Emission Quota Strategies as an Air Pollution Control Technique*

Daniel R. Mandelker** and Thea A. Sherry***

INTRODUCTION

In the continuing debate over the nation's air quality program, the choice of enforcement strategy to implement the Clean Air Act's air quality goals continues to receive major attention. While the Act requires the states to provide for limitations on emissions from stationary sources of pollution, it also authorizes them to include land use con-

* This paper was prepared under Contract No. 68-02-0278 between the United States Environmental Protection Agency and Rutgers University, entitled Contribution of Urban Planning to Air Quality. It is a somewhat revised version of a portion of a report which was published by the Environmental Protection Agency by R. Brail, D. Mandelker, T. Sherry, & G. Hagevik, EMISSION DENSITY AND ALLOCATION PROCEDURES FOR MAINTAINING AIR QUALITY (EPA-450/3-75-079, 1975). Research for the legal portion of this contract was conducted at Washington University School of Law (St. Louis) under the supervision of the junior author, who is primarily responsible for that portion of the article reviewing emission quota experiments in Chicago and Louisville. Washington University law students participating in the study, in addition to the junior author, were: Gary Feder, Elizabeth Levine, David Miller, Stephen Pressman, and Lawrence Singer. Claire Halpern, J.D., Washington University, 1975, provided additional editorial assistance. The authors would like to acknowledge the assistance of Professor Richard Brail, Rutgers University, and Mr. John Robson, Environmental Protection Agency, in the preparation of this article. The opinions, findings, and conclusions expressed, however, are the authors', and are not necessarily those of the Environmental Protection Agency or Rutgers University.

** Howard A. Stamper, Professor of Law, Washington University.

*** J.D., Washington University, 1974.


trols in their implementation plans as a supplementary means of com-
batting air pollution.°

Growing attention to the land use element in national and state
air quality programs has resulted in a concomitant increase in the use
of land use controls as a dominant enforcement strategy employed to
achieve and maintain national ambient air quality standards. Several
factors have contributed to this change in emphasis. Foremost among
them is the recognition that it is not sufficient to control emissions from
stationary sources and motor vehicles in order to achieve statutory air
quality goals. The location of new stationary pollution sources and the
volume, length, and direction of motor vehicle trips are heavily de-
pendent on the way in which land use patterns develop in urbanized
areas. These patterns in turn are influenced by regional and local land
development policies and the land use controls which implement them.

Air quality specialists and the federal Environmental Protection
Agency (EPA) have been examining a variety of land use controls
which can help to implement the goals of the national air quality pro-
gram. Among those being given serious attention are a variety of
measures known collectively as emission quota strategies. Emission
quota strategies provide a method for relating the production of emis-
sions by pollution sources to air quality standards. These strategies
are based on the application of air quality standards to stationary

FeuRer, & D. CaLLieS, EPA Authority Affecting Land Use, ch. 3 (1974); Mandel-
ker & Rothschild, The Role of Land-Use Controls in Combating Air Pollution Under
the Clean Air Act of 1970, 3 EcoLoGey L.Q. 235 (1973). See also Comment, Air
Zoning, 4 EcoLoGey L.Q. 781 (1975).

4. See Roberts, Croke, & Booras, A Critical Review of the Effect of Air Pollution
Control Regulations on Land Use Planning, 25 J. AIR POLL. CONTRol ASS'N 500
(1975); Robson, Land Use Planning and Air Pollution, Speech to 21st Annual Interna-
tional Education Seminar, Am. Right of Way Ass'n (June 24, 1975).

5. These linkages are already provided to some extent by the Clean Air Act.
The Act authorizes the Administrator of the Environmental Protection Agency (EPA)
standards limit the amount of pollution permitted in the air from any one pollutant at
any one period of time. However, the standards are not directly applicable to pollution
sources. They serve as criteria for judging the adequacy of state air quality implementa-
tion plans adopted to meet the requirements of the Clean Air Act. See 40 Fed. Reg.
53340, 53341 (1975). The Act also provides for the adoption by EPA of new source
performance standards that reflect "the degree of emission limitation achievable through
the application of the best system of emission reduction . . ." 42 U.S.C. § 1857c-6(a)
(1) (1970). These new source performance standards are not directly related to the
national air quality standards. However, a related provision of the Act requires the
states to adopt a procedure preventing construction or modification of applicable new
sources at any "location" which will prevent the attainment or maintenance of the na-
egies can be viewed as one method of implementing this latter requirement.
sources of pollution in the land use control process. The emission quota strategy first designates the maximum amount of pollution allowable in any one area based on an analysis of present air quality and the assimilative capacity of the air to absorb additional pollution without violating environmental standards. New stationary sources of pollution are then approved only if they meet applicable performance standards and related air quality control regulations, and do not exhaust the emission quota for the area in which they are located. Once the emission quota for an area is exhausted no additional stationary sources of pollution are allowed within that area.

Basic prerequisites to the implementation of any emission quota strategy are: first, a method for translating existing and proposed land use activities into equivalent pollutant emissions; second, a determination of the maximum amount of pollutant emissions allowed by air quality standards; and third, constraints on new development which will keep pollutant levels within these limits. While conceptually simple, this process creates many technical problems of execution which may be difficult to overcome in practice. One problem is the difficulty of translating land use activities into expected pollutant emission rates. Some technical work has been done in this area, but no fully satisfactory technique has yet been developed. Other problems arise in determining the impact of a given level of emissions on ambient air quality standards in any one regional subarea. Proportional or diffusion models relate emissions output to air quality levels but have not yet been perfected.

6. The text will concentrate on the application of emission quotas to stationary sources. However, emission quotas are also potentially applicable to mobile sources of pollution. See discussion in the text at note 92 infra.

Throughout the discussion it is assumed that emission quota limitations are applied as a supplement to conventional stationary source emission limitations. In theory, emission quotas could be adopted as a substitute for emission limitations, but this step would require a change in the federal statutory provisions containing the requirements for state implementation plans.

7. See 3 ENVIRONMENTAL PROTECTON AGENCY, Control Strategies, GUIDELINES FOR AIR QUALITY MAINTENANCE PLANNING AND ANALYSIS, II-3 to II-10 (1974) [hereinafter cited as CONTROL STRATEGIES].


9. For a thorough discussion of this problem, see Conn, The Difficulty of Forecasting Ambient Air Quality: A Weak Link in Pollution Control, 41 J. AMER. INST. PLANNERS 334 (1975):

The simplest rollback model assumes a proportional relationship between emissions and air quality; in other words, a given reduction in emissions applied uniformly over space and time is assumed to give rise to a proportional reduction in the level of pollution. Id. at 337. These models suffer from a variety of difficulties, including the assumption that reductions in emissions from pollutant sources are homogeneously distributed over the area affected by the emissions:

Full diffusion models . . . simulate mathematically the physical and chemical processes that affect primary pollutants on their release to the atmosphere . . .
Particular difficulties arise in applying data collected on a regional level to subareas within air quality regions. Unless this step can be executed, a data base for emission quotas cannot be provided since these quotas are necessarily applied at the subarea level. The technical problems underlying the emission quota strategies cannot be disregarded when their implementation and legal status are considered.

Assuming the interaction between pollutant emissions and air quality standards can be adequately formulated and applied on a subarea level, the analysis should produce a set of emission quotas for each subarea of an air quality control region which can serve as the basis for an overall emission quota strategy. If the emission rate of each land use category is known, a control method is available which can regulate emissions and (indirectly) air quality through the application of direct controls to new stationary pollution sources. Simply put, if in a given subarea a designated increase in pollutant emissions will lead to a violation of the air quality standards, land development controls can be exercised to prevent the approval of a new source if that source will increase new emissions to a level in excess of the permitted maximum.

This Article focuses on the use of emission quotas in the control of direct emission pollution from stationary sources, which are particularly amenable to control by means of area-based quota plans. Although somewhat similar techniques can be used to control air pollution from motor vehicles, the special problems which arise when dealing with mobile sources of pollution are beyond the scope of this article.

