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NEWS & ANALYSIS

Marketing Failure: The Experience With Air Pollution Trading in the United States

by Curtis A. Moore

This Article is the first of several and is the result of a study I conducted over a six-month period starting in mid-2002 after it became apparent that President George W. Bush intended to seek repeal of several cornerstone provisions of the Clean Air Act (CAA)¹ in favor of “trading,” an approach that confers on refineries, power plants, factories, and other polluters the right to pollute.

Since then, the Bush Administration’s “Clear Skies Initiative” has been officially unveiled. As appeared would be the case in mid-2002, it would establish a “trading” program in which the government explicitly approves emissions by polluters that would cause acid rain, smog, fine particle pollution, and contamination of the food supply with the toxic chemical mercury. Polluters could swap units of smog, acid rain, or fine particles—and the death and illness that they represent—like so many head of cattle or shares of stock. Acid rain, and the clouds of fine particles that accompany it, could move from one state to another and smog from a downtown neighborhood to the suburbs. Mercury could be stockpiled for future release, like wheat in silos or automobile transmissions in warehouses, ready for “just-on-time” delivery.

The premise of trading is that an obligation that is imposed on, say, an Exxon Corporation refinery might be transferred instead to a coal-fired power plant operated by the Southern Company three states away. Under those circumstances, many specific requirements associated with the permit required by the CAA cease to have meaning. Why include such provisions if trading is to be the order of the day? So, not surprisingly the Bush Administration is also demanding repeal of the CAA’s new source review (NSR) permit, saying that amendments to the law lacking such a provision would be vetoed.

NSR is a linchpin of the CAA. Not unlike the air pollution equivalent of a driver’s license or building permit, it assures that new or rebuilt sources of air pollution are “safe for the road,” so to speak. When multimillion or multibillion dollar refineries, power plants, factories, and the like are being built or substantially modified, NSR assures an examination of just how much pollution they will produce, who might be

killed or injured, what kinds of control technologies can be installed to minimize harm, and so forth. It is the means by which the law’s health-based standards are implemented. It guards joggers, children at school or summer camp, middle-age men with heart disease, and hundreds of millions of other Americans from the ravages of air pollution.

Yet the Bush Administration and the defenders of trading insist that their approach will not weaken the law, merely make it more effective. It would save money, encourage innovation, speed pollution reductions, and enhance protection of human health and the environment. In the words of the U.S. Environmental Protection Agency (EPA), “Clear Skies, by dramatically reducing polluting emissions from power generators, will be the most significant improvement to the [CAA] since 1990, and the most comprehensive and ambitious effort ever to clean up air pollution from power plants.”

The Administration’s proposal is modeled on what EPA describes as “America’s most effective clean air program, the 1990 CAA’s acid rain program.” This is high praise indeed.

Is this true?

Even if it is, is the use of a tool crafted for dealing with acid rain suitable for responding to pollutants that kill and cripple?

Those are the questions this series of articles seeks to answer. If trading were adopted as proposed by President Bush, then adjudged a failure 20 or so years from now, hundreds of thousands of Americans would have died and hundreds of millions more would have suffered, all needlessly.

Advocates of trading say that to the extent it has failed to reduce emissions enough to protect the resource, whether it’s alpine lakes or California children, the blame lies with policymakers who opted for a too-lax limit, whether it’s called a cap, baseline, pool, or whatever. That may be so, but then again, perhaps not.

In theory, there are essentially, four ways to choose the number on which a trading program is based.

Protection of a Resource

Biologists or other scientists determine what level of pollution a given resource—a sensitive ecosystem, for example, or asthma aggravation in exercising children—can tolerate without injury, then back-calculate to arrive at the aggregate emission reduction required to achieve that level.

Consideration of Costs

Economists or others calculate both the monetary value of the benefit (by, for example, assigning a dollar value to the

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1. 42 U.S.C. §§7401-7671q, ELR STAT. CAA §§101-618.

life of a child) and the costs of control, then balance the two against one another. The aggregate reduction is set at the point where the two lines cross.

Consideration of Technological Availability

Industrial experts review the technologies and practices available to reduce emissions and, on the basis of other criteria, calculate the total reduction that would be achieved if the technology were required. The criteria used to determine which technology should serve as the yardstick might take cost into account (as with best available control technology (BACT)), reject cost as a criterion (as with lowest achievable emission rate (LAER)) or some variation (as with maximum achievable control technology).

