

**ANALYSES OF THE NATIONAL ENERGY PLAN:
THE EFFECTS ON TRANSPORTATION**

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by
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PREFACE

As reflected in the CONTENTS, the substance of this paper is a collection of partial analyses of segments of the National Energy Plan, accompanied by some (where appropriate) predictions of likely effects should the program be implemented in its proposed form. Much of what is presented in Section II is new analysis of the price, tax, rebate, and efficiency effects upon motor gasoline consumption. These should be of interest to anyone evaluating the highly visible proposals of the standby gasoline tax and the so-called gas-guzzler tax.

The discussion of the effects of a strict adherence to the 55 MPH speed limit (Section III) brings up-to-date some of the Texas experiences with the 55 MPH limit. The section analyzing the possible impacts of increased taxes on aviation fuel presents an interesting viewpoint about the relative efficiency of energy use by airplanes and the ability of general aviation to generate further significant increases in fuel efficiencies. Another important implication of the Carter program is the increased transportation of coal for use in Texas. The discussion in Section VI examines the salient aspects upon rail and pipeline movements of coal and coal slurry.

Of direct, but seemingly lesser, importance for transportation, the National Energy Plan proposes the removal of the current excise tax on intercity buses (Section IV), the promulgation of energy efficiency standards for light-duty trucks (Section VIII), and the decontrol of retail gasoline prices (Section IX). Each of these is examined for its importance, either to Texas or to transportation in general.

Finally, a poll of transportation leaders in Texas was made to gauge their evaluations and analysis of the transportation aspects of Carter's program. Those results and the questionnaire are presented in Section X.

ABSTRACT

This monograph focuses upon the transportation aspects of the recently proposed National Energy Plan. It contains a point-by-point analysis of elements, specifically mentioned in the National Energy Plan, that relate directly to transportation. When appropriate, the analyses have generated some forecasts of the expected effects upon Texas and/or the U.S. should the proposals be enacted in their present form. The reader is advised that the substance of the paper is a collection of partial analyses of selected elements (mainly conservation) and that no overall critique of the entire National Energy Plan has been attempted.

The following items of the Carter proposal have been examined:

- (1) policies affecting gasoline prices and vehicle fuel efficiencies;
- (2) impact of the 55 mph speed limit;
- (3) removal of the excise tax on intercity buses;
- (4) increased taxes on aviation fuel;
- (5) increased demand for transportation of coal;
- (6) energy efficiency standards for light-duty trucks;
- (7) decontrol of retail gasoline prices;
- (8) impact of the National Energy Plan on Texas transportation relative to U.S. transportation; and
- (9) proposed study of the national system for transporting energy.

Additionally, a survey of leaders in the transportation industry of Texas was conducted to obtain their insight into the likely effects of the program of President Carter. Results from that survey are reported herein.

Briefly, the essential conclusions of the analyses are summarized below.

- Nationwide, bus operators would pay approximately \$10 million less annually in taxes.

INCREASED TAXES ON AVIATION FUEL

- \$12 million more in taxes will be paid by Texans in 1980.
- The 4 cents/gallon tax, per se, will probably not severely impact general aviation.
- The tax may pre-empt possible increases in the state aviation fuel tax thereby hindering the development of the State airport system.

INCREASED DEMAND FOR TRANSPORTATION OF COAL

- Approximately 150 million tons/year of coal will be brought into Texas by 1990.
- Transportation of this coal by rail would require an additional 81 train movements in the State.
- Railroad and coal slurry pipelines will need to be upgraded and constructed. Public assistance and other actions may be needed for efficient movement of these quantities of coal.

EFFICIENCY STANDARDS FOR LIGHT-DUTY TRUCKS

- If the tax/rebate system for light-duty trucks is more severe (e.g., higher taxes and smaller rebates) than for autos, there will be some shift away from use of pick-ups and vans as personal autos.
- Texas, the third leading agricultural state, is likely to be more adversely affected relative to the rest of the U.S. by such a tax/rebate system due to the heavy reliance upon pick-up trucks as a farm vehicle.
- Sales and uses of recreational vehicles (vans, campers, and motor homes) are likely to be reduced; at least, the vehicle mix will be affected as owners substitute away from inefficient to more efficient RV's.

DECONTROL OF RETAIL GASOLINE PRICES

- Not likely to have any immediately discernible effects, since ceilings have never been reached.

- 60 percent of these transportation leaders disapproved of the overall Carter program
- More than 80 percent stated that the Carter program would affect Texas more severely than the rest of the U.S.

Perhaps a final re-statement of a *caveat* is in order. The partial analyses of the transportation effects do not provide enough insight or information to evaluate fully either of the two critical issues:

(1) What will be the effect of the National Energy Plan upon the U.S.?

(2) How will Texas be affected relative to the rest of the U.S.?

In any full evaluation, however, the transportation impacts will be important. To that end, the contents of this monograph will prove useful.

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I. INTRODUCTION AND BACKGROUND

The recently proposed National Energy Plan (also identified as President Carter's Program or Carter's Plan) has stimulated a rising amount of discussion, particularly in Texas but also throughout the Nation. Much of the surrounding controversy in Texas focuses upon those elements of the plan which propose tax and price regulation changes on crude oil and natural gas production. The emphasis of this paper, however, is upon the specific transportation issues of the Carter plan and how the proposals are likely to affect related transportation activities in the State and Nation.

