

The Reality of Carbon Taxes

In the 21st Century



THE REALITY OF CARBON TAXES IN THE 21ST CENTURY

**A Joint Project of the Environmental Tax Policy Institute and the
Vermont Journal of Environmental Law
Vermont Law School**

ENVIRONMENTAL TAX POLICY INSTITUTE

Professor Janet E. Milne, Director
Vermont Law School
P.O. Box 96
164 Chelsea Street
South Royalton, Vermont 05068, U.S.A.
(802) 831-1266
www.vermontlaw.edu/envirotax

VERMONT JOURNAL OF ENVIRONMENTAL LAW

P.O. Box 96
164 Chelsea Street
South Royalton, Vermont 05068, U.S.A.
(802) 831-1024
www.vjel.org

Copyright: © Copyright 2008 by Vermont Law School. All rights reserved. Except as otherwise provided, the author of each article in this issue has granted permission for copies of that article to be made for classroom use, provided that: (1) copies are distributed at or below cost; (2) the author and *Vermont Journal of Environmental Law* are identified on the copied materials; (3) each copy bears the proper notice of copyright; and (4) *Vermont Journal of Environmental Law* is notified in writing of the use of the material(s).

For information about the availability of this book, please visit the website of the Environmental Tax Policy Institute, www.vermontlaw.edu/envirotax.

The chapters in this book were also published as articles in the Vermont Journal of Environmental Law, Volume 10. Cite as 10 VT. J. ENVTL. L. ____ (2008).



This volume is published by Western Newspaper Publishing, Co. on 100% recycled paper and uses a soy-based ink.

Cover Design by Jeffrey Davis

CONTENTS

Carbon Taxes in the United States: The Context for the Future <i>Janet E. Milne</i>	1
The Design of Carbon and Broad-based Energy Taxes in European Countries <i>Stefan Speck</i>	31
Environmental and Economic Implications of Taxing and Trading Carbon: Some European Experiences <i>Mikael Skou Andersen</i>	61
Carbon Taxation in British Columbia <i>David G. Duff</i>	85

PREFACE

As national and international debates about climate change continue to gain momentum, carbon taxes often sit in the shadow of cap-and-trade proposals. These two market-based approaches—taxes and permit trading—send price signals that can reduce greenhouse gas emissions, so they share much in common, but policymakers around the world will be making decisions about which one to use or whether to combine the two. In sponsoring this volume, the Environmental Tax Policy Institute and the Vermont Journal of Environmental Law decided that the time might be right to cast more light on carbon taxes by compiling information and insights about the use of carbon taxes.

The four chapters in this book survey the state of play for carbon taxes in the United States, Europe and Canada, and they explore the policy and politics of carbon taxes. At the start of the Clinton Administration in 1993, the United States considered a tax on energy, which may hold lessons for a carbon tax, and in June 2008, the United States Senate debated a cap-and-trade proposal. A number of European countries have adopted carbon taxes and used the revenue to reduce other tax burdens, while the European Union has also put its Emissions Trading Scheme into effect. In Canada, British Columbia adopted a carbon tax in 2008 and, like some states in the United States, is developing a regional cap-and-trade program. The chapters explore these developments and more.

As the book goes to press, the United States has elected Senator Barack Obama as its next President, the leadership of some key Congressional committees is changing, countries around the world are preparing for international discussions at the United Nations Climate Change Conferences in Poland in December 2008 (COP 14) and Copenhagen in 2009 (COP 15), and economies are facing recessions. The national and international circumstances are evolving, but we hope that the facts, analyses, and observations about carbon taxes contained in this book may be useful to readers in the United States and elsewhere as the climate change debate moves forward.

Janet E. Milne, Director
Environmental Tax
Policy Institute
Vermont Law School
December 2008

Jennifer Kuntz, Editor-in-Chief
Keith Weisinger, Managing Editor
Vermont Journal of Environmental Law,
Vermont Law School

CARBON TAXES IN THE UNITED STATES: THE CONTEXT FOR THE FUTURE

*Janet E. Milne**

Introduction	1
I. A Brief Introduction to the Vocabulary and Concepts of Energy-related Taxes.....	3
II. The Clinton Btu Tax and Its Lessons	6
A. The Clinton Btu Tax	6
B. Lessons from the Btu Tax Experience	10
1. The Fundamental Choice of Tax Base.....	10
2. Refining the Tax Base	12
3. The Taxpayer/Collection Point.....	13
4. The Tax Rate	14
5. The Use of the Revenue.....	15
6. A Viable Concept?.....	17
III. The Present Context for Carbon Taxes	18
A. Carbon Taxes	19
B. Cap-and-Trade Regimes.....	23
C. Carbon Tax Issues in the Cap-and-Trade Context	27
Conclusion.....	30

INTRODUCTION

When the Group of Eight met in Japan in July 2008, the leaders of major economies in the developed world recognized the role of market-based instruments in reducing greenhouse gas emissions:

Market mechanisms, such as emissions-trading within and between countries, tax incentives, performance-based regulation, fees or taxes and consumer labeling can provide

* Professor of Law and Director of the Environmental Tax Policy Institute, Vermont Law School, South Royalton, Vermont, USA, jmilne@vermontlaw.edu.

pricing signals and have the potential to deliver economic incentives to the private sector. We also recognize that they help to achieve emissions reduction in a cost effective manner and to stimulate long-term innovation. We intend to promote such instruments in accordance with our national circumstances and share experience on the effectiveness of the different instruments.¹

Although the George W. Bush Administration has not been sympathetic to climate change measures that will increase the price of energy,² the national debate about how to reduce greenhouse gas emissions will continue under a different president and a new Congress in 2009. They will determine whether energy taxes or emissions trading regimes are “in accordance with our national circumstances.”

Four decades ago, the United States was a leader in considering the use of taxes to reduce pollution. In 1970, President Nixon proposed a tax on lead additives to gasoline and in 1972 a tax on sulfur dioxide emissions.³ Although these proposals were not enacted, a tax on gas-guzzling cars went into law in 1978,⁴ followed in 1980 by a tax on chemicals to finance the Superfund, a fund dedicated to cleaning up hazardous waste sites.⁵ The United States was also a pioneer in permit-trading regimes, using them to implement the regulation of lead in gasoline in the early 1980s, ozone depleting chemicals in 1988, and sulfur dioxide in 1990.⁶ In recent years, however, European countries have seized the initiative in using environmental taxes and trading regimes. As detailed in other articles in this volume, a number of European countries have enacted significant,

1. G8 Hokkaido Toyako Summit Leaders Declaration § 33 (July 8, 2008), http://www.g8summit.go.jp/eng/doc/doc080714_en.html.

2. See, e.g., Statement of the White House Press Secretary (July 11, 2008), <http://www.whitehouse.gov/news/releases/2008/07/print/20080711-7.html> (“The wrong way [to deal with climate change] is to sharply increase gasoline prices, home heating bills and the cost of energy for American businesses . . .”).

3. See WILLIAM A. IRWIN & RICHARD A. LIROFF, *ECONOMIC DISINCENTIVES FOR POLLUTION CONTROL: LEGAL, POLITICAL AND ADMINISTRATIVE DIMENSIONS* 126–27 (1974) (prepared for the United States Environmental Protection Agency); STANLEY SURREY, *PATHWAYS TO TAX REFORM* 164 (1973) (discussing Nixon’s proposed pollution tax on the sulfur content of fuel).

4. 26 U.S.C. § 4064 (2000). The tax starts at \$1,000, increasing to \$7,700 for vehicles with fuel economy less than 12.5 miles per gallon, but the tax has been eviscerated by its exemption for “non-passenger” vehicles which, with changes to vehicle design, now applies to SUVs. *Id.* § 4064(b)(1)(B).

5. *Id.* §§ 4661–4662. The tax remained in effect until 1996. See also *id.* §§ 4681–4682 (imposing a tax on ozone depleting chemicals effective in 1990).

6. See David Harrison, Jr., *Tradable Permits for Air Pollution Control: The US Experience*, in ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, *IMPLEMENTING DOMESTIC TRADABLE PERMITS FOR ENVIRONMENTAL PROTECTION* 28–37 (1999) (explaining and evaluating U.S. permit-trading program regimes).

broad-based energy taxes or carbon taxes. In addition, the European Union has put into place the Emissions Trading Scheme for carbon emissions from 11,500 facilities,⁷ and it may expand the Scheme in the future to include other facilities and greenhouse gases.⁸

This article provides background and context for considering the use of broad-based energy taxes to reduce greenhouse gas emissions at the federal level in the United States. After a brief introduction in Part I to the concept of energy taxes and their design alternatives, Part II reviews the United States' most significant experience with enacting broad-based energy taxes—President Clinton's proposal to tax energy based on its energy content as measured by British thermal units (Btus)⁹—and the possible implications of that experience for today's debate over carbon taxes and permit trading. Part III sets pending carbon tax alternatives and actions in the context of the current proposals and programs for using tradable permits for greenhouse gas emissions. While it does not undertake to analyze the pros and cons of tax instruments versus other instruments, an exercise that would require many more pages than allowed here, it highlights analytical issues that are key when comparing carbon taxes and cap-and-trade regimes. The article concludes by suggesting that policymakers and advocates should not dismiss the possibility of using taxes to reduce greenhouse gas emissions despite the political volatility of tax proposals. If held to the same analytical standards, taxes and trading regimes bear many similarities and involve some of the same politically difficult choices.

I. A BRIEF INTRODUCTION TO THE VOCABULARY AND CONCEPTS OF ENERGY-RELATED TAXES

The basic formula for taxation is universal and relatively simple, building on three fundamental components and a very straightforward mathematical formula. The tax base multiplied by the tax rate equals the tax revenue:

7. See generally Council Directive 2003/87/EC, 2003 O.J. (L 275) 32 (establishing a greenhouse gas emission trading scheme); J. ROBINSON ET AL., CLIMATE CHANGE LAW: EMISSIONS TRADING IN THE EU AND THE UK 35 (2007).

8. *Commission Proposal for a Directive of the European Parliament and the Council amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emissions allowance trading system of the Community*, 4 COM (2008) 16 final.

9. EXECUTIVE OFFICE OF THE PRESIDENT OF THE UNITED STATES, A VISION OF CHANGE FOR AMERICA 105 (1993). A Btu is the "quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit." WEBSTER'S NEW WORLD DICTIONARY 178 (3rd college ed. 1991).

$$\boxed{\textit{Tax Base} \times \textit{Tax Rate} = \textit{Tax Revenue}}$$

Energy-related taxes are defined by the fact that the tax base (the commodity being taxed) is some form of energy. The specific tax base can vary significantly depending on the design of the tax. In the case of a carbon tax, the tax base is either the carbon content of fuels or the carbon dioxide (CO₂) they produce when combusted, usually measured in tons. By defining the tax base as carbon or CO₂, the tax is limited to fossil fuels. If the tax base also draws in non-fossil forms of energy, such as nuclear power or hydropower, it is often called a broad-based energy tax. A classic broad-based energy tax would define the tax base in terms of the energy content of the identified range of energy sources. However, the tax base for a broad-based energy tax could also be defined in terms of the market price per unit of energy (often called an ad valorem tax) or in terms of the volume of the fuel (such as a tax per barrel of oil). The dominant federal energy tax in the United States—18.4 cents per gallon of gasoline¹⁰—is a volume-based energy tax but not a broad-based energy tax because the tax base is limited to gasoline.

In the climate change context, using either carbon or CO₂ as a tax base would be preferable because the tax base provides the most direct link to the environmental problem—the emission of CO₂. However, greenhouse gas emissions more broadly might also serve as a tax base. Although carbon dioxide emissions account for 85% of U.S. greenhouse gas emissions, most of which come from combustion of fossil fuels, other types of greenhouse gases contribute to global warming: methane (8% of U.S. greenhouse gas emissions), nitrous oxide (5%), hydrofluorocarbons (2%), and perfluorocarbons and sulfur hexafluoride (less than 1%).¹¹ A classic greenhouse gas tax would define the tax base in terms of tons of emissions, adjusted for their global warming potential based on CO₂ equivalents.

Identifying the tax base also involves determining what commodities or emissions are exempt from the tax or should qualify for refund after the tax has been imposed. For example, a carbon tax that uses carbon content as a surrogate for eventual emissions presumably would exempt fossil fuels that are consumed in manufacturing processes for non-fuel purposes as “feedstocks;” not combusted, they will not yield emissions.

10. 26 U.S.C. § 4081(a)(2)(A)(i), (B) (2000). *See also id.* § 4081(a)(2)(A)(ii)–(iii) (imposing an excise tax on aviation fuels, diesel, and kerosene).

11. *See* U.S. ENVTL. PROT. AGENCY, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990-2006 ES-4-6 tbl.ES-2 (2008), available at http://www.epa.gov/climatechange/emissions/downloads/08_CR.pdf (basing 2006 emissions on carbon dioxide equivalents).

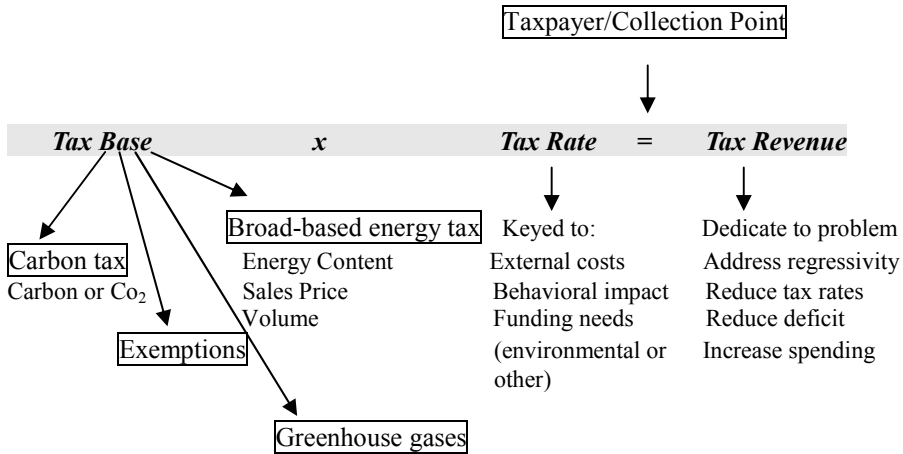
Although often tempered by political considerations, the tax rate of an environmentally related energy or greenhouse gas tax may reflect an environmental theory, such as the internalization of the external costs of emissions or the need to attain a certain degree of behavioral change. In the former instance, the tax rate would be defined by the external costs, and in the latter instance by the level necessary to achieve the specific behavioral effect. Alternatively, the environmental benefit may come primarily from the way in which government will use the revenue, with the rate set to generate the targeted amount. If the tax signal itself is strong enough to achieve some or all of the desired environmental result, however, revenue from the tax can be used to address non-environmental goals, such as measures that might mitigate regressive effects of the tax, fund unrelated programs, reduce the deficit, or reduce the burden of other tax rates in ways that will stimulate the economy.¹² If all of the revenue from the tax is used to provide tax relief of some form, the tax is “revenue neutral.” The new revenue offsets the revenue loss from the tax cuts, rendering the tax package as a whole revenue neutral.

Finally, an important design question is determining who will pay the tax. From an environmental perspective, the tax or ultimate incidence of the tax should fall on taxpayers who are most able to change their behavior in ways that will achieve the environmental goal. Political, economic, and administrative considerations, however, may come into play. For example, although consumers are often aware of the federal gas tax at the pump, the tax is actually paid when the fuel is removed from the refinery or terminal, thereby facilitating the collection of the tax.¹³

12. See generally Janet Milne, *Environmental Taxation: Why Theory Matters*, in 1 CRITICAL ISSUES IN ENVIRONMENTAL TAXATION: INTERNATIONAL AND COMPARATIVE PERSPECTIVES 1, 19–24 (Janet Milne et al. eds., 2003) (discussing theories underlying environmental taxes and their implications for the use of revenue).

13. 26 U.S.C. § 4081(a)(1)(A) (2000).

Figure 1: Basic Choices in Designing Energy or Greenhouse Gas Taxes



II. THE CLINTON BTU TAX AND ITS LESSONS

A. *The Clinton Btu Tax*

The experience with the Clinton Btu tax illustrates how environmental, economic, equity, and political factors influence the basic choices governing which type of tax to use, its design features, and its fate. Just four weeks after taking office in January 1993, President Bill Clinton announced to a joint session of Congress that a tax on energy would be part of his five-year, deficit-reduction package.¹⁴ He proposed an energy tax based on energy content as a way to reduce the deficit “because it also combats pollution, promotes energy efficiency, [and] promotes the independence economically of the country”¹⁵ Although the proposed Btu tax was ultimately replaced by a 4.3-cent increase in the gas tax and

14. 139 CONG. REC. H674, H678 (1993) (State of the Union Address by President Clinton on Feb. 17).

15. *Id.*

other measures,¹⁶ the experience with the Btu tax provides some useful lessons for considering the design and role of energy taxes today.

The tax base of Clinton's proposed excise tax covered an extraordinarily broad range of energy sources—fossil fuels, ethanol and methanol used as fuel, and domestic and imported electricity produced from nuclear or hydro power.¹⁷ Although the tax excluded renewable sources of energy, such as wind, solar, geothermal, and biomass, it was essentially an economy-wide energy tax. To provide a present-day context, Figure 2 summarizes the United States' fuel consumption patterns in 2006:

Figure 2: U.S. Consumption by Type of Fuel¹⁸

Fuel	Percent of Consumption
Liquid fuels	40.1
Natural gas	22.3
Coal	22.5
Nuclear electricity	8.2
Hydroelectricity	2.9
Biomass	2.5
Other renewables	0.9

The basic rate for the Btu tax, to be phased in over three years, was 25.7 cents per million Btus, with a supplemental tax of 34.2 cents per million Btus for refined petroleum products; each rate was indexed for inflation after 1997.¹⁹ Without the supplemental tax on petroleum, the tax on natural gas would have been higher as a percentage of market price than on oil, potentially discouraging the use of natural gas, which is a cleaner fuel.²⁰ These rates translated into an average of \$3.24 per barrel of oil (or 7.5 cents per gallon of gasoline), \$0.26 per million cubic feet of natural gas, \$5.57 per short ton of coal, and \$2.66 per thousand kilowatt hours for

16. *See generally* OMNIBUS BUDGET RECONCILIATION ACT OF 1993, H.R. REP. NO. 103-213, at 658 (1993), *as reprinted in* 1993 U.S.C.C.A.N. 1088, 1347 (containing conference agreement on the House and Senate bills).

17. STAFF OF THE J. COMM. ON TAXATION, 103D CONG., SUMMARY OF THE PRESIDENT'S REVENUE PROPOSALS 61 (Comm. Print 1993).

18. ENERGY INFORMATION ADMINISTRATION, ANNUAL ENERGY OUTLOOK 2008, at 115 tbl.A1 (2008), *available at* <http://www.eia.doe.gov/oiaf/aeo/pdf/tables.pdf>.

19. STAFF OF THE J. COMM. ON TAXATION, *supra* note 17, at 61. The Btu content was based on a national average for alcohol fuels and for all fossil fuels except coal, which was based on actual Btu content. *Id.*

20. OFFICE OF TAX POLICY, DEP'T OF TREASURY, FREQUENTLY ASKED QUESTIONS REGARDING THE ADMINISTRATION'S PROPOSED MODIFIED BTU TAX 2 (1993).

electricity from hydro and nuclear power (based on the national average of Btus required to produce electricity from fossil fuels).²¹ Estimated to raise \$22 billion per year when fully phased in and over \$70 billion during the five-year budget period from 1994 to 1998,²² the proposed broad-based tax represented a significant addition to the relatively limited portfolio of existing federal fuel taxes.

The revenue from the tax contributed to the budget package's deficit reduction goal of \$500 billion over five years, achieved through a combination of tax increases and spending cuts. Thus, deficit reduction was the primary use of the revenue. Nevertheless, the budget package as a whole contained other revenue-losing or increased-spending provisions that related to the Btu tax, in particular an increase in the earned income tax credit that would offer greater relief to lower income taxpayers²³ and expansion of the food stamp program and the Low Income Home Energy Assistance Program.²⁴ Thus, although new dollars from the Btu tax were not explicitly dedicated to offsetting relief, the total budget proposal provided some compensating measures to address the potential regressivity of the Btu tax.

The Btu tax proposal had a short but dramatic life. In a party-line vote, the House Ways and Means Committee approved it in May 1993 with relatively minor changes.²⁵ The committee's statement in support reads much like a present-day manifesto for carbon reduction:

In addition to deficit reduction, imposition of an energy tax will foster several worthwhile goals. First, the United States is one of the developed world's most intensive energy consumers. Most of the nation's energy is derived from non-renewable resources. Increasing the cost of non-renewable energy resources to individuals and businesses

21. OFFICE OF TAX POLICY, DEP'T OF TREASURY, THE ADMINISTRATION'S MODIFIED BTU ENERGY TAX PROPOSAL 2 (1993); OFFICE OF TAX POLICY, DEP'T. OF TREASURY, SPECIFICATIONS OF THE ADMINISTRATION'S MODIFIED BTU ENERGY TAX PROPOSAL 1 (1993).

22. STAFF OF J. COMM. ON TAXATION, 103D CONG., ESTIMATED BUDGET EFFECTS OF THE ADMINISTRATION'S REVENUE PROPOSALS CONTAINED IN THE FISCAL YEAR 1994 BUDGET, JCX-2-93 2 (1993).

23. 139 CONG. REC. H674, H678 (1993) (State of the Union Address by President Clinton).

24. *Administration's Energy Tax Proposals: Hearings Before the Comm. on Finance*, 103d Cong. 7 (1993) [hereinafter *Senate Finance Energy Tax Hearing*] (prepared statement of Hon. Lloyd Bentsen, Secretary, Dep't of Treasury).

25. See STAFF OF H. COMM. ON WAYS AND MEANS, 103D CONG., FISCAL YEAR 1994 BUDGET RECONCILIATION RECOMMENDATIONS OF THE COMMITTEE 292-309 (Comm. Print 1993) [hereinafter *WAYS & MEANS RECOMMENDATIONS*] (explaining the provisions of the Btu tax bill); David Rosenbaum, *Clinton Proposal for Tax Increases Passes First Test*, N.Y. TIMES, May 14, 1993, at A1 (describing the committee's changes).

will provide an economic incentive to conserve these irreplaceable resources.

Second, the burning of fossil fuels contributes to atmospheric pollution and increases the potential for global warming. Consumers of fossil fuels do not directly bear the cost of the environmental damage pollution creates. Imposing an energy tax on the consumer of fossil fuels will give consumers a financial incentive to reduce energy use. The committee believes that providing an economic incentive to conserve energy use, while also providing an incentive to use renewable resources, will lead to a cleaner environment.²⁶

The House of Representatives passed the budget proposal, including the politically sensitive Btu tax, by a margin of six votes in late May²⁷ after President Clinton and the House leadership struggled to win the necessary last minute votes.²⁸ Even with the passage of the bill in the House, however, support for the Btu tax was eroding in the Senate. The Finance Committee, which has jurisdiction over tax matters in the Senate, could not hold together its slim, two-vote Democratic majority when Oklahoma Senator David Boren and Louisiana Senator John Breaux signaled that they would not support the tax.²⁹ With the President's agreement, the committee replaced the Btu tax with a 4.3-cent increase in the gasoline tax and other measures,³⁰ including controversial increased spending cuts, to make up the difference in lost revenue. This modified plan passed the Senate in June as part of the budget package, with Vice President Gore voting to break the deadlock,³¹ and the gas tax increase prevailed over the Btu tax when the Senate and House went to conference to negotiate differences between the

26. WAYS & MEANS RECOMMENDATIONS, *supra* note 25, at 293.

27. 139 CONG. REC. H3301 (1993) (Roll No. 199, 219 yeas and 213 nays).

28. See Clifford Krauss, *When the President Rings, Mavericks Run for Cover*, N.Y. TIMES, May 29, 1993, at A1 (describing Democratic efforts to gain a majority in the House).

29. See, e.g., K. Nelson, *Clinton Yields to Opponents of Energy Tax Economy*, L.A. TIMES, May 29, 1993, at A1; David Hilzenrath & Eric Pianin, *Accord on Energy Tax, Spending Cuts Seen; But Senate Finance Committee Chief's Assessment Seems at Odds With Other Members*, WASH. POST, May 24, 1993, at A11; David Hilzenrath & Eric Pianin, *Senator Boren Targets Clinton Energy Tax; Lawmaker Seeks Deeper Budget Cuts*, WASH. POST, May 21, 1993, at A1.

30. STAFF OF J. COMM. ON TAXATION, 103D CONG., DESCRIPTION OF CHAIRMAN'S MARK ON REVENUE RECONCILIATION PROPOSALS SCHEDULED FOR MARKUP BY THE SEN. COMM. ON FINANCE, JCX-6-93, at 80 (1993).

31. 139 CONG. REC. S7986 (1993) (Roll call Vote No. 190); see also Eric Pianin & David Hilzenrath, *Senate Approves Budget Plan, 50-49; Vice President Gore Casts Deciding Vote*, WASH. POST, June 25, 1993, at A1 (reporting break of deadlock that occurred when six Democrats voted against the budget plan).

House and Senate bills.³² The final \$500 billion deficit-reduction plan, containing the gas tax increase but no Btu tax, passed both the House and Senate by the narrowest of margins in early August³³ and was signed into law by President Clinton.³⁴

B. Lessons from the Btu Tax Experience

1. The Fundamental Choice of Tax Base: The Significance of Regional Burden-Sharing and Political Postures

If the Clinton Administration's only consideration had been climate change, it presumably would have proposed a carbon tax. However, as the Administration considered its alternatives—an increase in the gas tax, a carbon tax, an energy tax, or a sales tax on energy—and presented its decision to pursue the Btu energy tax, it became clear that regional burden-sharing played a decisive role in defining the tax base. A significant increase in the gas tax would have disproportionately affected regions where people have to drive longer distances, particularly where public transit is not available.³⁵ A carbon tax would have placed the greatest tax burden on coal, which has a higher carbon content than oil or natural gas, thereby impacting coal-producing states and states dependent on coal for electricity more than states that rely primarily on nuclear power or hydropower.³⁶ Significant regional differences would have generated

32. OMNIBUS BUDGET RECONCILIATION ACT OF 1993, *supra* note 16, at 658–62.

33. See 139 CONG. REC. H6271 (1993) (Roll call Vote No. 406) (passing the House by a vote of 218 to 216); 139 CONG. REC. S10763 (1993) (Roll call Vote No. 247) (passing the Senate by a vote of 50 to 50, with the Vice President casting the deciding vote); see generally David Rosenbaum, *Clinton Wins Approval of His Budget Plan as Gore Votes to Break Senate Deadlock*, N.Y. TIMES, Aug. 7, 1993, at A1 (reporting on the tie-breaking vote).

34. Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66, 107 Stat. 510 (1993).

35. See 139 CONG. REC. H674, H678 (1993) (State of the Union Address by President Clinton); Keith Bradsher, *Less for Environment Than Energy in Tax Bill*, N.Y. TIMES, Mar. 18, 1993 (discussing the impact of a gas tax on southern, oil-producing states); Steven Pearlstein & Thomas Lippman, *Industry Analysts See Broad-Based Energy Tax in Clinton's Future*, WASH. POST, Jan. 1, 1993, at A4 (noting the political unpopularity of a gas tax in western states with limited mass transit); David Wessel, *Bentsen Sees Higher Taxes on Consuming*, WALL ST. J., Jan. 25, 1993, at A2 (reporting on Secretary of Treasury Bentsen's concerns about regional impacts of a gas tax).

36. *Senate Finance Energy Tax Hearing*, *supra* note 24, at 7 (prepared statement of Hon. Lloyd Bentsen, Secretary, Department of Treasury). See also Dawn Erlandson, *The Btu Tax Experience: What Happened and Why It Happened*, 12 PACE ENVTL. L. REV. 173, 175–76 (1994) (stating that Senator Robert Byrd from the coal-rich state of West Virginia single-handedly caused the carbon tax to be rejected); Thomas W. Lippman, *Energy Tax Has 'Green' Tint; Environmentalists Back Plan They Helped Draft*, WASH. POST, Mar. 2, 1993, at D1, available at <http://www.washingtonpost.com> (explaining that a carbon tax was politically impossible given Senator Byrd's position as Chairman of the Appropriations

questions of equity, economic impact, and the political opposition that comes with each. According to the Administration, the Btu tax's broad tax base would treat states relatively equally, while the higher energy cost and the exemption for renewable energy would still serve environmental goals. The Administration estimated that the tax would range by region from 0.54% to 0.67% of taxpayers' disposable personal income, a variation of only 0.13%.³⁷ Even so, as indicated above, the tax was not an easy sell.

Thus, the Clinton Btu tax experience in 1993 underscores the political and economic challenges of proposing a tax that targets only fossil fuels and generates regional disparities. Perhaps the argument that polluters should pay despite regional differences might be more persuasive now with the increased awareness of the risks of climate change.³⁸ But the 1993 events also serve as a reminder that cap-and-trade regimes for greenhouse gases may have similar regional impacts because they target the same base as a carbon tax or greenhouse gas tax. Despite the relative political opaqueness of cap-and-trade regimes, the same policy choice underlies broad-based carbon trading regimes that will place the financial burden disproportionately on some regions.

The political landscape of the moment influenced the choice of tax base as well. President Clinton would have had difficulty defending a significant gas tax increase after opposing, during the presidential race, Ross Perot's campaign proposal to increase the gas tax by fifty cents.³⁹ In addition, a carbon tax would have run counter to the interests of the powerful Senator Robert Byrd from coal-producing West Virginia, Chair of the Senate Appropriations Committee—a potentially lethal flaw.⁴⁰ The choice of tax base reflected the realities of political postures.

Committee); Matthew L. Wald, *Pondering an Energy Tax That Can't Please All the People*, N.Y. TIMES, Jan. 31, 1993, at F10 (comparing the relative impacts of the carbon tax on the energy sources of Ohio and Washington).

37. *Senate Finance Energy Tax Hearing*, *supra* note 24, at 120 (prepared statement of Hon. Lloyd Bentsen, Secretary, Department of Treasury). The Administration chose to define the tax base as the Btu energy content of these sources, rather than the price of the energy as with an ad valorem or sales tax, so that the tax burden would not vary with the price of energy. 139 CONG. REC. H674, H678 (1993) (State of the Union Address by President Clinton).

38. See generally WORKING GROUP II CONTRIBUTION, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: IMPACTS, ADAPTATION, AND VULNERABILITY 7–18 (Martin Parry et al., eds. 2007) (chronicling current knowledge about worldwide impacts of climate change).

39. Timothy Noah, *Clinton Aides Seek Gasoline Tax Boost, New Carbon Levy*, WALL ST. J., Dec. 9, 1992, at A2.

40. Erlandson, *supra* note 36, at 175; Lippman, *supra* note 36; Wald, *supra* note 36. See also *Senate Finance Energy Tax Hearing*, *supra* note 24, at 7 (statement of Hon. Lloyd Bentsen, Secretary, Department of Treasury) (noting disproportionate impact of a carbon tax on coal-producing states).

2. Refining the Tax Base: The Significance of International Competitiveness and Political Strategy

The Clinton Administration recognized the need to put imports on equal tax footing with domestic products in order to preserve the competitive position of domestic activities. The initial proposal provided that “imported taxable products” would be subject to tax at a level equivalent to domestic products.⁴¹ The Ways and Means Committee’s version of the Btu tax imposed a tax on imported energy-intensive products, defined as those with two percent of their value attributable to energy that would have been taxable if the products had been manufactured in the United States.⁴² Conversely, exported energy sources were exempt from the tax.⁴³ Although always subject to compliance with the General Agreement on Tariffs and Trade (GATT) and the World Trade Organization trade rules,⁴⁴ a border tax adjustment can mitigate concerns about the economic impact of the tax. While imposition of a tax on imports is consistent with the environmental goal of reducing carbon emissions, which are transboundary in nature, exempting exports is less justifiable on global environmental grounds.

