

Improving State Electricity Taxation

Making a Revenue Neutral Tax Shift
a Part of
Electric Industry Restructuring

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INTRODUCTION

States that have restructured their electric utility industry have generally found it necessary to restructure the taxes they impose on the electric industry as a part of the overall restructuring architecture. The introduction of competition for electricity services at either the wholesale or retail level complicates not only the ability of a state or local government to levy taxes but also its ability to maintain the level of revenues previously collected. Existing tax structures may also create unequal competitive opportunities in a restructured world, where owners of in-state utility power plants find themselves subject to taxes that are not or cannot be levied on competing independent or out-of-state power producers.

However, the turmoil of restructuring also offers opportunities to improve state electricity taxation in ways that both level the competitive playing field and improve the overall environmental and economic efficiency of electric utility taxes.

This paper reviews the major impacts electric industry restructuring are likely to have on current state taxation of electricity and recommends changes that will not only preserve tax revenue stability but will also enhance economic efficiency in the electric sector and positively effect the environment as well.

This review begins with an examination of traditional taxation imposed on the electric utility industry. It then examines how those types of tax structures are impacted by electric industry restructuring. A brief review is presented on how tax structures for the telephone and natural gas industries (which have undergone restructuring) were modified. The review proposes alternative methods of taxing electric utilities that we believe will improve efficiency and equity, while preserving necessary tax revenues for state and local governments. Finally, a number of important technical issues are examined to ensure that the alternative tax mechanism proposed does not produce undesirable or unexpected results.

THE GOALS OF STATE AND LOCAL UTILITY TAXATION

In most states, taxation of the electricity business usually is designed to meet at least five basic goals: adequacy of revenues, simplicity of collection, revenue stability, economic efficiency and distributive equity. This paper suggests that there is a missing sixth goal which is inextricably tied to the others: environmental efficiency.

The electric industry differs from most other products and services taxed by states in that the

production of electricity is the source of more than a third of the nation's air pollution and is responsible for other major land use, water and noise impacts as well. Only transportation is responsible for a larger share of our primary energy usage and a larger share of air pollution.

This large and unique environmental footprint should make environmental efficiency, like economic efficiency, an unavoidable objective of state taxation policy. The failure to assess the electric utility industry for the avoidable environmental impacts it causes leads to an inefficient selection of power resources and depresses the development of resources that would both lessen dependence on fossil fuels and reduce air emissions. In fact, upon closer analysis, environmental efficiency, due to the very large environmental impacts of this industry, is a significant part of achieving economic efficiency. In fact, they are two faces to increase social welfare.

As Alan Thein Durning expressed in his seminal book on environmental tax policy:

“In general, economics tells us that when you tax something, you get less of it. Our problem is that we tax things we want more of, such as paychecks and enterprise, instead of things we want less of, such as toxic waste and resource depletion. Naturally we get less money and more messes. Tax Shift is about doing the opposite – removing taxes from ‘goods’ and putting them on ‘bads.’”¹

How Have Utilities Been Taxed Historically?

Although states and local taxing authorities have differed in the precise mix of taxes imposed upon electric utilities, most jurisdictions impose one or more of the following forms of taxation:

1. Gross receipt taxes levied as a flat percent on gross revenues;
2. Franchise or corporate income taxes on net revenues;
3. Property taxes on personal and/or real property;
4. Sales or use taxes imposed upon consumption; and
5. Taxes on fuels used for electric generation.

In general, utility taxes have been an attractive source of revenue for state and local governments. Virtually every utility rate payer is also a taxpayer, making utility taxes attractively broad based. Somewhat uniquely, utility taxes allow state and local governments to tax federal agency electricity usage, even though they are prohibited from taxing federal agencies property or revenues directly. Perhaps even more attractive to state legislatures is the fact that utility taxes generally do not look like taxes to electricity consumers; they look like utility rates. Utility taxes have been easy to administer and collect. With a few, large highly regulated providers, states almost always had clear jurisdiction over the product, its producers and sellers. There were few entities to tax (property, gross receipts, franchise taxes and fuel taxes) and few entities to be relied upon to collect taxes (sales or use).

¹ Durning, A. and Bauman, Y, Tax Shift, 1998

In several states, electric utilities have been subject to taxes not levied on fully competitive businesses of comparable size. For example, in Ohio, public utility property was taxed at 100% of assessed valuation, while most other business property was taxed at only 25% of fair market value.² The tax burden on electric utilities has often been higher than that of other businesses due to the unique characteristics of being regulated monopolies. As Professor Bonbright noted in the seminal work on utility ratemaking:

“Assuming, as it seems plausible to assume, that this complex of utility taxes imposes a proportionately higher tax burden on the prices of utility services than nonutility taxes impose on nonutility commodities and services, there tends to result a misallocation of economic resources...”³

Electric utilities did not necessarily protest this tax burden as the taxes did flow through to customers in rates.

Some of the key characteristics of the utility industry include:

1. The electric industry is a highly stable business with predictable revenue and relatively low elasticities of demand (insensitive to price increases) as compared to many consumer products. This is because electricity is a necessity of modern life.
2. The high coincidence between ratepayers and taxpayers make utility taxes an effective, broad-based tax.
3. Utility taxes do not look like taxes to ratepayers, they look like utility rates, and, with growing demand for utility services, the revenues from these taxes rise without any action on the part of taxing authorities to “raise taxes.”
4. As monopolies, utilities were believed to suffer little competitive effect from the taxes levied upon them.

This last point was rejected 40 years ago by Professor Bonbright and is certainly debatable in today’s economic and regulatory environment. Many utility managers would argue that high taxes on electricity as compared to those levied upon other fuel sources such as natural gas, coal and petroleum have competitively disadvantaged electricity relative to these other fuels, at least for some end uses, long before the introduction of electricity competition.

² Doris Mahaffey, Reassessing Ohio’s Public Utility Property Tax in an Era of Public Utility Restructuring, P. 2

³ Bonbright, Principles of Public Utility Rates, 1961, P. 404

It is likely that the comparative ease in imposing electricity taxes as compared to other broad-based taxes has led to an over reliance on them for state and local funding of basic services. For example, many states have relied upon utility property taxes as well as natural resource severance taxes to fund schools.

Three Case Studies of Electric Utility Taxation

To better understand the problems associated with electric industry taxation, a few examples of systems that “worked” historically but may not “work” prospectively are appropriate.

Case 1: Retail Wheeling / Washington: Avista Utilities, formerly The Washington Water Power Company (WWP), has some of the lowest retail electric rates of any investor-owned utility in the United States, averaging less than \$.04/kWh for industrial customers and less than \$.06/kWh for residential customers. Nonetheless, in response to temporarily extremely low wholesale prices, industrial customers asked for and obtained the right to purchase a portion of their power requirements from non-utility sources in a pilot program which began in 1997.

Under this pilot, the amount of cost embedded in utility tariffs for bulk power supply (production plus bulk transmission) was deducted from the tariff rate to compute a “full margin,” retail wheeling distribution rate of about \$.01/kWh. Industrial customers were then free to negotiate with non-utility power suppliers, and if they could obtain a price which, combined with this distribution rate, was lower than the utility tariff, they could save money.

The result was a caricature of tax avoidance. The utility sold power at wholesale to non-utility power suppliers at a fraction above the pre-tax power cost embedded in rates. The non-utility power suppliers then sold the power to industrial consumers at a fraction below the post-tax power cost embedded in utility rates. Because the sale at wholesale to the non-utility power supplier was not “public utility” service, WWP neither had to remit state Public Utility Excise Tax (about 4 % of gross utility revenue) to the state, nor a City of Spokane 6 % Utility Revenue Tax. Because the sale by the non-utility power supplier to the retail customer was not “utility service,” the non-utility power supplier did not have to collect either of these taxes, and because it was an out-of-state supplier, it did not remit any other Washington taxes.

