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ECONOMIC AND TAX INCENTIVES FOR A CLEANER ENVIRONMENT: A SURVEY OF MARKETABLE POLLUTION PERMITS AND POLLUTION TAXES

Michael J. Casey*

I. INTRODUCTION.

Since its proposition in 1968, the "tragedy of the commons" analysis has been the basis for academic discourse on the relationship of allocation of property rights to market performance.[1] According to this theory, common resources like air and water tend to be overused when costs are not internalized. One may conclude from this analysis "that environmental protection systems could be designed more efficiently if the government were willing to define a system of tradable property rights."[2] The traditional mode of environmental regulation, by contrast, is based on a set of emissions standards identifying specific control technologies that are required to achieve compliance.[3] The problem with this method, however, is that the data required to identify exactly which technologies and standards should be applied are seldom available to regulators.[4]

When faced with this problem, regulators increasingly have turned to cost-benefit analysis to help them choose the appropriate standards, or, in some cases, alternatives to regulation. In a recent study, two economists applied cost-benefit analysis to proposed regulations for ground-level ozone.[5] They concluded that "air should be cleaned up in the most polluted areas but investing billions of dollars to get people to quit smoking, control radon gas and provide better prenatal and neonatal care might contribute much more [than cleaning up ground-level ozone]."[6] Regulators' increased use of cost-benefit analysis is beginning to emphasize the superiority of the market over political authority in current environmental regulation.[7]

This paper addresses the development and current status of marketable pollution permits in regulating air pollution. Section II begins with a comparison of the traditional "command and control" method of pollution regulation to the market approach. It also addresses propositions for a mixed system and application of the marketable permit system to a global market. Section III provides a guide to the development of the tradable emissions offset concept under the Clean Air Act as well as an examination of market concepts under the 1990 Clean Air Act Amendments. Finally, Section IV discusses alternatives to a market system for pollution control — pollution excise taxes and tax incentives for pollution reduction.

II. THREE MAJOR APPROACHES TO AIR POLLUTION CONTROL.

A. THE COMMAND AND CONTROL MODEL.

Since the early 1980s, regulators have employed three major approaches to air pollution control. The first of these methods is called the "command and control" model of pollution regulation.[8] It relies on conventional proscriptive regulations that impose standards for air quality and emission limitations.[9] Under this model of regulation, regulators utilize mathematical models to translate clean air goals into enforceable requirements for individual sources.[10] These source requirements include emissions limits and "design" standards that require polluters to employ particular pollution control technologies.[11] Historically, the U.S. Environmental Protection Agency (EPA) has favored the use of the command and control method for regulating pollution. In fact, current regulations under the Clean Water Act and the majority of the Clean Water Act (CWA) are designed to establish specific limits for substances determined to be harmful to health and the environment and to apply these limits to sources of emissions. Many environmental advocates believe that this method of pure governmental regulation is the most effective in assuring protection of the environment and reduction of pollution.

B. THE MARKET APPROACH.

Poised on the opposite side of this issue, many economists and free market advocates have said for years that taxing polluters for polluting the environment is preferable to regulating them.[12] Pollution control bonds and tax credits for pollution control devices were early suggested incentives for polluters to invest in

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environmental technology.[13] However, the Tax Reform Act of 1986 ruled out both of these incentives.[14] Additionally, neither the Bush administration nor the budget summit plan proposed the extension of tax credits for low pollution renewable energy resources, such as solar and geothermal power, which were scheduled to expire in 1989.[15]

In light of this recent death-knell to taxation of polluters, the second major approach to the control of air pollution, namely the market approach, appears to be the next best alternative. Under a system of marketable pollution permits, the market both sets the proper total rate of pollution and determines which companies will make reductions and how they will go about doing this.[16] President Bush's June 12, 1989 clean air plan contained early evidence of application of the market approach. The President's plan applied SOx and NOx emissions requirements to old electric power plants, rather than just new plants as did the previous Clean Air Act.[17] Plants failing to meet these requirements will be excused if they buy pollution credits from plants that do better than the required levels for emissions.[18] The first actual indication of practical use of the market approach occurred on July 16, 1991 when the Chicago Board of Trade announced that it was creating a private market for rights to emit sulfur dioxide.[19]

The theory behind a market approach to pollution control lies in the concept of private goods vs. public goods. Where goods are owned privately, one can easily exclude others from using them.[20] However, where public goods like water and air are concerned, it is not practical to exclude others from using them.[21] This non-excludability characteristic creates an incentive to over use the resource.[22] Abuse of resources in turn creates pollution.[23] The solution to the problem is to price the use of the common property resource to reflect its true cost, so that polluters will no longer treat the resource as a free good.[24] The pricing of resources creates a concurrent incentive to use less of the good.[25] Thus, it is theorized that a marketable permit system will lead to environmental conservation by the polluters themselves.

