</sup> and putting downward pressure on the gross margin. The overall effect of these (and other) effects was that the industry-wide gross refining margin of 2002 averaged \$8.05 per barrel, a 31-percent decline relative to the 2001 average of \$11.59 per barrel.

Meanwhile, the gross refining margin received by the FRS companies fell a lesser 20 percent compared to 2001 (Table 13). The average price received for petroleum products declined \$1.45 per barrel (4 percent) while raw materials and purchased product costs rose \$0.09 per barrel (less than 1 percent), which resulted in a \$1.54 per barrel decline in the gross refining margin.<sup>78</sup>

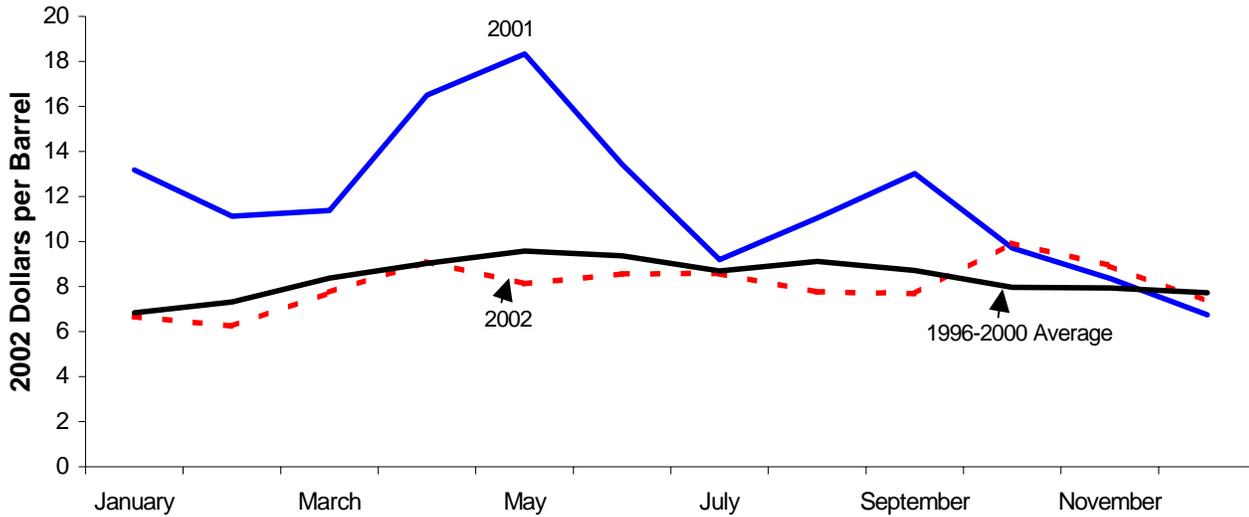
Successful efforts to increase the complexity of the FRS refineries over the last several years<sup>79</sup> allow the FRS companies to refine a wide range of crude oils, which has enabled them to use relatively low-cost heavy crude oils and transform them into relatively more higher-priced, light products. However, during 2002 the price of heavy crude relative to light crude increased (Figure 17), which put less downward pressure on the price of crude oil paid by the FRS companies and contributed to the slight increase in the raw materials and purchased product costs of the FRS companies. Similarly, the price of light products (represented by the price of motor gasoline) fell relative to the price of heavy products (represented by the price of residual fuel oil), which tended to increase the downward pressure on the prices of refined products of the FRS companies (Figure 18). Thus, the revenue side of the net margin was substantially lower in 2002 than in 2001. We will next examine the cost side of the net margin.

### ***Operating Costs Rise Despite Lower Energy and Marketing Costs***

A closer look at the operating costs that distinguish the gross margin from the net margin indicates that these costs increased 20 percent, but hardly at a uniform rate across the different types of costs (Table 13). Efforts over the last few years by the FRS companies to reduce their energy costs appeared to bear fruit in 2002 as energy costs fell \$0.11 per barrel, an 8-percent reduction from their 2001 level. Cogeneration projects are one of the major approaches that these companies have taken to reducing their energy costs over the last few years.<sup>80</sup>

However, continued retrenchment of marketing operations through both selective investment in outlets in profitable areas and sales of marginal outlets and of outlets in marginal areas<sup>81</sup> was less successful in 2002 as marketing costs fell \$0.02 per barrel, a 1-percent decline. The decline in marketing costs occurred despite extensive cost increases due to several companies re-branding their marketing outlets.<sup>82</sup> However, branded marketing outlets directly-supplied by the FRS companies continued to decline in 2002 (Figure 19), falling to 46,561 (14 percent less than the 54,085 reported in 2001 (Table 15)) and indicative of the FRS companies' efforts to increase the profitability of this line of business by shifting to wholesale and direct sales.<sup>83</sup> Company-operated outlets were reduced by slightly more than 14 percent while dealer outlets were reduced by slightly less than 14 percent. These efforts to eliminate marginal outlets resulted in increased productivity as the average monthly volume through all direct-supplied FRS branded outlets increased 7 percent between 2001 and 2002, with all of the increase achieved through dealer outlets.

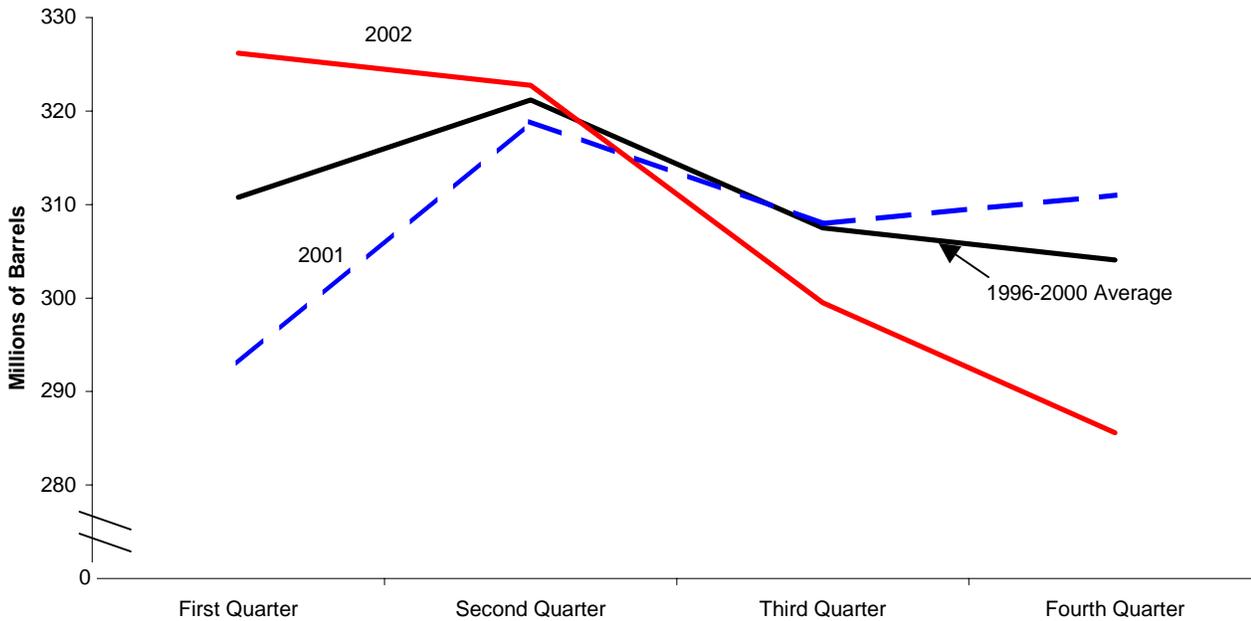
**Figure 15. Monthly Gross Refined Product Margin for United States, 1996-2000 Average, 2001, and 2002**



Note: The U.S. gross refined product margin is the difference between the composite wholesale product price and the composite refiner acquisition cost of crude oil.