The result was that the utility was made “more than whole,” the non-utility power supplier earned a profit, and the customer saved money. The sum of these benefits to the utility, power supplier, and customer was precisely equal to the avoidance of about 10% in gross revenue taxes.

When the retail wheeling pilot program was expanded to include smaller customers, a requirement was imposed for the non-utility suppliers to remit taxes as though they were utilities. After two years, the experiments ended and retail wheeling ceased on the WWP system.

Case 2: Wiscasset, Maine Nuclear Plant: The beautiful coastal town of Wiscasset, Maine (pop. 3,700) has been the site of the Maine Yankee Nuclear Power Plant since 1972. The power plant

was subject to state and local property taxes from the date it was constructed. Because it was a very large investment located in a very small city, it provided the overwhelming majority (90%) of the City's property tax revenues, some \$11 - \$13 million per year.⁴ This huge source of revenue made Wiscasset extremely "rich" in comparison to other local governments nearby, with a school district budget about twice as large and local government salaries several times as large as similarly-sized communities in Maine.⁵

As the electric industry was restructured throughout the New England market, the joint utility owners of the aging Maine Yankee decided that investing in needed plant upgrades would still leave the plant's economic viability in the competitive wholesale market uncertain. The plant was offered for sale but received no credible offers. The decision was made to shut down and decommission the plant. Suddenly, the Town of Wiscasset faced a major loss of town revenues. By 1998, when the property taxes declined to \$6.1 million, the Wiscasset police force declined from 8 officers to 5. And revenue continued to drop, down to a negotiated level of \$2.5 million in 2000.

Wiscasset is now facing huge decreases in public services and huge increases in taxes on other local property owners at precisely the time that several hundred high-paying local jobs at the nuclear plant have been eliminated.

This case study demonstrates that over-dependence on a single property tax payer is a risky strategy for any community. In addition, it illustrates that the opportunity to attract a large property tax payer may bias a community in favor of a type of investment that might otherwise be considered undesirable.

Case 3: Ohio's Electric Property Tax: Ohio is a major industrial state, with very large power consuming industries. It is also a major coal mining state, and the vast majority of the state's electric power is coal-fired. Because of this heavy concentration of electric utility investment, the stability of electric utility revenues and the ability of electric utilities to "pass through" taxes to consumers, the industry became an increasingly important source of tax revenue. In 1995, public utilities paid over \$1 billion in property taxes to local governments. By 1999, public utility taxes were providing 8% of all local revenues, and 14% of local revenues to school districts.⁶

As the electric industry began to restructure, the opportunity for non-utility owners of electric generating plants to enter the market developed. These non-utility generators were taxed at industrial tax rates, not at utility tax rates. Because of the character of Ohio's tax structure at the

⁴ Wiscasset Newspaper, December, 16, 1999.

⁵ Wiscasset Newspaper, January 14, 1999

⁶ Doris Mahaffey, Ohio Legislative Service Commission, Reassessing Ohio's Public Utility Property Tax in an Era of Public Utility Restructuring, pp 1-2

time, they paid only one-fourth the level of taxes that a utility owner would pay. This provided the non-utility owners with a considerable competitive advantage over utilities owning power plants. This competitive disadvantage led the utilities to seek tax parity through changes in state law. At the same time, this competitive advantage of non-utility owners actually reduced the value of utility-held electric generating properties, and thus led to reductions in the taxes received from the utilities, which led local governments to seek modifications to the tax law.

During the 1999 legislative session, the Ohio Legislature adopted Senate Bill 3, which reduced the level of property taxes on electric generating facility to the same level as other business property and implemented a kilowatt-hour tax designed to roughly apportion the lost revenue between customer classes. Because larger users typically pay lower rates, and the previous tax was included in rates at lower levels for larger users, a declining block rate form was adopted:

First 2,000 kWh: \$.00465
Next 13,000 kWh: \$.00419
Over 15,000 kWh: \$.00363

The tax revenue was dedicated to public education and local government operations, the same purpose to which the property tax was previously dedicated.⁷

The reliance on utility taxes in PA, NY and OH in particular made the reform of state taxation a central issue in their electric restructuring legislation. Because municipalities have relied heavily on the taxation of utility property to fund basic services, states such as OH, MD and NJ have adopted local tax transition mechanisms — tax leveling — as part of the overall restructuring legislative package to ease abrupt changes in local revenue as taxation changes.

MAJOR RESTRUCTURING TAX IMPACTS

The electricity industry is composed of four major structural pieces: power plants (generators) that produce electrical energy, transmission services, which are high voltage lines that bring the electricity from power plants to load areas, distribution systems, which are the lower voltage lines and equipment that deliver electricity to end-use customers, and corporate headquarters where administrative, regulatory, and generally billing and accounting employees work.

The creation of open access for use of transmission services undertaken by action of the Federal Energy Regulatory Commission (FERC) has resulted in competition for generator services at the wholesale level in almost every state. Following the FERC action, twenty five states have enacted state laws that have extended competition for generation services to the retail level in some fashion (some much more than others). The state actions allow end-use customers to choose their own electrical energy providers in much the same way they choose to buy other consumer commodities and services. These dramatic changes have moved the generation of

⁷ Ohio Revised Code 5727.81, effective May 1, 2001.

electricity from a being a fully regulated monopoly enterprise where state and federal authorities set prices, to a competitive enterprise where electric energy prices are expected to be set by the market.

Added to this structure under a competitive regime will be new entities that buy and sell electricity but are not producers and do not sell to end-use customers. These “marketers” make deals, linking wholesale buyers to sellers, and they may or may not take title to the electricity they broker. There will also be a variety of new load serving entities (LSE) that buy from producers, brokers and power pools and then resell the electricity to end use customers. Where previously there used to be only one seller — the local utility monopoly for each service territory — with retail competition there will be many sellers in each territory.

The major threats to state tax revenues of electric industry from these major restructuring changes are:

1. Utility property values will change as properties’ book values are brought more closely in line with their market values (which could be a sharp increase or decrease). Thus property tax revenues may be very different.
2. Asset ownership will change hands, often more than once, and the owners of unregulated assets will likely merge with other entities more readily than regulated utilities, creating greater political distance between the taxing agency and the utility.
3. States may lose jurisdiction over some electricity producers and sellers as out-of-state entities begin to sell in state and in-state entities begin to sell to out-of-state customers.
4. Gross revenues and net incomes of the remaining regulated utility functions drop significantly as utilities cease selling generation directly to consumers. The electric generation providers may no longer be classified as “utilities” for tax purposes.
5. If the goal of restructuring is ultimately successful, competition will bring lower overall market prices, and revenue-based taxes will possibly fall.

It is easy to imagine how this might play out in some future situation. First, as a result of allowing non-utility power suppliers to serve customers, only about one-half of current utility revenue, related to distribution, is still subject to traditional utility revenue taxes. Second, generating facilities, particularly nuclear generating facilities, are revalued at much lower levels for property tax purposes or entirely abandoned if uneconomic. New power plants will be built in locations and jurisdictions that are tax-favorable, leading to a “race to the bottom” to attract investments that will further reduce tax revenues from these sources. Finally, lower overall costs

mean that even if tax system changes were to keep up with institutional changes, the level of tax revenues would drop.

Under such a scenario, competitive tax fairness among all generators and suppliers becomes an issue, as does preservation of local tax revenues to support municipal and educational infrastructures.

