REDEFINING PROGRESS

GARY H. WOLFF

WHEN WILL BUSINESS WANT ENVIRONMENTAL TAXES?

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REDEFINING PROGRESS
ONE KEARNY STREET, FOURTH FLOOR
SAN FRANCISCO, CA 94108

1.800.896.2100

TEL 415.781.1191
FAX 415.781.1198
E-MAIL info@rprogress.org
WEBSITE www.rprogress.org

GARY WOLFF, P.E., PH.D.

Gary Wolff is the director of the Incentives Program at Redefining Progress. He is a licensed civil engineer in the state of California and an environmental and resource economist. He holds a master's degree in civil engineering from Stanford University and master's and doctoral degrees in environmental and resource economics from the University of California, Berkeley. His bachelor of science degree is in renewable energy technology. His fields of expertise include energy technology, water and wastewater, and solid waste management. Dr. Wolff has worked for an environmental regulatory agency (the State of California Regional Water Quality Control Board, San Francisco Bay Region), a public provider of wastewater services (the Central Contra Costa Sanitary District), and as a consulting engineer and economist. He founded 3E Engineering, an environmental engineering consulting firm, in 1986 and sold it in 1994. His clients have included numerous governmental entities, including special purpose utility districts and entities such as the World Bank, and private corporations and nonprofit organizations.

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I. INTRODUCTION

Economists have known for over 75 years, and the general public for over 25 years, that overuse of resources, too much pollution and waste, and many other social problems in the United States are caused in part from a single, underlying, abstract issue: the mismatch between market prices and social costs. Until market prices more closely reflect social costs,[1] businesses and individuals will continue to do what makes sense for them individually, though it makes little sense for others or for society in general. This problem is readily solved *on paper* by environmental taxes or tradable permit systems.

But taxes and tradable permits are unpopular in the real world because they may raise prices of products and services or lower wages and profits (after all, including previously excluded costs is what correcting externalities is about). Most businesses recognize this, and are deeply concerned about competitiveness—not just internationally, but also domestically between product types (for example, a plastic resin tax would benefit glass and aluminum beverage container manufacturers), or between large and small firms (users below some size are often exempt from regulation or permit fees due to difficulties in measuring or processing data from smaller firms—and if they are not exempt they may be at a competitive disadvantage to larger firms that can manage the paperwork and other responses more efficiently [2]). This helps to explain the lukewarm support for environmental taxes[3] and environmental tax reform by businesses, despite much rhetoric about the superiority of market mechanisms for environmental regulation.

1. A little-recognized reason that environmental taxes and tax reform have not been legislatively adopted is that social costs—in the real world—depend on social attitudes that are not objective. Suppose environmental pollution makes an individual sick. Society might view the cost as the value of lost work time plus medical expenses, but the choice among the variety of ways of calculating these costs is subjective. Or society might view the cost as these costs plus mental anguish and psychological pain, in which case subjective issues clearly arise.

2. For example, the larger landfill-owning firms in the United States actively supported new regulations for landfills in the 1980s and early 1990s because this helped to consolidate their dominant position in the industry.

3. Tradable permits are much more popular in some business circles—if they are given away—because they can create windfall profits for some or all permit recipients.

This concern persists despite a number of economic analyses that fail to substantiate a competitiveness problem from environmental regulations (Repetto 1995). The issue is, in some sense, driven by the culture of business. Concern about price competiveness is amplified by economic models that suggest lower-priced products dominate, period. But in the real business world price is only one of many ways that businesses compete. Nonetheless, we use a price-oriented definition of competitiveness in this paper because it provides an interesting reality check about the win-win rhetoric that so often dominates environmentalist discussions of business participation in environmental policymaking.

The question we ask and answer in this paper is: "When might a group of businesses desire—even lobby legislators for—an environmental tax or environmental tax reform?" The answer we provide is based on simple economic analysis and extensive discussion with interested parties—including presentations and discussions at the April 1999 Coalition for Environmentally Responsible Economies (CERES) conference in New York City; the April 1999 Industrial Ecology conference in Santa Cruz, California; and the June 1999 Business Environmental Leadership and Learning (BELL) conference in Ann Arbor, Michigan. Representatives of Nike, Coca-Cola, Monsanto, a wood products company in Northern California, several electric utilities, and others provided feedback on the presentations from their unique business perspective and experience. These comments have been interwoven with the analysis and discussion that follow.

Please note that we do *not* discuss the possibility that some group of businesses might lobby for a tax reform because they benefit from some specific reduction in taxes. Clearly this will be the case sometimes; but it is likely to occur only when more revenue is returned to one sector of the economy than came from that sector—a condition that cannot be met for all simultaneously unless consumers subsidize the business sector (e.g., corporate welfare or windfall profits), an outcome that is inefficient and undesirable for many reasons.

Our starting point was the Swedish nitrogen oxide tax on power plants over 10 megawatts (MW) in size. Nearly all revenue from this tax is returned to the participating power plants in proportion to the number of kilowatt-hours of electricity they produce. This tax and rebate system—also called a feebate (Von Weizsacker et al. 1997) and a refundable emissions payment system (Sterner and Hoglund 1998)—was designed to blunt the competitiveness impact of the nitrogen oxide charges on Swedish industry. Here we refer to it as a *sectoral environmental tax reform* (ETR).

The Swedish system seems to work admirably. This is useful information because many European ETRs involving energy have exempted or applied reduced rates for some economic sectors because of issues around competitiveness (e.g., Denmark and Sweden; OECD 1996). The Swedish example suggests that a tax and rebate "bubble" over the exempted industries—rather than an exemption—can offset the competitiveness concerns and create incentives to reduce energy use within these industries. This means that competiveness concerns can be addressed by careful design of particular ETRs. There may not be much reason for businesses to lobby for ETRs, but equally important, there may be no reason for businesses to be opposed.

Furthermore, we found that groups of businesses will be in favor of sectoral ETRs in theory if either of two conditions is met: (1) positive externalities at the industry level are funded by the rebate, or (2) some type of regulatory action is inevitable and an ETR with revenues kept within the industry is the lesser of the evils facing the industry. Although these conditions are not terribly difficult to meet in theory, practical considerations suggest they are unlikely to be met very often in practice. Hence the answer to our question—"When will business lobby for sectoral ETRs?"—seems to be, in practice, "Rarely."

This conclusion is preliminary, however. And even if true in general, real-world exceptions may be found as the effort to craft ETRs at the state and local level in the United States expands. This paper explores the theoretical and practical conditions under which businesses might lobby for a particular ETR. Environmentalists and business people should understand them because any opportunity for win-win environmental-business policy should not be neglected.

