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Pollution and Energy Taxes: Their Environmental and Economic Benefits

Raising revenues through environmental charges, thereby improving local environmental quality, makes more sense than raising taxes that drive business and workers away.

Now more than ever, environmental and economic priorities must be reconciled. Protecting the nation's air, waters, forests, and soils is urgent; so, too, is strengthening the national economy. The persistent budget deficit and longer-term competitive problems have raised questions about the compatibility of the two. Debates over protecting old-growth forests in the Northwest, over joining other nations in reducing greenhouse-gas emissions, and over protecting the nation's coasts and wetlands have all been cast as choices between environmental protection and jobs or income.

The resources with which to address these and other pressing problems are not at hand. National, state, and local governments are grappling with budget deficits. However, tax policy has been preoccupied with *how much* we tax, not *what* we tax. We need to use the fiscal powers of government to correct marketplace distortions, rather than to create distortions. Environmental protection can be strengthened and annual cost savings totaling more than one percent of gross domestic product—more than $50 billion per year—can be realized simultaneously.

The key is to make greater use of charges and levies on activities which excessively damage the environment. If federal, state, and local governments in the United States grasped the abundant good opportunities to levy such charges, we could reduce substantially environmental damages at much lower cost than through command-and-control regulations. At the same time, enough revenues would be collected to allow much more burdensome taxes to be reduced by ten percent or more, or permit us to reduce the deficit substantially, without raising those burdensome taxes even higher.

Counterproductive taxes

At present, our taxes on payrolls, incomes, and profits penalize the very activities that make the economy productive—work, savings, investment, and entrepreneurship. These taxes act as disincentives and reduce private incomes by much more than a dollar for each additional dollar they can raise in revenues. Taxes on wages and salary incomes discourage some workers by lowering take-home pay. The workers either withdraw from the labor force or work fewer hours. Payroll taxes also prompt employers to search for cheaper alternatives. They can automate their operations or move them overseas. Taxes on income from investments have analogous costs. They lower the after-tax returns from investments and induce people to seek tax shelters, to save less, or to move capital abroad. Putting capital in tax shelters diverts it from more productive investments, and lower sav-

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ings rates reduce capital formation. The private income lost by raising payroll, profits, or income tax rates would be in the range of $1.25 to $1.60 for every additional $1.00 of public revenue gained.

Even a value-added tax (VAT), which is more broad-based than many other revenue options, has distortionary effects. It would be borne partially by payrolls and profits—the two largest components of value added. Since payrolls and profits are already taxed quite heavily, the disincentive effects of a VAT must be estimated from a baseline that includes those existing taxes. Moreover, even though a VAT would be partially shifted forward to consumers, firms and industries differ substantially in their ability to pass the tax along to consumers. Some who enjoy considerable market power or those who do business in industries facing inelastic demands can readily raise prices without much effect on sales. Others who face intense competition cannot raise prices, and would have to adjust production accordingly. Even a VAT imposed at a uniform rate would distort the pattern of prices and production.

A lesser reliance on these conventional taxes would serve the system better. We could find needed revenues through environmental charges, which discourage activities that make the economy less productive—resource waste, pollution, and congestion, for example.

Environmental charges confront polluters and others who damage the environment with the full costs of their activities. When environmental resources are impaired, the costs typically aren't borne by the individual or firm responsible for the damage, but are suffered by all users. Although command-and-control regulations seek to force polluters to reduce their damaging activities, the results are usually administratively cumbersome and technologically inefficient. Currently, the total cost of compliance with environmental regulations in the United States is about $120 billion per year—or 2 percent of gross domestic product. These costs could be cut by a substantial fraction if cleanup and control were more efficient. Charges levied on the damaging activity ensure that costs are distributed uniformly to those who cause the damage, but allow them flexibility to develop solutions. The result is that those who can reduce environmental damage most easily do most of the cleanup; and all polluters seek low-cost abatement methods.

Moreover, we cannot effectively address some environmental problems through regulations because those that contribute to the problem are too numerous and diverse, or because the problem is shifting so quickly that regulations would quickly become obsolete. Traffic congestion, solid-waste generation, and carbon-dioxide emissions are three such problems. Environmental charges could deal with them more effectively. If applied where needed throughout the country, they could produce savings of 5 cents to 20 cents for every dollar raised in revenue—according to the estimates of the World Resources Institute (WRI). Savings would take the form of reduced waste collection and disposal costs, less time spent in traffic, fewer accidents, and less damage from atmospheric pollution.

