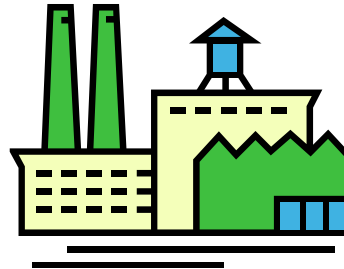


Emission Reduction Offset Transaction Costs Summary Report for 2017



ERC Bank



Stationary Source Offsets



ERC Trading



California Environmental Protection Agency



State of California

California Environmental Protection Agency

AIR RESOURCES BOARD

**Emission Reduction Offset Transaction Costs
Summary Report for 2017**

December 2018

This report has been reviewed by the staff of the California Air Resources Board. Publication does not signify that the contents necessarily reflect the views and policies of the Air Resources Board.

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EXECUTIVE SUMMARY

A. Background

Since 1993, Health and Safety Code Sections 40709 and 40709.5 have required local air quality management and air pollution control districts (district) to collect information regarding the cost of offset transactions from stationary source owners who purchase offsets as required by New Source Review (NSR) programs. State law also requires districts to adopt emission reduction credit (ERC) banking programs. Districts are required to collect specific information about offset transactions, including the price paid in dollars per ton, the pollutant traded, the amount traded, and the year of the transaction. Districts are also required to annually publish this information without disclosing the identity of the parties involved with the transaction. Districts that are not required to submit a plan for attainment of State ambient air quality standards and those that also meet federal air quality standards are exempt from such requirements.

B. Summary of 2017 Data

The California Air Resources Board (CARB) has compiled information regarding NSR offset transactions collected from all 35 districts and assembled it into this report. This report summarizes statewide emission reduction offset transactions in California for the year 2017. Districts that submit a plan for attainment of State ambient air quality standards and those that do not meet federal air quality standards are required to report their emission reduction offset transactions. A total of 219 transactions were reported to have taken place in California in 2017. This report does not include 23 hydrocarbon¹ (HC) transactions occurred in South Coast where there were no monetary costs. Of the remaining 196 transactions, two were for carbon monoxide (CO), three for sulfur oxides (SOx), 63 were for particulate matter with aerodynamic diameter less than 10 microns (PM10), 51 were for hydrocarbons (HC), and 77 were for oxides of nitrogen (NOx). A specific breakdown of all transactions by district is presented in Table V-1 (beginning on page 8). Unless otherwise noted, these transactions represent trades of offsets that are valid for the lifetime of the permitted source. This is in contrast to other types of credits that are valid for much shorter time frames (e.g., Regional Clean Air Incentives Market (RECLAIM) trading credits that are valid for one year).

C. Data Trends

Charts ES-1 and ES-2 illustrate the trends for the number of transactions and the number of tons traded during the past five years for the three most traded pollutants (HC, NOx, and PM10).

Chart ES-1 shows that in 2017, the number of reported transactions decreased for HC, but increased for NOx and PM10. Chart ES-2 shows that in 2017, the number of tons

¹ The term of hydrocarbon, as used in this report, includes volatile organic compounds and reactive organic compounds.

traded for HC, NOx and PM10 all decreased.

More information on California offset transactions that occurred from 1993 through 2017 can be found at ARB's Emission Reduction Credit Offsets webpage at: www.arb.ca.gov/nsr/erco/erco.htm.

Chart ES-1

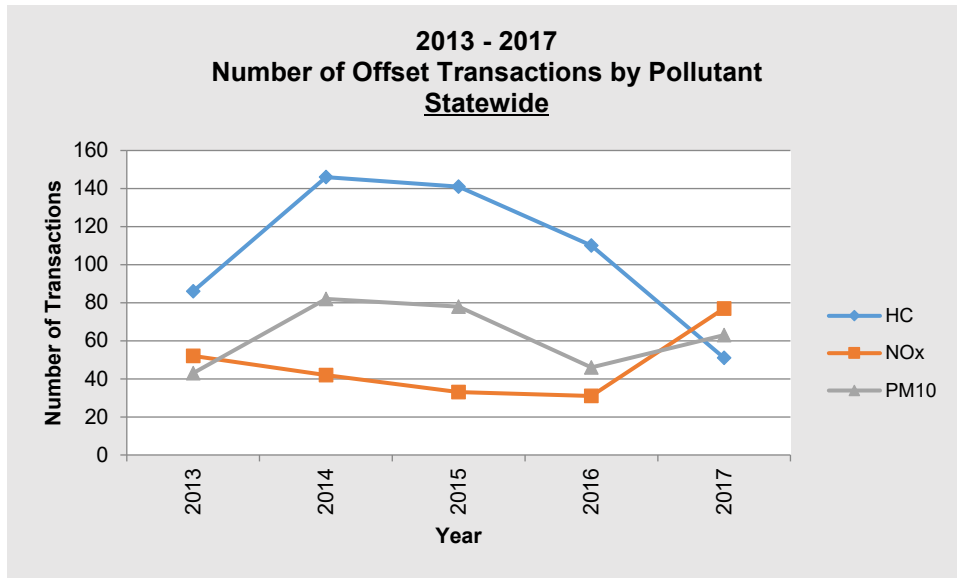
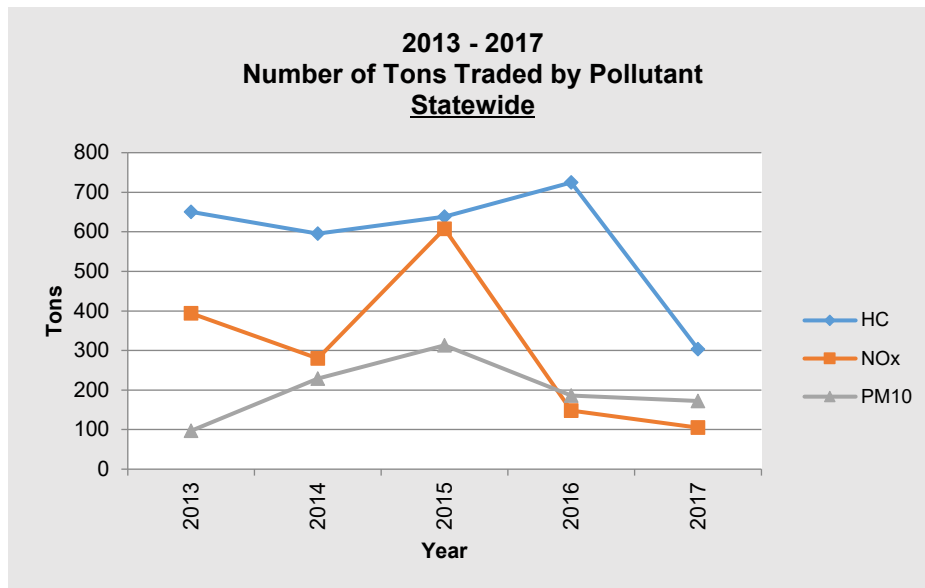


Chart ES-2



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I. INTRODUCTION

Section 40709.5(e) of the Health and Safety Code mandates that districts that are not exempt under Health and Safety Code Section 40709 collect information regarding the cost of offsets from stationary source owners who purchased offsets as required by district NSR programs. This report presents a compilation of the transactions in California from January 1 through December 31, 2017, as provided by the districts.

California's NSR programs are designed to accommodate industrial growth while protecting public health and the environment. The use of ERCs that are purchased on the open market to offset emissions from new or modified sources provides industry the flexibility to mitigate emissions in the most cost-effective manner, while ensuring that net emissions do not increase.

This report summarizes the prices paid for offsets, and the number and type of transactions taking place in California's emission credit market. This report does not attempt to analyze the cost data collected or attempt to predict future prices or ERC availability. As required by Health and Safety Code Section 40709.5(e), this report does not contain information that identifies the parties involved in the transactions.

Trading credits from the South Coast Air Quality Management District's Regional Clean Air Incentives Market (RECLAIM) program are not included because they are not directly comparable to ERCs used to satisfy NSR requirements. Also, tables and calculations do not include data on the cost of leasing credits from the Solutions for the Environment and Economic Development (SEED) program of the Sacramento Metropolitan Air Quality Management District.

