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Part IV

Department of Energy

Office of Conservation
and Solar Energy

Federal Energy Management and
Planning Programs; Methodology and
Procedures for Life Cycle Cost Analyses
(Marginal Prices and Adjustments)

DEPARTMENT OF ENERGY

Conservation and Solar Energy Office

10 CFR Part 436

[CAS–RM–80–124]

Federal Energy Management and Planning Programs; Methodology and Procedures for Life Cycle Cost Analyses (Marginal Prices and Adjustments)

AGENCY: Department of Energy.
ACTION: Advance notice of proposed rulemaking.

SUMMARY: The Department of Energy gives advance notice of proposed amendments to the methodology and procedures for analyzing the life cycle cost effects of energy conservation and renewable energy investments in Federal buildings. The amendments would require Federal agencies to use "marginal fuel costs," as set forth in the amendments, in conducting a life cycle cost analysis.

DATES: To be fully considered, comments should be received December 8, 1980.

ADDRESSES: Written comments should be mailed to: Carol Snipes, Office of Hearings and Dockets, Department of Energy, Mail Stop 6B–025, 1000 Independence Avenue, SW., Washington, D.C. 20585, (202) 252–9319, [CAS–RM–80–124].

FOR FURTHER INFORMATION CONTACT:
Jack Vitullo, Office of Federal Energy Management Programs, Mail Stop 1H031, Department of Energy, 1000 Independence Avenue, SW., Washington, D.C. 20585, (202) 252–9467.
Neal J. Strauss, Office of General Counsel, Mail Stop 1E–067, Department of Energy, 1000 Independence Avenue, SW., Washington, D.C. 20585, (202) 252–9507.

SUPPLEMENTARY INFORMATION:

I. Introduction

Section 545(a)(1) of the National Energy Conservation Policy Act (NECPA), Pub. L. 95–619, requires the Department of Energy (DOE) to "establish practical and effective methods for estimating and comparing life cycle costs for Federal buildings." The requirement was met through the publication of a final rule on life cycle costing (LCC) on January 23, 1980 (45 FR 5620).

In that rule, DOE provided a theoretical framework for analyzing possible investments in various Federal Energy Management Programs (FEMP). The methodology required by the LCC

rule involves a systematic analysis of all the significant costs associated with energy investments. The methodology relates the initial cost of an energy investment to the future costs associated with that investment, and it provides standardized assumptions for establishing the relevant costs. With some exceptions, § 436.14 required the use of average retail price projections in establishing energy costs for the various forms of energy. In the preamble to the final rule, DOE indicated that the price projections would be updated periodically in order to take into account the most current available data. DOE is publishing concurrently a notice or proposed rulemaking to update the original average retail price projections for use in FEMP in FY 1981.

DOE today gives advance notice of additional proposed amendments to the LCC rule to substitute marginal fuel costs for average retail price projections in FEMP no later than the beginning of FY 1982. This advance notice of proposed rulemaking (ANOPR) is intended to solicit comments from the public to assist DOE in formulating proposed amendments. DOE is seeking this assistance because the task of estimating marginal fuel costs for FEMP has proved to be very complex and members of the public may be able to provide useful information and insights, as well as reactions to DOE's preliminary analysis.

These "marginal fuel cost" amendments are intended to comply with Section 405 of the Energy Security Act (ESA) which amended section 545(a)(1) of NECPA to require the LCC methodology to "use marginal fuel costs as determined by the Secretary." It was stated in the Conference Report, at page 275, that "the Conferees intend that 'marginal fuel costs' are the marginal costs which a customer would pay for fuel or energy available in the region of the country where the Federal building is located."

DOE is of the view that, by mandating use of marginal fuel costs, Congress intended to ensure that allocation of FEMP investment dollars would occur on the basis of life cycle cost analyses using projections of the costs of producing and providing the next unit of supply rather than projections of average market prices. The latter reflects the distorting effects of price controls and certain taxes and subsidies bearing no relationship to the real resource costs. They also do not take into account the very real "external costs" of buying imported oil which are not directly reflected in market prices for oil or natural gas substitutes for oil

(e.g., higher national security expenditures). Accordingly, DOE has tentatively decided to define marginal fuel costs for FEMP as:

The costs to provide an additional unit of a given energy type to the end-user, including extraction, conversion, transportation, distribution, and an import premium, but without price controls and certain energy taxes and subsidies.

The cost projections under this definition were derived from the Analysis Report of DOE's Energy Information Administration entitled "Projecting Marginal Energy Costs Using the Mid-term Energy Forecasting System," DOE/EIA–0184/17. This Analysis Report defines three types of marginal energy costs, and labeled them "marginal energy costs", "marginal energy resource costs" and "energy replacement costs."

EIA's three definitions are:

Marginal energy costs—the costs to provide an additional unit of a given energy type to the end-user, including: (1) Extraction, conversion, transportation and distribution costs; and (2) energy taxes and subsidies.

Marginal energy resource costs—marginal energy costs excluding certain energy taxes and subsidies.

Energy replacement costs—marginal energy resource costs including values of selected externalities.

The definition of marginal fuel costs used for the rest of this ANOPR is equivalent to EIA's definition of "energy replacement costs." DOE would like comments on the appropriateness of the definition for marginal fuel costs proposed for use in the life cycle costing procedures for Federal buildings. Part II of this ANOPR discusses the basis for EIA's "marginal energy costs" and "marginal energy resource costs." Part III deals with the external costs attributable to consumption of imported oil.

To assist the public in responding to this ANOPR, DOE is providing a table of illustrative "marginal fuel costs". The marginal fuel costs satisfying the above quoted definition are supplied, by DOE region, in Appendix A of this ANOPR. They were derived by using the "marginal energy costs" output of the Mid-Term Energy Forecasting System (MEFS), adjusting that output to account for certain energy taxes and subsidies, and then adding an illustrative import premium of \$.56 per million BTU's (\$3 per barrel in 1978 dollars) to reflect selected externalities. Comparable average retail energy costs are also contained in the Appendix. It should be emphasized that these costs are illustrative only, and that they will be different from the costs in the appendices likely to be included in the

notice of proposed rulemaking (NOPR) which will be based on this ANOPR. Among other things, the NOPR is expected to differ from the ANOPR because appendices will include base year marginal fuel costs; may cover the industrial sector of the economy; and may use cost projections for 1985, 1990, and 1995 assuming high case rather than mid-case world oil prices. ("The Mid" case world oil price forecast, of $32.00 per barrel for 1985, $37.00 for 1990, and $41.00 for 1995, in 1979 dollars has been used in developing the illustrative marginal fuel costs in the appendices. The "high" world oil prices are $39.00 per barrel for 1985, $44.00 for 1990, and $56.00 for 1995 in 1979 dollars).

