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"Big Oil" at the Public Trough?
An Examination of Petroleum Subsidies

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Executive Summary

Critics of the oil industry allege that the industry receives large and unwarranted government subsidies and that rival technologies, such as those for ethanol, renewable energy, and energy efficiency, deserve compensating government preferences. The evidence indicates that, on balance, the oil industry is not a net beneficiary of government subsidies. The facts point in the opposite direction. The oil industry is more harmed than helped by government intervention in energy markets.

Special tax deductions, direct expenditures, net excise taxes, and research and development expenditures are constantly targeted by oil critics. However, those subsidies are a small share of oil revenues and far less generous than the preferences and subsidies provided for rival businesses and technologies such as mass transit and alternative fuels. Moreover, most energy subsidies are wealth transfers that do not significantly distort energy prices or affect energy markets.

The contention that oil consumers do not pay their fair share of the environmental and national defense costs they impose on society is dubious. There is little evidence to suggest that the environmental externalities imposed by oil consumption exceed the taxes and regulatory costs paid by consumers. The contention that national defense costs would be lower if domestic oil consumption were taxed is also not supported by the evidence.

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Introduction

The contention that the oil industry receives large government subsidies has a long history. The ethanol lobby justifies government preferences largely by decrying the market-distorting subsidies supposedly provided the oil industry. The environmental community raises the issue in an effort to justify increasing subsidies to "green" technologies. Oil's competitors and their advocates justify government help by calling for a "level playing field" between industries, a playing field that can supposedly be created only by offsetting one set of subsidies with another.[1]

The alleged oil subsidies at issue fall primarily into three categories. First, there are tax provisions: the depletion allowance and deductions for intangible drilling costs and enhanced oil recovery.[2] Second, indirect subsidies in the form of defense expenditures for the Middle East, the Alaskan pipeline, and the Strategic Petroleum Reserve are substantial and not reflected in oil prices. Third, there are environmental costs to oil consumption (primarily air pollution and global warming) that are not fully reflected in the price consumers pay for petroleum-based products. Because it does not act to "internalize" within oil prices the cost of the environmental externalities imposed by oil consumption, government is alleged to subsidize the oil industry indirectly.

Studies of energy market programs, including subsidies, focus on one of two questions: (1) How large are the government subsidies to and charges on various forms of energy? (2) Are those subsidies and charges at the appropriate level?

Relatively recent studies by Greenpeace and the Alliance to Save Energy are typical of the literature. According to Greenpeace, the oil industry received net government subsidies of from $15.7 billion to $35.2 billion, including defense subsidies, in 1995.[3] The ASE quantifies the environmental externality of oil consumption and recommends a 22.7 percent tax on oil. That tax would "get the prices right" and thereby solve the global warming problem at no cost.[4]

Both the Greenpeace and the ASE calculations, however, ignore the many burdens placed on oil production and use. Those burdens include Superfund taxes, road fuel use taxes, and many environmental regulations. An honest accounting demands that burdens be given as much analytic attention as positive subsidies.

The Anatomy of Energy Subsidies

Accounting data, such as government budget data, are typically used to measure energy subsidies. Using those accounting measures poses conceptual difficulties; a cautious interpretation of subsidies is in order.

A Definition of "Subsidy"

The classic definition of "subsidy" is a government action that bestows an economic benefit on a special-interest group, or economic sector, with the objective of encouraging certain economic behavior.[5]

The first defining characteristic of a subsidy, then, is that it results from a government action. Such action can be triggered by virtually any piece of legislation or regulatory initiative.[6]

The next defining characteristic of a subsidy is that it bestows an economic benefit on the recipient. Subsidies, however, can include programs other than direct monetary transfers from the government. For instance, an industry may receive favored tax treatment relative to comparable industries. The impact of such treatment is similar to that of a direct monetary transfer. Conversely, tax laws can penalize an economic unit if that unit is subject to higher taxes than comparable economic units. The effect is a negative subsidy.

Regulation may also provide a subsidy. For instance, the Price-Anderson Act encourages the development of nuclear power by limiting the liability of a plant owner in case

of a large nuclear accident.[7] This law is an important subsidy to nuclear power, although no monetary transfer occurs. Regulation may, on the other hand, impose a negative subsidy by requiring firms to expend additional resources. For example, health, safety, and environmental regulations impose costs but may also produce benefits.

Furthermore, a subsidy may affect a specific fuel or technology rather than energy markets in general. The impact on submarkets could distinguish energy subsidies from other energy policies. However, the complication is that all government actions have disproportionate effects on some segments of energy markets. Specific sectors receive benefits (or pay costs) even when the policy is not intended to subsidize.

In sum, subsidies may be direct or indirect, positive or negative. A subsidy for one technology discriminates against competing technologies. A subsidy may result in the favored technology's being a "winner"; however, the technology locked out of the market might have been preferable. Accounting measures of subsidies do not capture such market distortions.

The last defining characteristic of a subsidy is the intention to encourage specific economic behavior. The underlying rationale for an energy subsidy is to encourage the development of a fuel or technology that private markets neglect but that is in the public interest.