Selection of a More or Less Arbitrary Reduction Based on Political Considerations

Policymakers, mindful of a number of intangible considerations—the impact of a reduction in sulfur emissions on coal sales (and, hence, employment) in the western versus eastern regions, for example—negotiate a number that is politically acceptable to a critical mass of decisionmakers.

In the emission trading programs examined and proposed, it is quite clear that in none was the number selected to protect a resource. The reduction in sulfur dioxide (SO₂) emissions required to protect sensitive ecosystems from acid rain was, according to calculations at the time, on the order of 14 million tons annually, or more. Lead-additive trading was developed for the express purpose of reducing damage to the emission control systems, but continued even after it was clear beyond dispute that large numbers of drivers were misfueling, thus damaging those systems. Regional Clean Air Incentives Market (RECLAIM), although putatively designed to reduce emissions enough to achieve ambient air quality standards protective of health, was deliberately slowed in its earlier years. Then, when the deadlines for action arrived, the reductions were nowhere to be found. In short, RECLAIM could not have been based wholly on protection of health, because it was mindfully slowed.

Similarly, none was selected on the basis of technological availability. In the case of acid rain, uniform application of “scrubbers” would have achieved an emissions reduction of more than 14 million tons annually. Leaded gasoline was being sold at a time when unleaded was being burned by 80% or more of the light duty fleet. RECLAIM established an aggregate number without regard to what would have been achieved through basinwide use of other approaches. It is quite clear that numbers have been adopted through a combination of the consideration of costs and politics. Moreover, this pattern is being repeated.

The Kyoto Protocol calls for a reduction—though of concentrations, not emissions—roughly equivalent to a 7% decrease in carbon dioxide (CO₂) emissions from 1990 levels. To stabilize the climate, however, would require a reduction of 60% or more. Similarly, a wide range of studies throughout have concluded that emissions of greenhouse gases could be reduced by substantially more than 7% though the adoption of currently available technologies and practices. Thus, the Kyoto Protocol continues the pattern of adopting a number based on political and economic considerations.

The reductions should be greater, and the reductions could be greater, but they will not be. That failing is common to every trading program to date, and it will probably continue to be the case.

The conclusion is inescapable: pollution caps in trading programs will always be inadequate, because policymakers resort to trading when they lack the political will to either require uniform application of a technology-based limit or one based on protecting the resources. By definition, the cap is selected on the basis of costs to polluters and political considerations, and these only exert pressure in the direction of too little, too late.

The extension of trading into other areas could be even more devastating. Those pressing for “Clear Skies” trading are also seeking to establish it as the sole mechanism for dealing with emissions of “greenhouse” gases that cause global warming. Adopting an intrinsically flawed mechanism to respond to the threat of global warming could lead to global catastrophe.

Given the rapid advance of trading onto the world stage and its enthusiastic embrace by governments and businesses alike, it would seem reasonable to expect the literature to be filled with thorough and detailed analyses of the policy, not merely extolling its virtues but documenting its successes irrefutably and in detail, especially contrasting it to the failures of the regulatory programs that the supporters of trading want repealed. But that is not the case.

A few environmental economists, principally those located in or near Washington, D.C., have written a number of laudatory articles, arguing that not only does trading save money, but it saves even more than was projected before programs were adopted.

These articles rarely examine specific program details, comparing a trading regime in one jurisdiction to that of a command-and-control program in an adjacent area; or, the environmental benefits of a trading program in the United States with those of a regulatory approach in another nation, with analogous objectives. Despite the lack of such critical analysis, all manner of intrinsic advantages are attributed to trading. It is said to save money, encourage innovation, and stimulate rapid environmental improvements.

This examination started in the summer of 2002, aimed at examining in detail three trading schemes in the United States:

- The leaded gasoline trading program, which began operation in the United States in 1974;
- The acid rain trading program, which was created by the 1990 CAA Amendments;
- The RECLAIM program, which commenced in southern California in 1993;
- Smaller programs, including the now-defunct New Jersey emissions trading program, and a Louisiana program allowing trading between stationary and mobile sources, recently approved by EPA; and
- Emerging aspects of trading in greenhouse gases.

