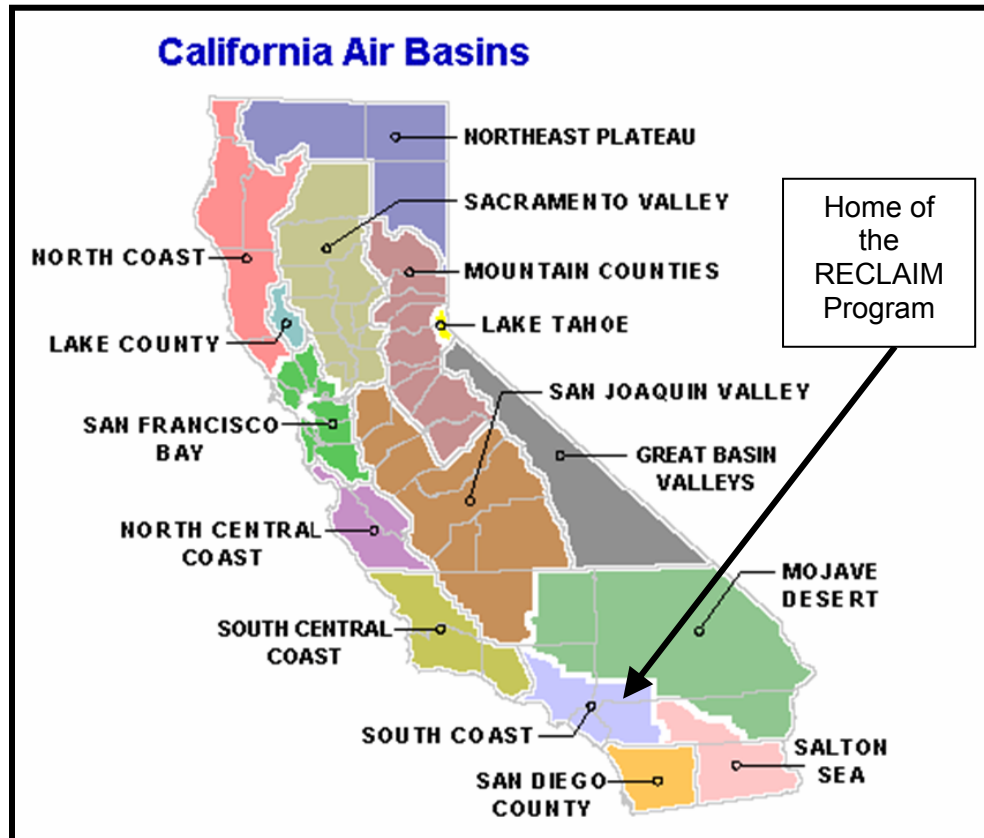


An Overview of the Regional Clean Air Incentives Market (RECLAIM)



Source: California Air Resources Board

The RECLAIM Program is in California's South Coast Air Quality Management District, which includes Los Angeles and Orange Counties, as well as parts of two other counties.

Staff Paper EPA Clean Air Markets Division

August 14, 2006

Note to the reader: This overview of the RECLAIM Program is provided by EPA solely for informational purposes in order to provide comprehensive current information about RECLAIM based on publicly available reports and analyses. This document does not constitute official EPA policy or opinion on the RECLAIM program. The Agency has previously performed an extensive evaluation of RECLAIM, led by EPA's Region IX (serving the Pacific Southwest). That evaluation was published in November 2002, and is available at <http://www.epa.gov/region09/air/reclaim/>.

An Overview of the Regional Clean Air Incentives Market (RECLAIM)

The Regional Clean Air Incentives Market (RECLAIM) was the first trading program in the nation created to reduce urban air pollution. Adopted in October 1993 by California's South Coast Air Quality Management District (SCAQMD or AQMD), RECLAIM was enacted to help meet the state and federal ambient air quality standards in the Los Angeles Basin, which suffers some of the worst air pollution in the country. The program established a cap and trade system to reduce emissions of nitrogen oxides (NO_x) by 75 percent and sulfur dioxide (SO₂) by approximately 60 percent from affected facilities by 2003 (measured from allocation levels, or allowable emissions, under the first year of the program in 1994).

The program's results thus far are mixed. Emissions have been reduced under RECLAIM, but the program has also been criticized for delaying reductions, over-managing the market, and perpetuating complexity and uncertainty. RECLAIM's most notable challenge was a result of the California electricity crisis in 2000 that dramatically affected the market and precipitated major program changes, including removal of the power sector from the market. These and other program modifications have changed the program in both subtle and significant ways over its lifetime, with the latest significant rule changes requiring more reductions to meet tougher air quality goals.

This paper first explains the basic structure of the program, and then discusses the impact of the 2000 power crisis and the subsequent changes to the program. Next, it describes notable recent amendments to RECLAIM and provides a brief overview of the program's successes and shortcomings. Finally, it summarizes key findings and looks to what lies ahead.

This paper relies primarily on analysis and research produced by the SCAQMD; evaluations by the California Air Resources Board and EPA Region IX; and LA Times coverage of the program. These documents were supplemented by discussions with Danny Luong, Air Quality Analysis and Compliance Supervisor for AQMD; Lucille van Ommering, South Coast Liaison for the California Air Resources Board; Josh Margolis, Managing Director, Cantor Fitzgerald Environmental Brokerage Services; and Samantha Unger, Director, California Emissions Markets, Evolution Markets.

RECLAIM BASICS

RECLAIM is a federally-approved regional cap and trade program that reduces SO₂ and NO_x emissions from affected industrial facilities in the Los Angeles area. (EPA has approved the program through California's State Implementation Plan, or SIP; amendments also require approval.) The program aims to achieve emission reductions equivalent to more traditional command and control programs at lower cost by providing greater flexibility to sources without jeopardizing air quality improvement. Optimally, the emissions trading program also accelerates emission reductions, spurs development of new and improved control technologies, increases compliance flexibility for facilities, and provides improved, comprehensive emissions monitoring. The geographic boundaries of the program are shown in Figure 1.

Figure 1: Boundaries of the South Coast Air Quality Management District



Source: South Coast Air Quality Management District, 2003 Air Quality Management Plan, page 1-3.

The SCAQMD, outlined in bold above, has jurisdiction over an area of approximately 10,743 square miles. The RECLAIM program covers the entire District, including the South Coast Air Basin and portions of the Mojave Desert Air Basin and the Salton Sea Basin.

RECLAIM is a result of “the most extensive public process ever initiated by the District [AQMD] for the development of any environmental regulation” (SCAQMD, 1994). Public workshops to design the program began in October 1990. Advisory and steering committees included representatives from government agencies to public health, research and financial organizations, and associated working groups included industries, environmental groups, California Air Resources Board and EPA. Three years later, on October 15, 1993, RECLAIM was adopted, with implementation set to begin January 1, 1994. The new program created cap and trade programs for NO_x and SO₂, but notably not volatile organic compounds (VOCs). While planners originally envisioned three separate trading programs instead of two, the difficulties with creating a program for VOCs – including the number of toxics present in VOCs that have different reaction rates to form ozone and the relatively far greater number of sources that would need to be included – led decision-makers to put the VOCs market on hold (Lents and Leyden, 1996).

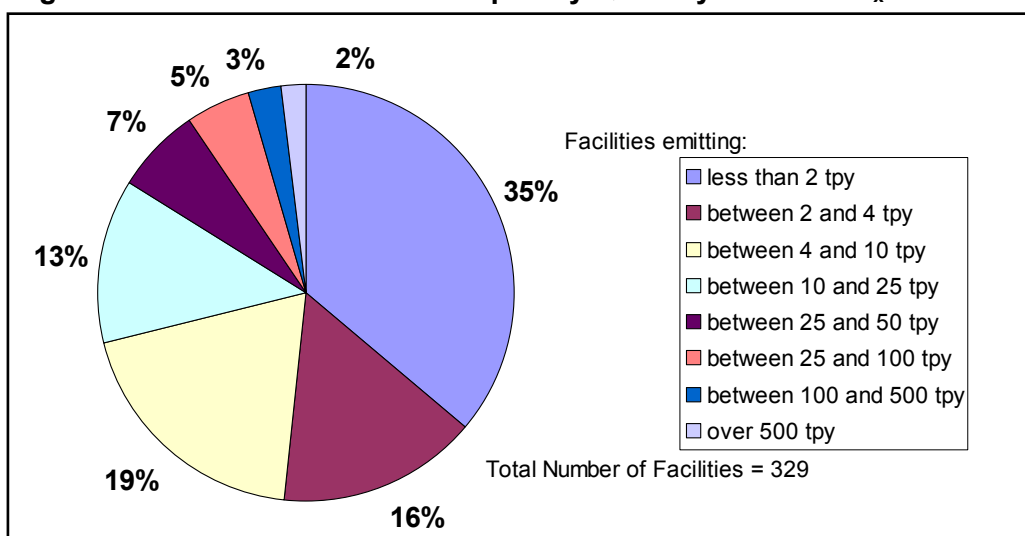
Applicability

RECLAIM covers a broad range of sources across numerous sectors, including power generators, refineries, industrial sources, aerospace companies, asphalt producers, chemical plants, cement plants and many others. The program caps stationary source emissions from sources that emit more than 4 tons of NO_x and/or SO₂ annually in two separate programs. Initially, RECLAIM covered nearly 400 facilities (mostly in the NO_x program). Currently, RECLAIM includes 311 facilities. All of these facilities are covered by the NO_x portion of the program and 33 are also covered by the SO₂ portion of the program. The net attrition in facilities from RECLAIM’s inception to the present is a result of relatively more shut downs and “exclusions” (i.e., one facility merges with another, excluding one from the program) than new entrants, although a significant number of facilities have also entered the program (106 facilities since 1994 according to the latest SCAQMD audit).

The SO₂ portion of the program is relatively small because of the near universal reliance on natural gas in the region. Refineries are the principal SO₂ RECLAIM sources. While both the SO₂ and NO_x programs are important for meeting air quality goals, the NO_x portion of the program has been more visible, given its broader scope and impact in California. For both programs, some “public” sources such as police and fire fighting facilities were categorically excluded, and opt-in provisions allowed non-covered sources such as ski resorts and hospitals to participate. Additionally, publicly-owned power plants were allowed to opt into RECLAIM.

At its inception, RECLAIM covered approximately 65 percent of NO_x emissions and 85 percent of SO₂ emissions from permitted stationary sources. These stationary sources represented 17 percent of total NO_x emissions and 31 percent of total SO₂ emissions in the region, with mobile sources the dominant contributor to regional NO_x emissions and also a substantial contributor to SO₂ emissions (SCAQMD, 1994). Figure 2 shows the distribution of emissions under RECLAIM in 2004. The figure shows that 35 percent of RECLAIM sources emitted less than two tons in 2004. These 119 facilities emitted a collective total of 87 tons of NO_x, or less than 1 percent of total NO_x emissions under the program. By contrast, the two highest emitting groups of facilities that together total approximately 5 percent of RECLAIM’s universe are comprised of just 15 facilities and emitted 67 percent of the program’s NO_x emissions in 2004.