Opposing this theory, R. Coase, in his 1960 article entitled "The Problem of Social Cost," contends that placing the cost of pollution on the polluter will not result in a change in the behavior of the polluter.[26] Therefore, there is no reason to assign the cost of polluting to the polluter. Coase argues that the common property user does consider the cost his use imposes on others, and that the person suffering damage would be willing to pay the user an amount approaching the damage caused if the user would discontinue the activity causing the damage.[27] If this viewpoint is correct, the marketable pollution permit system would be ineffective. Polluters would simply pollute to the level to which they were permitted, and would not feel any incentive to reduce their emissions. According to Coase's theory, neighboring residents of the polluter would likely band together to pay the polluter to decrease his emissions. Alternatively, these citizens might attempt to purchase the pollution permits themselves, and in this way prevent or reduce the pollution from which they suffer.

Pros and cons aside, the current Administration and leadership of the Environmental Protection Agency have pleged support for the use of market incentives to achieve environmental objectives.[28] William K. Reilly, Administrator of the U.S. EPA, stated in a speech delivered at Harvard's Kennedy School of Government on May 16, 1991 that "[r]egulations have provided the foundation, and we look to a new, sophisticated generation of market incentives to take us where regulations cannot take us."[29] He also cautioned, however, that all things cannot be traded, "[c]ommand-and-control has a place; in regulation, . . . [b]ut we have scarcely begun to plumb the possibilities of market incentives."[30]

Turning to the more practical aspects of a marketable pollution permit system, a regional authority would be required to distribute and monitor permits for specified amounts of emissions sold to purchasers within each region.[31] Of course, the total amount of emissions allowed by all of the permits would have to meet the National Ambient Air Quality Standards (NAAQS) for the particular pollutant for that region.[32] The states would designate Air Quality Control Regions as they undertake primary responsibility for achieving and maintaining national primary and secondary ambient air quality standards within each of their boundaries.[33] These permits, sold to purchasers, would be fully transferable upon verification to the regional authority.[34]

One benefit of such a system is that as a region prospers economically, permit

prices would increase, which would provide a resultant incentive for polluters to reduce their emissions in order to reduce the number of permits they require.[35] In this way, the market for permits would drive industry to develop better pollution control devices. In order to increase production, and concurrently emissions, industry would be forced to either buy available permits from other polluters, or reduce their own current emissions via new control technology to compensate for the future increased output. Those industries that are capable of increasing production without purchasing additional emissions permits would have a clear economic advantage over their not-so-facile competitors.

With a marketable pollution permitting system, the polluter is left with a choice of developing new abatement technologies or buying additional pollution permits.[36] Also, the system allows regulators to control pollution levels directly by setting the number of permits issued at the level of pollution permitted under the NAAQS for each region.[37]

The duration of these pollution permits is also quite important. If the time period is too short, uncertainty is created in the market on future permit costs, causing industry to become reluctant to commit capital to the development of pollution control devices.[38] Conversely, if the life of the permit is too long, government will be unable to respond effectively to new information on the effects of pollution by reducing (or increasing) allowable emissions.[39]

One drawback of such a system is that it requires constant emissions monitoring at each source of pollution to ensure that the polluter is not exceeding the amount of emissions allowed by the permits it has purchased.[40] This type of monitoring is far more intensive than that required under the "command and control" approach, since the emissions of all permitted polluters would have to be totalled and compared to ensure that the NAAQS for the region is not exceeded. The command and control approach is much simpler, since all sources are held to the same emissions limitations.

C. THE MIXED SYSTEM.

The third approach is a mixed system. This model employs the emissions limits of the command and control model as a baseline for allowable emissions.[41] It then allows firms to go above and below this baseline by exchanging rights to pollute with other sources.[42] It is incumbent upon the polluter to prove the net exchange was equal to the baseline emissions level.[43] Under a mixed system, the United States Environmental Protection Agency (EPA) would be required to determine which types of exchanges would be permitted based upon its ability to monitor the exchange and other optional considerations.[44] These considerations might include: allowing only those exchanges which are most cost effective to EPA in terms of administrative costs of overseeing the exchanges; designating which firms could participate, by excluding failing industries, or favoring sources in depressed areas; or granting exchange rights simply on a first come, first served basis.[45]