II. THE SWEDISH NITROGEN OXIDE EXPERIENCE

> Since January 1, 1992, an environmental charge has been levied on nitrogen oxides (NO_X) emissions from large combustion plants for energy production in Sweden. The charge is not a tax. The income from the charge is refunded to the liable plants in proportion to their energy production. The charge has been implemented successfully, and liable plants, the government authorities and environmental organizations are pleased with the system. It is regarded as effective, fair, and efficient. The emissions from combustion plants have been reduced significantly without distorting the competitiveness of the industry: 1992 emission levels dropped by 34 percent since 1990. (Olivecrona 1995)

The Swedish system involves a charge of approximately $4.80 (1992 dollars) per kilogram of NO_X emitted. There were 180 power plants greater than 10 megawatts (MW) and producing more than 50 gigawatt-hours (GwH) in the mandatory program in 1992.[4] The charge raised about $74 million that year, most of which was rebated at the rate of $0.002 per kilowatt-hour (KwH) produced at these 180 plants. Of the revenue, $185,000 was not rebated—this .25 percent of annual revenues was spent administering the program. Another $550,000 of revenue was not rebated—this .75 percent of annual revenue was retained as an adjustment sum. In addition to the $74 million of charges, $14 million of expenditures were made by the power plants in order to achieve the 34 percent emissions reduction from 1990 noted in the above quotation.

The $74 million is the post-abatement revenue from the charge—that is, more revenue would have been raised if no abatement in emissions had occurred. Presumably this reduction in revenue from the pre-abatement NO_X emissions base is larger than the $14 million spent for abatement—that is, plants presumably invested in abatement only when they could make money doing so. This point is relevant because it demonstrates that the concern that the pollution tax base might disappear,

4. In 1996 and 1997 the limits were brought down to 40 and then 25 GwH, increasing the number of plants in the system to over 600 (Sterner 1998).

leaving no revenues to rebate, was not borne out in practice. Some amount of NO_X emissions is associated with all conventional combustion processes. Although a fee of hundreds of dollars per kilogram of NO_X might make combustion infeasible or lead to an amazing new technology, at the practical scale of this charge and rebate system, it appears there will be plenty of NO_X emissions to tax for years to come.

The average cost of abatement was about $1.60 per kilogram of NO_X abated. This is only one-third of the emissions charge, which means that NO_X emissions abatement is inexpensive at first but becomes increasingly expensive as more abatement occurs. It is also interesting to note that the $4.80 per kilogram charge was based on a range of estimates from the parliamentary Environmental Charge Commission of between $0.40 and $10.00 per kilogram of abatement. As often occurs, the average of the estimates in advance of taking action (about $5.20 per kilogram) is far greater than the actual average cost of abatement ($1.60) after actions are actually taken.

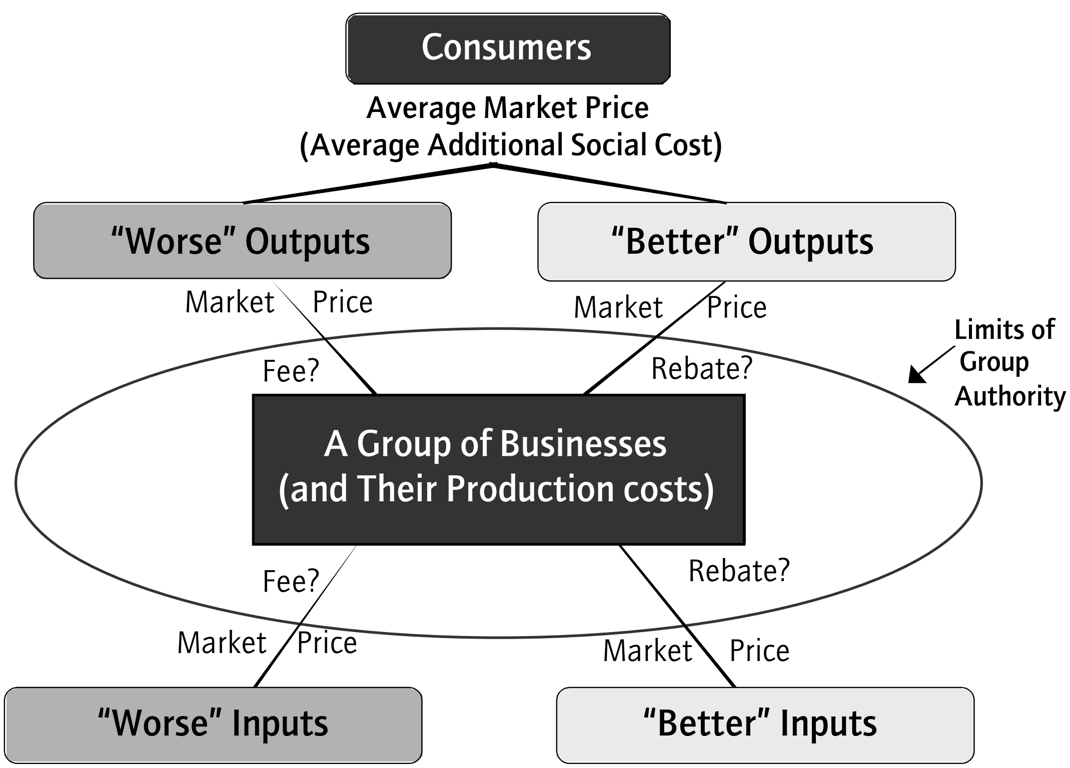
To understand the competitiveness advantage of this approach, consider if the revenues were not rebated. Charges of $74 million plus $14 million of abatement costs would need to be paid by the industry. To fund these additional payments prices must rise, wages must fall, returns on investment must fall, or some combination of these must occur. Assume that prices rise, which is not a bad assumption for a situation like this where only 180 employers in the entire country are involved. For such small segments of an economy, wage rates and the costs of raising capital are often controlled by conditions in the rest of the economy. Taking the $88 million dollars of expenditures and dividing by the number of KwH produced in 1992 (37,400,000,000) yields $0.0024 per KwH. That is, the cost of electricity would have risen by about one-fourth of a penny per KwH if there were no rebate of revenues. This is not an enormous increase, but it borders on significant. It amounts to a 2.5 to 5.0 percent rise in the price of electricity if Swedish electricity sells for $0.05 to $0.10 per KwH. Since NO_X is only one pollutant, one can see that significant competitiveness concerns would arise if charges for other pollutants (e.g., SO_X and CO_2) were to be imposed as well.

With the rebate, however, a similar calculation finds a price rise of less than $0.0004 per KwH. This is one-fifth the rise without a rebate, or an increase in price of between 0.5 and 1.0 percent if Swedish electricity sells for $0.05 to $0.10 per KwH. As quoted above, the actual price rise was not of much practical concern. Most Swedish observers felt that competitiveness was not distorted, even if some small impact did occur.

III. AN ECONOMIST DISSECTS THE INDUSTRY-LEVEL TAX-REBATE CONCEPT

The industry-level tax and rebate scheme is represented generically in figure 1. Some group of businesses is at the center of the scheme. These could be all the beverage container manufacturers in a country, all the tennis shoe manufacturers in the world, all the businesses in a country, and so forth. Who is in the group will depend on the politics and economics of the situation. The easiest way to think of the group is all businesses in some sector in the United States—for example, generators of electricity.

FIGURE 1: **INDUSTRY-LEVEL TAX AND REBATE DYNAMIC**



Suppose these businesses could categorize the inputs used in production into two categories: better and worse. They then combine these inputs in some process. By worse we mean considerably more socially damaging than better. One might call these categories environmentally "clean" and "dirty," as is common in the economics literature. But the better inputs need not be entirely "clean"; that is, they may have some social costs not included in their market prices. In beverage container manufacture, durable items designed for recycling might be thought of as better outputs, while short-lived items that are infeasible to recycle might be categorized as worse outputs. In electricity production, air pollution might be thought of as a worse input (that is, using up clean air) while labor and machinery are categorized as better inputs.

