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Draft Regulatory Analysis

Notice of Proposed Rulemaking for the Allocation and Pricing of Gasohol

May 1980

Prepared by:
U.S. Department of Energy
Economic Regulatory Administration
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DRAFT REGULATORY ANALYSIS

GASOHOL PRICING AND ALLOCATION PROPOSED RULE

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EXECUTIVE SUMMARY

The three principal problem areas addressed in the regulatory analysis of the proposed gasohol allocation and price rule and its deregulation alternative are: how to price unleaded blend stock and gasohol; how blenders are to obtain unleaded blend stock to blend with ethanol to produce gasohol; and how gasohol suppliers may distribute gasohol to purchasers. The proposed pricing and allocation rules, if adopted as final rules, would be in effect for about a year, because the statutory authority for gasoline price and allocation controls has an expiration date of September 30, 1981.

The principal issues addressed in the draft regulatory analysis are: what volume of ethanol and gasohol production can be expected between now and the end of 1981; what prices these products are likely to reach, independent of the rule and its alternative; what effect the rule and its alternative may have on the price and distribution of ethanol and gasohol; and what effect the rule and its alternative may have on motor vehicle misfueling and competition in the motor gasoline industry.

On supply issues, the draft regulatory analysis concludes that by December, 1981, ethanol and gasohol production should increase by a factor or 3 or 4 above present levels, enough to meet the President's goals, without requiring additional corn acreage or adversely affecting food production. Ethanol production should increase from it present level of about 92 million gallons per year (6,062 B/D) to the 3, 4

and 7 hundred million gallons per year levels (20,000, 30 000, and 45,000 B/D) necessary to produce gasohol at year-end rates of 200,000 B/D in 1980, 300,000 B/D in 1981 and 450,000 B/D in 1982. In 1980 gasohol will represent about 3.2 percent of the total gasoline market, and 7.9 percent of the total unleaded market, but its ethanol component, which represents the total increase in the supply of motor gasoline, will constitute less than .3 percent of the total gasoline market and less than .8 percent of the total unleaded market.

Gasohol should help extend, rather than adversely affect, unleaded supplies. Regional dislocations of unleaded supply should not occur for three reasons. First, to the extent that demand for unleaded gasoline is reduced in PAD II by gasohol consumption, unleaded suppliers will redirect unleaded to other regions, either by greater exports from the region or fewer imports, facilitated by exchange agreements for gasoline which most refiners frequently conclude with other refiners. Second, the lower cost of transporting one gallon of ethanol out of the Midwest than the cost of importing nine gallons of unleaded gasoline into the Midwest constitutes a strong economic incentive for ethanol to flow to other regions in addition to the Midwest. (These two factors will operate in either the regulatory or deregulation alternatives.) Third, in the regulatory alternative, DOE can offset possible shifts in the regional availability of unleaded gasoline in cases where a prospective unleaded blend stock supplier is short of supply by the sparing use in such cases of the proposed rule's "buyback" provision. DOE would afford the unleaded supplier (where the blender agreed) the opportunity to buy back an amount

of gasohol equal to the unleaded blend stock DOE required it to supply to the blender. In addition, most of the blend stock subject to supply orders would come from suppliers that would have provided unleaded to the region in which the order is issued in any event.

The concern that the deregulation alternative would deny volumes of blend stock to independent ethanol producers and thereby produce an anticompetitive effect does not appear to be valid. It seems more likely that gasoline marketers at all levels would compete to sell unleaded gasoline to ethanol producers.

On price issues, the analysis concludes that in the "base case," with no change in the present price rules, the retail price of gasohol before taxes (taxes would vary from state to state according to the aggregate exemptions in those states) would be about $1.21 in 1980 and $1.45 in 1981; the refiner, reseller and retailer incentives in the proposed price rule would raise the before-tax gasohol retail price to about $1.31 in 1980 and $1.55 in 1981.

In the decontrol case, the analysis assumes that competition is presently restraining unleaded gasoline prices at or below maximum lawful prices, and therefore concludes that decontrolled gasohol prices would be roughly similar to those in the price rule case: $1.31 in 1980 and $1.55 in 1981. Disparities in gasohol, leaded, and unleaded gasoline prices resulting from several factors including tax exemptions and variations in crude

oil costs, may produce a small, environmentally insignificant incidence of fuel switching. This phenomenon is discussed in more detail in a separate environmental assessment which is being prepared.

I. INTRODUCTION

Under the terms of Executive Order No. 12044, "Improving Government Regulations," and the Department of Energy's implementing order 2030.1, "Procedures for the Development and Analysis of Regulations, Standards and Guidelines" [44 F.R. 1032, January 3, 1979, and Federal Energy Guidelines, Par. 39,011], DOE is required to prepare a regulatory analysis of those of its proposed regulations which may either have a major impact on the general economy, individual industries, or geographical regions and levels of government, or may be significant in the sense that they affect important DOE policy concerns and are the object of public interest. The "Procedures" require that a regulatory analysis contain a statement of the problem and DOE's policy objectives, a description of the major alternatives, including nonregulatory alternatives, that DOE is considering to deal with the problem and to achieve its policy objectives, and a brief analysis of the economic consequences of each of these alternatives, quantified whenever possible. [Federal Energy Guidelines, Volume III at page 39,554.]

This preliminary regulatory analysis examines the impacts of the alternative proposals for the pricing and allocation of gasohol and its unleaded gasoline blend stock which are set forth in the "Gasohol Price and Allocation" Notice of Proposed Rulemaking issued by DOE's Economic Regulatory Administration

on May 16, 1980. In general, the rule proposes to encourage the manufacturing and marketing of gasohol either through amendments to the present motor gasoline price and allocation regulations or by exempting gasohol and its unleaded gasoline blend stock from those price and allocation regulations. A separate Environmental Assessment of the possible environmental consequences of increased gasohol marketing, both at the present rate and under the alternatives in the proposed rule, will be made available for public comment during this rulemaking proceeding. DOE invites public comments on this preliminary regulatory analysis and on the environmental assessment in conjunction with comments on the proposed rule. DOE will consider these comments before issuing a final regulatory analysis or adopting a final rule.

II. BACKGROUND

The Clean Air Act (42 U.S.C. 7401 et seq) generally prohibits the use of nonconforming motor fuels such as alcohol/gasoline blends. However, Section 211(f)(4) of the Act provides that the Environmental Protection Agency may waive this general prohibition to permit the use of specific fuels. EPA has permitted a waiver for the sale of "gasohol," a term which originated as a trademark held by the State of Nebraska for a petroleum product consisting of nine parts unleaded gasoline and one part anhydrous (waterless) ethanol. The term "gasohol" has now come into more general use, and DOE's proposed rule defines it as a blend consisting of 90 percent unleaded gasoline and 10 percent biomass-based anhydrous ethanol. Alcohol/gasoline blends with petroleum-based alcohol components are outside the scope of DOE's definition and this regulatory

analysis. EPA has permitted two such blends: "arconal," which contains 7 percent tertiary butyl alcohol (TBA) in unleaded gasoline (44 FR 10530, February 21, 1979), and "oxinal," which contains 2.75 percent methanol and 2.75 percent TBA in unleaded gasoline (44 FR 37074, June 25, 1979). EPA denied an application for a crude methanol blend consisting (by weight) of 75 percent methyl alcohol, 5 percent ethanol, 7.5 percent n-proponal and 12.5 percent i-butanol, in a 0 - 15 percent concentration (by volume) in unleaded gasoline (45 FR 26122, April 17, 1980). The number of retail outlets marketing gasohol has grown from only three in January, 1978, to over 2500 documented retail outlets in 38 states in April, 1980.[1/]

III. DOE POLICY

In general, the Department of Energy's policy is to encourage an increase in the supply of economic, domestically produced, environmentally sound substitutes for petroleum products, including motor gasoline, to assist in decreasing U.S. dependence on foreign sources of oil. One such substitute is gasohol. DOE hopes to foster the marketing of gasohol in a manner which extends existing supplies of unleaded gasoline, fosters competition in the motor fuels industry, promotes ease of distribution of gasohol within the existing market structure, and provides sufficient opportunities for market entry to protect the independent sector. The authority for motor gasoline allocation and price controls, the Emergency Petroleum Allocation Act of 1973, as amended, (EPAA, Public Law 93-159, 15 U.S.C. 751 et seq) is scheduled to expire in September,

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1/ National Gasohol Commission, (402)475-8044, 521 South 14th Street, Lincoln, Nebraska 68508. Lists from the remaining states, when received, could increase this total to over 4000 gasohol retail outlets.

1981. DOE policy is therefore to encourage gasohol marketing in 1980 and 1981 by removing existing regulatory impediments to permit a smooth transition to a decontrolled market in September, 1981.

IV. ADMINISTRATION GOALS

Unleaded gasoline was supplied at an average rate of 2,789,000 barrels per day (B/D) during calendar year 1979.[1/] While little definitive data has been collected on the fledgling gasohol industry, DOE estimates that about 6,000 B/D of ethanol was produced during 1979.[2/] If all this ethanol were combined with unleaded gasoline in a ratio of one part ethanol to nine parts unleaded gasoline, and marketed as gasohol during 1979, then gasohol represented about 2 percent (60,000 B/D) of the nation's unleaded motor gasoline supply in that year. DOE has tentatively estimated that in order to meet the gasohol production goals announced by the President on January 11, 1980, ethanol production must rise to year-end rates of 20,000 B/D in 1980, 30,000 B/D in 1981, and 45,000 B/D in 1982. Gasohol production would then rise to year-end rates of 200,000 B/D in 1980, 300,000 B/D in 1981, and 450,000 B/D in 1982. These assumptions represent the upper limits of gasohol supply upon which this analysis is based. These production levels represent a significant increase over present levels, but a relatively modest share of the total motor gasoline market. In 1980 gasohol will represent about 3.2 percent of the total gasoline market and 7.9 percent of the total unleaded market, but its ethanol component, which represents the total

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1/ Monthly Energy Review, Department of Energy, February, 1980.

2/ See Table III, "Current Ethanol Production," on page 25.

increase in the supply of motor gasoline, will be less than .3 percent of the total gasoline market and less than .8 percent of the total unleaded market.

V. PRESENT INCENTIVES

The Federal government and some state governments already encourage ethanol production and gasohol marketing through a range of incentives.

A. FEDERAL INCENTIVES

Gasohol marketing is encouraged by the National Energy Act motor fuel excise tax exemption on gasoline/alcohol blends, which is worth 4 cents per gallon of gasohol, and 40 cents per gallon of ethanol, if blended with gasoline. This is equivalent to $16.80 per barrel of ethanol. This exemption will continue through the year 1992 under the terms of the Crude Oil Windfall Profits Tax Act [Public Law 96-223, April 2, 1980, Section 232(a)].