ENERGY POLICY AND CONSERVATION ACT - 1975

In December of 1975, President Ford signed into law the Energy Policy and Conservation Act (EPCA). This act set average fuel economy standards for new automobiles sold in the U.S. each model year beginning in 1978. The auto manufacturers are subject under this legislation to a \$5 per vehicle tax for each tenth of a mpg. that average fuel economy of all new cars sold exceeds allowable fuel economy standards. The standards are as follows:

<u>Model Year</u>	<u>Average Fuel Economy Standard (miles per gallon)</u>
1978	18.0
1979	19.0
1980	20.0
1981-84	(to be determined)
1985	27.5

This system directly penalizes the automobile manufacturer. The penalty system, however, does not preclude the profitable deviation from the average fuel economy standard by the manufacturers. Various sales promotion and pricing strategies could be initiated by the manufacturers which might

fails to meet the applicable fuel economy standard under existing law (the Energy Policy and Conservation Act). Graduated rebates would be given for new automobiles and light trucks whose fuel economy exceeds the standard (see earlier table).

The tax would begin with the 1978 model year, increase through 1985, and remain constant thereafter. Each year the IRS will adjust the schedule in advance so that total rebates do not exceed total tax receipts. All electric vehicles are eligible for the maximum rebate. The tax on gas guzzlers and rebates on gas sippers differs from earlier legislation signed by President Ford in that the tax penalty falls initially upon consumers rather than automobile manufacturers.

2. Another controversial element of President Carter's energy program is the standby gasoline tax. In order to permit limited increases in gasoline consumption until 1980 and achieve an actual reduction in gasoline consumption from 1980 to 1987 (despite increases in total miles traveled), a standby gasoline tax is proposed. If annual gasoline consumption nationwide exceeds the target by one percent or more, a 5 cent per gallon tax will be imposed January 15th of the subsequent year. Similarly, if the annual consumption target is met, then the amount of the tax will be reduced by 5 cents per gallon in the following year. Thus, the tax will rise, remain the same or fall, depending on the prior year's gasoline consumption record. Additionally, the tax may not be increased or reduced by more than 5 cents per year. The cumulative amount of the tax may not exceed 50 cents per gallon. All funds collected would be returned, via the Federal income tax system, to the American people.

3. The auto efficiency standards element of Carter's conservation plan represents a continuation of the EPCA. The Secretary of Transportation is to analyze the necessity of raising the mileage standards above 27.5 mpg after 1985.

will bear heavily upon all modes of transport. In summary format, here are the highlights of the proposed crude oil taxes of the National Energy Plan.

Crude Oil Prices and Taxes would be altered to achieve these four points. The current price ceiling on crude oil (\$5.25 and \$11.28 per barrel) would remain in effect with the exception of crude oil discovered after April 20, 1977. The newly discovered crude oil market price would be allowed to rise over a three-year period to the 1977 world price estimated to be \$13.50 a barrel. Each price tier would be subject to adjustments due to domestic increases in the general rate of inflation.

Crude oil equalization taxes equal to the difference between the controlled domestic crude price and the world price of crude would be applied. Each of the three categories of domestic oil (old oil, previously discovered new oil, and newly discovered oil) will be subject to different tax levels during three distinct phases. Here are the three domestic oil categories and President Carter's plan for their taxation.

(1) Old Oil - The return to the producer will remain \$5.25 plus an adjustment for general inflation. A tax on old oil will be applied in 3 stages to bring the total market price to \$11.28 plus an inflation adjustment in 1979 and \$13.50 plus an inflation adjustment in 1980.

(2) Previously discovered new oil - The return to the producer will remain \$11.25 plus an adjustment for inflation. A tax on this oil will be applied in 1980 to bring the market price to a total of \$13.50 plus some inflation allowance.

(3) Newly discovered oil (or crude discovered after April, 1977) - The market price and the return to the producer will be allowed to increase in three stages to \$13.50 plus an adjustment for inflation by 1980.

II. POLICIES AFFECTING GASOLINE PRICES AND VEHICLE ENERGY EFFICIENCY

The purpose of this section is to discuss the expected future U.S. gasoline consumption, first assuming that President Carter's energy policy is not enacted, and second, assuming that different parts of his program are enacted. Some discussion also is given of some of the potential effects of the President's policy on transportation in Texas. The discussion is limited to an analysis of the following parts of President Carter's program: (1) EPCA energy efficiency standards, (2) gasoline price increases resulting from increases in crude petroleum prices, (3) gas guzzler taxes and rebates, and (4) standby gasoline taxes.

BASE CASE (WITHOUT CARTER POLICY)

The principal energy conservation policies which currently affect transportation, as outlined previously, are:

1. EPCA standards for automobiles;
2. EPCA regulations that allow DOT to set standards for light trucks;
3. State conservation plans that encourage fuel conservation through van-pools, carpools, park-and-ride, etc.; and
4. The 55 mph speed limit (discussed in a later section).

Analyses reported in the Carter Energy Plan predict that EPCA standards and other conservation measures, if completely effective, would reduce the annual U.S. gasoline consumption growth rate to one percent between 1977 and 1985. Recent projected growth in U.S. gasoline consumption of about 4.3 percent for 1977 over 1976 indicates that these existing policies are not reducing energy growth to one percent, at least in the short term. Indeed, this 4.3 percent

EFFECTS OF GASOLINE PRICE INCREASE

An analysis was made to predict the result of enacting Carter's recommendations for crude petroleum pricing, assuming that the gas guzzler tax and stand-by gasoline tax were not enacted. This analysis assumed a gasoline demand elasticity with respect to the real gasoline price of -0.1 (that is, a 10 percent increase in the real gasoline price would reduce consumption by one percent, if there were no other effects). This analysis indicated that Carter's 1978 target for gasoline consumption could be met if the basic growth rate, in the absence of the price increase, was 3.5 percent or less. Thus, the EPCA standards would have to be sufficiently effective to hold the growth rate to 3.5 percent to meet Carter's 1978 target.

