# IMPLEMENTATION AND ENFORCEMENT

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**Contents**





**Summary**

Air pollution control policy is part of the overall environmental policy, which is based on political decisions. Among the factors influencing these decisions are the scientific and technical information, the state of the national economy, the general policy priorities and the public opinion. The major elements of an air pollution control program include the establishment of targets, the formulation of strategies for attaining these targets and the introduction of a supervision system. The air pollution control goals, either long or short term are normally expressed as air pollution control standards. The supervision of goal achievement requires monitoring and surveillance programs. The problems encountered in emission are quite different. The levels of pollutant concentrations are much higher than those measured in ambient air. Legislation should provide the administrator with the authority to require the operator of any source of emissions to install and operate in parallel monitoring equipment for the emissions according to well-specified measuring instructions.

## 1. General approach

Preventive control through pollution regulations alone is not effective for the control of many environment-polluting activities. In most cases where pollution regulations are used, licensing requirements have to be combined with a regular checking procedure. The supervising administration must not only have access to the necessary information about the activity but should also be able to be in a position to take appropriate measures based on such information. Monitoring of the ambient environmental quality as well as of the emissions or discharges of polluting substances is essential. Furthermore, rules facilitating access of the responsible agencies to information generated by the operator of the polluting activity is an important prerequisite of a successful supervision. For example, polluters may be obliged to measure emissions or

discharges on a regular basis and to report the results. The agency will also have the right to carry out inspections, and to determine precise requirements for specific control measures, if the industrial process under examination proves to have a very negative environmental impact.

Environmental protection regulations usually ask for information that must be provided to a governmental authority, which is usually a state agency. This type of information may be necessary for the accomplishment of certain control strategies (for example compliance with emission standards). In general, the collection and inspection of such information is a complex operation, which necessitates the development of a special regulatory strategy. For example, the need to provide information on the possible effects of a product or on the possible impact of an installation has the immediate effect of inducing the providers of such information to consider the potential consequences. In addition, this information serves as a basis for any necessary feedback and follow-up action by the responsible agency. In the case of chemicals, a number of laws require the testing of a new chemical before it can be marketed, without defining any particular standard. In this case, therefore, the obligation to provide information is not a means of enforcing a particular standard but the basis for future action, when the relevant administration believes that marketing of the substance would be dangerous or would create an unacceptable risk for the public.

Compliance with applicable standards may also be ensured by administrative penalties. One point related with this procedure deserves attention, which is that the penalties must be more costly than pollution abatement. In the opposite case the polluter would prefer paying the penalties and continue to pollute. A higher penalty in the case of a repetition of the offense, including even a severe restriction or closure of the polluting activity under examination would significantly improve compliance.

The existence of these measures of administrative supervision and sanctions may serve as a deterrent to potential polluters. In general there is, however, a certain number of conditions that must be met if the measures are to be effective. It has been mentioned earlier that sanctions must be sufficiently severe. In a similar way, the supervising or prosecuting agencies must be competent to deal with the problem. In particular, they must process the necessary technical expertise and manpower, and they must have a certain amount of political backing. Polluters may try to exert political or other types of pressure upon the agencies in attempting to persuade them not to enforce the relevant standards or to convince them to interpret the regulations in a more relaxed way. Compliance with the applicable rules of environmental law must be accorded the highest priority, and safeguards must be placed against attempted interference with the exercise of powers under the law.

It is emphasized that rules must be designed to ensure that the monitoring of compliance does not become too complicated or cumbersome. Since there are numerous activities that may have detrimental effects on the environment, regulatory bodies must concentrate attention on the most important aspects. Regulatory interventions should be introduced only where the chain of events allows for successful control. For instance, it is not feasible to monitor the emissions of individual motor vehicles. It is easier to formulate and enforce regulations on the construction of engines that will result in an

overall reduction in exhaust emissions, although, in particular cases, emissions may be excessive due to a mechanical defect in an individual vehicle. For this reason, periodic inspection of cars should be mandatory as is the case in many countries. Subject to cost-benefit considerations, the feasibility of requiring owners of motor vehicles to install devices for the reduction of exhaust emissions, known as catalytic converters, has been also considered in many countries around the world as another possible option. Such an option has become more important in countries that already have a large number of old motor vehicles. Nowadays, in most industrialized countries new vehicles are all equipped with a catalytic converters.