Refinements to the tax base also illustrate the significance of strategic decisions once a tax is proposed. Not long after the Clinton Administration announced the proposed Btu tax, it signaled that it would revise some of the elements of the tax, in particular by broadening the list of exemptions. For example, faced with objections from states highly dependent on home heating oil, the Administration indicated it would exempt home heating oil from the supplemental tax on refined petroleum products.⁴⁵ In addition, proponents of ethanol argued that it should receive the same tax-exempt treatment as other renewable energy,⁴⁶ such as solar and wind.⁴⁷ The

41. DEP’T OF TREASURY, SUMMARY OF THE ADMINISTRATION’S REVENUE PROPOSALS 164 (1993). See also *Senate Finance Energy Tax Hearing*, *supra* note 24, at 137 (responses of Hon. Lloyd Bentsen, Secretary, Department of Treasury, to questions submitted by Senator John Danforth).

42. H.R. REP. NO. 103-111, at 746-47 (1993), *reprinted in* 1993 U.S.C.C.A.N. 378, 977-78.

43. DEP’T. OF TREASURY, SPECIFICATIONS OF THE ADMINISTRATION’S MODIFIED BTU ENERGY TAX PROPOSAL 3 (1993); H.R. REP. NO. 103-111, at 746-47 (1993), *reprinted in* 1993 U.S.C.C.A.N. 378, 977-78.

44. See *generally* ORG. FOR ECONOMIC CO-OPERATION AND DEV., THE POLITICAL ECONOMY OF ENVIRONMENTALLY RELATED TAXES 93-106 (2006) (discussing general and specific restrictions the GATT regulatory framework places on border tax adjustments).

45. OFFICE OF TAX POLICY, DEP’T OF TREASURY, THE ADMINISTRATION’S MODIFIED BTU ENERGY TAX PROPOSAL 2 (1993); Rick Wartzman, *Administration Alters Proposal for Energy Tax*, WALL ST. J., Apr. 2, 1993, at A2.

46. See *Senate Finance Energy Tax Hearing*, *supra* note 24, at 10 (statement of Hon. Lloyd Bentsen, Secretary, Department of Treasury, noting Senators’ concerns with application of tax to ethanol).

Administration's modified proposal, released in April, acquiesced.⁴⁸ Although the House Ways and Means Committee rejected the ethanol change,⁴⁹ the Administration's willingness to modify helped open the door to other changes in the tax proposal and the budget plan and emboldened the opposition.⁵⁰ "The opponents of the energy tax smelled blood."⁵¹ The controversial Btu tax was defeated at least in part because of the way the Administration played its hand.⁵² Strategic decisions for any tax bill will turn on the particular political landscape of the time, but the Clinton experience illustrates how flexibility with exemptions after the proposal is released can erode the strategic momentum of the plan and its perceived or real integrity.

3. The Taxpayer/Collection Point: A Technical Issue with Non-technical Consequences

The Clinton Administration originally intended to collect the tax as far upstream as possible, a logical standpoint considering administrative feasibility and the benefits of influencing upstream choices.⁵³ It fell sway, however, to industry pressures and agreed to allow the tax to be paid by end users of coal,⁵⁴ natural gas, and electricity, although the tax would still be collected by the natural gas or electric utility.⁵⁵ Not only did this contribute to the sense that the tax plan was negotiable, but it also undercut support for the tax among environmental groups, which argued that imposing the tax on

47. See Lippman, *supra* note 36 (reporting that Iowa Senator Tom Larkin complained to Treasury Secretary Bentsen about ethanol's inclusion in the Btu tax while other renewable sources were exempt).

48. OFFICE OF TAX POLICY, DEP'T. OF THE TREASURY, SPECIFICATIONS OF THE ADMINISTRATION'S MODIFIED BTU ENERGY TAX PROPOSAL 3 (1993).

49. WAYS & MEANS RECOMMENDATIONS, *supra* note 25, at 295.

50. Erlandson, *supra* note 36, at 177-78; Steven Greenhouse, *The White House Struggles to Save Energy Tax Plan*, N.Y. TIMES, May 10, 1993, at A1.

51. Erlandson, *supra* note 36, at 178.

52. See Richard Morgenstern, *Issue Brief 8: Addressing Competitiveness Concerns in the Context of Mandatory Policy for Reducing U.S. Greenhouse Gas Emissions*, in ADDRESSING U.S. CLIMATE CHANGE POLICY OPTIONS 112 (2008) (explaining that exemptions to President Clinton's Btu tax proposal contributed to its demise in the Senate).

53. DEP'T OF TREASURY, SUMMARY OF THE ADMINISTRATION'S REVENUE PROPOSALS 65 (1993).

54. Compare DEP'T OF TREASURY, SUMMARY OF THE ADMINISTRATION'S REVENUE PROPOSALS 65 (1993) (proposing that the tax on coal be imposed at the minemouth), with OFFICE OF TAX POLICY, DEPARTMENT OF TREASURY, DESCRIPTION OF MODIFIED BTU TAX 2 (1993) (indicating that the tax on coal would be imposed on the end user).

55. Jackie Calmes & David Wessel, *Clinton Changes Course on Part of Energy Tax—Agreement Would Ease Restrictions on Utilities to Pass Along the Levy*, WALL ST. J., May 11, 1993, at A2.

electric utilities would give utilities a greater incentive to use cleaner energy.⁵⁶ In addition, it heightened the political visibility of the tax to voting end users, leading a representative of utility regulators to comment that the Clinton administration did not want reminders that “this isn’t the ‘BTU tax,’ it’s ‘the Bill-is-taxing-you tax.’”⁵⁷ In finding the right collection point, a tax proponent needs to balance the administrative considerations, the environmental impacts, and the political repercussions—a choice perhaps less likely to occur with permit trading regimes where upstream trading is more feasible than downstream.

4. The Tax Rate: Balancing the Multiple Driving Factors of Deficits, Environmental Protection, and Economic Impact

The political impetus for the Clinton Btu tax sprang from the need to reduce the deficit. Although discussions about using some form of energy tax appeared on the table a month after President Clinton’s election in November 1992,⁵⁸ the concept was quickly wrapped into the question of how to reduce the deficit.⁵⁹ Consequently, the Btu tax’s relatively low tax rate—only \$3.24 per barrel of oil even with the supplemental rate on petroleum—generated the \$70 billion over five years needed as a key part of the deficit-reduction package. However, the tax rate did not appear to be grounded on an explicit environmental calculation, such as a refined notion of cost internalization or behavioral impact. The environmental aspect of the tax rate’s effect was real, but modest; the Administration estimated it would reduce the anticipated growth in energy consumption by seven percent.⁶⁰

56. Liam Eaton, *Clinton, Democrats Near Energy Tax Compromise Legislation: The Levy’s Collection Point Would Shift Closer to Consumers*, L.A. TIMES, May 11, 1993, at A12.

57. Calmes & Wessel, *supra* note 55. Before this concession, the Clinton proposal would have required utilities to pass the cost of the tax on to consumers in order to encourage conservation, but the utilities would have paid the tax so that it would not have appeared as a line item on consumers’ bills. OFFICE OF TAX POLICY, DEP’T OF TREASURY, *THE ADMINISTRATION’S MODIFIED BTU ENERGY TAX PROPOSAL 2* (1993).

58. Noah, *supra* note 39, at A2.

59. See Jeffrey Birnbaum & Michael Frisby, *Clinton Puts Emphasis On Deficit Reduction Goals as He Maps Economic Plans*, WALL ST. J., Dec. 18, 1992, at A1 (explaining that deficit reduction was President Clinton’s highest priority and specifying where the energy tax fit into his plan); David Wessell & Rick Wartzman, *Clinton’s Options; Tax Increases Seem Inevitable, Including Some on Middle Class*, WALL ST. J., Jan. 22, 1993, at A1 (discussing the President’s concerns about the deficit and his advisors’ interest in using an energy tax to reduce the deficit).

60. OFFICE OF TAX POLICY, *supra* note 45, at 1. See CONG. BUDGET OFFICE, *AN ANALYSIS OF THE PRESIDENT’S FEBRUARY BUDGETARY PROPOSALS III-6* (1993), available at <http://www.cbo.gov/ftpdocs/75xx/doc7531/93doc10.pdf> (concluding that the environmental and national security benefits of the tax were likely to be real but minimal).

The tax rate presumably also reflected a desire to limit the financial burden on individuals and industry. The Administration estimated that the tax, when fully phased in, would impose a direct cost of \$9.50 per month on a family of four with an income of \$40,000 and would increase manufacturing costs on average by 0.1%⁶¹ while still generating \$22 billion per year. Yet even that level of relatively modest additional cost met with immediate opposition from industry.⁶²

The relatively low tax rate, combined with a broad tax base extending beyond fossil fuels, suggests that while the Btu tax had environmental characteristics, its environmental features were muted by other considerations. This result was not inconsistent with the need of traditional tax policy to consider issues of economic impact and equity. At the same time, the Clinton experience dramatically underscores how the need for revenue can provide an opportunity to introduce a new type of environmental tax. Political opportunities in the future may come from the environmental side of the equation, or they may come from the revenue side, or both, but it will require delicate compromise to take advantage of a revenue-driven opportunity while maintaining the environmental features of the tax itself, in particular, the tax rate.

5. The Use of the Revenue: A Crucial Part of the Picture

As mentioned above, revenue demands can create a motive and an opportunity for a tax. In addition, the revenue from the tax can help build a package that reduces the regressivity of the tax itself and may produce broader benefits that can have significant political and policy implications. The Clinton Administration was aware of the regressivity issue from the start. In presenting the budget proposal to Congress, President Clinton announced that the Btu tax would “cost American families with incomes under \$30,000 nothing,”⁶³ given the budget proposal’s increases in the earned income tax credit and programs for food stamps, home energy assistance, and home weatherization that would reduce the burden on low-

61. *Senate Finance Energy Tax Hearing*, *supra* note 24, at 6–7, 121 (statement of Hon. Lloyd Bentsen, Secretary, Department of Treasury). The Administration estimated that the tax would raise costs for energy-intensive industries by less than four percent, but those industries might also benefit from tax relief provisions in the proposed budget plan. OFFICE OF TAX POLICY, *supra* note 45, at 3.

62. *See, e.g.*, Gerald F. Seib & David Rogers, *Interest Groups and Lobbyists To Fight Plan*, *WALL ST. J.*, Feb. 18, 1993, at A12.

63. 139 CONG. REC. H674, H678 (1993) (State of the Union Address by President Clinton).

income taxpayers.⁶⁴ Although the revenue from the Btu tax was not specifically dedicated to these forms of relief, the total package, which included the new revenue, allowed the Administration to argue that it was protecting low income households—an issue that must be confronted for any energy-related tax.

President Clinton promoted the Btu tax as serving environmental, energy security, and deficit-reduction goals.⁶⁵ The implementation of the tax itself would serve the first two goals, and deficit reduction would be achieved by the use of its revenue. The placement of the \$70 billion tax within a \$500 billion deficit-reduction package allowed the Clinton Administration to present the tax in a broader light and to cite the economic advantages of deficit reduction as reasons to support the tax. The Administration pointed to benefits such as lower interest rates,⁶⁶ which would reduce capital costs for industry and mortgage interest costs for homeowners,⁶⁷ providing benefits to a broad range of taxpayers and constituents. The President argued that lower interest rates would “more than offset” the additional cost of the tax to middle income people.⁶⁸ The President’s campaign promises not to raise taxes politically tarnished this net-benefit argument,⁶⁹ but the proposal nonetheless illustrates how the use of the revenue and the combined package can generate reasons to support a tax and potentially alleviate concerns. Different decisions about how to use new revenue from a climate change tax could be made at other times—such as whether to use all the revenue for offsetting tax relief on a revenue-neutral basis in order to strengthen the economy, or whether to dedicate some or all of the revenue to the environmental problem, which in turn may strengthen the economy. The point remains, however, that an assessment of the feasibility and merit of a tax is bound to the question of the use of its revenue.

64. OFFICE OF TAX POLICY, *supra* note 45, at 2; OFFICE OF TAX POLICY, DEP’T OF TREASURY, FREQUENTLY ASKED QUESTIONS REGARDING THE ADMINISTRATION’S PROPOSED MODIFIED BTU TAX 10–11 (1993).

65. 139 CONG. REC. H674, H678 (1993) (State of the Union Address by President Clinton).

66. *Id.*

67. *Senate Finance Energy Tax Hearing*, *supra* note 24, at 6–7 (statement of Hon. Lloyd Bentsen, Secretary, Department of Treasury).

68. 139 CONG. REC. H674, H678 (1993) (State of the Union Address by President Clinton).

69. See David Hilzenrath, *Politics Overtakes Policy in Energy Tax Debate*, WASH. POST, July 20, 1993, at C1 (noting that the energy tax proposal reversed President Clinton’s campaign promises). Es Risen, *Energy Tax Hits Consumer More than Oil Firms*, L.A. TIMES, May 27, 1993 (citing legislators’ perception of energy tax as a repudiation of the President’s campaign promises).

6. A Viable Concept?

In sum, the Clinton Btu tax shows how an environmental tax proposal is inevitably shaped by issues of economic impact, equity, and politics. The challenge is to ensure that, if it is truly an environmental instrument, it maintains sufficient environmental integrity while also guarding against unacceptable impacts on the economy and taxpayers. This is not an easy challenge, and the Clinton Btu tax shows how the environmental features, while present, probably did not dominate design decisions. Nonetheless, it offered a creative compromise with its broad tax base, relatively low tax rate (which could have been susceptible to subsequent increases), and equity and economic benefits through the use of the revenue.

The fate of the Clinton Btu tax need not necessarily ring the death knell for a federal carbon tax in the United States. There is no doubting the visceral reaction a new tax seems to inspire and the difficulty of adding additional costs to energy when the price of oil is high or the economy weak. Political prognostication is risky at best, but certain factors might help generate a more positive reaction in the future. For example:

- A wider majority in Congress would leave less political power in the hands of a few players, unlike the two-Senator margin President Clinton faced with the Senate Finance Committee.
- A stronger national commitment to address climate change could create greater political will to pursue a carbon tax.
- A strong need for revenue that can finance increased spending, reduce the deficit, or provide tax relief could add a second set of forces to propel a tax proposal. For example, as former Vice President Al Gore said in July 2008 when he reiterated his support for reducing payroll taxes by using carbon tax revenues, “[w]e should tax what we burn, not what we earn.”⁷⁰
- A heightened awareness of how increases in the price of fuel can change behavior could build support for price signals that economic instruments can maintain over time. Although economically painful, higher gas prices in 2008 are starting to change behavior and provide evidence that price signals can work.
- A more thorough discussion of the economic benefits of addressing climate change, with more active support from the

70. Al Gore, Address at D.A.R. Constitutional Hall, Generational Challenge to Repower America (July 17, 2008), available at <http://www.wecansolveit.org/content/pages/304> (last visited Dec. 2, 2008).

industries that will benefit, would help build the factual case and political support for long-term price signals.

- A sophisticated political understanding about the economic costs of alternative solutions to climate change would put carbon or greenhouse gas taxes on more equal footing with instruments that have less politically visible profiles. The negative impact of alternatives also can generate strange bedfellows for support, just as Ford, General Motors, and Chrysler supported the Clinton Btu tax in hopes of avoiding more stringent fuel economy regulations.⁷¹
- Campaign rhetoric would need to leave sufficient flexibility for considering a carbon tax unless unforeseen circumstances subsequently diminish the significance of campaign promises.

In the ever-changing kaleidoscope of facts and circumstances, it is difficult to predict which combinations might generate more favorable opportunities for a carbon tax. Nevertheless, the fact of one defeat should not preclude the possibility of a carbon tax—particularly if Congress or a president takes off the table cap-and-trade regimes that do not auction allowances to emit greenhouse gases.

III. THE PRESENT CONTEXT FOR CARBON TAXES

The United States has a number of laws that address greenhouse gas emissions, but it does not have a comprehensive, integrated, nationwide legal regime for reducing its contribution to global carbon dioxide or other greenhouse gases.⁷² Although the Environmental Protection Agency (EPA) has solicited comments on the ways in which it might use its authority under the Clean Air Act to regulate greenhouse gases,⁷³ the EPA Administrator stated his belief that “the Clean Air Act . . . is ill-suited for the task of regulating global greenhouse gases.”⁷⁴ This view was shared by the Office of Management and Budget in the Executive Office of the President and numerous Cabinet members in the Bush Administration.⁷⁵ A

71. Matthew Wald, *The Clinton Fuel Tax Finds a Few Unexpected Allies*, N.Y. TIMES, Mar. 14, 1993.

72. For an overview of a number of federal programs related to greenhouse gas emissions, see *Regulating Greenhouse Gas Emissions under the Clean Air Act*, 73 Fed. Reg. 44,354 (proposed July 11, 2008).

73. *Id.* at 44,354.

74. *Id.* at 44,355.

75. *Id.* at 44,356–44,361.

comprehensive program is likely to require federal legislation, and a number of proposals are pending in Congress, including carbon tax bills and more prominent cap-and-trade bills. In addition, states are starting to implement market-based measures. In order to place carbon taxes in the current context, the discussion below briefly describes proposed and actual carbon taxes and cap-and-trade regimes in the United States, focusing on major actions that can illustrate the current state of play. It does not address the range of tax expenditures for environmentally positive activities already in the federal tax code, such as tax incentives for renewable energy or, conversely, tax subsidies that may be environmentally damaging, such as tax benefits for oil and gas. Although beyond the scope of this article, they are significant market-based instruments that should be kept in mind when considering the portfolio of market-based approaches.

A. Carbon Taxes

Two carbon tax bills are currently pending in Congress. These bills differ from the Clinton Btu tax in that they focus on fossil fuels and do not tax nuclear power and hydropower. The “Save Our Climate Act of 2007,” H.R. 2069, introduced by Congressmen Fortney “Pete” Stark and Jim McDermott, proposes to tax fossil fuels at a rate of \$10 per ton of carbon content of coal, petroleum and petroleum products, and natural gas, increasing by \$10 per year until carbon dioxide emissions from the United States are reduced to eighty percent below their 1990 level.⁷⁶ The tax would be paid by the manufacturer, producer, or importer of the fuel, but the tax may be refunded if the fuel is used in a way that embeds or sequesters carbon,⁷⁷ and exports are exempt from the tax.⁷⁸ The bill suggests, but does not require, that the revenue from the tax could be used for tax relief for low- or middle-income taxpayers, funding for developing alternative energy, or other social goals.⁷⁹ It also calls for studies every five years of the environmental, economic, and fiscal impacts of the tax.⁸⁰

The second bill, “America’s Energy Security Trust Fund Act of 2007,” H.R. 3416, introduced by Congressman John Larson, would tax the CO₂ content of the same fossil fuels, and would be paid by the same classes of taxpayers as the Stark-McDermott bill.⁸¹ The proposed tax rate is \$15 per

76. H.R. 2069, 110th Cong. § 3(a) (2007). The taxable fuels exclude fuel placed in the Strategic Petroleum Reserve. *Id.*

77. *Id.*

78. *Id.*

79. *Id.* § 2(7).

80. *Id.* § 3(b).

81. H.R. 3416, 110th Cong. § 2(a) (2007).

ton, increasing by ten percent plus one percent more than the cost of living adjustment each year.⁸² Fuel used as feedstocks and exports are exempt, and taxpayers that carry out offset projects, sequester greenhouse gases, or destroy hydrofluorocarbons in the United States may qualify for a refund or tax credit for taxes paid.⁸³ According to one estimate, the \$15 per ton tax rate on carbon dioxide would translate into \$55 per ton of carbon, and by 2017 the tax rate (without inflation adjustment) would be approximately \$130 per ton of carbon, compared with \$100 per ton of carbon for the Stark-McDermott carbon tax.⁸⁴

Unlike the Stark-McDermott bill, the Larson bill would dedicate the revenue from the tax to a trust fund. The fund would finance a tax credit for clean energy technology (the lesser of \$10 billion per year or one-sixth of the fund each year), transition assistance for industries adversely affected by the carbon tax (starting at one-twelfth of the revenue into the trust fund the first year and phasing down to zero over ten years),⁸⁵ and a “carbon tax rebate” in the form of an income tax credit for individual taxpayers (the remainder of the revenue).⁸⁶ The income tax credit would equal the taxpayer’s per capita share of this portion of the trust fund’s revenue, capped at the level of federal payroll taxes paid with respect to that taxpayer or ten percent of the social security benefits the taxpayer received that year.⁸⁷ The bill also calls for a study of ways to assess a comparable tax on non-carbon greenhouse gases.⁸⁸

The carbon tax concept is not limited to the federal government. Two local areas have chosen to enact modest carbon-related energy taxes. In 2006, the voters of Boulder, Colorado approved a Climate Action Plan Tax, which imposed a tax on the end users of electricity collected by the utility.⁸⁹ The tax rates were set for 2007, but the city council has the ability to raise the rates up to specified caps in subsequent years. The maximum rates are 0.49 cents per kilowatt hour for residential users, 0.09 cents per kilowatt

82. *Id.*

83. *Id.*

84. Carbon Tax Center, Bills, <http://www.carbontax.org/progress/carbon-tax-bills> (last visited July 10, 2008).

85. H.R. 3416, 110th Cong. §§ 2(b), 3 (2007).

86. *Id.*

87. *Id.* § 3. See also GILBERT E. METCALF, BROOKINGS INSTITUTION, A PROPOSAL FOR U.S. CARBON TAX SWAP 11 (2007) (proposing a tax on greenhouse gas emissions at the starting rate of \$15 per ton of carbon dioxide equivalent, with revenue used for a refundable earned income tax credit, linked to payroll taxes, that would reduce the regressivity of the tax).

88. H.R. 3416, 110th Cong. § 4 (2007).

89. CAROLYN BROUILLARD & SARAH VAN PELT, A COMMUNITY TAKES CHARGE: BOULDER’S CARBON TAX 11 (2007), available at http://www.bouldercolorado.gov/files/Environmental%20Affairs/climate%20and%20energy/boulders_carbon_tax.pdf.

hour for commercial users, and 0.03 cents per kilowatt hour for industrial users.⁹⁰ The revenue is used to finance the city's climate action program, which aims to reduce the local greenhouse gas emissions to seven percent below 1990 levels by 2012,⁹¹ and tax rates are based on the amount each sector will receive for programs under the climate action plan.⁹²

In the region surrounding San Francisco, California, the Bay Area Air Quality Management District has imposed a fee that has more of the features of a traditional carbon tax. The tax base is explicitly defined in terms of emissions, but it also covers greenhouse gas emissions beyond carbon dioxide.⁹³ Starting in 2008, industrial facilities and businesses that are subject to air quality permit requirements must pay a fee of 4.4 cents per ton of greenhouse gas emissions.⁹⁴ The fee is estimated to generate \$1.3 million annually which the District will use for its climate programs.⁹⁵ In early 2008, San Francisco Mayor Gavin Newsom announced his intention to put a city carbon tax before voters,⁹⁶ and the Department of the Environment was instructed to prepare options.⁹⁷ Under the Mayor's revenue-neutral proposal, revenue would be used to reduce the payroll tax.⁹⁸

Thus, while carbon tax proposals have received relatively little political attention, they have been introduced in Congress, and local governmental bodies are using carbon-related tax bases to generate revenue to finance climate programs. Figure 3 summarizes the key features of the various tax regimes, as well as the features of the cap-and-trade systems described below, highlighting differences and similarities.

90. BOULDER REV. CODE § 3-12-2, available at <http://www.colocode.com/boulder2/chapter3-12.htm>.

91. *Id.* § 3-12-1.

92. BROUILLARD & VAN PELT, *supra* note 89, at 9–10.

93. Bay Area Quality Management District, Reg. 3, sched. T (May 21, 2008), available at <http://www.baaqmd.gov/dst/regulations/rg0300.pdf>.

94. *Id.*

95. Press Release, Bay Area Air Quality Management District, Air District Implements Greenhouse Gas Fee (May 21, 2008), available at http://www.baaqmd.gov/pio/news/2008/climate_fee080521.pdf.

96. Associated Press, *San Francisco to Vote on Business Carbon Tax: Mayor Promises Businesses Would Also See Cut in Payroll Tax*, Dec. 6, 2007, <http://www.msnbc.msn.com/id/22132812>; San Francisco Mayor Gavin Newsom, Inaugural Address 2 (Jan. 8, 2008).

97. COMMISSION ON THE ENVIRONMENT, SAN FRANCISCO CITY GOVERNMENT, RESOLUTION NO. 00208 COE, at 2 (2008), available at http://www.sfenvironment.org/downloads/library/res00208coe_carbontax.pdf.

98. Associated Press, *supra* note 96. See also City and County of San Francisco Small Bus. Comm'n, Minutes, Item 9, Jan. 14, 2008, available at http://www.sfgov.org/site/sbc_page.asp?id=75330&mode=text (stating the goal of revenue neutrality for a carbon tax).

Figure 3: Comparison of Elements of Tax and Cap-and-Trade Instruments

Tax	Tax Base	Tax Rate	Taxpayer	Use of Revenue
Federal gas tax now in effect (not including taxes on diesel, aviation fuel)	Gasoline	18.4 cents per gallon	Oil refiner; Position holder of fuel in terminal; Importer	Highway Trust Fund; Leaking Underground Storage Tank Trust Fund
Clinton Btu tax proposal in 1993	Fossil fuels; Hydropower; Nuclear; Ethanol (in original proposal)	25.7 cents per million Btus, with 34.2 cents per million Btus supplemental rate for oil	Oil refiner; End user of coal, electricity; Importer	Deficit reduction; Regressivity offsets in budget package
H.R. 2069 Save Our Climate Act of 2007 (Stark-McDermott)	Coal; Petroleum and petroleum products; Natural gas	\$10 per ton of carbon, increased by \$10 per year until emissions 80% below 1990 level	Manufacturer Producer Importer	Not mandated
H.R. 3416 America's Energy Security Trust Fund Act of 2007 (Larson)	Coal Petroleum and petroleum products; Natural gas	\$15 per ton of carbon dioxide, increased each year by 10% plus cost of living adjustment	Manufacturer Producer Importer	Dedicated to: Tax credit for clean energy technology; Transitional industry assistance; Carbon tax rebate
Boulder, Colorado, Climate Action Plan Tax	Electricity	Capped per kilowatt hour at: 0.49 cents (residential) 0.09 cents (commercial) 0.03 cent (industrial)	End user (collected by electric utility)	Climate action program
San Francisco, Bay Area Air Quality Management District Fee	Greenhouse gas emissions	4.4 cents per ton of greenhouse gas emissions	Industry, businesses subject to air quality permits	Climate protection programs

Cap-and-Trade	Covered Emissions	Cost per Permit	Regulated Entity	Use of Revenue
S. 3036 Lieberman-Warner Climate Security Act of 2008 (Amendment 4825)	Carbon dioxide Methane Nitrous oxide Sulfur hexafluoride Perfluorocarbons Hydrofluorocarbons	Unknown; ability to provide relief if economy subject to harm	Coal user; Importer or producer of natural gas, petroleum, coal-based fuel, or certain greenhouse gases; Producers of HCFCs	Broad range of purposes including: worker assistance; consumer relief; greenhouse gas reduction programs; deficit reduction
Regional Greenhouse Gas Initiative (RGGI)	Carbon dioxide from electricity generation	Unknown; potential for liberalized offset provisions if price above \$7/ton	Electricity generator	Extent of auctioning and use of revenue varies with state
Western Climate Initiative (proposed)	Carbon dioxide Methane Nitrous oxide Sulfur hexafluoride Perfluorocarbons Hydrofluorocarbons	Unknown; anticipates rigorous offset program to reduce cost	Broad range of sectors for facilities, starting with electricity sector in 2012 and expanding to other sectors in 2015	Minimum of 10% allowances auctioned in 2012, 25% in 2020, possibly higher thereafter; within guidelines, use of proceeds can vary by jurisdiction

B. Cap-and-Trade Regimes

The context for carbon taxes in the United States inevitably involves the question of the role of cap-and-trade regimes, which have been gaining momentum. As indicated at the start, this article does not serve as a critique of the relative merits of taxation versus cap-and-trade instruments. Rather, it can only briefly identify some of the relevant proposals or actions in order to put carbon taxes in context and to illustrate how many of the issues

that arise with carbon taxes also exist in cap-and-trade regimes. These issues include deciding which energy sources or emissions should be covered, at what point in the supply chain the price signal should be imposed, how to treat imports, and how to use any revenue (see Figure 3).

At the federal level, a number of proposals for cap-and-trade regimes for greenhouse gases were introduced in the 110th Congress spanning 2007 and 2008.⁹⁹ The most recent legislative activity of note centered on an amendment to the Lieberman-Warner Climate Security Act of 2008, S. 3036.¹⁰⁰ The amendment, submitted by Senator Barbara Boxer on behalf of Senators Joseph Lieberman and John Warner as a replacement for the original language of S. 3036, proposes an economy-wide cap-and-trade program. The amendment was designed to reduce greenhouse emissions to 19% below 2005 levels by 2020 and 71% below 2005 levels by 2050.¹⁰¹ Although the amendment only received forty-eight of the sixty votes it needed to close debate,¹⁰² it illustrates the type of cap-and-trade program receiving serious legislative attention.

The Lieberman-Warner bill, as described in the amendment, focuses on upstream producers or users and greenhouse gases beyond carbon dioxide. The proposed cap-and-trade system applies to entities that: use more than 5,000 tons of coal each year; process or import natural gas or produce natural gas in Alaska; manufacture or import petroleum or coal-based liquid or gaseous fuels; manufacture or import more than 10,000 tons of CO₂-equivalents of CO₂, methane, nitrous oxide, sulfur hexafluoride, or per fluorocarbons; or manufacture hydrochlorofluorocarbons.¹⁰³ Starting in

99. See, e.g., S. 3036, 110th Cong. (2008); S. 2191, 110th Cong. (2007); S. 1766, 110th Cong. (2007); S. 1554, 110th Cong. (2007); S. 1201, 110th Cong. (2007); S. 1177, 110th Cong. (2007); S. 1168, 110th Cong. (2007); S. 485, 110th Cong. (2007); S. 317, 110th Cong. (2007); S. 309, 110th Cong. (2007); S. 280, 110th Cong. (2007); H.R. 6316, 110th Cong. (2008); H.R. 6186, 110th Cong. (2008); H.R. 1590, 110th Cong. (2007); H.R. 620, 110th Cong. (2007).

100. The original Lieberman-Warner bill, S. 2191, 110th Cong. (2007), was reported favorably out of the Senate Committee on Environment and Public Works in May 2008 as “America’s Climate Security Act of 2007.” H.R. REP. NO. 110-337, at 1 (2008). However, Senator Boxer, chair of the committee, introduced a substitute Lieberman-Warner bill, S. 3036, 110th Cong. (2008), and subsequently offered Amendment 4825. 154 CONG. REC. S5048. Because the Senate’s vote centered on Amendment 4825, 154 CONG. REC. S5333–34 (2008); S. 3036, 110th Cong. (2008), this article focuses on the cap-and-trade program proposed in the amendment.

101. PEW CTR. ON GLOBAL CLIMATE CHANGE, SUMMARY OF THE BOXER SUBSTITUTE AMENDMENT TO THE LIEBERMAN-WARNER CLIMATE SECURITY ACT 3 (2008), available at <http://www.pewclimate.org/docUploads/L-WFullSummary.doc>. See also Juliet Eilperin, *Senate Leaders Pull Measure on Climate*, WASH. POST, June 7, 2008, at A3 (explaining the goals of the bill).

102. David Herszenhorn, *After Verbal Fire, Senate Effectively Kills Climate Change Bill*, N.Y. TIMES, June 7, 2008, available at http://www.nytimes.com/2008/06/07/washington/07climate.html?_r=1&scp=1&sq=David%20Herszenhorn,%20After%20Verbal%20Fire&st=cse&oref=slogin.