Throughout this ANOPR there are references to various DOE publications. Copies of these documents can be obtained by contacting Jack Vitullo, Department of Energy, 1000 Independence Avenue, SW., Washington, D.C. 20585, (202) 252–9467. Copies will also be available at the Freedom of Information Reading Room, Room 5B 180, 1000 Independence Avenue, SW., Washington, D.C. 20585, (202) 252–6020.

H. EIA's Marginal Costs

A. *The Mid-Term Energy Forecasting System.* The MEFS is EIA's integrated computer model of the domestic energy system with explicit representation at the regional level of (1) the supplies of and demand for petroleum products, natural gas and coal, (2) the cost of petroleum refining, electricity generation, and transportation; and (3) the price sensitivity of energy supply and demand. In forecasting future energy supply, demand and prices, MEFS simulates the interplay among a number of different variables, such as economic growth, world oil prices, and the discovery of additional domestic resources. Because of the uncertainty of such forecasts, MEFS provides range of forecasts based on different assumptions about world oil prices. For a fuller discussion of the assumptions upon which the MEFS is based, see Volume 3 of EIA's 1979 Annual Report to Congress, DOE/EIA–0173(79)/3.

What follows is a brief description of the calculations used to generate the MEFS "marginal energy costs".

1. *General.* Energy consumption levels and corresponding prices are determined in MEFS by solving a linear programming problem involving energy supply and demand variables and assumptions. The solution to the linear program is not automatically an equilibrium for the energy system because the solution does not provide directly for fuel substitution effects,

except in the case of electric utilities. To handle this problem, several iterations are performed using a revised set of demand estimates in each iteration. If, in a particular solution, the prices and associated quantities are within set tolerance limits of the previous prices and quantities, an equilibrium has been achieved. If not, new demand levels are calculated from the previous solution, taking cross-elasticity effects into account. The linear program is revised to reflect the new demand levels and is solved again. This iterative process continues until an equilibrium solution is obtained.

Since the estimated cost and quantity of the last unit of each fuel in each region and each sector are known in this solution, the cost of the next unit of energy may be found by evaluating the next point on the supply curve originally input to the solution methodology. In general, this point on a MEFS supply curve represents the cost of finding and producing the next unit of energy. The costs of transporting and distributing that unit of energy, as well as wholesale to retail markups, are then added to obtain the full "marginal energy cost" of the unit of energy.

2. *Coal.* The "marginal energy cost" of coal to each sector of the economy includes the cost of leasing, exploration, mining, processing, and transporting the marginal unit of coal supplied to the sector. Wholesale to retail price mark-ups are also included in the "marginal energy cost" of coal. Because there are competitive markets for most resources used to produce coal, as well as in the coal industry itself, the market price of this fuel is assumed to equal the "marginal energy costs." These costs include the costs of meeting established government standards with regard to land reclamation, water quality, worker safety, etc.

3. *Petroleum Products.* The "marginal energy cost" of petroleum products to each sector includes the acquisition costs of imported oil, transportation costs of refineries, refining costs, wholesale to retail markups and transportation costs to final consumers. Included are the costs of meeting government regulations related to the operations of oil producers/refiners in the areas of safety and environmental protection. By assumption, the market prices associated with production and delivery of petroleum products are unregulated in the MEFS forecast period and approximate the marginal costs of using those resources. Thus, market price is equated with "marginal energy cost."

4. *Natural Gas.* The "marginal energy cost" of natural gas is the sum of the

exploration, drilling and processing costs for the marginal unit of supply, plus transportation costs, and wholesale to retail markups. The "marginal energy cost" of natural gas higher than the market price, because the market price is computed based on a set of calculations modeling the impact of regulations issued under the Natural Gas Policy Act (Pub. L. 95–621). These calculations reflect two major effects of the regulations: (1) The wellhead prices of certain categories of natural gas continue to be controlled. and (2) the incremental pricing provisions tend to hold down the prices of natural gas to the residential and commercial sectors by requiring that the incremental costs be absorbed primarily by the industrial sector.

5. *Electricity.* The "marginal energy cost" of electricity depends on the "marginal energy cost" of the fuel used to generate the marginal unit of electricity, the capital cost per kilowatt hour (kWh) of the marginal generation, operating, transmission and distribution costs. The "marginal energy cost" of electricity does not correspond to the market price of electricity, because the latter is based, in most areas, on the average costs of generation, operation, transmission, and distribution, plus some return on the utility industry's rate base.

6. *Observations about the MEFS Marginal Energy Cost Projections.* MEFS projections are influenced by the characteristics and assumptions inherent in the MEFS model, described with some particularity in the 1979 EIA Annual Report, at page 293. Some charteristics and assumptions of MEFS are open to discussion, and it may be useful to identify issues regarding those that DOE will be considering during the comment period with the view toward determining what work, if any, is essential to ensure that the MEFS projections are suitable for use in FEMP. DOE is interested in comments regarding these MEFS characteristics and assumptions which addresss the signficance of the issues identified and make recommendations for DOE to consider.

General

- Is the uncertainty associated with energy prices adequately reflected in the MEFS forecasts? More specifically, should ranges be provided to account for uncertainties concerning such matters, as world oil prices, the impact of the deregulation schedule or natural gas, incremental pricing rules, utility and industrial use of natural gas, and regional variations in energy demand and prices? (See

EIA Annual Report to Congress 1979 (79 ARC) pp. 243ff, 82)

Natural Gas

- Do the MEFS implicit natural gas demand elasticities adequately account for the recent history of natural gas curtailments? (79 ARC pp. 332ff)
- Do the price forecasts reflect the most likely incremental pricing scenarios? (79 ARC, pp. 311f, 320, 91, 128ff)
- Is the transition to decontrol properly modelled? In particular, are changes in natural gas prices associated with decontrol of these prices in 1985 adequately taken into consideration? (79 ARC pp. 91, 104, 243ff)
- Are conversions to other fuels by current users of oil suitably considered? Specifically, is it reasonable to assume that the Powerplant and Industrial Fuel Use Act of 1978 (Pub. L. 95–620) will constrain natural gas demand due to its limitations on the use of natural gas? (79 ARC pp. 315f, 311, 323)
- Is the unconventional gas supply response to decontrol overestimated? Specifically, how does the deregulation schedule affect the supply of unconventional gas? (79 ARC, pp. 320ff, 330f, 148f, 124ff)