Figure 2: RECLAIM Facilities Grouped by Quantity of 2004 NO_x Emissions



Source: RECLAIM Task Force Meeting Presentation, November 1, 2005.

Emission Reductions

RECLAIM’s emission targets established a level of reductions equivalent to what would have been achieved through command and control measures. As such, RECLAIM replaced more than 30 adopted rules and 12 future potential rules (SCAQMD, 1994). Between the inception of the program in 1993 and full implementation in 2003, aggregate emissions from participating sources were required to decrease from 105 to 27 tons per day for NO_x and from 26 to 10.5 tons per day for SO₂. RECLAIM’s reductions were mandated through a cap on emissions that declined approximately 8 percent a year for NO_x and 7 percent a year for SO₂ until 2003. As originally conceived, allocations (and therefore emission levels) would remain at 2003 levels into the future.

Actual NO_x emissions from RECLAIM sources at the start of the program in 1994 measured approximately 70 tons per day (25,000 tons per year) while SO₂ emissions were around 20 tons

per day (7,000 tons per year). To provide perspective on the program's starting point, there are at least twenty U.S. power plants that individually emit more than 25,000 tons of NO_x per year, and hundreds of power plants that individually emit over 7,000 tons of SO₂ annually – and these were the emission levels for the entire region under RECLAIM.

Emissions Monitoring and Reporting

RECLAIM monitoring and reporting requirements are stringent and include missing data procedures to account for all emissions. Major sources of both NO_x and SO₂ – those with potential to emit ten or more tons of NO_x and 100 or more tons of SO₂ annually – must use Continuous Emission Monitoring Systems (CEMS) and report emissions on a daily basis. Large sources of NO_x, the next size category, are required to use a fuel meter or Continuous Process Monitoring System (CPMS) and report emissions on a monthly basis. Remaining sources use a fuel meter and/or timer and report emissions quarterly. Major sources are required to use a Remote Terminal Unit (RTU) to electronically transmit emissions data to SCAQMD, while other sources have the option to manually compile data and transmit it via modem. Emissions data can now be submitted via the internet, and a web-based application enables the AQMD to verify receipt of daily reports.

Allocations

A RECLAIM Trading Credit (RTC) is equivalent to one pound of NO_x or SO₂. Original RECLAIM participants were allocated a stream of RTCs at no cost based on the product of each facility's highest year of production between 1989 and 1992 and projected emission rates that would have applied to the sources under command and control between 1994 and 2003. More than 50 percent of all RTCs in the NO_x program were allocated to refineries and power plants – for 1994, the 37 facilities in these two sectors received 33 percent and 23 percent of NO_x RTCs, respectively. Refineries also received the majority of the SO₂ RTCs. Most new RECLAIM-eligible sources do not receive allocations, and must purchase RTCs from the market (although there is a reserve of RTCs set aside for low emitting businesses that create jobs).

RECLAIM Governing Structure

The South Coast Air Quality Management District is the regional government agency responsible for air pollution control in Los Angeles and Orange counties and parts of Riverside and San Bernardino counties. AQMD regulations must be approved by the state Air Resources Board and the U.S. Environmental Protection Agency.

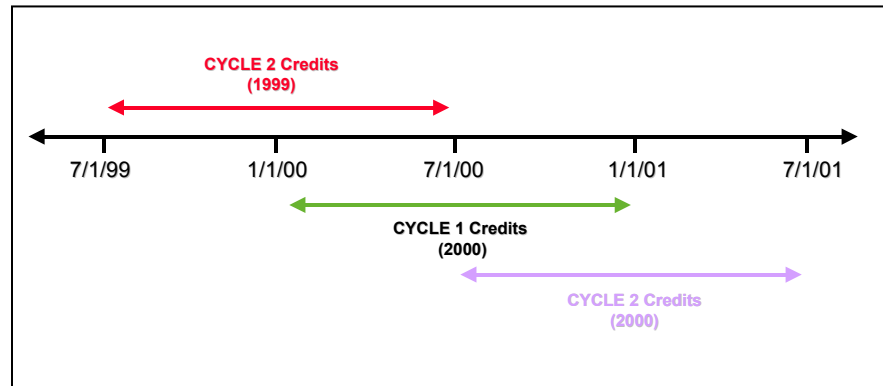
AQMD's Governing Board adopts policies and regulations that promote clean air within its four-county area, the smoggiest in the nation. The Governing Board has 12 members, nine of whom are elected officials. The remaining three Governing Board members are appointed by state elected officials -- one by the Governor of California, one by the Speaker of the State Assembly and one by the State Senate Rules Committee.

Source: <http://www.aqmd.gov/hb/govbd.html>

Trading and Banking

RECLAIM does not explicitly include banking; each RTC expires at the end of its 12 month term. There are, however, two compliance cycles. A facility is assigned to one of these cycles and allocated RTCs accordingly. Cycle 1 facilities have a compliance year that runs January 1 to December 31; Cycle 2 facilities' compliance year runs July 1 to June 30. The two compliance cycles are intended to provide flexibility, promote a liquid market and guard against price swings that might occur if all RTCs expired at the same time. Credits can be exchanged between the cycles, so two vintages of credits are available for time periods within each compliance year, as shown in Figure 3. This creates some opportunity for limited banking.

Figure 3: Structure of RECLAIM Trading Credit Cycles



Source: SCAQMD White Paper on Stabilization of NO_x RTC Prices, January 11, 2001, page 3.

Additionally, RECLAIM facilities are divided into two zones based on geographic location; coastal (Zone 1) and inland (Zone 2). Coastal zone reductions are more valuable due to upwind impacts from coastal to inland areas. As a result, coastal zone facilities can only use coastal zone RTCs (except in limited circumstances¹), while inland zone facilities can use RTCs from both zones. Every RTC is identified by vintage, compliance cycle and zone, but does not have a unique serial number. There is a filing fee associated with all transfers of RTCs (whether internal or external) to help fund administration of the RECLAIM program, although program administrators say its contribution is minimal relative to overall program costs (Luong, 2006). This fee began at approximately \$45 per transfer form, indexed to inflation. The current fee is \$100.75 per transfer form submitted to the AQMD, regardless of the size of the transaction (Unger, 2006). Finally, the NO_x and SO₂ RTC markets are separate; there is no interpollutant trading in RECLAIM.

Compliance

RECLAIM facilities must demonstrate that their facility-wide NO_x and SO₂ emissions do not exceed their RTC holdings. Sources have the option to buy RTCs to cover emissions in excess of allocation levels (the cap ensures the program achieves required aggregate reductions). Reconciliation occurs both quarterly and annually. RTCs can be purchased at any time throughout the year, and following each compliance year, a facility has 60 days to ensure RTC holdings are sufficient to cover emissions for that year.² Facilities that fail to hold sufficient RTCs are required to surrender future year RTCs at a ratio of 1:1 to cover any overage, and are also subject to substantial civil financial penalties determined on a case-by-case basis.

¹ Existing coastal facilities can use inland RTCs if the quantity that they are buying, plus the quantity that they were originally allocated for that year, is less than the quantity of tradable and nontradable RTCs that they were originally allocated for their first year in the program (typically 1994). New coastal facilities may only use coastal RTCs.

² At the end of a quarter, a source has 30 days to ensure RTC holdings are sufficient to cover emissions throughout that quarter.

(Because reconciliation occurs both quarterly and annually, facilities are subject to penalties for quarterly RTC shortfalls, even if holdings are sufficient to cover annual emissions at the end of the year.) Monitoring and reporting violations are most often settled via civil penalties determined on a case-by-case basis.

Additional Credits

RECLAIM also includes provisions for the generation of mobile and area source credits for conversion to RTCs for use in the program. Mobile source credit rules were included at the program's inception, but were never approved since EPA determined that these rules did not meet the Agency's approvability criteria. As a result, credits generated under these rules (e.g., motor vehicle scrappage) and the sources using them were subject to legal challenge, greatly discouraging their use. In 2001 and 2002, however, six new pilot credit generation rules for mobile and area sources were adopted into California's State Implementation Plan and subsequently approved by EPA. The AQMD worked very closely with EPA and the California Air Resources Board (ARB) in creating these very narrow, specific regulations and associated quantification methodologies to help ensure the creation of real, surplus and enforceable reductions as required for state and federal approval. Note that while RECLAIM does include opt-in provisions, they do not extend to mobile and area sources; instead, these provisions enable mobile and area sources to generate credits for sale to affected facilities that may use them for compliance purposes.

Audits and Backstop Provisions

The AQMD conducts annual program audits covering emissions, trading activity, compliance, job impacts and air quality and public health impacts; the audits also include field inspections to ensure accuracy of compliance data. Additionally, a more comprehensive three-year audit, completed in May 1998, was required to ensure the program is meeting all state and federal requirements. RECLAIM also includes backstop provisions should the average NO_x or SO₂ RTC price exceed \$15,000/ton (the cost of installing Best Available Retrofit Control Technology). These provisions require the AQMD to submit an evaluation of RECLAIM to the California ARB and EPA, and propose that the Governing Board amend the program as needed to address the problem.

THE 2000 CALIFORNIA ELECTRICITY "CRISIS" AND RECLAIM RESPONSE

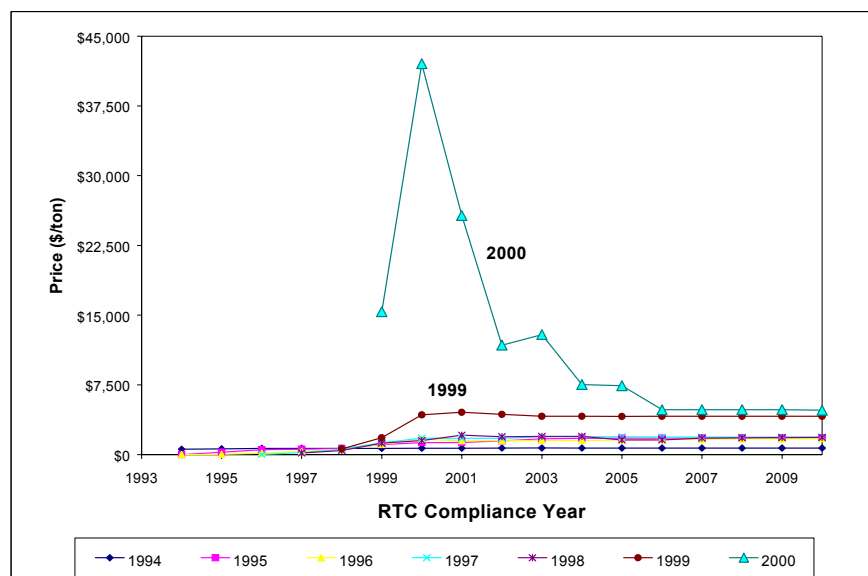
The Problem

From RECLAIM's inception in 1994 through 1998, NO_x emissions were well below allocations and NO_x RTC prices were stable and low. Average annual prices for current vintage NO_x RTCs were \$154/ton in 1996, \$227/ton in 1997 and \$451/ton in 1998 (SCAQMD, 1998, 1999, 2000). In comparison, NO_x reductions from stationary sources at the time of RECLAIM's inception ranged from \$11,000 – 16,000/ton (van Ommering, 2006). Given the availability of inexpensive RTCs, there was very little incentive for sources to install expensive control technology.

