



**Reason
Foundation**

**Market Pricing for Air Pollution:
An Alternative to the AQMP**

March 1989

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Introduction

For over two decades, the South Coast Air Quality Management District (AQMD) has faced the task of meeting federal and state air quality standards for the Southern California area. In a last ditch effort to prevent federally imposed standards, the District has come up with a "comprehensive control program" that is aimed at leading the basin into compliance by the year 2007. The Air Quality Management Plan, composed of a draconian set of proposals, sets a dangerous precedent for achieving environmental goals. It requires the district regulatory agencies to design, devise, and impose the specific manner in which residents and businesses in the basin will pursue their everyday activities. The plan not only legislates specific operating processes; it also requires research and development "commitments" of technologies that "may not exist yet" to enable the district to update and tighten its list of regulations.

While most people share the goal of improving area air quality, the proposed plan gives area residents little choice in how to go about doing so. Tier I, the first implementation stage of the plan, for example, proposes 120 regulatory measures that would control emissions from even near-negligible sources of pollution in the Los Angeles Basin. Residential swimming pools, lawn mowers, and backyard barbecue lighter fluid all would come under pollution-abatement regulations. The plan would require light duty motor vehicles to use radial tires, phase out stationary source fuel oil and solid fossil fuel use, and reduce vehicle emissions by alternative work schedules and telecommuting. The plan calls for fully 60 percent of the basin's workforce to modify their work schedules, with the expectation that many would follow a nine-day, 80-hour work week or a four-day, 40-hour work week. The plan anticipates no overtime being paid if work-day length exceeds the now-standard eight-hour day.

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With this type of approach, people have no flexibility in choosing the anti-pollution activity that is most practical for them. And rather than facing the goal of reducing air pollution, people face the goal of obtaining a government approved lawnmower, or a certified barbecue process. The regulations likewise put businesses into a straitjacket with narrow scope for choosing how to reduce pollution.

Such command and control approaches have historically been ineffective and inefficient. Earlier regulatory measures have failed, by the AQMD's own admission, because they inaccurately predicted population growth, the increase of small-source pollution, and the increase in driving brought about by cheaper gas in the '80s. Moreover, the specific measures turned out to be less effective than originally predicted. And a number of proposed measures integral to the success of the earlier plan were never adopted because they were politically, economically, or technically infeasible.

The current AQMD plan suffers from the same flaws. For example, one technological assessment of the plan concluded that many of the proposals do not use proven technology and may, in fact, be technically infeasible. The underlying assumption of the plan is that regulators can assess the overall air quality conditions in the basin; understand the interactions and operations of all the contributors to air pollution; design alternative operating processes for every sector taking into consideration their aggregate air pollution effects in the future; and impose, monitor, and enforce alternative operating processes. Even without consideration of cost effectiveness or least-cost solutions, this is a herculean task, and there is typically little reason to believe that proposed measures will actually produce the desired air quality results. The drafters of the Air Quality Management Plan (AQMP) themselves acknowledge "it is not possible to design the AQMP with reasonable assurance that it will meet all Clean Air Act requirements or be fully approved by the EPA." (p.1-11)

Furthermore, the nature of the proposed regulations makes it unlikely that the district can adequately monitor and enforce every aspect of the plan. Yet the fact that the regulations are technically in effect can create conditions ripe for inequities. Because of the plan's far-reaching, unrealistic requirements, few businesses will be able to comply fully.

The plan thus creates a kind of "hit list" that can be used against a company anytime an environmental organization or some other special interest group wishes to do battle. This powerful weapon can be selectively used against targeted industries or companies by checking the books for "violations" and going after them, either through law suits or through negative publicity campaigns.

Cost considerations make the plan even less attractive. The National Economic Research Associates (NERA), in a study commissioned by the California Council for Environmental and Economic Balance, estimated that the AQMP would cost Los Angeles residents \$2,555 per household annually--equivalent to a tripling of the general sales tax for basin residents. The NERA report estimates the size of the gap between costs and benefits to be some \$12.3 billion per year. Over the duration of the plan this represents a \$245 billion loss to basin residents. The AQMD's own lower cost estimates are highly misleading

since they calculate costs for fewer than half of all the plan's proposed measures.