Oil

- Are the forecasts for world oil prices reasonable? (79 ARC pp. 81ff)

Coal

- Is the high penetration of coal in both the utility and industrial sectors, and consequent low demand for natural gas, reasonable? (79 ARC 323ff, 313, 136ff)

Electricity

- Is the relatively slow rate of growth in real electricity prices reflected in these forcasts reasonable? In particular, would longer retention of oil and gas facilities, and the consequent deferral of new coal and nuclear capacity, result in more accurate projections? (79 ARC 309ff, 313, 325, 147)
- Are the regional price forecasts consistent with regional variations in electricity demand and type of generating capacity (e.g. coal, nuclear, oil, gas, hydroelectric, and unconventional)? (79 ARC 325)
- Is the introduction of combined cycle gas and oil technologies adequately considered? (79 ARC 325)
- MEFS assumes (except for DOE Regions 9 and 10) that the electricity generated in one region is not sold in another region. Does the assumption affect the regional marginal electricity prices? (79 ARC 273)

- How reasonable are assumptions concerning future utility capital and operating costs, and the passthrough of these costs? (79 ARC pp. 313, 325ff)

B. *Taxes and Subsidies.* As noted earlier, EIA's "marginal energy costs" include taxes and subsidies. To derive marginal fuel costs, as defined in this ANOPR, EIA's "marginal energy costs" must be adjusted in two ways. First, some taxes and subsidies included in EIA's "marginal energy costs" should be excluded. The following illustrate the broad range of taxes and subsidies that are included in EIA's "marginal energy costs:" for example, coal—State severance and black lung taxes, and the depletion allowance; electricity—the investment tax credit and State income taxes; petroleum—the investment tax credit and the depletion allowance; and for natural gas—differential royalty fees and intangible drilling allowances. DOE is considering excluding from the calculations certain taxes and subsidies in accordance with the following criterions: Exclude those that are unique to the energy industry, and also those not intended to correct for externalities. The tax and subsidy adjustments are made to approximate the "free market" price of energy, i.e. to approximate the real value of the marginal unit of energy in labor, capital and natural resources. The second adjustment required to derive marginal fuel costs is to add a cost representing the macroeconomic and national security costs associated with oil imports. This second adjustment, the oil import premium, is discussed in detail in the next section of the this ANOPR. The following table indicates these adjustments to EIA's "marginal energy cost" by energy source.

Table 1.—*Adjustments to EIA Marginal Energy Cost To Derive Marginal Fuel Costs*

EIA marginal energy cost	Taxes	Tax subsidies	Externalities
Oil			+ Oil import premium.
Natural gas	− Differential royalty fees.	+ Intangible drilling allowances.	+ Oil import premium.
Coal	Black lung tax. Severance tax (State).		
Electricity	(¹)	(¹)	

¹ (Based on marginal fuel cost developed above.)

1. *Oil Adjustments* For oil, the only adjustment to EIA's "marginal energy cost" is the oil import premium. The tax adjustments were excluded because EIA's petroleum product "marginal energy costs" are based solely on the cost of imported oil. The price of imported oil is unaffected by any taxes

presently imposed by Federal or State governments.

2. *Natural Gas Adjustments.* For natural gas, both a tax adjustment and an oil import premium adjustment are made to the EIA "marginal energy costs." In this case the tax adjustment adds intangible drilling allowances to the "marginal energy cost" and subtracts differential royalty fees. Intangible drilling allowances represent a special tax treatment of intangible (or not salvagable) drilling costs which allow producers either to deduct all of the costs in the year in which they were incurred or to capitalize these costs over a shorter period of time than would normally be allowed. The elimination of these allowances tends to increase the cost of production. Differential royalties refer to the royalty fees imposed by some states over and above the standard 12.5 percent. The elimination of this tax tends to lower the production. The combined effect of both of these adjustments is to increase the cost of production, because the intangible drilling allowance adjustment is greater than the differential royalty adjustment. As in the case of petroleum products, the oil import premium is added, because the saving of a Btu of gas is assumed to result in the ultimate saving of a Btu of imported oil. This assumption is based on the fact that natural gas can be easily substituted for oil.

3. *Coal.* For coal, the tax adjustment consists of modifications to account for the existence of the State severance tax and the black lung tax. State severence taxes are levies placed on the production of coal by certain States. The black lung tax is a Federal tax amounting to $0.25 per ton for surfaced-mined coal and $0.50 per ton underground-mined coal. This tax is used to help treat miners who have contracted black lung disease. This tax is being considered for exclusion because it relates to the past rather than the future cost of producing coal.

4. *Electricity.* To calculate the regional electricity marginal fuel costs the following methodology was used:

- The marginal fuel cost is computed for each fuel used to generate electricity in the region.
- The difference in dollars per million Btu between the "marginal energy cost" and marginal fuel cost is calculated and multipled times the quantity of each fuel consumed by electric utilities to calculate the increase in total costs to the utility for each fuel;
- The increased cost for each fuel is summed over all fuels to arrive at the total increase in fuel costs; and,

- The total increased fuel cost is divided by total generation to produce the increase in price necessary to cover the increased cost.

This increase in price is then added to the EIA "marginal energy cost" of electricity to produce the "marginal fuel costs" of electricity as defined in this ANOPR. This method of calculation implicity assumes that:

- The proportion of each fuel used in the generation of electricity by mode (seasonal peak, daily peak, intermediate, and base) does not change; and,
- The fraction of total generation by mode does not change.

DOE particularly seeks comment on the treatment of taxes, subsidies, and externalities described above and is especially interested in comments on other adjustments that may be considered appropriate.

III. The Import Premium

A. *Analytic Framework.* The price paid by a consumer for a unit of energy may not reflect certain additional societal costs associated with the consumption of that unit of energy, i.e, costs which accrue to society generally and are not directly reflected in energy market prices. Such costs are referred to as "externalities" and are difficult to quantify. For example, when an American purchases a Btu of imported oil at the world market price, that price does not reflect the negative impact on the American economy of importing oil, nor does it reflect the danger to this country of being dependent on imported oil. Other externalities might include the cost of pollution for coal fired electricity (to the extent that such costs are not reflected in the cost of the electricity).

