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## Marketable Pollution Permits: Their Values, Theory, and Application

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### *I. Introduction*

The Economic Council of Canada recently expressed interest in exploring alternatives to the traditional command and control model of pollution control. The marketable pollution permit (MPP) scheme proposed by Dales is one such alternative.<sup>1</sup> This idea will be examined to assess its potential for practical application. I conclude that the MPP idea has little potential for widespread application. It is not suited to replace the command and control model. There is potential for the supporting principles of the scheme to provide a useful adjunct to current regulatory controls.

The issue will be discussed in three sections. The first section will emphasize the value laden nature of the pollution control debate. The values incorporated in basic micro-economic analysis will be highlighted. I state my own views on what values are appropriate. Specific attention will then be given to the implicit values of an MPP scheme and cost benefit analysis. I end the discussion with the conclusion that there is good reason to be concerned about the values contained in these tools.

The second section examines the economic theory supporting an MPP scheme. It lays out the traditional arguments for rejecting the command and control model in favour of effluent fees. Next the arguments favouring the MPP scheme over the fees approach are examined. I conclude that MPP's have some advantages over an effluent fees approach.

The final section deals with the United States' efforts to capture the benefits of the economic theories in the field of air pollution control. The practical problems of implementing the theory are discussed. It is these problems that lead me to the position that it is only feasible to use the supporting concepts of the MPP scheme as an adjunct to current regulatory policies.

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\*The original version of this article was prepared in the context of a seminar on environmental law taught by Professor Mills at Dalhousie University.

1. J. Dales, *Pollution Property & Prices* (Toronto: University of Toronto Press, 1968).

## *II. A Value Laden Exercise*

Economic arguments are often presented as value free. I think this is clearly wrong. The purpose of this discussion will be to explain why I have reached this conclusion. To this end the basic assumptions of the standard perfect competition model will be explicitly stated. The values incorporated in that model will be explained and my own values will be stated. In light of that the reader can draw his own conclusion on my comments regarding cost benefit analysis and MPP schemes.

Briefly put, an MPP scheme prohibits any pollution unless the polluter has a permit. These permits create the right to emit a certain amount of specified pollutants for a particular length of time. Each permit is limited to its geographically defined market and they are transferable.

The basic model used in economic analysis is the perfect competition model. Its chief attraction is its prediction that wealth will be maximized in a perfect market. This is a justification for free market policies. Some of the major assumptions that the prediction of wealth maximization is based on include: full employment of resources, costless transitions of capital and labour, no seller or buyer is large enough to influence the market by its own actions, perfect information, no transactions costs and, that within each group of products no one item is preferred to another.

The model assumes that all relevant effects are fully priced. It also assumes that individual satisfaction is capable of being measured by the willingness people have to pay for products; that products can be traded off in relation to their price so that a different mix can leave the individual just as satisfied.

Obviously these assumptions are not met in real life. No one denies this. It is, however, important to keep them in mind when assessing how a theory will translate into practice. The values incorporated in this model are most evident in the adoption of wealth maximization as a value free goal. First of all it is based on the assumption of scarce resources (like all economic theory). The excess of wants over resources could just as easily be viewed as too many wants. Adopting the assumption of scarce resources reflects the view that nature should be shaped to man's desires rather than man shaping his desires to accommodate nature. This value choice is incorporated in all economic analysis.

Second, as Kronman points out, it necessarily involves a reference to other values.<sup>2</sup> As a goal it is inconsistent in that where different courses lead to the same total wealth it will not assist in the choice. It would support any of the choices even if they were made on the basis of opposing values.

Thirdly, Kronman argues it favours those with the initial entitlements by defining wealth maximization in terms of willingness to pay.<sup>3</sup> Only those views backed up with money count. No distinction is made between the importance of a dollar to a millionaire and the importance of a dollar to a starving person.

The perfect competition model extols the benefits of an unregulated free market based on its definition of wealth and the assumption of wealth maximization. These assumptions incorporate a specific view of man. It defines society as the sum of its individuals. Individual freedom, defined as an absence of coercion, is sought to be maximized.<sup>4</sup>

The view that individual freedom ought to be maximized and the definition of freedom as the absence of coercion are clearly value choices. Freedom could just as easily be defined as the freedom to enjoy a clean environment. Such an approach would yield very different results.

Society no longer adheres, if it ever did, to the conceptualization of individualism just enunciated. This is evidenced by the high degree of government regulation of the market place. Such intervention is strongly resisted by advocates, such as Nozick, of that view of individualism.<sup>5</sup> The government's involvement in income redistribution is also inconsistent with that conception of individualism as demonstrated by philosophers such as Hayek.<sup>6</sup>

I do not agree that the only points of view that count are those backed up with money. Neither do I agree with the approach to individualism that defines freedom as the absence

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2. A. Kronman, *Wealth Maximization as a Normative Principle* (1980), 9 J. Legal Stud. 232.

3. *Supra*, note 2, at 240.

4. D. Kennedy, *Form and Substance in Private Law Adjudication* (1976), 89 Harv. L. Rev. at 1728.

5. H. Hart, *Between Utility and Rights* (1979), 79 Colum. L. Rev. at 831.

6. F. Hayek, *The Constitution of Liberty* (Chicago: University of Chicago Press, 1960) at 231.

of coercion and seeks to maximize that ahead of all else. I state my values explicitly because they colour my analysis and my conclusions.

I believe that decisions as to what level of pollution control we are to have are fundamental value choices. As such they should remain political to emphasize their value laden nature. A weighing of the relative merits of more economic growth versus more environmental protection ought not to be portrayed as anything less than the conflict they envisage.

I generally support more environmental protection and less growth. This belief stems from the way I view the role of man in the world. I find unsatisfactory those explanations of the pollution problem which attempt to explain things in a very narrow framework. I find Sagoff's attempt to develop a right to environmental quality based on the Constitution of the United States as unconvincing.<sup>7</sup> Likewise, Tribe's attempt to explain pollution in terms of the development of immanence and transcendence in western thought is too narrow.<sup>8</sup>

Pollution is a world wide problem. It is not linked to specific ideologies. Both Sagoff and Tribe point to the fact that humans are basically want oriented. They draw different conclusions from this but it is, I feel, the central point in both their arguments. It is the basis for the choice of the assumption of scarce resources as opposed to the assumption of excessive demand.