Ethanol production is encouraged by financial assistance available from five Federal agencies: the Department of Energy, the Economic Development Administration of the Department of Commerce, the Farmers Home Administration of the Department of Agriculture, the Department of Housing and Urban Development and the Small Business Administration. A description of these programs and an indication of contacts for further information is provided by the U.S. National Alcohol Fuels Commission (412 First Street, S.E., Washington, D.C. 20003) in its "Federal Funding for Alcohol Production Development as of February, 1980." This publication also describes a number of congressional initiatives which may result in further funding of ethanol production

during fiscal year 1981.

During 1979, DOE's Economic Regulatory Administration revised its entitlements program (10 CFR 211.67) to permit producers of domestic, biomass-based ethyl alcohol to earn and sell entitlements. In its early stages, the program required that each alcohol producer's application be judged on a case-by-case basis. The first ethyl alcohol entitlements were issued to Archer Daniels Midland, Inc. of Decatur, Illinois on August 23, 1979, by an ERA decision and order (ERA-APS-78-2). ERA subsequently amended the program to provide that applicants need only certify that the ethanol is subsequently blended and sold as gasohol (44 Federal Register 63515, November 5, 1979). An ethanol producer earns 0.6189 run credits (calculated on a Btu equivalent basis) for each barrel of ethanol produced and blended with gasoline for fuel. This production incentive, which provides a subsidy of about 5 cents per gallon at the present run credit value, will be reduced at the same rate that crude oil price controls are being phased out. These controls terminate on September 30, 1981.

B. STATE INCENTIVES

Gasohol marketing is encouraged in sixteen states through the exemption of gasohol from part or all of various state and local taxes. These exemptions range in value from 1 to 10 cents per gallon, as shown in Table I. The usual condition is that the ethanol component of the gasohol must be produced in the state. In about half the states, the exemptions are reduced over time and made conditional.

Table I

VALUE OF AGGREGATE EXEMPTIONS FROM STATE TAXES

State	Total Tax (Cents/gal)	Exemption Value (Cents/gal)	
Arkansas	9.5	9.5	
Colorado	7	5	
Connecticut	11	1	
Indiana		8	Note 1
Iowa	8.5	8.5	
Kansas	8	5	
Louisiana	8	8	Note 2
Maryland	9	1	
Montana	9	7	
Nebraska	19.5	5	
New Hampshire	11	5	
North Dakota	8	4	
Oklahoma	6.5	6.5	
Oregon			Note 3
South Carolina		4	Note 4
South Dakota	8	3	
Wyoming	8	4	

Note 1: Exemption from sales tax.
Note 2: For ten years.
Note 3: Income from production of substitute fuels is exempt from personal and corporate income taxes.
Note 4: Reduced to two cents in 1982.

Source: U. S. National Alcohol Fuels Commission survey.

VI. STATEMENT OF PROBLEM.

A. PRICE

In general, DOE is concerned about any provisions of its gasoline price rules which, in combination with state and Federal tax exemptions for gasohol, may require gasohol to be priced substantially below comparable grades of gasoline. In some cases these factors have combined to reduce its lawful price even below some grades of leaded gasoline.

DOE's current refiner price rules do not permit the incremental costs incurred in acquiring ethanol, and in blending and marketing gasohol, to be recovered solely in the price of gasohol. The price rules do permit the cost of additives such as ethanol to be recouped in the prices charged for the various types and grades of gasoline marketed by the refiner [see 44 F.R. 60594, December 3, 1979, and 10 C.F.R. 212.83(c)(2)(iii)(D)]. The price rules also permit refiners to apportion increased costs to a particular type or grade of gasoline in whatever amounts they deem appropriate [§212.83(c)(1)(i)(B)]. However, the price rules do not define gasohol as a type or grade of gasoline, and thus bar refiners from recouping their increased alcohol costs in the price of gasohol. Most refiners are now required by DOE's price rules to sell gasohol at the selling price for the unleaded gasoline they market, even though gasohol is a product which costs more to supply. Consequently, several refiners filed applications for exception with DOE's Office of Hearings and Appeals, contending that the price regulations create an economic disincentive to their gasohol programs because the full cost of the ethanol component cannot be recouped on gasohol.

OHA has granted temporary exception relief in a number of these cases in order to allow individual firms to recoup the full cost of alcohol in their gasohol prices, rather than spreading it among all grades of gasoline. A summary of these cases, together with their citations, can be found in OHA's "Guidelines for Applications

for Exception Relating to Motor Gasoline Allocation and Price Regulations" (45 F.R. 10270, 10284, February 14, 1980). OHA and several firms have indicated to ERA that a change in the price rules would be a more efficient way of eliminating this disincentive to gasohol production than the exceptions process.

In some cases the operation of the present price rule, in combination with the exemption of gasohol from state as well as Federal taxes, has resulted in a reduction in the price of gasohol ranging up to 14 cents per gallon. In some circumstances this phenomenon could encourage the use of gasohol in cars permitted to use leaded regular gasoline, thus creating an artificial level of demand and reducing the availability of this grade of unleaded gasoline for those vehicles which need it.

Effective December 15, 1979 retailers may charge for each type and grade of gasoline a price which equals their acquisition cost, plus applicable taxes, plus a markup of up to 16.1 cents per gallon (44 F.R. 72566, December 13, 1979).[1/] The current maximum lawful selling price permitted to be charged by retailers who blend gasohol is the acquisition cost of the gasoline blended into the gasohol plus the fixed cents per gallon markup, plus tax costs. However, the present definition of "acquisition cost" set forth in §212.92 does not permit the cost of the ethanol acquired by a retailer who blends gasohol to be included in his cost basis. Rather, the cost of the ethanol component of the gasohol blend must be borne by the retailer as an offset against the allowable fixed cent per gallon markup.

1/ This markup will be increased in mid-June, 1980 by an amount which reflects inflation as measured by the consumer price index at that time.

Because the cost of the ethanol may not be included in this "acquisition cost," in some cases retailers who blend gasohol may not be able to recoup the ethanol cost in gasohol prices. DOE's price rules discourage gasohol marketing in such cases.

The maximum lawful selling price for gasohol permitted to be charged by reseller-retailers is calculated pursuant to §212.93. That section of the regulations requires sellers to calculate maximum allowable gasohol prices on the basis of a May 15, 1973 weighted average selling price, plus increased product costs, plus allowable nonproduct cost increases.

Pursuant to §212.93(a)(1), the May 15, 1973 weighted average selling price for gasohol is imputed to be the lawful price charged by the seller for the predominant covered product in the blend, which is the unleaded gasoline component of gasohol. If unleaded gasoline was not sold by a seller on or before May 15, 1973, the base date weighted average selling price is imputed to be the lawful weighted average selling price of leaded gasoline with the same or nearest octane rating, pursuant to §212.112(b)(2).

The existing regulations permit the cost of the ethanol component of gasohol to be passed through as an increased product cost on all grades of gasoline. Pursuant to the definition of "increased product costs" set forth in §212.92, as it was revised in June of 1978, increased product costs for gasohol are calculated by taking the difference between the weighted average unit cost of the gasohol blend in inventory and the weighted average unit cost of the predominant covered product in the blend (i.e., unleaded gasoline) in inventory on

May 15, 1973. See subsection (b) of the definition of "increased product costs" in §212.92.

The existing regulations also permit the maximum lawful selling price for gasohol charged by sellers other than retailers to be increased to reflect non-product cost increases. The amount of non-product cost increases permitted pursuant to §212.93(b) depends upon the size of the seller and the type of sale, i.e., whether the transaction is a "resale" (a sale other than retail sale) or a retail sale by the particular seller. The provisions of the second clause of §212.93(b)(1)(i), §212.93(b)(1)(iii), and §212.93(b)(1)(iv) specify the amount of permissible non-product cost increases with respect to "resales." The provisions of the first clause of §212.93(b)(1)(i) and §212.93(b)(1)(ii) specify the permissible non-product cost increases applicable to retail sales by reseller-retailers.

Alcohol producers which blend gasohol and have no history of gasoline marketing on the base date are required to establish prices for resales of the gasohol pursuant to the rule applicable to resellers of "new items", set forth in §212.111(b)(3).

The existence of the gasoline price regulations, and the present uncertainty in the industry concerning possible further amendments to them, may also constitute a generalized barrier to the growth of gasohol marketing. Firms may be delaying decisions to market gasohol in the hope that DOE will issue a rule which clears away this regulatory uncertainty.

B. ALLOCATION

The current gasoline allocation regulations, which establish the rights and obligations of suppliers and purchasers in the gasoline market, do not adequately accommodate the emerging role of gasohol as a substitute for unleaded gasoline. In the allocation regulations (10 C.F.R. 211.108), unleaded gasoline must be distributed among all of a supplier's assigned purchasers of motor gasoline, except for certain new-car fleet operators, in the same proportion as the supplier's supply of unleaded gasoline is to the supplier's total supply of gasoline. Each month a supplier is required to offer its historical wholesale purchaser-resellers a volume of gasoline equal to that volume which those firms purchased from it during the corresponding month in the base period (November 1977 through October 1978), reduced by the supplier's allocation fraction.[1/]

Gasohol per se is not defined or discussed in the gasoline allocation regulations. Although the allocation rules provide for the assignment of base period suppliers and volumes of gasoline to new retail gasoline outlets and bulk purchasers, they do not provide for the assignment of a base period volume of unleaded gasoline as a blend stock for gasohol production, either to current ethanol producers who wish to become new gasohol distributors, or to present resellers and retailers of unleaded gasoline.

1/ For a plain-language description of various regulatory terms, including "base period" and "allocation fraction," used in gasoline allocation, see DOE FACTS: DOE Gasoline Allocation Regulations, September 1979, available from DOE's Office of Public Affairs, Room B-110, 2000 M Street, N.W., Washington, D.C. 20461.

Nothing in the present allocation regulations, however, prevents ethanol producers from selling ethanol to those refiners, resellers and retailers that already market unleaded gasoline. Nor do the allocation regulations bar refiners, resellers and retailers from purchasing ethanol and blending it with unleaded gasoline, where they can persuade their historical purchasers of unleaded gasoline to buy gasohol in place of unleaded gasoline in fulfillment of their allocation requirements. In addition, neither EPA nor DOE regulations prevent suppliers from blending leaded gasoline with ethanol to produce leaded gasohol.

