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NEWS & ANALYSIS

RECLAIM: Southern California's Failed Experiment With Air Pollution Trading

by Curtis A. Moore

The bottom line is that capitalism may now be getting its ultimate test. For the smog market, more than any other system, will reveal whether financial incentives can prod major corporations into simultaneously acting for the public good and their own profit.

Tom Elias
The *Daily Breeze*,
December 27, 1993

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Manufacturers, power plants[,] and refineries have reduced emissions by a scant 16%—much less than was anticipated by this time. Businesses were given 10 years to eliminate about 13,000 tons of pollution annually, but as the program nears its end they have eliminated just 4,144 tons, according to projections by the South Coast Air Quality Management District.

The *Los Angeles Times*,
April 17, 2001

It is unlikely that any metropolitan area in the world has a longer, more distinguished record of combating air pollution than southern California. It is there that the linkage between car, truck, and other exhaust fumes and the thick clouds of “smog” blanketing the area was established by Dr. Arie Haagen-Smit. It is in California that the first motor vehicle emission control program—still the world’s most stringent—was established and the first coordinated air pollution control program adopted. Relying almost wholly on traditional “command-and-control” mechanisms in which polluters were identified, then required under penalty of law to curb their pollution, the area made almost fantastic strides in curbing air pollution from the 1950s through the mid-1990s.

It is not surprising, therefore, that when southern California decided in 1993 to partially abandon traditional command-and-control regulation in favor of a novel and untried system of “trading,” in which polluters could exchange their emissions not unlike stocks and bonds, it attracted notice throughout the world.

It has been a decade since this trading system—the Regional Clean Air Incentives Market (RECLAIM)—was first

proposed, so it now has an established record that can be assessed. The record demonstrates that RECLAIM failed to realize a number of its stated, most important objectives.

- RECLAIM was to have reduced emissions to legally mandated levels without recourse to government mandates. The emission reductions failed to materialize, forcing the South Coast Air Quality Management District (SCAQMD) to order the installation of specific control technologies.

- RECLAIM was to have simplified the emissions control program by, in effect, placing government in the role of broad oversight, leaving details to polluters themselves. Instead, a new layer of regulations was added for some sources, RECLAIM was left in place for others, while still others were subject to different rules altogether. In short, regulation of the region’s industrial sources of air pollution became more complex and uncertain, not less so.

- RECLAIM was to have accelerated the pace of reducing air pollution by freeing sources from the constraints of supposedly inflexible rules. Instead, under RECLAIM the rapid pace of reductions slowed to a crawl. In the period 1999–2001, for example, annual average concentrations of nitrogen oxide (NO_x) dropped by only 3%, compared to a 13% decline in the preceding three-year period from 1996–1998. Indeed, in 1999 ambient levels—the measure of how much air pollution people actually breathe—for NO_x actually increased, following a decade of consecutive reductions.¹

- RECLAIM was to usher in an era of openness and transparency by eliminating the complexity and confusion associated with source-by-source regulation. There would be simple, straightforward measures of progress. Instead, some traders have been accused of fraud and a variety of some of the largest firms in southern California—indeed, the United States—have been successfully sued for violating the U.S. Clean Air Act (CAA).

- RECLAIM was to have fostered the deployment of a new generation of environmental technologies because firms would choose to install them for the purpose of generating excess credits that could be sold at a profit. Instead, polluters bought credits, leaving those who made and sold new technologies without customers in what should have been the nation’s seedbed of environmental innovation. To the

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1. SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD), 2001 AIR QUALITY; SCWMD, EMISSION TRENDS [hereinafter SCAQMD].

extent that RECLAIM fostered innovation, it was focused on reducing the cost of emissions control, not the pollution itself.

Suffocating Environmental Innovation

The legacy of RECLAIM is likely to endure for years, perhaps even decades into the future for at least two reasons: first, sources required to hurriedly install emission control systems had little time to explore technological options that might have been superior, both as a general matter and in the context of California's unique climate, geographic, and other features. Second, during the decade-long market drought, some superior technologies may have simply died. An argument can be made that at least one such technology, SCONOX™, a revolutionary catalytic absorption system created by Süd Chemie Group, was a victim of RECLAIM. Another firm, Alzeta Corporation, almost assuredly lost sales. Energy conservation programs and renewable energy systems might have been victims of California's other experiment with the market, electricity deregulation, but RECLAIM certainly didn't help.

Governments and businesses in southern California had spent years and millions of dollars developing superior environmental technologies. Had these been successfully brought to market, they would have paid environmental dividends in the region for decades and generated jobs and profits for even longer. Now, it is an open question whether some of these can successfully penetrate the market.

The irony is that the 1989 plan for improving air quality in southern California, which was effectively subsumed by RECLAIM, was predicated explicitly on the ultimate achievement of air quality objectives through the development and deployment of these "Tier III" technologies. In pursuit of their development, the state set aside a fraction of the registration fee for every car to provide the SCAQMD's Technology Advancement Office (TAO) roughly \$10 million per year. TAO spent tens of millions on fuel cells, low-emitting burners and turbines, ultra clean fuels, zero emission paints, and a wide range of other extraordinary advances. Just as a number of these were ready to enter the market, RECLAIM cancelled the rules that might have propelled them to commercial maturity.

Yet trading is frequently said to encourage innovation, not kill it, an argument that reflects a fundamental misunderstanding of the incentives created by trading programs. Trading does stimulate innovation, but it is focused on cost, not the environment.

Innovation is of two kinds:

- There is innovation that leads to the development of environmentally superior technologies of the sort that can, for example, reduce multiple streams of pollution. Possibly the best example of such a technology is fuel cells, which chemically convert hydrogen into high quality electricity and absolutely pure water, with no pollution or waste whatsoever.
- Then, there is innovation concerned not so much with environmental improvement as reducing the cost of, say, curbing emissions of a specific pollutant by an exact amount by a date certain.

In trading schemes like RECLAIM, acid rain and leaded gasoline, the innovation that is stimulated, and which pre-

vails in the marketplace, is of the second type, concerned wholly with costs. The market places no value on the ability of a technology to avoid emissions of a toxic chemical such as ammonia or to simultaneously reduce levels of carbon monoxide (CO), volatile organic compounds (VOCs), and NO_x. Similarly, it matters not that the catalyst is a nonhazardous waste, because the polluter is interested in only one outcome: reducing emissions of a specific pollutant by a specific amount, no more, and at the lowest possible cost.

Some of these limitations are inherent in pollutant-specific regulations as well. But at least they provide the opportunity for decisionmakers to prefer options that achieve multiple outcomes or require the maximum possible reduction regardless of cost. There is no such opportunity in trading schemes like RECLAIM, however, for they—like the corporations that prefer them—are concerned solely with least cost. Moreover, regulations virtually guarantee reductions in emissions. Trading does not, as RECLAIM graphically illustrates.

By eliminating health- or technology-driven, source-specific permitting, trading minimizes regulatory incentives for adopting newer, cleaner ways of doing business. But eliminating source-by-source permitting and all that goes with it is the essence of trading, which is the reason the Bush Administration seeks repeal of new source review as part of its "Clear Skies" trading program.² The irony of RECLAIM is that the very same technologies that the SCAQMD was attempting to encourage by spending upward of \$10 million annually were, in effect, being suffocated by the district's own trading program.

The stifling effect of trading on technology development is apparent in other such schemes as well. In the acid rain program, for example, there is no evidence that so much as one advanced coal combustion technology has been deployed because of trading, though there is ample proof that command-and-control programs have induced such efforts. Similarly, the trading of leaded gasoline does not appear to have stimulated any advances in superior refining technologies. Indeed, the greatest single advance in fuel in the past 15 years, the development of environmentally engineered, or reformulated, gasoline was largely prompted by the command-and-control requirements of California that preceded RECLAIM.³ But it is with RECLAIM that the effects of trading on suffocating the development and deployment of environmentally superior technology are most clearly seen.

Still, there are far more reasons than this to conclude that RECLAIM is a failure. Consider the following.

2. The White House proposed repeal of new source review (NSR) and the U.S. Environmental Protection Agency's (EPA's) Assistant Administrator for Air and Radiation Jeffrey Holmstead said that "the [A]gency would not support and the president would veto any legislation that would not eliminate any [NSR]." Holmstead said NSR "gives you no benefit" if there is an emission trading system. *New Source Review Must Be Eliminated in Any Emission Trading Bill, Air Chief Says*, Daily Env't Rep. (BNA), Mar. 18, 2002, at A1.
3. ARCO Corporation introduced the first-ever environmentally engineered gasoline, which is named "EC-1" (for "Emission Control 1") in August 1989. It contained one-third less olefins and aromatics, 50% less benzene, and 80% less sulfur than regular gasoline, with a Reid vapor pressure 1 pound per square inch lower. EC-1 was intended to replace leaded gasoline. *See ARCO to Market Low-Emission Regular Gasoline*, OIL & GAS J., Aug. 21, 1989, at 31. ARCO decided to develop and offer EC-1 principally because of the competitive threat posed by methanol, which was at the time being aggressively encouraged by both regulations and technology development in California.