Consumers pay for products as well as for social damages created by all products and inputs. If economic activity can be "pushed to the right" on the diagram (that is, expanding use of the better inputs and production of the better outputs while decreasing use of the worse inputs and production of the worse outputs), consumers will benefit. But if doing so increases the market price of products, short-sighted consumers and business owners may perceive this change as contrary to their self-interest. And enlightened businesses may have a difficult time solving environmental problems individually since social damage may be occurring outside the limits of their individual authority, or even the limits of authority of the group of businesses in the sector.

In the discussion that follows we examine when the group of businesses might perceive a tax and rebate scheme as narrowly self-advantageous, a scheme, as we stated in the summary, we refer to as a *sectoral ETR.* By narrowly self-advantageous we mean that the average price of products falls, which probably increases the competitiveness of the group of businesses. A series of five tables illuminates the basic economics using arithmetic. The series works with a situation slightly simpler than in figure 1: There is only one product produced.

Table 1 represents a current situation, in abstract, in which a product is produced from a better and a worse input. The product is used to provide an end-use service rather than for its own sake. For example, electricity used to run light bulbs provides lumens of lighting service; electricity used to run a pump provides the service of moving water. Actually, any purchased good or service can be thought of in this way. For example, food provides the service of satisfying our appetites or sustaining our bodies. So the representation, although abstract, applies to nearly all things people buy in markets. The prices shown are average prices for an industry, so there could be variation from company to company or from locale to locale. But the average is our concern for now.

TABLE 1: **PRODUCTION OF GOOD "Z" WITHOUT A TAX AND REBATE SYSTEM**

	Units	Cost or market price per unit (e.g., cents per unit)	Social cost per unit, including market price
Better input (e.g., solar thermal–based electricity)	1	2	2
Worse input (e.g., fossil fuel–based electricity)	2	1	2
Further process (e.g., distribution of electricity)	1	6	6
Product (e.g., KwH of electricity delivered)	1	10 (1x2+2x1+1x6)	12 (1x2+2x2+1x6)
Or			
End-use service (e.g., lumens of light delivered)	10	1 (1x2+2x1+1x6)/10	1.2 (1x2+2x2+1x6)/10

Table 2 represents the situation when a group of businesses have a tax imposed on the dirty input and rebated on the output. This is like the Swedish NO_X system. But table 2 assumes that there is no behavioral change by any of the producers. They simply pay the fee on the input and accept the rebate on the output. There is no abatement of damage, and no expenditures for abatement. Interestingly, the price of the product and the end-use service don't change. This demonstrates what an environmental tax shift looks like when simple input-output analysis is used to model the effect of the shift (e.g., Metcalf 1998). The cost of products, end-use services, and total social cost remain unchanged, and there is no environmental "dividend." If an ETR actually had this effect it would be neither good nor bad for the economy or the environment (on average)—but as a partial representation this type of analysis may be useful (e.g., for distributional analysis).

TABLE 2: **PRODUCTION OF GOOD "Z" WITH A TAX OF 1 PER UNIT OF WORSE INPUT AND REVENUES REBATED ON THE PRODUCT, BUT NO CHANGE IN THE INPUT MIX USED BY THE BUSINESS**

	Units	Market price or cost per unit (e.g., cents per unit), including tax or rebate	Social cost per unit, including market price and tax or rebate
Better input (e.g., solar thermal–based electricity)	1	2	2
Worse input (e.g., fossil fuel–based electricity)	2	2 (1 plus 1)	3 (2 plus 1)
Further process (e.g., distribution of electricity)	1	6	6
Product (e.g., KwH of electricity delivered)	1	10 (1x2+2x2+1x6-2)/1	12 (1x2+2x3+1x6-2)/1
Or			
End-use service (e.g., lumens of light delivered)	10	1 (1x3+2x3+1x3-2)/10	1.2 (1x2+2x3+1x6-2)/10

Table 3 represents the situation when behavioral response occurs. If rather than two units of worse input to each one unit of better input, producers now use one unit of worse input per two units of better input, the market price of the product and end-use services will rise and the quantity of the product sold will decline (as will the quantity of inputs used to make it). The social cost per unit of product and end-use service stays the same, but the total social cost falls since less of the product is used. That is, an environmental "dividend" occurs. Although this is good for the consumer, it makes the producers in the system less competitive. If there are other producers who are not in the tax and rebate system or if there are substitutes for their product (e.g., glass or aluminum beverage containers for plastic), consumers will substitute away to other products. Businesses in the sector have no narrow-minded reason to like the tax reform.

TABLE 3: **PRODUCTION OF GOOD "Z" WITH A TAX OF 1 PER UNIT OF WORSE INPUT AND REVENUES REBATED ON THE PRODUCT, AND A CHANGE IN THE INPUT MIX USED BY THE BUSINESS**

	Units	Cost or market price per unit (e.g., cents per unit), including tax or rebate	Social cost per unit, including market price and tax or rebate
Better input (e.g., solar thermal–based electricity)	1.8 (2x0.9)	2	2
Worse input (e.g., fossil fuel–based electricity)	0.9 (1x0.9)	2 (1 plus 1)	3 (2 plus 1)
Further process (e.g., distribution of electricity)	0.9 (1x0.9)	6	6
Product (e.g., KwH of electricity delivered)	0.9	11 (1.8x2+0.9x2+0.9x6-0.9)/0.9	12 (1.8x2+0.9x3+0.9x6-0.9)/0.9
Or			
End-use service (e.g., lumens of light delivered)	9	1.1 (1.8x3+0.9x3+0.9x3-0.9)/9	1.2 (1.8x2+0.9x3+0.9x6-0.9)/9

This is not a happy conclusion for advocates of ETR or win-win business-environmental policies. But it is the result of simple economic analysis and it makes common sense. The common sense reason the (average) market price rises is that the environmental damage declines. The consumer pays for this benefit through a higher product price. The business uses that income to buy the less damaging but more financially expensive input. If the consumer did not pay a higher price, the business couldn't buy the less damaging input without losing money. With the exceptions below, if the economy is competitive enough, [5] environmental benefits from sectoral ETR will increase the average price of products from the sector covered by the ETR. And although this is good for consumers, because the total social cost they are paying for these products declines, it seems unlikely[6] that businesspeople in that sector would lobby for this type of ETR.

5. The example in tables 1 through 5 assumes that producers have no profit other than a fixed return on their investment. This is the case if markets are fully competitive. If "pure profits" (such as those earned by an unregulated monopoly) exist, prices will rise less because some of the increased cost of production will be pushed "backward" onto the business owner. But the price will still rise some even with imperfect competition unless the ETR breaks up the monopoly or oligopoly situation somehow, or otherwise increases competitiveness (see section on exceptions).
6. Unless they make "enlightened" business decisions based on their membership in society. After all, the consumer in this example represents everyone.

IV. TWO MAJOR EXCEPTIONS

Tables 4 and 5 represent the exceptions to the analysis. Table 4 represents the case where end-use efficiency is improved by spending the full revenue from the tax. If less spending is needed to improve end-use efficiency, a rebate is still possible even though it is not shown in table 4.