The allocation regulations do not address either the allocation of unleaded gasoline as a blend stock for gasohol production, or the supply obligations of gasohol suppliers. The intent of the proposed rule is to clarify the rights and obligations of unleaded blend stock and gasohol suppliers and purchasers in time of shortage, so that firms will be better able to develop a workable marketing strategy, and be more likely to decide to proceed with gasohol marketing programs. Without gasohol allocation rules, gasohol blenders and marketers might lose access to gasohol during a gasoline shortage because their unleaded blend stock suppliers are required by the rules to use all of that blend stock to meet base period supply obligations for unleaded gasoline.

In an effort to eliminate allocation regulatory uncertainty, and to obtain unleaded blend stock for gasohol, a number of firms have

applied to OHA for exceptions. OHA has granted some of these applications, and denied others. OHA's rationale for allocating unleaded blend stock through the exceptions process, together with a summary of these cases and their citations, appears in the "Guidelines" noted above (44 F.R. 10283, 10284, February 14, 1980). These "Guidelines," together with procedural information available from OHA's Allocation Task Force [(202) 653-3058], should help small businesses that are unfamiliar with OHA's procedures but wish to apply for blend stock exceptions. In general, OHA has granted allocations of unleaded blend stock in cases in which the applicant has shown: (a) a demand for gasohol in its market area; (b) a substantial commitment of resources to the production and marketing of gasohol; and (c) difficulty in obtaining unleaded blend stock, either because of the lack of a base period supplier, as in the case of an ethanol producer not yet in the motor gasoline business, or because of difficulty in obtaining unleaded gasoline on the spot market or the commitment of present unleaded suppliers to historical purchasers, as in the case of a gasoline jobber. OHA has denied applications in cases in which the applicant has not used a reasonable portion of its available unleaded supplies as a blend stock.

ERA has received requests from Congress, gasohol marketers, refiners, OHA, and the National Alcohol Fuels Commission to issue a proposed rule which would provide standards for ethanol producers, resellers and retailers to seek unleaded blend stock

supplies without the necessity and cost of using the exceptions process. In considering the various regulatory possibilities, DOE has attempted to devise a rule which would meet the various policy considerations noted above: to extend existing supplies of unleaded gasoline, to foster competition in the industry, to promote ease of distribution within the existing market structure, to allow sufficient market entry to protect the independent sector, and to permit a smooth transition to a decontrolled market after September 30, 1981. To some extent these are competing goals. In reviewing and analyzing the regulation and deregulation alternatives presented in the proposed rule, a principal problem is to decide which of these competing goals should be assigned greater weight.

In summary, the three problem areas addressed in the regulation and deregulation alternative proposals are:

- How unleaded blend stock and gasohol may be priced;
- How gasohol blenders may obtain unleaded gasoline to blend with ethanol; and
- How suppliers may distribute gasohol to purchasers.

VII. DESCRIPTION OF ALTERNATIVES

A. ALTERNATIVE 1: NO CHANGE IN REGULATIONS

In this case, DOE would not amend its rules concerning the price and allocation of unleaded blend stock and gasohol.

Price

The present refiner, reseller and retailer price rules would continue to govern gasohol sales until the expiration of price control authority in September, 1981. The Office of Hearings and Appeals would continue to process applications for exception to these regulations following the guidelines noted above.

Allocation

The present motor gasoline allocation regulations would remain silent on gasohol. OHA would continue to process applications for unleaded blend stock from gasoline resellers and retailers, and ethanol producers, in accordance with the February guidelines. OHA would also continue to process refiner appeals of its blend stock supply orders and the marketing of gasohol would presumably continue to expand at its current rate.

No exception from our regulations would be necessary for ethanol producers to market their product to motor gasoline refiners, resellers and retailers, or for those motor gasoline marketers to use some or all of their unleaded gasoline as blend stock for gasohol, where their historical unleaded gasoline purchasers agreed to buy gasohol in place of and in fulfillment of their entitlement to unleaded gasoline supplies.

Refiners could continue to test market gasohol and leaded/ethanol blends on the basis of exception decisions.

B. ALTERNATIVE 2: REGULATORY AMENDMENTS

Price Regulation

DOE would amend its refiner, reseller and retailer price rules to permit greater flexibility in the pricing of gasohol.

Refiners

DOE would designate gasohol as a separate and distinct category of gasoline for purposes of the refiner pricing formulae. Refiners would be permitted new flexibility to recoup in the selling price of gasohol a part or all of the increased product and non-product costs associated with its production and distribution. Product costs would include the acquisition cost of ethanol. Non-product costs would include those incurred to construct and operate new blending facilities, convert existing facilities to permit blending, purchase separate tanks and trucks, replace corrodible seals and equipment, obtain additional insurance, and advertise and market gasohol.

Refiners could also elect to assign part or all of these gasohol costs across all grades of gasoline or to assign all directly related gasohol costs completely to gasohol.

Retailers

Retailers would be required to price gasohol at or under a maximum permissible price which would include tax costs, acquisition costs,

and a margin of not more than 17.7 cents per gallon. Gasohol tax costs would vary according to the exemptions in particular states. The acquisition cost to the retailer of each gallon of a 90 percent/10 percent blend of gasohol would consist of 90 percent of the cost of bringing a gallon of unleaded blend stock into inventory, and 10 percent of the cost of bringing a gallon of ethanol into inventory. The maximum markup of 17.7 cents per gallon of gasohol would be ten percent (1.6 cents per gallon) greater than the 16.1 cents per gallon markup retailers may currently charge for gasoline. This increment represents a basic incentive for retailers to market gasohol. If it appears from comments on the proposed rule that actual gasohol marketing costs do not justify this increment, DOE may reduce or eliminate it.

Resellers

The existing regulations limit the amount of non-product cost increases which may be passed through by sellers other than retailers. The non-product cost limitations currently in effect may not be adequate to take into account increased cost associated with the blending and marketing of gasohol by resellers. Accordingly, in order to provide an additional incentive for resellers to blend gasohol, resellers would be permitted to charge a non-product cost allowance of .8 cents per gallon applicable to all sales of gasohol, in addition to the present maximum permitted reseller margin of 7.7 cents per gallon of gasoline. However, if comments on the proposed rule do not justify this increment, DOE may reduce or eliminate it.

Allocation Regulation

Unleaded blend stock assignments

Option 1: all firms. DOE would permit ethanol producers and motor gasoline resellers and retailers to apply for assignment of a supplier and base period volume of unleaded blend stock to be used solely for gasohol production and distribution. The allocation regulations would be amended to permit ERA to make assignments of suppliers and volumes of unleaded gasoline for use as gasohol blend stock,[1/] using existing criteria and procedures contained in Subpart C of Part 205, which governs the assignment of suppliers. However, additional criteria governing applications for supplies of unleaded gasoline for gasohol blending would be established in a proposed new Section 211.111 of Subpart F of Part 211.

Applicant firms would be required to: (a) show access to an assured supply of at least 800 gallons per month of non-petroleum-based ethanol for at least one year; (b) submit a marketing plan which describes the source and volumes of alcohol to be purchased for blending into gasohol, customers, the gasohol market area and distribution methods; (c) indicate willing suppliers of unleaded blend stock, if any, and volumes available to be supplied; (d) show evidence of investment in gasohol marketing facilities; and, in the case of an ethanol producer, either show that the ethanol production

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1/ Unleaded gasoline is also used to remove water from ethanol for fuel and to denature (poison) it so that it cannot be sold as a beverage. On February 27, 1980, the Bureau of Alcohol, Tobacco and Firearms of the Department of the Treasury issued a temporary rule, effective March 27, 1980, which revised 27 C.F.R. 212.13, "Completely Denatured Alcohol Formula No. 20," to permit 5.0 gallons of gasoline, automotive gasoline, kerosene or deordorized kerosene to every 100 gallons of ethyl alcohol of not less than 190 proof as a denaturing agent (45 FR 20420, March 27, 1980).

process uses a boiler fuel other than natural gas or a petroleum product, or show a reason why an existing capacity to use another boiler fuel is not being used, or submit a plan for the conversion within four years to a boiler fuel other than natural gas or petroleum product.

In evaluating an application for an unleaded blend stock assignment, the Economic Regulatory Administration's regional fuel allocation officers would consider: (a) the effect of each proposed assignment on the distribution and availability of unleaded gasoline in the area affected and on the proposed supplier's historical purchasers of unleaded gasoline; (b) the capacity of the applicant to adhere to its proposed marketing plan; and (c) the advisability of requiring the applicant to offer to sell a volume of gasohol back to its assigned unleaded blend stock supplier to maintain appropriate geographical gasoline supply balances.

ERA's regional allocation officers would have discretion to issue an assignment order, where the above criteria have been satisfied, which assigns a base period unleaded blend stock volume of up to nine times the volume of ethanol available to the applicant.

ERA would have discretion to refuse an assignment where adverse effects on a proposed supplier's allocation fraction or its ability to supply unleaded gasoline to its historical purchasers in any area would be impaired.

ERA would have discretion to condition an assignment order so as to require a successful applicant for unleaded blend stock to offer to

sell a part or all of the gasohol it blends back to the assigned supplier, in cases where such a condition would mitigate the adverse impact on the supplier's allocable unleaded supply and where the inclusion of such a "buyback provision" would not adversely affect the ability of the applicant to market gasohol through an existing or developing distribution system.

In all unleaded blend stock assignment orders, ERA would require that the assigned volumes of unleaded blend stock not be resold as unleaded gasoline.

Option 2: ethanol producers only. DOE would permit producers of non-petroleum based ethanol to apply for an assigned supplier of unleaded blend stock according to the terms for application and evaluation of assignments outlined in Option 1, but would not accept such applications from other firms, such as motor gasoline resellers and retailers, which already have access to unleaded gasoline. An ethanol producer applying for a blend stock assignment would have to make the same showings described in Option 1, including use of (or a plan to convert to) a boiler fuel other than natural gas or petroleum product where applicable.

Gasohol supply obligations

A refiner or wholesale purchaser-reseller that blends unleaded gasoline with ethanol for sale as gasohol would be permitted to allocate the gasohol at its discretion to its base period purchasers of motor gasoline, provided that: the purchaser's prior agreement would be required where the gasohol is offered in place of a motor

gasoline supply obligation; and the amount of gasohol supplied to meet a motor gasoline supply obligation would be 10 percent greater than the volume of unleaded gasoline to which the purchaser is entitled.

This provision would thus permit refiners to test-market gasohol to base period purchasers in fulfillment of unleaded gasoline supply obligations on a ten-for-nine basis. No purchasers would be required to buy gasohol.

ALTERNATIVE 3: EXEMPTION FROM PRICE AND ALLOCATION REGULATION OF UNLEADED BLEND STOCK AND GASOHOL.

