U.S. Energy Tax Policy

EDITED BY

Gilbert E. Metcalf

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U.S. ENERGY TAX POLICY

The United States faces enormous challenges in the energy area. Climate change, biofuels policy, energy security, and environmental degradation are all intimately bound up with energy production and consumption. Historically, the federal government has relied on tax subsidies to effect energy policy. With mounting federal deficits, policy makers and advocates are increasingly calling for a rethinking of our energy tax policy.

How can the federal tax code strengthen environmental policy and reduce security concerns in the area of energy? This book brings together leading tax scholars to answer this question. The authors tackle such difficult problems as climate change, efficient taxation of oil and gas, and optimal oil tax policy in a world in which OPEC oil producers dominate the world oil supply.

This volume presents a number of innovative policy suggestions backed by sophisticated and cutting-edge research carried out by leading scholars in the area of energy taxation. Scholars and policy makers alike will appreciate the incisive analysis and discussion of critical issues that are part of the energy challenge in the twenty-first century.

Gilbert E. Metcalf is Professor of Economics at Tufts University, Massachusetts, and a Research Associate at the National Bureau of Economic Research. He is also a Research Associate in the Joint Program on the Science and Policy of Global Change at MIT and is currently a Visiting Professor in the Department of Economics at MIT, where he teaches a class on the economics of energy markets.

Professor Metcalf recently served as a member of the U.S. National Academy of Sciences's Committee on Health, Environmental, and Other External Costs and Benefits of Energy Production and Consumption, and the peer-review team of the U.S. Environmental Protection Agency's climate modeling efforts. He has also been a consultant on energy matters to numerous government agencies and is a Lead Author for the Intergovernmental Panel on Climate Change's Fifth Assessment Report that is scheduled for release in 2014. Professor Metcalf also serves on the Advisory Board for the SECURE (Security of Energy Considering Its Uncertainty, Risk, and Economic Implications) Project funded by the European Commission. An associate editor of the *Journal of Economic Perspectives* and a member of the editorial board of the *Berkeley Electronic Journal of Economic Analysis and Policy*, Professor Metcalf is the author of more than seventy papers in academic and professional journals, including the *Journal of Political Economy*, the *Economic Journal*, *Journal of Public Economics*, and the *Review of Economics and Statistics*. He coedited *Behavioral and Distributional Effects of Environmental Policy* (2001, with Carlo Carraro) and *The Distribution of Tax Burdens* (2003, with Don Fullerton). Professor Metcalf's primary research area is applied economics with particular interests in taxation, energy, and environmental economics.

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The papers in this volume were written for a conference sponsored by the American Tax Policy Institute and held in Washington, D.C., on October 15 and 16, 2009. Conference authors and discussants are as follows:

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Introduction

Gilbert E. Metcalf

Anyone interested in understanding U.S. energy policy must begin from the premise that policy seeks to achieve multiple and often conflicting goals. Policy makers, for example, wish to encourage the reduction of greenhouse gas emissions (predominantly carbon dioxide from energy consumption) but at the same time reduce our reliance on oil consumption. Although at first glance these goals appear to be complementary, a leading contender for a replacement for the internal combustion engine in vehicles is a plug-in hybrid, which in turn could lead to an increase in demand for coal-fired electricity. Coal emits the most carbon dioxide per BTU of any energy source and so is a prime target for environmentalists who wish to reduce emissions.

Concerns with climate change, energy security, and pollution associated with the production and consumption of energy top the list of concerns about our use of energy; in addition, there are complex distributional considerations. The damages, for example, from coal combustion for electricity production vary widely across plants, with one recent study suggesting that the damages per kilowatt hour (kWh) from criteria pollutants range from less than 0.19 cents to more than 12 cents (National Research Council 2009). Meanwhile, policies to discourage the consumption of coal could have sharp distributional consequences. Just to focus on one fact, three states – Montana, Wyoming, and Illinois – account for over one-half of all recoverable reserves of coal in the United States. Whether the impacts of policies to reduce coal consumption would disproportionately fall on residents of these states is another question – a question that, among others, is addressed in this book.

