

# INCENTIVES FOR EMISSION CONTROL IN OTHER COUNTRIES

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## SYNOPSIS

Incentives for industrialists to reduce atmosphere emissions to levels lower than the legal limits are indirectly implicit in legislation. Incentives discussed are, Publicity, The bubble concept, The effect of changing standards, The effect of multiple standards, Economic benefits, and Emission credits.

In addition a short report is given on the preliminary results of a demonstration programme being run in the USA. Selected local authorities are running demonstration programmes with the objective of attaining air quality standards while maintaining the cities ability to attract and retain business and industry.

The International Union for Air Pollution Prevention Association (IUAPPA) has a total of 26 members and observers representing 28 countries. There are currently 39 countries actively participating in the World Health Organisations's Global Environment Monitoring Systems for Air Pollution. At the recent IUAPPA international conference in Paris some 43 countries were represented.

The above statistics show that there are a considerable number of nations who have air pollution control legislation in one form or another. It is however probably true to say that most of these countries have used the United States Clean Air Act, the British Alkali Act or a combination of the two as a model for their own legislation. Each legislation trying to achieve a reconciliation between the often conflicting interests of the public who want clean air, the manufacturer who wants to make a profit, the employees who want to keep their jobs and the government who wants national prosperity and contented citizens.<sup>1</sup>

The USA is the world's major industrial nation and its Air Pollution Control Association (APCA) is the largest association of its kind in the world. It is for this reason that the Clean Air Act of the USA and the Journal of the Air Pollution Control Association (JAPCA) were used as initial reference points, to find what incentives do exist to encourage an industrialist to reduce plant emissions below the legal limit. After reading through the Clean Air Act one could feel a certain sympathy for Anne Gorsuch the then EPA Administrator who told the APCA June 1981 conference that "frank examination of (the acts) implementation reveals staggering complexities and conflicts — sagas of intolerable time delays and investment losses — and a sad legacy of distrust among industry, states and the federal government."<sup>2</sup>

Reference was found in Section 405 of the Act which states that the Administrator in conjunction with the Council of Economic Advisors shall undertake a study and assessment of the economic measures for the control of air pollution which could:

1. Strengthen the effectiveness of existing methods of controlling air pollution.
2. Provide incentives to abate air pollution to a greater degree than is required by existing provisions of the Clean Air Act.
3. Serve as a primary incentive for controlling air pollution problems not addressed by any provision of the Clean Air Act.

Unfortunately the findings of this study do not appear to be available to date.

When legislation was first passed, whilst there was a general consensus that legislation was clearly needed there was little in the way of incentives for the industrialist. In fact there was probably a disincentive in that as air pollution control equipment costs roughly 10% of the total capital investment of the plant with annual running costs in the region of 10% of the control equipment's purchase price, no industrialist was keen to be first to commit himself and put his product at a cost disadvantage with his non-complying competitor. Thus initially there was a marked reluctance to proceed with the installation of control equipment. To make immediate investment in control equipment more attractive countries such as Sweden offered a 25% subsidy in the purchase price of approved control equipment. Such subsidies were for a limited period only and thereafter the avoidance of punitive penalties became the remaining obvious incentive.

France and USA are among those countries which offer aid to companies with a seemingly insoluble pollution problem. In such instances the State will evaluate various control approaches and finance the most promising method or methods. This subsidy is limited to isolated instances and not to the industry as a whole.

This subsidy actively encourages the suppliers of pollution control equipment to develop their technology and is of

immediate direct benefit to them rather than to industry as a whole.

As the implementation of control legislation became established and in many cases amended several inherent incentives became apparent. Some of these could be summarised as follows:

1. Publicity
2. The bubble concept
3. The effect of changing standards
4. The effect of multiple standards
5. Economic benefits
6. Emission credits

### *PUBLICITY*

The environmental impact statement which is mandatory in several countries has its merits and demerits. The availability of such statements to the public and the open debate thereof certainly publicises a firm's intentions and undoubtedly plays an important part in the formation of public opinion is notoriously fickle but a good public image is an important asset to any firm. The following examples give some indication of the effect that public opinion can have on the fortunes of a company.

In the 1960's with the advent of the Kennedy Administration in the USA and the much heralded new deal a strong awareness of social responsibility developed in the Universities and Colleges. This awareness became apparent when firms on their annual personnel recruiting campaign found that they were pointedly asked to give details of their firm's social awareness programmes. Those firms who could not give a satisfactory answer found that their recruitment campaign was a failure. Several major corporations found this reaction to be so strong that they were unable to recruit the desired calibre of staff. The net result was that these firms found that they had to implement crash programmes in social awareness to rectify the situation.

