

GREENING THE TAX CODE

CRAIG HANSON AND DAVID SANDALOW

SUMMARY

In recent years several Republican and Democratic governors have imposed new pollution taxes, often winning bipartisan acclaim. A growing number of commentators have supported such measures at the federal level.

Analysis indicates that taxes on air and water pollution could generate substantial revenue for the U.S. Treasury while improving environmental quality, stimulating technological innovation and enhancing energy security. Reducing tax expenditures with adverse impacts on natural resources could do the same. As lawmakers explore ways

to reduce federal budget deficits and reform the tax code, they should consider measures that shift more of the tax burden onto activities—such as pollution—that make the economy unproductive or reduce quality of life.

This policy brief examines fiscal instruments that both raise revenue and help improve environmental quality. The paper analyzes several different types of pollution taxes, considers current tax expenditures with adverse environmental impacts, discusses ways of integrating these instruments into tax reform packages and suggests directions for further research.

I. TAXES AND THE ENVIRONMENT

Tax policy influences countless thousands of decisions each day. It helps determine how much people work and spend, where they start new businesses and when they make capital investments. These decisions in turn have significant impacts on natural resources and the environment.

On rare occasion, federal tax measures have been designed to achieve environmental objectives. In 1989, for example, President George H. W. Bush signed legislation imposing a tax on certain ozone-depleting chemicals, in order to help implement obligations under a treaty adopted several years earlier by President Ronald Reagan. The tax achieved its environmental objective (with the use of these chemicals falling 38 percent in 1990 alone) and raised more than \$2.9 billion in its first five years.¹ Another example is the Superfund tax, a levy on oil, chemical and other companies with revenues designated for cleanup of toxic waste sites. The tax

was in place from 1980 through 1995 and raised more than \$20 billion for cleanups.²

In most cases, however, the impact of federal tax policy on the environment is unintended. This does not mean such impacts are insignificant—indeed, federal taxes have far-reaching effects on the natural environment. Provisions authorizing the expensing of timber production costs, for example, may increase pressures on natural forests. The oil depletion allowance subsidizes drilling in ecologically sensitive regions. Some observers believe the home mortgage interest deduction creates incentives for urban sprawl and encourages larger homes (which use more energy).

Significantly, many states impose taxes designed to enhance environmental quality, including water effluent charges and fuel taxes designated for natural resource protection. In 2004, for example, Maryland Governor Robert Ehrlich,

a Republican, proposed and signed legislation imposing a tax on septic systems and a surcharge on sewer bills with proceeds dedicated to protecting the Chesapeake Bay. The measure won him widespread bipartisan acclaim.

Just as tax policy can affect environmental quality, environmental policy can affect fiscal health. In part, this is because natural resource degradation and regulations designed to prevent it can both affect the tax base. More directly, it is because pollution taxes can help raise revenue.

No doubt the lack of enthusiasm for pollution taxes within Congress is due in large measure to the impression that pollution taxes lack political support. That impression is not consistent with recent experiences at the state level.

Historically, federal lawmakers have shown little enthusiasm for pollution taxes. According to the Organization for Economic Cooperation and Development, industrialized countries collected an average of 5.7 percent of their national government revenues from environmental charges (including motor fuel levies) in 2003. In the United States, that figure was 3.5 percent—less than half that of the United Kingdom (7.6 percent) and a third that of Denmark (10 percent).³

No doubt the lack of enthusiasm for pollution taxes within Congress is due in large measure to the impression that pollution taxes lack political support. That impression is not consistent with recent experiences at the state level. Like Maryland, several states have imposed new pollution charges to protect natural resources. Illinois, for example, now taxes many discharges into public waterways. Indiana, Kansas, Maine, Nebraska, North Carolina and West Virginia—among others—have all increased gasoline taxes in recent years.

These state-level experiences suggest several lessons. First, earmarking a tax for a popular purpose enhances its political acceptability. Second, setting tax rates at modest levels does the same. Third, indexing excise tax rates to the consumer price index (CPI), as Florida does with its gas tax, can help

prevent erosion of revenues in real terms. Finally, modest increases in energy-related taxes can sometimes be enacted with relatively little controversy.