After an initial section outlining the variety of emission quota strategies that are available, experiences with emission quotas in Cook

---

10. For a discussion of a methodology for making sub-county allocations see 13 ENVIRONMENTAL PROTECTION AGENCY, Allocating Projected Emissions to Sub-County Areas, GUIDELINES FOR AIR QUALITY MAINTENANCE PLANNING AND ANALYSIS (1974).

11. It should be noted here that emission quotas can be used as an implementation technique both in the attainment and maintenance of National Air Quality Standards. The EPA has concentrated primarily on the use of emission quotas as an air quality maintenance strategy. See note 7 supra.

12. The assumption throughout this article is that emission quotas will be used as a supplementary control measure. They will complement the standards that are applied to reduce emissions at the source through improvements in production technology. However, the possibility that emission reduction through modifications in production techniques may affect the implementation of the emission quota should not be forgotten. See text accompanying note 89 infra.

13. See the discussion in the text at note 92 infra.
County, Illinois (Chicago), and Jefferson County, Kentucky (Louisville), will be reviewed. Concluding sections will discuss potential legal problems in the implementation of the emission quota concept, and evaluate the use of emission quota strategies as an air pollution control technique.

I

THE EMISSION QUOTA IDEA

The basic elements in an emission quota strategy are the translation of ambient air quality standards into maximum emission quotas for each subarea of the air quality control region, and the application of the quota on a case-by-case basis to new stationary sources of pollution. The strategy is applied as approval for construction or modification of these sources is requested.

In practice, at least four methods exist for applying emission quotas. The first applies the quota to an entire local government jurisdiction. The other three methods apply the quota to smaller areas but differ in their way of defining these areas. Each method will be described briefly, and potential legal and administrative problems in their application noted.

A. Emission Allocation Planning

Emission Allocation Planning (EAP), the most broadly conceived of the emission quota techniques, contemplates the assignment of emission quotas to existing political jurisdictions, such as municipalities and counties, within an air quality control region. Using EAP, the air quality control agency, either on its own or in cooperation with the regional planning agency, assigns maximum allowable emission quotas to each political unit within its jurisdiction but does not attempt to apply the emission quota directly to new stationary sources. Instead, each local government meets its assigned quota in any way it wishes, whether by stationary source controls or otherwise. This approach is attractive because the emission quota does not necessarily freeze de-

14. For additional discussion see CONTROL STRATEGIES, supra note 7, at II-1. See also R. Braid, D. Mandelker, T. Sherry, & G. Hagevik, EMISSION DENSITY AND ALLOCATION PROCEDURES FOR MAINTAINING AIR QUALITY 1-4 to 1-7 (EPA-450/3-75-079, 1975) [hereinafter cited as ALLOCATION PROCEDURES].

15. Under one EAP proposal, the allocation of emission quotas to each jurisdiction would have been “based on an analysis of present air quality and the assimilative capacity of the air to absorb pollutants and still maintain air quality standards.” Id. at 2-11 (California proposal). In other words, the allocation is based on the contribution each local government jurisdiction is likely to make to regional air pollution problems, as determined by air quality modeling or similar procedures.
development out of any one subarea. Each governmental unit must decide how to allocate its assigned emissions.

The flexibility in this approach should allow each local government to meet its emission quota without adopting overstringent regulations that raise legal problems, but while it is appealing, it presents the danger that EAP strategy may conflict with conventional regional planning goals. Local governments may find that they can best comply with their assigned emission quotas by approving a series of small, dispersed industrial sources, since this kind of development pattern is most likely to facilitate the absorption of pollutants in the airshed. Thus, one result of implementing the EAP strategy could be a haphazard development pattern throughout the region.

This problem can be mitigated if the regional level gives more direction in the assignment of the emission quota. As one example, some method could be developed for transferring emission quotas among communities so that regional development patterns would not be distorted. Another approach would be to provide some method for regional review of local land use plans and controls to reduce the possibility that the assignment of the emission quota at the local government level would be inconsistent with regional plans. But any method for implementing EAP that decreases the regulatory autonomy of local government units will likely meet political resistance. It may also be argued that the realignment of regional planning and land use control measures should not be carried out solely with air quality objectives in mind, but should include the full range of developmental and environmental considerations that must be taken into account in a comprehensive planning program. Political conflicts over legislation seeking to establish an EAP procedure in California foundered on just this issue.

B. Floating Zone Emission Quotas

This emission quota strategy, as well as the others that follow, is applied solely within the jurisdictional limits of the governmental entity

16. Id. at 1-5.
17. For discussion of an emission allocation proposal which was legislatively considered in California, see id. ch. 2. The proposal died in large part because of conflict over whether the emission allocation system was to be implemented by land use planning or air pollution control authorities. For additional discussion of the California EAP proposal see Livingston & Blayney, Report on Guidelines for Relating Air Pollution Control to Land Use and Transportation Planning in the State of California (1973) (available from Cal. Air Resources Board).
18. Development rights transfer techniques have been advanced as one method of dealing with this problem. See Baker, Development Rights Transfer and Landmarks Preservation—Providing a Sense of Orientation, 1975 Urban L. Annual 131.
19. See note 17 supra.
having responsibility for the air quality control program. Unlike EAP, it does not require some form of regional, intergovernmental cooperation in order to make the emission quota strategy fully effective. An example, described more fully below, is the Floating Zone Emission Quota (FZEQ), which has been adopted by the Louisville, Kentucky Air Pollution Control District. A county or municipality delegated air quality control authority by the state could also apply the FZEQ method.

The FZEQ is applied on a source-by-source basis. When an application for approval of a new stationary source of pollution is received, the emission quota—the maximum amount of emissions consistent with clean air standards—is calculated for an area within a given radius of the proposed industrial site, say one mile. The area defined by the radius can be varied in size depending on the nature of the source and the pollutants it emits. The source can be approved if the pollutants it emits will not lead to a violation of the emission quota within this radius.

This emission quota technique has the advantage that there need be no advance allocation of the emission quota to districts within the political jurisdiction. Legal problems in the implementation of the quota are minimized because a decision to deny the approval of a new stationary source is deferred until such time as the quota is exceeded. In addition, the fact that the quota is applied on a case-by-case basis within the immediate area affected by each new source allows new sources to avoid sites at which disapproval is likely. Unfortunately, the FZEQ relies in part on adequate spacing between sources to avoid quota violations. Without additional controls on the location of new sources, the pressure to avoid quota saturation may again encourage the dispersal of new pollutant sources and a dispersed development pattern that may be undesirable.20

C. District Emission Quotas

More control over the location of new stationary sources is provided by the District Emission Quota (DEQ). This quota is again applied solely within the jurisdiction of the local government unit administering the air pollution control program. Unlike the Floating Zone Emission Quota, however, emissions under the DEQ are assigned to districts with fixed boundaries. Additional stationary sources of pollution are allowed in each district only so long as the emission quota for

that district is not exceeded. These emission quota districts can have the same boundaries as zoning districts for industrial and other stationary pollution sources.

Although the DEQ can provide more control over the location of new stationary sources of pollution through careful mapping of the emission quota districts, individual hardships and legal complexities are likely to arise because decisions to allocate emissions within each district will probably have to be made on a first-come basis. Under this system, each new source will be allowed until the quota for the district has been exhausted. Any other method for allocation of the emission quota within emission districts would present administrative problems of a serious magnitude.

Assume, for example, that a new source is proposed for a small area in an emission quota district and will emit 90 per cent of the emissions allocated to that district. The pollution control agency might well take the position that the allocation of emissions to this source is 'unfair,' first, because it will exhaust too much of the quota, and second, because the emission quota should be more evenly distributed among polluters located within the district. This position will be very hard for the control agency to defend absent some supportable criteria under which it can be made, and these criteria are difficult to discern. In particular, there is no guarantee that a refusal to approve a 'heavy' polluter guarantees the arrival, soon thereafter, of a series of 'light' and area-extensive polluters that will utilize the emission quota in smaller increments. The market cannot be relied upon to behave in so precise a fashion. Therefore, the control agency will of necessity be forced to distribute available emissions on a first-come basis.

