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Tax System - Environment

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United States Senate

WASHINGTON, DC 20510-4202

gore/downey proposal

1. types of taxes:

carbon tax--hits coal hardest; tilts playing field toward nuclear, hydro and other non-fossil fuels;

energy tax:

BTU tax--since coal has more carbon per unit energy than other fossil fuels (oil and natural gas), this hits coal less hard than a carbon tax would. does not really push toward non-fossil fuels.

NB. with either of above, most money is collected from oil since it is used to the greatest extent.

ad valorem--(downey) little effect on choice of fuels; major impact is to induce conservation. smallest hit on coal. (? here--shld be phased - in over a number of years).

2. outline of a proposal:

a. downey ad valorem energy tax--

this is a conservation measure. this also is where revenues can be generated that can (1) go to treasury; (2) go to taxpayers (as downey proposal wld also do); or (3) go to employers as an offset of their payroll taxes (one study says this is way to reduce consumption w smallest hit to GNP -- but skeptical and politically not viable).

b. oil import fee/establish floor on price of oil--

this is a security measure. panetta bill wld establish a flr of \$16/barrel. at this price, it probably wld not be an income generator, just wld induce security/stability. cld put higher if also wanted to raise money. wld be supported at least by the independent power producers (allows them to compete).

c. global warming tradeable permit scheme--

this would place a cap on emissions (e.x. we could hold utilities to their 1988 levels of co2 emissions). utilities will hate anything we do, but this is better for them (1) because they will only have to pay for emissions in excess of the ceiling we set for them (with a tax, they are paying for the full amount of emissions--e.x. fed govt wld give them permits for 5 tons of emissions (1988 levels). to extent they want to expand beyond that, they would need to purchase credits or find an offset.

--gives utility incentive to reduce emissions in order to have excess credits to sell

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--can induce other sectors to reduce greenhouse emissions if we allow them to opt in by e.x. doing better than appliance efficiency stds and allowing them to sell their credits to utilities

--can encourage efficient technologies 'cause utilities will thereby have credits left over that they can sell

--less hard on utilities 'cause gives them a marketable right

--better than a carbon tax 'cause sets an amount of emissions that are tolerable and allows market to decide how to get there. this is virtually impossible to do with a tax -- tax is geared toward price, not quantity, and estimates of what can be achieved with a specific tax are all over the board.

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THANK YOU

**PHOTOCOPY
PRESERVATION**

more coal goes to electricity →

why tax electricity instead of inputs?
(nuclear/hydro)

running of bills → ~~total~~ electricity bill

5% ↑ in energy → % ↓ in use of CBO
elasticity index

PHOTOCOPY
PRESERVATION

1.50	.50
\$15	\$5
\$450	\$150
<u>1 hb</u>	1 gm
1 b7u	1 b7u
\$2	\$1

$$\frac{\frac{\Delta P}{P}}{\frac{\Delta Q}{Q}} = E = -0.2_{SR}, -1_{LR}$$

59.2

? = how much it (that)
would CO₂ input?
→ Need CBO analysis

\$2/bbl \$2/bbl
\$20/bbl \$20/bbl
\$4/bbl

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M E M O R A N D U M

DATE: Friday, March 15, 1991
TO: AGJ, RM, LSF, KM
FROM: MER
SUBJECT: ENERGY T--ES

KEY POLITICAL CONCERNS:

1. It is risky to talk about tax increases in this political climate. It is suicidal to talk about tax increases that will take money from the middle class and give it to the poor. As currently drafted, the Gore-Downey proposal offers a suicide machine.

2. In addition, we are proposing to offer this as a "conservation" tax, yet it is impossible to say that the level of tax proposed is really enough to improve energy conservation. (Which isn't to argue for a higher tax, but a more effective approach. See Below).

RECOMMENDATION:

If you are committed to accepting the political risk inherent in proposing higher taxes then commit to reducing this risk by 'giving back' the tax increase to the middle class in a simple and direct manner. Craft a plan that will allow you to argue you are not increasing taxes at all -- offset energy tax increase with straightforward tax decrease.

If you are going to continue to call this a 'conservation' tax, further encourage conservation by using some of the money raised by the energy tax for efficiency and conservation incentives that offer paybacks to consumers.

You can then present this plan as one which:

** Saves people money;

** Produces a more efficient and effective energy

system;

** doesn't take money out of anyone's pockets.

You could credibly argue you are NOT raising taxes.

BACKGROUND:

Currently, the G-D (no pun intended) proposal lacks any real specifics on where to spend the \$75 - \$80 billion it

will raise over five years. The outline from Downey staffers et al directs the money to four places:

- o Earned Income Tax Credit expansion
- o Repeal limits on itemized deductions
- o Tinker with standard deductions
- o Tinker with top rates

While you could argue that the itemized deductions and standard deductions are targeted to the middle class, the EITC proposal dominates and the mix of tax changes waters down the proposal to confusion and leaves you vulnerable for the 'poor people' attack -- this is more ol' time lib'ral Democratic poltx: take it from the workers to give to the welfare crowd; tax and spend Democrats etc. There is tremendous resentment out there on these issues and this kind of transfer of resources.

Instead, why not, for example, talk only about doubling the standard deduction? The point: keep it simple and direct. Allow yourself to talk about a direct trade -- higher energy taxes for a better break on deductions -- rather than leaving yourself vulnerable to the 'taking-money-out-of-middle-class-pockets' bullet.

NOTE: Downey's staff has NOTHING on paper about where the money should go -- this is all presented to us verbally, which says to me they're not clear on this, but rather are waiting for some economist locked in a closet somewhere to spit out the numbers.