A subsidy is properly thought of as a kind of government action. However, it is sometimes defined to encompass all energy policy interventions. For instance, the definition of "subsidy" used by Greenpeace—"Subsidies represent government policies that benefit particular sectors of the economy"[8]—could be used to describe any government intervention in energy markets. The definition used by the Energy Information Administration—"government actions which had as their function alteration of energy markets by benefiting some group of producers or consumers"[9]—suffers from the same problem. My intention is not to criticize the EIA or Greenpeace; indeed, their definitions of "subsidy" are representative of the larger public policy literature. The point is simply that energy subsidies are difficult to define in terms of properties that are different from those of other energy policy actions. As we shall see, subsidies are even more difficult to measure.

Equity and Efficiency Implications of Subsidies

Subsidies can have equity effects or efficiency effects, or both. That is, subsidies may affect the distribution of wealth within society and the efficiency of economic activity. The effects may be positive or negative, minor or major, direct or indirect, intended or unintended. Policy analysts who wish to inform the public debate must consider equity and efficiency effects independently because each effect is important.

Subsidies may affect the distribution of wealth within society and the efficiency of economic activity.

Efficiency issues, however, are most prevalent in the energy subsidy debate. Most criticisms of subsidy heard today imply that public policy produces an inefficient level and composition of energy use.

Economic theory allows for conditions in which unregulated private markets provide too little or too much of some goods. If private markets undervalue an economic activity, then a government subsidy could enhance economic efficiency. Likewise, if private markets overvalue an economic activity, then a tax could enhance economic efficiency. However, if private markets correctly value an economic activity, then a government subsidy distorts resource use and produces inefficiency. Such inefficiencies are termed "nonmarket failures" by Charles Wolf;[10] others more bluntly term them "government failures."

The main economic question about subsidies, then, is whether they reduce a market failure or impose a government failure. Addressing the question requires a complex policy analysis. In the absence of such an analysis, we cannot determine whether subsidies are market distorting or market enhancing.

"Equity" refers to the distribution of benefits and costs. Virtually all government

actions produce equity effects, because government programs produce both winners (the beneficiaries of the action) and losers. The losers include those not benefited or even those punished by government action as well as those who pay the taxes or regulatory costs to secure benefits for others. Judging whether equity effects are favorable or unfavorable is a separate issue. Equity effects are not unambiguously good or bad. One concern here is the extent to which energy programs have equity effects without altering efficiency.

While economists are concerned chiefly with the economic efficiency of government interventions, politicians and policy activists are concerned chiefly with the equity effects of governmental interventions, especially when the issue is subsidy. For instance, the moniker "corporate welfare" is often derisively marshaled by those who generally do not oppose welfare in principle. They do, however, oppose welfare for the better off. The argument is grounded in a concern about equity. Moreover, the public appears to be more concerned about the "fairness" of governmental policy (the equity effect) than about its efficiency effects.

Market agents frequently adjust to the existence of subsidies so as to shift the ultimate cost or benefit of the subsidy from the intended to unintended parties.

Initial and Ultimate Effects of Subsidies

Although promoters of subsidies may intend one set of effects on production and consumption, market agents frequently adjust to the existence of subsidies so as to shift the ultimate cost or benefit of the subsidy from the intended to unintended parties. In fact, subsidies generally have such complex effects on the economy that examination of outlays provides only fragmentary and incomplete information. Because of this, taxation analysts distinguish between the *incidence* of a tax and the *ultimate burden* of a tax. That distinction is particularly important for measuring energy subsidies.

Consider a tax on retail sales. The initial incidence falls on the retailer. However, the retailer typically adds the tax to the sales price, and most of the burden shifts to customers. The retailer becomes the government's tax collector. Consumers respond to the sales tax in part by paying it and in part by attempting to avoid it. Avoidance measures include shopping in a no-tax region, shopping on the Internet, shifting purchases to nontaxed goods, and perhaps reducing consumption and increasing saving. Each of those avoidance efforts shifts part of the burden back to the retailer in the form of diminished sales. Further, data on sales tax receipts underestimate the cost to producers and consumers because the data do not reflect the lost value of diminished purchases.[11]

The distinction between the initial incidence of a tax and its ultimate burden is particularly applicable to tax allowances for energy. A tax allowance (termed a "tax expenditure" by economists) results in a reduced tax rate for certain goods and services vis-à-vis that paid by consumers of competing goods and services. Such disparities inevitably trigger complex market adjustments of the kind observed in consumer reaction to sales taxes.

Moreover, the benefits bestowed by subsidies are reduced by competition and captured, in part, by others, primarily consumers. If the initial subsidy lowers costs to the producer, those lower costs may translate into reduced market prices that benefit consumers. Most subsidy studies ignore the allocation of subsidies between producers and consumers, because accounting data cannot make that distinction.[12]

Estimating Energy Industry Subsidies

A 1999 report by the EIA summarizes the direct and indirect federal subsidies for energy using accounting data.[13] The report provides a useful taxonomy of subsidies.

Table 1 summarizes the EIA estimates of federal energy subsidies. Total energy subsidies were $6.2 billion, about 1 percent of total energy expenditures, in 1999.[14]

Figure 1 shows the magnitude of energy subsidies for each fuel source. The data in the figure clearly show that the oil industry receives less real subsidy than any other fuel industry.