This book contains a number of chapters that undertake economic analyses of some aspect of current or proposed energy policy. Much of the attention will be on fiscal policies – for example, market-based instruments

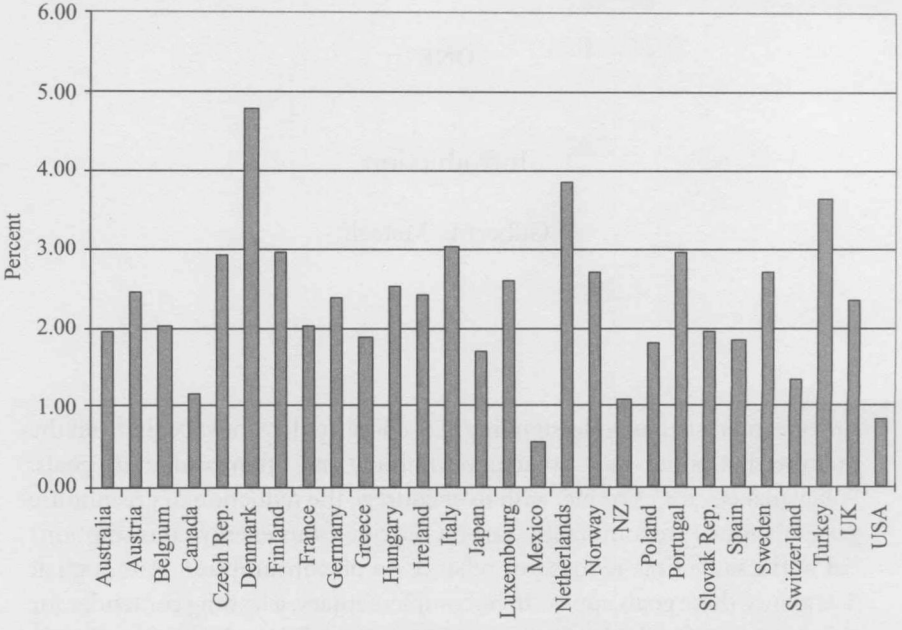

Figure 1.1. Environmental Taxes as a Percentage of GDP in 2006.

to reduce greenhouse gas emissions. To place the analyses in some context, it may be useful to review a few facts about energy-related fiscal policy.

Figure 1.1 reports environmental tax revenues as a percentage of GDP for a number of developed countries in 2006. The share of environmental tax revenues in GDP across OECD countries (weighted by GDP) was 1.71 percent in 2006. The share for the United States was 0.86 percent – the lowest rate among all OECD countries. In contrast, the share for the United Kingdom was 2.37 percent, 2.40 percent for Germany, and 4.79 percent for Denmark.

Figure 1.2 helps explain the unusually low share of environmental taxes in GDP for the United States. This figure reports the excise tax rate on gasoline as of January 1, 2009. The U.S. excise tax rate (federal and state) ranges from 10 to 34 percent of the tax rate of other countries (excepting Canada). It is half the Canadian rate. Clearly, the United States is an outlier on gasoline taxes.

Congress has been more active in providing subsidies for energy production to encourage desired activities. The Office of Management and Budget (2009) listed twenty-four federal tax expenditures related to energy, not including the excise tax credits for alcohol fuel (ethanol)

