Fall 1979

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The Energy Tax Act of 1978[1] amends the Internal Revenue Code of 1954[2] (IRC) in several ways to provide tax incentives for actions that would conserve energy or substitute alternative sources of energy for oil and gas. The act provides for a residential energy credit, a "gas guzzler" tax, subsidization of "gasohol" manufacture and use, reduced excise taxes on buses, and incentives for van pooling in transporting persons to work. It also provides for changes in the investment tax credit to promote conservation, and introduction of percentage depletion and the expensing of intangibles[3] in connection with the production of geothermal energy. This article reviews the major provisions of the act with sufficient detail to indicate their main thrust. It concludes with a discussion of the general economic implications of the act.

MAJOR PROVISIONS OF THE ACT

Title I—Residential Energy Credit

Section 101 of the act adds Section 44c to the IRC,[4] which provides, for individuals, a credit against income tax for (1) "qualified energy conservation expenditures" and (2) "qualified renewable energy source expenditures."[5] For the former, the credit is 15 percent of the expenditure, up to a maximum expenditure of $2,000 in a tax year; for the latter the credit is 30 percent of expenditure up to $2000, plus 20 percent of expenditure greater than $2,000 and no more than $10,000 in the tax year. Creditable expenditures in a given year are reduced by creditable expenditures in prior years on the same residence.[6] An "energy conservation expenditure" means an

expenditure on or after April 20, 1977 by the taxpayer for insulation or other energy conservation component (such as a thermal window) installed in a dwelling used by the taxpayer as his principal residence. A "renewable energy expenditure" means an expenditure on or after April 20, 1977, by the taxpayer for a renewable source property (a property which transmits or uses solar energy, geothermal energy or wind energy) installed in connection with a dwelling used as the taxpayer's principal residence.[7] Since swimming pools are not considered used for residential purposes under the act an otherwise qualified expenditure to heat a pool would not entitle a taxpayer to a credit.[8] Residents may claim proportionate shares of expenditures by groups of taxpayers in cooperative housing corporations and condominiums.[9] To qualify for credit an expenditure must be made on or before December 31, 1985.[10]

Title II—Transportation

Section 201 of the act adds a new section, Section 4064,[11] to the IRC which provides for a "gas guzzler" tax. The tax is based on the fuel economy of automobiles, measured in miles per gallon by procedures established by the Environmental Protection Agency (EPA) Administrator for the model year 1975 (assuming 55 percent urban driving and 45 percent highway driving).[12] The tax increases with decreasing fuel economy. The following table (Table I) does not give the complete tax schedules for different model years, but it does give the miles per gallon range and the corresponding range of the tax.[13]

The tax is levied on the sale by the manufacturer of each automobile. For purposes of the tax an automobile is defined as a four-wheel vehicle propelled by fuel. The vehicle must be made primarily for use on streets and highways and rated at 6,000 pounds gross weight or less.[14] Vehicles designated as non-passenger by the Secretary of Transportation, and emergency vehicles (ambulances, police cars or cars in other emergency uses as prescribed by the Secretary) are not subject to the tax.[15] The Secretary may prescribe special tax rate schedules for small manufacturers of automobiles (those producing fewer than 10,000 cars per year).[16] In the case of auto-

7. 26 U.S.C.A. §44C(c)(2) (1978).
8. 26 U.S.C.A. §44C(c)(2)(C) (1978).
9. 26 U.S.C.A. §44C(d)(2)-(3) (1978).
10. 26 U.S.C.A. §44C(F) (1978).
11. 26 U.S.C.A. §4064 (1978).
12. 26 U.S.C.A. §4064(c)(1) (1978).
13. 26 U.S.C.A. §4064(a) (1978).
14. 26 U.S.C.A. §4064(b)(1)(A) (1978).
15. 26 U.S.C.A. §4064(b)(1)(B)-(C) (1978).
16. 26 U.S.C.A. §4064(d) (1978).