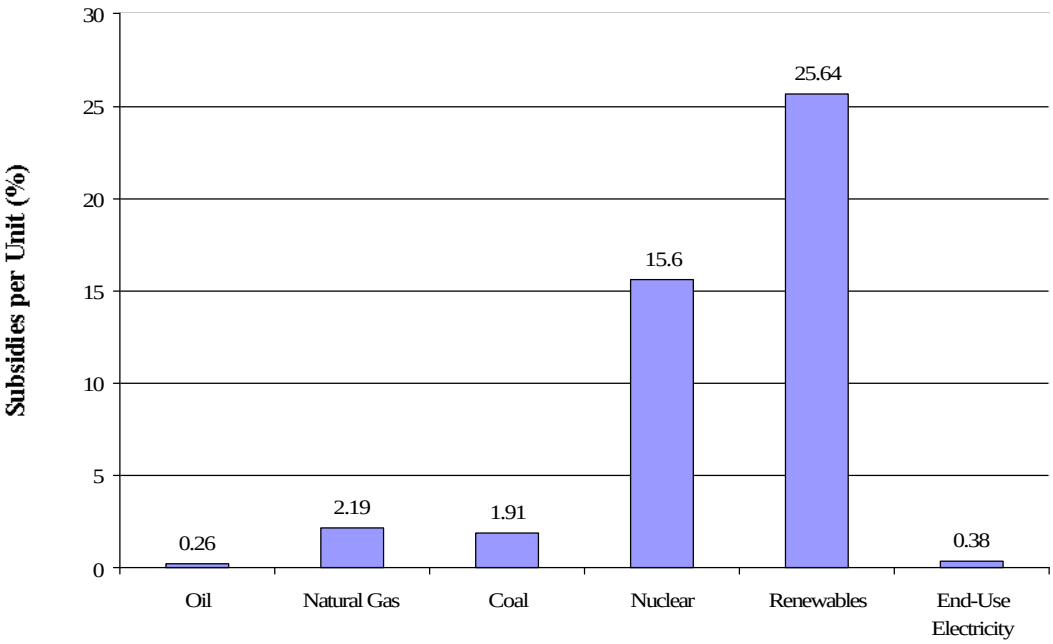
Table 1
Federal Energy Subsidies on a Budget Outlay Basis, Fiscal Year 1999 (millions of dollars)

	Type of Subsidy				
Beneficiary	**Direct Expenditures**	**Income**	**Excise**	**Research & Development**	**Total**
Oil	255	263	0	49	567
Gas	501	1,048	0	115	1,664
Coal	0	85	0	404	489
Misc. fossil fuels[a]	0	205	0	0	205
Nuclear	0	0	0	640	640
Renewables	44	15	725[b]	327	1,111
Conservation[c]	166	110	0	0	276
End use[d]	0	105	0	454	559
Electricity[e]	459	195	0	330[f]	687
Total	1,425	2,026	725	2,022	6,198

Source: Energy Information Administration, "Federal Financial Interventions and Subsidies in Energy Markets 1999: Energy Transformation and End Use," SR/OIAF/2000-02, Table ES1, p. x.

[a]This category represents expenditures not allocated to any of the three individual fossil fuels.
[b]Alcohol fuels excise tax.
[c]Conservation programs are directed primarily at consumers of energy and often are supported by grants.
[d]End-use programs are oriented to the development and introduction of new technologies for use in specific sectors.
[e]Does not include support for the Tennessee Valley Authority, the power marketing administrations, or the Rural Utilities Service.
[f]Electricity research and development in advanced turbine technology. Other generation technology research and development subsidies are distributed by fuel.

Figure 1
Magnitude of Energy Subsidies, 1999



Source: Energy Information Administration, "Federal Financial Interventions and Subsidies in Energy Markets 1999: Energy Transformation and End Use," SR/OIAF/2000-02, Table ES1, p. xiv.

Energy tax expenditures in 1999 totaled $2.75 billion, of which $263 million accrued to the oil industry.

Tax Expenditures

Federal tax law defines the tax deductions that businesses and individuals are entitled to in computing their federal income tax liability. The tax code provides numerous preferences for selected economic sectors and interest groups. The tax deductions resulting from those preferences are revenue losses to the government. The term "tax expenditures" is used to describe those revenue losses. As defined by the U.S. General Accounting Office,

> Tax expenditures are revenues foregone, or revenue losses, due to preferential provisions of federal tax laws, such as special exclusions, exemptions, deductions, credits, deferrals or tax rates.[15]

The subsidy literature considers tax expenditures as subsidies. The expenditures are (supposedly) revenue the government would have received in the absence of the tax deduction. Tax expenditures enjoyed by one sector are comparable to government revenues used elsewhere.

Tax expenditures, however, offer advantages (to the recipient) relative to direct monetary transfers. Tax expenditures are not taxable, whereas direct monetary subsidies are subject to federal income tax. Tax expenditures, moreover, are part of the tax code and hence are not normally subject to an annual review. In contrast, a direct monetary subsidy must compete with other expenditures in the annual review of the federal budget. (Given the vast inertia in budgeting, it is unclear how great an advantage this is in practice.)