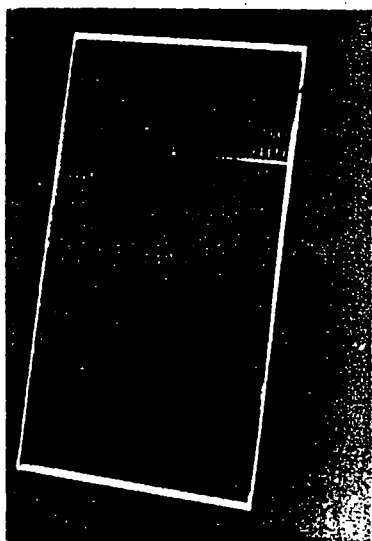
WE NEED TO THINK CAREFULLY ABOUT WHERE THIS MONEY SHOULD GO. Downey's people seem open to suggestions and fairly flexible.

On conservation issue: it's not clear that the 5 percent proposed will really promote conservation by causing people to change their behavior. That leaves you open to criticism that you're simply raising taxes: this proposal won't contribute to conservation or efficiency in any meaningful way.

This concern could be addressed by using some of the money raised by the tax increase to pay for some of the efficiency/conservation incentives that are being proposed by folks who don't have the money to pay for them, or other related ideas. The goal here would be to reinforce the conservation argument and allow you to claim that this proposal will encourage a more efficient energy system.

TABLE ENERGY NEWS[®]

Commercial and Industrial Energy Opportunities



voltaic panels made up of thin-film al, such as these made by Sovonics, the ting subsidiary of ECD, were among the logical issues debated by industry experts recent conference at MIT.

Executives Are Fast Approaching a Crossroad

By Don Best
REN Feature Report

There is strength in diversity, then the can photovoltaic industry has a titanic . That message came across loud and during the 3rd National Conference on voltaic Applications, which was held at Massachusetts Institute of Technology in ine.

out 200 top managers and researchers ed for the conference, expressing y differing opinions over the industry's direction. Everyone agreed that reduc- otovoltaics page 14

U.S. Energy Economy Is Maintained on \$46 Billion in Federal Subsidies

**Uneven Support Favors Some
Industries at Taxpayers' Loss**

Government Priorities Criticized

Ren News Report

The federal government spent at least \$46 billion to subsidize the United States' energy industry in fiscal year 1984. That's the preliminary finding of Richard Heede, research associate at Amory Lovins's Rocky Mountain Institute. Heede delivered his tabulation of federal energy support at hearings on June 20 before the House Subcommittee on Energy Conservation & Power.

The \$46-billion outlay, a conservative assessment according to Heede, equals about one-quarter of the federal budget deficit. When all tax expenditures, agency spending, and loans and guarantees are counted, Heede said the total subsidy would probably rise in excess of \$50 billion a year.

The level of federal energy subsidies is far larger than had previously been supposed by policy experts and lawmakers.

Taking the analysis a step further, Heede concluded that the sums allotted to different forms of energy "bear no relationship . . . to those options' contributions to meeting the nation's energy needs in a timely and cost-effective way."

Referring to a "bang per buck for the taxpayer," the researcher compared the amount of energy supplied by energy resources with the dollars given over to their support. Calculated this way, a dollar of subsidy to See Incentives page 13

**Analyst Prompts Congress To
Seek Equality in Tax Reform**

Opts for Orderly Phase-Down

REN News Report

"My preference is for a totally desubsidized energy sector," said Richard Heede, research analyst at Rocky Mountain Institute in Colorado. His study, still in progress, has identified taxpayer subsidies to energy companies roughly equal to 25% of the nation's budget deficit.

"It is better economics to subsidize no kind of energy supply (or saving) than to try to subsidize them all equally. Currently, however, the subsidies are far from equal by any measure," he said.

Following his testimony on Capitol Hill in June, Heede said he believed the present tax revision plan called Treasury II had the support of the Senate but not the House.

"Treasury II is arguably better—at least it loses the Treasury less revenue—than continuing all existing energy subsidies. Its energy provisions, however, are unfair to taxpayers, inimical to national security, and hostile to free enterprise. It does not promote the kind of economic growth and innovation this country needs. The original Treasury I proposal, with its more sweeping and evenhanded desubsidization of the energy sector, would have been considerably fairer," Heede explained in prepared comments before the House Subcommittee on Energy Conservation & Power.

See Researcher page 3

**Wind Signs Project
• Bering Sea Island**

Researcher Testifies for Gradual Desubsidization

Continued from page 1

Calling on Congress to work on comprehensive desubsidization legislation in the future, Heede urged lawmakers to pass HR 2001, introduced by Rep. Cecil Heffel (D.-Hawaii) in April. The bill extends credits for solar thermal, photovoltaics, wind, geothermal, biomass, ocean thermal energy, and hydropower—phasing them out in three to five years rather than abruptly ending most of the incentives at the end of this year. The bill has nearly 120 cosponsors.

"This will at least ensure that the relatively meager incentives currently given to renewable energy supplies—9% of our nation's total energy supplies today, and the fastest-growing part—will be phased out gradually. . . . HR2001 indeed offers a good model for gradual desubsidization, which I believe could and should be applied equally to all energy options," Heede argued.

The Rocky Mountain Institute is selling Heede's 29-page testimony, including the complete analysis of FY 84 subsidies, to recover some of the research costs. The report, Publication #85-7, is available for \$20 from the institute at Drawer 248, Old Snowmass, Colo., 81654.

Power Pricing Method Is Picked in California

Parties To Negotiate Details of Long-Run Utility Contracts

One-Year Moratorium Ordered

By Mark Weaver

REN Correspondent Report

The California Public Utilities Commission (CPUC) voted on July 10 to continue its suspension of interim Standard Offer No. 4 for one year. The standard offer, which contains the best terms for qualifying facilities selling power to utility companies in California, was temporarily suspended on April 17. The CPUC also set July 1986 as the goal for a long-term contract to take effect. The contract would set the prices utilities would pay independent power producers.