If there was a desire on the part of motorists to increase consumption by 4.3 percent in the 1977-1978 period, as they did in the 1976-1977 period, and energy efficiency standards were not effective, then the price elasticity would have to be -0.32 in order to meet Carter's goals. Most estimates of one-year price elasticities range from -0.1 to -0.2 , indicating that the goal probably would not be met under these circumstances.

In summary, an increase in the price of petroleum alone would meet Carter's 1978 goal if one or more of the following conditions held:

1. Growth rates for consumption slowed below the 1976-1977 pattern (to 3.5 percent or less).
2. EPCA energy efficiency standards became more effective.
3. The price elasticity of demand was fairly high.

The 4.3 percent rate of growth for 1976-1977 is relatively high and probably would return to a lower level such as the 3.4 percent growth rate of 1956-1973 even without EPCA standards. With EPCA energy efficiency standards, consumption would be further reduced. Thus, there would be a good

growth rate, and (3) 1.0 percent being the rate that would result if the EPCA standards were completely effective.

Table 2 summarizes the predicted reductions in gasoline consumption resulting from Carter's proposed increase in crude petroleum prices; four cases are shown. Table 3 shows the additional savings that would be necessary

Table 2. Predicted Reductions in U.S. Gasoline Consumption Resulting from Carter's Proposed Increases in Crude Petroleum Prices, for Different Demand Elasticities and Base Growth Rates

	3.4% Growth Low Demand Elasticity	4.3% Growth Low Demand Elasticity	3.4% Growth High Demand Elasticity	1.0% Growth High Demand Elasticity
	- - - - - Millions of Barrels Per Day - - - - -			
1978	.028	.029	.042	.041
1979	.045	.046	.075	.072
1980	.054	.055	.100	.095
1981	.033	.034	.092	.088
1982	.020	.020	.074	.070
1983	.012	.012	.059	.056
1984	.007	.007	.047	.045
1985	.004	.004	.038	.036

from increases in energy efficiency to not trigger the standby gasoline tax of 5 cents per gallon per year, for the same four cases.

The reductions shown in these two tables are incremental, not cumulative; therefore, to derive total savings needed from increased energy efficiency in any year, incremental savings for all preceding years must be added to that year's increment. Also, the calculations in these two tables assume that

one percent gasoline consumption growth rate is the growth rate that has been predicted to result if the EPCA standards were completely met. Column 4 indicates, then, that if price of petroleum increases and EPCA standards are completely met, the standby gasoline tax would not be "triggered" until 1982, or possibly 1983. Second, although recent growth rates do not support the assumption that the EPCA standards would be completely effective, these standards, either with larger penalties or together with the gas guzzler tax (which promotes basically the same efficiency goals as the EPCA standards but has higher penalties), probably would be sufficient to reduce consumption by the amount that is predicted for perfectly effective EPCA standards. Therefore, Column 4 presents a fairly good prediction of the additional fuel savings needed over and above price increases, EPCA standards, and the gas guzzler taxes and rebates in order not to trigger the standby gasoline tax. These calculations for each year assume, however, that: (1) the previous year's target is met, (2) the EPCA standards plus the gas guzzler tax are as effective as perfectly effective EPCA standards, and (3) the Carter Plan's calculations showing that perfectly effective EPCA standards plus gasoline price increases occurring before 1977 are sufficient to reduce gasoline consumption to one percent per year.

The above analysis indicates that petroleum price increases plus either the gas guzzler tax or higher penalties for EPCA standards, such that they become perfectly effective, would reduce gasoline consumption below targets that would trigger the standby gasoline tax until about 1981 or 1982. Other conservation programs would have to reduce consumption each year by roughly an additional 200,000 barrels increment for the standby gasoline tax not to be triggered after 1982. For all assumptions regarding growth rates and price elasticities of demand, the crunch from the standby gasoline tax hits in 1982 or later.

Table 4. Projected U.S. Gasoline Consumption Assuming Increased Oil Prices and Imposition of the Gas Guzzler Tax, With and Without the Standby Gasoline Tax for High and Low Price Elasticities of Demand for Gasoline

	U.S. Gasoline Consumption (Mill. Barrels Per Day) With Price Increases and Gas Guzzler Tax			
	Without Standby Gasoline Tax		With Standby Gasoline Tax	
	High Demand Elasticity	Low Demand Elasticity	High Demand Elasticity	Low Demand Elasticity
1978	7.23	7.24	7.23	7.24
1979	7.23	7.27	7.23	7.27
1980	7.21	7.29	7.21	7.29
1981	7.19	7.33	7.19	7.33
1982	7.19	7.39	7.19	7.39
1983	7.21	7.45	7.21	7.41*
1984	7.24	7.51	7.19*	7.42
1985	7.27	7.58	7.15	7.42
1986	7.32	7.66	7.09	7.43
1987	3.37	7.73	7.04	7.44
1988	7.42	7.81	6.98	7.46
1989	7.48	7.89	6.93	7.49
1990	7.55	7.97	6.90	7.52
1991	7.61	8.05	6.88	7.56
1992	7.68	8.13	6.88	7.61

*First year that 5¢/gal. standby gasoline tax is imposed. Additional 5¢/gal. year added in subsequent years reaching 50¢/gal. after ten years in these projections.

mph speed limit; (4) changes in highway safety, because of changes in automobile size, materials, and performance; and (5) changes in total expenditures for vehicles. These and other effects need to be analyzed before the overall impact of President Carter's energy policy can be fully evaluated.