TABLE 4: **PRODUCTION OF GOOD "Z" WITH A TAX OF 1 PER UNIT OF WORSE INPUT AND REVENUES SPENT TO CREATE A 30 PERCENT INCREASE IN END-USE EFFICIENCY, AND (AS IN TABLE 3) A CHANGE IN THE INPUT MIX USED BY THE BUSINESS**

	Units	Cost or market price per unit (e.g., cents per unit), including tax or rebate	Social cost per unit, including market price ands tax or rebate
Better input (e.g., solar thermal–based electricity)	1.8 (2x0.9)	2	2
Worse input (e.g., fossil fuel–based electricity)	0.9 (1x0.9)	2 (1 plus 1)	3 (2+1)
Further process (e.g., distribution of electricity)	0.9 (1x0.9)	6	6
Product (e.g., KwH of electricity delivered)	0.9	12 (1.8x2+0.9x2+0.9x6)/0.9	13 (1.8x2+0.9x3+0.9x6/0.9
Or			
End-use service (e.g., lumens of light delivered)	11.7 (9x1.3)	0.9 (1.8x2+0.9x2+0.9x6)/11.7	1.0 (1.8x2+0.9x3+0.9x6)/11.7

Table 5 represents the case where an increase in efficiency of the core production process results from spending the full revenue from the tax. Again, if this efficiency increase were to cost less, a rebate could also occur even though one is not shown in table 5.

TABLE 5: **PRODUCTION OF GOOD "Z" WITH A TAX OF 1 PER UNIT OF WORSE INPUT AND REVENUES SPENT TO CREATE A 30 PERCENT INCREASE IN PROCESS EFFICIENCY, AND (AS IN TABLE 3) A CHANGE IN THE INPUT MIX USED BY THE BUSINESS**

	Units	Cost or market rice per unit (e.g., cents per unit), including tax or rebate	Social cost per unit, including market price
Better input (e.g., solar thermal–based electricity)	1.8 (2x0.9)	2	2
Worse input (e.g., fossil fuel–based electricity)	0.9 (1x0.9)	2 (1 plus 1)	3 (2 plus 1)
Further process (e.g., distribution of electricity)	0.9 (1x0.9)	4.6 (6/1.3)	4.6 (6/1.3)
Product (e.g., KwH of electricity delivered)	0.9	9.5 (1.8x2+0.9x2+0.9x4.6)/0.9	11.6 (1.8x2+0.9x3+0.9x4.6)/0.9
Or			
End-use service (e.g., lumens of light delivered)	9	0.95 (1.8x2+0.9x2+0.9x4.6)/9	1.16 (1.8x2+0.9x3+0.9x4.6)/9

The spending needed to create either of these types of improvements could be close to zero if existing ignorance is overcome when the environmental tax jolts people to implement technology that is available but was neglected.[7]

Both exceptions to the analysis above can create outcomes like those shown in tables 4 and 5. The two exceptions to the analysis are: (1) imperfect information is causing significant waste that can be reduced profitably, and (2) a significant benefit exists that can only be captured by collaboration among a group of businesses.

For example, energy-efficient lamps, motors, and appliances can increase the end-use services (light, motive force, refrigerated food) consumers get from each KwH of energy (table 4). If the increase in end-use service per unit of product is enough, the market price of the end-use service can decline (although the market price of the product rises even more than before because the rebate is no longer available to subsidize the product).

7. Instances when inexpensive learning alone reduces costs may be uncommon, although an economic literature on "learning by doing" clearly shows why learning alone can occur and create significant cost savings (Arrow 1962). The classic example is the cost of airplane manufacture, which reportedly declines each year for the first several years a model is produced, solely due to efficiencies gained as workers learn how to use familiar tools to construct the new design.

Similarly, it is also possible that an increase in efficiency within the firm can be profitably purchased. Table 5 represents an instance when the cost of further process declines because the firm discovers that it can combine better and worse inputs in a less expensive way they were simply unaware of before. This could be precisely as in the consumer example (more efficient lights, motors, etc.) or for other reasons (e.g., a complete change in production process). Having been jolted over an imperfect information obstacle (ignorance), product price can actually fall.

How much inefficiency exists because of imperfect information is an area of enormous dispute. Lovins and Lovins (1999) have repeatedly drawn attention to this problem, and claim that it is very large. Glieck et al. (1999) and others have begun to investigate this problem for water use, especially in irrigated agriculture, and are finding some profitable but neglected opportunities to reduce water use. However, many economists claim that imperfect information cannot be causing too much unnecessary waste. If it were, they argue abstractly, someone could make money by running education seminars on how to reduce this waste. So, they argue, most such opportunities will have been discovered in a competitive, market economy. [8]

Tables 4 and 5 also represent the second exception to the situation in table 3 where the average price of the product rises. The second exception is, in the jargon of economics, when a positive externality exists that if taken advantage of would lower the cost of end-use services (table 4) or lower the cost of production (table 5).

A historical example like that represented in table 5 was a plastics industry attempt to invest in a system of polystyrene recycling facilities throughout the United States about 10 years ago (the National Polystyrene Recycling Association). The economic idea was that a standardized recycling infrastructure for used polystyrene would make available secondary polystyrene that met certain quality standards inexpensively and reliably. This reliable and inexpensive source of secondary resin would, in turn, keep the blended price of polystyrene purchased by polystyrene product manufacturers from rising as fast as virgin resin prices rose. This was a perceived positive externality at the industry scale that the industry chose to invest in as a group. Unfortunately, the price of primary resin began to fall shortly after this attempt began, and has not recovered since. The network of recycling facilities operated by the association has now been closed due to this financial pressure.

8. One rationale for ETR, whether at the industry, local, state, or national level, is the paternalistic one. Price rises can force businesses and consumers into learning that would lead to outcomes like those represented by tables 4 and 5. Forced learning like this might be the most cost-effective way to overcome imperfect information problems. But this does not achieve the result being sought—businesses lobbying for an ETR. Students do not lobby to go to school if they think there is nothing to learn.

But the same positive externality could be captured (with third parties investing in the recycling plants) if all polystyrene products manufacturers were to agree to a charge on primary resin that subsidizes purchase of secondary resin. This would be like charging a fee on a worse input in figure 1 and giving a rebate on a better input. If the positive externality in re-processing is large enough, an outcome such as that in table 5 would result. If the positive externality is not large enough (or the perception that a positive externality exists turns out to be wrong), an outcome such as that in table 3 would result.

The much-discussed possibility of “price-rise–induced technological change” is another example of a positive externality at the industry level (it may also be an example of imperfect information). If a positive externality from technological change exists, individual firms will underinvest in technological change because they cannot capture the full benefits of such investment. But if a group that can capture most of the spillover benefits invests together, they will invest in more technological change, and these investments will more than pay for themselves over time.

SEMATECH, the research consortium of the semiconductor industry and the U.S. government, is an example of this type of beneficial collaboration. The Electric Power Research Institute (EPRI) and numerous other organizations are also examples. There is ample experience that industry-level think tanks and research consortia have more than paid for themselves, ultimately lowering the price of some types of products to consumers. After all, that is what theoretically justifies trade associations, joint ventures, chambers of commerce, and many other types of collaborations among businesses. These collaborations are, in the jargon of economics, ways to capture positive externalities at the scale of the group of businesses that join together into them.