In a second decision culminating more than a year's effort, the commission established the method to be used to determine the long-run, cost prices that will be incorporated in long-term contracts.

CPUC tried to strike a balance

CPUC has requested that all parties come to an agreement on a schedule for addressing such issues as implementing the new method, structuring payments, terms of the contract, and how to update prices.

"Now the trick will be to come up with all the data that has to be put into the methodology," said Bill Flaherty, senior utilities engineer at CPUC. "Things like the assumptions which must be made, interest-rate projections, and energy prices.

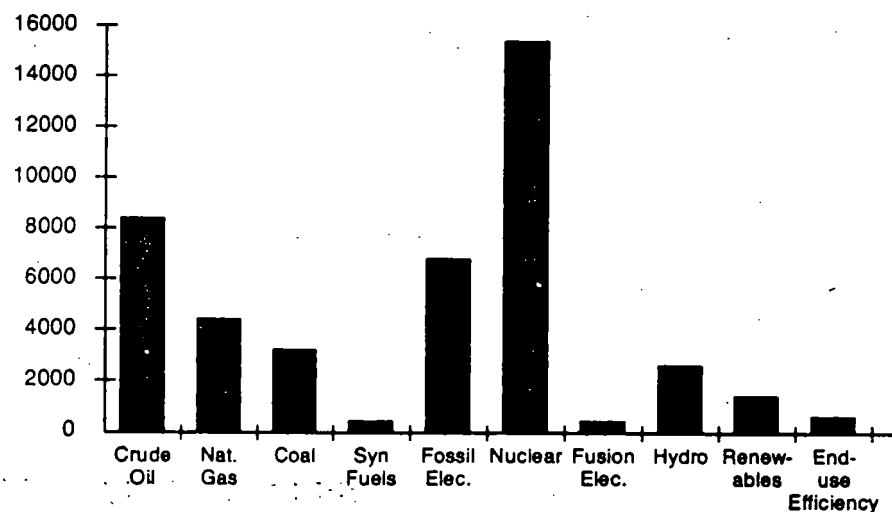
"The actual implementation will get down to the nitty-gritty of pricing out capital costs of planned additions and what is to be retired, and what the estimated fuel costs will be for the type of avoided plant," Flaherty explained.

"The Energy Commission wanted to take every unit of a utility, calculate the present costs still to be paid and what its operating costs were, and do a new calculation. We don't want to get that complicated. Instead, we will simply select what plant the utility will build.

"The utility can change its mind on what it will build, so periodically there will be a need to revise these calculations," Flaherty said. "You can only allow a certain amount of qualifying facilities to sign up before the price should be adjusted downward for capacity. Instead of a time schedule, you

Summary of federal energy subsidies in FY1984.

Millions of 1984 \$



Incentives for Energy Industry Have Misdirected Investments

Continued from page 1

energy efficiency and renewable energy yielded about 80 times as much energy as a dollar of subsidy to nuclear power.

Heede's summary of the levels of energy subsidies for nine resources plus conservation (energy-efficient technologies) indicates that nuclear electricity received the most federal support in FY 84—\$15.84 billion—while supplying 1.11 quad (quadrillion) Btu. In bang-to-buck terms, this means nuclear electric supplied less than 100,000 Btu per dollar of subsidy. Using the same measure of comparison, one dollar of federal subsidy for more efficient energy use yielded from 13 to 26 million Btu. Renewables, coal, gas, and oil each provided several million Btu per dollar.

The House subcommittee hearing covered renewable energy tax credits. Under present law, this subsidy for renewable energy sources, including solar, wind energy, and biomass, will end this year. Much larger subsidies to nonrenewables will continue.

Chaired by Rep. Ed Markey (D.-Mass.), the subcommittee has carried on in the tradition established by former chairman Rep. Richard Ottinger as the best friend of renewable energy on Capitol Hill. Committee members spent most of the day listening to witnesses who endorsed the role renewables play in the national economy while attacking the current administration's energy policy as outlined by provisions in President Reagan's tax revision plan.

al, i understand your desire and resolve to do something definitive with regard to CO2 emission. however, while i do not at all question your goal, i believe there are many questions that need to be answered with respect to the means you have chosen. it could be that you have addressed these in your work with mr. downey; in the event that you have not addressed them, i raise them for your consideration.

first, a carbon tax is a macroeconomic, top-down approach to the problem. there are options for a bottom-up approach. the heart of such an approach would be to implement and enforce vigorous new energy efficiency standards. the gains to be made from requiring the industrial, business, and residential sectors to improve the efficiency of motors, lighting and appliances are enormous--if implemented seriously, we are NOT just talking about fiddling at the edges of ghg emissions.

it seems to me that such an approach may not be appealing to you because, in line with newweek's criticism of wirth, it may seem that this is the easy approach. i would challenge that perception, however. while technologies are currently available to achieve significantly greater efficiency, it will take SUSTAINED, STRONG, AND FORCEFUL leadership to see them implemented. the fact of the matter is that these technologies are only cost-effective over their lifetimes and consumers -- demanding immediate returns on their investments -- will not easily be convinced to purchase the more expensive efficient technologies. moreover, as our troops march home victorious (showing that our access to oil simply can't be challenged) and oil prices plummet, the public will have little patience for talk of efficiency and conservation.

second, even if you do choose a macroeconomic approach, there are other options. as leon suggests, an oil (only) tax should be considered:

security: our security is threatened not by our use of fossil fuels in general, but by our use of oil. oil has been recognized (by reagan) as critical to our national security. therefore, a tax cld be imposed that hits imports even harder than domestics without raising gatt problems (and thereby easing louisiana, texas, alaska resistance).