The political acceptability of energy taxes in the years ahead will depend in part on public reaction to recent swings in energy prices. On the one hand, widespread alarm about high energy costs may make any taxes related to energy politically unpalatable for years to come. On the other hand, the substantial increase in gasoline prices during the past several years, with record-high levels in the immediate aftermath of Hurricane Katrina, followed by the steady decline in gasoline prices during the fall of 2005, may dampen concerns about the much smaller price impacts associated with some tax proposals. Will taxpayers who have seen average gasoline prices climb from \$1.50 per gallon in 2003 to \$3.06 in early September 2005 and then drop to \$2.15 in November 2005 automatically reject a measure that increases prices 5 or 10 cents per gallon? Would it matter if the revenues were designated for a popular objective, such as reducing the United States' dependence on foreign oil?

Questions such as these should be on the agenda as Congress considers tax reform and deficit reduction in the years ahead. This brief provides an overview of measures that could both raise revenue and help protect the natural environment, focusing first on tax expenditures with adverse environmental impacts and then on pollution taxes. After exploring these topics, we discuss ways of integrating these measures into tax reform proposals and suggest directions for future research.

II. TAX EXPENDITURES WITH ADVERSE ENVIRONMENTAL IMPACTS

“Tax expenditures” include special preferences, incentives and subsidies, such as exclusions from income, deductions, deferrals and credits. “These departures from the normative tax structure represent government spending for favored activities or groups, effected through the tax system rather than through direct grants, loans, or other forms of government assistance.”⁴

Many expenditures in the federal tax code have adverse environmental impacts. One example is the “percentage depletion allowance,” a long-standing preference that allows oil and gas producers, as well as hard-rock mining ventures,

to deduct a fixed percentage of gross income each year. The excess of “percentage depletion” over the more common “cost depletion” constitutes a subsidy to these extractive industries. The percentage depletion allowance was enacted in 1909 to stimulate domestic minerals production,⁵ and the continuing rationale for the provision is unclear. The Congressional Budget Office projected that eliminating this provision would have saved the U.S. Treasury \$900 million between 2004 and 2008.⁶

A similar tax expenditure allows extractive industries to expense their exploration and development costs rather than depreciate them over a number of years. This measure allows companies to write off the cost of machinery and equipment much faster than they wear out. Repealing this provision would save the Treasury an estimated \$17 billion over five years.⁷

As a result of these provisions, companies can sometimes deduct amounts greater than the actual costs of exploring, developing and extracting natural resources. By effectively subsidizing the costs of doing business, these provisions encourage the use of virgin materials at higher levels than market forces would dictate and discourage recycling. Many extractive industries operate in ecologically sensitive regions, raising particular concerns. Groundwater contamination is a frequent problem at mining sites and, in a rich irony, taxpayers can be left holding the bill for cleanup at these sites after companies have used these tax breaks to enhance returns.

The sport utility vehicle (SUV) tax deduction is another expenditure with adverse environmental impacts. Currently, the tax code distinguishes between light and heavy vehicles, giving preferential treatment to the business purchase of vehicles (such as SUVs) that weigh more than 6,000 pounds. When a business purchases a heavy vehicle, the business is allowed to expense \$25,000 of the purchase price in the first year and deduct the balance in subsequent years under a generous depreciation schedule. (The deduction was reduced from \$100,000 to \$25,000 in 2004.) In contrast, for purchases of light vehicles, no expensing is allowed and a less generous depreciation schedule is required. The perverse preferences for heavy vehicles damage air quality and undercut efforts to reduce oil dependence. Eliminating

the SUV deduction would save the Treasury more than \$700 million over five years.⁸

By their nature, many tax expenditures are difficult to repeal. Politically powerful groups often benefit from such expenditures, while the interests of other stakeholders or the general public tend to be more diffuse. Nevertheless, such expenditures have been reduced in the face of public pressure (as with the SUV tax deduction) or in the context of fundamental tax reform (as with the Tax Reform Act of 1986).

Many expenditures in the federal tax code have adverse environmental impacts.

Table 1 lists several tax expenditures with adverse environmental impacts. Reducing these expenditures would raise revenue while improving environmental quality. A future *Tax Reform, Energy and the Environment* policy brief will consider them in greater detail.

III. POLLUTION TAXES

Pollution taxes are charges imposed on activities that pollute the environment. They can apply to air emissions, water effluents or solid wastes, as well as to products with environmental impacts. Pollution taxes enjoy considerable theoretical support among economists, who consider them a means for correcting market failures.⁹ For instance, when a factory emits a toxic chemical into the atmosphere, it imposes a cost on others without compensation. Pollution taxes can help address this market failure by providing price signals that more accurately reflect the health and environmental costs of pollution. Such taxes create incentives for firms to reduce emissions to the point where incremental reduction costs are equal to the tax rate.