The costs of the AQMP, as the NERA report underscores, are likely to "be particularly burdensome to the poor." NERA estimates that "the percentage burden of costs is almost three times as great for households in the lowest income group than for households in the highest income group."

Any effort to improve air quality in the basin will entail costs. Until recently, the air basin has been treated largely as a "free good," such that polluters, whether highway users or industry, have emitted pollution with little regard to the costs this pollution imposed on the community. Any attempt to reduce pollution will impose new costs on basin businesses and residents. However, the key to successful pollution abatement is not a mega-plan or the superimposition of wideranging regulations by a megagovernmental authority such as that envisioned in the AQMP. Rather, the key lies in setting air quality standards and devising mechanisms to price air pollution emissions so that the "social" and other costs of pollution are internalized into the decision-making processes of businesses and residents.

Admittedly, in the absence of regulation, people do not freely incorporate pollution control measures into their lifestyles. But instead of requiring specific technologies or prohibiting specific processes, the District would be better off establishing practical, enforceable air quality levels and letting people search for the least-cost means to achieve them. Under a variety of emission pricing schemes, residential, commercial, industrial, and agricultural emissions could be reduced by encouraging "markets" in air quality.

The same approach, using markets and pricing, can be applied to land-use and transportation issues to achieve the goal of modifying people's commuting habits without dictating specific activities for specific groups of people. The AQMP, while accurately identifying activities that contribute significantly to the basin's pollution problem, has taken the approach of adding layers of regulations on these activities to bring about the altered behavior. Yet much of the targeted behavior results either from the "free goods" problem described above, or from existing regulations that have pushed behavior in the now-undesirable direction. Two primary examples are the existing zoning regulations that have mandated a separation of residential from business areas, thereby necessitating commuting to work, and transportation regulations that have forestalled the advent of door-to-door shuttle and other services that provide the kind of fast, flexible transportation that commuters desire.

Pollution Abatement: An Alternative Approach

The AQMD correctly recognizes that air pollution results from a complex of interrelated activities ranging from land-use patterns, industrial production, highway use, and so on. However, they mistakenly conclude that a superplan to coordinate and regulate behavior in all these areas is necessary to achieve the desired outcome--cleaner air. Nor do any of the nine alternative plans considered in the Environmental Impact Statement move away from this basic regulatory, planning model. All (including the "do-nothing" approach) rely on regulation of behavior and differ only in the specific types and scope of regulations set forth. This plan offers a distinctly different approach--one that adopts market-pricing concepts and establishes air pollution charges so that individual South Coast Air Basin residents and businesses will not behave as if clean air is unlimited and cost free. This approach also recognizes that existing land-use and transit regulations have actually prevented the adjustments in people's behavior that are necessary to reduce air pollution. Removing these restrictions, rather than adding to them, will more effectively achieve the desired reductions in traffic and other behavior that increases pollution in the Los Angeles basin.

While it is beyond the scope of this paper to discuss each of the proposals set forth in the AQMP, several key issues do deserve attention.

*** Jobs/Housing Balance.** The AQMP targets an improved jobs/housing balance to decrease the need for work-related commuting. To this end, it proposes a series of regulatory measures that would require new developments to meet specific jobs/housing balances and would create incentives for certain kinds of new development to take place.

A superior alternative would be to reform existing zoning ordinances that have caused the jobs/housing imbalance that we now see. One possible model is that currently used in Fort Collins, Colorado, in which zoning ordinances were replaced by a set of guidelines. Developers are required to meet 65 percent of these guidelines, but they can do so in whatever mix they believe is most economically sound. This approach allows for flexibility and has, in fact, resulted in the very kind of mixed land-use that the AQMP would seek through much more costly and inflexible regulations.