During the course of this examination, the author:

- Visited Europe to meet with officials of the European Community in Brussels, as well as Dutch air quality officers in the Netherlands;

- Visited California to examine records at the South Coast Air Quality Management District (SCAQMD) in Diamond Bar and meet with air quality experts at the California Air Resources Board in Sacramento; and
- Consulted with and interviewed academic, government, and other experts in Germany, the United Kingdom, Sweden, and various state and local governments in the United States.

Study Results

Comparing and contrasting these programs revealed grave flaws common to all of them. Finding the same failings in all trading programs—as well as evidence of the emergence of these failings in smaller or younger programs, even though they are for different pollutants, time frames, and circumstances—suggests that the deficiencies are intrinsic to trading itself, not the result of faulty program design or implementation.

Some of these failings have seldom, if ever, been discussed. These failings will be explored in greater detail below, but briefly, they include the following.

Abandoning Protection of Health

Implicit in trading of the “criteria” pollutants that cause sickness and death is the abandonment of protection of health as the single overriding objective of the CAA and air pollution regulation generally. Instead of reducing pollution as fast as technologically achievable, trading allows it—and the illness and death that it causes—to continue for the express purpose of saving money for polluters.

Trading Removes the Stigma of Pollution

Air pollution kills and injures. The stigma associated with such harmful action often acts as a powerful deterrent. Trading affirmatively sanctions pollution, thus removing the stigma.

Killing Environmental Innovation

Because trading focuses solely on reducing a single pollutant by an exact date and a precise amount at least cost, technologies and practices that deliver multiple benefits—new ways of burning coal, for example, as well as conservation and renewable forms of energy—are frozen out of the market. While trading stimulates cost innovation, it has the opposite effect on environmental innovation, suffocating emerging technologies.

Trading Rigidity Bars Mid-Course Adjustments

Trading provides polluters with a degree of flexibility in choosing the means by which to reduce a pollutant and, to some degree, the timing. It is otherwise rigid, however, so as a practical matter it becomes impossible to adjust goals based on new information—new technology, for example, or the discovery of more substantial injuries.

Delay and Undercontrol

Emission reductions under trading regimes are uniformly smaller and later than they otherwise would be. In the case of leaded gasoline, for example, the United States required 23 years to eliminate the fuel, while China took only 3.

Fraud, Malfeasance, and Secrecy

While emissions allocations are public, trades and prices are not. As a result, fraud is a constant threat. In two of three trading programs examined, there was documented fraud, while the third has not been officially scrutinized.

Converting a Public Good to Private Property

The effect of trading is to convert a common good—clean air—into a sump for waste by creating and then conferring on polluters the right to use it to dispose of their pollution. Thus, what once belonged to all—air quality—is converted to private property. The explanatory language accompanying one program, acid rain, characterizes this property as “right,” while in others it is an undefined privilege conferred on polluters.

Health and Environmental Objectives Are Not Achieved

In every case, trading failed to produce reductions required to protect the resource in question, requiring recourse to the very command-and-control mechanisms crafters had sought to avoid.

Intrinsic Flaws in Trading

Abandoning Protection of Health

There is some merit to stating the obvious: air pollutants are, by definition, substances that kill and injure human beings. Lead, for example, destroys the essence of a child’s humanity—intelligence. It is also linked to death in males from heart attack and stroke. SO₂ can, and has, triggered fatal attacks in severe asthmatics. It is transformed in the atmosphere into fine particles, which are linked with death. Ozone, or smog, causes hospitalization and school absences, and recently has been linked to the actual development of asthma in children. In short, when trading fails, the consequences are illnesses and deaths that otherwise would have been avoided. This is obvious.

What is less obvious is that death and illness are the consequence of even successful trading programs. If all polluters are doing their utmost to reduce air pollution, there is nothing available to trade. To create a commodity that can be traded, regulators must allow polluters to do less than their best.

