

United States
Environmental Protection
Agency

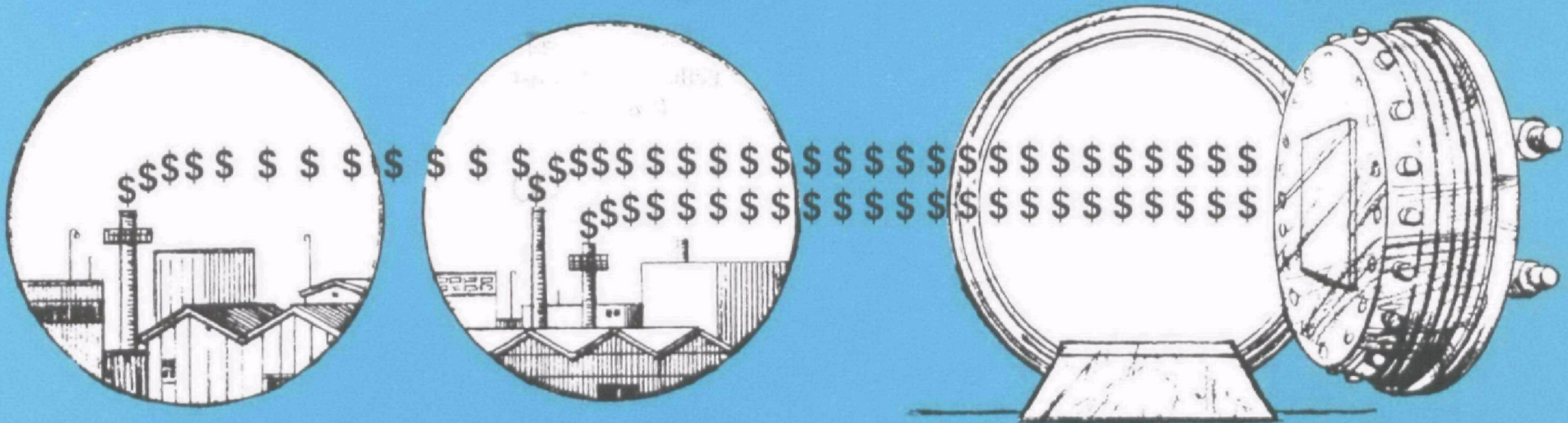
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Emissions Trading Publication



The Bubble and Its Use with Emission Reduction Banking





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THE BUBBLE AND ITS USE WITH EMISSION REDUCTION BANKING

Introduction

The U.S. Environmental Protection Agency and many state air pollution control agencies are implementing a series of steps to give industry increased flexibility in meeting Clean Air Act requirements. These Emissions Trading steps leave industry free to find and use less costly ways of controlling pollution.

By providing the flexibility to control pollution at far less cost, Emissions Trading can sharply increase the productivity of the environmental sector of our economy, freeing scarce capital for productive investments and resulting jobs. In addition to netting and offsets, Emissions Trading consists of two key components: the bubble and emission reduction banking.

Instead of meeting uniform emission limits at each source of emissions, the bubble allows firms to construct an imaginary dome or "bubble" over their facilities and to rearrange control requirements, decreasing controls where

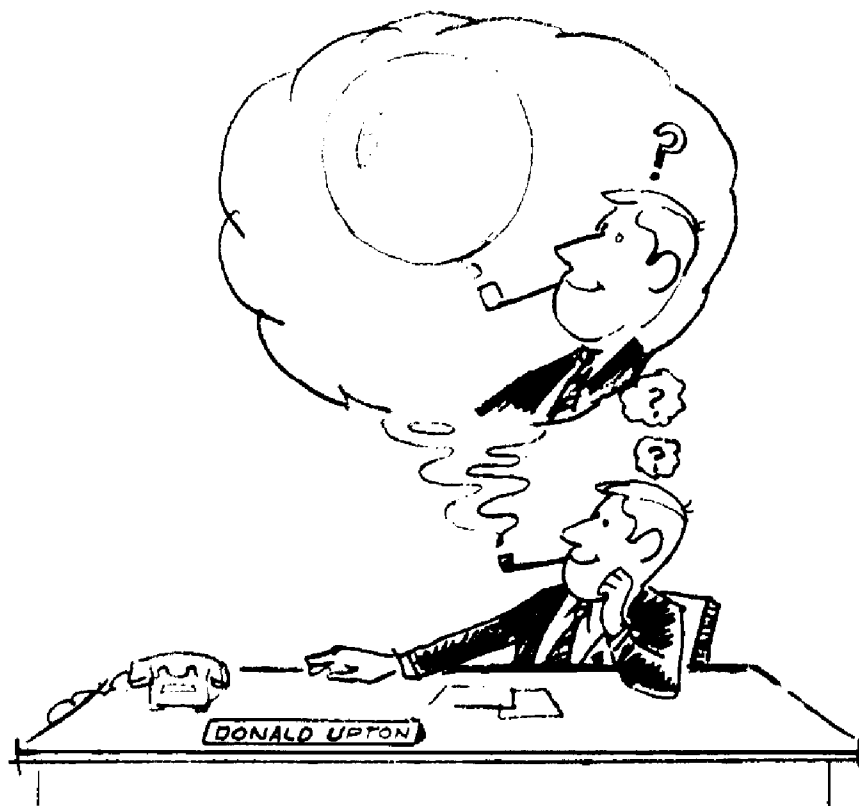
control costs are high in exchange for compensating increased controls where costs are low.