The mixed system also has inherent advantages and disadvantages. One commentator has suggested that the system may offer the same environmental protection as the traditional command and control appraoch.[46] Additionally, enforcement costs should be significantly lowered because the polluters will have the ability to trade, to their mutual advantage, burdens which previously formed the basis for their violations.[47] Also, the institutional burden placed on EPA would be minimal since trading would only be permitted gradually as the agency gains experience.[48] This gradual phase-in of the trading system, however, decreases the amount of initial pollution control cost dollar savings that one would see in a pure market permit system.[49] At the same time, the mixed system assures that pollution control goals will be achieved, which might not result in a purely market controlled system.[50]

D. THE GLOBAL MARKET.

The concept of tradable pollution permits also can be applied on an international scale to address the problem of global warming. Global warming, unlike other environmental hazards such as toxic chemicals and most air and water pollution, is not country specific. That is, the carbon dioxide ($C0_2$) and chlorofluorocarbon (CFC) emissions which contribute

to the so-called greenhouse effect arise from all industrialized nations, and the resultant warming affects not only those individual nations according to their proportion of emissions, but all areas of the world.[51] Interestingly, some scientists in countries such as the Soviet Union believe that the warmer climate and fertilizing effects of CO_2 will transform previously uncultivated lands into fertile farmland.[52] Developing countries, which depend upon ever-increasing industrialization, also pose a problem since they will be hardest hit by mandatory reductions in CO_2 and CFC output.[53] The result is that some countries may be likely to cheat on reductions, and others may simply refuse to sign global agreements while benefitting from reductions in other nations.[54] Economists have termed this behavior "free riding."[55]

In order to overcome the problem of "free riding," some have suggested the use of tradable permits.[56] In this way, nations that cannot make the necessary reductions may pay other countries to reduce their emissions.[57] Of course, this market approach favors rich nations who are better able to pay to increase their emissions. However, one commentator has proposed that less-developed nations may be able to participate in these market transactions by soliciting payment from countries wishing to increase emissions, in exchange for the planting of CO_2-reducing trees, or preservation of valuable forest areas.[58]

III. THE DEVELOPMENT OF THE TRADABLE EMISSIONS OFFSET CONCEPT.

A. THE CLEAN AIR ACT 1970-1978.

In order to trace the development of the emissions offset concept, it is necessary to look at the progression of Clean Air Act legislation from its amendment in 1970, to its latest revision on November 15, 1990. The 1970 Clean Air Act amendments required each state to submit an implementation plan (SIP) which demonstrated how the state planned to bring areas that violated the National Ambient Air Quality Standards (NAAQS) into compliance with the mandated air quality objectives.[59] These areas are termed "non-attainment" areas. Each SIP is also required to provide for preconstruction review of all new stationary sources to be constructed in areas that had achieved the federal standards.[60] Section 110(a)(4) of the Act essentially allowed no new sources of air pollution through construction of new sources or modification of existing sources in non-attainment areas.[61] This proscription posed great problems for industry, which could neither undertake new construction in optimal urban non-attainment areas nor modify or expand its existing non-attainment area sources. Industry's only option was to relocate to "cleaner" attainment area sites.

Up to this time, Congress and EPA contended that economic considerations had little place in health oriented legislation, and thus refused to confront the problem imposed on industry by the Clean Air Act requirements in light of the need for economic development.[62] In a 1976 interpretive ruling on Section 110, however, EPA decided to allow economic development in non-attainment areas under the following conditions:

(1) New or modified sources must meet certain emissions limits known as the lowest achievable emissions rate (LAER);[63]

(2) All other sources owned by the owner of a proposed new or modified source in the same region must have been in compliance with all applicable SIP requirements or conforming to a schedule or timetable for compliance;[64]

(3) The owner must arrange sufficient emission reductions to exceed, or more than "offset," the emissions produced by the new or modified source.[65]

In order to allow for industrial development in non-attainment areas, the concept of offsetting was created.[66] According to this concept, a new source could offset the amount of emissions it would add to the non-attainment area by obtaining reductions from existing sources which were greater than its planned addition.