II. NEW SOURCE REVIEW AND CALIFORNIA'S AIR QUALITY MANAGEMENT PROGRAM

The responsibility for controlling emissions from stationary sources of air pollution rests with California's local districts. The California Clean Air Act requires districts to adopt a NSR program that results in no net increase in emissions from new and modified stationary sources that have the potential to emit over a specified amount of nonattainment pollutants or their precursors. As part of NSR, stationary sources are required to apply the Best Available Control Technology (BACT) to reduce emissions. In some cases, stationary sources must also provide emission reduction credits (ERCs) to offset or mitigate the impact of emissions that remain from the source after the application of BACT. In order to qualify as mitigation, offsets must meet certain criteria: the emission reductions must be surplus to any federal, State or local laws or regulations and must be real, enforceable, quantifiable and permanent. California's offset requirements, reflected in district rules, are more stringent than federal offset requirements because they apply at lower emissions thresholds.

A. Emission Reduction Credit Banking and Trading

Emission reduction credit banking is defined as "a system by which reductions in emissions may be banked or otherwise credited to offset future increases... or a calculation method which enables internal emission reductions to be credited against increases" (Health and Safety Code Section 40709.5). Once created, ERCs may be banked with the district for future use by the source that generated them, used concurrently to offset new projects, or sold to other sources for use as mitigation.

The most common method of creating ERCs is to voluntarily control or curtail the emissions from an existing stationary source beyond that which is required by any regulation or rule. Curtailment could be from a change in operating hours of a source, the voluntary installation of additional pollution controls or through the shutdown of a source. Other less common methods of generating ERCs may include curtailing field burning of agricultural wastes. Credits must be generated pursuant to district rules and regulations, and must be reviewed and certified by the district. The legal requirements of credit generating programs are specified in the Health and Safety Code and further defined by rules in place in each district.

III. REQUIREMENTS TO REPORT COST OF OFFSETS

Sections 40709 and 40709.5 of the Health and Safety Code require districts that are not exempt to establish banking programs for ERCs and establish a mechanism to collect data regarding the price paid for offsets. The text of Health and Safety Code Sections 40709 and 40709.5 and Government Code Section 6254.7 can be found in Appendix A. The following is a summary of the requirements of those sections of the Government Code and the Health and Safety Code:

- Section 6254.7(f) of the Government Code authorizes districts to obtain information on the cost of offsets from applicants.
- Section 40709 of the Health and Safety Code makes an emission reduction banking system mandatory in every district except any district that is not required to submit a plan for attainment of State ambient air quality standards and if
 - The district is not in a federal nonattainment area for any national ambient air quality standard unless the sole reason for nonattainment is air pollutant transport and
 - A source has not petitioned the district to establish a banking system.
- Section 40709(c) of the Health and Safety Code specifies that emission reductions proposed to offset simultaneous emissions increases within the same stationary source need not be banked prior to use as offsets.
- Section 40709.5(e) requires that any district that has established a banking system is required to develop a program that provides the following information as public record:
 - Annual publication of the costs in dollars per ton, of emission offsets purchased for new and modified emission sources, excluding the identity of the parties involved.

- The annual publication shall specify for each offset purchase transaction:
 - The date of the offset transaction (year only)
 - The amount of offset purchased by pollutant
 - The total cost, by pollutant of the offsets purchased
- Each application for use of emission reductions banked shall provide sufficient information, as determined by the district, to perform the cost analysis.

IV. DATA COLLECTION PROCESS

In 1994, a subcommittee of the California Air Pollution Control Officers Association Engineering Managers worked with CARB to develop a uniform reporting form for collecting data from the districts for this report. The reporting form was designed to transmit information to CARB without disclosing the names of the transaction parties.

The form distinguishes between ERC categories: stationary, mobile, and agricultural offsets. The prices paid for credits may be affected by the type of source from which reductions are obtained. This is particularly true with mobile and agricultural sources that may have a finite lifespan.

The lifespan of the credit may significantly affect their price. For transactions involving credits with limited lifespans, the reporting form allows the districts to report the remaining useful life of those credits. Mobile source credits and lease agreement transactions for agricultural operations can also be distinguished using this section of the form.

The reporting form records the type of payment agreement, such as a direct sale of the credit, a barter for services or equipment, a transaction between subsidiary parties, or an assets transfer within a company. In each case, the type of transaction agreement may affect the price of the transaction.

Knowing these facts about each transaction will aid interested parties wishing to analyze credit market values.

A copy of the reporting form and instructions is in Appendix B. A glossary of terms is located in Appendix C.

V. DESCRIPTION OF 2017 STATEWIDE DATA

Table V-1 presents 196 transactions required to be reported that took place in California in 2017 listed alphabetically by individual district.

Leased and quarterly transaction costs are annualized for inclusion in the average cost figures presented throughout the report. The methodology used to annualize transactions can be found starting on page 33.

Per Health and Safety Code, affected districts must report to ARB regardless of whether any offset transactions occurred. Table V-2 lists the districts that reported no transactions in 2017.

In 2017, nine districts reported transactions. Tables A-1, B-1, C-1, D-1, E-1, F-1, G-1, H-1 and I-1 present information, by district, for CO, HC, NOx, PM10 and SOx reported by each district. Each table lists the pollutant, cost per ton of pollutant, and the total tons of pollutant traded. The price paid per ton was calculated by dividing the cost of the transaction by the number of tons traded in that transaction. The information is presented individually for each district since offset markets and costs per ton vary between districts and between transactions within the same district.

Tables A-2, B-2, C-2, D-2, E-2, F-2, G-2, H-2 and I-2 provide the total tons traded and the average, median, high and low prices paid per transaction per ton of pollutant. These tables exclude asset transfer, subsidiary, barter, and other non-monetary transactions.

For each district that reported monetary transactions for the three most actively traded criteria pollutants (HC, NOx, and PM10), Charts 1 - 11 illustrate the average cost of offsets per transaction for the past five years.

**Table V-1
2017 California Emission Reduction Credit Transaction Costs by District
Reported in Total Tons Traded**

District	Pollutant	\$/Ton	Tons	Notes
Bay Area AQMD	HC	\$5,105	31.741	Stationary
Total of 20 transactions	HC	\$5,700	0.300	Stationary
	HC	\$5,700	3.026	Stationary
	HC	\$6,000	5.930	Stationary
	HC	\$6,000	31.741	Stationary
	HC	\$6,000	74.000	Stationary
	HC	\$6,400	30.000	Stationary
	HC	\$6,500	0.836	Stationary
	HC	\$6,500	3.400	Stationary
	HC	\$7,000	35.740	Stationary
	HC	\$7,000	10.130	Stationary
	HC	\$7,000	2.100	Stationary
	NOx	\$9,000	1.090	Stationary
	NOx	\$13,000	4.400	Stationary
	NOx	\$13,145	7.050	Stationary
	NOx	\$13,415	0.703	Stationary
	NOx	\$14,000	1.090	Stationary
	NOx	\$14,000	3.910	Stationary
	NOx	\$16,500	4.350	Stationary
	NOx	\$18,000	0.530	Stationary
Imperial County APCD	NOx	\$1,875	1.560	1 Year Agricultural Offset
Total of 101 transactions	NOx	\$2,000	2.150	1 Year Agricultural Offset
	NOx	\$2,000	0.580	1 Year Agricultural Offset
	NOx	\$2,000	0.830	1 Year Agricultural Offset
	NOx	\$2,000	0.110	1 Year Agricultural Offset
	NOx	\$2,000	0.500	1 Year Agricultural Offset
	NOx	\$2,000	0.250	1 Year Agricultural Offset
	NOx	\$2,000	0.290	1 Year Agricultural Offset
	NOx	\$2,000	0.360	1 Year Agricultural Offset
	NOx	\$2,000	0.110	1 Year Agricultural Offset
	NOx	\$2,000	0.110	1 Year Agricultural Offset
	NOx	\$2,000	0.090	1 Year Agricultural Offset
	NOx	\$2,000	1.050	1 Year Agricultural Offset
	NOx	\$2,250	0.200	1 Year Agricultural Offset
	NOx	\$2,250	1.530	1 Year Agricultural Offset
	NOx	\$2,250	0.440	1 Year Agricultural Offset
	NOx	\$2,250	0.170	1 Year Agricultural Offset
	NOx	\$2,250	2.520	1 Year Agricultural Offset

Table V-1 (continued)