When trading was employed for the first time, this might have been a defensible policy. It was well established at the time of trading’s adoption that lead in gasoline poisoned catalytic converters, but not that it did the same to children. The sharp reductions of lead levels in the blood of children were revealed only *after* it was removed from gasoline. Until that point, trading was a program that balanced costs to one group—so-called small refiners—against those of a second—the car makers that might be required to replace, at

their cost, catalytic converters that had been disabled by mis-fueling.²

Similarly, while it is true that there was some discussion of the impacts of acids on human health during the decade-long debate over acid rain, the vast majority of attention focused on poisoned lakes and forests. Again, in large measure, trading of sulfur emissions was very much premised on balancing the economic interests of polluters on the one hand against those of people who owned, lived on, fished in, or otherwise utilized the damaged natural resources on the other hand. To the extent that a residual threat to human health remained, the process for setting health-based standards remained available as a safety net.

It was the RECLAIM program that moved trading from the realm of balancing competing economic interests into one in which human health was sacrificed for the sake of saving money for polluters. But even in that case, its proponents argued—wrongly, it turned out—that trading was a means of more quickly achieving the health-based ambient standards.

In the case of the Bush Administration's "Clear Skies" program, however, the president has consciously chosen to sacrifice human health and life solely for the sake of saving polluters money. There cannot be even a scintilla of doubt, for example, that emissions of nitrogen oxide (NO_x) could be reduced by 90% from powerplants within a matter of months or years because Germany did precisely that. The same can be said of further reductions in emissions of SO₂, which is now known to be transformed into small particles, which are linked to mortality.

The CAA of 1970 was designed to save lives and avoid illness. It requires that a concentration of air pollution that is generally safe be identified, then that sources of that pollutant reduce emissions enough to reach that level. The key to this is source-by-source permitting, so both regulators and the public know exactly what equipment is supposed to be installed and how much pollution flows from the smokestack. If the public wants to know, it reads the permit. If regulators want to know whether the polluter is complying, they inspect the premises and read the air pollution monitor.

Trading is the antithesis of source-by-source permitting. An overall cap is established, and allocations are assigned to each polluter (which is given the "right" to emit that amount in some programs). Polluters can reduce their emissions or buy some other polluter's "right" and emit more. The number contained in the permit is rendered meaningless, because a source 2,000 miles away, in say, Boise, Idaho, may have agreed to pollute less so a power plant in, say, Boston, Massachusetts, could pollute more.

If trading is the exclusive method of controlling emissions, as the Bush Administration has proposed in its "Clear Skies Initiative," permits cease to have any meaning. This is

why the Administration has demanded that NSR under the CAA be repealed.

Yet the premise of replacing source-by-source review with trading is that the health benefits of every pound of pollution are identical, whether the smokestack (or tailpipe) is in Boise or Boston. This is simply, and obviously, untrue. People in Boston will not be affected one whit by a pollution reduction in Boise and vice versa. Yet under trading, those are precisely the kinds of swaps that are being made.

President Bush has not only proposed extending trading to include criteria pollutants, but affirmatively acted to impose trading for mercury, a heavy metal of no nutritional value and toxic in every known form. A potent neurotoxin, mercury is now found in virtually every living thing due to the widespread emissions from coal-fired power plants. Levels are especially high in predators at the top of the food chain such as tuna, shark, and swordfish, as well as land animals that feed on fish and waterfowl, such as the endangered Florida panther. The U.S. Food and Drug Administration, as well as 40 states, have issued warnings against eating contaminated fish. Many are "no consumption" or "restricted consumption" advisories.

The CAA requires polluters that emit mercury and other toxic pollutants—arsenic and dioxin, for example—use the "maximum available control technology." The Bush Administration has instead proposed not only allowing trading, but delaying reductions, perhaps forever.

Trading Removes the Stigma of Pollution

While polluters and their defenders are reluctant to admit it, air pollution kills and injures. Its victims include some of the most defenseless members of society, children, as well as adults and the infirm. There is, justifiably, a stigma attached to air pollution, which helps explain why public information programs such as Community Right-to-Know, in which companies are required to disclose how much and what kinds of toxic chemicals they are releasing into the environment, are effective.

Trading, by treating pollution as a commodity—and, indeed, using euphemisms such as "allowance" rather than pollution—reduces this stigma, which, in turn removes from the hands of the public one of its most effective tools, moral suasion. Indeed, trading subtly shifts the moral balance toward the polluters, and away from its victims.

Killing Environmental Innovation

It may not be possible to overstate the lethal effect of trading on the development and adoption of superior environmental technologies. This is not to say that trading stimulates no innovation at all, because it does. It's just innovation of the wrong sort.