In the case put above, if an early entrant exhausts a substantial portion of the emission quota he will foreclose entry by other, and possibly lighter, polluters. The question is whether a first-come basis for allocating the emission quota is legally defensible. Even more serious legal problems will be presented if the next-in-line polluters find that they can make no reasonable use of their land if they are denied the polluting facility they had proposed.

D. Emission Density Zoning

A final variant of the emission quota, Emmission Density Zoning (EDZ), assigns the quota to a fixed unit of land in a single owner-

21. Many of the statements in this article are based on interviews conducted by Thea Sherry in Cook County, Illinois, and Louisville, Kentucky, during the summer of 1973.

22. For additional discussion see Roberts & Croke, Land Use as an Organizational Basis for Regional Air Resource Management, in PROCEEDINGS OF THE SECOND INTER-
ship. Though the term has been loosely applied to cover a wide variety of emission quota techniques, this variant of the emission quota will be referred to as Emission Density Zoning.

Under EDZ, the quota is stated as the amount of pollution that can be emitted by a stationary source in a fixed area of land over a specified time period. For example, an EDZ quota can provide that a new stationary source of industrial pollution can emit no more than two tons of particulate matter a year for each acre of the site on which it is located. If a new industrial source of pollution produces four tons of particulate matter each year, two acres of land would have to be acquired by the source in order to meet the EDZ requirement.

Defined in this manner, EDZ is attractive because it need not be related either to local land use and zoning controls, or to a fixed or floating emission quota district. New sources of pollution can comply with the EDZ quota simply by purchasing the necessary amount of additional land. Problems of implementation may arise, however, if no land is available for purchase near the site of the stationary source, or if owners of available land hold out for premium prices. New sources may then have to look elsewhere for sites, and the dispersal of new development that results again may not be consistent with local or regional planning policies. Alternatively, low density development may be produced by heavy polluters forced to buy large amounts of land in order to meet the emission limitation. Compliance problems will be aggravated if the local government unit that adopts and enforces the quota also attempts to control the location of new pollution sources through zoning policies restricting the areas in which these sources can locate. EDZ may also raise legal problems if the sources subject to the quota are forced to buy excessive amounts of land in order to comply with the quota.

This section has briefly outlined the characteristics of emission quota strategies, as well as the legal and implementation problems they are likely to create. These variants of the emission quota can best be distinguished by the increasingly site-specific nature of their requirements.

The first variant, Emission Allocation Planning, leaves most site decisions to the local governments assigned emission allocations. Each of the other three variants employs different kinds of site-related strategies in order to determine whether the emission quota has been violated. The Floating Zone Emission Quota and Emission Density Zoning propose mechanical tests for determining whether new sources...
of pollution can be approved at the site at which they propose to locate. Under the Floating Zone variant, the emission quota for a fixed area around the proposed site is applied to determine whether that area can absorb the new pollution source. Emission Density Zoning allows approval of new pollution sources only if the source acquires enough land at its site so that the amount of pollution it will produce, when spread over its entire site, will not exceed the emission quota. Both of these strategies may bring about undesirable development patterns as new industrial sources of pollution spread out over a wide area, settling in places where the air is sufficiently clean to be able to absorb their emissions without exceeding the national ambient air quality standards. District Emission Quotas can avoid this problem because they allow the governmental agency applying the quota to designate those districts in which new pollution sources can locate. The danger with this strategy is that the emission quota for an emission quota district may be exhausted before all the available land in the district is developed, perhaps unduly restricting new development and inevitably leading to legal disputes over which new source applications should be accepted and which should be rejected.

II

EMISSION QUOTA SYSTEMS IN PRACTICE

Implementation and enforcement responsibilities under the national Clean Air Act are delegated to the states and their air pollution control agencies. No local enforcement role is authorized by the federal legislation. Local experimentation with air pollution control techniques has nevertheless been possible in Illinois and Kentucky. Local agencies in these states have been given major enforcement responsibilities, partly because of difficulties in enforcement programs at the state level. In Illinois, the state’s Environmental Protection Agency did not delegate enforcement responsibilities to each county but assumed control over the state’s air quality program. Cook County, however, was a notable exception, as it had previously established an Environmental Control Department and had adopted an air pollution control ordinance. Thus, both the state and county agencies have enforcement authority within that county. Control over air pollution in

25. See note 20 supra.
Kentucky had been centered in the state's Air Pollution Board with limited local enforcement provisions. This enforcement structure was modified by the state's implementation plan, which authorized the Kentucky Air Pollution Board to create air pollution districts throughout the state with concurrent enforcement powers. In both states, then, certain local agencies were given an enforcement role in the air pollution control effort which allowed them to experiment with emission quota strategies as an air pollution control technique.

A. The Cook County Approach to Emission Quotas

Cook County was one of the first in the country to adopt local air pollution performance standards for industry. These standards for more than 10 years included criteria which measured air pollution in pounds/acre/year. Thus, they combined the measurement of pollution emissions by each plant source with pollution density by area. This approach is a modified Emission Density Zoning control to the extent that emissions are measured on an acreage basis. Plants could reduce their pollution output by acquiring more acreage, thereby foreclosing the possibility that additional plants would locate nearby and exhaust the pollution allocation for that area.

In 1973, this EDZ technique was abandoned. The county ordinance now measures pollution emissions by process weight rate. The process weight rate is the level of emissions allowable for each weight-unit of production. This system measures stationary source emissions by a ratio of plant input to output, no longer defining emission load by land area. Although the area measurement test has been omitted,

27. This pattern of enforcement was primarily due to the absence of county or regional air pollution agencies within the state.

28. The Kentucky implementation plan had also proposed a set of exceedingly stringent air pollution standards. The reaction to a tightening of pollution standards was quite negative, some critics claiming that growth in the area would be cut by three fourths. As a result, the Kentucky implementation plan which was finally submitted to and approved by EPA deleted any promise of stronger-than-minimum controls.


30. According to Mario Tonelli, supra note 26, the new ordinance is more in tune with the state, which has adopted stricter regulations. The ordinance was changed in Apr. 1973.

31. Cook County Ordinance Art. VI, § 6.2-1(d) provides:

For purposes of the regulation, the total process weight from all similar process units at a plant or premises shall be used for determining the maximum allowable emission of particulate matter that passes through a stack or stacks.

The stationary sources to which this control is applied are known as point sources in air pollution control terminology. Point sources are defined by EPA as any stationary
the Environmental Control Department continues to call this ordinance an emission density control because its sample stations measure emissions 30 feet above the top of the stack, at which point there has been some dispersal over the surrounding area. Nevertheless, as pollution emissions are not related to a fixed land area, the Cook County ordinance can no longer be classified as Emission Density Zoning. Cook County abandoned the earlier EDZ technique because the burden of compliance fell more heavily on smaller stationary sources. In theory, any plant, large as well as small, could meet the EDZ standards of the old ordinance without problems so long as it acquired a large enough site to control its emissions; the more land, the more a plant could emit. In practice, however, the EDZ controls were biased in favor of large sources. A large source usually had the funds to buy more land if necessary, and large sources usually had easier access to additional land for purchase. The Department thus believes that the old ordinance was unfair to small polluters, but the new process weight approach in turn places a heavier compliance burden on larger sources. They emit more pollutants and so must adopt more stringent measures to reduce pollution emissions.

B. The Jefferson County Approach to Emission Quotas

The emergence of an environmental concern in Jefferson County, Kentucky is no surprise. Jefferson County is the home of the first Ecology Court in the country. Ecology has been an important political issue and the county has had an air pollution control district since 1971. Although its air pollution control regulations are generally similar to those enacted by comparable agencies, it has provided a

source "causing emissions" in excess of designated threshold limits. 40 C.F.R. § 420.1(1).

The Jefferson County Air Pollution Control Regulations define a point source as "any air contaminant source which emits 25 tons per year or more of either particulate matter or sulphur dioxide." Air Pollution Control Regulations, Jefferson County, Ky., ch. I § 1.13.1 (Amended March 1973) [hereinafter cited as JEFFERSON COUNTY REGULATIONS].