Advantages

By influencing behavior through prices, pollution taxes harness market forces to improve economic efficiency and environmental quality at the same time. Such taxes have several advantages over traditional environmental regulations (which often require uniform pollution reductions among all regulated entities). With pollution taxes, emission reductions would tend to be more *cost-effective*—companies with low

Table 1 Possible Measures to Limit Environmentally Damaging Tax Expenditures

Measure	Revenue Raised (5-year period)
Repeal expensing of extractive industry exploration and development costs	\$17.1 billion ^a
Restrict “qualified parking” to carpools and parking at public transport stations	\$3.9 billion ^b
Repeal enhanced oil recovery cost tax credits and expensing of tertiary injectants	\$3.0 billion ^b
Capitalize costs of producing timber	\$2.4 billion ^b
Repeal “percentage depletion allowance” for extractive industries	\$0.9 billion ^b
Eliminate SUV tax deduction	\$0.7 billion ^a

a. Figures reflect estimated revenue from 2006 to 2010. Congressional Budget Office, *Budget Options* (Washington, DC: Congressional Budget Office, 2005).

b. Figures reflect estimated revenue from 2004 to 2008. Congressional Budget Office, *Budget Options* (Washington, DC: Congressional Budget Office, 2003).

mitigation costs will make more reductions, while companies facing higher costs will reduce less. As a result, the environmental objective is achieved at a lower overall cost to society than with traditional regulatory mechanisms.

Pollution taxes are also *flexible*, allowing firms to make their own decisions on how to reduce emissions. They can stimulate *continuous technological innovation* for better pollution-control methods and cleaner inputs. For example, levies on ozone-depleting chemicals stimulated technological breakthroughs in manufacturing processes and yielded product substitutes in industries such as semiconductors and chemicals. Last, but certainly not least, pollution taxes *generate revenue* that can be used to meet other objectives.¹⁰

Pollution taxes are charges imposed on activities that pollute the environment. They can apply to air emissions, water effluents or solid wastes, as well as to products with environmental impacts.

As an environmental policy tool, pollution taxes are appropriate for dealing with some, though not all, types of problems. They are especially well suited for situations where pollution is caused by a large number of different sources and where emission-reduction costs differ significantly among polluters. Likewise, they effectively address environmental problems where there is not just one technological

fix for a government to mandate. From an implementation perspective, taxes are appropriate when emissions or the products associated with emissions are relatively easy to measure and monitor.

Some Concerns

The regressivity of pollution taxes is often cited as a concern. Many pollution taxes are special forms of consumption or excise taxes that, when considered in isolation, could raise the cost of particular consumer goods such as energy. Because poorer households spend a greater share of their disposable income on consumer goods than do wealthy households, pollution taxes could disproportionately affect the poor. Nevertheless, the ultimate incidence of such taxes depends on many factors, such as the ability of producers in an industry to shift costs to consumers and the ability of consumers to find alternative products.

To address these concerns, a pollution tax could be enacted as part of a larger package of tax reforms in order to balance distributional impacts. Tax analysts suggest a number of such tax packages. For example, a common proposal is to use the proceeds of a carbon tax to finance reductions in the federal payroll tax, one of the more regressive measures in the tax code.¹¹ Such a package could not only address the regressivity of the pollution tax, but also stimulate net job creation. One quantitative study suggests that the package would create five jobs for each job lost.¹² Another proposal concluded that a basket of pollution charges, including levies on carbon, air pollution, and virgin materials, could be made nearly

distributively neutral by offsetting it with a payroll tax reduction, a refundable tax credit, and lower income tax rates.¹³

The stability of revenue from pollution taxes is also often cited as a concern. To the extent a pollution tax is successful in inducing taxpayers not to pollute, the revenue stream it generates may diminish over time. If the tax applies to a good or activity with a high elasticity of demand, small tax rates may help achieve the environmental objective but generate little revenue. (Conversely, if the good in question is relatively inelastic, a small tax may generate dependable revenue but do little to achieve the environmental objective.) These concerns, too, suggest that pollution taxes should be part of a larger package of fiscal measures.