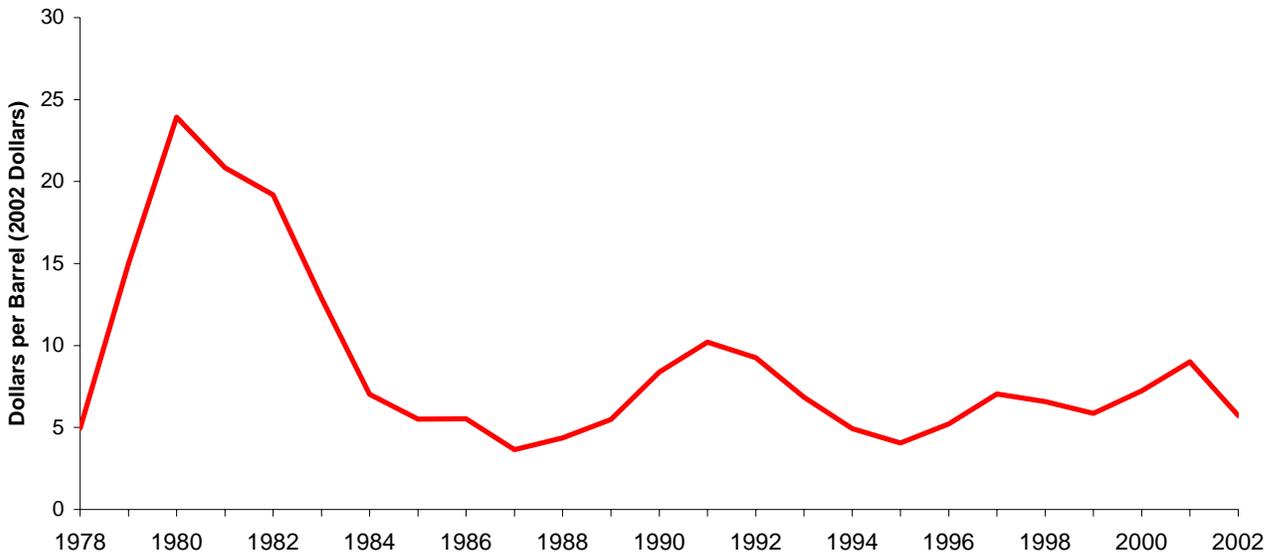
Sources: Energy Information Administration, *Petroleum Marketing Monthly*, DOE/EIA-0380 (April 1996 - March 2003), Table 1, Table 4, and Table 5; and Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0380 (February 1996 - January 2003), Table 3-2b.

**Figure 16. Quarterly U.S. Crude Oil Stocks, 1996-2000 Average, 2001, and 2002**



Source: Energy Information Administration, *Petroleum Supply Monthly*, DOE/EIA-0109 (Various issues, Washington, DC), Table 51.

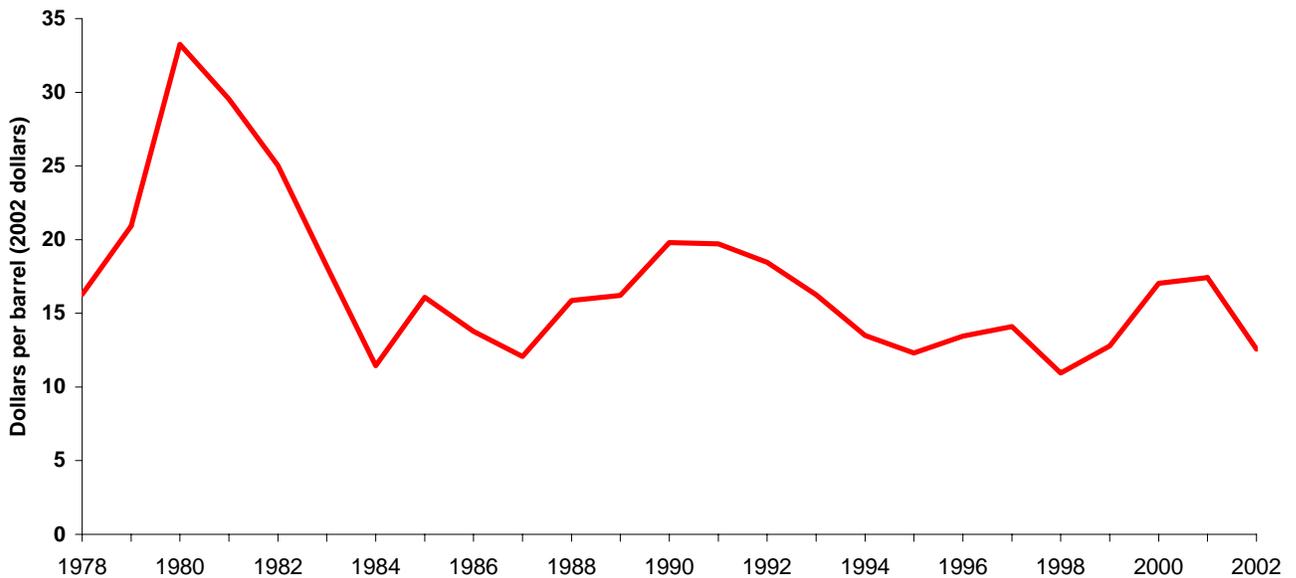
**Figure 17. Real Price Difference Between Light Crude Oil and Heavy Crude Oil, 1978-2002**



Note: Light crude oil tends to sell for a higher price per barrel than does heavy crude oil. Thus, the vertical distance of the line in the figure from the horizontal axis indicates the premium paid for light crude oil relative to heavy crude oil. The more expensive light crude oil is defined here as having an API gravity of 40.1 or greater and heavy crude oil is defined as having an API gravity of 20 or less.

Source: Energy Information Administration, *Petroleum Marketing Monthly*, DOE/EIA-0380, Tables 27 and 28.

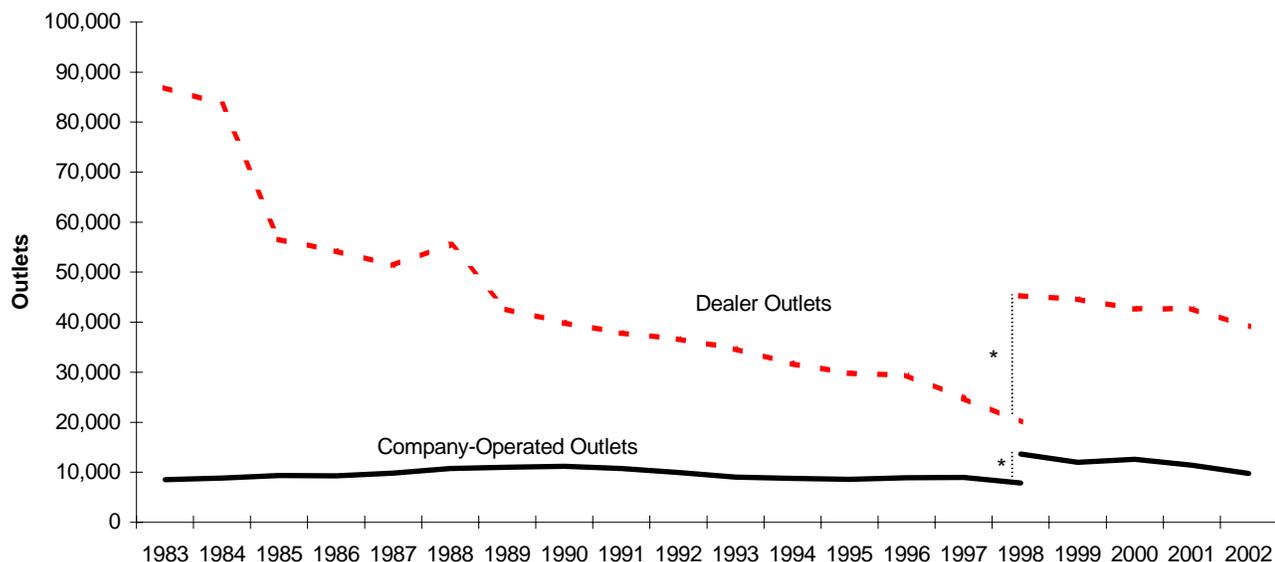
**Figure 18. Real Resale Price Difference Between Motor Gasoline and Residual Fuel Oil, 1978-2002**



Note: Motor gasoline tends to sell for a higher price per barrel than does residual fuel oil. Thus, the vertical distance of the line in the figure from the horizontal axis indicates the premium paid for motor gasoline relative to residual fuel oil.

Source: Energy Information Administration, *Petroleum Marketing Monthly*, DOE/EIA-0380, Table 4.

**Figure 19. Company-Operated and Dealer Outlets for FRS Companies, 1984-2002**



\*The addition of 11 companies to the group of U.S. majors in 1998, the largest single-year change in the history of the Financial Reporting System, resulting in the vertical displacement of the series in 1998.

Source: Energy Information Administration, Form EIA-28 (Financial Reporting System).

**Table 15. Motor Gasoline Distribution and Number of Direct-Supplied Branded Outlets for FRS Companies, 2001-2002**

	2001	2002	Percent Change 2001-2002
<b>(Million Barrels)</b>			
Third-Party Volume			
Wholesale	1,955.8	2,032.4	3.9
Retail			
Dealer	1,182.1	1,133.4	-4.1
Company-Operated	545.1	464.3	-14.8
Total Retail	1,727.3	1,597.6	-7.5
Direct	777.0	819.8	5.5
Total Third-Party Volume	4,460.1	4,449.8	-0.2
Intersegment Volume	78.8	101.4	28.7
<b>(Number of Direct-Supplied Branded Outlets)</b>			
Dealer Outlets	42,705	36,816	-13.8
Company-Operated Outlets	11,380	9,745	-14.4
Total Retail Outlets	54,085	46,561	-13.9
<b>(Thousand Gallons per Month)</b>			
Average Monthly Outlet Volume			
Dealers	96.9	107.7	11.2
Company-Operated	167.7	166.7	-0.6
All Direct-Supplied Outlets	111.8	120.1	7.4

Source: Energy Information Administration, Form EIA-28 (Financial Reporting System).