103. S. 3036, Amend. 4825, 110th Cong. § 4(16), (33) (2008) (defining “covered entity” and “non-HFC greenhouse gas”).

2012, these entities would need one allowance for each ton of CO₂-equivalent emissions or downstream emissions potential.¹⁰⁴ The bill establishes a declining number of allowances from 2012 to 2050¹⁰⁵ and tightly circumscribes the use of domestic offset projects or allowances from foreign trading programs.¹⁰⁶ Limited relief measures could be available, such as increased borrowing against future years' allowances.¹⁰⁷ To protect competitiveness, importers of products that generated substantial amounts of greenhouse gases during manufacture would have to purchase allowances if the country of origin has not taken comparable climate change actions,¹⁰⁸ somewhat akin to a border tax adjustment for a carbon or broad-based energy tax.

Over time, an increasing percentage of the allowances would be auctioned,¹⁰⁹ with proceeds going toward a variety of uses such as workers' transition assistance,¹¹⁰ suggested tax relief for consumers hardest hit with cost increases,¹¹¹ mass transit,¹¹² energy efficiency,¹¹³ low- or no-carbon electricity,¹¹⁴ research,¹¹⁵ wildlife and land conservation,¹¹⁶ firefighting,¹¹⁷ reducing greenhouse gas emissions from activities not covered by the cap-and-trade program,¹¹⁸ international programs,¹¹⁹ and deficit reduction.¹²⁰ In addition, allowances would be allocated, without charge, to industries dependent on fossil fuels (carbon-intensive manufacturers,¹²¹ electricity generators that use fossil fuels,¹²² and petroleum refiners¹²³) as well as to a variety of entities that would use the allowances to provide relief to consumers, encourage the transition to a lower-emission economy,¹²⁴

104. *Id.* § 202(a).

105. *Id.* § 201(a).

106. *Id.* §§ 302(b)(1), (2) (each limited to 15% of the covered facilities allowances).

107. *Id.* § 521.

108. *Id.* §§ 1301–1306.

109. *Id.* §§ 532(c), 582(c), 611(d), 631(c), 1202(c), 1331(c), 1402(c).

110. *Id.* §§ 533–535.

111. *Id.* §§ 583–585.

112. *Id.* §§ 611(f)–(i).

113. *Id.* § 613.

114. *Id.* §§ 903, 905–906.

115. *Id.* §§ 911–912.

116. *Id.* §§ 631(d), (e), 1201(a)(1)(C).

117. *Id.* §§ 1211(b), 1212(b).

118. *Id.* § 527.

119. *Id.* §§ 1331(b), 1332.

120. *Id.* § 1403.

121. *Id.* § 541.

122. *Id.* § 551.

123. *Id.* § 561.

124. *See, e.g., id.* § 601 (allocating to local distribution companies for electricity and natural gas for relief to lower-income consumers and small business); *id.* § 602 (allocating to states dependent on coal and manufacturing for reducing greenhouse gas emissions and encouraging energy efficiency); *id.* §

address adaptation on an ongoing basis,¹²⁵ and reward early action.¹²⁶ In addition, the proposed legislation contains a separate cap-and-trade program for hydrofluorocarbon emissions.¹²⁷

In the absence of a federal cap-and-trade regime to date, ten states in the Northeast and Mid-Atlantic (Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont) have joined together to create a narrower cap-and-trade regime targeting the electricity sector, the Regional Greenhouse Gas Initiative (RGGI).¹²⁸ The RGGI cap-and-trade program applies to carbon dioxide emissions from entities that generate at least twenty-five megawatts of electricity¹²⁹ with the goal of stabilizing emissions at current levels by 2014 and gradually reducing them to ten percent below 2009 levels by 2018.¹³⁰ Although implementation details vary from state to state,¹³¹ the program allows offset projects for up to 3.3% of the emissions and provides more liberal offsets if the price of permits rises to seven dollars per ton or above.¹³² The permits will be distributed primarily by auction, and the first auction by six states was held in late September 2008.¹³³

Another regional program, the Western Climate Initiative (WCI), is taking shape with efforts by seven western states (Arizona, California, Montana, New Mexico, Oregon, Utah, and Washington) and four Canadian

614 (allocating to state leaders in the reduction of greenhouse gas emissions); *id.* §§ 801–832 (allocating to Climate Change Technology Board for efficient buildings program, efficient manufacturing, and renewable energy); *id.* § 1011 (allocating to carbon capture and sequestration projects); *id.* §§ 1102–1103 (allocating to the Environmental Protection Agency for fuel efficient commercial fleets); *id.* § 1121 (allocating to the Environmental Protection Agency to reward production of cellulosic ethanol).

125. *See id.* §§ 621–625 (allocating to Indian tribes and states for coastal, freshwater, agricultural, and other impacts).

126. *Id.* §§ 701–702.

127. *Id.* § 1501.

128. *See* Memorandum of Understanding Governing Regional Greenhouse Gas Initiative § 1 (Dec. 20, 2005), available at http://rggi.org/docs/mou_12_20_05.pdf (initially signed by the governors of seven states).

129. *Id.*

130. *Id.* §§ 2C, 2D.

131. *See* CONN. GEN. STAT. § 22a-200c (2008); DEL. CODE ANN. tit. 7, §§ 6043–6047 (2008); MASS. GEN. LAWS ch. 25A, § 6 (2008); N.H. REV. STAT. ANN. §§ 125-O:19–28 (West 2008); N.J. STAT. ANN. § 26:2C-45 (West 2008); N.Y. COMP. CODES R. & REGS. tit. 6, § 242 (2008); MD. CODE ANN., ENVIR. § 2-1002 (2007); ME. REV. STAT. ANN. tit. 38, §§ 580-A to 580C (2007); R.I. GEN. LAWS §§ 23-82-1-23-82-7 (2007); VT. STAT. ANN. tit. 30, § 255 (2005).

132. *See* Memorandum of Understanding, *supra* note 128, § 2F(2)–(4).

133. Press Release, The Regional Greenhouse Gas Initiative, RGGI States' First CO₂ Auction Off to a Strong Start (Sept. 29, 2008), available at http://www.rrgi.org/docs/press_release_9_29_08_fin al.pdf.

provinces (British Columbia, Manitoba, Ontario, and Quebec).¹³⁴ WCI's goal is to reduce greenhouse gas emissions to fifteen percent below 2005 levels by 2020,¹³⁵ and it issued recommendations for the design of a regional cap-and-trade system in September 2008. The recommendations propose a broad-based regime for a range of greenhouse gases similar to those covered by the Lieberman-Warner bill described above.¹³⁶ They also specifically recognize that the cap-and-trade program can "work in concert" with carbon taxes and that WCI jurisdictions will determine how to integrate British Columbia's carbon tax (described in another article in this volume) with the cap-and-trade system.¹³⁷ The WCI program has been evolving in tandem with California's efforts to develop programs to meet its statutory commitment to reduce greenhouse gas emissions to 1990 levels by 2020,¹³⁸ and the California Air Resources Board has recommended a cap-and-trade system link with the WCI trading program.¹³⁹

C. Carbon Tax Issues in the Cap-and-Trade Context

If the federal government seriously tackles the issue of climate change, it will have to decide whether to create a broad-based, market-based regime for reducing greenhouse gas emissions. Either a carbon tax or an economy-wide cap-and-trade system would create the backbone for a comprehensive program, although neither would necessarily supplant policies targeted toward specific issues, such as fuel economy requirements for vehicles. The Bay Area Air Quality Management District's fee on greenhouse gas emissions and RGGI show conversely that tax and cap-and-trade regimes can also be tailored more narrowly, and the Western Climate Initiative is exploring how a tax may work in concert with a cap-and-trade regime. Policymakers can choose combinations from a large portfolio of options,

134. Press Release, Arizona, et al., U.S. States, Canadian Provinces Announce Regional Cap-and-Trade Program to Reduce Greenhouse Gases (Sept. 23, 2008), available at <http://www.westernclimateinitiative.org/ewebeditpro/items/10104F19871.pdf>.

135. WESTERN CLIMATE INITIATIVE, STATEMENT OF REGIONAL GOAL (2007), available at <http://www.westernclimateinitiative.org/ewebeditpro/items/O104f13006.pdf>.

136. WESTERN CLIMATE INITIATIVE, DESIGN RECOMMENDATIONS FOR THE REGIONAL CAP-AND-TRADE PROGRAM 1 (2008), available at <http://www.westernclimateinitiative.org/ewebeditpro/items/0104F19865.pdf>. The WCI's recommendations cover a range of greenhouse gases from electricity generation, industrial and commercial facilities, gasoline and diesel-based transportation, and residential, commercial, and industrial fuel (on an upstream basis). *Id.* at 1–2.

137. WESTERN CLIMATE INITIATIVE, *supra* note 136, at 4.

138. CAL. HEALTH AND SAFETY CODE §§ 38500, 38550 (West 2007).

139. CALIFORNIA AIR RESOURCES BOARD, CLIMATE CHANGE PROPOSED SCOPING PLAN: A FRAMEWORK FOR CHANGE 30 (2008), available at <http://www.arb.ca.gov/cc/scopingplan/document/psp.pdf>.

but the fundamental question remains whether the United States will pursue an aggressive tax or cap-and-trade regime at the federal level.

If the government chooses a relatively comprehensive, market-based approach, a fundamental design issue is whether to target only carbon, all greenhouse gases, or other energy sources as well even if they do not directly produce greenhouse gases. In other words, what is the tax base for the tax, or which emissions will define the trading regime? Carbon taxes, greenhouse gas taxes, and cap-and-trade regimes all focus directly on emissions in proportion to their global warming potential. In this respect, they are quite similar. By contrast, the Clinton Btu tax included nuclear power and hydroelectricity and did not tie even the tax on fossil fuels to their global warming potential. As discussed above, this choice was driven in large part by wanting to distribute the burden more evenly around the country. It remains to be seen whether carbon tax and cap-and-trade regimes ultimately will fall prey to the arguments about regional impacts that the Clinton Administration tried to avoid with its choice of the Btu tax—or whether the political will to address climate change will be strong enough to counter those arguments and maintain the focus on greenhouse gases.¹⁴⁰ The fact that ten states are implementing the RGGI cap-and-trade program may not necessarily serve as a bellwether for federal assessment of the tradeoffs between targeting fossil fuels and looking more broadly, since RGGI involves only the electricity-generating sector and states within a region may have more similar interests or profiles.

Taxes and emissions allowances each impose costs. The cost for the tax will be based on the tax rate; the cost of the allowances will depend upon the market. Consequently, both types of market-based regimes will have economic effects and pose regressivity issues.¹⁴¹ Taxes offer the benefit of a known cost, which may make the calculation of their projected economic effects and regressivity more reliable, though perhaps at the risk that policymakers will then dilute the tax rate below environmentally sound levels to reduce economic impacts. By not starting with a price, a cap-and-trade system may potentially postpone that moment of political reckoning.

140. One could argue that it is more important to distribute the burden for reducing the federal deficit equally around the country than the burden for reducing greenhouse gas emissions, which may be more allocable to one region than another. Such an argument again illustrates how revenue use is relevant to the policies and politics governing the design of the tax.

141. See Letter from Peter Orszag, Director, Cong. Budget Office, to Senator Jeff Bingaman, Chairman, Comm. on Energy and Natural Res., U.S. Senate (June 17, 2008) and accompanying report, CONG. BUDGET OFFICE, OPTIONS FOR OFFSETTING THE ECONOMIC IMPACT ON LOW- AND MODERATE-INCOME HOUSEHOLDS OF A CAP-AND-TRADE PROGRAM FOR CARBON DIOXIDE EMISSIONS 1 (2008), available at <http://www.cbo.gov/ftpdocs/93xx/doc9319/06-17-ClimateChangeCosts.pdf> (analyzing options for offsetting the disparate economic impacts of a cap-and-trade program).

Nonetheless, either type of instrument will have real costs that warrant full and comparative attention at the start.

Distributing allowances at no cost, without auction, may not provide a sound, easy answer to cost issues. Based on experience with the European Trading Scheme and economists' analyses, entities that receive allowances at no cost may still pass some or all of the value of the allowances on to consumers in the price of their products, using the windfall to increase their profits.¹⁴² Consumers will not necessarily see the savings. This counterintuitive result of free distribution means that awarding cap-and-trade allowances at no cost does not provide a simple way of mitigating the economic effect, regressivity, or regional disparity of a cap-and-trade system. In addition, a cap-and-trade program with free distribution would not create as strong an incentive to reduce aggregate emissions below the capped threshold.

The revenue side of the equation is also important when putting carbon taxes and cap-and-trade regimes in context. Placing a price on emissions through taxes or auctioned allowances will produce revenue for the government. As seen in the examples of proposals above, the revenue can be used to enhance the environmental impact by financing climate change programs, to address regressivity, to assist in economic transitions,¹⁴³ or to provide for deficit reduction or tax relief. As with the Clinton Btu tax, the need for new revenue may provide political motivation for the new instrument.

Thus, as Figure 3 illustrates, tax regimes and auctioned cap-and-trade regimes are fundamentally similar in their basic components—targeted fuels or emissions, cost imposed per unit, an identified party responsible for paying that cost, and revenue that can be put to use if the allowances are auctioned. Policymakers must make similar decisions for each. But the two regimes also have their known differences, often shorthand into certain cost (the fixed tax rate) versus uncertain cost (the market price), and uncertain environmental results (based on the behavioral effect of the tax) versus relatively certain environmental results (based on the cap). Predictability of cost and efficiency lend heft to the carbon tax side, and

142. Staff of the National Commission on Energy Policy, *Allocating Allowances in a Greenhouse Gas Trading System* 10–11 (2007), available at <http://www.energycommission.org/ht/display/ContentDetails/i/1578/pid/493>. For a discussion of the European experience, see Mikael Skou Anderson, *Environmental and Economic Implications of Taxing and Trading Carbon: Some European Experiences*, in this volume.

143. Nevertheless, the distribution of allowances at no cost to entities required to use them for specific purposes can provide an indirect means of funding programs. Recipients can sell the allowances and use the proceeds for their programs. For examples of this approach, see *supra* notes 124–26 and accompanying text.

certainty of result weigh in on the cap-and-trade side, but the issue should not be overstated—the Intergovernmental Panel on Climate Change has found taxes to be both cost effective and environmentally effective.¹⁴⁴

Taxes and cap-and-trade regimes are also very different in their administration, with the Internal Revenue Service responsible for taxes and private-sector and nonprofit entities playing significant roles in the implementation of trading regimes. Importantly, they are also within different committees' jurisdictions during the legislative process: the tax-writing committees control taxes and the environmental or energy committees control the cap-and-trade regimes. Different players will have the first voice for each, and their preferences and familiarities will influence choices. The ultimate decisions will be based on the intersection of policy and politics, as evidenced by the Btu tax proposal in 1993.

CONCLUSION

Climate-related taxes should receive serious attention as a new administration and Congress take shape following the November 2008 elections. The spotlight has been on cap-and-trade regimes, but tax regimes share many of the same characteristics. Although taxes seem more politically volatile, carbon taxes and cap-and-trade regimes should be subjected to the same calculations of economic impact, equity, administrative feasibility, and environmental effect, and the political calculation for each should not rest on a cursory dismissal of the viability of taxes. As detailed elsewhere in this volume, the experience in Europe demonstrates that climate-related taxes can be enacted in a variety of forms. The Clinton Administration's experience with the Btu tax should not toll the bell for climate change taxes, but rather serve as an indicator of sensitive issues that price-based mechanisms must address as the United States considers whether climate change taxes, or cap-and-trade regimes, might be "in accordance with our national circumstances."¹⁴⁵

144. See, e.g., WORKING GROUP III CONTRIBUTION, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: MITIGATION OF CLIMATE CHANGE 756 (Bert Metz et al. eds., 2007); see also *Approaches to Reducing Carbon Dioxide Emissions*, House Comm. on the Budget, 110th Cong. (2008) (statement of Peter R. Orszag, Director, Congressional Budget Office). The inflexibility of the cap that makes cap-and-trade regimes less efficient could be mitigated through a variety of means. See generally CONG. BUDGET OFFICE, POLICY OPTIONS FOR REDUCING CO₂ EMISSIONS (2008).

145. See Hokkaido Toyako, *supra* note 1.

THE DESIGN OF CARBON AND BROAD-BASED ENERGY TAXES IN EUROPEAN COUNTRIES

*Stefan Speck**

Introduction	31
I. The History of Energy Taxation in Europe.....	32
II. The Use of Energy and Carbon Taxes for Environmental Policy	36
III. Taxation of Transport Fuels in EU Member States.....	38
IV. How Have the Energy and Carbon Taxes Levied on Non-Transport Energy Products Developed Over Time?.....	42
A. Denmark.....	44
B. Germany.....	47
C. Sweden.....	50
D. The United Kingdom	53
Summary and Conclusion	55
Appendix.....	57

INTRODUCTION

Since the early 1990s, economic instruments in environmental policy have become an increasingly widespread trend in Europe. These policies began in the Scandinavian states and soon moved to other European countries. An increase in environmental awareness and mounting pressure on the environment culminated in the adoption of new economic instruments and tools, specifically energy and carbon taxes. This development came together with the understanding that economic instruments should be seen as complements to the traditional command-and-control measures.

Part I of this article discusses that, contrary to popular belief, energy taxes have been used for almost a century and are far from a new phenomenon. This section also reviews the most recent development of the

* Kommunalkredit Public Consulting, Türkenstr. 9, 1092 Vienna, Austria, tel: +43 1 31631-248, fax: +43 1 31631-104, email: s.speck@kommunalkredit.at.

European Union (EU) policy regarding the use of economic instruments for environmental policy. Part II highlights the underlying reasons and principles for using energy and carbon taxes in environmental policy. However, a more complicated and complex taxation scheme, driven by the fear that domestic industries would lose competitiveness, accompanied a more widespread use of energy and carbon taxes in case economic intervention was carried unilaterally.¹ Part III compares tax rates on transport fuels in four EU member states—Denmark, Germany, Sweden, and the United Kingdom (U.K.)—and the United States (U.S.). Part IV reviews the schemes implemented by the EU member states, provides assessment of energy and carbon taxation schemes levied on other energy products, and reveals differences in coverage, scope, tax rates, and their development over time.

I. THE HISTORY OF ENERGY TAXATION IN EUROPE

Energy taxes in Europe are not a recent development. European countries have utilized energy taxes for nearly ninety years. For example, Denmark and Sweden levied taxes on transport fuels, such as gasoline, as early as 1917 and 1924 respectively.² Sweden later instituted energy taxes on other non-transport energy products like mineral oils and coal beginning in 1957.³

The rationale behind these energy taxes was not based on environmental issues, but rather on fiscal issues.⁴ The taxes were seen as a means to raise revenues for the national budget and to control oil imports.⁵ However, during the 1980s, a change in the underlying principle for energy taxation emerged when European governments began using gasoline taxes

1. See Andrea Baranzini et al., *A Future for Carbon Taxes*, 32 *ECOLOGICAL ECON.* 395, 401 (2000) (discussing the impact of carbon and energy taxes on competitiveness); see also ZhongXiang Zhang & Andrea Baranzini, *What Do We Know About Carbon Taxes? An Inquiry into Their Impacts on Competitiveness and Distribution of Income*, 32 *ENERGY POL'Y* 507, 512 (2003) (noting that this fear is real and ongoing for policymakers).

2. See STEFAN SPECK ET AL., *NORDIC COUNCIL OF MINISTERS, THE USE OF ECONOMIC INSTRUMENTS IN NORDIC AND BALTIC ENVIRONMENTAL POLICY 2001–2005* AT 66, 197 (2006), available at <http://www.norden.org/pub/miljo/ekonomi/sk/TN2006525.pdf> (discussing the introduction of taxes on transport fuels in Denmark and Sweden).

3. See *id.* at 192 (discussing the implementation of energy taxes on fossil fuels beginning in the late 1950s).

4. See Speck, *supra* note 2, at 66–67 (discussing the fiscal basis for the introduction of taxes on transport fuel).

5. See *id.* (discussing the fiscal basis for the introduction of taxes on transport fuel).

to achieve environmental objectives.⁶ Gasoline taxes were designed in a way that favored unleaded gasoline, which received a tax rebate based on environmental considerations and the recognition of lead's harmful effects.⁷

The following decade saw even more widespread application of energy and carbon taxes driven by environmental policy objectives and by their revenue-raising potential. The forerunner countries, Denmark and Sweden, started to revise their overall energy taxation schemes in the early 1990s and implemented carbon dioxide (CO₂) taxes in response to the increased attention towards climate change.⁸ Other countries, including the Netherlands, Germany, and the U.K., soon followed by using energy and carbon taxes as policy instruments for climate change action.

The European Commission promoted the use of energy taxation schemes for climate change policy and proposed the first EU-wide energy and carbon tax in 1992.⁹ However, this proposal, and an amended version presented by the European Commission (EC) in 1994, was rejected by several EU member states.¹⁰ Shortly after, the European Commission made another attempt for energy taxation by submitting the 1997 energy products taxation proposal.¹¹ Unlike the 1992 proposal, which was primarily based on environmental considerations, the 1997 proposal

was born more as an internal market and taxation one. The aim was now no longer to introduce a new totally harmoniz[ed] EU CO₂/energy tax, but, more pragmatically, to extend and improve the existing framework for the

6. See European Env'tl. Agency [EEA], *Environmental Taxes and Charges, Deposit-Refund Schemes*, 69, EEA Tech. Rpt./No. 8/2005 (2005) (prepared by Stefan Speck, Ian Skinner, Dominic Hogg, and Patrick ten Brink) [hereinafter *Environmental Taxes and Charges*] at 40 (discussing that these taxes began to emerge as market-based instruments associated with the 'polluter pays' principle).

7. See *id.* (discussing how unleaded gasoline was preferred over leaded gasoline for its lessened environmental impact).

8. See SPECK, *supra* note 2, at 62 (noting that the Danish Parliament passed the carbon tax bill as a reaction to the increased attention on climate change).

9. See generally Commission of the European Communities, *Proposal for a Council Directive Introducing a Tax on Carbon Dioxide Emissions and Energy*, COM (92) 226 final (June 30, 1992), available at http://aei.pitt.edu/4830/01/000990_1.pdf (recognizing the need to address carbon emissions to limit the greenhouse effect).

10. Jacob Klok, *Energy Taxation in the European Union. Past Negotiations and Future Perspective* 10–11 (Instituto de Estudios Fiscales, Working Document No. 21/05, 2005), available at http://www.ief.es/Publicaciones/Documentos/Doc_21_05.pdf.

11. Commission of the European Communities, *Restructuring the Community Framework for the Taxation of Energy Products*, COM (97) 30 final (Dec. 3, 1997), available at http://aei.pitt.edu/3522/01/000671_1.pdf.

Member States taxation of mineral oils to cover all energy products sold on the Internal Market.¹²

The adoption of the Energy Taxation Directive by the Council of Ministers in 2003,¹³ a watered down version of the 1997 proposal, marked the end of lengthy discussions and negotiations between the EU member states at the European Council.¹⁴

The 2003 Energy Taxation Directive was of great significance for EU member states as it articulated the fiscal framework and structure for the taxation of energy products and electricity.¹⁵ The Directive widened the coverage of the Community framework, which had previously been limited to mineral oil products, to other energy products such as natural gas, coal, and electricity.¹⁶ In addition, it increased the minimum rates of taxation for mineral oils and introduced new minimum rates for other energy products. These new rates differentiated between business and non-business uses, and set the minimum rate for business use lower than the rate for non-business use.¹⁷ All EU member states are legally obligated to set national tax rates in accordance with the requirements of the Directive, which has to be transposed into national law.¹⁸

One of the reasons behind the slow progress in establishing a common EU structure of energy taxation is the EC's unanimity requirement on taxation issues. A single EU Member State can block any decision with respect to taxation.¹⁹ In 2001, a proposal was brought forward to revise the unanimity rule for certain tax issues and replace it with a qualified majority vote based on the "enhanced co-operation" mechanism.²⁰ The revised rule

12. Klok, *supra* note 10, at 10–11.

13. *Id.*

14. See generally Council Directive 2003/96, 2003 O.J. (L 283) (EC), available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:283:0051:0070:EN:PDF> (directing the EC to adopt certain environmental taxation measures).

15. See generally *id.*

16. The taxation scheme based on this Directive can be described as a broad-based energy tax and the tax base is defined in terms of the volume of the energy.

17. See Council Directive 2003/96/EC, *supra* note 14, art. 5, at 54 (allowing member states to apply differentiated rates of taxation for business and non-business use).

18. See *id.* art. 4, at 54 (prohibiting levels of taxation for specified energy products and electricity from being below prescribed minimum levels of taxation).

19. See *Environmental Taxes and Charges*, *supra* note 6, at 69 (discussing that progress is slow because all taxation decisions require unanimity).

20. See EEA, *Market-based Instruments for Environmental Policy in Europe*, 69, No. 8 (2005) http://reports.eea.europa.eu/technical_report_2005_8/en/EEA_technical_report_8_2005.pdf (offering an expanded discussion on enhanced cooperation in the EU), see also *Environmental Taxes and Charges*, *supra* note 6 (explaining that the European Commission proposed

was introduced by the Amsterdam Treaty, developed further by the Nice Treaty, and entered into effect on February 1, 2003.²¹

In 2005, the interest in energy and carbon taxes lost its momentum at the EU level and within EU member states with the adoption of the EU Emission Trading Scheme (EU ETS).²² The EU ETS can be described as the cornerstone in the fight against climate change at the EU level because it helps EU member states comply with their emission reduction commitments under the Kyoto Protocol. The scheme covers energy-intensive installations including combustion plants, oil refineries, coke ovens, iron and steel plants, and factories producing cement, glass, and other commodities.²³ These installations are emitting around fifty percent of the EU's CO₂ and are subject to energy taxation articulated in the Directive.²⁴

The adoption and implementation of the EU ETS, in combination with the recent sharp increase in world oil prices, lead any discussion of further increases in the energy tax level *ad absurdum* since consumers and producers are facing higher energy prices. This has led to calls for the reduction of energy tax rates in many European countries during the spring and summer of 2008.²⁵

Although the structure and minimum tax levels were laid down in the Directive, the actual design of the energy/carbon taxation regimes implemented by the EU member states are quite different, particularly with regard to energy and carbon taxes levied on industry. The reasons for these differences were manifold, but were generally introduced by national

that environmental taxation should in the future be decided under qualified majority rules as a fix to the slow progress resulting from the unanimity requirement).

21. *Market-based Instruments for Environmental Policy in Europe*, *supra* note 20; *Environmental Taxes and Charges*, *supra* note 6.

22. See generally Council Directive 2003/87, 2003 O.J. (L 275) (EC), <http://www.bmu.de/files/pdfs/allgemein/application/pdf/emissionshandel031030.pdf> (establishing a scheme for greenhouse gas emission allowance trading).

23. See *id.* at 42 (listing categories of activities covered by the EU ETS).

24. Larry Parker, *Climate Change: The European Union's Emissions Trading System (EU-ETS)*, (Congressional Research Service, Wash. D.C.), July 31, 2006, <http://fpc.state.gov/documents/organization/70317.pdf>. See also *Market-Based Instruments for Environmental Policy in Europe*, *supra* note 20, at 83 (discussing European environmental tax reform); Council Directive 2003/96/EC, *supra* note 14, art. 17, at 57 (allowing EU member states to apply tax reductions for energy-intensive businesses).

25. See generally European Commission, Oil Bulletin, No 1414, (July 1, 2008) available at http://ec.europa.eu/energy/oil/bulletin/2008/without_taxes/2008_06_30.pdf (charting the consumer price of petroleum products in European counties since July 2007).

governments in order to protect the competitiveness of their domestic industries.²⁶

II. THE USE OF ENERGY AND CARBON TAXES FOR ENVIRONMENTAL POLICY

The application of environmental taxes, including energy and carbon taxes, as a means aimed to achieve environmental protection can be traced back to the scholars Pigou, Baumol, and Oates.²⁷ In 1932, Pigou developed the rationale for environmental taxation, and in 1971 Baumol and Oates²⁸ analyzed how taxes could be applied to reach environmental standards cost effectively. Although their approaches and promoted rationales differ slightly, all three scholars postulate a uniform tax rate for both polluters and energy products, thereby equalizing marginal costs so that the total cost of abatement would be minimized.²⁹ Furthermore, environmental taxes would be an appropriate tool for implementing the polluter pays principle (PPP) which, in addition to the precautionary principle, is a foundation of European environmental policies.³⁰ The rationale behind the PPP is to

26. See Paul Ekins & Stefan Speck, *The Impacts of Environmental Policy on Competitiveness: Theory and Evidence*, in INTERNATIONAL COMPETITIVENESS AND ENVIRONMENTAL POLICIES 33, 34, 48 (Terry Barker & Jonathan Köhler eds., 1998) (offering a detailed discussion about the competitive effects of environmental taxes); see also Paul Ekins & Stefan Speck, *Competitiveness and Exemptions From Environmental Taxes in Europe*, 13 ENV. & RES. ECON. 369, 370 (1999) [hereinafter *Competitiveness and Exemptions*] (“The principle reason for the introduction of the tax exemptions is concern about the effects of environmental, and especially energy, taxes on competitiveness”); Paul Ekins & Stefan Speck, *Environmental Tax Reform in Europe: Energy Tax Rates and Competitiveness*, in 5 CRITICAL ISSUES IN ENVTL. TAX’N 77, 78 (Nathalie J. Chalifour et al. eds., 2008) [hereinafter *Energy Tax Rates and Competitiveness*].

27. See ARTHUR PIGOU, *THE ECONOMICS OF WELFARE* 113–14 (Macmillan 4th ed. 1932) (noting that environmental prudence from sound education can produce lasting effects because future generations inherit these new ideas and build upon them for further, generational, environmental advancements). See also *id.* at 236 (discussing price caps on commodities including coal).

28. See generally William J. Baumol & Wallace E. Oates, *The Use of Standards and Prices for Protection of the Environment*, 73 SWED. J. OF ECON. 42, 42–51 (1971) (discussing the cost-effectiveness of the pricing and standards approach to energy taxation).

29. See *Market-based Instruments for Environmental Policy in Europe*, *supra* note 20, at 45 (explaining that taxes should be set at a level that internalizes environmental damage); see also National Environmental Research Institute [NERI], *Working Paper: Overview of Environmental Tax Reforms in EU Member States*, in *Competitiveness Effects of Environmental Tax Reforms*, 22, WP. 1 (2007) (prepared by Stefan Speck), http://www2.dmu.dk/COMETR/COMETR_Final_Report.pdf [hereinafter *Environmental Tax Reform in Member States*] (discussing that while the scholars disagree in approach, all three agree that the cheapest way to achieve political environmental objectives is through a uniform tax).

30. See Consolidated Version of the Treaty Establishing the European Community, Dec. 29, 2006, 2006 O.J. (C 321) 174 (stating that the community policy on the environment shall be based on the precautionary principle and as such polluters should pay).

internalize environmental costs—externalities—which accrue through environmental pollution.

However, current political practice differs from its theoretically-principled basis. Energy and carbon taxes implemented by EU member states generally discriminate between energy users. The taxation schemes differentiate between energy products by setting tax rates that are not in accordance with the fuels' energy content. Furthermore, special tax provisions, including reduced rates for specific energy products, tax rebates for the industry as a whole, or rebates for individual industry sectors, are often the rule and not the exception (discussed in Part III below).³¹ The legal framework for granting special tax provisions, which are regarded as a form of state aid, is outlined in the Community Guidelines on State Aid for Environmental Protection (Environmental Guidelines).³² These Environmental Guidelines, combined with the Energy Taxation Directive, set rules for determining which tax provisions may be granted by EU member states. For example, they allow for reduction of energy tax rates if the reduced rates are still above the minimum excise rates established under the Energy Taxation Directive.³³ Further reductions are also possible if member states consider special rules, including agreements for introducing energy-saving measures under the Environmental Guidelines.³⁴

It is important to recognize that the current developments in the energy and carbon taxation schemes in the four EU member states are part of a policy reform process within the concept of environmental tax reform (ETR).³⁵ The underlying principle of an ETR is to reform the national tax system by shifting the tax burden from conventional market areas, such as production labor and capital, to environmentally related fields, such as environmental pollution or natural resource use.³⁶

The original idea emanates from levying a tax on energy consumption and using these revenues to reduce the taxes and charges levied on labor,

31. See *Energy Tax Rates and Competitiveness*, *supra* note 26, at 78 (discussing European tax rebates and exemptions in different sectors, especially industry sectors).