The final LCC rule of January 23, 1980, addressed the question of externalties by requiring, for analytical purposes, the assumption that the cost of an energy capital investment for conservation or renewables is 90 percent of the actual cost. However, this approach requires the same externality credit be given for every investment regardless of the type of energy conserved. Further, the approach does not reflect the amount of energy to be conserved by the investment; a very efficient energy investment is given the same credit per-dollar invested as a less efficient energy investment.

It is DOE's tenative belief that this treatment of externalities should be abandoned in favor of an approach which takes account of relevant external costs in the projection of marginal fuel costs. For FEMP, DOE presently believes the most relevant externality is the

premium cost to the Nation of importing oil. Comment is requested on the appropriateness of other externality adjustments that may be considered.

Since these costs are not reflected in the price of fuel, the impact of these costs are not reflected in the level of consumption which takes place at the world oil price. These hidden costs result from such sources as increased vulnerability to sudden supply disruptions, and adverse impacts on U.S. trade balances and domestic inflation.

Another way to view those hidden costs is as benefits which would accrue to the Nation from reducing oil imports. Obtaining those benefits is a major objective of U.S. energy policy, and of the Federal Energy Management Program (FEMP). The magnitude of the sum of the benefits resulting from an import reduction is dependent on the base level of imports. For example, there would clearly be little or no value of actions to reduce imports if there were already little or no oil imported. If we measure those benefits in units of dollars per barrel, then they may be regarded as a per-barrel "premium" for import reduction. Thus, to evaluate Federal Government energy investments whose intended effect is to reduce oil imports, it is necessary to estimate the size of the premium.

The *import premium,* the per-barrel value of actions to reduce oil imports, is the sum of benefits arising from two sources: the price effect from lower world oil demand and the security effects from decreased vulnerability to the micro and macroeconomic costs of sudden supply disruptions.

The *world price component* depends on the relationship between U.S. imports and world oil prices. Generally, a reduction in U.S. imports should put downward pressure on the world oil price path. That is not to say that oil prices will decrease, but that as a result of a reduction in U.S. oil imports, the price path over time will be lower than it would have been otherwise. The size of the reduction in the oil price depends mainly on two key variables, the OPEC production response to a reduction in U.S. imports, and the sensitivity to price of the demand for OPEC oil.

The *security component* results from a reduction in the costs and likelihood of an interruption in oil supplies. The cost of an interruption, should it occur, is smaller if the amount of imported oil is small.

The size of particular components of the premium can be quite sensitive to specific conditions in the world petroleum market. However, the size of the total premium is less sensitive to these conditions than are the sizes of the

components. The security effect tends to be greatest when the world oil price effect is smallest. The converse if also true.

The size of the benefits and costs of import reduction also depends on whether the U.S. acts alone or in cooperation with other importing countries. For example, a ten percent cut in total oil imports increases security to all countries that import oil. The same benefits to all importing countries would result from a single country's cutting imports by the same total. The net benefits to the U.S. of import reductions can be substantially greater if those U.S. actions are concurrent with actions that result in import reductions in other parts of the world.

A full explanation of the methodology underlying the import premium is contained in Appendix B to the DOE Staff working paper "The Energy Problem: Costs and Policy Options," May 23, 1980.

B. *Estimates of the Import Premium.* There is considerble uncertainty as to what an appropriate value for the import premium might be. Preliminary analysis within DOE suggests a range of $3–10 per barrel, taking into account the likely effect of reduced U.S. consumption on world oil prices and decreased vulnerability to disruptions. This should not, however, be taken to represent the maximum possible range. The parameters varied in estimating this range were likelihoods of different levels of disruptions and long-run pricing-production objectives of OPEC. Many other parameters such as demand elasticities could have been varied as well.

As indicated by the following table there is a rather wide range of estimates from other observers.

Table 2.—*Alternative Estimates of the Premium Above Direct Costs for Incremental Changes in U.S. Imports*

[Dollars per barrel]

Components of per barrel costs	Nordhaus [a]	Lemon [b]	Stobaugh and Yergin [c]
Change in direct oil prices	3–28	12.50	17
Macroeconomic effects	10–18	22.42	5–55
Security from supply disruption	[d]N.I.	4.00	[d]N.I.m,s
Total	13–46	38.92	22–72

[a] Nordhaus, William D., "The Energy Crisis and Macroeconomic Policy." Cowles Foundation Discussion Paper No. 534, July 30, 1979 (unpublished).
[b] Lemon, J. R., "The Direct and External Benefits of Reducing Oil Imports, *Energy Topic,* Supplement to *IGT Highlights,* October 1, 1979.
[c] Stobaugh, R. and D. Yergin, eds., *Energy Future,* Random House, New York, 1979.
[d] Not included in the estimate.

Much of the range, however, is more apparent than real. For example, the Stobaugh and Yergin premium is large

principally because; (1) it assumes that U.S. oil import reduction will induce equivalent oil import reductions in other oil importing countries, (2) the estimate is based on a very large base level of imports (9–14 MMBD) as opposed to the current 7–8 MMBD level; and, (3) a long term elasticity of world oil demand of about 0.35 is assumed. If they had assumed that the U.S. was acting alone and the level of oil imports was at the current level, the Stobaugh and Yergin model would yield a premium of $7 to $23.

As a part of an ongoing effort to determine an appropriate range of estimates for the premium, DOE is sponsoring a conference on October 2 and 3, 1980, on the import premium. Selected energy/economic analysts have been invited to present the results of their analysis of the appropriate structure, magnitude, and application of the oil import premium. It is hoped that the widespread dissemination of that work will contribute a useful consensus on the value of reducing the demand for imported oil. The proceedings of this conference may be obtained by writing to Director, Office of Oil Policy, Office of Policy and Evaluation, U.S. Department of Energy, Mail Stop 7E088, 1000 Independence Ave. SW., Washington, D.C. 20585.

If the premium were $1 per barrel, it would equal $0.187 (in 1979 dollars) per million Btu's for oil and natural gas. If the Premium were $3 per barrel, it would equal $0.56 per million Btu's, and it it were $10 per barrel, it would equal $1.87 million Btu's. For purposes of illustration, the marginal fuel costs set forth in Appendix A were calculated on the basis of a $3 per barrel (1978 dollars) premium (this equates to $3.23 per barrel in 1979 dollars, or $0.56 per million Btu's).