Pollution Tax Options

What types of pollution taxes might be considered at the federal level? The following are some options:

Water pollution tax

Roughly 40 percent of the nation's lakes, rivers and streams fail to meet water quality standards, despite a regulatory program limiting discharges that has been in place since the 1970s.¹⁴ A tax on water pollutants released by major facilities could help clean the nation's waterways and raise revenue. One option would be to impose a tax on the level of biological oxygen demand (BOD) in discharges from publicly owned treatment works and industrial dischargers. BOD is a common water pollution metric, measuring the concentration of oxygen-demanding wastes in water effluents.¹⁵

A study by the Joint Committee on Taxation found that a tax of about 65 cents per pound of effluent would raise \$11 billion from 2006 through 2010.¹⁶ The Joint Committee found that the costs of administering a BOD tax would be small, because levels of BOD discharges are already routinely monitored and specified in permits.

Nitrogen fertilizer tax

A nitrogen fertilizer tax is an excise levy that would address the problem of nutrient overloading in our waterways and coasts. The seasonal appearance of “dead zones” in such waters as the Gulf of Mexico and the Chesapeake Bay is a persistent and growing environmental problem. Dead zones are vast regions of oxygen-depleted waters in which bottom-dwelling organisms die and from which fish are driven away.

These zones hurt the shrimp, crab, and oyster industries as well as commercial and sport fishing.

Dead zones are triggered by nutrient pollution, especially nitrogen, often from agricultural sources. Experts estimate that half the nitrogen overload in the Gulf of Mexico comes from agricultural fertilizers and soil nitrogen from farmland in the Mississippi River basin.¹⁷ Some studies suggest that as much as 20 percent of nitrogen applied to fields is not used by crops but instead ends up in lakes and coastal waterways via runoff and drainage.¹⁸

A levy of \$10 per metric ton of carbon would generate significant revenue—roughly \$16 billion per year given current U.S. fossil fuel consumption levels... It would raise the price of gasoline by about 2½ cents per gallon and the price of electricity by roughly 2 percent.

A nitrogen fertilizer charge, administered at the point of purchase, would create an incentive for more efficient fertilizer use. Given the amount of nitrogen that currently washes away, reducing fertilizer use could lower farmers' tax exposure with little or no impact on yields.¹⁹ Furthermore, given the large number of farms applying nitrogen fertilizer, a charge may be one of the most practical approaches for reducing nutrient loadings. Modeling conducted by the World Resources Institute using U.S. Department of Agriculture data indicates that a charge set at a rate likely to decrease fertilizer usage by 10 percent could generate more than \$3 billion per year.²⁰

Carbon tax

A carbon tax would be imposed on emissions of carbon dioxide from fossil fuels. Such emissions are easily measured since coal, oil and natural gas each have known and well-understood carbon content per unit of fuel. The tax could be assessed on the carbon content of fossil fuels when they enter the economy—such as at oil refineries, coal-processing plants and points of import—thereby reducing complexity and keeping administrative costs low.

Table 2 Impact on Energy Prices of \$10 per Metric Ton Carbon Tax, Raising \$16 Billion in First Year^a

	Direct Impact ^b			Indirect Impact	
	Oil	Natural Gas	Coal	Electricity	Gasoline
Unit of fuel	barrel	thousand cubic feet (mcf)	short ton	kilowatt-hour (kWh)	gallon
Metric tons of carbon/unit of fuel ^c	0.1177 / barrel	0.0149 / mcf	0.5187 / ton	0.00017 / kWh	0.0024 / gallon
Average U.S. price ^d (2004)	\$36.77 / barrel	\$10.74 / mcf	\$27.30 / ton	\$0.076 / kWh	\$1.90 / gallon
\$10/metric ton carbon levy:					
Absolute price increase	\$1.18 / barrel	\$0.15 / mcf	\$5.19 / ton	\$0.0017 / kWh	\$0.024 / gallon
Percent price increase	3.2%	1.4%	19.0%	2.3%	1.3%

a. A levy of \$10 per metric ton of carbon is equivalent to \$2.73 per metric ton of carbon dioxide.

b. Assumes that the carbon levy is directly applied to oil, natural gas, and coal used to generate energy. Tax credits could be given to fossil fuels used as feedstocks for products such as plastics. Electricity and gasoline would not be directly taxed; the price impacts on these would be a result of the upstream tax on primary fossil fuels.