V. EXAMPLE ONE—MANURE FROM ANIMAL FEEDING OPERATIONS (AFOs)

The Swedish example demonstrates that competitiveness concerns can be addressed; that is, the price rise in table 3 can be kept quite small. But "it only hurts a little" is a poor motivator. Indeed, the history of the Swedish nitrogen oxide charge system indicates that the driving force was acidification of soil and water from nitrogen oxide emissions throughout northern Europe. Some 20 percent of Swedish forest land had become so acidic that forests were damaged. The government had supported lime addition to over 6,000 lakes to reduce acidity, and at least 15,000 lakes in southern Sweden had suffered significant ecosystem damage due to air-pollutant induced acid rain. In 1988, Sweden and 24 other countries signed the Protocol to the Convention Concerning the Control of Emissions of Nitrogen Oxides, in which states agreed that their emission levels by 1994 should have been reduced to the 1987 level.

That charges were used rather than command-and-control regulations appears to have resulted from the timing of the creation of a Swedish parliamentary commission in 1988. The Environmental Charge Commission was given the task of analyzing the scope for using economic measures in environmental policy on a larger scale. The Act on NO_X charges is based on one of the commission's proposals. No doubt industry participated in the investigation and proposal process, but it is unlikely industry sought out and lobbied for this particular system except as a lesser of the necessary evils.

This suggests that one powerful way to get such reforms into place in the United States is to identify social and environmental issues—like the acid rain problem in northern Europe—that are either now or soon will be widely recognized as priorities for public policy. When political action is going to happen—because the momentum is there already—a within-industry environmental tax reform may be desirable from the industry perspective.

Consider the water and air quality problems associated with animal feeding operations (AFOs). There are approximately 450,000 AFOs in the United States. The size of AFOs is measured by the U.S. Department of Agriculture (USDA) in animal units (AUs). An AU is the number of animals equivalent to one beef cow. About 85 percent of AFOs have fewer than 250 AUs. About 6,600 AFOs in 1992 had more than 1,000 AUs, which is considered to be a large operation (General Accounting Office [GAO] 1995). These large operations, also referred to as CAFOs (confined animal feeding operations)[9] have been growing rapidly in the last few decades. The average number of animals per AFO increased by between 56 percent (cattle) and 176 percent (egg-laying poultry) in the period from 1978 to 1992. In contrast, the total number of AFOs declined in the period from 1987 to 1992. There may be as many as 10,000 AFOs with more than 1000 AUs in the United States today (EPA 1999a).

The 1992 National Water Quality Inventory (EPA 1992) found that 27 percent of assessed river and stream miles in the United States, 25 percent of assessed lake acres, and 14 percent of estuary square miles were impaired by agricultural non–point source pollution. Feedlots were a source of impairment for about 26 percent of agriculturally impaired river and stream miles. If these figures were representative of U.S. water quality in general, [10] they would imply that 7 percent of U.S. water bodies are directly impaired by feedlots. Total impairment by manure from AFOs may be larger than this, however, since some impairment from rangeland is due to manure from grazing animals and some impairment from cropland is due to excess manure applied as fertilizer.

We were unable to find any credible national data on the air quality problems associated with AFOs. However, common sense and life experience suggest that odor problems, at least, are widespread. Their policy significance depends on what portion of the U.S. populace is subject to these odors, and whether air emissions are primarily a “nuisance,” or cause widespread health, sanitation, environmental, or financial problems. Respiratory problems, especially for children, have been documented to occur as a result of air pollution (e.g., hydrogen sulfide) from manure piles or feedlots. Manure spills have killed fish and caused miscarriages. Chicken manure from CAFOs is believed to be linked to the microbe Pfisteria, which caused both fish kills in the Chesapeake Bay and sickened people. In one Illinois community, property values are reported to have declined 30 percent after a CAFO was located there (Sierra 1999). Atmospheric deposition of ammonia nitrogen from hog operations may be one of the

9. A facility with between 300 and 1000 AUs is also classified as a CAFO if pollutant discharges into water (of either of two specified types) occur at that facility.

10. A relevant note in EPA 1992: “According to EPA officials, these state assessment data are generally the best available information on water quality from a national perspective. However, these officials said the data have several limitations: water quality assessment methodologies were not consistent across states; not all surface waters were assessed; and, surface waters assessed do not constitute a representative sample for projection purposes.”

largest sources of nitrogen deposition in the Neuse estuary in North Carolina, and many watersheds in eastern North Carolina (EDF 1999). Nitrogen deposited to waterways can cause a variety of problems, including plant and algal growth that impedes navigation or recreational use, and aquatic plant growth-decay cycles that periodically deplete the water of oxygen (during decay), asphyxiating fish and invertebrates.

The U.S. EPA and USDA Unified National Strategy for AFOs (EPA 1999a) calls for voluntary (AFOs) and mandatory (CAFOs) nutrient management plans. The EPA estimates that between 15,000 and 20,000 mandatory plans will be required, and that at least 330,000 nutrient management plans will need to be developed (or revised if they already exist). This means that 94 percent or more of these plans will be voluntary.

The strategy proposes “a national expectation that all animal feeding operations develop and implement comprehensive nutrient management plans by the year 2008” (EPA 1999b). There is apparently no specific proposal to enforce this “expectation” unless a National Permit Discharge Elimination System (NPDES) permit containing specific effluent limitations is issued to a facility. At present, a bit fewer than 2,000 CAFOs have been issued NPDES permits. The strategy emphasizes voluntary actions supported by government-funded technical and financial assistance programs.

In particular, the Environmental Quality Incentive Program has been funded at $200 million in 1997 and 1998 and $174 million in 1999. Requests for funds under this program have been approximately three times the amount available. The administration request for year 2000 funding of this program was $300 million. The Clean Water Act Section 319 program provides grants to implement non–point source pollution controls. About $100 million per year has been available from this fund since 1990, with about 40 percent being directed to agriculture (including AFOs). The Clean Water State Revolving Loan Fund is currently funding about $3 billion in projects annually. The strategy proposes to allow states to reserve up to an amount equal to 20 percent of their grant capacity under this program for implementation of non–point source and estuary projects. All together, these programs might make available as much as $1 billion per year for pollution problems associated with AFOs, although less is likely to be available for AFOs because the programs must also address other non–point sources of pollutants.

The EPA and the GAO (GAO 1995) estimate that best management practices for mid-sized AFOs are in the range of $3,000 to $20,000 per year. If $10,000 per year were required to implement best management practices (BMPs) at the average AFO, the annual cost to implement BMPs at 450,000 AFOs nationwide might be $4.5 billion. This amounts to about 5 percent of the annual income from livestock and livestock products from U.S. farms (about $93 billion in 1998; ERS 1999). If these crude estimates are accurate, at least $3.5 billion of the cost of BMPs at AFOs will be borne by consumers, workers, or investors in AFOs, and up to another $1 billion may be borne by the public through general taxes. This also means that government funding to support these efforts is at most about 22 percent (1 / 4.5) of the estimated cost of implementation.