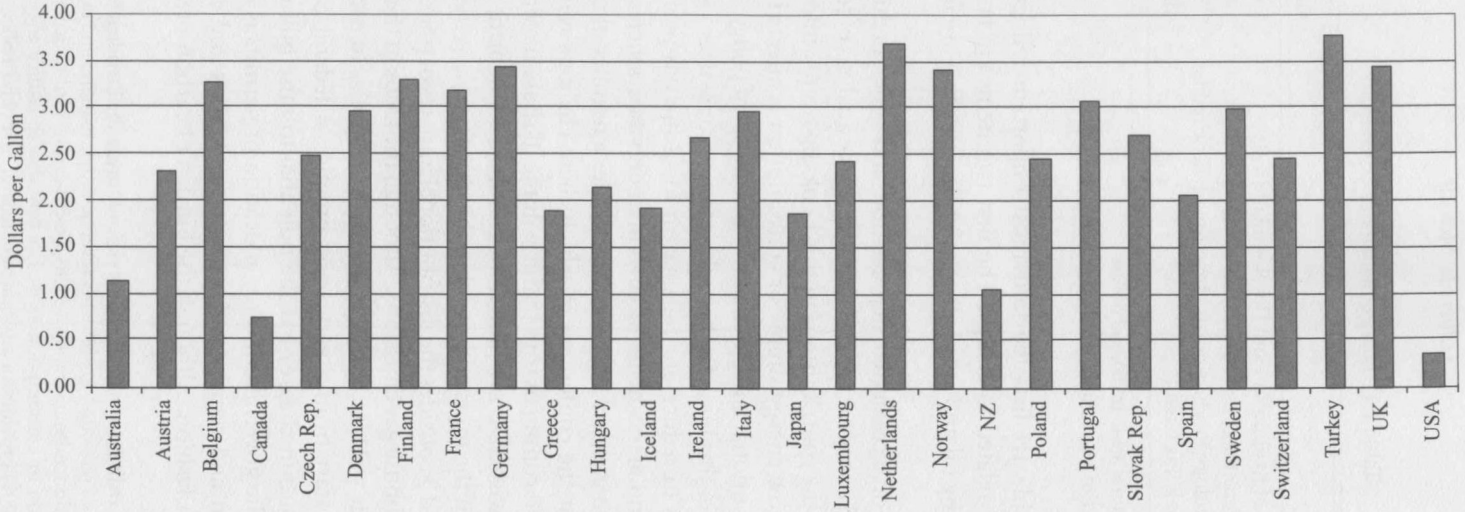

Figure 1.2. Tax Rate on Unleaded Gasoline in 2009.

Table 1.1. *Energy-related tax expenditures*

Category	2009–2013
Expensing of Exploration and Development Costs	1,550
Excess of Percentage Over Depletion Costs	4,430
New Technology Production and Investment Tax Credits	5,010
Alcohol Fuels Tax Credit	10,630

Tax expenditures are in millions of dollars.
Source: Office of Management and Budget (2009).

production.[1] Table 1.1 lists the four most important reductions in federal tax revenue related to energy. The first two items are tax preferences largely received by oil and gas drillers, and the next two are for renewable fuels.[2]

The reliance on accelerated depreciation and other deductions along with income and excise tax credits complicates the analysis of federal energy policy. Many of the contributions in this book dig deeply into the tax code to understand how energy supply or consumption is affected as well as to assess the distributional and efficiency implications of policy.

The chapters in this book fall broadly into two categories: assessments of possible policies to reduce our reliance on fossil fuels as part of a climate change policy and assessments of current energy tax policies. In addition to the chapters themselves, the volume includes a number of contributions by discussants at the conference at which these chapters were presented. We have included commentaries in this volume in those instances in which the discussants wished to say something of substance in print that enriches understanding of the topic addressed in the chapter.

Chapters 2 and 3 consider the distributional impacts of policies to impose a price on greenhouse gas emissions. Although the focus in these chapters is on cap-and-trade policies, much of the analysis applies to carbon charges. These chapters start from a very basic premise: a federal cap-and-trade system (like a carbon charge) has the potential to raise billions of dollars in revenue for the government. Free allocation of permits is equivalent to auctioning them and returning the revenues to firms and consumers in some lump-sum fashion. Although the burden of carbon pricing through

[1] The ethanol tax credit is not treated as a tax expenditure in the President's budget submission, because it is a reduction in excise tax revenue rather than income tax revenue.

[2] Energy Information Administration (2008) describes the various federal subsidies for energy production or consumption as well as subsidies to reduce energy use in detail. Metcalf (2007, 2009) provides an assessment of federal energy tax policy.

the cap-and-trade system is determined by the carbon intensity of goods and services consumed by households along with the capital intensity of carbon-intensive industries, the full burden of carbon pricing must account for the use of proceeds (or distribution of free permits) from the cap-and-trade-system.

