The original documents are located in Box 8, folder: "Papers on the President's Program (1)" of the Frank Zarb Papers at the Gerald R. Ford Presidential Library.

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Revised Base Case Forecast and The President's Program Forecast

National Petroleum Product Supply and Demand

Technical Report 75-2

Office of
Quantitative Methods

February 5, 1975

Federal Energy
Administration

Washington
D.C. 20461

NATIONAL PETROLEUM PRODUCT SUPPLY AND DEMAND

REVISED BASE CASE FORECAST AND

THE PRESIDENT'S PROGRAM FORECAST

Technical Report 75-2

F.E.A. - E.A.T.R. - 75-2

February 5, 1975

Short Range Modeling and Forecasting Division

Office of Quantitative Methods

Federal Energy Administration

This Technical Report replaces Technical Report 75-1, Comparison of Forecasts of Petroleum Product Demand Illustrating the Effects of Prices and Other Factors, FEA, January 16, 1975.

SUMMARY

For 1975 as a whole it is estimated that the President's program will:

-- reduce aggregate petroleum demand by 548 MBD;

-- increase domestic production by 101 MBD;

-- reduce petroleum imports by 649 MBD.

The effects of each component of the President's program grow over time. As a result, for the fourth quarter 1975 the impact will be greater than when averaged over the entire year. For fourth quarter 1975:

-- aggregate petroleum demand will be reduced by 880 MBD;

-- domestic production will be increased by 160 MBD;

-- petroleum imports will be reduced by 1040 MBD.

By December 1975 the President's goal of reducing petroleum imports by one million barrels per day will be surpassed under the President's program. For December under the program

-- aggregate petroleum demand will be reduced by 934 MBD;

-- domestic production will be increased by 160 MBD;

-- petroleum imports will be reduced by 1094 MBD.

The import savings in December 1975 are accounted for as follows (MBD):

160	Elk Hills development
98	conversion to coal
147	suspension of gas curtailments
689	effects of higher prices
1094	

The reductions in petroleum demand by product in December 1975 will be (in MBD):

motor gasoline	-278
distillate	-238
residual	-310
all other products	-108
Total	-934

INTRODUCTION

This Technical Report presents the results of implementing FEA's short term petroleum product supply/demand balance simulation under two sets of assumptions: a Base Case scenario which documents petroleum product supply and demand using a current macroeconomic simulation and updated price and weather data; and a Policy Option Scenario which incorporates the particulars of the President's energy program into the Base Case scenario. The supply and demand forecasts presented here are slightly different from those prepared in December 1974 and early January 1975 in that:

-- the particulars of the President's program (rather than its general structure) are accounted for explicitly;

-- more recent macroeconomic forecasts are available; and

-- price and weather data have been updated.

The impact of the President's program on aggregate petroleum demand and petroleum imports for 1975 as a whole, fourth quarter 1975, and December 1975 are presented in a summary section. Other sections of the report present the scenarios and associated supply and demand forecasts, the derivation of the effect of the President's program on petroleum prices, and the derivation of forecast inventory policies. The forecasting procedure utilized for this report is documented in National Petroleum Product Supply and Demand, October 1974 Through 1975, Technical Report 74-5, FEA, November 8, 1974.

Appendices present a comparison of alternative forecasts documenting the effects of prices and other important factors, alternative elasticity estimates, and factors influencing a determination of the price of imported crude oil.

SUPPLY/DEMAND BALANCE SCENARIOS AND FORECASTING RESULTS

Two supply/demand balance scenarios are presented: a Base Case and a Policy Option Scenario. The two scenarios are specified as follows.

> Base Case: The petroleum product demand simulation documented in Technical Report 74-5 was utilized. Based upon recent economic indicators, a DRI macroeconomic simulation prepared in December was incorporated in the demand forecast; this simulation projected relatively weak consumer demand over 1975 with a decline in real GNP of 3.5 percent over the year. The relative prices of the products were held constant at their last observed level.
>
> Policy Option Case: This case differs from the Base Case through the incorporation of the President's energy policy as given in the State of the Union Message.
>
> The price assumptions occasioned by the imposition of import fees and deregulation are given below in the section on prices. In addition it was assumed that:

-- domestic production increases by 160 MBD by the end of 1975 due to the development of Elk Hills;

-- petroleum demand is reduced by 98 MBD due to switching from oil to coal;

-- petroleum demand due to natural gas curtailments ceases after May 1, 1975 due to the deregulation of new natural gas at the wellhead;

-- price changes due to the President's policies are held constant in real terms at their May 1975 levels.

The Base Case supply/demand balance scenario is presented in Table I and the Policy Option scenario in Table II. Tables III through VII itemize the impact of the various components of the President's program by product for each quarter of 1975 and for 1975 as a whole.

Table I

Base Case (1/25)
Supply and Demand Forecast
(MBD)

Forecast without Implementation of the President's Program		1975 1Q	2Q	3Q	4Q	Year
DEMAND	MOGAS	6178	6715	6880	6614	6597
	Distillate	3916	2546	2215	3457	3034
	Residual	2654	2010	1935	2401	2250
	Kerojet	769	812	815	838	809
	Naphthajet	211	248	244	276	245
	Petrochemicals	333	338	337	350	339
	LPG	1560	1076	1025	1470	1283
	Other products	2029	2127	2383	2178	2179
Total all products		17650	15872	15834	17583	16735
SUPPLY	Domestic: Crude	8663	8622	8575	8540	8600
	NGL	1676	1657	1650	1656	1660
	Gain	413	399	357	407	393
Total Domestic Supply		10752	10678	10582	10603	10653
Change in inventories		-229	+165	+323	-260	0
Imports		6669	5359	5575	6720	6082
Total all products		17650	15872	15834	17583	16735

Table II

Supply and Demand Forecast
with the President's Program
(MBD)

Forecast with full Implementation of the President's Program		1975 1Q	1975 2Q	1975 3Q	1975 4Q	Year
DEMAND	MOGAS	6139	6489	6603	6336	6392
	Distillate	3915	2462	2055	3243	2919
	Residual	2625	1879	1718	2118	2085
	Kerojet	767	803	797	816	796
	Naphthajet	211	245	238	269	241
	Petrochemicals	332	330	322	333	329
	LPG	1559	1068	1009	1445	1270
	Other products	2027	2108	2344	2143	2155
Total all products		17575	15383	15085	16703	16187
SUPPLY	Domestic: Crude	8703	8702	8695	8700	8701
	NGL	1676	1657	1650	1656	1660
	Gain	413	399	357	407	393
Total Domestic Supply		10792	10758	10702	10763	10754
Change in inventories		-229	+165	+323	-260	0
Imports		6554	4790	4706	5680	5433
Total all products		17575	15383	15085	16703	16187

Table III

Impact of the President's Program
First Quarter 1975
(MBD)

Product	Demand Changes: Price Effects	Coal Conversion	Suspension of gas Curtailments	Total
MOGAS	-39	0	0	-39
Distillate	- 1	0	0	- 1
Residual	- 4	-25	0	-29
Kerojet	- 1	0	0	- 1
Naphtajet	- 1	0	0	- 1
Petrochemicals	- 1	0	0	- 1
LPG	- 1	0	0	0
Other	- 2	0	0	- 2
Total all Products	-49	-25	0	-75

Elk Hills Development	-	40
Current change in consumption		
Demand for petroleum imports	=	-115

Table IV

Impact of the President's Program
Second Quarter 1975
(MBD)

Product	Demand Changes: Price Effects	Coal Conversion	Suspension of gas Curtailments	Total
MOGAS	-227	0	0	-227
Distillate	- 20	0	-62	- 82
Residual	- 48	-49	-34	-131
Kerojet	- 9	0	0	- 9
Naphtajet	- 3	0	0	- 3
Petrochemicals	- 8	0	0	- 8
LPG	- 9	0	0	- 9
Other	- 20	0	0	- 20
Total all Products	-344	-49	-96	-489

Elk Hills Development	-	80
Current change in consumption		
Demand for petroleum imports	=	- 569

Table V

Impact of the President's Program
Third Quarter 1975
(MBD)

Product	Demand Changes: Price Effects	Coal Conversion	Suspension of gas Curtailments	Total
MOGAS	-278	0	0	-278
Distillate	- 64	0	-96	-160
Residual	- 89	-74	-54	-217
Kerojet	- 19	0	0	- 19
Naphtajet	- 6	0	0	- 6
Petrochemicals	- 15	0	0	- 15
LPG	- 16	0	0	- 16
Other	- 38	0	0	- 38
Total all Products	-525	-74	-150	-749

Elk Hills Development	-	120
Current change in consumption Demand for petroleum imports	=	-869

Table VI

Impact of the President's Program
Fourth Quarter 1975
(MBD)

Product	Demand Changes: Price Effects	Coal Conversion	Suspension of gas Curtailments	Total
MOGAS	-278	0	0	-278
Distillate	-120	0	-94	-214
Residual	-131	-98	-53	-282
Kerojet	- 22	0	0	- 22
Naphtajet	- 7	0	0	- 7
Petrochemicals	- 17	0	0	- 17
LPG	25	0	0	- 25
Other	- 35	0	0	- 35
Total all Products	-635	-98	-147	-880

Elk Hills Development	-	160
Current change in consumption Demand for petroleum imports	=	-1040

Table VII

Impact of the President's Program
Annual 1975
(MBD)

Product	Demand Changes: Price Effects	Coal Conversion	Suspension of gas Curtailments	Total
MOGAS	-205	0	0	-205
Distillate	- 52	0	-63	-115
Residual	- 69	-61	-35	-165
Kerojet	- 13	0	0	- 13
Naphtajet	- 4	0	0	- 4
Petrochemicals	- 10	0	0	- 10
LFG	- 12	0	0	- 12
Other	- 24	0	0	- 24
Total all Products	-389	-61	-98	-548
Elk Hills Development				101
Current change in consumption Demand for petroleum imports				-649

PRICE ASSUMPTIONS

The petroleum product demand simulation applies price elasticity assumptions to deflated wholesale price indices for all products except motor gasoline. For motor gasoline price effects are measured in terms of the deflated, ex-tax retail price per gallon. For all products except motor gasoline, the price effects are lagged with respect to how long a price change is assumed to be sustained. This lag structure (assuming constant elasticities) is given for a one, two, and three quarter duration. The assumed elasticities are:

Product	1Q	2Q	3Q
Distillate	-.09	-.12	-.12
Residual	-.15	-.18	-.21
Kerojet	-.06	-.07	-.08
Naphthajet	-.06	-.07	-.08
LPG	-.04	-.04	-.05
Petrochemicals	-.12	-.14	-.16
Other products	-.05	-.05	-.05

For motor gasoline the relationship between market price and demand was included as part of the regression estimating the demand forecasting equation. The specification of the forecasting equation is such that the price elasticity of motor gasoline demand varies somewhat depending upon the values of price and quantity demanded at which it is measured. Generally, for the year 1975, the price elasticity of motor gasoline is -.15.

Using the results of analyses conducted with the Office of Economic Impact, FEA, the implication of the President's policy of import fees, and deregulation was traced for nominal prices measured by month for January through May 1975. These nominal prices were then converted into the appropriate indexed and deflated format for incorporation into the petroleum product demand simulation. The derivation of the nominal price time series is given below.

Construction of May 1, 1975 Petroleum Prices

The end of year 1974 crude oil price was derived as follows

$$\$8.4425 = .75\,[.6 \times \text{Old Oil Price} + .4 \times \text{New Oil Price}] + .25 \times \text{Imported Oil Price}$$

where .75 = proportion of crude & NGL domestically produced
.25 = proportion of crude & NGL imported
.6 = current proportion of domestic supply that is Old Oil
.4 = current proportion of domestic supply that is New Oil

Old Oil Price = $5.25 per barrel
New Oil Price = $11.00 per barrel
Imported Oil Price = $11.00 per barrel*

The May 1, 1975 crude price was obtained by equating the Old Price to the New Oil Price, and the Imported Oil Price to $13 to account for decontrol, the domestic excise tax, and the import fee. It was assumed that the price of NGL would be equivalent to the price of crude oil, even if a smaller BTU equivalent tax were to be placed on it. After May 1, 1975, all petroleum prices were assumed to rise nominally by the rate of inflation; that is, not to change in real terms.

The refined product average was constructed using the crude oil series plus estimates of refining costs and other cost factors. The distillate and residual price series were constructed from the crude series with the rule that increases in the domestically produced distillate and residual would equal increases in average crude prices. Imported residual and distillate were assumed to increase in price by an amount equal to the import fee. The average price indices constructed for the products are the weighted by their domestic to imported ratios. Since nearly all gasoline is domestically produced, its price increases only reflect crude increases.

These rules produce straight pass through of costs to products without shifting costs from one product to another. As an alternative to this simple, pro-rata "cost pass through" price construction, historical price relationships were also examined. Historical ratios of the various product prices to the refined products average were used to forecast prices. The results of forecasting prices on the basis of historical ratios was little different from that given by the simple pass through assumptions. Since it is expected that regulations will be enforced to equalize product price increases, the equalized cost pass through with immediate adjustment was used to forecast prices. The nominal price forecast assumed is given in Table VIII.

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* Although higher imported oil prices are quoted, $11 is the estimate of the average economic cost of imports to refiners. See Appendix B.

First Four Months of 1975

For the transition period February 1 to April 30, 1975, the following prices were used.

The per barrel increases in crude prices in February, March, and April reflect the $1, $2, $3 import fee on imported crude. Domestically produced crude is still averaged under the Old-New Oil Scheme. The product average, residual, distillate, and gasoline prices during this period reflect the change in crude prices due to the $1, $2, $3 crude import fee and the $0, 60¢, $1.20 fee on imported products,* as well as the ratio of domestically produced to imported products.

These ratios are assumed to be:

Petroleum Product Average	
Domestically Produced	.82
Imported as Product	.18
Residual	
Domestically Produced	.35
Imported as Product	.65
Distillate	
Domestically Produced	.85
Imported as Product	.15

Gasoline - All Domestically Produced.

Product prices are calculated as follows:

Petroleum Product Average Wholesale Price = $10.15** + .82 (Average Change in Crude Oil Price) + .18 (Change in Product Import Fee)

Residual Wholesale Price = $ 7.75** + .35 (Average Change In Crude Oil Price) + .65 (Change in Product Import Fee)

Distillate Wholesale Price = $11.98** + .85 (Average Change in Crude Oil Price) + .15 (Change in Product Import Fee)

Gasoline Retail Price = $0.41** + Average Change in Crude Oil Price per gallon

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* See The White House, Fact Sheet (January 15, 1975) The President's State of the Union Message, p. 33, items (A) 1(a) and (A) 1(c). The system of rebates on products nullifies the February fee on products.

** Latest observed price per barrel - except gasoline (per gallon).

Table VIII

Price Assumptions

	Jan.	Feb.	March	April	March
Crude*	8.44	8.99	9.54	10.09	13.00
All Products*	10.15	10.60	11.16	11.72	14.25
Distillate*	11.98	12.44	13.00	13.56	16.15
Residual*	7.75	7.94	8.52	9.10	10.64
Gasoline**	.41	.423	.436	.449	.519

---

* Wholesale prices per barrel

** Retail price per gallon excluding taxes. The natural average for gasoline taxes is 12-14¢.

INVENTORY ADJUSTMENTS FOR 1975

A comparison of forecast and observed inventory policies for the months of October, November and December 1974 has revealed higher than forecast stock levels. In fact the stock levels observed at the beginning of December 1974 are believed to be near the industry's sustainable capacity as that capacity was measured in September 1973. As a result, the inventory profiles assumed for the supply/demand simulations presented here were changed in the aggregate to be consistent with recent observations. A more careful analysis of expected product by product inventory behavior will be incorporated in the implementation of the regionalized, shortfall minimizing supply/demand simulation to be prepared in February 1975.

Stated simply: the inventory changes projected for 1975 in Technical Report 74-5 and subsequent applications of that report showed a net drawdown in 1975 of over 200 MBD for 1975 as a whole. The estimate of this reduction in inventories arises from the imposition of "minimum operable" as compared to "historically normal" bounds on major product inventories.* The inclusion of more traditional inventory profiles will be reflected in the results of the next application of the full regional model.

For the forecasts given above the following assumptions were imposed upon the aggregate inventory profile assumed:

-- a zero net change in aggregate stock levels over 1975;

-- inventory build-up in the second and third quarter 1975 was constrained such that the largest assumed aggregate stock level was that observed on December 1, 1974;**

-- the relative rate of first quarter to fourth quarter drawdown and second quarter to third quarter build-up was set at that given by the Base Case simulation in Technical Report 74-5.

