

CSIS

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**The
Changing Geopolitics of
Energy – Part VII**

US Use of Energy and Energy Imports

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**Strategic Energy Initiative
Center for Strategic and International Studies**

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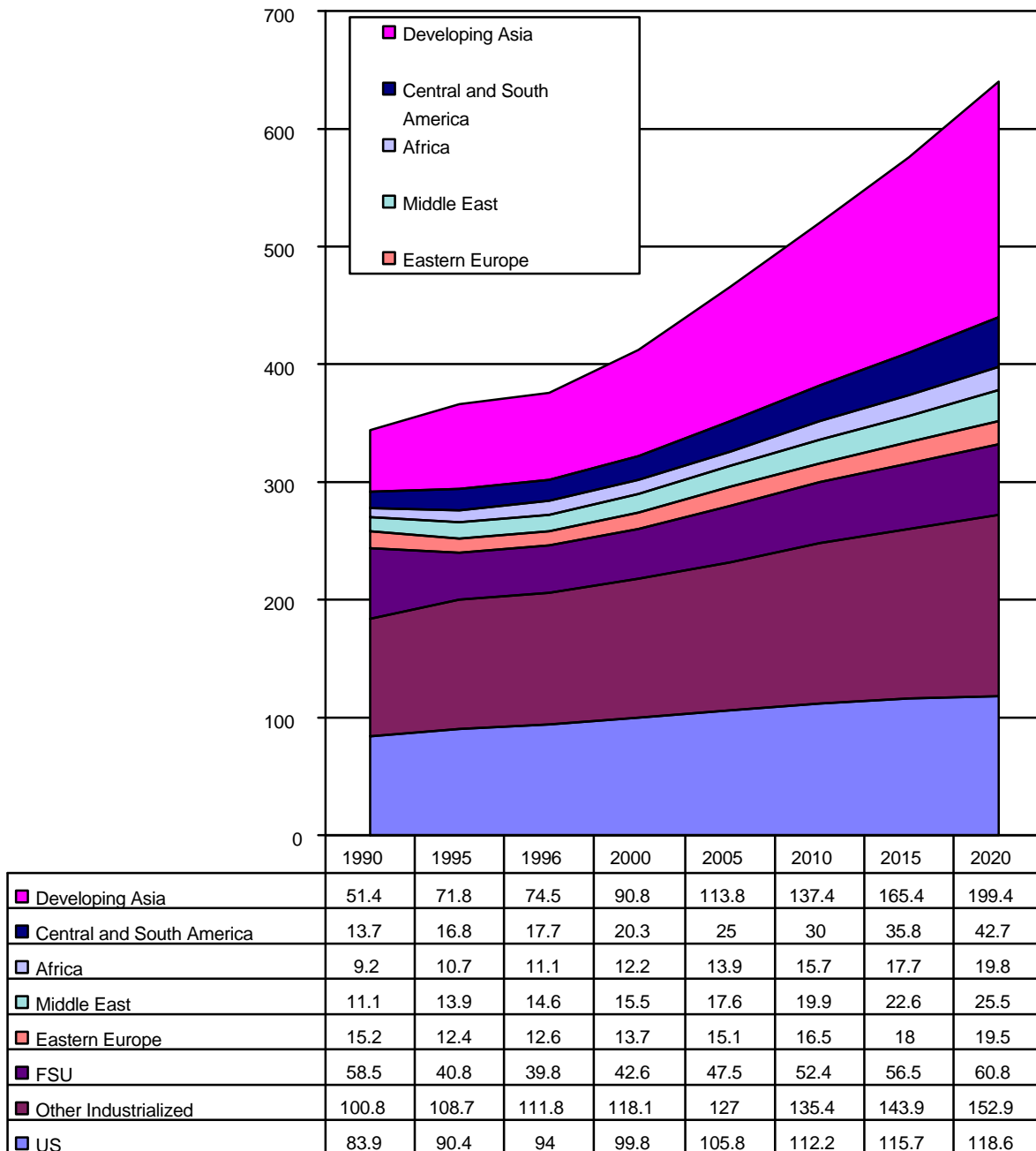
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The Geopolitics of US Energy Use and Imports

Key Issues Affecting the US

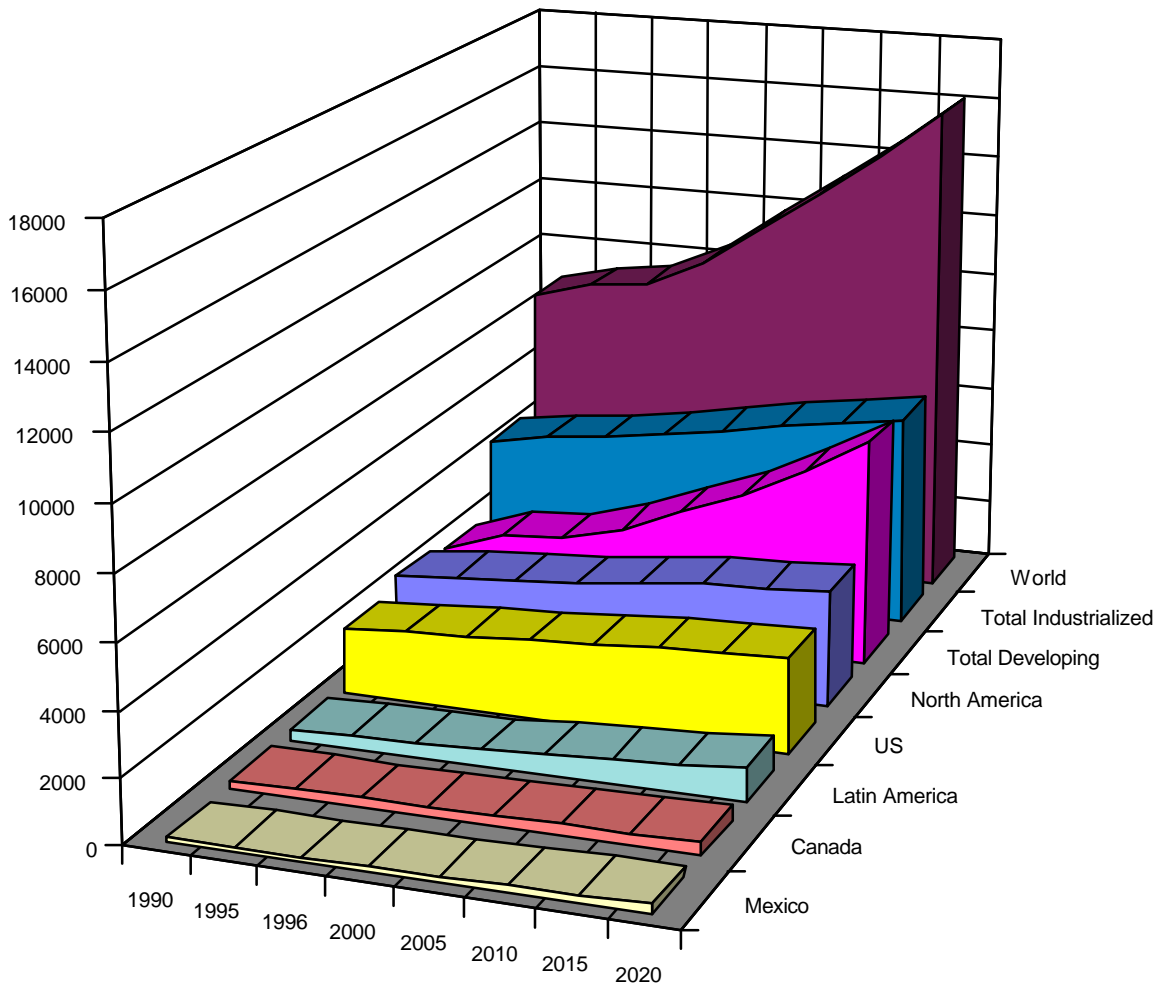
- **The Guardian of the Gulf and oil/gas transport, but not a direct importer.**
- **Can American people perceive the strategic importance of protecting energy as a commodity, input to world economy?**
- **Energy use increasing slowly, but no longer drives world demand.**
 - **Increases only average about 1% annually for most fuels.**
 - **Nuclear drops 1.8% annually.**
- **Energy consumption per dollar of GNP less than 60% of the real cost in 1973.**
 - **Fuel costs drop sharply compared to other rises in CPI.**
- **US will grow steadily more dependent on oil imports.**
 - **But, energy imports steadily smaller share of total imports and exports.**
 - **Real cost of energy imports still far below cost in late 1970s.**
 - **Much depends on US success with enhanced oil recovery.**
- **Carbon emissions will rise 1.2% per year.**
 - **US share of total global emissions will drop sharply during 1997-2020.**

US versus World Energy Use: 1990-2020: The Vast Majority of Future Demand Growth is Foreign (in Quadrillions of BTU)



Source: Adapted by Anthony H. Cordesman from the "reference case" EIA, International Energy Outlook, 1998, DOE/EIA-0484(97), p. 133.

US Energy Use of All Kinds Measured Relative to World Use in Millions of Tons of Oil Equivalent: 1990-2020



	1990	1995	1996	2000	2005	2010	2015	2020
■ Mexico	124	138	142	167	202	226	251	278
■ Canada	274	307	317	336	361	387	413	440
■ Latin America	346	423	446	511	630	756	902	1076
■ US	2115	2278	2369	2515	2667	2827	2916	2988
■ North America	2513	2723	2828	3018	3229	3440	3580	3706
■ Total Developing	2154	2854	2972	3499	4293	5116	6085	7245
■ Total Industrialized	4654	5018	5187	5490	5866	6241	6543	6842
■ World	8663	9212	9478	10408	11736	13095	14504	16112

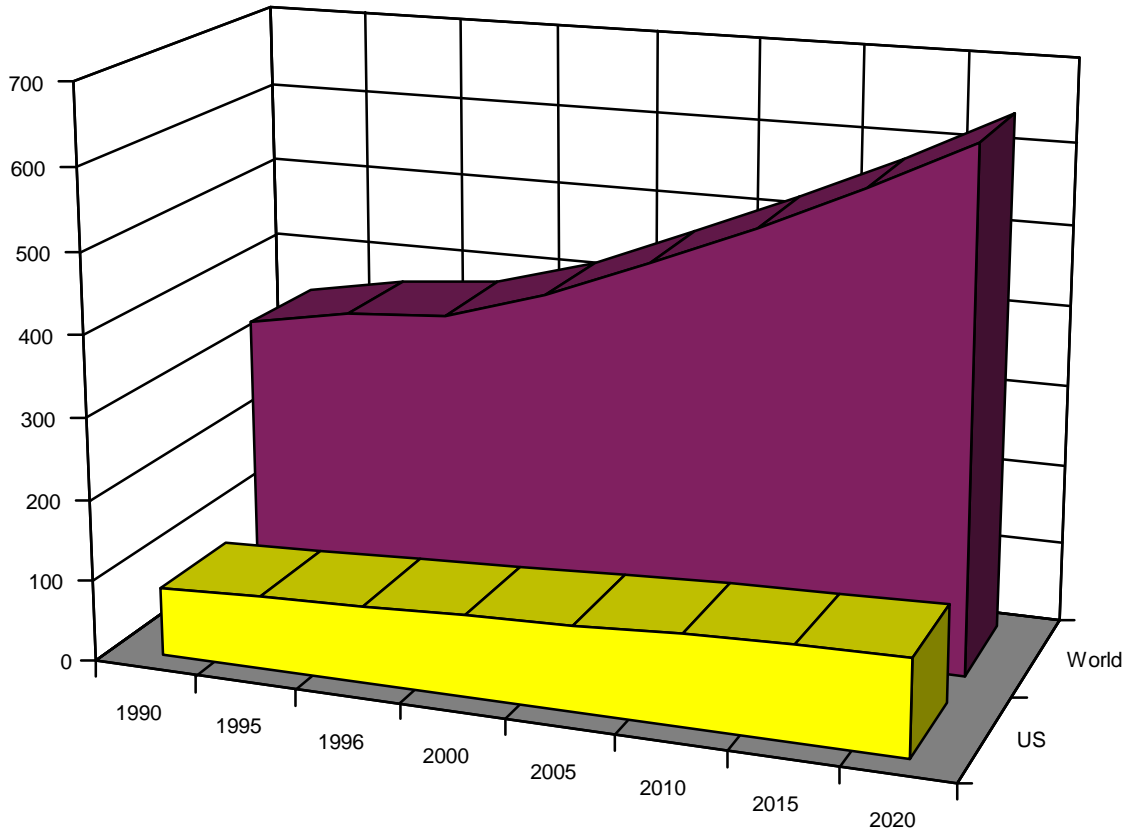
Source: Adapted by Anthony H. Cordesman from the “reference case” EIA, International Energy Outlook, 1998, DOE/EIA-0484(97), p. 146.

Slow Growth in Demand: The US Energy Profile: 1990-2020

<u>Fuel Use</u>	<u>1990</u>	<u>1996</u>	<u>2000</u>	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>	<u>% of Annual Change 1995-2020</u>
Oil Use in MMBD	17.0	18.3	19.6	21.3	22.7	23.7	24.4	1.3
Natural Gas Use in TCF	18.7	21.9	24.1	26.2	28.8	30.6	32.2	1.6
Coal Use in Millions of Short Tons	896	983	1,058	1,112	1,162	1,215	1,257	1.2
Nuclear Use in Billions of Kilowatts	577	675	689	643	596	480	383	-2.2
Hydroelectric and Renewable Consumption in Quadrillions of BTU	5.8	6.6	7.2	7.5	7.8	8.0	8.2	0.7
Electricity Generation in Billions of Kilowatts	2,713	3,243	3,318	3,601	3,877	4,115	4,308	1.2
Carbon Emissions in Millions of Metric Tons	1,346	1,463	1,577	1,689	1,803	1,888	1,956	1.3

Source: Adapted by Anthony H. Cordesman from EIA, International Energy Outlook, 1998, DOE/EIA-0484 (97), April 1998, pp. 136-142.

