Analysis of Market Impacts of 2004 RECLAIM Amendments

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Review of NOx RECLAIM Market, 1994-2002

Since its inception in 1994, $682 million worth of RTCs have been traded in the RECLAIM market. In addition to yielding a reduction equivalent to or greater than that for the command-and-control regime, RECLAIM RTC prices have been at very low levels throughout this period, except during 2000-2002. This period experienced unusual conditions from the crisis in the electricity market and, therefore, power plant operations. Actions taken by SCAQMD stabilized the market and prices have generally returned to pre-2000 levels and substantially below the $15,000 per ton ceiling set under Rule 2015.

Figures 2-6 and 2-8 below (from Annual RECLAIM Audit Report for the 2002 Compliance Year) show RTC prices. Figure 3-1 shows comparable changes in annual emissions and annual RTCs available and holdings per day. Table 1 show data used in Figure 3-1.

Figure 2-6
Yearly Average Prices for NOx RTCs

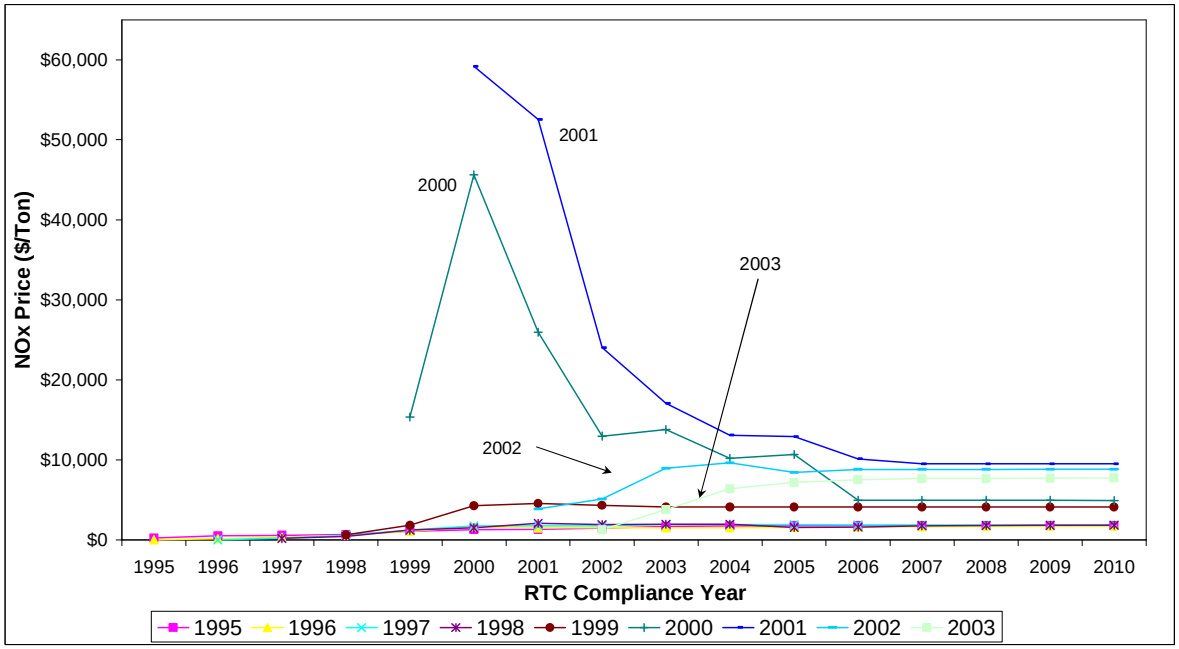


Figure 2-8
Changes in Monthly Average Prices for NOx RTCs since July 2001

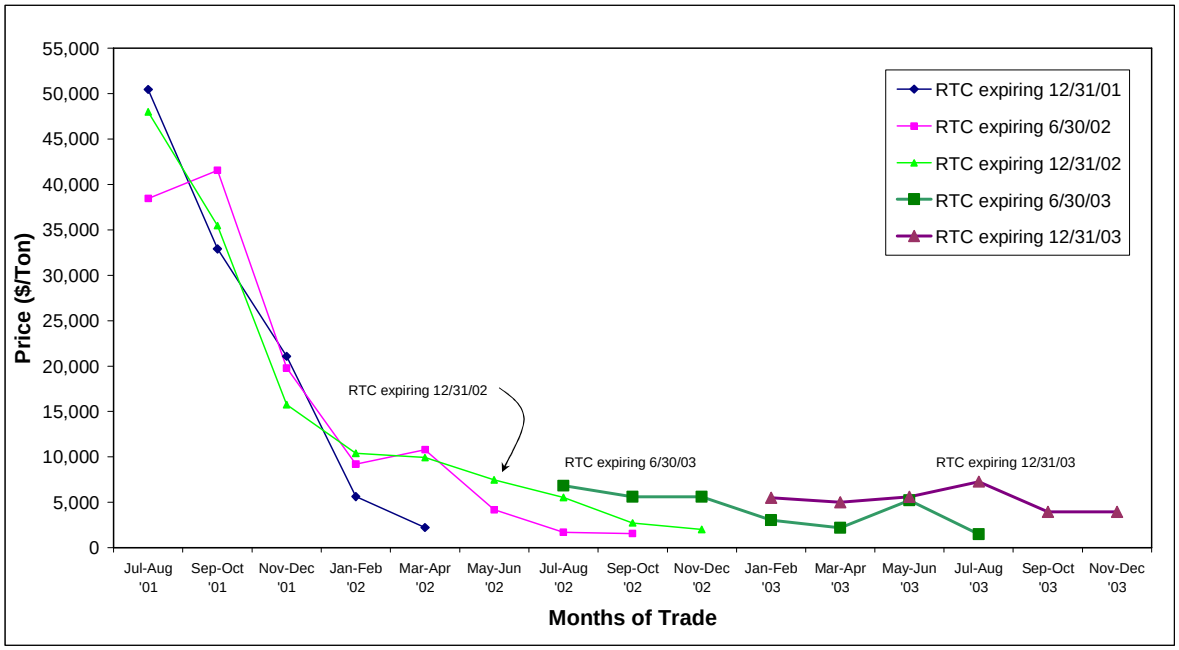


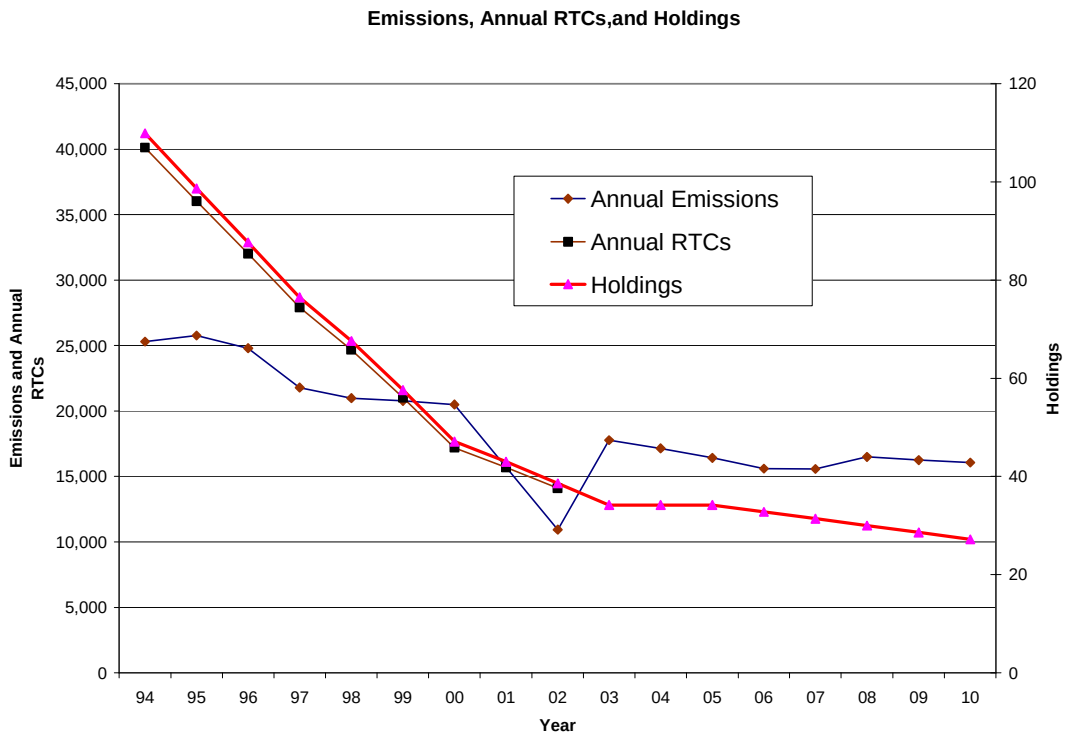
Table 1 - Annual NOx Emissions, RTCs and Holdings

	1994	1995	1996	1997	1998	1999	2000	2001	2002
1. Annual Emissions	25314	25764	24794	21786	20982	20775	20491	15721	10943