Control Costs

Although the prices for pollution “credits”—the commodity being traded under RECLAIM—started fairly low in the program’s early periods, as emissions began to greatly exceed the number of available credits, prices jumped. A credit that carried the right to emit one pound of NO_x went for as little as \$.13 in 1999. By January 2000, the price was up to \$1.14, and in July 2000, the same credit sold for \$37. By September 2001, prices settled somewhat, falling to about \$13 per pound—100 times what they had been earlier.⁴

In order to return pollution to at least marginally acceptable levels, the SCAQMD was forced to remove electricity generators from RECLAIM programs, then reinstate mandates for meeting stringent emission limits. As a practical matter, this required basinwide installation of selective catalytic reduction (SCR). Thus, in the final analysis, these sources paid three times: once, for their emission credits; twice, for emission controls; thrice, for fines and other penalties.

Some might say this is merely a trading system operating as it should. But RECLAIM and other trading programs are not merely markets hanging in empty air. Their purpose is to save lives by reducing air pollution, and by this measure as well, RECLAIM is a failure.

Lost Reductions

Under earlier command-and-control programs in southern California, emissions of NO_x, which is the key cause of smog, had been cut dramatically. Under RECLAIM, however, the rapid pace of reductions slowed to a crawl. In the most recent three-year period for which data is available, 1999–2001, for example, annual average concentrations of NO_x dropped by only 3%, compared to a 13% decline in the preceding three-year period of 1996–1998. Indeed, in 1999, levels of NO_x actually increased, following a decade of consecutive reductions.⁵

Illusory Savings

Still, RECLAIM’s defenders maintain that trading saved money. But the record, not only in RECLAIM, but in the acid rain and leaded gasoline programs as well, makes it clear that what “saves” money is not trading, but level of the mandated reduction. To put it simply, it costs less to do less. In the case of RECLAIM, the “savings” in the early years of the program were due solely to the relaxation of the schedule that the previously adopted command-and-control rules required for the installation of modern emission controls. Thus it was not the use of a “market-based system” that reduced cost, but rather the sacrifice of emission reductions. Of course, one consequence of this relaxation was that people died who otherwise would have lived and children missed school who, but for RECLAIM, would have been in the classroom.

4. Gary Polakovic, *Innovative Smog Plan Makes Little Progress*, L.A. TIMES, Apr. 17, 2001.

5. SCAQMD, *supra* note 1.

Cheating

As in other trading programs, the public must rely on the integrity of the public and private employees charged with overseeing accounting to assure that the system is working. Whether there has been corruption or cheating in the RECLAIM program, it has certainly been alleged. According to the *Los Angeles Times*, InterGen Energy Inc., a Massachusetts-based power producer, says it paid Automated Credit Exchange \$4 million to purchase 237 pounds of emissions credits for a power plant proposed near Palm Springs. But the company alleges that the pollution trader failed to deliver the credits and broke an agreement to refund all of the money. InterGen filed a lawsuit against the trader in October 2002.⁶ This was two months after Automated Credit was cited by the SCAQMD for false reporting.⁷

The Missing Safety Net

Indeed, the experience with RECLAIM also illustrates better than either of the other two trading programs an often overlooked reality: trading leaves the public with little, if any, safety net. In the case of RECLAIM, electricity generators relied almost wholly on buying pollution credits, abandoning their plans to install pollution control equipment. When, because of manipulation of the market by electricity traders like Enron, these companies were forced to increase their output, air pollution soared. Had control systems been installed, there would have been increases in emissions, but only a small fraction of what actually occurred. Thus, another of the effects of trading is to shift the risk of unforeseen events from those who create the risks—polluters—to those whose only connection to the enhanced threat is that they breathe.

Increased Uncertainty

In addition, rather than lowering uncertainty and economic risks associated with environmental improvement programs, RECLAIM had precisely the opposite effect. Under RECLAIM there were big winners (those who had been allocated excess credits and sold them at astronomical prices in mid-2000 and late 2000) and big losers (those who “guessed wrong” about credit prices and were forced to pay more for credits than controls, and in some cases violated the RECLAIM rules, thus incurring penalties). The citizens in the South Coast Air Basin also suffered by enduring increased smog associated with higher emissions, and by paying somewhat more for electricity because power producers passed these costs along into California’s other experiment with “market” mechanisms (electricity deregulation).⁸

The only consistent winners in the RECLAIM system were the brokers who made money through the RECLAIM

6. Gary Polakovic, *Smog-Credit Trader Under Investigation*, L.A. TIMES, July 30, 2002.

7. Press Release, SCAQMD, AQMD Issues Violation for Alleged False Reports in Reclaim (Aug. 2, 2002).

8. Perversely, since the California electricity market price was set by the highest accepted bid of any producer, and this was at times a high-polluting plant in the SCAQMD that included excessive reclaim trading credit (RTC) costs in its bid, ratepayers statewide also were hurt economically by RECLAIM.

trades, and the owners of power plants and refineries that benefitted most from their initial allocations, and, in the case of power plants, had a mechanism to readily pass along increased credit costs.

Southern California is now attempting to place emission reduction programs back on a sound footing, but that may prove difficult even in a state that was among the first jurisdictions to recognize and combat the threat of air pollution.

The Origins and Evolution of California's Air Pollution Control Programs

The seriousness of local air pollution threats in southern California was first recognized in the early 1940s. In 1946, the Los Angeles County Board of Supervisors established the first local air pollution control district in the nation. Then in the mid-1950s, California established the first state agency to control motor vehicle emissions. Countywide or regional air pollution districts were required throughout the state by 1970. Many of the controls originated in California became the basis for the federal control program, which began in the 1960s.

In the 1970s, it became apparent at both the state and federal levels that local programs were not enough to solve a problem that was regional in nature and did not stay within jurisdictional boundaries. Instead, air basins, defined by geographical boundaries, became the basis for regulatory programs.

In 1976, the California legislature adopted the Lewis Air Quality Management Act which created the SCAQMD from a voluntary association of air pollution control districts in Los Angeles, Orange, Riverside, and San Bernardino counties. The new agency was charged with developing uniform plans and programs for the region to attain federal standards by the dates specified in federal law. The agency was also mandated to meet state standards by the earliest date achievable, using reasonably available control measures.

Nearly all control programs developed before 1989 relied on the development and application of cleaner technology and add-on emission control devices. These efforts had been effective in improving the basin's air quality. Ozone levels had declined by almost one-half over the previous 30 years, sulfur dioxide (SO₂) and lead standards had been met, and other criteria pollutant concentrations had significantly declined. However, the basin still violated health-based standards for ozone, nitrogen dioxide (NO₂), CO, and particulate matter with a diameter of 10 microns or less (PM₁₀). Further progress, officials concluded, required redoubled efforts, and with that in mind they began development of the 1989 Air Quality Management Plan (AQMP), described as "the most aggressive schedule for new rules seen in the history of air pollution control in southern California."

The 1989 AQMP used a three-tiered format, proposing a comprehensive set of control measures that included the use of less-polluting solvents and new, more efficient application methods in a variety of operations, as well as the use of alternative fuels. Most control measures were to be adopted within several years after adoption of the AQMP, while others required more time due to the need for advances or breakthroughs in technology. Implementation responsibilities were delineated between the SCAQMD, the California Air Resources Board (ARB), the U.S. Environmental Pro-

tection Agency (EPA), and local governments, depending on each agency's authority and type of control measure.

As the SCAQMD began implementing its aggressive new rules, polluting industries were galvanized to roll those rules back and rid themselves of the board members who had caused their adoption. One by one, the board's most outspoken and assertive members, those who would have been least likely to support trading, were forced off. In some cases, their political careers were ended by industry-financed campaigns. All of this set the stage for RECLAIM.⁹

The Advent of RECLAIM

By the beginning of the 1990s, economists and businesses had been pressing for relief from source-by-source permitting for nearly 20 years. To some extent, they succeeded over the years, as federal and state governments agreed to more flexible devices such as "bubbles" and "offsets." But with the enactment of the 1990 CAA Amendments, they achieved near total victory because the acid rain control program was predicated wholly on trading. Soon, trading became the vogue, and in the early 1990s proposals for what eventually became RECLAIM surfaced in southern California.