(4) The proposed "offsets" must represent air pollution reductions that make reasonable progress toward attainment of applicable NAAQ Standards and provide a "net benefit" to the air quality of the area.[67]

The definition of the term "reasonable progress" is left to the determination of the individual states.[68] Additionally, a new source must not cause a previously clean area to violate any federal air quality standards (NAAQS).[69]

The difference between locating in a non-attainment area and locating in an attainment area can be explained as follows. In a non-attainment area, reductions in existing facilities must more than offset the emissions of the proposed new source.[70] If a new source is located in an attainment or clean area, the offset need only be sufficient to prevent violation of the NAAQ standards.[71]

The 1976 interpretive ruling also included a "no-banking" provision whereby the owner of a proposed new or modified source could not purchase or arrange additional offsets as a credit against later increased emissions.[72] In other words, a new source may only increase its emissions if an existing source concurrently decreases its emissions.[73] EPA's rationale for the no-banking provision was that they believed banking would result in no appreciable environmental benefits since any reductions in emissions would eventually be withdrawn from the bank and returned to the environment as new emissions.[74]

In 1977, the Clean Air Act was again amended.[75] Congress approved the 1976 "offset policy" with some important modifications. First, the technology forcing requirement of lowest achievable emissions rate (LAER), which previously was applied as either the most stringent limitations in any SIP or the lowest rate achieved in practice, now required the reviewing authority to apply the more stringent of the two.[76] Second, the States were no longer to determine the meaning of the term "reasonable further progress."[77] Instead, the 1977 Act provided the following definition:

> "The term 'reasonable further progress' means annual incremental reductions in emissions of the applicable air pollutant ... which are sufficient to provide for attainment of the applicable national ambient air quality standard by the date required ...."[78]

Under Section 173 of the 1977 Amendments,[79] states were provided several options to effect the offset policy:

(1) A state may choose to make no provision for industrial growth in non-attainment areas.[80]

(2) A state may adopt the offset policy.[81]

(3) A state may adopt other measures to permit industrial growth while assuring reasonable further progress is made toward attainment of the NAAQS.[82]

For example, a state might impose more stringent emissions limitations on existing sources in order to create a "growth cushion" for new sources constructed in the area.[83] Of course, this type of action involves a form of emissions offset banking by the state that violates the no-banking provision of the 1976 interpretive ruling.[84]

EPA also adopted the "bubble concept" in the 1977 Clean Air Act Amendments.[85] The bubble concept allows emissions standards to be applied to an entire plant, rather than individual point-sources. This effected a mini-offset policy for plant-owners because one facility, building, or smokestack within the plant could increase its emissions so long as some other facility within the plant reciprocated by equally reducing its emissions.[86] In *ASARCO, Inc. v. U.S. Environmental Protection Agency,*[87] the D.C. Court of Appeals rejected EPA's adoption of the "bubble concept" as contrary to the Clean Air Act's definition of a "source."[88] However, the federal circuit approved of bubbles that did not involve new sources for use in attainment areas in the later decision of *Alabama Power v. Costle.*[89]

In 1978, the EPA again filed an interpretive ruling that revised the offset policy. The ruling lifted the earlier prohibition on emission offset banking.[90] The banking method offers some distinct environmental advantages. Namely, it allows owners to clean-up old, obsolete facilities prior to modernizing or constructing new facilities since they know they can keep the resultant emissions reductions in reserve for later use in the new facilities. Without the banking provision, owners would be encouraged to keep old facilities in operation so they could be used concurrently in future offset situations. Reduction of pollution through the natural attrition of aging facilities would thus be slowed or halted completely.

The 1978 revised offset policy also allowed the banking of emissions reductions resulting from firms going out of business.[91] These pollution credits could be passed on or sold to new firms locating in the area. Economists theorized that the whole concept of offsets, together with banking, could lead to a "complete market approach" to emissions control which would include trading and taxation of emissions rights.[92] The banking concept presents one major question: who will own the offsets produced by firms reducing their emissions?[93] Either the state must act as banker, distributing banked emissions savings through some type of permit system, or the individual firms will act as owners of their own emissions offsets.[94] Options available to the firms include saving the emissions offsets for future expansion, selling the offsets to other firms, or, perhaps unrealistically, withdrawing the offsets completely from the market as a conservation measure. Then EPA Administrator Costle, acting as Chairman of the Interagency Regulatory Council, referred to the 1978 revised offset policy as an example of the "alternative regulatory techniques" that should be given greater attention in the future.[95]

B. THE 1990 CLEAN AIR ACT AMENDMENTS AND THE FUTURE OF MARKETABLE POLLUTION PERMITS.

Since the early 1970s many scholars have theorized about the future of marketable pollution permits. In 1973, Robert Hahn and Roger Noll addressed the offset and banking concepts and provided the following "logical next step" for reforming air pollution regulations:

> EPA's controlled trading policy places constraints on the amount of emissions from sources before and after a trade is consummated... A logical next step in reforming air pollution regulation is to adopt a more comprehensive marketable permits system by eliminating the requirements that trades be reviewed on a case-by-case basis by regulators, that a source be in compliance with standards prior to trading, and that new facilities remain in compliance with new source performance standards. Regulators adopting this form of tradable emissions permit would no longer set source-specific technical standards as a baseline for further trades. Instead, the tasks facing the regulator would be to set overall ambient air quality standards, to limit total emissions in each geographic region to an amount that satisfies these standards, to organize the market institutions for allocating emissions among sources, and then to enforce the overall standards by detecting and fining sources that emit more pollutants than their permits allow.[96]

This proposal leaves the development of pollution control technology to industry. It allows the market to force technology when needed, as a response to any action on the part of EPA to tighten emission standards in each geographic region. Of course, it also requires increased monitoring activity by the Agency in order to detect emissions permit violators who may choose not to utilize the previously mandatory control technology.

In 1988, Paul R. Portney wrote on three proposals for reforming environmental regulation.[97] In his second "modest proposal," Mr. Portney posits that the EPA's "bubble" and "offset" policies should be reoriented from emissions to risk.[98] In other words, "regulated entities, public or private, should be allowed to relax pollution controls at one point and install new protective measures elsewhere, subject to a demonstration that an overall improvement in health or environmental quality will take place as a result of the change."[99] This theory is based on the premise that by refocusing the trading policies of the EPA on risks instead of emissions, more attention will be given to the broader goal of overall protection of health and the environment than to individual source emissions.[100] Under this proposal, a plant might be able to relax air pollution controls at one source in exchange for a reduction in water pollution emissions elsewhere in the plant or at another plant in the area.[101] However, the plant owners would bear the burden of proving that their water pollution reductions are equal to the air pollution increase in terms of environmental risk.[102] The concept is termed "risk bubbling."[103] Risk bubbling benefits both society and industry in terms of improved health and environmental conditions, and

reduced regulatory burdens.[104] It also has the effect of shifting market competition from source-specific control technologies to development of multifaceted methodologies for bolstering economic health and environmental protection.[105]

Since the 1977 Amendments, those sections of the Act that govern permitting, offsetting and banking, namely Sections 110, 171(3), and 173,[106] have not been subject to legislative revision. Under Title IV of the 1990 Amendments, Congress has established an acid rain reduction program that makes extensive use of marketable "allowances."[107] The goal of this program is to reduce emissions of sulfur dioxide and nitrogen dioxide from electric utilities.[108] These reductions are to be achieved by means of marketable allowances to be issued annually by EPA.[109] The allowances will be freely transferable among the owners or operators of the individual power plants, including the rights to receive allowances for future years and, if unused, to bank these credits for future use.[110]

As noted earlier, the Chicago Board of Trade voted on July 16, 1991 to create a private market for the rights to emit sulfur dioxide as granted under Title IV.[111] The Board of Trade's initiative envisions the trading of "cash forward" contracts in 1993, which in essence are agreements to trade permits that will be issued by EPA in 1995.[112] These trades can be made up to three years in advance of their issue and the contracts are projected to trade initially at $400 per ton.[113] One major flaw in this system is that state regulators may be unwilling to allow their resident utilities to participate in interstate trades of pollution rights, thus stifling the free trading necessary to ensure an effective market.[114]

IV. ALTERNATIVE POLLUTION TAXES AND TAX INCENTIVES.

Despite the current Administration's rejection of pollution taxes, many scholars continue to point to potential future uses of tax incentives as a method for reducing pollution. The following section addresses a number of tax options that merit discussion.

Under Section 5611 of the Internal Revenue Code,[115] natural resource extractors are allowed a deduction for the greater of the "percentage depletion" or "cost depletion" of the resource. Both require multiplication of annual sales by a fixed percentage, but depletion can then exceed the owner's basis in the universal property.[116] One economist has suggested that by limiting the allowable reduction to the owner's basis, the windfall element of percentage depletion could be eliminated.[117] Also, under Section 613(b) of the Code,[118] poisonous substances such as mercury, uranium, sulphur, and asbestos qualify for the top twenty-two percent (22%) depletion rate. This creates a conflict between the federal and state agencies that work to remove these substances from the environment, and the Code which provides incentives to bring them in.[119] These allowable deductions should either be dropped, or the rates applicable to hazardous substances be reduced.[120]