c. For oil (crude), natural gas (pipeline), coal (electric utility grade), and gasoline (all grades), see Energy Information Administration, Documentation for Emissions of Greenhouse Gases in the United States 2003, and "Thermal Conversion Factors," in Annual Energy Review (Washington, DC: U.S. Department of Energy, 2005); available online at [http://www.eia.doe.gov/oiaf/1605/ggrpt/documentation/pdf/0638\(2003\).pdf](http://www.eia.doe.gov/oiaf/1605/ggrpt/documentation/pdf/0638(2003).pdf) and http://www.eia.doe.gov/emeu/aer/append_a.html, respectively. For electricity, see U.S. Environmental Protection Agency, "E-GRID database" (Washington, DC: U.S. Environmental Protection Agency, 2002); available online at <http://www.epa.gov/cleanenergy/egrid/index.htm>.

d. Energy Information Administration, U.S. Department of Energy. Coal (delivered price to electric utilities) available at http://www.eia.doe.gov/cneaf/coal/page/acr/acr_sum.html; natural gas (residential price) available at http://tonto.eia.doe.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm; oil (domestic first price) available at http://tonto.eia.doe.gov/dnav/pet/pet_pri_dfp1_k_a.htm; electricity (all end users) available at <http://www.eia.doe.gov/cneaf/electricity/epa/epa7p4.html>; and gasoline (all grades) available at http://tonto.eia.doe.gov/dnav/pet/pet_pri_gnd_dcus_nus_a.htm.

A levy of \$10 per metric ton of carbon would generate significant revenue—roughly \$16 billion per year given current U.S. fossil fuel consumption levels.²¹ A tax at this level would have only a very small impact on oil and natural gas prices and somewhat larger impact on the price of coal (Table 2). Further downstream, it would raise the price of gasoline by about 2½ cents per gallon and the price of electricity by roughly 2 percent.²²

A carbon tax of this kind could help reduce dependence on foreign oil, cut local air pollution, promote technological innovation in the energy sector and reduce emissions of heat-trapping gases. In April 2005, one of the nation's largest utilities—Duke Energy—called for such a levy.²³ Recently commentators on both the right and left—including columnists Charles Krauthammer, John Tierney and Tom Friedman—have called for increases in the gasoline tax.²⁴ These views are similar to those expressed by Professor Gregory Mankiw, who urged an increase in the gasoline tax both before and after serving President George W. Bush as Chair of the Council of Economic Advisers from 2003 to 2005 (although he was silent on this topic while in government service).²⁵

Table 3 outlines a number of possible pollution taxes. Future *Tax Reform, Energy and the Environment* policy briefs will evaluate some of these taxes in more detail.

IV. NEXT STEPS

Proposals to reform the federal tax code and reduce the federal budget deficit provide a timely opportunity for considering the provisions just outlined. In both contexts, policymakers will need to make difficult choices. Policies that increase efficiency, stimulate technological innovation, protect human health and improve environmental quality—while raising revenue—may be especially attractive.

Proceeds from pollution taxes or reduced tax expenditures could be used to help make any reform package revenue neutral. This essentially entails a shift in the tax base. Taxes would be reduced on activities that benefit the economy—such as work and savings—and increased on activities that have undesirable impacts—such as pollution and resource waste.

Pollution taxes could complement or improve some of the proposals discussed in the context of fundamental tax

Table 3 Possible Pollution Taxes

Tax	Tax Base	Possible Charge Rate	Estimated Revenue
Carbon	Carbon content of fossil fuels used for energy	\$12/MT C, rising 50¢ each year	\$100.0 billion ^a
Volatile organic compounds	Volatile organic compound (VOC) emissions from stationary sources	\$2,100/ton	\$49.5 billion ^b
Water effluents	Effluents from water treatment, pulp & paper, food processing, & chemical plants. Based on effluent's biological oxygen demand (BOD)	\$0.65/lb of effluent	\$11.2 billion ^c
"Superfund" tax	Petroleum and chemical feedstocks; corporate environmental income tax (reinstatement of expired tax)	9.7¢/barrel of oil; rate varies by chemical feedstock; 0.12% of corporate income over \$2 million ^e	\$8.0 billion ^d
Fertilizer	Nitrogen fertilizers	20¢/lb	\$3.3 billion ^f
"Gas guzzler" tax	Light trucks, minivans, & SUVs up to 10,000 lbs. (extension of existing tax beyond passenger cars)	Varies by vehicle fuel efficiency up to \$7,700/vehicle	\$2.9 billion ^g
Mercury emissions fee	Mercury emissions from industrial boilers, waste incinerators, and chlor-alkali plants	Varies by source: \$3,000 – \$40,000/lb	\$1.1 billion ^h

a. Figures reflect estimated revenue from 2007 to 2011. See Congressional Budget Office, *Budget Options* (Washington, DC: Congressional Budget Office, 2005).