Cities and states stand to benefit greatly by making use of environmental charges. The recession has forced state and local governments to cut expenditures and raise taxes. However, tax increases spell double trouble for local and state economies. They discourage work and savings in the same way federal taxes do, and they encourage the flight of mobile labor and capital to lesser-taxed jurisdictions. The excess burden of conventional taxes imposed by state and local governments is thus even higher, from their perspective, than the estimates imply for federal taxes. Raising revenues through measures that improve local environmental quality makes more sense than raising taxes that drive business and workers away. So far, although forty-three states use environmental charges to some extent, their potential has barely been touched.

WRI analyzed the economic and environmental effects of several environmental charges—including taxes on fossil fuels, pay-by-the-bag charges for solid-waste collection, and road tolls that vary with the level of congestion. The analysis shows that the U.S. economy could easily shift $100 billion to $150 billion in federal, state, and local revenues from taxes on the "goods" of work and investment to charges on these "bads" of waste—pollution and congestion. The economy would reap dividends of $50 billion to $80 billion per year in the form of reduced environmental damage and greater economic productivity as a result. And other opportunities abound.

Solving the solid waste problem

Landfills in many American cities are filling up with

trash, or closing down for environmental reasons. Between 1960 and 1988, the volume of municipal solid waste generated every year more than doubled—from 88 million tons to 180 million tons. The pace of new landfill construction has slowed, as environmental standards and community resistance have toughened. As a result, landfill-disposal costs are dramatically higher than a decade ago.

Since households in most communities pay for solid-waste services through property taxes, it costs them nothing to put out an extra trash bag, though, in heavily urbanized regions, the costs to communities of dealing with more solid waste may be $100 per ton or more. As a result, households do too little to cut back on waste disposal, and communities are forced to spend too much on waste services.

This incentive problem can be corrected by charging households the full incremental costs of waste disposal through a "pay-by-the-bag" system. Hundreds of communities throughout various countries have initiated such systems. Estimates derived from a statistical evaluation of the experiences of a sample of communities imply that households that pay by the bag respond vigorously to price signals (see *Table 1*). A typical community that raised its collection fee per 32-pound bag from zero to $1.50—in line with incremental costs—would reduce solid-waste generation by 18 percent. Fees combined with a curbside recycling program would reduce waste volume by about 30 percent. For "pay-by-the-bag" systems that include curbside recycling, the savings from reduced landfill costs would more than offset the budgetary costs of the recycling programs. Adopted nationwide in communities with high or moderate waste-disposal costs, charges accompanied by curbside recycling would generate revenues of $6.3 billion per year and net savings of $432 million. This shows how local governments can use fee-for-service user charges to increase efficiency and reduce pressure on property taxes.

Table 1 **Results of Solid-Waste Pay-by-the-Bag Systems** [1]

	Communities	
	High-Cost	Moderate-Cost
Appropriate level of charges		
for 32-gallon container	$1.83	$1.03
per ton	$195	$110
Changes in waste volume		
Reduction in landfill volume (lbs. per person per year)	320	180
Increase in recycled volume (lbs. per person per year)	133	75
For a community of 500,000 people		
Reduction in landfill volume	37%	21%
Net savings from landfill reduction (million $ per year)	$6.96	$2.21
Increase in recycled volume (tons per year)	29,688	16,741
Gross cost of recycling (million $ per year)	$2.97	$1.67
Revenues from charges (million $ per year)	$23.57	$16.73
For all high- and moderate-cost states		
Net savings (million $ per year)	$487	$618
Gross cost of recycling (million $ per year)	$206	$467
Revenues (billion $ per year)	$1.65	$4.68

1. Based on market and non-market disposal costs.

Abating traffic congestion

Variable tolls can help control traffic congestion on the nation's roads and highways. Congestion, which already costs tens of billions of dollars in delays, accidents, and pollution has worsened because the total miles traveled by motor vehicles increased by 90 percent between 1970 and 1989; yet, funds were available to increase urban-road capacity by less than 4 percent. Nearly 70 percent of rush-hour travel endures stop-and-go conditions—a 30-percent increase in the past decade. Without a change in policies, congestion will only worsen.

Drivers ignore the full costs of using crowded roads. When they enter a congested highway, they consider only how long it will take to reach their destinations, and they ignore the fact that their cars delay all other drivers and increase the probability of accidents. Too many cars, therefore, are on the road under congested conditions. Tolls based on the costs that an additional car imposes on all others during congested periods would allocate road capacity more efficiently. These tolls would induce some drivers to reschedule or reroute trips, some others to car-pool, and still others to use public transportation.