As a matter of public policy, it should also be possible to exempt the expenses of certain environmentally offensive behaviors from deduction under Section 162 of the Code.[121] For example, business rentals of gasoline powered machinery or equipment not equipped with emissions control devices might be deemed non-deductible under Section 162. Such exemptions could be implemented on a regional basis, so that the differing concerns of each region might be properly addressed.[122] Government might also require operators of environmentally hazardous activities to get insurance coverage in order to continue operations.[123] According to this proposal, the United States Government would act as the insurer of last resort and could, therefore, force the insured party to bring its industrial or commercial processes in line with current environmental standards, or lose coverage.[124]

Novel investments in pollution reducing technology should also be encouraged through tax incentives.[125] The potential for inverse condemnation stands in the way of such investments.[126] For example, DuPont plans to replace its harmful chlorofluorocarbons (CFCs) business with less harmful hydrochlorofluorocarbons (HCFCs).[127] However, its investment in new facilities and research and development to produce these HCFCs is quite risky, since HCFCs themselves may be banned or restricted by the time they are actually produced.[128] One option to encourage such risky investments is to provide tax credits and accelerated depreciation for innovative

equipment and the costs of retrofitting production facilities.[129]

Another area that merits preferential tax treatment is timber resources preservation.[130] In this area, government might provide the current accelerated amortization deduction for forestation and reforestation under Section 194 of the Code and Section 631 long-term capital gains treatment for timber felling royalties, only to those programs which utilize plantings demonstrated to be capable of withstanding warmer climates.[131] Thus, the future of our timber reserves will be more secure in light of the proposed devastating effects of global warming on current timber species.[132]

Similarly, soil conservation programs might be promoted through the use of property tax incentives.[133] However, one must first overcome the requirements in state constitutions that property taxation be "uniform and equal." This can be accomplished in two ways. First, through the use of differential assessment statutes, all but two states have been able to overcome the uniformity clauses and permit property to be classified for tax purposes.[134] Second, states might attempt to amend their constitutions to permit exceptions to the uniformity rule.[135]

Two areas where pollution taxes may be or already have been passed are the carbon tax and a new tax on ozone-depleting chemicals.[136] One commentator has stated that "Capitol Hill and White House sources suggest that a carbon tax may be in the cards as part of a deficit reduction package emerging from the budget summit."[137] Rep. Fortney Pete Stark (D-Calif.) has introduced a carbon tax on oil, coal, and natural gas that is proportional to the carbon dioxide they produce when burned.[138] Such a tax "might reduce output of CO_2 (which causes global warming) by encouraging conservation, inducing substitution of nonfossil energy sources which do not produce carbon dioxide (such as solar, wind, hydro, and nuclear power), or reducing consumption of products with relatively high energy content."[139] It has been estimated that the Stark bill would not only stabilize CO_2 emissions, but would, over its phase-in, also generate approximately six billion dollars in its first year, and up to thirty billion dollars annually in its fifth year.[140] Although such a tax would involve economic costs in the form of higher energy prices, it would also produce economic benefits in terms of reduced global warming and reduction of health costs, lost work time, lower property values, injuries to commercial forests, and lost recreational value of lakes and streams due to the acid rain associated with the combustion of fossil fuels.[141]

The new tax on ozone-depleting chemicals (ODCs) has arisen from the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer.[142] Sections 4681 and 4682 of the Revenue Reconciliation Act of 1989 (effective Jan. 1, 1990), contain the new tax provisions.[143] The tax is expected to "counteract the increased cost associated with the development of environmentally safe substitutes, and foster a competitive marketplace."[144] The tax affects manufacturers, importers of products containing ODCs, and holders of floor stocks.[145] This tax has been referred to as "the latest in a series of recent tax measures designed to address environmental concerns, [a]nd more are anticipated."[146]

In March, 1990, the House Ways and Means Committee held hearings to examine strategies to promote environmental objectives through federal tax policies, including tax incentives for environmentally beneficial practices and pollution taxes on emissions or discharges that contribute to air and water pollution.[147] Some of the proposed methods included creation of a new category of tax-exempt bonds to encourage environmental infrastructure spending, tax-based incentives to promote more efficient use of raw materials, tax credits for motor vehicle fleets using clean-burning fuels, tax measures to discourage the use of individual automobiles for commuting, and tax incentives to encourage production of clean-burning alternative fuels and renewable energy technologies.[148]

These legislative initiatives indicate that although the Bush Administration will not likely sponsor any new pollution taxes, great interest and support exists in Congress for future environmentally beneficial tax provisions.