III. IMPACT OF 55 MPH SPEED LIMIT

In order to continue to qualify for federal highway aid, in January, 1974, Texas established 55 mph as the legal speed limit. Although conclusive data are not available, it is generally recognized that some fuel savings (probably less than 3 percent of statewide highway fuel consumption) and some reduction in highway fatalities resulted.

President Carter emphasizes the need to "vigorously enforce" the speed limit. He notes that if "widespread non-compliance and lack of enforcement continue," the Secretary of Transportation may find it necessary to exercise his authority to withhold Highway Trust Fund revenues from states not enforcing the 55 mph speed limit.

COMPLIANCE WITH THE SPEED LIMIT

Speed surveys are taken periodically by the State Department of Highways and Public Transportation. Trends in speed data are presented in Table 5.

It is apparent that the imposition of the speed limit significantly reduced highway speeds in Texas. The average speed recorded in 1977 was 58 mph. In spite of the significant reduction in the speed limit, average speeds are slightly in excess of the speed limit.

ENFORCEMENT OF THE SPEED LIMIT

The Department of Public Safety has made a concerted effort to enforce the speed limit. Both the number of speeding citations issued and the percentage of total citations issued for speeding have increased dramatically (Table 6).

The Department of Public Safety contends that, given its existing level of equipment and manpower, additional enforcement of the speed limit is not

feasible. However, although the President's proposal does not state what is meant by vigorous enforcement, the data in Table 5 suggest that the speed limit is being vigorously enforced in Texas.

CONCLUSIONS

Texans have significantly reduced their highway travel speeds. Whether or not existing speeds are considered to be in compliance with the speed limit depends on the definition of compliance that the federal government will dictate.

The data indicate that Texas has taken strict measures to enforce the speed limit. It appears that the number of citations issued cannot be significantly increased without a corresponding increase in the funding available to the Department of Public Safety. There is also considerable doubt that issuing more citations will noticeably reduce highway speeds. Unless the driving public thoroughly accepts the speed limit, enforcement alone will not result in compliance.

Residents of Texas and other southwestern and western states are more affected by the reduced speed limit. Intercity travel distances tend to be much greater. For example, the average Texan travels some 2800 miles per year on main rural highways, while the average U. S. resident travels about 2200 miles per year on main rural highways.

One other point might be mentioned. It is estimated that the total potential fuel savings resulting from the reduced speed limit are somewhat small being approximately 3 percent of highway motor fuel consumption. The reduction in speeds that has occurred has already caused the majority of those potential fuel savings to be realized. The magnitude of savings that would occur by lowering existing highway speeds to 55 mph would be approximately one percent of highway motor fuel consumption.

IV. IMPACT OF REMOVAL OF EXCISE TAX ON INTERCITY BUSES

As a part of President Carter's energy package, "legislation is requested to remove the 10 percent excise tax on intercity buses." Intercity buses, under average operating conditions, achieve approximately 125 passenger-miles per gallon. Alternative modes, namely the auto and air modes, attain efficiencies of 32 and 14 passenger-miles per gallon, respectively.

Eliminating the federal excise tax on buses would reduce the cost of purchasing the bus. Presently, vehicle depreciation represents about 6 percent of the cost per bus-mile. A 10 percent reduction in bus cost would, then, reduce the cost per bus-mile by 0.6 percent. If this entire cost were passed through to the customer, bus fares would decrease by 0.6 percent.

A 0.6 percent reduction in fare would result in approximately a 0.18 percent increase in ridership.¹ Since buses currently serve only 1 percent of intercity passenger travel in Texas, a 0.18 percent increase in that ridership will have an undetectable effect on transportation fuel consumption in Texas.

Since over 40 million passengers are served annually by the Texas intercity bus industry, a significant fare reduction would be beneficial to Texans. However, a fare reduction as small as that which could result from eliminating the excise tax on intercity buses would not be a significant benefit to Texans.

On a nationwide basis, fewer than 1000 intercity buses are purchased annually. Excise tax per bus is approximately \$10,000; nationwide, eliminating the excise tax would reduce taxes paid by approximately \$10 million. As much as 10 percent of this reduction might occur as a result of buses purchased from Texas bus manufacturers.

¹Source: "Effects of Fares on Transit Riding." Highway Research Record No. 213. It is assumed that the elasticity of intercity bus ridership demand does not vary significantly from the elasticity of urban-transit ridership demand.

V. IMPACT OF TAX ON AVIATION FUEL

President Carter's energy proposals will impact the Texas general aviation industry in three ways: (1) an increase in the tax on aviation gasoline and aviation turbine fuels used for noncommercial aviation¹ from 7 cents to 11 cents per gallon, (2) an increase in the well-head price of oil that will result in approximately a 7 cents per gallon increase in the pre-tax cost of aviation fuels, and (3) deletion of the termination provisions of Sec. 202 of the Airport and Airway Development Act of 1970, Public Law 91-258. Sec. 202 provided for the termination of the present 7 cents per gallon federal tax on fuels used for noncommercial aviation on and after July 1, 1980.