WRI's analysis estimates that tolls set to reflect the costs of traffic delays would range from zero to $2.10 for a typical ten-mile trip, and would reduce

vehicle miles traveled at peak periods on the nation's busiest urban highways by 11 percent. Such tolls would generate annual revenues of $44 billion and net savings exceeding $4 billion in reduced travel time—over and above the costs to drivers of adjusting their travel schedules. To cover the full social costs of accidents and delays, tolls would range from zero to about $3.60 for a typical ten-mile trip, would reduce peak traffic by 22 percent, and would save about $11 billion per year on revenues totaling $98 billion (see *Table 2*). If congestion tolls are not adopted, nearly $50 billion will have to be spent on highway construction by 1999, just to achieve the same mitigating effect on road congestion. Congestion tolls could avoid these costs, while generating the billions of dollars needed to pay for upkeep of our existing transportation infrastructure and to improve public-transportation options. Peak-period pricing works for electricity and telecommunications—two other capital-intensive industries. It can work for urban transportation.

Table 2 Results of a Nationwide Congestion Toll System (1989)

Congestion Toll	
Original VMT [1] (million per year)	1,055,637
Adjusted VMT[1] (million per year)	989,153
Percent reduction	6.3%
Revenue generated (billion $ per year)	$44.1
Most congested VMT [1] (million per year)	399,432
After toll (million per year)	354,964
Percent reduction	11.1%
Net savings (billion $ per year)	$4.2
With Accident Toll	
Adjusted VMT [1] (million per year)	966,708
Percent reduction	8.4%
Toll range (cents per mile)	.00 to .28
Revenue generated (billion $ per year)	$73.4
Adjusted congested VMT [1] (million per year)	332,971
Percent reduction	16.6%
Net savings (billion $ per year)	$7.3
With Accident Delay Toll	
Adjusted VMT [1] (million per year)	943,912
Percent reduction	10.6%
Toll range (cents per mile)	.00 to .36
Revenue generated (billion $ per year)	$98.4
Adjust congested VMT [1] (million per year)	310,455
Percent reduction	22.3%
Net savings (billion $ per year)	$10.8

1. Vehicle miles traveled

Fortunately, the technologies needed to make congestion tolls cheap and efficient already exist. Along several U.S. highways, electronic toll stations transmit signals to "smart cards" carried on passing vehicles that record the vehicle's point of entry to, and exit from, the highway. Such systems are already in place on several U.S. highways. With congestion tolls, the card can be debited directly at rates that depend on length of trip, choice of route, and time of travel.

Other possible green fees

There is a wide range of other potentially useful environmental charges— including effluent charges on toxic substances and vehicle emissions, recreation fees for use of the national forests and other public lands, product charges on ozone-depleting substances and agricultural chemicals, and the reduction of subsidies for mineral extraction and other commodities produced on public lands. Such environmental charges would reduce a wide range of damaging activities in a cost-effective manner, while raising over $12 billion in revenues (see *Table 3*).

Reducing environmental impacts from energy use

Throughout the fuel cycle, there are significant environmental damages. At the extraction stage, there are problems with land disturbance, mine drainage and wastes, oil spills, ecological disruptions from hydroelectric storage, and so on. At the conversion stage, there are impacts on land, air, and water quality. Atmospheric emissions in the United States still total 20 million tons of sulfur dioxide, 19 million tons of nitrogen oxide, 62 million tons of carbon monoxide, 17 million tons of volatile organic compounds, and 7.5 million tons of particulates. The large majority of these emissions emanate from energy use in transportation, electricity generation, and industrial processes.

Many of these impacts are addressed by environmental regulations, with varying degrees of effectiveness. Nonetheless, there are still significant environmental damages associated with energy conversion and use that are not captured by market prices. For example, recent estimates of the environmental damages due to atmospheric emissions from

Table 3 Other Environmental Charges

Kind of Charge	Likely Revenue (billion $)
Charge on toxic releases	0.3
Fee on vehicle hydrocarbon emissions in regions not meeting air quality standards	0.5
Water effluent fee	2.4
Recreation fees in national forests	5.0
Tax on ozone-depleting substances	0.5
Charge on pesticide and fertilizer use	1.0
Reducing depletion allowance for fuel and non-fuel mineral extraction	1.2
Increasing royalties for hardrock mining on public lands	0.6
Full-cost pricing of Bureau of Reclamation water	0.5
Full-cost pricing of Forest Service timber	0.4
TOTAL	12.5

coal-fired power stations, at current standards of pollution control, amount to at least $0.006 per kwh—approximately 10 percent of total generating costs.

Combustion of fossil fuels also generates carbon dioxide, which, along with other greenhouse gases, risks warming the Earth's atmosphere. Unless checked by effective national and international policy, carbon-dioxide emissions will continue to grow in the United States and worldwide. Global warming could cause significant environmental damage—including coastal erosion and flooding from sea-level rise, the destruction of wetlands and other ecosystems, accelerated species extinction, and disruption of hydrological patterns.