32. See generally *Community Guidelines on State Aid for Environmental Protection*, 2008 O.J. (C 82) 1, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2008:082:0001:0033:EN:PDF>.

33. See *id.* at 25, ¶ 153 (allowing for a reduction of tax rates as long as the new rates are above the minimum level set by the 2003 Energy Tax Directive).

34. See Council Directive 2003/96/EC, *supra* note 14, art. 15, at 56 (allowing member states to apply full or partial exemptions for reductions involving environmentally-friendly products and energy from renewable resources).

35. See *Market-based Instruments for Environmental Policy in Europe*, *supra* note 20, at 83–84 (outlining environmental tax reforms in the EU).

36. See *id.* (outlining environmental tax reforms in the EU).

particularly on social security and/or pension contributions.³⁷ Therefore, the general strategy behind an ETR—also known as environmental fiscal reform, ecological tax reform, or green tax reform—is to address and achieve multiple policy objectives simultaneously. It is not surprising that the revenue generating effect of environmental taxes—particularly energy taxes, as they generate the biggest share of revenues from all environmental taxes by far—must be the first part of an ETR to be analyzed. Otherwise, the economic policy objective of the reform process, i.e., the reduction of taxes and charges levied on labor, cannot be reached satisfactorily because taxes and charges levied on labor generate the highest amount of revenues for national budgets in Europe. It is worthwhile to state that the high tax burden on labor was a perceived cause of high rates of unemployment in several European countries during the 1990s, as well as an impediment for hiring additional workers during periods of low economic growth and when economies were depressed.³⁸ Revenues from taxes and charges levied on the factory production labor were increased during these decades and were seen as too high, especially in the Scandinavian countries with rather high marginal income tax rates.³⁹

The concept of an ETR has been introduced in all four EU member states analyzed in this paper. At the time of the ETR implementation, energy and carbon taxes were significant in all of these countries. However, these countries have adopted varying strategies regarding both the introduction of new energy and carbon taxes and the revision of already existing ones.⁴⁰ The following sections of the article assess the different designs of energy and carbon taxes.

III. TAXATION OF TRANSPORT FUELS IN EU MEMBER STATES

The taxation of transport fuels has a long history and, as mentioned above, was often implemented as a means of generating revenues for national budgets. Therefore, it is not surprising that transport fuel taxes

37. See generally ARBEIT OHNE UMWELTZERSTÖRUNG. STRATEGIEN FÜR EINE NEUE WIRTSCHAFTSPOLITIK [EMPLOYMENT WITHOUT ENVIRONMENTAL DEGRADATION: STRATEGIES OF A NEW ECONOMY DIRECTION] (H.C. Binswanger, H. Frisch & H.G. Nutzinger eds., 1983) (addressing the tensions between advancing business interests and environmental protection).

38. See *Environmental Tax Reform in Member States*, *supra* note 29, at 21 (suggesting high taxes on labor are perceived to be a cause for high unemployment).

39. *Id.*

40. See SPECK, *supra* note 2, at 41 (discussing different strategies of EU member states regarding the increase of existing energy and carbon taxes, as well as, the introduction of new ones). See also *Environmental Tax Reform in Member States*, *supra* note 29, at 27 (discussing the launch of new environmental taxes and the revision of existing ones by Nordic governments).

also have some significance in the context of the ETR packages, particularly in the German ETR as discussed in the “*Germany*” section.⁴¹ Table 1 shows the development of gasoline taxes since 1990 in the four EU member states and the U.S. The tax rates in national currencies are converted into Euros, which can lead to some distortions because of the recent exchange variations. This is particularly visible in the case of the U.S., as the respective federal and state average tax rates are expressed in dollars per 1,000 liters as well as in Euros per 1,000 liters. Exchange rate variations also affect Denmark, Sweden, and the U.K. since these EU member states have not adopted the Euro.

41. See *Environmental Taxes and Charges*, *supra* note 6, at 50–51 (discussing how environmental tax reforms in Germany have included raising fuel taxes).

Table 1: Overview of development on tax rates on gasoline unleaded.⁴²

	Denmark	Germany	Sweden	U.K.	U.S.	U.S.
	€/1,000L	€/1,000L	€/1,000L	€/1,000L	\$/1,000L	€/1,000L
1990	286.4	291.0	388.2	268.8	82	64.4
1991	284.5	307.0	398.4	312.7	99	79.9
1992	288.1	419.0	391.6	315.1	101	77.8
1993	296.3	419.0	425.3	328.0	90	76.9
1994	324.8	501.0	426.7	367.2	101	84.9
1995	412.1	501.0	429.7	380.9	101	77.2
1996	444.3	501.0	488.6	423.9	101	79.5
1997	443.6	501.0	493.6	555.8	101	89.1
1998	449.4	501.0	501.3	636.6	101	90.1
1999	507.0	531.7	503.0	708.5	101	94.7
2000	519.2	562.4	529.3	796.6	101	109.3
2001	532.7	593.1	486.2	771.7	101	112.7
2002	547.7	623.8	504.3	776.4	101	106.8
2003	547.7	654.5	516.2	710.5	102	90.2
2004	547.1	654.5	525.0	739.5	103	82.8
2005	546.2	654.5	534.4	740.1	104	83.6
2006	545.6	654.5	539.2	736.4	105	83.6
2007	546.3	654.5	547.0	752.8	105	76.6

The pattern of development of the national tax rates levied on diesel fuel for transport is similar to that of gasoline. Between 1990 and 2008, tax rates increased in the four EU member states. The smallest increase was in Denmark where rates rose approximately eighty percent. In contrast, Sweden's tax rate quadrupled during the same time period. The U.K. also experienced a dramatic tax rate increase during the 1990s, which can be attributed to the road fuel duty escalator.⁴³

42. The U.S. tax rate data has been converted into Euro for comparison reasons using the exchange rates published by Eurostat (the Statistical Office of the European Communities) for the years 1990–2007. The U.S. data is the sum of the federal average rate and the state average rate. *Environmental Tax Reform in Member States*, *supra* note 29, at 134; EUROPEAN COMMISSION DIRECTORATE GENERAL TAXATION AND CUSTOMS UNION *Excise Duty Tables*, July, 2008; OECD International Energy Agency [IEA], *ENERGY PRICES & TAXES Q. STAT.*, First Quarter 2008, at 114, 141, 258, 284, 292 [hereinafter IEA 2008]; International Energy Agency [IEA], *ENERGY PRICES & TAXES Q. STAT.*, Third Quarter 1999, at 135, 279 [hereinafter IEA 1999].

43. See Paul Ekins & Stefan Speck, *Proposal of Environmental Fiscal Reforms and the Obstacles to Their Implementations*, 2 J. OF ENVTL. POL'Y AND PLAN. 93, 102 (2000) (discussing this increase in "road fuel duty [as] . . . a major innovation compared with other European countries").

Table 2: Overview of tax rates levied on diesel for transport.⁴⁴

	Denmark	Germany	Sweden	U.K.	U.S.	U.S.
	€/1,000L	€/1,000L	€/1,000L	€/1,000L	\$/1,000L	€/1,000L
1990	224.0	230.0	127.6	290.3	87	68.3
1991	222.5	230.0	121.7	312.0	102	82.3
1992	225.4	280.0	107.5	307.4	105	80.9
1993	231.8	280.0	110.7	317.7	105	89.7
1994	270.4	317.0	246.6	359.9	116	97.5
1995	309.8	317.0	259.8	380.9	116	88.7
1996	311.2	317.0	297.1	424.1	116	91.3
1997	319.4	317.0	297.5	557.2	116	102.3
1998	318.7	317.0	299.7	647.7	116	103.5
1999	352.4	347.7	300.8	749.0	116	108.8
2000	382.4	378.4	346.0	845.8	117	126.6
2001	406.6	409.1	328.4	833.3	118	131.7
2002	407.8	439.8	340.7	824.1	118	124.7
2003	407.8	470.4	348.3	754.1	119	105.2
2004	407.3	470.4	365.1	784.9	120	96.5
2005	406.6	470.4	392.7	785.5	121	97.3
2006	406.2	470.4	396.0	781.4	122	97.2
2007	406.7	470.4	402.2	799.0	128	93.4

These large increases took place mainly during the 1990s. Since 2000, the tax rates have been more or less frozen with the exception of Sweden. Sweden is one of the few European countries which indexes its energy and carbon tax rates; the nominal tax rates are adjusted with inflation annually so that the real value of the tax rates is kept constant.⁴⁵ This is in clear contrast to Germany where the transport fuel tax rates have been frozen since 2003 so that the real tax rates—tax rates with constant prices—have been reduced.⁴⁶ The increase in U.S. tax rates can best be described as meager during this period given that the nominal average tax rates for gasoline and diesel have been increased by around twenty-eight percent and forty-seven percent respectively.⁴⁷ It is interesting to note that the tax rates levied on diesel fuel are higher only in the U.K. and the U.S., as opposed to

44. See *Environmental Tax Reform in Member States*, *supra* note 29 (giving an overview of the history of diesel taxes); IEA 2008, *supra* note 42, at 113, 140, 257, 283, 291; see also IEA 1999, *supra* note 42, at 116, 134, 243, 269, 278.

45. See SPECK, *supra* note 2, at 35, 171 (stating that the real value of energy related taxes in Norway remains constant due to the fact that environmental taxes have been increased annually according to the inflation rate).

46. See IEA 2008, *supra* note 42, at 140–41 (showing identical tax rates since 2003).

47. See *id.* at 291–92 (listing tax rates for diesel and gasoline in the U.S.).

Denmark, Germany, and Sweden where taxes levied on gasoline are higher.⁴⁸

IV. HOW HAVE THE ENERGY AND CARBON TAXES LEVIED ON NON-TRANSPORT ENERGY PRODUCTS DEVELOPED OVER TIME?

The current energy tax policies introduced in EU member states, as well as those adopted at the EU level in the form of the 2003 Energy Taxation Directive discussed above, are far from the theoretical rationale. Taxes are generally set at different rates for different energy users and products. The taxation of transport fuels is probably the closest to the theoretical rationale because only certain industries, such as the agriculture and fishing, are regularly eligible for special tax provisions in the form of reduced tax rates for gasoline and diesel.⁴⁹

In contrast to the taxation of transport fuels are the energy and carbon taxes levied on non-transport energy products. EU member states, including the four examined in this article, adopted disparate and complex taxation strategies aimed at lowering the effective tax burden for their domestic industries. National policies in all of these countries share the same objective, protecting the competitiveness of domestic industries. The rationale for implementing these strategies is simple. Environmental taxes, emission trading schemes (when emission allowances are being auctioned), and stricter regulations are leading to higher costs for the industries. Additionally, if these taxes are introduced unilaterally, the international competitiveness of the domestic industry can be impaired.⁵⁰

The policy of providing special tax provisions to industries is also underpinned by the argument that high uniform energy and carbon taxes would reduce environmental pollution in the countries levying these taxes while increasing environmental pollution in countries without the taxes.⁵¹ Furthermore, these high, uniform energy and carbon taxes could lead

48. See *id.* at 113–14, 140–41, 257–58, 283–84, 291–92 (listing tax rates for diesel and gasoline in Denmark, Germany, Sweden, the U.S., and the U.K.).

49. See *Environmental Tax Reform in Member States*, *supra* note 29 (explaining that a tax levied on transport fuels follows the theoretical rationale because there is a uniform effect across society).

50. See Ekins and Speck, *supra* note 26, at 386 (stating that where environmental taxes are imposed only in one country, the international competitiveness of industries in that country may be impaired); See also ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, *THE POLITICAL ECONOMY OF ENVIRONMENTALLY RELATED TAXES* 75 (2006) (discussing the negative impacts of unilateral taxes on international competitiveness).

51. See *Environmental Tax Reform in Member States*, *supra* note 29, at 23 (discussing the effects of special tax provisions on environmental pollution).

industries to relocate to those countries with lower energy tax burdens.⁵² Relocation of industrial production due to stricter environmental regulation has been widely discussed in the economic literature and is often linked to the Porter hypothesis.⁵³

There are also arguments against granting special tax provisions to industries. One of main reasons for implementing environmental taxes instead of traditional regulatory measures is the belief that distributing these taxes equally across all polluters will produce more efficient results.⁵⁴ Furthermore, tax provisions can impede the utilization of cheap emission abatement efforts in the production sector. These increased emissions must be offset by more costly emission abatement options in the household sector to reach a given target.⁵⁵ This situation can lead to “substantial excess costs” as discussed in the economic literature.⁵⁶

52. See Terry Barker, Sudhir Junankar, Hector Pollitt & Philip Summerton, *Carbon Leakage: Analysis within an E3ME Framework*, in COMPETITIVENESS EFFECTS OF ENVIRONMENTAL TAX REFORMS: FINAL REPORT TO THE EUROPEAN COMMISSION, DG RESEARCH AND DG TAXATION AND CUSTOMS UNION 474 (2007), available at http://www2.dmu.dk/cometr/COMETR_Final_Report.pdf (“The model shows that the energy-intensive industries will re-locate in response to the change in relative prices brought about by twenty-eight percent carbon abatement below business as usual by 2010”). See also Sci. Ass’tment & Pol’y Analysis, Sub-Comm’n Neth. Res. Programme on Climate Change, *Spillovers of Climate Policy An Assessment of the incidence of Carbon Leakage and Induced Technological Change Due to CO₂ Abatement Measures*, 19–20, No. 500036 002 (Dec. 2004) (prepared by J.P.M. Sijm et al.), available at <http://www.rivm.nl/bibliotheek/rapporten/500036002.pdf> (discussing how high energy taxes could lead to relocation of industries); Mustafa H. Babiker, *Climate Change Policy, Market Structure, and Carbon Leakage*, 2 J. INT’L ECON. 421, 422 (2005) (discussing the relocation of industry based on carbon controls).

53. Harvard economist Porter stated that the setting of environmental standards would actually be promoting innovations. The gains from innovations would then offset the increased costs of the environmental standards. See Michael E. Porter & Claas van der Linde, *Toward a New Conception of the Environment-Competitiveness Relationship*, J. ECON. PERSP. 97, 98 (1995) (arguing that environmental standards lead to innovations that will partially or totally offset compliance costs of environmental regulations); see generally Mikael Skou Andersen, *An Introduction to Environmental Tax Reform and The Competitiveness Issue*, in COMPETITIVENESS EFFECTS OF ENVIRONMENTAL TAX REFORMS, *supra* note 52 (discussing the relationship between environmental regulations and competitiveness); Adam B. Jaffe et al., *Environmental Regulation and the Competitiveness of U.S. Manufacturing: What Does the Evidence Tell Us?*, 33 J. ECON. LITERATURE 132, 132–63 (1995) (discussing that the proponents of the Porter hypothesis suggest that the competitiveness of the U.S. as a whole can be enhanced by more stringent environmental regulations); Rhys Jenkins, *Environmental Regulation and International Competitiveness: A Review of Literature and Some European Evidence* (The United Nations University, Institute for New Technologies, Discussion Paper No. 9801, 1998), available at <http://www.intech.unu.edu/publications/discussion-papers/9801.pdf> (discussing the effects of stricter environmental regulations on competitiveness at the industry level).

54. Organization for Economic Co-Operation and Development [OECD], *Green Tax Reforms: An Assessment*, in ENVIRONMENTALLY RELATED TAXES IN OECD COUNTRIES: ISSUES AND STRATEGIES 126 (2001) [hereinafter *Green Tax Reforms*].

55. See Michael Kohlhaas, *Energy Taxation and Competitiveness: Special Provisions for Business in Germany’s Environmental Tax Reform*, 6–7, (F.R.G. Inst. for Econ. Res., Working Paper No. 349 2003), available at <http://www.diw.de/documents/publikationen/73/40455/dp349.pdf> (discussing

Having briefly discussed the pros and cons for granting special tax provisions in EU member states, the following sections explore the actual designs of energy and carbon taxation schemes in Denmark, Germany, Sweden, and the U.K. The final section compares the schemes of these four countries.

A. Denmark

The Danish energy/carbon tax regime consists of three individual taxes: the energy tax, the CO₂ tax, and the sulfur tax. The energy tax, which is based on the energy content of the fuel, is levied on fossil fuels, oil products, and coal. Natural gas is the exception because the energy content is not taken into account.⁵⁷ The carbon dioxide tax was introduced in 1992 at a rate of approximately thirteen Euros per ton of CO₂.⁵⁸ In 2005, the CO₂ tax rate was slightly reduced to twelve Euros per ton of CO₂.⁵⁹ This reduction corresponded with an energy tax increase so that the overall tax burden remained constant.⁶⁰

The sulfur tax was introduced in 1996 and is levied on all fossil fuels with a sulfur content exceeding 0.05% (based on weight).⁶¹ Since its introduction, the rate has been set at 2.7 Euros per kilogram of sulfur in energy products, or at about 1.3 Euros per kilogram of sulfur dioxide (SO₂) emissions. The tax design provides an incentive to consume energy

how the goods and materials sector pays reduced taxes as compared to private households which pay the full tax rate); Michael Kohlhaas, Deutsches Institut für Wirtschaftsforschung [DIW], *Gesamtwirtschaftliche Effekte der ökologischen Steuerreform*, in Quantifizierung der Effekte der Ökologischen Steuerreform auf Umwelt, Beschäftigung und Innovation 2 (2005), available at <http://www.umweltdaten.de/publikationen/fpdf-l/2961.pdf>; see also Christoph Böhringer & Thomas F. Rutherford, In Search of a Rationale for Differentiated Environmental Taxes 1 (Zentrum Für Europäische Wirtschaftsforschung GmbH [Center for European Econ. Res.], Discussion Paper No. 02-30, 2002), available at <http://opus.zbw-kiel.de/volltexte/2003/867/pdf/dp0230.pdf> (discussing how deviation from uniform taxation results in excess costs and the fact that lowering taxes on certain sectors of the economy requires increased taxes in other sectors).

56. See Christoph Böhringer, *Environmental Tax Differentiation Between Industries and Households—Implications for Efficiency and Employment*, 2 (Center for European Economic Research [ZEW], Discussion Paper No. 02-08, 2008), available at <ftp://ftp.zew.de/pub/zew-docs/dp/dp0208.pdf> (stating that as tax differentiation comes close to exempting the productions sector, substantial excess costs result).

57. See SPECK, *supra* note 2, at 61 (discussing the energy taxes levied on fossil fuels).

58. The tax is differentiated on the basis of the carbon content of the different fuels so that the CO₂ tax rate for light fuel oil is about 0.036 Euro per liter, for heavy fuel oil 0.043 Euro per liter, and for coal 0.032 Euro per kg.

59. See SPECK, *supra* note 2, at 64 tbl.2.2 (illustrating the overall principles in the Danish CO₂ tax).

60. *Id.*

61. See SPECK, *supra* note 2, at 62 (discussing the introduction of the Danish sulfur tax).

products with low sulfur content or to abate SO₂ emissions by using pollution reducing technologies, i.e., scrubbers.

A rather complex system of energy and carbon tax differentiation for industry has been in place since the 1996 tax reform. This replaced a regime in which all VAT registered companies had been exempt from virtually all energy tax burden.⁶² Industries are eligible for a full energy tax refund for the energy used for process purposes and which still applies nowadays. However, since 1998, industries have had to pay the full energy tax for the energy used for space heating purposes.⁶³

An even more complicated exemption regime applies to the CO₂ tax. When the CO₂ tax was introduced in 1992, industries were completely exempt from any CO₂ tax payments. From 1993 to 1995, non-energy intensive industries were subject to a CO₂ tax equivalent to fifty percent of the total CO₂ tax. Energy-intensive industries were subject to a more generous refund amounting to about ninety percent of the CO₂ tax burden.⁶⁴

The 1996 tax reform led to a change in the special tax provisions granted to industry. Since then, industry has been paying CO₂ taxes according to different types of usage. The full CO₂ tax rate applies to space heating while differentiation between heavy and light processes has been established to determine the effective tax burden. Companies can further reduce the CO₂ tax burden for these processes if they enter into voluntary agreements with the government.⁶⁵ Table 3 provides an overview of the development of energy and CO₂ tax rates for different energy users and usages.

62. Evtl. Prot. and Emp. in Nordic Countries [TemaNord], *The Use of Economic Instruments in Nordic Environmental Policy 1999–2001*, 44–45, 114, 581 (2005).

63. SPECK, *supra* note 2, at 63.

64. See *Environmental Tax Reform in Member States*, *supra* note 29, at 34 (discussing the three-tiered reimbursement scheme for the Danish CO₂ tax).

65. For a more detailed discussion of the Danish system including the development of energy tax rates over time, see *Environmental Tax Reform in Member States*, *supra* note 29, at 38 (discussing eligibility for a reduction in the Carbon tax rate by entering agreements with the Danish energy authority to increase energy efficiency); SPECK, *supra* note 2, at 65 (discussing how companies can reduce their tax burden by improving energy efficiency).

Table 3: Development of energy and CO₂ tax rates for different users and usages.⁶⁶

	Household and service sector	Industry–space heating	Industry–light process	Industry–heavy process
Light fuel oil	€/1,000L	€/1,000L	€/1,000L	€/1,000L
1996	239.2	239.2	18.3	1.1
2000	268.3	268.3	24.6	1.1
2007	286.5	286.5	24.6	1.1
Heavy fuel oil	€/ton	€/ton	€/ton	€/ton
1996	269.0	269.0	21.7	1.3
2000	304.5	304.5	29.2	1.3
2007	324.8	324.8	29.2	1.3
Natural gas	€/1,000m ³	€/1,000m ³	€/1,000m ³	€/1,000m ³
1996	31.3	31.3	14.9	0.9
2000	244.2	244.2	20.1	0.9
2007	305.8	305.8	20.1	0.9

A different taxation regime applies to electricity consumption and consists of two components: an energy tax and a CO₂ tax. Since 1977, the energy tax has been levied on electricity consumption regardless of where or how electricity is generated. For example, the energy tax is the same if the electricity is generated abroad or domestically, and whether or not it is produced by power plants or renewable energy sources. However, fossil fuels used for electricity production are exempt from the energy and CO₂ tax. Since 1992, a CO₂ tax has been levied on electricity consumption in addition to the energy tax.⁶⁷

Table 4 illustrates how the electricity tax regime distinguishes between three categories of use: electricity used for heating purposes, for other purposes and for industry.

66. *Environmental Tax Reform in Member States*, *supra* note 29; SPECK, *supra* note 2, at 64.

67. See Speck, *supra* note 29, at 33–34 (discussing the introduction of the CO₂ tax in addition to the existing energy tax on electrical consumption).

Table 4: Energy and CO₂ taxes levied on electricity.⁶⁸

	Heating purposes	Other purposes	Industry
	€/MWh	€/MWh	€/MWh
1996	57.8	62.5	8.2
2000	76.6	85.3	13.4
2005	80.8	89.5	8.6

A portion of the revenues raised by the energy and CO₂ taxes were earmarked for the Danish ETR programs which can be divided into three distinct packages.⁶⁹ The 1993 tax reform package was implemented between 1994 and 1998. This tax shifting program amounted to approximately six billion Euros, corresponding to 1.2% of the GDP at that time.⁷⁰ The scope of the 1995 tax reform package, implemented between 1996 and 2000, was smaller than the 1993 ETR. The revenues generated by the CO₂ tax and sulfur tax levied on industrial energy consumption totaled about 0.2% of the GDP in 2000.⁷¹ Finally, the 1998 tax reform package, implemented between 1999 and 2002, generated revenues by increasing the energy and CO₂ tax rates. The revenues were then recycled back into the economy.

There are similarities in the recycling mechanisms utilized in the three ETRs; the taxes and charges levied on labor were reduced and part of the revenues were used to provide investment grants for energy-saving measures.⁷²

B. Germany

The German energy tax regime is not a new development and taxes have been levied on the consumption of mineral oils, particularly transport fuels, since the 1950s.⁷³ The scope of energy taxes broadened in 1989 with the introduction of a tax on natural gas.⁷⁴ Nevertheless, coal was not

68. For purposes of comparison, the values have been converted from kilowatt hours to megawatt hours. SPECK, *supra* note 2, at 66.

69. See *Environmental Tax Reform in Member States*, *supra* note 29, at 35–37 (discussing each phase more thoroughly).

70. See *id.* at 34 (evaluating the 1993 tax reform package).

71. *Id.* at 34 (discussing the 1994 tax reform package).

72. *Id.* at 36.

73. BUNDESMINISTERIUM DER FINANZEN, ENTWICKLUNG DER MINERALÖL- UND STROMSTEUERSÄTZE IN DER BUNDESREPUBLIK DEUTSCHLAND 1–10 (2005).

74. *Environmental Tax Reform in Member States*, *supra* note 29, at 40.

subject to energy taxes until 2007. This is because prior to the abolishment of the electricity taxation scheme in 1995, the coal industry in Germany had been heavily subsidized.⁷⁵ This tax scheme was known as *Kohlepfennig* and was an *ad-valorem* tax, its rates differentiating between industry and households.⁷⁶

The energy tax regime experienced some major changes during the implementation of the ETR between 1999 and 2003.⁷⁷ Accordingly, mineral oil taxes on transport fuels were gradually increased by 154 Euros per 1,000 liters for gasoline and diesel, amounting to a thirty-one percent increase on gasoline and forty-eight percent increase on diesel.⁷⁸ The taxes on light heating fuels were increased by fifty percent and the tax on natural gas was increased twofold during the same time period.⁷⁹ Taxes on heavy fuel oil increased in 2000 and again in 2003. Also, it is interesting to mention that heavy fuel oil used for electricity generation in Germany is still subject to an energy tax, unlike Denmark where all energy products used for electricity generation are tax exempt.⁸⁰ Furthermore, an electricity tax was introduced in 1999, increasing gradually in five annual steps.

When analyzing the German energy taxation scheme, it is important to distinguish between pre-1999 tax rates and the post-1999 tax rates. This is because the revenues raised through increasing energy tax rates from the 1999 ETR were earmarked for the tax shifting program; they were recycled back to the taxpayers by reducing employers' and employees' pension contributions. The revenue generated from the electricity tax is completely earmarked for the tax shifting program and amounts to approximately thirty-two percent of the total revenues used for the tax shifting program.⁸¹ The biggest share is generated from the energy taxes levied on transport fuels, gasoline and diesel, accounting for more than fifty percent of the revenues. "The total volume of the tax shifting program was 18.6 billion Euro in 2003," amounting to around 0.9% of the GDP.⁸²

75. *Id.*

76. *Id.*

77. See *Environmental Tax Reform in Member States*, *supra* note 29, at 41 (explaining the changes as primarily increases in existing energy taxes and the addition of an electricity tax). See generally Stefan Bach, *Be- und Entlastungswirkungen der Ökologischen Steuerreform nach Produktionsbereichen [Loading and Discharge Effects of the Ecological Tax Reform by Branch]* 1-41 (Deutsches Institut für Wirtschaftsforschung, FuE-Vorhaben Förderkennzeichen, 2005), available at <http://www.umweltdaten.de/publikationen/fpdf-l/2960.pdf> (discussing German ecological tax reform).

78. *Environmental Tax Reform in Member States*, *supra* note 29, at 41, tbl.A4-3a (charting the annual increases).

79. See *id.* (charting the annual increases).

80. See *id.* (charting the increases); see also *id.* at 38 (noting the exemption).

81. See *id.* (noting that the reduction is paid to both groups equally).

82. *Id.* at 41.

These changes in the energy taxation regime were also accompanied by a special energy tax provision for energy products other than transport fuels. The industries included in this provision were manufacturing, agriculture, forestry, and fishing, and their tax provisions are set out below.⁸³

All companies in manufacturing, agriculture, fishing, and forestry are granted a tax relief of “40 percent of the standard energy tax rates for electricity, heating oil and natural gas; . . . an effective tax rate of sixty percent of the standard rate.”⁸⁴ This tax relief program only applies for the energy consumption exceeding the base amount of 512.5 Euros annually—referred to as *Sockelbelastung*. In other words, the full energy tax rates have to be paid until the energy tax burden exceeds 512.5 Euros annually, and only then does the tax relief package apply.⁸⁵

Moreover, there is an additional tax option—*Spitzenausgleich*—applicable to the manufacturing industry. Under this rule, “a company is eligible for a refund if the energy tax burden is greater than its tax relief from the reduction in the pension contributions payable by the company.”⁸⁶ However, the refund currently amounts to only ninety-five percent of the difference.⁸⁷

The following example reveals how the manufacturing industry faces considerable tax relief. In 2004, “the standard electricity tax rate . . . was 20.5 EUR/MWh [Euros per megawatt hour].”⁸⁸ Companies which were statistically classified as manufacturing industries, agriculture, fishing, and forestry businesses were facing an effective tax rate of sixty percent of the standard rate, amounting to a tax rate of 12.3 Euros/MWh. The manufacturing industry faced an even lower effective tax rate of 0.62 Euros/MWh—three percent of the standard rate—“but only when they qualify for the ‘*Spitzenausgleich*’ regulations.”⁸⁹

In 2007, the taxation regime for industry underwent a slight revision. By extending the tax rate to the full tax rate, the tax reduction meant that the sixty percent rule was also valid for the pre-1999 tax rate—the rate prior to the implementation of the ETR. An overview of the development of the energy tax rates of selected energy products can be found in the Appendix.

83. See generally Stefan Bach, *supra* note 77.

84. *Environmental Tax Reforms in Member States*, *supra* note 29, at 42.

85. *Id.*

86. *Id.*

87. *Id.*

88. *Id.*

89. *Id.*

C. Sweden

The Swedish energy and carbon taxation regime is very comprehensive and consists of four different types of taxes.⁹⁰ Energy taxes on transport fuels were introduced in 1924 for gasoline and extended to diesel in 1937.⁹¹ In 1957, Sweden introduced an energy tax on fossil fuels limited to mineral oils and coal. A further revision of the scheme extended the tax to liquified petroleum gas (LPG) in 1964 and to natural gas in 1985. The energy tax rates have been increased continuously since the tax was introduced.⁹²

The introduction of a CO₂ tax in 1991 marked a major revision in the energy and carbon tax mechanism. Notwithstanding the fact that the energy tax rates peaked in 1990, they were subsequently lowered, thereby offsetting the increased tax burden caused by the implementation of the CO₂ tax.⁹³ The CO₂ tax rates are set in accordance with the carbon content of the fossil fuel. In 1991, the CO₂ tax rate was around forty-three Euros per ton of CO₂, and increased to around 100 Euros per ton in 2007 and to 106 Euros per ton in 2008.⁹⁴

A sulfur tax, introduced alongside the CO₂ tax in 1991, was the third element of Sweden's energy tax system. It is only levied on heavy fuel oil, coal, and peat fuels. Fuels with a sulfur content not exceeding 0.05% in weight are tax exempt. Nevertheless, the environmental effect of this tax can be questioned because these rates have not been revised since their introduction.⁹⁵

Finally, the nitrogen oxide (NO_x) charge, Sweden's last addition to its tax regime, became effective in 1992. The NO_x charge was originally levied on nitrogen oxide emissions from combustion plants generating at least fifty gigawatts per hour (GWh), but was extended to include plants

90. See SPECK, *supra* note 2, at 192 (noting that the excise duties on fossil fuels in Sweden consist of an energy tax, a CO₂ tax, a sulfur tax, and a NO_x tax); see generally Thomas Sterner, *Policy Instruments for Environmental and Natural Resource Management*, (2003) (reviewing environmental policies and theories); see also PATRIK SÖDERHOLM, *EXTENDING THE ENVIRONMENTAL TAX BASE: PREREQUISITES FOR INCREASED TAXATION OF NATURAL RESOURCES AND CHEMICAL COMPOUNDS*, REP. NO. 5416, at tbl.2.1 (2004) (showing changes in environmental taxes in Sweden regarding energy taxes, transport taxes, taxes on natural gravel, and taxes on certain other substances between 1994 and 2002).

91. SPECK, *supra* note 2, at 197.

92. *Id.* at 192.