The assumed inventory profile for 1975 is as follows (in MBD):

Quarter	Stock Change
1975:1Q	-229
1975:2Q	+165
1975:3Q	+323
1975:4Q	-260

* Such an inventory policy is appropriate to a period of embargo related shortages; but not appropriate to the current supply situation.

** Aggregate inventories are estimated to have changed by-770 MBD during December 1974.

APPENDICES

Appendix A: Comparisons of Forecasts of Petroleum Product Demand Illustrating the Effects of Prices and Other Factors

Appendix B: Domestic New Oil and Imported Crude Prices

APPENDIX A

Comparisons of Forecasts of Petroleum Product Demand Illustrating the Effects of Prices and Other Factors

The time series describing the consumption demand associated with four different sets of assumptions were determined using the petroleum product forecasting procedure (documented in Technical Report 74-5). The assumptions separate income and weather effects from price effects from the end of 1973 through 1975. Actual data is used for all the time series for all periods prior to the fourth quarter of 1973. The particular assumptions follow.

Series I: Pre-Embargo Forecast

This series projects consumption demand for the fourth quarter 1973, and for the years 1974 and 1975 under the assumption that the severe economic downturn did not occur, that the relative price of petroleum products did not increase, and that normal weather prevailed. The macroeconomic forecast assumed was prepared in December 1973.

Series II: Income and Weather Effects

This series simulates consumption demand from fourth quarter 1973 through 1974 using observed values for the macroeconomic variables and the weather. Normal weather was assumed for 1975. The macroeconomic forecast for 1975 was prepared in December 1974. The differences between Series I and II are attributable entirely to income and weather effects. The relative price of petroleum products was held at its third quarter 1973 level.

Series III: Price Effects

Series III differs from Series II in that the effects of the increase in petroleum prices are incorporated in the simulation. For 1975 the relative price of petroleum products was assumed to remain at its present level. For 1974 Series III represents "expected consumption" as determined by the forecasting procedure. For 1975 Series III is the current "base case" forecast without accounting for the President's program.

Series IV: Actual Consumption for 1974, the President's Program in 1975

Series IV portrays actual demand during 1974 and presents the demand forecast associated with the President's program as documented above.

THE COMPARISONS

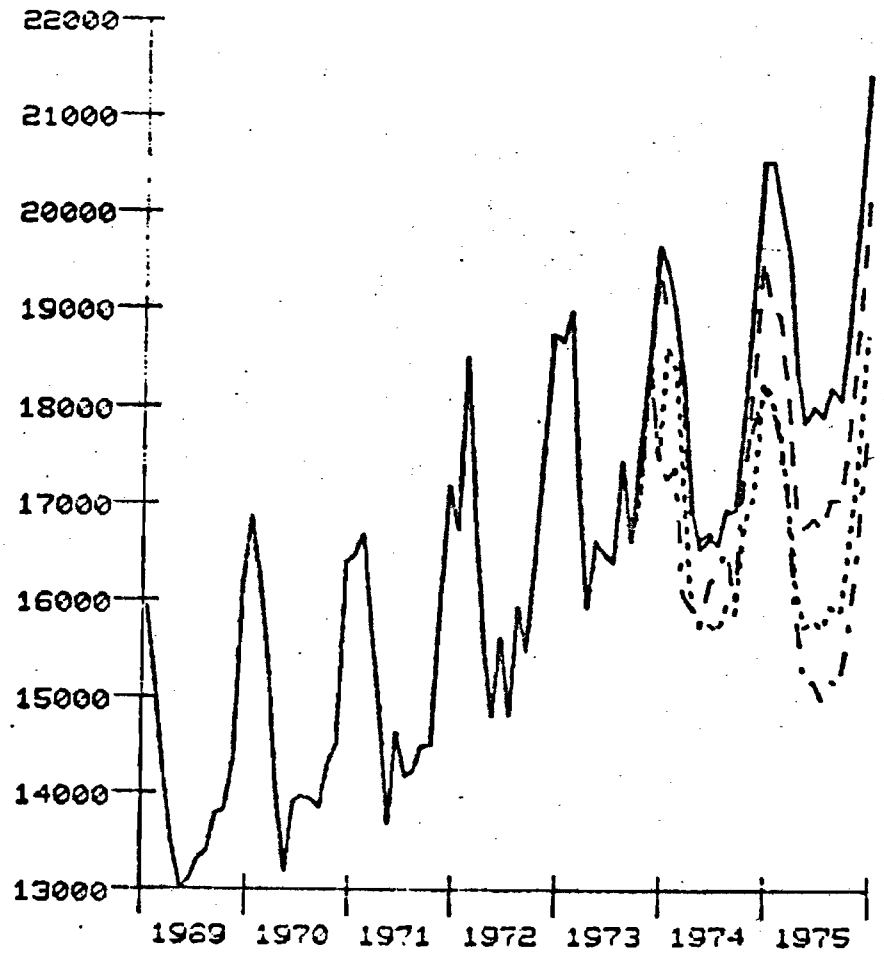
The following figures present recent consumption experience and forecast consumption for each of the assumptions given above, for each of motor gasoline, distillate and residual fuel oil, and all petroleum products taken together

- o the four time series are illustrated for the period 1969-1975 and separately for 1974 and 1975 on a larger scale
- o the four time series are expressed in percentage terms with Series I = 100%. The three remaining series are plotted in percentage terms with respect to Series I.

For 1974 actual consumption fell below those levels which were anticipated before the economic downturn and higher prices (as given in Series I). Even when higher prices and lower income are taken into account, first quarter demand is still lower than "expected" due to the embargo. In the summer of 1974 a surge of post-embargo "pent up" demand may be noted. However, in the last quarter of 1974 demand returns to "expected" levels determined by the forecasting procedure.

A brief discussion of alternative elasticity estimates is provided as the last section of the Appendix.

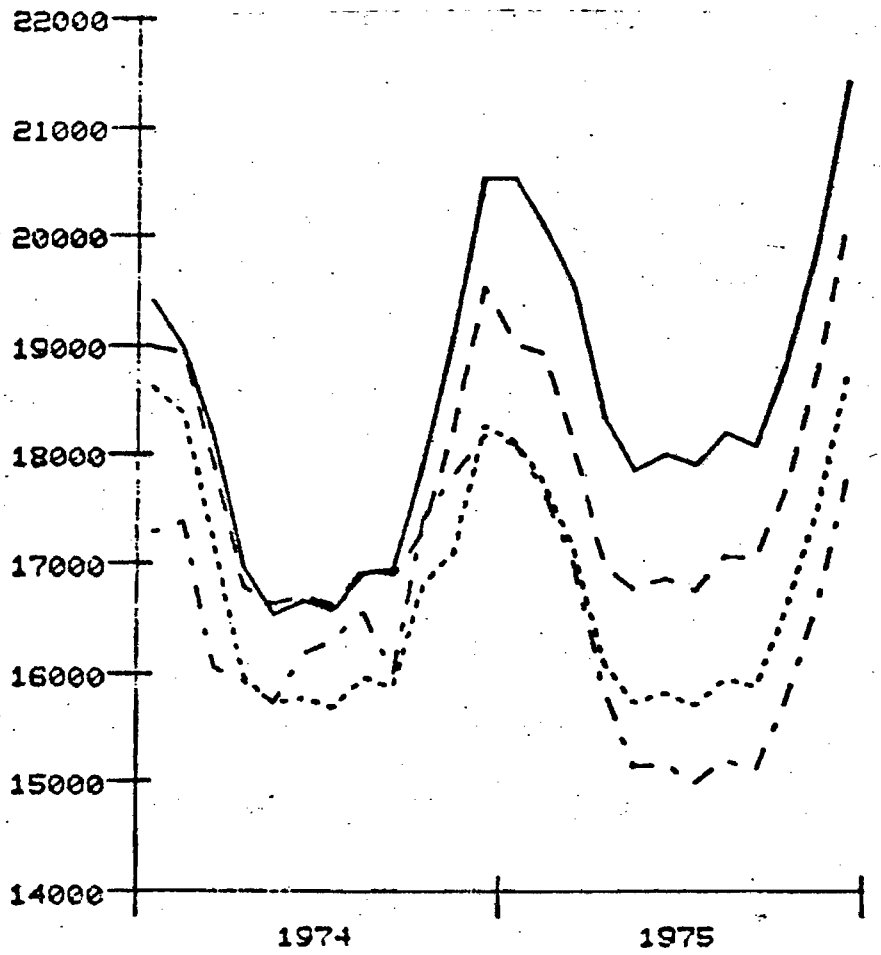
COMPARISONS OF TOTAL PRODUCT DEMAND
(MBD)



Series

I: Pre-Embargo Forecast
II: Income and Weather Effects - - - - - - -
III: Price Effects added to Income and Weather Effects . . . . . .
IV: Actual 1974, President's Program 1975 -. -. -. -.

COMPARISONS OF TOTAL PRODUCT DEMAND
(MBD)



Series

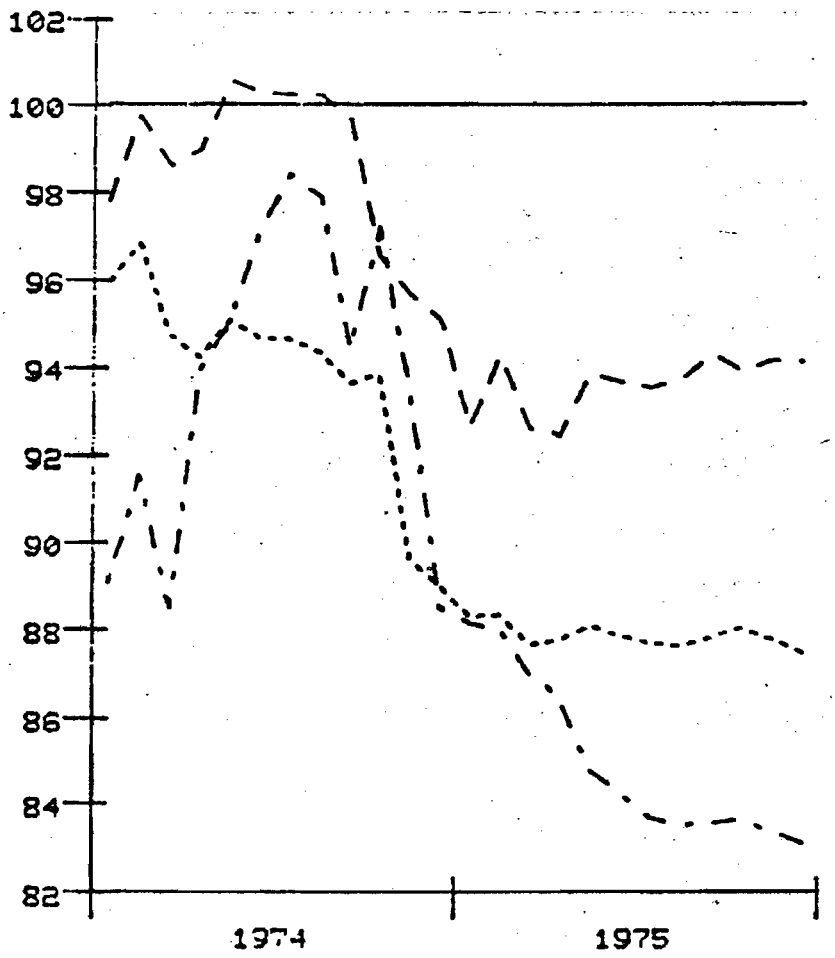
I: Pre-Embargo Forecast _____

II: Income and Weather Effects - - - - - - -

III: Price Effects added to Income and Weather Effects . . . . . .

: Actual 1974; President's Program 1975 -. -. -. -.

COMPARISONS OF TOTAL PRODUCT DEMAND
(in percentage terms)



Series

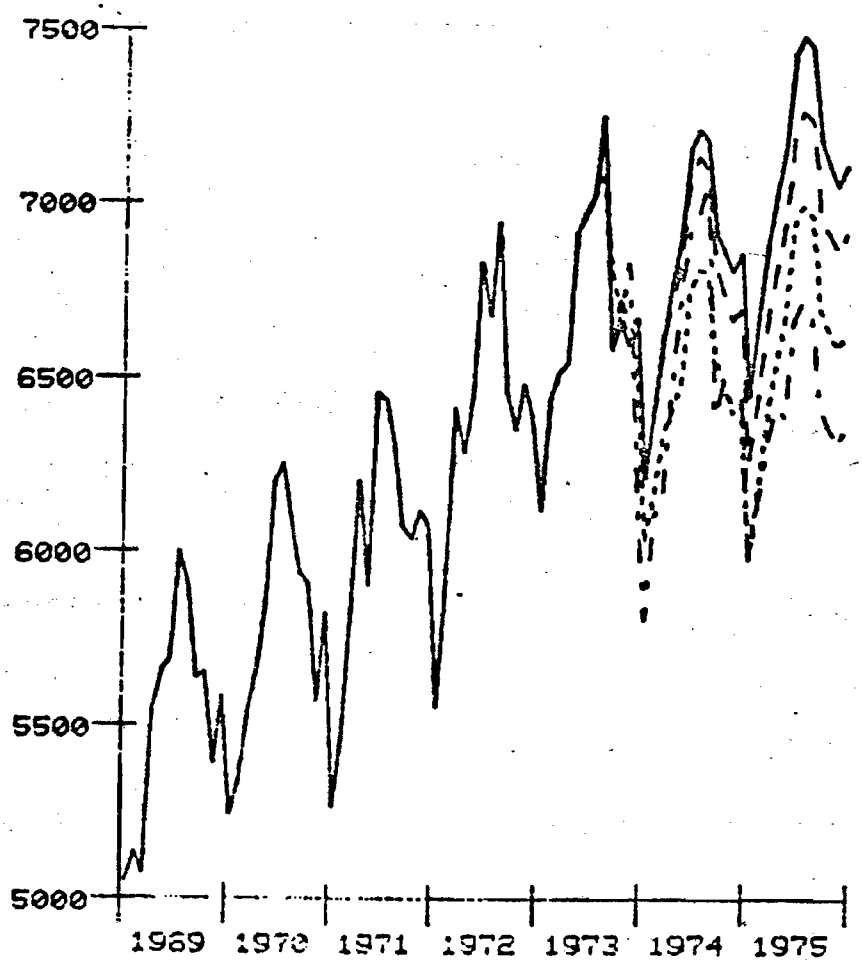
I: Pre-Embargo Forecast _____
II: Income and Weather Effects - - - - - - -
T: Price Effects added to Income and Weather Effects . . . . . .
: Actual 1974, President's Program 1975 -. -. -. -.