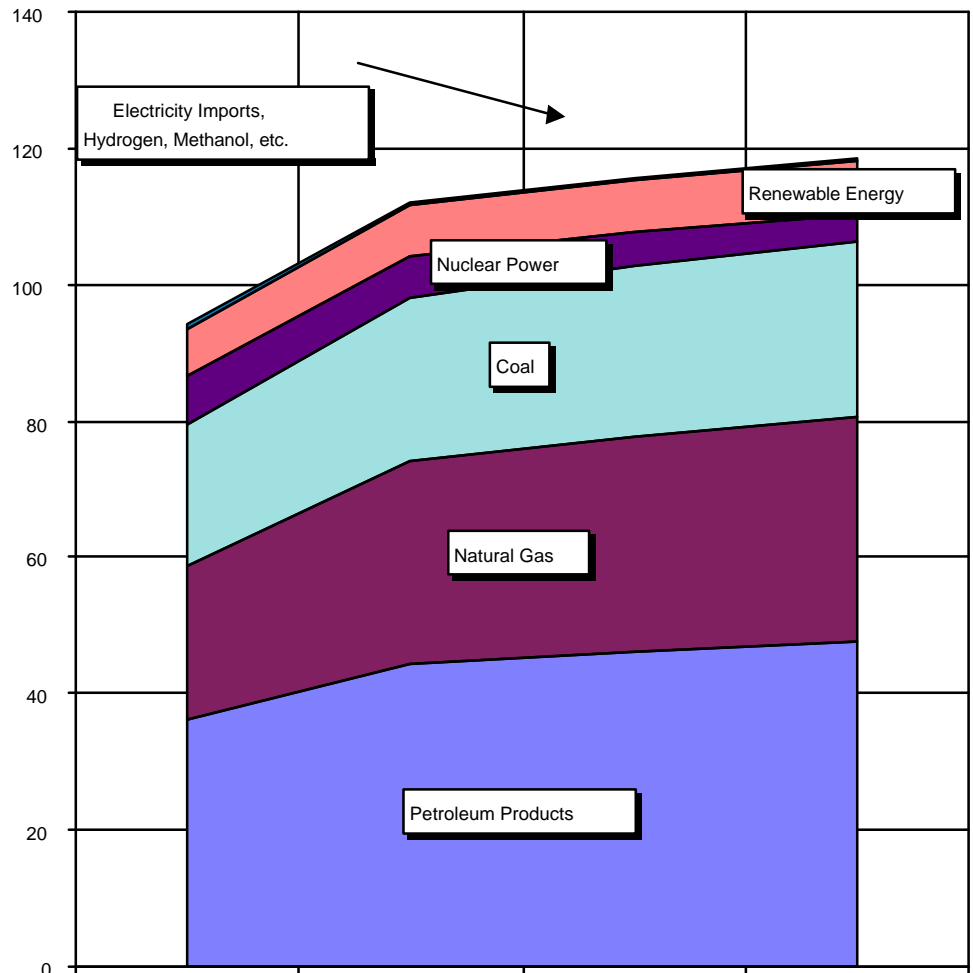
US Energy Use Relative to World Use: 1995-2020 (in Quadrillions of BTU)



	1990	1995	1996	2000	2005	2010	2015	2020
■ US	83.9	90.4	94	99.8	105.8	112.2	115.7	118.6
■ World	343.8	365.6	376.1	413	465.7	519.6	575.6	639.4

Source: Adapted by Anthony H. Cordesman from the “reference case” EIA, International Energy Outlook, 1998, DOE/EIA-0484(97), p. 133.

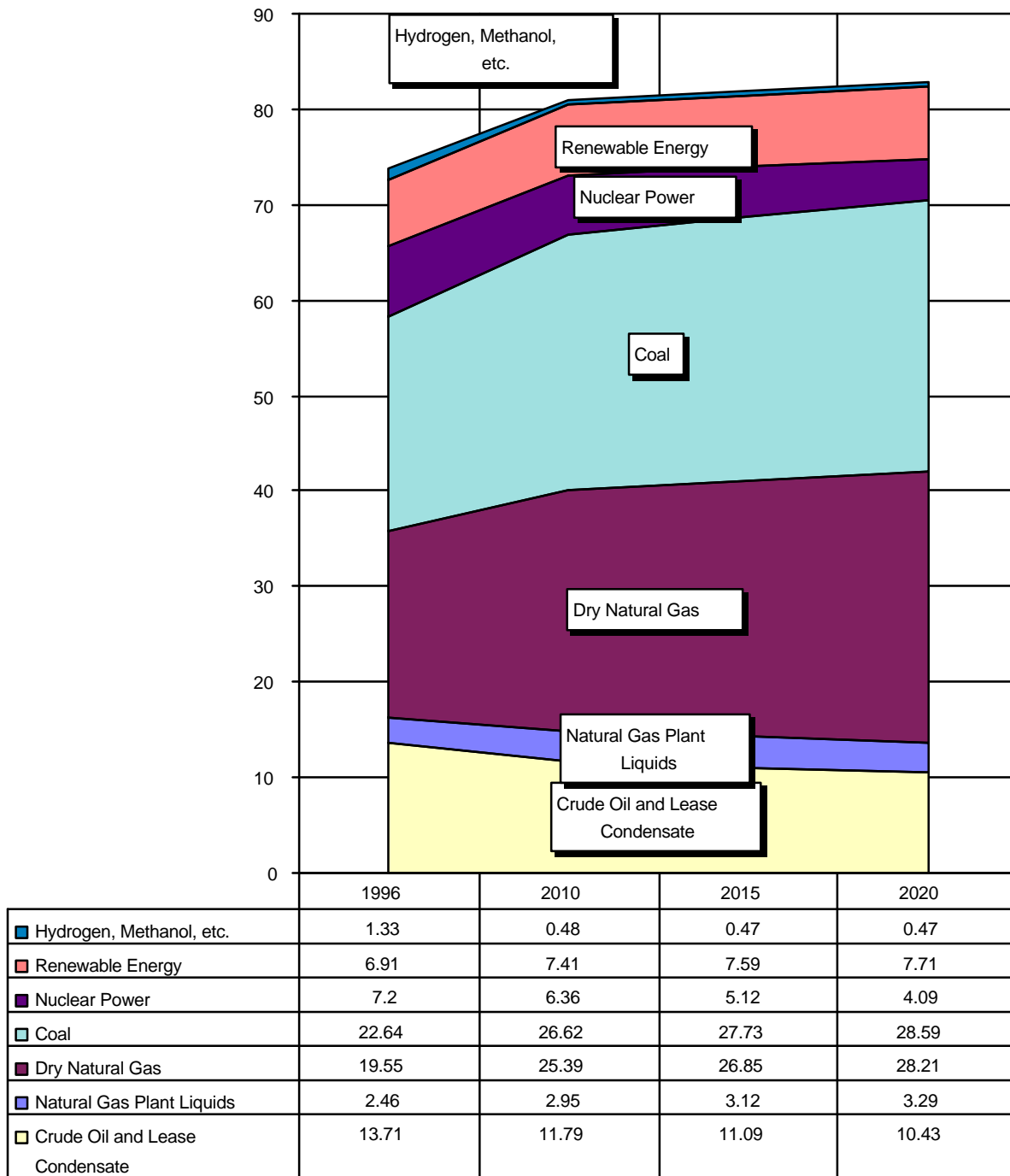
US Domestic Energy Consumption By Type: 1995-2020 (in Quadrillions of BTU)



	1996	2010	2015	2020
Electricity Imports, Hydrogen, Methanol, etc.	0.39	0.4	0.4	0.43
Renewable Energy	6.91	7.42	7.62	7.74
Nuclear Power	7.2	6.36	5.12	4.09
Coal	20.9	24.03	24.95	25.61
Natural Gas	22.6	29.63	31.44	33.06
Petroleum Products	36.01	44.33	46.2	47.64

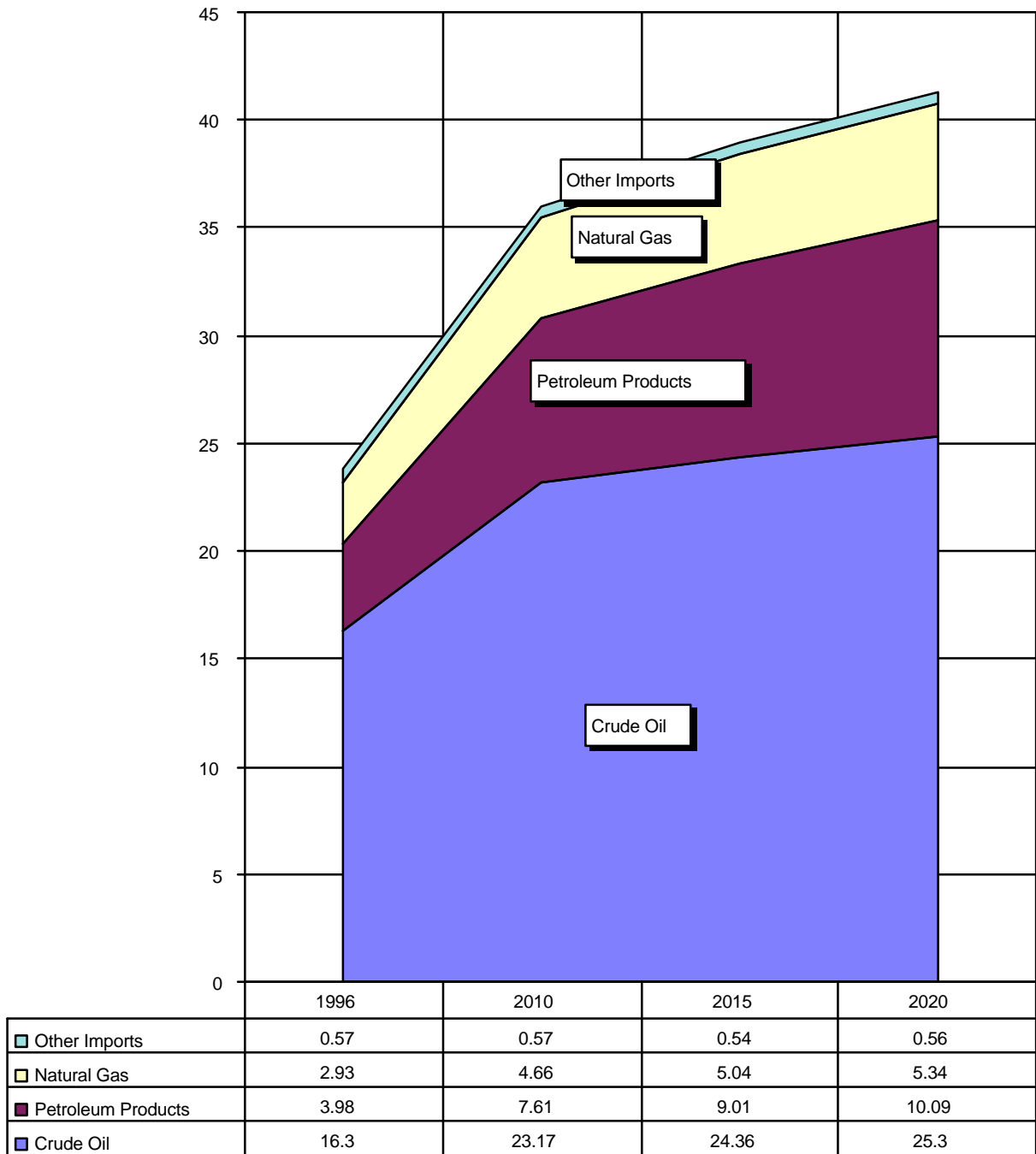
Source: Adapted by Anthony H. Cordesman from EIA, Annual Energy Outlook, 1998, DOE/EIA-0383 (97), December, 1997, pp.128.

US Domestic Energy Production By Type: 1995-2020 (in Quadrillions of BTU)



Source: Adapted by Anthony H. Cordesman from EIA, Annual Energy Outlook, 1998, DOE/EIA-0383 (97), December, 1997, pp.128..

