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Certificate Trading Program
Reduces Acid Rain Emissions

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WASHINGTON -- As part of a sixth-grade science project, Rod Johnson's students in Glens Falls, N.Y., removed 330 tons of sulphur dioxide from the air.

Holding raffles, bake sales and auctions over a three-year period, they raised \$25,000 to buy 330 certificates in the U.S. Environmental Protection Agency's acid-rain-emissions trading program -- one of the nation's hottest new commodity markets. Each certificate allows the owner to emit one ton of the noxious gas.

Utilities trade the certificates -- some selling them for profit, others buying them to comply with air-quality standards. But the students at Glens Falls Middle School are going to sit on theirs. The way the EPA program works, that means the nation's air will be that much cleaner.

Proposed by the Bush administration in 1990 as a novel, market-oriented solution to the problem of acid rain, the trading of what amounts to sulfur-dioxide-pollution permits has led to results that have exceeded expectations. Since its 1994 inception, the trading program, administered by the EPA, has contributed to a 30% drop in sulfur-dioxide emissions from major polluters, the agency says.

Cheap Alternative

President Clinton hopes to sell a version of the trading program to other nations meeting in Kyoto, Japan, in December to conclude a treaty that curbs global warming. Though some environmentalists don't like this approach, and government agencies are finding it hard to explain the complex system to local citizens, business-people are warming to it. And Mr. Johnson says his students like trading because, "We can identify a problem and then participate in a solution."

Trading appears to be a cheap way to help curb pollution. Industry had complained that removing sulfur dioxide from the air would cost as much as \$1,500 a ton. But the price of about 7.2 million certificates being traded this year reflects a cost

of \$90 a ton. After years of hand-wringing, acid rain is being reduced by a market that lets individual companies make their own antipollution strategies.

"This program turns companies into pollution minders," says Daniel J. Dudek, a senior economist for the Environmental Defense Fund in New York, who sold the idea to the Bush administration and has become a kind of Johnny Appleseed, spawning other trading plans. "When they [polluters] think about it, they say, 'Hey! That's money going up the stacks.'" "

Trading allows a company to hunt for the most cost-efficient ways to reduce emissions. In some programs it doesn't necessarily have to be their emissions. The Los Angeles area's South Coast Air Quality Management District, for example, established a program in which it gave four oil refineries credit in the form of certificates for removing the equivalent 2,000 tons of smog after they bought and junked 17,502 pre-1982 cars, which, the agency says, spewed an equivalent amount of pollution over the four-county district.

But the program has been extremely difficult to sell to residents of Wilmington, an unincorporated area near Los Angeles Harbor where homes and schools sit next door to several refineries. The eyes of Elidia Madrigal, a teacher's aide in the local elementary school, widen as a concerned neighbor explains the program to her in Spanish: "If they take a couple of bags of garbage away from the street, it allows them to throw a couple of bags in front of your house," the neighbor says.

Activists Sue

"This is unfair! We're not going to tolerate this," Ms. Madrigal says, complaining that the fumes from a refinery half a block away sometimes make her and her students sick. A local activist group, Communities for a Better Environment, is suing the refineries, the state and the Air Quality District in Federal District Court in Los Angeles, charging that the trading program violates the civil rights of residents of the predominantly Mexican-American neighborhood. They want to stop the trading program and get the government to set tighter emissions standards.

But Paul Eisman, a senior vice president for Ultramar Diamond Shamrock Corp., which owns the nearby refinery, loves the program. By buying and junking 334 old cars, it was able to avoid installing more expensive vapor-control equipment.

"This is a microcosm of a huge issue," says Mr. Eisman, who adds that trading allows companies to deal with pollution that otherwise would be too expensive to reduce. "The emission that's least costly to reduce gets reduced first," he says. But he adds that he understands Ms. Madrigal's concern: "If you're living next door to a situation like this, you're never going to be totally happy with it."

Kevin Snape, director of the Clean Air Conservancy, a Cleveland-based environmental group that promotes trading solutions, says local "hot spots" will disappear as cheap certificates are bought up and companies discover it is less expensive to buy new antipollution equipment.