Chapter 2, by Burtraw, Walls, and Blonz, considers the distributional implications of carbon pricing arising through policies to allocate permits to consumers through electricity and natural gas local distribution companies (LDCs), as has been proposed in the American Clean Energy and Security Act of 2009 (H.R. 2454), popularly known as the Waxman-Markey bill. Allocation of allowances to LDCs is an effort in large part to equalize costs to electricity users across different regions of the country. Burtraw, Walls, and Blonz show that alternative allocation mechanisms can achieve lower household costs on average and effect a more balanced set of impacts across regions than would occur under the system set out in H.R. 2454. A key message in their analysis is that administrative details matter. How LDCs distribute the value of the permits they receive to rate payers has significant efficiency costs. This message is echoed and amplified in the next chapter in the book.

In Chapter 3, Rausch and colleagues also undertake a distributional analysis of carbon pricing policy using a new computable general equilibrium model of the U.S. economy that offers rich detail about household income and location. The USREP model provides results for the near-term general equilibrium impact of carbon pricing for a number of different scenarios. Whereas Chapter 2 focuses specifically on allowance allocation in the electricity sector, with detailed attention to key provisions of the Waxman-Markey bill, Chapter 3 considers more stylized proposals in a general equilibrium context in which both factor prices and consumer prices can adjust.[3]

Allowing for backward shifting, Rausch and colleagues find that carbon pricing by itself (ignoring the return of revenue) is modestly progressive owing to the policy's impact on capital income. This stands in contrast to most studies that assume full forward shifting of a carbon price into higher consumer prices; these studies find that carbon pricing is quite regressive. The authors find, as do Burtraw, Walls, and Blonz, that policy design matters. Despite proscriptions in H.R. 2454 against using the value

[3] Using some public finance terminology, forward shifting occurs when consumer prices rise in response to carbon pricing, whereas backward shifting occurs when factor prices fall. Chapter 2, by Burtraw, Walls, and Blonz, assumes forward shifting of the carbon price, whereas Chapter 3, by Rausch et al., allows for both forward and backward shifting, with the model determining the amount of each.

of LDC allowances to lower the marginal price of electricity, Rausch and colleagues find that if consumers misperceive the free allowance value as lowering the price, then the costs of climate policy rise sharply. Minor differences in the design of the electricity bill could lead electricity customers to confuse a reduction in the average price of electricity with an increase in the marginal price.

The next three chapters address important design features of carbon pricing. Economists in large measure have long favored a carbon tax, whereas politicians and environmental advocates have favored cap-and-trade systems. In Chapter 4, Weisbach analyzes the choice between taxes and cap-and-trade systems and argues that in a domestic context the two systems can be made to be functionally identical. The oft-stated differences – taxes fix prices but let emissions vary, whereas cap and trade fixes emissions but let prices vary – ignore flexible design principles under either a tax or permit system that can blur or eliminate the distinctions. In the international context, however, Weisbach argues that important differences remain and that taking coordination, monitoring, and verification problems into consideration leads to a distinct preference for taxes over cap and trade.

Much of the debate over carbon taxes versus cap-and-trade systems has hinged on the seminal paper by Weitzman (1974). A key point in Weisbach's chapter is that the Weitzman analysis for the climate problem is incomplete and that inappropriate conclusions can be drawn from applying Weitzman's model to the climate change instrument choice problem. Chapter 5, by Kaplow, elaborates on Weisbach's argument. Kaplow – as well as Weisbach – argues that the Weitzman model has two key limitations: its reliance on linear instruments, and the assumption that policy cannot be revisited in the future. Once one relaxes those assumptions, either approach can be used and, most importantly, the carbon price can be designed to match the marginal damage of emissions at any point on a nonlinear marginal damage curve. In other words, we needlessly limit ourselves in requiring the use of linear instruments.[4] The Kaplow chapter was originally commissioned as a set of comments on the Weisbach contribution to this book at the Washington, D.C., conference at which these papers were presented. Kaplow expanded on his conference comments to such an extent that what were originally intended to be comments on the Weisbach chapter in the book became a fully freestanding and substantive chapter.

[4] Some might argue that linear systems are simpler, but the nonlinear nature of the personal income tax (marginal tax rates increasing with income) is among the least complex aspects of the tax code.