Hailed by the *Los Angeles Times* as "a revolutionary approach to combat smog,"¹⁰ the SCAQMD's RECLAIM program became the nation's first smog market, allowing industries to buy and sell pollution credits. Its adoption in October 1993 followed three years of acrimonious public debate that sharply divided even businesses. On one side, the region's largest industries—including oil and aerospace firms—strongly endorsed RECLAIM, while some smaller businesses contended that it would prove unworkable and financially risky for all but the biggest polluters. Environmental groups also attacked RECLAIM as a step backward in the region's fight against smog. The trading program would delay cleanup in its early years and could create "hot spots" of pollution around an industrial plant that chose to buy credits, they said.

Endorsements of RECLAIM came from the region's most influential industries and largest polluters, including Chevron, U.S.A., Inc., Hughes Aircraft Company, Rockwell International Corporation, Shell Oil Company, and Southern California Edison Company, as well as then-Gov. Pete Wilson (R), then-Los Angeles Mayor Richard Riordan (R), and EPA. In contrast, some companies—the most notable was the Southern California Gas Company, the nation's largest gas utility—and almost all environmental and health groups opposed RECLAIM.

RECLAIM imposed an annual limit on the amount of air pollution—SO₂ and NO_x—that each participating company could emit. Companies that reduced emissions more than required could sell reclaim trading credits (RTCs) to others companies that either could not or would not reduce emissions.

9. Clearly, RECLAIM was not adopted because earlier policies had failed, because if measured in terms of reductions in air pollution, pre-1994 air quality programs had been effective in improving the basin's air quality. For example, for the first time in 1992, the federal annual NO₂ standard was not violated in the basin. Similarly, measured by the number of control measures that had been adopted as rules and the resulting tons of pollutants targeted for reductions, pre-1994 programs had been a success.

10. Marla Cone, *AQMD Board Creates First U.S. "Smog Market,"* L.A. TIMES, Oct. 16, 1993.

“In setting up the only free market system for reducing smog,” wrote the *Los Angeles Times*, “the [SC]AQMD has created an alternative to its traditional yet cumbersome approach, which was to enact hundreds of constantly evolving rules for industry.”

Before embarking on the development of the RECLAIM program, the SCAQMD had adopted a wide range of rules and regulations, designed to impose some of the most stringent emission limits in the world. But for the three years that RECLAIM was under development, the region had made virtually no progress in cleaning up industrial air pollution because nearly all of its efforts were focused on developing the trading program. Dozens of planned rules were stalled awaiting the fate of RECLAIM, while enforcement of still others was effectively suspended.

The baseline—or starting pollution limit—for companies was based on recessionary years, when emissions were down, which meant that in at least some cases RECLAIM allowances would actually increase air pollution.¹¹

The 1994 Plan

The 1994 AQMP set RECLAIM into concrete. The rationale for RECLAIM was that it was “laborious and time-consuming” to impose incremental controls on “thousands of stationary sources.” Yet RECLAIM did not exempt the tens of thousands of small businesses from permitting. They continued to be subject to the old system. Instead, the SCAQMD culled out from case-by-case permitting the hundreds of largest and most sophisticated sources: RECLAIM covered only 431 sources, 390 for NO_x, and 41 for SO₂.¹²

11. The region’s 12 greatest sources of NO_x and their air pollution allocations for 1994, 2000, and 2003 in tons per year were:

	1994	2000	2003
Chevron, U.S.A.	2,822	1,038	752
California Portland Cement Company	2,210	543	393
Los Angeles Dep’t of Water and Power	1,901	326	236
ARCO	1,853	996	722
Mobil Oil	1,851	716	519
Southern California Edison	1,763	485	352
Union Oil Co.	1,518	530	384
Texaco Refining Inc.	1,499	478	346
Southern California Edison	1,270	376	273
Los Angeles Dep’t of Water and Power	820	147	106
Southern California Edison	742	185	134
Unocal Oil Co.	646	204	148

12. The 1994 AQMP explained the rationale for RECLAIM:

Rule development in the 1970s and 1980s resulted in dramatic improvement in Basin air quality. However, the effort to impose incremental rule changes on the thousands of stationary sources under District permits was laborious and time[-]consuming. The District concluded it was possible that the limits of the command-and-control regulatory process were being reached. The 1991 AQMP introduced the concept of a Marketable Permits Program and outlined the skeleton of an idea that was forerunner to what is now known as the Regional Clean Air Incentives Market (RECLAIM).

A historical milestone occurred with the adoption of RECLAIM on October 15, 1993. RECLAIM is an alternative means of achieving further emission reductions from stationary sources, different from the traditional source-specific regulatory program. RECLAIM calls for declining mass emissions limits on the total emissions from all sources within a facility. The facility can choose from a selection of methods for achieving the prescribed emission reductions: add-on controls, use of reformulated products, changes in production, purchase of excess emission reductions from

For these pollution sources, RECLAIM subsumed the technology-based and health-driven requirements that had been adopted pursuant to the 1989 and 1991 AQMPs. These measures were not described in the 1994 AQMP, but instead were listed in a footnote on page 1-11 as follows:

The following 1991 AQMP control measures were subsumed by RECLAIM: P-B-1, P-B-2, P-C-2, P-C-4, P-C-5, P-C-6, P-C-7, P-C-8, A-C-5, and A-F-01.

The significance of this list would likely be lost on the casual reader, but it is the heart of RECLAIM: namely, the rules requiring specific emission limits of identified sources had been abandoned. The rules subsumed included installation of best available control technology on miscellaneous sources as well as emission controls on:

- Catalytic cracking at oil refineries; and
- Afterburners, small boilers and process heaters, metal melting furnaces, curing and drying ovens, glass melting furnaces, and miscellaneous combustion sources—swimming pool heaters and residential and commercial water heaters.

Short-Term and Intermediate-Term Emission Reduction Measures for NO_x and SO₂

The 1994 AQMP included 61 stationary source, 16 on-road, 10 off-road, 11 transportation control and indirect source, 2 advanced transportation technology, and 4 further study measures. The adoption of RECLAIM, however, superseded many of the measures that had been adopted to reduce emissions of NO_x or SO₂ from stationary sources. Also included in the 1994 AQMP were a number of “potential substitute measures,” that could be implemented if there were a shortfall in emission reductions due to a failure of RECLAIM.¹³

Omitted from this list of backstop measures, however, was a catalogue of others, many extremely hard fought and very important in terms of reducing NO_x emissions.

other sources, and/or any other methods that would be enforceable and quantifiable. At the time of adoption, RECLAIM was estimated to affect approximately 390 and 41 of the largest emitters of oxides of nitrogen and oxides of sulfur in the Basin and is designed to reduce emissions of these pollutants by 80 and 14 tons/day, respectively, by July 1, 2004.

RECLAIM, VOLUME I: DEVELOPMENT REPORT AND PROPOSED RULES; SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (1993).

13. Those related to NO_x were as follows:

1994 AQMP Number	Control Measure Title
Potential Substitute Measures	
CMB-A	Emission Reductions From Miscellaneous Combustion Sources (NO _x)
CMB-B	Emission Reductions From Small Boilers and Process Heaters (NO _x)
CMB-C	Emission Reductions From Curing and Drying Ovens (NO _x)
CMB-D	Emission Reductions From Afterburners (NO _x)
CMB-E	Emission Reductions From Metal Melting Furnaces (NO _x)
CMB-F	Further Emission Reductions From Internal Combustion Engines (NO _x)

RECLAIM's Impact on Emissions

Under previous command-and-control programs, emission of NO_x and other pollutants in the basin had been cut dramatically. Under RECLAIM, however, the rapid pace of reductions slowed to a crawl.

A major reason that progress slowed so dramatically was that polluters bought emission credits rather than installing controls. This was especially true of power plants, which began buying RTCs, or pollution credits soon after RECLAIM's adoption. By the year 2000, power producers had purchased 67% of the RTCs for NO_x that expired on that year, even though they accounted for only about 14% of total allocations.¹⁴

Despite predictions by the supporters of RECLAIM that some polluters would rush to install controls in order to generate excess credits that could then be sold, that simply did not happen. By April 2000, roughly 20 months before full compliance was projected, the SCAQMD had received only "a trickle of applications from companies to upgrade pollution control capacity," according to the *Los Angeles Times*.¹⁵ In the year 2000, the SCAQMD reviewed the availability of cost effective technologies to reduce NO_x emissions, finding that many new controls could be deployed—but had not been—at an average cost of less than \$2 per pound.