TAX EFFECTS

Table 7 shows the fuel used in noncommercial aviation in Texas during each of the last five years and estimated fuel usage for 1980. Table 7 also shows what the impact of the proposed 4 cents per gallon tax and the increased pre-tax price of fuel would have been if they had previously been in effect. The total impact of President Carter's energy proposal on Texas noncommercial aviation fuel users is estimated at \$10,000,000 in 1978 increasing to \$12,000,000 by 1980. After 1980, the impact will increase to \$19,000,000 per year due to continuance of the existing 7 cents per gallon tax.

The impact of increased fuel costs on the level of noncommercial aviation activity is not clear. Recent fuel cost increases, particularly the 1972-1974 period, do not appear to have hindered the growth of general aviation. On the con-

¹The term 'noncommercial aviation' means any use of an aircraft, other than use in a business of transporting persons or property for compensation or hire by air.

TABLE 7

IMPACT OF FEDERAL FUEL TAXES ON TEXAS NONCOMMERCIAL AVIATION

(1) Year	(2) Aviation Gasoline (gallons)	(3) Turbine Fuel	(4) Present Tax (.07)	(5) Proposed Tax (.04)	(6) Well Head Price Increases	(7) Total Impact (Cols. 5 + 6)
1980	43,700,000 ¹	63,400,000 ¹	\$7,497,000	\$4,284,000	\$7,497,000	\$11,781,000
1976	35,665,000 ²	49,500,000 ⁴	5,961,550	3,406,600	5,961,550	9,368,150
1975	36,899,919 ³	44,325,000 ⁴	5,685,744	3,248,997	5,685,744	8,934,741
1974	35,127,298 ³	36,675,000 ⁴	5,026,161	2,872,092	5,026,161	7,898,253
1973	37,372,248 ³	31,200,000 ⁴	4,800,057	2,742,890	4,800,057	7,542,947
1972	33,838,613 ³	24,075,000 ⁴	4,053,953	2,316,544	4,053,953	6,370,497

Sources:

¹ Texas Airport System Plan.

² Ethyl Corporation.

³ Texas Aeronautics Commission.

⁴ TTI Analysis. Data on the number of gallons of jet fuel used in general aviation in Texas are not reported. These estimates are based on data developed as part of the Texas Airport System Plan.

TABLE 8

CESSNA 172, FOUR SEAT LIGHT AIRCRAFT, FULLY LOADED

Assumptions: Altitude 5,000 ft. MSL, 2,450 RPM, no wind
 TAS 117 MPH/8.0 GPH = 14.625 MPG
 Automobile: 50 MPH, 14 MPG

From	To	Distance		Fuel Used		Time	
		Surface	Air	Surface	Air	Surface	Air
Austin	Beaumont	247	212	17.5	14.5	4:56	1:49
	Brownsville	331	311	23.5	21.3	6:37	2:39
	Dallas	202	186	14.4	12.7	4:02	1:35
	Del Rio	233	209	16.5	14.3	4:40	1:47
	El Paso	583	534	41.5	36.5	11:40	4:34
	Amarillo	485	426	34.5	29.1	9:42	3:38
	Odessa	339	297	24.2	20.3	6:47	2:32
	Texarkana	341	311	24.3	21.3	6:49	2:40
Houston	El Paso	743	676	53.0	46.2	14:52	5:47
Amarillo	Brownsville	784	706	56.0	48.3	15:41	6:02
Texarkana	El Paso	821	738	58.5	50.5	16:25	6:18

This is maximum normal cruise for this aircraft. It is not practical to try for greater speed, nor will a speed reduction significantly improve miles per gallon.

savings that might be realized through more efficient use of equipment are negligible. The only meaningful method to reduce fuel consumption is to reduce flights.

In contrast to automobile technology, aircraft and engine design improvements that would result in significant fuel economy improvements are not expected. Aircraft manufacturers have always been extremely weight conscience. Consequently, reduction in vehicle weight, the most important factor in increased fuel efficiency for automobiles, is not possible with general aviation aircraft.

Another consideration, from the State perspective, is that an 11 cents per gallon federal aviation fuel tax may preclude additional taxation at the State level. At the present time, a 5 cents per gallon tax is collected on aviation gasoline which is refundable upon application. About 60 percent of the taxes so collected are refunded. The unrefunded tax is divided, 75 percents to the Texas Aeronautics Commission and 25 percent to the Available School Fund. There is no State tax on turbine fuel. The State may, at some future time, wish to impose state aviation fuel taxes to assist with development of the State airport system. A high level of federal fuel taxes would make this more difficult.

VI. IMPACT OF INCREASED DEMAND FOR TRANSPORTATION OF COAL

According to Governor Birscoe's Washington Report of April 25, 1977, President Carter's energy program will require the importation to Texas of 150 million tons of coal per year by 1990.

Almost all of this coal will be used as steam boiler fuel for electric generating plants. Consequently, it can be anticipated that virtually all of this coal, which moves by rail, will move in unit trains. At present, the typical unit coal train consists of about 100 cars of 100 tons capacity each, similar to grain unit trains which have moved through Texas to Gulf Coastports for several years. If it is assumed that this unit train consist will prevail through 1990, then the arrival rate of unit coal trains at destination points in Texas would be 41 trains per day. Because these trains must return to the point of origin for reloading, and assuming that empty train consist does not change, the departure rate would also be 41 trains per day. It is reasonable to assume that the average length of haul, once inside Texas, will be 500 miles, and that 500 miles can be run in a 24-hour day. Therefore, at any one time, 81 extra train movements per day can be anticipated as required to move the entire 150 million tons per year of coal.