The EIA estimates (Table 1) that energy tax expenditures in 1999 totaled $2.75 billion, of which $263 million accrued to the oil industry. Thus, the oil industry received 0.96 percent of the tax expenditures on the energy industry. Most of that subsidy reflects an enhanced oil recovery credit.[16]

Compare this $263 million tax subsidy to the oil industry with the tax subsidies enjoyed by other industries. A comprehensive study of tax expenditures by the GAO, for instance, lists the 15 largest tax expenditures.[17] The list does not include tax deductions for the oil industry. Instead, the list includes such things as pension contributions, deductions for medical insurance premiums, deductions for state and local taxes, deductions for charitable contributions, and other deductions. The GAO estimates that in 1993 tax expenditures for all business programs were $61.5 billion.[18]

Direct Expenditures

The sole direct expenditure subsidy for the oil industry, according to the EIA, is the Low-Income Housing Energy Assistance Program. Other direct expenditure subsidies that favor the fossil fuels industry (that is, the natural gas and coal industries) include federal public power undertakings and the various regulatory agencies' ongoing activities that qualify as direct subsidies to the industry.

The LIHEAP, under the management of the U.S. Department of Health and Human Services, provides block grants to states and Indian tribes to administer assistance to low-income households in meeting their heating and cooling needs.[19] According to the EIA, the LIHEAP spent $1.26 billion in 1999 to administer assistance to 4.5 million households. Of that amount, only $255 million was used for oil.[20]

Low-income households certainly benefit from this program,[21] but energy producers may not be significant beneficiaries. The EIA reports that the average LIHEAP household consumes about 10 percent more energy than does the average low-income household[22] and only about 0.4 percent less energy than the national average household uses for heating.[23] The data thus suggest that LIHEAP recipients would have purchased about 90 percent as much energy without the subsidy. Thus, much of the LIHEAP subsidy displaces existing energy expenses, enabling recipients to spend more of their incomes elsewhere.

Underscoring that conclusion is a survey of household energy consumption conducted by the EIA. That survey found that house-

holds in the lowest three income levels spent 33.2 percent, 38 percent, and 35.6 percent, respectively, of their energy budgets on space heating in 1993.[24] Households eligible for federal assistance spent 34.7 percent of their energy budgets on space heating. Apparently, the LIHEAP does not encourage low-income households to substantially increase their expenditures on space heating.

The distinction between the incidence and the ultimate burden of a tax applies to the LIHEAP subsidy. In its initial incidence, the LIHEAP subsidy is an energy subsidy because it subsidizes the consumption of energy. However, LIHEAP recipients respond to the subsidy by decreasing the amount of their discretionary income allocated to energy. After market adjustments, LIHEAP appears to be more of an income subsidy to the household than a subsidy for energy businesses.

Another large federal subsidy of the "direct expenditure" type is for energy services for electricity generation. This subsidy, which totals somewhere between $2.38 billion and $5.1 billion (depending on how federal interest rate support and return on asset support are calculated) is the largest single energy subsidy.[25] It reflects the taxpayer cost of supporting government power administrations such as the Tennessee Valley Authority, the Rural Electrification Administration (currently Rural Utilities Service), and the power marketing administrations (including most prominently the Bonneville Power Administration). Those providers operate at a financial loss that appears as a subsidy.[26] Those subsidies are not included in Table 1, given the uncertainty of the calculations, but it should be noted that none of those subsidies is directed at the oil industry.

Direct expenditures also include those for energy regulatory agencies. Those agencies' activities are intended to provide a service to the industry and its customers and, when funded by general revenues, are considered by many to be subsidies. The Nuclear Regulatory Commission, for instance, had a budget of $464 million in 2000 but had offsetting receipts of $460 million.[27] Hence, its net cost (the direct subsidy) was $4 million in 2000. Other energy regulatory agencies, such as the Bureau of Land Management and the Minerals Management Service, have no offsetting revenues. Hence, many analysts count their entire expenses as subsidies.

Those regulatory expenditures do not appear in Table 1, however, because they are indirect rather than direct subsidies and thus outside the scope of the latest EIA studies. In any case, their impact on the market is negligible.

Trust Funds and Excise Taxes

The government uses numerous trust funds to meet specific needs of various industries. Trust funds allow firms in an industry to form a common pool of funds to address an external cost. For instance, if an industry imposes environmental costs, the government taxes the industry to obtain funds for environmental restoration. The EIA describes several environmental trust funds. For instance, the Oil-Spill Liability Trust Fund, which finances federal oil-spill cleanup efforts, is financed by a tax on oil entering U.S. ports.[28]

Presumably, the government does not intend trust funds to be subsidies. The subsidy literature does not consider trust funds as subsidies as long as industry-related expenses match industry-related receipts. If industry-related expenses exceed industry-related receipts and general revenues make up the difference, the industry receives a subsidy. However, if industry-related trust fund receipts supplement general revenues, the industry receives a negative subsidy. The EIA reports that only the Black Lung Disability Trust Fund is running a deficit. On the whole, energy-related trust fund program receipts exceed costs by $13 billion annually.[29]

Another dedicated energy fund that draws attention is the Highway Trust Fund, a federal program that assists in the construction and maintenance of highways and is funded by a vehicular fuels tax. Although vehicular fuel taxes had traditionally been imposed as a