Banking lets firms make such trades over time by receiving credit for reducing their emissions beyond the amount required by law. The resulting emission reduction credits (ERCs) can be "banked" (stored) and used in the future to meet other requirements.

Emission reduction credits can be used by existing plants in bubble applications to lower the cost of meeting current or future emission limits. They can be used to speed industrial growth by easing the siting of new plants or the expansion or modernization of existing facilities. They can also be sold to others for the same purposes.

Although firms can realize large cost savings by using the bubble or banking independently, together these trading steps can provide considerably greater compliance flexibility and can achieve significantly greater economic and air quality benefits. This brochure describes the bubble and banking, and explains their interrelationships.

THE BUBBLE



What Is the Bubble?

Conventional pollution controls set uniform emission limits on similar industrial processes, but fail to take into account widely varying costs of control due to age, construction, or design. Because costs of controlling the

same pollutant from adjacent processes often vary by over 100 to 1, the potential savings of an alternative approach are enormous, with no adverse effect on air quality. But centralized agencies cannot write general rules which allow hundreds of individual cost-saving variations. They simply do not have the resources to acquire such plant-specific information.

The bubble responds to this problem by allowing managers of existing facilities — either within a plant or among a number of plants — to reduce pollution controls where costs are high in exchange for compensating increases in controls where costs are low, so long as air quality and enforceability are assured. (See Exhibit 1.) The bubble encourages industry to apply its own information and expertise to develop more efficient strategies for controlling air pollution. In particular, firms can use the bubble to reduce their costs of meeting RACT requirements now being imposed by many states. Because it can produce large cost savings, the bubble also provides an incentive for firms to measure emissions better and to develop innovative pollution control technologies and more efficient, less polluting processes.

USE OF THE BUBBLE CAN REDUCE COMPLIANCE COSTS

EMISSION CONTROL COSTS:

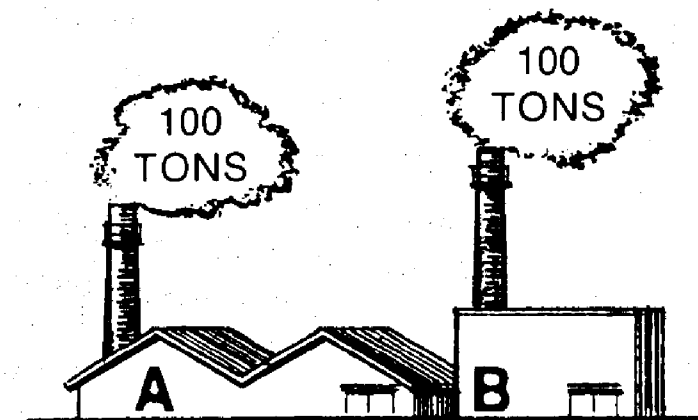
PLANT A: \$ 5,000 PER TON

PLANT B: \$15,000 PER TON

BEFORE USE OF BUBBLE

TOTAL ALLOWED EMISSIONS: 200 TONS

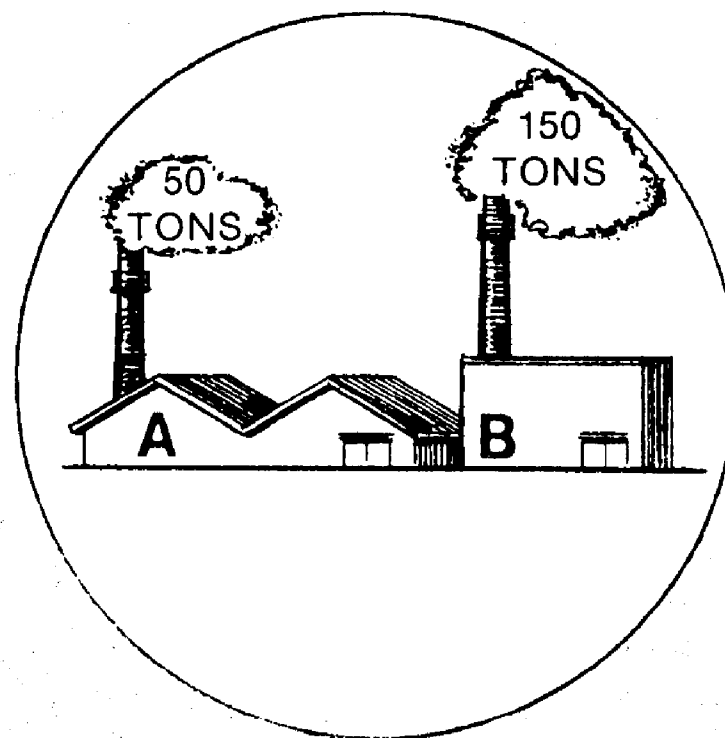
CONTROL COSTS: \$2 MILLION



AFTER USE OF BUBBLE

TOTAL ALLOWED EMISSIONS: 200 TONS

CONTROL COSTS: \$1.5 MILLION



THE BUBBLE

Are Firms Using the Bubble?

Since the original bubble policy appeared in the *Federal Register*, more than 100 plants have developed bubble applications. These bubbles *average* over \$2 million in cost savings, and many will produce extra environmental and energy benefits.

EPA has approved twenty bubble applications representing collective savings of over \$50 million. Under the first EPA approved bubble, the Narragansett Electric Company in Rhode Island will burn high sulphur fuel oil at one facility, in exchange for burning natural gas or not operating at another facility. Overall SO₂ emissions from the two facilities, located 1/4 mile apart, would decrease by 10 percent. The bubble will save Narragansett customers at least \$3 million on an *annual basis*. In addition, by burning domestic natural gas, Narragansett will reduce fuel oil imports by approximately 600,000 barrels per year. In another bubble, ARMCO Inc. will save more than \$15 million in capital — 10% of that corporation's pretax profits — by controlling open dust in lieu of fugitive emissions at a single Ohio steel plant, while producing six times as many emission reductions and bringing the area into attainment of the primary standard for TSP.

EPA's Emissions Trading Policy Statement makes the bubble easier, simpler and faster to use. This policy

represents major changes in air quality management and in EPA's relations with the states. The Agency has endorsed a "generic" New Jersey rule which will let states approve individual VOC (hydrocarbon) bubbles without time-consuming Federal review. EPA has also reduced the cases in which full-scale air quality modeling is required to show the ambient equivalence of a trade. Among other steps, EPA has expanded the bubble's availability by extending this "generic" New Jersey approach to other air pollutants (TSP, SO₂), extending the bubble to areas which currently lack approved State Implementation Plans (SIPs), and giving plant managers more time to implement bubbles. At least twenty other states are currently drafting generic bubble rules; many include banking components.

With these changes, many more bubbles will be approved. The predicted savings are enormous. A large 3M plant in Pennsylvania will save about \$5 million in capital and operating costs. DuPont will save an estimated \$12 million and comply faster by overcontrolling several large point sources of hydrocarbons in lieu of many fugitive sources at a single New Jersey works. EPA estimates that bubbles could be saving American industry approximately \$1 billion by the end of 1982, with better air quality results than traditional regulation.