The aggregate impact of the decisions made by polluters under RECLAIM can be seen in the measured concentrations of air pollution, which ought to be the true test of the program's success or failure. It was, after all, to be, first and foremost, a program to avoid needless death and injury by reducing emissions of air pollution. Its premise was that it would achieve the same benefits as the traditional command-and-control programs that had been successfully reducing air pollution in Los Angeles for over 20 years. It did not. For whether or not RECLAIM was a success by other measures, it failed with respect to reducing air pollution as projected. As the *Los Angeles Times* reported on April 17, 2001:

Manufacturers, power plants[,] and refineries have reduced emissions by a scant 16%—much less than was anticipated by this time. Businesses were given 10 years to eliminate about 13,000 tons of pollution annually, but as the program nears its end they have eliminated just 4,144 tons, according to projections by the [SCAQMD].¹⁶

So little progress had been made by 2001 that the SCAQMD was telling businesses to slash their air pollution at more than twice the rate they had over the previous seven years. Meanwhile, the agency estimated that industry would emit an extra 3,373 tons of pollutants into the air in 2001, which was 14% more than it was allowed under RECLAIM.

Chief among those rejecting the option of installing controls were electricity generators, which began shelving plans to install selective catalytic reduction or other technological means of reducing air pollution. The effect of trading versus command-and-control programs can be

seen clearly if actions in the SCAQMD, where the RECLAIM program was in effect, are compared to those in Ventura County, which continued to rely on command-and-control programs.

Emission Control Retrofits, South Coast Versus Ventura Air Pollution Control Districts (APCDs) (Plants Over 200 Megawatts)

APCD/Owner	Plant	Capacity (megawatts)	Control Date
<i>SCAQMD (trading programs)</i>			
AES	Huntington Beach (4 units)	880	March 2001
LADWP	Haynes (6 units)	1,606	June 2001
Reliant	Etiwondo (2 units)	640	June 2001
AES	Alamitos (4 units)	1,600	March 2001
El Segundo LLP	2 units	670	February 2001
AES	Redondo (2 units)	960	March 2001
LADWP	Scatterwood	460	June 2001
<i>Ventura (command-and-control programs)</i>			
Reliant	Mandalay	430	September 1991
Reliant	Ormond Beach	1,500	November 1994

These decisions undoubtedly resulted in one of the outcomes feared most by health and environmental groups: "hot spots" of pollution. One specific plant, the AES Alamitos Generating Station, and the experience of a particular utility, the Los Angeles Department of Water and Power, illustrate this.

AES' Alamitos Generating Station

Located on the eastern side of the city of Long Beach in the county of Los Angeles, this facility is one of the clearest illustrations of the way in which RECLAIM acted as a barrier to emissions reductions that otherwise would have occurred. In 2000, it consisted of two 480-megawatt (MW) boilers equipped with SCR systems that had been installed many years earlier when the facility was owned by Southern California Edison; two 320-MW and two 175-MW boilers that had not yet received SCR retrofits; and eight 16.6-MW gas turbines with little control. In the early 1990s, in accord with Rule 1135, the facility was scheduled for retrofit installation of SCR to reduce NO_x emissions.¹⁷ (Rule 1135 was the command-and-control regulation that mandated emission limits from power-generating facilities of 9 parts per million (ppm) of NO_x or less.)

Then, RECLAIM was adopted, subsuming Rule 1135. Work on SCR installations at Alamitos halted. Had Rule 1135 been left in place, all of the boilers would have been retrofitted or retired prior to the beginning of 2000. But SCR was not installed, and later AES had to increase electricity generation at Alamitos to meet increased demand (due to manipulation of electricity markets by Enron and other en-

14. REPORT ON POTENTIAL BACKSTOP MEASURES TO STABILIZE NO_x RECLAIM TRADING CREDITS PRICES, SCAQMD (2001), available at <http://www.aqmd.gov/hb/010123a.html>.

15. Polakovic, *supra* note 4.

16. *Id.*

17. SCAQMD, FINAL ENVIRONMENTAL IMPACT REPORT FOR: AES ALAMITOS, L.L.C.—SELECTIVE CATALYTIC REDUCTION (SCR) INSTALLATION AT ALAMITOS GENERATING STATION (UNITS 1, 2, 3, AND 4) (2001).

ergy traders as part of California's other failed experiment with trading). Alamitos exceeded its year 2000 NO_x emissions allocation by 685,000 pounds in the third quarter, which one official called "one of the most egregious air pollution violations in this agency's history."¹⁸

Sued by the SCAQMD, AES was forced to do the following:

- Pay a total cash penalty of \$17 million to the SCAQMD, with \$13 million due within 30 days and the remaining \$4 million due by July 1, 2001;
- Install state-of-the-art air pollution controls on its power plants at Alamitos, as well as those in Redondo Beach and Huntington Beach;
- Operate its three power plants on the principle of "environmental dispatch" until all air pollution control equipment is installed, using the cleanest units first and the dirtiest last to meet power demand;
- Deduct from its future year allocations its year 2000 excess emissions; and
- Purchase emission credits as needed to make up for its year 2000 excess emissions.¹⁹

While the coffers of the SCAQMD were enriched by the fines, this was undoubtedly of little solace to those downwind of Alamitos, who were forced to breathe pollution that, but for RECLAIM, would never have been emitted.

Comparable experience with the nation's largest municipal electric utility, the Los Angeles Department of Water and Power (LADWP), further illustrates the shortcomings of the RECLAIM program.

The LADWP

Like AES and other power generators subject to RECLAIM, the LADWP chose to purchase credits rather than install emission controls. As with AES, when out-of-state generators drove up electricity costs in the year 2000, the LADWP was forced to boost power generation, rapidly depleting the utility's NO_x credits. Faced with a lawsuit, the LADWP negotiated a settlement allowing it to operate beyond its RECLAIM emission limit, but also requiring it to do the following:

- Meet a NO_x emission limit of 7 ppm at Haynes unit 6;
- Install SCR (or meet similarly stringent emission limits) on Valley units 1–3, Haynes units 3 and 4, Scattergood units 1 and 3, and Harbor units 6 and 7, if deemed cost effective; and
- Provide a minimum of \$14 million to be used for supplemental environmental projects to benefit the residents of the basin.²⁰

This agreement was functionally equivalent to imposition of the command-and-control requirements that had pre-

vailed before RECLAIM. In response to these requirements, the LADWP did not choose to install SCR across the board, but instead opted to replace two 222-MW steam boilers with a single combined cycle system, which would not only reduce NO_x emissions, but increase generating efficiency, thus lowering output of other pollutants as well. In short, the response of the LADWP to a command-and-control requirement was to install innovative new generating technology, while the response to RECLAIM trading had been to buy credits.²¹

RECLAIM's Impact on Innovation

There could be few better jurisdictions to examine the impact of a trading program on the development and deployment of innovation technologies. Starting in 1989, the SCAQMD spent roughly \$11 million per year to identify, develop, and commercialize new fuels and technologies for reducing air pollution. While most efforts focused on automobiles, trucks, and other mobile sources, there was spillover, e.g., in development of fuel cells, whether for stationary or mobile applications. In short, if there is any area in the world where the evidence proving the ability of trading to stimulate new technologies, it would be in the basin.

There can be few better specific illustrations of the suffocating impact of RECLAIM on technology innovation than the 10-year struggle, in vain, to deploy SCONO_xTM.

SCONO_xTM is a method of reducing emissions of NO_x that enjoys several inherent advantages over the most widely used technology, SCR.²²

These include the following:

- SCONO_xTM simultaneously removes CO, VOCs, and NO_x, while SCR destroys only the latter.
- SCONO_xTM can reduce NO_x concentrations to 1 ppm, which has not been demonstrated with SCR;
- SCR requires use of ammonia, a toxic air pollutant, while SCONO_xTM does not; and
- SCR catalysts are considered hazardous wastes at the end of their useful lives, while SCONO_xTM is not.²³

Despite these multiple advantages, and notwithstanding its successful demonstration at facilities in Redding, San Diego, and Vernon, California, as well as Andover, Massachusetts, SCONO_xTM has been unable to penetrate the retrofit market for one simple reason: it costs more than SCR.²⁴

Had SCONO_xTM been competing for installations at new facilities rather than old ones, in all likelihood, it would have penetrated the market. Federal and California law alike pre-

18. *California's Power Crisis Triggers \$17m NO_x Fine*, ENVTL. FIN., at <http://www.environmental-finance.com/2000/newsdec2.htm>.

19. Press Release, SCAQMD, AQMD Reaches Landmark Settlement for One of Regions Largest Air Quality Violations (Dec. 13, 2000).

20. Statement of Dr. Alan C. Lloyd, Subcommittee on Energy and Air Quality, Committee on Energy and Commerce, U.S. House of Representatives, Hearing on Electricity Markets: California (Mar. 22, 2001).