For electricity, the premium varies by region according to the amount of oil and gas used to generate electricity. For the 10 DOE regions, the impact of a $1 per barrel (oil and gas) premium on electricity costs would be as follows:

Table 3.—*1985 Regional Incremental Increase in Electric[1] Prices Due to Oil Import Premium*

DOE region										
1	2	3	4	5	6	7	8	9	10	Nat.
.33	.09	.23	.22	.04	.30	.05	.23	.22	—	.17

[1] Increases per MMBTU of electricity for each dollar per barrel increase in oil import premium.

IV. Comments

Interested persons are invited to comment on methodologies, assumptions and prices described herein. Comments should be submitted to Carol A. Snipes, Office of Hearings and Dockets, Mail Stop 6B–025, 1000 Independence Avenue, S.W., Washington, D.C. 20585, and should be identified on the outside of the envelope and on the documents submitted with the designation "CAS–RM–80–124 LCC Marginal Prices and Adjustments." Fifteen copies should be submitted by December 8, 1980, in order to ensure consideration.

Any information or data considered to be confidential must be so identified in writing. DOE reserves the right to determine the confidential status of information or data and treat it accordingly.

Issued in Washington, D.C., October 1, 1980.

Kelly C. Sandy III,

Executive Director, Office of Conservation & Solar Energy.

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APPENDIX A TO ANOPR ON LIFE CYCLE COSTING

MARGINAL FUEL COSTS
(ILLUSTRATIVE)

Table A 1. Residential Sector: Distillate
(1979 $/Million Btu)

	DOE Region										
	1 New England	2 New York/ New Jersey	3 Mid- Atlantic	4 South Atlantic	5 Mid- west	6 South- west	7 Central	8 North Central	9 West	10 North- west	United States
1985											
Marginal Energy Cost	6.62	6.71	6.91	6.99	6.39	6.63	6.33	6.46	6.24	6.24	6.64
+ Import Premium	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
= Marginal Fuel Cost	7.18	7.27	7.47	7.55	6.95	7.19	6.89	7.02	6.80	6.80	7.20
Average Retail Price	6.62	6.71	6.91	6.99	6.19	6.63	6.33	6.46	6.24	6.24	6.64
1990											
Marginal Energy Cost	7.47	7.56	7.75	7.84	7.23	7.48	7.17	7.25	7.09	7.09	7.50
+ Import Premium	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
= Marginal Fuel Cost	8.03	8.12	8.31	8.40	7.79	8.04	7.73	7.81	7.65	7.65	8.06
Average Retail Price	7.47	7.56	7.75	7.84	7.23	7.46	7.17	7.25	7.09	7.09	7.50
1995											
Marginal Energy Cost	8.13	8.22	8.43	8.51	7.91	8.15	7.84	7.92	7.75	7.75	8.18
+ Import Premium	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
= Marginal Fuel Cost	8.69	8.78	8.99	9.07	8.47	8.71	8.40	8.48	8.31	8.31	8.74
Average Retail Price	8.13	8.22	8.43	8.51	7.91	8.15	7.84	7.92	7.75	7.75	8.18

Note: 1. The Marginal Energy Costs and the Average Retail cost contained in the table above are based on the mid international oil price
scenario shown in Supplement 1, to Volume 3 of the EIA Annual Report to Congress 1979. DOE/EIA-0173(79)/3

2. The oil import premiums used for illustrative purposes were calculated on the basis of a $3.00 per barrel premium or $0.56 per million
Btu's. If the oil import premiums were $10.00 per barrel then the premium would be $1.87 per million Btu's and the marginal fuel cost
would be $1.31 higher than listed above.

APPENDIX A TO ANOPR ON LIFE CYCLE COSTING

MARGINAL FUEL COSTS
(ILLUSTRATIVE)

Table A 2. Residential Sector: Liquid Gases
(1979 $/Million Btu)

	DOE Region										
	1 New England	2 New York/ New Jersey	3 Mid- Atlantic	4 South Atlantic	5 Mid- West	6 South- west	7 Central	8 North Central	9 West	10 North- west	United States
1985											
Marginal Energy Cost	7.55	7.68	8.02	8.02	7.64	7.58	7.57	7.80	7.60	7.60	7.72
+ Import Premium	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
= Marginal Fuel Cost	8.11	8.24	8.58	8.58	8.20	8.14	8.13	8.36	8.16	8.16	8.28
Average Retail Price	7.55	7.68	8.02	8.02	7.64	7.58	7.57	7.80	7.60	7.60	7.72
1990											
Marginal Energy Cost	8.92	9.05	9.39	9.39	9.02	8.95	8.94	9.17	8.97	8.97	9.10
+ Import Premium	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
= Marginal Fuel Cost	9.48	9.61	9.95	9.95	9.58	9.51	9.50	9.73	9.53	9.53	9.66
Average Retail Price	8.92	9.05	9.39	9.39	9.02	8.95	8.94	9.17	8.97	8.97	9.10
1995											
Marginal Energy Cost	9.67	9.80	10.14	10.14	9.72	9.70	9.64	9.87	9.72	9.72	9.82
+ Import Premium	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
= Marginal Fuel Cost	10.23	10.36	10.70	10.70	10.28	10.26	10.20	10.43	10.28	10.28	10.38
Average Retail Price	9.67	9.80	10.14	10.14	9.72	9.70	9.64	9.87	9.72	9.72	9.82

Note: 1. The Marginal Energy Costs and the Average Retail Cost contained in the table above are based on the mid international oil price
scenario shown in Supplement 1, to Volume 3 of the EIA Annual Report to Congress 1979. DOE/EIA-0173(79)/3

2. The oil import premiums used for illustrative purposes were calculated on the basis of a $3.00 per barrel premium or $0.56 per million
Btu's. If the oil import premiums were $10.00 per barrel then the premium would be $1.87 per million Btu's and the marginal fuel cost
would be $1.31 higher than listed above.