*** Transit Deregulation.** Because vehicle emissions account for a large percentage of the Southern California basin's air pollution, measures that reduce vehicle miles traveled or encourage use of low emission automobiles will have a substantial impact on the basin's air quality. The AQMP states as a goal a reduction in vehicle-miles traveled, particularly during rush hours, and proposes an array of regulations and measures for expanding transit facilities and highways. Construction measures proposed could cost as much as \$44 billion.

Some of the AQMP goals could be achieved with much greater flexibility for businesses and commuters by: 1) deregulating transit to allow for shared taxis, vanpools, and expanded shuttle services beyond what is now permitted for airport service; and 2) charging a rush-hour toll (on new lanes only) that would give people an incentive to carpool or use public transportation.

A calculation by Robert Poole, of the Reason Foundation, reveals that an increase in the average number of people per car from 1.2 to 1.7 would cut the number of cars on Los Angeles highways by 30 percent. A toll would also shift non-commute traffic to off-peak traffic times. USC economist Peter Gordon has shown that fully 72 percent of afternoon rush-hour trips are for something other than coming home from work. If drivers shifted only a portion of these non-commute trips to other times of day to avoid rush-hour charges we would have a major reduction in rush-hour congestion. Electronic systems are available to make such charging proposals feasible without toll booths or other delay-causing mechanisms.

*** Requiring Adherence to Existing Vehicle Emissions Standards.** The Southern California Automobile Club has shown that major pollution reductions would occur if all vehicles in each model simply met existing emission standards. James Ormer of the Auto Club points out that the effects of more durable and reliable emissions control devices, together with the advent of vehicle computer-monitoring systems, are already making possible dramatic reductions in automobile pollution--reductions that will soon begin to show up in pollution data for the South Coast.

These improvements are occurring without the kinds of major disruptions in people's lives that would result from the AQMD plan. The AQMD plan downplays these improvements that are underway and, instead, focuses on an array of regulatory measures designed to require people to use different technologies and alter their work schedules. Emphasis on emissions charges, as outlined below, would serve as an incentive for people to purchase low-emissions vehicles, alter their work schedules, use public transportation, or pay high emissions charges. The choice, however, would be their own.

*** Markets in Air Pollution.** The basic idea behind markets in air pollution is to improve air quality by charging polluters for the damages they create and by compensating people who make investments in anti-pollution equipment and processes. When people have the financial incentive to care about the level of pollution they generate, they will undertake measures to reduce their "pollution bill," just as skyrocketing oil prices induced voluntary conservation measures by homeowners across the nation in the early 1980s.

Suppose, for example, that the District simplifies the AQMP by requiring all industries to reduce emissions by 5 percent by some specified year (varying percentages could be established for sulfur and nitrogen oxides, carbon monoxides, hydrocarbons, and so on). Companies that have already made pollution control investments could be granted exemptions from the first phase of cuts in order to avoid unfair penalties. (If this causes a run on pollution control equipment, the requirement has nonetheless helped improve air quality.) Alternatively, a sliding scale could be established requiring the worst offenders to reduce emissions more than less polluting companies.

Rather than specifying each process that every industry must use, such a broad ruling allows individual firms to decide the least-cost, most convenient ways to reduce air pollution. Such flexibility would eliminate the type of debate and expense that has emerged from the AQMD plan. Southern California Edison Co., for example, promoted an alternative in which trapping hydrocarbons and other organic gases from escaping into the air would be emphasized over controls on nitrogen oxides. Edison says that its plan would get rid of ozone faster and at less cost. Opponents, of course, have challenged Edison's plan, arguing that it would not meet federal clean-air standards. With a flexible approach, there is no need for Edison to engage in argument with anyone but the federal enforcer. If it implements a plan that falls below the standards, it is not in compliance and would face the penalties and schedules then imposed.

There are a variety of options that could be adopted to allow firms either to meet the standard or somehow pay for the right to exceed it. One way is to impose emission charges for those that violate standards. There are two basic ways to set up a system of emission fees. The government can sell permits that entitle the holder to emit a certain amount of a specified pollutant, or it can monitor several types of emissions and send out bills based on meter readings. Either way, the polluters, who know more about their own production technology than most regulators, can choose the level of emissions they will produce while taking into consideration the efficiency of the alternative processes available to them.