District	Pollutant	\$/Ton	Tons	Notes
	NOx	\$2,250	1.840	1 Year Agricultural Offset
	NOx	\$2,250	1.410	1 Year Agricultural Offset
	NOx	\$2,250	1.160	1 Year Agricultural Offset
	NOx	\$2,250	0.490	1 Year Agricultural Offset
	NOx	\$2,250	0.730	1 Year Agricultural Offset
	NOx	\$2,250	1.710	1 Year Agricultural Offset
	NOx	\$2,500	0.150	1 Year Agricultural Offset
	NOx	\$2,500	0.340	1 Year Agricultural Offset
	NOx	\$2,500	0.450	1 Year Agricultural Offset
	NOx	\$2,500	0.760	1 Year Agricultural Offset
	NOx	\$2,500	1.000	1 Year Agricultural Offset
	NOx	\$2,500	1.450	1 Year Agricultural Offset
	NOx	\$2,500	1.790	1 Year Agricultural Offset
	NOx	\$2,500	2.390	1 Year Agricultural Offset
	NOx	\$2,500	2.380	1 Year Agricultural Offset
	NOx	\$2,500	0.110	1 Year Agricultural Offset
	NOx	\$2,500	0.070	1 Year Agricultural Offset
	NOx	\$2,500	1.050	1 Year Agricultural Offset
	NOx	\$2,625	2.840	1 Year Agricultural Offset
	NOx	\$2,750	2.820	1 Year Agricultural Offset
	NOx	\$2,750	3.380	1 Year Agricultural Offset
	NOx	\$2,750	5.670	1 Year Agricultural Offset
	NOx	\$2,750	2.290	1 Year Agricultural Offset
	NOx	\$2,816	0.390	1 Year Agricultural Offset
	NOx	\$2,816	1.730	1 Year Agricultural Offset
	NOx	\$3,000	1.870	1 Year Agricultural Offset
	NOx	\$3,000	0.640	1 Year Agricultural Offset
	NOx	\$3,000	0.280	1 Year Agricultural Offset
	PM10	\$300	1.810	1 Year Agricultural Offset
	PM10	\$300	2.850	1 Year Agricultural Offset
	PM10	\$300	4.540	1 Year Agricultural Offset
	PM10	\$375	1.130	1 Year Agricultural Offset
	PM10	\$375	2.130	1 Year Agricultural Offset
	PM10	\$375	2.740	1 Year Agricultural Offset
	PM10	\$375	4.450	1 Year Agricultural Offset
	PM10	\$375	4.970	1 Year Agricultural Offset
	PM10	\$400	0.200	1 Year Agricultural Offset
	PM10	\$400	0.390	1 Year Agricultural Offset
	PM10	\$400	0.440	1 Year Agricultural Offset
	PM10	\$400	0.520	1 Year Agricultural Offset
	PM10	\$400	0.710	1 Year Agricultural Offset
	PM10	\$400	0.810	1 Year Agricultural Offset
	PM10	\$400	0.820	1 Year Agricultural Offset

Table V-1 (continued)

District	Pollutant	\$/Ton	Tons	Notes
	PM10	\$400	0.880	1 Year Agricultural Offset
	PM10	\$400	1.220	1 Year Agricultural Offset
	PM10	\$400	1.580	1 Year Agricultural Offset
	PM10	\$400	2.020	1 Year Agricultural Offset
	PM10	\$400	2.370	1 Year Agricultural Offset
	PM10	\$400	2.480	1 Year Agricultural Offset
	PM10	\$400	2.670	1 Year Agricultural Offset
	PM10	\$400	3.520	1 Year Agricultural Offset
	PM10	\$400	3.720	1 Year Agricultural Offset
	PM10	\$400	4.430	1 Year Agricultural Offset
	PM10	\$400	5.130	1 Year Agricultural Offset
	PM10	\$425	1.020	1 Year Agricultural Offset
	PM10	\$425	1.770	1 Year Agricultural Offset
	PM10	\$425	2.150	1 Year Agricultural Offset
	PM10	\$435	4.700	1 Year Agricultural Offset
	PM10	\$450	0.010	1 Year Agricultural Offset
	PM10	\$450	0.250	1 Year Agricultural Offset
	PM10	\$450	0.380	1 Year Agricultural Offset
	PM10	\$450	1.180	1 Year Agricultural Offset
	PM10	\$450	1.740	1 Year Agricultural Offset
	PM10	\$450	2.050	1 Year Agricultural Offset
	PM10	\$450	2.060	1 Year Agricultural Offset
	PM10	\$450	2.140	1 Year Agricultural Offset
	PM10	\$500	0.450	1 Year Agricultural Offset
	PM10	\$500	0.530	1 Year Agricultural Offset
	PM10	\$500	0.940	1 Year Agricultural Offset
	PM10	\$500	0.970	1 Year Agricultural Offset
	PM10	\$500	1.100	1 Year Agricultural Offset
	PM10	\$500	1.870	1 Year Agricultural Offset
	PM10	\$500	1.930	1 Year Agricultural Offset
	PM10	\$500	2.360	1 Year Agricultural Offset
	PM10	\$500	3.130	1 Year Agricultural Offset
	PM10	\$500	3.210	1 Year Agricultural Offset
	PM10	\$500	3.390	1 Year Agricultural Offset
	PM10	\$500	5.470	1 Year Agricultural Offset
	PM10	\$500	6.130	1 Year Agricultural Offset
	PM10	\$500	6.160	1 Year Agricultural Offset
	PM10	\$500	8.100	1 Year Agricultural Offset
	PM10	\$500	9.970	1 Year Agricultural Offset
	PM10	\$500	13.980	1 Year Agricultural Offset
Placer County APCD	CO	\$25	42.114	Agricultural (Q1,Q2,Q3,Q4)
Total of 6 transactions	HC	\$7,827	0.862	Agricultural (Q1,Q4)
	PM10	\$7,983	1.525	Agricultural (Q1,Q4)
	PM10	\$9,483	3.097	Agricultural (Q2,Q3)
	NOx	\$10,740	0.954	Agricultural (Q1,Q4)

Table V-1 (continued)

District	Pollutant	\$/Ton	Tons	Notes
	SOx	\$500	0.807	Agricultural (Q1,Q2,Q3,Q4)
San Joaquin Valley APCD	CO	\$2,500	0.033	Stationary
Total of 33 Transactions	HC	\$618	0.069	Stationary
	HC	\$645	0.072	Stationary
	HC	\$694	0.077	Stationary
	HC	\$739	0.082	Stationary
	HC	\$779	0.087	Stationary
	HC	\$824	0.092	Stationary
	HC	\$878	0.098	Stationary
	HC	\$904	0.101	Stationary
	HC	\$4,000	10.000	Stationary
	HC	\$4,750	2.000	Stationary
	HC	\$5,000	0.067	Stationary
	HC	\$5,000	0.200	Stationary
	HC	\$5,000	0.009	Stationary
	HC	\$5,059	0.305	Stationary
	NOx	\$21,750	3.000	Stationary
	NOx	\$21,750	1.000	Stationary
	NOx	\$21,750	2.500	Stationary
	NOx	\$21,750	2.500	Stationary
	NOx	\$24,000	3.989	Stationary
	NOx	\$24,000	2.790	Stationary
	NOx	\$29,500	1.000	Stationary
	NOx	\$30,000	0.242	Stationary
	NOx	\$33,000	1.469	Stationary
	NOx	\$33,000	1.530	Stationary
	PM10	\$6,415	3.187	Stationary
	PM10	\$6,415	4.607	Stationary
	PM10	\$14,500	1.500	Stationary
	PM10	\$16,000	8.004	Stationary
	PM10	\$16,000	1.394	Stationary
	PM10	\$17,000	0.935	Stationary
	SOx	\$16,000	0.387	Stationary
	SOx	\$16,000	0.026	Stationary
San Luis Obispo APCD	HC	\$20,000	20.000	Stationary
Santa Barbara County APCD	HC	\$75,000	0.360	Stationary
Total of 2 Transactions	NOx	\$75,000	3.126	Stationary
South Coast AQMD	HC	\$20,547	0.370	Stationary
Total of 26 Transactions	HC	\$21,917	2.190	Stationary
	HC	\$21,917	0.730	Stationary
	HC	\$21,917	12.96	Stationary
	HC	\$21,917	0.180	Stationary
	HC	\$21,917	2.370	Stationary
	HC	\$21,917	0.730	Stationary

Table V-1 (continued)