Stabilizing atmospheric concentrations of greenhouse gases requires the reduction of carbon-dioxide emissions. Because almost all economic activities use energy derived from fossil fuels, such reductions could be achieved most efficiently by taxing the carbon content of fuels. Because fuels' carbon content varies per unit of energy, coal, oil, and natural gas would be taxed at different rates. A carbon tax would provide market incentives for all users to find the best mix of fossil and non-fossil fuels and energy conservation for their particular circumstances, and to avoid the inefficiencies of regulatory mandates.

A carbon tax of about $30 per ton, phased in over five years, would stabilize U.S. emissions at 1990 levels by the year 2000, and would generate revenues of $36 billion by the fifth year. Most macroeconomic models suggest that the economic consequences of such a tax would be either fairly small losses or outright gains—depending on how the tax revenues were recycled into the economy through other tax cuts. But these macroeconomic models neglect the potential damages from climate change, and also overlook other significant benefits of carbon taxes—reduced dependency on oil imports and decreased emissions of other air pollutants.

Since a carbon tax's main impact would be to reduce the growth of coal consumption, measures would be needed to offset the economic impacts on such states as West Virginia, Kentucky, and Wyoming—where coal production is concentrated. The Clinton Administration has dealt with this problem by proposing a modified BTU tax that taxes fuels in proportion to their BTU content or BTU equivalent (with disproportionately heavy rates on oil). While less efficient in terms of carbon-dioxide abatement than a strict carbon tax, this proposal deals with a broader range of environmental and security issues, and is estimated to have similar impacts on carbon-dioxide emissions per dollar of revenue over a fifteen-year horizon. If it had passed, the Clinton tax proposal, when fully phased in over three years, would have raised net revenues of about $22 billion dollars annually.

The economic burden of this tax would have been small. Energy prices in the United States are currently well below those in Europe and Japan—our principal industrial competitors. Studies show little competitive advantage from low energy prices. Countries with low energy prices have not experienced more rapid economic growth, lower rates of inflation, or more favorable trade balances. Principally, low energy prices lead to continuing low levels of energy efficiency. Energy costs make up only 2.6 percent of U.S. industrial-production costs, on average, and, even if totally absorbed by industrial energy users, the tax would have raised average manufacturing costs by one-tenth of one percent.

Moreover, since most energy-intensive industries are also capital-intensive industries, the indirect economic effects on industrial competitiveness would be favorable. The U.S. current-account deficit has been largely a monetary phenomenon, arising from the need for huge foreign borrowing to finance domestic deficits. Reducing the budgetary deficit will lower capital imports and long-term interest rates, and prevent the dollar from rising against other currencies. Capital-intensive industries might gain more from lower interest rates and a more favorable exchange rate than they would lose from higher energy prices. Bond and foreign-exchange markets have reacted precisely in this direction, in anticipation of enactment of the Administration's deficit-reduction proposals.

Another important effect is the one on employment. An energy tax falls most heavily on the most energy-intensive industries, which are not, by and large, the most labor-intensive. Moreover, the energy tax encourages all firms to substitute other production inputs for energy use. This generally implies a substitution toward more employment. By contrast, a VAT (an alternative broad-based tax) falls partially on wages and salaries, which constitute the largest share of value added. Consequently, one would expect that, for the same amount of revenue collected, a broad-based energy tax would have more favorable employment implications. Given the concern over the slow rate of job growth in the current recovery, this distinction is important.

The distributional effects of a broad-based energy tax are mildly regressive as a percentage of household expenditures. However, a VAT would also be regressive to approximately the same degree, since it falls more heavily on consumption than on savings. The principal difference is that an energy tax offers easy and constructive opportunities for tax savings. At present, the only way most people can reduce their tax bills is to work less and earn less income. Environmental charges would give them the option of reducing their tax bills by acting on their principles—by saving energy or bicycling to work. The average household could offset 20 percent to 30 percent of the higher costs of gasoline from the proposed energy tax just by keeping tires properly inflated.

If people are asked whether they favor higher taxes, overwhelmingly the answer is "no." If people are asked whether they would rather be taxed on their use of energy and on the amount of waste they generate than on their salaries, profits, or monthly expenditures, the answer is "yes." According to public-opinion polls, most people faced with a choice of higher taxes would prefer "sin" taxes on cigarettes and alcohol, or pollution taxes, because people see some direct benefit coming from those tax payments.

These findings refute the argument that environmental quality can be obtained only at the cost of lost jobs and income. Indeed, providing a better framework of market incentives by restructuring our revenue system can improve environmental quality simultaneously, and make the American economy much more competitive. Taxes on income, payrolls, profits, and value added are distortionary taxes, and their use implies some net drag on the economy. By contrast, well-designed energy and environmental taxes are corrective taxes, and can achieve double dividends by reducing excessive environmental damages at the same time that they raise government revenues.