Market dynamics changed in 2000 because, for the first time, emissions were close to RTC allocation levels. Emission increases came primarily from power plants as the constrained power market required local power plants without additional emission controls – including older, higher-emitting peaking units – to ramp up their utilization to meet demand. Power companies turned to the RTC market to cover their higher emissions, thus rapidly depleting the available supply of RTCs and driving prices up.

While initially allocated 14 percent of total allocations for 2000 (down from 23 percent at the start of the program), the power sector purchased 60 percent of NO_x RTCs expiring in June 2000 and 67 percent of NO_x RTCs expiring in December 2000 (SCAQMD, 2001). In 1999, the average price of vintage 1999 NO_x RTCs was \$1,827/ton and the average price for vintage 2000 was \$4,284/ton. During 2000, the average price of vintage 1999 cycle 2 NO_x RTCs (which could be used for compliance for the first six months of 2000) jumped to \$15,377/ton, and then current year NO_x RTCs approached \$45,000/ton, as shown in Figure 4 (SCAQMD, 2001). During 2001, prices for 2000 RTCs climbed even higher to over \$59,000/ton. At least one trade took place at a price of \$62/RTC – equivalent to \$124,000 a ton, far in excess of the BARCT cost backstop (Unger, 2006). Figure 4 displays the average annual prices NO_x RTC prices from 1994 through 2000.

Figure 4. Average Annual NO_x RTC Prices from RECLAIM Inception to 2000

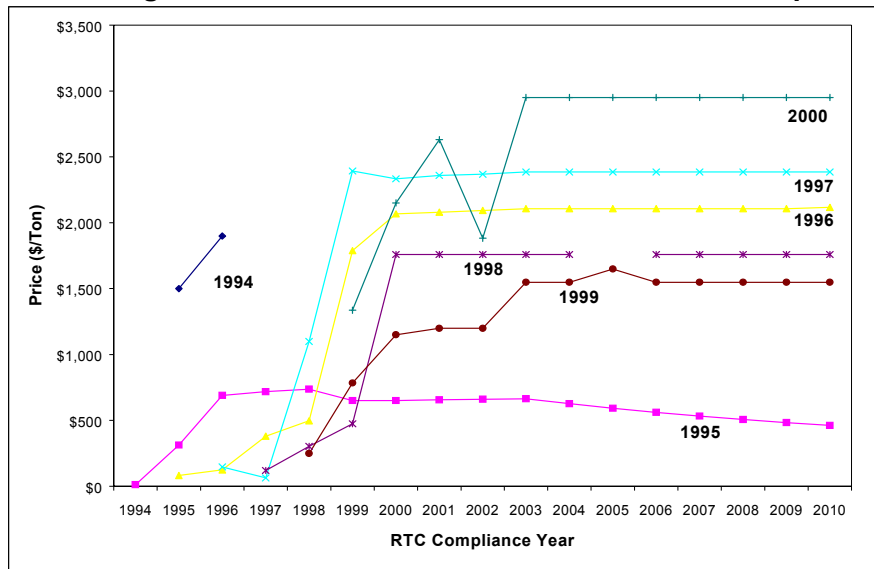


Source: SCAQMD White Paper on Stabilization of NO_x RTC Prices, January 11, 2001

Note that this figure displays average annual NO_x RTC prices for all vintages traded by calendar year, with the years on the y-axis representing each vintage of RTC. For example, the RTC Compliance Year 2000 line displays the average prices for all vintages traded during calendar year 2000. The average price for vintage 1999 NO_x RTCs in 1999 was approximately \$1,800/ton, whereas the average price for the same vintage RTCs in 2000 averaged \$15,000/ton.

The SO₂ RTC market did not experience the same volatility. As shown in Figure 5, average prices were relatively stable. The AQMD attributes this relative stability to the absence of the power sector in RECLAIM's SO₂ program (SCAQMD, 2001).

Figure 5. Average Annual SO₂ RTC Prices from RECLAIM Inception to 2000



Source: SCAQMD White Paper on Stabilization of NO_x RTC Prices, January 11, 2001

The NO_x RTC market dynamic played out on a much bigger stage of electricity industry restructuring problems in California, and resultant rolling black-outs that made national headlines. While beyond the scope of this paper, the relevance of the state's electricity crisis to RECLAIM is that environmental requirements were listed among the many causes for the state's power crisis (the California Energy Commission estimates that the purchase of RTCs added \$500 million to the \$2 billion cost of power generation in the summer of 2000) – and this in turn wreaked havoc on the NO_x RTC market.

It is generally accepted that the primary cause of the NO_x RTC price spike was the state's energy supply situation, but the lack of new pollution control investments under RECLAIM up to this point – and the fact that sources did not hedge their positions and elected to buy on the spot market (Margolis, 2006) – also likely had a role.

The lack of direct emission controls coupled with the temporary increased usage of older, dirtier power plant boilers, meant that by 2000, emission reductions were not keeping pace with reductions in allocations. NO_x emissions had been reduced from RECLAIM's inception through 1999, but reductions occurred primarily through shutdowns, relocation outside the AQMD's jurisdiction, improved housekeeping, and improved process efficiency. Stakeholders disagree about how well RECLAIM was functioning prior to the electricity crisis (and whether it just hastened the exposure of RECLAIM's weaknesses), but it is clear the market was more volatile than anyone expected.

The percentage of facilities that complied with annual RTC-holding requirements in 2000 was not much lower than in 1999. In 2000, 41 of 356 facilities failed to comply with requirements to hold sufficient NO_x RTCs to cover emissions, registering excess emissions of over 1,100 tons (SCAQMD, 2002). The compliance rate for these NO_x facilities was 88 percent, while all of the SO₂ program facilities were in compliance with RTC requirements. In 1999, 31 of 361 facilities failed to hold sufficient NO_x RTCs, resulting in a 91 percent compliance rate for that year, while all facilities in the SO₂ program held sufficient RTCs in that year. (More information on trends in compliance is included in the Results section, on page 16.)

Power plants accounted for most of the excess emissions in 2000. Excess emissions for the year actually measured 3,294 tons when looking just at compliance year 2000 (2000 emissions versus 2000 allocations). However, as AQMD's audit explains, since RECLAIM's structure allows RTCs from different compliance periods to be used in overlapping six-month windows, RTCs from 1999 and 2001 could be used to offset emissions in 2000, reducing the emissions in excess of allocations to approximately 1,100 tons. This was the first occurrence of emissions significantly exceeding allocations under RECLAIM.

The Response

In January 2001, the AQMD's Executive Officer formed an Advisory Committee to provide recommendations to stabilize the NO_x RTC market. The Committee was open to all interested stakeholders, and included representatives from the AQMD, California ARB, CEC, and EPA as well as facilities, environmental groups, trade groups and brokers. This group developed options, and AQMD staff proposed recommendations to its Governing Board. The resulting amendments were adopted in May 2001. According to AQMD, their goal was to reduce and stabilize RTC prices, increase accuracy and availability of trading information, expedite installation of emission control equipment at power plants and facilitate building of new power plants to meet the state's energy needs (SCAQMD, 2001).

Selected Provisions of May 2001 Amendments to Stabilize NO_x RTC Market: Note that these amendments were aimed at the NO_x market and had only tangential impacts on the much smaller SO₂ market, which continued to operate without significant incident.

- **Removed power generators from market and required emission controls.** Power generating facilities greater than 50 MW were removed from the RECLAIM trading universe for 2001 – 2003 and required to install Best Available Retrofit Control Technology (BARCT) controls by the end of 2003. Though still required to comply with the program, power plants could no longer purchase NO_x RTCs to offset emissions. AQMD held a reserve of NO_x RTCs that power plants could purchase for \$7.50 per pound (\$15,000 per ton) through the Mitigation Fee Program (described below). The AQMD would use these funds to purchase reductions from other sources. (As a result, AQMD could purchase RTCs from the market at the then-prevailing – much lower – market rate.) Any excess emissions from power plants would also be offset by deductions from future allocations. The power sector could not re-enter the market until and unless there was evidence that no negative impact on the rest of the program or the state's energy security would result. The AQMD would re-evaluate the market in 2004.
- **Required large sources to submit compliance plans.** Facilities emitting over 50 tons annually must submit compliance plans specifying their approach (via an enforceable commitment) for complying with NO_x allocations; plans could include several alternatives. Smaller sources (25 to 50 tons) were required to submit informational reports projecting compliance for 2002 through 2005.
- **Improved RTC trade registration information.** The AQMD adopted changes, including requirements for timely registration of trades, to provide more accurate and timely market information to participants.

- **Added new mobile and area source credit generating rules.** The amendments included additional credit rules to provide more opportunities to generate RTCs, such as replacing diesel-fired heavy-duty vehicles with clean technologies and pilot credit generation programs for marine vessels, hotelling operations, truck/trailer refrigeration units and agricultural pumps.
- **Created RECLAIM Air Quality Investment Program (AQIP) and Mitigation Fee Program.** New investment programs provide a short-term source of RTCs for new power plants (Mitigation Fee Program) and “structural buyers,” defined by RECLAIM to include new facilities and small facilities with BARCT controls already in place (Air Quality Investment Program) through 2004. For both programs, facilities pay AQMD \$7.50/lb of excess NO_x emissions, which would be used to obtain reductions to offset increases. Two million dollars were allocated to obtain reductions from marine vessels to support the AQIP.
- **Passed resolution to evaluate centralized market.** The Governing Board also adopted several resolutions, one of which directed AQMD to evaluate the merits of a centralized market for RECLAIM. In such a market, all trading would take place at a single point through an electronic system for matching buyers and sellers and determining a clearing price. This request arose from the concern that trading information was incomplete and out-of-date prior to and during the electricity crisis, hampering the decision-making capability of market players and exacerbating the situation. In a report released one year later, the AQMD and a working group concluded that the existing market structure, with improvements advanced in the May 2001 amendments, was more appropriate. Creating a centralized market would be expensive, require additional oversight, add complexity, and disrupt the current market (SCAQMD 2002).