A major concern for policy makers considering the design of U.S. climate policy is the possibility of "leakage." Leakage occurs when the policy-induced higher costs of carbon-intensive manufacturing lead firms to shift production from a country that imposes a carbon price to one that doesn't. If the manufactured goods now produced in a country with no carbon price in place are exported to the United States and no tariff is placed on their embedded carbon, then a domestic carbon tax will have no impact on emissions but will simply lead to a loss of domestic jobs.[5] An obvious solution to this problem is to levy a tariff on embedded carbon in imported goods from countries that do not impose a carbon price. This solution, however, runs up against two obstacles: first, it is not obvious what the tariff rate should be on the imported products; second, any such tariff needs to be made compatible with international trade agreements. Chapter 6, by McLure, addresses these complex issues.

Drawing on a vast literature on border adjustments for value-added taxes, McLure describes the various ways in which border adjustments could be made and carefully walks the reader through how they would operate. His careful analysis makes clear the difficult task facing lawmakers to construct a border-adjustment system that takes into account the varying carbon-pricing regimes in other countries and avoids creating any number of distortions and unintended consequences. McLure dissects various arguments for and against different border-adjustment approaches and clearly distinguishes irrelevant from crucially important issues.

Chapter 7, by Strand, revisits the cap and trade versus tax debate from an entirely new perspective. Whereas Weisbach and Kaplow show that most of the differences between these two instruments are overstated, Strand raises an important difference in a world in which some countries export energy goods (e.g., oil) to other countries and have market power. Carbon taxes and cap-and-trade policies are no longer equivalent in the Weisbach and Kaplow sense. A carbon-tax system in oil-importing countries enhances the strategic position of the oil-importing countries relative to a cap-and-trade system. In short, the tax is more efficient than a cap-and-trade system at extracting monopoly rents from oil-exporting countries. Which system a country prefers then depends on whether it is an oil-exporting or an oil-importing country.

The next three chapters in the book turn to broader environmental issues in energy markets. In large measure, they are assessments of existing

[5] If foreign production technologies are less efficient than domestic technologies, global emissions could, in fact, rise.

energy policy rather than assessments of possible policy. Chapter 8, by Parry, constructs estimates of the optimal tax on gasoline and diesel in the United States. The analysis draws on earlier work by the author but takes into account up-to-date estimates of the damages from transportation fuel use, including the damages from climate change. In addition, technology has made new instruments possible so that more precisely targeted instruments can be employed (e.g., electronic metering and pay-as-you-drive insurance). As discussed by Fullerton, Hong, and Metcalf (2001), the efficiency gains from more precisely targeted environmental instruments can be large. Parry considers how the optimal tax on gasoline and diesel is affected by the ability to charge directly for externalities related to mileage (as opposed to fuel).

There has been considerable debate over the past decade about the tax treatment of oil and gas producers in the United States. Although most of the discussion has occurred at the federal level, an important driver of oil-production activity is state severance tax policy. Chapter 9, by Chakravorty, Gerking, and Leach, provides a very helpful overview of state oil tax systems and the interplay between state and federal energy taxes. They then embed taxes in a Hotelling model of production to examine how producers adjust the time profile of production in response to taxes. Calibrating their model to U.S. data they find that production is relatively insensitive to changes in state severance tax rates or federal percentage depletion rules. Increasing severance tax rates or further restricting the use of percentage depletion thus is likely to raise new revenues, although whether the federal government or states receive the revenue depends on which tax instrument is changed. Moreover, although the expensing of intangible drilling costs does appear to increase drilling activity, the authors are pessimistic that it will lead to appreciably more oil, given the already extensive drilling activity that has occurred in the continental United States.

Chapter 10, by de Gorter and Just, investigates the complex interactions of the different U.S. biofuels policies. The two key policies are an excise tax credit for ethanol blending in gasoline and mandates for biofuel use in transport fuels. These interact with each other and with existing gasoline excise taxes. The chapter considers how mandates and credits interact with optimal and suboptimal gasoline excise tax rates (accounting for the externalities discussed in Parry's contribution to this volume). The authors confirm previous results that mandates dominate excise tax credits in the presence of optimal fuel taxes. Importantly, they show that the efficiency advantage of mandates over excise tax credits increases sharply if fuel taxes are levied at a suboptimal level. Given the political difficulties with raising the gasoline tax in the United States, these results are highly relevant.