Each person, as a person has certain basic needs. These stem from his very existence. One of these is a nontoxic environment. This surely provides a sound basis to develop a right to a clean environment.

Beyond this I think those who criticize our homocentric view of the world are correct. Such a view assumes that without us the world would have no meaning. It is this narrow view that Sagoff criticizes when he attacks those who desire a clean environment solely because it is beautiful.<sup>9</sup>

Having stated my values as best I can, there is one more point that needs emphasis before proceeding. The concept of

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7. M. Sagoff, *On Preserving the Natural Environment* (1974), 84 Yale L. J. at 228.

8. L. Tribe, "Ways Not To Think About Plastic Trees" in *When Values Conflict* (Cambridge: Ballinger Publishing Co. 1976) at 81.

9. *Supra*, note 7, at 223.

preference shaping or means-ends fluidity is very important. Economists assume preferences are independent of changes in resource allocation. This is not the way the world operates. What people expect is partly a function of what they have been exposed to.

The idea of a clean environment is relative. It is based on what we think is polluted. If we were exposed to different pollution levels, then our concept of a clean environment would change.

This is important because not only will the level of environmental protection achieved today affect that demanded in the future but the values expressed today will affect the values developed in the future.

Means-ends fluidity causes both Sagoff and Tribe to reject Stone's idea of giving standing to natural objects.<sup>10</sup> They objected to the fact that it was more a precedural device to give environmentalists standing rather than a real attempt to break away from a want oriented approach. Rather than attempting to encourage respect for nature as something valuable in and of itself this approach forces nature to fit into people's conception of their wants. The problems of translating values into such terms are discussed later in the context of cost benefit analysis.

The purpose of examining these economic tools is to see if they contain values that may shape the way people see things which are inconsistent with the values one is attempting to reinforce.

I have included cost benefit analysis in this discussion for two main reasons: 1) the issues involved are important in deciding between an MPP scheme and a fees approach; 2) as a widely used policy tool it might be used to decide the structures of an MPP scheme.

Before discussing how values influence these tools on a theoretical level, a very brief mention will be made on how they influence cost benefit analysis on a practical level. One major unresolved issue is the extent to which future benefits and costs ought to be discounted. Those who believe the market does not provide adequately for the future argue for a lower or zero discount rate.

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10. G. Stone, *Should Trees Have Standing: Towards Legal Rights For Natural Objects* (1972), 45 S. Cal. Law Rev. at 450.

Any discounting necessarily favours proposals putting costs on future generations and benefits on the present generation. Others feel the market adequately provides for the future and no explicit adjustments needs to be made.

The problems of measuring costs and benefits cannot be understated. This is especially true of what are called soft variables or fragile values. These are things that are not normally priced in the market such as the feeling of satisfaction some people get knowing an unspoiled piece of wilderness exists even though they may never see it. Sagoff strongly objects to cost benefit analysis in dealing with these because the choice of what values to count and how to measure them is subject to so much variation that the results of the analysis have little meaning.<sup>11</sup>

There is no market for these values so different survey techniques are used. This is expensive and the answers people give are not necessarily trustworthy. First, they may be influenced by whether the person feels their answer will affect their tax burden. Secondly, people have little experience pricing these values so it is difficult to tell how close they have come to how they really feel. Attempting to avoid the problem by having people rank things in order of priority does not work because there is no one logical order deducible from the results.<sup>12</sup>

There are tremendous difficulties in measuring the costs of pollution. The costs of gathering information not reflected in the market are large. Predicting future damage is made more difficult by nonlinear damage functions and interactions between the pollutants.

It is easy to see there are many areas where judgement calls must be made. These interject values into the analysis. Marketable pollution permit schemes are subject to these same

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11. *Supra*, note 7, at 223.

12. Arrow demonstrated that unambiguous collective rankings do not necessarily result from unambiguous individual ranking. Consider this example of three different individual orderings: ABC

BCA

CAB

213 prefer A to B, 213 prefer B to C and though one expects 213 to prefer A to C in fact 213 prefer C to A. K. Arrow, *Social Choice to Individual Values* (2d).

difficulties in deciding for instance what number of permits to issue. Aside from these practical problems there are effects that flow from the very act of using either cost benefit analysis or an MPP scheme.

The use of these techniques assumes that people express the same preferences in the market as they do as a collective body. Sagoff argues that in fact people think about these things on two different levels, a private level and a public level.<sup>13</sup> If this is so, any attempt to reflect the allocation a perfect market would make would still not reflect what society as a collective body might desire.

This argument directly addresses the assumption that society's preferences may be revealed by the summation of individual market decisions. To my mind it is plausible that different answers result from the questions 'How much should society spend for X?' and 'How much would you spend for X?', assuming aside measurement problems. Whether there is a social consciousness separate from the sum of individual consciousnesses is, I think, a matter of legitimate debate.

A related argument is that people think of things that are priced, differently than those that are not. The very act of assigning a price to a previously unpriced value will change the way people feel about it. Kelman calls this the downvaluation effect.<sup>14</sup>

Tribe describes this effect as stemming from a flattening of an inchoate sense of obligation to another person or thing as that person or thing into an expression of self interest measured in dollars.<sup>15</sup> He also points to a shortening of discontinuities in that no amount of money could fully compensate for the elimination of a species, so any attempt to measure it will necessarily fall short.<sup>16</sup>

An example of this at work may be seen in the health care field. Society allocates only a certain amount of money to treatment and research. Using cost benefit analysis one would conclude that society has decided the benefit of saving more

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13. M. Sagoff, *Economic Theory and Environmental Law* (1981), 79 Mich. L. Rev. at 1394.

14. S. Kelman, *What Price Incentives* (Boston: Auburn House Publishing Co., 1981) at 59.

15. *Supra*, note 8, at 74.