Productivity increases, though, were offset by a substantial increase during 2002 in other operating costs related to refining, which rose by \$1.12 per barrel (51 percent) relative to 2001. However, the change was largely due to data reported by one of the respondents. Removal of that company from this particular calculation would eliminate more than half of the apparent FRS change in refining-related operating costs between 2001 and 2002. Additionally, the FRS companies involved in recent mergers have somewhat elevated the cost structure of the FRS companies as the surviving companies merge their operations and corporate cultures. Further, environmental spending to comply with the Clean Air Act Amendments of 1990 continues, accounting for some increase in other operating costs. (Although we have no estimate of the significance of the environmental spending within 2002 other operating costs, a recent study examined these for the 1995 to 2001 period and is summarized in the Highlight entitled, “*Environmental Compliance Partially Eclipses Recent Gains in Profitability.*”)

In summary, despite the profits of recent years, the year 2002 saw the lowest level of profits for refiner/marketers in the history of the FRS. The net margin was reduced in 2002 by a falling gross margin (and revenues), a circumstance that was worsened by higher operating costs, which played a large role in the losses experienced in 2002. Nonetheless, reduced energy and marketing costs in 2002 relative to 2001 may give hope for the future domestic refining/marketing results of the FRS companies because cost-cutting efforts by these companies over the last several years suggest that they have reorganized (and continue to fine tune) their operations to better withstand the vicissitudes of their industry.

### **Environmental Compliance Partially Eclipses Recent Gains in Profitability**

The effect of environmental legislation on profitability over the 1995 to 2001 period is explored through two avenues in a recent EIA study (*The Impact of Environmental Compliance Costs on U.S. Refining Profitability, 1995 – 2001*<sup>a</sup>): operating costs, and capital expenditures and depreciation charges. This study updates earlier work that examined the apparent effects of environmental compliance on refining/marketing operations’ operating costs and capital expenditures (including depreciation charges) over the 1988 to 1995 period.<sup>b</sup>

The profitability<sup>c</sup> of the FRS companies’ U.S. refining/marketing operations increased from approximately zero in 1995 to more than 14 percent in 2001 (Figure 11). An investigation of the reasons for increased profitability are complicated by tax and other considerations that affect net income and the investment base. However, a more straightforward approach for an examination of profitability changes is available.

The net margin is also closely related to refining/marketing profitability. Figure 20 shows that when cash earnings per barrel sold (net refined product margin adjusted for price changes) are low, so is refining/marketing profitability (return on investment). The correlation between profitability (measured by return on net investment in place) and the net margin is 0.93,<sup>d</sup> which is highly significant by the usual statistical conventions.

The net refining margin (net margin) is refined product revenue minus purchases of raw material inputs to refining and refined product purchases (gross margin) less out-of-pocket operating costs per barrel of refined products sold. The net margin represents the before-tax cash earnings from production and sale of refined products and excludes ancillary activities such as non-fuel sales from convenience stores. The net margin is an important determinant of short-term decisions in refining operations. Basically, for a given scale and configuration of a refinery, output will tend to be expanded as long as the added output contributes to cash earnings.

The increase in the net margin over the 1995 to 2001 period was due to both an increase in the gross margin and a reduction in operating costs. The gross margin increased over the 1995 to 2001 period (Figure 12) as low product stocks (especially in 2000 and 2001) led to higher product prices and the increasing sophistication of the FRS companies' refineries<sup>e</sup> allowed the companies to take advantage of price differences between light and heavy crude oil (Figure 17), lowering their raw materials costs.

Meanwhile, operating costs generally declined. The FRS companies routinely noted various cost-cutting efforts in their public disclosures for the 1995 to 2001 period (i.e., annual reports and Securities and Exchange Commission Form 10-K filings). Although energy costs actually increased over the period, reductions in other costs more than offset these increases (Table 16). Among these were environmental operating costs, which declined \$0.15 per barrel (30 percent) due to increased familiarity with the production of reformulated fuels and the increased scale of production. Marketing costs were even more significant to the increased net margin as they fell \$0.36 per barrel (19 percent) due to the increased use of lower-cost motor gasoline distribution channels (i.e., wholesale and direct sales) and the decreased use of higher-cost motor gasoline distribution channels (i.e., directly supplied company-operated and dealer-operated outlet sales). Lastly, and most important, was the reduction in other refining costs, which fell \$0.44 per barrel (19 percent) due to cost-cutting efforts such as holding lower stock levels, as cited by numerous FRS companies. Thus, one of the reasons for the growth in profitability of U.S. refining/marketing was lower environmental operating costs, but it was hardly the major reason as it was surpassed by marketing costs and other operating costs in terms of the nominal change.<sup>f</sup>

The asset base used to generate the cash earnings discussed above must also be examined. Capital expenditures and depreciation charges attributable to environmental requirements are also part of the profitability calculation. Capital spending by the FRS companies, which had steadily declined between 1995 and 1997, surged in 1998 as 11 non-vertically integrated refiners were added to the FRS group. Capital spending continued to increase following 1998 largely due to mergers and acquisitions (Figure 21). (Excluding mergers and acquisitions, FRS capital spending has been essentially flat at \$3.6 billion annually between 1998 and 2001.) Capital spending for environmental compliance fluctuated through the 1990's and early 2000's ahead of deadlines established by the Clean Air Act Amendments of 1990 (CAAA90). The amount of capital investment by the FRS companies was considerably less after 1995 than earlier. The effects of this change were twofold: depreciation for environmentally-related assets declined from \$745 million (in 2001 dollars) in 1995 to \$673 million in 2001; and the share of fixed assets accounted for by environmental investments declined (Figure 22) from 38 percent in 1995 (having peaked at 47 percent a year earlier) to 9 percent in 2001. Thus, the asset base on which the income was earned grew more due to economic reasons and less due to environmental reasons during the 1995 to 2001 period than had been the case during the 1991 to 1995 period.

In summary, the financial effects (i.e., operating costs, depreciation charges, and investment) attributable to environmental compliance all diminished between 1995 and 2001, but have they returned to pre-CAAA90 levels? To address this issue, actual profitability was compared with profitability adjusted to remove the financial effects attributable to environmental compliance in order to determine the effect of environmental compliance over the 1996 to 2001 period. The ratio of income (omitting environmentally related operating costs and depreciation) to net fixed assets (omitting the part of the investment base attributable to environmental requirements) is an accounting measure of profitability that excludes the financial effects of environmental requirements.<sup>g</sup> Operating income is used as the measure of income for both measures of profitability for simplicity.<sup>h</sup> The average profitability over the 1996 to 2001 period was lower (Figure 23) (by 42 percent) than it would have been in the absence of environmental requirements, but it still exceeds the 32-percent reduction in profitability associated with environmental compliance over the pre-CAAA90 1988 to 1990 period.

<sup>a</sup>T See Energy Information Administration, *The Impact of Environmental Compliance Costs on U.S. Refining Profitability, 1995 – 2001* (Washington, DC, May 2003). This report can be found on the Internet at <http://www.eia.doe.gov/emeu/perfpro/ref-pi2/index.html> .

<sup>b</sup> See Energy Information Administration, *The Impact of Environmental Compliance Costs on U.S. Refining Profitability* (October 1997). This report can be found on the Internet at <http://www.eia.doe.gov/emeu/perfpro/ref-pi/contents.html> .

<sup>c</sup> Profitability of lines of business of the FRS companies is computed by dividing the net income contributed by the line of business by the net investment in place associated with the line of business. More explicitly, net investment in place is the sum of year-end net property, plant, and equipment and year-end investments and advances to unconsolidated affiliates.

<sup>d</sup> The results from the regression of the return on net investment in place (ROI) for domestic refining/marketing on the net margin (in 2001 dollars) for all FRS refiners (i.e., those FRS companies having non-zero values for beginning and/or ending refining capacity) for the years 1977 through 2001 are as follows: Multiple R = 0.934; R square = 0.872; adjusted R square = 0.867; standard error of the regression = 1.440; and observations = 25. The estimated equation is: Domestic refining/marketing ROI = -1.156 [0.651] + 5.514 [0.440] \* net margin, where the standard errors of the estimated coefficients are in brackets.