District	Pollutant	\$/Ton	Tons	Notes
	HC	\$22,465	1.100	Stationary
	HC	\$22,465	3.470	Stationary
	HC	\$22,465	1.830	Stationary
	HC	\$22,465	0.550	Stationary
	HC	\$23,562	0.730	Stationary
	HC	\$25,753	0.180	Stationary
	HC	\$26,027	0.180	Stationary
	HC	\$26,027	0.180	Stationary
	NOx	\$83,561	1.100	Stationary
	NOx	\$83,561	0.550	Stationary
	NOx	\$83,561	0.370	Stationary
	NOx	\$83,561	0.370	Stationary
	NOx	\$83,561	0.180	Stationary
	NOx	\$83,561	0.180	Stationary
	NOx	\$83,561	0.180	Stationary
	NOx	\$83,561	0.180	Stationary
	NOx	\$83,561	0.180	Stationary
	NOx	\$83,561	0.180	Stationary
	NOx	\$83,561	0.180	Stationary
	NOx	\$83,561	0.180	Stationary
Ventura County APCD	HC	\$21,000	2.000	Stationary
Total of 5 Transactions	HC	\$61,750	1.000	Stationary
	HC	\$61,750	1.000	Stationary
	HC	\$61,750	1.000	Stationary
	HC	\$62,700	1.000	Stationary
Yolo Solano AQMD	HC	\$16,129	5.000	Agricultural
Total of 2 Transactions	HC	\$25,000	1.130	Agricultural

**Table V-2
Districts with No Offset Transactions to Report in 2017**

District	Year of Last Reported Offsets
Amador County Air Pollution Control District	N/A*
Antelope Valley Air Pollution Control District	N/A*
Butte County Air Quality Management District	2011
Calaveras County Air Pollution Control District	N/A*
Colusa County Air Pollution Control District	2008
Eastern Kern Air Pollution Control District	2000
El Dorado County Air Quality Management District	2006
Feather River Air Quality Management District	2016
Glenn County Air Pollution Control District	N/A*
Great Basin Unified Air Pollution Control District	N/A*
Lake County Air Quality Management District	N/A*
Lassen County Air Pollution Control District	N/A*
Mariposa County Air Pollution Control District	N/A*
Mendocino County Air Pollution Control District	N/A*
Modoc County Air Pollution Control District	N/A*
Mojave Desert AQMD	2014
Monterey Bay Air Resources District	2016
North Coast Unified Air Quality Management	N/A**
Northern Sierra Air Quality Management District	N/A*
Northern Sonoma County Air Pollution Control	N/A*
Sacramento Metro Air Quality Management District	2016
San Diego County Air Pollution Control District	2012
Shasta County Air Quality Management District	2014
Siskiyou County Air Pollution Control District	N/A*
Tehama County Air Pollution Control District	2010
Tuolumne County Air Pollution Control District	N/A*

* No record of offset transactions reported. Districts that are not required to submit a plan for attainment of State ambient air quality standards and those that also meet federal air quality standards are exempt from the requirement to collect information regarding the cost of offset transactions.

** The North Coast Unified AQMD is not required to submit a plan for attainment with State air quality standards and is not designated non-attainment with any federal ambient air quality standard. However, the District's Board elected to establish an offset program and is required to prepare an annual publication of the costs, in dollars per ton, of emission offsets purchased for new and modified emission sources.

VI. DESCRIPTION OF 2017 DATA BY DISTRICT

A. Bay Area Air Quality Management District

The Bay Area Air Quality Management District (BAAQMD) reported 20 monetary transactions in 2017. Of those 20 transactions, 12 were for HC, 8 were for NOx.

**Table A-1
2017 Emission Reduction Credit Transaction Costs
Reported in Total Tons Traded
BAAQMD**

Pollutant	\$/Ton	Tons
HC	\$5,105	31.740
HC	\$5,700	0.300
HC	\$5,700	3.026
HC	\$6,000	5.930
HC	\$6,000	31.741
HC	\$6,000	74.000
HC	\$6,400	30.000
HC	\$6,500	0.836
HC	\$6,500	3.400
HC	\$7,000	35.740
HC	\$7,000	10.130
HC	\$7,000	2.100
NOx	\$9,000	1.090
NOx	\$13,000	4.400
NOx	\$13,145	7.050
NOx	\$13,415	0.703
NOx	\$14,000	1.090
NOx	\$14,000	3.910
NOx	\$16,500	4.350
NOx	\$18,000	0.530

**Table A-2
2017 Summary Statistics for Emission Reduction Credit Transactions
BAAQMD**

Pollutant	Total Tons Traded	Average (mean)	Median \$/Ton	High \$/Ton	Low \$/Ton
HC	228.921	\$6,242	\$6,200	\$7,000	\$5,105
NOx	23.124	\$13,883	\$13,708	\$18,000	\$9,000

Chart 1

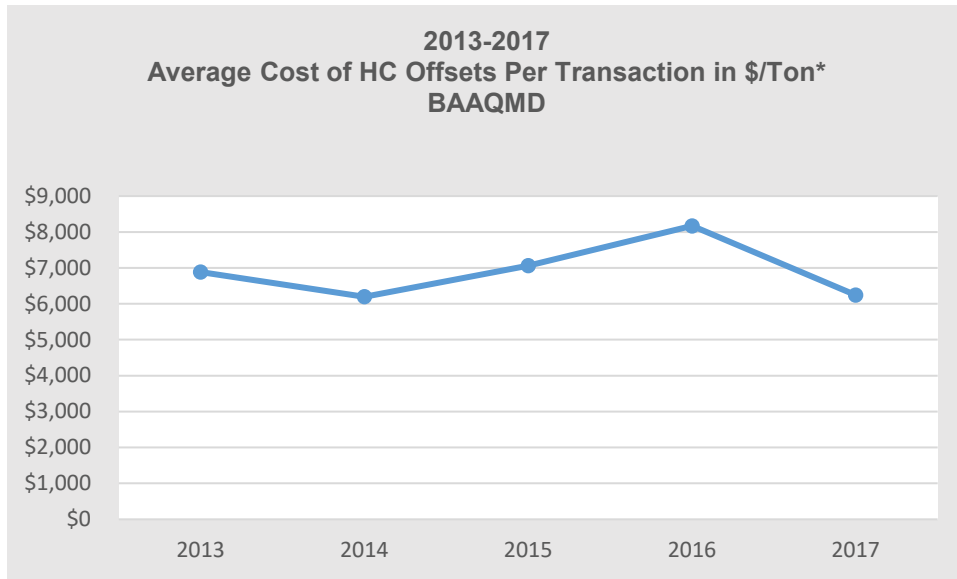
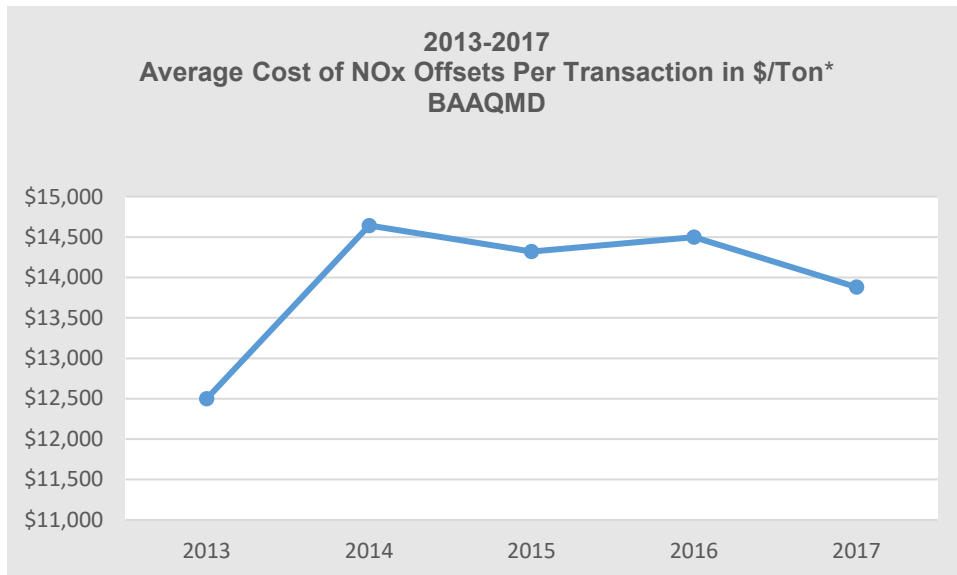


Chart 2



* Excludes asset transfer, subsidiary, barter, and other non-monetary transactions with no cost data.

B. Imperial County Air Pollution Control District

The Imperial County Air Pollution Control District (ICAPCD) reported 101 monetary transactions in 2017. Of those 101 transactions, 46 were for NOx and 55 were for PM10.