16. *Supra*, note 15.



lives by increasing expenditures is no longer worth the cost of those expenditures. It could then quantify the value of a human life and decide if the benefits of additional spending were worth more in the national defence area, for example, than the medical services area.

I think there is a difference between saying the value of a life is \$189,576.35 and saying the health budget will be increased by 6 percent, even if the spending of an additional \$189,576.35 would save another life. I agree with Kelman that any attempt to price all the values that go into a decision would decrease the esteem with which we regard them.

Some might argue this is only a cowardly fiction. Such an argument presupposes that there is some completely value-free reference point to judge what is true and false. It also presupposes fictions have no value. I disagree with both points. This so called cowardly fiction allows one to make necessary allocational decisions without attempting to price the value of a human life. This preserves a belief in the sanctity of human life, that has long found expression in society. At some point this separation could mask hypocrisy because without a meaningful commitment by society, how can it be said that people really value life. This tension does not however, destroy the usefulness of the fiction in the first place.

A market is based on the pursuit of self interest. Anything that emulates or expands its application will foster an increased amount of self interest. To the extent society values altruism or spontaneity it should be careful about adopting tools that incorporate antithetical values. The resulting decrease in altruism is what Kelman calls the feeling fall off effect.<sup>17</sup>

In summary, I feel that cost benefit analysis and MPP schemes contain values that conflict with the values supporting a desire for increased environmental quality. The three main reasons for this conclusion are: that people make different judgements on a public as opposed to private level; that pricing values leads to a decrease in their worth; and that these tools foster the pursuit of self interest in an area when that is not appropriate.

Despite what I think to be convincing arguments to the contrary, some people such as Tribe continue to assert there

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17. *Supra*, note 14, at 56.

is no theoretical reason why cost benefit analysis should not be used in the environmental field ie. it's value free.<sup>18</sup> Tribe rejects the idea that “. . . values and ends are reducible to logically arbitrary expressions of will or desire . . .” because it leaves him in a subjective position.<sup>19</sup>

Tribe appears to identify a relativistic position with his concept of transcendence, choice without principles, which leads to dehumanization.<sup>20</sup> Such drastic results do not necessarily fall from the adoption of a subjective stance. Nothing precludes one from adopting a set of values and acting consistently with them. One can argue that they are the best, just not that this is objectively verifiable. Based on the rest of Tribe's position I must say I am not convinced that he has fully thought through the argument, given his summary dismissal of it in a footnote.<sup>21</sup>

The argument that cost benefit analysis can adjust for the downvaluation effect completely misses the point. This assumes that the adjustment plus the price (set in a market for instance) are equal to the initial worth of the value. In other words, the adjusted price now represents the true worth of the value. The whole problem began however, with the assumption that a price could not fully reflect the worth of a value and any attempt to compensate by increasing the price will necessarily fail for the same reason.

The affects of preference shaping make it important to recognize the values contained in the tools used to pursue one's goals. If, as I believe, cost benefit analysis and MPP schemes contain values inconsistent with those I seek to reinforce by the use of those tools there exists a fundamental conflict. For example, if MPP's are used, the creation of this private property 'right' may well change the way pollution is viewed. For those who object to pollution, the creation of a right to pollute would not be attractive. I think this would be so even though the MPP was designed according to collective input regarding conflicting values.

While the adoption of these tools may encourage values

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18. L. Tribe, *From Environmental Foundations to Constitutional Structures: Learning From Natures Future* (1974), 84 Yale L. J. at 545.

19. *Supra*, note 18.

20. *Supra*, note 8, at 79.

21. *Supra*, note 18, at 551.

inconsistent with the reason for their adoption, this alone is not sufficient reason for outright rejection. If these tools are more effective than alternatives in achieving desired goals, then better results will be achieved with them. Results are important because the environment that people expect is partly a function of what they are exposed to. If rejection of these tools because they contain values inconsistent with the objectives sought leads to a failure to achieve the objectives and results in an erosion of original values it becomes a classic 'dammed if you do, dammed if you don't' situation.

I would be much more reluctant to adopt cost benefit analysis than an MPP scheme. Cost benefit analysis is a decision making tool whereas MPP's need some outside decision maker to determine its structure (ie. determine the number of permits). The impact of the downvaluation effect etc. is, I think, more important in setting directions for society. The MPP allows for collective input into the structuring decisions which do not require all values to be priced.

I think it is best to make these decisions on a collective ie. political level, as opposed to using cost benefit analysis and shifting the focus to the administrative setting. There is a conflict here in the desire to see nature valued as something good *per se* to have environmental quality viewed as a legitimate right, and the desire for majoritarian input. Even with all the faults of current legislative structures, I would rather have an open decision based on societal values than perfunctory bureaucratic decisions.

Without wandering further I shall endeavor to succinctly state my conclusion. Cost benefit analysis and MPP schemes are value laden tools. These values are inconsistent with values promoting environmental quality. Cost benefit analysis poses more cause for concern because it is a decision making tool and the quantification process lends itself to administrative rather than collective decision making.

### III. *The Economic Rationale of MPP's*

Returning to the beginning of the paper it will be remembered that one of the assumptions in micro economic theory (on which all the efficiency arguments are based) is that everything is priced. This assumption in turn is based on the concept of a private good, one which you can exclude others from

enjoying. The air and water are public goods. By and large it is not practical to exclude others from their use. This poses problems because each individual does not consider the costs his use imposes on others.

The classic explanation of this problem in the context of the fisheries, is that of Scott Gordon.<sup>22</sup> His point is that this nonexcludability characteristic creates an incentive to over-utilize the resource. A fisherman would not regulate his catch to provide for the future because he could not keep another fisherman from catching the fish tomorrow that he did not catch today. The only way to be sure to benefit from that fish is to catch it today, even if the fisherman is well aware he would be better served by not catching it if the fish could be allowed to reproduce to replenish the stocks.<sup>23</sup>

Air and water being common property resources are likewise overutilized causing pollution. The standard economic response was to advocate measures that would price the use of a common property resource like air to reflect its true costs, so that the polluter would no longer treat it as a free good. This would create an incentive to use less of it. The increased price of the goods would reflect the costs of using the common property resource. Society would reallocate its spending in response to the new signals to achieve an efficient resource allocation.