V. CONCLUSION.

It appears that both Congress and the EPA are preparing for an increase in the use

of taxes and market control in environmental regulation. The anticipated boom in industry-led pollution control technology advances would appear to be a welcome development for environmentalists. However, one must recognize the difficulties that accompany the monitoring of such a system. It is regrettable, but true, that some polluters will attempt to cheat the system. Since there are no uniform source-based emissions limits under a marketable permit system, EPA and other regional authorities must be prepared to expend more time and resources to monitor individual sources. The emissions of each polluter must be compared to the total allowed by those permits acquired by each firm. Only in this way can the regulators ensure that those limits set for each region are met.

The recent forays into pollution offset banking are a healthy testing of the waters in market-based pollution control. Limited applications of this alternative system will provide the data and experience necessary for any future, broad-range policy shift in environmental regulation. However, until such time when the daunting logistics of implementing a market-based system can be adequately managed, EPA must maintain a strong command and exercise firm, but flexible control over the reduction of pollution and protection of our environment.

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1 Hahn & Hester, *Marketable permits: Lessons for theory and practice,* 16 Ecology L.Q. 361 (1989) [hereinafter *Marketable permits*]. See also Hardin, *The Tragedy of the Commons,* 162 Science 1243 (1968).

2 *Marketable Permits, supra* note 1, at 361, *citing* J. Dales, *Pollution, Property and Prices* (1968).

3 *Marketable Permits, supra* note 1, at 361.

4 *Id.* at 362.

5 N.Y. Times, April 30, 1991, at C4, col. 5.

6 *Id.*

7 Meidinger, *On Explaining the Development of "Emissions Trading" in U.S. Air Pollution Regulation,* 7 Law & Pol'y 464, 447-79 (1985).

8 del Calvo y Gonzales, *Markets in Air: Problems and Prospects of Controlled Trading,* 5 Harv. Envtl. L. Rev. 377 (1981) [hereinafter *Markets in Air*].

9 *Id.* at 383.

10 *Id.*

11 *Id.*

12 Hoerner & Hubbard, *Cleaning Up the Air: Should Polluters Be Taxed?,* 43 Tax Notes 1454, 1454-57 (1989) [hereinafter *Cleaning Up the Air*].

13 *Id.* at 1454.

14 *Id.*

15 *Id.*

16 *Id.* at 1455.

17 *Cleaning Up the Air, supra* note 12, at 1455.

18 *Id.*

19 N.Y. Times, July 17, 1991, at A1, col. 1.656565

20 MacFayden, *Marketable Pollution Permits: Their Values, Theory, and Application,* 9 Dalhousie L.J. 724, 724-51 (1985) [hereinafter *Marketable Pollution Permits*].

21. *Id.* at 733-34.

22 *Id.*

23. *Id.*

24. *Id.*

25 *Marketable Pollution Permits, supra* note 20, at 733-34.

26 *Id.*

27 *Id.* at 735. *See also* Coase, *The Problem of Social Cost,* 3 J. Law & Econ. 1 (1960).

28 Remarks by William K. Reilly, Kennedy School Forum: "Incentive-Based Approaches To Environmental Protection", John F. Kennedy School of Government, Harvard University, May 16, 1991, at 2.

29 Id. at 4.

30 Id.

31 *Markets in Air, supra* note 8, at 383-84.

32 National Ambient Air Quality Standards (NAAQS) are those primary and secondary standards prescribed by the Administration for each air pollutant for which air quality criteria have been issued, the attainment and maintenance of which in the judgment of the Administrator, based on such criteria and allowing an adequate margin of safety, are requisite to protect the public health, or, in the case of a secondary standard, to protect the public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air. 42 U.S.C.A. § 7409 (a) & (b) (West 1983).

33 42 U.S.C.A. § 7407 (a) (West 1983 and Supp. 1991).

34 *Markets in Air, supra* note 8, at 384.

35 *Id.*

36 *Marketable Pollution Permits, supra* note 20, at 738.

37 *Id.*

38 *Id.* at 739.

39 *Id.* at 740.

40 *Markets in Air, supra* note 8, at 384-86.

41 *Id.* at 385.

42 *Id.*

43 *Id.*

44 *Id.*

45 *Markets in Air, supra* note 8, at 385-86

46 *Id.* at 395.

47 *Id.*

48. *Id.*

49 *Id.*

50 *Markets in Air, supra* note 8, at 396.

51 *The Cost of Keeping Cool,* The Economist, Jan. 26, 1991, at 59 [hereinafter *Keeping Cool*].

52 *Id.*

53 *Id.*

54 *Id.* at 14. *See also Warm World, Cool Heads,* The Economist, Oct. 27, 1990, at 13 [hereinafter *Warm World*].

55 *Keeping Cool, supra* note 51, at 59.

56 *Id.* at 14.