APPENDIX A TO ANOPR ON LIFE CYCLE COSTING

MARGINAL FUEL COSTS
(ILLUSTRATIVE)

Table A 3.   Residential Sector: Natural Gas
(1979 $/Million Btu)

| | DOE Region | | | | | | | | | | |
	1 New England	2 New York/ New Jersey	3 Mid- Atlantic	4 South Atlantic	5 Mid- West	6 South- west	7 Central	8 North Central	9 West	10 North- west	United States
1985											
Marginal Energy Cost	5.66	5.59	5.02	4.70	4.62	4.14	4.47	4.16	5.09	5.51	4.78
+ Tax Adjustment	.29	.29	.28	.27	.28	.27	.28	.27	.29	.28	.28
+ Import Premium	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
= Marginal Fuel Cost	6.51	6.44	5.86	5.53	5.46	4.97	5.31	4.99	5.94	6.35	5.62
Average Retail Price	4.93	4.46	3.91	3.45	3.51	3.68	3.47	3.61	4.39	5.48	3.83
1990											
Marginal Energy Cost	6.79	6.71	6.13	5.77	5.69	5.14	5.48	4.99	5.95	6.37	5.81
+ Tax Adjustment	.31	.30	.30	.29	.30	.30	.29	.28	.30	.30	.30
+ Import Premium	0.55	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
= Marginal Fuel Cost	7.66	7.57	6.99	6.62	6.55	6.00	6.33	5.83	6.81	7.23	6.67
Average Retail Price	6.05	5.59	4.68	4.07	4.23	4.82	4.40	4.61	5.05	5.87	4.65
1995											
Marginal Energy Cost	7.20	7.11	6.52	6.16	6.08	5.51	5.86	5.32	6.20	6.76	6.18
+ Tax Adjustment	.31	.30	.30	.29	.30	.30	.29	.28	.30	.30	.30
+ Import Premium	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
= Marginal Fuel Cost	8.07	7.97	7.38	7.01	6.94	6.37	6.71	6.16	7.06	7.62	7.04
Average Retail Price	6.49	6.09	5.13	4.62	4.66	5.29	5.05	5.08	4.88	6.40	5.06

Note: 1. The Marginal Energy Costs and the Average Retail Cost contained in the table above are based on the mid international oil price scenario shown in Supplement 1, to Volume 3 of the EIA Annual Report to Congress 1979. DOE/EIA-0173(79)/3

2. The oil import premiums used for illustrative purposes were calculated on the basis of a $3.00 per barrel premium or $0.56 per million Btu's. If the oil import premiums were $10.00 per barrel then the premium would be $1.87 per million Btu's and the marginal fuel cost would be $1.31 higher than listed above.

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MARGINAL FUEL COSTS
(ILLUSTRATIVE)

Table A 4.   Commercial Sector: Distillate
(1979 $/Million Btu)

| | DOE Region | | | | | | | | | | |
	1 New England	2 New York/ New Jersey	3 Mid- Atlantic	4 South Atlantic	5 Mid- West	6 South- west	7 Central	8 North Central	9 West	10 North- west	United States
1985											
Marginal Energy Cost	6.35	6.43	6.47	6.48	6.18	6.35	6.13	6.21	5.93	5.93	6.32
+ Import Premium	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
= Marginal Fuel Cost	6.91	6.99	7.03	7.04	6.74	6.91	6.69	6.77	6.49	6.49	6.88
Average Retail Price	6.35	6.43	6.47	6.48	6.18	6.35	6.13	6.21	5.93	5.43	6.32
1990											
Marginal Energy Cost	7.20	7.27	7.32	7.32	7.03	7.19	6.97	6.99	6.78	6.78	7.16
+ Import Premium	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
= Marginal Fuel Cost	7.76	7.83	7.88	7.88	7.59	7.75	7.53	7.55	7.34	7.34	7.72
Average Retail Price	7.20	7.27	7.32	7.32	7.03	7.19	6.97	6.99	6.78	6.78	7.16
1995											
Marginal Energy Cost	7.86	7.94	7.99	8.00	7.70	7.86	7.65	7.66	7.43	7.43	7.82
+ Import Premium	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
= Marginal Fuel Cost	8.42	8.50	8.55	8.56	8.26	8.42	8.21	8.22	7.99	7.99	8.38
Average Retail Price	7.86	7.34	7.99	8.00	7.70	7.86	7.65	7.66	7.43	7.43	7.82

Note: 1. The Marginal Energy Costs and the Average Retail Cost contained in the table above are based on the mid international oil price scenario shown in Supplement 1, to Volume 3 of the EIA Annual Report to Congress 1979. DOE/EIA-0173(79)/3

2. The oil import premiums used for illustrative purposes were calculated on the basis of a $3.00 per barrel premium or $0.56 per million Btu's. If the oil import premiums were $10.00 per barrel then the premium would be $1.87 per million Btu's and the marginal fuel cost would be $1.31 higher than listed above.

APPENDIX A TO ANOPR ON LIFE CYCLE COSTING

MARGINAL FUEL COSTS
(ILLUSTRATIVE)

Table A 5. Commercial Sector: Residual
(1979 $/Million Btu)

	DOE Region										
	1 New England	2 New York/ New Jersey	3 Mid- Atlantic	4 South Atlantic	5 Mid- West	6 South- west	7 Central	8 North Central	9 West	10 North- west	United States
1985											
Marginal Energy Cost	5.51	5.60	5.93	5.50	5.52	5.51	5.56	5.40	5.19	5.01	5.54
+ Import Premium	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
= Marginal Fuel Cost	6.07	6.16	6.49	6.06	6.08	6.07	6.12	5.96	5.75	5.57	6.10
Average Retail Price	5.51	5.60	5.93	5.50	5.52	5.51	5.56	5.40	5.19	5.01	5.54
1990											
Marginal Energy Cost	6.20	6.31	6.65	6.24	6.26	6.25	6.30	6.09	5.95	5.76	6.24
+ Import Premium	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
= Marginal Fuel Cost	6.76	6.87	7.21	6.80	6.82	6.81	6.86	6.65	6.51	6.32	6.80
Average Retail Price	6.20	6.31	6.65	6.24	6.26	6.25	6.30	6.09	5.95	5.76	6.24
1995											
Marginal Energy Cost	6.76	6.86	7.20	6.80	6.88	6.87	6.92	6.70	6.55	6.36	6.79
+ Import Premium	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
= Marginal Fuel Cost	7.32	7.42	7.76	7.36	7.44	7.43	7.48	7.26	7.11	6.92	7.35
Average Retail Price	6.76	6.45	7.20	6.80	6.88	6.87	6.92	6.70	6.55	6.36	6.79

Note: 1. The Marginal Energy Costs and the Average Retail Cost contained in the table above are based on the mid international oil price scenario shown in Supplement 1, to Volume 3 of the EIA Annual Report to Congress 1979. DOE/EIA-0173(79)/3

2. The oil import premiums used for illustrative purposes were calculated on the basis of a $3.00 per barrel premium or $0.56 per million Btu's. If the oil import premiums were $10.00 per barrel then the premium would be $1.87 per million Btu's and the marginal fuel cost would be $1.31 higher than listed above.