ADDITIONAL RECLAIM AMENDMENTS

There have been over a dozen amendments to RECLAIM since it began in 1994. This paper discusses the amendments in response to the electricity crisis and those adopted in January 2005, because they both required major changes to the program’s administration and compliance requirements. The January 2005 amendments were enacted to meet commitments of the AQMD’s 2003 Air Quality Management Plan and state law requirements for BARCT implementation and equivalency to command and control reductions. The changes are confined to the NO_x program.

Selected Provisions of the January 2005 Amendments:

- **Reduced allocations across the board to achieve additional NO_x reductions.** End point allocations for RECLAIM facilities were capped at the 2003 level. The 2005 amendments reduced these allocations from all covered facilities to achieve additional, cumulative NO_x reductions of 7.7 tons per day when fully implemented in 2011, or an additional 23 percent from current allocations of 34.2 tons per day. (As noted on page 3, original NO_x RTC allocations issued in 1993 at the start of the program were 105 tons per day for 1994 and 27 tons per day for 2003. Allocations have subsequently been revised to 109.9 tons per day for 1994, 34.2 tons per day for 2003 and 26.5 tons per day

for 2011. The revised allocations resulted from changes to baseline emissions based on new information, additional facilities included in the program, and changes to RTCs under rule provisions.) The SO₂ allocations are not affected by this amendment and remain level. NO_x allocations will be reduced in phases, beginning with an additional 4 tons per day in 2007 and then another 0.925 tons per day in each year from 2008 -11. According to EPA Region IX, however, only the amendments requiring additional reductions of 4 tons per day in 2007 were submitted for approval into California's State Implementation Plan. If the state intends to have the SIP reflect the additional reductions totaling 7.7 tons per day by 2011, the state will need to submit these additional amendments as a SIP revision (Wong, 2006). The AQMD reports that these reductions are going to be required in full (provided the conditions in the next bullet are met), and that sources' 2007-2011 allocations have already been reduced accordingly. While there are two types of exemptions to the reductions, the aggregate reductions will be achieved regardless, leaving remaining sources to make up the shortfall. Two cement manufacturing facilities have applied for exemptions, and their cases are under review by AQMD (Luong, 2006).

- **Price protection mechanism to reduce potential for high market volatility.** These additional, incremental RTC reductions will not occur if the 12 month rolling average price of NO_x RTCs exceeds \$15,000 per ton. In this case, incremental reductions set aside as non-tradable/non-usable will be restored to the market. Reductions will resume when the 12 month rolling average NO_x RTC price is less than \$15,000 per ton for more than 6 months, and continue until all incremental reductions are phased in.
- **Limited trading authority restored to power generators (until full market participation restored in 2007).** Restrictions on the sale of NO_x RTCs will remain in effect until the 2007 compliance year. Because power plants were required to install controls (generating excess reductions to those that would have been required to meet the 2003 allocation levels), this restriction remains to ensure excess holdings are retired in 2005 and 2006 instead of sold to other facilities. Otherwise, power plants can now buy NO_x RTCs without restriction, sell to new power plants, and sell 2007 and later NO_x RTCs with no restrictions. In 2007, power plants will be granted full participation in the NO_x market.
- **Passed resolutions to develop credit generation rules, evaluate market indicators and reassess needed reductions.** The Governing Board also adopted several resolutions providing direction to the AQMD, including: developing additional cost-effective credit generation rules; determining whether any parameters beyond market price should be monitored as possible signs of market anomalies; and re-evaluating programmatic BARCT and command and control equivalency as part of future program revisions.

PROGRAM RESULTS

AQMD's background information supporting the proposed January 2005 amendments to the NO_x program clarify some of RECLAIM's successes and shortcomings: "Since implementation began in 1994, there has been a 50 percent decrease in reported [NO_x] emissions, some technology advancement, better monitoring and reporting, and a high level of compliance in

achieving facility emissions caps. But the program initially over-allocated, which led to under-utilization of available, cost-effective technologies. Even in the last compliance year [2003], there were 6.6 tons per day of unused RTCs, resulting in low credit prices, and leaving little incentive for further controls” (SCAQMD, 2005a). The 2004 compliance year, the last year for which data are compiled, resulted in a similar number of “left over” RTCs. Some observers caution, though, that this large buffer may in fact be a hedge against unforeseen needs, such as faulty monitors or increased production, rather than true surplus (Margolis, 2006).

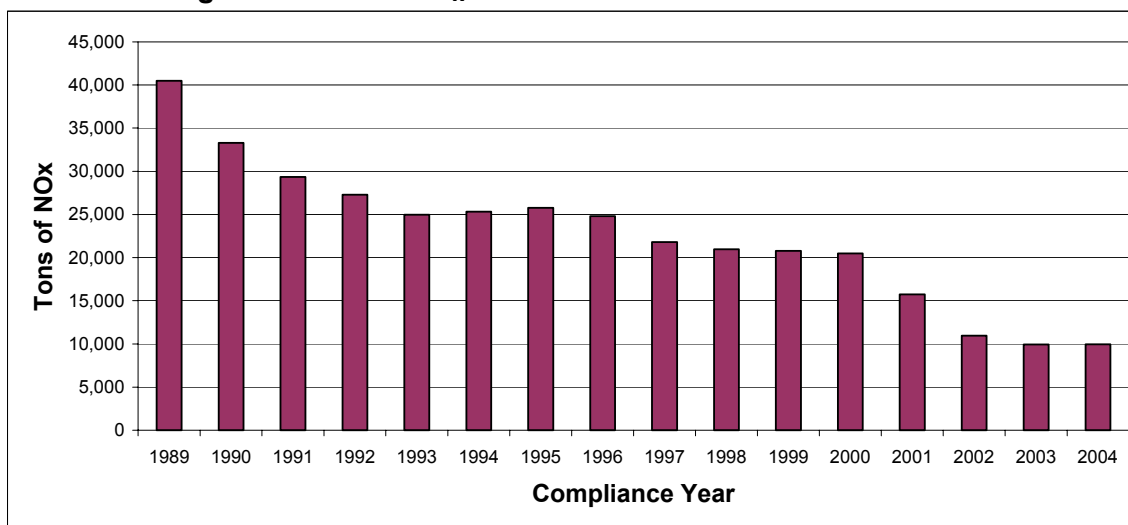
Emission Reductions

RECLAIM aimed to reduce NO_x emissions by 75 percent from initial allocations and SO₂ emissions by 60 percent by 2003. NO_x and SO₂ emissions have decreased under RECLAIM while economic activity in the region has grown.

- NO_x emissions declined 60 percent, from approximately 25,000 tons in 1994 to 10,000 tons in 2004 (or 75 percent from initial allocations of approximately 40,000 NO_x RTCs).
- SO₂ emissions declined 50 percent, from approximately 7,000 tons in 1994 to 3,500 tons in 2004 (or 65 percent from initial allocations of approximately 10,000 SO₂ RTCs).

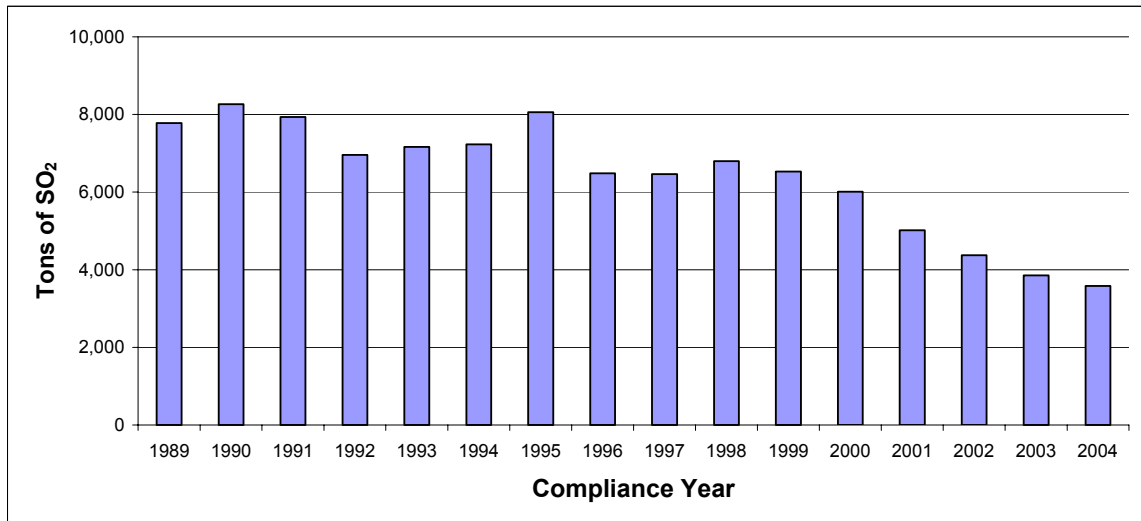
NO_x and SO₂ reductions over time are shown in Figures 6 and 7. AQMD has consistently concluded that the program has met its emission reductions goals based on the fact that aggregate emissions in the NO_x and SO₂ programs are below allocations every year (with the exception of NO_x emissions during the power crisis).

Figure 6. Annual NO_x Emissions for RECLAIM Sources



Source: SCAQMD Annual RECLAIM Audit Report for the 2004 Compliance Year, March 3, 2006, page 7-2.

Figure 7. Annual SO₂ Emissions for RECLAIM Sources



Source: SCAQMD Annual RECLAIM Audit Report for the 2004 Compliance Year, March 3, 2006, page 7-2.

It is clear from these charts that reductions are occurring while RECLAIM is in place, but it is difficult to determine actions at individual facilities (e.g., in terms of emission controls, reduced utilization, etc.). The AQMD posts facility-level emissions data on its website for a continuous 5-year period (www.aqmd.gov/reclaim/reclaim_emission.html), but the data does not begin until compliance year 2004. In program audits, the AQMD provides some detail, breaking out NO_x emission reductions by power-producing and non-power producing facilities beginning in 2000. These data show that power plants alone reduced NO_x emissions by 92 percent between 2000 and 2003, while other facilities reduced NO_x emissions in the same timeframe by 31 percent.

More detailed information on the power producers in RECLAIM is available through EPA, as these sources are also in the federal Acid Rain Program. A review of RECLAIM sources in the Acid Rain Program reveals that a number of the oil- and gas-fired power producing units have installed Selective Catalytic Reduction (SCR) control technology to reduce NO_x emissions, while a few have also installed low NO_x burner technology (query tool available at <http://cfpub.epa.gov/gdm/>). These installations are the primary driver behind the post-2000 NO_x emission drops.

As for non-power facilities, AQMD staff indicated that refineries have installed controls equivalent to SCR and also experimented with a de-NO_x catalyst, while cement producers have used tire burning as a substitute for coal to reduce emissions (Luong, 2006). Additionally, the AQMD's latest audit reported that RECLAIM SO₂ reductions are primarily a result of "emissions control projects at refineries... [with] typical projects including removal of sulfur compounds from feed streams and refinery fuel gas, and the use of catalysts" (SCAQMD, 2004). Since refineries are the primary emitters in the SO₂ program, it is presumably the installation of these controls that is behind the drop in emissions over the last six years, although the extent to which shutdowns or activity curtailment play a role is not readily discernable.