I think it is important, before proceeding further, to examine the fundamental challenge Coase put forward to this point of view.<sup>24</sup> Coase argues that placing the cost of pollution on the polluter will not, contrary to the standard assumption, result in a change in behaviour of the polluter. He therefore contends there is no *a priori* reason to assign the cost to the polluter. If he is correct then the theoretical grounding of the MPP scheme is very insecure because it is a derivation of the mainstream economic arguments.

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22. H. Scott Gordon, "The Economic Theory of a Common Property Resource: The Fishery" in *Economics of the Environment* (New York: W. W. Norton & Co., 1977) at 111.

23. With a private resource one would stop producing when the marginal revenue of the last unit equalled the marginal cost. With a common property resource production would continue past this point until average revenue equalled average cost, thus dissipating the rent that could have been generated on the intramarginal units.

24. R. Coase, *The Problem of Social Cost* (1960), 3 J. of Law Econ. 1.

The proposition that liability rules will not affect allocation is counter-intuitive. It relies on the role of bribes. Standard theory assumes that the common property user does not consider the cost his use imposes on others. Coase argues that he does consider these costs.

Given all the standard assumptions of economic theory Coase argues that the person suffering damage would be willing to pay the user an amount up to the damage caused if the user would stop inflicting the damage. Any decision to increase the size of the common property resource would include a calculation of the bribe foregone at equilibrium. This amount will be equal to the damage the user causes. As this is precisely the amount that changing the liability rules to make the user liable would place on the user, there will be no change in his costs. His behaviour therefore will not change.

I think that Coase's model does not accurately represent the situation. Even if one accepts his argument that different liability rules will not affect long run resource allocation<sup>25</sup> there are other reasons to suspect that his analysis will not yield the predicted results. He adopts the standard assumption that preferences are independent of allocations. If this was true, people would give the same answer to the question 'How much would you pay to decrease pollution?' as they would to the question 'How much would you need to be paid before you would allow an increase in pollution?' (the increase and decrease being equivalent).

This is not accurate for two main reasons. In the first place the initial allocation of the assets will affect the income distribution, hence the respective abilities to pay. Assigning the asset to individuals would increase their income allowing them to purchase more pollution control. In the second place, the initial assignment of the rights to individuals would shape their preferences in favour of more pollution control.

The presence of risk aversion in the populace would lead them to different choices depending on the initial assignment.

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25. G. Calabresi, "Transactions Costs, Resources, Allocation & Liability Rules" in *Economics of the Environment* (New York: W. W. Norton & Co. 1977) at 253. For this result to hold true there would have to be perfect price discrimination in a perfectly competitive market. It is not at all clear why this unusual result would be obtained.

There is evidence suggesting people view quite differently the act of being exposed to a risk depending on whether they pay to avoid it or are paid to encounter it.<sup>26</sup> To the extent people view pollution as risk creating this would clearly result in different answers to those questions.

The existence of transactions costs and information costs means that initial allocations will make a difference. In the majority of cases it will lead to too much pollution. This results from the fact that polluters are generally a smaller group than pollutees. There are tremendous costs involved in trying to organize diffuse interests (where each has suffered minor damage). There are also large costs in trying to trace the cause of pollution when there are multiple sources emitting similar pollutants. These factors would cause an under-representation of the diffuse interests due to their relatively higher costs of organization.

In summary, I conclude there are very good reasons to believe that changing the initial allocation of rights to internalize the costs of pollution on the polluter will result in a different allocation of resources. I have spent so much time on this point because it is fundamental to the economic theory that follows that firms will alter their behaviour in response to a change in the cost of polluting.

Economists generally recommend cost internalization measures over the command and control model of direct regulation, or subsidization. The usual form is an effluent fees proposal whereby a price for each unit of pollution discharged is levied against the polluter. The polluter then chooses how much pollution he will discharge.

Regulation is rejected by economists mainly because of the costs it entails. Across the board regulations make no allowance among firms for the fact that some firms may cut back pollution much more cheaply than others. A fees system accounts for these costs by leaving the decision to the firm as to whether it would be cheaper to abate than pay the fee. Advocates of fees claim that the resulting reallocation of abatement effort could achieve the same level of pollution control at substantial cost savings.

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26. M. Kelman, *Consumption Theory, Production Theory and Ideology in the Coase Theorem* (1979), 52 S. Cal. L. Rev. at 682.

Economists admit that it would theoretically be possible to reach the same result if regulations were tailored to each individual firm's costs. The cost of obtaining estimates of the relevant cost functions and of administering the complex regulations are generally accepted to preclude this option.<sup>27</sup>

Another argument is that regulations only provide incentives to meet a standard. Effluent fees provide incentives for a continued effort to cut back because the polluter pays for every unit discharged.

Subsidization is another form of handling pollution control that is generally rejected in favour of fees. Capital write-off provisions in Canada allow a deduction for taxes of 50 percent of the undepreciated capital cost of investment in pollution control.<sup>28</sup> The problem is that it still costs the firms something and they earn no money on pollution control investment. This lack of incentive to decrease pollution has led to this scheme's rejection by economists.<sup>29</sup>

It would be possible to structure subsidies based on the amount of pollution cut back. This would be the mirror of an effluent fees approach. It would create real incentives for firms to abate. The problem is that there is no natural level for the subsidy as it is based on a calculation of foregone production. Presumably it would be paid to those that closed down and decreased emissions to zero and those that would have started up but for the subsidy. It would be an administrative nightmare.

Dales followed the standard line of analysis to this point but rejects the effluent fee approach in favour of his MPP scheme. The MPP scheme is designed to attempt to correct some of the problems encountered with effluent fees. One of the main problems it was to solve was the difficulty in setting the fee at the correct level.