Natural Gas and Telecommunications Taxation Under Restructuring

The recent trend in electricity industry restructuring follows similar initiatives in natural gas and telecommunications. For the most part, states have dealt with the same tax issues in these industries as they now face in electricity. While we present the approaches taken in these industries, it is important to note that electricity is different, at least in its environmental aspects. Natural gas is a uniform commodity, consisting of methane. Telecommunications is not itself a good with associated environmental impacts (although the consumption of electricity by telecom firms certainly has environmental impacts.)

Washington may be a typical example of how states have addressed these changes. Prior to restructuring, Washington State imposed a state gross revenue tax on natural gas and telecommunication utilities of about 4%. In addition, cities were permitted to impose gross revenues taxes on these utilities of up to 6%.

When the first competitive telecom providers emerged, they were not “utilities” and therefore were not subject to the utility tax scheme. Instead, they were “retail” businesses, subject to the state and local sales taxes. The state sales tax of 6.5% provided a windfall to the state, but the local sales taxes of 1.5% or less resulted in a revenue loss to the cities.

The state acted in 1983. By extending the retail sales tax to all telecommunication services, including both utility and non-utility service, equity was achieved between types of providers. Cities retained their authority to impose gross revenue taxes, but that authority was extended to any telecom providers offering service within the city, not just regulated utilities. The result is that all telecom service are taxed at the same rate, which eliminates competitive issues.

In natural gas, a similar problem emerged when natural gas “transportation” emerged as a separate service. Large natural gas users began buying their gas from producers in Canada then paying pipeline companies and local distribution utilities to deliver the gas. Because the utility was only selling the use of the local pipe (and was neither reselling the gas nor the pipeline service), the portion subject to state and local taxes dropped sharply. In 1988, the City of Pullman, Washington (home of Washington State University, a large natural gas user) earmarked the four police officers whose positions were being eliminated due to the conversion of the University to gas transportation (loss of a 6% tax rate on a \$5 million annual gas bill). The state responded in 1989 by imposing a “use tax” on the use of any natural gas not subject to the public utility excise tax, and allowing the cities to do the same. Today there is no tax advantage to

choosing transportation service over sales service.

In each of these cases, the primary concern was maintaining tax adequacy (assuring that at least the same level of total taxes were collected), and to a lesser extent, tax equity (assuring that all providers of telecommunication and natural gas service paid the same level of taxes). No consideration of environmental issues was included in these tax changes. (Note that the imposition of the tax rates on a larger number of entities has caused administrative inefficiencies.)

Changing Asset Values of Power Plants and Other Equipment

The creation of competition for generation services has caused major shifts in utility revenues as the value of power plants has shifted from those determined by regulation to those set by the competitive market. The elimination of the monopoly relationship between a generating utility and its customers allows customers to shop around for the best electricity deal they can find. A generator's revenues are no longer assured. Power plants with high operating costs are less attractive in a competitive market and, in fact, some high-cost generators may not operate at all. A significant number of power plants, particularly nuclear power plants, have been permanently closed due to expectations that the plants would not be economically competitive. Conversely, low-cost generators become much more attractive and will likely have rising market values. These outcomes were not only expected by the restructuring they were the desired outcome — letting ordinary market forces improve the efficiency of the production and delivery of electricity.

Changes in Plant Ownership and Customer Base

As restructuring has proceeded, many utilities have decided to divest their generating resources or to merge with other companies to create more economic business units. As this activity has occurred, many power plants have been sold and even resold, with each sale creating a new measure of value for these plants.⁸ In situations where utilities have sold power plants, generally as part of restructuring, some power plants have sold at a discount of the actual investment of the selling utility (creating what are known as “stranded costs”), while others have sold for 2 - 3 times the actual investment. For the most part, plants with low operating costs (mostly coal and hydro) sell for a premium, while plants with high investment costs, such as nuclear plants, typically sell for a discount of book value.

⁸ The FERC Uniform System of Accounts does not permit purchasers of power plants to reflect the difference between depreciated book value and market value as a component of the value of a power plant which it acquires at a price above book value. These differences are recorded as “acquisition adjustments” and stated separately. However, property taxing authorities, generally constrained by law to measure “fair market value” do normally recognize changed values resulting from such transactions.

Further, the electrical energy generated from any one power plant may be sold to different end-use customers. End-use sales can shift from in-state to out-of-state customers and, likewise in-state customers may begin to buy electrical services from out-of-state power plants. In addition to these changes, new power plants are being built and operated by new, non-utility entities unaffiliated with the state's existing utilities. Thus, what was a business with few, well-known, highly regulated taxpayers will now have multiple entities — much like many other unregulated businesses.

As customers purchase from much more remote power plants, some up to several states away, states may not be certain whether they have sufficient jurisdiction (nexus) to impose certain types of taxes. Generators, those located both within and outside of state boundaries, will sell into regional power pools, or strike bilateral sale agreements with customers or, perhaps, with middlemen may, in turn, also buy out of the regional pool. Middlemen will repackage power acquired from several sources and resell it to end-use customers or to a local supplier, who in turn sells to end-use customers. In many instances, both the physical and transactional relationship between the generator and customer will be quite remote.

If a state or local jurisdiction attempts to preserve its level of tax revenue from the utility sector in the face of changing institutional structures, geographic origin of power and changing prices, it may create unintended consequences. For example, if either the value of generating facilities declines (for property tax purposes) or the level of utility revenues declines (due to either lower prices or a shift of generation to non-utility sellers), simply increasing the tax rate on the remaining utility revenues may compound the problem, further decreasing property values and/or further encouraging the choice of out-of-state power suppliers.

Need for Competitive Fairness Among Market Participants

Rather than having a single provider of electricity services, retail competition creates several competing suppliers, only one of which might be related to the existing utility. Fairness requires that all competitors be subject to the same taxation. If only the incumbent utility must collect a sales tax or pay a revenue or income tax (or all three), the other competing sellers will have an unfair cost advantage. This is precisely what occurred in states such as Illinois, Ohio and Washington and led to tax reforms.

This raises the question of whether states will have jurisdiction to impose taxes which generate the historical level of revenues they have collected from vertically integrated electric utilities. It is not at all clear that states have the same authority to collect from non-utility generators, brokers and resellers of electrical services sold within their states as they have from traditional vertically-integrated utilities.

A number of states have adopted registration requirements for entities that sell electricity to end users. The statute enacted in Maine (35-A MRSA, sec.3203) as a part of restructuring, for example, includes the following language:

2. *Requirements. A competitive electricity provider may not undertake the sale of electricity at retail in this State without first receiving a license from the commission. Before approving a license application, the commission must receive from the applicant:*
 - F. *Evidence that the applicant is registered with the State Tax Assessor as a seller of tangible personal property ...together with a statement that the applicant agrees to be responsible for the collection and remission of taxes...on all taxable sales of electricity made by the applicant to consumers located in this State.*

The legal principle controlling a state's ability to tax out-of-state companies is referred to as "nexus" or, in effect, showing a clear business operation within the state, not just the sale of goods from out of state into the state. The national office supply mail order firm, Quill, sells in every state of the union. In many states, they may be the single largest provider of office supplies. However, their offices and warehouses are in only a few states, and they vigorously contested the rights of other states to tax their operations as interference in interstate commerce, prohibited by the U.S. Constitution. The U.S. Supreme Court ruled that merely making sales in a state did not constitute a nexus for imposition of an obligation for Quill to collect a sales tax on behalf of the states in which it did not have offices or warehouses.⁹

If an out-of-state power supplier has no business operations within a state and merely arranges for power from a non-utility power supplier to be delivered to an electric utility at a point of delivery outside of the state where it is to be used, there may be a real question as to the ability of a state to impose and collect taxes from the power supplier.