No further information regarding the nature and timing of emission control equipment is readily accessible. Staff attribute this state of affairs primarily to the sheer volume of facilities tracked under the AQMD's jurisdiction (30,000) that render tracking of such documentation cumbersome (although the RECLAIM program with its extensive reporting requirements is a more manageable subset). This is unfortunate, since this data would help explain progress under

RECLAIM and provide valuable input into ongoing regulatory efforts at the state and federal level.

The AQMD does provide additional useful emissions data at the aggregate level to assist in program evaluation. For example, as a part of each annual audit, AQMD maps quarterly emissions to assess potential changes in geographic distribution and seasonal fluctuations in NO_x emissions. Thus far, they have not found any distinct shift in the geographic pattern of emissions, nor any distinct seasonal variations in emissions under RECLAIM. With respect to the latter, the 2003 audit reported similar variation to that seen prior to the start of the program, with only a slight increase in NO_x emissions during the ozone season (4 percent above the mean), whereas the 2004 audit found an increase of 7 percent above the mean for this time period (SCAQMD, 2003 & 2004).

Air Quality Improvements

The 2003 Air Quality Management Plan explains that South Coast Basin's severe air pollution problem "is a consequence of the combination of emissions from the nation's second largest urban area and meteorological conditions [including low wind speed and abundant sunshine] which are adverse to the dispersion of those emissions" (SCAQMD, 2003).

The California Clean Air Act required a 50 percent reduction in population exposure to ozone (relative to a 1986-88 baseline) by the by the end of 2000. This goal was met early in the RECLAIM program – 1994 for Los Angeles and Orange counties and 1996 for Riverside and San Bernadino counties (SCAQMD, 2006). According to the latest audit (2006), per capita exposure is still well below the 2000 target.

According to the AQMD's latest Environmental Assessment in 2004, while ozone NAAQS is exceeded far more frequently in their jurisdiction than almost any other area in the U.S., ozone air quality over the last several years has been the cleanest recorded in terms of maximum concentrations and number of days exceeding the standards (SCAQMD, 2004). The air in the L.A. basin is clearly getting cleaner over time, although in 2005, the greater Los Angeles region once again became the nation's smog capital under the 8-hour ozone standard.

Emissions of SO₂ and NO_x are indeed going down, but RECLAIM is only one of many programs helping to improve air quality. Gains may also be attributed to cleaner car exhaust or other emission reduction programs. Figure 8 shows the ozone air quality progress in the region since 1998, compiled from monitored ozone concentrations at 28 locations in the South Coast Air Basin and nearby Salton Sea Air Basin.

Figure 8: Comparative Summary of Days Exceeding Ozone Standard in the South Coast Air Basin

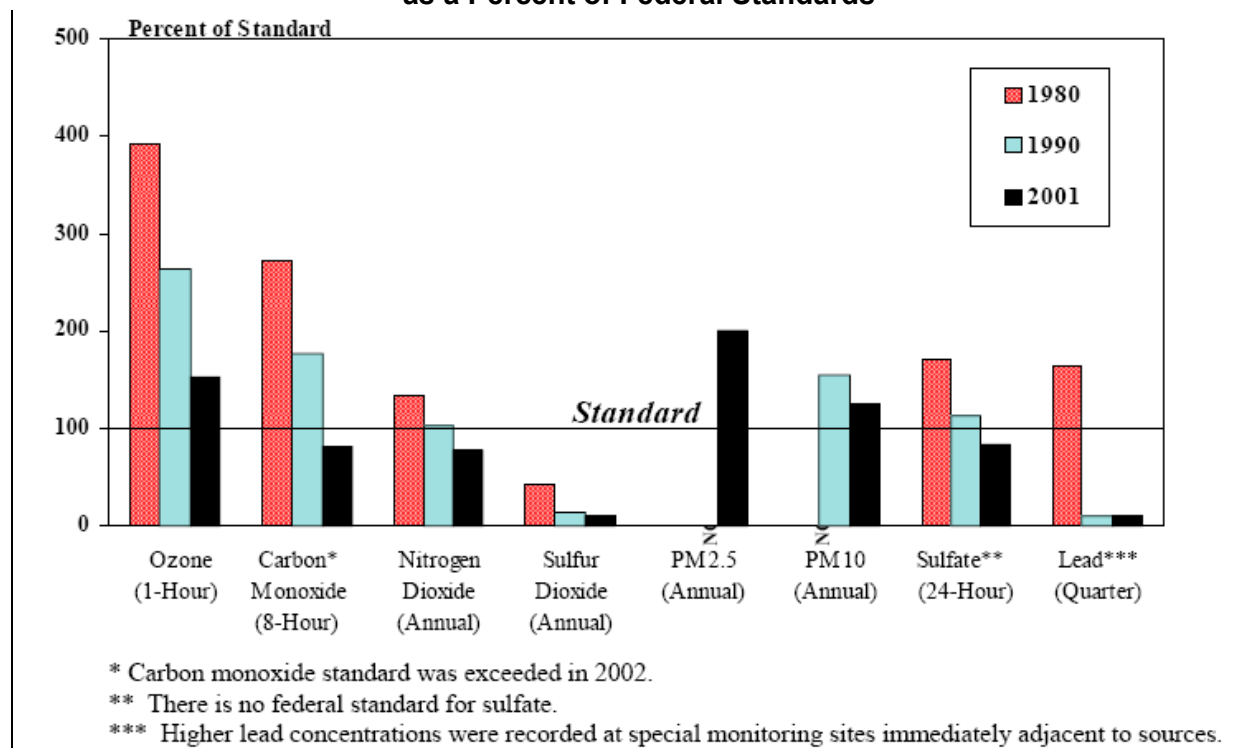
	Calendar Year							
	1998	1999	2000	2001	2002	2003	2004	2005
Days exceeding state standard (0.09 ppm, 1 hour avg)*	113	120	125	121	118	133	110	111
Days exceeding federal standard (0.08 ppm, 8 hour avg)*	62	42	40	36	49	68	27	28
Basin Maximum Ozone Concentration (pphm)	24	17	18.5	19.1	16.9	21.6	16.3	16.3

Source: SCAQMD Annual RECLAIM Audit Report for the 2004 Compliance Year, March 3, 2006, page 7-5.

* The state ozone standard is averaged over a one hour period, whereas the federal standard is averaged over an eight hour period. The state standard is in fact more stringent. To attain the federal standard, the EPA's National Ambient Air Quality Standards web site (www.epa.gov/air/criteria.html) explains that the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

While emission reductions under RECLAIM are also relevant for the attainment of air quality standards for fine particles and other pollutants, the AQMD reports solely on the program's impact with respect to ozone. Figure 9 shows measured concentrations of all criteria pollutants against the federal standards, highlighting the persistent ozone and particle matter concerns in the RECLAIM region.

Figure 9: Maximum Pollutant Concentrations in the South Coast Basin as a Percent of Federal Standards



Source: South Coast Air Quality Management District, 2003 Air Quality Management Plan, page 2-7.

Compliance and Enforcement

According to annual program audits, RECLAIM sources have exhibited compliance rates with RTC-holding requirements ranging from a low of 84 percent in the first year of the program to a high of 97 percent in 2002 and 2003. Compliance in the SO₂ program is generally higher than in the NO_x program. The 2004 overall compliance rate was 96 percent, with 13 facilities exceeding their NO_x RTC holdings by amounts ranging from 40 pounds to over 40 tons and all facilities complying with their SO₂ RTC holdings (SCAQMD, 2006). As a whole, facilities have generally met or exceeded the reductions required by allocations – whether or not that requirement was sufficient is discussed in the next section.

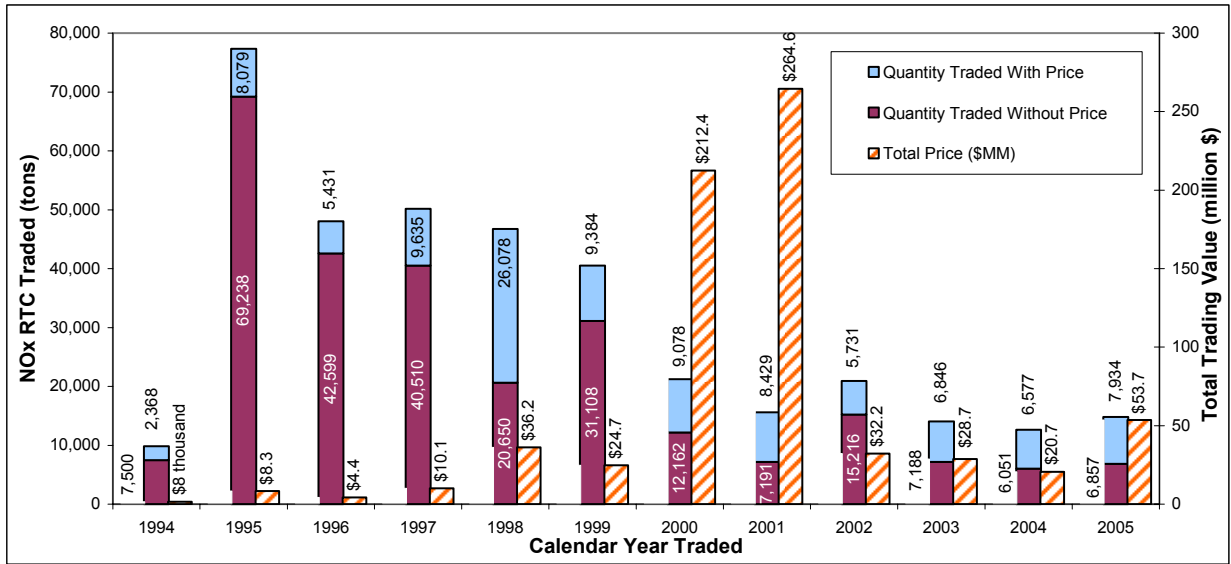
AQMD reports that for most years of the program, over 90 percent of facilities were in compliance, and that for 2000 (when only 88 percent of sources complied with NO_x requirements and emissions exceeded NO_x RTC holdings by a significant amount), 76 percent of excess NO_x emissions were attributable to two power producing facilities.

While there have been some criticisms about slow enforcement actions, some very substantial fines have been negotiated for excess emissions under RECLAIM. Two such fines big enough to make headlines were a \$17 million fine levied against AES for more than 300 tons of excess NO_x emissions and a \$14 million fine for Los Angeles Department of Water and Power. Note that these fines were negotiated, rather than automatic, per RECLAIM's requirements. Automatic financial penalties would likely ensure an even higher compliance rate.