In Ohio, he notes, utilities have found that byproducts of trading in the federal acid-rain program include cheaper and more effective scrubbers and new low-sulphur fuel-mixing techniques. "All of this would have never happened under the old regulatory model that said you must install this specific technology," he says.

Basic Idea

The basic idea for the sulfur-dioxide program is relatively simple. The government set a cap that reduced the number of tons of the pollutant it would allow in the air, starting in 1995 and declining thereafter. Then it issued to 110 of the nation's dirtiest power plants tradable certificates that matched their share of the cap. Companies that cut emissions below their cap had extra certificates to sell. Companies that didn't had to buy them from the cleaner companies. Companies can save certificates from year to year, but federal clean-air standards still limit the amount of pollution that can be released.

For Milwaukee-based Wisconsin Electric Power Co., a unit of Wisconsin Energy Corp., the cap meant it had to cut sulfur-dioxide emissions from its five power plants by about 30,000 tons. Daniel L. Chartier, the company's emissions manager, figured he could remove 20,000 tons relatively cheaply by switching to low-sulphur coal. To get the remaining 10,000 tons, he learned, would be tough. He would have to buy two house-size, \$130 million machines called "scrubbers."

But because other companies had reduced their emissions well below the cap, the market was flooded with cheap allowances. And since buyers can approach sellers in any part of the country, prices

tend to even out. Mr. Chartier bought 10,000 of them, estimating he saved his company more than \$100 million. This year he formed the Emissions Marketing Association and 63 companies, mostly large utilities, have joined it. "We found growing enthusiasm as the knowledge of emissions trading increased," he says.

More markets are coming. Twelve northeastern states are adapting a version of the federal sulfur-dioxide trading program to reduce ozone levels, starting in 1999. Some of them have also joined a group of 37 states considering a larger smog-reduction plan. California has hatched a variety of such programs.

Big Business

While some may find it hard to envision pollution rights as a commodity, trading is already a big business. The EPA expects sulfur-dioxide trading to reach \$648 million this year. The utility industry estimates actual volume is probably double that-or equal to the \$1.2 billion cash market for U.S. soft red winter wheat. "Trades have basically doubled every year," says Brian McLean, head of EPA's acid-rain division, which tracks trades.

The Environmental Defense Fund's Mr. Dudek says this is only the beginning. He is consulting with traders at British Petroleum Co., helping them determine how a world-wide market in carbon-dioxide-emission allowances would work.

The Clinton administration has made trading a main part of its negotiating position on the treaty to prevent global warming. The treaty would impose a global limit on man-made sources of carbon dioxide, created by burning petroleum products, coal and natural gas. Since the 1850s, concentrations of carbon dioxide have increased in the atmosphere, and many scientists say that is artificially warming the Earth by trapping more of the sun's heat.

Draft versions of the U.S. plan would give each industrial nation an "emissions budget" that would be its pro rata share of the global limit. (A program for developing nations would be negotiated at a later time.) Industrial nations that curb emissions below 1990 levels would have allowances to sell. Countries that can't curb it, or won't, must buy them.

Adapting the U.S. acid-rain program to do that means stretching a trading program designed to cover hundreds of emitters to one that would cover

millions and allowing international transactions. This will compound the complexity of trading, but Mr. Dudek insists it will also create many more cheap opportunities to reduce global carbon-dioxide levels.

For example, a U.S. company could buy more efficient boilers or expensive antipollution equipment to meet its share of U.S. carbon-dioxide-emissions quota. Or, it could invest in more cost-effective clean-up projects in Russia. In a global program, Russia will have a great many allowances to sell because its industrial economy has collapsed since 1990, sharply cutting its emissions. And 1990 is expected to be the benchmark year for the treaty.

Excess Certificates

According to Australian analysts, the U.S., New Zealand, Japan, Norway and their country will have to buy emission allowances to meet their limits. European nations will, more or less, balance each other out. So the world's excess certificates would be held by Russia and the rest of the former Soviet empire.