COMPARISONS OF TOTAL PRODUCT DEMAND
(MBD)

	1969	1970	1971	1972	1973
Series I	14139.578	14702.325	15221.995	16424.795	17498.876
Series II	14139.578	14702.325	15221.995	16424.795	17450.454
Series III	14139.578	14702.325	15221.995	16424.795	17281.801
Series IV	14139.578	14702.325	15221.995	16424.795	17264.536

	1974	1975
Series I	17879.671	19046.637
Series II	17613.712	17826.402
Series III	16771.039	16734.724
Series IV	16726.897	16186.571

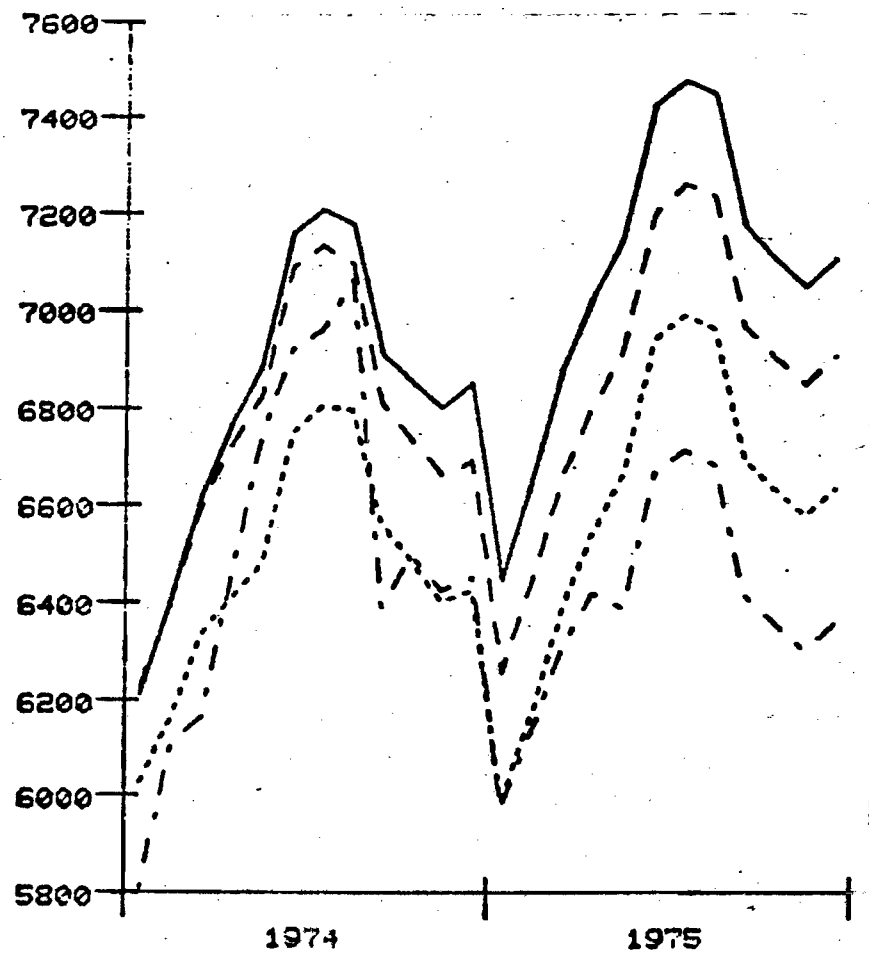
COMPARISONS OF MOTOR GASOLINE DEMAND
(MBD)



Series

I: Pre-Embargo Forecast _____
II: Income and Weather Effects - - - - - - -
III: Price Effects added to Income and Weather Effects . . . . . .
IV: Actual 1974, President's Program 1975 -. -. -. -.

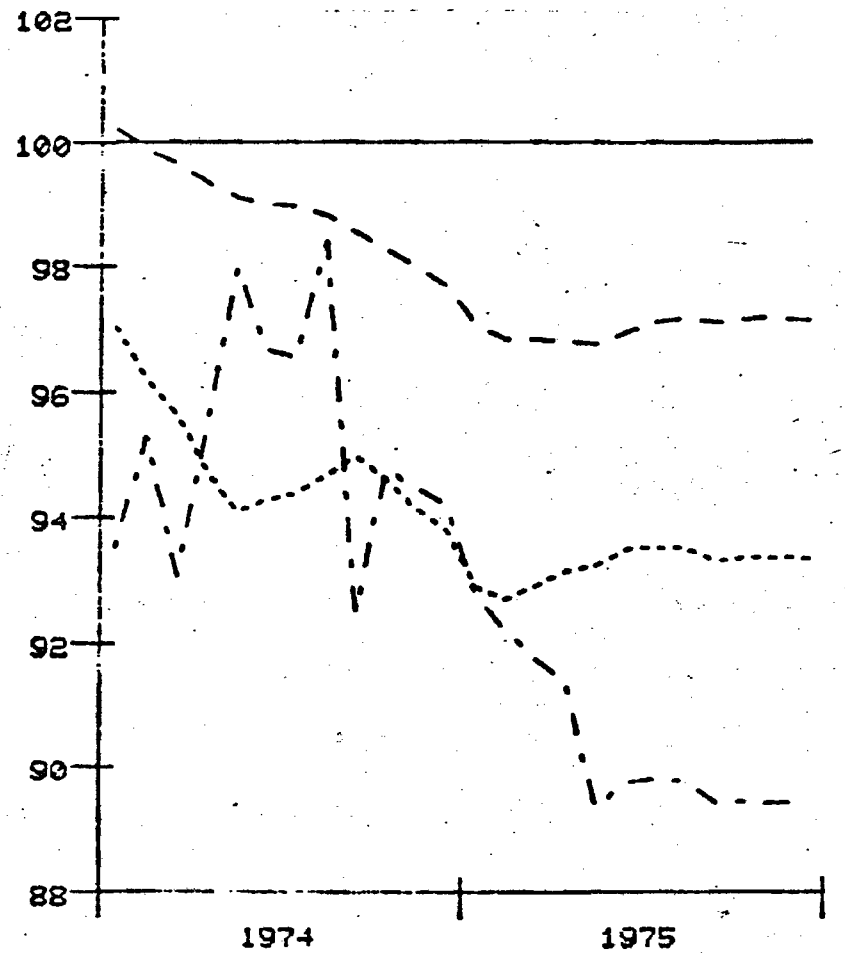
COMPARISONS OF MOTOR GASOLINE DEMAND
(MBD)



Series

I: Pre-Embargo Forecast _____
II: Income and Weather Effects - - - - - - -
III: Price Effects added to Income and Weather Effects . . . . . .
/: Actual 1974, President's Program 1975 -. -. -. -.

COMPARISONS OF MOTOR GASOLINE DEMAND
(in percentage terms)



Series

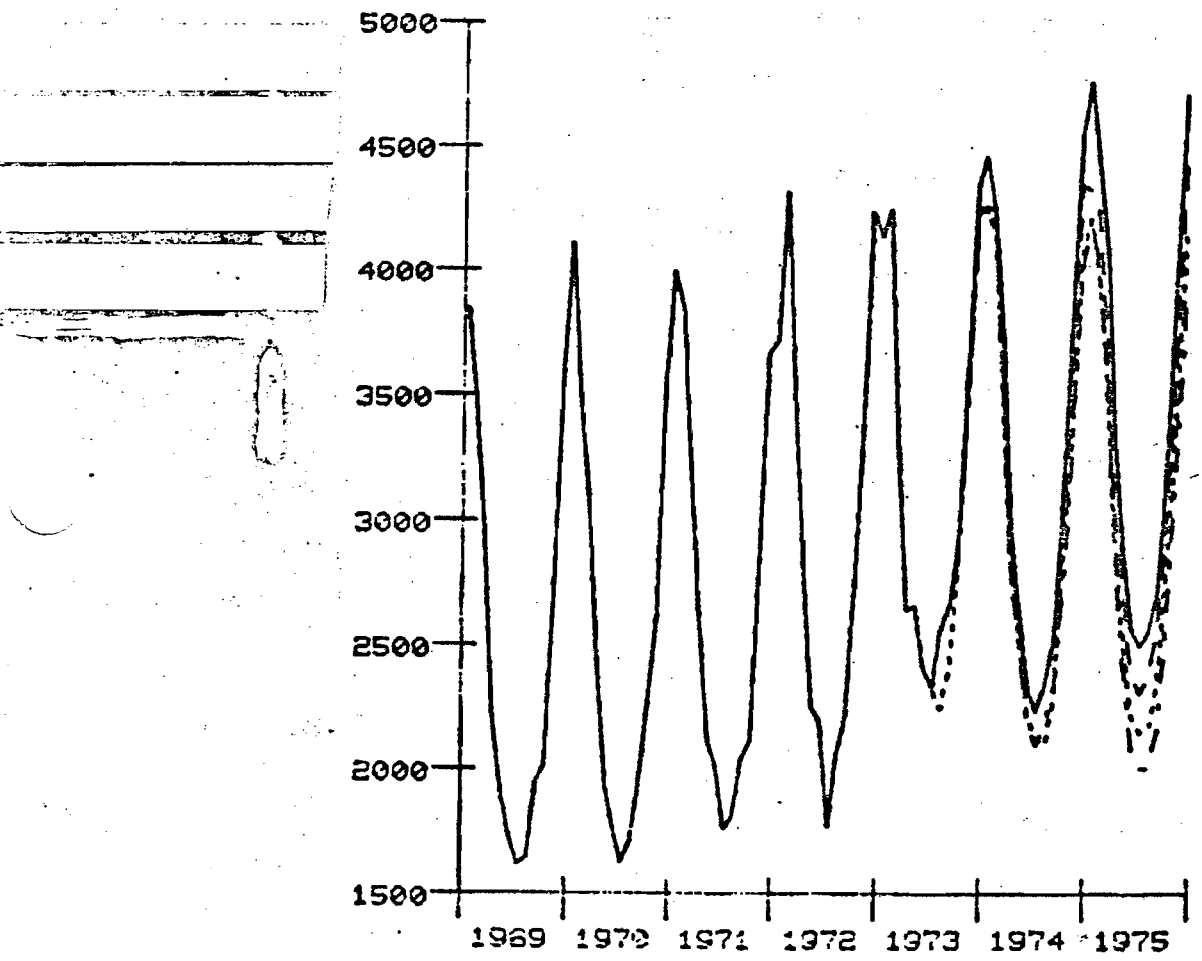
I: Pre-Embargo Forecast
II: Income and Weather Effects - - - - - - -
III: Price Effects added to Income and Weather Effects . . . . . .
': Actual 1974, President's Program 1975 -. -. -. -.

COMPARISONS OF MOTOR GASOLINE DEMAND
(MBD)

	1969	1970	1971	1972	1973
Series I	5523.206	5781.476	6012.151	6391.249	6684.050
Series II	5523.206	5781.476	6012.151	6391.249	6696.738
Series III	5523.206	5781.476	6012.151	6391.249	6683.359
Series IV	5523.206	5781.476	6012.151	6391.249	6671.254

	1974	1975
Series I	6819.155	7076.738
Series II	6746.946	6865.342
Series III	6467.523	6596.793
Series IV	6496.869	6391.458

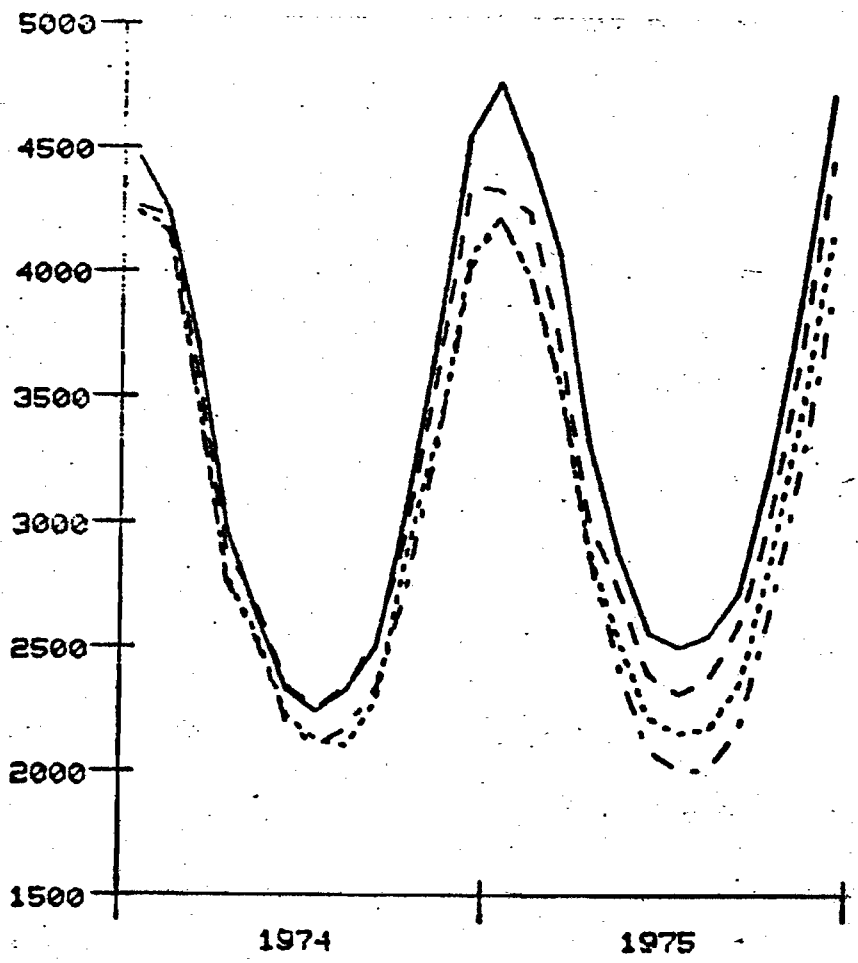
COMPARISONS OF DISTILLATE DEMAND
(MBD)



Series

I: Pre-Embargo Forecast _____
II: Income and Weather Effects - - - - - - -
III: Price Effects added to Income and Weather Effects . . . . . .
IV: Actual 1974, President's Program 1975 -. -. -. -.

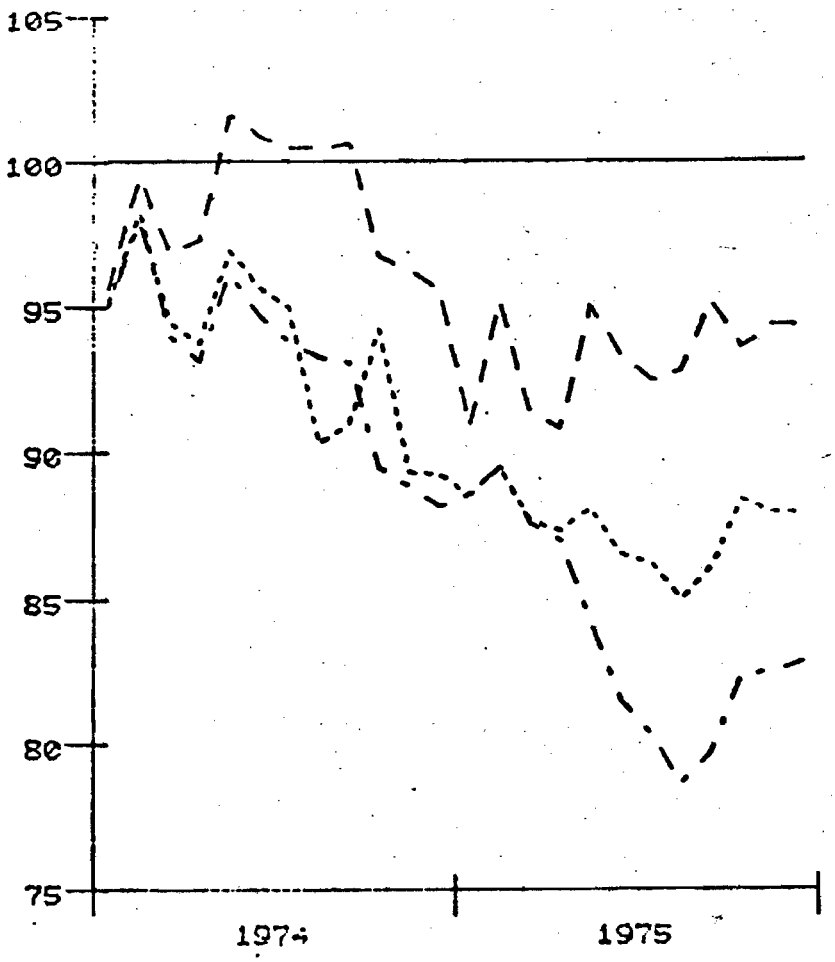
COMPARISONS OF DISTILLATE DEMAND
(MBD)



Series

I: Pre-Embargo Forecast _____
II: Income and Weather Effects - - - - - - -
III: Price Effects added to Income and Weather Effects . . . . . .
V: Actual 1974, President's Program 1975 -. -. -. -.