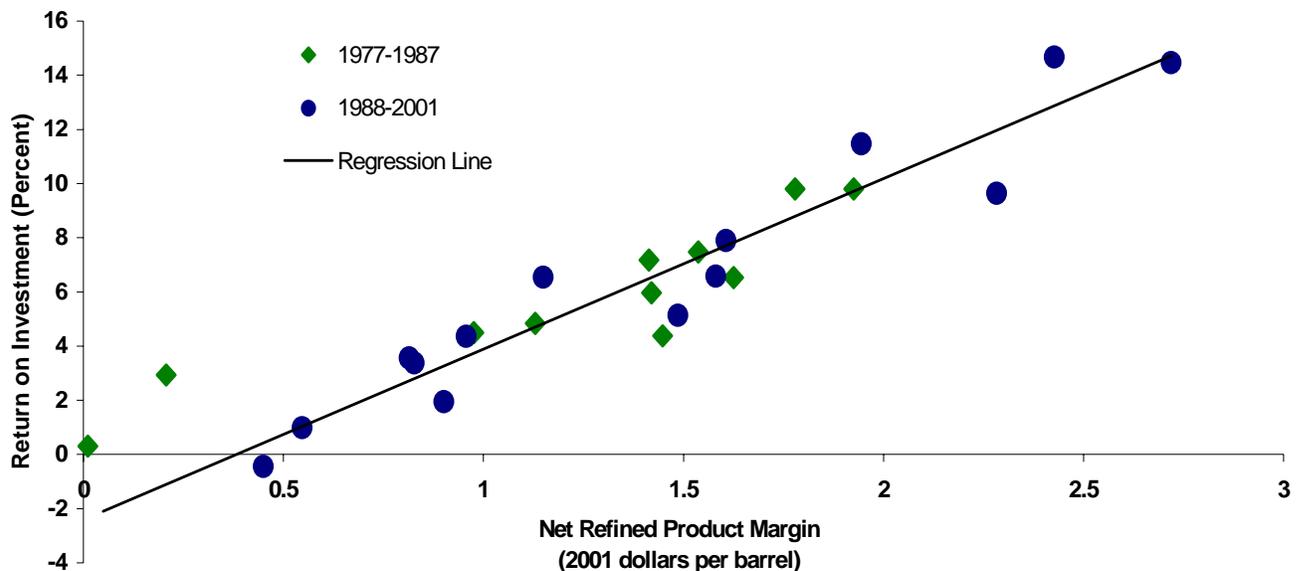
<sup>e</sup> See, Energy Information Administration, *Update of Tables and Figures from U.S. Petroleum Refining and Gasoline Marketing Industry* (Washington, DC, June 2002), Table 6. This is an Internet-only product and is located at <http://www.eia.doe.gov/emeu/finance/usi&to/downstream/update/index.html>.

<sup>f</sup> Percentage changes may be misleading because a large percentage can occur due to a large nominal change relative to a large base, or because of a small nominal change relative to a small base. Consequently, nominal changes are also presented and may take precedence over percentage changes when ascribing significance to factors.

<sup>g</sup> However, this measure of profitability does not include any estimates of the impacts on energy market dynamics (including 9/11) that might have occurred in the absence of environmental requirements on the U.S. refining industry.

<sup>h</sup> Were net income, the more traditional measure of income in profitability calculations, used instead of operating income, then the effects of environmental compliance on affiliate income, income taxes, and gains/losses from asset sales would all have to be estimated. These additional estimates are avoided by using operating income. Further, return on investment calculated with net income is highly correlated with return on investment calculated with operating income. Consequently, the returns on investment that are compared use operating income in the calculation.

**Figure 20. U.S. Refining/Marketing Return on Investment and Net Refined Product Margin for FRS Companies, 1977-2001**



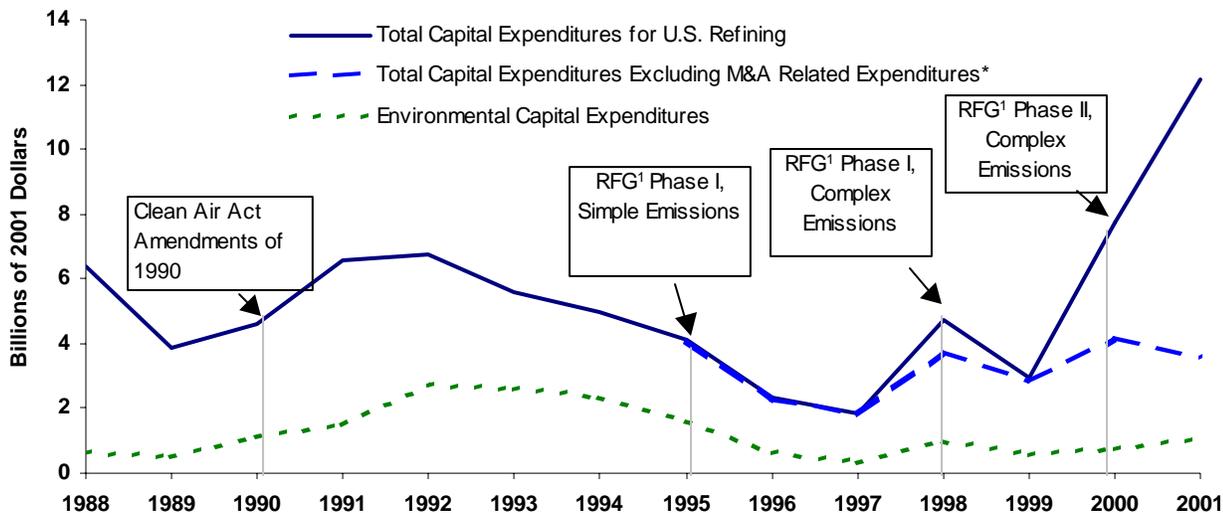
Source: Energy Information Administration, Form EIA-28 (Financial Reporting System).

**Table 16. Components of the Gross Refining Margin and Average Refined Product Revenues for FRS Companies, 1988, 1995, and 2001**  
(2001 dollars per barrel of refined product sold)

	1988	1995	2001	Percent Change 1995-2001
Average Refined Product Revenues	29.36	27.04	33.88	25.3
Raw material Acquisition Costs and Refined Product Purchases	20.05	20.87	26.04	24.8
Gross Margin	9.31	6.17	7.85	27.2
Energy Costs	1.45	0.92	1.37	49.3
Marketing Costs	2.14	1.95	1.59	-18.6
Environmental Operating Costs	0.36	0.49	0.34	-29.8
Other Refining Costs	2.94	2.26	1.82	-19.4
Net Refining Margin	2.43	0.55	2.72	397.0
<b>Average Refined Product Revenues</b>				
Motor Gasoline	33.59	30.26	36.96	22.1
Distillate	27.59	24.70	32.96	33.4
Other Products	23.20	23.17	26.30	13.5
All Refined Products	29.36	27.04	33.88	25.3

Source: Energy Information Administration, Form EIA-28 (Financial Reporting System).

**Figure 21. U.S. Refining Capital Expenditures for FRS Companies, 1988-2001**

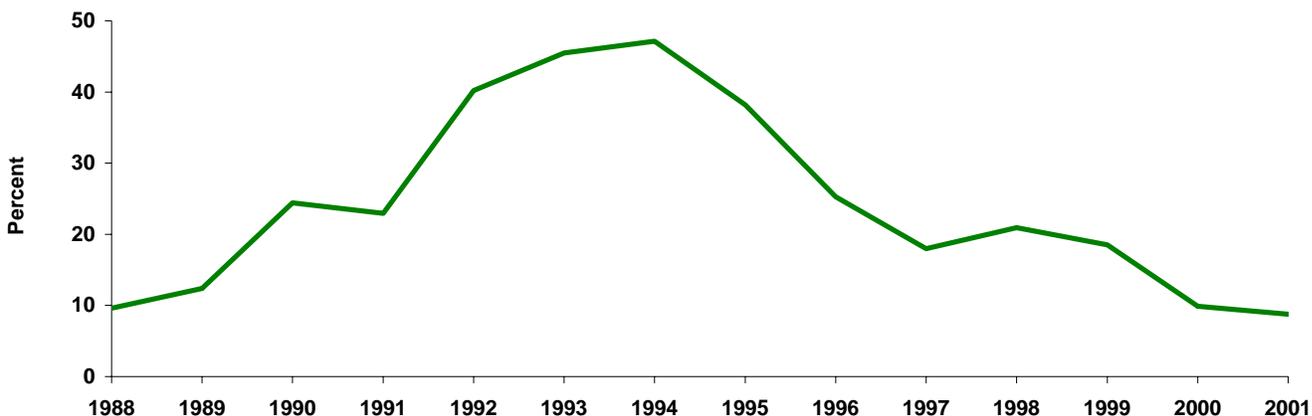


<sup>1</sup>Reformulated motor gasoline.

\* Note that total capital expenditures excluding merger & acquisition related expenditures only cover the period 1995 through 2001.