32. Tonelli interview, supra note 26.

33. By acquiring additional land the large industry can avoid a violation of the emission density control. On the other hand, if industries are forced to acquire additional land in order to comply with emission density controls they may have to locate in areas in which the air is better than what the national standards require. The Illinois Institute of Environmental Control stated that this was the reason why the state stayed away from emission density zoning. Hawker interview, supra note 26.

34. Jefferson County is the only district which has been set up in Kentucky in recent years.

35. Unlike other air pollution ordinances, the Jefferson County regulation is very short and broadly stated. According to one of its draftsmen, it was intended to inform industry of the basic requirements and to work through a tough enforcement policy.
major innovation in control techniques by authorizing a Floating Zone Emission Quota.\textsuperscript{38}

This regulatory scheme grew out of an emissions inventory conducted by the district, which indicated that two types of industrial wastes, sulphur dioxide and particulates, were the major sources of pollution.\textsuperscript{37} While the Air Pollution Control Board found that each industry individually complied with its required emission limitations, this approach did not produce an acceptable region-wide ceiling on air pollution.\textsuperscript{38} Using the year 1975 as a target, the Board sought to develop a plan to overcome this problem and determine the maximum tolerable levels of industrial pollution for the district.\textsuperscript{39} Working with air quality diffusion models, the Board especially sought to establish maximum limits for particulates and sulphur dioxides for its entire jurisdiction. Once these limits were calculated, the Board partitioned the entire district into sections\textsuperscript{40} and imposed a quota on pollution output in each section.\textsuperscript{41} By this method, the Board concluded that heavily industrialized sections within the district could not exceed emission limits of 4,000 tons of particulates and 8,000 tons of sulphur dioxide per year.\textsuperscript{42} If no section in the district exceeded these limits, the sum total of particulate and sulphur dioxide pollution in the district by 1975 would be in line with federal standards.

Originally, the Board planned to use its Air Quality Diffusion Model data as the basis for setting different emission quota standards for each section of the district.\textsuperscript{43} This approach has now been

\textsuperscript{36.} JEFFERSON COUNTY REGULATIONS, supra note 31.

\textsuperscript{37.} These pollutants are of primary concern in Cook County and Louisville as they are the main pollutants produced by industrial plants. Louisville has a wide variety of industrial pollutants, such as synthetic rubber, whiskey, paint, tobacco, and coal. The coal industry, which has been traditionally a rural operation, has moved part of its operation to the Louisville area and has been especially troublesome from a pollution standpoint. Industry alone was creating approximately 788,000 tons of pollutants across the region each year. In addition, there are pollution "hot spots" in certain areas in which rubber factories and power plants are located. Offutt interview, supra note 20.

\textsuperscript{38.} Id.

\textsuperscript{39.} The year 1975 was selected because the district had set 1975 as the target date for meeting the Clean Air Act's primary and secondary standards for particulates.

\textsuperscript{40.} Sectioning the county was done as part of the development of the Board's program. The sections were two kilometers square each.

\textsuperscript{41.} That is, the emission quota would be enforced as an overlay on point source emission limitation standards, and would not replace them. The information gathered through the emissions inventory enabled the Board to take existing as well as target pollution levels into account in setting the quota.

\textsuperscript{42.} JEFFERSON COUNTY REGULATION, note 31, supra, §§ 1.13.3(A)(1); 1.13.3(A)(2).

\textsuperscript{43.} For example, the downtown section would neither have the same quota as the east-county section, which is virtually undeveloped, nor as the so-called "rubbertown" section, where much pollution is originating.
dropped, and the controlling provision of the district's ordinance establishes a 4,000 ton particulate/8,000 ton sulphur dioxide limit for all sections of Jefferson County covered by the district. This quota translates into 1,270 and 2,550 tons per square mile respectively. As each new source comes up for approval, compliance with the emission quota is determined by estimating emissions within one mile of the proposed location. New sources can be approved so long as the uniform emission quota for the district is not violated within this radius.

This strategy is a variant of the Floating Zone Emission Quota technique. The Board adopted it partly because it was afraid differential emission quotas for different areas of the district might be attacked as discriminatory. Differential quotas for different sections of the district would also have encouraged the shifting of new sources of pollution to less polluted areas of the district where more growth would be possible without violating the quota standards. This tendency, however, could have been avoided by applying stricter quotas in less polluted areas where industry was to be discouraged. As finally adopted, the emission quota limits did allow ample margin for growth, as they were set at fairly high levels.

Although the Board takes pride in its emission quota standard, it must be observed that the district's success to date is due primarily to very tough enforcement of traditional stack and point source regulations. Moreover, the emission quota has been enforced without major protest, perhaps because it was set at a generous level. Two industries have been denied the right to build or expand, but the denials were not challenged and in one case the industry relocated to another

---

44. See note 42 supra.
45. Public hearings were held prior to the enactment of the emission quota ordinance. To the surprise of the Board there was little local protest over the proposal although three groups, land speculators, large property owners, and of course some industries, did complain that emission quota limits were too stringent. State officials were also skeptical.
46. As an example, the Board has required an industry like B.F. Goodrich to include in an annual report to the Board a review of 120 different functions carried on in its plant which can potentially produce pollutants. If the Board is dissatisfied with the industry's efforts in controlling any of these functions it requires an improvement before allowing a permit to be renewed. By the summer of 1973, the Board reported that of 245 individual industries which in 1971 were producing an excessive amount of industrial pollution only 18 sources remained which had not sufficiently reduced their output. The Board attributes its success to its willingness to go to court to force industries to comply with stationary source standards. Although the Board suggests that nearly 3,000 pollution cases have been heard by the District's Ecology Court it also dismisses all of these cases as minor. Offutt interview, supra note 20.
47. One reason may be the leniency of the standard. Although perhaps acceptable in "rubbertown," 2,550 tons per square mile per year of sulphur dioxide is hardly a desirable addition to a previously unpolluted area.
area in the district. There is potential for a test case, however. Along the Ohio River there are 2,000 acres of undeveloped land which have been purchased by a local public Riverport Authority. The Authority is determined to use these acres to build a port and to develop new industry around it, but the land in question is part of a section in which no future growth is permissible under the emission quota ordinance. The scene is set for Board denial of a construction permit.

C. Jurisdictional Problems in Jefferson and Cook Counties

In both Jefferson and Cook Counties, jurisdictional conflicts have arisen between pollution control and zoning agencies regarding the enforcement of emission quotas. These conflicts have threatened the potential effectiveness of emission quotas as an air pollution control technique. Emission quotas in their purest form require more than the traditional air quality enforcement effort. To function at their optimum, emission quotas require the coordination of air pollution standards and enforcement with land use planning and controls. These latter functions by definition are delegated to the planning and land use control agencies.

In Cook County, the enforcement of an emission quota is complicated by the overlapping jurisdiction of county and municipal agencies concerned with the administration of air pollution and zoning controls. About 127 municipalities have been granted the power to zone within their own jurisdictions under state enabling legislation or their home rule charters. County land use controls apply in the unincorporated areas of the county and are enforced by the Cook County Building and Zoning Department. In the air pollution control program, the Cook County Environmental Control Department has jurisdiction over both incorporated and unincorporated county areas, but its air pollution controls must take account of the county and municipal zoning regulations to avoid conflicting decisions of the agencies concerned with approving new industrial development.

49. To date, the Board has worked with the Authority and has helped it to modify its plan to avoid this confrontation. Supra note 48.
50. Tonelli interview, supra note 26. Interview with Dan Ferrone, Department of Planning, Cook County, July 1973. Coordination is monitored by keeping up to date a grid map which pinpoints the sample stations. The grid map partitions the county into areas of high and low pollution concentrations. The Cook County Environmental Control Department will not approve a plant if it will cause a violation of primary or secondary air quality standards, but whether the location is beneficial or at least adequate from a land planning perspective is not within its jurisdiction to resolve. The local standard which was set to meet national air quality standards was not the measure of what people breathe, according to the Environmental Control Department, but what
Era must also cooperate with the Environmental Control Department to keep up the latter's emission inventory on an industry by industry basis. Additional confusion arises from the concurrent enforcement of industrial performance standards. These are contained both in the county zoning ordinance (enforced by the county building department) and in the air pollution regulations.