COMPARISONS OF DISTILLATE DEMAND
(in percentage terms)



Series

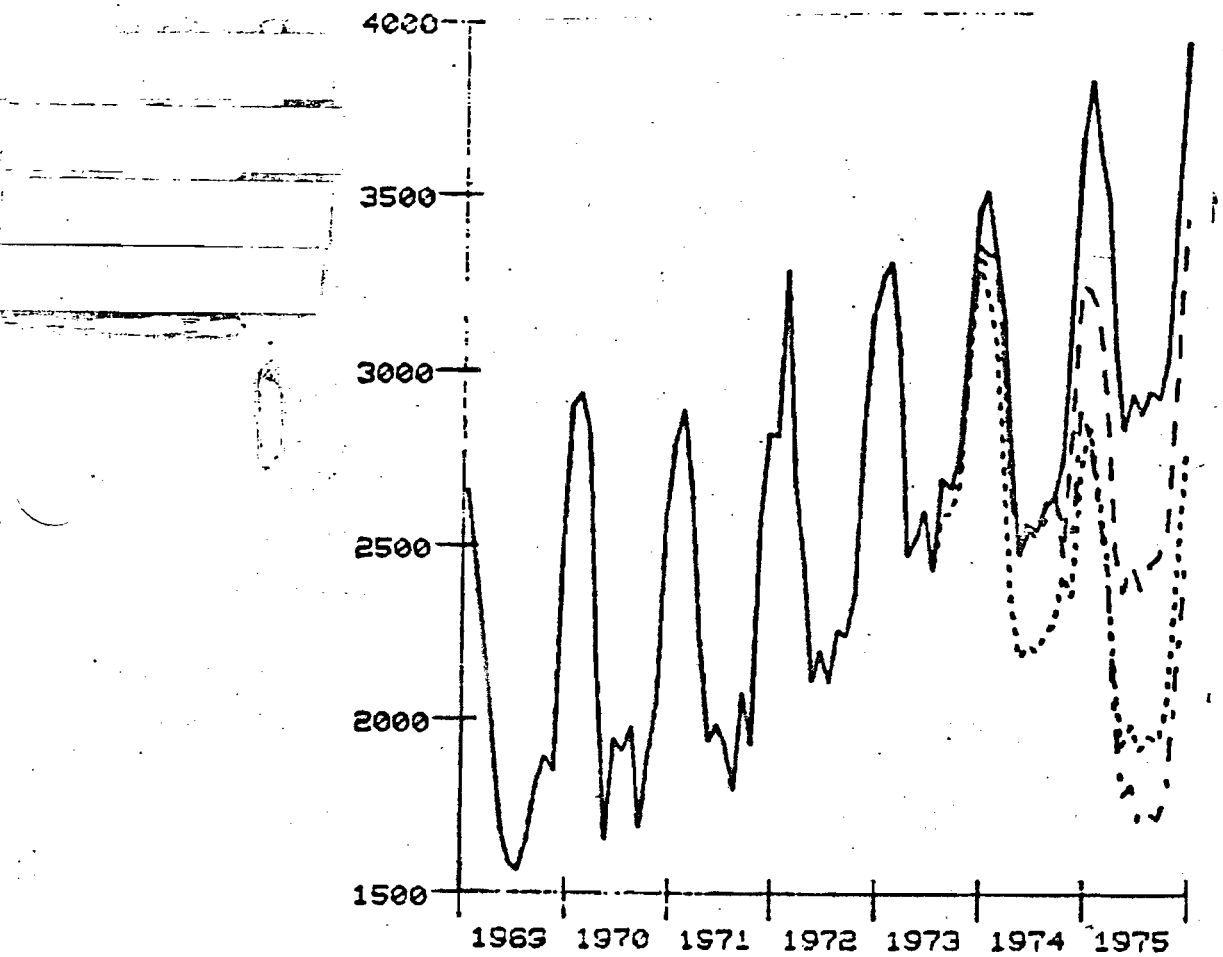
I: Pre-Embargo Forecast _____
II: Income and Weather Effects - - - - - - -
III: Price Effects added to Income and Weather Effects . . . . . .
IV: Actual 1974, President's Program 1975 -. -. -. -.

COMPARISONS OF DISTILLATE DEMAND
(MBD)

	1969	1970	1971	1972	1973
Series I	2471.056	2544.016	2667.570	2929.040	3145.984
Series II	2471.056	2544.016	2667.570	2929.040	3128.233
Series III	2471.056	2544.016	2667.570	2929.040	3079.981
Series IV	2471.056	2544.016	2667.570	2929.040	3129.922

	1974	1975
Series I	3224.843	3461.554
Series II	3161.426	3227.345
Series III	3016.302	3033.582
Series IV	2999.126	2918.757

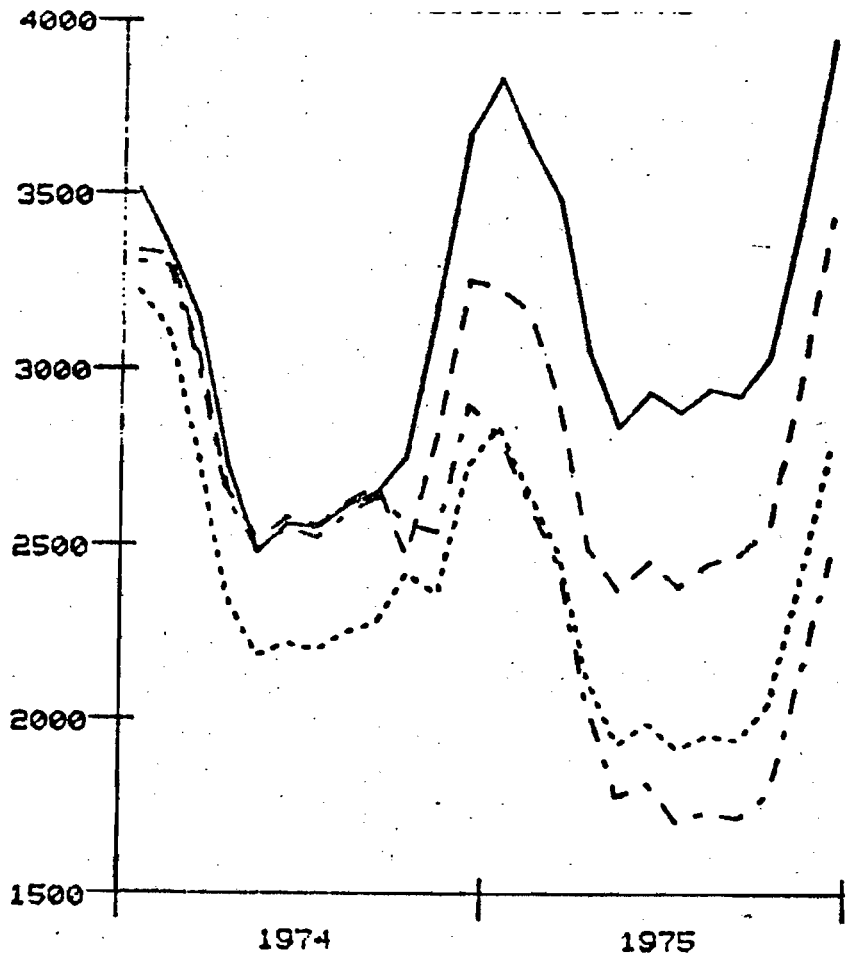
COMPARISONS OF RESIDUAL DEMAND
(MBD)



Series

I: Pre-Embargo Forecast
II: Income and Weather Effects - - - - - - -
III: Price Effects added to Income and Weather Effects . . . . . .
IV: Actual 1974, President's Program 1975 -. -. -. -.

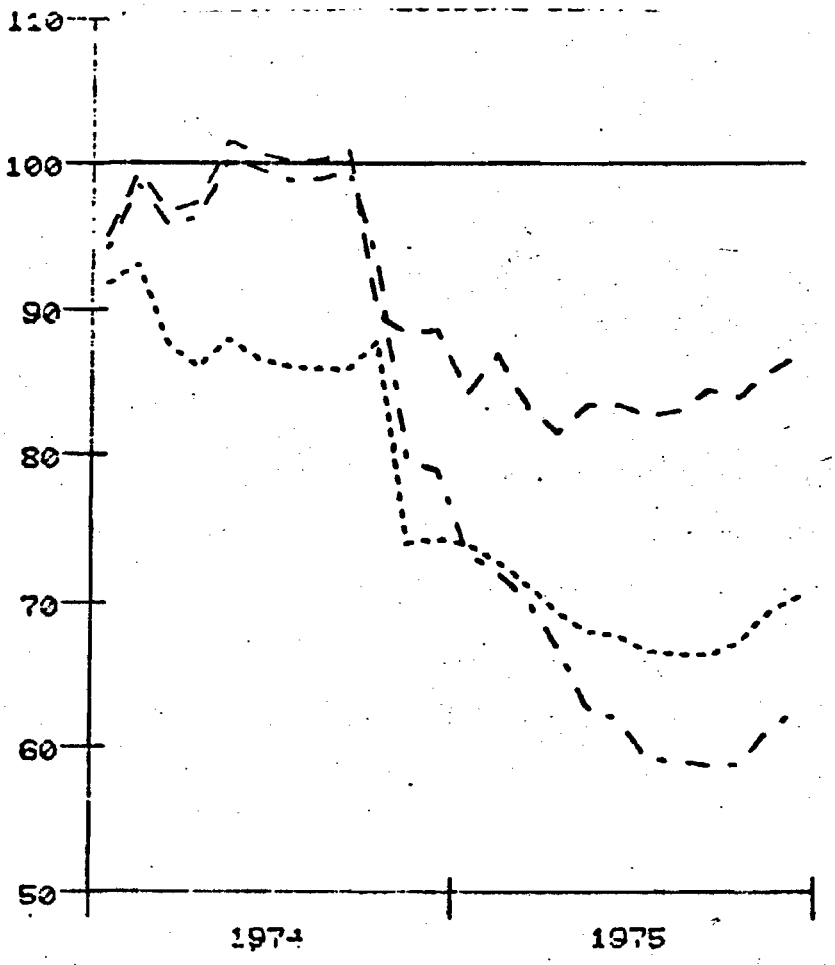
COMPARISONS OF RESIDUAL DEMAND
(MBD)



Series

I: Pre-Embargo Forecast _____
II: Income and Weather Effects - - - - - - -
III: Price Effects added to Income and Weather Effects . . . . . .
IV: Actual 1974, President's Program 1975 -. -. -. -.

COMPARISONS OF RESIDUAL DEMAND
(in percentage terms)



Series

I: Pre-Embargo Forecast _____
II: Income and Weather Effects - - - - - - -
III: Price Effects added to Income and Weather Effects . . . . . .
IV: Actual 1974, President's Program 1975 -. -. -. -.

COMPARISONS OF RESIDUAL DEMAND
(MBD)

	1969	1970	1971	1972	1973
Series I	1979.634	2206.707	2299.857	2540.901	2861.546
Series II	1979.634	2206.707	2299.857	2540.901	2845.528
Series III	1979.634	2206.707	2299.857	2540.901	2821.617
Series IV	1979.634	2206.707	2299.857	2540.901	2836.278

	1974	1975
Series I	2930.882	3244.806
Series II	2817.434	2735.381
Series III	2503.294	2249.949
Series IV	2749.009	2084.824

COMPARISON OF SELECTED ELASTICITIES

The short run elasticity estimates incorporated in the FEA short-term forecasting procedure are difficult to estimate, particularly in the case of disaggregated product categories. Representative elasticity estimates from alternate sources are presented in Table AI for purposes of comparison to indicate the general plausibility of the figures used in the forecasts. However, the precise interpretation or application of these estimates should not be attempted out of context of the models in which they are developed, the time frames to which they are applied, or the definitions used in their computation. The elasticities presented are calculated on a consistent basis but are intended to be only summary indicators of the price sensitivity of the alternate models. An accurate statement of the price response of other models would require direct application of the full model to price and other changes.

TABLE AI

ESTIMATES OF PRICE ELASTICITY OF DEMAND
PETROLEUM AND PRODUCTS[1]
SHORT RUN
(Up to 1 Year)

	FEA[2]	Houthakker, Verlager & Sheehan[3]	Phlips[4]	DRI[5]	Chase[6]	Hudson-Jorgenson[7]
All Petroleum[8]	-.10			-.10	-.10	-.11
Gasoline[1]	-.10 (-.15)	-.09 (-.14)	-.07 (-.11)		-.13 (-.20)	
Distillate	-.12					
Residual	-.21					
Kerojet	-.08					
Naphthajet	-.08					
LPG	-.05					
Petrochemicals	-.16					
Other Products	-.05					

1/ Estimates of gasoline elasticity relate to retail prices, extax shown in parentheses. All other estimates relate to wholesale prices or have been converted to wholesale prices under the assumption that cost pass-throughs occur without proportional markups.

2/ Consensus estimate by Troika, CEA, Treasury, OMB, and FEA - 1974.

3/ Prepared by EPA and CEQ - December 1973.

4/ Phlips, L., "A Dynamic Version of the Linear Expenditure Model," The Review of Economics and Statistics, Vol. LIV, No. 4 (Nov. 1972), pp. 450-465.

5/ DRI Energy Forecast, January 1975.

6/ Chase Econometric Analysis, January 24, 1975.

7/ For Ford Foundation - 1974.

8/ All elasticities relate to wholesale prices except that in the case of gasoline the second figure in () relates to the retail price before excise taxes. In judging the relative degree to which different products respond to price, the wholesale figures provide the best indication. They indicate that gasoline is less responsive than some other product.

The elasticity figure is higher for the retail price than for the wholesale price. That is because the elasticity is the ratio between the percentage change in consumption and the percentage change in price. A 10¢ change, for example, would be a 40% change in a 25¢ wholesale price, but only a 25% change in a 40¢ retail price -- thus, the denominator of the elasticity figure would be greater in the case of the wholesale price than in the case of the retail price. However, if the change in actual consumption -- the numerator -- remains the same, the elasticity figure changes.

APPENDIX B

Domestic New Oil and Imported Crude Prices

The current average price of imported crude reported to the FEA for the cost passthrough is $12.53 per barrel (November). New oil prices currently average about $10.83 per barrel. This appendix discusses differences between the declared and economic price of crude.

One important reason for the difference is the method of valuating imported oil for the cost passthrough. Currently, there are three basic types of purchases of foreign crude: equity, participation, and third party. Equity oil is that oil produced and owned by the concessionaire (e.g., Aramco) under agreement with the host country. Since the concessionaire owns the oil there is no purchase price per se. However, the host country charges the concessionaire taxes and royalties on this oil. The sum of these taxes and royalties, plus the cost of producing the oil, is the tax paid cost and represents the real cost of the oil to the concessionaire. Although there have been increases in tax and royalty rates in recent months, during 1974 tax paid costs were lower than the price of crude sold to non-concessionaires.

The second type of purchase, participation oil, is that oil produced by the concessionaire which the host country owns as a result of a participation agreement and which the host government sells to the concessionaire at a negotiated price. For example, sixty percent of the oil produced by Aramco is owned by Saudi Arabia and Saudi Arabia sells the major portion of this oil back to companies of Aramco at the "buyback" price, which currently is $10.46 per barrel.

The third type of purchase, third party purchases, is oil purchased by any company either from the host government or the concessionaire. This price may be viewed as a free market price although this price will vary depending upon purchase terms (i.e., quantity and date of delivery). During 1974 at times third party purchase prices were higher than both government tax paid costs and buyback prices. During the first quarter some third party purchases ran in excess of $20.00 per barrel.

For purposes of the cost-passthrough refiners value buyback oil and third party purchase oil at purchase price plus transportation cost and fees.

However, for equity crude refiners are permitted to set a value on their equity crude which would prevail if they had dealt with their affiliated entities at arms'-length. In effect, this means that the refiner may charge himself a price or his equity crude which equals the third party purchase price. The $12.53 figure for imported crude includes equity crude which is valued above its actual cost to the refiner. Also, there is the added factor of the U.S. treatment of taxes paid on equity crude. Taxes paid to host governments are the basis for foreign tax credits, and this may reduce the real costs of equity crude. In this sense the $12.53 figure overstates the real costs of imported crude to the refiner. Thus, the difference between the prices of new oil and imported oil reported for the cost passthrough does not necessarily reflect the difference in "real costs" to the refiner.

The real difference in cost is difficult to determine. New Oil prices are still rising and have not stabilized, but it is safe to assume that they will stabilize at some price below $12.53, which would represent an equilibrium between the real costs of imported oil and the price of new oil.

Although institutional complexities complicate the determination of imported crude prices, the equilibrium price of new domestic crude and the opportunity cost of acquiring imported crude will be the same. Therefore, the analysis in this study assumes an imported oil price of $11 per barrel, the approximate price of New Oil.

B

COMPARISON OF FEA FIGURES WITH INTERIOR COMMITTEE STAFF ANALYSIS OF THE PRESIDENT'S ENERGY PROGRAM

TECHNICAL REPORT

75-3

F.E.A. - E.A.T.R. - 75-3

FEBRUARY 5, 1975

OFFICE OF ECONOMIC IMPACT
OFFICE OF QUANTITATIVE METHODS

FEDERAL ENERGY ADMINISTRATION

COMPARISON OF FEA FIGURES WITH INTERIOR COMMITTEE STAFF ANALYSIS OF THE PRESIDENT'S ENERGY PROGRAM

BACKGROUND

On Friday, January 17, an Interior Committee staff study prepared for Senator Henry M. Jackson was issued as a critique of President Ford's energy program. This critique estimated that the minimum direct cost to consumers of the President's program was over $43 billion and that producer profits would be at least $14 billion. The study's assumptions and analysis have been carefully reviewed and it appears that there is a substantial over estimate of the cost figures and that there are little or no increases in producer profits. This paper attempts to show where assumptions and conclusions differ from those of FEA analysis.