21. LADWP, HAYNES GENERATING STATION REPOWERING PROJECT DRAFT ENVIRONMENTAL IMPACT REPORT (2002).

22. Ironically, SCR is itself an example of a superior technology developed in the United States, but sold to foreign firms because of the lack of a domestic market. The SCR catalyst was developed by Corning, Inc. an upstate New York firm, which had no choice but to sell its patents to Mitsubishi because it could find no U.S. customers. Mitsubishi has since sold hundreds of SCR systems throughout the world, including the United States. See CURTIS A. MOORE & ALAN S. MILLER, GREEN GOLD: JAPAN, GERMANY, THE UNITED STATES, AND THE RACE FOR ENVIRONMENTAL TECHNOLOGY 146 (1994).

23. BORIS E. REYES, NO_x ABATEMENT TECHNOLOGY FOR STATIONARY GAS TURBINE POWER PLANTS—AN OVERVIEW OF SELECTIVE CATALYTIC REDUCTION (SCR) AND CATALYTIC ABSORPTION EMISSION CONTROL SYSTEMS (2002).

24. *Id.*

clude taking the cost of a pollution control technology into account for facilities in nonattainment areas such as Los Angeles. The law requires adoption of the lowest achievable emission rate (LAER), defined as the most stringent emissions limitation which is contained in the implementation plan of any state for such class or category of source, without regard to cost.

Thus, the basin, with the nation's worst air pollution, was the ideal market for SCONO_xTM, except that new power plants were not being built. Instead, generators were continuing to operate plants that were decades old. To reduce this pollution, regulators relied on the source-specific rules described earlier. With their abandonment, the opportunity for SCONO_xTM to penetrate the market effectively disappeared.

Another promising technology is a range of ultra low NO_x burners made by Alzeta for use in commercial and industrial applications. Alzeta's technology development programs have been funded by the Southern California Gas Company, the SCAQMD, the U.S. Department of Energy, and the California Energy Commission. Alzeta's burners meet NO_x requirements of 9 ppm and lower.²⁵

Although Alzeta's burners have been commercially available since the early 1990s, few, if any, were installed for purposes of generating RECLAIM credits from 1994–1999. Since 1999, however, and especially due to the designation of Alzeta emission levels of 9 ppm as best available control technology by the SCAQMD, the firm has installed nearly 100 burners in the basin.²⁶

RECLAIM's Impact on Control Costs

From the perspective of polluters, RECLAIM was an unalloyed success from its effective date of January 1, 1994 to the year 2000. The market price of trading credits, or RTCs, remained low, and firms expended relatively little on emissions controls. This was largely because many sources were allocated far more RTCs than their recent emissions, and, as a result, were able to delay the installation of feasible, cost effective controls.

Starting in the year 2000, however, it was time to pay the piper. For six years, credit allocations had declined, but not been consumed, though the "crossover" date was approaching, and everybody in the system knew it. Under the theory of RECLAIM, "the market" would anticipate the point at which adequate credits would no longer be available, and invest in pollution control systems. Indeed, according to this reasoning, some facilities would opt for innovative, advanced control technologies that overcontrolled, thus generating valuable credits that could be sold. In reality, as discussed earlier, almost none of the sources installed emission controls, and matters did not improve in 2001 either.

Emissions began to greatly exceed the number of available credits, and prices jumped accordingly. A credit that carried the right to emit one pound of NO_x went for as little as \$.13 in 1999. By January 2000, the price was up to \$1.14, and in July 2000, the same credit sold for \$37. By September

2001, prices settled somewhat, falling to about \$13 per pound—100 times what they had been earlier.²⁷

Some of these dramatic price increases could be attributed to the sudden and unexpected electricity crisis in the state, because power-generating facilities had chosen to buy credits rather than install control technologies. Then, when the companies decided to power up their in-state turbines and boilers because of a heat wave, combined with increases in the price of out-of-state electricity, credits were either completely unavailable, or only at an astronomical sum.²⁸ The response is that had controls been installed, pollution levels would have been lower, hence credits cheaper.

Some proponents of RECLAIM continue to defend it. Robert Wyman, an attorney for the Regulatory Flexibility Group, a business organization that led the push to establish RECLAIM, claimed that trading has saved businesses like Anheuser-Busch Inc., Disneyland, Hughes Aircraft, and TRW Inc. about \$400 million in compliance costs. RECLAIM, he told the *Los Angeles Times*, "is experiencing stress, but on the whole this program has been a resounding success."²⁹

Wyman's assessment is belied by the facts, however. Consider the following:

- RECLAIM did not provide the emission reduction promised in the year 2000, and led to a slower pace of progress in reducing emissions in the period from 1995-1999. As it is currently structured, RECLAIM allows more emissions beyond 2003 than would be required if a more traditional control approach were in place.
- Many firms in RECLAIM were forced to spend more for emission reduction credits than they would have spent on emission controls, thus increasing these firms' net costs for environmental compliance, without a concurrent reduction in emission.
- The flaws in the RECLAIM program interacted with the flaws in California's restructured electricity market in a way that further inflated the cost of electricity in California.

The net result was that RECLAIM failed to provide the emission reductions promised in the year 2000, while concurrently forcing firms to expend on the order of \$177 million³⁰ on RTCs, which was several times the cost of installing control equipment to obtain equivalent reductions.

Cheating, Corruption, and Noncompliance

Rules, regulations, taxes, and the wide variety of other ways of compelling reductions in air pollution are transparent—the public can examine a permit, or find the level of a tax, or request a copy of a regulation. No so with trades. In some programs, such as leaded gasoline, they're secret, off limits to the public. In others, such as the acid rain program, the trades are public information, but the process is extraordinarily complex and time-consuming. Thus, effectively,

25. CALIFORNIA ENERGY COMMISSION, *LOW NO_x GAS TURBINE COMBUSTORS FOR DISTRIBUTED POWER GENERATION* (2000); R.F. MacDonald, *Hi-Country Foods*, at <http://www.rfmacdonald.com/customers/hicountry.html>.

26. Personal Communication, Luis Morales, Alzeta Corporation (Aug. 7, 2002).

27. Polakovic, *supra* note 4.

28. *Id.*

29. *Id.*

30. SCAQMD, *White Paper on Stabilization of NO_x RTC Prices* 8 (Jan. 2001).

the acid rain program may be transparent, but it is barely so. Consequently, although it is the public that is supposedly being protected and governmental power that is being exercised, the integrity of a trading program depends on the honesty of traders and the competence of bureaucrats. In the case of RECLAIM, there clearly are troubles. “The Los Angeles region’s beleaguered smog-credit trading program is under a legal cloud,” reported the *Los Angeles Times* on July 30, 2002.

The *Los Angeles Times* article focused on a single incident, complaints by several businesses that a Pasadena broker cheated them.

District records indicated that the firm under investigation, Automated Credit Exchange (ACE), handled about 8% of the pollution-credit exchanges in RECLAIM in 2001. The trader under investigation, Anne Sholtz, is a former California Institute of Technology economist described by the *Los Angeles Times* as “an architect of the RECLAIM program.”

Evidence that there may be a pattern of abuse is provided by the fact that two California-based advocacy organizations have successfully filed suits against Southern California Gas, United Air Lines, Inc., and a number of other large polluters for violations of RECLAIM. The lawsuits, which were filed by Our Children’s Earth and Communities for a Better Environment under the CAA, charged that the companies had failed to purchase sufficient pollution credits, thus higher emissions and more pollution than allowed by federal law. Other defendants in the suits included Crimson Resource Management Corporation, Fontana Paper Mills Inc., National Gypsum Company, Van Can Company, and Western Metal Decorating. The companies settled the litigation, agreeing to either reduce emissions directly or purchase RECLAIM credits.³¹

Whether RECLAIM has failed to reduce emissions adequately because of violations by companies or fraud by traders is, in one sense, irrelevant. Even if the allegations prove false, the message is that trading is a total commitment to the market system, with all that entails. Committing to the “market” means embracing sharp dealing amongst competitors, skirting the edges of illegality, deceptive business practices, and all of the other abuses inherent in it, whether the trading is for air pollution, electricity, or stock in companies like Enron and Global Crossing. The trader accused in this case, ACE, asserts that the complaints are actually nothing more than an attempt by a rival company, Coral Energy, to put it out of business. Accepting trading as a means of emis-

sions control is accepting the reality that firms will engage in exactly that kind of conduct, whether or not it, in fact, happened in the instance of ACE.³²

Is there, in fact, corruption in the RECLAIM program? Is RECLAIM being competently managed? Are air pollution levels actually declining? The answers given by public officials to those questions should reassure the public: “This is simply a matter of an allegation of potential fraud between parties trading credits,” said SCAQMD Executive Officer Barry Wallerstein. “Whatever may have gone on here does not affect air quality. *We are the keeper of the records, [and] we know precisely how many credits there are*, and there are only the amount of credits prescribed under the RECLAIM rules,” Wallerstein added (emphasis added). That is precisely the point: a government agency knows, the traders know, and those buying and selling the credits know, but the public does not. It must, instead, trust all those people, blindly.