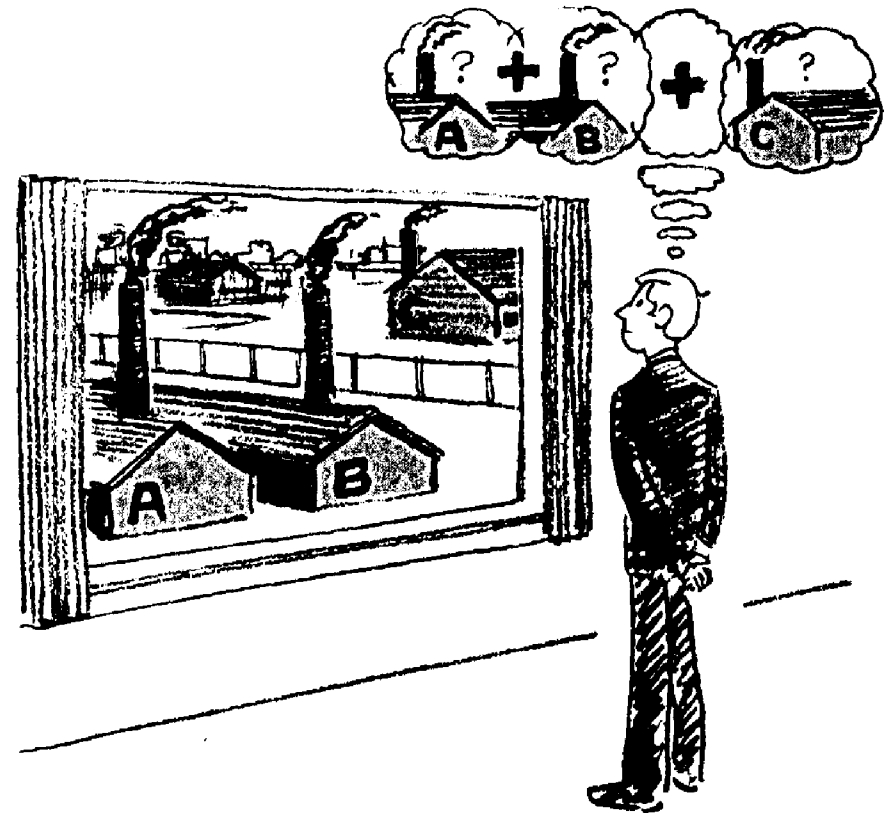
MULTI-PLANT BUBBLES

Can Bubbles Be Used Between Plants?

Most firms are not aware that bubbles between plants, even those under different ownership, are allowed. Moreover, it is relatively easy for a plant manager to evaluate internal facilities to determine the possibilities for an alternative, less expensive mix of controls. Plant managers are less likely to know of bubble opportunities with other facilities, whether those facilities are owned by the same or different firms. Multi-plant bubbles may also be more difficult to arrange because the emission reduction and increase occur at different locations, which sometimes increases the complexity of demonstrating ambient equivalence.

However, multi-plant bubbles can result in greater flexibility and broaden the potential number of benefiting firms. For example, multi-plant bubbles can allow smaller sources and sources with only one emission point to take advantage of the bubble. They can also multiply savings because control costs are likely to vary much more widely across emission points in different plants and industries. EPA has taken steps to encourage multi-plant bubbles by developing simplified procedures which sharply reduce the air quality modeling requirements for evaluating most of these bubbles, even if an approved state "generic rule" is

not yet in place. For VOC and NO_x bubbles, generally no modeling at all is required.