TABLE I

Model year	Miles-per-gallon range	Tax range
1980	15 or above– less than 13	0– $550
1981	17 or above– less than 13	0– $650
1982	18.5 or above– less than 12.5	0– $1,200
1983	19 or above– less than 13	0– $1,550
1984	19.5 or above– less than 12.5	0– $2,150
1985	21 or above– less than 13	0– $2,650
1986 or later	22.5 or above– less than 12.5	0– $3,850

mobiles leased by the manufacturer, the first lease shall be considered a sale and the tax shall be payable in installments proportionate to the ratio of periodic lease payments to the total payments to be made.[17]

Section 221[18] of the act adds subsection (c) to Section 4081[19] of the IRC. The new subsection exempts certain alcohol mixtures from the tax of four cents per gallon for gasoline sold by the producer or importer thereof (to be reduced to one and one-half cents per gallon on October 1, 1979).[20] Exemptions include sales of any gasoline or other liquid fuel, in a mixture with alcohol or for use in producing such a mixture. The mixture must be at least 10 percent alcohol, which is defined as methanol or ethanol, not including alcohol produced from petroleum, natural gas or coal.[21] The exemption is to apply within the dates of December 31, 1978 to October 1, 1984.[22]

Section 222 of the act,[23] referring to Section 6421 of the IRC,[24] which provides for certain refunds of the gasoline tax, denies credit or refunds to taxpayers for nonbusiness, non-highway uses of gasoline, special motor fuels and lubrication oil (e.g., use in a personal motorboat).[25]

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17. 26 U.S.C.A. § 4217(e) (1978).
18. Pub. L. No. 95-618, § 221, 92 Stat. 3185 (1978).
19. 26 U.S.C.A. § 4081(c) (1978).
20. 26 U.S.C.A. § 4081(c)(1) (1978).
21. 26 U.S.C.A. § 4081(c)(1) and (3) (1978).
22. Pub. L. 95-618, § 221(c)(2), 92 Stat. 3185 (1978).
23. Pub. L. 95-618, § 222, 92 Stat. 3186 (1978).
24. 26 U.S.C.A. § 6421 (1978).
25. 26 U.S.C.A. § 6421(3)(B) (1978).

Sections 231 and 232[26] of the act, referring to Sections 4061 and 4063 of the IRC,[27] remove the 10 percent excise tax on buses and the eight percent excise tax on bus parts. Section 233 of the act,[28] referring to Sections 6421, 6424 and 4221 of the IRC,[29] removes excise taxes on fuel, oil and tires used in connection with intercity, local and school buses.

An incentive for van pooling in the transportation of persons to and from work by their employers is provided in Section 241[30] of the act. Referring to Section 46 of the IRC,[31] which provides for an investment tax credit, the act allows a credit of 10 percent of full cost for commuter highway vehicles with a useful life of three years or more.[32] Such vehicles must have a seating capacity of at least eight adults in addition to the driver, and at least 80 percent of their mileage must be for transporting taxpayers' employees from home to work or on business trips.[33] To insure employees will not have increased personal tax liability on account of employer-furnished transportation, Section 242 of the act[34] provides that the value of such transportation is not to be included in the employee's gross income. In furnishing transportation, employers may not discriminate in favor of officers, shareholders or "highly compensated" employees and must provide transportation in addition to, and not as part of, regular compensation.[35]

Title III—Changes in Business Investment Credit

Section 301 of the act,[36] which amends Section 46 of the IRC,[37] provides the amount of the investment tax credit in a taxable year shall be the sum of the following percentages of a qualified investment: (1) the regular percentage, (2) the energy percentage (in the case of an "energy property" defined below) and (3) the Employee Stock Ownership Plan (ESOP) percentage. The regular percentage is 10 percent from January 21, 1975 to December 31, 1980, and seven percent thereafter. The energy percentage is 10 percent from Oc-

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26. Pub. L. 95-618, § § 231-232, 92 Stat. 3187-3189 (1978).
27. 26 U.S.C. § 4061 (1976) and 26 U.S.C.A. § 4063 (1978).
28. Pub. L. 95-618, § 233, 92 Stat. 3190 (1978).
29. 26 U.S.C.A. § § 4221, 6421, 6424 (1976).
30. Pub. L. 95-618, § 241, 92 Stat. 3192 (1978).
31. 26 U.S.C.A. § 46 (1976).
32. Otherwise the credit could be as little as 10 percent of one-third of the cost. 26 U.S.C. § 46(c)(2) (1976).
33. 26 U.S.C.A. § 46(c)(6) (1978).
34. Pub. L. 95-618, § 242, 92 Stat. 3193 (1978).
35. 26 U.S.C.A. § 124 (1978).
36. Pub. L. 95-618, § 301, 92 Stat. 3194 (1978).
37. 26 U.S.C.A. § 46(a) (1978).