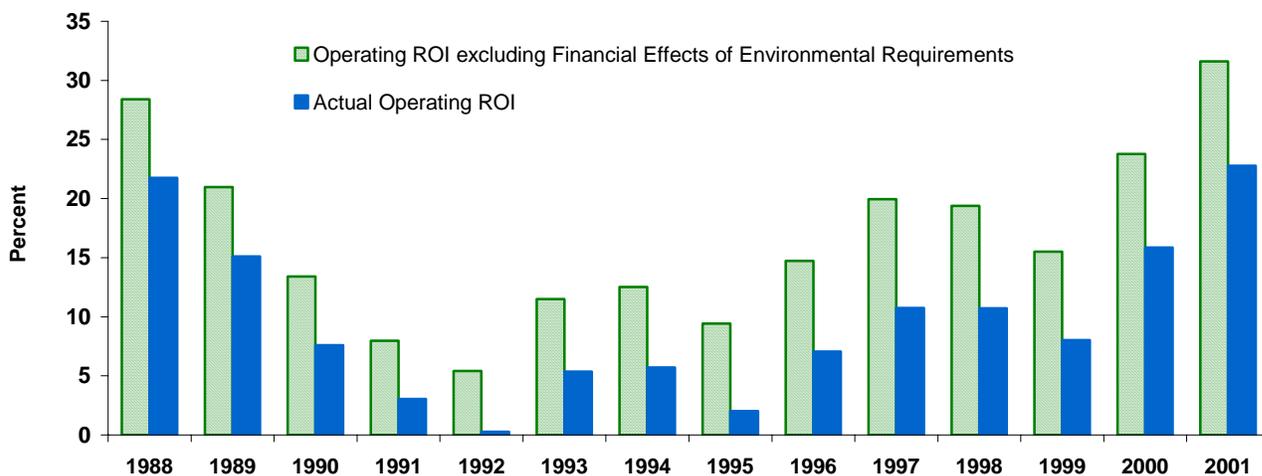
Sources: U.S. refining capital expenditures - Energy Information Administration, Form EIA-28 (Financial Reporting System)  
Environmental capital expenditures - 1990-1996: American Petroleum Institute, *Petroleum Industry Environmental Performance* (Washington, DC, May 1997), pp. 47-48. 1997-2001: American Petroleum Institute, *U.S. Oil and Natural Gas Industry's Environmental Expenditures* (Washington, DC, February 2003), p. 9. FRS environmental capital expenditures are prorated by share of U.S. crude distillation capacity.

**Figure 22. Environmental Capital Expenditures as a Share of U.S. Refining Capital Expenditures for FRS Companies, 1988-2001**



Sources: U.S.refining capital expenditures - Energy Information Administration, Form EIA-28 (Financial Reporting System)  
 Environmental capital expenditures - **1988-1989**: American Petroleum Institute, *Petroleum Industry Environmental Performance* (Washington, DC, May 1997), pp. 47-48 and U.S. Department of Commerce, Bureau of the Census, *Pollution Abatement Costs and Expenditures* (various issues) (Washington, D.C.). (Estimates of expenditures were made by applying the ratio of the American Petroleum Institute series to the corresponding Census series for the 1990-1994 overlap period to the Census values for 1988 and 1989.) **1990-1996**: American Petroleum Institute, *Petroleum Industry Environmental Performance* (Washington, DC, May 1997), pp. 47-48. **1997-2001**: American Petroleum Institute, U.S. Oil and Natural Gas Industry's Environmental Expenditures (Washington, DC, February 2003), p. 9. FRS environmental capital expenditures are prorated by share of U.S. crude distillation capacity.

**Figure 23. Operating Return on Investment in U.S. Refining/Marketing for FRS Companies, 1988-2001**



Note: Operating Return on Investment (Actual Operating ROI) = operating income as a percent of net property, plant, and equipment (PP&E). Operating ROI excluding financial effects of environmental requirements = operating income less environmental operating costs less environmental depreciation expenses as a percent of net PP&E less environmental net PP&E.

Sources: Energy Information Administration, Form EIA-28 (Financial Reporting System); American Petroleum Institute, *Petroleum Industry Environmental Performance* (Washington, DC, May 1997); American Petroleum Institute, *U.S. Oil and Natural Gas Industry's Environmental Expenditures* (Washington, DC, February 2003).

## Foreign Refining and Marketing

### ***Profitability of Foreign Refining/Marketing Operations At An All-Time Low***

In 2002, foreign refining/marketing return on net investment in place achieved an all-time low in the 26-year history of the FRS at 1.3 percent, breaking the previous low of 3.3 percent in 1985 (Figure 11). A small reduction in refined product revenue relative to 2001 coupled with a 56-percent decline in other revenue and a 3-percent decline in operating expense resulted in a 86-percent decline in net income (83-percent decline in net income exclusive of unusual items).

The FRS companies' foreign refining/marketing earnings are derived from two sources: unconsolidated affiliates and consolidated operations. The corporate parent of an unconsolidated affiliate owns 50 percent, or less, of the affiliate, and does not directly control the affiliate (a joint venture, for example is usually an unconsolidated affiliate from the perspective of at least one of the partners<sup>84</sup>). Essentially, the unconsolidated affiliate is more of a property or holding of the parent corporation than it is a company that the parent actually operates. The effect on financial operations of an unconsolidated affiliate can only be seen on the parent corporation's income statement, where the parent company's proportional share of the affiliate's net income is reported. Conversely, a fully consolidated affiliate is directly controlled by the parent corporation (although it could be owned by several companies, with the parent corporation owning more than 50 percent). In addition, all operating financial information about a fully consolidated affiliate (such as revenues) is reported in the public financial disclosures of the parent corporation.

### ***Consolidated Operations Contribute to Net Income***

Historically, the operations of the FRS companies' unconsolidated foreign refining/marketing affiliates have been mainly in the Asia-Pacific region. ChevronTexaco owns much of the FRS Asia-Pacific refinery capacity, most of which is unconsolidated. In fact, about 69 percent of FRS unconsolidated foreign refinery capacity was in the Asia-Pacific region in both 2001 and 2002 (Table 17).

Consolidated FRS foreign refinery capacity is mostly located in Europe, falling from 51 percent in 2001 to 50 percent in 2002. The primary reason for the slight decline was BP's re-assignment of two Australian refineries to its U.S. affiliate (an FRS respondent) in 2002,<sup>85</sup> which increased the share of consolidated capacity in Asia and diminished it elsewhere, including Europe.

The contribution to net income from the FRS companies' unconsolidated foreign refining/marketing operations has been small for the last several years (since 1997) (Figure 24). However, in 2002, it reached an all-time low with a loss of \$331 million (after a loss of \$4 million in 2001). Alternatively, consolidated operations have consistently contributed more to the FRS companies' foreign refining/marketing earnings than have unconsolidated operations over the last several years, particularly since 1996. More to the point, between 1990 and 1996, earnings from unconsolidated operations averaged 44 percent of the contribution from consolidated operations, peaking at 102 percent in 1996. Since then (over the 1997 to 2002 time period), unconsolidated operations' earnings have averaged 9 percent of consolidated operations' earnings, reaching a nadir in 2002 by generating a loss, while consolidated operations generated income.

The FRS companies gave several reasons for the disappointing performance of foreign refining/marketing. These included low margins due to excess refinery capacity and weak demand, lower refinery runs in response to low margins and due to refinery outages (which were due to a fire (El Paso)<sup>86</sup> and an electrical outage (ConocoPhillips)<sup>87</sup>), and foreign exchange losses.

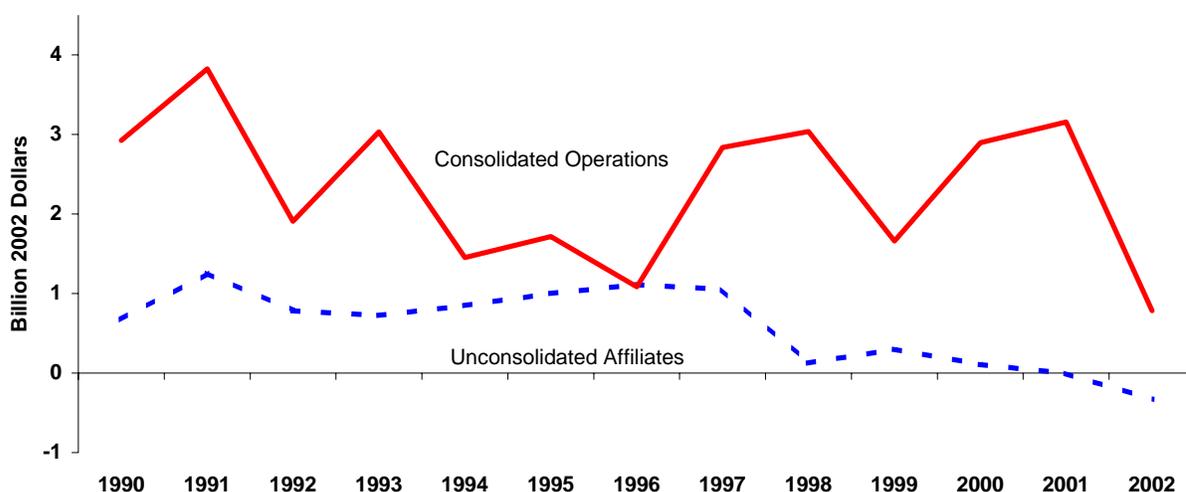
**Table 17. Regional Distribution of Foreign Refinery Capacity for FRS Companies, 2001-2002**  
(Percent)

	Consolidated Operations		Unconsolidated Affiliates	
	2001	2002	2001	2002
<b>Europe</b>	51.0	50.0	18.0	17.9
<b>Asia</b>	25.0	29.0	68.6	68.7
<b>Latin America</b>	11.6	9.2	0.7	0.7
<b>Canada</b>	9.7	9.2	0.0	0.0
<b>Other</b>	2.7	2.6	12.7	12.7
<b>Grand Total</b>	100.0	100.0	100.0	100.0

Note: The region denoted as "Other" includes Africa and the Middle East.