How the enforcement of the Cook County air pollution ordinance is carried out in practice can be illustrated by an analysis of the procedures that apply to the approval of a new industrial pollution source. Construction of a new industry begins with submission of a detailed plan indicating where it will locate, the manufacturing process to be used, and proof of compliance with air pollution control standards. The plan is reviewed by the County Zoning Department to determine zoning compliance and is then sent to the Environmental Control Department. It enforces air pollution controls through a permit system which reviews plant operation, not land use. It determines what plant controls will be necessary to assure compliance with national ambient air quality standards and the county air pollution control ordinance. In order to obtain a location and construction permit from the Environmental Control Department, the industry must show that it can meet all of the applicable national and county standards. To receive an operations permit, the completed plant must also meet air pollution control

people need in order to breathe. This approach is consistent with the Department's philosophy that its purpose is not to rid the Chicago area of as much pollution as is theoretically and practically possible but merely to keep within the national standards.

52. The inventory is obtained by monitoring the sample stations dispersed throughout the area. If a station registers a high reading, inspectors are sent into the area to determine the polluting industry. Thus, the Environmental Control Department deals directly with each plant at its stack or cluster level.


54. The zoning ordinance includes certain performance standards not necessarily identical to the Environmental Control Department standards for manufacturing, as well as noise control provisions. The County Zoning Department, however, did not appear to be very clear about the ordinance of the Environmental Control Department (and vice versa). The Zoning Department was unsure whether the requirements were identical, whether the unit of measurement was the same, or if either one preempted the other. It was confident, however, that the ordinances conformed. The Environmental Control Department deals not only with the Zoning Department but also with the 127 municipalities in Cook County.

55. The Zoning Department has jurisdiction only over the unincorporated part of the county. In contrast, the Environmental Control Department has jurisdiction over the entire county, excluding the city of Chicago, which has set up its own environmental control department. See text at note 25 supra.

56. The Environmental Control Department has the scientific knowledge and the inspectors to accurately assess whether industry can meet the necessary performance standards established by the county, which sets up a work program for each industrial complex.
operating standards.\textsuperscript{57}

The Environmental Control Department's enforcement powers, however, are limited to the air pollution ordinance. It cannot direct either the county or the municipalities how to zone for industrial, residential, or business uses, and must accept their determinations of present and future land use patterns. The result is that the Department has the scientific knowledge to determine what areas are so heavily zoned for industry that air quality violations will occur, but has no means of preventing a municipality from zoning for industry in those areas.\textsuperscript{58} In addition, although the permit system provides enforcement powers, this process has not been used to prohibit construction at locations considered undesirable from an air pollution standpoint.\textsuperscript{59} One observer believes that emission density control under these limitations is after-the-fact regulation.\textsuperscript{60}

In Jefferson County, emission quota standards are not considered a zoning device, and the Board avoids even mentioning the word zoning in its ordinance. In fact, there are no professional planners on its staff. Planning and zoning powers are exercised by the Jefferson County Planning and Zoning Commission, which nevertheless agrees that as emission quota standards are actively enforced these standards will preempt local zoning ordinances.\textsuperscript{61} Both the Commission and the Board also agree that an umbrella agency should be created to achieve the necessary coordination, with existing agencies merely providing the information needed for regulation, but neither agency seems willing to cooperate. There are other problems. (1) Even if the legal hurdles are surmounted, there are technical difficulties which may impair the

\textsuperscript{57} After completion the plant is subject only to regular inspections. If the plant does not comply at either stage, however, it need only comply when it can. It is not subject to a waiting period or penalty.

\textsuperscript{58} Both the Environmental Control Department in Cook County and the Air Pollution Control District in Jefferson County are staffed entirely by chemists and engineers. In neither are there plans to bring in attorneys or urban planners. Fred P. Bosselman, a prominent Chicago land use attorney, believes that the establishment of a centralized agency combining air pollution and land use control functions could be helpful. Interview, July 1973. Mario Tonelli, \textit{supra} note 26, concurred. The Cook County Environmental Control Department also agreed that an agency combining land use zoning and environmental control standards would be desirable. However, zoning as such was not applauded; basically, performance standards were considered separately from land use.

\textsuperscript{59} Tonelli interview, \textit{supra} note 26. All the department does is to give an industry a "slap on the hand" for a violation or delay the appropriate permit until the standards are satisfied.

\textsuperscript{60} Interview with Marvin Salzenstein, President of Polytechnic, Inc., July 1973. He is the author of articles over the last ten years on air pollution control.

\textsuperscript{61} Yet Dan Ridings, the Planning Commissioner, concedes that the Pollution Board is far better equipped than his agency to make such quasi-zoning decisions. Interview, July 1973.
operation of these schemes. (2) The district has never bothered to deal with industries whose stack heights are less than 30 meters. As noted earlier, the county-wide limits in the emission quota are set at rather high levels to avoid completely discouraging growth. As a result, pollution will increase in areas with relatively clean air.

III

LEGAL PROBLEMS IN THE USE OF EMISSION QUOTAS

Emission quotas do not appear at first sight to raise serious constitutional problems. Emission quota controls rely on well-established principles of constitutional law which generally support any regulatory control resulting in cleaner air, improved atmospheric conditions, and improved public health. Legal problems may arise, however, because regulatory assumptions underlying conventional zoning controls may not fully accommodate the restraints imposed on the private use of land by emission quotas. In conventional zoning, every parcel of land in a community is assigned a permitted use and density which is sufficiently permissive to avoid a due process “taking.” Fairness and equal protection objections are avoided in conventional zoning through the use of criteria which allocate land uses and densities on the basis of development policies that can be uniformly and consistently applied.

Emission quotas proceed on a different premise. The emission quota places a threshold limit on allowable emissions within the air quality region as assigned to specific geographic subareas. New stationary sources of pollution will be approved only so long as these threshold limits limits are not exceeded. The difficulty is that the pollution holding capacity of a region or sub-area may not be altered, as density and use restrictions may be altered in conventional zoning, to afford greater leniency to individual sources in order to forestall constitutional attacks. Eventually, additional sources of pollution must be prohibited so that emission quotas will not be exceeded. Constitu-

62. As a result, the numerous small industries presently being ignored may ultimately produce enough pollution to create a substantial increase in pollution levels.

63. Offutt interview, supra note 20.

64. See In re Spring Valley Development, 300 A.2d 736, 5 ERC 1127 (Me. 1973), noted 22 Kan. L. Rev. 127 (1973), upholding the Maine Site Location of Development Law. This law authorizes the state Environmental Improvement Commission to consider the effect on the natural environment when reviewing for approval a development that comes under the law’s provisions.


tional objections may be raised when the application of air quality standards leaves the landowner with no constitutionally acceptable alternative for the development of his land.

A. The Quota Exhaustion Problem

These constitutional issues can best be viewed from the vantage point of the applicant whose source has been disapproved under the circumstances outlined above. Let us take the equal protection argument first. An unsuccessful applicant will allege that his application has been denied solely because he was last in line, and that other sources with no greater merit have been approved solely because they were presented to the air pollution control agency earlier. He would claim that a system of land use regulation which distributes development opportunities on this basis is unconstitutional because the criterion utilized to make the allocation—priority of application—cannot be sustained as reasonably appropriate under the equal protection clause.

Unfortunately, there is very little legal precedent to assist in an analysis of this constitutional claim. As Professor Krasnowiecki has pointed out, "There was a sense running through standard zoning that you cannot establish regulations for an area that would allow one landowner to deprive the other of a pro-rata share of permissible development." In other words, as applied in the emission quota context, there seems to be acceptance of the principle that the quota cannot be filled on a first-come basis if development will be prohibited on any land subject to the quota after it has been exhausted. This problem does not arise under traditional zoning ordinances. Traditional residential zoning assigns a density limitation to all zoning districts, but each parcel of land within the district is entitled to the allowable density. The density for the district is not exhausted under such a quota system until all land in the district has been developed.