Some states require retail electricity sellers to maintain a local agent. Whether these statutory requirements are sufficient to establish nexus to require collection of sales or income taxes will vary, depending in part upon state law. In states asserting taxing jurisdiction, the question of sufficient nexus to satisfy constitutional requirements may remain in doubt until it has been fully litigated.

To address the nexus problem created by *Bellas Hess* and *Quill*, states imposing sales taxes typically also impose "use" taxes, which apply the sales tax rate to the "use" of any tangible personal property purchased in a different state, but used within the taxing state. In general, large companies subject to audit requirements do remit use tax, but individuals who may shop for clothes or other articles by mail order or in adjacent states with lower or no sales tax typically do not. We will discuss how this principle may be applicable to the electric industry in the next section of this paper.

⁹ Quill Corp. v. North Dakota, 504 U.S. 298 (1992), citing as precedent National Bellas Hess, Inc. v. Department of Revenue of Illinois, 386 U.S. 753 (1967).

From the view of tax administration, the multiplicity of generating and selling entities will, at a minimum, increase the complexity of tax administration and collection responsibility as compared to the historical norm where a single integrated company was the sole taxable entity for an entire service territory. Since competition, by definition, involves more market participants than a monopoly does, the complexity of tax administration is virtually unavoidable.

Fewer Changes at the Distribution and Transmission Levels

The distribution and transmission of electricity will remain regulated and will operate most similarly to past practice, but there will be some changes there as well. Many of the companies in the distribution/transmission service business will no longer be selling generating services, and they will turn over control of their transmission facilities to Regional Transmission Organizations (RTOs). That is, they will not sell electricity; they will sell only delivery services, often referred to as “wire services.” The gross revenues of these companies could easily be reduced by half or more compared to the revenues collected when these companies were part of fully vertically integrated utilities.

Further, the wire systems themselves are likely to be bought and sold, perhaps sold and resold several times in the next few years as the industry consolidates.

The asset values of transmission lines, much like those of generating facilities, are also likely to change as the rules by which the regional power markets operate are established. Pricing protocols for transmission access in particular will have a great effect upon the asset value of the lines in a competitive market. Some lines will become more valuable as they produce more revenue based upon their use and congestion; others will be less valuable. These values will be reflected in sales prices when the lines change hands, but it is uncertain what values will be reflected either for property tax purposes under “fair market value” principles or for utility ratemaking under FERC transmission ratemaking principles.

Distribution system property values may not change as much as those of power plants and transmission. However, the sales of distribution systems to date have shown that surprisingly high prices may be paid which reflect the perceived value of the system to the purchaser who, perhaps, expects to reach economies of scale not enjoyed by the vertically integrated utility. The sale of distribution systems by investor-owned utilities to newly created municipal utilities has typically been completed at premiums of book value of 30% - 70%. A recent proposed transaction in Hawaii involving a premium of more than 100% above book value was rejected by the Hawaii Public Utilities Commission as an excessive price.

Customers

The greatest constant in the midst of all of these changes is likely to be the customer. Even though customers might choose to purchase from out-of-state generators or sellers, it is likely that, as compared to pre restructuring, customers will stay in the same physical location and will

probably use more or less the same amount of electricity. Tax revenue stability, therefore, can be enhanced by linking taxation to the end-use customer rather than to the location, property value, gross receipts or net income of the utility or the energy supplier /generator. This is the approach taken by most states so far in restructuring of natural gas taxes, and we see a similar pattern developing in electricity.

Many industry observers believe electricity prices are likely to decline over time as competitive markets bring increased efficiencies to the electric industry. States probably would be hesitant to impose taxes on a percent of revenue basis as is typical with sales and use taxes, unless there is a high comfort level that the growth in electricity use will be sufficient to make up for any loss of tax revenue due to declining prices.

ENVIRONMENTAL GOALS OF STATE ELECTRICITY TAXATION

Simplicity, predictability, tax revenue neutrality and competitive neutrality should not be the only goals of state electricity taxation. Electricity production has a very large, perhaps the largest, environmental impact of any sector of our economy. Tax policy should work to alleviate the environmental damage caused by electricity production and, at the very least, not make it worse.

Dollar for dollar few industries have a larger environmental footprint than the electric utility industry. Most other high-impact industries, such as aluminum smelting, irrigated agriculture and chemical manufacturing are all highly energy-intensive industries, and much of their environmental impact is actually the off-site impact of their energy use, not their on-site activities. While the electric utility industry accounts for only 2.5 percent of the nation's GNP, it is the source of 67 percent of the country's SO_x emissions, 28 percent of the NO_x emissions, 36 percent of carbon emissions and 33 percent of the mercury emissions. Electricity production is also the country's major stationary source of fine particulates, a pollutant which the USEPA reports is responsible for 60,000 deaths a year from respiratory failure.

Not only do these large environmental impacts distinguish electricity from all other utilities regulated by the states, but the cost of the health, property and ecosystem damage is not reflected in the price of electricity service. The damage is real, but the costs are external to the prices customers pay for electricity.

Most of these impacts are un-priced externalities. The electric generator does not "pay" for the use of the air for either combustion (CO₂) or for waste disposal (NO_x, SO_x, volatile organic compounds, and particulates), even though these are valuable inputs to their production. Essentially, electricity produced from fossil fuels, of which coal has the most serious environmental impacts, ought to be priced higher than electricity produced from cleaner fuel sources. The failure to include all relevant costs in the price of electricity has effectively shifted the cost of environmental damage caused by the burning of fossil fuels from those who are causing this cost to all of society.

In the past there may have been room for the argument that those who were causing the cost by buying electricity produced by fossil fuels — the captive monopoly customers — and those who were experiencing the environmental harm, were the same people — the customers living near or under utility smoke stacks. This relationship, if it ever existed, is certainly no longer true when customers can choose a supplier that may be located hundreds if not thousands of miles away, and that supplier may be using clean, renewable energy sources to generate power.

Air Pollution from Fossil Electric Generators ¹⁰
Pollutants Health & Environmental Harm
67% of US SO _x Acid Rain
Fine Particles — Death & Illnesses
Regional Haze & Pollution in Parks
28% of US NO _x Acid Rain
Fine Particles — Death & Illness
Regional Haze & Pollution in Parks
Smog - Asthma & Respiratory Disease, vegetation damage
Over fertilization of estuaries
36% of U.S. CO ₂ Climate Change
33% of U.S. MERCURY
Fish Contamination — 40 States with Fish Consumption Warnings
Poisoning of Wildlife

It is evident the public values electricity produced with lower environmental impacts. In states where product labeling is required and consumers are able to choose alternative power suppliers, those selling “green” electricity have been able to obtain higher prices for that superior product. Not all consumers apply the same premium value, however, and in particular, businesses in competitive sectors where the use of cleaner power may not translate into improved marketability

¹⁰ 1996 EPA. National Air Pollutant Emissions Trends (NO_x & SO_x)
1997 EPA Mercury Study Report to Congress (Mercury)
1994 EPA National Air Pollutant Emissions Trends (CO)

of their products may assign no premium value. Further, since air pollution impacts can be far away from the utility's service area, a decision in one locality may adversely impact another.

In the "fully regulated" era, a utility's choice of a generating resource or a purchased power resource was subject to regulatory review, including a review of environmental impacts. In a competitive market, the capital market will drive generation choices, tempered by local regulations such as siting and taxation policy.

For these reasons, internalization of pollution costs into the costs of specific resource choices is an essential element for improving the efficiency of competitive markets. Absent any reflection of differential social costs of different resources, the market will not have the cost information to make rational distinctions between resources.