THE CASE OF VORTEX INDUSTRIES

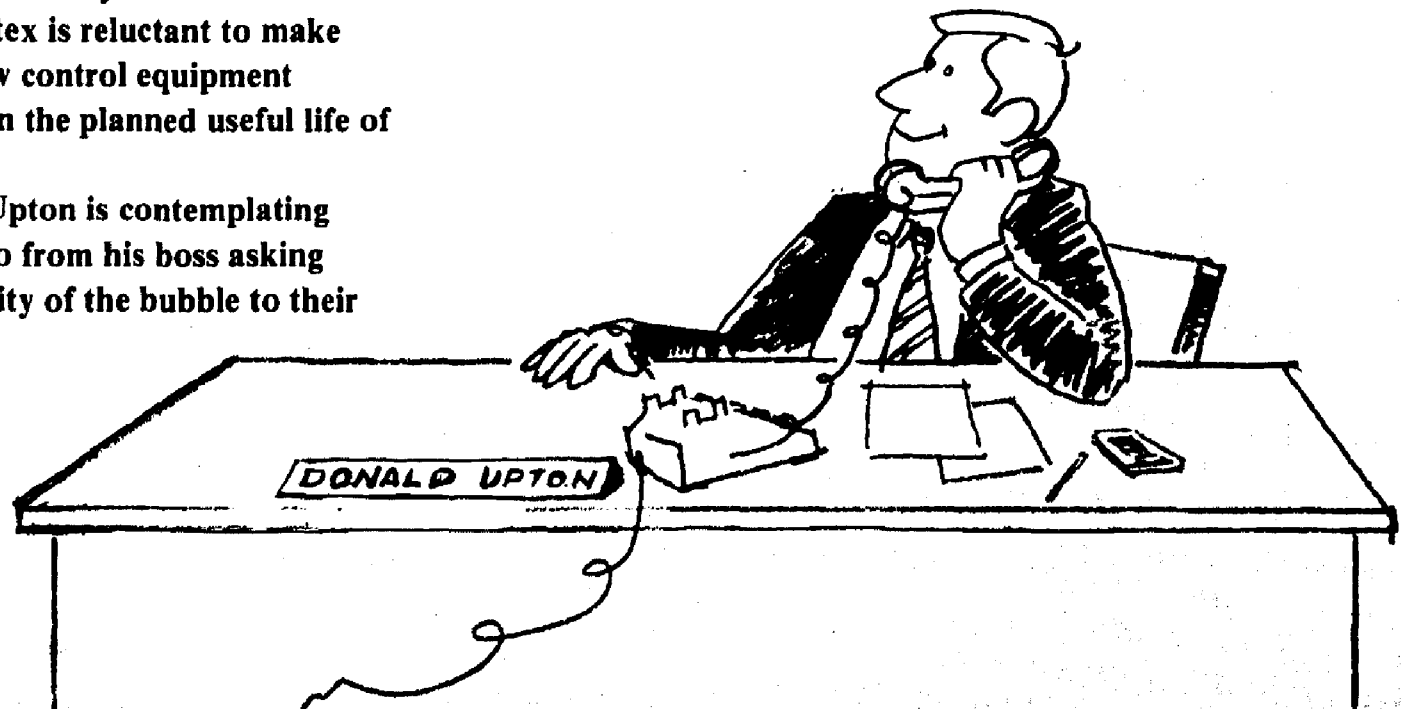
Let's take a simple example to see how this system can work. Vortex Industries operates a refrigerator manufacturing plant. The plant has two metal coating lines. One line is fairly new and was designed to control hydrocarbon (HC) emissions at 80 percent effectiveness, as required by state regulations. The second line, scheduled for reconstruction in five years, was also controlling emissions at 80 percent. A recent accident damaged the second line's carbon adsorption equipment. It now has an effectiveness rate of only 60 percent, which means it will release about 35 extra tons of hydrocarbons per year unless it is further controlled.

To repair the adsorption system, Vortex would have to spend \$500,000, which would effectively amount to a total overhaul of the equipment. Vortex is reluctant to make this expenditure because the new control equipment would last seven years more than the planned useful life of the coating line.

While Vortex manager Don Upton is contemplating this decision, he receives a memo from his boss asking him to investigate the applicability of the bubble to their

facilities. Upton is skeptical but instructs his engineers to audit the plant's emission sources to determine their potential for creating surplus reductions. To his surprise, they discover that by switching one line to a water-based solvent, Vortex could reduce HC emissions by 40 tons per year. Upton estimates the cost of producing this reduction would be roughly \$80,000 per year. While expensive, the reduction could be used as part of a bubble and would cost considerably less than an overhaul of the carbon adsorption unit.

Upton calls his state air agency to learn about eligibility requirements and details of the approval process.



How Can a Source Get its Bubble Approved?

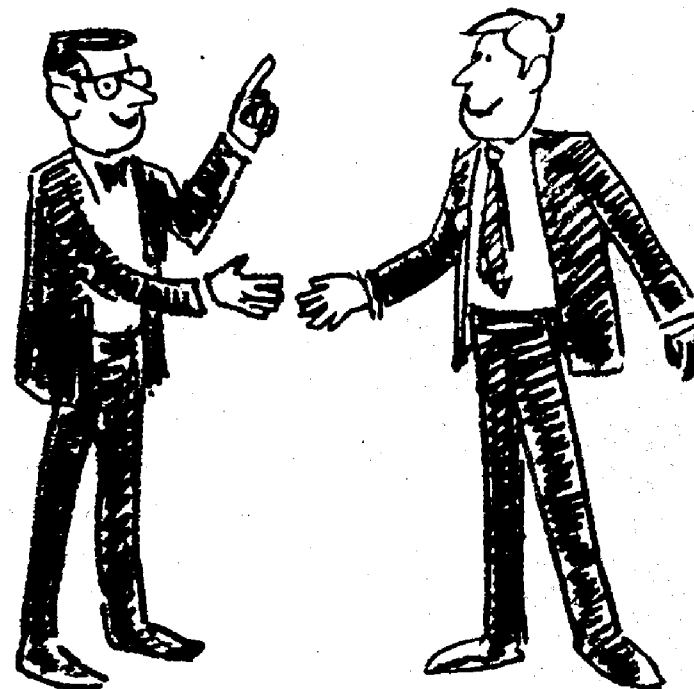
In proposing a bubble, plant managers must demonstrate that resulting air quality will be equivalent to that produced by applicable State Implementation Plan (SIP) requirements. The new emission limitations must become legally binding through either a site-specific SIP revision, or a permit change or similar state procedure under a generic bubble rule. In states with a SIP which includes an approved generic bubble provision, SIP revisions are not required for individual bubble applications which fall within the scope of the rule. In those states, after the bubble application receives state approval, the new emission limitations are immediately in effect. If the applicable SIP limits are under development, a firm can propose a bubble and, subject to the demonstration of equivalence, have that bubble written into the SIP.