COMPARISON OF RESULTS

The staff study indicates that the tax revenues from the President's program will be $29 billion, substantially the same as the Administration estimate of approximately $30 billion. However, costs of the programs, as estimated by the Committee staff are $43 billion. Table 1 compares the total costs of the program as estimated by the Administration with the Interior Committee staff estimates. The portion of these additional costs that will be paid by the consumer is $19.2 billion. A detailed discussion of the underlying assumptions and support for these figures is presented below.

TABLE 1

COMPARISON OF ALTERNATIVE COST ESTIMATES[1/]
($ Billions)

Action	Interior Committee Staff Study	FEA Cost Analysis
Oil		
Petroleum Import Fee	$ 4.8	$ 3.97
Excise Tax on Domestic Crude Oil	6.4	7.22
Decontrol of Old Oil	12.6	13.01
	$23.8	$24.20
Natural Gas		
New Interstate Gas	$ 4.5	$ 1.09
Old Interstate Gas	3.8	4.38
Intrastate Gas	8.9	2.33
	$17.2	$ 7.80
Coal		
Price Increase	$ 2.3	$ 0.0

1/ Calculations for both studies are contrasted in the section discussing the assumptions of the analyses.

The Treasury Department estimates that $5 billion of this cost increase applies to state and local governments. The FEA analysis of the macroeconomic effects indicates that approximately $7.8 billion will flow into capital goods investment or will be absorbed by reduced markups under forecasted market conditions. Therefore, the net first year costs at an annual rate are $19.2 billion for consumers.

Finally, the staff study's higher estimates of consumer costs were compounded when converted to average costs per household. The study assumes 53 million families of four when, in fact, there are about 70 million households in this country. Therefore, estimates per family are too high and ignore the important fact that the costs will vary substantially by income class and be as low as $85 per year for the lowest income group (0-$2,000 class). Table 2 illustrates this range of costs and contrasts these increased costs with estimates of expected tax relief.

TABLE 2

ILLUSTRATIONS OF PERMANENT TAX RELIEF AND INCREASED ENERGY COSTS AT VARIOUS LEVELS OF HOUSEHOLD INCOME

Household Income	Total Increased Energy Costs	Permanent Tax Relief Plus $80 Special Payments for Adjusted Gross Incomes Equal to Household Incomes Shown	
		Single Person	Family of Four Persons
$ 2,000	$ 85	$ -80	$-160
3,000	110	-120	-160
5,000	150	-250	-178
8,000	188	-297	-337
10,000	228	-254	-349
12,000	253	-190	-316
15,000	296	-190	-221
18,000	318	-190	-210
25,000	393	-190	-192
30,000	420	-148	-151

SOURCE: Office of the Secretary of the Treasury, Office of Tax Analysis, January 30, 1975

DIFFERING ASSUMPTIONS

There are major differences in some of the assumptions used in each analysis. These are highlighted in this section along with the detailed cost calculations.

Oil

The mix between imported oil and domestic oil is different because FEA estimates assume that demand reductions and import savings occur. In addition, FEA's inclusion of Natural Gas Liquids is identified separately from aggregate crude oil. However, the total figures are quite similar.

The figures of the Committee Staff Study are repeated as:

	Consumer Cost ($ Billions/Yr)
1. Imported Oil	
Tariff: 6.5 MMBD X 365 X $2	$ 4.8
2. Presently Controlled Oil	
a. Decontrol: 5.7 MMBD X 365 X $8.15	12.6
b. Excise Tax: 5.7 MMBD X 365 X $2	4.2
3. Presently Uncontrolled Oil	
Excise Tax: 3.0 MMBD X 365 X $2	2.2
TOTAL OIL	$23.8

The FEA Analysis is contrasted as:

	Consumer Cost ($ Billions/Yr)
1. Import Fee	
Uses estimate of 5.433 MMBD Imports after implementation of President's Program	
$2 X 5.433 MMBD X 365 =	$ 3.966
2. Excise Tax on Domestic Oil	
Production of 8.7 MMBD	
$2 X 8.7 MMBD X 365 =	6.35
Equivalent Tax of $1.43 per Barrel of Natural Gas Liquids (NGL) with 1.66 MMBD	
$1.43 X 1.66 MMBD X 365 =	.866
3. Decontrol of Old Oil	
Assumes 60% old oil exclusive of Elk Hills (.1 MMBD annual average), hence 5.16 MMBD of old oil rising from controlled price of $5.25 to uncontrolled price of $11.	
$5.75 X 5.16 MMBD X 365 =	10.83
Assumes NGL price rises equivalent amount of crude oil. Crude increase $4.56 less $1.43 due to NGL tax.	
$3.13 X 1.66 MMBD X 365 =	1.896
Adjustment of + $.29 billion to account for rounding and refinery gain and to balance calculated increase of product prices of $4.10 and average consumption of 16.17 MMBD.	.29
($4.10 X 16.17 MMBD X 365 = $24.2 billion)	
	$24.198

Natural Gas

The staff study assumes that there will be large windfall profits to natural gas producers (almost $10 billion). In fact, this argument overstates the natural gas impacts for the following reasons:

-- Approximately one trillion cubic feet of contracts for interstate gas would expire and be available for new contracts in 1975, even with decontrol. This is less than half of the staff study estimates. Without deregulation very little new gas is going to interstate sales.

-- The Committee staff estimates that intrastate natural gas prices will rise to $2.21 per MCF and that 60% of all intrastate gas contracts could be renegotiated to that price. This is inconsistent with current market conditions. Current spot prices for intrastate natural gas are about $1.50 per MCF, which is less than the BTU equivalent of oil at $11.40 (Interior staff figure) which would be $1.97. With a $.37 excise tax, the new intrastate price would be estimated at $1.87 or more, but not at $2.21. Present intrastate prices average about $.50 per MCF although new sales are at $1.50 per MCF. This indicates that only the equivalent of 20% of intrastate average prices reflect the current price of $1.50.

-- Deregulation would presumably bring up to .8 tcf of additional gas into the interstate market in 1975. If this occurs it would tend to replace an equivalent amount of imported oil which would have cost consumers as much or more as the new gas prices. The President's program would tend to shift this amount from oil imports to gas, but would only increase consumer costs by the amount of the excise tax.

The figures of the Committee Staff Study are:

	Consumer Cost ($ Billions/Yr)
1. New Interstate Gas	
Decontrol: 2.3 tcf X ($2.21-$0.45) X 1.11	$ 4.5
2. Old Interstate Gas	
Excise Tax: 9.2 tcf X $0.37 X 1.11	3.8
3. Intrastate Gas	
Price Increase: 0.6 X 11.0 X ($2.21-$1.00) X 1.11	8.9
TOTAL NATURAL GAS	$17.2

The FEA Analysis is contrasted as:

1. New Interstate Gas	
Estimated at .91 tcf with equilibrium price of $1.11 compared to average of $.28 on old gas. Excise tax of $.37.	
$1.20 X .91 tcf =	$ 1.092
2. Old Interstate Gas	
Interstate estimated as two thirds of total gas consumption of 19.1 tcf.	
$.37 (19.1 X .66 - .91) =	4.376
3. Intrastate Gas	
Excise tax on one third of total consumption.	
$.37 X (19.1 X .33) =	2.332
TOTAL NATURAL GAS	$ 7.800

Coal

The Interior Committee analysis assumes that half of the total coal produced will rise in price by an equivalent of $2 per barrel. We estimate that 80% of all coal is under long-term contracts, where prices tend to reflect long run coal production costs, which do not tend to rise in real terms. Further, our current estimate indicates that coal prices are limited by the inability of gas and oil consumers to convert to coal. As a result even the remaining 20% of coal sold in spot markets is likely to sell only at prices necessary to cover overtime pay and other costs of getting out the 1975 rate of production (about 35 MT more than 1974 because of production lost during the strike). Higher prices for oil would add very little to the amount of conversion to coal. Conversions to coal are estimated at 23 million tons in 1975 and 47 in 1976.

The figures of the Committee Staff Study are:

		Consumer Cost ($ Billions/Yr)
Price Increase:	0.5 X 540 mmt X 4:27 X $2	$ 2.3

The FEA Analysis is contrasted as:

-- FEA assumes no direct increase in coal due to the President's program.	$ 0.0

C

COMPARISON OF FEA FIGURES WITH THE LIBRARY OF CONGRESS CONGRESSIONAL RESEARCH SERVICE'S ANALYSIS OF THE PRESIDENT'S ENERGY PROGRAM

Technical Report

75-4

F.E.A. - E.A.T.R. - 75.4

February 5, 1975

Office of Economic Impact

Office of Quantitative Methods

FEDERAL ENERGY ADMINISTRATION

COMPARISON OF FEA FIGURES WITH THE LIBRARY OF CONGRESS CONGRESSIONAL RESEARCH SERVICE ANALYSIS OF THE PRESIDENT'S ENERGY PROGRAM

BACKGROUND

On January 23, 1975, the Congressional Research Service (CRS) of the Library of Congress, issued a critique of President's Ford energy program. This critique estimated that the direct costs to consumers of the President's program were in the range of $40-$50 billion and that the inflationary impact would be a 2.7 to 3.3 percentage point increase in the inflation rate. This study's assumptions and analysis have been carefully reviewed, and it appears that there is a substantial overestimate of the cost figures and that the change in the Consumer Price Index (CPI) will be less than that stated in the CRS analysis. This paper documents where the Congressional Research Service's assumptions and conclusions differ from those of the FEA analysis.

COMPARISON OF RESULTS

Total Cost

The Congressional Research Service estimates that the cost of the President's program could be as high as $50.3 billion in 1975. Table 1 presents the total cost of the program according to the Administration and to the Congressional Research Service. The portion of the total cost that will be paid by consumers is $19.2 billion. A detailed discussion of the underlying assumptions and support for these figures is presented below.

The Treasury Department estimates that $5 billion of this cost increase applies to state and local governments. The FEA analysis of the macroeconomic effects demonstrates that approximately $7.8 billion will flow into capital goods investments or will be absorbed by reduced markups under forecasted market conditions. Therefore, the net first year costs at an annual rate are $19.2 billion for consumers.

TABLE 1

COMPARISON OF ALTERNATIVE COST ESTIMATES 1/

Action	Congressional Research Service Study	FEA Cost Analysis
Oil		
Petroleum Fees and Excise Taxes	$12.6	$11.19
Decontrol of Old Oil	11.0	13.01
	$23.6	$24.20
Natural Gas		
Excise Tax	$ 8.36	$ 7.1
Deregulation of New Gas	5.40	.7
	$13.76	$ 7.8
Coal		
Price Increase	$ 5.2	$ 0.0
Changes in Utility Accounting		
Inclusion of Construction Work in Progress (CWIP) in Rate Base	$ 6.8	
Inclusion of Pollution Control Equipment in Rate Base	1.0	
	$ 7.8	$ 0.0

1/ Calculations for both studies are contrasted in the section discussing the assumptions of the analyses.

Impact on the Consumer Price Index

The Congressional Research Service study further states that given a cost of $50.3 billion in 1975 and given an anticipated 1975 GNP of $1500 billion, the President's program could raise prices by 3 percentage points. A stage-of-processing model was used by FEA to forecast the effect that energy price changes have upon the Consumer Price Index and components of the CPI. The model requires two inputs: (1) forecasts of wholesale energy prices and (2) forecasts of the general wholesale and retail price indices prior to energy price changes. Price information is combined with historical information on the relationship between the stages-of-processing to forecast the effects that energy price changes will have on the prices of curde wholesale goods, intermediate wholesale goods, finished wholesale products, and finally, retail consumer goods and services.

Using this methodology, it is estimated that the CPI will increase 2 percentage points during the first full year of the program. Given the normal, unencumbered economy, the CPI would rise by approximately 2.5 percentage points during the first full year of the program in addition to the normally expected rise. These estimated increases tend to overestimate the affect of the program for two reasons:

(1) The energy price increases that were used as inputs to the model assume a full pass-through of the taxes and import fees. It is unlikely that this will occur because of the tax rebates to industry and because the economy is generally weak. Thus, excess supply would result if industry attempts to pass-through all of the costs.

(2) The stage-of-processing model is based upon historical markup relationships and these may not hold because of the currently poor market demand conditions. That is, demand is currently at such a low level that companies may not be willing to pass on increased costs for fear of further reducing their markets.

Consumer Cost Impacts

The consumer costs that will actually be incurred by households has been estimated by the Administration to be $19.2 billion for the first year at an annual rate. Table 2 illustrates the

TABLE 2

ILLUSTRATIONS OF PERMANENT TAX RELIEF AND INCREASED ENERGY COSTS AT VARIOUS LEVELS OF HOUSEHOLD INCOME

Household Income	Total Increased Energy Costs	Permanent Tax Relief Plus $80 Special Payments for Adjusted Gross Incomes Equal to Household Incomes Shown	
		Single Person	Family of Four Persons
$ 2,000	$ 85	$ -80	$-160
3,000	110	-120	-160
5,000	150	-250	-178
8,000	188	-297	-337
10,000	228	-254	-349
12,000	253	-190	-316
15,000	296	-190	-221
18,000	318	-190	-210
25,000	393	-190	-192
30,000	420	-148	-151

SOURCE: Office of the Secretary of the Treasury, Office of Tax Analysis, January 30, 1975

range of costs by income class and contrasts these increased costs with estimates of expected tax relief. No total estimate of the impact on consumers is presented on the CRS study.

DIFFERING ASSUMPTIONS BETWEEN ADMINISTRATION ANALYSIS AND CRS STUDY

There are major differences in some of the assumptions used in each analysis. These are highlighted in this section along with the detail.

Oil

The mix between imported oil and domestic oil is different because our estimates assume that demand reductions and import savings occur. In addition, FEA's inclusion of Natural Gas Liquids is identified separately from aggregate crude oil. However, the total figures are quite similar.

The figures of the Congressional Research Service are repeated as:

	Cost ($ Billions/Yr)
1. Excise Tax	
17.3 MMBD x 365 x $2	$12.6
2. Presently Controlled Oil	
Decontrol: 5.22 MMBD x 365 x $5.75	11.0
TOTAL OIL	$23.6

The FEA analysis is contrasted as:

	Cost ($ Billions/Yr)
1. Import Fee	
Uses estimate of 5.433 MMBD Imports after implementation of President's program	
$2 x 5.433 MMBD x 365 =	$ 3.966

2. Excise Tax on Domestic Oil

Production of 8.7 MMBD

$2 x 8.7 MMBD x 365 = 6.35

Equivalent tax of $1.43 per barrel of natural gas liquids (NGL) with 1.66 MMBD

$1.43 x 1.66 MMBD x 365 = .866

3. Decontrol of Old Oil

Assumes 60% old oil exclusive of Elk Hills (.1 MMBD annual average), hence 5.16 MMBD of old oil rising from controlled price of $5.25 to uncontrolled price of $11.

$5.75 x 5.16 MMBD x 365 = 10.83

Assumes NGL price rises equivalent amount of crude oil. Crude increase $4.56 less $1.43 due to NGL tax.

$3.13 x 1.66 MMBD x 365 = 1.896

Adjustment of +$.29 billion to account for rounding and refinery gain and to balance calculated increase of product prices of $4.10 and average consumption of 16.17 MMBD. .29

($4.10 x 16.17 MMBD x 365 = $24.2 billion)

$24.198

Natural Gas

The Congressional Research Service study assumes that 1975 natural gas production is 22.5 trillion cubic feet (tcf) and that the amount of new gas subject to deregulation in 1975 will be equivalent to a $5.4 billion initial cost for the first year. In fact, this argument overstates the natural gas impacts for the following reasons:

-- Approximately 1 trillion cubic feet of contracts for interstate gas would expire and be available for new contracts in 1975, even with decontrol. This is substantially less than that reflected by the CRS study in its $5.4 billion cost for the first year. Without deregulation, very little new gas is going to interstate sales.

-- The excise tax will be levied on net marketed production and not on total gas production. Hence, only 19.1 tcf will be affected by the excise tax of 37¢. This will result in a much lower total cost attributed to the excise tax.