2. Annual Change (from 1994 base)		1.8%	-2.1%	-13.9%	-17.1%	-17.9%	-19.1%	-37.9%	-56.8%
3. Annual RTCs	40127	36031	32017	27919	24678	21013	17197	15693	14105
4. RTCs minus Emissions	14813	10267	7223	6133	3696	238	-3294	-28	3162
5. % Difference (4 as ratio of 1)	36.9%	28.5%	22.6%	22.0%	15.0%	1.1%	-19.2%	-0.2%	22.4%
6a. Holdings per day	109.9	98.7	87.7	76.5	67.6	57.6	47.1	43	38.6
7.a % Change in holdings (year over year)		10.19%	11.14%	12.77%	11.63%	14.79%	18.23%	-8.70	10.23%

	2003	2004	2005	2006	2007	2008	2009	2010
6b. Holdings	34.2	34.2	34.2	32.80	31.40	30.00	28.60	27.20
7b. % Change in holdings (year over year)	11.40%	0.00%	0.00%	4.09%	4.27%	4.46%	4.67%	4.90%

Figure 3-1

Annual NOx Emissions, RTCs and Holdings



Other than the period 2000-2002, there are only small changes in prices while there was a steady drop in emissions and RTCs available. The gap between the two (RTCs minus emissions) continued to shrink from 37% in 1994 to 15% in 1998. Then there was a sharp decline to 1.1% followed by two years of negative gap or excess demand for RTCs caused by the electricity crisis. However, the situation improved in 2002 to a 22% surplus and easing of price pressures. The lower level of emissions during 2001-2003 period in the RECLAIM market was partly due to the slowing economy and may also be attributed to the changes made in regulatory policy following the electricity crisis.