Bubbles must generally satisfy the following requirements:

- *Have the Same Impact on Air Quality.* The emission reductions under the alternative approach must be quantifiable and enforceable, and the impact of the trade on ambient air quality must be shown to be equivalent to existing requirements. Depending on differences in location, method of discharge, and other considerations, monitoring and/or modeling may sometimes be required to establish this equivalence. Bubbles must involve comparable pollutants.
- *Be No Less Enforceable.* The surplus reductions used in a bubble must be sufficiently reliable and measurable to be permanent. Strategies incorporating uncertain control techniques or reductions may need a greater than 1:1 ratio of reduction to relaxation to provide this certainty.

How Can Multi-Plant Bubbles Be Arranged?

Vortex's Upton prepares and submits a bubble application. Upton frequently brings up the subject of Emissions Trading at local business meetings. One day a friend introduces him to the manager of Happy Cooker at a Chamber of Commerce luncheon. Happy Cooker is a major producer of gas and electric ranges which operates a large plant one-half mile from Vortex. Without controls, Happy Cooker's single coating line would emit 800 tons of hydrocarbon vapors per year. Although existing control equipment is capable of reducing these emissions by 85 percent, the plant manager is now operating the equipment at 80 percent effectiveness as required by the SIP. Increasing control to 85 percent would cost an additional \$30,000 per year in operating expenses, and would reduce emissions by 40 tons per year. As their conversation progresses, it becomes clear to Upton that Happy Cooker could further reduce emissions at a much lower cost than Vortex's internal bubble strategy. It would be cheaper for Vortex to pay Happy Cooker to reduce emissions by 40 tons per year than for Vortex to reduce emissions by 40 tons itself.



The two managers reach an agreement: Happy Cooker will increase controls to the 85 percent level and Vortex will pay Happy Cooker \$50,000 each year to do so. Vortex will save \$30,000 per year in annualized costs over an internal bubble, and Happy Cooker will receive a \$20,000 per year profit. The cost analysis is as follows:

COST SAVINGS THROUGH A MULTI-PLANT BUBBLE

Company		Strategy	Annualized Costs	Tons Controlled
1.	Vortex-	Totally overhaul carbon adsorption equipment on the damaged metal coating line.	\$110,000	35
2.	Vortex-	Bubble within its facility by switching one line to a water-based solvent	\$ 80,000	40
3.	Vortex-	Form a multi-plant bubble with Happy Cooker	\$ 50,000 (payment to Happy Cooker)	40
	Happy Cooker-	Increase controls to 85% and sell reduction to Vortex	\$ 20,000 (profit)	

What Is the Relationship Between Banking and the Bubble?

As the plant managers at Vortex and Happy Cooker prepare their new multi-plant bubble proposal, Vortex's manager begins to think, "is there some other plant in the area that could achieve the emission reductions I need for less cost than Happy Cooker?" At the same time, Happy Cooker's manager thinks, "maybe some other plant could have saved even more money than Vortex using my surplus emission reductions, and would have paid me more. But I do not want to make the investment in further controls without a guaranteed buyer." Both think, "this multi-plant bubble is a good idea, but we can only use it if the reductions and relaxations happen at the same time. Besides, if we hadn't known each other, we wouldn't have known of the possibility of trading reductions between our plants. *What we need is a system that lets us locate, purchase, and sell excess reductions like any other commodity, and lets us store excess reductions for future use or sale.*"