Market Activity

In 2005, there were 740 trades approved by the AQMD for over 17,000 tons of NO_x and SO₂ RTCs. Since 1994, over 370,000 tons of NO_x RTCs and over 130,000 SO₂ RTCs have been traded. Of those RTCs, over 100,000 NO_x RTCs and nearly 30,000 SO₂ RTCs were traded with a price for a total value of over \$780 million (trades with price are generally conducted through brokers while trades without price are generally transfers to brokers, between brokers or within a facility) (SCAQMD, 2006). Figure 10 shows the history of the NO_x RTC market through 2005 and Figure 11 shows the SO₂ market for the same time period. In Figure 10, note the relatively low trading volume for NO_x RTCs and the extraordinarily high associated value of \$265 million in 2001 at the tail end of the electricity crisis.

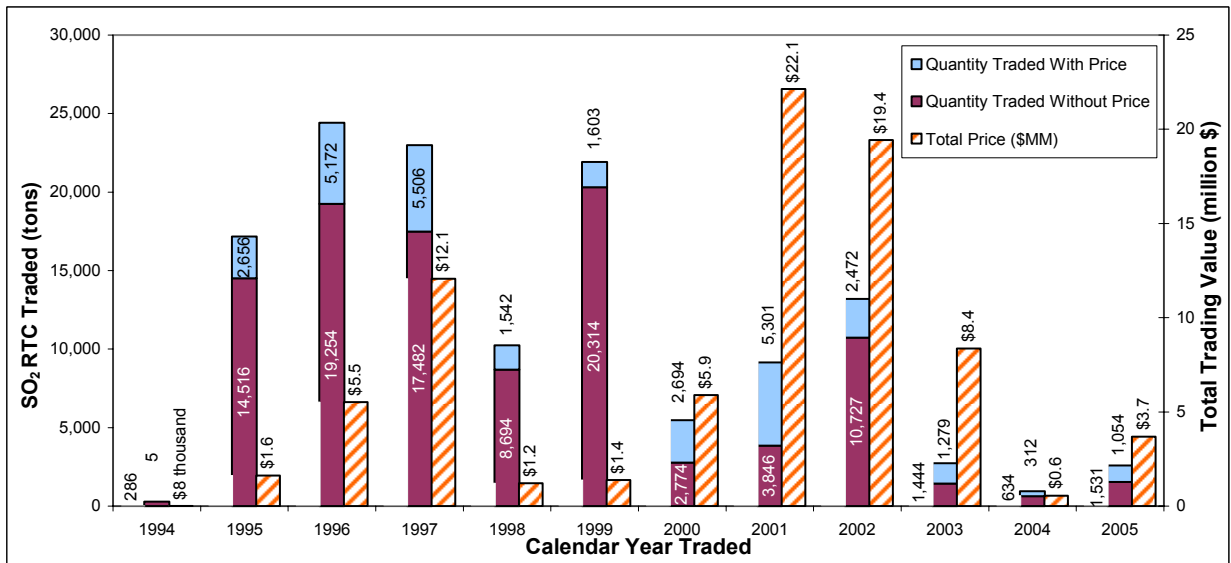
Figure 10: Total Quantity of NO_x RTCs Traded



Source: SCAQMD Annual RECLAIM Audit Report for the 2004 Compliance Year, March 3, 2006, page 2-8

Note that trades with prices are generally conducted through brokers whereas trades without price are generally transfers to brokers, between brokers or within a facility. Prices are nominal.

Figure 11: Total Quantity of SO₂ RTCs Traded



Source: SCAQMD Annual RECLAIM Audit Report for the 2004 Compliance Year, March 3, 2006, page 2-8

Note that trades with prices are generally conducted through brokers whereas trades without price are generally transfers to brokers, between brokers or within a facility. Prices are nominal.

RECLAIM is described as a thinly traded market, with only a small percentage of facilities actively trading. According to Samantha Unger of Evolution Markets, most transactions occur for compliance purposes; only a very small number of sources (less than 10) speculate in the market. According to a recent RECLAIM Working Group Meeting presentation, 67 facilities with 0.8 percent of program emissions did not sell RTCs in the three year period from 1999 to 2002. There are numerous potential reasons for the relatively limited participation by facilities (which should not necessarily reflect poorly on the program, since the level of trading just helps determine the extent to which potential cost savings are realized). One possibility is that many

of the sources covered by the program are very small emitters, and may not want or need to be involved in the market. Limited market participation may also be a reflection of uncertainty (explained in more detail in the next section) or transaction costs associated with RTC transfers. There is not sufficient information on transaction costs to enable an informed judgment of their market impact. As noted previously, the AQMD charges a transfer fee of approximately \$100 per transaction form. Additionally, most brokers reportedly charge a fee between 2.5 percent and 3.5 percent (with a \$100 minimum) of the value of the transaction, split between the buyer and the seller. These transaction costs are high compared to allowance markets in other cap and trade programs (US EPA, 2005), but lower than fees in historical credit markets where there is typically a much higher level of uncertainty.

While not robust, the market is a diverse one, with transfers, swaps, and forward contracts, and participation by brokers, traders and investors in addition to facilities. Additionally, AQMD reports that mutual funds have entered the RTC market in 2005. There is an active futures market, particularly in the last year and a half, although activity has slowed in the past few months as prices have risen. Figure 12 shows the annual average prices for each year of the program for current vintage NO_x RTCs as well as future vintages. In a properly functioning market, RTC prices would reflect the marginal cost of control, or the cost of removing the next ton of emissions at a given time. Note that while these numbers indicate some of the RECLAIM market's volatile history, these annual average numbers fail to encompass the biggest upward (and downward) price swings. They also fail to showcase the drop in prices that typically occurs as RTCs near expiration. The AQMD's latest audit notes that, with the exception of the power crisis in 2000 and 2001 when there was a shortage of RTCs, RTC prices generally decrease as expiration dates approach, most recently in June 2005 and December 2005. December 2005 figures were not included in the latest audit, but RTCs expiring in December 2004 and June 2005 were traded at less than \$2,000 per ton (SCAQMD, 2006).

Figure 12 Annual Average NO_x RTC Prices*

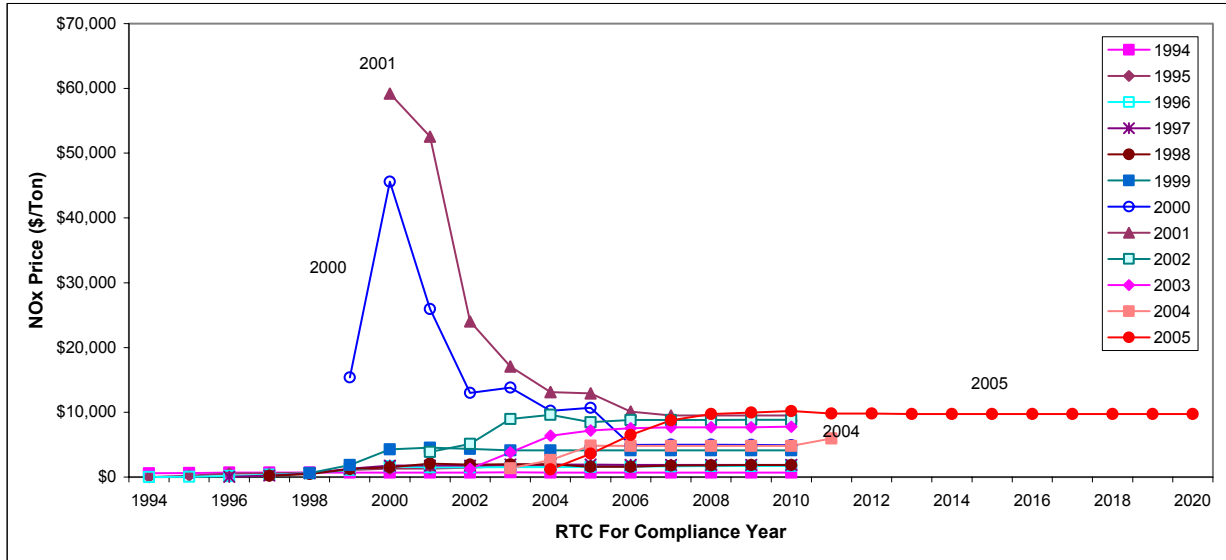
Year of Purchase	Annual Average Price per NO_x ton, Current Vintage	Annual Average Price per NO_x ton, Vintage 2003	Annual Average Price per NO_x ton, Vintage 2010
1996	\$154	---	\$1,729
1997	\$227	---	\$1,880
1998	\$451	\$1,971	\$1,859
1999	\$1,827	\$4,115	\$4,114
2000	\$45,609	\$13,809	\$4,915
2001	\$59,199	\$17,064	\$9,510
2002	\$5,110	\$8,952	\$8,839
2003	\$3,795	\$3,795	\$7,750
2004	\$2,633	\$1,359	\$4,792
2005	\$3,630	---	\$10,193

Source: Compiled from SCAQMD Annual Audits
 *Prices are nominal.

As a whole, NO_x RTC prices have been rising for the last 18 months. The AQMD's latest audit found that the 2005 average prices for future year RTCs are the highest since RECLAIM's inception (SCAQMD, 2006). One of the reasons behind the rise is the reduction of 2007-2011 allocations to accommodate additional emission reductions.

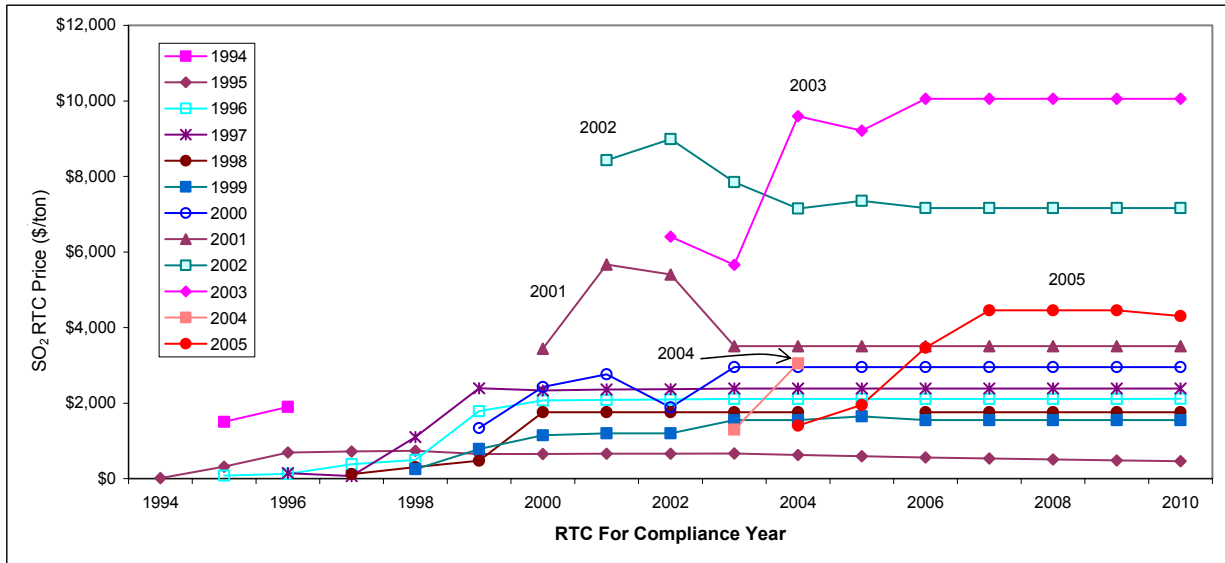
Figures 13 and 14 show average RTC prices for all vintages traded by calendar year.