tober 1, 1978 to December 31, 1982 and zero thereafter. The ESOP percentage is one percent from January 21, 1975 to December 31, 1980, plus an additional one-half of one percent from January 1, 1977 to December 31, 1980 if allowed by Section 301(e) of the Tax Reduction Act of 1975.[38]

For purposes of the energy credit, an "energy property is:

1. An alternative energy property (generally a property using fuels or forces other than oil or gas).
2. A solar or wind energy property if used to generate electricity or to heat or cool.
3. A specially defined energy property such as a heat exchanger.
4. Recycling equipment used to recycle solid waste.
5. Shale oil equipment for use through the retorting stage.
6. Equipment for producing natural gas from geopressurized brine.[39]

The energy percentage is reduced to five percent if the property in question is financed wholly or in part by tax-exempt industrial development bonds. The tax credit is denied to air conditioning and space heaters and to boilers fueled by oil or gas.[40]

Title IV—Miscellaneous Provisions

Section 402 of the act,[41] amending Section 263 of the IRC,[42] allows taxpayers the choice of expensing (rather than amortizing) the intangible drilling and development cost of wells drilled to a geothermal deposit.[43] Expensed intangible costs are a "preference item" for purposes of the minimum tax, and for these purposes are treated like those in the oil and gas industry. Under provisions of the Tax Reduction and Simpliciation Act of 1977,[44] oil and gas intangible costs are preference items to the extent that *excess* intangibles exceed oil and gas net income, and *excess* intangibles are the amount by which intangible costs exceed what would have been allowed by straight-line depreciation.

Section 403 of the act[45] amends Section 613 of the IRC[46] to permit percentage depletion for geothermal deposits exploited in the United States or a possession at the following rates:

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38. 26 U.S.C.A. §46(a)(2) (1978). The Tax Reduction Act of 1975 is Pub. L. No. 94-12, 89 Stat. 26 (1975).
39. 26 U.S.C.A. §48(1)(2) (1978).
40. 26 U.S.C.A. §48(a)(1) (1978).
41. Pub. L. 95-618, §402, 92 Stat. 3201 (1978).
42. 26 U.S.C.A. §263(c)(1) (1978).
43. See definition, *supra* note 3.
44. Pub. L. No. 95-30, 91 Stat. 126 (1977).
45. Pub. L. 95-618, §403, 92 Stat. 3203 (1978).
46. 26 U.S.C.A. §613(e) (1978).

Year	Rate
1978, 1979, 1980	22%
1981	20
1982	18
1983	16
1984 and thereafter	15

The percentage depletion allowance is found by multiplying the above rates by the gross value of geothermal brines at the wellhead. A geothermal deposit is defined in the act as "a geothermal reservoir consisting of natural heat which is stored in rocks or in an aqueous liquid or vapor (whether or not under pressure)."[47] Natural gas extracted from geopressured brine is allowed percentage depletion by the act at the rate of 10 percent of gross value (if the necessary drilling occurs between September 30, 1978 and December 31, 1983).[48]

ECONOMIC ANALYSIS OF THE ACT

General Considerations

The Energy Tax Act of 1978 uses tax incentives to try and induce private actions that might have been left to the inducements of free market prices. It is commonly argued by economists that in a world of reasonable competition and foresight and in the absence of significant externalities, the price system tends to produce an efficient allocation and use of resources, including energy resources. In such a world private costs and benefits tend to coincide with social costs and benefits. Consequently, when individuals take an action such as investing in an energy saving property, because individual benefits promise to exceed individual costs, the action is of net benefit in a social sense as well. But with special tax incentives, such as those provided in the act, private costs and benefits become different from social costs and benefits, and what is now profitable to the individual is not necessarily beneficial to society. Thus, if a tax incentive lowers the private cost of an energy saving device, individuals will push investment in the device to the point where marginal private cost equals marginal private benefit, but beyond the point where marginal social cost equals marginal social benefit. Consequently, society is harmed by the special tax incentive. All this is familiar ground to the economist analyzing the effects of subsidies, tax expenditures and differential taxation.

The question, then, is whether there are externalities or failures of competition of foresight, or some other special consideration, that

47. 26 U.S.C.A. § 613(e)(3) (1978).
48. 26 U.S.C.A. § 613A(b)(2) (1978).

would justify one or more of the tax incentives in the act. Before discussing this question in connection with several provisions of the act we must dismiss two common misconceptions in relation to the energy problem.