-- Deregulation could presumably bring up to .8 tcf of additional gas into the interstate market in 1975. If this occurs, it would tend to replace an equivalent amount of imported oil which would have cost as much, or more, as the new gas prices. The President's program would tend to shift this amount from imports to gas, but would only increase consumer costs by the amount of the excise tax.

The figures of the Congressional Research Service are:

	Cost ($ Billion/Yr)
1. Excise Tax	
22.5 tcf x .37	$ 8.3
2. Deregulation of New Gas	5.4
	$13.7

The FEA analysis is contrasted as:

1. New Interstate Gas

Estimated at .91 tcf with equilibrium price of $1.11 compared to average of $.28 on old gas. Excise tax of $.37.

$1.20 x .91 tcf = $ 1.092

2. Old Interstate Gas

Interstate estimated as two-thirds of total gas consumption of 19.1 tcf.

$.37 (19.1 x .667 - .91) = 4.376

3. Intrastate Gas

Excise tax on one-third of total consumption

$.37 x (19.1 x .33) = $ 2.322

TOTAL NATURAL GAS $ 7.800

Coal

The Congressional Research Service analysis assumes that coal produced in 1975 will rise in price by an equivalent of $2 per barrel or approximately $8/ton. We estimate that 80 percent of all coal is under long-term contracts, where prices tend to reflect long-run coal production costs, which do not tend to rise in real terms. Further, our current estimate indicates that coal prices are limited by the inability of gas and oil consumers to convert to coal. As a result even the remaining 20 percent of coal sold in spot markets is likely to sell only at prices necessary to cover overtime pay and other costs of getting out the 1975 rate of production (about 35 mmt more than 1974 because of production lost during the strike). Higher prices for oil would add very little to the amount of conversion to coal. Conversions to coal are estimated at 23 million tons in 1975 and 47 in 1976.

The figures of the Congressional Research Service study are:

	Cost ($ Billion/Yr)
Price Increase: $8 x 650 mmt =	$5.2

The FEA analysis is contrasted as:

-- FEA assumes no direct increase in coal due to the President's program (see discussion of assumptions).	$0.0

Changes in Utility Accounting

The above costs of the President's program as estimated by FEA consisted of the cost of imposing taxes and fees on petroleum and natural gas and the cost of decontrolling the price of old oil. The costs associated with changes in utility accounting procedures were not included for several reasons:

(1) The need for additional funds to finance electric utility expansion will require some form of rate change. This need for a rate change is independent of the President's energy program. Hence, the costs of any proposals, such as changes in the accounting procedures, should not be included in the costs of a program designed to achieve energy independence.

(2) The changes in accounting procedures presented by CRS allow for the addition of one billion dollars worth of pollution control equipment in addition to the expansion of plant and equipment. This clearly is not part of the cost of achieving energy independence and may not even be the appropriate amount of pollution control from a cost-effectiveness standpoint.

(3) The accounting changes are part of the long-term energy program and will have no effect on short-run energy supplies.

In addition to inappropriately including the utility accounting changes, the CRS has incorrectly estimated the impact of these changes. The Congressional Research Service estimates that the additional 1975 costs will be $6.8 billion by including construction work in progress in the rate base. This is based on an FPC/Office of Economic study, An Analysis of the Electric Utility Industry's Financial Requirements, 1975-79. This cost is incorrect in that the costs of including construction work in progress in the rate base as estimated using the FPC study are $3.4 billion.

D

THE NORTHEAST ENERGY PROBLEM AND ALTERNATIVES

The Northeast Energy Problem

The President's energy program, which seeks to stimulate conservation of petroleum through the imposition of import fees and excise taxes, will increase energy costs throughout the United States. These increases will be offset, but not eliminated, under the President's proposed across-the-board tax rebate program. In the initial phase of the program (February-April 1975) the temporary $3.00 import fee could cause significant increases in Northeast overall energy costs primarily because of New England's predominant (85%) dependence on petroleum products. The ultimate $2.00 tariff/excise tax, however, will equalize regional energy costs -- see Tab, Program Costs and Income Effects.

Programs Already in Operation and Proposed to Mitigate the Regional Imbalance

The President's program anticipated the temporary regional imbalance associated with the immediate import tariff element of the overall program by providing for an effective rebate of import fees on imported petroleum products. This is achieved by a $1.20 fee on products, rather than the $3.00 fee applied to crude oil.

Also, FEA's Old Oil Entitlements program will be maintained during the scheduled life of the import fee program to continue spreading price increases on crude oil among all refiners and to lessen disproportionate regional cost effects derived from the heavier dependence on imported crude oil.

After the $2.00 tariff/excise tax program element replaces the temporary import tariff program (April 1975) the overall energy cost increase for New England will be essentially equal to or slightly less than the rest of the country.

In the near term, while the import tariff program is operative, certain additional measures could be adopted to mitigate the Northeast/New England high energy cost situation as enumerated below:

Increased Rebated Portion of Import Fee on Products

Since the Northeast is heavily dependent on imported residual oil, an increase in the rebated portion of the oil import fee from the current proposed level would have a mitigating affect on the impact of petroleum product price increases on the Northeast. Alternatively, the rebate increase could be limited to residual oil only, since New England is dependent on residual oil for 32% of its total energy consumption and about 90% of its residual oil consumption is imported.

However, in both cases, increasing the amount of rebate will widen the cost differential between an imported barrel of crude and an imported barrel of product, thereby increasing the economic attractiveness of imported products and creating a disincentive to increased domestic refinery capacity. Thus, this alternative only is desirable for a short period of time. Also, the benefit of any rebate on products is expected to expire with adoption of the $2.00 tariff on crude oil and products under the President's program.

Maintain and Adjust Price Controls to Provide for a Disproportionately Higher Pass-Through of Increased Costs to Gasoline

Another alternative for mitigating the impact of increased prices on the Northeast is to limit the pass-through of increased costs of crude oil to those petroleum products on which the Northeast is least heavily dependent. By limiting the proportionate cost increases to products other than gasoline to some fixed percentage of the proportionate share of refinery output, the impact in the Northeast could be reduced at the expense of other regions. This occurs because New England consumes only 82% as much gasoline per capita as the national average (12.6 barrels per capita in New England compared to 15.4 barrels for the United States.

However, several problems are associated with this alternative. First, this places the burden of increased prices on motorists in New England and on businesses such as the motel industry which are heavily dependent on automobile travel. Secondly, although New England consumes less gasoline per capita than the national average, New England is still more heavily dependent on gasoline as an energy source than the United States in total (gasoline consists of 23% of the total energy consumed in New England, while only 18% for the entire United States).

Target Federal Assistance Programs to Northeast Consumers

Another alternative for mitigating the impact of increased petroleum prices on the Northeast is to channel federal assistance funds

associated with proposed federal conservation programs to that area. For instance, the low income assistance program (the Winterization Program) requested by the President provides for grants to states for the winterization of homes occupied by persons in the poverty income category. These funds are for the provision of insulating materials to decrease the energy consumption of these homes and reduce the fuel bills of low income persons.

A significantly higher share of the 55 million dollars of annual funds for this program would normally go to the Northern States since these states have a greater number of homes in need of improved insulating techniques. However, the criteria for allocating the funds among states could be established placing a priority on homes in the areas most heavily impacted by the increased prices. In the long term, it is doubtful whether this priority would provide a greater total amount of funds to New England for winterization than would have been received by the program as currently planned, since the program provides for winterization of all homes of those low income persons expected to voluntarily participate in the program. However, the addition of such a priority could provide New England low income persons the assistance earlier in the life of the program.

Adjustment of Utility Rate Structures to Promote Conservation and Assist Low Income Persons

An alternative which could significantly stimulate conservation of petroleum in the Northeast and also provide assistance to low income and elderly persons would involve an adjustment of utility rate structures. Currently utilities in the Northeast use about 20% of the total petroleum consumed in the Northeast. The typical utility rate structure provides a lower rate per kilowatt hour for increasingly higher consumption levels. This "declining block" rate structure rewards intensive consumers of electricity and places a burden on consumers of smaller quantities, often the low income persons and elderly in a community. These structures typically charge 4¢ per kilowatt hour for the first 100 kilowatt hours, but only 1.5¢ per kilowatt hour for amounts over 400 kilowatt hours.

To assist the low income and elderly persons, a special rate could be designed within the rate structure to ameliorate the impact of anticipated rate increases due to increased petroleum prices on the low income and elderly. This special rate would guarantee a basic amount of electricity at a reasonable rate, for example 400 kilowatt hours per month at 2.5¢ per kilowatt hour, or a total of $10 per month. This special rate could be tailored to each local or state area's individual socioeconomic composition and usage pattern.

In addition, utility rates could be entirely restructured to provide for an increase in the average price of a kilowatt hour for increasingly larger blocks of electricity. The typical declining block rate structure would be inverted to become an inclining block rate structure. As an illustration, the first 400 kilowatt hours would be provided for an average price of 2 1/2¢ per month per kilowatt hour; the next 100 kilowatt hours would cost an average of 2.8¢ per kilowatt hour, and consumption over 1,000 kilowatt hours would cost 3.5¢ per kilowatt hour. With this type of rate structure, any individual user of electricity would realize a significantly stronger economic incentive to conserve energy.

In addition to the inevitable institutional resistance to such changes, there are a number of economic and operational problems associated with the adoption of an equitable inclining block rate structure. First, the prices of electricity would no longer bear a direct relationship to the costs of producing and generating electricity. Also, difficulties would arise if the total consumption of electricity declined to the point where less base loading was allowable, but peak loading was substantially unchanged. This situation would preclude economic incentives for increased use of coal and nuclear facilities in generating electricity.

LONG-TERM SOLUTIONS

In the longer term, there is sufficient reason to believe that the Northeast can bring its dependency on petroleum products in balance with other regions of the country and thus eliminate proportionately higher adverse impacts of petroleum price increases. Several programs included in the President's program, including coal conversion in electric utilities, and OCS leasing, will tend to reduce the dependency of the Northeast on imported oil. Also the Northeast, especially the New England States and New York can substantially reduce its dependency on imported oil by accelerating construction of nuclear power generation capacity and local refinery capacity.

Coal Conversion Opportunities in Electric Utilities in the Northeast

A dramatic increase in oil consumption for steam electric generation was observed in the last decade in the Northeast. In 1964, 63% of steam electric generation was fueled by coal and 33% by oil; while in 1972 only 6% was derived from coal and 93% from oil. In 1972, electric utilities in New England were consuming 88 million of the 445 million barrels of petroleum consumer per year. If dependency on petroleum in the Northeast is to be reduced, the trend in utilities toward increased use of oil must be changed.

An examination of oil burners in electric utilities in the Northeast has uncovered 33 plants which are eligible for mandatory coal conversion under the provisions of the Energy Supply and Environmental Coordination Act of 1974 (ESECA), as administered by FEA. The total savings from conversion in these 33 plants are estimated at 260 thousand barrels per day of petroleum. However, under the current provisions of ESECA only 53 thousand barrels per day can be saved by 1978 due to the requirement to meet environmental limitations imposed by State Implementation Plans (SIP's) by December 31, 1978. The table below indicates the conversion potential while maintaining the SIP compliance deadlines.

Table 1 - Coal Conversion Potential in the Northeast AS ESECA Now Reads

	# of Plants	MW	BBl/Oil Per Day (000)	# of Plants Needing Fuel Desulphurizati Equipment
1975	2	161.0	3.68	0
1978	7	1,924.5	49.32	2
1980	17	7,495.7	144.30	11
1985	7	2,922.9	59.83	7

If the deadline for meeting state implementation plans is extended to December 31, 1978, and if the regional requirement currently within ESECA is removed (that no plant can be mandated to covert within a region where air pollution exceeds primary ambient standards) then 170 thousand barrels per day of petroleum savings can be obtained by 1978, over three times the savings in this timeframe, as shown in the table below.

Table 2 - Coal Conversion Potential in the Northeast Providing Regional Limitations are Removed and Meeting SIP's by Dec. 31, 1980

	# of Plants	MW	BBl/Oil Per Day (000)	# of Plants Needing Fuel Desulphurizati Equipment
1975	9	3,097.0	69.08	4*
1978	12	4,460.5	100.96	8 (6*)
1980	6	2,066.7	37.46	2
1985	6	2,805.3	49.62	5

*Need FGD by Dec 31, 1980.

The FEA is seeking extension of compliance deadlines for state implementation plans and removal of the regional limitation from ESECA. State governors can significantly reduce dependency on petroleum in the Northeast by supporting that effort.

Increase Local Refining Capacity

Although New England consumes about 1.2 million barrels per day of petroleum, it has only 20 thousand barrels per day of petroleum refining capacity, of which over 7,000 barrels per day consists of asphalt. An increase in indigenous refining capacity would not only decrease the costs of domestically produced petroleum consumed in the Northeast due to a reduction in transportation expenses, but would also reduce the dependency of the Northeast on imported petroleum products.

However, New England and Northeastern states have generally resisted attempts to construct refineries within these states during the last few years. If we had built all refineries which were planned but not constructed due to opposition of state and local organizations, the Northeast would have an additional 0.9 million barrels per day of refining capacity, thereby making the region approach refinery self-sufficienty. However, opposition from local citizen's groups, local environmental organizations, and state environmental boards have successfully opposed construction of every proposed refinery. Table 3 summaries the refineries planned, but not constructed, due to local and state opposition.

New England petroleum consumption is expected to increase to over 1.5 million barrels per day by 1985. For the New England states and the Northeastern states to be protected from arbitrary price increases in foreign countries on petroleum products, it is imperative that these states realize the benefits of siting refineries within their boundaries.

Increased Construction of Nuclear Power Facilities

At the end of 1974, 11.5% of 48,560 megawatts of electric generating capacity in the Northeast was fueled by nuclear power. Over 61% consisted of steam boilers fueled by petroleum. Nuclear generation is planned to increase to 31.4% of total generating capacity in 1983. Oil dependency in electrical generation at that time would be reduced to 44.7% of total generating capacity, as shown in Table 4.

TABLE 3

REFINERIES PLANNED BUT NOT CONSTRUCTED DUE TO OPPOSITION ON ENVIRONMENTAL GROUNDS

COMPANY	LOCATION	SIZE B/D	FINAL ACTION BLOCKING PROJECT
Fuels Desulfurization (1)	Riverhead, L.I.	200,000	City Council opposed project and would nc change zoning.
Maine Clean Fuels (1)	South Portland, Me.	200,000	City Council rejected proposal.
Maine Clean Fuels (1)	Searsport, Me.	200,000	Maine Environmental Protection Board rejected proposal.
Northeast Petroleum	Tiverton, R.I.	65,000	City Council rejected proposal.
Supermarine, Inc.	Hoboken, N.J.	100,000	Hoboken Project withdrawn under pressure from environmental groups.
Commerce Oil	Jamestown Island, R.I.-Narragansett Bay	50,000	Opposed by local organizations and contes in court.
Olympic Oil Refineries, Inc. (2)	Durham, N.H.	400,000	Withdrawn after rejection by local referendum.
C.H. Sprague & Son	Newington, N.H.	50,000	Voted down in community vote on June 28, 1974.

(1) Maine Clean Fuels and Georgia Refining Company are subsidiaries of Fuels Desulfurization and the refinery in question is the same in each case, so the capacity in B/D is not additive, but the incidents are independent and additive.

(2) Olympic is still considering other nearby sites.

For a reduction of dependency on petroleum in electrical generation, it is imperative that nuclear and coal based power plants provide nearly all the growth in generating capacity in the Northeast and New England states. However, the construction of New England nuclear power facilities has been delayed during the last year in several cases due to local protests associated with siting of these facilities. For example, Narragansett Electric Company which planned construction of multiple nuclear units in Charleston, Rhode Island, has delayed construction pending resolution of local protests surrounding the sale of Federal lands for this purpose. Other examples are shown in the table on the next page. In fact, nuclear facility construction delays in New England have effected about three quarters of new nuclear generation capacity planned to go into operation before 1983.

It is imperative that the proper balance of environmental safeguards and energy requirements be considered by state and local areas to assist in the proper and timely development of nuclear power facilities and to avoid further construction delays.

Offshore Leasing

The petroleum dependency of the Northeast can be reduced by the exploration and drilling of offshore areas in the Atlantic. Federal Government projectsion indicate that the Atlantic OCS may produce as much as 500,000 barrels of oil and 800 MMCF of natural gas per day, by 1985, if leasing and exploration are aggressively pursued.