impact: a tax focused exclusively on oil will likely have a greater impact on behavior than a tax that broadly hits all carbon-based fuels. transportation accounts for the greatest portion of our oil use and a huge chunk of our co2 emissions. because substitutes for oil are not readily available, a tax on oil could change transportation use. conversely, a carbon tax, while hitting the coal industry very hard may NOT achieve lasting emission reductions -- substitutes (oil and natural gas) are readily available;

real behavioral changes may not be realized. moreover, while coal is more carbon-intensive than oil, oil accounts for a greater portion of co2 emissions because it accounts for a greater portion of our energy consumption.

both of these approaches have impacts beyond mining/drilling operations. a carbon tax will hit not only w.va, ky, ala; tennessee will be very hard hit, too -- tva is the largest single user of coal in the country. moreover, energy - intensive (and carbon-dependent) products (glass, steel, plastics, chemicals, paper) will be hard hit. a potential consequence that must be considered is that these industries may be driven overseas where their carbon inputs (both in terms of energy and feedstock materials) are not taxed.

a marketable permit system is yet another approach that should be considered. you have already entered this arena, and it seems premature to abandon at this point. initial indications are that such a system can achieve emissions reductions in a more cost-effective way than carbon taxes can.

if not implemented very carefully, a carbon tax could have dramatic and traumatic impact on the coal industry and on regions of the country (including tennessee) heavily dependent on coal. moreover, it is not clear that more will be gained by such a draconian system than could be achieved by other means.

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON WAYS AND MEANS
LONG TERM STRATEGY HEARING ON THE ENVIRONMENT
MARCH 6, 1990

USE OF THE FEDERAL TAX SYSTEM TO IMPROVE THE ENVIRONMENT

by

Roger Dower and Robert Repetto

Directors of Research in Energy Policy and Economics

World Resources Institute

Washington, D.C.

INTRODUCTION

It is widely recognized that our current U.S. tax system causes a significant decrease in economic efficiency. Taxes that fall on labor earnings discourage labor force participation and those that fall on capital earnings discourage savings and investment. Thus, the traditional American virtues of hard work and thrift are penalized. Over time, lower rates of savings and labor force participation reduce vital income and economic growth. Tax rate variations also distort the allocation of investment and effort among sectors.

Of course, purely lump-sum taxes are impossible, and all tax systems result in some economic burdens. Even so, the size of aggregate economic losses from tax-induced distortions is a matter of concern. The total efficiency cost of the U.S. tax system has been estimated to be between 4 and 7 percent of GNP.¹ In current dollars, this amounts to about 200 to 350 billion dollars per year. Most of these losses are attributable to personal and corporate income taxes. At the margin, the efficiency costs of raising additional revenues from incentive-distorting taxes is even steeper. Estimates place the efficiency loss from marginal increases in tax revenues from the present system at 15 to 45 cents for each extra dollar collected. Reducing these burdens has motivated previous and ongoing efforts to simplify and reform the tax code.

Today's hearing, on the possibility of using the tax code to protect the environment, is a step toward reducing the economic burden of the tax system. By taxing the polluting activities which generate economic costs through environmental degradation, economic efficiency can be strengthened. Pollution taxes also help correct the well-known failure of markets to reflect the costs and profit-loss calculations of the polluting firm or household.

Shifting the tax base so that taxes fall less heavily on savings and work, and more heavily on environmentally damaging activities, pays double dividends in economic efficiency. Every dollar taken off the personal or business income tax pays a 15 to 45 percent dividend in increased economic welfare. If the tax loss is made good by a dollar levied on polluting activities, there is a further dividend in the form of reduced environmental damages and regulatory costs. This additional dividend is by no means negligible. The United States currently spends about 100 billion dollars, 2 percent of GNP, on pollution abatement, waste disposal, and environmental regulation. It is widely conceded that the current "command-and-control" regulatory system is administratively burdensome on both industry and government, and results in an inefficient distribution of abatement responsibilities among pollution sources. In addition, it is ineffectual in coping with the innumerable "non-point" discharges by households and small enterprises that form an increasing fraction of all pollution.

¹ This and following estimates predate the 1986 tax reform act and hence probably overstate current excess burdens, particularly those of the personal income tax.

Despite these expenses, environmental degradation from the remaining emissions impose economic costs estimated at from 30 to 100 billion dollars per year, 0.7 to 2.0 percent of GNP, about equally split between health and other damages. These estimates do not include potential future losses from climate change and other large-scale atmospheric disturbances linked to emissions from fossil fuels and industrial processes.

Compared to current regulatory approaches, taxes on environmentally damaging activities can stimulate far-ranging changes in consumer behavior, product designs and industrial processes. More importantly in the long run, these economic instruments provide more effective incentives for waste-reducing technological changes than do command-and-control regulations. The breadth of environmental pressures requires these broad and continuous technological responses. In the past, environmental taxes have been viewed with suspicion by both business and environmental interests. While generally in favor of the flexibility offered by such economic approaches to environmental management, industry has objected to the extra cost of charges levied on emissions that fall within established environmental standards. Applying environmental taxes in a revenue-neutral way, reducing other business taxes commensurately, addresses this concern.

Some environmental groups have resisted the implication that polluters can "buy off" their responsibilities for environmental clean-up by paying a tax. However, that perspective is changing in the face of widespread risks to the global environment that require abatement action on a broad front. The concept of "sustainable development" rests on the idea that economic progress can be reconciled with environmental protection if, and only if, the need for resource efficiency and environmental protection are fully integrated into the decisions of producers and consumers throughout the economy. Environmental taxes are a key component of a sustainable future whether the revenues are used to reduce the deficit, fund new programs, or offset less desirable federal taxes.