Innovation is of two kinds:

- There is innovation that leads to the development of environmentally superior technologies like integrated gasification-combined cycle (IGCC), wind turbines, and conservation regimes that can reduce many pollutants simultaneously. None of the trading programs has stimulated this kind of innovation.

2. It is not clear that there are genuine cost savings resulting from trading. Lead was eventually eliminated so refinery upgrades were merely delayed, not avoided. Similarly, with the failure of RECLAIM to reduce pollution to the levels required, power plants in southern California were ordered to install emission reduction technology. They thus paid for technology, as well as pollution credits that ultimately were useless. In addition, multimillion dollar fines were levied on several polluters. Economists claim that the acid rain trading program is saving money, but it has yet to reach its end-date of 2010, so such claims may be premature. To the extent that there are cost reductions, they are attributable not to trading per se, but to the cap. Doing less, by definition, costs less than doing more.

- Then, there is innovation of a different sort, concerned not so much with environmental improvement as saving money in the reduction of a specific pollutant—SO₂, for example—by an exact amount: namely, the allocation for that particular source.

In trading schemes like acid rain, RECLAIM, and leaded gasoline, the innovation that is stimulated, and which prevails in the marketplace, is of the second type. In the acid rain program, the innovation stimulated was in new railroad tracks, on-loading and off-loading systems, and other ways of bringing lower sulfur coal from the Powder River Basin to market. These improvements added nothing extra to the environmental benefits. In other words, the “magic” that the market brings to bear, happens only on the cost side—the environmental benefits, after all are capped, so there are reductions in only one pollutant and only by so much. The flexibility inherent in trading is in cost.

What the advocates of trading fail to understand is that technologies can only win in the marketplace if they deliver the same environmental benefit at less cost. The market places no value on IGCC’s ability to reduce not only SO₂ by an order of magnitude, but also reduce NO_x, carbon monoxide (CO), volatile organic compounds (VOCs), and heavy metals such as mercury. The polluter is interested in one—and only one—outcome: reducing emissions of SO₂ to its allocated level of pollution, no more, and at the lowest possible price. The same was true in RECLAIM and in the leaded gasoline program. Indeed, in the latter case, some refiners simply imported leaded gasoline from China, then sold it in the United States for a profit, thanks to trading.

This rigidity is perhaps the greatest single practical flaw in trading. Under a technology-forcing regime, the multiple benefits of specific technologies or practices can be seized. To be sure, buying coal shipped by rail from the Powder River Basin is a cheaper way of reducing SO₂ emissions than replacing a 1950s vintage power plant with IGCC. However, if IGCC can also deliver reductions in NO_x, CO, CO₂, VOCs, mercury, and other pollutants, the cost is almost certain to be less expensive than an aggregation of pollutant-specific technologies, such as scrubbers, selective catalytic reduction, and carbon absorption.

Moreover, the CAA’s current tool for forcing technology is the source-by-source permitting process, in which polluters are required to install controls that achieve BACT or LAER. Eliminating permits in favor of trading, as the Bush Administration has proposed, leaves no mechanism for bringing new technologies on line. Indeed, the rigidity and narrow focus stifles environmental innovation:

- Thus, in the leaded gasoline trading program, refiners imported leaded gasoline from China, rather than developing environmentally superior gasolines.
- In the acid rain program, polluters are burning lower sulfur coal, rather than adopting new technologies, e.g., “cool water” [IGCC], or renewable forms of energy, e.g., wind, or conservation. Environmentally, all of these are preferable to lower sulfur coal because: they reduce emissions by up to 98 to 100%; they reduce all pollutants, not just one; and may, indeed, save money, e.g., wind, compared to a fully controlled new coal-fired power plant.

The “innovation” in acid rain has been in extending a rail line, new types of rail track, better ways of on-loading and off-loading coal, and combustion changes enhancing the ability to blend coals.

- In the case of RECLAIM, polluters chose to avoid control technologies (thus destroying the markets for advanced, environmentally superior systems) in favor of simply reducing capacity. Perhaps there have been innovations in moving electricity on the grid, but not much else.