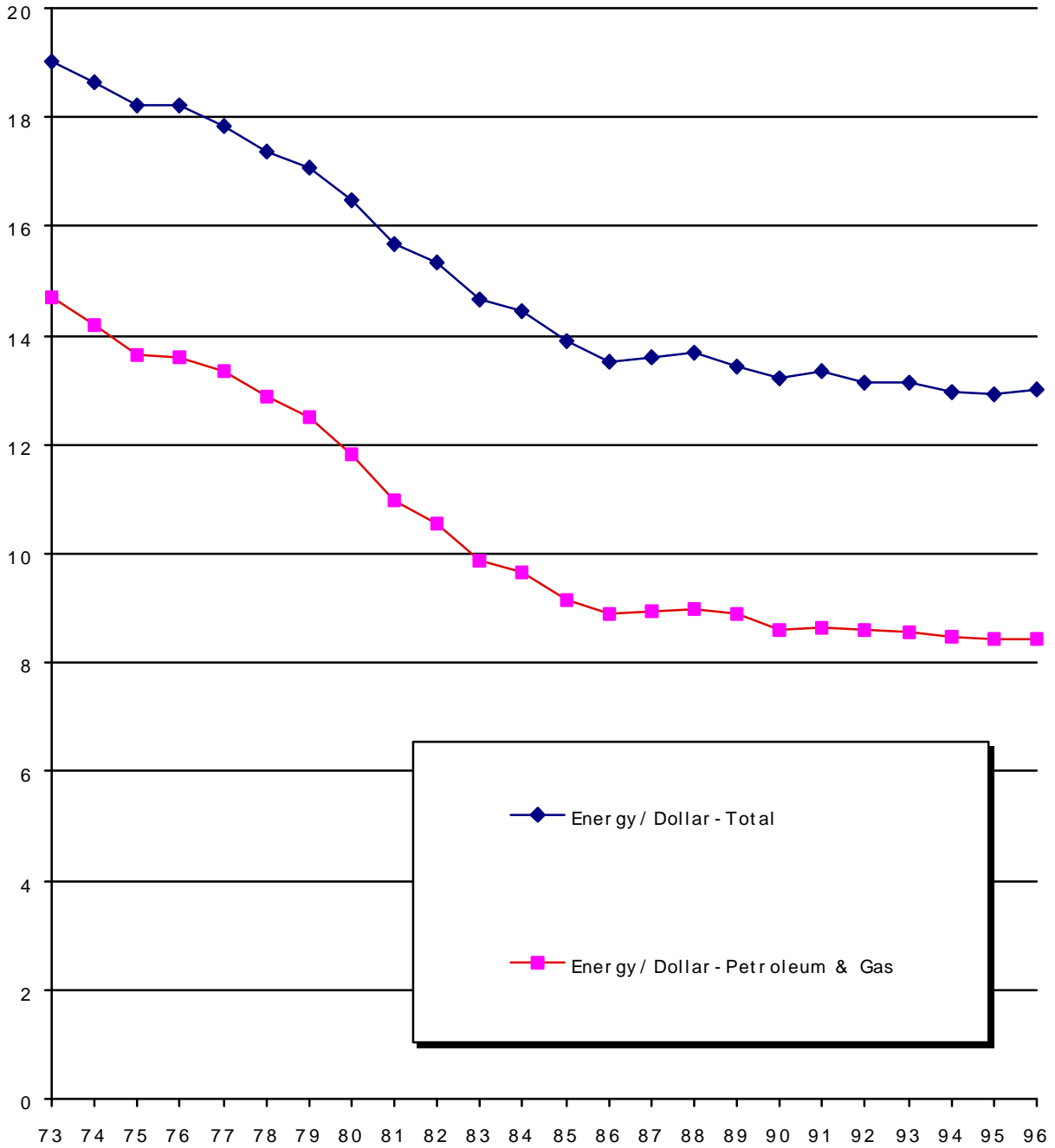
US Energy Imports by Type: 1995-2020 (in Quadrillions of BTU)



Source: Adapted by Anthony H. Cordesman from EIA, Annual Energy Outlook, 1998, DOE/EIA-0383 (97), December, 1998, pp.128..

Energy Consumption per Dollar of the GDP is Less Than 60% of the Cost in 1973

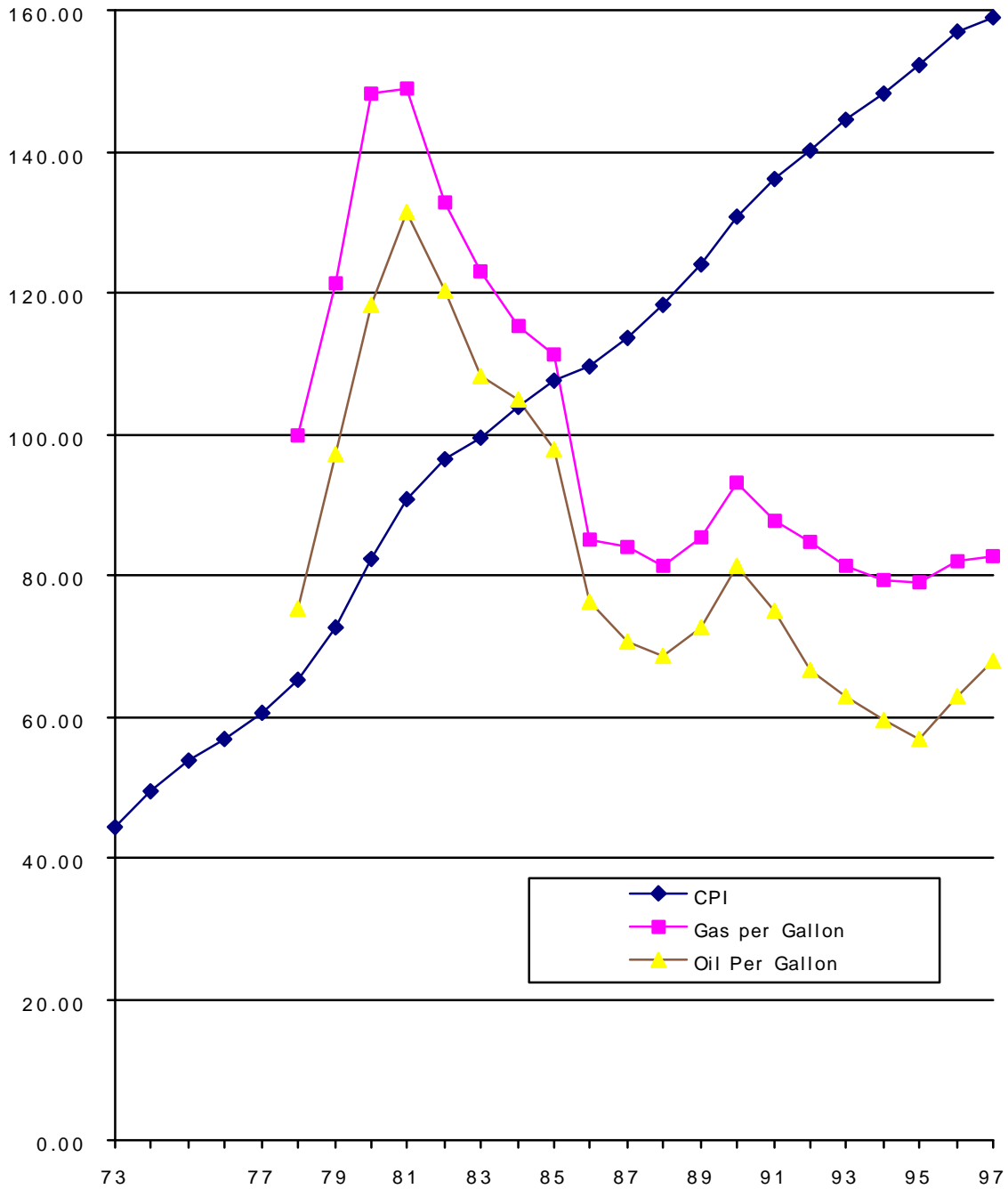
(Thousands of BTU per \$Constant 1992 US Millions)



Modified by Anthony H. Cordesman from DOE/EIA, Monthly Energy Review, April 1997, pp. 16-17.

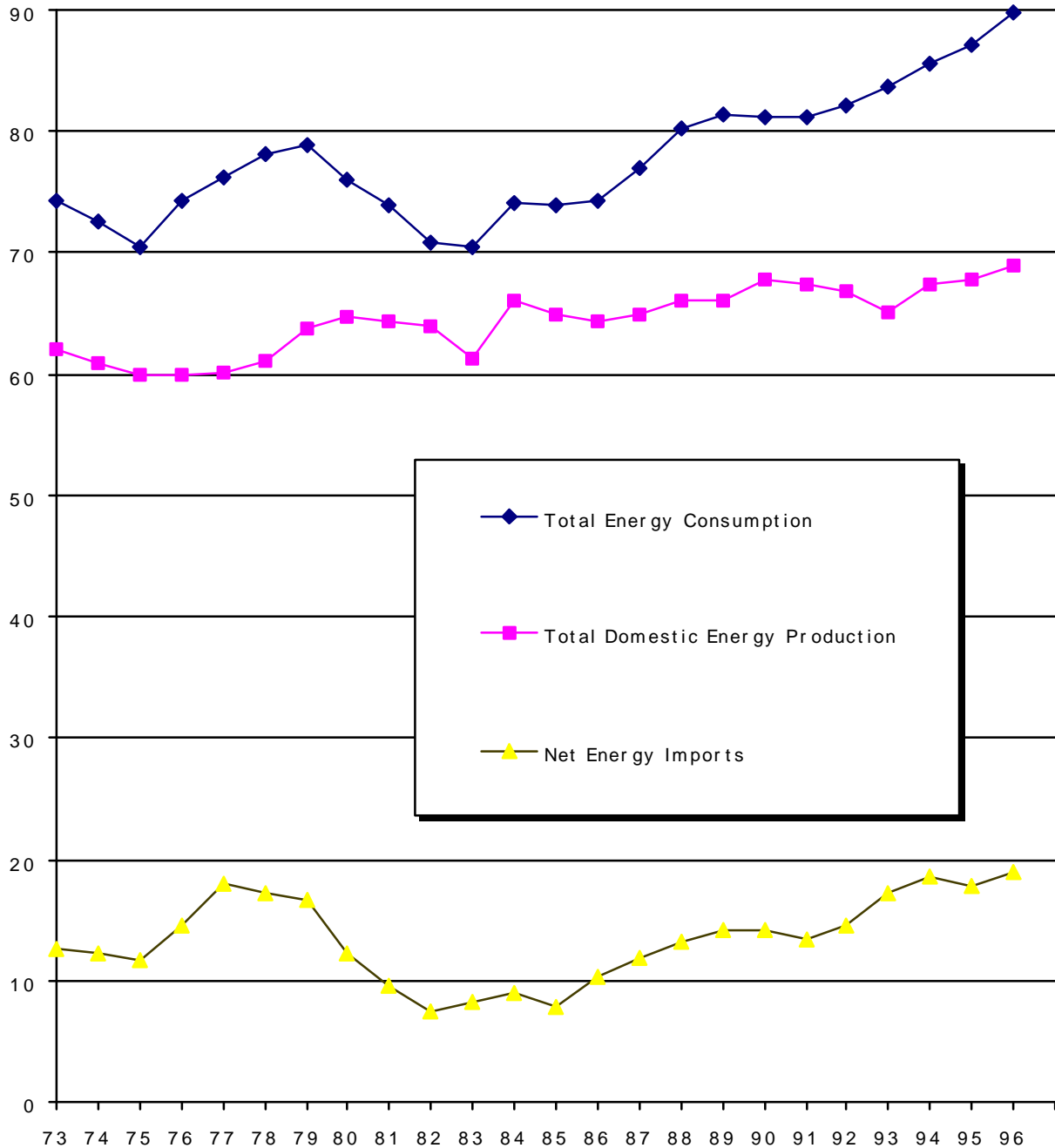
Fuel Costs Remain Low Relative to Other Consumer Goods: Cost of Gasoline and Heating Oil Relative to US CPI

(CPI Index = 100 in 1984)



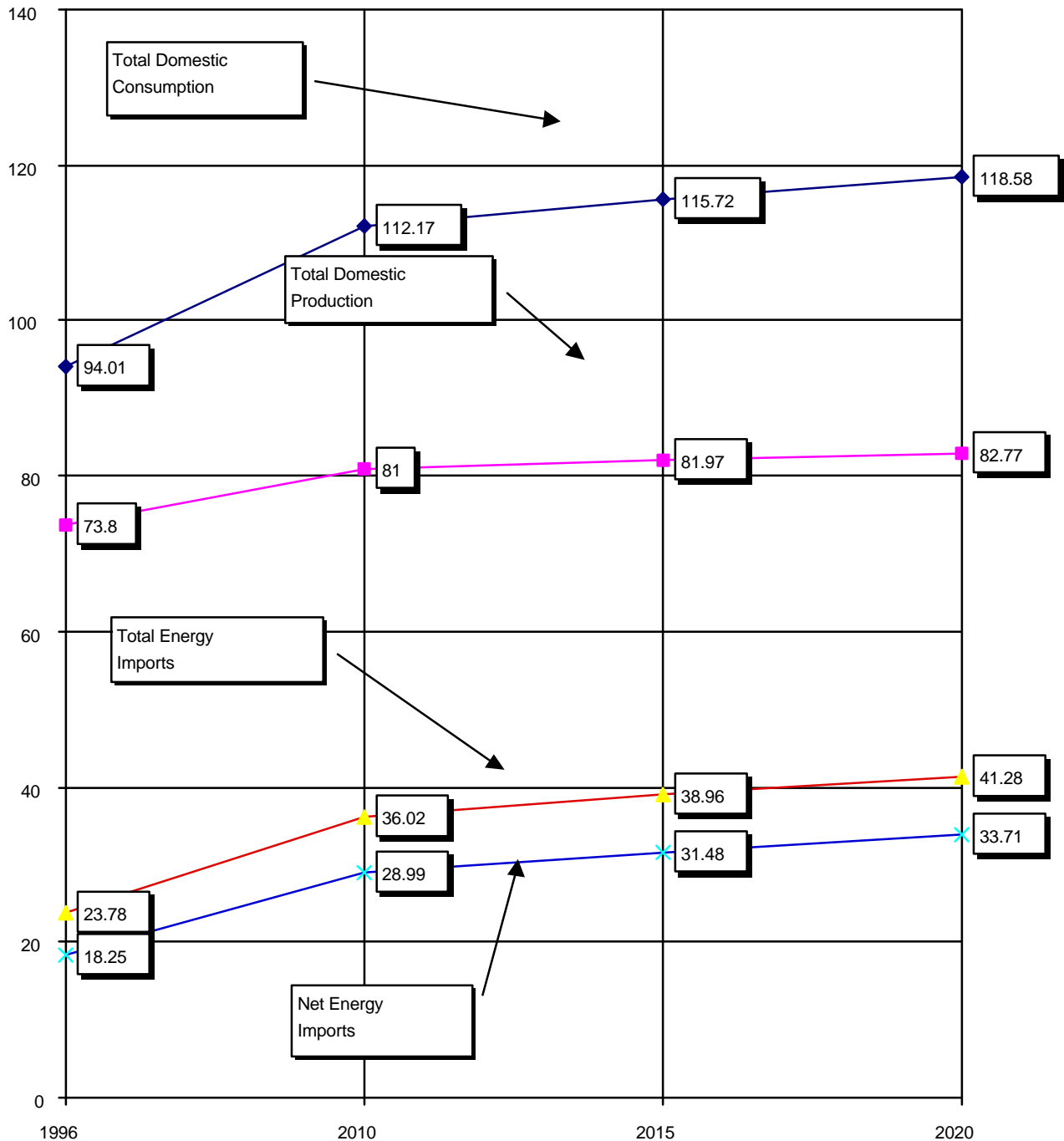
Modified by Anthony H. Cordesman from DOE/EIA, Monthly Energy Review, April 1997, p. 13.