Figure 13. Yearly Average Annual NO_x RTC Prices 1994-2005



Source: SCAQMD Annual RECLAIM Audit Report for the 2004 Compliance Year, March 3, 2006, page 2-10.

Figure 14. Yearly Average Annual SO₂ RTC Prices 1994-2005



Source: SCAQMD Annual RECLAIM Audit Report for the 2004 Compliance Year, March 3, 2006, page 2-11.

Beginning in 2003, the AQMD began tracking trades involving “continuous streams of RTCs that extend infinitely forward in time”, known as infinite trades. AQMD reports that these streams are typically traded as a block starting with 2011 (but other start years are possible) and extending forward at a fixed price per pound (SCAQMD, 2005). Market analysts report that an infinite stream of NO_x RTCs beginning in 2011 (i.e., one ton of NO_x annually for perpetuity) is currently averaging \$120,000 – \$150,000 per ton. If the stream started with 2006 RTCs, the cost is likely closer to \$200,000 per ton (Unger, 2006).

Requiring new sources to buy RTCs in the market has not appeared to act as a barrier to entry. Since its inception, 106 additional facilities have been included in RECLAIM, compared to 67 excluded facilities and 107 shutdowns (SCAQMD, 2006). Some of these facilities are opt-ins. In 2003 and 2004, for example, seven facilities voluntarily opted into the program, including several small municipal utilities, small power companies and a metal casting company.

Cost Savings

Prior to the start of the program, AQMD estimated the cost of implementing RECLAIM was \$80.8 million per year for the period from 1994 to 1999 (in 1987 dollars), whereas the corresponding command and control system was estimated to cost \$137.8 million annually, on average (SCAQMD, 1993). Thus, RECLAIM would save facilities an average of approximately \$57 million or 42 percent. The LA Times reported in 2001 that companies saved 41 percent on compliance costs compared to traditional regulations, but claimed that most of those savings were from delaying installation of pollution control equipment (Polakovic, 2001). The source of this estimate is not clear.

According to AQMD, actual implementation costs for RECLAIM have been markedly lower than projected (SCAQMD, 2000). AQMD's early studies also found that RECLAIM would result in over 1,100 fewer jobs foregone and increased employment opportunities as compared to command and control (SCAQMD, 1993).

Program administration costs are difficult to pinpoint. The group that administers the RECLAIM program – running the program full-time and acting as a clearing house for all RECLAIM information within the AQMD – consists of one supervisor, four engineers, an inspector and a specialist (Luong, 2006). This group works closely with line inspectors, permit engineers, and a rulemaking group at different stages, making a total staff number elusive. An Environmental and Resource Economics article in 2000 reported that about 30-100 people (but only seven full-time) work on RECLAIM (Schwarze and Zapfel, 2000).

Monitoring and Reporting

RECLAIM's monitoring and reporting protocols are generally seen as stringent, comprehensive and effective. There have been some concerns about overly complex monitor certification requirements, but the program has taken steps to address this. A majority of emissions under the program are measured with CEMS (95 facilities with 456 major sources have CEMS (Luong, 2006), or two thirds of the covered universe, a very substantial number, especially considering the relatively small size of many facilities in terms of emissions per year), and facilities have displayed high passing rates for Relative Accuracy Test Audits and monitor availability. Most noncompliance with the RECLAIM program results from a failure to reconcile RTCs with emissions, rather than monitoring violations or reporting problems. Conservative missing data procedures help ensure complete emissions accountability. According to annual audits, as much as 20 percent of emissions were determined with these procedures in RECLAIM's early years, but more recently between 3-8 percent of emissions are determined with missing data procedures (primarily refinery emissions).

Stakeholder Involvement

Though often controversial, RECLAIM has made great efforts to encourage broad participation by the public, the regulated community, environmental and public health organizations and other interested stakeholders from the program's inception through its numerous changes and updates.

Multi-sector Coverage

RECLAIM includes a great diversity of sources, which could offer valuable insights into future trading programs that need to be more heterogeneous to achieve increasingly aggressive air quality goals. According to AQMD staff, one of the principal current topics under discussion about the program's future is a proposed "off-ramp" for small sources emitting 3 tons or less per year whereby such sources would instead face alternative requirements. These sources account for approximately 35-40 percent of the entire RECLAIM universe, but are responsible for only 2 percent of the emissions.

RECLAIM also includes provisions to generate credits outside the program. Of RECLAIM's EPA-approved Pilot Credit Generation rules, three rules have been used to generate credits: the pilot programs for refuse haulers, marine vessels and agricultural pumps. The total NO_x emission reduction credits potentially available from these programs as of the March 2006 audit was approximately 620 tons, with the vast majority of those credits resulting from NO_x reductions from 35 marine vessels. These credits are under various stages of audit and have not yet been released for use in the program.

PROGRAM CRITICISMS

RECLAIM has received its share of criticism, from too-sluggish emission reductions to accusations of criminal wrong-doing and negligence. Criticism about program efficacy peaked following the 2000 power crisis. In April 2001, the LA Times called RECLAIM a "serious disappointment" and the Deputy Executive Officer for the California ARB said RECLAIM "hasn't done as well as the regulations it replaced." The LA Times reported that RECLAIM had only reduced emissions by 16 percent, companies were failing to meet targets, and proposals to fix the program were "mired in controversy" (Polakovic, 2001). The AQMD answered with significant amendments to RECLAIM in May 2001, which in their determination "resulted in accelerating control equipment installation, reduced emissions and stabilized RTC prices," (US EPA, 2002) and subsequent changes have since called for even further reductions. This section examines the main criticisms.

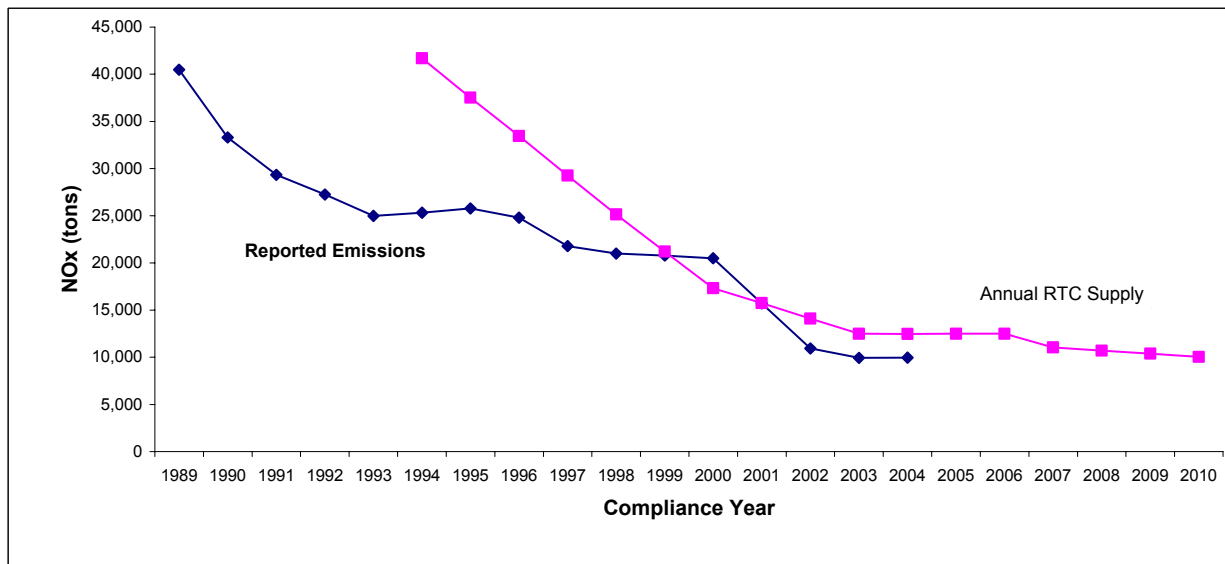
Excessive Allocations and Delayed Reductions

RECLAIM is frequently criticized for allocating too many NO_x RTCs to facilities in the early years of the program, sending the wrong signal to the market and delaying installation of control technologies. Because Southern California was experiencing a recession at the time of RECLAIM's inception, peak production rates were used in order to ensure that facilities were not locked into artificially low future production rates. As a result, initial allocations were as high as 40 percent above actual emissions in the first two years of the program (in 1994, more than 41,000 tons of RTCs were allocated, and NO_x emissions measured only approximately 25,000 tons). With emissions substantially lower than available RTCs, prices were low during the first years of the program (far lower than the cost of controlling emissions), and many sources not surprisingly chose to rely on the market. Thus, the market failed to send the appropriate price signals to install controls – in fact, there was a disincentive to install controls until the 2000 power crisis.

Figures 15 and 16 show the allocations for NO_x and SO₂ RTCs, respectively, as compared to emissions. Figure 15 clearly shows the impact of the power crisis in the elevated emissions in 2000, and the large NO_x reductions in the following years are largely attributable to the

installation of emission controls on power plants. The drops in SO₂ emissions are less well-explained, but largely attributable to refinery controls.