The Sierra Club, the Southern Environmental Law Center, and many other environmental and community organizations believe the strategy is inadequate, apparently because it is too slow and has no teeth. The Sierra Club in particular has called for a national moratorium on construction of new "livestock factories" until the new regulatory programs are fully in place. The American Farm Bureau (AFB 1999), the American Pork Producers Council, and other agricultural organizations also oppose the strategy. They do not say why they oppose the strategy, but do state they support "voluntary, incentive-based programs." The AFB also seems to believe that the EPA does not have full authority to regulate AFOs as proposed, and would prefer state and other local solutions.

All of this suggests that a sectoral ETR might be attractive to operators of AFOs and environmentalists. The proposed National Strategy for AFOs has significant private- and public-assistance costs. If a market-based solution is more efficient, it would help farmers and the public by reducing the total cost of the solution and by achieving it more rapidly. A sectoral ETR could be administered in tiers, just as in the EPA-USDA strategy, by starting with CAFOs.

About 30 percent of the 83,000 animal units in the United States (1992 data) are in facilities with more than 1,000 AUs on-site (calculation by the author using GAO 1995 and EPA 1999a). So a tax and rebate system aimed at about 2 percent of the AFOs in the United States (10,000 / 450,000) could address 30 percent of the manure produced and managed. Monitoring the number of AUs at this number of facilities on an average annual basis seems feasible. A tax or fee per AU could serve as a proxy for the quantity of manure produced. Water and air quality monitoring at these facilities is feasible, as is visual inspection to determine if BMPs are being followed. Facilities could be rewarded with revenue rebates if they meet water and air quality standards, or alternatively if they have implemented and continue to use BMPs. If the fee is high enough to lead to 100 percent compliance, the system could be discontinued. In the interim, the 50 percent of operators who comply faster (or are already in compliance) will profit at the expense of the 50 percent of operators who are slower in complying. A financial incentive would exist for solving the problem, rather than paperwork and enforcement actions such as penalties for failure to solve the problem.

Alternatively, the tax or fee, and revenue rebates, could be on some other basis. We do not endorse any particular tax and rebate scheme in this paper, but simply put forward a few examples that are useful to discuss. Another interesting scheme would involve a fee per AU and rebates for fertilizer and energy produced from manure from the facilities subject to the fee. This would encourage conversion of manure into stable products that are nonthreatening to the environment and have market value. Although their market value may not be enough to repay the cost of production,[11] at least the energy and nutrient value in the manure would be captured by facility operators and society rather than simply "managed in a nondamaging fashion."

11. It is also possible that an outcome like that in table 5 might result if wastes can be converted to energy and nutrient resources at a low enough cost by capturing industry-level economies of scale. If political interest in a sectoral ETR for AFOs exists, this point would be worthy of further investigation.

VI. EXAMPLE TWO—ELECTRICITY SURCHARGES

As noted previously, a positive externality at the industry level can lead to outcomes such as those in tables 4 and 5. These might be attractive to members of the industry. The most studied example of this possibility is electric production. There are numerous analyses that suggest that small "system charges" or "public goods" charges per KwH that are used to subsidize investment in energy efficiency can lead to these types of outcomes. For example, the American Council for an Energy-Efficient Economy (Eto 1998) argues that public-benefit charges used to subsidize weatherization, energy-efficiency investments, and energy-efficiency research, more than pay for themselves from the consumer perspective. That is, the price of end-use services can decline even though the price of kilowatt hours rises—since fewer KwH may satisfy customers, total expenditures for electricity may fall.

There are a number of actual programs and legislative proposals in the utility area that attempt to take advantage of these types of industry-level benefits (see Kushler 1998 for a summary of current programs). For example, there is a public goods charge in California that raises several hundred million dollars per year during the transition period from full regulation to deregulated power generation. This money is used to subsidize low-income assistance, energy-efficiency investments, stranded investments like nuclear and wood-fired power plants that cannot compete in today's energy market, and public interest energy research. Although this is not a revenue-neutral environmental tax reform, it is a closely related system that has some industry support. If the base of the public interest charge were energy produced in "worse" facilities rather than all energy used in the state, the actual system would be like that shown in tables 4 and 5.

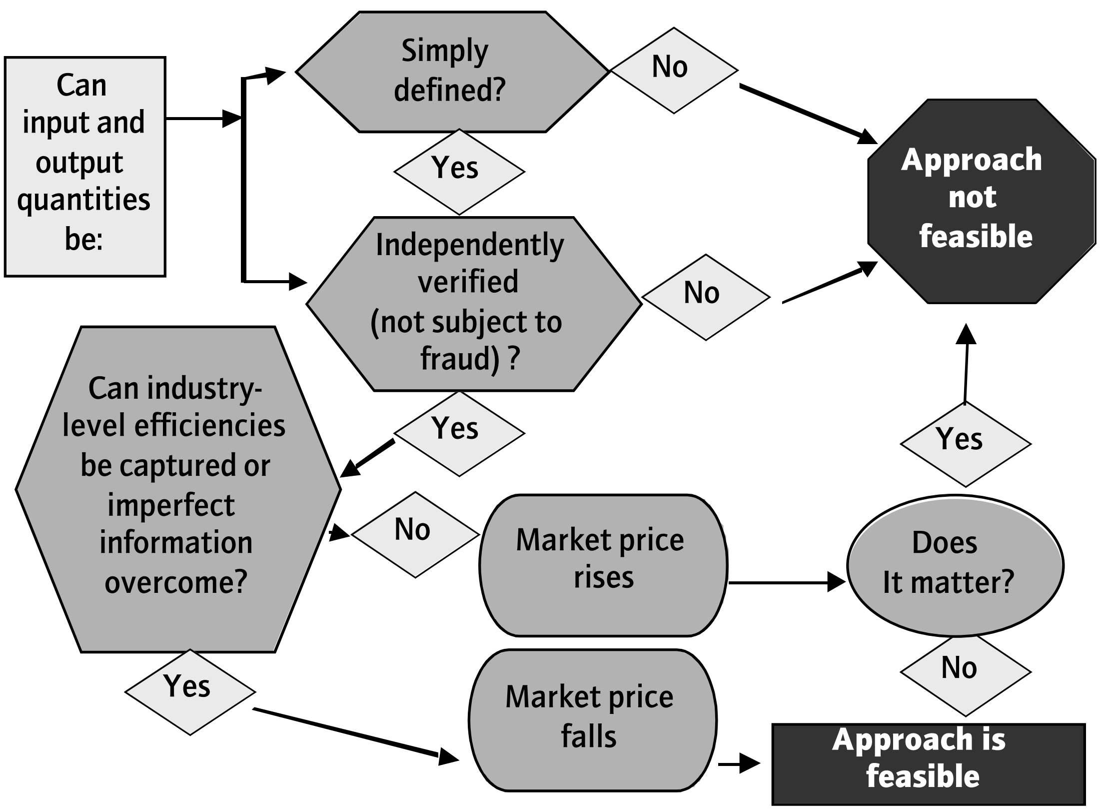
Several national initiatives exist involving a public goods charge on electricity with a rebate of some sort. Also, a tradable permit system that is equivalent, mathematically, to the Swedish nitrogen oxide system has reportedly been endorsed by the states of New York and New Jersey (Lashof 1999). So-called output-based allocations of tradable permits (permit giveaways based on KwH produced) are being explored by the Resources for the Future Foundation (RFF), the EPA, and are proposed in a bill sponsored by Senators Jeffords and Pallone. All of these are variations around the sectoral ETR scheme discussed in this paper.