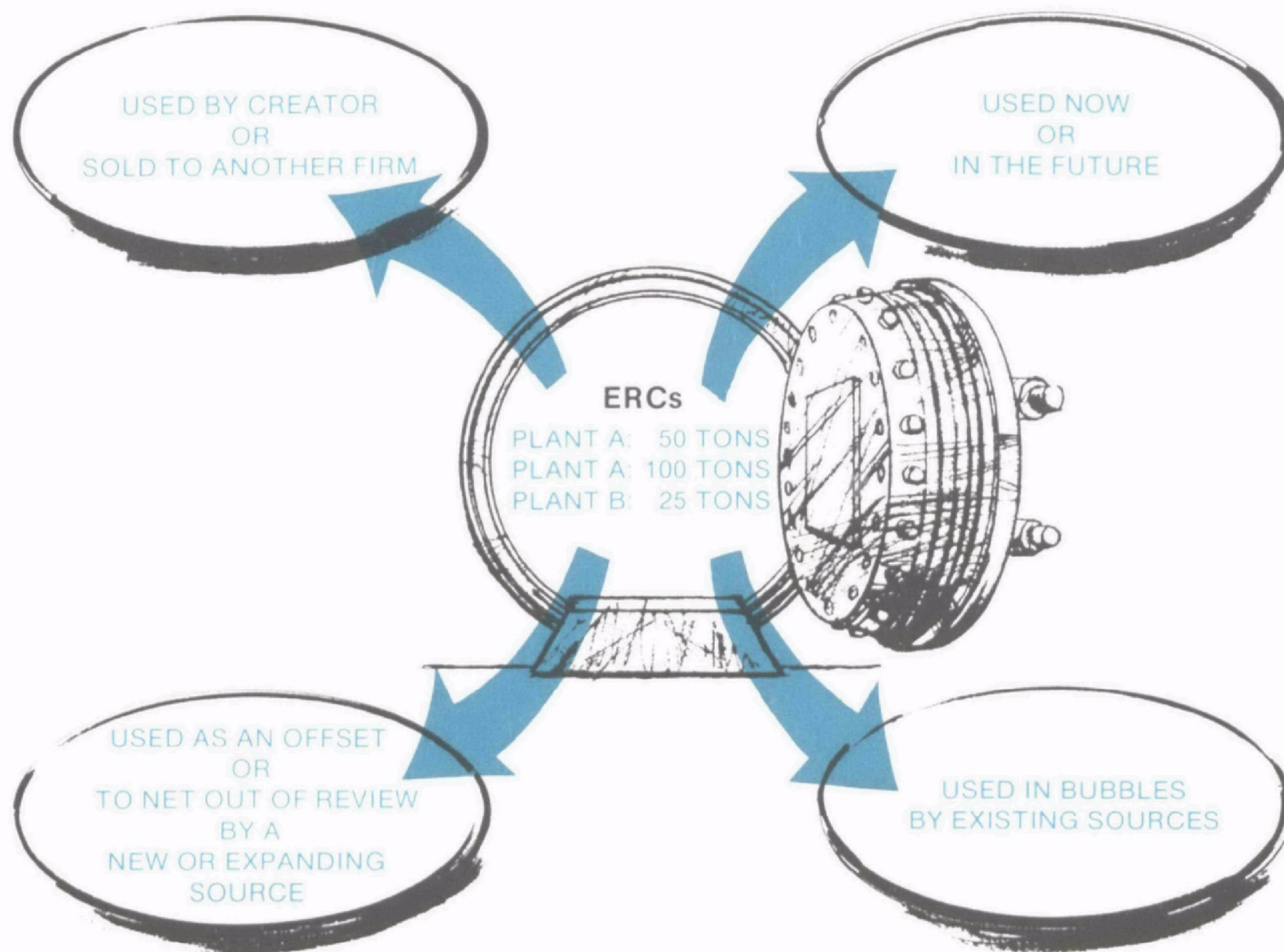


EMISSION REDUCTION BANKING

What Is Emission Reduction Banking?

Banking simply lets firms receive credit for surplus emission reductions. Under state banking rules, any firm that reduces emissions beyond SIP requirements and can show that the reduction is surplus, quantifiable, permanent, and enforceable, can receive emission reduction credits (ERCs) and hold them over time in a legally protected manner. These ERCs are an official certification of the reduction which specifies the type of pollutant and the amount and location of the reduction. A firm holding ERCs can use them either now or in the future to offset expanded production facilities or as part of a bubble for existing facilities. The firm can also sell them as offsets to another company desiring to locate or expand in a nonattainment area. Firms may also apply internally created ERCs against increases in emissions resulting from expansion or modernization within existing plants to "net out" of new source review. (See Exhibit 3)

BANKED ERCs CAN BE USED IN MANY WAYS



EMISSION REDUCTION BANKING

Louisville, Kentucky; the San Francisco Bay area; and the Seattle-Puget Sound area are the first jurisdictions with formal banking systems. About 20 other states or localities throughout the country are developing generic banking rules. Many of these banking rules are being developed as part of generic bubble provisions.