Trading Rigidity Bars Mid-Course Adjustments

Just as trading has the effect of suffocating innovation, so too does it preclude mid-course adjustments based on new information on the damages of air pollution or ways of controlling it. The amount of the reduction is inflexible, the latest date it is to be attained is rigid, and the specific pollutant to be controlled is rigid. To change any of these, for any reason, requires the enactment of a new law or the adoption of a new program.

Because the emission reductions mandated by the 1990 acid rain program are manifestly inadequate, proposals to increase them were increased in the mid- to late 1990s. They have not been adopted, and there is no likelihood of that in the foreseeable future. To finally eliminate leaded gasoline required enactment of a congressional ban. Tardy achievement of the RECLAIM reductions occurred only after a massive outcry.

Thus, trading renders the creation of a political consensus in support of action to protect human health and the environment into ceaseless and often futile labor. Having once persuaded legislators to enact and the executive branch to implement legislation, citizens must do it again after trading fails.

Moreover, because trading is a static system, it becomes impossible to track the development of new technologies. This contrasts sharply with dynamic systems based on technology, e.g., “best” controls, or protection, e.g., of health or a sensitive ecosystem. Thus, even though technologies exist to economically reduce emissions of SO₂ (and, simultaneously, many other pollutants as well), the acid rain program lacks any mechanism to track technological developments. The same is true of RECLAIM. Leaded gasoline continued to be sold for seven years after a fuel designed expressly to replace it was commercially available, because there was no mechanism to reflect such progress.

Delay and Undercontrol

Delay is implicit in trading because it requires time for markets to develop. Undercontrol is also implicit, because if all sources are exercising maximum possible efforts to eliminate pollution, there is no commodity left to exchange. For this reason, protracted schedules for compliance and undercontrol characterize the acid rain, RECLAIM, and leaded gasoline programs alike. For example, from the time an acid rain program was first proposed in the United States in 1980, to the date at which the program will take full effect in 2010, roughly 30 years will have passed. Emissions in the United States will have been cut by about 35%. In contrast, Germany cut power plant emissions by 90% in six years, from the first proposal in 1982 to completion in 1988.

The same sort of delay occurred with RECLAIM, and one comparison demonstrates how unnecessary this was. In southern California, two neighboring air quality management districts (the SCAQMD and Ventura), were on virtually the same emissions reduction schedule. Starting in 1991, when the SCAQMD began considering RECLAIM, they began diverging, with Ventura adhering to a regulatory regime. By the time RECLAIM was an obvious failure in 2001, emission controls had been in place in Ventura for a decade. Thus, RECLAIM resulted in the loss of roughly a decade. However, in no trading scheme were the delays longer or the losses more tragic than with leaded gasoline.

Time lost in completing cleanup, whether of acid rain, smog, or leaded gasoline, translates to health benefits lost as well. The most dramatic illustration of the magnitude of these losses was the 23 years spent reducing lead, which is associated not only with death from heart attack and stroke in adults but the destruction of children's intelligence, the essence of their humanity.

There are monetary consequences of these unnecessary delays, and lead is perhaps the best illustration of this as well: when researchers calculated the economic benefit in the United States from improvements in worker productivity due to the intelligence increase resulting from eliminating leaded gasoline, they found that it ranged from \$110 billion to \$319 billion per year. Had leaded gasoline been eliminated more rapidly in the United States, as it was in every other nation that has undertaken its removal, those economic benefits would have been greater and realized faster, though there would have been a heavier financial burden placed on so-called small refiners and drivers still using the fuel. That burden on drivers was once estimated by EPA to be one-tenth of \$.01 per gallon.

Fraud, Malfeasance, and Secrecy

In all trading programs, the prices actually paid for pollution are secret, so there is no way to test the proposition that trading reduces control costs. In addition, in the leaded gasoline program the ownership of the credits was also secret. While ownership of acid rain allowances is public, actual emissions information becomes available only after the fact, too late to avoid health damage. Extracting information from the government database is a complex, tedious, and time-consuming task well beyond the capabilities of ordinary citizens.

During preparation of this report, the author asked an EPA official for assistance tracking the trade from 1995 to 2001 from a single unit of the nearly 3,000 allowances in the acid rain trading program. The response was that "[g]oing all the way back to 1995 would be a fairly large analysis," and therefore could not be done. Although the author is reasonably adept at extracting information from government databases, the complexity of following a few tons of air pollution through a dozen or more trades, bouncing from Long Island to Illinois, then to Texas and back was overwhelming. What does a mother of two in Cleveland do?