Sales of gasohol would be exempt from DOE's petroleum product price and allocation regulations. Sales of unleaded gasoline by a supplier to the purchaser which uses the unleaded blend stock to produce gasohol would also be excluded from coverage in these price and allocation regulations. However, subsequent sales of this unleaded blend stock as unleaded gasoline would be unlawful.

VIII. ECONOMIC IMPACTS.

A. ANALYTICAL ASSUMPTIONS AND LIMITATIONS.

DOE has not collected and verified definitive data on the supply and price of non-petroleum based ethanol and gasohol, although the incorporation of these products in our data collection process is under consideration by the Energy Information Administration. Some data has been collected on the fledgling gasohol industry on an *ad hoc* basis in order to make the threshold policy decisions which led to the goals noted above in Section IV (ADMINISTRATION GOALS).

For purposes of this analysis we have assumed that idle distillery plant capacity will be used where it proves economically feasible, new plant capacity will be constructed as needed to meet production goals, that transportation of ethanol and gasohol to distilleries, refineries, terminals, and retail outlets will be by existing rail tank cars, product pipelines, and trucks, that ethanol production will be concentrated in the Midwest, and that the average ethanol plant will be of a size capable of producing between 20 and 50 million gallons per year (1300 to 3200 B/D) of ethanol or more.

For price and supply analysis we have also assumed that the incentives described in Section V (PRESENT INCENTIVES) will continue at least through December 31, 1981. This analysis is necessarily subject to some uncertainty regarding incentives for the production and marketing of ethanol and gasohol because any new product in the energy field today is subject to uncertain political and social acceptance.

An additional source of uncertainty is the fact that the rate of market entry in ethanol production and gasohol blending is a function of private business decisions, which may be affected positively by expected increases in the demand for unleaded gasoline and gasohol, but negatively by high interest rates, and limits on individual corporate financing capabilities. Other factors which may also influence market entry include regulatory constraints or uncertainty as to future regulatory action. However, the regulatory environment of any investment decision is usually somewhat uncertain.

In the discussion which follows additional analytical cautions are indicated where appropriate. Finally, the "Gasohol Price and Allocation Notice of Proposed Rulemaking" solicits information, data, and suggestions from the public on Federal actions and regulations which might promote the increased use of gasohol. The conclusions in this preliminary regulatory analysis may be revised in light of new information received in the course of this rulemaking proceeding.

B. ETHANOL AND UNLEADED GASOLINE COSTS, SUPPLY AND DEMAND.

The cost of gasohol sold by blenders includes two main elements: the cost of biomass-based anhydrous ethanol, which includes the cost of the ethanol production process, and the cost of relatively high octane, clear pool unleaded gasoline.

Ethanol Costs

At present the wholesale price of biomass-based ethanol appears to be primarily affected by the cost of its feedstock (corn or wheat), and to be priced independently from its chemical equivalent, which is petroleum-based, 200-proof anhydrous ethyl alcohol. Some observors of the ethyl alcohol industry believe that producers of biomass-based ethanol will eventually price it to start at the price of its petroleum-based chemical equivalent. Others note that biomass-based ethanol is presently sold in a separate market. The price of petroleum-based 200-proof anhydrous ethyl alcohol delivered in tank car quantities in the East stood at $2.029 per gallon in mid-April.[1/] The price for 190 proof petroleum-based ethyl alcohol

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1/ Chemical Marketing Reporter, Schnell Publishing Company, 100 Church Street, New York, N.Y. (212) 732-9820.

was $1.88, 14 cents a gallon lower.

No regularly reported data on Midwest wholesale, non-petroleum based ethanol prices are available. However, on April 16, 1980, the wholesale price of biomass-based anhydrous ethanol stated FOB Decatur, Illinois by its largest producer, Archer-Daniels-Midland, was $1.80 per gallon. The price of ethanol is not regulated; no price ceilings have been set, and it can be expected to fluctuate with supply and demand. In this deregulated environment the ADM price has risen about 10 percent in the past year. During the same period ADM's production capacity has increased about threefold, from approximately 50,000 gallons per day to about 150,000 gallons per day. Because the overall supply of biomass-based ethanol for fuel is increasing rapidly, we have assumed that during 1980 and 1981 its price will increase at about the same 10 percent rate at which the ADM price increased during 1979. Because ADM is a market leader, we have selected its $1.80 per gallon biomass-based ethanol price for purposes of this regulatory analysis.

Ethanol Production

With the assumptions noted above, the present production level of ethanol, which is about 89 to 92 million gallons per year, or about 5800 to 6000 B/D, could be increased to the Administration's goal levels of 20,000 B/D in December 1980, 30,000 B/D in December 1981, and 45,000 B/D in December 1982, without creating undue upward price pressure. This is in part because these volumes are relatively small compared to the total level of gasoline production, which

averaged 6,833,000 B/D during 1979, of which 2,789,000 B/D was unleaded gasoline. These volumes are also relatively small in comparison to the amount of ethanol production which would be required to put pressure on existing agricultural production of corn, with resulting upward pressure on its price.

Concerns have been expressed, however, that if 2 billion gallons per year (or about 130,000 B/D) of ethanol were produced, the required 20 million tons of corn or its equivalent would represent one fifth of the current exportable U.S. grain surplus, and could require cultivation of idle U.S. farmland, with a resulting upward pressure on corn prices.[1/] However, the Office of Technology Assessment has calculated that this volume would not increase the price of food.[2/] Five members of the U.S. Senate Agriculture Committee have also asserted that the alternative energy from agricultural and forestry biomass, including corn, corn stover, and wood can be increased substantially without increasing food prices.[3/] The Department of Agriculture has taken the postion that an alcohol program on the relatively small scale required to meet the Administration's ethanol production goals would be appropriate, but a large scale program would be inappropriate.[4/] We believe that the corn acreage required to

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1/ Terry Brown, "Gasohol's Effect on Food Supply Hit," Chicago Tribune, March 20, 1980, page 10.

2/ Office of Technology Assessment, U.S. Congress, Gasohol: A Technical Memorandum, September, 1979, quoted in the Washington Post editorial "More on Gasohol," March 11, 1980, page A-16.

3/ Letter to the editor from Senators Jesse Helms, Richard G. Lugar, Herman E. Talmadge, George S. McGovern, and Donald W. Stewart, Washington Post, March 11, 1980, page A-16.

4/ Don Fink, Senior Policy Analyst, DOA, "Energy from Agriculture: Proceeding With Care," in The Energy Consumer, U.S. Department of Energy, Office of Consumer Affairs, January, 1980, page 9.

meet DOE's ethanol production goals would be well below the acreage levels which would adversely affect food production and corn prices. For example, only about 1.9 million acres of corn would be required to produce 32,615 B/D of ethanol, which is roughly the year-end rate required to meet DOE's 1981 goal. Table II compares ethanol production and corn acreage at DOE's goal levels to the much higher 2 billion gallons-per-year level used in the "food versus fuel" controversy.

Table II

CROPLAND REQUIRED FOR ETHANOL PRODUCTION

Ethanol (Billion gals. per year)	Ethanol (Barrels per day)	Corn Acreage (Millions, at 100 bushels per acre)	Percent of 1978 Corn Harvest
0.3	20,000	1.2	1.6
0.4	30,000	1.7	2.2
0.7	45,000	2.6	3.8
2.0	130,463	7.6	10.8

Source: Derived from Secretary of Agriculture Bob Berglund's May 4, 1979, statement before the Committee on Science and Technology of the U.S. House of Representatives (USDA 1032-79), page 20.

The firms which produce the present ethanol for gasohol are shown in Table III.

Table III

CURRENT ETHANOL PRODUCTION

Firm	State	Approximate capacity (Gal/year)	(Bbl/day)	Feedstock
Archer-Daniels-Midland	Illinois	50,000,000	3,262	Corn
Milbrew	Wisconsin	2,000,000	130	Cheese whey
Midwest Solvents	Kansas	4,950,000	323	Milo/corn
Georgia-Pacific	Washington	2,000,000	130	Wood sugars
Publicker Industries	Pennsylvania, Louisiana	13,200,000	861	Sugar
A. Smith-Bowman	Virginia	800,000	52	Corn
American Distillers	Missouri	10,000,000	652	Corn
American Agrifuels	Missouri	10,000,000	652	Corn
		92,950,000	6,062	

Source: U.S. National Alcohol Fuels Commission

Several factors suggest that the distillery industry has the capacity to increase its total production of ethanol for gasohol from the present level of between 5,800 and 6,000 B/D to the DOE goal levels.

First, the distillery industry has done it before. The nation's distilleries were modified during World War II to produce industrial grain and wood alcohol for use in torpedoes and submarines. Production increased six-fold during the war years. In 1944, industry produced almost 600 million gallons of alcohol, or about 39,000 barrels per day. About half of this industrial alcohol was used to manufacture synthetic rubber.[1/]

Second, industry's interest in producing ethanol is evident in trade publications and informal communications received by the Department of Energy. A private survey of major U.S. distilleries[2/] and a recent trade publication report[3/] revealed five firms interested in producing ethanol for fuel. Together these 5 firms might produce 41.4 million gallons per year, or 2700 B/D of ethanol for fuel. Other distilleries which have shown some interest in producing ethanol for fuel are located in Massachusetts, Kentucky, Indiana, Pennsylvania, California, Tennessee, Virginia, New Jersey, Maryland, and Iowa. Twelve other distillers contacted in the private survey indicated no interest in producing ethanol for fuel.

1/ The Energy Consumer, DOE Office of Consumer Affairs, January 1980, page 3.

2/ Unpublished November, 1979 survey by Radian Corporation, 7927 Jones Branch Drive, Suite 600, McLean, Virginia 22102 (703) 734-2635.

3/ "Gasohol Market Expansion Has Limits," in Platt's Oilgram Price Report, February 22, 1980, page 3-A.

Third, the Department of Energy's Region VII Office (covering Iowa, Kansas, Missouri, and Nebraska, and headquartered in Kansas City, Missouri) reported on January 17, 1980, that the Chicago Office of the Bureau of Alcohol, Tobacco, and Firearms has received approximately 900 requests for experimental permits to construct alcohol fuels production facilities. (Publications and contacts for farm loans and ATF permits for ethanol production are listed on pages 18 and 19 of DOE's January 1980 publication The Energy Consumer.)