Economic theory holds that efficient resource allocation can take place under competition if certain conditions are met. One of these conditions is that all consumers have "perfect information" about the market. A second is that goods are "perfect substitutes." A third is that all goods are sold at their respective marginal costs. Absent some means of labeling electricity resources, consumers cannot have the required perfect information and will not be able to recognize that a "solar kilowatt-hour" and a "coal kilowatt-hour" are not "perfect substitutes," even though the electrical characteristics are identical. Finally, without somehow internalizing the pollution costs of different resources, it cannot be asserted that they are being sold at their marginal cost. A combination of labeling requirements (so that consumers know what they are buying) and some means of incorporating pollution costs into the price of electricity from different fuel sources is necessary for markets to work efficiently.

The Polluter Should Pay

The environmental damage costs from electricity production are real. When they are not included in the price of the purchaser who causes them, they are shifted to others who in fact are subsidizing the original purchaser by paying for the environmental damage. Customers make purchase choices including purchases of electricity based upon what has value to them. Individual purchases contain their own price/value tradeoff decisions. The aggregate of all customers' tradeoff decisions reflect the amount of electricity customers are willing to buy at any given prices. If a portion of the costs of electricity are subsidized, purchases will tend to over-consume that resource and likewise if it is over-priced, they will consume less than the efficient amount of that resource. Economic theory holds that society as a whole is best off, and makes optimal use of its resources, when all goods (including environmental resources) are priced at their full (marginal) cost.

Carbon

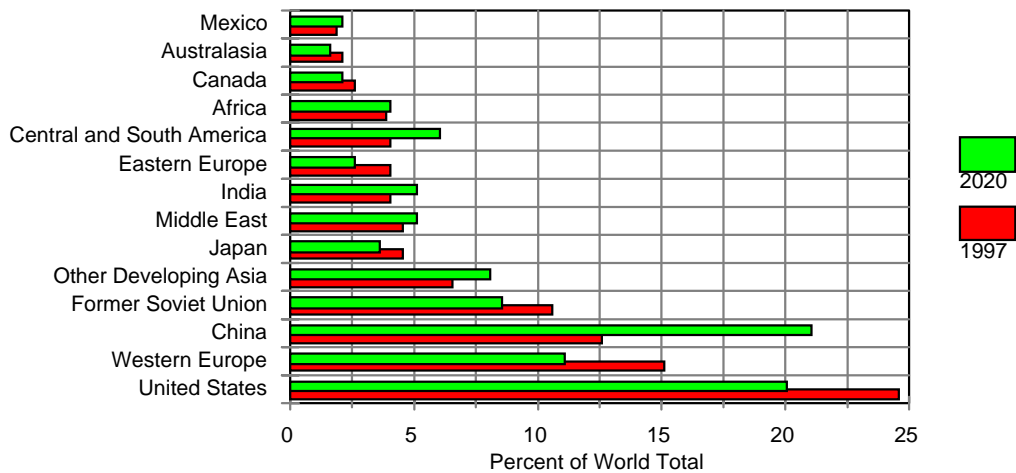
The most troublesome pollutant related to electricity production is probably carbon for the reason that it is not a regulated pollutant in the United States even though the atmospheric loading of

carbon from human use of fossil fuels is of world-wide concern. Other pollutants, such as sulfur dioxide, particulates, oxides of nitrogen, and water pollution are all regulated by various state and federal laws. These are particularly strict and fairly uniform for new generating resources, but not necessarily applied consistently to existing resources.

Climate change impacts from the greenhouse effect pose a significant threat to property, human health and security around the world. For this reason many developed countries have adopted public policies, such as carbon taxes, that more accurately price the full cost of fossil fuel use.

Accurately pricing fossil fuel through carbon taxation encourages the efficient level of carbon emission and encourages shifts from fossil fuels to less damaging resources. With accurate pricing, the energy resources of the future will use sparingly the scarce carbon-based fossil fuels such as coal, petroleum and natural gas in advanced technologies such a fuel cells and rely more heavily upon renewable resources such as wind and solar.

Regional Shares of World Carbon Emissions 1997 and 2020



Source: Environmental Issues and World Energy Use, DOE/EIA-0484

Because electric restructuring rewrites the ground rules for the electric industry in a profound and unprecedented way, state policy makers have reason to take a broad a view when considering possible alternative policy approaches. The very fact that the electric industry has such a large footprint should prompt policymakers to consider carefully environmental impacts when creating new structures, including the necessary tax structures. As a first principle and at a minimum, policy makers ought to make sure their restructuring decisions do not result in harm to the environment. Because the adverse environmental impacts of electric generation fall on the public

generally, and not exclusively on the consumer of the electricity, an additional goal of state taxation could be to mitigate the large environmental impacts of electricity production.

PRODUCTION-BASED TAXES

There are a variety of ways taxes can be structured to meet the goals of state taxation, including the mitigation of environmental harm . This paper looks at two types of pollution taxes for the electric industry: taxing the production of pollution by electricity generators and taxing the consumption of electricity by the end users.

Production Taxes on Supplier

The most effective tax from an environmental point of view is probably a tax on the production of pollution. Economists have recommended pollution, BTU or Carbon taxes on all fossil fuels as the right way to achieve efficient use. Many nations have implemented such taxes.

Production taxes places the tax at the point of pollution — fuel combustion in the generator. When considering a production tax, it is important to focus on taxing the output of pollution from the power plant. Pollution control devices may already capture (and therefore internalize) emissions of non-carbon pollutants, and so it may not be necessary to tax the input of these pollutants, and most states have regulatory programs which already measure the emission of non-carbon pollutants. Carbon emissions, however, can be measured directly by the input of fuel. Essentially all of the carbon value of the fuel is emitted as carbon dioxide, carbon monoxide or as unburned particulate carbon. The first is the principal greenhouse gas, the second is poisonous and the third is carcinogenic.

A tax on producers based upon actual power plant emission outputs, priced as an accurate surrogate for the unpriced externalities, would be the most economically efficient, least distorting tax. However, there are several problems with taxing production.

The states where energy consumption takes place may not have jurisdiction over producers, especially producers located out of state but whose power output is sold within the state. This is the “nexus” issue discussed earlier. Jurisdiction over load serving entities is stronger as the entities not only will be easily ascertainable, but will likely have some presence within the state as they somehow collect data on consumption from customer meters. Distribution utilities, which deliver the power, have a very close relationship with the customers. The strongest “nexus” will be that between the state where the customer resides and the customer.

Taxing the air emission outputs of power plants automatically takes into account differences in power plant technologies and their relative fuel burning efficiencies (heat rates). Clean coal burned in an inefficient power plant can create more carbon emissions than dirtier coal burned in a highly-efficient plant. While the non-carbon emissions may be regulated, the carbon emissions currently are not. It is the output of the power plant that is the measure of the social cost of the

environmental harm.

This tendency to avoid the cost of regulated pollutants and ignore unregulated pollutants became extremely evident in Southern California during the west coast electricity crisis of 2000 - 2001. The South Coast Air Quality Management District has a regulatory scheme for nitrogen oxides. This program, initiated a decade ago, grants credits to “existing” polluters that permit them to emit a defined level of nitrogen oxides. To exceed this level, polluters were required to buy additional credits in the market from other polluters who had either cleaned up their processes or reduced their operations. During the period May, 2000 through February, 2001, the cost of pollution credits exceeded the cost of fuel for many of the older, more polluting power plants. To avoid the NOx credit expense, utilities routinely operated power plants that had lower fuel efficiency when these units had lower NOx emissions.