Assuming that mother is smarter than the author, she still learns too little, too late. Emissions are revealed only retrospectively. It is possible to find out in 2002 the amount of pollution that came from a smoke stack in 1999—long after a death or illness would have occurred—but not what will be emitted in 2003. Without knowing this in advance,

the public is effectively denied the ability to protect itself by, for example, buying a household filter or keeping children indoors.

The shroud of confidentiality surrounding emissions and the trades opens the door to fraud. This certainly occurred in leaded gasoline, according to EPA's Inspector General, and has been alleged in RECLAIM.

Whether there has truly been fraud in these specific instances is, in a sense, irrelevant. The point is that by committing to a market system, the door to the myriad evils of the market is opened, and eventually the potential will be realized, just as it was recently with the likes of Enron (which, not coincidentally, was a major trader in the acid rain program), Global Crossing and Arthur Andersen. In the case of shares of stock or head of cattle, what traders take is money or something else of monetary value. In the case of emissions trading, however, what is taken is life, health, or some other intangible for which money is a poor and unacceptable substitute.

Converting a Public Good to Private Property

The atmosphere is a common good, available to all. Trading converts it into a commodity for storage of waste, then conveys it to polluters. It thus becomes private property or something akin to it. This effect is greatly worsened by the likelihood that what is created for polluters may be something akin to a right, which is constitutionally protected.

Although it would not be necessary to explicitly create a "right" to pollute to assure that a polluter has something tangible to trade, two of the three programs, leaded gasoline and acid rain, did just that.³ Precisely what this right may be has not been determined by courts, but it certainly seems to turn several centuries of common law on its head. Historically, courts have traditionally favored protection of life and health over protection of property. Clearly the "right" created under these programs must be substantial, because it is conferring polluters a government sanctioned ability to, by definition, injure the property and health of others, whether that is the destruction of children's intelligence, the lives of middle-age men, or the lung function of joggers.

Although the infliction of these injuries on any specific individual may be problematic, the injuries themselves are statistical certainties: the intelligence of some children, somewhere, will without question be destroyed. Just as surely, some persons, somewhere, will die. In a society founded on the proposition, as explained in the Declaration of Independence, that each and every person is possessed of certain "inalienable rights," including those of life, liberty, and happiness, this is an extraordinary twist. Now, instead of an American having a right to his life, a polluter has the right to take it. It is no overstatement to say that this proposition is revolutionary.

3. The statutory language of the acid rain law describes the allocations as "not a property right," leaving open the question of what kind of "right" it is. Notwithstanding this language, commentators regularly describe the allocations as rights. Consider the following commentary in a Aug. 5, 2001, *Washington Post* article: "What Payne and Taylor trade is the right to pollute—specifically, the government-given right to emit sulfur dioxide (SO₂) and nitrogen oxides, the two gases chiefly responsible for acid rain." Ricardo Bayon, *Trading Futures in Dirty Air—Here's a Market-Based Way to Fight Global Warming*, WASH. POST, Aug. 5, 2001, at B2.

Trading temporarily lessens the economic burden on some polluters, but it does so by prolonging, and in many cases increasing, damage to the health and environment of victims, whether lakes poisoned by acid rain or children missing school because of smog. Trading thus, in effect, converts the monetary cost of reducing air pollution that would otherwise be borne by the polluter into a nonmonetary value, e.g., forest damage or increased illness, and shifts the burden to the public or the environment, especially those most sensitive, such as alpine lakes or children.

Health and Environmental Objectives Are Not Achieved

None of the three trading programs achieved its environmental objectives. The southern California trading regime, RECLAIM, started in 1993. It was designed to reduce about 13,000 tons of emissions of NO_x over a 10-year period from power plants and refineries, but by 2001, officials projected there would be a shortfall of 68%. Power plants were pulled from RECLAIM and ordered to install pollution control devices. To eliminate leaded gasoline in the United States required 23 years, compared to 10 in Japan and 3 in China.