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sort of "user fee" dedicated exclusively to this fund, Congress levied an additional transportation fuels tax in 1990 to support the General Revenue Fund, and that tax, according to the EIA, amounted to a "negative tax" on the oil industry that was 10 times the size of the direct and indirect subsidies to the industry.[30] During most of the 1990s, the oil industry was burdened by this negative subsidy in the form of a 4.3 cent per gallon tax on motor fuels. Since October 1, 1997 (the beginning of fiscal year 1998), the government has been depositing the funds in the Highway Trust Fund.[31]

The Federal Highway Administration provides data on funding for highways and the disposition of revenues at the federal and state-plus-local levels.[32] The main point is that federal, state, and local taxes and fees for road funding were $89.1 billion in 1998, while spending on roads was $69.2 billion and funds diverted for nonroad use were $19.9 billion.

Numerous other taxes and fees are collected from motorists by various levels of government. Conventional taxes include motor fuel taxes levied at the federal, state, and local levels. Additional taxes include registration fees, drivers' license fees, title fees, vehicular property taxes, and sales taxes. The Federal Highway Administration reports the amount of those "other taxes and fees" that is allocated to roads but does not report the amount actually collected from motorists. A significant portion of total taxes and fees collected for roads, however, is redistributed away from road use.[33] Most of the funds diverted from road use go to mass transit or to general revenues of state and local governments. Consumers of vehicle transportation services pay taxes that exceed government expenditures on those services by billions of dollars per year.

An accounting of indirect subsidies to oil consumers reveals a number of additional negative subsidies beyond that of the motor fuels tax.

In sum, an accounting of indirect subsidies to oil consumers reveals a number of additional negative subsidies beyond that of the motor fuels tax. The negative annual subsidies from road and highway taxes were not highlighted by the EIA, because that report dealt exclusively with federal subsidies. State and local governments levy many of the road taxes and use some of those tax receipts to support various other government services.

R&D Expenditures

The federal government has a long history of supporting R&D, particularly in defense-related technologies and basic research. The U.S. Department of Energy supports national defense (nuclear weapons), environmental restoration, basic research, and the development of energy-related technologies.

The EIA reports that in 1999 the DOE budget for energy programs was $2.02 billion, of which $49 million was allocated to oil-related research. This apparent oil subsidy is 2.4 percent of the total R&D budget for energy programs. The largest share of the DOE's energy budget was used for electricity-related technologies, such as coal ($404 million), nuclear ($640 million), and renewable energy and energy conservation ($327 million).

The DOE's R&D budget for applied energy programs has declined over the last two decades. The largest declines are in the nuclear and coal programs. The oil program continues to be a small share of the energy program R&D budget. The conclusion we can draw from these data is that federal R&D subsidies for energy technologies are relatively small and on the decline. Furthermore, many energy R&D subsidies are primarily wealth transfers that do not significantly distort energy markets.[34]

The accumulation of funding for energy R&D programs since the DOE was established in 1977 adds a qualification to this conclusion. From 1978 through 1996, the DOE spent (in 1996 dollars) $20.1 billion on nuclear energy (excluding nuclear weapon research), $13.3 billion on energy conservation, $13.2 billion on coal R&D, and $5.1 billion on solar energy.[35] Those amounts included the $4.5 billion spent for fast breeder reactors from 1978 through 1987 and the $661.8 million spent on magnetohydrodynamics from 1978 through 1992.[36] Neither

of the latter two programs attained commercial success.

The R&D programs by themselves may not affect energy markets, but, in combination with government tax and regulatory changes, those programs have significant market effects. In 1995 nuclear power produced 21.8 percent of the kilowatt-hours generated by utilities in the United States.[37] This market share results from the enormous R&D subsidy over time along with state regulations that encouraged the construction of nuclear plants.[38] Other state and federal policies encouraged the adoption of energy conservation measures and the use of solar technologies. We can define the initial incidence of those subsidies and infer that the government research community was a beneficiary. We cannot determine whether energy consumers were made better or worse off by those subsidies.

National Security and Environmental Costs

For some time, critics of the oil industry concentrated their fire on tax expenditure subsidies. The more recent critics emphasize indirect subsidies in the form of the national defense and environmental costs of using oil. A Greenpeace study, for instance, argues that the oil industry (and thus oil consumers) does not pay the military costs of defending oil in the Middle East. The ASE argues that the producers and consumers of oil products do not pay sufficient environmental taxes, especially taxes for global warming. On the basis of those and other similar analyses, some observers peg the indirect subsidies to the oil industry at $84 billion annually.[39]

The argument for additional externality taxes derives from a simple economics framework. A textbook condition for the efficient use of resources is that the marginal cost of a product must equal its price. This equality implies an absence of externalities. However, marginal cost includes private costs (those borne by the consumer) and external costs (those borne by entities other than the consumer). Economic efficiency thus requires that the price of oil include marginal private cost plus marginal external cost. Environmentalists argue that the price of oil is not high enough to reflect the marginal external cost and that a tax on oil would "get the prices right." Short of that, preferences and subsidies to oil competitors would "level the playing field" and help establish competitive neutrality in the marketplace.