ENVIRONMENTAL TAXES AND ECONOMIC CONSIDERATIONS

There is a wide range of environmental problems that could be addressed through the appropriate use of environmental taxes. For example, the Congressional Budget Office (CBO) provides revenue estimates for air pollution and water pollution tax options. In general, these problems may fall into one of two classes. The first set of environmental targets are those pollutants that are already subject to some form of regulation at the federal, state or local level. For these environmental taxes might be viewed as substituting for current command and control regulatory strategies or supplementing those strategies and reinforcing the economic incentive to reduce pollution. The size of the tax and its revenue potential are, of course, a function of which view is adopted. A second class of environmental target might be those pollutants for which no regulatory program is in place. The CBO analysis of a carbon tax option to limit CO₂ emissions is an example of the latter.

Environmental taxes addressing either type of pollution situation can provide important economic benefits. In addition, they share important common issues in their

design and implementation that bear on the range of economic outcomes with which they may be associated. The remainder of this testimony highlights some of those issues and provides illustrations in terms of a carbon tax.

The U.S. would not be the first country to consider a carbon tax. Carbon taxes are being explored by several other countries as a way of reducing CO₂ emissions and raise revenues. In fact, the Netherlands and Finland have carbon taxes in place. While the tax rate being employed so far are relatively small, they are in addition to already fairly high energy taxes. For example, the Netherlands carbon tax is designed to raise around \$75 million with coal being taxed at \$1.30 per ton. The carbon charge in Finland is set at \$6.10 per ton of carbon.

The Case for a Carbon Tax

The combustion of fossil fuel to power our homes, businesses, cars, and trucks results in the discharge of a wide array of pollutants into our environment. While several of the pollutants from the burning of fossil fuels are regulated by federal, state and local governments (most notably, SO₂, volatile organic compounds, particulate and NO_x), one major pollutant, carbon dioxide (CO₂), remains unconstrained. Carbon dioxide may offer an unique and important basis for an environmental tax.

CO₂ is not a conventional pollutant in the sense of being associated with immediate effects on health and the environment. It is, however, a greenhouse gas and one of the major contributors to the risk of accelerated global warming. While many would argue over the timing and degree of risk posed by global warming, there is an apparent consensus in the scientific community that a global temperature rise of 3 to 9 degrees Fahrenheit is likely to be associated with a doubling of the global atmospheric concentration of CO₂. An effective doubling of CO₂ could occur as early as 2030. The potential economic, social and environmental disruptions associated with global warming on this scale are also uncertain but may include:

- rapidly changing climate patterns rather than the relatively stable climates of the past millennia;
- new and changing water resource regimes;
- more vulnerable and uncertain agricultural production systems;
- smaller and less numerous ecosystems;
- rising sea levels; and
- increased risk of large scale environmental losses from positive feedback effects.

A tax levied on fossil fuels in relation to their carbon content (and thus contribution to CO₂ emissions) is one mechanism for reducing CO₂ emissions. A "carbon tax" would change the prices of fossil fuels (natural gas, coal and oil) relative to each other and to other sources of energy. While a "carbon tax" would have significant revenue raising potential, the economic rationale for the tax would be to ensure that prices of fossil fuels reflect the economic and environmental risks associated with combustion. Thus, a carbon tax should be viewed first and foremost as a tool for

redressing an existing market failure -- that current energy prices do not fully account for the social costs of energy consumption.

The Congressional Budget Office, in its analysis of options for reducing the deficit, has outlined some of the basic design characteristics of a carbon tax that might be considered.² The tax should be levied on fossil fuels as they enter the economy at the mine, dock and wellhead. This ensures that the tax base is relatively broad, and will capture virtually all sectors of the economy that consume fossil fuels. It also removes the need to decide in advance which sources of CO₂ should be controlled and at what level. The price signals resulting from the tax will make those determinations so that the reductions are achieved the cheapest way possible.

The "Right" Level of Environmental Taxes

The level at which environmental taxes should be set is conceptually straight forward. Ideally, one would estimate the expected value of future risks associated with the discharge into the environment of an additional unit of pollution. For most pollutants, however, including CO₂, this information is not yet available or reliable. Without quantitative information, for example, on the benefits of reduced global warming risks, it is difficult to estimate with precision the degree to which fossil fuel prices are currently understated. The tax rates used by CBO to evaluate a carbon tax option, on the other hand, are based on estimated level necessary to level off or actually reduce CO₂ emissions over a 10 year period. CBO's "stabilization tax" rate is around \$28 per ton of carbon and can be equated to a tax of \$17 on a ton of coal, \$3.60 on a barrel of oil and \$0.45 per thousand cubic feet of natural gas. The potential emission reductions from this tax might be consistent with the announced White House position to "stabilize CO₂ emission as soon as possible." The carbon tax rate can always be raised or lowered as additional information concerning the benefits and costs of CO₂ emission reductions is developed.

The problem of having little formal data on the degree to which market prices diverge from social prices is not unique to greenhouse warming. The lack of similar information for most other current environmental problems complicates, but does not stop the development of programs to reduce those risks. Further, many types of excise taxes are rationalized, in part, as raising the price of certain goods to reflect the social costs associated with their consumption. Federal and state "sin" taxes (on alcohol or tobacco, for example) are rarely estimated, for example, on the basis of a formal accounting of the social costs and benefits of reducing the use of the taxed product.