As already described, in the competitive electricity market, the electricity from a given power plant may be sold to different customers than those who purchased it under regulation, and those customers may no longer reside in the same state as the power plant or anywhere near the plant. Also, as described, the sellers of the power may not be the owners of the power plant. New commercial entities have come into being in the competitive market such as aggregators and marketers who purchase power from a variety of sources and then resell it to customers. Market brokers bring buyers and sellers together but never take title of the generated power. The remoteness of the power plant or producer from the end-using customer can pose difficulties for any tax placed upon the producer like income, franchise or gross receipts taxes as there may not be sufficient nexus for a state to tax the owners of the power plant. Further, a state tax on production could cause the migration of generation to states with no production tax but which are within economic transmission distance.

Assuming for the moment that there is sufficient nexus to tax, how can the producer be identified if it is out of state and how can a state know what emissions a remote power plant is producing? As it happens, states and federal agencies have other reasons for tracking the fuel source and emissions of remote power plants. The U.S. Energy Information Administration requires utility owners of power plants (but not non-utility owners) to report their monthly fuel usage by plant. Many states require the pollution output be tracked for customer labeling and disclosure purposes or to determine whether or not a plant qualifies as a renewable resource for purposes of meeting a state’s renewable portfolio standard. Some states, such as Massachusetts and Connecticut, also have Environmental Performance Standards requirements which limit the amount of emissions from any plant whose power is sold in those states. Tracking mechanisms have been developed to accommodate these other requirements.

Summary of Production Taxes

1. Production taxes are best if levied on all fuels. If this is not done, the tax could make inter-fuel competition less efficient by biasing consumers in favor of the under-taxed resource.

2. Revenues to the state may decrease as pollution decreases, adversely impacting the stability goal of utility taxation.
3. Taxes imposed only on power producers within a state will have the effect of causing out-of-state producers to have a competitive advantage, which may contravene state economic policy.
4. The ability for states to tax out-of-state power producers is limited by the nexus principle. This may be the most compelling argument against such an approach.
5. A tax on producers will improve economic and environmental efficiency if priced right. An incremental improvement will occur even if an optimal shift is not achieved.
6. The transaction can be tracked because the data on emissions by power plant is available. It is made more difficult if the power passes through multiple brokers and/or marketers before it is sold.

CONSUMPTION TAXES

The type of taxation that is likely to work best given these changes is a per kWh tax on consumption. The problem of jurisdiction — or nexus — disappears with a consumption tax since the customer's location is within the taxing state, and the consumption clearly occurs within the state, regardless of the locus of the seller of the energy. Further, tax collection is not likely to be a problem since taxes can be collected on the bills of distribution companies that will clearly have a sufficient physical presence in the states (poles and wires) for nexus to exist.

Consumption levels are easily determined as they continue to be metered by the local distribution utility, and all customers are likely to remain hooked up to the local monopoly provider of distribution service, at least for the immediate future.

In this case, it no longer matters whether the customer chooses to buy electricity from an in-state or out-of-state generator or whether the generator is integrated into a regulated utility or is an independent producer. This levels the playing field among all sellers of electric energy services, as all end use is subject to the same tax, regardless of origin. Finally, levying a fixed per kWh basis rather than a percent of sales tax will create a more secure revenue stream because it is indifferent to changes in the price of electricity. For this reason, consumption taxes have been the electric utility tax reform solution — or a piece of the solution — adopted in most states where restructured taxes are part of overall electric utility industry restructuring.

This is the same approach adopted by states dealing with natural gas market restructuring, and essentially similar to tax changes imposed on telecommunications providers in the 1980's. It meets the tests of adequacy of revenues, simplicity of application and collection, and

predictability of revenues.

The most important shortcoming of this approach is that per kWh consumption taxes are imposed at the distribution level and therefore are blind to the source and identity of generation. A means to differentiate between usage of environmentally-preferred resources and other resources is needed to have this approach address environmental goals, goals electric restructuring removes from the regulatory process.

One means to achieve this would be to tax all electricity consumption at a common rate but offer differential tax credits or rebates to end-use consumers who can demonstrate that they have obtained an environmentally-preferred resource. Evidence has been collected suggesting that consumers actually prefer tax credits for choosing “green” power over tax penalties for choosing “brown” power.¹¹ By roughly a two to one margin, consumers surveyed indicated that a tax credit would more likely motivate them to choose a green resource than would a tax penalty.

To institute such a system, consumers expecting or requesting rebates would need to demonstrate compliance with the terms of the rebate, and a rebate mechanism would need to be established. The first would become the responsibility of the marketers or other load serving entities delivering the environmentally-preferred power. As a part of their marketing of a premium-priced product, they could offer to provide the documentation or even provide full rebate process compliance. On a post-rebate basis, it might not be a premium-priced product, and the marketing could make that clear, just as retail advertising routinely features the “post-rebate” price of everything from computers to hair spray. If coupled with an environmental disclosure requirement as a condition of marketer registration, the marketing effort could be easily monitored by the state regulatory commission or other appropriate body to ensure no deceptive techniques were used.

Establishing a rebate mechanism is relatively straightforward. Rebate programs already exist for retail purchases as small as \$1.00. States could either contract with existing rebate processing firms or develop their own rebate staff.

One reason manufacturers offer rebates is because they know that not all customers who expect to get a rebate will actually submit the documentation to obtain the rebate. This means the actual loss in tax revenue will be less than the amount justified by the level of green power marketing. This will be a benefit to the states. Another reason for using rebates as a marketing tool is the rebate form itself provides valuable marketing information. This may also be beneficial to state environmental agencies in determining the impact of the tax/rebate form.

Experience With Environmental Taxes In Other Countries

¹¹ Lockhart, J. A. and Wilhelm, W. B., Tax Policy to Promote Green Consumption Choices in the Electric Utility Industry: A Discrete Choice Modeling Approach, August, 2000

Environmental taxes have been used extensively in Europe to shape consumption of the product of polluting industries. Various taxes in these countries apply to carbon dioxide, carbon monoxide, sulfur dioxide, nitrogen oxides, Biological Oxygen Demand, and other emissions and discharges from utilities and other industries. Some of these taxes have been in effect for a long enough period of time to allow evaluation of the impact they have had on usage.¹²

CO2 taxes have been implemented in Denmark, Finland, Sweden, The Netherlands and Norway have revenue-neutral taxes, offsetting income taxes or other general taxes. Norway has estimated that CO2 emissions have dropped by 3% - 4% in response to a tax which increased the cost of heating oil by 15% and petrol by 10%. Nearly all of Norway's electricity is hydroelectric.

British Columbia, Canada has been engaged in an active Tax Shift pilot program since 1999, spearheaded by Dr. Mark Jaccard, former Chairman of the B.C. Public Utilities Commission. This study recommended that environmental taxes replace Income and Capital Gains taxes, the Provincial Sales Tax, and Payroll taxes.¹³ The initial impact of the B.C. effort has been the closure of a wigwam burner at a large saw mill in the B.C. Interior, replaced by a wood-fired electric generating plant with state of the art emission controls. While carbon emissions remain about the same, at least the carbon is doing some useful work, displacing some other fossil-fired electric generating resource.

Taxing consumption has already been identified as the most stable way to impose electricity taxes capable of achieving the dual objectives of revenue stability and competitiveness. How can this tax be best designed to achieve these two goals along with environmental improvement?

Electricity taxes can be structured to encourage clean choices by taxing dirty sources at higher rates than cleaner sources and exempting the cleanest sources altogether. Iowa took this approach during restructuring when they exempted wind energy and methane production from electricity taxation. Reducing the cost of clean sources compared to electricity produced from other fuel sources not only encourages producers and customers to choose cleaner electricity resources, but in doing, so it encourages the development of Iowa's rich, indigenous wind resources. Washington has done the same in exempting the construction of renewable energy facilities from the state's sales tax.