National Security Costs as an Oil Industry Subsidy

The issue of defense expenditure subsidies to the oil industry revolves around two specific questions: First, does the national defense budget subsidize the use of oil? Second, should the government tax oil imports or consumers to pay the national defense costs of protecting oil supplies in the Persian Gulf and in other regions? The answer to the first question is affirmative. The answer to the second question is negative.

The argument that the national defense budget subsidizes oil was perhaps most clearly made in a Greenpeace study, which concluded that national defense costs directly attributable to Middle Eastern oil are in the range of $10.5 billion to $23.3 billion per year.[40] The Greenpeace analysis begins by reviewing other estimates of the military costs of defending oil in the Middle East, estimates that range from $79 billion per year to $500 million per year. The enormous range in estimates reflects the use of different methodologies. The lower estimate is an estimate of marginal defense costs. The higher estimate is a total cost estimate. Because the cost estimates depend critically on the methodologies employed, a brief discussion of each methodology is in order.

The total cost approach allocates the military budget to various regions around the world, with a specific sum to the Middle East. The oil security objective then receives some share of that allocation. Considering that the total national defense budget was $268.5 billion in 1998, the funds estimated as oil relat-

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Government subsidies to the oil industry do not appear to produce significant distortions in energy markets.

ed are necessarily large.[41] Given the total size of the defense budget, the Greenpeace estimate of the national defense costs of oil supplies ($10.5 billion to $23.3 billion for 1995) is not surprising.

The marginal cost approach relates the change in military spending to the change in the use of foreign oil, or perhaps to the change in world oil prices. In one application, the marginal cost approach estimates the decline in defense spending that results from subtracting the oil security objective from the military budget. The Congressional Research Service estimate of $500 million in defense expenditures per year for oil is derived from this analytic approach.[42] An alternative application of the marginal cost approach estimates the potential savings in military expenses resulting from a marginal reduction in domestic oil use. If a large and permanent tax were placed on oil, the use of oil products would certainly decline. With less dependence on foreign oil, so the argument goes, a reduction in military expenditures would be feasible. Once again, however, the Congressional Research Service study suggests that a marginal reduction in oil use would not facilitate reducing military expenditures.

In sum, reducing consumption of foreign oil would have little impact on defense expenditures, which suggests that the national security costs of oil imports are minimal and that they do not significantly affect energy markets.

Environmental Costs as an Oil Industry Subsidy

A second externality cost of oil is the environmental cost. The combustion of fossil fuels results in the emission of several air pollutants that impose an environmental cost on nonusers. Air pollution is the classic example of an environmental externality. The ASE develops this argument and recommends "getting the prices right" by imposing additional taxes on oil products. Such taxes would reflect existing air pollution costs as well as global warming costs.

While it is certainly true that conventional vehicles produce environmental emissions that impose an external cost on nonusers, the argument that additional pollution taxes would promote efficiency is quite a different assertion. The Environmental Protection Agency has promulgated regulations designed to achieve cost-effective environmental quality. The EPA's approach is to favor environmental standards over pollution taxes. For motor vehicles, those standards include requirements for catalytic converters, unleaded gasoline, reformulated fuels, and fuel efficiency standards.[43] We cannot determine a priori whether those standards impose costs at the margin that exceed environmental benefits or are less than environmental benefits.

In addition to environmental restrictions, there are federal, state, and local taxes on motor fuels. Those taxes are, in effect, marginal externality taxes, although their purpose is to generate revenue. Those net tax payments, which are in addition to the costs of existing environmental regulations, should more than pay the marginal environmental cost of using oil products. A recent study by W. Kipp Viscusi and others used EPA data on the economic costs imposed by the environmental damage associated with energy use.[44] Calculations were based on emissions contribution per unit of fuel consumed and percentage of retail price. Those calculations were then compared with the net current taxes paid by various energy sources and considered under various tax approaches (consumption, Btu, ad valorem, and carbon). Although the authors acknowledged a wide range of uncertainty in the assumptions, they found that the external environmental costs of gasoline were "internalized" completely by regulatory action and overtaxation for other purposes.[45]

Conclusion

The EIA estimate of energy subsidies for 1999 provides the foundations for much of this study's analysis. Total energy subsidies in

1999 were somewhere between $8.6 billion and $11.3 billion and included tax expenditures, direct expenditures, excise taxes, and R&D expenditures. The oil industry received a subsidy of approximately $567 million, a tiny fraction of the total sum of energy subsidy and a far smaller sum than other energy industries received from the federal government. The largest share of subsidies supports electricity-generating fuels and technologies.

Conventional estimates of subsidies, however, use accounting or budget data that are seriously misleading. Subsidies are difficult to define because they have no unique characteristics that distinguish them from other energy policy actions. Furthermore, subsidies are difficult to estimate and the beneficiaries are difficult to identify. Finally, subsidies do not necessarily distort markets in that they do not necessarily affect consumer decisionmaking or behavior.

A critical component of subsidy analysis is determining whether the government subsidy reduces a market failure or introduces a government failure. Moreover, the apparently simple task of estimating subsidies is not feasible without measuring the costs or benefits of the subsidy in question. In the absence of a cost/benefit analysis, we should interpret accounting measures of subsidies with caution.