The argument for fees flowing from standard analysis is that by setting the fee equal to the damage caused by the pollution the market would yield an efficient result. The cost of pollution

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27. *Supra*, note 1, at 86.

28. Strikeman, *Income Tax Act* (annotated) Richard DeBoo Publishers (Toronto: 1968).

29. Seneca, Tausig, *Environmental Economics* (Englewood Cliffs: Prentice Hall, 1979) at 239.

would be treated like any other cost the firm encountered. This is called the damage cost pricing approach.

This approach would require a large administrative agency because it would be necessary to set different fees for different sources because not every unit of pollution does the same damage. Even the most ardent advocate of a fees approach compromises here to some form of across the board fee structure. Clearly at some point the extra administrative costs are not justified by the minimal efficiency gains. Yet even with the compromise the measurement problem remains.

The time of the year affects the ability of the environment to assimilate pollution and would presumably have to be accounted for. Tracing the damage to one source in a multi source area could prove impossible. The presence of thresholds complicate things. If no damage is caused until  $X$  is exceeded, is it only the  $X + 1$  unit that causes the damage or is there some other allocation? The same problem occurs when two or more chemicals react to form a harmful substance. How is the damage to be allocated amongst them? These are just some of the problems that exist in measuring the physical effects.

The physical effects are most likely easier to measure than the damage to such things as aesthetics. Attempting to measure these soft variables get into all the problems mentioned earlier dealing with pricing values in cost benefit analysis. These problems essentially reduce the process to a blatantly arbitrary exercise.

This has led to the adoption of result oriented pricing. The claim to efficiency is abandoned. In its place is the argument of cost effectiveness. This was the argument I used in initially describing the fee approach because it is the most common way it is presented. As previously stated, no firm would abate if it was less expensive to pay the fee. The result is that those firms that can abate the most cheaply cut back the most, resulting in savings to society. Marketable pollution permits rely on this same idea. The polluter is left with the choice of abating or buying another pollution permit on the market. The permit price has the same effect as the fee.

An argument for the superiority of an MPP scheme is that it provides more certainty as to pollution levels with less information. All that is necessary is to decide how much



pollution is permissible and set the number of permits at that level.

This argument assumes quantity is the most important consideration. Both schemes can achieve the same results. A fee approach requires more information about firms' production functions to estimate the result of different fees but gives more certainty as to the price effects. Depending on whether the cost or the amount of pollution is more important, one would be preferred to the other. This preference could change for different pollutants ie; society may be more concerned with costs where only aesthetics as opposed to health concerns are involved.

Marketable pollution permits do not necessarily create more certainty for investors. It is argued that fees would have to be experimented with at first, due to imperfect information, in order to determine what response the polluters will make to different fees. The MPP has its own source of uncertainty.

The MPP's are set for a fixed time. The choice of this time period is very important. If it is too short then there will be very little certainty in the market because the authorities can always decide to change the number of new permits it will issue once the old ones have expired. It would be difficult if not impossible to predict the cost of pollution permits in the future if they were subjects to frequent arbitrary supply changes. The willingness of industry to commit itself to large long term commitments of money in pollution control in that atmosphere of uncertainty is unclear.

If the time period is lengthened to create a stable investment environment it will decrease governments ability to respond to new information. How this balance between the desirability of certainty for investment decision making and the desire to preserve the ability to respond to new information should be struck is a difficult question to which I have no satisfactory answer.

Dales correctly points out that it will be necessary for the authorities not to change the number of permits before the old ones expire.<sup>30</sup> If new permits are issued midstream in response to industry pressure then the whole pricing mechanism will be thrown into confusion. The price is set on the

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30. *Supra*, note 1, at 95.

assumption of a fixed number of permits. Any increase in the number of permits would dilute the value of the original permits.

In summary, the attractiveness of the certainty arguments rests on the assumptions that: the quantity of pollution is more important than price; the time period of the permits is long enough to provide a suitable investment climate; and the authorities do not bow to pressure to change the number of permits prematurely.

Another argument for MPP's is that it automatically accounts for inflation whereas fees would have to be continually re-adjusted. This is correct but does not necessarily mean that the fees would not keep up with inflation.

A fees scheme is said not to deal with the problem of entry into the market. As long as a firm pays the fee it can enter. With MPP's the entry is accounted for by the fact that the increased demand for the permits automatically increases the price. This is true as far as it goes but what is to prevent the authorities from increasing the fee to account for growth. In the same vein it is possible that the government could decide to issue more permits when they are up for renewal if it is felt the limited supply has created an overly high price that has unduly inhibited growth.

Some argue a permit system would be at least partially self enforcing. I doubt there will be any significant effect here because of the necessity to monitor emissions to detect violations. While individual permit holders have an interest in seeing the rules obeyed so the value of their permits do not get diluted, they do not have the resources or power to monitor all the other participants in the market. For this reason I feel enforcement will be primarily a public responsibility.

In the end the choice between a fees versus an MPP approach largely rests on whether you are more concerned with levels of pollution or costs of pollution abatement as the other arguments for and against lend little to either side. I would adopt the MPP proposal because it accomplishes directly what the result oriented fees approach attacks only indirectly. Only if the cost of pollution control was clearly the overriding concern would I adopt a fees approach.

A couple of final points on this area. Both MPP's and fees are only practical for point source emissions of pollution. Dales

clearly recognized that the monitoring problems with non-point source discharges would be insurmountable.<sup>31</sup>

Both these models are talked of in the context of classical air and water pollution. A fair amount is known about these areas. This knowledge allows informed decision making in setting up the parameters. No such knowledge is available in the environmental risk type pollutants (ie. heavy metals, new drugs, cancer causing agents). If as Gelpe and Tarlock feel these will be of increasing importance in the future,<sup>32</sup> these models will have a decreasing chance of applicability. With the level of obsolescence of knowledge in that area as well as the general uncertainty, all the problems discussed in determining the life of an MPP would be exacerbated across the board.