**Table B-1
2017 Emission Reduction Credit Transaction Costs
Reported in Total Tons Traded**

Pollutant	\$/Ton	Tons
NOx	\$1,875	1.560
NOx	\$2,000	2.150
NOx	\$2,000	0.580
NOx	\$2,000	0.830
NOx	\$2,000	0.110
NOx	\$2,000	0.500
NOx	\$2,000	0.250
NOx	\$2,000	0.290
NOx	\$2,000	0.360
NOx	\$2,000	0.110
NOx	\$2,000	0.110
NOx	\$2,000	0.090
NOx	\$2,000	1.050
NOx	\$2,250	0.200
NOx	\$2,250	1.530
NOx	\$2,250	0.440
NOx	\$2,250	0.170
NOx	\$2,250	2.520
NOx	\$2,250	1.840
NOx	\$2,250	1.410
NOx	\$2,250	1.160
NOx	\$2,250	0.490
NOx	\$2,250	0.730
NOx	\$2,250	1.710
NOx	\$2,500	0.150
NOx	\$2,500	0.340
NOx	\$2,500	0.450
NOx	\$2,500	0.760
NOx	\$2,500	1.000
NOx	\$2,500	1.450
NOx	\$2,500	1.790
NOx	\$2,500	2.390
NOx	\$2,500	2.380
NOx	\$2,500	0.110
NOx	\$2,500	0.070
NOx	\$2,500	1.050
NOx	\$2,625	2.840
NOx	\$2,750	2.820
NOx	\$2,750	3.380
NOx	\$2,750	5.670

Table B-1 (continued)

Pollutant	\$/Ton	Tons
NOx	\$2,750	2.290
NOx	\$2,816	0.390
NOx	\$2,816	1.730
NOx	\$3,000	1.870
NOx	\$3,000	0.640
NOx	\$3,000	0.280
PM10	\$300	1.810
PM10	\$300	2.850
PM10	\$300	4.540
PM10	\$375	1.130
PM10	\$375	2.130
PM10	\$375	2.740
PM10	\$375	4.450
PM10	\$375	4.970
PM10	\$400	0.200
PM10	\$400	0.390
PM10	\$400	0.440
PM10	\$400	0.520
PM10	\$400	0.710
PM10	\$400	0.810
PM10	\$400	0.820
PM10	\$400	0.880
PM10	\$400	1.220
PM10	\$400	1.580
PM10	\$400	2.020
PM10	\$400	2.370
PM10	\$400	2.480
PM10	\$400	2.670
PM10	\$400	3.520
PM10	\$400	3.720
PM10	\$400	4.430
PM10	\$400	5.130
PM10	\$425	1.020
PM10	\$425	1.770
PM10	\$425	2.150
PM10	\$435	4.700
PM10	\$450	0.010
PM10	\$450	0.250
PM10	\$450	0.380
PM10	\$450	1.180
PM10	\$450	1.740
PM10	\$450	2.050
PM10	\$450	2.060
PM10	\$450	2.140
PM10	\$500	0.450
PM10	\$500	0.530
PM10	\$500	0.940
PM10	\$500	0.970
PM10	\$500	1.100
PM10	\$500	1.870
PM10	\$500	1.930

Table B-1 (continued)

Pollutant	\$/Ton	Tons
PM10	\$500	2.360
PM10	\$500	3.130
PM10	\$500	3.210
PM10	\$500	3.390
PM10	\$500	5.470
PM10	\$500	6.130
PM10	\$500	6.160
PM10	\$500	8.100
PM10	\$500	9.970
PM10	\$500	13.980

**Table B-2
2017 Summary Statistics for Emission Reduction Credit Transactions
ICAPCD**

Pollutant	Total Tons Traded	Average (mean)	Median \$/Ton	High \$/Ton	Low \$/Ton
NOx	54.040	\$2,367	\$2,250	\$3,000	\$1,875
PM10	147.670	\$432.5	\$425	\$500	\$300

Chart 3

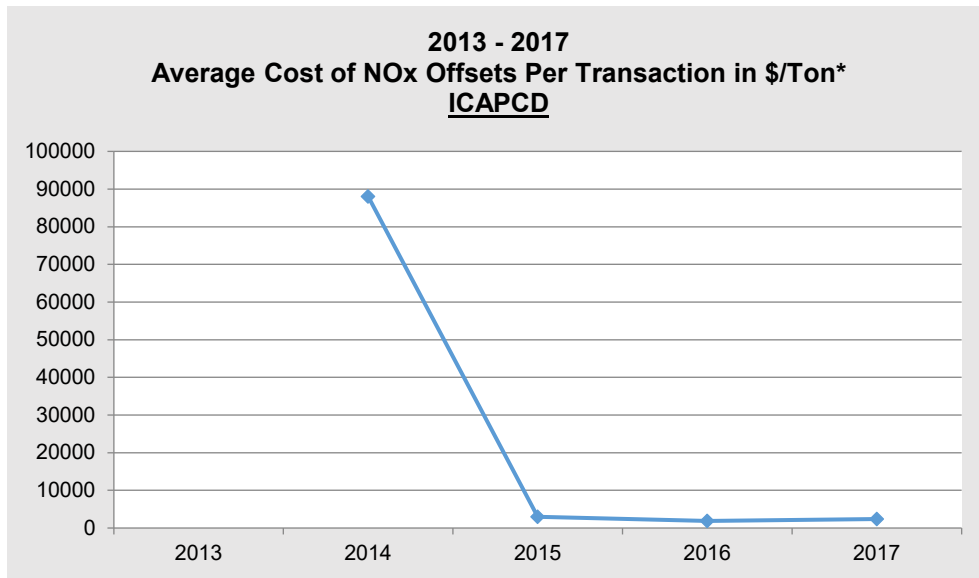
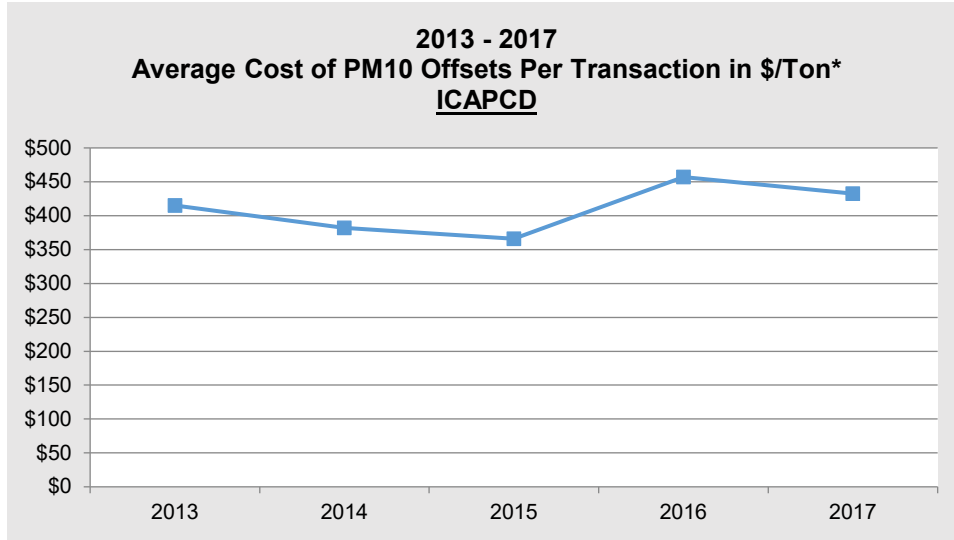


Chart 4



* Excludes asset transfer, subsidiary, barter, and other non-monetary transactions with no cost data.