First is the idea that energy is uniquely scarce, and that this justifies extraordinary measures to conserve it and to develop new sources. This idea stems from the fact that fossil fuels are limited in amount and are not renewable. The truth is that our total energy supply, including solar energy, still is quite abundant relative to our uses of it, and that a large component of the total supply is renewable. Our problem is how we can efficiently use the energy available to us, how we can efficiently change from reliance on fossil fuels to reliance on renewable energy sources. What is important is that each step we take yields benefits that exceed costs. Precisely for this reason, prices should be free to respond to relative scarcities and government generally should not distort price incentives with special tax incentives.

The second misconception is that we must hold down effective energy prices in the interest of reducing inflation. While it is tautologically true that if the dollar price of a commodity rises and other dollar prices remain constant, the general price level must rise, it does not follow that rising energy prices necessarily entail inflation. With appropriate monetary-fiscal restraints on aggregate demand we can have a stable general price level while the price of energy rises (and some other prices fall). What is important in any case is that the *relative* price of energy (or of any other commodity) be free to reflect its relative scarcity, so we are induced to use it efficiently. We cannot justify special tax incentives on the mistaken ground that relying on price incentives necessarily would involve further or faster inflation.

Perhaps we can justify special tax incentives when externalities are present; that is, where prices do not fully reflect social costs or benefits. Such an externality may exist in connection with our growing reliance on Middle East oil. Artificially high as the Organization of Petroleum Exporting Countries price may be, it may not reflect fully the military and economic cost to us of the risk that Middle East oil may be denied us. We may be justified in trying to promote less reliance on such oil than its price would induce. It would seem, however, that the proper approach to this problem is to raise the price of imports, by a tariff[49] or other means, and to allow the

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49. The proceeds f the tariff could be used to make per capita rebates to low-income consumers or to build emergency reserves of oil or both.

domestic price to rise accordingly, rather than to lower the effective cost of some domestic substitute for oil by a percentage depletion allowance. If Middle East oil is more costly than its price indicates, its effective price to us should rise relative to all other prices, not only in relation to some substitute for oil such as geothermal energy.

With these general considerations noted, let us now turn to the several types of special tax incentives offered in the Energy Tax Act of 1978.

The Residential Energy Credit

The credit in question lowers the effective private cost of investments designed to conserve energy or increase use of renewable sources of energy such as solar energy. Of course, it does not lower the social costs of such investments. Our previous analysis accordingly would suggest that the credit will induce an inefficient use of resources; it will induce too much investment in conservation and substitution, as the investment is pushed beyond the point where marginal social benefit equals marginal social cost. The appropriate amount of investment would occur if the prices of conventional forms of energy were free to reflect their relative scarcity. As conventional fuels rise in relative price, as they are almost sure to do for the foreseeable future, solar energy and the like will be used in their own good time.

In support of the tax credit, it may be argued that unconventional sources like solar energy are relatively new and untried; that demonstration effects would speed sound development; and that the industries supplying equipment and installation are not mature and cannot price on the basis of high volume. Therefore, some initial artificial inducement may result in a more efficient use of resources in the long run. This is similar to the infant industry argument for a protective tariff;[50] it has some merit, but carries the risk that the special incentive will continue long after it has served its purpose.

Transportation

Perhaps the most dramatic of the special incentives provided under the heading of transportation is the "gas guzzler" tax. The schedule of taxes creates two kinds of incentive. First is the incentive for automobile manufacturers to increase the gasoline efficiency of their product to hold down the effective price per car. The manufacturer leading the race for greater efficiency will gain a competitive advantage in the retail market. Second is the incentive to consumers to

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50. For example, see P. SAMUELSON, ECONOMICS 701-702 (10th ed. 1976).

purchase cars that yield greater gasoline efficiency. If General Motors, say, offers a line of cars in 1986 with an efficiency range of 12.5 to 22.5 miles per gallon, the consumer can save up to $3,850 by opting for the more efficient cars on the line.

This second incentive is especially powerful in comparison with a rise in the price of gasoline, as the following calculation will show. Suppose the useful life of a car is five years and the owner drives 10,000 miles per year. At an average of 12.5 miles per gallon, the owner will purchase 800 gallons of gasoline per year; at 22.5 miles per gallon, 444 gallons per year, an annual saving of 356 gallons. The saving of the gas guzzler tax resulting from choosing the car that gets 22.5 miles per gallon is $770 per year (ignoring interest). Accordingly, the price of gasoline would have to be about $2.15 per gallon (770/366) for the owner to save on gasoline as much as he would save on the gas guzzler tax by buying the automobile with 22.5 miles per gallon efficiency.