Sources: Company Annual Reports and filings of U.S. Securities and Exchange Commission Form 10-K.

**Figure 24. Foreign Refining/Marketing Net Income from Consolidated Operations and Unconsolidated Affiliates of FRS Companies, 1990-2002**



Source: Energy Information Administration, Form EIA-28 (Financial Reporting System).

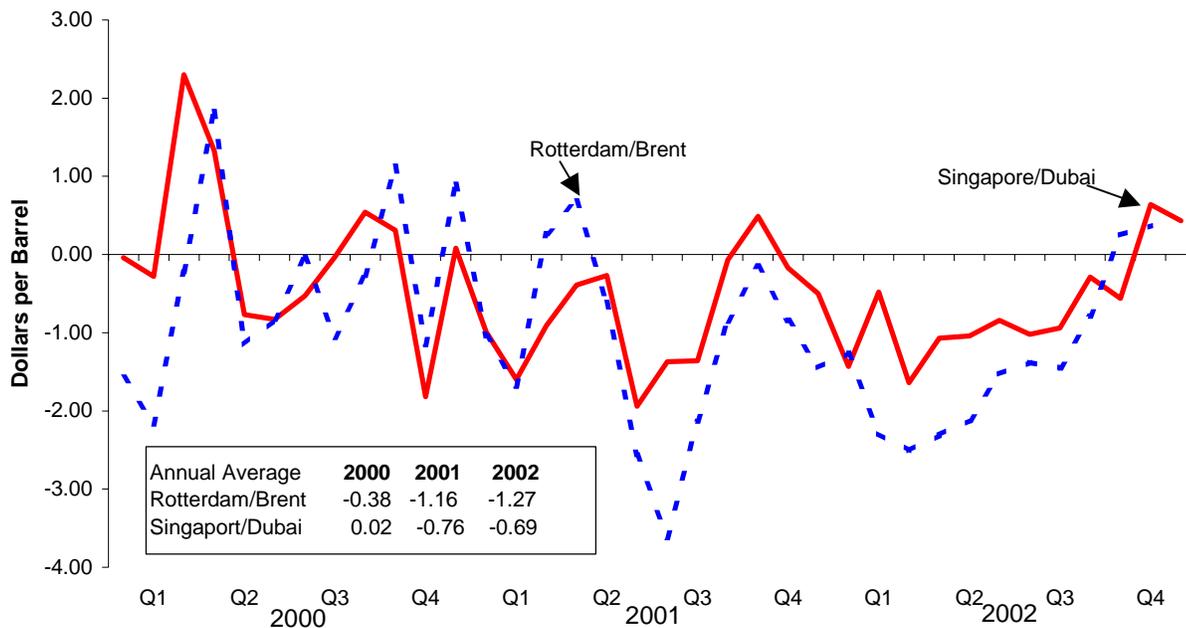
### **Asian-Pacific Markets Continue Poor Performance**

During 2002, the FRS companies' unconsolidated affiliates generated a loss of \$331 million, which was a reduction of net income of \$327 million relative to a \$4-million loss in 2001. The Asian-Pacific refining margins of 2002 (represented by the Singapore/Dubai gross refining margin) were much lower than those of 2001 over the first half of 2002, but by the end of the year this circumstance had reversed with the fourth quarter refining margin of 2002 exceeding that of 2001 (Figure 25) by \$3 per barrel.

Due to the late rally, the gross refining margin in the Asian-Pacific region in 2002 averaged \$0.07 per barrel more than in 2001.

Consumption of petroleum products in the Asia-Pacific region (combining Asian Developing Countries with Australasia and Japan) increased 2 percent between 2001 and 2002. However, the increased consumption was insufficient to prevent the FRS companies from reporting lower returns from their unconsolidated foreign refining/marketing operations, which are located in this region. Excess refining capacity and the recent relatively small growth of Asia-Pacific petroleum product consumption<sup>88</sup> are reasons given in company public disclosures for the losses generated by the Asia-Pacific operations of the FRS companies.

**Figure 25. Foreign Refining Margins, 2000-2002**



Sources: Energy Intelligence Group, *Oil Market Intelligence* **2000**: January 2001 and July 2000, p. 12; **2001**: January 2002 and July 2001, p. 12; and **2002**: January 2003 and July 2002, p. 12.

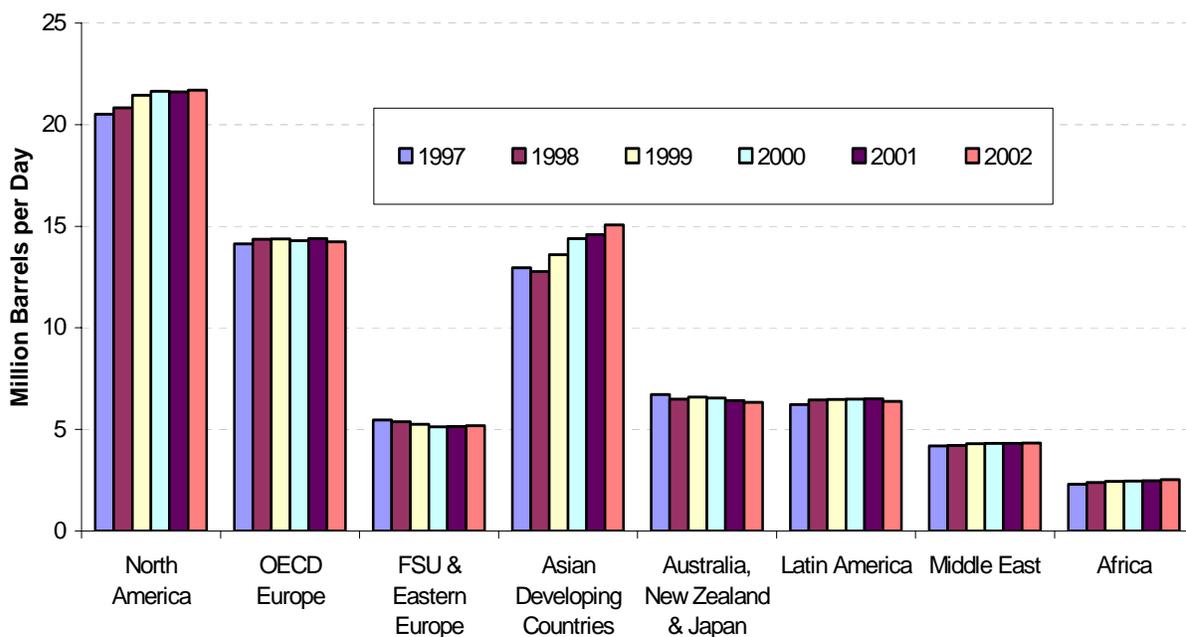
### **European Markets Continue to Bolster Foreign Refining/Marketing Results**

The FRS companies' consolidated operations (bottom line net income from foreign refining/marketing less income from unconsolidated affiliates) provided \$783 million of net income, which was 75-percent lower than the \$3.12 billion result achieved in 2001. Lower earnings were consistent with the decline in Europe's consumption of petroleum products (Figure 26), which fell 1 percent between 2002 and 2001 (and increased a scant 0.8 percent between 1997 and 2002).

European refining margins (represented by the Rotterdam/Brent gross refining margin) were \$1 to \$2 dollars per barrel lower during the first half of 2002 than during the first half of 2001 (Figure 25). However, they rallied in the second half of the year (much as they did in the Asia-Pacific region) and surpassed the 2001 margin in both the third and the fourth quarters of 2002. Despite the late rally, the average margin for 2002 was \$0.11 per barrel lower than the average margin for 2001. Thus, the

industry-wide story of lower petroleum product consumption and a negligible decrease in the refining margin provided a background for an equally dismal story for the FRS companies. Among the reasons cited in public disclosures for the FRS companies' decline in earnings from their European operations were an electrical outage (and resulting diminished product sales), lower refining margins, lingering effects of the 9/11 events on product demand, and currency (foreign exchange) losses.