There has been little judicial consideration of the quota problem. Recently adopted no-growth ordinances in many municipalities which utilize a quota approach will no doubt test the constitutionality of the quota strategy, at least as applied to limit residential growth. The issue has not yet been settled and will probably be extensively litigated. Our impression, however, is that the state courts, at least, will

69. The issues are extensively discussed in POTOMAC INSTITUTE, INC., LOCAL GROWTH MANAGEMENT POLICY (1975).
be hostile to explicit quota programs that foreclose last-come developers from areas in which, but for the quota, they would have been allowed to develop their land.\textsuperscript{70}

It is possible that quota exhaustion can be forestalled or avoided by the addition of certain add-on measures which will moderate the quota's impact on new pollution sources. Transfers of air pollution emission rights between emission quota districts under the DEQ method, or between local government jurisdictions under the EAP method, are one possibility.\textsuperscript{71} However, this technique may raise constitutional objections similar to those that have been levied against the transfer of development rights in the conventional land use controls context.\textsuperscript{72}

A general reduction of emissions from existing sources could also allow the approval of additional new sources without violating the applicable emission quota. A reduction in pollution produced by new sources could be obtained through the general enforcement of emission limitations applied to these sources, and need not raise constitutional problems. Another possibility, not now authorized by the Clean Air Act, is to require payments by new sources to existing sources so that the latter can invest in production technology to reduce their pollution output. Constitutional objections might possibly be raised to these payments by new sources. However, they can be sustained on the rationale that the payments are simply a compensatory alternative to the

\begin{itemize}
  \item We should also note that equal protection problems created by quota restrictions may also arise under other control strategies that have been adopted to implement the Clean Air Act. EPA's no significant deterioration rules place a quota on air pollution emitted by designated new stationary sources in no significant deterioration areas. See 39 Fed. Reg. 42510 (1974). Presumably, equal protection problems similar to those discussed here may arise in these areas. The problem is not likely to occur, however. Emission quotas are often applied to local industrial "hot spots" in which much industrial development has already occurred and in which any restriction on new industrial development appears arbitrary. No significant deterioration areas are likely to be areas in which little industrial development has taken place. The disapproval of a new stationary source in these areas is not likely to happen at a location already committed to industrial use.
  
  State implementation plans must also contain a procedure authorizing the denial of a new stationary source at any "location" at which it would violate a national ambient air quality standard. 42 U.S.C. §§ 1857c-5 (1970). This provision would authorize the disapproval of a stationary source under circumstances that could raise equal protection and due process problems similar to those discussed in the text. Apparently the states have not yet used this provision to disapprove new sources solely on the basis of their location. If they did, the constitutional problems discussed in the text are again likely to arise.

70. \textit{But cf.} Construction Industry Ass'n of Sonoma County v. City of Petaluma, 375 F.2d 574, 8 ERC 1001 (9th Cir. 1975), cert. denied, 44 U.S.L.W. 3467 (U.S. Feb. 24, 1976), in which the court upheld a local growth control program under conventional federal equal protection doctrine.

71. \textit{See} note 18 \textit{supra}.

additional financial investment that new sources would have to make in their own plants in order to keep their pollution levels below the required limits.\textsuperscript{73}

As applied in the emission quota context, the possible adverse equal protection implications are most serious in the District Emission Quota. As the quota is assigned by district, it may be exhausted before all of the land in the district available for industrial or other polluting uses can be developed. Quota problems are less serious under the Emission Allocation Planning procedure, since local government agencies subject to EAP quotas can more easily adjust their land use control regulations to meet the quota without application on a district basis. Legal problems may still arise under this system if the EAP process does not contain a method to force communities to zone up to their emission threshold.\textsuperscript{74} Some communities may then adopt land development control policies that do not exhaust their emission quota. In this situation, developers seeking approval in less reluctant communities may soon exhaust the quota, and equal protection problems may arise when the last-come developers are refused approval. Equal protection problems may also arise in communities heavily zoned for development which already have a serious pollution potential at the time the quota is assigned. These communities will not have much leeway to adjust their land use regulations so that zoned usage with a pollution potential will not exceed the pollution quota assignment.

The quota problem may be easier to handle under the Floating Zone Emission Quota as adopted in Jefferson County. This emission quota control has the advantage that it does not require the mapping of emission quota zoning districts in advance. The area in which a violation of the emission quota is tested varies as each new source is proposed. Thus, the margin of safety for each new source increases the greater its distance from existing sources of pollution. As a result, there is less likelihood that new sources will be disapproved, so long as the applicable zoning restrictions do not prevent the location of new sources at sites where air pollution requirements will not be violated.

The Emission Density Zoning approach does not raise an equal protection problem. Individual polluters can comply with the emission quota simply by acquiring enough land to bring their emissions within the quota limits. No polluter will be denied approval under this system simply because his application is presented after earlier approvals have exhausted an emission quota applied to a district, area, or governmental jurisdiction. Although the amount of land needed to absorb emis-

\textsuperscript{73} The subdivision exaction cases may provide a helpful precedent here. \textit{Id.} at 109-117.

\textsuperscript{74} See discussion, text accompanying notes 14-19 \textit{supra}. 
sions will vary with the amount of pollution emitted by each polluter, the emission quota can be uniform throughout the jurisdiction. Land absorption requirements will vary according to the amount of pollution emitted so that this uniform standard will not be exceeded. EDZ may present due process taking problems, however, if a polluter is required to purchase an excessive amount of additional land simply to absorb his pollution load. This and other possibilities raising due process questions will be discussed in the next section.

B. The Taking Issue

1. In General

A second legal problem arising under emission quota strategies is the so-called due process taking issue. A point may be reached in the application of emission quotas at which a last-come developer will be prohibited from constructing his facility but may not be able to put his land to any other reasonable use. An illustration using the District Emission Quota will indicate the nature of the problem.

Assume a heavily industrialized area which is also designated an emission quota zone under a DEQ. Several undeveloped parcels remain in this area. New development is allowed to proceed for a time as the emission quota in the area is not exhausted. A point is then reached at which a new facility is approved which exhausts the quota. The next application is then denied. This application covered a plot of ground in the middle of the industrial area. Since no other use for the parcel is reasonable under the circumstances, non-industrial uses in a heavily industrialized area being out of the question, no further development of this parcel is allowable under the DEQ.

The question becomes whether this restriction on the development of the last-come applicant's land is serious enough to warrant a finding by a court that the restriction is unconstitutional and violates due process of law as a "taking" of property. Courts have long accepted the proposition that a regulation of land use can stand against taking objections so long as some reasonable use may be made of the property after the regulation has been applied. The purpose of the regulation must be constitutionally acceptable, such as the elimination of incongruent and incompatible uses from zoning districts, the protection of wetlands or other environmental resource areas, or the improvement of air quality. Once this requirement has been met, the next issue is the extent

75. For a curt and recent holding on this point, as applied to a land use restriction under a state wetland act, see Sands Point Harbor, Inc. v. Sullivan, 136 N.J. Super. 436, 346 A.2d 612 (App. Div. 1975).
EMISSION QUOTA STRATEGIES

of the restriction. Only if no reasonable use may be made of the property consistent with the regulation will it be held unconstitutional.