b. Figures reflect estimated revenue from 2007 to 2011. See Congressional Budget Office, *Budget Options* (Washington, DC: Congressional Budget Office, 2001).

c. Figures reflect estimated revenue from 2006 to 2010. See Congressional Budget Office, *Budget Options* (Washington, DC: Congressional Budget Office, 2000).

d. Figures reflect estimated revenue from 2006 to 2010. See Congressional Budget Office, *Budget Options* (Washington, DC: Congressional Budget Office, 2005).

e. James McCarthy, "Superfund Taxes or General Revenues: Future Funding Options for the Superfund Program" (Washington, DC: Congressional Research Service Reports, 2005).

f. Figures reflect one-year estimates for fertilizer use in 2001 in 2001 dollars. Estimates based on WRI analysis using the USMP Regional Agricultural Policy Model, U.S. Department of Agriculture. 5 year estimates are unavailable. Further results are published in S. Greenhalgh and A. Sauer, *Awakening the Dead Zone: An Investment for Agriculture, Water Quality, and Climate Change* (Washington, DC: World Resources Institute, 2003).

g. Figures reflect estimated revenue from 2004-2008, incremental to expected revenue from existing tax base of passenger cars. See Congressional Budget Office, *Budget Options* (Washington, DC: Congressional Budget Office, 2003).

h. Figures reflect estimated revenue in initial year of applying the fee. Fee rates reflect estimated marginal abatement costs by source per communication with the U.S. Environmental Protection Agency and Energy Information Administration, Reducing Emissions of Sulfur Dioxide, Nitrogen Oxides, and Mercury from Electric Power Plants (Washington, DC: U.S. Department of Energy, 2003). Data on emissions per source are from U.S. Environmental Protection Agency, 1999 National Emissions Inventory Documentation and Data (Washington, DC: U.S. Environmental Protection Agency, 2002).

reform. For example, one proposed reform package would involve eliminating income taxes on all but the highest-income earners and capturing the forgone revenue through a value-added tax (VAT) or similar consumption tax.²⁶ One concern with this proposal is that the VAT rate would have to be fairly high in order to make the package revenue neutral.²⁷ Adding targeted pollution taxes to the mix would help lower the general VAT rate. This modest change aligns with the proposal's original intent since pollution taxes, just like a VAT, are based on consumption.

Another tax reform proposal that has been floated for many years is to eliminate the double taxation of corporate dividends. "Double taxation" refers to the fact that shareholder dividends are effectively taxed twice, first by the corporate

income tax and then by the shareholder's personal income tax. One concern, however, is how to compensate for the lost revenue if this proposal were implemented. An innovative strategy suggested by economists Kevin Hassett of the American Enterprise Institute and Gilbert Metcalf of Tufts University would be to finance the reform with a carefully crafted carbon levy.²⁸ According to the most recent analysis, a levy of approximately \$13 per metric ton of carbon would be sufficient.²⁹ Hassett and Metcalf conclude that net consumer prices would be relatively unaffected for the majority of industry sectors. For finance, insurance and other industries that are not energy intensive but distribute a sizable share of earnings as dividends, such a tax reform package could actually cause net consumer prices to fall.³⁰

Pollution taxes could help numerous other possible tax reforms become revenue neutral. For instance, they could help offset the repeal of the alternative minimum tax (AMT), reductions in the Social Security payroll tax, or similar measures. How pollution taxes could be integrated into these and other tax reforms is an area ripe for further economic and political analyses.

Of course, policymakers could go *beyond* revenue neutrality and use the proceeds from pollution taxes to help reduce the deficit. Federal budget deficits are likely to remain an enormous challenge in the coming years, especially as baby boomers begin to retire and collect Social Security and Medicare benefits. Furthermore, natural disasters have recently placed unexpected burdens on the national budget. Pollution taxes could help replenish the nation's coffers, enabling the government to meet its commitments to

social and national security and circumventing the need to impose higher taxes onto tomorrow's taxpayers—the nation's children. As Alan Greenspan and others have noted, new revenue measures likely will be part of an eventual deficit reduction package.³¹ Although pollution taxes alone will not solve the deficit crisis, they can be an attractive part of the solution.