However, as recently as January 10, 1975, coastal governors and their representatives at meetings in Dover, Delaware and in Princeton, New Jersey were raising strong opposition to Federal Government's offshore drilling plans. In fact, they recommended a halt to any more leasing until broad changes are made in the government's program. The Department of the Interior estimates that the changes requested would result in a 2-4 year delay in obtaining oil from these coastal waters.

TABLE 4

New England and New York Nuclear Power Facility Delays

Name of Company	Unit or Site	Size/Mfg.	Status/Remarks
New England Nuclear Energy Co. (Sub of No. East Utility System)	Montegue #1 & #2	1159 MW/GE	Have construction permit... Financial-lack of revenues Delay - 12 months
New York State Electric & Gas	Somerset #1 & #2	1150 MW/GE	Construction Permit not filed Delayed 24 months -- reduced need for power. Trial case of N.Y. State regulatory process.
Boston Edison	Pelgrim #2	1180 MW/	Construction Permit review in process. Mass. State Attorney interviewed on water discharge to Bay.
Narragansett Electric	Charleston R.I. Naval Base	multiple nuclear units	Held up pending resolution of local protest of GSA sale of land for this purpose.
Public Service of New Hampshire	Seabrook #1 & #2	1150/	Construction Permit review in process - strong local intervenor group expected in hearings - project 0-12 months delay.
New England Power Exchange	Sandy Point to Tewksberry	345 KV Transmission line	Delay four months - Prolonged State and local procedures
New England Power Exchange	Bill/Burl to Tewksberry	345 KV Transmission line	Delay four months - Prolonged State and local procedures
Boston Edison	Mystic Station to North Cambridge	345 KV Transmission line	Delay three months - State procedures.

GPO 886-098

E

ANALYSIS OF GASOLINE RATIONING

Energy Conservation and Environment
Federal Energy Administration
January 24, 1975

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SUMMARY

Description of Rationing System

- Each licensed driver in the country would receive an equal monthly allotment of coupons entitling him to purchase 36 gallons/month at the controlled price. These coupons could be freely traded or sold. The coupon market would permit those drivers with needs greater than those represented by the monthly allotment to purchase additional coupons from those who use less than their monthly amount.

- Commercial users would receive coupon allotments equivalent to 90 percent of their consumption during the 1973 base period.

- For that limited class of users for whose special needs the coupon resale market is not a reasonable solution, 3% of the coupons would be set aside and distributed by the state. This distribution would be based primarily on emergency or hardship.

- Coupons would be picked up in person at Post Offices by each eligible individual. They will be invalidated at the pump at time of purchase, and deposited by retailers with banks in a special coupon account. Gasoline deliveries to suppliers will be made to retailers only for amounts equivalent to coupons collected.

Gasoline Use Data

- Estimated consumption in 1975 is 6.4 million barrels per day or 270 millions of gallons per day (MG/D)

- Number of licensed drivers in 1974 was 125.1 million. There will be an increase of up to 15 million anticipated if coupon rationing is put into effect.

- Without rationing, each driver would use 50 gallons per month.

- With the expected increase in licensed drivers and supply limited by 1 million barrels per day, by rationing, the allowance for each licensed driver would be:
  per day = 1.2 gallons
  per month = 36 gallons
  per year = 432 gallons

Problems with Gasoline Rationing

Gallons per month and price of Gasoline

- To save 1 million barrels per day, while assuring adequate fuel for business will mean limiting each licensed driver to about 36 gallons per month, compared to current average of 50 gallons/month. It is expected that the coupons will sell for about $1.20 per gallon. Hence, for those who must purchase more than their basic ration, the effective price of gasoline (pump plus coupon price) is estimated at $1.75/gallon.

Impact on National Energy Goals

- Gasoline rationing, while it may limit consumption in the short run, makes no contribution to our mid- and long-term goals of energy independence, because it provides no incentives for increasing supply.

- Gasoline consumption is only 40% of total petroleum use. Residual and fuel oil comprise a substantial amount of total petroleum imports. By concentrating exclusively on private vehicles and gasoline, other fruitful areas for energy conservation are not addressed -- such as improved industrial efficiency and better constructed and insulated buildings. In the final analysis, we cannot be independent unless these other petroleum uses are also reduced dramatically.

Potential for Inequities

- Each person receives an equal number of coupons, but use of gasoline varies widely among drivers. Thus, rationing inevitably leads to inequities. Some examples are:

  - A widowed secretary with two children living in the suburbs who commutes 16 miles each way to work in a car that gets 12 mpg will experience a 68% increase in her commuting costs, because she must purchase 17 additional coupons each month at an average cost of $1.20 per gallon. This amounts to about $245/year in additional costs.

  - A blue-collar worker who owns a car that gets only 9 mpg can drive just over 320 miles/month on his basic ration, and could not easily afford to purchase a new, more efficient automobile. On the other hand, an affluent neighbor can readily trade in his equally inefficient old car to purchase one getting better

than 22 mpg. This allows him to drive over 790 miles on the same allotment of coupons.

- Substantial regional inequities would exist. The average driver in some rural states such as Montana travels nearly 600 miles per month versus about 300 in less rural states such as New York and New Jersey. Similar disparities exist between city dwellers and suburbanites. Under rationing each would receive the same gallonage.

- Certain very poor persons, such as migrants, drive large distances each year. They can neither afford to buy additional coupons nor are alternative methods of transportation available to them.

- The recreation and tourism industry would be very heavily impacted, as would the auto industry. Automobile sales could decrease 35% from what they would otherwise be.

Increase Bureaucracy and Complexity

- o The Government would be involved in many new aspects of our every day life, adding an inescapable portion of bureaucracy, complexity, and inconvenience.

- o The Government would decide:

  - if a new business should get fuel;
  - if expanding businesses deserve more fuel;
  - if specific individuals would qualify for more coupons because of hardships.

- o Gasoline rationing can be implemented but it is complex, expensive, and at best a short term solution. It takes 4-6 months to implement, about 15 to 25,000 full-time people and $2 billion in Federal costs, uses 40,000 Post Offices for distribution, and requires 3,000 state and local boards to handle exceptions.

- o Because coupons are transferable, they must be picked up by each driver in person quarterly at Post Offices. Long lines and delays are inevitable.

- o Gas stations, with limited quantities to sell, are unlikely to maintain more than the most limited service hours. Evening and weekend closings are almost a certainty.

Impact on GNP

- Use of allocation and rationing to reduce imports by one million barrels per day could create a drop of nearly 13 billion dollars in the GNP and place several hundred thousand more workers on unemployment rolls. Also, rationing would have an inflationary impact due to the significantly higher clearing price of gasoline coupons sold by those having excess coupons.

Comparison of Gas Rationing and President's Program

- Each option has major regional impacts; rationing hits the mountain states, the southwest and the mid-west hardest. The President's program affects New England and the east coast.

- Rationing will reduce consumption in the short term but is inadequate as long term solution. The President's program is effective in both the short and long run.

- Both rationing and the President's program transfer about $2 billion to poor families in the first year.

- Rationing is costly and complex; the President's program is inexpensive and easy to administer.

- Rationing raises the CPI by over 2.5 percentage points; the President's program by about 2.5 points.

- Rationing could cost the country $13 billion in GNP and a substantial increase in unemployment; the President's program would have negligible effects in each area.

DESCRIPTION OF COUPON RATIONING SYSTEM

At the time of the 1973 embargo an effort was begun to design a rationing plan. After much analysis regarding various possible approaches, that effort culminated in the development of a proposed rationing program and the purchase of 4.8 billion coupons. A description of that proposed plan is outlined below.

I. SYSTEM OPERATION

A. Entitlements

- An estimated 140 million licensed drivers receive an equal monthly coupon allotment (estimated at 36 gallons per month). These coupons could be freely traded and sold.
- Commercial users receive a coupon allotment equivalent to a percentage of base period consumption, estimated at 10% less than 1973 consumption.
- State set-aside for special cases (3% of available supply), i.e., migrants, the handicapped, etc.
- Government and non-profit organizations included in commercial sector.
- Coupons for first quarter are all of the same denomination, and are not serialized. Changes could be made in subsequent quarters.

B. Distribution

- Postal Service would distribute coupons at the 40,000 Post Offices four times a year.
- Estimated that 4.8 billion coupons would be needed in first quarter (amount currently in storage).
- Under special conditions, an agent could pick up coupons for those not able to do so themselves.
- Users would pay a fee of $3.00 per quarter amounting to $1.5 billion. (This would cover most of estimated program cost).
- Local Boards throughout the states would handle special appeals from state residents with emergency or hardship gasoline needs.
- In first quarter, individuals would turn in self-executed application forms at their Post Office. Postal employees would validate application, examine and mark driver's license, and issue ration coupons.

- o In subsequent quarters, licensed drivers would receive state-issued authorization cards in the mail, entitling them to pick up ration coupons at their post offices.

- o For first quarter, commercial users would submit an FEA form to their bank, which would issue them an allotment in the form of a coupon draft. These drafts would be exchanged for coupons at the Post Office. Forms would be forwarded by banks to FEA so that FEA could issue coupon drafts for the second and following quarters.

- o Forms retained for audit purposes.

- o U.S. agencies would apply directly to FEA for coupon allotments.

C. Banking System

- o Commercial banks would be mainstay of coupon redemption mechanism.

- o Initially, gas stations take deposit ration coupons received from motorists to local banks and receive gasoline drafts (in gallons) enabling them to purchase additional gasoline from their supplier.

- o In subsequent quarters, a complete ration banking system would be established, in which commercial, government and non-profit users along with gas stations, and suppliers, would participate.

- o FEA Processing Centers would handle initial applications and maintain records of all commercial users. These centers would issue drafts for ration coupons in subsequent quarters, through the mail.

D. Coupon Resale Market

- o Unused coupons would be freely traded or sold. Those with excess coupons could sell them to those willing to pay the price.

- o Federal Government would make no attempt to control or regulate trade in coupons except to identify and prohibit practices which inhibit natural interplay of market forces.

- o It is estimated that excess coupons would be sought by more than one half of all users.

E. State Set-Aside

- o State set-aside of coupons (about 3%) would be available to recognize claims of users for whom the resale market is not a vehicle for their special needs.
- o About 3,000 local boards throughout the states would administer the set-asides, replying to applications.
- o The State set-aside will also be used for organizations or governmental units performing essential public health or safety services.
- o Federal Government could provide guidelines to assure uniform application of eligibility criteria.

F. Enforcement System

- o Vigorous enforcement program would be required to prevent widespread abuses.
- o The audit program would focus on commercial and non-profit users to detect overstatement of base period volumes, and on gasoline suppliers to detect illegal shipments of gasoline.
- o There would also be a system to detect multiple applications by individuals.

II. PRELIMINARY ESTIMATE OF RESOURCES REQUIRED (STEADY-STATE ANNUALIZED BASIS)

A. Personnel Resources

(1) Federal

FEA Headquarters - 625 positions

FEA Regions - 3,250 positions (1,200 opl; 2,000 enforcmt)

U.S. Post Office - unknown

Non-FEA Enforcement - 2,500 positions

(2) State and Local

3,000 local boards @10 each (15,000 volunteers; 15,000 support staff)

51 Department of Motor Vehicle @100 each - 5,100 positions

B. Costs	(million $)
USPS Distribution @ $1.60 per transaction	845
USPS shipping costs	50
Coupon printing serialized	195
Forms printing	30
ADP system	200
Public Education Materials	10
	1,330
Direct Salaries	
o Federal (6375 @ 20K)	127.5
o State and local (20,100 @ 20K)	402
GRAND TOTAL	1.86 billion

GASOLINE USE DATA

Use Data

A. Estimated consumption in 1975

Millions of barrels per day (MB/D)	6.4 MB/D
Millions of gallons per day (MG/D)	270 MG/D

B. End use categories - volume (MG/D) and percent

Private use	205	76%
Business/Commercial	57	21%
Government	8	3%

C. Number of registered vehicles in 1975 — 130.75 million

D. Number of licensed drivers in 1974 — 125.1 million
(increase of up to 15 million anticipated if coupon rationing is put into effect)

Programmatic Assumptions for Rationing

A. Will achieve 1 MB/D saving through reduction in gasoline consumption

B. Business will receive 90% of 1973 gasoline consumption

C. Coupons will be provided to licensed drivers as opposed to allocations based on registered vehicles

Key Parameters of Data and Assumptions

A. Savings target (1 million B/D) — 42 MG/D

B. Business and Government Allowance

o Estimated 1975 consumption	65 MG/D
o Less 10% of 1973 Consumption	6 MG/D
o Allowance	59 MG/D

C. Private Use Allowance

o Estimated 1975 consumption	205 MG/D
o Less reduction	36 MG/D
o Allowance	169 MG/D

D. Allowance for Each Licensed Driver
Gallons: Per day = 1.2
per month = 36
per year = 432

E. Private Use of Automobiles by Trip Purpose

Work trip	31%
Recreational trip	31%
Family business	34%

PROBLEMS WITH GASOLINE RATIONING

Gallons per Month and Price of Gasoline

- To save 1 million barrels per day, while assuring adequate fuel for business will mean limiting each licensed driver to about 36 gallons per month, compared to current average of 50 gallons/month and restricting businesses to 10% less than their last year's use. It is expected that the coupon will sell for about $1.20 per gallon during the first year. Hence, for those who must purchase more than their basic ration, the effective price of gasoline (pump, plus coupon price) is estimated at $1.75/gallon.

Impact on Energy Conservation Goals

- Gasoline rationing, while it may limit consumption in the short run, makes no contribution to our mid- and long-term goals of energy independence.

- Rationing limits the consumption of gasoline not through price but through proscription. Thus, an artificial shortage is created, inciting people to attempt to "beat the system" rather than to conserve fuel.

- Moreover, because of the inherent complexities in even the most carefully designed rationing system, and the fluid nature of American society, a rationing scheme is probably limited to a useful life of no more than two years. Thus, even as a conservation tool, it has a limited utility.

- Rationing provides no incentive for increasing domestic petroleum supply or bringing on alternate energy sources.

- Gasoline consumption is only 40% of total petroleum use. Residual and fuel oil compromise a substantial amount of total petroleum imports. By concentrating exclusively on private vehicles, many other fruitful areas for energy conservation are not addressed -- such as improved industrial efficiency, better constructed and insulated buildings, less wasteful use of electricity and natural gas. In the final analysis, we cannot be independent unless those other petroleum uses are also reduced dramatically.

Potential for Inequities

- Each person receives an equal number of coupons, but use of gasoline varies widely among drivers. Govern-

mental decisions will be based on statistical averages and broad, objective criteria; they cannot possibly take into account most of the differences in individual needs and preferences. Thus, rationing inevitably leads to inequities. Some examples are:

- A widowed secretary with two children living in the suburbs who commutes 16 miles each way to work in a car that gets 12 mpg will experience a 68% increase in her commuting costs, because she must purchase 17 additional coupons each month at an average cost of $1.20 per gallon each. This amounts to about $245/year in additional costs.

- A blue-collar worker who owns a car that gets only 9 miles/gallon can drive just over 320 miles/month on his basic ration, and could not easily afford to purchase a new, more efficient automobile. On the other hand, an affluent neighbor can readily trade in his equally inefficient old car to purchase one getting better than 22 mpg. This allows him to drive over 790 miles on the same allotment of coupons.

- A single individual with a mid-size car (14 mpg) could drive up to 17 miles/day. If he wanted to take a 500 mile trip over a long 4-day weekend, he could only use his car for that four-day period during that month. He would have to arrange for other transportation for the remaining 26 days of the month, or purchase additional coupons.

- A Congressman living in Georgetown has enough gas to drive his 10 mpg car to work by himself 5 days a week and still travel 54 miles on the weekend.

- Substantial regional inequities would exist. The average driver in some rural states such as Montana travels nearly 600 miles per month versus about 300 in less rural states such as New York and New Jersey. Similar disparities exist between city dwellers and suburbanites. Under rationing each would receive the same gallonage.

- A family of 4 with two licensed drivers and one car which gets 15 mpg moves from New York to California. This move would take 2-3/4 months of the family's coupons. One out of every five families moves every year.

- Certain very poor persons, such as migrants, drive large distances each year. They can neither afford to buy additional coupons nor are alternative methods of transportation available to them.

- A family in which the husband, wife and two teenage children all drive would receive sufficient coupons to drive approximately 2160 miles per month while the next door neighbor with only one licensed driver could drive only 540 miles per month, assuming both own cars which get 15 mpg.