APPENDIX A TO ANOPR ON LIFE CYCLE COSTING

MARGINAL FUEL COSTS
(ILLUSTRATIVE)

Table A 6. Commercial Sector: Liquid Gases
(1979 $/Million Btu)

	DOE Region										
	1 New England	2 New York/ New Jersey	3 Mid- Atlantic	4 South Atlantic	5 Mid- West	6 South- west	7 Central	8 North Central	9 West	10 North- west	United States
1985											
Marginal Energy Cost	7.55	7.68	8.02	8.02	7.64	7.58	7.57	7.80	7.60	7.60	7.70
+ Import Premium	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
= Marginal Fuel Cost	8.11	8.24	8.58	8.58	8.20	8.14	8.13	8.36	8.16	8.16	8.26
Average Retail Price	7.55	7.68	8.02	8.02	7.64	7.58	7.57	7.80	7.60	7.60	7.70
1990											
Marginal Energy Cost	8.92	9.05	9.39	9.39	9.02	8.95	8.94	9.17	8.97	8.97	9.06
+ Import Premium	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
= Marginal Fuel Cost	9.48	9.61	9.95	9.95	9.58	9.51	9.50	9.73	9.53	9.53	9.62
Average Retail Price	8.92	9.05	9.39	9.39	9.02	8.95	8.94	9.17	8.97	8.97	9.06
1995											
Marginal Energy Cost	9.67	9.80	10.14	10.14	9.72	9.70	9.64	9.87	9.72	9.72	9.79
+ Import Premium	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
= Marginal Fuel Cost	10.23	10.36	10.70	10.70	10.28	10.26	10.20	10.43	10.28	10.28	10.35
Average Retail Price	9.67	9.60	10.14	10.14	9.72	9.70	9.64	9.87	9.72	9.72	9.79

Note: 1. The Marginal Energy Costs and the Average Retail Cost contained in the table above are based on the mid international oil price scenario shown in Supplement 1, to Volume 3 of the EIA Annual Report to Congress 1979. DOE/EIA-0173(79)/3

2. The oil import premiums used for illustrative purposes were calculated on the basis of a $3.00 per barrel premium or $0.56 per million Btu's. If the oil import premiums were $10.00 per barrel then the premium would be $1.87 per million Btu's and the marginal fuel cost would be $1.31 higher than listed above.

APPENDIX A TO ANOPR ON LIFE CYCLE COSTING

MARGINAL FUEL COSTS
(ILLUSTRATIVE)

Table A 7. Commercial Sector: Natural Gas
(1979 $/Million Btu)

| | DOE Region | | | | | | | | | | |
	1 New England	2 New York/ New Jersey	3 Mid- Atlantic	4 South Atlantic	5 Mid- West	6 South- west	7 Central	8 North Central	9 West	10 North- west	United States
1985											
Marginal Energy Cost	4.92	4.92	4.50	4.13	4.26	3.54	4.02	3.91	4.51	4.86	4.26
+ Tax Adjustment	.29	.29	.28	.27	.27	.27	.27	.27	.29	.28	.28
+ Import Premium	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
= Marginal Fuel Cost	5.77	5.77	5.34	4.96	5.09	4.37	4.85	4.74	5.36	5.70	5.10
Average Retail Price	4.18	3.79	3.40	2.88	3.14	3.08	3.01	3.36	3.81	4.82	3.33
1990											
Marginal Energy Cost	6.05	6.04	5.61	5.20	5.32	4.55	5.03	4.73	5.37	5.71	5.30
+ Tax Adjustment	.31	.31	.30	.30	.30	.28	.29	.29	.30	.30	.30
+ Import Premium	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
= Marginal Fuel Cost	6.92	6.91	6.47	6.06	6.18	5.39	5.88	5.58	6.23	6.57	6.16
Average Retail Price	5.31	4.92	4.18	3.50	3.86	4.23	3.95	4.36	4.47	5.21	4.19
1995											
Marginal Energy Cost	6.46	6.44	6.00	5.59	5.71	4.92	5.41	5.07	5.62	6.10	5.67
+ Tax Adjustment	.31	.31	.30	.30	.30	.28	.29	.29	.30	.30	.30
+ Import Premium	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
= Marginal Fuel Cost	7.33	7.31	6.86	6.45	6.57	5.76	6.26	5.92	6.48	6.96	6.53
Average Retail Price	5.75	5.82	4.61	4.06	4.30	4.70	4.59	4.82	4.30	5.74	4.60

Note: 1. The Marginal Energy Costs and the Average Retail Cost contained in the table above are based on the mid international oil price
scenario shown in Supplement 1, to Volume 3 of the EIA Annual Report to Congress 1979. DOE/EIA-0173(79)/3

2. The oil import premiums used for illustrative purposes were calculated on the basis of a $3.00 per barrel premium or $0.56 per million
Btu's. If the oil import premiums were $10.00 per barrel then the premium would be $1.87 per million Btu's and the marginal fuel cost
would be $1.31 higher than listed above.

APPENDIX A TO ANOPR ON LIFE CYCLE COSTING

MARGINAL FUEL COSTS
(ILLUSTRATIVE)

Table A-8: Electricity: Residential and Commercial Sector Marginal Fuel Cost for 1985
(1979 $/Million Btu)

| | DOE Regions | | | | | | | | | | |
	1 New England	2 New York/ New Jersey	3 Mid- Atlantic	4 South Atlantic	5 Mid- West	6 South- West	7 Central	8 North Central	9 West	10 North- West	United States
1985											
Increased Cost of: (Millions of 1979 $)											
Coal	-2	-8	-180	-346	-44	-19	-10	-46	-5	-3	-663
Distillate	33	3	45	-	21	-	-	-	16	-	118
Residual	254	36	63	-	19	-	-	-	254	-	626
Natural Gas	44	105	16	180	53	1393	37	-	358	-	2186
Total	329	136	-56	-166	49	1374	27	-46	623	-3	2267
+ Total Generation	331	503	953	1819	1690	1132	383	204	791	523	8328
= Increased Price (1979 $/MM Btu)	.99	.27	-.06	-.09	.03	1.21	.07	-.23	.79	-	.27
+ Marginal Residential Energy Cost	30.11	21.96	19.19	15.43	16.78	14.79	11.06	8.33	19.31	11.95	16.79
= Residential Marginal Fuel Cost	31.10	22.23	19.13	15.34	16.81	16.00	11.13	8.10	20.10	11.95	17.06
Average Retail Price	22.70	22.76	16.90	12.84	15.66	17.19	17.14	17.25	17.76	6.57	15.80
+ Marginal Commercial Energy Cost	29.80	20.88	18.79	15.78	16.35	13.74	10.15	7.06	20.37	11.74	16.52
= Commercial Marginal Fuel Cost	30.79	21.15	18.73	15.69	16.38	14.95	10.22	6.83	21.16	11.74	16.79
Average Retail Price	22.38	21.68	16.51	13.19	15.22	16.14	16.23	15.99	18.82	6.36	16.24

Note: 1. The Marginal Energy Costs and the Average Retail Cost contained in the table above are based on the mid international oil price
scenario shown in Supplement 1, to Volume 3 of the EIA Annual Report to Congress 1979. DOE/EIA-0173(79)/3

2. The oil import premiums used for illustrative purposes were calculated on the basis of a $3.00 per barrel premium or $0.56 per million
Btu's.