The Office of Technology Assessment estimated in September, 1979 that at least 50 to 70 million gallons per year (3,262 to 4566 B/D) of new capacity to produce ethanol for fuel is under study or has been ordered and could be in production by 1981. OTA estimated that a new distillery with a 50 million gallon per year capacity could be brought on stream in two years, and that idle existing capacity could be converted in one year or less.[1/]

DOE's June, 1979 "Report of the Alcohol Fuels Policy Review," in its discussion of the food versus fuel issue (on page 11), points out that the feedstocks for fuel ethanol are not likely to be entirely foodstuffs. Ethanol for gasohol will be made from co-product streams in agricultural processing plants, and could include wastes such as the side streams from corn processing plants and food wastes such as cheese whey. The API Net Energy Analysis of Alcohol Fuels cited above takes a

1/ U.S. Congress, Office of Technology Assessment, Energy from Biological Processes Staff, "Gasohol: A Technical Memorandum," September 1979.

different view, however, contending that the manufacture of ethanol from agriculture residues like corn stover is currently in the research and development stage. In any event, the DOE Policy Review concluded that there are enough raw materials available to produce 660 million gallons per year of ethanol (44,000 B/D). DOE's present view is that production of ethanol for gasohol could increase from its present level, which, depending on the estimate, ranges from 50 to 92 million gallons per year (3,262 to 6,062 B/D), to the 3, 4 and 7 hundred million gallon per year levels necessary to produce 20, 30 and 45 MB/D of ethanol from grain for fuel without a significant impact on food and feed prices.

Ethanol Production Processes

The future supply, demand and cost of ethanol for fuel will also depend on the efficiency of existing and new ethanol plants. Most existing ethanol production facilities use either natural gas or petroleum as a boiler fuel, according to the American Petroleum Institute.[1/] The consensus of available literature is that greater efficiency in the use of process energy will be achieved through conversions of existing plants and in new plants. If future plants use more energy-conserving process fuels, these fuels may also prove less costly, and with economies of scale might sommewhat decrease the cost of ethanol, and its price in constant dollars. Such fuels might also improve the "net energy balance" of ethanol plants. Net energy balance is defined here as the amount of energy, stated in

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1/ American Petroleum Institute, "Net Energy Analysis of Alcohol Fuels," by D. M. Jenkins et al., Battelle Columbus Laboratories, November 1979 (API No. 4312).

Btus, required to produce a particular volume of a product compared to the amount of energy contained in that product, also stated in Btus. A balance in which these Btu amounts are roughly equivalent, and the energy which emerges from the production process is more usable than the energy in the feedstock, can be considered to be favorable.

It should be noted that industry and government discussions of the net energy issue sometimes use net energy balance tests with differing premises. Net energy tests of the Btus required to produce ethanol range from a limited, reasonable, "line around the facility" test, which compares Btus used in the ethanol production process to Btus in the resulting ethanol, to unlimited tests which push the line backward to include Btus in raising corn and forward to Btus in the gasohol blended from ethanol and unleaded gasoline. The "line around the facility test," which is favored by the U. S. National Alcohol Fuels Commission, is more likely to yield a favorable energy balance than the various extended tests.

ERA used this test in its "Guidelines for Evaluation of Applications for Designation as a Producer, Marketer or Consumer of Petroleum Substitutes in the Entitlements Program" (44 F.R. 6895, February 5, 1979). In its successful application for entitlements for ethanol production, Archer Daniels Midland showed ERA that its wet corn milling ethanol production process, which is based on natural gas and coal-fired elctricity, yielded a favorable net energy balance. Each

day the facility consumed 4.6 billion Btus in order to produce 62,000 gallons of ethanol which contained 5.2 billion Btus.[1/] (Most existing ethanol production facilities use either natural gas or petroleum, according to the American Petroleum Institute.)

In contrast, the more extended net energy balance test used by the American Petroleum Institute yielded an unfavorable energy balance. API "considered the total system energy inputs. These included fuel to grow feedstock, fuel to make fertilizer to grow feedstock, and fuel to run the alcohol process." API concluded that corn-based alcohol plants using traditional technology consume about 2.2 Btus per Btu of ethanol produced, and that a plant with energy-conserving technology would consume 1.2 Btus for each Btu produced. API assumes that all process fuel purchased by these ethanol plants would be coal in order to "minimize use of petroleum and natural gas."[2/]

The Office of Technology Assessment also used an extended test and found an unfavorable balance. The energy balance included "growing the feedstock, converting it to ethanol, and using the ethanol as fuel." OTA concluded that each gallon of ethanol displaces about 0.8 gallons of gasoline. DOE's Office of Alcohol Fuels concluded that this unfavorable balance should be corrected

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1/ ERA Decision and Order to Archer Daniels Midland Company, Docket Number ERA-APS-78-2, August 23, 1979, at page 4.

2/ American Petroleum Institute, "Net Energy Analysis of Alcohol Fuels," by D. M. Jenkins et al., Battelle Columbus Laboratories, November 1979, at pages 1 and 7.

to 0.98 to reflect certain factors, including the volumetric expansion which results when 0.1 gallon of ethanol is blended with 0.9 gallon of unleaded gasoline and produces 1.002 gallons of gasohol.

OTA noted that the use of oil or natural gas as a boiler fuel "could result in the fuel cycle consuming slightly more oil and natural gas than is displaced." But OTA suggested that with an energy efficient distillery "the ratio of total energy displaced to total energy consumed is 1.5 ($\pm$0.4), i.e., the energy balance is positive (a ratio greater than 1)." And OTA contended that factors such as more productive farmland, and additional energy savings at the distillery (not having to dry the distiller's grain) could further improve this energy balance.

OTA put the margin of error in these calculations at "plus or minus 0.3 gallons of gasoline per gallon of ethanol," and attributed this uncertainty to fuel efficiency measurement errors, differences in farming practices and yields, and "the magnifying effect on these errors of the low (10%) ethanol content of gasohol."[3/]

DOE's Report of The Alcohol Fuels Policy Review (June, 1979) conceded (at pages 15 and 16) that "some older distilleries (designed for beverage rather than fuel alcohol) use more Btu's of oil and gas to make alcohol than there are Btu's in the alcohol product. Including the oil and gas used to grow and transport the raw material worsens this balance." New ethanol conversion facilities, however, might yield a small but positive net energy balance even if all the fuel

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3/ U. S. Congress, Office of Technology Assessment, Energy From Biological Processes staff, "Gasohol: A Technical Memorandum," September 1979, at pages 13, 15-17.

used were oil and gas.

Mobil Research and Development Corporation is reported (in a Wall Street Journal article by Jerry E. Bishop) to have estimated that "with current practices it would require the energy equivalent of two to three gallons of high-grade petroleum fuel such as gasoline to produce enough alcohol energy to replace a gallon of gasoline," and "Only if petroleum or natural gas fuels were eliminated from the distilling process and replaced by burning agricultural wastes would alcohol production show a net energy profit."

Mr. Robert Jackson, an alcohol fuels specialist with Continental Oil Company (CONOCO), expressed a more positive view of the use of natural gas to produce ethanol in a January 16, 1980 interview with Robert MacNeil of WETA-TV on the PBS Network. Speaking of ADM, a firm which uses natural gas as a fuel to make ethanol, Mr. Jackson said, "Now, it's quite impossible to run a car on natural gas without a lot of complications. So that if you could convert natural gas into an equivalent amount of energy which you can run in a motorcar, that seems to be a reasonable conversion to make." Citing the possibility of using a cogeneration production process to reduce energy demand, Mr. Jackson said, "I think that's the least part of the problem, whether we have energy efficiency or not."

The January 11, 1980 White House Fact Sheet on the President's Alcohol Fuels Program summarized several important policy considerations in its paragraph on net energy balance:

"Questions have arisen over whether a net energy gain results from the production of alcohol fuels. Numerous studies have examined this issue and most conclude that the net balance is small but positive, and exact estimates differ, depending on the process employed. It is expected that improvement in technology efficiency and ability to utilize feedstock by-products more effectively will improve the net energy balance. For example, a plant using food processing residue for feedstock and coal for fuel may achieve a net reduction in imports approaching its total production. Also, the use of coal in the alcohol production process improves the oil savings attainable through increased use of gasohol.

Thus the use of coal or non-fossil fuels for alcohol production is highly preferable to use of oil or natural gas."

Following this policy direction, the proposed rule discourages the use of natural gas or petroleum as a boiler fuel in a new ethanol plant and encourages the conversion of an existing facility to another boiler fuel, such as coal, because of the benefits to the net energy balance of the plant, and to oil savings, from the use of improved technology, the use of byproducts as feedstocks, and the use of coal as a boiler fuel. DOE has funded 14 contracts to examine methods of improving the alcohol fuels production process, 10 of which are with universities. The remaining contracts are with the Department of Agriculture and several corporations.

The cost of the ethanol production process over the next ten years will include the cost of converting plants to burn coal or some other non-petroleum, non-natural gas boiler fuel. In the longer term, researchers hope to discover a method of by-passing the distillation step altogether through the use of enzymes which might convert starches or cellulose directly into alcohol. No early breakthroughs in this field are expected.[1/]

1/ UPI, "Enzyme Use to Cut Cost of Gasohol," Washington Star, March 12, 1980, page F-8.

The environmental impacts of increased ethanol production will be examined in the environmental assessment to be issued following DOE's proposed rulemaking on "Gasohol Price and Allocation." For purposes of this analysis we have assumed that present ethanol plants are in compliance with Federal environmental requirements. If it should be determined that existing and new ethanol plants must undertake new expenditures for environmental control equipment, these costs would also be reflected in the wholesale price of ethanol.

Unleaded Gasoline Costs

The price of unleaded gasoline is affected by a number of supply, production and demand factors. On the supply side, the price of unleaded gasoline is affected by the price of crude oil. This cost seems likely to continue to rise at a more rapid rate than the price of ethanol feedstocks, such as corn and grain, during the next several years, because a substantial proportion of the crude oil inputs to U.S. refineries is imported, and therefore subject to the influence of OPEC pricing actions. Furthermore, progressive decontrol of domestic crude oil will cause price increases in refiners' inputs of domestic crude oil. In 1979, daily input to U.S. refineries was 14.5 million barrels per day, of which 58.6 percent represented domestic production, and 43.2 percent represented crude oil imports from OPEC nations and non-OPEC sources.[1/]

The price of unleaded gasoline is also affected by its production cost. To increase the octane of clear pool motor gasoline, reformate

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1/ Source data from DOE's February, 1980 Monthly Energy Review, pages 32 to 37. The total exceeds 100 percent because of non-crude oil inputs.

or other high-octane components, such as pyrolisis gasoline or cat-cracked gasoline, must be added to it. The equipment which produces these high-octane stocks are high-cost units, with high operating costs. The amount of investment in catalytic reformers is expected to increase in the next five years to meet increases in unleaded demand.[1/] (However, a number of refiners have informally indicated to the National Alcohol Fuels Commission that they hope to avoid some of these reformer costs by marketing high-octane gasohol to replace some portion of the unleaded pool they might otherwise have to supply through the construction of additional catalytic reformers.)