C. Placer County Air Pollution Control District

The Placer County Air Pollution Control District (PCAPCD) reported six transactions: one HC, one NOx, one SOX, two PM10 and one CO

**Table C-1
2017 Emission Reduction Credit Transaction Costs
Reported in Total Tons Traded
PCAPCD**

Pollutant	\$/Ton	Tons
CO	\$25	42.114
HC	\$7,827	0.862
NOx	\$10,740	0.954
PM10	\$7,983	1.525
PM10	\$9,483	3.097
SOx	\$500	0.807

**Table C-2
2017 Summary Statistics for Emission Reduction Credit Transactions*
PCAPCD**

Pollutant	Total Tons Traded	Average (mean)	Median \$/Ton	High \$/Ton	Low \$/Ton
CO	42.114	\$25	\$25	\$25	\$25
HC	0.862	\$7,827	\$7,827	\$7,827	\$7,827
NOx	0.954	\$10,740	\$10,740	\$10,740	\$10,740
PM10	4.622	\$8,733	\$8,733	\$9,483	\$7,893
SOx	0.807	\$500	\$500	\$500	\$500

D. San Joaquin Valley Air Pollution Control District

The San Joaquin Valley Air Pollution Control District (SJVAPCD) reported 33 transactions: one transaction for CO, 14 for HC, 10 for NOx, 6 for PM10, and 2 for SOx

**Table D-1
2017 Emission Reduction Credit Transaction Costs
Reported in Total Tons Traded
SJVAPCD**

Pollutant	\$/Ton	Tons
CO	\$2,500	0.0335
HC	\$618	0.069
HC	\$645	0.072
HC	\$694	0.076
HC	\$739	0.083
HC	\$779	0.087
HC	\$824	0.092
HC	\$878	0.098
HC	\$904	0.101
HC	\$4,000	10.000
HC	\$4,750	2.000
HC	\$5,000	0.067
HC	\$5,000	0.200
HC	\$5,000	0.009
HC	\$5,059	0.306
NOx	\$21,750	3.000
NOx	\$21,750	1.000
NOx	\$21,750	2.500
NOx	\$21,750	2.500
NOx	\$24,000	3.989
NOx	\$24,000	2.790
NOx	\$29,500	1.000
NOx	\$30,000	0.242

Table G-1 (continued)

Pollutant	\$/Ton	Tons
NOx	\$33,000	1.469
NOx	\$33,000	1.530
PM10	\$6,415	3.187
PM10	\$6,415	4.607
PM10	\$14,500	1.5
PM10	\$16,000	8.004
PM10	\$16,000	1.394
PM10	\$17,000	0.935
SOx	\$16,000	0.387
SOx	\$16,000	0.026

**Table D-2
2017 Summary Statistics for Emission Reduction Credit Transactions*
SJVAPCD**

Pollutant	Total Tons Traded	Average (mean)	Median \$/Ton	High \$/Ton	Low \$/Ton
CO	0.034	\$2,500	\$2,500	\$2,500	\$2,500
HC	13.260	\$2,492	\$891	\$5,059	\$618
NOx	20.018	\$26,050	\$24,000	\$33,000	\$21,750
PM10	19.629	\$12,721	\$15,250	\$17,000	\$6,415
SOx	0.413	\$16,000	\$16,000	\$16,000	\$16,000

Chart 5

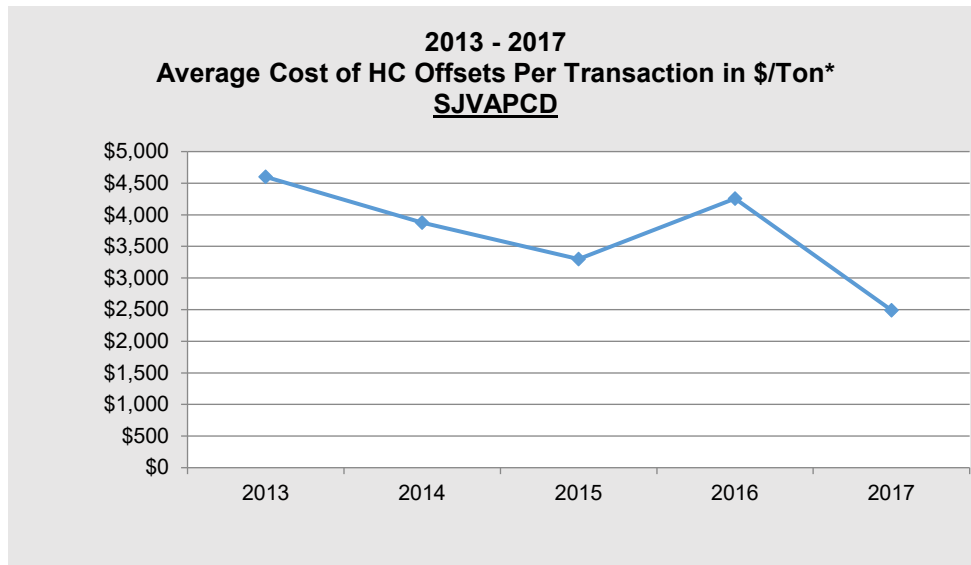


Chart 6

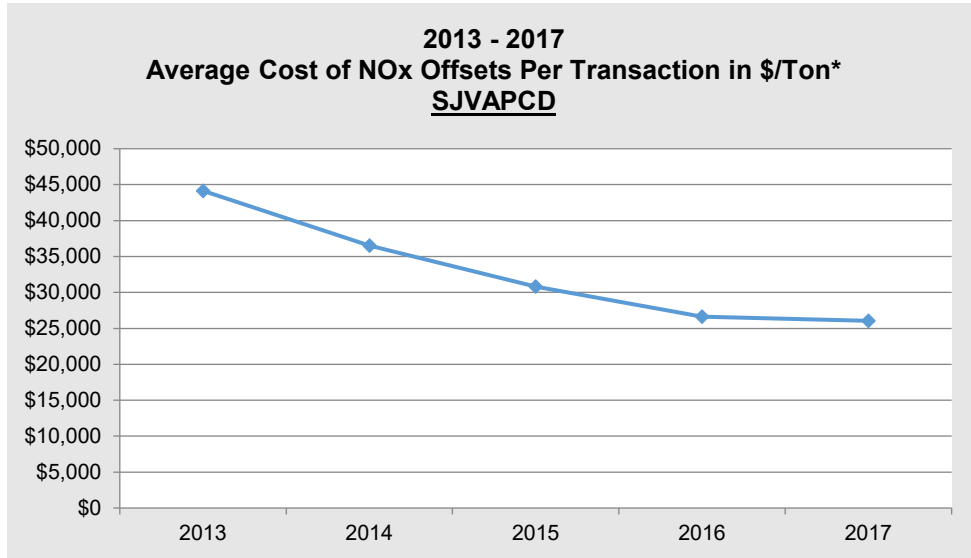
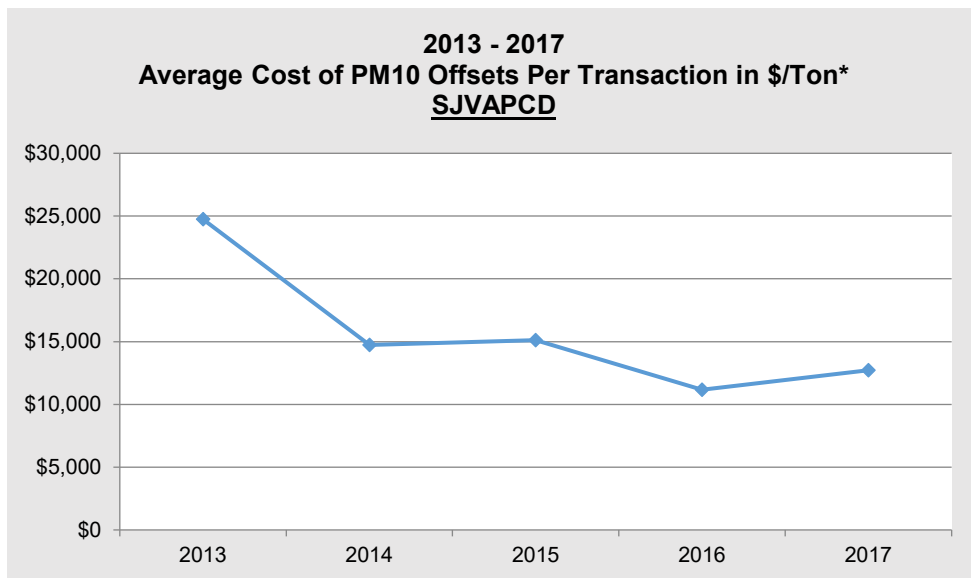


Chart 7



* Excludes asset transfer, subsidiary, barter, and other non-monetary transactions with no cost data.

E. San Luis Obispo County Air Pollution Control District

The San Luis Obispo County Air Pollution Control District (SLOCAPCD) reported one monetary transaction for HC in 2017.

**Table E-1
2017 Emissions Reduction Credit Transaction Costs
Reported in Total Tons Traded
SLOCAPCD**

Pollutant	\$/Ton	Tons
HC	\$20,000	20

F. Santa Barbara County Air Pollution Control District

The Santa Barbara County Air Pollution Control District (SBCAPCD) reported one HC and one NOx monetary transactions in 2017.