Total US Energy Consumption and Production Relative to Net Energy Imports: 1973-1996 (Quadrillions of BTU)



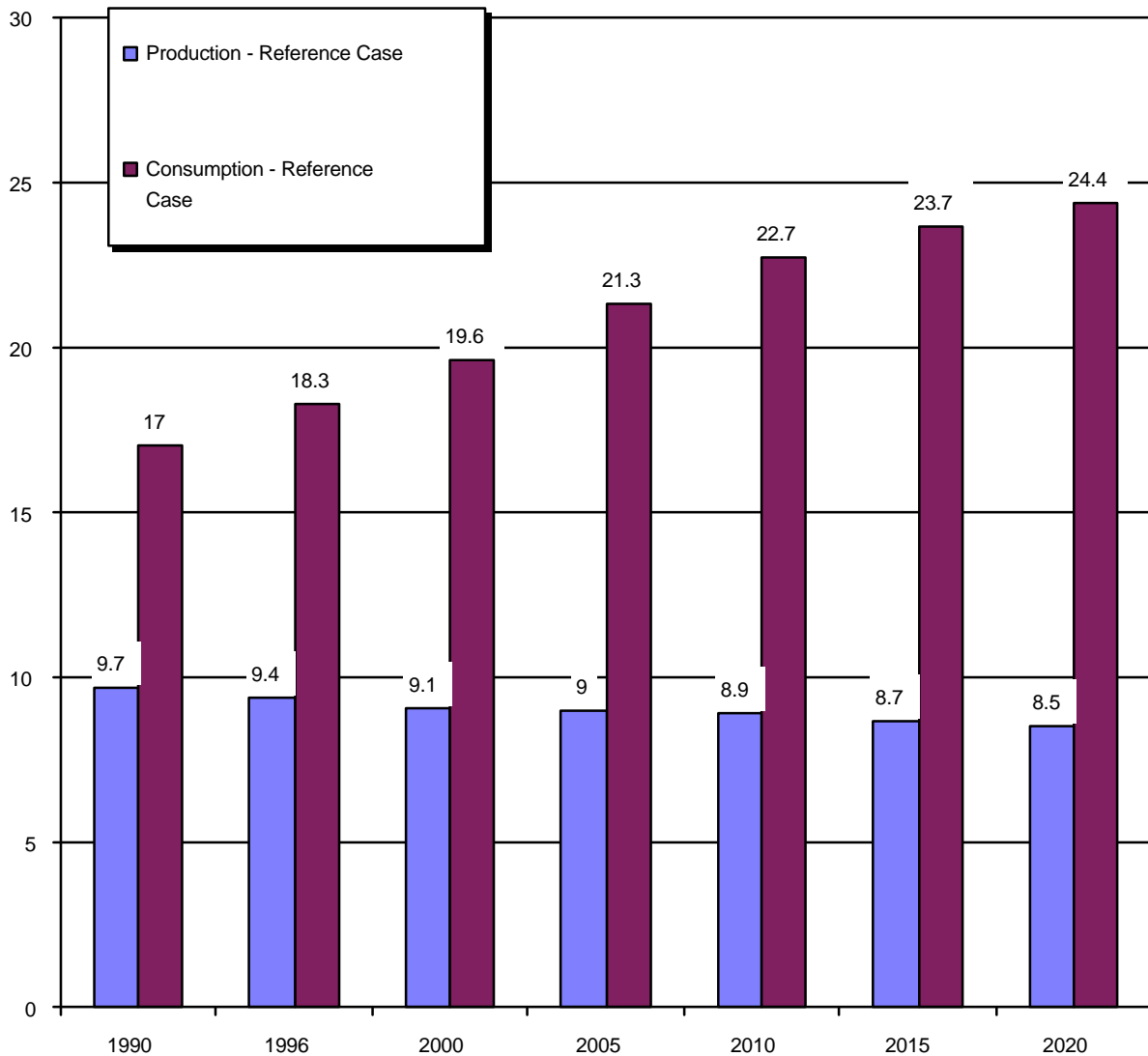
Source: Adapted by Anthony H. Cordesman from EIA, Monthly Energy Review, April, 1997, p. 3, and DOE/EIA, 0035(96/05), p. 11.

Total US Energy Consumption and Production Relative to Net Energy Imports: 1995-2020 (in Quadrillions of BTU)



Source: Adapted by Anthony H. Cordesman from EIA, Annual Energy Outlook, 1998, DOE/EIA-0383 (97), December, 1998, pp.128 and 131.

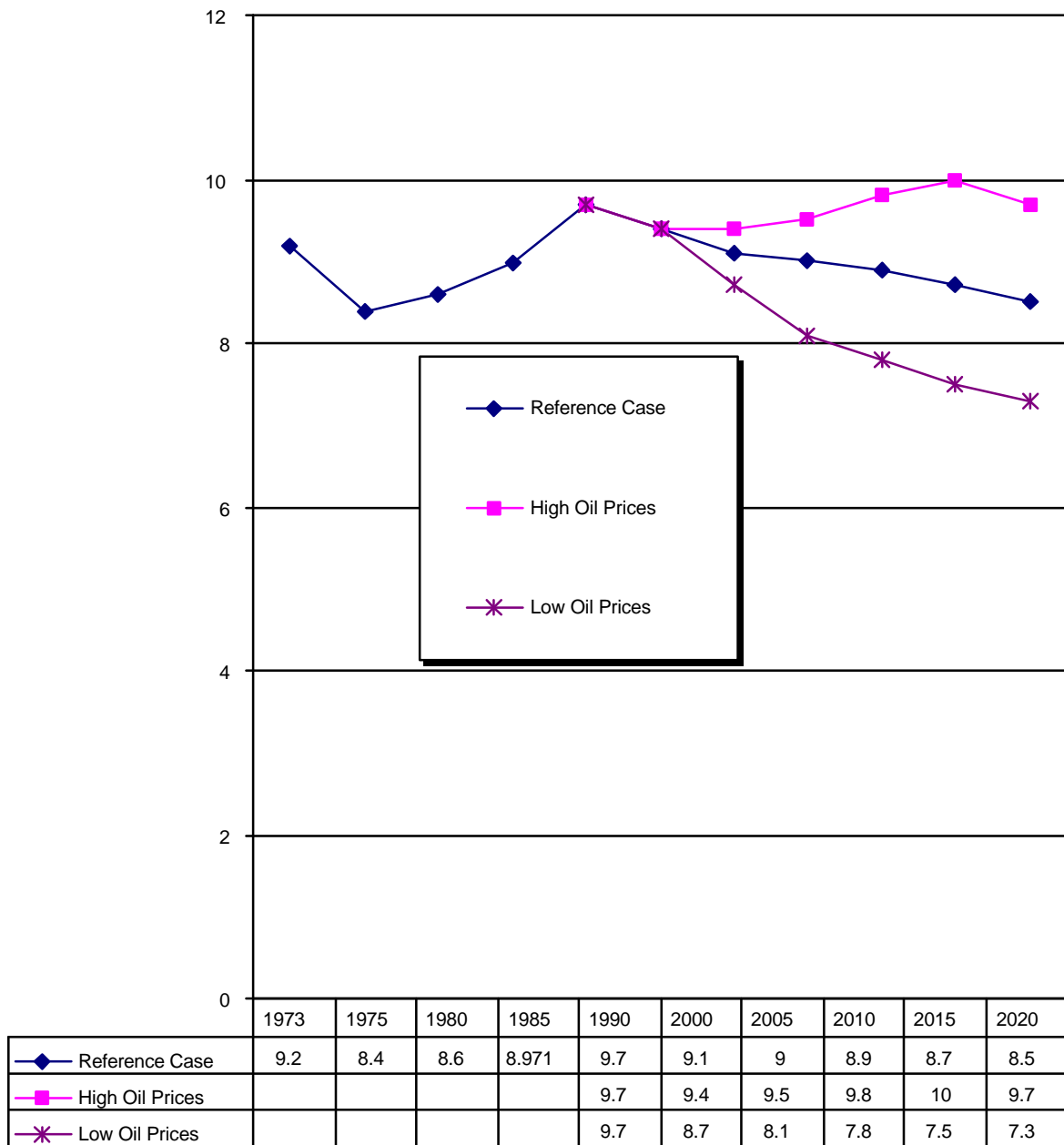
US Oil Production versus US Oil Consumption: 1990-2020
 (Estimated Domestic Oil Production Capacity versus Domestic Consumption in MMB/D)



Source: Adapted by Anthony H. Cordesman from EIA, International Energy Outlook, 1998, DOE/EIA-0484 (97), April 1998, pp. 136 and 175, and EIA, Monthly Energy Review, April, 1997, pp. 118, 130-131.

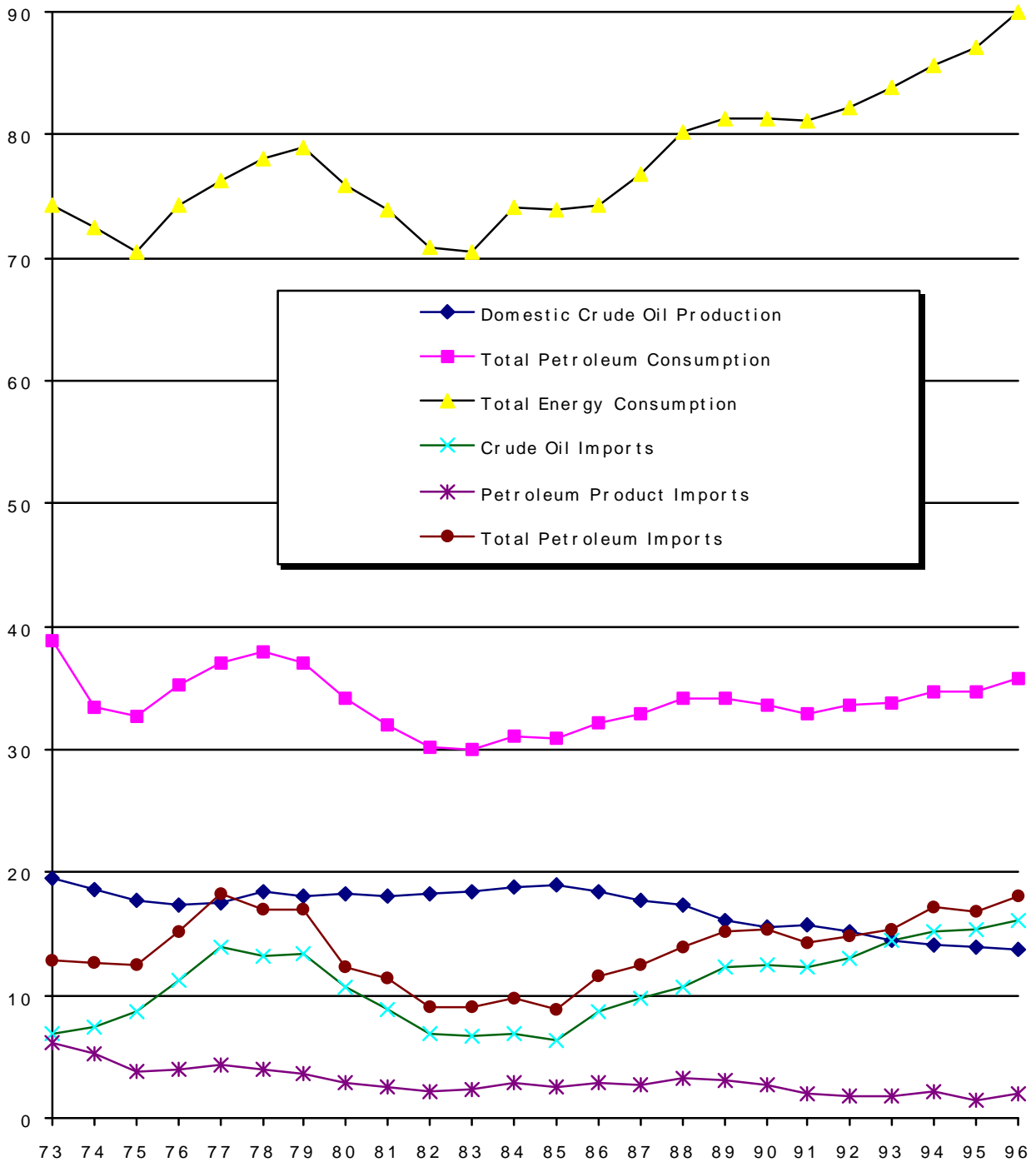
US Domestic Oil Production is Highly Price Sensitive