93. See *id.* (discussing the CO₂ tax and subsequent lowering of energy taxes in Sweden).

94. SPECK, *supra* note 2, at 119. See also SWEDISH MINISTRY OF FINANCE GOVERNMENT, BUDGET 2008 HIGHER CARBON DIOXIDE TAX FOR REDUCED TRAFFIC EMISSIONS, FACT SHEET ON THE SWEDISH GOVERNMENT'S BUDGET BILL FOR 2008, <http://www.sweden.gov.se/content/1/c6/08/86/13/5e9ed088.pdf>.

95. See Speck, *supra* note 2, at 193 (discussing the sulfur tax in Sweden).

generating more than twenty-five GWh. This meant that around five percent of the total NO_x emissions are covered by the charges.⁹⁶

Since 1995, energy taxes were indexed and linked to the Consumer Price Index in Sweden. This ensured a constant, real value of the tax rates. As mentioned above, this policy is the exception and not the rule in Europe.

The Swedish broad-based energy and carbon taxation regime is definitely one of the most interesting schemes developed and implemented in Europe. It reveals some appealing features from the last fifteen years as it underwent various revisions that were sometimes directly related to the fear that Swedish industries would lose competitiveness. One of its most striking features was the introduction of the CO₂ tax in 1991. Importantly, special tax provisions (i.e., reduced tax rates) have not been granted to Swedish industry, leading to a significant increase in the overall tax rate.⁹⁷ This particularly affected energy products other than transport fuels.⁹⁸ Consequently, industry was subject to the same tax rates as the rest of the economy which meant that the Swedish industry faced the highest energy and carbon taxes in Europe.⁹⁹ However, the total energy and carbon tax burden had a ceiling; the energy and carbon tax bill of a company could not exceed 1.7% of the sales value in 1991 and 1.2% in 1992.¹⁰⁰

Another major revision of the energy and carbon taxation regime took place in 1993 when industry, agriculture, forestry, and fishing businesses were granted generous tax privileges.¹⁰¹ These sectors were, and still are, completely exempt from paying the energy tax, and also pay a reduced CO₂ tax.¹⁰² Table 5 shows the structure of the energy and carbon tax system and how it developed over time. The total energy tax burden consists of the energy tax and the CO₂ tax, which is levied on light fuel oil consumed by households and the service sector. The last column of Table 5 demonstrates how the industry energy and CO₂ tax rates developed since 1990. During 1990 and 1992, industry faced the same tax burden as households. However, since 1993, industry has been exempted from the energy tax and only a fraction—twenty-one percent in 2007—of the general CO₂ tax.¹⁰³ The last column shows the effective tax burden on industry, while the first column reveals the total energy and carbon tax burden facing households and the service sector.

96. *See id.* (examining the introduction of the NO_x tax).

97. *See* SPECK, *supra* note 2.

98. *See* tables in the Appendix.

99. *Environmental Tax Reform in Member States*, *supra* note 29, at 48.

100. *Id.*

101. SPECK, *supra* note 2, at 194.

102. *Id.*

103. *Id.*

Table 5: Development of the energy and CO₂ tax rates levied on light fuel oil.¹⁰⁴

	Total energy and CO ₂ tax	Energy tax	CO ₂ tax	Energy and CO ₂ tax burden—industry
	€/1,000L	€/1,000L	€/1,000L	€/1,000L
1990	143.3	127.6	0	143.3
1991	168.5	72.2	96.3	168.5
1992	167.3	71.7	95.6	167.3
1993	160.1	59.2	100.9	25.2
1994	165.8	61.3	104.4	26.1
1995	167.1	61.8	105.2	26.3
1996	193.1	69.3	123.8	31.0
1997	197.0	75.6	121.4	30.4
1998	202.0	83.3	118.7	59.3
1999	202.7	83.6	119.1	59.6
2000	213.3	88.0	125.3	62.6
2001	239.3	74.3	165.0	57.8
2002	273.4	77.2	196.3	58.9
2003	317.2	78.9	238.3	59.6
2004	365.0	80.2	284.7	59.8
2005	360.3	79.2	281.1	59.0
2006	363.3	79.9	283.4	59.5
2007	369.0	81.1	287.9	60.5

When discussing the Swedish taxation regime, it is important to draw attention to how the electricity tax on industry developed.¹⁰⁵ The 1993 ETR completely exempted Swedish industry from the electricity tax. Later, in 2004, the industry's exemption status changed when a reduced electricity tax rate was set, corresponding with the minimum tax rate laid down in the 2003 Energy Taxation Directive discussed above. However, energy intensive industries are still eligible to receive a full exemption of the electricity tax if they participate in projects to increase their electrical efficiency, which has the same effect as the tax would have had.¹⁰⁶ This

104. See *Environmental Tax Reform in Member States*, *supra* note 29, at 79, tbl.A5-1 (regarding the overview of tax rates on light fuel oil—nominal versus effective).

105. Shown in Table A.3 in the Appendix.

106. See Council Directive 2003/96/EC, *supra* note 14, art. 15, at 56 (allowing reductions or exemptions for electricity produced from high-efficiency generators).

policy is consistent with the regulations of the 2003 Energy Taxation Directive.¹⁰⁷

In addition to the provision granting generous tax rebates, energy intensive companies are still eligible for a refund scheme if their CO₂ tax liability exceeds 0.8% of their sales value. This refund scheme has remained intact since its introduction in 1997.¹⁰⁸

The introduction of the CO₂ tax in 1991 was part of a major fiscal reform process primarily aimed at cutting high income taxes. The reduction in income taxes amounted to a loss equivalent to approximately 4.6% of the GDP in that year, which was partially offset by revenues equivalent to 1.2% of the GDP generated from the CO₂ and SO₂ taxes.¹⁰⁹

D. The United Kingdom

The U.K. energy tax structure is rather simple when compared to the schemes implemented in the Scandinavian countries. The U.K. scheme relies heavily on revenues generated by energy taxes levied on transport fuels. Unlike the Scandinavian countries, the U.K. does not have a general scheme of energy taxes for energy products, such as natural gas, coal, and electricity.

The U.K. government introduced a tax for all consumers in 1990, the Fossil Fuel Levy (FFL), which was imposed on the purchase of taxable electricity.¹¹⁰ The tax was designed as an *ad valorem*, similar to Germany's electricity taxation scheme of the early 1990s. Initially, the majority of the revenues raised by the FFL were used to subsidize nuclear power with only a small fraction earmarked to support renewable energy.¹¹¹ After 1998, the nuclear industry no longer received subsidies raised by the FFL. Instead, the FFL revenues were utilized to support renewable energy projects under the Non-Fossil Fuel Obligation. The levy peaked in 1992 at eleven percent of the end-user electricity price (exclusive value added tax) and was set to zero in 2003.¹¹² This zero percent rate is still in place and as a result, the FFL has not been abolished.¹¹³

107. *Id.*

108. *Environmental Tax Reform in Member States*, *supra* note 29, at 49; *see also Competitiveness and Exemptions*, *supra* note 25, at 376–77 (discussing the context in which this refund scheme was introduced).

109. *See Environmental Tax Reform in Member States*, *supra* note 29, at 47. (discussing the fiscal reform process in Sweden in 1991).

110. *See id.* at 49 (explaining the introduction of the FFL).

111. *Id.*

112. *Id.*

113. *Id.*

In April 2001, the U.K. government introduced a new economic instrument, the Climate Change Levy (CCL). It applied only to non-domestic energy use—commercial and industrial use—and exempted household use.¹¹⁴ Since 2001, the consumption of natural gas, electricity, and coal has been subject to the CCL and the consumption of LPG is subject to both the CCL and the existing energy tax.¹¹⁵ The revenues generated by the CCL are used for a tax shifting program, the ETR, in the U.K.¹¹⁶ Between 2001 and 2007, the CCL rates remained constant implying that the alterations in the rates presented in these tables are caused by variations in exchange rates.¹¹⁷

The U.K. approach regarding the grant of special tax provisions was drawn from the three previously analyzed EU member states, evidenced by the fact that tax provisions reducing the CCL rates are also part of the CCL. Energy intensive companies are eligible for an eighty percent tax discount if they agree to stringent energy efficiency improvement targets.¹¹⁸ These regulations have been introduced due to concerns over the loss of the U.K. industry's international competitiveness. The government's policy approach was to give conditional tax exemptions to energy intensive companies.¹¹⁹ The concept behind this approach is that companies benefit from reduced tax liability when they enter into legally binding Climate Change Agreements, requiring adoption of an energy saving reduction program.¹²⁰ In the U.K., the definition of energy intensive industries is crucial since only those industries deemed to be energy intensive are eligible for the CCL reduction. In contrast, German industries are eligible for special tax treatment based on statistical classification.¹²¹ The German approach must be challenged because the use of statistical categories as the

114. *Id.*

115. *Id.*

116. *See id.* at 49–50 (discussing three tax shifting programs that directly target businesses households).

117. POLICY NETWORK, BRIEFING PAPER: THE POLITICS OF CLIMATE CHANGE IN THE U.K. 4 (2008), http://www.policy-network.net/uploadedFiles/Events/Events/The_politics_of_climate_change_in_the_UK_briefing.pdf (discussing the flat rate of CCL taxes between 2001 and 2007).

118. *See* OECD Env't. Programme, *Working Paper: The United Kingdom Climate Change Levy: A Study in Political Economy 2* (discussing tax exemptions available to companies implementing energy savings programs).

119. *See id.* at 92 (offering conditional exemptions to energy-intensive industries as an approach to economic concerns generated by the CCL).

120. *See id.* (“Any sector within this legal ambit can then enter into a Climate Change Agreement (CCA) which requires them to adopt and implement an energy saving or carbon emission reduction program[.]. The CCA is legally binding. In return, the sector will be exempt from eighty percent of the CCL.”).

121. *See Environmental Tax Reform in Member States, supra* note 29, at 50–51 (explaining the difference between U.K. and German selection process for special tax treatment).

basis for providing tax relief does not take into account the issue of energy intensity.

The introduction of the CCL generated small revenues (approximately 0.1% of the GDP) that were recycled back to U.K. industries via reduction in the rate of employers' social security contribution.¹²² This policy guarantees that the total tax burden remains the same while various industrial sectors are affected differently. For example, some sectors are benefitting from the recycling measures, in particular those which are labor-intensive as opposed to energy-intensive. Others are net losers, in that their net tax burden is higher than before the CCL was implemented.¹²³ The recycling mechanism adopted in the U.K. only affects industries, which is logical because only this sector is subject to CCL payments. In Germany, however, the ETR policies are levied on the energy consumption of the whole economy resulting in a reduction of employers' and employees' pension contribution.

SUMMARY AND CONCLUSION

This article analyzes the main features of the energy and carbon taxation regimes in four EU member states. This discussion can only be described as a starting point for such analysis as the national designs are complicated and complex. This article reveals some of the differences between the four countries, particularly whether they have implemented broad-based energy taxation schemes or if their energy taxation regime is only applicable to industry.

As discussed throughout the article, special tax provisions for industries are implemented widely in the four EU member states. However, tax provisions vary between the countries, making it difficult to provide an overview of effective tax rates that affect industries. Depending on the country and its particular industry-specific tax provisions, reduced tax rates either affect specific industrial sectors or the whole industry. Additionally, some countries—Germany and Sweden—have placed ceilings on the total energy tax burden for individual companies. However, all of these policies aim to protect the competitiveness of domestic industries, since energy and carbon taxes are often blamed for industrial relocation.¹²⁴

122. See OECD, *supra* note 118, ¶ 83 (“In the case of the CCL, recycling involves a reduction in employers' social security contributions . . .”).

123. See *id.* ¶ 86 (“While the CCL was designed as part of a revenue-neutral reform, this does not mean that each and every industry would find itself in a tax-neutral position.”).

124. For further discussion, see Mikael Andersen's article, also published in this volume.

The Scandinavian countries, Denmark and Sweden, have been the forerunners in implementing broad-based energy and carbon taxes. They are regularly described as high energy tax countries when assessing the standard rate, i.e., the energy and carbon rate which particular households are facing. Denmark and Sweden have also implemented wide-ranging tax provisions so that the energy and carbon tax rates faced by industries are only a fraction of what households have to pay. It is therefore necessary to distinguish between different types of energy consumers when applying the “high energy and carbon tax” label. Currently, the interest in the application of economic instruments has shifted away from environmental taxes—specifically energy and carbon taxes—more to the EU ETS at the EU energy and climate policy level, which started to be operational in the pilot phase from 2005 to 2007 inclusive and from 2008 to 2012 during the first commitment period of the Kyoto Protocol.¹²⁵

As highlighted above, the energy sector, as well as energy-intensive sectors are covered by the EU ETS. This is in contrast to the coverage of the 2003 Energy Taxation Directive, as it does not extend to all energy products consumed in both sectors. The Energy Taxation Directive does not apply to energy products used for purposes other than motor fuels and heating fuel.¹²⁶ For example, energy products used for chemical reduction and electrolytic and metallurgical processes and the ones used in mineralogical processes are not covered in the Energy Taxation Directive. Nevertheless, double regulations do exist, meaning that the consumption of energy products can be subject to energy and carbon taxes as well as covered by the EU ETS¹²⁷ resulting in calls by industries for a complete tax exemption of fuels, i.e., a zero level of taxation, covered by the EU ETS.¹²⁸ This discussion is still ongoing at the EU level as well as the national hampering of the further development of energy and carbon taxation regimes.¹²⁹

125. See Claudia Dias Soares, *Coordinating Energy Taxes With the EU Emission Trading System*, in 5 CRITICAL ISSUES IN ENVIRONMENTAL TAXATION, INTERNATIONAL AND COMPARATIVE PERSPECTIVES 209–10 (Nathalie J. Chlajfour et al. eds., 2008) (discussing the impacts of the EU ETS directive).

126. See *id.* at 211–12 (discussing the application of the EU ETS directive).

127. See Kai Schlegelmilch & Maïke Bunse, *Ecological Tax Reform and Emissions Trading: Can They Work Together in Practice? An Empirical Analysis for Germany*, in 5 CRITICAL ISSUES IN ENVIRONMENTAL TAXATION, *supra* note 125, at 183, 197 (discussing the dual burden resulting from electricity tax and high electricity prices).

128. The Energy Taxation Directive allows the possibility of a zero level of taxation in Article 17.4. Council Directive, *supra* note 14.

129. See *Commission Green Paper on Market-based Instruments for Environment and Related Policy Purposes*, at 15, COM (2007) 140 final, (Mar. 28, 2007) (discussing the potential of market-based instruments in environmental policy as well as the interaction between energy taxation regimes).

APPENDIX¹³⁰

Table A.1: Development of the taxes levied on light fuel oil.

	Denmark	Germany	Germany (Manf. Industry)	Sweden	Sweden (Manf. Industry)	U.K.
	€/1000L	€/1000L	€/1000L	€/1000L	\$/1000L	€/1000L
1990	224.0	28.4	28.4	143.3	143.3	11.4
1991	222.5	39.0	39.0	168.5	168.5	12.7
1992	225.4	39.6	39.6	167.3	167.3	12.8
1993	231.8	41.2	41.2	160.1	25.2	13.3
1994	233.3	41.7	41.7	165.8	26.1	15.5
1995	240.2	42.7	42.7	167.1	26.3	20.2
1996	239.2	41.9	41.9	193.1	31.0	22.4
1997	235.2	40.7	40.7	197.0	30.4	28.5
1998	262.7	40.9	40.9	202.0	59.3	31.6
1999	264.9	61.4	45.0	202.7	59.6	39.0
2000	268.3	61.4	45.0	213.3	62.6	44.6
2001	275.1	61.4	45.0	239.3	57.8	44.1
2002	282.6	61.4	45.0	273.4	58.9	43.6
2003	282.6	61.4	53.2	317.2	59.6	51.3
2004	282.3	61.4	53.2	365.0	59.8	57.5
2005	281.8	61.4	53.2	360.3	59.0	76.4
2006	281.5	61.4	53.2	363.3	59.5	94.5
2007	281.9	61.4	45.0	369.0	60.5	135.8

Note: the standard tax rate payable is presented for the four EU member states, i.e., no special tax provisions are considered. In addition, the reduced rates for German and Swedish industries are shown.

and other market-based instruments, such as the EU ETS. The intention of the green paper was to generate a discussion about what role market-based instruments can and should play in European Community policies).

130. See *Environmental Tax Reform in Member States*, *supra* note 29, at 79 tbl.A5-1 (displaying an overview taxes rates on light fuel oil in EU member states).

Table A.2: Development of the taxes levied on natural gas.

	Denmark	Germany	Germany (manu- facturing industry)	Sweden	Sweden (industry)	U.K.
	€/1000m ³	€/1000m ³	€/1000m ³	€/1000m ³	€/1000m ³	€/1000m ³
1990	0	13.7	13.7	46.5	46.5	0
1991	0	19.0	19.0	94.9	94.9	0
1992	0	19.3	19.3	94.3	94.3	0
1993	0	20.1	20.1	93.7	18.6	0
1994	0	20.3	20.3	97.0	19.3	0
1995	0	20.8	20.8	97.7	19.4	0
1996	31.3	20.4	20.4	115.0	23.2	0
1997	193.8	19.9	19.9	115.2	22.7	0
1998	225.4	19.8	19.8	115.9	44.4	0
1999	227.3	37.7	23.5	116.3	44.6	0
2000	244.2	37.7	23.5	122.3	46.9	0
2001	292.5	37.7	23.5	147.7	43.3	26.1
2002	301.5	37.7	23.5	171.9	44.1	25.8
2003	301.5	59.6	43.9	204.0	44.6	23.5
2004	301.1	59.6	43.9	239.3	44.8	23.9
2005	300.6	59.6	43.9	236.2	44.2	23.8
2006	300.3	59.6	43.9	238.2	44.6	23.8
2007	300.6	59.6	35.8	241.8	45.3	24.4

Note: the standard tax rate is presented for the three EU member states (Denmark, Germany and Sweden), i.e., no special tax provisions are considered. In addition, the reduced rates for German and Swedish industries are shown. The situation in the U.K. is different as the rates of the climate change levy are reported. Discussed above, only industry is subject to this levy and households are exempt from these economic instruments.

Table A.3: Development of the taxes levied on electricity.

	Denmark (other purposes)	Germany (house- holds)	Germany (industry)	Sweden (house- holds)	Sweden (industry)	U.K. (CCL) (industry)
	€/MWh	€/MWh	€/MWh	€/MWh	€/MWh	€/MWh
1990	42.0	8.6	5.5	9.6	6.6	0
1991	41.7	8.6	5.4	9.6	6.7	0
1992	47.4	8.4	5.2	9.6	6.6	0
1993	48.7	8.8	5.3	9.3	0	0
1994	53.0	10.3	5.9	9.6	0	0
1995	58.7	10.6	6.0	9.6	0	0
1996	62.5	0	0	11.4	0	0
1997	66.8	0	0	13.1	0	0
1998	75.5	0	0	17.0	0	0
1999	78.1	10.2	2.0	17.1	0	0
2000	85.3	12.8	2.6	19.2	0	0
2001	87.4	15.3	3.1	19.6	0	6.9
2002	89.6	17.9	3.6	21.6	0	6.8
2003	89.6	20.5	12.3	24.9	0	6.2
2004	89.5	20.5	12.3	26.4	0.5	6.3
2005	89.4	20.5	12.3	27.4	0.5	6.3
2006	89.3	20.5	12.3	28.2	0.5	6.3
2007	89.4	20.5	12.3	28.6	0.5	6.4

Note: the standard tax rate is presented for the three EU member states (Denmark, Germany, and Sweden), i.e., no special tax provisions are considered. In addition, the reduced rates for German and Swedish industries are shown. The situation in the U.K. is different as the rates of the climate change levy are reported. Discussed above, only industry is subject to this levy and households are exempt from these economic instruments.

ENVIRONMENTAL AND ECONOMIC IMPLICATIONS OF TAXING AND TRADING CARBON: SOME EUROPEAN EXPERIENCES

*Mikael Skou Andersen**

Introduction	61
I. Implications of Carbon-Energy Taxation for CO ₂ Emissions and Energy Consumption	64
II. Implications for Competitiveness and Economic Performance.....	70
A. The Theoretical Debate on Tax Shifts	70
B. Revenue Recycling Programs	73
C. Macroeconomic Results	77
D. Energy-intensive Industries	78
III. Trading Carbon while also Taxing it.....	80
A. Effective Carbon Price Signal as a result of the ETS Cap on Emissions.....	80
B. Double-Regulation Complexities.....	82
Conclusion.....	84

INTRODUCTION

When President of the European Commission Jose Manuel Barroso responded to questions about the European Union's climate policy, he explained the significance of applying market-based instruments for creating a market for low-carbon technologies, stating: "The US and Japan are much better on technology than the EU, but technology and goodwill are not enough. We need a binding cap on emissions to put a real price on carbon and give the right economic incentives to environmentally-friendly technologies."¹

* Professor, Dept. of Policy Analysis, NERI, University of Aarhus, Grenåvej 12-14, Kalo, DK-8410 Rønde. <http://person.au.dk/en/msa@dmu.dk>.

1. *Barroso Defends EU's Climate Strategy*, ENDS EUROPE DAILY, Issue 2399, Oct. 2, 2007, <http://www.endseuropedaily.com/articles/index.cfm> (last visited Nov. 26, 2008).

Developments in Europe are now greatly improving the market prospects for renewable energy technologies. The inception in 2008 of a second Kyoto commitment period with more stringent caps implies that allowances on the European carbon certificate market now trade for a significant price. The carbon allowance price adds to the impacts of recent increases in international oil prices. These changes greatly improve the economic advantages of substituting fossil fuels with renewable energy technologies, particularly biomass and wind energy.

Rising energy costs create pressures to relieve fossil fuel consumers from the politically determined price signals for carbon and energy. Nevertheless, market-based instruments are something quite different from energy prices increasing as a result of market fluctuations.

Experiences attained in member states that pioneered the use of market-based instruments provide evidence for this observation. These member states are, on average, more energy-efficient and competitive than the European Union (EU) as a whole.² This difference is because the properties of market-based instruments can differ from those of energy market prices, as will be clear from this article.

Europe's initial experience with market-based instruments dates back to the early 1970s when several countries introduced effluent charges on water pollutants.³ In 1972, the Dutch Central Planning Office warned of excessive costs from a proposed extension of sewage treatment for waste water, at an estimated three percent of national income.⁴ Macroeconomic modeling projected losses in industrial output, causing an overall decline in economic growth of close to four percent.⁵ Despite these gloomy forecasts, the Dutch Central Bureau of Statistics estimates that the entire public and private activity of waste water treatment today captures merely 0.6% of annual gross domestic product (GDP) in the Netherlands.⁶ The obtained efficiency is regarded as a result of the pioneering Dutch levy on emissions of waste water.⁷ The price signal has provided economic incentives to control pollution at the source, reducing the projected need for costly and passive investments in end-of-pipe treatment, especially for big

2. Mikael Skou Andersen, *Governance by Green Taxes: Implementing Clean Water Policies in Europe*, 2 ENVTL. ECON. & POL'Y STUD. 39, 39–63 (1999).

3. *Id.*

4. *Id.*

5. MINISTRY FOR TRANSP. & PUB. WORKS, THE HAGUE, THE COMBAT AGAINST SURFACE WATER POLLUTION IN THE NETHERLANDS (1975).

6. EUROPEAN ENVTL. AGENCY [EEA], EFFECTIVENESS OF URBAN WASTEWATER TREATMENT POLICIES IN SELECTED COUNTRIES: AN EEA PILOT STUDY 38 (2005).

7. *Id.* at 24.

dischargers.⁸ Costs for waste water services in other countries with some element of market-based instruments are also well below one percent of GDP. This low figure underlines that dire economic forecasts from macroeconomic models need not always materialize, especially if such models do not capture opportunities for technological innovation.

Following the Organization for Economic Co-operation and Development's (OECD) appraisal of the efficiency of market-based policy instruments in the mid-1980s and the 1988 Toronto Conference on the Changing Atmosphere, which triggered political interest in addressing climate change, the four Nordic countries soon introduced taxes on the greenhouse gas carbon dioxide (CO₂).⁹ Finland (1990), Sweden (1990), Norway (1991), and Denmark (1992) were first to launch and gradually strengthen economic signals to curb emissions.¹⁰ Concerns regarding climate change coincided with priorities to reduce income taxation and combined to a tax shifting exercise. A few years later, the Netherlands (1996) and Slovenia (1997) followed suit.¹¹ When at the end of the decade Germany (1998) and the United Kingdom (U.K.) (2000), two of the largest European economies, joined the club of carbon taxation,¹² more weight and significance was added. This resulted in an annual bill of more than twenty-five billion Euro which were converted from other taxes to carbon-energy taxes.¹³ Details of these tax reforms are outlined in the article by Stefan Speck (this volume). Unilateral member state carbon and energy taxation initiatives were complemented by the EU Directive on Energy Taxation,¹⁴ which was finally agreed upon in 2003 after more than ten years of negotiations, and which establishes minimum tax rates for energy products in all twenty-seven EU member states.¹⁵ With respect to carbon, the EU Directive on the Emissions Trading¹⁶ was also passed in 2003 and

8. *Id.* at 25.

9. Mikael Skou Andersen, *Vikings and Virtues: A Decade of CO₂ Taxation*, 4 CLIMATE POL'Y 13, 27 (2004) (reviewing twenty ex-post carbon-energy tax studies).

10. *Id.*

11. Mikael Skou Andersen & Stefan Speck, *The Environmental Tax Reforms in Europe: Stabilization, Mitigation Compensation, and CO₂ Stabilization*, in JACQUELINE COTTRELL ET AL., 6 CRITICAL ISSUES IN ENVIRONMENTAL TAXATION: INTERNATIONAL AND COMPARATIVE PERSPECTIVES, VOLUME (2009) (in press).

12. *Id.*

13. Stefan Speck, *The Design of Carbon and Broad-based Energy Taxes in European Countries*, in this volume.

14. Council Directive 2003/96, 2003 O.J. (L 283) 51 (EC) (restructuring the Community framework for the taxation of energy products and electricity).

15. *Id.*

16. Council Directive 2003/87, 2003 O.J. (L 275) 32 (EC) (establishing a scheme for greenhouse gas emission allowance trading within the Community).

came into effect two years later, thereby capping member state emissions for designated sectors.¹⁷

Quite a lot of research has been done already to figure out environmental and economic implications of applying market-based instruments. In contrast to the 1990s when theoretical ex-ante modelling studies largely prevailed, the literature in the last decade has been enriched with more empirically based ex-post studies. Using various analytical approaches and modelling techniques, these recent studies have focused on actual experiences attained in Europe with carbon-energy taxation. This article reviews what has been learned about the impact of taxes on energy consumption and carbon emissions: according to basic behavioural and economic theory carbon-energy taxes are expected to curb emissions and decouple energy consumption from economic growth. With some qualifications, ex-post evaluation studies have largely confirmed the existence of such patterns for Europe. More controversy surrounds the broader macro-economic implications of carbon-energy taxation, especially for competition and economic growth. However, as the review of theoretical literature below indicates, the misty character of this debate seems, to some extent, to be caused by the heat of vested interests, as there is relatively broad consensus about the properties of revenue-neutral environmental tax reforms. The final section of this article addresses the differences between taxing or trading carbon. Environmental and economic implications of the emissions trading system (ETS) established in EU are considered and possible complications of both trading and taxing carbon are discussed. Less quantitative data and evidence is available to allow for firm conclusions on Europe's ETS experiences because the ETS carbon-trading system is relatively young. Due to apparent over-allocation, the system experienced a temporary collapse during the first commitment period (2005–2007).

I. IMPLICATIONS OF CARBON-ENERGY TAXATION FOR CO₂ EMISSIONS AND ENERGY CONSUMPTION

One expects carbon-energy taxes to provide incentives in two directions: a demand effect, whereby the demand for energy is reduced as a result of the price-increase caused by the tax; and a substitution effect, whereby carbon-fuels are substituted by low-carbon or carbon-neutral fuels to the extent that these are available at lower costs. While reduced energy

17. Emission Trading Scheme (EU ETS), http://ec.europa.eu/environment/climat/emission/index_en.htm (last visited Nov. 12, 2008).

demand may reflect either a lowering of output or actual energy savings, it is often more appropriate to monitor for energy intensity. In other words, we would expect to see changes in energy and carbon intensity as a result of carbon pricing.

The price at which CO₂ is traded under the cap of the second commitment period in the European ETS is presently twenty to twenty-five Euro per ton.¹⁸ Compared to these price levels, unilaterally applied carbon taxes in individual EU member states have been more modest and range generally from a low, and to some extent symbolic, level for the most energy-intensive industries and up to about twenty-five Euro per ton in the cases of Sweden and Finland (although Denmark taxes energy for heating purposes in households and industries at an effective rate of about eighty Euro per ton CO₂).¹⁹ In comparison, the Intergovernmental Panel on Climate Change (IPCC) projects that a global carbon price will require a level of thirty to forty Euro per ton CO₂ in 2020 to achieve stabilization of atmospheric greenhouse gas concentrations at 450–550 ppm.²⁰

Evaluating the impact of carbon-energy taxes on CO₂ emissions is complicated because taxes in certain sectors have replaced pre-existing energy taxes, but now come under a different name and with a modified tax base—carbon content rather than gigajoules. Sweden is often mentioned as a pioneer with respect to carbon taxes, but it had taxes for industrial energy consumption already in place in 1974.²¹ These taxes were modified in 1990 towards a carbon-energy tax base.²² The actual increase in price signal depends somewhat on the fuel in question and its relative use in different sectors.

Carbon energy taxes have been in effect in the four Nordic countries and the Netherlands for more than a decade, providing the firmest basis for ex-post assessment. Similarly, Slovenia has operated on a longer timeline, but as a country in transition, with data and conversion difficulties.²³ Comparatively, Germany and the U.K. introduced carbon energy taxes at the end of the previous decade.²⁴

18. PointCarbon.com, Providing Critical Insights into Energy and Environmental Markets, <http://www.pointcarbon.com/> (found under Point Carbon EUA OTC assessment (EUR/t)) (last visited Nov. 26, 2008).

19. Andersen, *supra* note 9.

20. Terry Barker, COMETR Final Workshop, Avoiding Dangerous Climate Change Through Environmental Tax Reform: Existing Research and COMETR, slide 9 (Mar. 21, 2007).

21. Andersen et al., *supra* note 11.

22. *Id.*

23. *Id.*

24. *Id.*

Carbon-energy taxes are not yet applied across-the-board with uniform rates for all emitters and fuels. Over time, member states have adjusted and extended tax rates and tax bases to achieve carbon-energy taxes in greater accordance with theoretical prescriptions.²⁵ However, in the short run, pragmatic considerations have prevailed. For this reason effective fuel-tax rates vary considerably from sector to sector. While exemptions, liability caps, or special arrangements that specific industries or target groups have obtained are not always immediately transparent, these circumstances are of course crucial when proper evaluations of impacts and effectiveness have to be provided. For these reasons, statements about the effectiveness and impacts of carbon-energy taxes are in most evaluation studies, provided only on a sectoral basis.²⁶

The European research project, Competitiveness Effects of Environmental Tax Reforms (COMETR), has been the first comprehensive attempt to retroactively account for these implications by considering differences in sectoral tax burdens within a suitable macroeconomic framework capable of providing an overall assessment.²⁷ The E3ME model of Cambridge Econometrics is a time-series estimated macroeconomic model of economy-energy-environment relations of EU-25.²⁸ This model can also account for EU trade relations with the rest of the world.²⁹ For the purposes of modeling changes in fuel consumption and CO₂ emissions as a result of relative price changes and feed-backs in the economy, the model has a high resolution featuring eleven different fuels and more than forty economic sectors.³⁰ The COMETR project has compiled country-specific figures for carbon and energy taxes, including the relevant sector-specific exemption arrangements for the purpose of modeling and disentangling the impacts in E3ME.³¹

Two scenarios were generated by the E3ME for the period 1994–2012. The Baseline Case (B Case) is an endogenous solution of E3ME over the period 1994–2012.³² This scenario includes the tax shift package in

25. *Id.*

26. *Id.*

27. See COMETR, Competitiveness Effects of Environmental Tax Reforms, <http://www2.dmu.dk/cometr> (last visited Nov. 26, 2008) (COMETR is a research project under the European Union's Sixth Framework Program for Research).