Despite industry interest there has been little lobbying by industry for these types of systems. This is probably because most industry participants see the tax and rebate schemes as ways to protect competitiveness and offset price rises resulting from regulations the industries fundamentally wish were not needed. As stated previously, "it will only hurt a little" is not much of a motivator. Until we can document more fully the positive externalities at the industry scale that tax and rebate schemes can capture, private-sector enthusiasm will either be based on "lesser of evils" thinking, or nonexistent.

VII. SOME BASIC LIMITATIONS

There are some basic limitations to sectoral ETR (indeed, to many market-based solutions). Figure 2 is a logic diagram that presents two of the core limitations and links them to the issue of market price rise and whether the scheme is feasible or infeasible.

FIGURE 2: **WHEN IS THIS APPROACH FEASIBLE?**



If the input and output quantities that are to be taxed and subsidized cannot be simply defined, the scheme is not feasible. For example, a system that attempts to tax manure at AFOs is not feasible because manure varies greatly in weight (e.g., wet weight versus dry weight) and by type of animal from which it came. A definition for animal units (AUs) was created partially as solution to this problem. Similarly, defining "clean, green" electric power has been very difficult in California. Several definitions are in use, with various criticisms of them being discussed. Carbon emissions is one yardstick for "dirty" power; but anti-nuclear advocates do not consider carbonless nuclear power to be "clean." There are also significant land and aquatic habitat issues associated with hydro-power, making it difficult to claim that all hydropower is "clean." The system in Figure 1 requires society or a group of businesses to be able to agree, in a very broad way, that various inputs belong in either the "better" or "worse" category. That agreement is not as easy to obtain as one might think.

Second, if the defined quantities cannot be independently verified, this approach is not feasible because it is subject to widespread fraud. An investment tax credit for high–energy-efficiency machinery is feasible only if one can verify purchase and installation of such machinery when a tax filer claims to have purchased it. In the Netherlands, for example, an accelerated depreciation system exists for new [12] types of environmentally friendly technologies (Hotte, van der Vlies, and Hafkamp 1995). To qualify, the equipment must be placed on a list maintained by the Ministry of Housing, Regional Planning, and Environment. The government can confirm total claims for accelerated depreciation against total sales of listed equipment (a form of third party verification).

If the quantities used as the basis for taxes and rebates can be simply defined and independently verified, one needs to ask if industry-level efficiencies can be captured or if ignorance can be overcome profitably. If so, outcomes such as those in tables 4 and 5 result, and the approach might feasibly motivate businesses to support it. If not, market price will rise, the outcome described by table 3. Of course the rise in price may not matter to the businesses. For example, it might be too small to create a competitiveness concern, or industry may believe that it increases competitiveness because products can now be promoted as environmentally superior. (This latter is an important exception to the earlier discussion of competitiveness based solely on price.)

12. Interestingly, technologies are removed from the list as they become established. This means that early adopters of environmentally friendly technology are being financially rewarded for taking a risk on the new technology; later adopters are not rewarded because the risk has passed.

The approach is also not feasible when the environmentally or socially damaging activity has no socially acceptable level. One would not use any market-based approach to prevent unsafe workplace practices, for example. They are simply prohibited. Similarly, airborne emissions of some substances (e.g., dioxin, mercury) are believed by some to be harmful at any measurable level, so market-based solutions to these types of problems are not appropriate. Some level of social or environmental damage must be acceptable if a tax instrument is to be used to regulate damage (either that, or the tax must be set so high that it has the same effect as a prohibition).

VIII. SOME PRACTICAL OBSTACLES

Market-based schemes face numerous practical obstacles. Our interest is in obstacles that may prevent businesses from seeing a sectoral ETR as in their own interest. For example, if the **administrative cost** of sectoral ETR were much greater than comparable command-and-control regulations, business might be opposed. Fortunately, that does not seem to be a valid concern based on the one real experience with this type of ETR. As noted previously, the Swedish NO_X system has administrative costs of less than 1 percent of revenue raised. This small administrative cost is probably not an obstacle for businesses.

Because the advantages represented in tables 4 and 5 are not inextricably linked to the adoption of sectoral ETRs, they may fail to obtain business support. For example, if a group of businesses believe a positive externality exists, they might prefer to fund capture of it in some other way than environmental charges. Since the benefits of less environmental or social damage do not accrue directly to the businesses, they may choose to use annual revenues, market share, or other measures they feel more comfortable with as the basis for funding.

Similarly, members of a group of **businesses may prefer other solutions** even if they agree that imperfect information is costly to them. For example, seminars and industry- or government-funded technical assistance programs may be more familiar or less costly, or perceived as less intrusive or less risky than a tax and rebate scheme. After environmentalists work for years to convince industry that some type of resource- or pollution-related efficiency opportunity exists, industry might simply agree and move forward to take advantage of it without sectoral ETR.

Also, because **some businesses gain at the expense of others** in sectoral ETRs, it may be difficult to get all businesses in the sector to support the reform. For example, farmers who are slower to implement BMPs in the AFO example would pay to implement BMPs (eventually, if the tax is high enough to be effective) and pay the tax in the interim. This means that losers in the race to comply will pay for both their own compliance (as they would anyway under command and control) and a portion of the cost of compliance of winners.

An advocate of sectoral ETRs might point out that if more than one product is produced (as in figure 1) and the rebate is made only on the "better" product, the market price of that product will decline. This is true, and provides a real opportunity to get some businesses to support such sectoral ETRs. But those businesses that are diversified or have sufficient foresight to develop "better" products rarely constitute a majority of any industry. Although those businesses would be winners from sectoral ETR, there would be just as many, or possibly more, losers in the sector.

Indeed there will probably be business losers under any ETR that successfully solves a social or environmental problem. Even when an outcome like table 4 or 5 occurs, the providers of the "worse" inputs will see their sales decline (lower left box in figure 1). They will oppose the tax and rebate scheme by the businesses they sell to because losses for them are inevitable, even if the group of businesses at the center of figure 1 benefit. When vertical integration exists, the core business will have to compare financial losses to its fully or partially owned supplier against gains to the core business. Again, this reduces the likelihood that most businesses in any sector would support such a policy. If only a few significant firms in an industry are vertically integrated, they may have reason to oppose the scheme.

Finally, even when a regulatory solution is going to be imposed, as in the AFO example, **command and control may be the lesser evil**. One can readily imagine that the proposed national AFO strategy—plans that take 10 years to write and implement and are not backed up by a credible enforcement threat—may be more acceptable than a charge system that forces the solution to occur much more quickly, and in which some players will pay some of the cost of compliance by others. Command-and-control regulations can be more comfortable than other options precisely because they are slow to be implemented and enforced, and regulated parties have numerous opportunities to be involved in their implementation and enforcement. In some sense, command-and control-regulations provide more "due process" and more attention to "special circumstances" than do market-based solutions.