The acid rain program, which was enacted in 1990, has thus far produced slight improvements in some regions and none in others. Worse, at some power plants, emissions have actually increased. According to one study, although SO₂ emissions decreased about five million tons nationwide, they actually rose in 16 states. Of the 600 power plants that emit SO₂, 252, or 42%, actually increased their emissions, resulting in between 4,800 and 5,600 premature deaths in 2001. Similarly, trading allowed concentrations of lead in gasoline in some regions, especially the Southwest, to increase, creating elevated concentrations where use remained high.

Global Warming: History Repeats Itself

The pattern found in leaded gasoline, acid rain, and RECLAIM is beginning to repeat itself in the context of global warming:

- Science dictates that greenhouse gas emissions be reduced by about 60% to achieve climate stability. Instead, the Kyoto Protocol, which relies on trading, would call for average reductions of about 6%, with actual increases of emissions in Australia and some other nations.
- Although there has been an international agreement since the Rio “Earth Summit” to stabilize emissions of greenhouse gases at 1990 levels, there have been no new markets for environmental technologies as a consequence. The Toyota Prius was stimulated in large measure by the regulation of the California Air Resources Board. One technology for burning coal more cleanly, pressurized fluidized bed combustion (PFBC) has been withdrawn from the global market. Another, IGCC, is being adopted almost wholly at refineries as a means of exploiting petroleum coke. The markets for solar, wind, and other renewable technologies have been stimulated by specific policies such as the German and United Kingdom purchase mandates, and comparable state-level requirements in the United States.

- Only in isolated cases have national emissions of greenhouse gases been reduced. Ironically, one of those is China, widely demonized by the United States, Australia, and other coal-producing and coal-consuming nations. China’s gross national product is growing at double-digit rates, but its CO₂ emissions are declining. This is largely because China has mandated the adoption of best available technologies, rejecting options that are still allowed in other countries.

- Because of trading, the focus remains almost wholly on CO₂, which will not deliver climate benefits for one century because that is the atmospheric lifetime of CO₂. Greenhouse gases with much shorter lifetimes, which could deliver much faster climate benefits as well as immense health and environmental protection, such as tropospheric ozone, methane, and black carbon are being almost completely ignored.

Conclusion

The experience of the United States—and, indeed, the world—with emissions trading is limited principally to three programs. None of these has before been subjected to close, critical analysis to determine whether they in fact are the unbridled successes that their proponents claim.

There can be little doubt that trading certainly failed in two of the three cases examined, RECLAIM and leaded gasoline, and seems destined to do the same in the third, acid rain. The record is so stark and compelling that any expansion of trading beyond its current scope should be halted, and existing regimes should be rescinded before they cause further damage.

This analysis does not pretend to be the exhaustive effort that ought to be devoted to trading before it is extended beyond its current scope. It is, nevertheless, the most ambitious effort undertaken to date, which is, in and of itself, a reflection of the abdication of responsibility by government officials in the United States and elsewhere, who are proposing to extend trading into new arenas without careful review of U.S. experience. If such a novel, untried approach were being advocated by communities other than polluters and their allies, the suggestion would be rejected out of hand by government and business alike. At the very least, proposals would be subjected to extraordinary scrutiny.

It merits noting that much of the pressure to extend trading into new arenas is generated by those anxious for the appearance of progress in addressing global warming and power plant emissions. Public interest groups have increasingly embraced such proposals in the mistaken belief that any action is better than none at all. Two generations of American children with diminished intelligence, hundreds of thousands in children subjected to years of illness and hundreds of lakes that remain acidified belie such a belief. In the cases of smog, acid rain and leaded gasoline, there was room for error, and time for corrective action. There will be neither in the case of global warming.

Perhaps the conclusions of this analysis are too pessimistic. Then again, perhaps not. Government, universities, and some public interest groups have the resources to amplify on and confirm—or refute—this examination. They also have an obligation to do so.

For himself, the author's view is that few programs can rival the achievements of the CAA of 1970, which arguably is the history's most successful environmental law. The failings that prompted adoption of the CAA Amendments of 1990, including the acid rain trading program, were due to a lack of will on the part of a succession of political appointees in the face of a concerted program of massive resistance, de-

lay, and obstruction on the part of the coal and utility industries, resulting in the needless deaths of millions of Americans. The underlying law is sound, and America could do far worse than returning to the pre-1990 law, coupled with stringent enforcement of its provisions, as opposed to the repeals proposed by the current Administration.