While the judicial approach to the taking problem is clear in outline, there is no clearcut indication how the courts would react to the application of an emission quota which, as in the example given above, would foreclose any reasonable use of the land. Some helpful precedents do, however, exist in the zoning field. Zoning ordinances have been held unconstitutional when they have frozen the permitted uses on land at a level so low that no development is permitted. The theory is that the zoning agency must acquire and pay for the right to completely restrict development if the restriction is to withstand constitutional attack. In one leading case, a local zoning ordinance restricted an existing private parking facility in a built-up downtown area so that it could only be used for parking purposes.\(^6\) The effect of this restriction was to prohibit any development of the land and to force the owner of the parking area to maintain it in an undeveloped state for the use of adjacent buildings. For this reason, the ordinance was held unconstitutional. In like vein, some courts have invalidated very low density zoning ordinances on the ground that they are improper substitutes for the acquisition of the land through exercise of the power of eminent domain.\(^7\)

In the parking lot case, there were no reasons of public health or welfare to justify so restrictive a limitation on the use of the landowner's property. Another group of cases has validated total restrictions on the use of land if the prohibited use would have harmful impacts on the surrounding area. Examples are cases prohibiting the quarrying of stone and gravel in residential areas where the stone or gravel operation would have harmful consequences on surrounding residences.\(^8\) In all of these cases, however, the prohibited activity was harm-producing and obtrusive in its surroundings, and arguably fell in a nuisance category, where absolute prohibitions on use are upheld.\(^9\) Land restricted from new development under an emission quota does


\(^8\) E.g., Goldblatt v. Town of Hempstead, 369 U.S. 590 (1962); Consolidated Rock Products Co. v. City of Los Angeles, 57 Cal. 2d 515, 20 Cal. Rptr. 638, 370 P.2d 342 (1962).

not fall into this category. Indeed, as in the example given above, the prohibited use would be entirely consistent with existing uses in the surrounding area.

The wetlands regulation cases addressing the due process taking problem might be helpful in the emission quota context. These cases have considered the validity of regulations which totally prohibit development in wetlands areas in order to avoid permanent damage to an environmental resource. While some courts have found restrictions of this kind unconstitutional, the trend now is in the other direction. However, those cases upholding the constitutionality of wetlands restrictions also seem distinguishable from our example. These restrictions are intended to maintain the integrity of the wetlands by prohibiting the introduction of obtrusive uses that might be harmful to the area, analogous to cases upholding total restrictions on rock quarrying.

To be comparable to wetland controls, emission quotas would have to restrict all development in a given area in order to implement air quality objectives. Emission quotas, however, require an allocation strategy rather than total prohibition. New sources of air pollution are allowed up to a threshold; the question is how the emission allocation is to be awarded. The last-come polluter who is not allowed to develop his land can argue that no reason exists for the refusal other than quota exhaustion. Even though the reason for the restriction—to prevent air pollution—is appropriate, his argument is that his land cannot be fully deprived of all of its development value for any public purpose unless compensation is paid. Here the cases invalidating low density zoning restrictions as improper substitutes for the condemnation of the restricted land seem most in point.

What may save emission quotas from constitutional invalidation, however, is the fact that the restrictions on land use imposed by the quota are not likely to be as serious as the example given above would indicate. So long as some reasonable use can be made of the land, courts are likely to sustain the restrictions, and the likelihood that the

---


81. See note 77 supra.

82. On this basis the Court of Appeals for the First Circuit upheld a reduction in parking spaces for the Boston airport and other operators that had been imposed under a transportation control plan adopted for the Boston area under the Clean Air Act. South Terminal Corp. v. EPA, 504 F.2d 646, 678, 679, 6 ERC 2025, 2044, 2045 (1st Cir. 1974).
deprivation will be total can partly be avoided by carefully constructed ordinances matching local zoning designations with applicable emission quota limits.

It is questionable, however, whether local zoning can parallel the administration of an emission quota because of the tendencies under emission strategies to spread industries over a wide area and the opposite tendencies of zoning to concentrate like industries. One problem is that the criteria for zoning businesses will differ in many respects from the criteria for implementing quota strategies. For instance, many businesses zoned for industry will not pose serious pollution problems, but other industrial activities may cause significant difficulties.

2. Under Emission Density Zoning

Due process taking objections of a different variety may arise under the Emission Density Zoning variant of the emission quota. This technique does not permit the disapproval of a pollution source if the owner of the source can acquire enough additional land to bring his pollution level under the quota. A similar compliance problem arises under the residential density controls contained in zoning ordinances. Enough land must be purchased by any would-be developer to bring his density within the allowable limits. The difference in the density control situation is that the residential density policy is applied uniformly to all developers within the density control district, and does not vary with the nature of the residential development. Each unit of residential development requires the same amount of land. In EDZ, the emission limitation standard is uniformly applied, but the amount of land each source needs to absorb pollution emissions will vary with the emissions produced. The question then becomes whether EDZ is vulnerable because the land assembly requirement is disproportionate to the size of the source even though it is proportionate to the amount of pollution the source emits. If EDZ is vulnerable on this ground, there is a risk that a court would find it unconstitutional as a taking if the amount of land required for any one source is excessively disproportionate to its size.

There is little direct legal precedent that can provide an answer to this question, although some guidance is furnished by the cases con-

83. The argument that follows assumes that the land assembly requirement is measured against the size of the source. If the alternative assumption is made, that the constitutionally permissible land acquisition should be measured by the amount of pollution emitted by the source, an argument can be made that the land assembly requirement, no matter how onerous, must be accepted as a measure of the pollution source’s duty to internalize the otherwise unacceptable effects of its pollution output. See Costonis, supra note 72.
sidering the constitutionality of official map restrictions and subdivision control dedications. An official map is a land use control through which a state or municipality can temporarily prohibit land from development in areas such as rights-of-way that are intended for future acquisition for highway purposes.84 As in EDZ, the criteria for the application of the official map technique are uniform throughout a specific area, but the effect of the official map on different landowners will vary. In some instances, the official map may restrict an excessive amount of land belonging to a single property owner. The courts have generally sustained official maps against the argument that a temporary restriction on development is unconstitutional as a taking. But the cases suggest that an official map will be held unconstitutional if it results in the temporary restriction of development of an excessive amount of land belonging to one property owner.85

Subdivision control dedications are literally donations of land by subdivision developers to the community, to be used as sites for roadways, parks, and schools.86 These dedications are required before a subdivision plan will be approved. While the case law on subdivision dedications is unsettled, recent cases appear to have accepted subdivision dedications as constitutional whenever the purpose to which the dedicated land will be put meets a public need generated by the subdivision.87 Here, as in the official map cases, there is also some judicial indication that a required subdivision dedication that is unduly burdensome on a particular developer will likewise be found unconstitutional.88

These cases dealing with excessive land reservation and dedication requirements suggest that a land use control may serve some con-

85. A variance from the official map may be granted if the map is overrestrictive because it covers an excessive portion of the affected property. Rochester Business Institute, Inc. v. City of Rochester, 25 App. Div. 2d 97, 267 N.Y.S.2d 274 (1966). See Mandelker, supra note 84, at 465.
86. See Note, Subdivision Land Dedication: Objectives and Objections, 27 STAN. L. REV. 419 (1975).
87. Just what nexus must be proved between the service need generated by the subdivision and the dedication or in-lieu money payment demanded from the developer has not yet been determined. For an expansive view of this requirement, see Associated Home Builders of Greater East Bay, Inc. v. City of Walnut Creek, 4 Cal. 3d 633, 484 P.2d 606, 97 Cal. Rptr. 630, appeal dismissed, 404 U.S. 878 (1971). For a recent review of the case authority, see Comment, Subdivision Exactions: The Constitutional Issues, the Judicial Response, and the Pennsylvania Situation, 19 VILL. L. REV. 782 (1974).
institutionally acceptable community-wide purpose, but may nonetheless be held unconstitutional as applied if the burden it places on a single landowner is excessive. The vice of EDZ in this context is that the emerging test appears to be one of proportionality. Large emission sources may be able to absorb the costs of acquiring additional land without having to raise prices, while small but heavily polluting emission sources may not. If a small factory with high emissions is required to make a disproportionately excessive investment in additional land in order to comply with the requirement, it is possible that EDZ will be found unconstitutionally burdensome as applied to that landowner.