IX. THE POSSIBILITY OF PERVERSE RESULTS

The following problems can probably be avoided by careful design of an ETR. But they are worth mentioning for two reasons. First, if attempts to implement within-the-industry ETRs in the United States are made, and fail due to poor design, the concept will be discredited when it should not have been. Second, some tax incentives have created perverse results in the past. It is important to learn from those mistakes.

The simplest principle of incentive design is to reward precisely what is desired. Failure to do so can lead to **perverse incentives**. For example, a U.S. and a California investment tax credits rewarded investment in wind energy. Significant investment occurred, but production was low for many years because there was little incentive for the investments to operate profitably (i.e., to generate wind electricity). Just investing created a nice rate of return. And although windfarm operators had an incentive to produce and sell more power, in theory, in many cases the cost of retrofitting poorly built or located machines exceeded the increase in operating revenue from such retrofits. The windfarm story has a happy ending, primarily because the cost of wind energy has declined steadily and significantly over time. This is an example of a price-induced technological change that captured a positive research and development externality.

Another example is a failed proposal in Minnesota to provide a subsidy to electricity produced from the burning of poultry manure (Morris 1999). Minnesota has many waste-to-energy facilities (garbage incinerators). Since manure from confined-animal facilities can cause environmental problems, someone thought to kill two birds with one stone (so to speak). Recently, a similar provision for a subsidy for combustion of poultry manure ($.0177 per KwH, rather than $.015 as in the Minnesota bill) has appeared in the U.S. Senate tax bill (although not in the House tax bill). Sponsored by Senator William V. Roth (R-DE), the PEEP (poultry energy power) Act could provide approximately $50 million in subsidies.

This proposal is an example of a very poorly designed incentive. Rebates or subsidies should be directly linked to performance standards such as stabilization of the waste or a broad category of environmentally sound, beneficial reuse practices.

The particular technologies used to achieve performance objectives should be selected by the marketplace and individual businesses, not government.[13] In this sense, a rebate per KwH of electricity is a poorly designed incentive. It can have the perverse effect of encouraging electricity consumption, although it is intended only to protect consumers and businesses from price rises that are a consequence of solving some other social problem. One needs to consider carefully whether the price rise is really bad for society or the business sector involved, not just offer "bribes" to industries that complain about competitiveness impacts. Bribes may be politically necessary or even desirable, but they are motivated by very different reasoning than thoughtful incentive design.

A sectoral ETR might **foster oligopoly or monopoly**. Suppose that the poorest farmers also tend to have the most offensive AFOs. If they are slow in correcting these problems because they have credit or other financial difficulties, a fee and rebate system may marginalize their operations further. Recall that those who lose in these types of systems pay for their own compliance and some portion of compliance elsewhere in the system. Clearly it would be perverse for small family farmers who operate AFOs to bear the burden of direct compliance and be forced to pay for better environmental quality at, say, CAFOs owned by a few large corporations. Although this imaginary scenario might be an efficient solution from an economic perspective, it would be inequitable.

A poorly designed tax and rebate scheme can create **windfall profits** for businesses and fail to keep prices from rising. Suppose a public-benefits charge is applied to all electricity generated in the United States and the revenue is rebated to electricity producers in the form of an investment tax credit for investment in energy-efficiency technologies. This may lead to windfall profits for the energy producer or the seller of energy-efficient technology. Speaking loosely, any giveaway

13. There are many interesting technologies for reducing nutrient pollution from animal manure. One recently supported by the Pork Producers Marketing Board through research at the University of Guelph, Canada, is the "Enviropig." Enviropigs (Nickerson, 1999) metabolize phosphorous more effectively than standard pigs, leading to manure with less phosphorous in it. This may or may not be a good solution to hog manure–related problems. Environmental policymakers should allow the marketplace and other agencies (e.g., those governing genetic engineering) to choose between techniques for achieving acceptable water, air, and habitat quality in and around AFOs. Incentives for the Enviropig or poultry-energy power are misguided and potentially perverse: incentives for clean water, air, and habitat are neither.

to industry is a potential source of windfall profits. [14] This is a perverse result that should be guarded against carefully.

Furthermore, if the public were to acknowledge the existence of a "positive externality" at the scale of some group of businesses, it makes good economic sense to subsidize the situation with funds from other sources if environmental taxes or fees prove to be inadequate. Given how difficult it is to identify such externalities, opening the door to public subsidies of this type may lead to constant **pressure by the sector to increase the subsidy**.

Last, a sectoral ETR might be used to **greenwash the industry image**. Small fees to support partial energy-efficiency programs have been pointed to by industry as proof that all economically effective energy-efficiency options were being pursued when in fact numerous opportunities were being neglected (e.g., the Residential Conservation Service program initiated by President Carter).

14. Economists agree that "grandfathered permit allocations"—valuable emissions permits given to firms on the basis of past emissions—cause prices of goods produced with permitted emissions to rise, creating windfall profits for the permit recipients. Other forms of permit giveaways can also create windfall profits, although there is one scheme—output-based allocations and equivalents (Sterner and Hoglund 1999)—that, in theory, does not create windfall profits.

X. WHERE TO FROM HERE?

This paper argues that there is little reason for industry sectors to propose or lobby for sectoral environmental tax reforms. This is a realistic assessment given the typical focus of businesses on their own, narrow, financial performance. There is room, however, for business support of ETR on a number of other grounds. It is important to not overstate the conclusion of this paper. Individual businesses or groups of businesses may support economywide or sectoral ETRs because these businesses feel the ETR will be good for them. The support of such businesses is critical to obtain so that the public and decisionmakers understand that ETR is *not* costly to *all* businesses.

But realistic advocates of ETR should accept, with the exceptions mentioned here, that broad business support of any particular ETR is unlikely to occur. The exceptions are worth mentioning, in summary. First, beneficiaries of tax cuts or rebates may like some ETRs because they receive much more in payments than they pay in new taxes (Hoerner 1999 demonstrates this possibility for a variety of carbon tax proposals). Second, some businesses or business groups may see sectoral ETRs as to their own advantage in the longer term or despite price rises. That is, many businesspeople have a wider definition of self-interest than “profit maximization” or “keeping our products inexpensive.” Where wider perceptions of self-interest seem to exist in a sector of the business world, the possibility of sectoral ETR should continue to be mentioned as one among many tools for solving environmental problems in that sector in economically efficient ways. Third, the lesser of the evils approach may have more appeal and fewer obstacles in some circumstances than discussed in this paper. What is considered the lesser evil is very subjective and context-specific. Again, in those cases where political momentum for solving some environmental problem exists, sectoral ETR should be mentioned as a possibility.

Finally, it is worth noting that sectoral ETR can be a compromise between some industries and environmentally motivated parties. For example, as noted previously, some European countries have exempted or provided lower tax rates for energy-intensive industry as part of wider ETRs. These were political compromises with politically powerful industrial sectors. A different compromise that might work tolerably well for these sectors and environmentalists would be to implement ETR "bubbles" over select resource-intensive sectors as part of a national or statewide ETR. Just as the national or statewide ETR is intended to be revenue neutral for the economy as a whole, there could be bubbles within the overall ETR that are also revenue neutral for businesses within the bubble. This would be more consistent with the environmental objective of national or statewide ETRs, but respect the competitiveness concerns frequently expressed in some business circles.

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