It should be emphasized that these 81 train movements will not appear overnight, but will increase gradually over a thirteen-year period. Even if all 81 were running today, they would represent only an 11 percent increase in daily train movements in Texas over those operated in 1955.

These train movements will not, however, be uniformly distributed over Texas. They will be concentrated on a few rail lines. It can be anticipated that the greatest demands for coal will be in the vicinity of Dallas/Fort

is a general business practice sanctioned by common law. There may have been justification for prohibiting railroads from engaging in this practice in the days when they were virtually the only means of long haul transportation, but with the growth of multi-modal competition, that justification is no longer valid. It is recommended that Texas urge the repeal of this Federal constraint upon railroad's contracting capability.

Public investment will be required as train density increases on some rail lines in order to minimize the safety and environmental impact upon the public. In particular, attention must be given to improving grade crossing protection on those lines where train density can be expected to increase as a result of coal movement.

Coal can also be delivered to Texas by coal slurry pipeline. Capacity of presently proposed coal slurry pipelines ranges from 15 million tons to 25 million tons annually. Coal slurry pipelines are a very specialized transportation device which may be best employed when large quantities of coal are to be moved from one point of origin to one or a few points of destination. At currently estimated tariffs, it appears that unless an annual volume of 15 million tons of coal is required at a particular destination, railroads will be a more economical transportation device. Above 15 million tons, coal slurry pipelines are advantageous. No coal transportation capacity by slurry pipeline presently exists in Texas.

It is likely that coal will be delivered to Texas by some mix of railroad and coal slurry pipeline transportation with railroads predominating. And, although transportation capacity is not likely to be an insurmountable problem, attention needs to be focused on the increased demands for upgrading railroads and building coal slurry facilities that are to be required. As presently proposed, the National Energy Plan is silent on this matter.

VII. STUDY OF THE NATIONAL ENERGY TRANSPORTATION SYSTEM

A specific item of the National Energy Plan is the establishment of a commission to complete a study by the end of 1977 to evaluate the demands upon the transportation network necessary to move to market the projected mix of energy supplies in 1985. Texas has a vital interest in such a study and its ensuing recommendations.

Oil and natural gas produced in Texas have historically moved from Texas to the North and Northwest by a well-developed system of pipe lines or by tanker from the Gulf Coast. Texas has satisfied its own large energy requirements from these internal resources. While Texas will continue to ship oil and natural gas to the North and Northeast, it will now have to satisfy some of its own energy requirements with externally-produced energy, principally coal. Also, oil and gas can no longer satisfy energy requirements nationally, and the nation must depend upon coal to a greater extent. Because of current environmental constraints, low sulfur Western coal is in greatest demand. As coal technology develops, it may be possible to substitute more Eastern coal for Eastern markets. Nevertheless, a reorientation of energy transportation routes will be required.

In the preparation of this study, the Texas Transportation Institute (TTI) at Texas A&M University could provide valuable inputs. Actively involved in transportation for over 20 years, TTI has also recently produced several energy studies of importance to the state and nation.

VIII. ENERGY EFFICIENCY STANDARDS FOR LIGHT-DUTY TRUCKS

Current law provides for the setting of energy efficiency standards for trucks weighing 10,000 pounds or less. The National Energy Plan establishes two categories of light-duty trucks: 1) under 6,000 pounds, and 2) 6,000 pounds to 10,000 pounds. As of yet, no preliminary standards have been mentioned, so an assessment of the likely effects of this provision at this time is not possible. However, some general comments about potentialities are relevant.

Pick-up trucks and vans are the bulk of the vehicle fleet comprising the under-6,000-pound weight class. So, any tax/rebate mechanism of this class of vehicles will affect commercial as well as personal and recreational activities.

PICK-UP TRUCKS

Pick-ups are a widely-used substitute for personal automobiles. For this segment of light-truck owners, then a tax/rebate mechanism will likely encourage adjustments toward energy-efficient vehicles--possibly toward automobiles. In their commercial and agricultural uses, however, pick-up trucks are needed for their payload delivery capacity. To the extent that the selected fleet efficiency standards and resulting vehicle sizes (the pick-up trucks might likely be smaller for economizing on weight) cause higher vehicle operating costs for service, commercial, and agricultural users, these costs will partially be passed on in higher prices of goods, food, fiber, and services.

VANS

Similarly, the market for light-duty vans contains an element of owners who are substituting van travel for personal auto travel. If the resulting

IX. DECONTROL OF RETAIL GASOLINE PRICES

The proposed decontrol of gasoline prices is likely to have little or no immediate effect upon retail sales of gasoline in Texas. Currently, prices at the pump are several cents per gallon below the authorized or controlled price. Consequently, there exists a fairly wide cushion to allow for price increases (due either to increased demands and/or increased costs of crude oil) to occur. The complicated retail price control and gasoline allocation regulations currently "on the books" have tended to distort unnecessarily--particularly since the mandated price ceilings have never been reached--the marketing of gasoline. Marketers, for example, have consistently claimed that the regulations have often forced them to buy gasoline at prices higher than those which could have been obtained in a competitive market.