(Estimated Oil Production Capacity in MMBD)



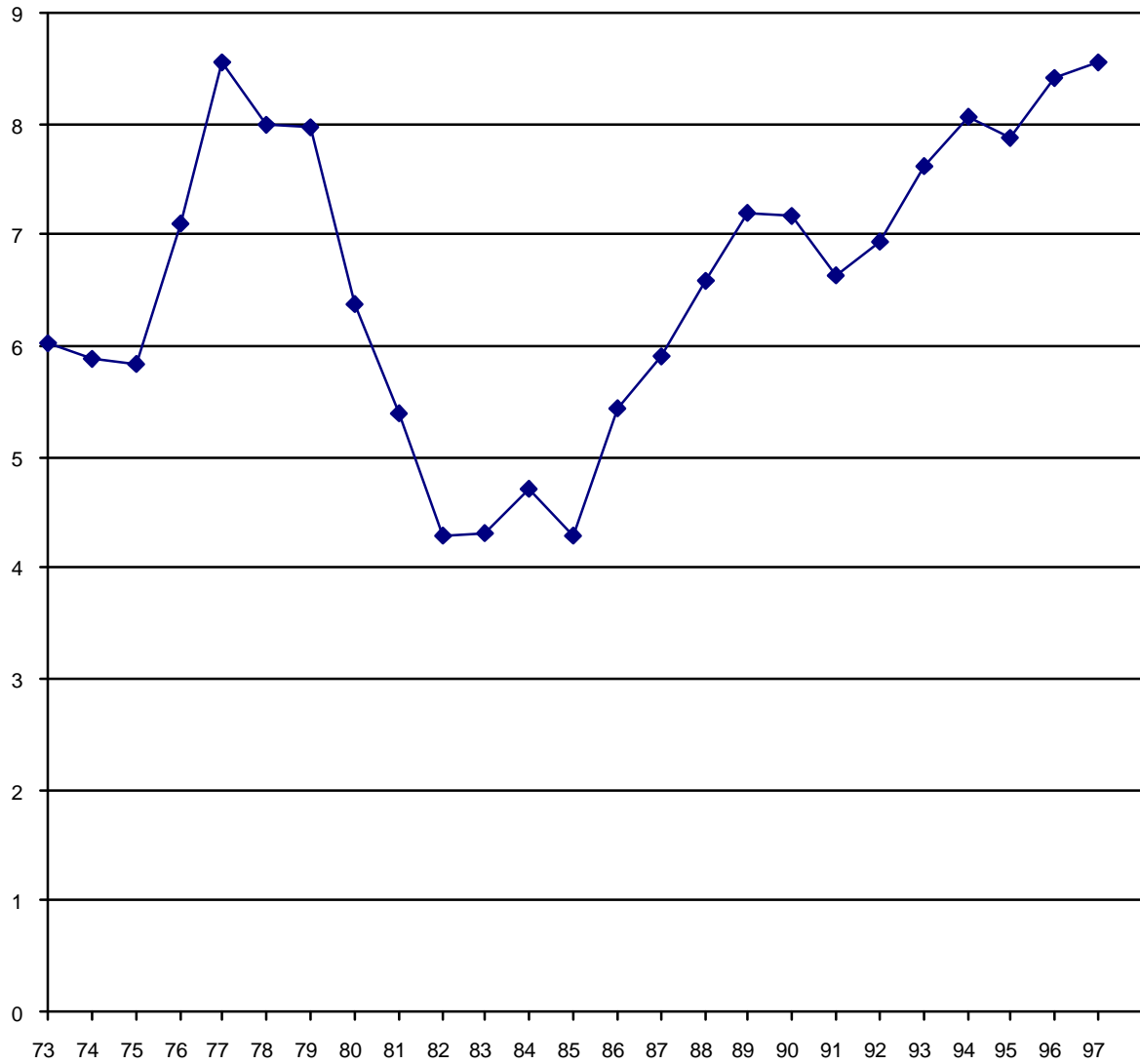
Source: Adapted by Anthony H. Cordesman from EIA, International Energy Outlook, 1998, DOE/EIA-0484 (97), April 1998, pp. 175-177, and EIA, Monthly Energy Review, April, 1997, pp. 130-131.

US Dependence on Petroleum Imports Has Grown Steadily Since 1985:
 (US Domestic and Total Oil Consumption Relative to Total Energy Use in Quadrillions of BTUs)



Source: DOE/EIA, 0035(96/05), p. 7, and EIA, Monthly Energy Review, April, 1997, pp. 5, 7, 9.

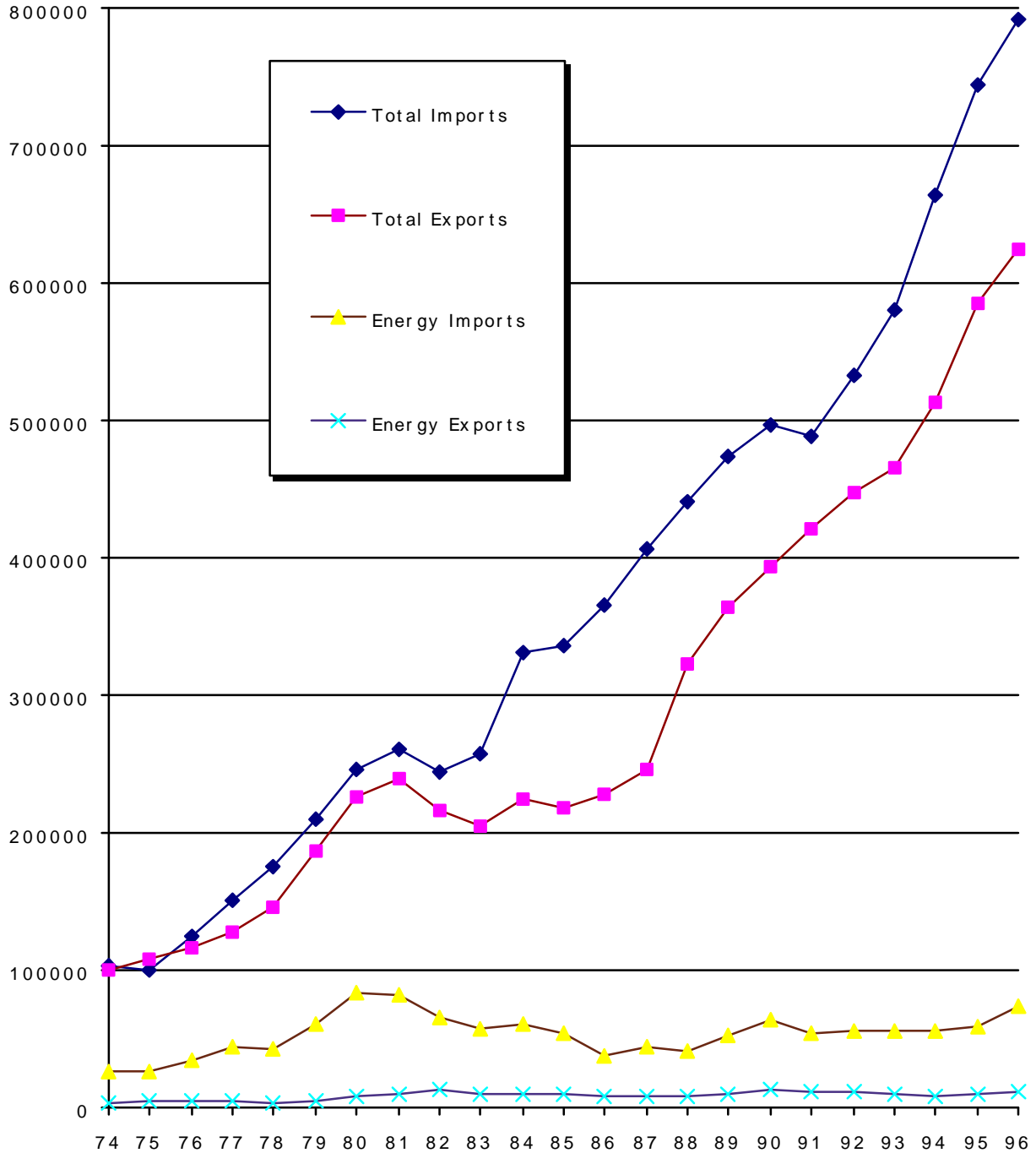
The Decline and Rise in Net US Oil Imports: 1973-1997
 (Net Imports of Crude Oil and Petroleum Products in MMBD)



Source: Adapted by Anthony H. Cordesman from EIA, Monthly Energy Review, April, 1997, pp. 42-43.

The Cost of US Energy Imports Has Declined Steadily Relative to Total Imports and Exports

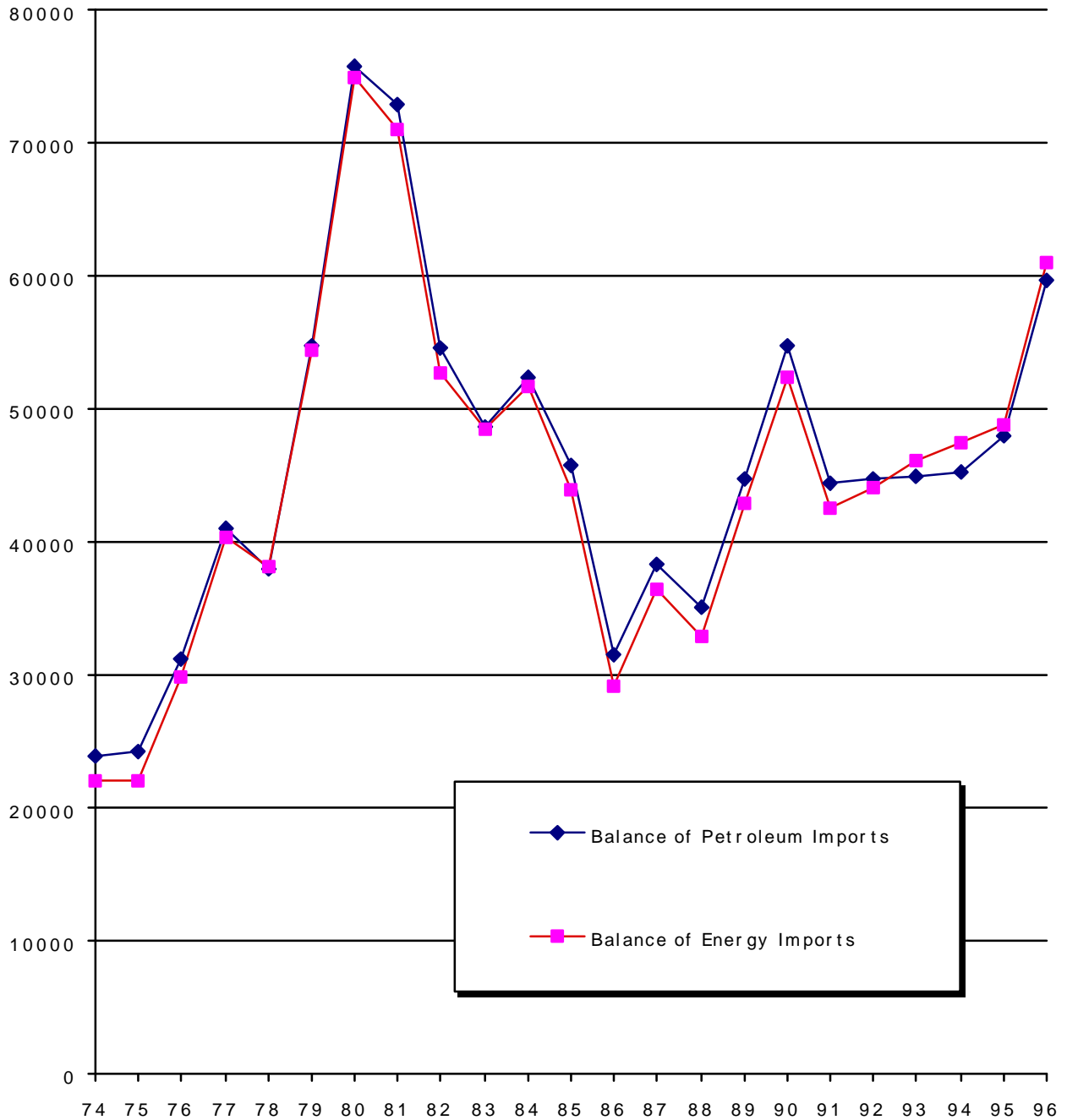
(\$ Current Millions)



Source: DOE/EIA, 0035(96/05), p. 11, and Monthly Energy Review, April, 1997, p. 11.