#### IV. *The Practical Application of Theory*

The theoretical arguments of economists have not been very influential in the past. The Economic Council of Canada's recent expression of interest in this area may foreshadow changes in Canada.<sup>33</sup> In the United States some efforts have been made to accommodate the economic cost effectiveness arguments in air pollution regulation.

The 1970 *Clean Air Act* (CAA) set pollution targets based on health not economic criteria, secondary targets of general welfare protection (ie. aesthetics) included cost considerations. The potential cost of meeting these goals became so great that by the mid 1970's it was recognized that cheaper ways of attaining pollution control goals had to be found.<sup>34</sup> Offsets, bubbles and banking were created in response to this pressure.<sup>35</sup>

The offset was designed to allow development in areas where the pollution levels would have precluded new development under the original legislation. If the new emission source could find an existing comparable source or sources and obtain a reduction from them greater than the new source's planned

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31. *Supra*, note 1, at 98.

32. Gelpe, Tarlock, *The Uses of Scientific Information in Environmental Decision Making* (1974), S. Cal. L. Rev. at 371.

33. *Supra*, note 2.

34. J. Lanclair, *Who Owns the Air? The Emission Offset Concept and Its Implications* (1979), 9 *Env't'l L.* at 578.

35. J. Gonzales, *Markets in Air: Problems and Prospects of Controlled Trading* (1981), 5 *Harv. Env't'l L. Rev.* at 377.

additions then it would be allowed to proceed.<sup>36</sup> Reasonable further progress toward the air quality goal was made and growth was accommodated. The offsets can be more easily generated by sources which can abate more cheaply. Offsets thus create incentives to allocate abatement efforts to the most cost effective source.

The bubble concept treats emissions from several sources as emissions from one source. A firm can cut back different amounts at the different sources so long as the total emissions from all sources is acceptable. Obviously, a firm would abate the most at the cheapest source. This saves money when compared to across the board reductions previously enforced in the regulations.

Banking is an extension of the offset concept. Originally the decrease from the existing source had to be substantially contemporaneous with the increase from the new source.<sup>37</sup> Banking allows firms a credit, which may be saved when they reduce their pollution level more than they are required. It can later be traded to another firm or kept for the firm's own use. It should allow for more active offset trading.

Needless to say, these programs have not been trouble free. The practical problems of implementing an MPP scheme are very large. Some of these problems will now be discussed with reference, where appropriate, to the problems experienced in the United States. Another of the main areas of concern in an MPP scheme is the accurate monitoring of pollution to ensure the permits are being complied with. The problem is more acute for an MPP scheme than in the normal command and control model.

Under the *CAA* technology forcing is the method used to move towards pollution goals. This requires that inspectors check facilities to see if they have the appropriate equipment in place and working (not a small task). Regulations limiting discharge concentration only require sufficient periodic monitoring to pose a reasonable threat of being caught. With an MPP there has to be continuous monitoring to see if the emission limit is being complied with. Just to measure stack

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36. *Id.*

37. P. Reed, G. Wetstone (ed) *Air and Water Pollution Control Law: 1982* (Washington: Environmental Law Institute, 1982) at 244.

emissions there has to be measurements of flow, pressure, temperature, and concentration at several points in the stack.<sup>38</sup> While continuous monitoring might not be necessary for permits based on ambient air quality, these permits have a number of other problems which will be discussed later.

A major problem with any MPP scheme is the market and permit design. Without examining the banking regulations of each state I could not say how this problem is dealt with in the United States.

A permit may be based on the amount of pollutant emitted or the effect the emission has on ambient air quality. The ambient air quality approach is theoretically superior because it measures the results of emissions, which is what we are concerned with. It is generally rejected as impractical because of the extra cost involved.<sup>39</sup> It would necessitate firms holding several different permits based on the ambient effects at various locations and complex modelling to determine the impact on air quality of each firm's emissions.

The problems of undifferentiated quantity permits is that they would permit a concentration of polluters in one area. This may be alright where the pollutants have few localized effects (ie. chlorofluorocarbons) but for any pollutant that has localized effects it would allow pollution levels to grow to a hazardous level.

To the extent the existing market contains regions that are relatively clean it would be desirable to prevent them from becoming as polluted as elsewhere. This assumes a value decision has been made in favour of environmental protection.

The concentration problem poses health concerns; the diffusion problem, softer value concerns. Both these suggest a need for geographic differentiation in the permit to influence where polluters emit. That is to say the permit would have varying values depending on where it was to be used. This necessarily complicates the market structure and increases costs. Noll's analysis suggests that there is very little to be gained from geographic resolution.<sup>40</sup> He considers only

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38. *Supra*, note 35, at 389.

39. Noll, "The Feasibility of Marketable Emission Permits in the United States" in *Public Sector Economics* (Toronto: McMillan, 1983).

40. *Supra*, note 37, at 256.

abatement costs in his analysis.<sup>41</sup> He also assumes an even starting distribution<sup>42</sup> of pollution thereby not considering the possible health consequences where economies of scale leads to concentrations of polluters. He factored out the very considerations in favour of a geographically differentiated permit. It is, therefore, not surprising he reached the result he did.

A possible way to avoid the complexities of geographically differentiated permits would be to set the market boundaries in such a way to form regions of relatively equal air quality. An undifferentiated permit would not affect location decisions by polluters. There would be no reason to expect a diffusion or concentration of pollutants. The problem is this may create so many small markets as to make the administrative costs prohibitive. Small size could also stifle the viability of a market by limiting the number of participants which in turn may affect the level of transactions.

The concern over market size is very real. There must be enough trading to create a regular price for a permit and give people confidence that they will be able to buy in the future if they sell today (otherwise they may not sell today). Without an established price the MPP scheme will be of more limited effect. Firms will still reallocate pollution abatement effort to the least cost source within the firm but will not have a ready measure to compare themselves to other firms. The result is it will be difficult for a firm to tell if it should cut back more and try to sell the extra permits or cut back less and buy more. The problem is that without confidence in the market polluters will be unwilling to sell off permits but until people start selling and buying in numbers the market will be too sparse to inspire confidence, a catch 22 situation.<sup>44</sup>

The number of participants is important to establish this level of transactions. An established price will allow a ready calculation of the cost of holding a permit versus abatement. If the number of participants is too small the price may be fixed or some of the larger firms may try to squeeze out their competitors by cornering the permit market. In Los Angeles

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41. *Supra*, note 39.