Conclusion

The basic argument for cap-and-trade programs is that they harness the power and flexibility of the marketplace to achieve environmental results “better, faster, cheaper.” The experience in southern California with RECLAIM clearly shows that these promises are by no means certain. In fact, the opposite has occurred. As part of RECLAIM’s design, progress in reducing emissions was deliberately slowed between 1994-1999. In the year 2000, when progress was finally going to resume, the program failed to meet its emissions goals and significantly increased pollution-related costs for many sources as well as for the state’s electricity markets.

While some have claimed that RECLAIM’s failure was due to the unique circumstances surrounding the electricity crisis in California, which also resulted from a state experiment with utilizing the market for trading, there is little, if any, evidence to support these assertions. There is, however, ample evidence for the opposite proposition: namely, that the failure of RECLAIM was due to failings of this particular program and inherent flaws in trading generally.

On May 11, 2001, the SCAQMD effectively conceded that RECLAIM was a failure, at least with respect to power plants, by adopting new Rule 2009. This rule withdraws electric-generating facilities from the trading program, returning them to command-and-control regulation.³³ Each generating facility is required to meet a NO_x emission rate

31. Press Release, Our Children’s Earth, “Environmentalists Settle Seven Federal Lawsuits Over Embattled Pollution Trading Credits; Companies to Reduce Over 200,000 Pounds of Smog-Forming Pollution” (Aug. 14, 2002), available at <http://www.ocefoundation.org/press-081402.htm>.

32. One of the lawyers representing ACE’s interests, Bob Wyman—the same attorney who lobbied for creation of RECLAIM on behalf of his industrial clients and who now insists that it is a “resounding success”—said the dispute is a misunderstanding over dates when credits transferred. According to the *Los Angeles Times*, Wyman said in October 2000 in correspondence to the SCAQMD that the “allegation is false” and the mistake was “completely inadvertent.” In response, the SCAQMD levied a fine of \$1,000.

33. The text of Rule 2009 follows:

RULE 2009. COMPLIANCE PLAN FOR POWER PRODUCING FACILITIES

(a) Purpose

The purpose of this rule is to specify the compliance plan requirements for Power Producing facilities, as defined in Rule 2000 (b)(56), and to ensure timely installation of BARCT at all electric generation units.

(b) Compliance Plan for Power Producing Facilities

- (1) No later than September 1, 2001, the Facility Permit holder of a Power Producing Facility shall submit to the Executive Officer a compliance plan meeting all the requirements specified in this rule.

equal to or better than that available with the best available retrofit control technology “at the earliest feasible date,” but no later than January 1, 2004, for turbines used as peaking units, and January 1, 2003, for all other units. As a practical matter, the new rule requires SCR or its emission equivalent, on all generating units.

The damage done by RECLAIM will not be repaired easily or quickly. Innovative technologies such as SCONOXTM

that could have been deployed will not be, with the result that environmentally inferior solutions will be in place for their lifetimes, which is likely to be at least 20 years. Moreover, because some of these systems would certainly have improved and their costs lessened with the experience gained from installing and operating them in the basin, an invaluable opportunity to advance technologies that are genuinely “better, faster, cheaper” has been lost.

-
- (2) The compliance plan shall demonstrate that all RECLAIM NO_x emitting equipment, except equipment subject to Rule 219—Equipment Not Requiring a Written Permit Pursuant to Regulation II, at the Power Producing Facility shall achieve, at a minimum, BARCT emission levels for NO_x at the earliest feasible date but no later than January 1, 2004 for turbines used as peaking units, and January 1, 2003 for all other units.
- (3) The compliance plan shall include the following information:
- (A) A list and description of all RECLAIM NO_x emitting equipment pursuant to paragraph (b)(2), existing control equipment, and the associated emission rates expressed in parts per million (ppm) and pounds per net megawatt hour of electric generation.
- (B) For existing equipment and NO_x control technologies that have already achieved BARCT where the facility permit does not specify BARCT limit(s) for NO_x, the compliance plan shall include a schedule to modify the permit to include the BARCT limit(s) to ensure compliance with paragraph (b)(2) of this rule.
- (C) Description of additional NO_x control technology to be installed at each RECLAIM NO_x emitting equipment, except equipment subject to Rule 219, to satisfy the requirements in paragraph (b)(2) of this rule and the associated NO_x emission rate expressed in parts per million (ppm) and pounds per net megawatt hour of electric generation.
- (D) Source test data or continuous emission monitoring data supporting the emission rate specified for equipment described in subparagraph (b)(3)(A), except for NO_x process unit(s) that have not opted for a concentration limit pursuant to Rule 2012—Requirements for Monitoring, Reporting, and Recordkeeping for Oxides of Nitrogen (NO_x) Emissions, subparagraph (e)(2)(C). Source test data or continuous monitoring data shall be obtained using the applicable protocols specified in Rule 2012.
- (E) Manufacturing guarantee or other documents provided by the equipment manufacturer to support the emission rate for equipment described in subparagraph (b)(3)(B).
- (F) Schedule showing dates of submittal of permit applications, installation of NO_x control equipment, operation of NO_x control equipment, and any necessary outages to install and operate air pollution control equipment for NO_x control technologies specified in subparagraph (b)(3)(B). The Facility Permit holder shall consult with California Independent Operator (Cal-ISO) or its successor and the California Energy Commission (CEC) prior to submitting the proposed schedule for outages.
- (G) A method of operating NO_x emitting electric generating equipment at all power producing facilities under common ownership, in aggregate exceeding 250 megawatt generating capacity and located within the South Coast Air Basin. The method of operation shall meet the criteria for operating the lowest NO_x-emitting units to the maximum extent feasible taking into account spinning and non-spinning reserve, any regulation for the purpose of maintaining voltage support and frequency control, minimum equipment operation levels, scheduled outages, forced outages, any “required must run” requirements, any operation ordered by the California Independent System Operator or the California Department of Water Resources; and any specific unit generation contracts executed prior to May 11, 2001, in accordance with the following priority:
- Priority I: Operate units with less than 0.11 pound of NO_x per net megawatt hour of electric generation.
- Priority II: Operate units with less than or equal to 0.50 pound of NO_x per net megawatt hour of electric generation.
- Priority III: Operate units with greater than 0.50 pound of NO_x per net megawatt hour of electric generation.
- Priority IV: Operate units not equipped with any NO_x control equipment.
- The Facility Permit holder shall specify in the compliance plan how units will be selected for operation and how records will be kept and made available to the Executive Officer upon request to verify daily compliance with this subparagraph.
- (H) Information necessary to demonstrate that NO_x RTCs acquired meet the requirements specified in Rule 2007—Trading Requirements, paragraphs (c)(4), (c)(5), and (c)(6). The information submitted shall, at the minimum, include:
- (i) NO_x RTCs held by the Facility Permit holder at the time of compliance plan submittal;
- (ii) NO_x RTCs acquired by the Facility Permit holder prior to January 12, 2001; and
- (iii) An itemized list of NO_x RTCs acquired or sold on and after January 12, 2001, including the date of acquisition or sales and the seller(s) or buyer(s) of RTCs.
- (4) Applicable orders for abatement or settlement agreements may demonstrate partial or full compliance with the requirements of paragraphs (b)(2), (b)(3), and (b)(4) of this rule.
- The Facility Permit holder shall submit information specified below with the compliance plan for informational purposes to demonstrate compliance with the methods of deploying electric generating units and the Facility Permit holder’s plan for complying with NO_x allocations on a quarterly basis, pursuant to Rule 2004—Requirements, for compliance years beginning 2001 through 2005. Information provided shall be based on the Facility Permit holder’s best available information at the time of compliance plan submittal and shall be updated annually, beginning May 31, 2002 and November 30, 2002 for Cycle 2 and 1 facilities, respectively, and every year thereafter through 2004 to reflect the Facility Permit holder’s best available information at that time.
- (A) Projected annual NO_x emissions from each electric generation unit for compliance year 2001 through 2005. The projection shall be based on emission rate for each piece of equipment and shall be consistent with information provided in subparagraph (b)(3)(A) and (B).
- (B) Anticipated NO_x emission reductions to be obtained under the Mitigation Fee Program or approved Mobile Source Emission Reduction Credits (MSERCs) or Area Source Credits (ASCs) for each compliance year.