Two recent bubble trades made possible by the operating Louisville bank illustrate banking's ability to facilitate use of the bubble. In one, GE negotiated and later exercised an option to lease several hundred tons of banked hydrocarbon reductions for \$60,000 from International Harvester. GE used those reductions to meet October 1981 State RACT requirements for its coating lines. The bubble avoided both a disruptive production shutdown and purchase of a \$1.5 million incinerator which would have been worthless when the relevant lines were replaced in 1983. In the other trade Borden Chemical bought 25 tons of banked VOC reductions from B. F. Goodrich for \$1000/ton, and used these ERCs to meet methanol-tank RACT requirements which would otherwise have cost at least \$3300/ton.



How Can Banked ERCs Be Used in Bubbles?

The bubble lets firms develop a more cost-effective mix of emission reductions. Extending the bubble to more than one plant can greatly increase these potential cost savings, because multi-plant bubbles can cover a wider range of sources with greater control cost differences. However, as Vortex and Happy Cooker discovered, it takes time to locate buyers and sellers, and get both the reduction and relaxation approved.

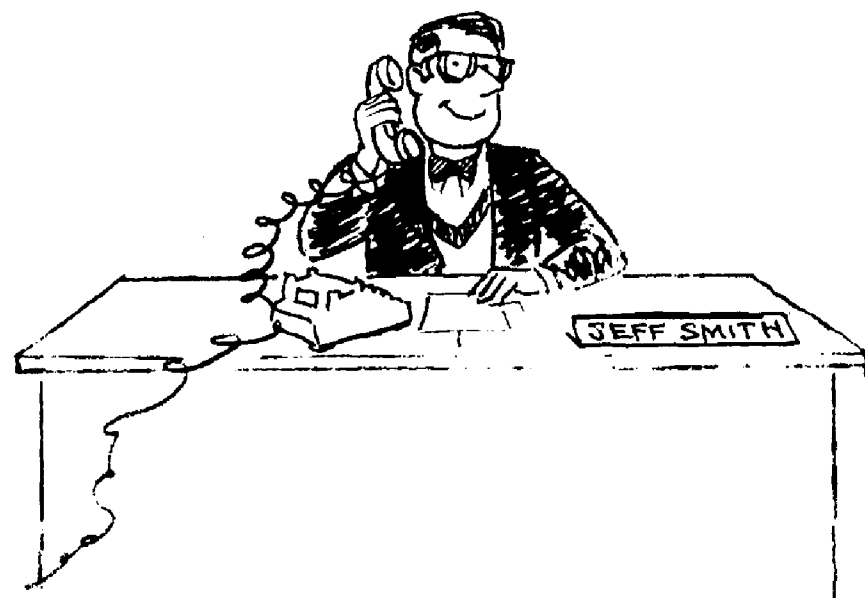
Banking can facilitate bubbles in several ways:

- *Banking introduces time flexibility into a firm's compliance strategy.* It allows firms to use present or past emission reductions to comply with existing or future requirements. Thus a firm may create surplus emission reductions when it is most economical (for example, when installing new control equipment) and bank the credit to sell later or use in a bubble application. Because the most cost-effective combinations of increases and reductions seldom occur at precisely the same time, banking increases the potential savings of single and multi-plant bubbles.
- *Banking provides greater certainty.* Firms wishing to use their own reductions in a bubble to meet future

control requirements can create and bank them in advance, assured that they are valid and acceptable to the State Air Pollution Agency. Banked ERCs are also assured protection against confiscation as specified by the banking rule. Firms using reductions purchased from other firms will also benefit from the ERC's defined legal status.

- *Banking provides a central clearinghouse of available emission reductions.* A firm wishing to use another firm's emission reductions under the bubble can easily find a trading "partner" by examining the register of banked credits. Trades are not limited to firms that discover each other by chance.
- *Banking facilitates the approval process.* Because the emission reductions are previously certified, part of the trade is approved before the bubble application occurs. The company and regulatory authority then face a smoother workload, speeding permit approval and reducing regulatory risk and uncertainty.

Because uniform point- and process-specific requirements are a central part of air pollution control at the state level, Emissions Trading offers communities and industry an attractive opportunity to reduce the costs of achieving environmental goals. ■



EPA's Regulatory Reform Staff can provide technical assistance to help industry, State or local air agencies, economic development groups, and other organizations implement generic rules or other Emissions Trading steps.

For more information call (202) 382-2685 or write for additional materials.