Although emission charges have been attacked as "a license to pollute," there is little practicality to this statement. None of the air pollution plans proposed across the country expects to reduce pollution to zero. As long as we accept that there will be some level of pollution, emission charges provide one way to charge the people who pollute the most. With emission charges, the government would no longer try to tell polluters how to clean up, nor even that they have to clean up at all, provided they pay for their excess emissions. The collected emission fees, in turn, could contribute to other government investments in pollution control, such as reducing emissions from mass transit vehicles.

Emission charges are only one of several ways to use the pricing mechanism to control pollution. Another alternative is emissions trading, through which polluters offset their excess emissions by purchasing "emission reduction credits" (ERCs) from companies whose pollution levels are below the standards. For example, if Company A has developed a new process that reduces its release of hydrocarbons below that of the mandated level, it could sell those rights to Company B which, for whatever reason, has not managed to meet the level (i.e., a "nonattainment" company). Current EPA regulations allow for such trades, and a system has been established by which aggregate pollution levels in a basin are reduced every time a trade occurs. With each trade, a certain number of pollution rights are "retired." In order to exercise 100 pollution rights, for example, a nonattainment company must purchase 110 rights, even though only 100 can be used. Overall area pollution is reduced because the 10 unused rights are forever retired.

AER*X, an air rights trading company located in Santa Monica (with other offices in Washington, DC; Wisconsin; Michigan; and South Carolina) has been in the business of trading air rights for several years. AER*X President John Palmisana reports that emissions trading is steadily on the rise, with approximately one trade occurring every two weeks. Emission offsets are available for sale to companies in the Los Angeles area; hydrocarbon offsets, for example, are currently selling between \$500 and \$1500 per pound per day. The development of a market in air rights has spurred a number of such companies.

Emission traders offer a variety of services to facilitate transactions, such as locating emission-reduction credit buyers and sellers, appraising the market value of ERCs in specified locations, assessing the cost of producing ERCs, acting as liaisons with regulatory agencies, negotiating trades, evaluating tax consequences of trades, and so on. The services are very much like other financial brokers, only the commodity is air rights via emission reduction credits. Since 1976, over 2000 emission trade transactions have taken place. Stricter rulings on the percent reductions required by firms could foster stronger markets in ERCs. Stronger markets, in turn, will contribute to the reduction in emissions as more and more air pollution rights are retired. And because ERCs are generated when firms shut down, an increased reliance on such markets actually encourages older, more polluting industries to shut down earlier than they otherwise might because of reduced closing costs.

Emissions charges and emission trading offer a tremendous number of advantages over the command and control approach. They certainly offer impressive efficiency advantages by "assigning" the task of pollution reduction to the firms that can do it at least cost. Suppose, for example, that Firm A can reduce hydrocarbon emissions for \$20 per ton. The same reduction would cost Firm B \$200 per ton, due to the differences in their production processes. If an

emission charge of \$100/ton is implemented, Firm A will invest \$20 to save the charge, and net \$80. All other firms that can reduce emissions by investing less than \$100 per ton will do so. And so, the companies that can cut emissions at least cost will be the ones that reduce pollution--something that no regulator has sufficient information to achieve.

Emissions trades and charges also are more efficient and effective because firms are given the financial incentive to undertake whatever level of emission reduction is practical. If it only pays for a firm to reduce emissions by one half, it can do so and either pay emissions charges or buy credits for the other half. Local residents benefit because pollution is at least reduced to some extent. In contrast, with the command and control approach, firms are required to adopt specific technologies or face penalties for noncompliance. So the choice is either to adopt the government technology all the way or to do nothing. For some firms, it will make more economic sense to do nothing and face the chance of being caught, even if the firm using practical and cost-effective methods, could cut emissions by 50 percent.

Second, markets in air pollution provide the incentive for technological innovation. Firms will invest in alternative technologies that will lower their pollution bill. Even though the AQMP attempts to legislate commitments to technological development in "Tier III," the goal faced by industry is to meet the regulations and not necessarily to reduce emissions. Companies will focus research on ways to meet the requirements, rather than on technological savings that will yield the greatest reduction in emissions.