42. *Supra*, note 37, at 258.

43. *Supra*, note 39.

for example 10 companies emit 85 percent of the sulfur oxides.<sup>43</sup> The banking set up in the States only credits amounts by which companies decrease emissions more than required. It would not, therefore, be possible to force competitors out of business by cornering the market.

Large transactions costs will also inhibit the number of trades. The development of banking was partly a response to the large transactions costs involved in trading offsets. It was difficult to find suppliers so most of the trades occurred within the same firm.<sup>45</sup> Large transactions costs have also sparked the approval of a streamlined procedure for obtaining a bubble.<sup>46</sup> Prior to this the costs only made it worthwhile in a few large applications (18 were approved with average savings of \$2,000,000 each).<sup>47</sup>

Obviously not all types of emissions are equally serious. The definition of the categories of permissible trades will also affect the viability of the markets. A wide definition provides more participants but allows the possible substitution of more harmful for less harmful pollutants. The EPA currently restricts trades to within each of the criteria pollutant groups they monitor (ie. sulphur oxides) with the condition that the more harmful ones are not substituted for less harmful ones.<sup>48</sup>

The decision on how to allocate the permits is probably politically the most thorny, and therefore practically the most important problem is setting up an MPP scheme. The permits might be auctioned off or distributed free to present polluters. This discussion shall concentrate on the broader debate as to whether the permits should be sold or given away, not on how each goal would be carried out.

The banking provisions in the United States have been

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44. Note *A Remedy for the Victims of Pollution Permit Markets* (1983), 92 Yale L. J. at 1022 discusses the difficulties in remedying the structural deficiencies of the market. It concludes that the best course is to create a cause of action to allow those injured by high localized pollution levels to be compensated by the government. This conclusion implicitly accepts that the scheme is of itself worthwhile.

45. *Supra*, note 37, at 255.

46. E. Saideman, *An Overview of the Bubble Concept* (1983), *Colum. J. of Envi'l L.*, at 157 describes the pressures leading up to a streamlining of the process designed to decrease the costs of getting approval for a bubble.

47. *Supra*, note 39.

48. *Id.*

harshly criticized for what is perceived to be a giving away to industry of property in the air.<sup>49</sup> Economists generally pay little attention to this allocation problem. If the concern is environmental quality then people decide on what level of protection they want, that number of permits is issued and that level of protection is obtained. Allocation will not affect the result.

It is also argued that in general equilibrium it makes little difference how they are allocated. If industry pays, consumers pay higher prices but get lower taxes (government revenue increases). If industry gets them free both taxes and prices are the same. However, the two groups, taxpayers and consumers are not identical groups. Evidence suggests the net benefits are allocated regressively if industry pays.<sup>50</sup> Economists generally separate the distributional impacts of their proposals arguing that these side effects are best dealt with directly. Given the scarcity of such direct dealing I think that such impacts must be considered and weighed with other competing interests when the decision is made.

Even assuming that each person would be in exactly the same dollar position under either allocation (equal incomes, identical consumption, same taxes) I think there are legitimate reasons for distinguishing between the two allocations. One argument rests on the previously discussed idea that people weigh things differently in their public role as opposed to their private consumption patterns.

Allocating the MPP to industry at no charge may be seen as society surrendering its rights in the common property resource. To the extent there is a separate sense of the collective, the fact that individuals are in the same position will not meet this concern. The fact that there was collective input into the organization of the scheme will not prevent this problem. It is this perception that polluters should pay society that is important.

If the idea of a separation of public and private roles is rejected it is quite possible to object that this is just a fiction. While not wanting to debate whether there is in fact a sense of collectivity (as opposed to society being the mere sum of

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49. B. Akerman, D. Elliot, *Air Pollution Rights* (1982-83), Yale Law Report.  
50. *Supra*, note 29, at 127.



individuals) I would argue that fictions are important. It has been argued that all our legal theories are fictions representing value choices.<sup>51</sup>

To the extent one views pollution as undesirable then it would not be desirable to give industry a valuable asset for doing something regarded as undesirable. This is a development on the preference shaping argument that creating a right to pollute in the first place tends to legitimize pollution. Giving that right away for nothing would reinforce this by society apparently attaching so low a value to this right.

This would be so even though a polluter may not emit any more pollution than under the command control model for free. In that model though, there is a clear impression that society is in charge and polluters must tow the line (again it is impression that counts here). What weight is placed on this argument depends on what value people place on maintaining the stigma attached to pollution. I think it is valuable. I do not think all polluters are evil despoilers of the environment or that all pollution can or should be eliminated. I do think there is too much pollution now and fear that a legitimization of pollution may lead to acquiescence in efforts to improve the environment.

The force of these arguments decreases in considering the United States' banking provisions. There, because the credit is only given for exceeding the required cut backs, the values of the command and control model are clearly visible. One could view it as society not giving away anything because the set up clearly indicates these cutbacks are more than what society originally required.

Even after deciding who to allocate the permits to there are many practical problems to overcome. In attempting to design an MPP scheme for chlorofluorocarbons the organizers found that they had vastly overestimated their ability to educate people as to the rational of the scheme.<sup>52</sup> This is economic language for the assumption that if people only understood they would agree with you because the answer is so obvious.

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51. R. Samek, *Fictions and the Law* (1981), 31 U. of Toronto L. J. at 290.

52. M. Shapiro, E. Wachtel, *Marketable Permits: The Case of Chlorofluorocarbons* (1983), 23 Nat. Resources J. at 591.

These organizers found that even after deciding to allocate the permits free of charge the decision of which polluters (manufacturers, first line users, end of line users) to issue the permits to was one of their most difficult tasks.<sup>53</sup>

They also found that another thing economists tend to ignore, short run transitional effects, posed large problems in trying to arrange an implementation plan.<sup>54</sup> Any decision to sell the permits would clearly favour the firms in a stronger financial position at the time. An economist is not too concerned if a few firms go bankrupt because he assumes full employment and mobile capital and labour. In current economic conditions the assumption of available alternate employment is often not tenable. Besides the possibility of political pressure there are legitimate theoretical grounds for objection.