Government subsidies to the oil industry do not appear to produce significant distortions in energy markets.[46] Oil subsidies primarily redistribute wealth and leave energy markets relatively unaffected. Consequently, changes in oil prices and oil use reflect changes in underlying supply and demand conditions, rather than government subsidies. Despite measurement problems, energy subsidies appear to be relatively small and declining over time.

Notes

1. Of course, eliminating inefficient subsidies is preferable to adding an offsetting inefficient subsidy. Elimination removes a drain on the economy; offset adds another drain.

2. See, for instance, Brian Dunkiel, Gawain Kripke, and Erich Pica, "Dirty Little Secrets: 1998 Update," Friends of the Earth, Washington, 1998.

3. Douglas Koplow and Aaron Martin, "Fueling Global Warming: Federal Subsidies to Oil in the United States," Greenpeace, Washington, June 1998.

4. Douglas L. Norland and Kim Ninassi, "Price It Right: Energy Pricing and Fundamental Tax Reform," Alliance to Save Energy, Washington, 1998.

5. Energy Information Administration, "Federal Energy Subsidies: Direct and Indirect Interventions in Energy Markets," November 1992, p. ix.

6. This study examines subsidies provided by the federal government and considers some energy subsidies provided by state and local governments. It does not consider state utility regulation, which is now widely recognized as causing significant distortions in electricity and natural gas markets.

7. See Barry Brownstein, "The Price-Anderson Act: Is It Consistent with a Sound Energy Policy?" Cato Institute Policy Analysis no. 36, April 17, 1984. For a defense of the Price-Anderson Act from an efficiency perspective, see Benjamin Zycher, "Accounting for Costs and Cost Biases," Letter to the editor, *Regulation* 15, no. 2 (Spring 1992): 3–4.

8. Koplow and Martin, p. 1.1.

9. Energy Information Administration, "Federal Energy Subsidies: Direct and Indirect Interventions in Energy Markets," p. ix.

10. Charles Wolf Jr., *Markets or Governments: Choosing between Imperfect Alternatives* (Cambridge, Mass.: MIT Press, 1991).

11. That economic loss is the sum of producer and consumer surplus and is referred to as a "deadweight loss."

12. The benefit to producers and consumers would equal their increment in producer and consumer surplus, which can only be estimated if one knows the appropriate supply and demand curves.

13. Energy Information Administration, "Federal Intervention and Subsidies in Energy Markets 1999: Energy Transformation and End Use," SR/OIAF/2000-02, May 2000, p. xi.

14. Ibid., p. 53.

15. U.S. General Accounting Office, "Tax Policy: Tax Expenditures Deserve More Scrutiny," GAO/GGD/AIMD-94-122, June 1994, p. 14.

16. Energy Information Administration, "Federal Intervention and Subsidies in Energy Markets 1999: Primary Energy," Table 7, p. 16. Section 43 of the Internal Revenue Code provides taxpayers an enhanced oil recovery (EOR) credit equal to 15 percent of qualified EOR costs. This credit, however, is phased out if oil prices rise above $28 a barrel in inflation-adjusted 1991 dollars. Ibid., p. 19.

17. U.S. General Accounting Office, p. 50.

18. Ibid., p. 84.

19. Most of the important decisions about the LIHEAP's implementation—the mix and dollar range of benefits and the manner in which benefits will be provided—are left to the states. In general, program recipients must have incomes less than 150 percent of the poverty level for their state or less than 60 percent of the state's median income. No household with income below 110 percent of the poverty guidelines may be excluded. In addition, a "reasonable" amount of funds must be set aside by the states for energy crisis intervention and up to 15 percent of the states' allotments (up to 25 percent with a waiver) may be used for low-cost residential weatherization or other energy-related home repair. Energy Information Administration, "Federal Energy Market Interventions 1999: Energy Transformation and End Use," pp. 9–10.

20. Most of the LIHEAP was directed toward heating assistance, and EIA estimates that only 23 percent of the program's recipients rely on home heating oil in the winter. Ibid., pp. 8–9.

21. In fiscal year 1996—the latest year for which data are available—the average annual LIHEAP benefit per recipient ranged from $54 to $403 for heating assistance, from $77 to $623 for winter crisis aid, and from $15 to 146 for cooling assistance. The national average energy benefit for households receiving heating or winter crisis assistance, or both, is estimated to be $180. Energy Information Administration, "Federal Energy Market Interventions 1999: Energy Transformation and End Use," p. 9. According to Leon Litow of the Division of Energy Assistance of the U.S. Department of Health and Human Services, the subsidy covers an average of about 53 percent of the heating bills of the recipients. Personal correspondence.

22. Energy Information Administration, "Federal Energy Subsidies: Direct and Indirect Intervention in Energy Markets," p. ix.

23. Energy Information Administration, "Federal Energy Market Interventions 1999: Energy Transformation and End Use," p. 9.

24. Energy Information Administration, "Household Energy Consumption and Expenditure 1993," DOE/EIA-0321(93), October 1995, p. 75.

25. Energy Information Administration, "Federal Energy Market Interventions 1999: Energy Transformation and End Use," p. 49.

26. Robert J. Shapiro, *Cut-and-Invest: A Budget Strategy for the New Economy* (Washington: Progressive Policy Institute, March 1995), p. 19.