A slightly more complex approach might be to create a multi-tiered taxation on electricity production. Here a full tax would be levied on electricity originating from the dirtiest fuel resources, a lesser amount on relatively cleaner sources, such as natural gas, and then a very low

¹² European Environmental Agency, Environmental Taxes: Implementation and Environmental Effectiveness, 1996

¹³ Taylor, Jaccard, and Olewiler, Environmental Tax Shift: A Discussion Paper for British Columbians, 1999.

tax or full tax exemption on renewable resources the state would like to encourage.

As discussed above, a logical way to achieve this would be to impose a uniform kWh tax on all electricity consumption, based on “dirty” resource impacts and then allow consumers to apply for rebates when they choose more environmentally-sensitive power supplies. Consistent with the principles used in developing “green power” marketing programs, large hydro projects would not be exempt from the tax, as the land use and fishery impacts are typically severe.

Issues With Consumption Taxes

Consumption taxes are a second-best strategy compared with production taxes. A tax on producers would be simple, direct and require a very small administrative burden because there are only a few hundred power plants in any given region.

Second, production taxes would directly affect the decision to invest in renewable or other clean resources, while consumption taxes require that consumers make explicit choices. Experience with residential consumers in states which have opened retail competition to the residential class shows that most small consumers do not dedicate the time needed to make informed choices. Absent the “informed consumer” pre-requisite for efficient resource allocation under competition, there is a less likelihood that desired change will occur than if producers were taxed.

A consumer tax is clearly more administratively complex, as individual consumers will be eligible for different tax rates and rebates.

The benefits of consumer taxes are fairly straightforward. First, the state has the legal authority to tax consumption, while it may not have the nexus to tax producers. Second, the tax on consumers, collected by distribution utilities looks most like the current system, which in most states is a revenue and/or sales tax on the distribution utility. Since customers are likely to remain relatively stable, while producers may be a dynamic group, this approach meets the goals of predictability of revenues. A consumer tax can be designed to mitigate regressiveness in a way that a producer tax cannot be. Finally, and most important to this discussion, a consumer tax can affect consumer choices of generating resources and move the market towards a more economically efficient generation mix.

Retail Sellers of Electricity as Tax Collectors

Because of the registration and licensing requirements for retail sellers that most states are enacting as part of their restructuring legislation, it is likely that state officials will be able to identify the sellers of electricity much more easily than they will be able to identify the power generators. The jurisdiction to tax may also be easier to establish, although it isn't a slam dunk. A retail customer may place a standing order for power with a broker using the internet, where neither the broker nor the power plant has any presence or connection with the taxing state. Some

states have attempted to address the problem of remote sellers by requiring any company intending to sell electricity within the state to register with the appropriate state agency and agree to make itself subject to state taxation. The previously described Maine statute is an example of this approach. Whether such local registration approaches will be sufficient to create nexus has not yet been determined by court review. It is viewed by other states, such as Washington, as a potentially risky strategy.

In many states, the utility or its affiliate may continue to be the primary retail seller for most customers for some time to come, particularly for the residential and small commercial classes. Where the sale is made by the distribution company, or billed through the distribution company, the taxable relationship will be present. In these cases, the administrative process and burden is already in place, with the distribution utility acting as the tax collector.

EXAMPLE: UTILITY TAX TO REPLACE GENERIC REVENUE TAX

This example tax is for a hypothetical region where a combination of utility revenue and property taxes averaging \$.01/kWh are collected on electricity. The goal is to restructure the tax system to produce the same level of revenue but to impose the tax on the carbon emissions of the electric generation, rather than on the investment in power plants and the sale of electricity.

For discussion purposes, we assume that the region's current fuel mix consists of 50% coal, 30% natural gas, 10% nuclear, and 10% renewable resources. Since coal generation emits twice as much carbon dioxide per unit of electric as natural gas fueled power plants, and nuclear¹⁴ and renewable resources are essentially non-carboniferous, this produces a relatively simple algebra problem:

$$\begin{aligned} & 50\% \text{ (coal) } \times \text{ generic tax} \\ + & 30\% \text{ (gas) } \times (\text{generic tax} / 2) \\ + & 10\% \text{ (nuclear) } \times (\text{no tax}) \\ + & 10\% \text{ (renewable) } \times (\text{no tax}) \\ = & \$.01/\text{kWh (current average revenue)} \end{aligned}$$

Solving for the generic tax, we find that a tax of \$.0155 on coal, \$.077 on natural gas, and no tax on nuclear or renewable electricity would produce the same level of revenue. Therefore, the tax would be imposed on all users of electricity at a rate of \$.0155/kWh. A tax credit of \$.0078/kWh would be allowed for customers choosing a natural gas resource and a tax credit of \$.0155/kWh would be allowed for customers choosing nuclear or renewable energy.

Uniform Tax Per kWh:	1.55 cents/kWh
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¹⁴ Because this example is directed at carbon dioxide emissions, no examination of other forms of subsidy to other power sources, such as nuclear, are discussed. This does not necessarily mean they should not be examined if a new tax structure is devised.

Tax Credit, Natural Gas:	(.78) cents/kWh
Tax Credit, Nuclear / Renewables:	(1.55) cents/kWh
Tax Credit, Mixed Portfolio:	(.55) cents/kWh ¹⁵

TECHNICAL ISSUES REGARDING IMPACTS OF A TAX MODIFICATION

Consumption Changes

Will per kWh consumption taxes imposed at distribution level affect electricity use? The answer, quite clearly, is yes. Current taxes imposed on vertically integrated utilities add 10% or more to the cost of electricity. Given various studies of the elasticity of demand for electricity, a 10% increase in price would be expected to produce a 1% - 7% decrease in usage.¹⁶ However, since the purpose of this reform of taxation is to produce the current level of tax revenue from the current level of electricity usage, the elasticity imposed by the current tax system is already embedded in consumer consumption patterns.

Regulatory Treatment of Taxes

Taxation expense under ordinary rate of return regulation included taxes as an integral part of per kWh rates, apportioning the expense by customer use. This apportionment is in fact very similar to the concept of imposing taxes on a consumption per kWh basis as recommended here. For that reason, the overall effect of moving to a kWh consumption tax is less one of imposing new costs on customers than it is of moving these costs from a place where they are bundled within rates to a place where they are explicitly added to rates. The tax/rebate format offered here would not interfere with this ratemaking formula, as the distribution utility would actually be collecting and remitting the tax. The effect of the rebates would be a direct transaction between the customer and the state.

In the world of electricity regulation prior to restructuring, taxes generally were passed through to the customers in the ordinary rate making process. This was true whether the tax was levied on the utility or customer sales. Tax expense was a cost of doing business that became part of the utility's overall revenue requirement used to calculate customer rates. Under ordinary utility rate making practice, taxation expense was allocated to customers using the same methods of allocation applied to apportion the cost of plant, wires, fuels, administration and other expenses.

¹⁵ A customer choosing a mixed portfolio of 50% coal, 30% natural gas, and 20% non-carbon resources would effectively pay 50% of the tax on coal, plus 30% of the tax on natural gas resources, or \$.01/kWh, exactly as is collected in existing rates. However, unlike the current situation, the customer could realize an additional tax credit of up to \$.01/kWh by choosing a non-carbon resource.

¹⁶ Estimates of the elasticity of demand for electricity vary widely between studies, sectors and short-run and long-run analysis.

Generally, costs were allocated to each class of customers (residential, commercial and industrial) based upon proportional use of the electric system (measured by energy use and peak demand). The cost ultimately became part of the per kWh (or demand) rate charged to customers.