Appendix A: History of Air Pollution Control in Southern California

The seriousness of local air pollution threats in southern California was first recognized in the early 1940s. In 1946, the Los Angeles County Board of Supervisors established the first local air pollution control district in the nation. In the mid-1950s, California established the first state agency to control motor vehicle emissions. Countywide or regional air pollution districts were required throughout the state by 1970. Many of the controls originated in California became the basis for the federal control program, which began in the 1960s.

In the 1970s, it became apparent at both the state and federal levels that local programs were not enough to solve a problem that was regional in nature and did not stay within jurisdictional boundaries. Instead, air basins, defined by geographical boundaries, became the basis for regulatory programs.

In 1976, the California Legislature adopted the Lewis Air Quality Management Act which created the SCAQMD from a voluntary association of air pollution control districts in Los Angeles, Orange, Riverside, and San Bernardino counties. The new agency was charged with developing uniform plans and programs for the region to attain federal standards by the dates specified in federal law. The agency was also mandated to meet state standards

by the earliest date achievable, using reasonably available control measures.

Nearly all control programs developed before 1989 relied on the development and application of cleaner technology and add-on emission control devices. These efforts had been effective in improving the basin's air quality. Ozone levels had declined by almost one-half over the previous 30 years, SO₂ and lead standards had been met, and other criteria pollutant concentrations had significantly declined. However, the basin still experienced exceedances of health-based standards for ozone, NO₂, CO, and PM₁₀.

It became apparent in the early to mid-1980s that achieving and maintaining state and federal air quality standards required a new long-range strategy, focused on spurring the development of new fuels and technologies. Add-on controls were no longer adequate. This concept of "technology forcing" was incorporated in the 1989 AQMP, adopted on March 17 at a joint meeting of the Governing Board of the SCAQMD and the Executive Committee of Southern California Association of Governments (SCAG). Five months later, the ARB approved the plan.

The 1989 and 1991 Plans

Culminating five years of work, the 1989 plan laid out, in its own words: "The most aggressive schedule for new rules seen in the history of air pollution control in [s]outhern California."

- (5) Compliance plans approved by the Executive Officer shall be enforceable and shall contain terms and conditions specifying NO_x BARCT levels, implementation schedule, including permit application, equipment installation and operation dates for achieving enforceable NO_x BARCT emission levels, and methods for deploying electric generation units.

(c) Denial of Compliance Plan

The Executive Officer shall not approve the compliance plan unless it can demonstrate compliance with this rule. If the Executive Officer denies a compliance plan, the Facility Permit holder shall, within 30 days, submit to the Executive Officer a revised compliance plan addressing all deficiencies identified by the Executive Officer. Failure to submit an approvable plan by the date specified shall be a violation of this rule.

(d) Modification of Compliance Plan

A Facility Permit holder may submit an application at least 60 days prior to scheduled permit application submittal date to modify the terms and conditions in an approved compliance plan to replace the control technologies listed in the plan at the same or earlier implementation schedule with one or more alternative equipment, process, or NO_x control technology capable of achieving, at a minimum, an equivalent BARCT level. A modified compliance plan must meet all applicable requirements of this rule. The Facility Permit holder shall be subject to the terms and conditions of the existing compliance plan until the modified plan is approved by the Executive Officer.

(e) Mitigation Fee Program

In addition to the requirements specified in Rule 2004(o)(1), the mitigation fee program may be used through the 2004 compliance year only by Power Producing Facilities that exceed their annual allocations provided the facility also has complied with the schedule and actions specified under an approved compliance plan pursuant to this rule.

(f) Violations

- (1) Failure to submit the compliance plan on or before September 1, 2001, to submit a revised compliance plan within 30 days of receiving a denial, or to submit an annual update of information specified in paragraph (b)(4) of this rule at least 30 days prior to the beginning of each compliance year will be a violation of this rule and shall constitute a single, separate violation of this rule for each day until such time as an approvable plan is submitted.
- (2) Failure to comply with the dates set forth in the compliance plan for submission of permit applications, installation of control equipment, operation of control equipment or the purchase of credits will be a violation of this rule, commencing when the stated date is missed and shall constitute a single separate violation of this rule for each day until such time as compliance is achieved.
- (3) Failure to comply with emission limits specified in the approved compliance plan shall constitute a single separate violation of this rule for each day until such time as compliance is achieved.

(g) Fees

The compliance plan shall be assessed a fee in accordance with Rule 306—Plan Fees. For the purposes of this rule, the annual updates to compliance plans submitted pursuant to paragraph (b)(4) of this rule will be assessed a fee in accordance with Rule 306.

(h) Rule 221—Plans

Compliance plan required under this rule will not be considered a plan pursuant to Rule 221—Plans.

(i) Appeals

A Facility Permit holder has the right to appeal the denial of the compliance plan to the Hearing Board in the same manner as a permit denial as specified in Health and Safety Code Section 42302.

The 1989 AQMP used a three-tiered format, proposing a comprehensive set of control measures that included the use of less-polluting solvents and new, more efficient application methods in a variety of operations, as well as the use of alternative fuels. Most control measures were to be incorporated within several years after adoption of the plan, while others required more time due to the need for advances or breakthroughs in technology. Implementation responsibilities were delineated between the SCAQMD, the ARB, EPA, and local governments, depending on each agency's authority and type of control measure.

At the same time that this effort was underway in the basin, the California Legislature passed the California Clean Air Act (CCAA). The CCAA required all nonattainment air basins in the state to develop new attainment plans to meet federal and the more stringent state air quality standards alike. In addition, the CCAA placed a number of performance tests before each AQMP. The deadline for the adoption of a CCAA plan for southern California was July 1, 1991.

In tandem, both the ARB and the SCAQMD were also adopting the first wave of new regulations called for under the 1989 AQMP. The 1991 plan was built on the 1989 plan, and it was designed to achieve all state and federal requirements.

Air Quality Trends

By 1991, southern California had built a clear record of success. Between 1975–1977 and 1988–1990 exceedances of the standards for lead had been completely eliminated. Despite a population increase of 81% between 1960–1990, and associated increases in industrial activity and vehicle miles traveled, air pollution concentrations had been significantly reduced. Improvements included the following:

- A 21% reduction in the number of days that ozone exceeded the standard;
- A 61% reduction for CO; and
- A 89% reduction for NO₂.

The SO₂ standard was met throughout the period.

Nonetheless, in 1989 and 1990 measured concentrations of some pollutants were still well above standards set to protect public health. Consider the following:

- In 1989, one or more of the federal standards were exceeded on 219 days in the basin;
- The federal ozone standard was exceeded more than three times as often in the basin as in any other area of the United States;
- The basin was the only area in the country to exceed the federal NO₂ standard;
- It exceeded the CO standard most frequently as well, with two and one-half times as many exceedances as the next worst area of the nation; and
- The highest annual average PM₁₀ concentration in the United States was also recorded in the basin, and was 1.2 times as high as the next highest in the United States.

The key to continued progress was clearly to build on the 1989 plan, which was precisely what the 1991 plan did. It proposed to implement the following control concepts:

- Extensive use of clean fuels;
- Rapid introduction of clean vehicles;
- Conservation of natural gas and electricity;
- Reduction of emissions from all sources; and
- Reduction of vehicle miles traveled and trips taken.

“Tiers” of Pollution Controls

Following the structure of the 1989 plan, the 1991 plan contemplated three tiers of control measures.

Tier I represented known technology, and included control measures, 54 of which were new. All Tier I measures were scheduled for adoption by 1996.³⁴

34.

District—Tier I Control Measures

AQMP Measure No.	Title
P-B-1	Control of Emissions From Petroleum Refinery Fluid Catalytic Cracking (FCC) Units (SO _x)
P-B-2	Control of Emissions From Petroleum Refinery Fluid Catalytic Cracking (FCC) Units (NO _x)
P-B-6	Control of Emissions From Petroleum Refinery Flares (All Pollutants)
P-C-2	Control of Emissions From Afterburners (NO _x)
P-C-4	Control of Emissions From Small Boilers and Process Heaters (NO _x)
P-C-5	Control of Emissions From Metal Melting Furnaces (NO _x)
P-C-6	Control of Emissions From Curling and Drying Ovens (NO _x)
P-C-7	Further Control of Emissions From Glass Melting Furnaces (NO _x)
A-C-5	Control of Emissions From Miscellaneous Combustion Sources (NO _x)
A-C-6	Further Control of Emissions From Internal Combustion Engines (NO _x)
A-D-2	Control of Emissions From Swimming Pool Water Heating (NO _x)
A-D-3	Control of Emissions From Residential & Commercial Water Heating (NO _x)
A-F-1	Installation of Best Available Retrofit Control Technology on Miscellaneous Sources (All Pollutants)
M-G-1	Zero-Emission Urban Bus Implementation (All Pollutants)
M-G-2	Low Emission Retrofit of Transit Buses (NO _x , SO _x , PM ₁₀)
M-I-7	Eliminate Leaf Blowers (All Pollutants)
E-D-1b	Residential Sector—Natural Gas Savings (All Pollutants)
E-C-1a	Commercial Sector—Electricity Savings (NO _x)
E-C-1b	Commercial Sector—Natural Gas Savings (All Pollutants)
E-C-2a	Industrial Sector—Electricity Savings (NO _x)
E-C-2b	Industrial Sector—Natural Gas Savings (All Pollutants)
E-C-2c	Industrial Sector—Glass Recycling (NO _x)
E-C-2d	Industrial Sector—Paper Recycling (NO _x)
E-C-3	Local Government Sector—Electricity and Natural Gas Savings (All Pollutants)

35.