The Economic Benefits of Environmental Taxes

Environmental taxes offer several distinct advantages over other tax strategies and other methods for addressing environmental risks. A hypothetical carbon tax

² Congressional Budget Office, Reducing the Deficit: Spending and Revenue Options, U.S. Government Printing Office, Washington, D.C., February 1990.

get this report

illustrates the range of these benefits. Although a full economic analysis of carbon taxes has not yet been completed or published, the CBO discussion of alternative tax options and past analyses of various energy taxes offer some insights to comparative benefits of a carbon tax as a revenue source and a greenhouse warming policy response.

Revenues - Unlike other regulatory-based measures to reduce CO₂ emissions (or other pollutants), a carbon tax would raise significant revenues. According to CBO, a CO₂ stabilization tax might generate around \$163 billion over a five year period. These revenues could play key roles, for example, in reducing the federal budget deficit, in reducing any distribution burdens imposed by a carbon tax, or providing the funds to sponsor research and development on technologies affecting the demand and supply for energy. While the process by which any carbon tax revenues are allocated should not necessarily be different than for other federal revenues, the existence of revenue potential does offer important economic policy opportunities. This is particularly true if carbon taxes are viewed as just one part of a larger effort to rationalize domestic energy use and minimize economic and social disruptions.

Cost-Effective Emission Reductions - The market for fossil fuels and fossil fuel energy sources cuts across virtually every economic sector of the U.S. economy. Each of the various uses of fossil fuels offers different opportunities for reducing the amount or type of fossil fuels utilized. Each of the opportunities is likely have different control costs. It would be nearly impossible to select the cheapest or most cost-effective set of regulations or control requirements from the hundreds or thousands of opportunities for conserving energy or switching fuels. A carbon tax would automatically bring out many of the least expensive CO₂ reduction options as the tax is passed on through the markets for fossil fuel products.

While there is strong presumptive evidence that a carbon tax would lead to cost-effective emission reductions, several characteristics of domestic energy markets may still limit the range of economic responses. For example, state and local electric utility regulatory constraints may restrict the ability of prices to guide conservation or efficiency investments even at higher energy price levels. No market is perfect, and the full range of CO₂ emission reductions from a carbon tax may require other regulatory and institutional reforms. Any other set of emission control requirements is likely, however, to cost the economy more to achieve the same level of control than a carbon tax.

A carbon tax is likely to reduce other pollutants associated with fossil fuel consumption. Unlike CO₂, however, SOX and NOX emissions are more a function of the type, for example, of coal used and the method by which the coal is transformed into energy. (The same amount of CO₂ is emitted from burning a ton of coal no matter how it is burned.) Therefore, it is not necessarily the case that the resulting non-CO₂ emission reduction would also be cost-effective. Different environmental taxing strategies would probably make more sense if SOx emissions were the primary pollution of concern. Nevertheless, a carbon tax will reduce the use of coal to produce energy and, thereby lower emissions of many other pollutants. The value of these benefits should, of course, be included in any analysis of the costs of a carbon tax. They can be subtracted from

the cost side of the equation to arrive at a net cost of CO₂ reduction or added to the benefits of reducing CO₂ emissions.

Efficiency Gains from a Carbon Tax - Unlike many other sources of federal revenue, a carbon tax would generate overall economic efficiency gains, regardless of how the revenues from the tax are used. Short-term macro economic costs will arise from a carbon tax (as they do with most tax strategies as discussed more fully below), but the ultimate rearrangement of resources in the economy following the imposition of a properly design carbon tax should leave the economy better off. This reasoning follows from the logic of a carbon tax -- that is, to correct existing prices for energy to reflect the social costs of fossil fuel combustion, primarily CO₂ emissions. If the tax has been set at the right level, the resulting new prices should lead to a better allocation of economic resources in the long term.

Relationship to Other Policy Options - There appears to be almost unanimous agreement that greater investments in energy efficiency and conservation and research in alternative energy supplies are key components of any domestic strategy to reduce CO₂ emissions. In fact, these two areas are the central pieces of the President's current policy recommendations concerning the risk of global warming (along with increased scientific research). Higher energy prices, reflecting their true social costs, would work in tandem with these other programs. The success of investments in energy technologies depends, in large part, on the existence of an economic incentive for households and industrial consumers of energy to use the fruits of the research. Energy consumers could be forced to apply conservation and efficiency measures, but prices offer a much more effective mechanism for encouraging the right kind of efficiency at the right time and right place. In addition, higher energy prices would provide a continuing incentive for the private sector to develop alternative energy use and production techniques to supplement (or even eventually displace) public sector efforts.

Macroeconomic Consequences of Environmental Taxes

No matter how badly the market has priced domestic output in terms of environmental costs, the fact remains the U.S. economy has arranged itself around these prices. Production, employment and energy consumption patterns have developed that are dependent on status quo of relative prices not inclusive of social costs. Thus, attempts to reorganize prices by an environmental tax will rearrange current economic patterns and may result in measurable economic losses even taking into account the possibility of some winners as well as losers. In the case of a carbon tax, those industries or energy users most dependent on fossil fuels, least able to switch to alternative energy sources, least able to produce lower energy product lines, or least able to reduce their overall use of energy will be hardest hurt. By definition, however, these losses should be viewed as transitory not permanent if the change in the price of energy is no more than the benefits associated with reduced fossil fuel energy consumption.