28. E3ME: An Energy-Environment-Economy Model of Europe, http://www.camecon.com/suite_economic_models/e3me.htm (last visited Nov. 26, 2008).

29. *Id.*

30. *Id.*

31. COMETR, *supra* note 27 (found under "The Project").

32. The following builds on Barker, T, Junankar, S, Pollitt, H, Summerton, P, 2007, *The effects of environmental tax reform on international competitiveness* in THE EUROPEAN UNION: MODELLING WITH E3ME, in ANDERSEN, M.S., ET. AL., COMETR, Competitiveness Effects of Environmental Tax

exchange for the carbon-energy taxes in each Member State, including exemptions or special treatment for the industries most affected and the compensating reduction in another tax.³³ This scenario is calibrated closely to the observed outcome by using historical data, which includes the effects of environmental tax reform (ETR) implementation.³⁴ The Reference Case (R Case), which is a counterfactual projection without the ETR, includes historical and expected developments in the EU economy, for example, the EU ETS.³⁵

By subtracting the outcome of the counterfactual reference case from the baseline case, it becomes possible to disentangle the specific impact of the carbon-energy taxes introduced under the revenue-neutral ETR. Because the model has information for historical energy tax burdens prior to the introduction of the carbon-energy taxes, it becomes clear what impact the various tax reforms can be ascribed. In summary, this illustrates the difference between what actually happened and what would have happened had there been no ETR (with both cases projected to 2012). The exception to this is that revenue neutrality is assumed in each case through the revenue-recycling mechanisms. Exemptions, non-payments, and negotiated agreements are included as accurately as possible, subject to the total revenues matching the published figures in each case.

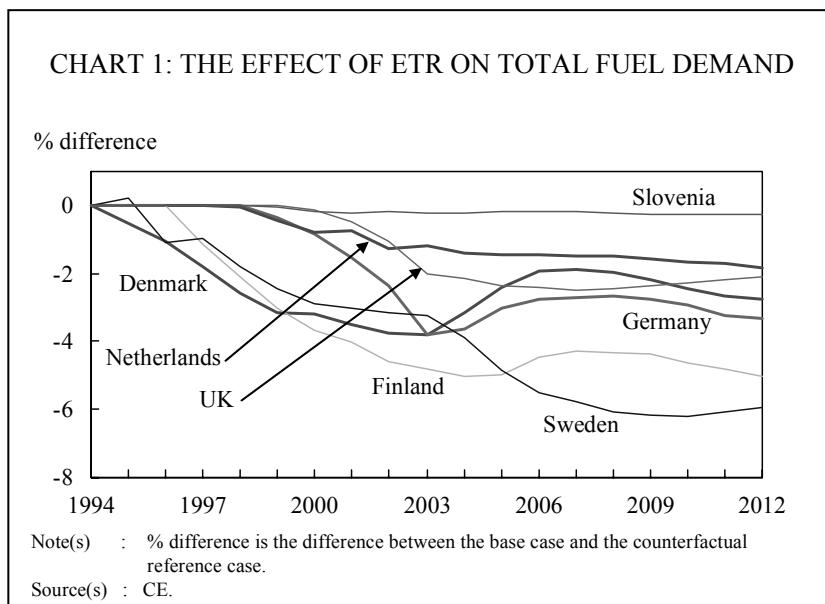
Six European countries that have implemented an ETR show a reduction in fuel demand (see Chart 1). The size of the reduction in fuel demand is dependent on: the tax rates imposed; how they are applied to the various fuels and fuel user groups; how easy it is for fuel users to substitute between the various fuel types and non-fuel inputs; and the scale of the secondary effects resulting from changes in economic activity. On average, the attained reduction in fuel demand in 2004 was 2.6%, although it was slightly larger in Finland than in the other countries.

Reforms, Final Report to the European Commission, DG Research and DG TAXUD, <http://www2.dmu.dk/cometr> (last visited Nov. 26, 2008).

33. European Sectoral Analysis, Cambridge Econometrics, available at http://www.camecon.com/consultancy_capability/euro_sectoral_analysis.htm (last visited Nov. 12, 2008).

34. *Id.*

35. *Id.*



A key feature of the results is the recovery in fuel demand due to higher world energy prices found in several of the examined countries in 2004 and 2005 in the B Case relative to the R Case. In most of the ETRs, the environmental taxes were not increased in line with fuel prices (and may have been reduced in some cases), so the relative change in fuel prices was less in 2004 and 2005.

With lower consumption we would expect to see a reduction in greenhouse gas emissions, but total emissions will also depend on the relative consumption levels of each fuel type. For example, a tax system that encourages the use of coal is likely to produce higher emissions than one which encourages the use of natural gas or bio-fuels. E3ME includes explicit equations for fuel shares of hard coal, heavy oil, natural gas, and electricity.³⁶ Assumptions about the other fuel types link them to the closest modeled alternative (for example, other coal is linked to hard coal, crude oil to heavy oil). The demand for middle distillates (petrol, diesel) for transportation needs is linked to total fuel demand by that sector. These sectors do not generally use other fuels, so fuel-share equations are not required.

36. E3ME Manual, Cambridge Econometrics (Apr. 20, 2006), available at http://www.camecon-e3memanual.com/cgi-bin/EPW_CGI.

The scenario results show that there are reductions in greenhouse gases (GHGs) for six member states from the ETR (see Chart 2). The effects closely follow the results for total fuel consumption, with the largest reductions occurring in regions with the highest tax rates. For example, Finland and Sweden experienced the largest reductions in emissions, in most cases exceeding the decline in fuel demand and providing evidence for the efficiency of ETRs in reducing emissions. In contrast, the German ETR was not particularly efficient in reducing emissions because it did not include coal. By 2004, the European ETRs reduced greenhouse gas emissions by an average of 3.1% for the six member countries examined, with the largest reduction of 5.9% recorded for Finland.

Martin Enevoldsen³⁷ has studied in detail the Danish and Dutch experiences with carbon-energy taxation and controlled outcomes against developments in Austria, which did not introduce market-based instruments or ETR. Denmark's policy of ETR began in 1992, whereas the Netherlands introduced its ETR in 1996, after several years of promoting voluntary long-term agreements with industries.³⁸ Between 1990 and 2000 industry in Denmark improved its energy intensity by nearly thirty percent.³⁹ The Netherlands and Austria only obtained improvements in the range of ten to fifteen percent.⁴⁰ A particular aspect of Denmark's carbon-energy taxation program was the earmarking of twenty percent of the revenues to co-finance energy-efficiency measures and upgrade production technology.⁴¹ This feature of Denmark's program is believed to have been responsible for the marked impacts on energy productivity. The funds from revenue were made available in a program supervised by the Danish Energy Agency.⁴² Auditors independently reviewed company energy practices and made recommendations for improvements and investments based on up to four years of return.⁴³ Bjørner and Togeby⁴⁴ have confirmed that companies participating in this program received on average sixty percent greater energy savings than companies subject to the tax only.

37. MARTIN K. ENEVOLDSEN, *THE THEORY OF ENVIRONMENTAL AGREEMENTS AND TAXES* 141–66 (Wallace E. Oates & Henk Folmer eds., 2005).

38. *Id.*

39. *Id.*

40. *Id.*

41. *Id.*

42. *Id.*

43. *Id.*

44. T. BUE BJØRNER & M. TOGEBY, *AM. COUNCIL FOR AN ENERGY-EFFICIENT ECON. [ACEE], INDUSTRIAL COMPANIES' DEMAND FOR ENERGY, BASED ON A MICRO PANEL DATABASE: EFFECTS OF CO₂ TAXATION AND AGREEMENTS ON ENERGY SAVINGS* 263–74 (1999).

II. IMPLICATIONS FOR COMPETITIVENESS AND ECONOMIC PERFORMANCE

A. *The Theoretical Debate on Tax Shifts*

Michael Porter, a Harvard economist, argued in *The Competitive Advantage of Nations* (1990) that, contrary to conventional wisdom, environmental policies may encourage process or product-oriented innovation and improve competition, particularly when anticipating requirements that will spread internationally.⁴⁵ Porter cautioned that many environmental regulations presently violate competition principles because command-and-control requirements for specific pre-defined technologies, often end-of-pipe, do not leave room for adaptation, flexibility, and innovation.⁴⁶ References to Porter's hypothesis in the literature tend to neglect the premise that it is only by using *market-based* instruments for environmental policy implementation that competition can be improved.⁴⁷ In real company management the challenge remains to identify and harvest the low-hanging fruit despite the vigorous controversy in the 1990s over Porter's claims that there *was* low hanging fruit not yet picked by businesses.

David Pearce framed the argument slightly differently. Pearce called attention to the possible *double dividend* feature of carbon-energy taxes, referring to the improvement in social welfare that could arise if taxation shifted from goods to bads, for example, i.e., from labor to carbon.⁴⁸ Since environmental taxes serve to correct market failures, by definition they do not share the distorting properties of many other taxes.⁴⁹ By adopting a fiscally neutral package that exchanges income taxes or corporate taxes for carbon-energy taxes, the opportunity arises to reap positive benefits in terms of higher employment; this increased employment rate may improve short-term economic performance while the tax shift also delivers a long-term environmental dividend. Pearce's approach was adopted in the

45. MICHAEL E. PORTER, ON COMPETITION 187 (1998); Michael E. Porter & Claas Van Der Linde, *Toward a New Conception of the Environment-Competitiveness Relationship*, 9 J. ECON. PERSP. 97, 101 (1995).

46. *Id.*

47. Michael E. Porter, *America's Green Strategy*, 264 SCI. AM. 168, 168 (1991).

48. David W. Pearce, *The Role of Carbon Taxes in Adjusting to Global Warming*, 101 ECON. J. 938, 940-41 (1991).

49. *Id.*

famous European Commission Whitepaper, which argued for shifting taxation to reap both dividends.⁵⁰

Many economists have had difficulties with the “free lunch” implied in the double dividend argument, as well as with the rhetoric on the win-win options of environmental policy. Lawrence Goulder, Professor of Environmental and Resource Economics at Stanford University, differentiates between *weak* and *strong* versions of the double dividend argument.⁵¹ The strong version claims that any environmental tax that replaces another tax will, by definition, improve social welfare. The weak version, on the other hand, merely focuses on the revenue-recycling aspect: it claims uncontroversially that, once environmental taxes have been introduced, using revenues to reduce distortionary taxes is preferable to returning revenues as a lump-sum.⁵² However, Goulder presents an intermediate version of the double dividend argument as well. The intermediate version implies that context and circumstances dictate whether overall social welfare will in fact be improved as a result of ETR and depends on the specific properties of the distortionary tax that is being replaced with an environmental tax.⁵³

In a similar vein, Dutch economists A. Lans Bovenberg and Ruud A. de Mooij have pointed to the existence of a possible “tax interaction effect,” whereby the costs of environmental taxes increase commodity prices consequently lowering the real value of after-tax income.⁵⁴ If ETR provides too little income tax relief to offset the increase in commodity prices, employees will lower their labor supply, in turn, triggering a wage-spiral and inflation. Typically, the negative tax interaction effect will exceed the positive revenue-recycling effect, except under special circumstances where highly distortionary taxes are replaced. The formal argument hinges on two crucial assumptions: first, that income taxation *a priori* minimizes the excess tax burden; and second, ETR is introduced on top of existing environmental taxes or regulations that sufficiently internalize

50. *Commission White Paper on Growth, Competitiveness, and Employment: The Challenges and Ways Forward into the 21st Century*, at 81, 91, COM (1993) (May 12, 1993).

51. See Lawrence H. Goulder, *Environmental Taxation and the ‘Double Dividend’: A Reader’s Guide*, 2 INT’L TAX & PUB. FIN. 157, 159 (1995) (articulating the different notions of weak and strong double dividend theories and examining the theoretical and empirical support for each).

52. *Id.*

53. *Id.*

54. See A. Lans Bovenberg & Ruud A. de Mooij, *Environmental Levies and Distortionary Taxation*, 84 AM. ECON. REV. 1085, 1088 (1994) (arguing that environmental taxes mayacerbate preexisting tax distortions).

externalities.⁵⁵ Despite these unrealistic restrictions, this argument appears to be widely accepted among tax experts.

Evidence suggests that many of the analyses which focus on the tax interaction effect are too stylized and restrictive. Bovenberg and de Mooij's first article was based on a static model. In a second article where they explore the relationships in the context of a dynamic model, the findings are relaxed somewhat: if the ETR leads to lower regulatory pressure on companies, then a double dividend may arise.⁵⁶ Nielsen⁵⁷ explores the double dividend hypothesis using a dynamic model that includes unemployment. Bovenberg shows that unemployment will be reduced if a pollution tax is introduced.⁵⁸ In this case, the tax interaction effect also influences the value of the unemployment benefit, causing more unemployed to enter the labor market.⁵⁹ However, the overall effect on the rate of economic growth could still become negative. Eban Goodstein questions the basic assumption of the tax interaction effect that higher prices will reduce labor supply.⁶⁰ Empirical studies based on micro-data have found this relationship to be ambiguous.⁶¹ When dual-earner families are considered, higher prices lead to an increase in labor supply, as workers seek to compensate the reduction in family income generated by the price increases.⁶²

Despite the controversy on the direction and magnitude of the tax interaction effect, a consensus in the literature remains—no tax interaction effect will occur when ETR lowers employers' social security contributions

55. DANIEL WEINBRENNER, *ÖKOLOGISCHE STEUERREFORM: WIRKUNGSZUSAMMENHÄNGE ZWISCHEN EMISSIONS-UND FISKALSTEUERN*, WIESBADEN: DEUTSCHER UNIVERSITÄTSVERLAG (1999).

56. See generally A. Lans Bovenberg & Ruud A. de Mooij, *Environmental Tax Reform and Endogenous Growth*, 63 J. PUB. ECON. 207, 208 (1997) (analyzing new channels through which an environmental tax reform may yield a double dividend).

57. Søren B. Nielsen, Lars H. Pedersen & Peter B. Sørensen, *Environmental Policy, Pollution, Unemployment and Endogenous Growth*, 2 INT'L TAX & PUB. FIN. 185, 193 (1995).

58. Bovenberg, *supra* note 56.

59. *Id.*

60. See Eban Goodstein, *The Death of the Pigovian Tax? Policy Implications from the Double-Dividend Debate*, 3 LAND ECON. 402, 408–11 (2003) (arguing that additional empirical and theoretical analysis is needed before concluding the double-dividend is incorrect).

61. *Id.*

62. Elizabeth Gustafson & Lawrence Hadley, *Labour Supply and Money Illusion: A Dynamic Simultaneous Equation Model*, 29 Q. REV. ECON. & BUS. 63, 70 (1989).

resulting in no, or only marginal price changes.⁶³ In this specific case, one would expect to obtain a double dividend.⁶⁴

B. Revenue Recycling Programs

In view of the theoretical debate, it is interesting that European countries have practiced different strategies for revenue recycling; Sweden and Finland have mainly recycled revenue by lowering income taxes.⁶⁵ For Sweden, a long-standing tax policy aim has been to lower the pressure of income taxation on labor income.⁶⁶ The tax reforms in these two countries aim to lower direct income taxes: carbon-energy taxes have contributed to securing alternative revenues for some, but not all, of these income tax reductions.⁶⁷ This observation applies for Sweden's early ETR in 1990 as well as for the most recent phase after 2001.⁶⁸ It also applies to Finland for the more comprehensive tax shifts introduced since 1996; whereas, revenues were small and the recycling was not transparent in the phase prior to 1996.⁶⁹ It would have been difficult for both countries to follow the recommendations from the fiscal literature to aim at lowering employers' social security contributions, because such contributions are relatively small in both countries.

On the other hand, Denmark and the U.K. have more closely followed the recommendations from the fiscal conventionalists, predominantly directing revenues to lower employers' social security contributions to avoid inflationary effects.⁷⁰ However, because of the imbalance between energy consumption and employee numbers, lowering social security contributions at the company level does not necessarily lead to full compensation for the individual company. Denmark and the U.K. have mitigated the imbalance via the various mechanisms for energy-intensive industries such as agreements and reduced rates for heavy industries.⁷¹ The real purpose of these exemptions seems to have been to avoid the tax interaction effects. Finally, out of concern that incentives would otherwise

63. Ian W. H. Parry, *Pollution Taxes and Revenue Recycling*, 29 J. ENVTL ECON. & MGMT., at S-64, S-64 to -76 (1995).

64. See Paul Ekins & Terry Barker, *Carbon Taxes and Carbon Emissions Trading*, 15 J. ECON. SURVS. 325, 336-37 (2003) (analyzing the effect of substituting an environmental tax for an employer's social security tax).

65. Andersen, *supra* note 11, at 523.

66. *Id.*

67. *Id.*

68. *Id.* at 524.

69. *Id.*

70. *Id.* at 525.

71. *Id.*

be too weak, both countries have earmarked between five and twenty percent of revenues for direct energy-efficiency subsidies via, for example, the Carbon Trust.⁷²

The Netherlands and Germany have followed mixed approaches. In the initial phase, the Dutch reduced income taxation out of social concern.⁷³ This led to the increase of the basic tax-free allowance for income and to using complicated formulas for exempting basic consumption of electricity and gas.⁷⁴ In the second phase, the Dutch adhered more to the side of fiscal conventionalists and reduced the employers' wage component and corporate taxes.⁷⁵ In Germany, the ecological tax reform split the revenue recycling equally between a reduction of employers' and employees' social security contributions.⁷⁶ This reform established a program of revenue recycling more concerned with political appeal than fiscal orthodoxy, taking into account that the eco-tax reform aimed equally at gasoline prices and other fuels.⁷⁷

Slovenia mainly restructured its existing energy taxes into fuel taxes with a carbon-energy tax base.⁷⁸ Therefore, the issue of revenue recycling did not seem to arise in the Slovenian context.

Hence, we can summarize the observations on the revenue recycling approaches by dividing the member states in question into three different groups: the fiscal conventionalists (U.K. and Denmark); the fiscal pragmatists (Sweden and Finland); and finally, the political pragmatists (Netherlands and Germany). The pragmatists are labeled as such because reforms were designed to accommodate pressing concerns with the tax systems and the electorate rather than with fiscal theory.⁷⁹

72. *Id.*

73. *See generally* WILLEM VERMEEND & JACOB VAN DER VAART, GREENING TAXES: THE DUTCH MODEL, KLUWER LAW INTERNATIONAL LTD (1998) (arguing the Dutch were able to reduce income taxation initially leading to an increase of the basic tax-free allowance for income).

74. *Id.*

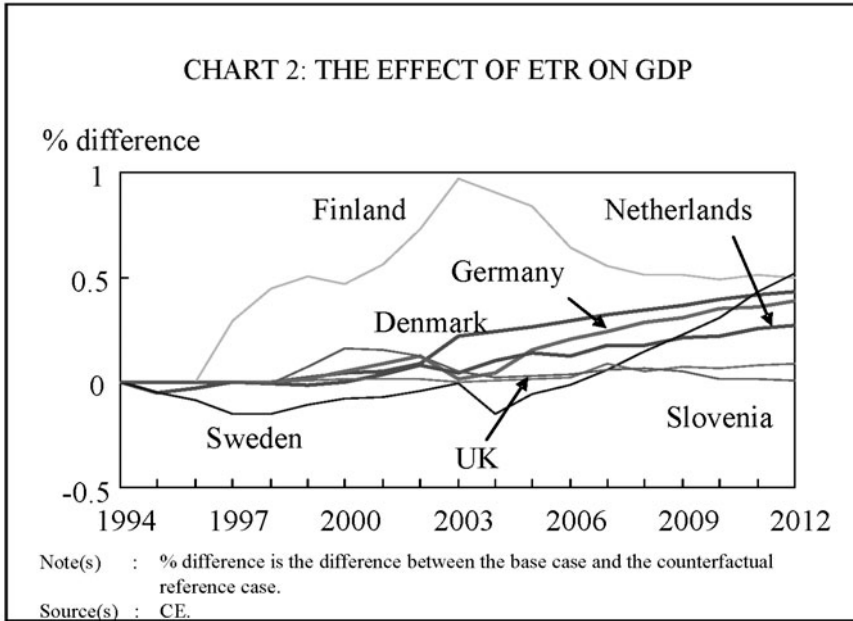
75. Andersen, *supra* note 11, at 519.

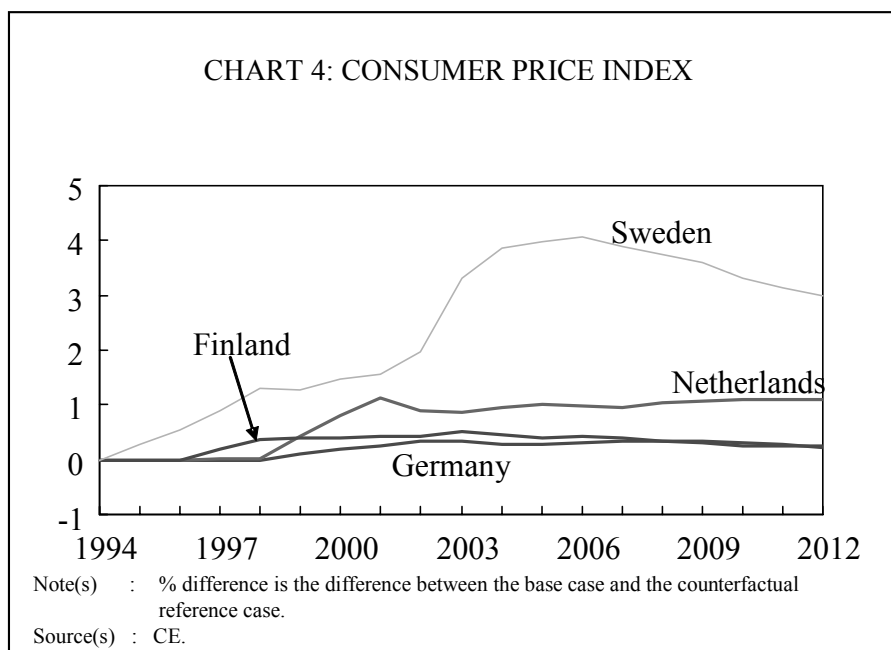
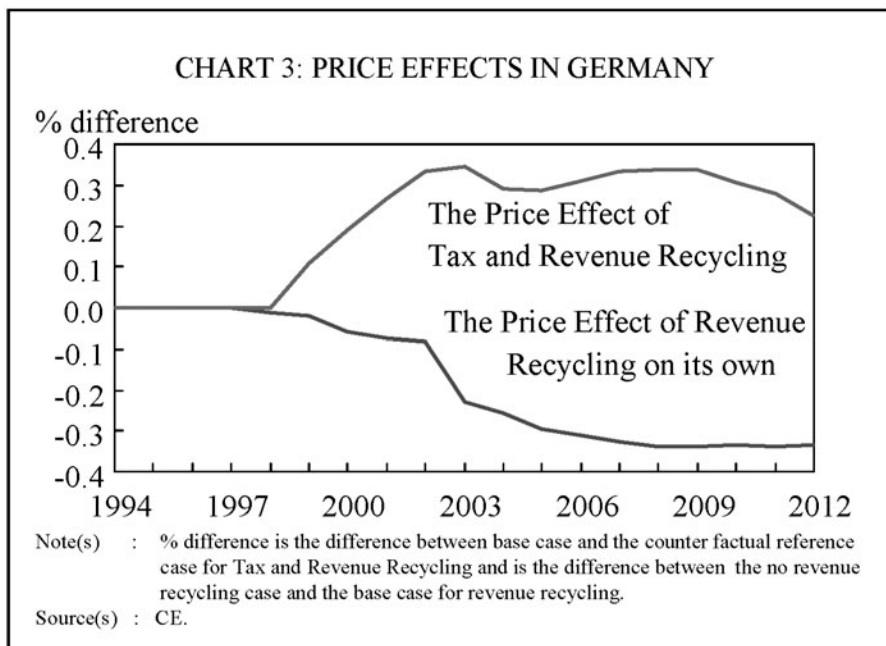
76. *Id.* at 521.

77. *Id.*

78. *Id.* at 520.

79. *Id.* at 523.





C. Macroeconomic Results

According to E3ME results, European countries that have implemented ETR did not experience a negative impact on economic growth in terms of GDP (see Chart 2). In Sweden, the effects take slightly longer to appear because the large increase in household electricity taxes depresses real incomes in the short run. Finland receives a short-term boost to GDP from the effects of the taxes on fuel demand, because a reduction in the demand for imported fuel improves the country's trade balance.

Since the ETRs result in higher fuel prices, this will likely increase the overall price level. The degree of this increase will depend on the scale of the increase in fuel costs; how easy it is for industry and consumers to switch between fuels to cheaper alternatives and non-energy inputs, and how much of the cost is passed on by industry to consumers, dictated by the level of competition in the industry and estimated econometrically for each region and sector. Revenue recycling may have a deflationary effect when the revenues are recycled through reductions in employers' social security contributions, lowering labor costs. This is demonstrated by Germany, where nearly half of the revenues were used for reducing employers' contributions (see Chart 3). In Denmark and the U.K., there were no significant increases in the overall price index. In the U.K., this is because the tax is relatively small and was compensated with slightly cheaper labor costs. In Denmark, the tax was larger, but was again compensated with lower labor costs (see Chart 4).

The consumer price index, as the measure of inflation, will record a larger increase when taxes are levied on households rather than industry. The reason for this is that the consumer price index is a weighted average of the price of consumer products, including energy. When taxes are levied on households, the whole tax is reflected in the consumer price index, rather than just the share that is passed on by industry. Therefore, it is not unexpected that Sweden shows the largest increases in the consumer price index, followed by the Netherlands (see Chart 4).

Of the four countries with revenue recycling fully or partly over income taxation, the impact is negligible in the U.K. and Denmark. This is not the case in the Netherlands and Sweden. Although further analysis is required, the Swedish experience suggests that combining carbon-energy taxes on households with reductions in income taxes could cause inflation rates at a level that triggers a possible tax interaction effect. Inherent in the logic of ETRs implemented in the U.K. and Denmark is that the consumer price index will not be discernibly affected; this is primarily because of the revenue recycling via lowering social security contributions.

D. Energy-intensive Industries

A complication arises with energy-intensive companies because the compensation that they receive, via the reduction in social security contributions, does not fully match the additional energy costs. These companies may have a small labor stock yet consume large amounts of energy. Their sensitivity depends on the degree to which they use carbon-intensive fuels (see Figure 1). In member states such as Sweden, Finland, and Slovenia, the energy-intensive industries are less sensitive to carbon-based energy taxes because they benefit from the availability of hydropower and nuclear power.⁸⁰ However, in most member states, complicated schemes have been designed to balance, cap, or reduce the tax burden of energy-intensive industries.⁸¹

Exemptions not only distort the desired impacts of carbon-energy taxation, but also pose a threat to fair terms of competition. According to EU law, exemptions constitute state aid and must be approved by the European authorities.⁸² This requirement controls member state concessions to energy-intensive industries.⁸³ The state aid guidelines⁸⁴ offer certain opportunities for reducing the tax rates of energy-intensive industries, especially if these rates are higher than the EU's minimum tax rates. These opportunities are to some extent modeled on the basis of the 1995 decision regarding the Danish CO₂-taxation scheme.⁸⁵ Denmark was the first member state to obtain explicit Commission approval of its carbon-energy taxation system.⁸⁶ Because agreements between energy-intensive industries and the relevant authorities played a role in obtaining tax rate reductions in the Danish scheme, it was natural that the Commission's state aid guidelines reflected the role of agreements vis-à-vis selective tax reductions.

Member states seek to obtain exemptions and special arrangements for particular sectors due to concerns about the impacts on competition. The Energy Taxation directive stipulates that exemptions should be limited to five or, at maximum, ten years; however, base exemptions exist for dual use of fuels and for certain uses of electricity in metallurgical and mineralogical

80. Andersen, *supra* note 11, at 525.

81. *Id.*

82. Consolidated Versions of the Treaty on European Union and the Treaty Establishing the European Community 2006/67 art. 87–88, 2002 O.J. (C 325) 1.

83. *Id.*

84. Community Guidelines on State Aid for Environmental Protection, 2008/1–33, O.J. (C 82)

1.

85. State aid case N459/95, 1995 O.J. (C 324) (EN).

86. *Id.*

industries.⁸⁷ Member states make different use of these exemption mechanisms. From an environmental economic point of view it would be desirable to avoid numerous exemptions and to tax carbon-energy at a uniform rate.

The burden for energy-intensive industries remains negative but, due to many exemptions, the actual burden is rather modest. Company managers in energy-intensive industries often focus on the gross burden of ETR; unadjusted for the gains, this burden has amounted up to five percent of the gross operating surplus.⁸⁸ However, detailed analysis in COMETR of revenue recycling and energy-efficiency gains indicates that the gross burden on industries is considerably less. While the net burden for cement and glass industries is actuality below one percent of the gross operating surplus, in ferrous and non-ferrous metal industries, the burden has reached two percent in some cases.⁸⁹ Even in the Swedish case, with no offsetting of employers' social security contributions, the costs are estimated not to exceed four percent of gross operating surplus for cement and steel industries.⁹⁰

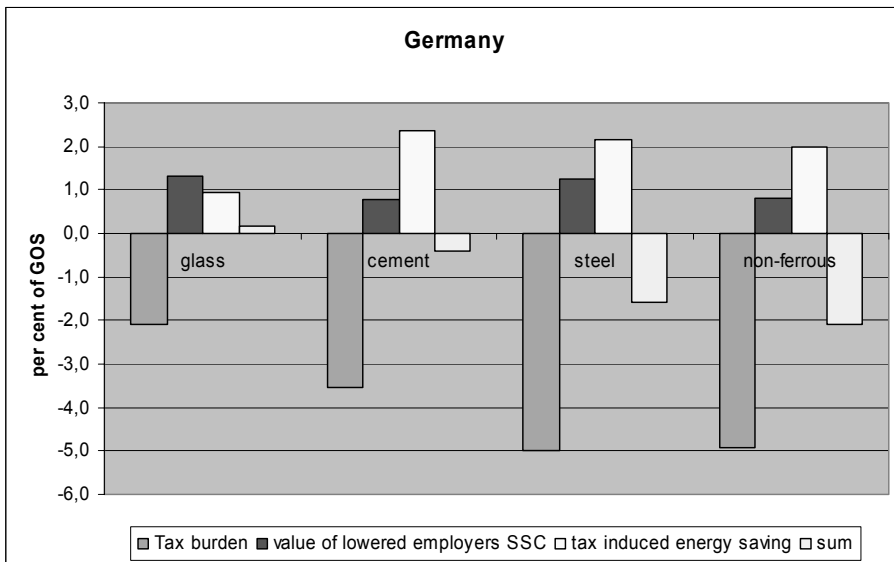


Figure 1: Energy-intensive sectors in Germany: Tax burden, value of lowered employers' social contributions (SSC) and value energy-savings induced by the tax as percent of gross operating surplus. Source: COMETR.

87. Council Directive 2003/96, *supra* note 14, at art. 3.

88. Andersen, *supra* note 11, at 530.

89. *Id.*

90. *Id.* at 533.

III. TRADING CARBON WHILE ALSO TAXING IT

A. Effective Carbon Price Signal as a result of the ETS Cap on Emissions

Implementing a CO₂ emissions trading system (ETS) in the European Union has created a more complex regulatory environment where member state carbon-energy taxation and EU minimum energy tax rates now coexist with the trading of grandfathered emission certificates for carbon.