Tier II measures represented “significant advancements” in technology.³⁵

Tier III called for “the development of new technology.”

Stationary Point Source Control Strategy

There are about 50,000 stationary point sources located within the basin. (Point sources are defined as emissions at a

facility with an identified location, such as power plants and refinery boilers.) Emissions from these sources were to be reduced by application of control measures in Tier I, control targets in Tier II, and control goals in Tier III. On a composite pollutant basis, Tier I measures were expected to achieve reductions of 31%, Tier II of 17%, and Tier III of 13% of the baseline emissions.

SCAQMD Control Measures Ranked According to Adoption Priority

Priority	Control Measure No.	AQMP Title
6	M-I-5	Limit Sulfur Content of Marine Fuel Oils (SO _x)
7	M-I-8	Emission Standards for Construction and Farm Equipment (175 Hp and less) (ROG, NO _x , PM ₁₀)
13	A-F-1	Installation of BARCT on Miscellaneous Sources (All Pollutants)
14	P-C-8	Further Emission Reductions From Cement Kilns (NO _x)
17	M-I-4	Control of Emissions From Marine Diesel Operations (NO _x)
21	E-D-1b	Residential Sector—Natural Gas Savings (All Pollutants) ¹
22	A-C-5	Control of Emissions From Miscellaneous Combustion Sources (NO _x) ¹
24	M-I-7	Eliminate Leaf Blowers (ROG, NO _x , CO, PM ₁₀)
29	E-C-1a	Commercial Sector—Electricity Savings (NO _x) ^{1,3}
31	M-I-1	Control of Emissions From Ship Berthing Facilities (NO _x)
39	E-D-1a	Residential Sector—Electricity (NO _x) ^{1,3}
41	P-B-2	Control of Emissions From Petroleum FCC Units (NO _x) ¹
42	P-C-7	Further Emission Reductions From Glass Melting Furnaces (NO _x)
45	P-C-8	Control of Emissions From Curing and Drying Ovens (NO _x)
48	P-C-5	Control of Emissions From Metal Melting Furnaces (NO _x)
49	E-C-1b	Commercial Sector—Natural Gas Savings (All Pollutants) ¹
53	E-C-2a	Industrial Sector—Electricity Savings (NO _x) ^{1,2}
57	P-B-6	Control of Emissions From Petroleum Refinery Flares (All Pollutants) NO _x
59	P-F-2	Emission Minimization Management Plan (All Pollutants) ^{1,2}
60	E-C-2b	Industrial Sector—Natural Gas Savings (All Pollutants) ^{1,2}
61	E-C-3	Local Government Conservation (All Pollutants) ^{1,2}
62	A-C-6	Further Control of Emissions From Internal Combustion Engines (NO _x) ^{1,2}

Control Measures on SCAQMD Rulemaking 1991 Calendar Under the 1989 AQMP

Control Measure No.	AQMP Title
A-D-3	Control of Emissions From Residential and Commercial Water Heating (NO _x)
P-B-1	Control of Emissions From Petroleum Refinery Fluid Catalytic Cracking (FCC) Units (NO _x)
P-C-4	Control of Emissions From Small Boilers and Process Heaters (NO _x)

Technology Advancement Projects

Subject	Agency	Expected Duration
Alternative Fuels in Refinery Heaters	District	1989–1995
Fuel Cells (>100MW)	District	1989–2000
Low-NO _x Combustion for Residential, Commercial, and Industrial Applications	District	1990–1997

Demonstration Projects

Project	Responsible Agency	Date
Alternative Fuels in Refinery Heaters	District	1990–1995
Fuel Cells (11MW)	District	1990–2000
Low-NO _x Combustion for Residential, Commercial, and Industrial Applications	District	1990–1997

36.

¹Cost-effectiveness based on average for type of source and pollutant.
²Emission reductions based on conservative estimate.
³Emission reductions based on energy savings.

The order of adoption of the measures in the AQMP was arranged to maximize the emission reductions and to come as close as possible to achieving a reduction of 5% per year.³⁶ However, since a full 5% per-year reduction from all sources would have equaled zero emissions in 20 years, the annual slope of descent to attainment was closer to 4% per year for the basin.

Monitoring Progress

State and federal laws required the SCAQMD to periodically assess the effectiveness of air pollution programs in reducing emissions, and determine whether or not the basin was still proceeding along the course set forth in the AQMP.

Each year, following approval of the plan, the SCAQMD

or implementing the air pollution control measures contained in the AQMP. The annual reports were to provide information necessary to adjust the ranking of control measures to achieve reductions of the 5% per year or 15% over three years required by the CCAA. Every third year, the SCAQMD was required to assess the overall effectiveness of the air pollution control program and prepare a triennial monitoring report.

By mid-1991, 34 control measures had been adopted by the ARB or the SCAQMD, producing a total emissions reduction of 239 tons per day (tpd) for reactive organic gases (compared to a target of 229), and 161 tpd of NO_x (compared to the target of 191).³⁷ Additional rules had been adopted by the ARB to further reduce mobile source emissions. Based on the adoption of these measures, complemented by efforts

Control Measure	Title	Rule No.
ROG Rules		
A-1	Wood Flatstock Coatings	SCAQMD Rule 1104
A-2	Wood Furniture Coatings	SCAQMD Rule 1136
A-3	Can & Coil Coatings	SCAQMD Rule 1125
A-4	Aerospace Coatings	SCAQMD Rule 1124
A-6	Automobile Refinishing	SCAQMD Rule 1151
A-7	Marine Vessels Coatings	SCAQMD Rule 1106
A-8a	Architectural Coatings	SCAQMD Rule 1113
A-10	Graphic Arts	SCAQMD Rule 1130
A-12	Solvent Degreasers	SCAQMD Rule 1122
A-14	Expand Plastic-Foam Blowing	SCAQMD Rule 1175
A-15	Semiconductors Manufacturing	SCAQMD Rule 1164
A-17	Petro Solvent Dry Cleaners	SCAQMD Rule 1102
A-18	Underarm Products	ARB
A-19	Domestic Products	ARB
A-21	Adhesives	SCAQMD Rule 1168
B-3	Sumps, Pits & Separators	SCAQMD Rule 1176
B-13	Valves, Pumps & Compressors	SCAQMD Rule 1173
C-1	Commercial Bakeries	SCAQMD Rule 1153
D-1	Starter Fluid	SCAQMD Rule 1174
D-3	Publicly Owned Treatment Works (POTWs)	SCAQMD Rule 1179
F-6	Exempt Equipment	SCAQMD Rule 219
F-7	Soil Decontamination	SCAQMD Rule 1166
F-8 ⁽¹⁾	New Source Review	SCAQMD Reg. XIII
G-5	Smoking Vehicle Enforcement	N/A
NO_x Rules		
B-6	Crude Oil Pipeline Heaters	SCAQMD Rule 1146
B-14	Oil Field Steam Generators	SCAQMD Rule 1146
B-15	Refinery Heaters & Boilers	SCAQMD Rule 1109
C-2	Internal Combustion Engines	SCAQMD Rule 1110.2
C-7	Small Boilers and Heaters	SCAQMD Rule 1146.1
C-8	Industrial Boilers, Heaters, & Generators	SCAQMD Rule 1146
C-9	Gas Turbines	SCAQMD Rule 1134
C-10	Electric Power Generators & Boilers	SCAQMD Rule 1135
F-8 ⁽¹⁾	New Source Review	SCAQMD Reg. XIII
SO_x Rules		
F-2	Sulfur Content-Gas Fuels	SCAQMD Rule 431.1
F-3	Sulfur Content-Liquid Fuels	SCAQMD Rule 431.2

⁽¹⁾F-8 (New Source Review) reduces both ROG and NO_x.

was to prepare a monitoring report summarizing the basin's progress in meeting the schedules for developing, adopting,

at the ARB and EPA, the SCAQMD's 1991 AQMP projected steady declines in air pollution emissions and concentrations alike.