As presently proposed, this element of the National Energy Plan contains the provision that the retail sales of gasoline (particularly the competition in the industry and retail prices) will be monitored during the peak driving period over the summer. At the end of that period, it is expected the price controls would be removed, in the absence of rapidly increased prices. As a further protection, some type of stand-by authority to re-impose price controls would be sought. Such an authority might be of some benefit if a drastic event, such as another foreign oil embargo, were to occur quickly.

Finally, the decontrol provision leaves the pricing and allocation of gasoline to be determined by market decisions. Removal of gasoline price ceilings is a necessary item in the National Energy Plan, since prices of crude oil and its derivatives will have to be increased in order to promote the desired conservation responses from the people.

X. SURVEY OF TRANSPORTATION INDUSTRY LEADERS

In connection with the 18th Transportation Conference sponsored by TTI and TAMU, representatives from Texas' transportation industry were queried about the effects of the proposed National Energy Plan upon transportation. A questionnaire was developed to pinpoint those transportation-related elements of the plan. A summary of the survey results and portions of the questionnaire are presented in the following pages.

A total of 54 persons participated in the survey. The distribution of their professional educational backgrounds is as follows:¹

Business Administration	30%
Civil Engineering	28%
Transportation-Related	9%
Law	4%
Economics	4%
Chemical Engineering	4%
Psychology	4%
Mechanical Engineering	2%
Electrical Engineering	2%
Marine Transportation	2%
Public Safety	2%
Education	2%
Not Specified	6%

All levels of organization management are represented in the survey.

The distribution of respondents by their major work responsibilities is:

Executive	54%
Managerial or Administrative	30%
Technical	16%

¹ Percentages may not total 100 because of rounding error.

GAS GUZZLER TAX AND REBATE

1. A decrease in petroleum consumption
2. An improvement in highway safety
3. A decrease in use of private automobiles for travel
4. A decrease in total automobile production and sales
5. A decrease in state highway tax revenues
6. A decrease in sales of large (heavy) automobiles
7. Improve the effectiveness of current automobile efficiency standards in reducing fuel consumption

	EXTREMELY UNLIKELY	MODERATELY UNLIKELY	SOMEWHAT UNLIKELY	NO EFFECT	SOMEWHAT LIKELY	MODERATELY LIKELY	EXTREMELY LIKELY	DON'T KNOW
1. A decrease in petroleum consumption	5%	13%	16%	11%	27%	13%	0%	0%
2. An improvement in highway safety	15%	8%	19%	36%	15%	8%	0%	0%
3. A decrease in use of private automobiles for travel	19%	11%	17%	24%	17%	9%	4%	0%
4. A decrease in total automobile production and sales	7%	16%	14%	29%	21%	11%	2%	0%
5. A decrease in state highway tax revenues	6%	6%	6%	18%	18%	27%	20%	0%
6. A decrease in sales of large (heavy) automobiles	2%	6%	2%	7%	39%	19%	26%	0%
7. Improve the effectiveness of current automobile efficiency standards in reducing fuel consumption	6%	6%	4%	12%	27%	25%	20%	0%

STANDBY GASOLINE TAX

1. A decrease in consumption of petroleum
2. An increase in costs of shipping freight
3. Pre-empt increase in highway tax revenues
4. Will be needed to decrease petroleum consumption
5. A decrease in vehicle miles of travel
6. A decrease in sales of automobiles

1. A decrease in consumption of petroleum	6%	19%	7%	19%	30%	13%	7%	0%
2. An increase in costs of shipping freight	0%	0%	0%	11%	11%	18%	60%	0%
3. Pre-empt increase in highway tax revenues	4%	6%	6%	6%	25%	21%	26%	8%
4. Will be needed to decrease petroleum consumption	20%	13%	17%	15%	11%	13%	11%	0%
5. A decrease in vehicle miles of travel	11%	6%	13%	21%	26%	21%	2%	0%
6. A decrease in sales of automobiles	5%	13%	11%	34%	18%	12%	4%	4%

REMOVAL OF THE 10 PERCENT EXCISE
TAX ON INTERCITY BUSES

1. A reduction in busline operating costs
2. A reduction in bus fares
3. An increase in the number of intercity bus passengers
4. A decrease in private automobile travel

	EXTREMELY UNLIKELY	MODERATELY UNLIKELY	SOMEWHAT UNLIKELY	NO EFFECT	SOMEWHAT LIKELY	MODERATELY LIKELY	EXTREMELY LIKELY	DON'T KNOW
1. A reduction in busline operating costs	2%	2%	6%	7%	52%	15%	17%	
2. A reduction in bus fares	27%	7%	22%	27%	11%	2%	4%	
3. An increase in the number of intercity bus passengers	7%	7%	17%	39%	24%	2%	4%	
4. A decrease in private automobile travel	10%	12%	14%	43%	22%	0%	0%	

TAX ON AVIATION AND MARINE FUELS

1. A decrease in use of general aviation
2. A decrease in pleasure-oriented marine travel
3. A decrease in production and sales of private aircraft
4. A decrease in production and sales of private boats
5. An increased incentive to adopt more energy-efficient engines

1. A decrease in use of general aviation	10%	10%	29%	29%	10%	6%	4%	
2. A decrease in pleasure-oriented marine travel	4%	15%	26%	37%	11%	2%	6%	
3. A decrease in production and sales of private aircraft	4%	11%	21%	34%	21%	4%	4%	2%
4. A decrease in production and sales of private boats	2%	10%	24%	37%	20%	2%	6%	
5. An increased incentive to adopt more energy-efficient engines	0%	4%	6%	15%	45%	19%	11%	