Price Effects of the Proposed Reductions

SCAQMD staff has proposed a reduction of 7 tons per day for the period 2006-2010. The impact on RTC prices of the proposed changes depends on the demand for RTCs which is dependent on the emissions generated. The supply of RTCs is easily calculated and is shown in Figure 3-1. The reduction in RTCs during 1994-1999 was a total of 60.5% or 12.1% on an annual basis. In comparison, the reductions sought in 2006-2010 period are for a total of 22.4% or 4.4% per year. These are much smaller than those that occurred during the 1994-1999 period.

Since price depends on both supply and demand conditions, one needs to also consider the emissions levels. The impact of the proposed reductions in available RTCs hinges on the trend in emission levels over the 2006-2010 period. Unexpected events, like the

energy crisis of 1999-2000 obviously cannot be predicted but socioeconomic changes need to be taken into account to estimate the likely trend. Socioeconomic projections of the AQMP are perhaps the best indicator of emissions.[1]

The national and local economy suffered an economic recession in 2001 but had a lingering effect that appears to be continuing. As a result, the economic growth has been slower than expected, especially when viewed in terms of jobs growth. Payroll jobs are expected to grow at a 1.79% annual rate for the period 1993-2010 according to the 2003 AQMP. Actual jobs growth for Southern California was approximately 1.7% for the period 1993-2003. This period included the expansion of 1994-2000 and the recession/slowdown of 2001-2003. It is difficult to make forecasts of emission levels for the near term but it is reasonable to expect that similar rates of growth will continue in the next few years.

However, total emissions showed a steady declining trend from 1994 to 1999, a period of vigorous job growth. This decline in emissions may be attributed to technology and process improvements in the firms in the RECLAIM market. It is thus reasonable to assume that such trends will continue at least in the short run. A more precise simulation of the trend in emissions is beyond the scope of the present project.

Under these assumptions, the market for RTCs will tighten over the 2006-2010 period and the RTC prices are likely to be higher as compared to those for the period 1994-1999. As is visible from Figure 3-1, the rate of decline for emissions is less than that for RTCs. Even though the rate of decline in RTCs for the period 2006-2010 is proposed to be much smaller, at only 4.4% a year compared to 12.1% for 1994-1999, it is likely that excess demand for RTCs will push up prices. However, such increases will yield prices that will still be far short of the $15,000 per ton ceiling.

Given the likelihood of upward pressure on prices during 2006-2010, it is advisable to have an option in place to release planned RTC reductions into the market. In other words, if the RTC price exceeds $15,000 per ton, the reductions should be allowed to become tradable. This trigger will act as a stabilizing force in the market.

Power Plants

Following the electricity crisis of 1999-2000, power plants were taken out of the RECLAIM market. This helped to stabilize RTC prices. Now that market conditions have returned to normal, it is prudent to include power plants back into the market. This will increase the size of the market and thus make it more efficient. To the extent that power plants can bring additional emission reductions, it eases the burden on the rest of the market. If there are relatively better (cheaper) sources of technological improvements in the power producing sector, these could help meet the proposed reductions with smaller increases in RTC prices.

[1] In this analysis, emissions were projected based on a five-year moving average, calculating the average emissions level over five-year intervals. A moving average is a smoothing technique that minimizes daily fluctuations and shows the historical trend of the data.

Other Considerations

1. A case study reported in the Review of RECLAIM Findings (October 20, 2000) listed several sources for future emission reductions (page 1-19 and Appendix A). While some of these opportunities may have already been exploited, it is likely that there is potential for further reductions. For example, boilers, process heaters, and gas turbines were mentioned as sources of significant gains. If these gains can be realized over the next few years, these can go a long way to bring stability to the market and keep RTC prices low. This, and other measures, could become part of the BARCT process.
2. If possible, the proposed reductions should be applied selectively, i.e., more reductions should be sought from industries that have greater potential and lower costs for emission reductions.
3. It is suggested that some RECLAIM facilities may want to move to a command-and-control program in the future. Such an option may yield higher emission reductions from these facilities. But if such actions upset the RECLAIM market and have a significant negative effect on prices, it may not be a prudent alternative from the point of view of overall emission abatement efforts.

RECLAIM markets have generally performed well and have helped the region move towards cleaner air without command-and-control measures. This market based mechanism needs careful monitoring and adjustments on an ongoing basis so that it can continue to lead to emissions reductions in an economically efficient manner.