In 1980 the eruption of Mt St Helens released heavy clouds of radio-active gases into the atmosphere. The radionuclides included radium 226, potassium 40, thorium 232, lead 214, polonium 210, and heavy concentrations of radon gas as well as its fast decaying daughters bismuth 214, and polonium 214. In comparison the Three Mile Island accident released xenon gas which is much less hazardous to health than radon and which was in a lesser concentration.<sup>3</sup> The radio-activity of the gases from Mt St Helens was virtually unnoticed whilst the Three Mile Island accident made world headlines. Largely as a result of the adverse publicity generated by the Three Mile Island incident the nuclear power industry in the USA has come to a virtual standstill. Furthermore some plants under construction have been totally abandoned leaving shareholders with a severe financial loss.

The association of top management with an environmental impact statement publicly commits the directors of a

company to the social norms of society, and makes it more difficult for them to shirk their commitments. The French with Gallic pragmatism have the concept that the managing director of a firm which persistently transgresses pollution emission levels should be given a mandatory jail sentence. The philosophy behind this being that it is the managing director's ultimate responsibility to determine a firm's sincerity towards pollution control. The threat of a personal jail sentence and the consequent social disgrace is an incentive for the managing director to ensure that his firm keeps within the law.

A proper public image complicates and lengthens approval times for future modifications or relocation to new sites. These protracted negotiations can increase the costs of the project disasterously and in addition lose the firm an important marketing advantage.

### *THE BUBBLE CONCEPT*

In the bubble concept multiple emissions from a firm or an area are considered as a whole rather than on an individual basis. This concept allows an industrialist to minimise the overall pollution costs by being able to reduce the emissions from a relatively easily controlled source and to relax somewhat on a source which is difficult and expensive to control.

In a similar manner the firm may expand and introduce a new pollution source provided that overall global emission does not increase. This concept was formally introduced in the USA in late 1979 and has given industrialists an opportunity to reduce pollution to within the legal limits more economically.

### *THE EFFECT OF CHANGING STANDARDS*

The punitive aspects of legislation considered in relation to the exponentially increasing cost of more efficient pollution control encourages an industrialist to install equipment which will keep emission within the legal limits but only just. One could say that emission limits are tantamount to the legal right to pollute up to the legal limit.

Unfortunately legal limits particularly in major industrial countries have shown a marked tendency to be reduced downwards at relatively frequent intervals. This has led to many plants being forced to retrofit additional control equipment to remain within compliance. For example at Pennsylvania Power and Light Brunners Island Power Station a 350 MW unit was initially equipped with an electrostatic precipitator adequate to keep emissions within the then legal limits. A change in the emission limits obliged the company to erect an additional piggy-back precipitator on top of the existing unit. The piggy-back unit was designed to handle 60% of the boiler flue-gases whilst the original unit handled the remaining 40%. This combination unit was able to keep emissions below the revised emission levels. Yet a further change in emission requirements forced the company to re-think their total strategy. This re-think resulted in a decision to cut out the two precipitators and install a fabric filter unit behind them.

One of the reasons for this decision was that no need for any further retrofit could be seen to be required for any foreseeable future occurrence.

The expense of retrofitting has shown the real incentive that exists to assess carefully future possible trends and to install control equipment which offers sufficient flexibility to meet potential future needs.

The Federal Republic of Germany in an attempt to avoid the necessity of revising emission standards incorporated what they call a principle of anticipatory action when setting standards.<sup>4</sup> Despite this precaution standards have also had to change albeit at a slower tempo.

It is interesting to note that in a Euro-barometer poll carried out for the EEC commission in 1981 77% of the German population considered the destruction of the environment to be the most important problem of the future, ranking even above unemployment. This is a definite indication that one can continue to expect demands for emission levels in Germany to be reduced.

#### *THE EFFECT OF MULTIPLE STANDARDS*

Overseas legislation often contains multiple standards for single source emissions. For example emissions from power plant boilers in the USA must conform to minimum standards in respect of particulate emissions, opacity and sulphur dioxide, with a likelihood that nitrogen oxide emissions will also be controlled in the foreseeable future.

Experience in the USA has shown that in more than 90% of the instances a power station that conforms to opacity standards is well within the requirements for particulate emissions. In fact once the control authorities have verified this relationship opacity becomes the overriding control factor.

One of the outcomes of the IUAPPA Paris conference is a growing realisation that air pollution no longer offers a direct health hazard, and that other aspects are attracting increasing attention. Items which have been highlighted include damage to buildings and historical monuments, damage to crops and forests, and aesthetics.

Legislation overseas has already begun to reflect the influence of the above factors and it can be predicted that multiple standards will proliferate to include these aspects. Again the incentive exists for the shrewd industrialist to assess future trends and to select control equipment and an operating philosophy which will be flexible enough to meet the coming needs.