On the demand side, the price of unleaded gasoline is affected both by the gradually increasing number of post-1974 automobiles which require it to prevent fouling of catalytic converters, and by the fact that the high-octane aromatics in unleaded gasoline are also in demand as a petrochemical feedstock. In 1977, unleaded gasoline represented 27 percent of the total motor gasoline supplied to the U.S. market. The unleaded market share increased to 34 percent in 1978 and 39 percent in 1979.[2/] Industry observers noticed during 1979 and early 1980, however, that the unleaded market share was not growing as fast as expected, in part because of the general conservation effect in that year, and in part because more cars able to use leaded gasoline remained or appeared in the U.S. automobile fleet than expected.

1/ DOE Office of Oil and Gas Supply Development, Trends in Refinery Capacity and Utilization, September 1979, page 35; National Petroleum Council, "Working Draft Interim Report on Refinery Flexibility," November 27, 1979, pages 14 and 22.

2/ DOE February 1980 Monthly Energy Review, page 38.

Acting in response to refiner statements that the Environmental Protection Agency's lead phase-down requirements were forcing them to produce more unleaded gasoline than the market could absorb, on February 20, 1980 EPA suspended until April 1 its requirement that refiners produce 45 percent of their gasoline runs as unleaded, which would have been 6 percent more unleaded than refiners produced in the comparable quarter of 1979.[1/] In late February, refiners indicated to DOE that the EPA waiver had somewhat relieved the situation caused by slack unleaded demand. EPA may extend the waiver to the next 1980 quarter.

Demand for unleaded gasoline is also affected by the overall demand for motor gasoline. As of April 18, 1980, overall demand for the previous four week period was running below overall motor gasoline demand in the comparable 1979 period.[2/]

In summary, the price of unleaded gasoline is affected by:

- Crude oil costs, which are likely to increase to reflect inflation and OPEC pricing actions;
- The extra operating costs of increasing the octane to clear pool motor gasoline;
- The investment costs associated with building the catalytic reformers which produce high-octane blend stocks;

1/ Environmental Protection Agency, "Controls Applicable to Gasoline Refiners: Lead Phase-down" 45 FR 14854, March 7, 1980. See also "EPA suspends no-lead production quota, "Platt's Oilgram Price Report, February 22, 1980, page 1-A. (Hereafter cited as Platt's.)

2/ DOE Energy Information Administration, "Weekly Petroleum Status Report," April 25, 1980, pages 30 & 31. See also "DOE: Apparent Demand Down 11% From Year Ago," Platt's, February 22, 1980, page 1-A. See also "Marketplace: Jobbers and C-Store Trends," McGraw-Hill, March 24, 1980, and "U.S. Gasoline Supplies: Full Up," Newsweek, March 24, 1980, page 71.

- o The demand for high-octane aromatics as a petrochemical feedstock, which competes with their use as a motor gasoline blending element;
- o The general demand for unleaded gasoline, which represents an increasing share of the total motor gasoline pool, but has been increasing at a lower rate than expected; and
- o Overall motor gasoline demand, which conservation has reduced somewhat below present supply.

The future price of unleaded gasoline will depend on these factors, as well as the existence of price controls through September, 1981. The present "refinery gate" price of unleaded gasoline -- that is, its price to jobbers and distributors, FOB refineries, pipeline terminals and inland waterway barge terminals -- is shown for the midcontinent area as of mid-April 1980, in Table IV.

Table IV

WHOLESALE UNLEADED GASOLINE PRICES: MIDCONTINENT

City/State	Price Range (Cents/gal)
Chicago	93.5 - 99.5
St. Louis	98.0 - 102.2
Minneapolis/St. Paul	96.5 - 99.7
Oklahoma	91.0 - 93.9
Arkansas	96.6
Detroit	95.5 - 99.7

Source: Platt's, April 14, 1980, page 5-A.

The average refinery gate unleaded gasoline price was 97 cents per gallon both for the midcontinent area and for the nation in mid-April 1980. Therefore, for purposes of this analysis we will assume a national average refinery gate price during 1980 for unleaded gasoline of 97 cents per gallon. We will also assume that the average cost of crude oil and unleaded gasoline will increase by 25 percent

over the next year,[1/] resulting in a national average refinery gate price of unleaded gasoline of $1.21 by April 1981.

C. CUMULATIVE IMPACT ON GASOHOL PRICES UNDER EACH ALTERNATIVE

Summarizing the analysis of costs affecting gasohol prices, it appears that many factors are likely to operate in a manner which could exert upward or downward pressure on future gasohol prices, regardless of DOE action or inaction on its proposed gasohol pricing and allocation rule or deregulation alternative. Independent factors which would tend to increase gasohol prices could include:

- Strong demand for gasohol as a novelty item, or for its octane benefit, or in response to advertising;
- Limited overall gasoline supply (which does not appear to be a problem at present);
- Costs of contructing new ethanol production facilities, and activating or converting idle existing distillation units, which will in turn vary with the size of the unit, the prime interest rate, the rate of inflation, and the need for environmental control equipment;
- Increases in the cost of boiler fuel for ethanol distillation (natural gas, petroleum, and coal);
- Increases in ethanol and gasohol transportation costs (rail tank car, truck, and product pipeline rates);
- Costs of converting tanks and trucks, and replacing seals;
- Costs of gasohol advertising, marketing and insurance;
- Increases in the prices of: (1) ethanol feedstocks (corn and grain); (2) petroleum-based 200-proof ethyl alcohol, a price target for biomass-based ethanol; (3) crude oil; and (4) grades of gasoline similar to and competitive with gasohol, such as unleaded premium.

1/ DOE Energy Information Administration, Short Term Energy Outlook, February 1980, page 17.

Independent factors which would tend to hold down future gasohol prices include:

- o Continuation of the present substantial state and Federal gasohol tax incentives;
- o Continuation of the DOE ethanol production entitlement;
- o Enactment of further Federal ethanol production incentives;
- o More efficient ethanol distilleries, including new technology to use wastes as feedstock and coal as a boiler fuel for distillation;
- o An increased volume of ethanol production in general, and a corresponding reduction of unit costs, resulting from additional distillery capacity;
- o The wage/price guidelines of the Council on Wage and Price Stability, as applied to ethanol production;
- o Increases in the supply of crude oil and unleaded gasoline, and in total reforming capacity in the nation's refineries; and
- o Reduced gasoline consumption overall; and
- o A high rate of gasohol market entry by refiners, resellers, and retailers with access to unleaded gasoline and ethanol. Competition among many marketers might restrain gasohol prices below those levels likely if only a few gasoline marketers sell gasohol.

No-Action Base Case

Table V summarizes the price effects in 1980 and 1981 resulting from an analysis of the first alternative, in which we would not change existing regulations. The price effects and their underlying assumptions shown in Table V constitute a set of baseline conditions, or "base case," to which we will add (in Table VI estimated increments in price likely to result from the price regulation alternative (which permits refiners to assign alcohol costs to gasohol, and resellers and retailers to set a higher margin).

In Table V, the cost of gasohol is calculated by adding the wholesale cost of one gallon of ethanol to the wholesale cost of nine gallons of unleaded gasoline, and dividing that total by 10 gallons of the resulting gasohol blend. In 1980, the analysis assumes a refinery gate price of unleaded of 97 cents per gallon, a wholesale price of ethanol of $1.80 per gallon, and a resulting wholesale price of gasohol of $1.05 cents per gallon [$1.80 + ($0.97 x 9) divided by 10 = $1.05]. Thus in 1980 a gallon of gasohol would cost 8 cents more to produce and market at wholesale than a gallon of unleaded gasoline [$1.05 - $0.97 = $0.08]. In 1981, this analysis assumes that the national average price of unleaded gasoline will rise about 25 percent to $1.21 per gallon, the average biomass-based ethanol price will rise at a lesser rate of about 10 percent to $1.98 per gallon, and the resulting wholesale price of gasohol will rise to $1.29 per gallon [$1.98 + ($1.21 x 9) divided by 10 = $1.29].

Table V

GASOHOL PRICE EFFECTS WITH NO CHANGE IN REGULATIONS (BASE CASE)

	1980	1981
	(Dollars per gallon)	
Wholesale price of Unleaded gasoline	$0.97	$1.21
Refiner increment to all grades of gasoline of additional gasohol cost. 1/	$0.00026	$0.00038
Retail maximum margin	$0.161	$0.161
Reseller maximum margin	$0.077	$0.077
Gasoline and gasohol retail price (ex taxes)	$1.20826	$1.4483

1/ Based on an aggregate additional cost of gasohol to the consumer of $25,600,000 in 1980 and $36,800,000 in 1981, as discussed on page 37.

For purposes of calculating the aggregate cost to the gasoline consumer of these gasohol prices, and assigning them to all grades of gasoline, we have assumed that the 8 cent-per-gallon additional wholesale cost of gasohol above unleaded gasoline in 1980 (and the 8 cent per gallon increment in 1981) will be applicable to a total 1980 gasohol production level of 320 million gallons per year (20,874 B/D) and a total 1981 gasohol production level of 460 million barrels per year (30,007 B/D). The analysis also assumes that all refiners will market this gasohol and will be required to spread its cost over all grades of gasoline, and that the total volume of gasoline supplied in 1980 will be 96,979,113,000 gallons, or 6,326,100 B/D, which represents a level 10 percent below the 1979 level of 7,029,000 B/D, and assumes compliance with the Administration's conservation targets [.90 x 7,029,000 = 6,326,100 x 365 x 42 = 96,979,113,000].

Applying the 8 cent-per-gallon 1980 incremental cost of gasohol to the 320 million gallons of gasohol projected to be produced in that year, the aggregate incremental cost to the consumer would be $25,600,000 [$.08 x 320,000,000 = $25,600,000]. Spread across 96.9 billion gallons of gasoline, this 1980 gasohol cost would increase gasoline prices by $0.00026 per gallon.

Applying the 8 cent-per-gallon 1981 incremental cost of gasohol to the 460 million gallons of gasohol expected in 1981, the aggregate incremental costs to the consumer would be $36,800,000 [$.08 x 460,000,000 = $36,800,000]. If this 1981 incremental gasohol

cost is spread among 96.9 million gallons of gasoline, gasoline prices will increase by $0.00038 per gallon. Slight variations in these small amounts would occur if the assumptions were varied so that resellers or retailers blended and marketed the gasohol.