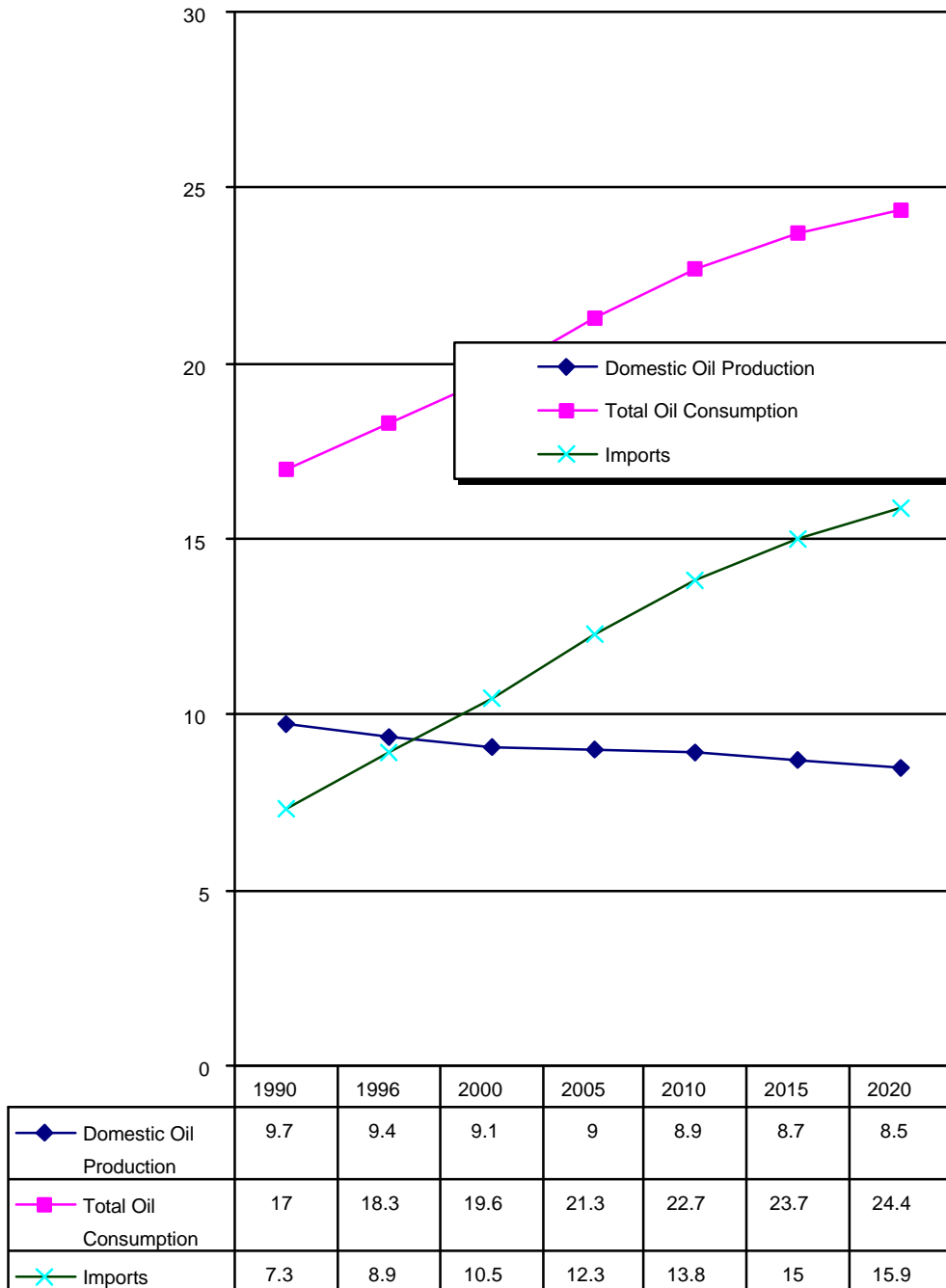
The Cost of US Oil and Energy Imports Has Remained Relatively Constant, Even in Current Dollars

(\$Current US Millions)



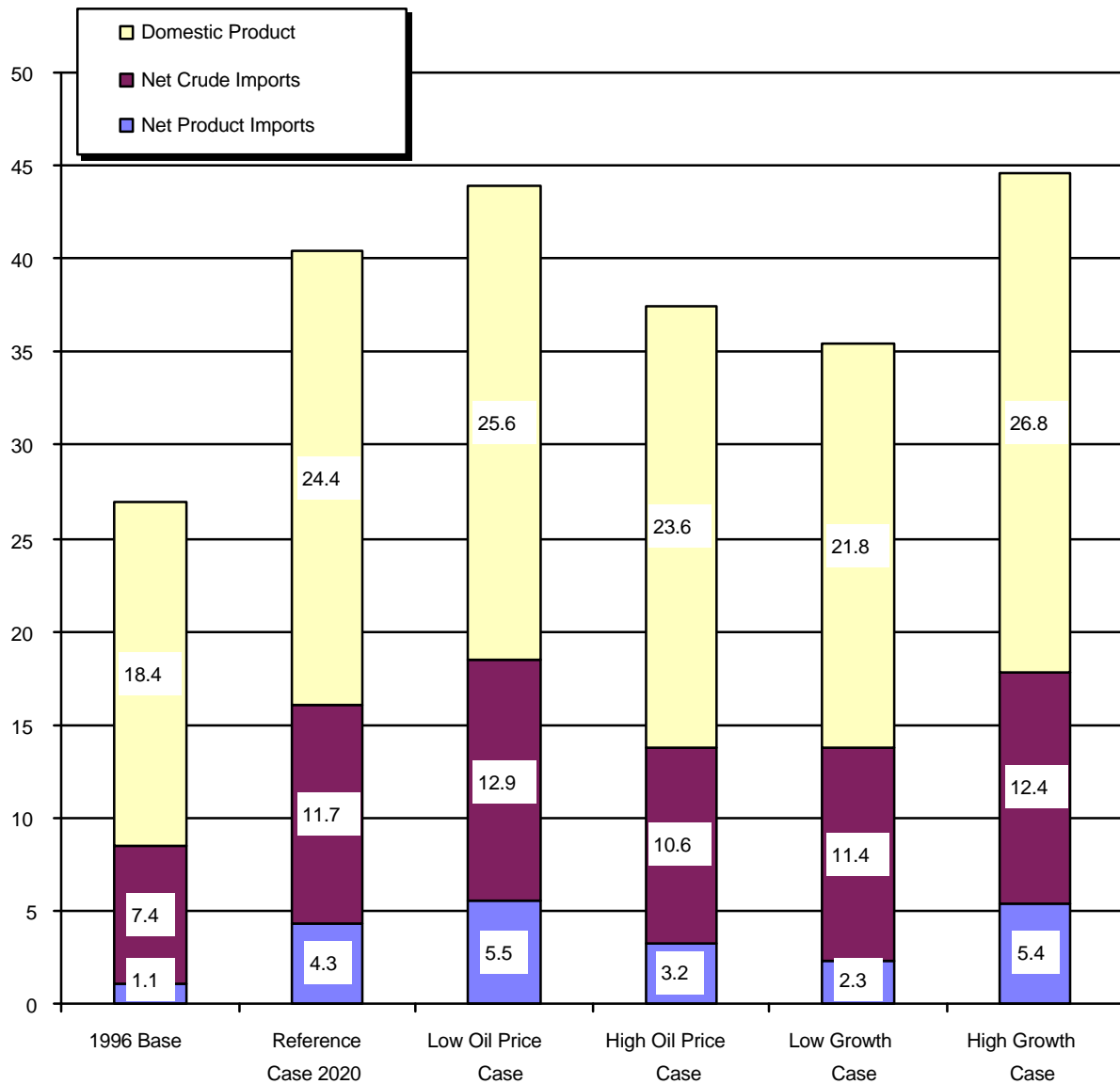
Total Imports include nominal amounts of coal and coal coke, and all natural gas, as well as crude oil and petroleum products. Source: Modified by Anthony H. Cordesman from DOE/EIA, Monthly Energy Review, April 1997, p. 11.

However, US Oil Imports Will Grow Steadily in the Future:
 (US Oil Consumption in MMBD)



Source: DOE/EIA, International Energy Outlook, 1998, p. 136 and 175.

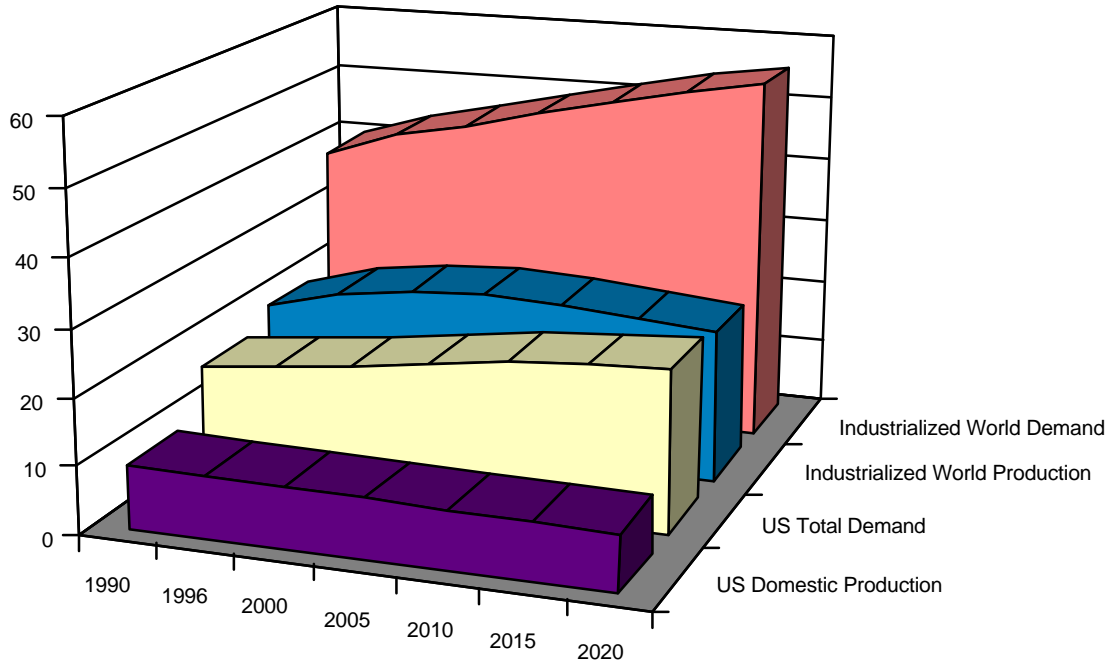
Possible Range of US Dependence on Imported Oil in 2020 (in MMBD)



Source: Adapted by Anthony H. Cordesman from EIA, Annual Energy Outlook, 1998, DOE/EIA-0383 (97), December, 1998, pp. 667.

US Increase in Dependence on Imported Oil Matches Rest of Industrialized World: 1990-2020

(Average Daily Domestic Production vs. Demand in Millions of Barrels Per Day)

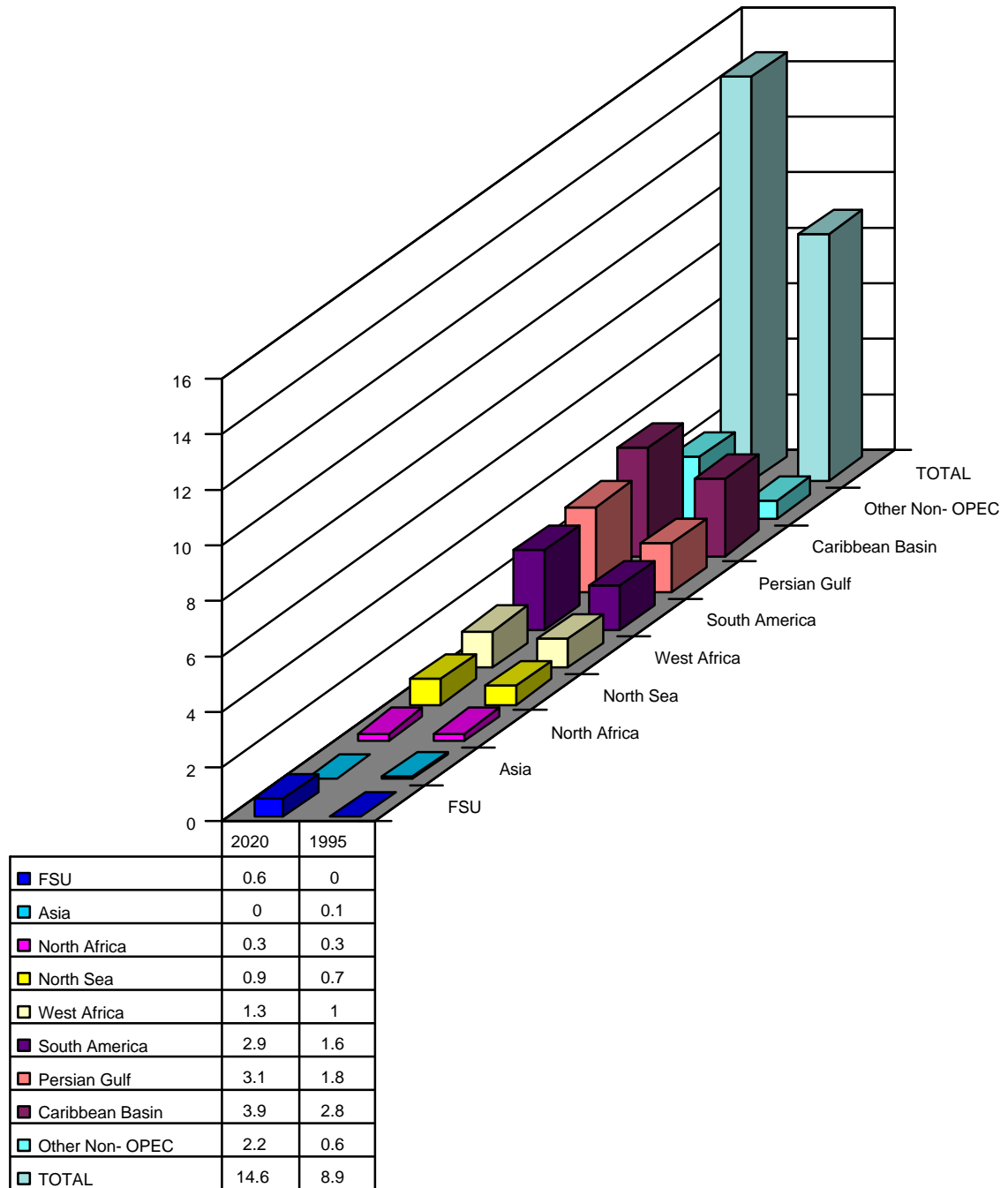


	1990	1996	2000	2005	2010	2015	2020
■ US Domestic Production	9.7	9.4	9.1	9	8.9	8.7	8.5
■ US Total Demand	17	18.3	19.6	21.3	22.7	23.7	24.4
■ Industrialized World Production	20.1	23	24.7	25.4	24.8	23.7	22.9
■ Industrialized World Demand	39.5	43.4	45.6	48.4	51.1	53.3	55.3

Source: DOE/EIA, International Energy Outlook, 1998, p. 136 and 175.