Figure 26. Petroleum Consumption by Region, 1997-2002



Source: BP plc, *BP Statistical Review of World Energy* (June 2003), p. 9.

## Other Energy

The FRS “other energy” line of business consists of energy operations other than the production of oil, natural gas, or coal. This includes nonconventional energy operations such as synfuels and renewables, as well as assorted other activities including electric power production and supply, transportation of power, energy trading operations, and energy management services. Measured by asset growth, the other energy line of business has grown much faster in recent years than all other lines of business of the FRS companies (See Figure 27). This is equally true if revenues are used as a measure instead of assets.

### **Revenue and Income Drop Due to Energy Trading Decline**

The story for the FRS companies' other energy line of business since the mid-1990's has been one of tremendous growth, followed by a dramatic reversal of that growth in 2001 and 2002. Much of the growth has been due to increased electric power generation and trading in both electricity and natural gas by the FRS companies. However, a decline in revenues and actual losses in earnings over the last two years has occurred largely due to the downturn in the energy trading business following the Enron financial scandal.

From 1995 until 2000, the FRS companies' revenues in other energy grew at a brisk annual rate (Figure 27) of 127 percent. In 2001, revenues dropped 1.4 percent, as Enron ceased reporting to the FRS. By 2002, the energy trading crash had spread across the energy industry, leading to a collapse in other energy revenues of 48 percent from the 2001 level (Table 18). The demise of El Paso's trading business<sup>89</sup> was the biggest cause of this.

The income story is similar to the revenue story. Other energy income grew at a 74- percent annual rate over 1995 through 2000. In 2001, income dropped 27 percent over the 2000 level. In 2002, however, income collapsed 173 percent as earnings went negative, with much of the decline due to losses of El Paso and ChevronTexaco's affiliate Dynegey Inc., which had also been active in energy trading.<sup>90</sup>

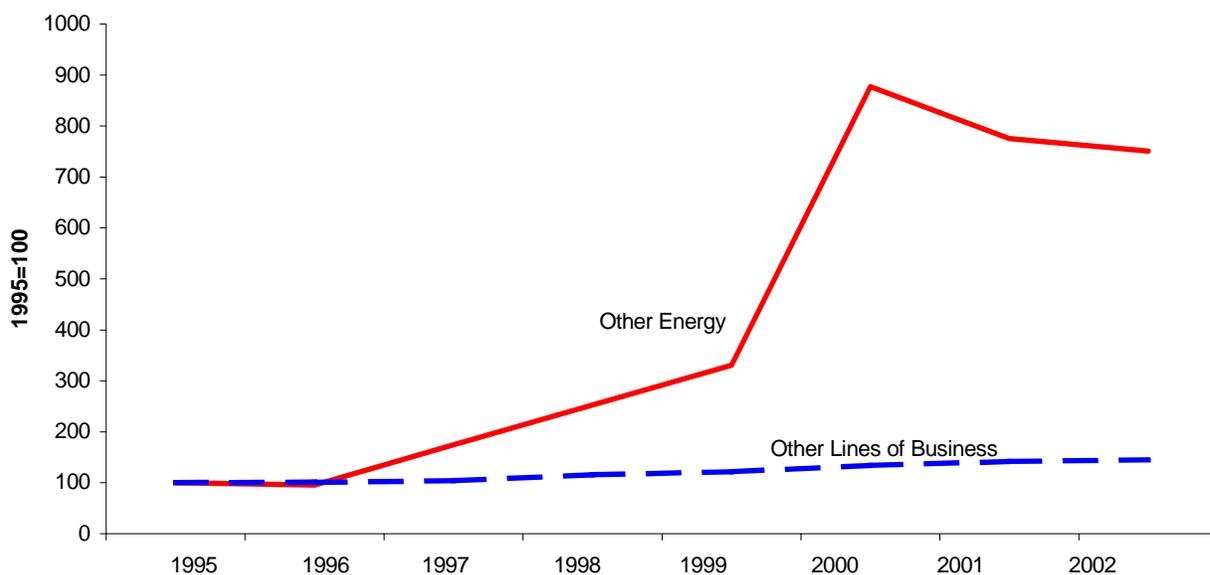
### ***Nonconventional Energy: Tar Sands and Geothermal Stand Out***

Originally, the FRS "other energy" line of business was primarily intended to cover nonconventional energy, which includes renewable resources (such as wind, solar, and geothermal energy) and hydrocarbons from tar sands, oil shale, coal gasification and liquefaction, among other sources. Although nonconventional energy was the lion's share of other energy until the mid-1990's, the FRS companies' forays into nonconventional energy were generally unprofitable, and most FRS companies started to scale back their investments in nonconventional energy during the 1980's.

Nonetheless, two nonconventional energy projects stand out: Exxon Mobil's Canadian tar sands and the Unocal Corporation's geothermal energy in Southeast Asia. Exxon Mobil significantly relies on production from tar sands, and has been extracting oil from Canadian tar sands since the 1970's. The company reports a year-end 2002 total of 800 million barrels of Canadian tar sand reserves, representing 6.3 percent of its worldwide crude oil and natural gas liquids reserves.<sup>91</sup> Gross synthetic crude oil produced from those tar sands was 84 million barrels in 2002, up from 80 million barrels in 2001.<sup>92</sup>

Unocal has over 35 years experience in geothermal energy. It operates major geothermal fields producing steam for electricity at Tiwi and Mak-Ban in the Philippines, and Gunung Salak and Wayang Windu in Indonesia. These four projects supply steam for a total of 1,120 megawatts of generating capacity.<sup>93</sup> Unocal's total 2002 geothermal energy production averaged 13 million kilowatt-hours, the equivalent of 20,000 barrels of oil per day, down from 22,000 barrels per day in 2001. Its net proved geothermal reserves at year-end 2002 were the equivalent of 232 million barrels of oil, compared to 162 million barrels in 2000.

**Figure 27. Net Investment in Place in Other Energy and All Other Businesses for FRS Companies, 1995-2002**



Source: Energy Information Administration, Form EIA-28 (Financial Reporting System).

**Table 18. Income Components for Other Energy for FRS Companies, 2000-2002**

Income Components	2000	2001	2002	Percent Change 2001- 2002
Operating Revenue	84,987	83,811	43,243	-48.4
Operating Expenses	81,948	81,678	43,886	-46.3
Operating Income	3,039	2,133	-643	-130.1
Equity Income	753	902	-563	-162.4
Net Income	2,741	1,993	-1,460	-173.3
unusual items	0	8	-133	--
Net Income excluding unusual items	2,741	1,985	-1,327	-166.9

Source: Energy Information Administration, Form EIA-28 (Financial Reporting System).

## End Notes

<sup>54</sup> Energy Information Administration, *Performance Profiles of Major Energy Producers 2001*, DOE/EIA-0206(01) (Washington, DC, January 2003), p. 34.

<sup>55</sup> Exxon Mobil, *2002 Financial & Operating Review*, p. 55 and *2001 Financial and Operating Review*, p. 54.

<sup>56</sup> ChevronTexaco, *2002 Supplement to the Annual Report*, p. 35 and *2001 Supplement to the Annual Report*, p. 24.

<sup>57</sup> BP, *Report to the Securities and Exchange Commission on Form 20-F, 2002*, pp. 27 and 80.

<sup>58</sup> BP, *Report to the Securities and Exchange Commission on Form 20-F, 2002*, pp. 27 and 35.

<sup>59</sup> Marathon Oil, *Report to the Securities and Exchange Commission on Form 20-F, 2002*, p. F-44.

<sup>60</sup> The levels of domestic and foreign production taxes are not comparable, because the latter includes royalty expenses while the former does not.

<sup>61</sup> It is not clear why the Other Western Hemisphere region experienced a large increase in production taxes in 2002. However, the fact that this region produces heavy oils that may not bring as high a price as lighter oils may be a contributing factor, and some South American governments may have increased their production taxes to levels higher than in other regions.

<sup>62</sup> See Energy Information Administration, *State Energy Severance Taxes, 1989-1993*, DOE/EIA-TR/0599 (Washington, DC, September 1995).

<sup>63</sup> While the same causality may be driving both domestic and foreign production tax patterns, none is obvious.

<sup>64</sup> Both an individual region's change in lifting costs and its amount of production have an effect on aggregate lifting costs because the cost changes in individual regions are weighted by the production in the region to obtain the aggregates.

<sup>65</sup> Energy Information Administration, *Performance Profiles of Major Energy Producers 2001*, DOE-EIA-0206(2001) (Washington, DC, January 2003), p. 37. This publication is available on the Internet at <http://tonto.eia.doe.gov/FTP/ROOT/financial/020601.pdf> (as of November 12, 2003).