The assumptions in the no-action base case produce higher aggregate costs to gasoline and gasohol consumers than may actually develop, because they do not account for several factors which cannot presently be quantified:

- Fourteen refiners of varying size have received OHA exception relief permitting them to treat gasohol as a separate product and price it to include gasohol costs. Consumers of other grades of gasoline offered by these refiners would not be required to subsidize gasohol costs.

- In a number of these cases the increased gasohol prices will be partially or completely offset by state tax incentives. As indicated in Table I, sixteen states have exempted gasohol from state or local motor fuel taxes. Three states have exempted gasohol from the state sales tax and one state has exempted it from local sales taxes. Aggregate exemptions range from 1 to 10 cents per gallon, but are conditional or reduced over time in about half the states.

- Most refiners without OHA exception relief would be required to continue to price gasohol at their

unleaded price, and to spread the increased gasohol cost over other grades of gasoline. However, they would also be required to pass through in their gasohol prices the state gasohol tax exemptions. In some cases the resulting gasohol price could fall below the price of unleaded gasoline and even leaded gasoline.

Price Regulation Case

Table VI summarizes the estimated additional price effects which might occur in 1980 and 1981 if we adopt the proposed price regulation. The analysis assumes the same wholesale ethanol, unleaded gasoline, and gasohol prices in 1980 and 1981 as in Table V. However, in Table VI the incremental costs of gasohol in 1980 and 1981 are not spread over all grades of gasoline and borne by all gasoline consumers as in Table V. The analysis assumes instead that refiners will elect to treat gasohol as a separate type of gasoline and assign all gasohol costs to it in 1980 [320,000,000 x $0.08 = $25,600,000] and 1981 [460,000,000 x $0.08 = $36,800,000]. The price of gasohol is 8 cents higher than in the base case, and the prices of other grades of gasoline are reduced by the slight increments shown in Table V.

The analysis also assumes that all retailers will price gasohol at a level which includes their full permitted margin of 17.7 cents per [$0.161 + $0.016 = $0.177]. It should be noted that the retail maximum margin for gasoline could be adjusted for inflation during 1980, and that the gasohol increment might be reduced or eliminated if not justified by comments received on this proposed rulemaking.

The analysis also assumes that all resellers will price gasohol to include a maximum permitted gasohol margin of 8.5 cents per gallon, which includes the present reseller margin of 7.7 cents per gallon of other grades of gasoline, plus an additional .8 cent per gallon increment in the proposed gasohol price rule. It appears that resellers would incur some additional costs to market gasohol. Although we cannot quantify these costs, we have proposed this minimal .8 cent per gallon increment for gasohol, which represents 10 percent of the permitted margin of 7.7 cents per gallon for other grades of gasoline, in order to provide a basic incentive for resellers to market gasohol. Reservations have been expressed about the necessity for this increment, and if the comments received on the proposed rule do not justify this amount, we may reduce or eliminate it.

Table VI

GASOHOL PRICE EFFECTS WITH PROPOSED PRICE RULE

	1980	1981
	(Dollars per gallon)	
Wholesale prices:		
Unleaded gasoline	$0.97	$1.21
Ethanol	$1.80	$1.98
Gasohol	$1.05	$1.29
Retail maximum margin	$0.177	$0.177
Reseller maximum margin	$0.085	$0.085
Gasohol retail price (ex taxes)	$1.312	$1.552

Source: ERA estimates.

and state and local motor fuel and sales taxes. In addition, it is possible that the establishment of the price incentive in the proposed rule might encourage increased market entry and thereby increase the total volumes of gasohol marketed in 1980 and 1981. Increased gasohol price competition might result, with some corresponding reduction in gasohol prices. As the rate of possible market entry is unknown, this marginal price effect cannot be quantified.

It should be noted that the statutory authority for price regulation is scheduled to expire in September, 1981.

Decontrol Case

If we adopt the price and allocation deregulation alternative, the factors which independently affect the supply, demand and price for gasohol would be the major determinants of the retail price of gasohol. The wholesale price of unleaded blend stock sold for gasohol production would also be released from controls, and be subject only to the forces of supply and demand. (The wholesale price of unleaded gasoline would remain under controls.) Table VII summarizes the possible price effects in the decontrol case. The analysis notes that the price of biomass-based ethanol is presently uncontrolled, and assumes it will continue to be influenced by the price of chemically equivalent petroleum-based 200 proof ethyl alcohol. A further assumption in Table VII is that the presently adequate supply of unleaded gasoline will probably

restrain the price of decontrolled unleaded blend stock to about the same level as that of controlled unleaded gasoline. Implicit in this unleaded gasoline price assumption is the further assumption that competition is presently restraining unleaded gasoline prices at or below their maximum lawful prices.

Table VII

GASOHOL PRICE EFFECTS WITH PRICE DECONTROL

	1980	1981
	(Dollars per gallon)	
Wholesale prices:		
Unleaded gasoline	$0.97	$1.21
Ethanol	$1.80	$1.98
Gasohol	$1.05	$1.29
Retail margin	$0.182	$0.182
Reseller markup	$0.085	$0.085
Gasohol retail price (ex taxes)	$1.317	$1.557

Source: ERA estimates.

The degree of gasohol market entry resulting from price decontrol cannot be quantified, but is expected to exceed the market entry rate under continued price regulation, with a corresponding increase in competition, and some restraining effect on gasohol prices. In addition, the gasohol which refiners will market in the decontrol case could be priced lower than the gasohol which new, independent market entrants would obtain and sell in the price and allocation

regulation case. Decontrolled refiner prices for gasohol might be lower because the cost of bringing relatively small amounts of ethanol to gasoline refiners will be relatively lower than the cost of bringing large amounts of unleaded gasoline to ethanol distilleries. Also, in the decontrol case refiners could use existing unleaded gasoline outlets and distribution systems to market gasohol, which might be less costly to the consumer than the construction or purchase of new outlets to market gasohol by ethanol producers not yet in the gasoline business.

Concerns have been expressed that in the decontrol case independent ethanol producers would not be able to set up competing gasohol outlets. It has been suggested that refiners, resellers and retailers of unleaded gasoline might not agree to sell decontrolled unleaded blend stock to independent ethanol producers, and that slightly less price competition might result. In our view these concerns do not appear to be valid. In the decontrol case we would expect competition to operate at all levels in the sale of blend stock both to restrain its price and to assure its supply. Any refiner, reseller or retailer could sell unleaded gasoline as blend stock. No single supplier or class of suppliers could successfully deny an ethanol producer access to blend stock.

Concerns have also been expressed that in the decontrol case, if ERA were to mount less than a full enforcement effort, unleaded blend stock purchasers might resell the blend stock as unleaded gasoline

in volumes sufficient to create a black market and disrupt lawful unleaded distribution. Notwithstanding the fact that ERA would subject these violators of the continuing gasoline regulations to enforcement action, including refunds and possible civil and criminal penalties, the potential for abuse still exists. Therefore, ERA would enforce the ban on resales of blend stock as unleaded gasoline.

EASE OF GASOHOL DISTRIBUTION UNDER EACH ALTERNATIVE.

In the no action case, it would be relatively easy for those who already have unleaded gasoline to distribute gasohol, but those ethanol producers who are not presently marketers of unleaded gasoline would encounter the same difficulty as today. As noted present regulations do not bar refiners, resellers, and retailers with access to unleaded gasoline from blending it with ethanol to produce gasohol. The limits on gasohol marketing here are the willingness of historical unleaded gasoline purchasers to buy gasohol as a substitute for unleaded gasoline, and the availability of ethanol, which is unlikely to exceed the goals of 20,000 and 30,000 B/D at the end of 1980 and 1981. The new distilleries which could increase the volume of available ethanol require two years to build.

No action

With no change in our present motor gasoline allocation and price regulations, ethanol producers who wish to enter the gasoline

market face several obstacles. They may seek supplies of unleaded blend stock on the spot market or attempt to establish a contractual relationship with a refiner. The supplier, however, must give first priority to his supply obligations under DOE's allocation regulations. An ethanol producer may apply to OHA for an exception. However, the case-by-case exceptions process is necessarily slow, and subject to court appeals by suppliers.

Allocation Regulation

In the allocation regulation alternative, marketers with access to unleaded gasoline retain their present flexibility to blend it with ethanol and market gasohol, and ethanol producers are given access to unleaded blend stock through an ERA application procedure which will necessarily impose some administrative burden.

In option 2 of the proposed allocation regulation (described on page 18), only ethanol producers would be eligible to apply to ERA for an assignment of a base period supplier and volume of unleaded blend stock. This option would somewhat improve the ease with which ERA regional offices could handle the caseload of applications, and possibly facilitate more unleaded gasoline assignments to ethanol producers in a shorter time than under Option 1. However, ethanol producers which use natural gas or petroleum as a boiler fuel would be required to show intent to convert to another boiler fuel, which could severely limit the number of producers who would apply, since most now use natural gas or petroleum. Data on the number of ethanol producers

that might be able to convert their distilleries to other boiler fuels may be forthcoming from the public comments on the proposed allocation rule, but is unavailable at present.

Another provision of the proposed allocation rule which might limit the number of ERA blend stock assignments is the requirement that the reviewing ERA office consider the effect on the proposed supplier's historical purchasers of unleaded gasoline.

In the case of a number of small refiners, the offices might conclude that, even though unleaded supplies of all suppliers in a given market area are adequate when considered together, the gasoline supply fraction of the proposed supplier (perhaps a small refiner with inadequate access to crude oil) would be reduced to an unacceptable level if it were required to supply unleaded blend stock to the applicant. This sensitivity to the proposed supplier's other unleaded supply obligations also appears in the no action alternative, under which OHA would continue to consider the effect of its exceptions decisions on supplier fractions.

The proposed "buyback" provision of the allocation rule has been the subject of conflicting comment. The provision would give ERA discretion to require the successful applicant blender to sell back to the designated unleaded blend stock supplier a volume of gasohol equal to the volume of unleaded gasoline supplied under the ERA assignment order. It has been argued

that such a provision would hinder the growth of the gasohol market by discouraging new blenders from applying for assignments. Prospective applicants for a blend stock assignment may not apply unless they can choose their own method of marketing the gasohol they produce with the assigned unleaded gasoline. An opposing contention has been advanced that the "buyback" provision, together with increased ethanol production, will help gasohol become an important part of the unleaded market in the present "start up" period, which coincides with gasoline allocation and price controls, and that as a result both the major and independent sectors will be able to participate in gasohol marketing after these controls expire in September, 1981.