"We're talking about transfers of billions of dollars here," says Stephen Deady, commercial minister at Australia's embassy in Washington. "We think the whole question of emissions trading needs further work." European nations say they will consider trading plans, but only after the Clinton administration announces how much it will reduce U.S. emissions.

Japan, anxious for meaningful results, has requested more details of the U.S. position. China, expected to be a major player in the Kyoto negotiations as a leader of developing nations, may be of two minds. Chinese diplomats reject carbon-dioxide controls as "ecocolonialism." But some officials see trading as an additional means of getting outside investors to clean up most of China's severe pollution problems in exchange for trading certificates.

Despite the faint praise from its allies, U.S. officials remain bullish. Although the Russians haven't publicly stated their position, Energy Secretary Federico Pena says Russian officials are "very interested" in emissions trading. To sell certificates, he explains, Russia would first have to set up a rigorous monitoring system so the money from the sales could be focused on cleaning up the country's dirtiest factories or its enormous natural-gas-distribution system, which is believed

to be leaking huge quantities of methane, a more potent greenhouse gas than carbon dioxide.

Mr. Pena sees a situation in which "a U.S. company could go over, make a major investment to reduce the leakage and get credit for that. That would be a win for the local people, the government, the U.S. company and a win for global warming."

But the idea baffles some groups. "When this gets to the real world, there's no way it can work," says Daniel Becker, director of the Sierra Club's energy program. "You're going to let Russia be able to sell credit for plants that have already been closed so that General Motors can emit more pollution here?"

'Win-Win' Deals

The Clinton administration says trading also offers "win-win" deals for developing nations. The Energy Department has been helping Costa Rica develop a program based on reforestation. For outside investors, Costa Rica will agree to protect a portion of its rain forest that would otherwise be logged. Because standing forests remove carbon dioxide from the air, Costa Rica will then issue trading certificates.

Richard L. Sandor, second vice chairman of the Chicago Board of Trade, has bought 1,000 of them, each permitting the owner to emit 1,000 tons of carbon dioxide. He hopes to sell them to U.S. companies in anticipation of a global-trading plan. "If Kyoto gives us a framework, that's all we need," says Mr. Sandor, who has been studying the possibility of carbon-dioxide trading for the Board of Trade. He says a world-wide market could generate \$10 billion to \$20 billion a year, rivaling the size of the U.S. soybean market.

But Mr. Sandor will have a hard time selling any of this to Bill Hare, a physicist and global-warming expert for Greenpeace International in Amsterdam. Costa Rica's effort "worries the hell out of us," Mr. Hare says. He explains that there is no international-accounting system to ensure that the trees will remain standing.

Still, he says some kind of trading regime could come out of Kyoto, though it may take years to negotiate the complex rules. Swarms of investment bankers and venture capitalists are showing up at global-warming meetings, once ill-attended affairs dominated by a few scientists. "This is a very interesting development," he says.

Meanwhile traders continue to push the envelope. As the result of a modernization program, New York state's Niagara Mohawk Power Corp. cut its carbon-dioxide emissions by 2.5 million tons. It traded emission rights for that amount to an Arizona utility for 20,000 tons of sulfur-dioxide allowances. Then Niagara donated the sulfur-dioxide allowances to local environmental groups, which are retiring them. And \$125,000 of the tax benefits Niagara received from the deal are being used to convert a Mexican fishing village to nonpolluting solar power.

Martin A. Smith, chief environmental scientist at Niagara, says the reductions and the experience in trading were worth it. "Do we just stand by and let these gases accumulate?"

The Globe's Dirty Dozen

Annual carbon-dioxide emissions

	Total Tons (millions)	Tons per Capita
U.S.	5,475	20.52
China	3,196	2.68
Russian Federation	1,820	12.26
Japan	1,126	9.03
India	910	0.90
Germany	833	10.24
U.K.	539	9.29
Ukraine	437	8.48
Canada	433	14.83
Italy	411	7.19
South Korea	370	8.33
Mexico	359	3.93

Source: Oak Ridge National Laboratory assessment of 1995 data

Return to top of page

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