3. The Marginal Fuel Cost increments are based on the EIA Analysis Report "Replacement Energy Cost in the Residential and Commercial Sector,
1985, 1990, and 1995," July 1980 as amended by EIA memorandum, September 9, 1980 "Revised Electricity Replacement Cost Estimates."

APPENDIX A TO ANOPR ON LIFE CYCLE COSTING

MARGINAL FUEL COSTS
(ILLUSTRATIVE)

Table A-9: Electricity: Residential and Commercial Sector Marginal Fuel Cost for 1990
(1979 $/Million Btu)

	1 New England	2 New York/ New Jersey	3 Mid- Atlantic	4 South Atlantic	5 Mid- West	6 South- West	7 Central	8 North Central	9 West	10 North- West	United States
1990											
Increased Cost of: (Millions of 1979 $)											
Coal	-3	-9	-204	-420	-48	-25	-11	-75	-7	-3	-805
Distillate	27	–	53	–	36	–	–	–	16	–	132
Residual	154	5	76	10	19	–	–	–	331	–	595
Natural Gas	22	69	34	297	73	1442	129	–	385	2	2453
Total	200	65	-41	-113	80	1417	118	-75	725	-1	2375
÷ Total Generation	393	570	1131	2251	1973	1390	455	257	967	587	9975
= Increased Price (1979 $/MM Btu)	.51	.11	-.04	-.05	.04	1.02	.26	-.29	.75	–	.24
+ Marginal Residential Energy Cost	29.73	19.25	22.02	17.39	18.65	18.57	15.75	8.46	22.59	15.88	19.01
= Residential Marginal Fuel Cost	30.24	19.36	21.98	17.34	18.69	19.59	16.01	8.17	23.34	15.88	19.25
Average Retail Price	22.82	22.14	17.50	14.09	16.53	18.80	16.59	15.04	18.35	7.95	16.56
+ Marginal Commercial Energy Cost	29.42	18.17	21.63	17.74	18.21	17.51	14.84	7.19	23.65	15.67	18.74
= Commercial Marginal Fuel Cost	29.93	18.28	21.59	17.69	18.25	18.53	15.10	6.90	24.40	15.67	18.98
Average Retail Price	22.51	21.06	17.11	14.44	16.09	17.74	15.68	13.77	19.41	7.74	16.92

Note: 1. The Marginal Energy Costs and the Average Retail Cost contained in the table above are based on the mid international oil price
scenario shown in Supplement 1, to Volume 3 of the EIA Annual Report to Congress 1979. DOE/EIA-0173(79)/3
2. The oil import premiums used for illustrative purposes were calculated on the basis of a $3.00 per barrel premium or $0.56 per million Btu's.

3. The Marginal Fuel Cost increments are based on the EIA Analysis Report "Replacement Energy Cost in the Residential and Commercial Sector, 1985, 1990, and 1995," July 1980 as amended by EIA memorandum, September 9, 1980 "Revised Electricity Replacement Cost Estimates."

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MARGINAL FUEL COSTS
(ILLUSTRATIVE)

Table A-10: Electricity: Residential and Commercial Sector Marginal Fuel Cost for 1995
(1979 $/Million Btu)

	1 New England	2 New York/ New Jersey	3 Mid- Atlantic	4 South Atlantic	5 Mid- West	6 South- West	7 Central	8 North Central	9 West	10 North- West	United States
1995											
Increased Cost of: (Millions of 1979 $)											
Coal	-6	-9	-284	-502	-53	-38	-12	-124	-18	-3	-1049
Distillate	13	–	–	–	42	–	–	–	–	–	55
Residual	24	5	13	22	19	–	–	–	–	–	83
Natural Gas	8	83	14	312	73	824	169	.–	210	–	1693
Total	39	79	-257	-168	81	786	157	-124	192	-3	782
÷ Total Generation	470	625	1282	2650	2214	1703	517	327	1143	622	11553
= Increased Price (1979 $/MM Btu)	.08	.13	-.20	-.06	.04	.46	.30	-.38	.17	–	.07
+ Marginal Residential Energy Cost	21.01	21.74	18.59	17.79	18.81	17.44	18.95	11.84	17.47	11.15	17.85
= Residential Marginal Fuel Cost	21.09	21.87	18.39	17.73	18.85	17.90	19.25	11.46	17.64	11.15	17.92
Average Retail Price	19.49	21.75	17.45	14.44	16.34	18.42	16.75	13.18	16.62	8.25	16.14
+ Marginal Commercial Energy Cost	20.70	20.66	18.19	18.14	18.37	16.39	18.04	10.57	18.52	10.95	17.59
= Commercial Marginal Fuel Cost	20.78	20.79	17.99	18.08	18.41	16.85	18.34	10.19	18.69	10.95	17.66
Average Retail Price	19.18	20.67	17.05	14.80	15.90	17.37	15.84	11.91	17.67	8.05	16.49

Note: 1. The Marginal Energy Costs and the Average Retail Cost contained in the table above are based on the mid international oil price
scenario shown in Supplement 1, to Volume 3 of the EIA Annual Report to Congress 1979. DOE/EIA-0173(79)/3
2. The oil import premiums used for illustrative purposes were calculated on the basis of a $3.00 per barrel premium or $0.56 per million Btu's.

3. The Marginal Fuel Cost increments are based on the EIA Analysis Report "Replacement Energy Cost in the Residential and Commercial Sector, 1985, 1990, and 1995," July 1980 as amended by EIA memorandum, September 9, 1980 "Revised Electricity Replacement Cost Estimates."

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