Short-term Macroeconomic Impacts - Virtually, every macroeconomic analysis of energy or environmental taxes report lower levels of GNP and higher prices levels than would be the case without the tax. As shown in an analysis conducted by Data

Resources Inc., this result is also true of virtually any tax strategy for reducing the federal budget deficit including increased income taxes or a broad-based consumption tax.³ These analyses assume, however, that no other benefits from a tax are forthcoming.⁴ While this may be true for certain types of taxes, it cannot be the case for an environmental tax. A tax on tobacco, justified in part on the social costs of smoking, would be shown using these models to have a negative effect on the economy. There is a problem in the logic. Economists argue that we have too much pollution because we fail to price properly the use of the environment. Yet, when we do price it right, the economy is forever worse off.⁵

✓ The major source of confusion is not from the logic but within the models themselves. (None) of the most quoted analyses or macroeconomic models include or capture the benefits from tax strategies that correct market failures as well as raise revenues. The realization that domestic national income accounts include only a fraction of the benefits from environmental pollution control is hardly new. Further, virtually all economic studies relating environmental regulation to economic productivity losses ignore the benefit side of the equation.⁶ It is essentially assured that any economic analysis of an environmental tax will show economic losses.⁷

³ Caton, Christopher N., "Fixing the Deficit: What is the Best Way?", Presented at PIRNIC Oil Policy Seminar, Washington, D.C., March, 1989.

⁴ Very quick reductions in the deficit could translate into short-term losses in GNP as the economy adjusts (depending on domestic monetary policy). Over the long run, however, lower domestic interest rates should stimulate domestic investment and economic growth.

⁵ For a more detailed discussion of these issues as they relate to a gasoline tax, see: French, Mark, "Efficiency and Equity of a Gasoline Tax Increase," Federal Reserve Board, Washington, D.C., July 1988.

⁶ This omission is most is most explicitly noted in, Barbera, A.J. and V.D. McConnell, "The Impact of Environmental Regulations on Industry Productivity: direct and Indirect Effects," Journal of Environmental Economics and Management, Vol. 18, No. 1, (1990), pp 50-65.

✗ ⁷ There is a more subtle issue involving the establishment of a baseline for comparing costs and benefits. For example, in a recent analysis of the costs to electric utilities of climate change estimated that this industry might have to spend ✗ up to \$100 billion over the next twenty years to meet new peak load demands. (DRI/McGraw-Hill, Energy Review, Lexington, MA, August, 1989). Should this figure be included in current baseline GNP, or is it part of the benefits of reducing global warming risks?

The problem is fundamental to how society values economic and environmental goods. GNP is an imperfect way to measure social welfare unless gross national output can be defined and estimated to include the value of reductions in environmental risks.

Nevertheless, short-term transitions are likely to occur under any new tax policy. These costs for environmental taxes will be a function of the size of the tax, the time period over which the tax is put in place, structural rigidities in the economy, and how the tax revenues are used. In the case of a carbon tax the current macroeconomic models portray the flexibility of the economy by assumptions concerning the responsiveness of the demand for energy as a whole and fossil-fuel energy specifically to price changes, and the responsiveness of supply of energy to price changes. Econometric models rely on past trends as predictions of the future. These models may overstate the transition costs if they underestimate the ability or incentive for consumers and producers to adopt energy-reducing responses.

For example, if new opportunities for conservation or energy efficiency to reduce energy demand become (or are) available, short-term transition costs associated with a carbon tax might be significantly lower. The possibility of this latter point being true has attracted the attention of energy efficiency enthusiasts and others. Some have argued that energy conservation can be costless and result in CO₂ emission reductions at a zero or even a negative cost.⁸

If the transition costs of an environmental tax are judged to be too high, the timing of the tax could be modified. A carbon tax that is phased in over a period of several years would reduce the interim economic impacts by providing more time for producers and consumers to respond to the price changes. While a phased tax will not achieve the same emission reductions, at least in the same time frame, it would put the economy on a long term transition path to reduced pollution. In addition, some of the macroeconomic consequences could be reduced by rebating the revenues by reducing other tax burdens.

International Competitiveness - Raising relative domestic product prices through an environmental tax will have differential industry impacts. Without formal economic modelling it is hard to identify which sectors of the economy would be most affected. In the case of a carbon tax, those industries that are less energy intensive or best able to substitute inputs or outputs to minimize energy costs will be hurt less than other industries. It is likely, however, that overall the cost of domestic products will rise, in the short-run, relative to our international competition. This is true regardless of the fact

⁸ It is impossible at this point to test the hypothesis that enough energy conservation and efficiency is available at very low costs to negate the short-term macroeconomic impacts of a carbon charge. An economic supply curve for energy efficiency (that relates the price of energy efficiency investments with the quantity energy efficiency in various consumer and producer sectors) on an aggregate national level needs to be developed and incorporated into the econometric macroeconomic models.

that energy prices in Europe and Japan, for example, are already much higher than U.S. prices.

The ultimate impact of an environmental tax on the domestic trade balance would depend, in the case of a carbon tax, on whether the tax was used to help reduce the federal budget deficit, the degree to which oil imports are lowered and the new mix of outputs as the domestic economy responds to higher energy prices. Nevertheless, it may be important from a trade perspective to consider federal policies (tax or otherwise) that would help minimize any detrimental trade effects by lowering the costs of other factors in production. For example, increased investment tax credits for research and development on energy saving technologies, revised treatment of capital gains or reductions in the double taxation of corporate profits might offset some of the increased energy prices.⁹

Distributional Consequences of an Environmental Tax

While a properly designed environmental tax would result in improved economic efficiency, it would also redistribute domestic incomes. Again, a full accounting of who wins and who losses under a new price regime requires formal economic modelling. For a carbon tax, though, it can be presumed that concern might be focused on at least three key potential distributional impacts. First, to the extent that a carbon tax would fall relatively hardest on the use of coal, wealth and jobs in the coal mining and production sectors will fall. Thus, any strategy to redirect energy prices, on the basis of CO₂ or some other pollutant, will have to also address the need to adopt transition policies for the coal mining population. Some programs to assist in the downsizing of the coal mining sector, at least in some regions of the country, are presumably already in place and might provide guidance in the development of a larger scale effort.