#### *ECONOMIC BENEFITS*

It is seldom that the economic value of a collected pollutant is such that a high efficiency collector can be financially justified. Such instances do exist and strangely enough are sometimes overlooked by management. In such instances

the incentive is patently obvious. Other instances are not so obvious and require a sound knowledge of the prevailing economic conditions.

In the USA power stations are in most cases privately owned and are normally situated at a point remote from a coal field. In this situation power stations shop around for the cheapest suitable grade of coal. Industry emission controls have led to certain grades of coal being considered suitable for power stations and other grades as eminently unsuitable. One power station carefully assessed what was available on the equipment market and the benefits which the equipment could offer. The company then invested in excess of one million dollars in upgrading their existing pollution control system with the knowledge that even with using what was generally considered the worst possible coal they would be able to maintain their emissions well within the required emission levels. They then negotiated a very favourable long term contract with the supplier of the poor coal. The net result was that the total capital expenditure on the control equipment was recovered over a 6 month period.

Sevalco a producer of carbon black in England faced the option of afterburning its hydrogen sulphide enriched off-gases. The quantity and quality of the off-gas was such that they were able to (a) generate sufficient steam and electricity to make the plant self supporting and (b) have enough off-gas left over to fire a transverse arch kiln capable of producing 4 million bricks per month.

Imperial Metals of Birmingham have reduced their overall sulphur dioxide emissions by substituting 40% of the coal normally used in their boilers with municipal refuse. This move reduced operating costs, and sulphur dioxide emissions as well as saving the surrounding community considerable refuse disposal costs.

#### *EMISSION CREDITS*

Emission credits seem to be a uniquely American phenomena. In terms of the bubble concept an industry or area is set an overall emission limit. The industry has now an incentive that should they be able to reduce their emissions below the pre-set limit that the difference between the set limits and the actual emission can form a credit. This credit can either be used to allow expansion by the firm or else marketed to another form in an adjacent area who has either difficulty in meeting its own emission limits or is interested in starting a new facility in the area. Presumably the market value of the emission credit is directly proportional to its magnitude and the overall economic attractiveness of the area.

During 1979 The EPA in conjunction with various other state departments funded a programme which awarded eight urban areas demonstration grants.<sup>5</sup> The objective of the programme was to find ways to attain air quality standards while maintaining the cities ability to attract and retain businesses and industry.

The final selection of the municipal areas which had to have a population in excess of 100 000 was based on the economic and air quality problems in the area and the ability and commitments of the applicant to implement the proposed activities.

After a period of time the emphasis placed on various programmes was changed, the changes and percent of grant to be spent on each category are shown in the attached table.

CHANGES IN PERCENT OF GRANT DEVOTED TO MAJOR CATEGORIES

Item		Boston	Bridge- port	Buffalo	Elizabeth	Phila- delphia.	Chicago	St. Paul	Portland
1. Develop Supplements to command + Control Regulations									
i) Offsets	From	80	30	15	10	15	70	—	35
	To	40	20	10	10	10	10	—	35
ii) Emission Fees	From	—	—	—	—	15	—	—	—
	To	—	—	—	—	20	—	—	—
iii) Density Zoning	From	—	—	—	—	—	—	90	—
	To	—	—	—	—	—	—	90	—
iv) Bubble Policy	From	0	0	—	—	—	0	—	—
	To	20	5	—	—	—	30	—	—
2. Co-ordinate air quality + Economic Development programmes									
i) Provide Assistance to Industry	From	20	15	25	20	30	10	—	—
	To	40	20	30	20	30	30	—	—
ii) Focus on Specific Areas	From	—	30	30	—	—	—	—	—
	To	—	25	30	—	—	—	—	—
iii) Develop + Implementation area Policies	From	—	10	30	60	20	20	10	—
	To	—	15	30	60	20	10	10	—
3. Transportation									
i) Reduce Emissions	From	—	15	—	10	20	—	—	65
	To	—	15	—	10	20	—	—	65

Some preliminary results from the programme are as follows:-

- Local agencies can significantly improve their capacity to provide financial and technical assistance for pollution control. Items such as advice on loans grants and tax incentives available to private firms are important facts.
- Co-operation between air pollution control authorities and economic development agencies is important.
- The bubble concept is seen as a means to bring firms into compliance with emission limits at lower costs.
- Air pollution control requirements are not major considerations in location, expansion and production decisions of most firms. Labour supplies and transport facilities are more important.
- Extensive public programmes to create and allocate off-sets were not really needed by the participating authorities.
- The retention of existing smaller firms with expansion potential and the establishment of similar industries

was felt to be the source of the majority of new work opportunities.

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