***Vehicle Emissions Charges.** Much of the air pollution in the South Coast Air Basin comes from vehicle emissions. Many of the ideas discussed above can similarly be applied to vehicles. Specified levels of aggregate vehicle emissions could be established for each industry fleet or household, based on the number of people of driving age. Those exceeding these limits would have to purchase vehicle ERC rights from others. This way, those that are adding to the congestion and air pollution would pay extra; yet, by purchasing rights from others, aggregate vehicle emissions would be maintained at specified levels. As the population rises, the district could tighten the exchange rate for vehicle ECRs.

With the extra costs involved in obtaining ERCs, there would be financial incentives for consumers to purchase less-polluting vehicles and for industry to supply them. The auto companies have demonstrated that there's a premium in developing and promoting new environmental technologies. Saab, for example, advertises itself in Britain, where lead-free gasoline will soon be required, as "SAAB--Supporters of CLEAR; the Campaign for Lead-Free Air." "With lead-free petrol, Saab engines are not just efficient, they're quieter and cleaner too...If all cars were this mindful of the laws of nature, perhaps new laws would be

unnecessary." (*Financial Times*, July 19, 1988: 2).

We have already seen impressive gains in vehicle emission reductions over the past two decades. Since 1970, emissions of hydrocarbons and carbon monoxide from the average car have been lowered by 90 percent and nitrogen oxides by 75 percent. This is largely due to technological advances in engine design, the catalytic converter that transforms dangerous gases into less harmful ones, and reductions in the lead content in gasoline; and industry continues to make new headway in reducing auto emissions. The *New York Times* recently reported, for example, that Ford Motor Company is among the car manufacturers that are working to improve the efficiency of catalytic converters to reduce automotive pollution. The Detroit Diesel Corporation is manufacturing diesel-type engines modified to run on pure methanol, which contributes less to the production of ozone than do conventional fuels, though methanol use involves other safety considerations. General Motors and Ford also have developed automotive engines for methanol and natural gas.

A variety of other technological and institutional developments that could reduce pollution are in the experimental stage. Some economists advocate a system of adding traceable isotopes to industrial emissions to "fingerprint" each firm's emission levels. By linking emissions with specific companies, pollution bills could be sent out, offering another possible way to charge polluters.

Conclusion

In order to reduce pollution, it is necessary to incorporate polluting costs as part of everyday business and household expenses. Car owners are accustomed to paying licence plate fees, insurance fees, and so on, but they are not yet paying the pollution costs of their driving habits. The same is true for industry. Pollution-pricing plans such as emissions trading and emissions charges propose to incorporate such costs. There will be a natural resistance to plans that require people to pay for things that had previously seemed "free," but only through such systems can we hope to reduce air pollution in a manner that is efficient, effective, and equitable. The plan above describes a market that is driven by a broad-based ruling requiring all polluters to reduce emissions by certain percentages. While there are other ways to establish the impetus for markets, the important point is that properly structured incentives will induce people to adopt antipollution activities voluntarily.

Deregulation of land-use and transportation also offer a way of letting people make the kinds of trade-off decisions regarding the costs of their current behavior versus the costs of altering their behavior in ways that help reduce their contribution to pollution. This deregulation will be most effective if it is accompanied by various mechanisms for charging for pollution emissions. Such

a pollution-abatement plan offers far greater flexibility and far greater prospects of reducing pollution in ways that are cost efficient and enforceable than the AQMD plan, or any of the variants now under consideration.

The proposed Air Quality Management Plan continues the government tradition of setting unrealistic goals for environment quality and imposing inflexible, top-down mechanisms for achieving those goals. Past federal legislation, for example, that stated the water pollution goal of "zero discharge" into the nation's waterways, has remained just that--a statement of goals. Similarly, the AQMP seeks to put the Los Angeles basin in compliance with federal clean-air standards by 2007--using control measures whose emission reductions are highly speculative and whose true costs are yet to be revealed. They, too, are likely to become just statements of goals on the environmental wish list.

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