57 *Id.*

58 *Id.*

59 Landau, *Who Owns the Air? The Emissions Offset Concept and Its Implications,* 9 Envtl. L. Rev. 575 (1979) [hereinafter *Who Owns the Air*].

60 *Id.* at 577.

61 42 U.S.C.A. § 7410(a) (4) (West 1983).

62 *Who Owns the Air, supra* note 59, at 578.

63 41 Fed.Reg. 55,524 (1976).

64 *Who Owns the Air, supra* note 59, at 579; 41 Fed.Reg. 55,529 (1976).

65 *Who Owns the Air, supra* note 59, at 579; 41 Fed.Reg. 55,529 (1976).

66 *Marketable Pollution Permits, supra* note 20, at 741.

67 *Who Owns the Air, supra* note 59, at 579; 41 Fed.Reg. 55,529-30 (1976).

68 *Who Owns the Air, supra* note 59, at 579 n. 31.

69 *Id.* at 579.

70 *Id.*

71 *Id.*

72 *Id.* at 580.

73 *Marketable Pollution Permits, supra* note 20, at 742.

74 *Who Owns the Air, supra* note 59, at 580.

75 42 U.S.C.A. §§ 7401-626 (West Supp. 1977), Pub. L. No. 95-95, 91 Stat. 685 (1977).

76 *Who Owns the Air, supra* note 59, at 581.

77 *Id.*

78 42 U.S.C.A. § 7501 (West Supp. 1977).

79 42 U.S.C.A. § 7503 (West Supp. 1977).

80 *Who Owns the Air, supra* note 59, at 582 n. 49; § 172(b) (4); 42 U.S.C.A. § 7502(b) (4) (West Supp. 1977).

81 § 173(1) (A); 42 U.S.C.A. § 7503(1) (A) (West Supp. 1977).

82 *Who Owns the Air, supra* note 59, at 582; § 173(1) (B); 42 U.S.C.A. § 7503(1) (B) (West Supp. 1977).

83 *Id.* at 582 n. 51.

84 *Id.* at 583.

85 *Id.;* 40 C.F.R. § 60.2(d) (1977).

86 *Id.*

87 578 F.2d 319 (D.C. Cir. 1978).

88 *Id.* at 329.

89 606 F.2d 1068, *modified,* 636 F.2d 323 (D.C. Cir. 1979).

90 *Who Owns the Air, supra* note 59, at 585.

91 *Id.* at 594.

92 *Id.* at 595 & n. 110.

93 *Id.* at 595.

94 *Id.* at 596.

95 *Who Owns the Air, supra* note 59, at 597, quoting [Current Developments] 9 Env't Rep. (BNA) 1958 (1979).

96 Hahn & Noll, *Barriers to Implementing Tradeable Air Pollution Permits: Problems of Regulatory Interactions,* 1 Yale J. on Reg. 63, 64 (1983).

97 Portney, *Reforming Environmental Regulation: Three Modest Proposals,* 13 Colum. J. Envtl. L. 201, 202 (1988) [hereinafter *Proposals*].

98 *Id.* at 207.

99 *Id.*

100 *Id.* at 208.

101 *Id.*

102 *Proposals, supra* note 97, at 208.

103 *Id.*

104 *Id.* at 209.

105 *Id.*

106 42 U.S.C.A. §§ 7410, 7501(3) and 7503 (West Supp. 1977).

107 Carter, *New Clean Air Act Amendments of 1990,* Natural Resources Law Newsletter (American Bar Association), v. 22, Number 3, p.1 (1991).

108 *Id.*

109 *Id.*

110 *Id.*

111 N.Y. Times, July 17, 1991, at A1, col. 1.

112 *Id.* at A14, col. 1.

113 *Id.* The price of these contracts will have a natural ceiling set at the current fine per ton that is assessed by EPA for exceeding the legal emissions limit. Above this price, the utilities may choose to pay the fine rather than the premium to acquire additional emissions rights. *Id.*

114 *Id.*

115 26 U.S.C.A. § 611 (West 1988).

116 Westin, *Environmental Taxes: Some Options,* 48 Tax Notes 355, 356 (July 16, 1990) [hereinafter *Options*].

117 *Id.*

118 26 U.S.C.A. § 613(b) (West 1988).

119 *Options, supra* note 116, at 356.

120 *Id.*

121 *Id.*

122 *Id.*

123 *Id.* at 358.

124 *Options, supra* note 116, at 358.

125 *Id.*

126 *Id.*

127 *Id.*

128 *Options, supra* note 116, at 359.

129 *Id.*

130 *Id.* at 356-57.