The EU ETS covers large installations, such as power plants larger than twenty megawatts.⁹¹ It also covers refineries and most energy-intensive industries—notably ferrous metals, cement, glass, ceramic products, as well as pulp and paper.⁹² The ETS requires member states to limit emissions to the number of allowances that their ETS installations hold, while establishing a market for allowances across all twenty-seven member states and providing some linkage to the use of Clean Development Mechanism (CDM) credits and joint implementation projects.⁹³

Since emission certificates are grandfathered to industries, the carbon price signals run along two routes. Direct costs may arise as industries need to acquire certificates for additional production activities.⁹⁴ Indirect costs arise as electricity producers factor the value of certificates into power prices for all electricity consumers (see Figure 2). In most cases, the national allocation plans have provided certificates matching the historical emissions to industries.⁹⁵ Conversely, several member states have restricted allocating certificates to power plants substantially below historical emissions levels due to the pass-over ability of power producers.⁹⁶ This implies that the pass-over on power prices is the main route along which the ETS will make an economic impact on industries.

Numerous studies have investigated the pass-over on power prices. The most pessimistic studies assume a 100% pass-over rate. For example, McKinsey comes to a figure of 10€/MWh for a 20€/tCO₂ allowance price.⁹⁷

91. *Id.* at 538.

92. *Id.*

93. *Id.*

94. J. P. M. Sijm, S. J. A. Bakker, Y. Chen, H. W. Harmsen & W. Lise, *CO₂ Price Dynamics: The Implications of EU Emissions Trading for the Price of Electricity*, 05–081, ENERGY RES. CENTER OF THE NETH. 1, 72 (2005).

95. *Id.*

96. *Id.*

97. European Commission [EC], *Report on International Competitiveness*, EU ETS Review (Dec. 2006).

However, several studies show that the pass-over rate will only be 100% when power demand exceeds the base load and a coal or lignite plant that sets the marginal price.⁹⁸ During periods where hydro-power or nuclear power sets the marginal price, it is not likely that power operators will be able to factor in the full value of the certificates. One study for Germany and the Netherlands hence comes to a pass-on rate of forty to sixty percent.⁹⁹ The International Energy Agency (IEA) points out that large parts of the European electricity market are not yet fully liberalized and that price regulations will restrict pass-over.¹⁰⁰ Nevertheless, the IEA points to the Nordic electricity market (Nordpool) as one region where electricity trade has been successfully liberalized and where pass-over of ETS costs should be expected. Due to the significance of hydro and nuclear power, one Finnish study concludes that the average pass-over rate on the Nordpool exchange should be in the range of forty percent, for example, 4€/MWh for a twenty Euro allowance price.¹⁰¹

The studies mentioned above imply a cap-induced carbon price in the range of 4–10€/MWh for the power sector for a 20€/tCO₂ allocation price.¹⁰² This pass-over cost can be compared with CO₂ taxes on electricity in the range of 6–12€/MWh for smaller business users in the Netherlands, the U.K., Germany, and Denmark. In contrast, large energy-intensive industries with exemptions are generally liable only to the EU minimum energy tax rate of 0.5€/MWh (this rate applies not only in member states with environmental tax reforms, but across the EU as a whole).¹⁰³

These findings suggest that with effect from 2008 the ETS will effectively have increased the cost of CO₂/MWh for the affected energy-intensive industries to a carbon price level comparable to that of smaller business users in member states with carbon-energy taxes. This appears to be a significant increase. The ability to pass-over the value of grandfathered ETS allowances will reflect the carbon burden of the marginal power producer. Consequently, these pass-overs will likely create significant wind fall gains for electricity producers, unfortunately without providing the desired price signal distinguishing between electricity based

98. *Id.*

99. *Id.*

100. See Julia Reinaud, *CO₂ Allowance and Electricity Price Interaction: Impact on Industry's Electricity Purchasing Strategies in Europe*, INT'L ENERGY AGENCY 1, 23–32 (2007), available at http://www.iaea.org/textbase/papers/2007/jr_price_interaction.pdf (examining the links between CO₂ prices, electricity prices, and electricity costs to industry).

101. Government Institute for Economic Research, *Impacts of the European Emission Trade System on Finnish Wholesale Electricity Prices*, VAT Discussion Papers, 405 (Helsinki) (Nov. 2006).

102. Reinaud, *supra* note 100.

103. *Id.*

on carbon and carbon-neutral power sources respectively. Significantly, there is no simple way to compensate energy-intensive industries for the imposed burden because there is no revenue available for recycling under the ETS-scheme.¹⁰⁴ Therefore, one can expect more substantial inroads on energy-intensive industries' gross operating surplus from ETS than from pre-existing ETR.

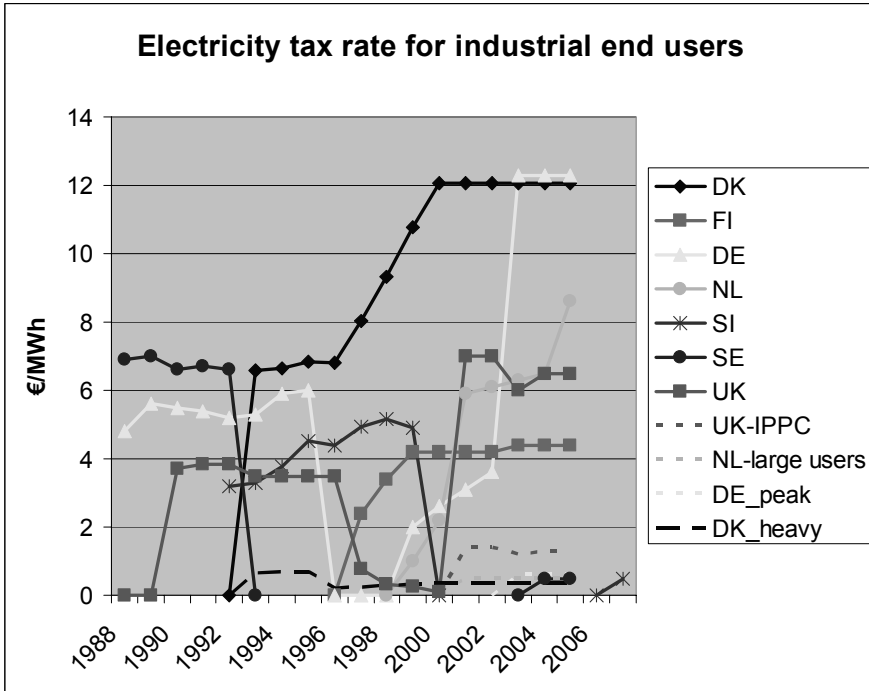


Figure 2: End-user electricity tax rates for industries 1988–2006 in the seven European countries with environmental tax reforms (Source: COMETR database).

B. Double-Regulation Complexities

It is not surprising that the simultaneous taxing and trading of carbon has evoked concerns about perceived double-regulation. The ETS-system divides emitters into two sectors: ETS and non-ETS. The double-regulation argument states that as emissions from the ETS-sector are fully regulated from the trade with certificates, there is no further need for a regulatory

104. Sijm, *supra* note 94, at 11.

tax.¹⁰⁵ The ETS sets a cap for emissions from the ETS-sector; additional allowances must be acquired on the market, possibly with the use of other flexible instruments, if emissions exceed this cap.¹⁰⁶

Consequently, some governments are considering abandoning carbon-energy taxes for the ETS-covered installations. Due to EU state aid regulations, approval will be required from the European Commission for any measures that lift taxes selectively for certain emitters as would be the case if the ETS sector was excluded.¹⁰⁷ On one hand, the Energy Taxation Directive foresees that installations covered by tradable quotas can be fully exempted from the minimum energy tax rates.¹⁰⁸ On the other hand, the Energy Taxation Directive has a broader mandate than carbon taxation only; it also covers energy-supply and tax-rate harmonization.¹⁰⁹ The ETS-system has created a market with volatile prices and where pass-over rates are highly dependent on regional specificities of the power markets. Accordingly, the ETS-system as such cannot necessarily guarantee the level playing field as was the intention with the harmonizing minimum energy tax rates. The issue remains whether the grandfathered allowances under ETS can qualify as a fully-fledged scheme of tradable quotas in the context of the Energy Taxation Directive.

With respect to environmental implications, the present level of carbon-energy taxation has impacted CO₂ emissions. An increase in emissions can be expected if carbon costs are lowered by removing taxes. The additional domestic emissions would need to be offset by additional allowances, acquired on the European ETS-market or on the international market for flexible mechanisms. These allowances are only available at a cost. Changes in one member state might not affect the European ETS price, but if seven member states were to remove carbon-energy taxes, a perceivable impact on the ETS price can be expected and would offset the value of the tax relief.

Removing carbon-energy taxes will also inflict a loss of revenue because none is generated under the ETS-scheme.¹¹⁰ If the policy aim is to raise taxes with a minimum of excess burden, few other taxes can exhibit properties as attractive as those of carbon-energy taxes. Shifting the tax burden back to labor would not be preferable. Taxing other greenhouse gases not currently subject to taxation, or other external effects, is a more

105. *Id.* at 17.

106. *Id.*

107. Andersen, *supra* note 11, at 526.

108. *Id.* at 526–29.

109. *Id.*

110. *Id.*

desirable method with less adverse effects. If revenue sources of such a similar nature cannot be identified, then the member state will face both the cost of the additional allowances as well as the distortionary costs related to the new tax base. Based on this observation, the new tax base actually needs to be better than the present one, which means that the alternative tax-base should provide sufficient extra benefits to compensate for the additional cost of allowances.

CONCLUSION

The European Commission has proposed in its Climate Policy Package¹¹¹ that a post-2012 emissions trading system shall phase out grandfathering allowances and introduce auctioning. These changes would help solve many of the difficulties indicated here by generating revenue. Without this revenue recycling and its effect on lowering other taxes, carbon pricing will adversely affect the economies and competitiveness of the respective countries.

The experience in Europe with environmental tax reforms as summarized in this article has provided important insights to the macroeconomic implications of carbon-energy taxes. Macroeconomics has been largely neglected in much of the literature, which tends to take a microeconomic perspective on using market-based instruments. By introducing carbon-energy taxation while safeguarding a revenue-neutral tax shift, the negative economic impacts from taxing carbon can be avoided and a significant contribution to reducing greenhouse gases could be achieved. Reducing employers' social security contributions appears to be the soundest approach to avoiding tax-interaction effects. A phased approach is needed whereby the cost of carbon is increased each year by 1–2€/tCO₂ from the present level in Europe. According to best estimates this would be sufficient to provide the kind of economic signal required to help reduce greenhouse gas emissions and stabilize atmospheric emissions at a level sufficient to enabling attainment of the two degree target—provided that other major emitters impose policies of a similar stringency.

111. *Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and the Committee of the Regions*, at 6, COM (2008) 30 final (Jan. 23, 2008).

CARBON TAXATION IN BRITISH COLUMBIA

*David G. Duff**

Introduction	85
I. Background	86
II. The Carbon Tax	91
A. Tax Base	91
B. Taxpayer/Collection Point	93
C. Tax Rates	95
D. Use of Revenue	96
III. Implications	99
Conclusion	103

INTRODUCTION

Among alternative public policies to reduce emissions of carbon dioxide and other greenhouse gases (GHGs), environmental taxation represents a promising but often under-utilized approach—particularly in North America where the introduction of any new tax involves enormous political challenges. In Canada, however, British Columbia became the first North American jurisdiction to implement a consumption-based environmental tax specifically designed to reduce GHG emissions when the Provincial Government enacted a carbon tax effective July 1, 2008.¹

This paper provides a general overview and initial evaluation of British Columbia's carbon tax, explaining the background to the announcement of the tax in the Provincial Government's 2008 Budget, the structure of the

* Associate Professor, Faculty of Law, University of Toronto; Visiting Associate Professor, Faculty of Law, University of British Columbia. For research assistance in the preparation of this article, I am indebted to Joanna Vince, a J.D. student at the University of Toronto Faculty of Law.

1. Carbon Tax Act, 2008 S.B.C., ch. 40 § 157 (Can.). As explained later in this paper, the Province of Quebec became the first jurisdiction in North America to introduce a carbon tax when it imposed a duty on the bulk sale of specific fossil fuels (gasoline, diesel fuel, heating oil, propane, petroleum, and coke) effective October 1, 2007. See Regulation Respecting the Annual Duty Payable to the Green Fund, R.Q. ch. R-6.01, r.0.2.3.1 (2008).

legislation and its relation to other provincial initiatives to address climate change, and the possible implications of the tax for climate change policy in Canada. Part I provides a short background to the tax, summarizing the evolution of Canadian climate change policies up to the announcement of the tax in February 2008. Part II explains the structure of the carbon tax and its relation to other provincial climate change policies, reviewing the Provincial Budget and the specific tax implementing legislation. Part III discusses the implications of the tax for climate change policy in Canada, considering public reaction to the tax in British Columbia and subsequent developments at the federal level.

I. BACKGROUND

Canada ratified the Kyoto Protocol on December 17, 2002, legislatively affirming the commitment that it had made at the negotiating table five years earlier to reduce Canada's GHG emissions by 6% from the 1990 level of 599 million tons of carbon dioxide equivalent (CO₂e) emissions.² Notwithstanding a series of Green Plans and Climate Change Action Plans, which have generally emphasized public education, voluntary initiatives, and fiscal incentives,³ GHG emissions in Canada increased substantially throughout the 1990s and early 2000s; reaching 747 million tons in 2005—over 25% higher than the 1990 level and almost 34% higher than Canada's commitment under the Kyoto Protocol.⁴

Although population and economic growth have made it especially difficult for Canada to limit or even stabilize GHG emissions,⁵ particularly in the provinces of Alberta and Saskatchewan where increased oil and gas production from conventional sources as well as Alberta's oil sands have been a major contributor to Canada's rising GHG emissions,⁶ ineffective public policies have also played a significant role. The Federal Government has consistently failed to introduce measures that would put a

2. On the unrealistic and highly political nature of this commitment, which was designed to ensure that promised emissions reductions in Canada would be slightly better than those promised by the United States, see JEFFREY SIMPSON ET AL., *HOT AIR: MEETING CANADA'S CLIMATE CHANGE CHALLENGE* 33–41 (2007).

3. For a discussion of these plans, see *id.* at 47–107.

4. *Id.* at 16.

5. See *id.* at 80–83 (explaining that Canada's GHG emissions would have increased only 6% from 1990 to 2005 if the country had experienced the same rates of population and economic growth as European countries experienced during this period).

6. *Id.* at 24, 83–84.

market price on GHG emissions in order to discourage their occurrence.⁷ Offering little more than “pious hopes and good intentions,”⁸ the Federal Liberal Government, which had signed and ratified the Kyoto Accord, did little to ensure that Canada could meet its commitments under the agreement.

On January 23, 2006, Canadians elected a new federal government, giving the Conservative Party under Stephen Harper the largest number of seats in the House of Commons, though substantially short of a majority. Unlike the Liberal Party, which (despite its failure to contain rising GHG emissions) supported the Kyoto Protocol in principle, the Conservative Party was skeptical of the agreement,⁹ instead favoring a “made-in-Canada” approach to the reduction of GHG emissions.¹⁰ Although popular support for the Kyoto Accord dictated that the new government could not formally withdraw from the agreement,¹¹ the Environment Minister declared in November 2006 that Canada would not meet its commitments under the Protocol.¹²

In the months following this announcement, Canada experienced the second warmest winter on record, with temperatures averaging approximately three degrees Celsius above normal.¹³ For this reason, as well as increased media attention to the problem of global climate change, polls taken in January 2007 indicated that the environment had become Canadians’ primary concern, displacing Canadians’ usual concern about health care.¹⁴ In April 2007, the Conservative Government responded by introducing a “regulatory framework for air emissions” promising emissions regulations for large industrial facilities, mandatory emissions standards for passenger vehicles, strict efficiency regulations for household

7. See generally NICHOLAS STERN, *THE ECONOMICS OF CLIMATE CHANGE* 39–42 (2007) (discussing the need to price carbon in order to encourage emissions reductions).

8. SIMPSON ET AL., *supra* note 2, at 87.

9. Harper himself has characterized Kyoto as “essentially a socialist scheme to suck money out of wealth-producing nations.” *Id.* at 95.

10. CONSERVATIVE PARTY OF CANADA FEDERAL ELECTION PLATFORM, *STAND UP FOR CANADA* 37 (2006), available at <http://www.conservative.ca/media/20060113-Platform.pdf>.

11. SIMPSON ET AL., *supra* note 2, at 98.

12. *Canada Backs Away from Kyoto Protocol Commitment*, ENV’T NEWS SERVICE, Nov. 22, 2006, <http://www.ens-newswire.com/ens/nov2006/2006-11-22-03.asp>.

13. See SIMPSON ET AL., *supra* note 2, at 7 (explaining that the previous winter had been the warmest on record, almost four degrees Celsius above normal, and above average temperatures had been experienced since 1996).

14. *Environment Tops Public Agenda, Poll Finds*, CTV.CA, Jan. 26, 2007, http://www.ctv.ca/servlet/ArticleNews/story/CTVNews/20070125/environment_poll_07025?s_name=&no_ads=.

appliances, and an emissions trading system for large emitters.¹⁵ Instead of hard caps on GHG emissions, however, the Government's plan proposed intensity-based emissions targets, which would limit emissions per unit of output but permit aggregate GHG emissions to increase.¹⁶ Nonetheless, the Government insisted the plan would achieve a total reduction in GHG emissions of 20% below the 2006 level by 2020.¹⁷

In this context, as in the United States, where federal inaction on climate change policy appears to have stimulated state and local initiatives to address climate change,¹⁸ provincial governments have stepped forward introducing a variety of policies to promote renewable energy, encourage energy efficiency, and reduce the emission of GHGs.¹⁹ On July 1, 2007, the Province of Alberta introduced a cap-and-trade regime for large emitters, incorporating intensity-based limits on regulated facilities that can be satisfied through emissions reductions, the purchase of "emissions offsets" or "emissions performance credits" from other regulated facilities, or the payment of \$15 per ton of CO₂e to a Climate Change and Emissions Management Fund.²⁰ On October 1, 2007, the Province of Quebec introduced North America's first carbon tax by introducing a duty of approximately \$3 per ton of CO₂ on bulk sales of fossil fuels to be paid by roughly fifty large distributors in the Province.²¹ On February 19, 2008, the

15. GOVERNMENT OF CANADA, REGULATORY FRAMEWORK FOR AIR EMISSIONS 7, 13, 29, 33 (2007), available at http://www.ec.gc.ca/doc/media/m_124/report_eng.pdf.

16. GOVERNMENT OF CANADA, ECOACTION: ACTION ON CLIMATE CHANGE AND AIR POLLUTION 4 (2007), available at http://www.ec.gc.ca/doc/media/m_124/brochure/brochure_eng.pdf ("[A] company will have to cut its greenhouse gas emissions per unit of production by 18% by 2010 [and] a further 2% in each and every year after 2010").

17. *Id.*

18. See, e.g., Kristen H. Engel, *State and Local Climate Change Initiatives: What is Motivating State and Local Governments to Address a Global Problem and What Does This Say About Federalism and Environmental Law?*, 38 URB. LAW. 1015 (2006).

19. For a comprehensive inventory of provincial and territorial initiatives as of August 2007, see THE COUNCIL OF THE FEDERATION, CLIMATE CHANGE: LEADING PRACTICES BY PROVINCIAL AND TERRITORIAL GOVERNMENTS IN CANADA (2007), available at http://www.councilofthefederation.ca/pdf/s/CCInventoryAug3_EN.pdf.

20. To the extent that many large emitters have opted to pay the \$15 per ton charge rather than reduce emissions, the Alberta cap-and-trade regime may operate as a *de facto* carbon tax. Teresa Meadows, *Carrots, Sticks, Taxes, Caps and Trades: Canada's Provinces and Territories Tackle Climate Change*, Paper delivered at the Canadian Bar Association's 2008 National Environmental, Energy and Resources Law Summit 7–12 (May 15–16, 2008), available at http://www.cba.org/cba/cle/pdf/env08_meadows,%20teresa_paper.pdf.

21. Regulation Respecting the Annual Duty Payable to the Green Fund, R.Q. ch. R-6.01, r.0.2.3.1 (2008) (requiring distributors of fossil fuels to pay approximately one cent per liter on the bulk sale of gasoline, heating oil, and diesel; half a cent per liter on the bulk sale of propane; and \$8.00 per ton of coal sold). For a summary of this duty, the revenues from which are earmarked to a "Green Fund" used to support expenditures announced in the Province's Climate Change Action Plan, see Meadows, *supra* note 20, at 20–21.

Government of British Columbia announced that it would introduce a consumption-based carbon tax of \$10 per ton of CO₂e, rising to \$30 per ton by 2012²²—making the Province the most aggressive jurisdiction in Canada (and perhaps North America) when it comes to addressing climate change.

For several reasons, it is perhaps not surprising that British Columbia would be a leader in the development of public policies to reduce GHG emissions. With almost half the Province's population concentrated in a metropolitan area (Vancouver) that enjoys a more moderate climate than the rest of Canada and almost 93% of its electricity currently generated from hydroelectric power,²³ carbon emissions in British Columbia are among the lowest in Canada on a per capita basis at 15.5 tons in 2005 compared to 23.1 tons in the country as a whole.²⁴ Despite low emissions per capita, however, total emissions increased by 30% between 1990 and 2005,²⁵ with the greatest growth resulting from fossil fuel production and fugitive emissions from oil and natural gas, which almost doubled during this period.²⁶ At the same time, British Columbia is particularly vulnerable to the effects of global climate change, having already lost half of its lodgepole pines to the ravages of the mountain pine beetle,²⁷ experiencing summer droughts and severe winter storms, and facing a major risk of flooding from sea level increases.²⁸

In the Throne Speech in February 2007, in which it announced its legislative agenda for the year, the Provincial Government declared that it would “take concerted provincial action to halt and reverse the growth in

22. BRITISH COLUMBIA MINISTRY OF FINANCE, BUDGET AND FISCAL PLAN 2008/09–2010/11 at 11–12 (2008) [hereinafter B.C. BUDGET 2008], available at http://www.bcbudget.gov.bc.ca/2008/bfp/2008_Budget_Fiscal_Plan.pdf.

23. GOVERNMENT OF BRITISH COLUMBIA, THE BC ENERGY PLAN: A VISION FOR CLEAN ENERGY LEADERSHIP 26 (2007), available at http://www.energyplan.gov.bc.ca/PDF/BC_Energy_Plan.pdf.

24. ENVIRONMENT CANADA, NATIONAL INVENTORY REPORT—GREENHOUSE GAS SOURCES AND SINKS IN CANADA, 1990–2005 at 548 (2007), available at http://www.ec.gc.ca/pdb/ghg/inventory_report/2005_report/2005_report_e.pdf. Among Canadian provinces and territories, per capita emissions in 2005 were lower only in Quebec (11.8 tons) and the Yukon (13 tons). *Id.* at 537, 551. In contrast, emissions per capita were greatest in Saskatchewan (71.6 tons) and Alberta (71.0 tons), which have significant oil and gas production. *Id.* at 544, 546.

25. *Id.* at 548.

26. *Id.* at 549.

27. WALTON ET AL., PROVINCIAL-LEVEL PROJECTION OF THE CURRENT MOUNTAIN PINE BEETLE OUTBREAK: UPDATE OF THE INFESTATION PROJECTION BASED ON THE 2007 PROVINCIAL AERIAL OVERVIEW OF FOREST HEALTH AND REVISIONS TO THE “MODEL” (BCMBP.V5) 11 (2008), available at <http://www.for.gov.bc.ca/hre/bcmpb/BCMPB.v5.BeetleProjection.Update.pdf>.

28. See B.C. MINISTRY OF THE ENV'T BRITISH COLUMBIA, ENVIRONMENTAL TRENDS IN BRITISH COLUMBIA, 142, 150 (2007), available at http://www.env.gov.bc.ca/soe/et07/EnvironmentalTrendsBC_2007.pdf (detailing the impacts of climate change on the environment of British Columbia).

greenhouse gases,”²⁹ pledging to reduce British Columbia’s greenhouse gas emissions “by at least 33 percent below current levels by 2020” or 10% below 1990 levels.³⁰ Among other initiatives to encourage emissions reductions, the speech suggested that “our tax system should encourage responsible actions and individual choices” and that the Government would over the next year “look for new ways to encourage overall tax savings through shifts in [behavior] that reduce carbon consumption.”³¹

In April 2007, the Provincial Government announced that it would join the Western Regional Climate Action Initiative (subsequently the Western Climate Initiative),³² a collaborative effort launched in February 2007 by the Governors of Arizona, California, New Mexico, Oregon, and Washington to develop regional strategies addressing climate change, including the design of a market-based cap-and-trade regime based on hard emissions targets.³³ In November 2007, the Government enacted into law the emissions targets announced in the Throne Speech as part of a Greenhouse Gas Reduction Targets Act,³⁴ which also established an emissions target for 2050 of 80% less than 2007³⁵ and mandated the Provincial Environment Minister to establish emissions targets for 2012 and 2016 and produce bi-annual reports on provincial progress in meeting these targets.³⁶ In the Provincial Budget delivered on February 19, 2008, the Government announced that it would introduce a carbon tax based on GHG emissions from fossil fuel combustion effective July 1, 2008.³⁷

29. Iona Campanolo, Lieutenant-Governor, Speech from the Throne at the Opening of the Third Session, Thirty-Eighth Parliament of the Province of British Columbia 12 (Feb. 13, 2007), available at http://www.leg.bc.ca/38th3rd/Throne_Speech_2007.pdf.

30. *Id.* at 14.

31. *Id.* at 23.

32. Press Release, Office of the Premier, B.C. Joins Western Regional Climate Action Initiative (Apr. 24, 2007), http://www2.news.gov.bc.ca/news_releases_2005-2009/2007OTP0053-000509.htm.

33. See Western Climate Initiative (WCI), <http://www.westernclimateinitiative.org> (last visited Nov. 17, 2008) (explaining that in addition to its founding states and British Columbia, the WCI now also includes as partners Utah and Montana, and the Canadian provinces of Manitoba, Ontario, and Quebec).

34. Bill 44, Greenhouse Gas Reduction Targets Act, 2007, 3rd Session, 38th Parliaments, British Columbia, 2007, § 2(1)(a), available at http://www.leg.bc.ca/38th3rd/3rd_read/gov44-3.htm. Although the bill passed Third Reading on November 26, 2007, it does not yet appear to have been proclaimed into law.

35. *Id.* § 2(1)(b).

36. *Id.* § 4.

37. B.C. BUDGET 2008, *supra* note 22, at 11.

II. THE CARBON TAX

As Janet Milne explains in her contribution to this volume, the design of a carbon tax involves four essential elements: the definition of the tax base, the identification of persons subject to the tax (the taxpayer/collection point), the specification of tax rates, and the use of the revenues generated by the tax.³⁸ The 2008 Provincial Budget and the subsequent legislation implementing the British Columbia carbon tax address each of these features.

A. Tax Base

Although CO₂ is only one of several GHGs attributable to human activities,³⁹ CO₂ emissions are the leading contributor to climate change both globally and in Canada, accounting for more than 60% of anthropogenic GHG emissions globally and almost 80% of GHG emissions in Canada.⁴⁰ Likewise, in British Columbia, CO₂ accounts for almost 80% of GHG emissions.⁴¹ Of this percentage, the vast majority results from the combustion of fossil fuels.⁴²

As its name suggests, the British Columbia carbon tax does not apply to all GHG emissions, but only to emissions from the combustion of fossil fuels and other specified combustibles in the Province, with rates based on CO₂e emissions associated with the various fuels and combustibles that are subject to the tax.⁴³ As a result, while the tax applies to emissions of CO₂

38. Janet E. Milne, *Carbon Taxes in the United States: The Context for the Future*, in this volume.

39. Other gases include methane (CH₄), most of which results from the anaerobic decomposition of solid wastes in landfills, the production and distribution of oil and natural gas, enteric fermentation in ruminants, coal mining, and manure management; nitrous oxide (N₂O), most of which is attributable to agricultural soil management (including the application of synthetic and organic fertilizers), the combustion of fossil fuels, the production of nitric acid for synthetic fertilizers, and manure management; and hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆), one or more of which is either used as a substitute for ozone depleting substances (ODS), attributable to the production of ODS substitutes, used in electrical transmission and distribution, or attributable to the production of aluminum, the manufacture of semiconductors, or the production of magnesium. Environment Canada, Information on Greenhouse Gas Sources and Sinks, http://www.ec.gc.ca/pdb/ghg/about/gases_e.cfm (last visited Oct. 16, 2008).

40. ORG. FOR ECON. CO-OPERATION AND DEV., ENVIRONMENTALLY RELATED TAXES IN OECD COUNTRIES: ISSUES AND STRATEGIES 117 (2001). For the Canadian figure, see ENVIRONMENT CANADA, *supra* note 24, at 41.

41. B.C. MINISTRY OF THE ENV'T, *supra* note 28, at 152.

42. *Id.*

43. B.C. BUDGET 2008, *supra* note 22, at 12.

and other GHGs from the combustion of fossil fuels,⁴⁴ it does not apply to CO₂ emissions from industrial processes such as the production of oil, gas, aluminum, or cement; or to the emission of other GHGs such as methane and nitrous oxide from the disposal of solid waste and the agricultural sector.⁴⁵ Nor does the tax apply to the combustion of biofuels such as firewood, woodwaste, ethanol, biodiesel, and bio-heating oil, which are arguably carbon-neutral.⁴⁶ Instead, the Provincial Budget explains:

The tax base includes fossil fuels used for transportation by individuals and in all industries, including the combustion of natural gas to operate pipelines, as well as road, rail, marine and air transportation. As well, the tax base includes fuel used to create heat for households and industrial processes, such as producing cement and drying coal.⁴⁷

Additionally, since the tax applies only to the combustion of fossil fuels within the Province, it also excludes or specifically exempts fuels exported from British Columbia and fuels used for inter-jurisdictional commercial marine and aviation purposes.⁴⁸ As a result, the budget explains, “neither the emissions released elsewhere to produce fuel imported to BC or the emissions released elsewhere from burning fuel exported from BC are included in the tax base.”⁴⁹

Although the British Columbia carbon tax does not apply to all GHG emissions, the substantial share of CO₂ in total GHG emissions and the equally substantial role of fossil fuel combustion as a cause of CO₂ emissions means that the tax base is quite broad, reaching approximately 70% of aggregate GHG emissions within the Province.⁵⁰ While the exclusion of GHG emissions from industrial processes has been sharply criticized by the Opposition New Democratic Party (NDP),⁵¹ administrative

44. *See id.* (noting that the combustion of fossil fuels produces emissions of methane and nitrous oxide as well as CO₂, which are converted into CO₂ emissions in order to apply the tax).

45. *Id.* at 13.

46. *Id.* Fuels that include fossil fuel and biofuel, such as blended gasoline and ethanol, are subject to tax only on the fossil fuel content of the fuel. Carbon Tax Act, 2008 S.B.C., ch. 40 § 13 (Can.).

47. B.C. BUDGET 2008, *supra* note 22, at 13.

48. *Id.* at 12. The specific exemption for inter-jurisdictional commercial marine and aviation purposes appears in the Carbon Tax Act, S.B.C. 2008 S.B.C., ch. 40 § 14.