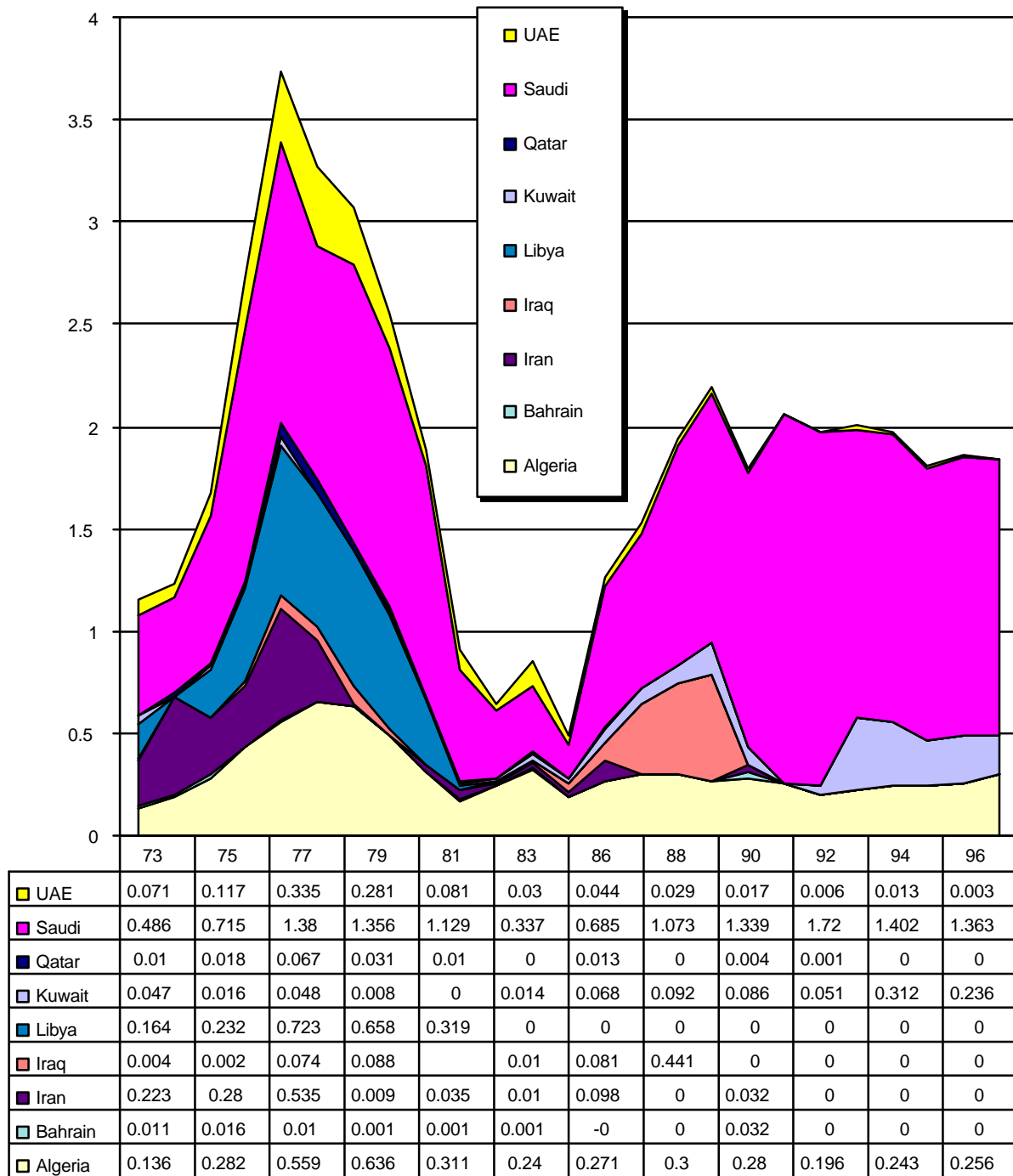
Increase in North American Oil Imports by Regional Supplier: 1995 and 2020: Highest Growth is in Dependence on Gulf and South America

(MMBD, EIA Reference Case)



Source: Adapted by Anthony H. Cordesman from EIA, International Energy Outlook, 1998, DOE/EIA-0484 (97), April 1998, p. 36.

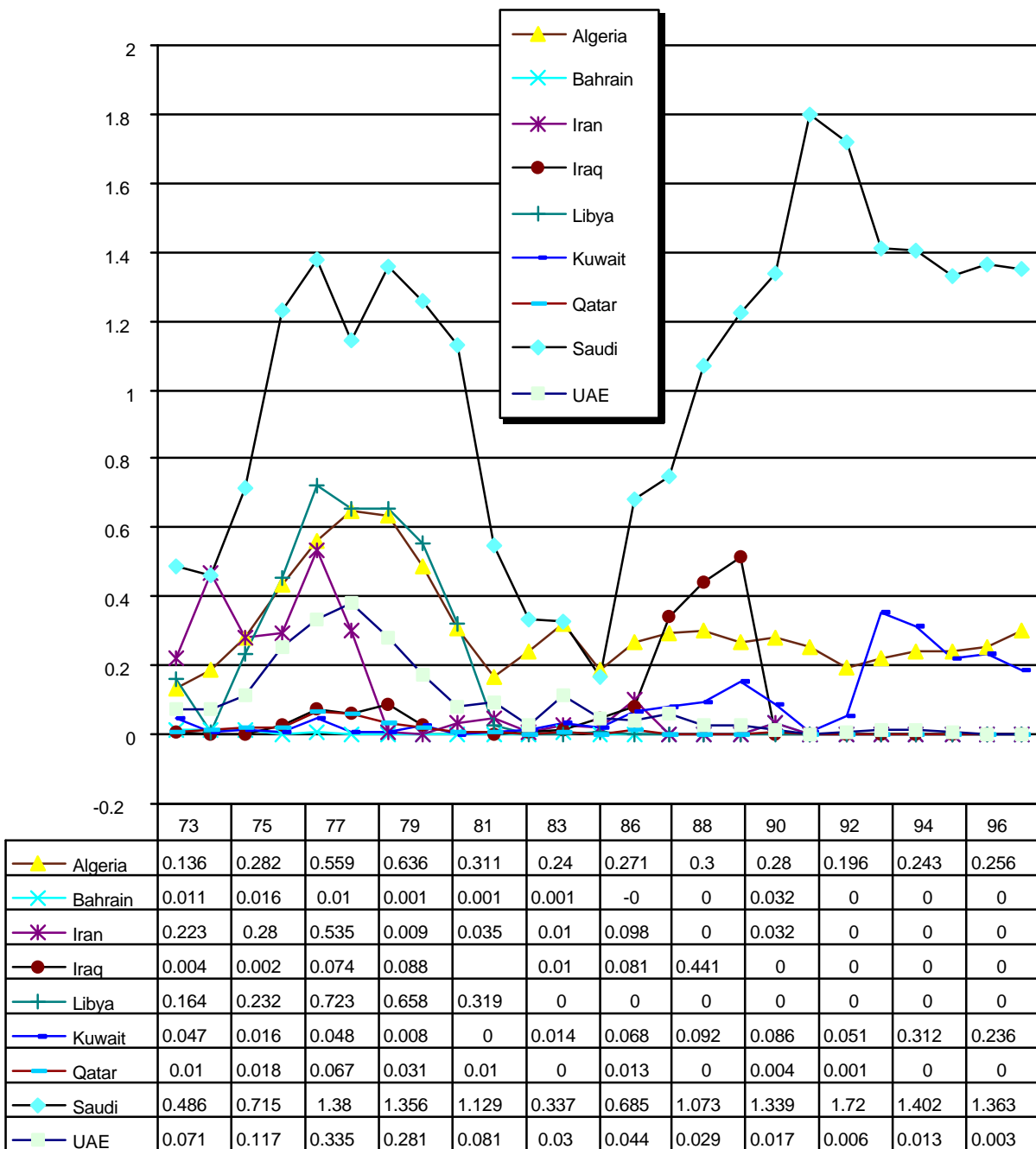
US Net Oil Imports from the Middle East by Exporting Country: 1985-1996 (Millions of Barrels Per Day of Crude Oil, NGL, and Refined Products)



Source: Adapted by Anthony H. Cordesman from EIA printout dated May, 1996, and EIA, International Energy Outlook, 1997, DOE/EIA-0484 (97), April 1997, pp. 157-160, and EIA, Monthly Energy Review, April, 1997, pp. 130-131.

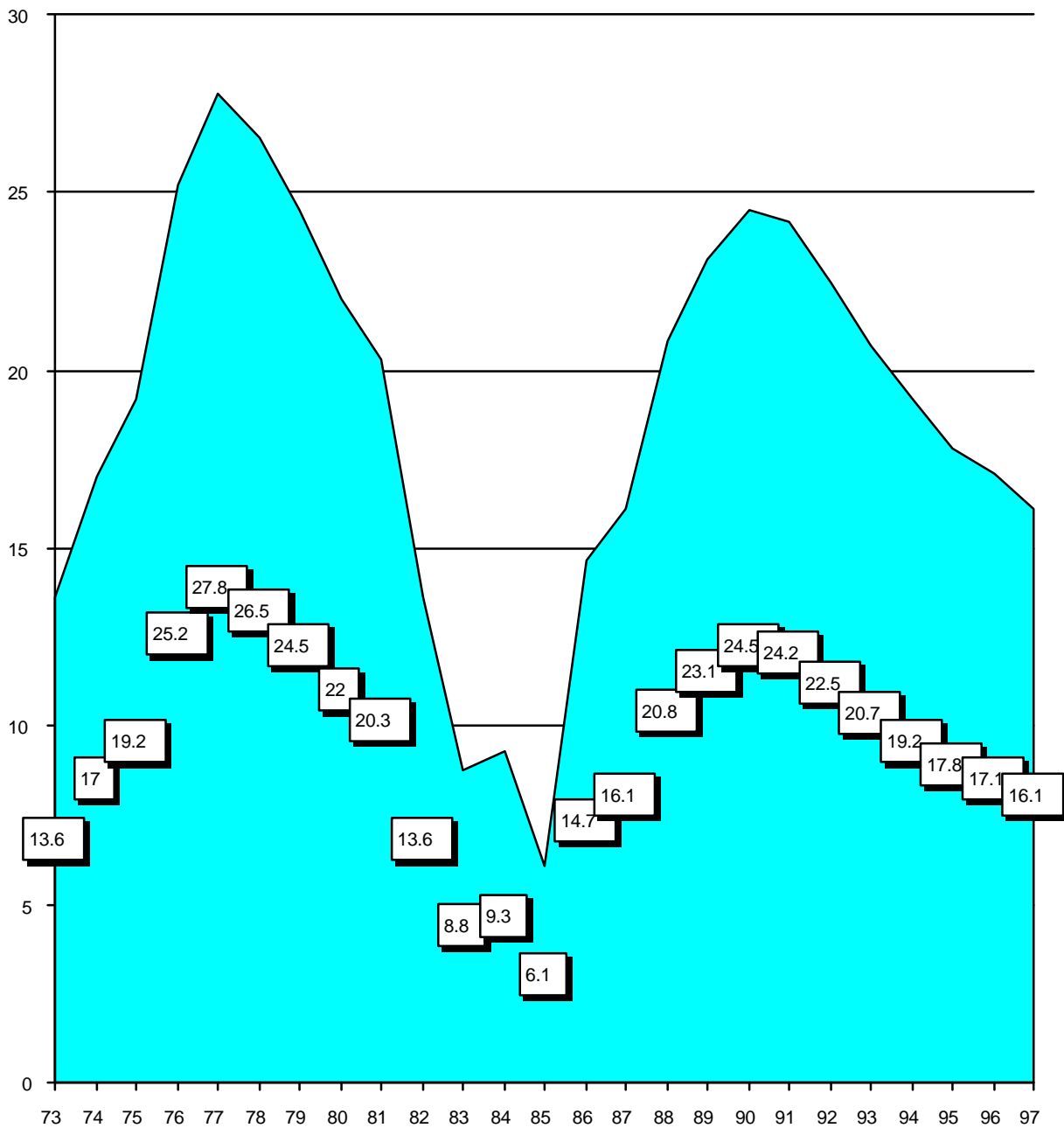
Cumulative US Oil Imports from the Middle East by Individual Exporting Country: 1985-1996

(Millions of Barrels Per Day of Crude Oil, NGL, and Refined Products)



Source: Adapted by Anthony H. Cordesman from EIA printout dated May, 1996, and EIA, International Energy Outlook, 1997, DOE/EIA-0484 (97), April 1997, pp. 157-160, and EIA, Monthly Energy Review, April, 1997, pp. 130-131.