**Table F-1
2017 Emissions Reduction Credit Transaction Costs
Reported in Total Tons Traded
SBCAPCD**

Pollutant	\$/Ton	Tons
HC	\$75,000	0.360
NOx	\$75,000	3.126

**Table F-2
2017 Summary Statistics for Emission Reduction Credit Transactions*
SBCAPCD**

Pollutant	Total Tons Traded	Average (mean)	Median \$/Ton	High \$/Ton	Low \$/Ton
HC	0.360	\$75,000	\$75,000	\$75,000	\$75,000
NOx	3.126	\$75,000	\$75,000	\$75,000	\$75,000

Chart 8

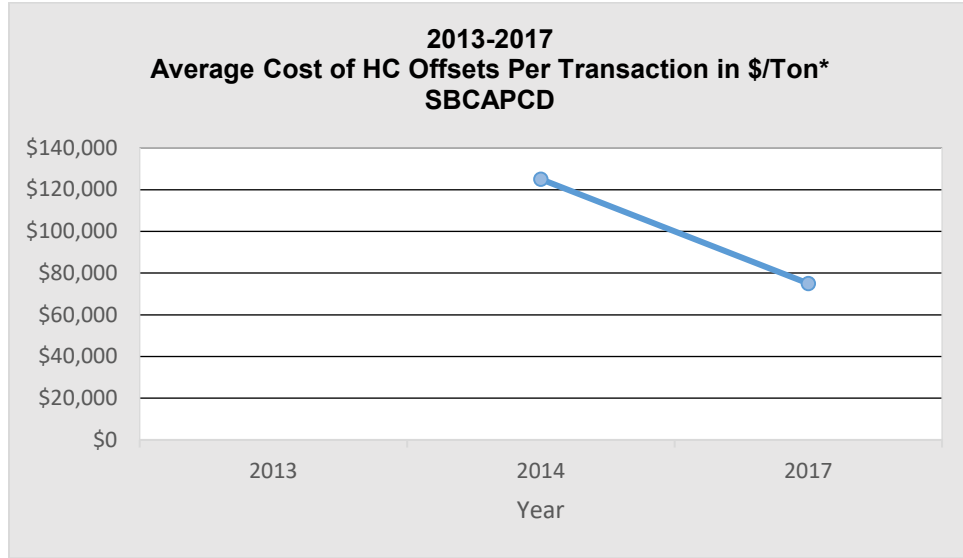
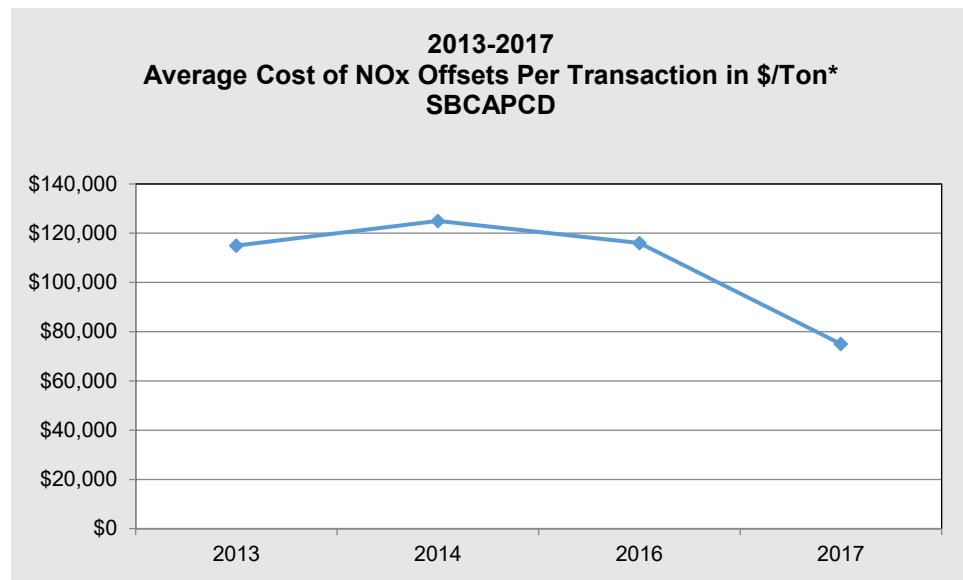


Chart 9



* Excludes asset transfer, subsidiary, barter, and other non-monetary transactions with no cost data.

G. South Coast Air Quality Management District

The South Coast Air Quality Management District (SCAQMD) reported 26 monetary transactions and 23 non-monetary transactions in 2017. Of the 26 monetary transactions reported, 15 transactions were for HC, and 11 transactions were for NOx.

**Table G-1
2017 Emission Reduction Credit Transaction Costs
Reported in Total Tons Traded
SCAQMD**

Pollutant	\$/Ton	Tons
HC	\$20,547	0.370
HC	\$21,917	2.190
HC	\$21,917	0.730
HC	\$21,917	12.960
HC	\$21,917	0.180
HC	\$21,917	2.370
HC	\$21,917	0.730
HC	\$22,465	1.100
HC	\$22,465	3.470
HC	\$22,465	1.830
HC	\$22,465	0.550
HC	\$23,562	0.730
HC	\$25,753	0.180
HC	\$26,027	0.180
HC	\$26,027	0.180
NOx	\$83,561	1.100
NOx	\$83,561	0.550
NOx	\$83,561	0.370
NOx	\$83,561	0.370
NOx	\$83,561	0.180
NOx	\$83,561	0.180
NOx	\$83,561	0.180
NOx	\$83,561	0.180
NOx	\$83,561	0.180
NOx	\$83,561	0.180
NOx	\$83,561	0.180
NOx	\$83,561	0.180

**Table G-2
2017 Summary Statistics for Emission Reduction Credit Transactions*
SCAQMD**

Pollutant	Total Tons Traded	Average (mean)	Median \$/Ton	High \$/Ton	Low \$/Ton
HC	27.740	\$22,885	\$22,465	\$26,027	\$20,547
NOx	3.650	\$83,561	\$83,561	\$83,561	\$83,561

Chart 10

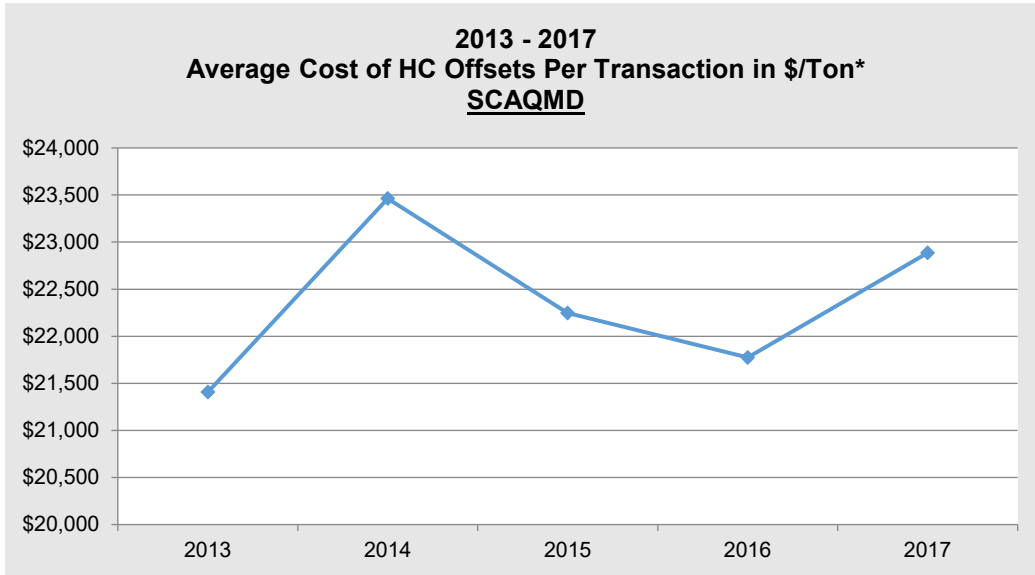
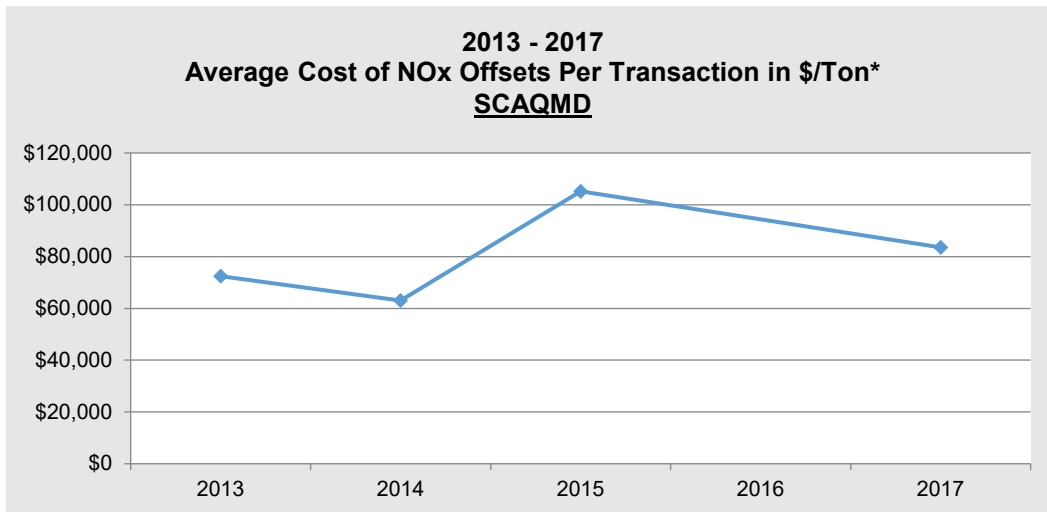