3. **With Supplementary Control Techniques**

Additional due process taking issues may be examined by considering the application of emission quotas in relation to traditional control techniques. Suppose a prospective developer will exceed his emission quota even though he will comply with all applicable new source performance standards. Suppose he can show that by using tall stacks, by switching fuel on meteorologically poor days, and by implementing other supplementary control techniques, he will not violate applicable air quality standards even though his emissions still exceed the quota. Now, assume that unless the development can be built no reasonable use can be made of the land. Should the developer be given a variance? If no variance is given, there may be a taking. If he is given a variance, equal protection objections may be raised by smaller developers who cannot afford the same supplementary control techniques.

The equal protection objections can be considered first. These objections have been dismissed in comparable situations when cost of compliance would arguably exclude developers unable to meet the requirements of the regulations. Planned unit development ordinances are a case in point. Developers usually need to assemble comparatively large tracts of land in order to take advantage of these ordinances. Courts have not, however, found these ordinances objectionable even though their effect is to exclude the smaller developer who cannot assemble a tract meeting the minimum size requirement. They reason that the planned unit development process is open to all on the same terms.\(^8\)

Whether a developer subject to an emission quota should be given a variance under the circumstances described above depends on how the strategy is constructed. If the quota is related to the attainment

---

and maintenance of air quality standards, a variance can be given if the supplementary methods of control will not violate that standard even though the emission quota is exceeded. However, the acceptability of supplementary control techniques under the Clean Air Act has been limited.\(^9\)

An administrative problem is also raised if supplementary control techniques form the basis for a variance from the quota. In that event, operating permits will be required; these must be periodically reviewed to determine if the supplementary controls remain adequate to prevent air quality standard violations. It could be a condition of the variance that the supplementary controls be maintained and implemented during the life of the new source; noncompliance would be met by permanent or temporary shutdown of the facility.

The elimination of nonconforming sources, or a reduction in their emissions through improved technology, would also decrease the emission load in the affected area and may permit new development to occur without violating the emission quota. These tradeoffs in strategy will have to be recognized in the administration of emission quotas. Problems of equity may arise among different polluters which require some form of compensatory allowance for existing polluters who reduce their emissions. Air quality programs do not presently take into account the difficulties existing polluters may face in meeting new, stricter standards.

By considering factual patterns in which the restriction on land development resulting from the application of an emission quota is likely to be extreme, this section has suggested that equal protection and due process taking objections may, in a particular case, invalidate the application of an emission quota. While these problems should not be dismissed lightly, it is possible that in practice the extreme factual situations in which the application of emission quotas is likely to present constitutional difficulty may not arise. So long as some reasonable use may be made of the land restricted by the quota, courts are likely to avoid a finding of unconstitutionality.

Constitutional objections are also less likely to arise under emission quota strategies which are not tied specifically to designated areas.\(^9\)\(^1\) Under Emission Allocation Planning, for example, the mix-

---

\(^9\) NRDC v. EPA, 489 F.2d 390, 6 ERC 1248 (5th Cir. 1974) (Georgia state implementation plan). Supplementary control techniques would not be permitted under pending Senate amendments to the Clean Air Act. S. REP., supra note 1, at 78-79.

\(^9\) Floating zone emission quotas may also be more easily sustained if all sources that are subject to the quota are also required to seek approval under the floating zone conditional use techniques that are now common to zoning ordinances. Presumably, a source refused approval under the quota would also be refused approval as a floating zone or conditional use. Excessive emissions as defined by the quota could be adopted
ture of land uses required by the quota in each local government jurisdiction is not dictated by its emission assignment. Through careful planning and land use regulation, municipalities may be able to avoid situations in which the disapproval of a new stationary pollution source will raise constitutional objections. Emission Density Zoning also holds promise as an emission quota strategy that can be applied with a minimum of legal difficulties, so long as situations which require excessive land acquisitions can be avoided.

CONCLUSION

This Article has considered emission quota strategies as applied to the non-reactive pollutants produced by stationary sources, such as particulates and sulfur dioxide. Most discussion of emission quotas has centered on their application to these pollutants. Emission quotas may also be applied in the control of air pollutants emitted by motor vehicles and other mobile sources, but the theoretical and implementation problems that would arise in connection with these sources have not yet been fully explored.\(^9\) Related to this problem is the need to develop emission quotas for indirect sources: the large commercial, recreational, and residential developments which do not emit pollution directly but which attract motor vehicle traffic which in turn creates pollution problems. Location decisions about stationary sources made through the application of emission quotas will necessarily affect the locations of indirect sources, such as residential complexes, as these fulfill the housing needs generated by such stationary sources as industrial plants.\(^9\)\(^3\) Emission quota strategies can also be developed for indirect sources, but problems of application in this important context have not been extensively considered.

While emission quota strategies hold some promise as a technique for advancing air pollution objectives, this Article has indicated that they present serious problems in adoption and implementation. The avoidance of constitutional objections in the administration of emission quotas may require land use controls at the local level that are finely tuned to the administration of the quota, and we noted earlier as one of the criteria to be used in refusing floating zone or conditional use approval. For cases holding floating zones constitutional see Beall v. Montgomery County Council, 240 Md. 77, 212 A.2d 751 (1965); Rodger v. Village of Tarrytown, 302 N.Y. 115, 96 N.E.2d 731 (1951). The difficulty is that floating zones and conditional uses are primarily of use as a zoning technique in undeveloped areas. It is doubtful whether they could be applied to prohibit industrial and similar pollution sources in areas which are zoned for these uses.

92. ALLOCATION PROCEDURES, supra note 14, at 4-27 to 4-30.

93. See generally Comment, Control of Complex Emission Sources—A Step Toward Land Use Planning, 4 ECOLOGY L.Q. 693 (1975).
that this degree of fine tuning may not be possible. If local zoning cannot be used to direct new stationary sources of pollution to areas in which their approval under the emission quota can be assured consistent with local zoning allocations, the application of the emission quota will probably proceed on a first-come basis. Constitutional difficulties in the administration of the quota may then arise whenever a new stationary source is disapproved for a site which can be put to no other reasonable use.

Finally, emission quotas, much like other air pollution control strategies, may encourage a dispersed rather than a concentrated form of development. Under the Floating Zone Emission Quota, for example, it seems clear that the system will work without undue hardship on individual developers only so long as new and expanded facilities are properly spaced. Dispersion and scattering of new development along these lines may not be desirable from a planning standpoint, and may actually interfere with policies which seek to maintain air quality in those areas that meet or exceed established air pollution standards. Dispersal of development is not necessarily undesirable in all urbanized settings, but it should not be introduced on a local or regional level as an accidental by-product of a regulatory system which is not fully coordinated with broader and comprehensively considered land planning policies.

Environmental control legislation has usually been directed to the abatement of environmental pollution through remedial techniques aimed directly at pollution sources. The national Clean Air Act is no exception. Its primary enforcement techniques are directed to the reduction of air pollution through emission limitations applied directly to stationary and mobile sources of pollution. Although the adoption and enforcement of these controls will necessarily have major impacts on land use and urbanization patterns, these land use impacts were given minimal consideration when the Clean Air Act was adopted, even though land use controls are authorized in state implementation plans as a complementary enforcement strategy. Growing awareness of the importance of land use controls in the achievement of national air quality goals has now led to an increasing reliance on them as an integral component of air quality programs.

Emission quota strategies stand as a significant land use control technique that can link the emission limitation measures employed in an air quality program to local and regional land use controls or can at least provide an air quality framework within which these land use controls can be exercised. Emission quotas thus have substantial potential as an auxiliary land use control by taking air quality objectives into account when decisions are made to determine the location of
sources of air pollution. This potential should not be underestimated. Nevertheless, emission quota strategies can take several forms, and the manner in which they are drafted and enforced will largely determine the success with which they can be implemented. Limited experience with emission quotas in the few metropolitan areas which have tried them give some encouragement that they can become a useful air pollution control strategy. But additional theoretical work is needed both on the sophisticated techniques which are necessary in the implementation of emission quota strategies, and on additional field experience in their adoption and enforcement. If, in addition, an adequate legal framework for emission quotas can be specified which will meet possible constitutional objections, the emission quota strategy may yet emerge as a desirable if not essential component of local and regional air quality programs.