Presentation of Taxes on Bills

As utility regulation was practiced in most jurisdictions, taxes were not listed as a stand alone category on customer bills.¹⁷

Under the taxation approach recommended here, a flat per kWh tax would be explicitly added to customer bills so that the customer would be aware of the relationship between taxation and electricity consumption. This approach will tend to shift the tax burden towards customers with lower than average rates compared to a revenue-based tax. These include large, steady industrial customers, and in many states, small-use residential consumers who benefit from lifeline, baseline or inverted rates. Since the purpose is to collect revenues based on the pollution emitted during the production of electricity, absent any demonstration that the customer has used a low-pollution resource, all kilowatt-hours must be deemed equal, and a kilowatt-hour tax is fair. The rebate mechanism provides a means for those customers with lower pollution per kWh to pay lower taxes; the current method imposes lower taxes on any customer paying a lower rate, regardless of the reason.

Distributive Effects of Consumption Taxes

Because electricity is a necessity, careful thought must be given to the distributive effects of a per kWh tax. Electricity has what is known as low income-elasticity of demand. While electricity usage rises with income, it is not at all proportional. Electricity constitutes a larger share of low-income household income than it does in other households. Because of this, any tax based upon sales or usage places a proportionally higher burden on lower-income users.

The most direct way to address the very concerns over the distributive effects of a usage based tax is to exempt a certain level of usage from taxation for all customers. For example, exempting the first 200 - 400 kWh per month may be in the right range as it is a sufficient amount of usage to support basic lighting and cooking, although, probably not heating or cooling which are also necessities in some climates. States that have adopted lifeline or baseline rate principles, such as California, have applied significantly lower rates to these levels of use.

¹⁷ Several states do have separately stated taxes. In California, the Energy Users Tax is separately stated, while in Washington, utilities successfully lobbied for a requirement that all state and local taxes be separately listed on bills, so that they could “point their finger” at the cause of that portion of utility rates. See RCW 82.16.090

It is important to recognize that a lower rate for the essential level of consumption is not a very effective income support mechanism for the poor. Many low-income households have many members, and their electricity usage may be larger than average. The initial exemption should be established in order to put higher taxes on the elastic portion of all customer demand and not to help the poor. This will have the effect of encouraging all users to constrain their usage of polluting electricity; other programs are needed to meet the goal of protecting low-income citizens.

Appliance	Use/Day	kWh/Month
TV (color)	6 hrs	27
TV (b&w)	6 hrs	12
Ceiling Fan	12 hrs.	54
Home Computer	2 hrs	4
Microwave Oven	15 min.	23
Range & Oven	15 min.	23
Toaster	8 min	2
Dishwasher	1 hr.	30
Clothes Washer	40 min	10
Refrigerator (manual defrost 14-16 cu.ft.)	24 hrs	76
Refrigerator (frost-free 14-16 cu.ft.)	24 hrs.	123
Refrigerator (frost-free 18-22 cu.ft.)	24 hrs	200
Freezer (manual defrost)	24 hrs.	67
Freezer (frost-free)	24 hrs.	150
Water Heater	24 hrs.	322
Lights	8 hrs.	100
Room A/C*	24 hrs	209
Central A/C*	24 hrs.	627
Heat Pump (cooling)*	24 hrs.	537
Heat Pump (heating)*	24 hrs.	405
Central Heat**	24 hrs.	964
VCR	2 hrs.	2
Vacuum Cleaner	1 hr.	22

* 8 mos. avg. ** 4 mos. avg.

Note: the above figures are estimates and the amount of electricity you use will depend on the efficiency of your electric appliances.

Source: Entergy Corporation

Electricity Facts															
<p>Generation Price</p> <p>Average price (cents per kWh) for varying levels of use Prices do not include regulated charges for delivery service</p>	<table border="1"> <thead> <tr> <th>Average Monthly Use</th> <th>250 kWh</th> <th>500 kWh</th> <th>1000 kWh</th> <th>2000 kWh</th> </tr> </thead> <tbody> <tr> <td>Average Generation Price</td> <td>5¢</td> <td>4.5¢</td> <td>4¢</td> <td>3.5¢</td> </tr> </tbody> </table> <p>Your average price will vary according to when and how much electricity you use. See your most recent bill for your average monthly use and Terms of Service or your bill for the actual prices</p>	Average Monthly Use	250 kWh	500 kWh	1000 kWh	2000 kWh	Average Generation Price	5¢	4.5¢	4¢	3.5¢				
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<p>Contract</p> <p>See your contract or Terms of Service for more information</p>	<p>■ Minimum Length: 2 Years</p> <p>■ Price Changes: Fixed over contract period</p>														
<p>Supply Mix</p> <p>We used these sources of electricity to supply this product from 6/96 to 5/97</p>	<table border="1"> <tbody> <tr> <td>Coal</td> <td>40%</td> </tr> <tr> <td>Natural Gas</td> <td>20%</td> </tr> <tr> <td>Nuclear</td> <td>15%</td> </tr> <tr> <td>Hydro</td> <td>10%</td> </tr> <tr> <td>Solar, Wind, Biomass</td> <td>10%</td> </tr> <tr> <td>Waste Incineration</td> <td>5%</td> </tr> <tr> <td>Total</td> <td>100%</td> </tr> </tbody> </table>	Coal	40%	Natural Gas	20%	Nuclear	15%	Hydro	10%	Solar, Wind, Biomass	10%	Waste Incineration	5%	Total	100%
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<p>Air Emissions</p> <p>Nitrogen oxides (NOx), sulfur dioxide (SO₂), and carbon dioxide (CO₂) emissions relative to regional average</p>	<table border="1"> <caption>Air Emissions Relative to Regional Average</caption> <thead> <tr> <th>Pollutant</th> <th>Relative Emissions (approximate)</th> </tr> </thead> <tbody> <tr> <td>Nitrogen Oxides</td> <td>0.75</td> </tr> <tr> <td>Carbon Dioxide</td> <td>1.25</td> </tr> <tr> <td>Sulfur Dioxide</td> <td>0.25</td> </tr> </tbody> </table> <p style="text-align: center;">Regional Average</p>	Pollutant	Relative Emissions (approximate)	Nitrogen Oxides	0.75	Carbon Dioxide	1.25	Sulfur Dioxide	0.25						
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To further avoid distributive effects of a tax on electricity use, a portion of the tax revenues could be dedicated to subsidizing the electricity bills of low-income users. The subsidy should include the delivery of energy efficiency as well as simply cash credits. Energy efficiency is a better public investment than cash credits as a single efficiency investment will endure to keep electricity bills lower for several years.

The consumption tax could be charged as a single, flat per kWh charge or, it could be designed to increase with greater usage levels. Typically electric rates are shaped to reflect the perceived economies of scale and relative load shape of different customer usage, using either embedded or marginal costs as a basis.

Labeling and Disclosure

In order for this type of program to work effectively, consumers would have to be able to obtain consistent information on the environmental impact of their power supply choices. Many states have already adopted uniform reporting requirements for power marketers, with easily understood labels. These approaches should be required as part of a change in the tax structure. An example of a disclosure label is shown below:

The combination of a uniform tax on electricity consumption, a uniform disclosure program on the fuel mix and pollution output of different power marketing options, and tax credits for the choice of clean energy resources would allow customers to see the real societal costs of their power choices, directly receive the benefit of choosing cleaner power, and allow marketers the ability to differentiate their product by describing its eligibility for tax rebates. As a practical matter, it would be best if the tax credits were reflected directly on the consumer's power bill, rather than in a separate transaction.

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