Another argument not often considered is the 'second best' argument. When these MPP schemes are considered they are often done on a narrow basis ie. chlorofluorocarbons. If they place higher costs on that industry than others, by selling permits for example, it will result in sectors prices increasing artificially in relation to other sectors with other less strict pollution control. This change will distort the resource allocation by causing an overly large contraction of that sector. It is also interesting to note that all of these problems developed with a substance which due to its nongeographic impact was very well suited to an MPP approach.

A brief note should also be made of the fact that as the advanced economies opt for more pollution control and less growth the pressures for income redistribution both nationally and internationally will grow. It will no longer be possible to point to a growing pie in efforts to defer redistribution claims.

In summary I think the organizers of chlorofluorocarbon MPP schemes are correct in their conclusion that it is the things economists pay the least attention to that create problems in attempting to implement an MPP scheme.<sup>55</sup> On the administrative side there are large problems in designing the permits and markets as well as in the monitoring and

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53. *Id.* at 590.

54. *Id.*

55. *Id.*

enforcement. On the political side the allocation question and possible short term dislocations are capable of generating a lot of pressure. Added to this is the preference for a tried and true methodology. All these factors lead me to conclude that MPP proposals have little practical appeal. I think that the emergence of toxic chemical problems into the forefront of environmental concerns will also lessen interest in MPP schemes. I think their big benefit is sponsoring a search for more cost effective ways to employ the traditional command and control model. While the efforts in the United States show such developments are not without problems they also show that substantial cost savings are possible. More importantly these developments demonstrate that it is not necessary to dismantle the command and control model to employ cost effectiveness arguments.

### V. Conclusion

There are sound theoretical reasons to believe that a MPP scheme would achieve the same level of pollution control as the traditional command and control regulatory model at a much lower cost. This result would be achieved by creating a market in pollution which would allow individualized responses by producers. The profit motive would result in abatement effort being directed at the sources which could most easily be cleaned up rather than demanding that all producers meet one standard regardless of individualized cost differences.<sup>56</sup> Due to the values incorporated in economic analysis and the technical difficulties of establishing the scheme I have concluded that the theoretical promise of a MPP scheme, at most, translates into possibility of subsidiary relationship with the current command and control model.

The values that lead people to advocate environmental protection are often not in accord with the implicit values of economic theory.<sup>57</sup> Any attempt to set the level of permits on efficiency or cost benefit criteria assumes that the environment is something that derives its value solely from the use people make of it. It also assumes that there is some hypothetical market where it is possible to price all the effects of pollution.

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56. See *infra*, at 12-21.

57. See *infra*, at 2-12.

This market is very difficult to imagine given the complex and diverse effects of pollution, especially given the fact that there is no where near the perfect information necessary to contemplate this result. The very concept of profit maximization is in itself value loaded. The assumption that a price can fully represent the value placed on the environment is difficult to maintain in the absence of rational maximizers with perfect information.<sup>58</sup>

To the degree that the level of permits is set on criteria other than efficiency and cost benefit concerns some of the above problems are of less importance. Nonetheless the concerns over the effect of explicitly pricing pollution in the market remain to the extent that the very act of pricing changes the way the environment is viewed.<sup>59</sup> These concerns are accentuated if the permits are distributed free to current producers. This type of distribution says either that the producers always had a right to pollute or that while people have a right to a clean environment a certain amount will be given away for free. I believe these type of arguments from the basis for the opposition of environmentalists on license to pollute grounds.

Adopting a MPP scheme poses dangers to many environmentalists because it incorporates values antithetical to those sought to be reinforced. The existence of preference shaping strengthens this concern, but also poses a harsh dilemma.<sup>60</sup> If economic tools are rejected because of these concerns there exists the risk that the environment will deteriorate to a greater degree because of the ineffectiveness of the current approach. This result would shape people's conception of what clean is and may lead to a decrease in the level of protection obtained, exactly the opposite result that environmentalists wish to achieve. In short they are caught between a rock and a hard place.

There are a great number of technical problems which likewise impede the implementation of a MPP scheme.<sup>61</sup> It would be difficult to structure a market with a sufficient level of transactions to operate effectively. There are problems in determining the tradability of different pollutants, of avoiding

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58. See *infra*, at 5-9.

59. See *infra*, at 8-10.

60. See *infra*, at 12.

61. See *infra*, at 21-30.

harmful local concentrations, and of appropriate geographic delimitation. The monitoring and enforcement as well as the market infrastructure may impose significant costs. The allocation of the permits is probably the most difficult practical problem.<sup>62</sup> To give them to current producers not only raises objections from environmentalists and potential producers but also from actual producers as no one method can satisfy all producers. It would also create an additional barrier to new entry in the market. To sell the permits would raise stiff industry opposition to the short term dislocations caused by increased costs to them.<sup>63</sup>

In a short while it is true that potential savings to society from the implementation of such a scheme are great, the values implicit in it as well as the technical difficulties in applying the theory will as a practical matter limit its impact to a subsidiary role. In that role it ought to be possible to obtain significant cost savings by sensitizing the regulatory system without raising all of the concerns of a full scale conversion.

This conclusion undoubtedly reflects a particular value choice that the possible savings of a full scale MPP scheme are not worth its costs. It also reflects an assessment of the likelihood of the political process implementing a scheme which while saving money in total greatly redistributes the incidents of costs and benefits. It is important to realize that any decision on this matter represents a particular philosophical position. Any attempt to deal with this matter must take account of this conflict. While others may have different opinions on the usefulness of MPP schemes unless the basic conflict of values is openly addressed any decision made on the issue will be necessarily incomplete.

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62. See *infra*, at 27-28.

63. See *infra*, at 28-29.