The second sector differentially affected by a carbon tax may be lower income households. Any tax on consumption, be that product specific or a broad-based consumption tax is likely to be regressive. That is, that lower income households would pay more under such a tax as a percentage of income than higher income classes. Analyses by CBO and others argue, however, that an energy tax may actually be proportional if tax payments are compared to expenditures rather than income or if the comparison uses income over a lifetime rather than in one year.¹⁰ While the degree of inequity associated with a carbon tax may be subject to some analytical uncertainty,

⁹ A recent report by the Office of Technology Assessment identifies several federal policy options that could help reduce the cost of capital to U.S. firms and thus improve their competitive positioning. Office of Technology Assessment, Making Things Better -- Competing in Manufacturing, U.S. Congress, Washington, D.C., 1990.

¹⁰ See, for example, Congressional Budget Office, The Budgetary and Economic Effects of Oil Taxes, U.S. Government Printing Office, Washington, D.C., April 1986.

various policies might be considered as part of a energy tax package to help offset any effect. Income tax credits for energy payments made by lower income classes may be one possibility. Another option with much broader implications would be to offset some portion of carbon tax receipts by lowering another regressive tax. The current payroll tax that finances social security programs is an obvious prospect.

Finally, a carbon tax is likely to have very different regional impacts. Electricity consumers in states that rely heavily on coal-fired power plants will pay a greater portion of the tax than consumers serviced by nuclear or hydropower. Further, the wealth of regions of the country that contain greater concentrations of energy intensive industries may suffer relative to other regions.

CONCLUSIONS

Most taxes have the potential to distort economic choices. Environmental taxes are quite different. As long as care is given to setting the right tax level, taxes based on environmental degradation offer the potential of redirecting our economy to a more efficient allocation of resources as well as generating significant revenues. It makes little sense to raise the cost of good things in the economy while other components of the domestic economy remain underpriced. While it would be misleading to understate the implementation issues surrounding various environmental taxes or their distributional implications, the huge benefits from a more rational tax system puts a high value on finding the right solutions to these potential problems.

Outline of Possible
Downey-Gore Environmental Tax

Tax Base and Point of Collection

Excise taxes would be imposed on the following energy sources at the points in their chain of distribution indicated:

Petroleum	Removal from refinery
Coal	Removal from mine
Natural gas	Removal from pipeline to local distribution system
Natural gas liquids	Removal from production facility
Electricity	Sale to user or generation by a major generating facility for use without sale

Imports of coal, natural gas liquids, and refined petroleum products would be taxed at the border. Because domestic petroleum, natural gas and electricity generally is taxed downstream in the distribution chain from importation, tax on imports of those energy sources would be the same as for domestically produced sources.

Imported derivative products would be taxed at the border (generally at the base rate amount, described below) if the imbedded energy cost of producing the products exceeded [5-10] percent of their value on importation.

Tax Rates

The environmental excise tax rate would consist of a "base rate amount" and an additional "global warming surcharge". The base rate amount would apply to all taxable energy sources and would be a set dollar/cents amount per unit of energy source designed to approximate [2.5-5] percent of the average national retail sales price of the taxable energy source.

The global warming surcharge would be phased in over a 10-year period and would increase the rates applicable to fossil fuels by the following number of percentage points of average national sales price:

Years	Coal	Petroleum	Natural Gas/ N.G. Liquids
1-3	5	2	.25
4-5	10	4	.50
6-7	15	6	.75
8-9	25	8	1.00
10 <u>et. seq.</u>	35	10	1.00

[These surcharge rates reflect phase-in of the previously discussed carbon tax proposal of a 1-percent tax on natural gas, a 10-percent tax on petroleum, and a 35-percent tax on coal. They might be reduced proportionately in light of the base rate applicable under the possible proposal.]

Average national retail sales prices would be adjusted no more frequently than annually whenever the current market average price exceeded (fell short of) that used in calculating tax by more than [2-5] percent. Floor stocks taxes would be imposed whenever such an adjustment resulted in an increase in the per unit amount of tax on the energy source in excess of [5-10] percent.

Exemptions

Exemptions, realized by the mechanism and in the amount indicated, would be provided for--

- (1) Electricity generated using coal, petroleum, or natural gas by credit against the electricity tax in an amount not exceeding the base rate amount for the coal, petroleum, or natural gas so used.
- (2) Coal, petroleum, or natural gas used for a non-fuel (e.g., raw material) use or in the production or transportation of the same taxable fuel by refund to the user of the product.
- (3) Exports of primary energy sources generally by refund to the exporter. (Refunds for exported electricity would be limited to tax determined using the base rate amount.)
- (4) Exports of derivative products having an imbedded production energy cost in excess of [5] percent of the product value and produced with energy subject to tax at a rate in excess of [10] percent by refund on exportation of such excess to the exporter with refunds being determined using the base rate amount. (Self generators of energy could be allowed up-front exemptions in the case of

products clearly destined for export as is allowed under other present Federal excise taxes.)

Effective Date

The tax would be effective on the later of January 1, 1991, or the first day of the calendar quarter beginning at least six months after its enactment. Floor stocks taxes would be imposed on coal, petroleum products, natural gas, and natural gas liquids held beyond the point of taxation on the effective date.

Possible Coal Incentives

(1) Enhanced research-and-development-type credit for research on technology to enhance the BTU content of coal.

(2) Enhanced cost recovery methods/periods for equipment used in implementing such enhanced BTU content of coal. *enhanced efficiency*
e.g. fluidized bed boilers. *enhanced efficiency*

(3) Job retraining credits for employers of displaced miners based on a targeted jobs credit model.

(4) Full deductibility of student loan interest and amortization of job retraining tuition costs incurred by displaced miners.

(5) *Trees, not reforestation*