Application of our earlier general analysis suggests that the gas guzzler tax will make automobiles "too efficient" by 1986. The purchaser of an automobile looks for several qualities other than gasoline economy: passenger and luggage capacity, riding comfort and safety features, to name three. By providing a powerful incentive for only one quality, the tax will produce greater gasoline efficiency at the expense of other qualities, and cause the buyer to enjoy fewer satisfactions than otherwise might be the case. It would be better to free oil prices, allowing the price of gasoline to reflect its full marginal cost, including the externality already discussed, and thereby provide the "correct" incentive to fuel economy.

Much the same thing can be said for the other transportation incentives provided in the act: the subsidy to "gasohol,"[51] repeal of the excise taxes related to buses and encouragement of van pooling. In each case, the substitution induced will be pushed beyond the point where social marginal benefit is equal to social marginal cost. Again, the correct approach is to internalize the external cost of uncertain Middle East supply and to free oil and gasoline prices from regulation.

Changes in the business investment credit

The act also provides an energy tax credit to cheapen the effective cost of certain installations that conserve energy or substitute renew-

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51. It is noteworthy that much of the pressure to encourage the use of "gasohol" comes from farm interests who wish to expand the demand for grains and other farm-produced sources of alcohol.

able for nonrenewable energy sources. The effect is to lower private costs relative to social costs, and to induce more of the desired investment than otherwise would take place (and than is economically sound). However, much the same argument may be made as was stated above in connection with the residential credit: it may be that ignorance or other competitive imperfection, including imperfection of capital markets, supports the use of a subsidy for a time to introduce a new technology of energy production or use. The energy credit does have a cut-off date of December 31, 1982. With such a cut-off date, if it is observed, the energy credit on balance may be useful and sound.

Miscellaneous provisions

Under this heading the act allows the option of expensing the intangible costs of productive geothermal wells,[52] and for percentage depletion in the production of geothermal fluids and the extraction of natural gas.[53] The percentage depletion rates applying to geothermal fluids are the same as those applying to limited quantities of oil and gas owned by independent producers and royalty owners under the Tax Reduction Act of 1975.[54] The effect is to reduce the effective income tax rate of the producers of geothermal energy, and thereby make such energy more competitive relative to energy derived from oil and gas or coal.

Generally, economists condemn percentage depletion allowances and intangibles expensing as subsidies which distort the allocation of resources and harm society. Under this view it would be better to have no such tax provisions for any energy source, and to allow the energy industries to compete with other industries and with each other for labor, capital and markets. With some qualification, the present writer sympathizes with this view.[55] However, it is possible to argue that if other sources of energy—coal, shale oil and part of oil and gas—enjoy special tax privileges that are denied to geothermal energy production, then too little geothermal energy production will occur. We could get a better allocation of resources *within* the energy sector, if not between it and other sectors, if all energy sources are treated in a similar manner. If this is correct, then we may be somewhat better off by extending expensing and depletion privileges to

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52. 26 U.S.C.A. § 263(c) (1978).
53. 26 U.S.C.A. § 613(e) (1978).
54. 26 U.S.C.A. § 613A (1975).
55. *See* McDonald, *Taxation System and Market Distortion,* ENERGY SUPPLY AND GOVERNMENT POLICY 27-50 (R. Kalter & W. Vogely eds. 1976).

geothermal energy production. Such privilages also may help in carrying a new industry through a start-up stage—the infant industry argument again—when uncertainty will be great and costs higher than in the long run.

SUMMARY AND CONCLUSIONS

The act provides a wide range of special tax incentives designed to encourage conservation and the substitution of new energy sources for oil and gas. The incentives undoubtedly will have some of the desired effects, but at the cost of some allocative inefficiency. They will probably make us worse off when compared to a condition of tax neutrality and free oil and gas prices. Ideally, we should internalize the external cost of insecure supply in the case of oil and allow free oil and gas prices to provide the incentives to conserve oil and gas and develop other energy sources. There may be, however, some extenuating circumstances relating to competitive imperfections that would justify some temporary special tax treatment of renewable energy sources.