- The recreation and tourism industry would be very heavily impacted, as would the auto industry. Automobile sales would decrease 35% from what they would otherwise be.

- A small successful Midwestern sales firm which had increased its business and sales area 50% since 1973 would have the market area it can cover reduced 40% under its basic rationing allotment.

Increased Bureaucracy and Complexity

- o The Government would be involved in many new aspects of our everyday life, adding an inescapable portion of bureaucracy, complexity, and inconvenience.

- o Gasoline rationing can be implemented but it is complex, expensive, and at best a short term solution. It takes 4-6 months to implement, about 15 to 25,000 full-time people and $2 billion in Federal costs, uses 40,000 Post Offices for distribution, and requires 3,000 state and local boards to handle exceptions.

- o The Government would decide:

  - if a new business should get fuel;
  - if expanding businesses deserve more fuel;
  - if specific individuals would qualify for more coupons because of hardships.

- o Because coupons are transferable, they must be picked up by each driver in person quarterly at Post Offices. Long lines and delays are inevitable.

- o Gas stations, with limited quantities to sell, are unlikely to maintain more than the most limited service hours. Evening and weekend closings are almost a certainty.

- o The longer a rationing program is in place, the more likely collusive and illegal behavior becomes, such as counterfeiting or pilferage of coupons.

Impact on GNP

- Use of allocation and rationing to reduce imports by one million barrels per day would create a drop of nearly 13 billion dollars in the GNP and place several hundred thousand more workers on unemployment rolls. Also, rationing would have an inflationary impact due to the significantly higher market clearing price of gasoline (pump plus coupon) resulting from reduced supplies.

- Rationing leads to distortions in the marketplace as adjustments in business investments, modes of distribution, and purchases are made based on artificial, rationing-imposed costs.

Impact on Poor

- Low income people are likely to drive less than average and thus, have excess coupons to sell. If speculators buy large quantities of coupons from the poor at low prices in order to resell them at high prices to the more affluent, the potential income benefits of the rationing program will be garnered by these entrepreneurs rather than by the poor.

Effects on Refining Runs

- A reduction of 1 million barrels per day in the use of gasoline through rationing would have the following effects on refining production:

  - 1,500,000 b/d crude oil imports

  + 500,000 b/d product imports (made up of approximately 300,000 b/d residual oil products and 200,000 b/d middle distillates)

- Such a reduction is likely to reduce domestic petroleum related employment, increase the cost/barrel of domestic production, and decrease the production rate and efficiency of U.S. refiners.

COMPARISON OF GAS RATIONING AND PRESIDENT'S PROGRAM

There are two principal options for reducing petroleum imports in the short to mid-term. They include the President's program of a petroleum tariff and decontrol of domestic oil prices; and a cap on imports with gasoline rationing and petroleum allocation. This paper briefly describes these options and discusses the impact of each on reducing imports, regional equity, inflationary impact, impact on the poor, administrative complexity and cost, and impact on the recession and employment.

OPTION A: IMPORT CAP/RATIONING

- A volumetric limit would be placed on imports equivalent to the reductions called for in the President's program. A reduction of 1 million barrels per day cannot feasibly be allocated without rationing.
- The current system of price controls for petroleum would be strengthened, including control of new domestic crude; thus an artificial shortage would be created.
- Since price is not used to determine distribution of petroleum products, the government would maintain its system of allocating to retailers, based essentially on historical use for products other than gasoline. The government would also control refinery yields.
- To prevent long gas lines, coupon rationing would be introduced. Such a program would include as its basic features:

  1) Each licensed driver would receive an equal monthly coupon allotment; these coupons could be freely traded or sold. The coupon market (the "white market") permits those drivers with needs greater than those represented by the monthly allotment to purchase additional coupons from those who use less than their monthly amount. Thus the market, rather than the government, is responsible for assessing "need" for gasoline above the basic minimum ration. Failure to provide a white market would invite a black market and increase the inequities.

2) Commercial users, whether they buy in bulk or at the pump, would receive coupon allotments equivalent to a percentage of their consumption during the 1973 base period.

3) For that limited class of users (migrants, handicapped, etc.) for whose special needs the coupon resale market is not a reasonable solution, a proportion of coupons would be set aside and distributed by the state. This distribution would be based primarily on emergency or hardship needs.

4) Coupons would be picked up in person at Post Offices by each eligible individual. They will be invalidated at the pump at the time of purchase, and deposited by retailers with banks in a special coupon account. Gasoline deliveries to suppliers will be made to retailers only for amounts equivalent to coupons collected.

OPTION B: PRESIDENT'S PROGRAM OF TARIFF, TAX DECONTROL AND REBATE

- After April 1975, this program would consist of an additional tariff on petroleum imports of $2 per barrel and an excise tax of $2 per barrel on all domestic petroleum.

- Domestic oil prices will be decontrolled and a windfall profits tax implemented to ensure that the revenue generated will accrue to the government, not the oil companies. This will raise the overall price of petroleum by $2 a barrel. The tariff, taxes and decontrol, then, will add $4 to the price of a barrel of oil.

- In addition, an excise tax on natural gas equivalent to $2 a barrel would be adopted and new natural gas prices deregulated to equalize the impact on oil and natural gas consumers and decrease natural gas consumption.

- $30 billion will be collected by the government from the tariff and taxes. These revenues will all be rebated to consumers and governments.

Regional Disparities

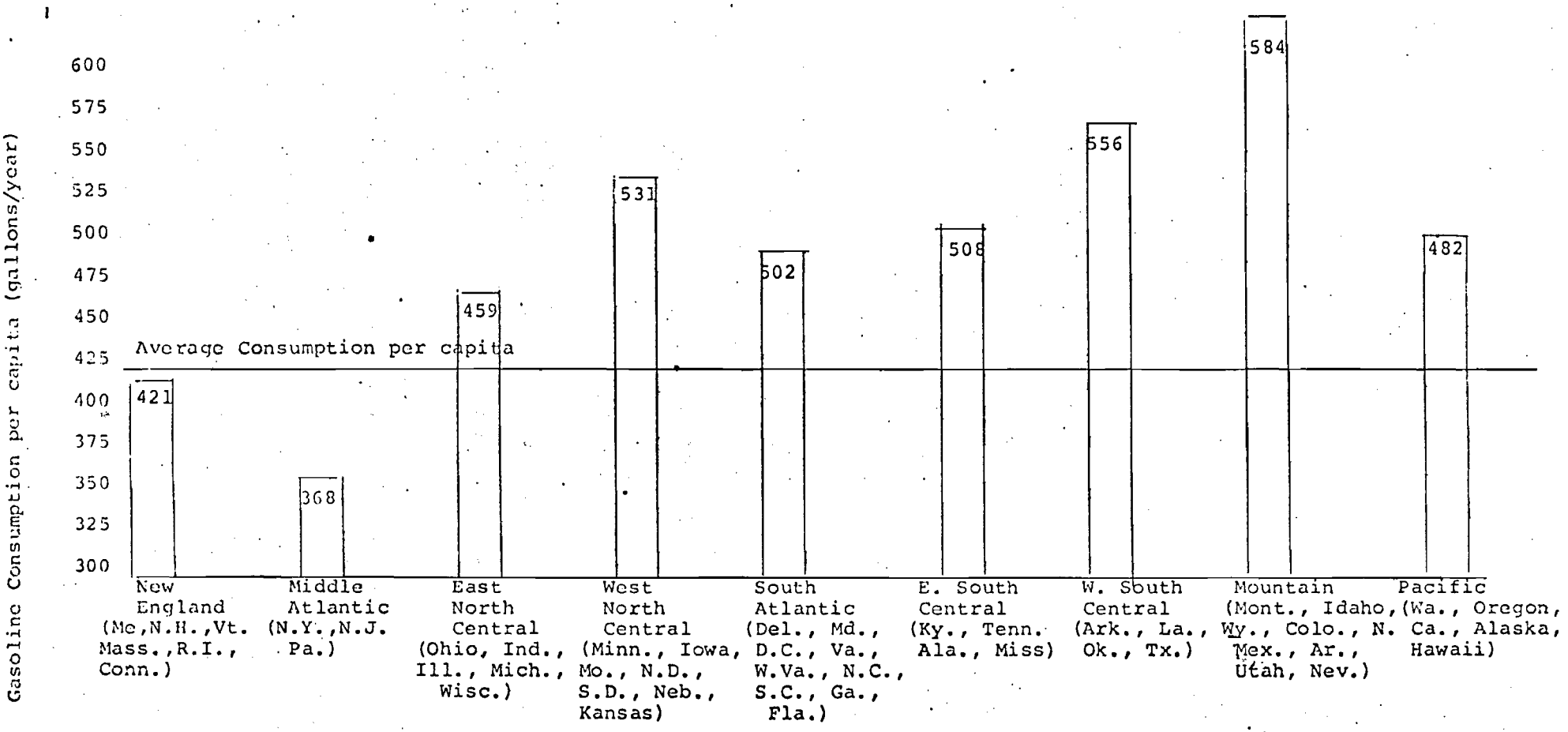
- Both options have major regional impacts. There are substantial regional variations in per capita gasoline use. Those in the Middle Atlantic states use less than two-thirds the gasoline of those in the Mountain states. Gasoline rationing as the attached chart shows, weighs more heavily on residents of the mountain states, southwest, and mid-west than on other citizens.

- Reliance on gasoline to bear the brunt petroleum cutbacks also discriminates against rural dwellers and in favor of those in cities. In the aggregate, rural dwellers use almost twice the gasoline/year of city dwellers.

- The President's program, which includes oil, natural gas and electricity generated from petroleum, impacts most heavily on the New England, West North Central, West South Central, and Mountain states.

Petroleum and Natural Gas Use by Regions of the United States

* Per Household per Year	Petroleum Consumption (bbl)*	Natural Gas Consumption (MMCF)*	Petroleum & Natural Gas (BTU)*
United States Total	744.02	3.307	7384.8
New England	120.57	.071	731.74
Mid-Atlantic	85.81	.156	625.86
East North Central	66.19	.326	688.85
West North Central	74.12	.386	792.61
South Atlantic	88.62	.164	649.80
East South Central	62.34	.299	640.76
West South Central	97.89	1.158	1694.87
Mountain	80.51	.467	907.81
Pacific	67.97	.280	652.37


Gasoline Consumption per capita (gallons/year)
600
575
550
525
500
475
450
425
400
375
350
325
300
Average Consumption per capita
421
368
459
531
502
508
556
584
482
New England (Me,N.H.,Vt. Mass.,R.I., Conn.)
Middle Atlantic (N.Y.,N.J. Pa.)
East North Central (Ohio, Ind., Ill., Mich., Wisc.)
West North Central (Minn., Iowa, Mo., N.D., S.D., Neb., Kansas)
South Atlantic (Del., Md., D.C., Va., W.Va., N.C., S.C., Ga., Fla.)
E. South Central (Ky., Tenn. Ala., Miss)
W. South Central (Ark., La., Ok., Tx.)
Mountain (Mont., Idaho, Wy., Colo., N. Mex., Ar., Utah, Nev.)
Pacific (Wa., Oregon, Ca., Alaska, Hawaii)

Effectiveness in Reducing Imports in Short and Long Term

- In the mid to long term the elasticity for gasoline is lower than that for other petroleum products. This is because there are fewer substitutes for gasoline than there are for other fuels. This means that an increase in the price of all petroleum products (President's program) will reduce imports more than an equal increase in the price (gasoline tax) of gasoline. In the short term this is not the case.

- The reduction in imports from the President's program option is 900,000 barrels per day in 1975, 1.6 million in 1977, and 2.1 in 1985. This estimate is not a guaranteed saving, but is based on econometric studies.

- The rationing/allocation option could obviously be adjusted to any level desired. The level considered in this paper is 1 million barrels per day in 1975 moving to 1.5 million in 1977. Because of the complexity of the administration and the limited ability of a rationing program to adjust to changes in the economy (e.g., people moving, new businesses started) it is probably not a viable option for more than one or two years. Hence, it is not really a feasible part of a mid or long term program. Moreover, the longer the system lasts, the more exceptions are made, the more people learn how to evade the rules, and the greater are the opportunities for counterfeiting and abuse.

- If we are to reduce significantly our vulnerability to imports in the mid and long term we must adopt an option to reduce consumption of petroleum that can be effective in 1980 and 1985.

Income Effect

- Gasoline rationing would have some beneficial impact as lower income people sell their excess coupons to those with higher income who in general use more gasoline. This effect would be somewhat limited by the plan to distribute coupons only to licensed drivers. The actual income transfer effects depend on the size of the shortage and the marginal price of the coupons.

- Private sector demand for gasoline in 1975 is estimated to be approximately 206 MG/D. Reducing daily petroleum consumption by 1 MMB/D solely through reductions in gasoline would result in a 17 percent reduction in supplies. The equilibrium price of gasoline would be about $1.75 per gallon ($.56/gal pump price plus $1.19/coupon).

- The average "poor" household consumes 404.7 gallons of gasoline per year per vehicle while the "lower," "middle" and "well-off" households average 632.2, 823.1, and 800.8 gallons per year per vehicle, respectively. The average number of gallons of gasoline consumed per vehicle is 727.8. The surplus/shortage of gasoline per household group and the potential income transfer can be calculated by comparing the individual household consumption rates with the average consumption rate. The table shows the average gasoline use, by household income, the surplus/shortage of gasoline, and the net income transfer likely to occur through the sale of coupons.

GASOLINE CONSUMPTION
AND INCOME TRANSFER

Income	(0-5,000)	(5,000-12,000)	(12,000-16,000)	(16,000+)
Gal/Veh	404.7	632.2	823.1	800.8
Net Surplus/ Shortage (Gal/Veh)	+199.4	-28.1	-219.0	-196.7
Net Income Transfer ($Billions)	+2.20	-.20	-.92	-1.08

- The poor household would have surplus coupons for 1,852 billion gallons of gasoline. The coupons for purchase of gasoline would trade at $1.19/gallon which would result in a net transfer of 2.20 billion dollars to the poor category of households in the first year.

o Similarly, the President's program would transfer roughly $2 billion from those with incomes above $12,000 to those with lower incomes, preliminary calculations indicate.

	Income ($1,000)			
	0-5	5-12	12-16	16+
Additional Cost of Energy ($Mil)	725	8,200	2,900	7,500
Rebated Revenues ($Mil)	3,520	7,350	3,610	4,520
Net Transfer ($Billions)	+1.36	+0.44	-1.06	-.74

Administrative Complexity and Cost

o The cost and number of people required to implement the President's system of tariffs, taxes and rebates is estimated at about $50 million and 400-500 additional people on the government payroll.

o The complexity of administering gasoline rationing and allocation is considerably greater than the other option, both because of the printing, distribution, collection, and control of coupons and because of the exceptions process for the poor necessary in every state and local community. Rationing will require an additional 17,000 government employees and approximately $2 billion per year to administer.

Inflationary Impact

o A $2/barrel import tariff plus excise taxes on domestic petroleum and natural gas would increase the Consumer Price Index by about 2.5 percentage points in 1975. Again, these fees would be returned to consumers so that the overall level of disposable income would not be changed.

- Under rationing, the cost of buying an additional coupon should stabilize at the market clearing level of $1.19. Thus, there would be an "inflationary" impact of over 2.5 percentage points on the Consumer Price Index in 1975.

ADDENDUM

To save 1MMB/D of petroleum imports in 1975 could be accomplished by reducing market supplies of gasoline, distillates, residual etc., in varing amounts. The amount of gasoline that would be available for private use and the costs of gasoline would depend on the amount of petroleum saving that is "loaded" onto gasoline. The table shows the amount of gasoline per registered driver, the percent reduction of gasoline supply, and the estimated cost of coupons under 100, 70 and 50 percent application of petroleum saving to gasoline.

% of 1MMB/D Applied to gasoline	Gasoline per driver/wk (gals)	Gasoline per driver per month (gals)	Cost of coupon ($ per gal)
100	8.4	36	1.19
70	9.1	39	.64
50	9.5	41	.38

A similar computation for a rationing program lasting through 1977 and equaling the impact of the President's tax package (1.6 MMBD savings of petroleum imports) can be made:

% of 1MMB/D Applied to gasoline	Gasoline per driver/wk (gals)	Gasoline per driver per month (gals)	Cost of coupon ($ per gal)
100	7.5	32	.70
70	8.2	35	.41
50	8.8	38	.26