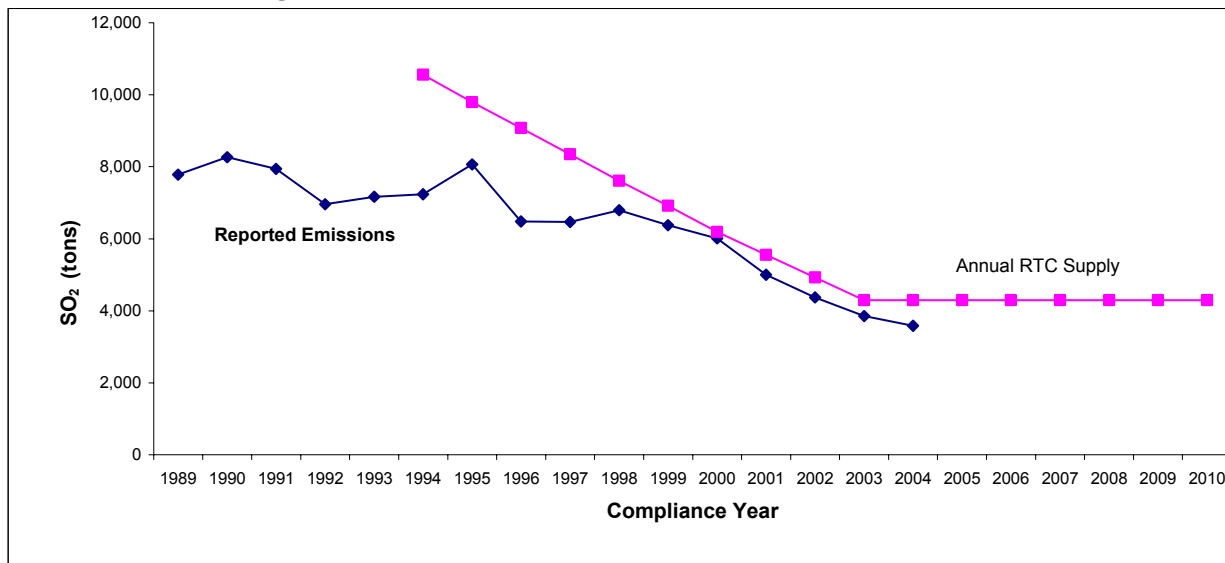
Figure 15: Annual NO_x Emissions and Available RTCs



Source: SCAQMD Annual RECLAIM Audit Report for the 2004 Compliance Year, March 3, 2006, page 3-6.

*Note that allocations in 1999 were 238 tons (1.1 percent) higher than emissions, but in 2000, emissions were significantly higher than allocations— by 3,294 tons, or 19 percent. In 2001, emissions also exceeded allocations, but only by 28 tons, or 0.18 percent.

Figure 16: Annual SO₂ Emissions and Available RTCs



Source: SCAQMD Annual RECLAIM Audit Report for the 2004 Compliance Year, March 3, 2006, page 3-6.

AQMD concluded “the program initially over-allocated, which led to under-utilization of available, cost-effective technologies...resulting in low credit prices, and leaving little incentive for further controls” (SCAQMD, 2005a). With the exception of the electricity crisis, between 15 – 30 percent of all RTCs expire each year without being used. EPA Region IX’s evaluation of RECLAIM finds “the majority of facilities in RECLAIM had little difficulty complying with their

annual allocations, even during the timeframe during which California's energy deregulation affected RECLAIM" (US EPA, 2001).

It should be noted, however, that RECLAIM's generous allocations were tied to the decision not to allow banking, which in turn was tied to designers' concerns about ambient pollution levels for attainment purposes. Since unused RTCs expire at the end of 12 months, the impact of unused RTCs on emissions is very time-limited. With banking, unused allocations could have been carried over indefinitely into future years to even further delay installation of controls. Conversely, it is possible that had the program included banking, there may have been a greater incentive to install controls earlier.

Accusations of Fraud and Mismanagement

It is commonly accepted that transparency and security are critical in a market-based program to ensure program integrity and public confidence. Even more so than with other pollution control programs, concerns about fraud can seriously undermine confidence and operations. RECLAIM has suffered from a few episodes related to fraud, adding to public concern and distrust:

- The California ARB's January 2000 evaluation found a number of problems with the program, including failure to settle violation notices in a timely manner.
- In September 2003, two California-based environmental organizations, Communities for a Better Environment and Our Children's Earth, filed a lawsuit against the SCAQMD alleging improper oversight of RECLAIM. Specifically, they alleged inaccurate recordkeeping and failure to carefully monitor exchange of credits, among other things, potentially resulting in 500 tons of excess NO_x emissions. The parties reached a settlement agreement in which SCAQMD agreed to create a \$1 million Supplemental Environmental Projects fund to achieve NO_x or fine particle reductions in low income communities disproportionately impacted by pollution.
- In June 2004, one of a number of RECLAIM's designers (who subsequently became a broker in the market) was arrested on charges of defrauding companies of millions of dollars and convicted on one count of wire fraud in April 2005.

Impacts of these events were exacerbated by lack of market transparency. In response, the AQMD has made strides in making data more accessible and available, and has added additional scrutiny to the trading process.

High Degree of Management and Resulting Uncertainty

There have been 17 amendments to RECLAIM since 1994. Many of the amendments simply clarify or elaborate on existing regulations, but others add or change requirements through interventions some observers characterize as excessive and/or reactive. For example, although RECLAIM was crafted as a market program, amendments in May 2001 fundamentally changed that structure, making RECLAIM more like a command and control program in order to correct the 2000 demand and price surges. Some say these corrections occurred far too quickly, without giving the market a chance to self-correct.

RECLAIM's governing structure – specifically the political nature of the Governing Board and its associated pressure to remedy a tense situation as quickly as practicable – may have contributed to this intervention. Another likely contributor was AQMD's new conclusion,

apparent in correspondence with EPA, that market programs must in fact be coupled with specific, enforceable control requirements. AQMD stated in 2002 that it believes an important lesson from RECLAIM is that it may not be feasible to rely on a 'pure' market-based program without requiring enforceable compliance plans (US EPA, 2002).

The high degree of intervention is seen by the AQMD's oversight of the trading market as well, which results in added integrity in some cases, and delays and uncertainties in others, impacting the development of a healthy, vibrant market. AQMD reports that it takes a week to process a trade, while brokers estimate closer to two weeks. Three different people review RTC trades to ensure that the RTCs are present in the seller's account, and that they have not previously been used.

A great deal of information is included in an RTC transfer request, which must be jointly filed by the buyer and seller with original signatures on the same form. For example, the transfer must include the origin of the RTCs (e.g., allocation by AQMD, conversion from mobile or area source ERCs); the buyer must indicate how the RTCs will be used (e.g., allocation increase to satisfy compliance requirements); and if the RTCs are for the current compliance year, the seller must indicate the reason for the generation of the RTCs (e.g., process change, control equipment, production decrease). Before approving a trade, AQMD will calculate a facility's emissions and holdings to see whether sufficient RTCs are held in aggregate – if not, the trade will be rejected. This high degree of involvement is controversial, and increases processing time, adds uncertainty and elevates program administration costs. With respect to the last point in particular, the benefit of this level of scrutiny is unclear.

RECLAIM has been criticized by EPA and others in the past for failing to supply adequate information about market performance and current environmental conditions, also compounding uncertainty. While AQMD has made strides to provide better information (e.g., the 2001 amendment requirements for more timely registration of trades), there are still elements that make informed decision-making and assessment of some program elements challenging (e.g., lack of easily accessible facility-level emissions data and emissions control equipment information). Further uncertainty is added with mobile and area source credits, although this is less of a concern now that several pilot credit programs have earned federal approval.

Finally, since RECLAIM was designed to achieve a BARCT equivalent reduction level, it remains open to further reduction requirements as pollution control technology improves, adding yet another element of uncertainty. However, incremental tightening of environmental requirements is of course also generally found in command and control systems.

SUMMARY OF KEY FINDINGS

- Between 1994 and 2004, monitored NO_x and SO₂ emissions from RECLAIM facilities dropped by 60 percent and 50 percent, respectively. Reductions from 1994 baseline allocation levels measure 75 and 65 percent, respectively.
- RECLAIM shows the critical nature of baseline credibility in a program's perceived success or failure. An inflated baseline led to a widely-acknowledged over-allocation of RTCs for the first several years of the program, sending the wrong signal to the market, delaying installation of control technologies, and providing a basis for critics to discount any reductions under the program.
- Ozone air quality in the LA Basin is improving, but it is not clear how much is due to RECLAIM, and the region still has a long way to go to achieve healthy air.
- Compliance rates with RECLAIM's NO_x and SO₂ requirements have ranged from 84 to 97 percent. Several multi-million dollar fines for excess emissions demonstrate AQMD's commitment to enforcement and send a strong signal to participants about accountability. Automatic financial penalties in addition to excess emission offsets with future year RTCs may provide an even stronger signal.
- RECLAIM's NO_x and SO₂ RTC markets are diverse, but do not have a significant volume of trades. There is confidence in the RTC currency backed by comprehensive emissions monitoring, but relatively low participation and high transaction costs for a cap and trade program. This is due in part to the AQMD scrutiny of trades and the substantial number of very small facilities in the program (more than one-third of facilities in RECLAIM each emitted less than 2 tons of NO_x in 2004).
- RECLAIM provides a great deal of valuable information on aggregate program performance in annual audits, but less substantial data on a more detailed level (e.g., historic facility specific emissions and pollution control equipment installations). Data availability has improved over time, however, in response to demand for greater confidence and accountability.
- The requirement that RECLAIM achieve an BARCT-equivalent reduction level that continues to evolve subjects RECLAIM facilities to a relatively high degree of regulatory uncertainty, but one necessary for the environmental goals of the program as it is designed. However, some uncertainties associated with the program, such as frequent rule changes and case-by-case scrutiny of transactions, do not appear to be directly linked to program goals and may in fact impede the effectiveness of the program
- RECLAIM has shown a remarkable resilience in getting back on track following setbacks and the AQMD has been very conscientious about incorporating broad stakeholder input to the greatest extent possible.

NEXT STEPS

According to CARB's 2000 evaluation of RECLAIM, "implementation of the RECLAIM program continues to be an enormous challenge for the District due to the complexity of Regulation XX [which defines the program requirements]."

With complexity comes uncertainty. Power plants are still primarily on the sidelines of the NO_x program until 2007. Regulations are in place for new reductions, but some facilities may be exempt. While several applications for exemptions have been filed, a final decision has not yet been made, leaving sources unsure as to whether their allocations will be shaved yet again to meet the new reductions (and also creating uncertainty since any facility that is exempted will not be allowed to sell or swap credits). Prices are beginning to edge upwards. New power generation is poised to come online in 2007 and 2008, just as existing power plants re-enter the market and the next phase of reductions begins.

It is unclear whether controlled power plants will add their surplus NO_x RTCs to the market each year to help ease the potential resulting shortage or whether those with surplus NO_x RTCs will instead hold onto them as long as possible (given the constraints on banking) as a hedge against unforeseen needs. There is concern about more changes to the program, either in response to market conditions or another revisiting of Best Available Retrofit Control Technology and command and control equivalency, particularly as the federal air quality standards are updated.

RECLAIM's future is not entirely clear in terms of exact emission reductions or additional cost savings, but with its broad stakeholder acceptance, there is every indication that it is here to stay. If the past is any guide, the program will frequently self-assess and prescribe solutions as new developments occur, making efforts to involve stakeholders and adapt to stay on target with goals and address concerns. While it is tempting to compare RECLAIM to other successful market programs, RECLAIM's distinctive characteristics – particularly its role in helping address the LA Basin's severe nonattainment problem, small regional scale, unique governing structure, and very broad and diverse source universe – make comparisons to other programs difficult. In terms of broad market-based principles, however, there are many lessons to be learned from the implementation of this ambitious program.

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