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**Biographical Sketches**

**Dr. Pavlos Kalabokas** obtained his first degree in Physics from the University of Athens, Greece, in 1983, followed by the Masters and Ph.D degrees in Air Pollution Chemistry from the University of Paris VII, France, during 1983-87. The topic of his research was "sampling and analysis of carbonyl compounds in the atmosphere of Paris, France".

He was a visiting scientist to the German Research Center KFA-Julich, Institute of Chemistry of Polluted Atmospheres, during 1987-1988, and to the German Research Center KFA-Julich, Institute of Applied Physical Chemistry, during 1989-1990. During 1991-1993 he was Research Associate at the Laboratory of Meteorology of the University of Athens working on the vertical measurements of tropospheric and stratospheric ozone over Athens. During 1994-1997 he was Research Associate at the Environmental Research Laboratory of the Greek National Center of Scientific Research "Demokritos" working on the analysis of air pollution data in Athens using atmospheric models.

Since 1997 Dr. Kalabokas has been an elected Researcher at the Research Center for Atmospheric Physics and Climatology, Academy of Athens, studying urban air pollution in Athens; rural ozone levels around Athens; atmospheric pollution around refineries; and air quality in the area of the proposed new airport of Athens (the NTU Athens project).

To date Dr. Kalabokas has published over 65 papers on the above research topics. His other scientific activities include review of papers for international scientific journals on environmental pollution, and review of research projects in the European Union. He is a member of the Greek Committee on Environmental Pollution problems.

**Dr. Michael Christolis** is a Civil Engineer specializing in environmental science and technology. Currently he is working as a research collaborator at the National Technical University of Athens (NTUA), Greece, on the mathematical modeling of environmental problems. He has so far accumulated twenty years of experience in air quality monitoring, pollutant dispersion modeling, assessment of the impacts of industrial accidents, design of emergency systems, and implementation of the Seveso Directive in Greece.

During 1983-1988 he was the Head of the Laboratory for the Air Quality Monitoring Network for the City of Athens. In 1988 he joined the Computational Fluid Dynamics Unit (CFDU) of the Chemical Engineering Department of the NTUA, working on research projects on the computational modeling of various applications focusing on environmental issues and problems.

**Professor Nicholas C. Markatos** obtained his Diploma in Chemical Engineering from the National Technical University of Athens, Greece, in 1967, followed by M.Sc, DIC and Ph.D degrees from the Imperial College of Science, Technology & Medicine, University of London, UK, during 1970 to 1974.

In 1983 Professor Markatos was appointed Director of the Centre for Mathematical Modeling and Process Analysis at the school of Mathematics and Scientific Computing of the University of Greenwich, London, England. At that time he was also a visiting lecturer to the Computational Fluid Dynamics Unit of Imperial College as well as working for CHAM Ltd, (Concentration Heat and Momentum, Limited), London, England. At CHAM he worked first as leader of the Aerospace Group (1976) and then, from 1977 until 1984, as Manager of the Applications Team working on various Fluid Mechanical, Thermodynamic and Transport problems.

Since 1974 he has served as technical consultant to many Research Centres, state institutions and industries.

In June 1980 he was awarded the "Certificate of Recognition" by the Inventions Council of NASA.

In 1985 Professor Markatos was elected Professor of Chemical Engineering at the National Technical University of Athens, and in 1990 he was elected Head of the Chemical Engineering Department. In 1991 he was elected Rector of that University.

Professor Markatos' main scientific interest is in the mathematical modeling of Transport Phenomena, Fluid Mechanics, Thermodynamics and Physical Processes like Fluid Flow (Laminar and especially Turbulent), Heat and Mass Transfer, Environmental Flows, Combustion, etc.

He is referee of scientific papers, reviewer of new books, as well as member of the Editorial Board of several international Scientific Journals.

He has published over 100 original scientific papers in international journals and participated and organized many international conferences, seminars and meetings all over the world. Author of two books, he has also published many articles in the popular press on Engineering Higher Education.