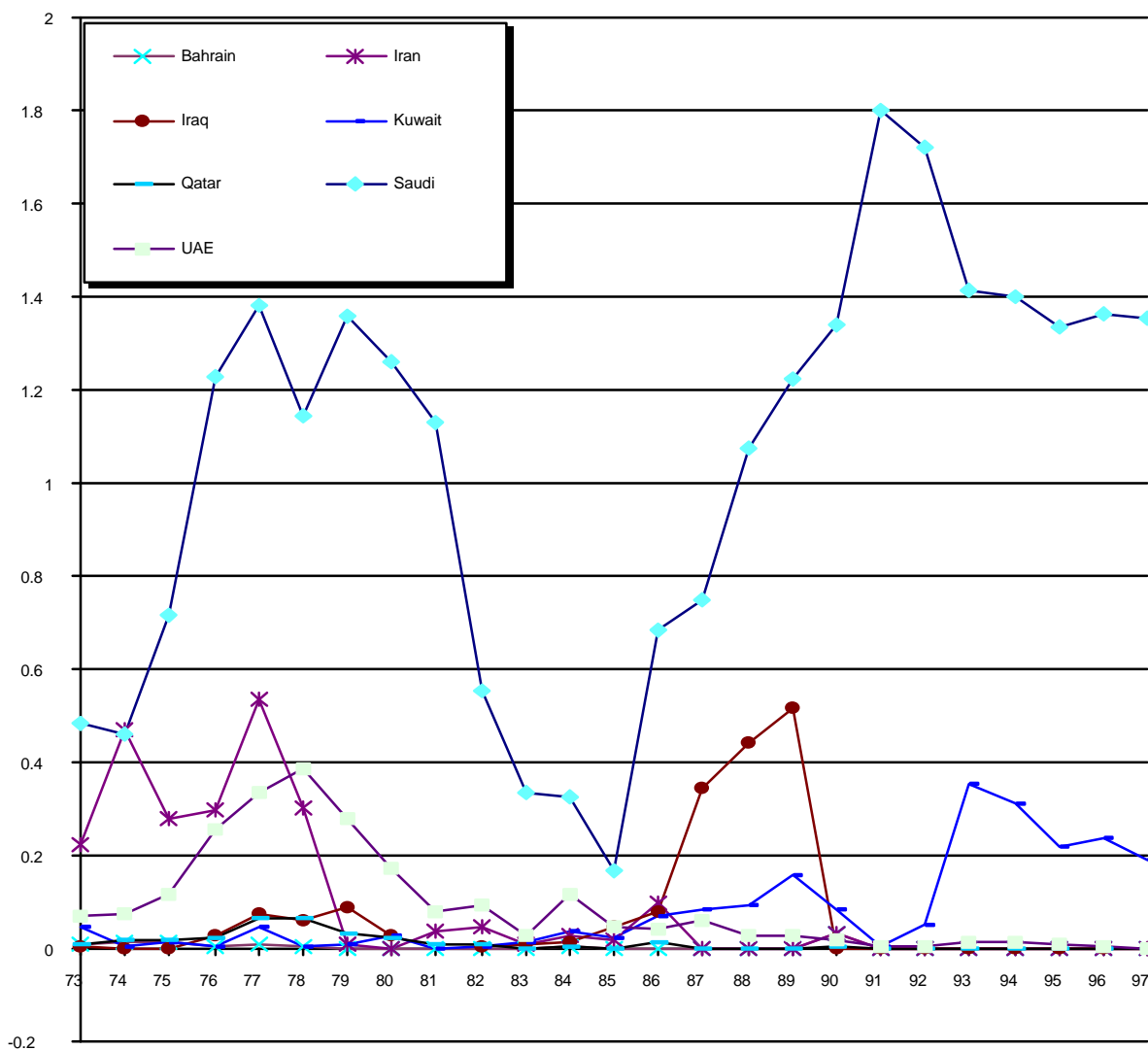
Percentage of Total US Petroleum Imports from the Gulf: 1973-1996



Source: Adapted by Anthony H. Cordesman from EIA printout dated May, 1996, and EIA, Monthly Energy Review, April, 1997, pp. 130-131.

US Net Oil Imports from the Gulf by Individual Gulf Exporting Country: 1985-1996

(Millions of Barrels Per Day of Crude Oil, NGL, and Refined Products)

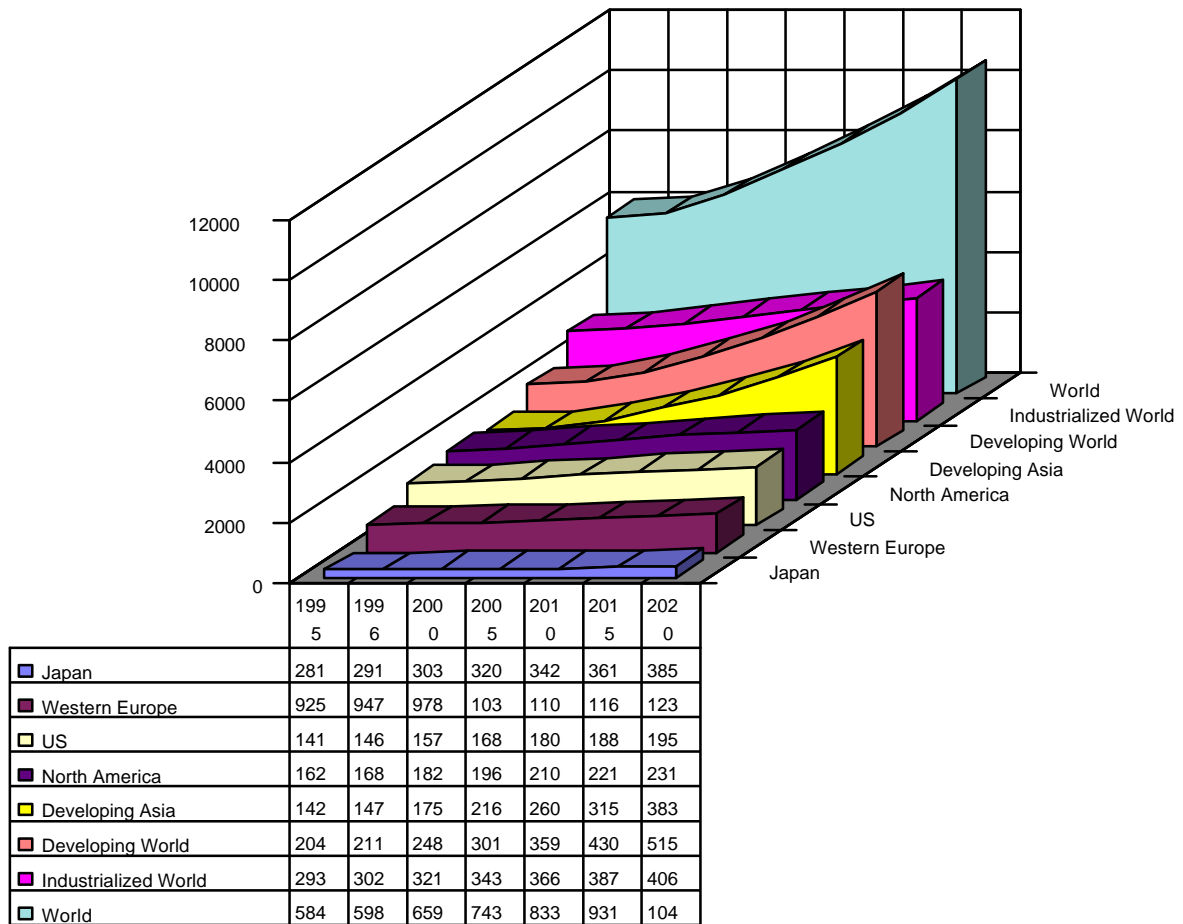


	73	74	75	76	77	78	79	80	81	82	83	84	
Bahrain	0.011	0.012	0.016	0.003	0.01	0.003	0.001	0.001	0.001	0.002	0.001	0.004	
Iran	0.223	0.469	0.28	0.298	0.535	0.304	0.009	0	0.035	0.048	0.01	0.027	
Iraq	0.004	0	0.002	0.026	0.074	0.062	0.088	0.028		0.003	0.01	0.012	
Kuwait	0.047	0.005	0.016	0.005	0.048	0.006	0.008	0.027	0	0.005	0.014	0.036	
Qatar	0.01	0.017	0.018	0.024	0.067	0.064	0.031	0.022	0.01	0.007	0	0.005	
Saudi	0.486	0.461	0.715	1.23	1.38	1.144	1.356	1.261	1.129	0.552	0.337	0.325	
UAE	0.071	0.074	0.117	0.254	0.335	0.39	0.281	0.172	0.081	0.092	0.03	0.117	
	85	86	87	88	89	90	91	92	93	94	95	96	97
Bahrain	0.001	-0.001	0	0	0	0.032	0	0	0	0	0	0	0
Iran	0.019	0.098	0	0	0	0.032	0	0	0	0	0	0	0
Iraq	0.046	0.081	0.343	0.441	0.514	0	0	0	0	0	0	0	0
Kuwait	0.021	0.068	0.084	0.092	0.157	0.086	0.006	0.051	0.353	0.312	0.218	0.236	0.191
Qatar	0	0.013	0	0	0.002	0.004	0	0.001	0.001	0	0	0	0
Saudi	0.168	0.685	0.751	1.073	1.224	1.339	1.802	1.72	1.414	1.402	1.334	1.363	1.352
UAE	0.045	0.044	0.061	0.029	0.028	0.017	0.003	0.006	0.014	0.013	0.01	0.003	0

Source: Adapted by Anthony H. Cordesman from EIA printout dated May, 1996, and EIA, *International Energy Outlook, 1997*, DOE/EIA-0484 (97), April 1997, pp. 157-160, and EIA, *Monthly Energy Review*, April, 1997, pp. 130-131.

Who Pollutes? The Comparative Impact of the US on Total World Carbon Emissions 1995- 2015

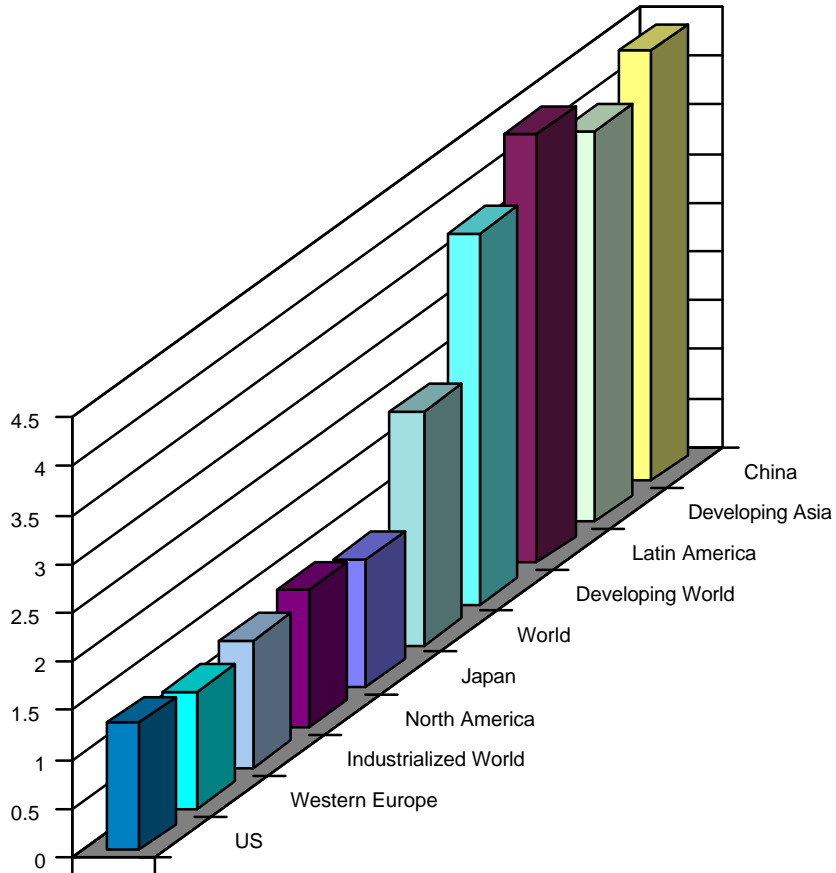
(Total Carbon Emissions In Millions of Metric Tons, EIA Reference Case)



Source: Adapted by Anthony H. Cordesman from EIA, International Energy Outlook, 1998, DOE/EIA-0484 (97), April 1998, p. 142.

Who Makes Pollution Grow? The Impact of the US on the Average Annual Increase in Total Carbon Emissions 1995-2020

(Total Carbon Emissions In Millions of Metric Tons, EIA Reference Case)



■ US	1.3
■ Western Europe	1.2
■ Industrialized World	1.3
■ North America	1.4
■ Japan	1.3
■ World	2.4
■ Developing World	3.8
■ Latin America	4.4
■ Developing Asia	4.0
■ China	4.4

Source: Adapted by Anthony H. Cordesman from EIA, International Energy Outlook, 1998, DOE/EIA-0484 (97), April, 1998, p. 142.