27. *Budget of the United States Government: Fiscal Year 2001*, Appendix (Washington: U.S. Government Printing Office, 2000), pp. 1187–88.

28. Other energy trust fund programs include the Abandoned Mine Reclamation Program, the Nuclear Waste Fund, the Uranium Enrichment Decontamination and Decommissioning Program, the Leaking Underground Storage Program, the Pipeline Safety Fund, and various aquatic resource programs such as boat safety programs, coastal wetland projects, and sport fish restoration programs. Energy Information Administration, "Federal Energy Market Interventions 1999: Primary Energy," p. 37.

29. Ibid., p. 36.

30. Energy Information Administration, "Federal Energy Subsidies: Direct and Indirect Interventions in Energy Markets," p. 7.

31. Effective December 1, 1990, the federal gas tax was increased from 9.1 cents per gallon to 14.1 cents, with 2.5 cents per gallon dedicated to general revenue. The federal tax was increased to 18.4 cents per gallon on October 1, 1993, and 6.8 cents per gallon went to general revenue. Effective October 1, 1995, 2.5 cents of the 6.8 cents was rededicated to the Highway Trust Fund, and effective October 1, 1997, the remainder of the 4.3 cent per gallon tax on gasoline that had been going to general revenues was rededicated to the Highway Trust Fund. Excise taxes of 4.3 cents per gallon on rail diesel fuel and fuel used on inland waterways, as well as a 6.8 cents per gallon tax on motorboat fuel, small engine gasoline, and special fuels, however, continue to be deposited in the general fund. Energy Information Administration, "Federal Financial Interventions and Subsidies in Energy Markets 1999: Primary Energy," p. 41.

32. Federal Highway Administration, "Highway Statistics 1998," FHWA-PL-99-017, November 1998, p. iv.9.

33. Rayola Dougher, "The Funding of Roads in the United States: How the Taxes and Fees

Collected from Motorists Are Spent," Research Study no. 088, American Petroleum Institute, Washington, March 1997.

34. Jerry Taylor, Testimony at Hearing on Fiscal Year 1998 Budget Authorization for Department of Energy, Environmental Protection Agency, and National Oceanic and Atmospheric Administration before the Subcommittee on Energy and Environment of the Joint Committee on Science, 105th Cong., 1st sess., April 9, 1997; and Ronald Sutherland, "Federal Energy R&D Expenditures: A Case of Misplaced Incentives," Cato Institute Policy Analysis, forthcoming.

35. Data obtained from Robert Bradley, "Renewable Energy: Not Cheap, Not 'Green,'" Cato Institute Policy Analysis no. 280, August 27, 1997, p. 63. Original source: U.S. Department of Energy, Office of Chief Financial Officer.

36. Energy Information Administration, "Federal Energy Subsidies," pp. 153, 154.

37. Energy Information Administration, "Annual Energy Outlook 1997," DOE/EIA-0383(97), December 1996, p. 108.

38. Peter VanDoren, *Politics, Markets, and Congressional Policy Choices* (Ann Arbor: University of Michigan Press, 1991), pp. 59–63.

39. J. B. Wahl, "Oil Slickers: How Petroleum Benefits at the Taxpayers' Expense," Institute for Local Self Reliance, Washington, 1996.

40. Koplow and Martin.

41. Council of Economic Advisers, *Economic Report of the President,* 1999 (Washington: Government Printing Office, 1999), p. 421.

42. Congressional Research Service, "The External Costs of Oil Used in Transportation," CRS Report for Congress 92-574ENR, June 17, 1992.

43. For a review of EPA's policies addressing vehicular pollution, see Arnold Howitt and Alan Altshuler, "The Politics of Controlling Auto Air Pollution," in *Essays in Transportation Economics and Policy,* ed. Jose Gomez-Ibanez, William Tye, and Clifford Winston (Washington: Brookings Institution, 1999), pp. 223–55.

44. W. Kipp Viscusi et al., "Environmentally Responsible Energy Pricing," *Energy Journal* 15, no. 2 (1994): 23–42. The authors ignored the potential costs of greenhouse gas emissions, however, given the uncertainty surrounding those calculations.

45. A potential weakness of the analysis, however, is the fact that gasoline taxes are currently thought of as user fees for highway construction and maintenance. In a sense, then, gasoline taxes are already dedicated to the internalization of a different set of externalities, the cost of the public provision of highways. Yet transportation economists believe that automobile drivers are massively cross-subsidizing the trucking industry through the gasoline tax. Most highway construction and maintenance costs are necessitated by the demand for—and damage done to—interstate highways by the trucking industry. An efficient gasoline tax, these economists believe, would be borne entirely by the trucking industry (fuel taxes would be imposed only on diesel fuel). Automobile drivers would "free ride" on the diesel tax except where congestion-based pricing was necessary to ration access. Thus, we can still conclude that gasoline taxes at present internalize driving externalities for auto mobiles, at least at the macro level. See Kenneth Small, Clifford Winston, and Carol Evans, *Road Work: A New Highway Pricing and Investment Policy* (Washington: Brookings Institution, 1989).

46. This conclusion is not meant to suggest that oil subsidies are efficiency enhancing. It is simply intended to establish that critics of the oil industry have exaggerated the benefits received by the industry.

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