49. B.C. BUDGET 2008, *supra* note 22, at 13.

50. *Id.*

51. *New Carbon Tax Receives Praise, Sparks Criticism*, CBC NEWS (Can.), Feb. 19 2008, <http://www.cbc.ca/technology/story/2008/02/19/bc-carbon-tax-reactions.html>. NDP Finance Critic Bruce Ralston commented, “The tax doesn’t capture the full spectrum of emissions. [It] will hit

challenges to the measurement of these emissions—which depend on production processes and can vary from facility to facility—suggest that their initial exclusion from the carbon tax is reasonable. Additionally, it seems reasonable to exclude CO₂ emissions from industrial processes and other GHG emissions from waste disposal and agriculture from the carbon tax because, as the budget explains, “many of these emissions will be subject to the cap-and-trade system or other GHG reduction measures under development.”⁵² The exclusion of fuels for export and fuels used for inter-jurisdictional commercial, marine, and aviation purposes may also be justified on the basis that the tax is intended to apply only to emissions from the combustion of fossil fuels within the Province.⁵³ Although one might argue that British Columbia should take some responsibility for emissions resulting from inter-jurisdictional commercial, marine, and aviation operations within the Province, international agreements and competitiveness considerations suggest that these emissions should also be exempt pending broader inter-jurisdictional coordination on the taxation of emissions from these sources and their inclusion in an international emissions trading regime. Also, since Canada’s constitution limits provincial taxing jurisdiction to “Direct Taxation” imposed “within the Province,”⁵⁴ it is possible that a carbon tax that applies to fossil fuels exported from the Province or used for inter-jurisdictional commercial, marine, and aviation purposes would exceed provincial jurisdiction.⁵⁵

B. Taxpayer/Collection Point

As the discussion of the tax base indicates, the British Columbia carbon tax is intended to apply to the combustion of fossil fuels within the Province, by individuals and by enterprises, for personal use and business purposes. As such, it is properly characterized as a destination-based consumption tax on the combustion of fossil fuels.⁵⁶ Unlike a pure

consumers and average families the hardest as large industrial polluters get a pass and a handout. . . . This budget puts all of the burden on individuals instead of big polluters. Clearly, the industrial lobbyists won in the backrooms.” *Id.*

52. B.C. BUDGET 2008, *supra* note 22, at 13.

53. *Id.*

54. Constitution Act, 1867, 30 & 31 Vict. ch. 3 § 92(2) (U.K.).

55. For a comprehensive account of constitutional provisions relevant to the regulation of greenhouse gases in Canada, see generally SHI-LING HSU & ROBIN ELLIOT, REGULATING GREENHOUSE GASES IN CANADA: CONSTITUTIONAL AND POLICY DIMENSIONS (2008), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1265365 (last visited Nov. 17, 2008).

56. Thomas J. Courchene, Climate Change, Competitiveness and Environmental Federalism: The Case for a Carbon Tax (June 3, 2008), available at http://www.irpp.org/miscpubs/archive/tjc_canada2020.pdf (background document for Canada 2020 Address).

destination-based carbon tax, however, the tax does not exempt embedded carbon taxes on the export of provincially-produced goods and services, nor apply to the import of goods and services from other jurisdictions.⁵⁷ For this reason, the tax may be vulnerable to the same concerns about international competitiveness that motivated the Clinton Administration to favor a system of border tax adjustments for its proposed Btu tax.⁵⁸ Indeed, certain sectors, such as the concrete and cement industry, have already complained about the tax's impact on domestic competitiveness, arguing that the tax "will make B.C.'s three cement facilities vulnerable to plant closures" as consumers switch to Asian producers who are not subject to carbon taxation or emissions limits.⁵⁹

Although the tax is nominally applied to every person who either purchases taxable fuel for use in the Province or uses fuel that is imported into or produced within the Province,⁶⁰ the tax is actually applied and collected at the wholesale level by the distributors of different fuels, rather than the retail level, in the same way that the Province applies and collects motor fuel taxes.⁶¹ According to the Provincial Budget, this arrangement "minimizes the cost of administration to [the] government and the compliance cost to those collecting the tax on [the] government's behalf."⁶² As Milne observes, collecting the tax upstream from actual consumers may also lessen the political visibility of the tax, improving its political viability.⁶³ As popular opposition to British Columbia's carbon tax has increased since its announcement in February,⁶⁴ one might wonder whether it would have been more politically wise for the Government to impose the tax on fuel distributors (as in Quebec), rather than consumers—even if the economic burden of the tax ultimately falls on consumers in the form of

57. For a proposal along these lines, see Thomas J. Courchene & John R. Allan, *Climate Change: The Case for a Carbon Tariff/Tax*, POL'Y OPTIONS, Mar. 2008, at 59–64 (proposing to require the carbon tax to be applied to all imports from all countries and to be applied to all domestically produced and consumed products).

58. Milne, *supra* note 38, at 12.

59. Richard Gilbert, *British Columbia's Ready-Mix Producers See Threat in New Carbon Tax*, DAILY COM. NEWS & CONSTRUCTION REC. (Ontario), July 17, 2008, <http://www.dailycommercialnews.com/article/id28999>.

60. Carbon Tax Act, 2008 S.B.C., ch. 40, §§ 8(1), 10(1) (Can.).

61. *Id.* §§ 15(1), 17(1).

62. B.C. BUDGET 2008, *supra* note 22, at 12.

63. See Milne, *supra* note 38, at 14 (discussing the Clinton Administration's plan for collecting the tax and the realities it faced).

64. See, e.g., Jonathan Fowlie, *Most Oppose Carbon Tax: Anti-tax Sentiment a Potential Threat to Liberals Ahead of Election, Pollster Says*, VANCOUVER SUN, June 18, 2008, <http://www.canada.com/vancouvernews/news/story.html?id=0c50aa7d-d414-4eb6-8b86-843d2ef28cad> (reporting that 59% of those responding to a poll conducted in early June were opposed to the tax, with roughly half of respondents saying that they oppose it "strongly").

higher prices.⁶⁵ Indeed, the Opposition NDP appears to have gained considerable popular support by arguing, among other things, that the tax should be applied to industrial polluters at the source rather than consumers.⁶⁶

C. Tax Rates

As explained in the discussion of the tax base, the British Columbia carbon tax applies to the combustion of fossil fuels and other specified combustibles in the Province, with tax rates based on their respective CO₂e emissions. At an initial rate of \$10 per ton of CO₂e emissions,⁶⁷ the tax results in a levy of 2.41 cents per liter of gasoline, 2.76 cents per liter of diesel, 1.53 cents per liter of propane, 2.45 cents per liter of aviation fuel, 49.66 cents per gigajoule of natural gas, \$17.72 per ton of low-heat-value coal, \$20.79 per ton of high-heat-value coal, \$24.87 per ton of coke, \$10.22 per ton of peat, \$23.91 per ton of shredded tires, and \$20.80 per ton of whole tires.⁶⁸

According to the Provincial Budget, the tax rate is scheduled to increase by \$5 per ton on July 1 of each year until July 1, 2012,⁶⁹ when the tax rate will be \$30 per ton of CO₂e emissions. The resulting levies for each type of taxable fuel and combustible are three times the amount charged in 2008.⁷⁰ The budget explains further changes in tax rates will depend on various factors including: whether British Columbia satisfies its emissions targets, the impact of other policies such as fuel standards and cap-and-trade regulations, actions taken by other governments to reduce GHG emissions and set a price on carbon,⁷¹ and the advice of a Climate Action Team established in November 2007 to advise the Provincial Government on emissions targets for 2012 and 2016 and on ways to reduce GHG emissions.⁷²

65. See Meadows, *supra* note 20, at 21 (reporting that the actual result of the duty in Quebec is on the consumers instead of the distributors).

66. See Chad Skelton, *B.C. prefers NDP's Carbon Tax Plan*, VANCOUVER SUN, June 27, 2008, <http://www.canada.com/vancouversun/news/story.html?id=a824db32-b10c-44e5-8292-ddc4d31a4ecc&k=30817> (reporting that 82% of British Columbians would prefer the Government to "target major industrial polluters" than levy a carbon tax at the retail level).

67. B.C. BUDGET 2008, *supra* note 22, at 12.

68. Carbon Tax Act, 2008 S.B.C., ch. 40, scheds.1–2 (Can.).

69. B.C. BUDGET 2008, *supra* note 22, at 12 tbl.1.1.

70. See Carbon Tax Act, scheds. 1–2 (calculating the average tax increase within four years).

71. B.C. BUDGET 2008, *supra* note 22, at 20.

72. Press Release, Office of the Premier, Province Announces Climate Action Team (Nov. 20, 2007), http://www2.news.gov.bc.ca/news_releases_2005-2009/2007OTP0180-001488.htm#.

Although the budget itself acknowledges that a price of even \$30 per ton of CO₂e emissions may be insufficient to encourage significant changes in behavior,⁷³ it also offers two reasons for introducing the tax at a relatively low rate and gradually increasing this rate over five years. First, it explains, this approach “gives individuals and businesses time to make adjustments and respects decisions made prior to the announcement of the tax.”⁷⁴ Second, it notes, the phase-in also ensures “certainty about rates for the first five years.”⁷⁵ This is a notable advantage over emissions trading regimes in which the price of GHG emissions is subject to market fluctuation.⁷⁶

In addition, a low initial rate followed by a gradual increase may reduce public opposition to the tax and increase its political viability.⁷⁷ However, given increasing opposition to the tax in British Columbia⁷⁸ it appears as though a gradual phase-in alone cannot ensure popular support or acceptance for the taxation of GHG emissions. On the contrary, the Organisation for Economic Cooperation and Development concluded that political viability of environmental taxes and other economic instruments, like emissions trading, ultimately depends on the public’s understanding of the environmental problem, the purpose of the economic instrument, and the perceived fairness of the instrument itself.⁷⁹ The Provincial Government attempted to improve public understanding through an extended series of announcements and legislative measures, beginning with the Throne Speech in February 2007, along with using the revenues collected from the tax to enhance its perceived fairness.

D. Use of Revenue

According to the Provincial Budget, the British Columbia carbon tax is anticipated to raise \$338 million in its first year, \$631 million in 2009/10, and \$880 million in 2010/11.⁸⁰ Unlike the carbon tax in Quebec, which dedicates revenues to a Green Fund in support of spending initiatives

73. B.C. BUDGET 2008, *supra* note 22, at 18, 20.

74. *Id.* at 11.

75. *Id.*

76. See, e.g., Reuven S. Avi-Yonah & David M. Uhlmann, *Combating Global Climate Change: Why a Carbon Tax is a Better Response to Global Warming than Cap and Trade* 37 (Univ. of Mich. Pub. Law Working Paper No. 117, 2008) available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1109167 (last visited Nov. 17, 2008) (discussing the “Cost Certainty” of the carbon tax as opposed to the cap-and-trade regime).

77. ORG. FOR ECON. CO-OPERATION AND DEV., *THE POLITICAL ECONOMY OF ENVIRONMENTALLY RELATED TAXES* 153 (2006).

78. Fowlie, *supra* note 64.

79. ORG. FOR ECON. CO-OPERATION AND DEV., *supra* note 77, at 21–22.

80. B.C. BUDGET 2008, *supra* note 22, at 15.

announced in the Province's Climate Change Action Plan,⁸¹ the British Columbia carbon tax is intended to be "revenue neutral"—with all revenues from the tax "recycled" back to individuals and businesses in the form of personal and corporate income tax cuts,⁸² and a refundable Climate Action Tax Credit for low-income households.⁸³ Through these measures and additional corporate income tax cuts scheduled for 2010 and 2011,⁸⁴ the budget projects that revenue reductions for the fiscal years 2008/09 to 2010/11 will match the expected revenues raised by the carbon tax.⁸⁵

In order to ensure that the carbon tax remains revenue neutral, the implementing legislation includes provisions requiring the provincial Minister of Finance to prepare and submit annual plans to the provincial legislature, projecting over a three-year period both the revenues that the carbon tax is estimated to collect and the revenues that are expected to be returned to taxpayers through tax reductions, exemptions, or credits.⁸⁶ If the Minister fails to ensure that carbon-tax revenues are fully recycled through these "revenue measures," the legislation imposes a personal penalty in the form of a salary reduction of 15%.⁸⁷

In addition to this revenue recycling the budget also announced a one-time Climate Action Dividend of \$100 per person funded from the Province's 2007/08 surplus and paid to all residents on December 31, 2007.⁸⁸ According to the budget, this payment was "intended to help British Columbians make changes to reduce their use of fossil fuels."⁸⁹ More cynically, perhaps, the payment (which was distributed in the month of June, immediately before the tax came into effect on July 1, 2008) may have been intended to reduce public opposition to the tax by providing a "sweetener" to accompany its introduction.⁹⁰ In practice, however, the

81. See An Act Respecting the Régie de l'Énergie, R.S.Q. ch. R-6.01, ch. VI. 3 §§ 85.35, .38 (2007) (discussing financing for the reduction of greenhouse gas).

82. See B.C. BUDGET 2008, *supra* note 22, at 104–05 (announcing rate reductions of 2% in 2008 and 5% in 2009 for the lowest two brackets of provincial personal income tax, and reductions in the general and small business corporate income tax rates of 1% effective July 1, 2008).

83. See *id.* at 103 (announcing an annual refundable credit, "[t]o help low-income individuals and families with the carbon taxes they pay and as part of the government's commitment that the carbon tax be revenue neutral," of \$100 per adult and \$30 per child, reduced by 2% of net family income exceeding \$30,000 for individuals and \$35,000 for families).

84. See *id.* at 15 (proposing cuts in 2010 and 2011 for the general corporate tax rate and the small business corporate income tax rate).

85. *Id.*

86. Carbon Tax Act 2008, S.B.C. ch. 40, § 3(2) (Can.).

87. *Id.* § 5(3).

88. B.C. BUDGET 2008, *supra* note 22, at 105.

89. *Id.*

90. See John Bermingham, *B.C. Gov't Issues \$100 Cheques to Residents Next Month*, THE PROVINCE (Vancouver), May 16 2008, <http://www.canada.com/theprovince/news/story.html?id=47e58a>

“dividend” may have heightened public awareness and hostility to the new tax—exemplified by the common complaint that the payment “barely covers an average fill-up at current gas prices.”⁹¹

Whatever its political impact, the Climate Action Dividend has been rightly criticized on the grounds that the amount of the payment is insufficient to finance meaningful household expenditures on emissions reduction measures. Additionally, the surplus might have been better spent on public initiatives to reduce GHG emissions, such as improved public transit or a program to improve the energy efficiency of low-income housing. In contrast, the recycling of carbon tax revenues through personal and corporate income tax rate reductions and the introduction of a refundable tax credit for low-income households may be justified by economic efficiency, tax equity, and political reality. From an efficiency perspective, economists widely conclude that a shift from economically-distorting taxes on economic “goods,” like the production of income, to cost-internalizing taxes on environmental “bads,” like GHG emissions, should produce a so-called “double dividend” in the form of enhanced environmental protection and improved economic efficiency.⁹² From a tax-equity or fairness perspective, the introduction of a refundable tax credit for low-income households represents an attractive measure to offset the potential regressivity of a carbon tax, which is apt to impose a larger relative burden on low-income individuals and families who are likely to devote a larger share of their incomes to the consumption of goods and services.⁹³ Politically, a firm commitment to revenue neutrality should lessen popular opposition to the tax as a new levy designed to increase

47-38b6-4f2c-b16b-ecce7144573f1 (reporting that the head of the British Columbia branch of the Canadian Taxpayers’ Federation stated the payment was “just a total bribe” designed to “keep the squealing about the carbon tax to a minimum”).

91. Vaughn Palmer, *Voters Really, Really Don’t Like Gas Tax, Poll Tells Stubborn Campbell*, VANCOUVER SUN, June 18, 2008, <http://www.canada.com/vancouver/sun/columnists/story.html?id=0329b877-e8a6-4883-b313-b143edd401e0>.

92. See e.g., ORG. FOR ECON. CO-OPERATION AND DEV., *supra* note 40, at 35 (asserting that a double dividend occurs with more effective environmental protection and a reduction in other distortionary taxes).

93. See ORG. FOR ECON. CO-OPERATION AND DEV., *supra* note 77, at 134–49 (explaining that energy taxes tend to be income regressive, and direct mitigation measures should be used to reduce the impact on household income in order to compensate for the larger burden on low-income families). A similar argument can be made in support of special measures to offset increased costs faced by residents of rural and Northern communities who may find it difficult to make adjustments to reduce transportation and heating costs. See, e.g., *Official Report of Debates of the Legislative Assembly*, 26 HANSARD 9, 9840 (afternoon sitting Feb. 20, 2008) (statement of Bob Simpson, Member of the Legis. Assemb., Cariboo North, B.C.), available at <http://www.leg.bc.ca/hansard/38th4th/H0220pm-09.pdf> (“Our lifestyles are fundamentally different, and putting an incremental tax on fuels adds additional burdens to people who live in rural B.C. . . .”).

government revenues. In practice, however, recent polls suggest that most Canadians would prefer to see carbon tax revenues devoted to investments in renewable energy and energy efficiency, rather than cuts in income taxes.⁹⁴

III. IMPLICATIONS

When British Columbia announced that it would introduce a carbon tax in February 2008, the Provincial Budget confidently proclaimed that “[a] rare consensus has formed in British Columbia among individuals, certain business interests, environmental organizations, and economists that a carbon tax is a key and necessary tool in the move to reduce GHG emissions”⁹⁵ Indeed, although the tax was immediately condemned by some business organizations and at least one conservative policy institute,⁹⁶ it was warmly welcomed by most environmental organizations,⁹⁷ and continues to enjoy the support of several business interests in the Province.⁹⁸ In May 2008, two polls indicated that Canadians supported the idea of a carbon tax at the national level. Sixty-one percent of respondents stated they supported a tax on businesses and people based on the carbon emissions that they generate,⁹⁹ and 72% described the introduction of the British Columbia carbon tax as a positive step.¹⁰⁰

As gasoline prices soared during the spring and early summer of 2008 and the Canadian economy began to experience the effects of an economic

94. See, e.g., Mike De Souza, *Carbon Tax Gaining Support Across Canada: Poll*, CANWEST NEWS SERVICE (Ottawa), May 25, 2008, <http://www.canada.com/topics/news/story.html?id=c28d5cd4-5404-4ade-a748-0352268d392c> (reporting that 47% of respondents thought that “revenues should be spent on ‘renewable energy like wind and solar power’ and 16 per cent [sic] said they wanted to see more spending on ‘energy efficient technologies’”).

95. B.C. BUDGET 2008, *supra* note 22, at 11.

96. See Jonathan Fowlie & Fiona Anderson, *B.C. Introduces Carbon Tax: Province is the First Jurisdiction in North America to Have Consumer-Based Carbon Tax*, VANCOUVER SUN, Feb. 19, 2008, <http://www.canada.com/vancouversun/news/story.html?id=ecea1487-507c-43ef-ab88-5a972898e0b7&k=38130> (quoting representatives of the Canadian Federation of Independent Business and the Fraser Institute).

97. See *id.* (quoting representatives of the Suzuki Foundation and the Sierra Club of British Columbia).

98. See Brian Hutchinson, *Public Opinion Shifts Over New B.C. Carbon Tax*, NAT'L POST (Toronto) June 20, 2008, http://www.nationalpost.com/todays_paper/story.html?id=599801 (reporting that the Business Council of British Columbia decided not to oppose the tax).

99. *Most Canadians Support Carbon Tax, Poll Suggests*, TORONTO STAR, May 7, 2008, available at <http://www.thestar.com/printArticle/422643>.

100. See, De Souza, *supra* note 94 (noting that “72 per cent [sic] of those surveyed” in a poll discussing British Columbia’s recently introduced carbon tax on fossil fuels “said that it was a positive step”).

downturn, however, whatever consensus may have existed when the British Columbia carbon tax was first announced on February 19 appears to have disappeared by the time it became effective on July 1. In mid-June, the Leader of British Columbia's Opposition NDP launched an "axe the tax" campaign,¹⁰¹ invoking an anti-tax slogan that sits uncomfortably with the party's social-democratic orientation. By the end of August, polls showed that the New Democratic Party had more popular support than the governing Liberal Party for the first time in several years.¹⁰²

In the meantime, the Federal Liberal Party, under Leader Stéphane Dion, released a "Green Shift" tax plan on June 19¹⁰³ proposing a revenue-neutral carbon tax modeled on the British Columbia tax that would commence at \$10 per ton of CO₂e emissions and rise to \$40 per ton within four years.¹⁰⁴ Incorporating scheduled reductions in personal and corporate income tax rates,¹⁰⁵ new or enhanced refundable tax credits for low-income individuals and families,¹⁰⁶ and tax incentives for green technologies,¹⁰⁷ the Green Shift plan would also introduce a legislative requirement for revenue neutrality by mandating the Federal Auditor General to annually monitor carbon tax revenues and foregone revenues resulting from rate reductions, exemptions, and credits.¹⁰⁸ Unlike the British Columbia carbon tax, however, the Green Shift plan would exempt gasoline on the basis that this category of fossil fuel is already subject to an effective tax rate of \$42 per ton of CO₂e emissions under the existing federal tax on motor fuels.¹⁰⁹ The

101. See New Democrat: Official Opposition, *Axe the Gas Tax* (June 16, 2008), <http://www.bcndpcaucus.ca/en/axethetax> (contending that Gordon Campell's new fuel tax targets consumers who already are suffering from high gas prices while being ineffective in combating climate change).

102. See *B.C. Poll Fires a Warning Shot for Federal and Provincial Liberals*, VANCOUVER SUN, Aug. 28, 2008, <http://www.canada.com/vancouvernews/editorial/story.html?id=75f4c677-dc4e-411b-b25f-0f41c8598bdf> ("[T]he Angus Reid Strategies poll released this week showed B.C. New Democrats ahead of the Liberals for the first time in years.").

103. Meagan Fitzpatrick, *Liberal Carbon Tax Plan Good for Planet, Wallet: Dion*, NAT'L POST (Toronto), June 19, 2008, available at <http://www.nationalpost.com/news/story.html?id=599498>.

104. LIBERAL PARTY OF CANADA, *THE GREEN SHIFT: BUILDING A CANADIAN ECONOMY FOR THE 21ST CENTURY* 6 (2008), available at http://www.thegreenshift.ca/pdfs/green_shift_book_en.pdf.

105. See *id.* at 6–9 (proposing to reduce the lowest rate of personal income tax as well as to reduce the general and small business corporate income tax rates).

106. See *id.* at 7–8 (proposing to introduce a new child tax benefit worth \$350 per child, to replace the existing employment tax credit with a refundable credit targeted at individuals earning less than \$50,000 per year, to enrich the Working Income Tax Benefit by eliminating a \$3,000 income threshold below which the benefit is currently unavailable, and to make the Disability Tax Credit refundable).

107. See *id.* at 9 (proposing accelerated depreciation rates and refundable tax credits to encourage the development of green technologies).

108. *Id.* at 6.

109. *Id.*

plan would also create an annual “Green Rural Credit” of \$150 for every Canadian residing in a rural area and an enhanced deduction for northern residents to lessen the impact of the tax on individuals who face higher transportation and heating expenses.¹¹⁰

While the exemption for gasoline, the credit for rural residents, and the enhanced deduction for northern residents appear to have been designed primarily for political reasons, the tax measures for rural and northern residents also address an important fairness concern resulting from the prospect that the tax might fall more heavily on these individuals. To the extent that the existing motor fuel tax constitutes a form of benefit-taxation designed to finance public expenditures on roads and highways, however, it is more difficult to justify the exemption of gasoline from the proposed carbon tax.

Not surprisingly, given its libertarian predispositions and its unwillingness to adopt aggressive policies to limit GHG emissions, the governing Federal Conservative Party was quick to attack the Liberal Party’s Green Shift plan, characterizing it as a tax increase that “will not be revenue neutral,”¹¹¹ and launching radio advertisements attacking the plan and Liberal Party Leader Stéphane Dion.¹¹² Denouncing the Green Shift plan as “crazy” and “insane,”¹¹³ Prime Minister Stephen Harper labeled the plan a “‘green shaft’ that will stifle the Canadian economy” and “take this country back to the tax-and-spend policies of the past.”¹¹⁴

Although the Conservative Party’s characterization of the Green Shift plan as a tax increase to support larger government spending constitutes a deliberate misrepresentation of the proposal, opinion polls conducted during the summer of 2008 suggest that the Prime Minister’s denunciations and the Conservative Party’s attack ads had a significant impact on popular support for the plan as well as for the Federal Liberal and Conservative Parties. While a poll conducted in July found that 51% of respondents supported the Green Shift plan and 41% were opposed, a poll conducted at the end of August found that 52% opposed the plan and 45% were in

110. *Id.* at 8.

111. Fitzpatrick, *supra* note 103 (quoting Prime Minister Stephen Harper).

112. David Akin, *Tories Launch New Attack on Liberal Green Plan*, NAT’L POST (Toronto), Aug. 4, 2008, available at <http://www.nationalpost.com/related/topics/story.html?id=700261>.

113. *Id.* (“Prime Minister Stephen Harper’s denunciation of Mr. Dion’s plan as ‘crazy’ and ‘insane’”).

114. Chris Morris, *Liberal Green Shift is ‘Green Shaft,’ Says Harper*, TORONTO STAR, Aug. 14, 2008, <http://www.thestar.com/News/Canada/article/478887>.

favor.¹¹⁵ More significantly from a political perspective, while polls conducted in early August suggested that the Conservative Party's attacks on the Green Shift plan and the Liberal Leader had not had a noticeable effect on popular support for these federal political parties,¹¹⁶ a poll released in early September indicated that support for the Federal Conservative Party had pulled significantly ahead of the support for the Federal Liberals.¹¹⁷

In this circumstance, the Prime Minister called a federal election on September 7, seeking to capitalize on its rise in the polls and secure the legislative majority that it was denied in January 2006.¹¹⁸ Campaigning against the Liberal Party's Green Shift plan, the Conservative Party fell short of its majority when the election was held on October 14, but increased its share of the popular vote and obtained nineteen more seats in the House of Commons.¹¹⁹ In contrast, popular support for the Liberal Party fell by 4% and the Party lost twenty-seven seats in the House.¹²⁰ A week after the election, Stéphane Dion resigned as Liberal Leader, blaming "the massive Conservative advertising onslaught against him personally and against his carbon-tax-based Green Shift environmental policy" for the disappointing election outcome.¹²¹

In British Columbia, where the introduction of a provincial carbon tax appears to have cost the governing Liberal Party considerable political support,¹²² the next election is scheduled for May 12, 2009,¹²³ giving the Government little time to reverse its sagging political fortunes. Although the provincial Premier has not backed away from the carbon tax, recent

115. Juliet O'Neill, *Support for the Liberals' Green Shift Dropping: Poll*, VANCOUVER SUN, Sept. 1, 2008, available at <http://www.canada.com/vancouver/sun/story.html?id=37ed64fc-b218-4959-918a-fa0b72dc30fc>.

116. See Akin, *supra* note 112 ("Nationally, support for the Conservatives is at 34%, up two percentage points over the last six weeks, while the Liberals are at 30%, down two percentage points.").

117. Brian Laghi, *Harper Tories on the Brink of Majority, Poll Finds*, THE GLOBE & MAIL (Ottawa) Sept. 2, 2008, available at <http://www.theglobeandmail.com/servlet/story/RTGAM.20080901.wpoll0901/BNStory/Front/home> (reporting that 37% of respondents would vote for the Conservative Party and 29% for the Liberal Party).

118. *Vote set for Oct. 14: Harper Expects Tight, Tough Election*, CBCNEWS.CA, Sept. 7, 2008, <http://www.cbc.ca/canada/story/2008/09/07/election-call.html>.

119. Compare Election Canada, 40th General Election, http://enr.elections.ca/National_e.aspx (last visited Nov. 13, 2008) (reporting 2008 election results) with International Foundation for Electoral Systems, Election Profile: Canada, <http://www.electionguide.org/results.php?ID=350> (last visited Nov. 13, 2008) (reporting 2006 election results).

120. *Id.*

121. Bruce Campion-Smith and Les Whittington, *Dion Resigns but Will Remain as Leader for Now*, TORONTO STAR, Oct. 20, 2008, <http://www.thestar.com/FederalElection/article/520583>.

122. *B.C. Poll Fires a Warning Shot for Federal and Provincial Liberals*, *supra* note 102.

123. According to the British Columbia Constitution Act, provincial elections must be held on fixed dates, which are the second Tuesday in May every four years after May 17, 2005. Constitution Act, R.S.B.C. ch. 66, § 23(2) (Can.).

statements suggest that the Government has opted to downplay the carbon tax after the federal election, emphasizing instead infrastructure spending and accelerated income-tax cuts to combat the economic downturn.¹²⁴ Whether the British Columbia carbon tax survives the provincial election next spring remains to be determined.

CONCLUSION

As an economic instrument to combat global climate change by placing a price on GHG emissions, there is much to favor in the use of environmental taxes like the British Columbia carbon tax.¹²⁵ Nonetheless, as experience at the federal level and in British Columbia suggests, the introduction of a consumption-based tax on GHG emissions is likely to be politically difficult, irrespective of its merits in terms of environmental effectiveness, economic efficiency, and distributional fairness. Reflecting on this experience, however, a number of suggestions emerge regarding ways in which a carbon tax might be made politically more appealing.

First, as the New Democratic Party's objection to the tax in British Columbia demonstrates, it is unwise to introduce a consumption-based tax on the combustion of fossil fuels without simultaneously announcing a comprehensive tax or emissions trading regime to address GHG emissions from industrial processes and other sources like waste disposal and agriculture. By leaving the regulation of these sectors to subsequent measures, such as the future emissions trading regime established under the Western Climate Initiative, the British Columbia Government opened itself to accusations that it was placing "all of the burden on individuals instead of big polluters."¹²⁶

Second, in order to address fairness considerations concerning the distributional impact of the tax, the tax should be accompanied by other measures to compensate for increased and largely unavoidable tax burdens. Examples include the Climate Action Tax Credit for low-income households announced in British Columbia's 2008 Provincial Budget and

124. Justine Hunter, *B.C. Accelerates Income-tax Cuts*, GLOBE & MAIL (Ottawa), Oct. 23, 2008, http://www.theglobeandmail.com/servlet/story/RTGAM.20081022.wcampbell1022/BNSStory/politics/home?cid=al_gam_mostemail.

125. *See generally*, STERN, *supra* note 7, at 351–67 (explaining that a tax-based approach will raise public revenues and can be used for short term flexibility as to how, where, and when emissions are reduced, while providing long term quantity goals to limit the risk of catastrophic environmental damage).

126. *New Carbon Tax Receives Praise, Sparks Criticism*, *supra* note 51.

the Green Rural Credit proposed in the Federal Liberal Party's Green Shift plan.

Third, the political viability of a carbon tax may also be enhanced by legislative measures to ensure revenue neutrality—though these measures must be clearly explained and vigorously defended in order to prevent the deliberate mischaracterization of the tax as a tax increase. Alternatively, as at least one Canadian poll suggests,¹²⁷ the political viability of a carbon tax may also be enhanced by dedicating the revenues that it yields to investments in renewable energy and energy efficiency, as was done in Quebec.¹²⁸ While the revenue-recycling measures accompanying the British Columbia carbon tax likely improved its political acceptance, the payment of a Climate Action Dividend to all residents of the Province appears to have been a poorly-conceived attempt to lessen public opposition to the tax, which may have had the opposite effect by drawing public attention to the new tax at the same time as it came into effect.

Fourth, phasing in a carbon tax may enhance its political viability. By beginning with relatively low rates and gradually increasing them over time according to a schedule set out when the tax is first introduced, political opposition may be lessened. As British Columbia's 2008 Provincial Budget explains, this approach "gives individuals and businesses time to make adjustments and respects decisions made prior to the announcement of the tax" and provides certainty about tax rates during this phase-in period.¹²⁹

Fifth, competitiveness concerns are best addressed by implementing border tax adjustments that would impose carbon taxes on the embedded-carbon content of goods imported into the jurisdiction and exempt embedded carbon taxes on goods and services that are exported from the jurisdiction.¹³⁰ Although these kinds of border tax adjustments are difficult to devise for a broad-based carbon tax and would have to satisfy international trade rules,¹³¹ these kinds of arrangements are apt to be essential if jurisdictionally-specific carbon taxes are to have any hope of long-term viability.

Finally, as shifting public opinion in British Columbia and Canada demonstrates, popular support and acceptance of a carbon tax may depend on the timing of its introduction, considering prevailing fuel prices and

127. De Souza, *supra* note 94.

128. Regulation Respecting the Annual Duty Payable to the Green Fund, 2008 R.R.Q. ch. R-6.01, r.0.2.3.1 (Can.).

129. B.C. BUDGET 2008, *supra* note 22, at 11.

130. Courchene & Allan, *supra* note 57.

131. *See generally*, ORG. FOR ECON. CO-OPERATION AND DEV., *supra* note 77, at 89–106 (discussing border tax adjustments in environmentally related taxes).

economic conditions. While the introduction of a carbon tax appears to have been politically popular in British Columbia and Canada in the spring and early summer of 2008, opposition grew as gas prices increased and economic conditions deteriorated. Whether carbon taxes can garner support in tougher economic times remains to be determined.