<sup>66</sup> As has been mentioned numerous times over the last few years, the net margin is highly correlated with return on investment. The correlation was re-estimated during the spring of 2003 with additional data (now covering the period 1977 through 2001) and the correlation coefficient was found to be 0.93. See Energy Information Administration, *The Impact of Environmental Compliance Costs on U.S. Refining Profitability, 1995-2001* (May 2003), page 4. This publication is available on the Internet at [http://www.eia.doe.gov/emeu/perfpro/ref\\_pi2/index.html](http://www.eia.doe.gov/emeu/perfpro/ref_pi2/index.html) (as of November 12, 2003).

<sup>67</sup> The net margin excludes peripheral activities such as non-petroleum product sales at convenience stores.

<sup>68</sup> Energy Information Administration, *Short-Term Energy Outlook* (Washington, DC, November 6, 2003), Table A1. This publication is available on the Internet at <http://www.eia.doe.gov/pub/forecasting/steo/oldsteos/nov03.pdf> (as November 12, 2003).

<sup>69</sup> Comparing the stock levels of 2002 with the average for the period of 1996 through 2000 tells a similar story with a slightly smaller difference in the first quarter and similar differences in the subsequent quarters.

<sup>70</sup> Note that the apparent decline in the number of FRS wholly owned U.S. refineries was mostly due to double counting among merging companies. The actual decline was two refineries, BP sold its Yorktown, Virginia refinery to Giant Industries (a non-FRS company) and Precor shutdown its Hartford, Illinois rather than make upgrading investments. All other changes are purely due to double counting.

<sup>71</sup> See Premcor Inc., "Premcor to Close Hartford, Ill. Refinery in October" (February 28, 2002).

<sup>72</sup> See BP plc, "Giant Industries, Inc. Announces Acquisition of Yorktown, Virginia Refinery from BP" (February 12, 2002).

<sup>73</sup> Tesoro Petroleum Corporation, "Tesoro Petroleum Corporation Announces Revised Terms for Golden Eagle Acquisition" (May 6, 2002).

<sup>74</sup> Shell Oil Company, press release (February 12, 2002).

<sup>75</sup> *Houston Chronicle*, "Merger finally a done deal, ConocoPhillips now country's largest refiner" (August 31, 2002).

<sup>76</sup> Several FRS companies mentioned upgrading projects in their public financial disclosures. These included: ChevronTexaco (ChevronTexaco, *2002 Supplement to the Annual Report*, p. 40), ConocoPhillips (ConocoPhillips Petroleum Company, *2002 Annual Report*, pp. 18 and 19), ExxonMobil (Exxon Mobil Corporation, *2002 Annual Report*, p. 15 and *2002 Financial and Operating Review*, p. 63), Amerada Hess (Amerada Hess Corporation, *2002 Annual Report*, p. 2), Lyondell-CITGO Refinery LLP (Lyondell Chemical Corporation, 2002 U.S. Securities and Exchange Commission Form 10-K Filing, p. 54), Marathon Corporation (Marathon Corporation, *2002 Annual Report*, p. 23 and 2002 U.S. Securities and Exchange Commission Form 10-K Filing, p. 47), Premcor Inc., (Premcor Inc., 2002 U.S. Securities and Exchange Commission Form 10-K Filing, p. 50), Tesoro Petroleum Corporation (Tesoro Petroleum Corporation, 2002 U.S. Securities and Exchange Commission Form 10-K Filing, p. 46), and Valero Corporation (Valero Corporation, 2002 U.S. Securities and Exchange Commission Form 10-K Filing, p. 41).

<sup>77</sup> Energy Information Administration, *Annual Energy Review 2002*, DOE/EIA-0384(2002) (Washington, DC, October 24, 2003), Table 5-19. This publication is available on the Internet at <http://www.eia.doe.gov/emeu/aer/petro.html> (as of November 12, 2003).

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<sup>78</sup>A \$1.50-per-barrel decline seems less significant when compared to a base of almost \$34 per barrel than when it is compared to a base of slightly less than \$8 per barrel.

<sup>79</sup>See Energy Information Administration, "Update of Tables and Figures from *U.S. Petroleum Refining and Gasoline Marketing Industry*," Table 6. This is an Internet-only product that is available at <http://www.eia.doe.gov/emeu/finance/usi&to/downstream/update/index.html> (as of November 12, 2003).

<sup>80</sup>See for example, Energy Information Administration, *Performance Profiles of Major Energy Producers 2001*, DOE/EIA-0206(2001) (Washington, DC, January 2003), p.43 (This publication is available on the Internet from a link at <http://www.eia.doe.gov/emeu/finance/histlib.html> (as of November 12, 2003).) and ExxonMobil Corporation, *2002 Financial and Operating Review*, p. 66.

<sup>81</sup>Amerada Hess added 25 Hess Express convenience stores during 2002 (Amerada Hess Corporation, *2002 Annual Report*, p. 12). ConocoPhillips recorded charges for the impairment of assets associated with retail outlets that will be sold during 2003 (ConocoPhillips, *2002 Annual Report*, p. 72). ExxonMobil identified four key areas for its focus: "cost reductions, nonpetroleum income growth, selective and disciplined new investments, and high-grading service stations (ExxonMobil Corporation, *2002 Annual Report*, p. 17)." Marathon consolidated Speedway SuperAmerica operations by exiting southeastern States in which it has a minimum market presence, refocusing on its Midwest operations. (Marathon Oil Company, *2002 Annual Report*, p. 23). Valero invested in "top-performing stores" and closed marginal ones (Valero Corporation, *2002 Annual Report*, p. 15).

<sup>82</sup>For example, BP is transforming many Amoco outlets into BP outlets, but continuing to offer Amoco-branded motor gasoline (see BP plc, "BP Unveils Chicago's Gas Station of the Future" (May 14, 2002) at [http://www.bpamoco.com/centres/press/p\\_r\\_detail\\_p.asp?id=895](http://www.bpamoco.com/centres/press/p_r_detail_p.asp?id=895) (as of November 12, 2003)). Also, Shell is transforming many Texaco outlets that were formerly part of Equilon into Shell-branded outlets (see Shell Oil Company, "Shell Brand Poised for Major Expansion in U.S." (February 8, 2002) at [http://www.piersystem.com/external/final\\_View.cfm?pressID=5527&CID=69](http://www.piersystem.com/external/final_View.cfm?pressID=5527&CID=69) (as of November 12, 2003)). Additionally, BP has installed photovoltaic panels at many of its outlets, which are asserted to supply about "20 percent of the site's overall energy needs" (see BP plc, "Committed to Cleaner Environment, BP Begins Selling Ultra Low Sulfur Diesel in California; Converts ARCO Sites to Solar" (June 14, 2002) at [http://www.bpamoco.com/centres/press/p\\_r\\_detail\\_p.asp?id=903](http://www.bpamoco.com/centres/press/p_r_detail_p.asp?id=903) (as of November 12, 2003)).

<sup>83</sup>This continues a recent trend discussed elsewhere, particularly two Energy Information Administration publications: *Performance Profiles of Major Energy Producers 2000*, DOE/EIA-0206(2000) (Washington, DC, January 2002), p. 44 (available on the Internet at <http://tonto.eia.doe.gov/FTP/ROOT/financial/020600.pdf> (as of November 13, 2003)) and *Restructuring: The Changing Face of Motor Gasoline Marketing* (October 2001), an Internet-only product at <http://www.eia.doe.gov/emeu/finance/sptopics/downstrm00/index.html> (as of November 13, 2003).

<sup>84</sup>The Caltex joint venture was an unconsolidated affiliate for both of its parents, Chevron and Texaco.

<sup>85</sup>The refineries are the 69,800 barrels per day Bulwar Island refinery and the 158,500 barrels per day Kwinana refinery.

<sup>86</sup>El Paso Corporation, 2002 U.S. Securities and Exchange Commission Form 10-K filing, p. 60.

<sup>87</sup>ConocoPhillips Company, *2002 Annual Report*, p. 43.

<sup>88</sup>Between 1992 and 1997 Asia-Pacific (computed by combining Asian Developing Countries and Australia, New Zealand, and Japan) petroleum product consumption increased 28 percent. However, between 1997 and 2002 Asia-Pacific petroleum product consumption increased 9 percent. Thus, the growth over the last few years has failed to match the pace over the earlier period, which seems to be the major reason that companies speak of excess refinery capacity in this region.

<sup>89</sup>El Paso Corporation, press release (November 8, 2002).

<sup>90</sup>Dynegy Inc., 2002 Securities and Exchange Commission Form 10-K, pp. F-73, F-74.

<sup>91</sup>Exxon Mobil Corporation, *2002 Financial and Operating Review*, p.57.

<sup>92</sup>Exxon Mobil Corporation, *2001 Financial and Operating Review*, p.35.

<sup>93</sup>Unocal Corporation, 2002 Securities and Exchange Commission Form 10-K, pp. 18-19.