The transportation leaders were asked to indicate the degree to which they approved or disapproved of the individual conservation elements of President Carter's energy policy. The distribution of responses is as follows:

The effects will be much more severe on Texas transportation	39%
The effects will be somewhat more severe on Texas transportation	43%
The effects will be the same on Texas transportation as for the rest of the United States	13%
The effects will be somewhat less severe on Texas transportation	5%
The effects will be much less severe on Texas transportation	0%

In summary, the most significant findings of the survey are that approximately 65 percent of the transportation leaders expressed disapproval of the overall Carter program. Several of the leaders commented that the Carter program did not place enough emphasis on incentives to increase domestic energy sources. Fifty-two percent of these leaders opposed the provisions of the Plan for a gas-guzzler tax, and 62 percent opposed the standby gasoline tax. On the other hand, 75 percent of the leaders support the automobile efficiency standards in the Carter Plan, 63 percent support the proposal for strict adherence to the 55 MPH speed limit, and 62 percent support the proposed efficiency standards for light-duty trucks. Opinions regarding the removal of the 10 percent excise tax on intercity buses and an increase in the taxes on general aviation and marine fuels were about equally distributed between approval and disapproval.

Perhaps the most important statistic in the survey is that 82 percent of the transportation leaders expressed the opinion that the impact of the Carter Energy Plan will be more severe on Texas than on the rest of the U.S.

XI. IMPACT ON TEXAS TRANSPORTATION RELATIVE TO U.S. TRANSPORTATION

Unlike the differential effects of the proposed oil and gas policies upon Texas vis-à-vis the rest of the U.S., the relative transportation effects of the National Energy Plan are less obvious. There are, however, some things that should be accounted for in drawing such a comparison. These include tax revenue policy alternatives, federal-state revenue contributions, and facilities for the transportation of energy.

TAX-REVENUE POLICY ALTERNATIVES

The imposition of the fuel economizing incentives in the National Energy Plan will reduce the quantities of gasoline and aviation fuel sold. In Texas, the state levies a tax per gallon on these fuels. If the stand-by gasoline tax (federal) and the aviation fuel tax (federal) are imposed, then the fiscal flexibility of the State to recoup lost revenues is somewhat pre-empted. In Texas, this is of particular importance since the state gasoline tax (5¢/gallon) is the lowest of any state in the U.S. A portion of the aviation tax, as mentioned previously, in Texas provides financing for airport planning and development. Future state funding for highway maintenance and/or airport development may suffer disproportionately as a result of these two taxes in the National Energy Plan.

FEDERAL-STATE REVENUE CONTRIBUTIONS

If a substantial part of the National Energy Plan, especially the gas guzzler tax and/or the stand-by gasoline tax are enacted, Texas highway revenues from the state gasoline tax and the federal gasoline tax would be

ENERGY TRANSPORTATION FACILITIES

Although precise estimates cannot yet be made, there appears to be a likely and significant shift in the transportation of energy in Texas. First of all, the thrust of the National Energy Plan is to increase net exports of energy (chiefly oil and gas) from Texas to other parts of the U.S. A parallel thrust of the plan is, through the conversion of utilities from gas to coal, to increase the importation of coal into Texas.

Since Texas has long been a provider of energy to its sister states and in the process has developed the expensive and highly complex network of rail, pipelines, and port facilities, the U.S. should be prepared to assist in easing any burdens that a shift away from these facilities might impose. At the same time, Texas is likely to require proportionately more new transportation facilities and upgrading (see previous sections) of existing ones to provide for the expanded coal movements, whether by pipeline slurry or unit trains.

BIBLIOGRAPHY

Data Resources, Inc.

- 1973 A Study of the Quarterly Demand for Gasoline and Impacts of Alternative Gasoline Taxes. Unpublished study prepared for the Council on Environmental Quality.

Executive Office of the President

- 1977 The National Energy Plan. Washington, D.C.: Executive Office of the President.

Federal Energy Administration

- 1974 Project Independence. Washington, D.C.: U.S. Government Printing Office. (November, 1974).

Gapay, Les

- 1977 "Energy Program Not So Tough After All," Wall Street Journal: Tuesday, May 3.

Horning, Roberta

- 1977 "Carter's Economic Advisors Can't Gauge Gas Price Increase." Houston Chronicle: Sunday, May 15. Section 1, page 19.

McFarland, William F., Kay Smith, Theron Fuller, and Dock Burke

- 1975 State Revenue Scenarios for Different Economic Conditions and Taxation Policies. Texas A&M University: Texas Transportation Institute.

McKinsey and Company

- 1976 Responding to the Changing Environment. A report prepared for the State Department of Highways and Public Transportation. Dallas, Texas: McKinsey and Company, Inc.

Texas Transportation Institute

- 1973 Fuel Conservation In Texas: Transportation. Interim report prepared for the Governor of Texas. Texas A&M University: Texas Transportation Institute.

Thompson, Russell G.

- 1975 Relationships Between Supply/Demand and Pricing for Alternative Fuels in Texas: A Study in Elasticities. Report prepared for the Governor's Energy Advisory Council of Texas (January, 1975).

Wildhorn, Sorrel, Burke K. Burright, John H. Enns, and Thomas F. Kirkwood

- 1974 How to Save Gasoline: Policy Alternatives for the Automobiles. Santa Monica, California: Rand Corporation. Report R-1560-NSF.