DOE's present view, which is subject to reconsideration in light of the comments which are received on the proposed allocation rule, is that ERA would probably use its discretionary "buyback" authority very sparingly, in cases in which both applicant and supplier were willing to agree to such an arrangement in order to satisfy the supplier's other unleaded supply obligations. Such sparing use would neither hinder new blenders from applying for a blend stock assignment, nor freeze out independent marketers in favor of major suppliers. DOE's statutory mandate is to protect the independent sector and also to assure the equitable distribution of gasoline in time of shortage. The discretion in the "buyback" provision would be exercised with both these goals in mind, in order to prevent disruptions of supply and distribution patterns. Assignment orders issued without a "buyback" provision would

not be subject to a subsequent mandatory "buyback" by the unleaded blend stock supplier.

In general, the incentives in the allocation and price rule alternative, taken together, would probably result in aggressive market entry by refiners. They would have the fewest distribution problems, because they already supply the unleaded market, and they have the necessary investment capital to modify their equipment and marketing systems as necessary.

Allocation Decontrol

Of the several alternatives under consideration, decontrol of the allocation of unleaded blend stock and gasohol would probably result in the easiest distribution for existing marketers, but as noted above, concerns have been expressed that ethanol producers not now in the gasohol business might have difficulty purchasing decontrolled blend stock. We believe that in the decontrol case the marketplace would function in a manner which would eliminate this concern. Gasoline marketers at all levels would compete to sell unleaded gasoline to ethanol producers. The concern that any single supplier or class of suppliers could successfully deny an ethanol producer access to blend stock therefore appears to be unwarranted.

The new gasohol marketing structure under the decontrol option would probably assume about one year earlier the general shape which will likely develop after controls expire in September, 1981.

E. EFFECT OF NEW GASOHOL MARKET ON UNLEADED SUPPLY (ALL ALTERNATIVES)

Concerns have been expressed that the OHA supply orders under the no action alternative, or the ERA administrative supply orders under the allocation alternative, or the general growth of the gasohol market under the decontrol alternative, might result in the removal of unleaded gasoline from areas of the existing distribution system other than the Midwest, where ethanol production is presently concentrated, without assurance that these other areas would be supplied a compensating volume of gasohol or unleaded gasoline. The concern is that the OHA and ERA supply orders, or the attractive force of higher decontrolled unleaded gasoline blend stock prices, would lower supplier allocation fractions in areas where the gasohol is not marketed.

This analysis, and the analysis performed independently for the gasohol rule's environmental assessment, indicate that gasohol should help extend, rather than adversely affect, unleaded supplies. Regional dislocations of unleaded supply should not develop for several reasons. First, suppliers experiencing decreased demand for unleaded gasoline in the Midwest because gasohol has extended unleaded supplies in that region will be able under any of the alternatives to redirect unleaded gasoline to other regions which require additional gasoline, principally by exchanges, but also by physical redistribution. Most refiners frequently conclude exchange agreements for significant volumes of gasoline with other refiners. Second, there is a strong economic incentive for ethanol to flow out of the Midwest to other regions, because it costs less to transport one gallon of ethanol out of the Midwest than it does to import nine gallons of unleaded gasoline

into the Midwest for use as gasohol blend stock. Third, in the regulatory alternative most blend stock supply orders would be issued in each DOE region to unleaded suppliers of that region, and those suppliers experiencing difficulty might be offered the discretionary opportunity, where the gasohol blender agreed, to buy back gasohol to replace the unleaded blend stock supplied to a blender under a DOE order. In any event, gasohol will represent only a small portion of total gasoline supply and total unleaded supply if DOE's 1980 and 1981 production goals are met. If we assume that unleaded gasoline will average 40 percent of a total gasoline supply of 6,326,100 B/D in 1980 and 1981, total unleaded gasoline supply will be 2,530,440 B/D, of which gasohol will be 7.9 percent in 1980 [200,000 divided by 2,530,440 = 0.07904] and 11.9 percent in 1981 [300,000 divided by 2,530,440 = 0.11857]. Gasohol will be only 3.2 percent of total gasoline supply in 1980 and 4.7 percent of total gasoline supply in 1981. Ethanol will represent much smaller portions of unleaded and total gasoline supplies.

Table VIII

ETHANOL AND GASOHOL SHARE OF UNLEADED AND TOTAL GASOLINE SUPPLY
(Percent)

	Unleaded Gasoline	All Gasoline
	(Percent)	
Gasohol		
1980	7.9	3.2
1981	11.9	4.7
Ethanol		
1980	.8	.3
1981	1.1	.5

Source: ERA estimates.

We will also consider the issue of regional supply imbalances in the environmental assessment which is being prepared.

F. FUEL SWITCHING AND GASOHOL

The Department of Energy carefully examined the motives which may lead motorists to misfuel late model vehicles with leaded gasoline in section III C, "Consumer Fuel Switching Behavior," at pages III-27 through III-59 of its January, 1979 Final Environmental Impact Statement: Motor Gasoline Deregulation and the Gasoline Tilt, Volume I (available from the Office of Public Information of DOE's Economic Regulatory Administration, Room B-110, 2000 M Street, N.W., Washington, D.C. 20461). The relationship between a growing gasohol market and fuel switching is examined in the environmental assessment.

In general, concerns have been expressed that:

- Some motorists may fuel their unleaded-only vehicles with leaded gasoline, motivated either by a spot unleaded gasoline shortage or by the fact that a particular outlet's leaded gasoline is priced below the average price of unleaded fuels (including higher-priced gasohol) available to unleaded-only cars in its market area;

- Some motorists may fuel their vehicles which are permitted to use leaded gasoline with gasohol, and thereby diminish the supply of unleaded gasoline (referred to as "reverse switching") when gasohol is priced lower than leaded gasoline.

We think there may be some switching of both types due to consumer confusion, or a desire to obtain the performance which gasohol provides due to its octane advantage over most unleaded regular gasoline. We think switching behavior may also result in a few cases from wide disparities in price. Where gasohol is exempt from state taxes it may be priced low enough to attract motorists who would normally purchase leaded gasoline, and who also seek the octane advantage of gasohol.

Conversely, in some cases the retail price of gasohol offered by one marketer may be much higher than the leaded retail price offered by another marketer in the immediate vicinity. This result has been reported in certain specific cases, but is not a general phenomenon. The wide price spread develops when a refiner must supplement its crude oil supply with high-priced cargoes of spot market foreign crude oil, and then must pass through these crude oil costs on the prices of all its gasoline grades at outlets competing with those of another refiner that purchased crude oil purchased at lower prices, probably under long term contracts. Retail price differences of up to 15 cents a gallon between competing outlets for the same type of gasoline have occurred in market areas where the competing outlets are supplied by refiners which have access to lower-priced crude oil.

The remedy for these price differentials probably lies with improved motor gasoline stock levels. In general, the supply

outlook for motor gasoline has greatly improved in recent months and gasohol will represent only a small portion of that supply in the near term. Therefore we think the environmental impact of a small incidence of misfueling will be insignificant. We also think the environmental benefit of extending unleaded supplies through the use of gasohol will substantially counterbalance the adverse impact of gasohol-related misfueling. The environmental assessment will discuss these offsets in greater detail.

G. COMPETITION (ALL ALTERNATIVES).

Each of the alternatives contains advantages and disadvantages when examined with a view to encouraging competition throughout the refiner, reseller and retailer motor gasoline market structure. In general, the no-action and allocation regulation alternatives contain the most disadvantages from this industry-wide point of view, and the deregulation alternative contains the most advantages.

The Federal Trade Commission, in its comment on our Motor Gasoline Deregulation EIS (at page 200 of Volume II), stated that "Existing regulations discourage exploitation of more economical or efficient techniques, because reductions in costs cannot be retained as profit, but must be passed through as reductions in price." The FTC contrasted the relative inefficiency of regulated production to the prospect of more investment in more efficient techniques, and more supply, as a result of decontrol. Gasohol deregulation would start a new industry in the direction of maximum efficiency, which is a prime goal of competition.

The FTC contends that the consumer will benefit from some of the savings which result from more efficient production.

DOE's congressionally-mandated motor gasoline allocation regulations are by their very nature anti-competitive. That is, they freeze supplier/ purchaser relationships as of a base period in order to assure an equitable share of available supplies to each historical purchaser in time of shortage. To use the allocation regulations to promote competition is an inherent contradiction in terms. The best that can be done is to structure the regulations so as to create as few barriers to competition as possible.

For example, in the no-action alternative, OHA will use the exception provision of our procedural regulations to continue to consider applications for a base period supplier and volume of unleaded blend stock by small independent marketers, in furtherance of the mandate in the EPAA to protect the independent sector of the petroleum industry.

In the regulation alternative, ERA would also consider the same type of applications for assignment of blend stock suppliers.

The allocation regulations have anti-competitive impacts as applied to gasohol. In the no-action alternative, suppliers may be required to supply unleaded blend stock to purchasers they do not wish to supply. In the regulation alternative, as in the no-action case, recipients of supply orders have a vested interest in perpetuating the allocation control system as a whole, even though it is anti-competitive.

In developing the options in the proposed allocation rule, we realized that Option 2, which limits ERA blend stock assignments to ethanol producers only, is anti-competitive, because it denies access to jobbers and retailers. (However, these firms already have access to unleaded gasoline and an opportunity, if purchasers are willing and ethanol is available, to produce and market some gasohol. In addition, OHA will consider applications for exception from these marketers where they have shown evidence of an effort to use some of their existing unleaded supply for gasohol production.)

The effect of the "buyback" provision of the proposed allocation rule may also be anti-competitive, because it might be abused to screen out the development of competing distribution systems by ethyl alcohol producers. We have attempted to address this concern through ERA discretionary authority to use "buyback" sparingly. "Buyback" would limit competition in those instances in which it was used, but no more so than the freeze on supplier/purchaser relationships as of a base period which is the basis of the entire allocation system.

The decontrol proposal would permit competition to operate at all marketing levels in the sale of blend stock and gasohol, but independent ethanol producers are concerned that immediate deregulation could create difficulties for prospective market entrants. However, if the regulation proposal is adopted, suppliers that are forced to provide blend stock to ethanol producers which they do not wish to supply will not be likely

to continue to supply them after general gasoline decontrol in September, 1981. One of our policies is to promote a smooth transition to a decontrolled market at that time. The allocation and price deregulation alternative would pave the way for 1981 decontrol more effectively than the other alternatives, which would tend to build constituencies for continued controls. The proposed price and allocation rule would adjust the structure of the present regulations, which are based on the anti-competitive concept of a supplier/purchaser freeze, in order to promote increased marketing of gasohol during the remainder of the program. We seek public comments on the implications for competition of each of these proposed alternatives.

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