V. CONCLUSION

As lawmakers consider fundamental tax reform and the federal budget deficit, pollution taxes should be on the agenda. Such taxes have the potential to achieve multiple social goals, including enhancing tax revenues, improving environmental quality, enhancing energy security and contributing to fiscal responsibility. Given the country's fiscal and environmental challenges, policymakers should welcome all the innovative ideas they can get.

ABOUT THE AUTHORS

Craig Hanson is a Senior Associate with the Sustainable Enterprise Program at the World Resources Institute.

David Sandalow is Director of the Environment & Energy Project at The Brookings Institution.

ACKNOWLEDGMENTS

The authors thank the following panel of reviewers for their constructive feedback and suggestions: Steve Ellis (Taxpayers for Common Sense), William Gale (The Brookings Institution), David Jhirad (World Resources Institute), Gilbert Metcalf (Tufts University), Isabel Sawhill (The Brookings Institution) and Robert Shackleton (Congressional Budget Office).

The authors also thank Robert Katz, Liz Marshall and Fred Wellington of the World Resources Institute for comments to early drafts; Nalin Sahni and James Lester for their research; and Hyacinth Billings, Gayle Coolidge, Maggie Powell and Margaret Yamashita for their assistance in converting the draft version into a finished publication.

The authors are grateful to the Merck Family Fund, Stephen M. Wolf, the Summit Foundation and the Town Creek Foundation for their generous support of this work.

The authors alone are responsible for the views and perspectives expressed in this publication.

NOTES

1. Elizabeth Cook, "Making a Milestone in Ozone Protection" (Washington, DC: World Resources Institute, 1996).
2. Sal Lazzari, "Taxes to Finance Superfund" (Washington, DC: Congressional Research Service, 1996).
3. Organization for Economic Co-operation and Development, *Economic Instruments Database* (Paris: Organization for Economic Co-operation and Development, 2005). Available online at <http://www2.oecd.org/ecoinst/queries/index.htm>.
4. S. S. Surrey and P. R. McDaniel, *Tax Expenditures* (Cambridge, MA: Harvard University Press, 1985), p. 3.
5. Doug Koplow, "Durante Way Off Base in Support for H.R. 6" (Cambridge, MA: Earth Track, 2003).
6. Congressional Budget Office, *Budget Options* (Washington, DC: Congressional Budget Office, 2003).
7. Congressional Budget Office, *Budget Options* (Washington, DC: Congressional Budget Office, 2005).
8. Congressional Budget Office, *Budget Options* (Washington, DC: Congressional Budget Office, 2005).
9. For more discussion about pollution taxes as a means of correcting market failures, see P. Portney and R. Stavins, eds., *Public Policies for Environmental Protection*, 2nd ed. (Washington, DC: Resources for the Future, 2000); R. Repetto et al., *Green Fees: How a Tax Shift Can Work for the Environment and the Economy* (Washington, DC: World Resources Institute, 1992).
10. Auctioned tradable pollution allowances and/or permits would generate revenue and offer many of the same listed advantages.
11. Martha Phillips, "Returning Carbon Permit Proceeds to the Economy: Three Options" (Washington, DC: Climate Policy Center, 2001). Although this paper discusses options for recycling the revenue of Auctioned carbon emission allowances, from an economics perspective the options are equally applicable to a carbon tax.
12. J. Barrett and J. A. Hoerner, "Making Green Policies Pay Off," EPI issue brief 143 (Washington, DC: Economic Policy Institute, 2000).
13. Gilbert Metcalf. 1999. "A Distributional Analysis of Green Tax Reforms," *National Tax Journal* 52 (4): 655–82.
14. Congressional Budget Office, *Budget Options* (Washington, DC: Congressional Budget Office, 2000).
15. One BOD equals 1 milligram of oxygen consumed per 2.2 pounds of effluent or discharge. See Congressional Budget Office, *Budget Options* (Washington, DC: Congressional Budget Office, 2000).
16. Joint Committee on Taxation, in Congressional Budget Office, *Budget Options* (Washington, DC: Congressional Budget Office, 2000).
17. D. Goolsby et al. 1999. *Flux and Sources of Nutrients in the Mississippi–Atchafalaya River Basin: Topic 3 Report for the Integrated Assessment of Hypoxia in the Gulf of Mexico*, NOAA Coastal Ocean Program Decision Analysis Series no. 17 (Silver Spring, MD: National Oceanic and Atmospheric Administration, 1999).
18. The 20 percent is from the National Academy of Sciences, found in Environmental Working Group, *Pouring It On: Nitrogen Use and Sources of Nitrogen* (Washington, DC: Environmental Working Group, 1996).
19. Based on the historical experience of agriculture in the state of Iowa. See Environmental Working Group, *Pouring It On*.
20. Figures reflect estimates for fertilizer use in 2001 in 2001 dollars, based on WRI analysis using the USMP Regional Agricultural Policy Model, U.S. Department of Agriculture. Additional results are published in S. Greenhalgh and A. Sauer, *Awakening the Dead Zone: An Investment for Agriculture, Water Quality, and Climate Change* (Washington, DC: World Resources Institute, 2003).
21. A levy of \$10 per metric ton of carbon is equivalent to \$2.73 per metric ton of carbon dioxide. U.S. emissions of carbon from the combustion of fossil fuels for energy were 1.6 billion metric tons in 2004. See Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2004* (Washington, DC: U.S. Department of Energy, 2005), figure ES1 and table ES3; available online at <ftp://ftp.eia.doe.gov/pub/oiaf/1605/cdrom/pdf/ggrrpt/057304.pdf>.
22. Assuming that the entire tax is passed on to consumers.
23. Duke Energy Corporation, "Carbon Tax as an Element of Tax Reform Agenda," available at http://comments.taxreformpanel.gov/_files/ProposalforTaxReformDuke050429.doc.
24. Charles Krauthammer, "Tax and Drill," *Washington Post*, May 21, 2004, A25; John Tierney, "The Solve-Everything Tax," *New York Times*, October 4, 2005, A27; Thomas Friedman, "The Real Patriot Act," *New York Times*, October 5, 2003, A13; Thomas Friedman, "Driving toward Middle East Nukes in Our Own SUVs," *New York Times*, February 10, 2006, A25.
25. N. Gregory Mankiw, "Gas Tax Now!" *Fortune*, May 24, 1999, 60; and N. Gregory Mankiw, "Repeat after Me," *Wall Street Journal*, January 3, 2006, A24.
26. Michael Graetz, "A Fair and Balanced Tax System for the 21st Century," draft. Available online at http://www.law.yale.edu/outside/html/faculty_home/graetz/extra/Public%20Interest%20Tax%20Plan.pdf.
27. Graetz's proposal suggests a federal VAT on the order of 10 to 14 percent, in addition to preexisting state and local sales taxes.
28. K. Hassett and G. Metcalf, *Environmental Taxes to Finance Capital Tax Reform* (Washington, DC: Redefining Progress, 2001).
29. Gilbert Metcalf, "Tax Reform and Environmental Taxation," working paper 11665 (Cambridge, MA: National Bureau of Economic Research, 2005). The estimate of \$13 per metric ton of carbon is the carbon tax required to offset the forgone revenue of the "dividend exclusion prototype" or "DEP" approach to eliminating the double taxation of corporate dividends. In 2003, the forgone revenue from the DEP would have been \$20.1 billion.
30. Hassett and Metcalf, *Environmental Taxes*; Metcalf, "Tax Reform and Environmental Taxation."
31. Nell Henderson, "Greenspan Says He Expects a Tax Increase," *Washington Post*, April 22, 2005, E01.

ABOUT THIS POLICY BRIEF SERIES

The *Tax Reform, Energy and the Environment* policy brief series is designed to educate policymakers and various stakeholders about opportunities to reform the federal tax code in a manner that improves both fiscal health and environmental quality. The Brookings Institution and the World Resources Institute will invite a number of experts to be guest authors and reviewers of future installments.

This publication is the first of the series. Future installments will discuss specific topics in greater detail. Topics may include:

- Tax expenditures with adverse environmental impacts
- Stability of environmental tax revenues
- Carbon tax design issues
- Revenue-recycling opportunities for pollution taxes
- Nitrogen fertilizer charges
- Mercury emissions fees

To register colleagues to receive complimentary copies of these installments, please visit greenfees.wri.org/policybriefs/registration.

The Brookings Institution is a private nonprofit organization devoted to independent research and innovative policy solutions. Celebrating its 90th anniversary in 2006, Brookings analyzes current and emerging issues and produces new ideas that matter—for the nation and the world.

The World Resources Institute is an environmental think tank that goes beyond research to find practical ways to protect the earth and improve people's lives. Our mission is to move human society to live in ways that protect Earth's environment and its capacity to provide for the needs and aspirations of current and future generations.