Chart 11



* Excludes asset transfer, subsidiary, barter, and other non-monetary transactions with no cost data.

H. Ventura County Air Pollution Control District

The Ventura County Air Pollution Control District (VCAPCD) reported five HC monetary transactions in 2017.

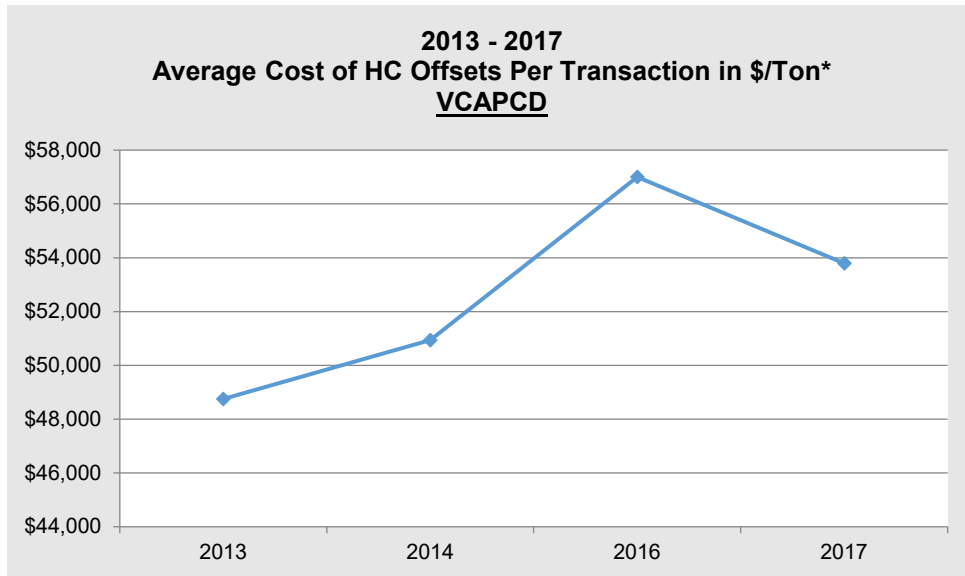
**Table H-1
2017 Emissions Reduction Credit Transaction Costs
Reported in Total Tons Traded
VCAPCD**

Pollutant	\$/Ton	Tons
HC	\$21,000	2.000
HC	\$61,750	1.000
HC	\$61,750	1.000
HC	\$61,750	1.000
HC	\$62,700	1.000

**Table H-2
2017 Summary Statistics for Emission Reduction Credit Transactions*
VCAPCD**

Pollutant	Total Tons Traded	Average (mean)	Median \$/Ton	High \$/Ton	Low \$/Ton
HC	6.000	\$53,790	\$61,750	\$62,700	\$21,000

Chart 12



* Excludes asset transfer, subsidiary, barter, and other non-monetary transactions with no cost data.

I. Yolo Solano Air Quality Management District

The Yolo Solano Air Quality Management District (YSAQMD) reported two monetary transactions for HC in 2017.

Table I-1

**2017 Emissions Reduction Credit Transaction Costs
Reported in Total Tons Traded
SLAQMD**

Pollutant	\$/Ton	Tons
HC	\$16,129	5.000
HC	\$25,000	1.130

Table I-2

**2017 Summary Statistics for Emission Reduction Credit Transactions*
SLAQMD**

Pollutant	Total Tons Traded	Average (mean)	Median \$/Ton	High \$/Ton	Low \$/Ton
HC	6.130	\$20,565	\$20,565	\$25,000	\$16,129

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APPENDIX A

HEALTH & SAFETY CODE SECTIONS 40709 & 40709.5, AND GOVERNMENT CODE SECTION 6254.7

H&SC; 40709 DISTRICT BANKING AND OFFSET SYSTEM

(a) Every district board shall establish by regulation a system by which all reductions in the emission of air contaminants that are to be used to offset certain future increases in the emission of air contaminants shall be banked prior to use to offset future increases in emissions. The system shall provide that only those reductions in the emission of air contaminants that are not otherwise required by any federal, state, or district law, rule, order, permit, or regulation shall be registered, certified, or otherwise approved by the district air pollution control officer before they may be banked and used to offset future increases in the emission of air contaminants. The system shall be subject to disapproval by the state board pursuant to Chapter 1 (commencing with Section 41500) of Part 4 within 60 days after adoption by the district.

(b) The system is not intended to recognize any preexisting right to emit air contaminants, but to provide a mechanism for districts to recognize the existence of reductions of air contaminants that can be used as offsets, and to provide greater certainty that the offsets shall be available for emitting industries.

(c) Notwithstanding subdivision (a), emissions reductions proposed to offset simultaneous emissions increases within the same stationary source need not be banked prior to use as offsets, if those reductions satisfy all criteria established by regulation pursuant to subdivision (a).

(d) This section does not apply to any district that is not required to prepare and submit a plan for attainment of state ambient air quality standards pursuant to Section 40911 if both of the following apply to the district:

(1) The district is not in a federal nonattainment area for any national ambient air quality standard unless the sole reason for the nonattainment is due to air pollutant transport.

(2) An owner or operator of a source or proposed source has not petitioned the district to establish a banking system.

(Amended by Stats. 2000, Ch. 729, Sec. 5.)

H&SC; 40709.5 REVIEW OF EMISSION CREDIT SYSTEMS

40709.5. Any district which has established a system pursuant to Section 40709 by which reductions in emissions may be banked or otherwise credited to offset future increases in the emissions of air contaminants, or which utilize a calculation method which enables internal emission reductions to be credited against increases in emissions, and as of January 1, 1988, is within a federally designated nonattainment area for one or more air pollutants, shall develop and implement a program which, at a minimum, provides for all of the following:

(a) Identification and tracking of sources possessing emission credit balances accruing from the elimination or replacement of older, higher emitting equipment.

(b) Periodic analysis of the increases or decreases in emissions which occur when credits are used to bring new or modified emission sources into operation.

(c) Procedures for verifying the emission reductions credited to the bank or accruing to internal accounts and for adjusting of credited emissions based on current district requirements.

(d) Periodic evaluation of the extent to which the system has contributed or detracted from the goal of allowing economic growth and modification of existing facilities, and has contributed to or detracted from the district's progress toward attainment of ambient air quality standards.

(e) Annual publication of the costs, in dollars per ton, of emission offsets purchased for new or modified emission sources, excluding information on the identity of any party involved in the offset transactions. This publication shall specify, for each offset purchase transaction, the year the offset transaction occurred, the amount of offsets purchased, by pollutant, and the total cost, by pollutant, of the offsets purchased. Each application to use emissions reductions banked in a system established pursuant to Section 40709 shall provide sufficient information, as determined by the district, to perform the cost analysis. The information shall be a public record.

(Amended by Stats. 1992, Ch. 612, Sec. 3. Effective January 1, 1993.)

GOVERNMENT CODE SECTION 6254.7

(a) All information, analyses, plans, or specifications that disclose the nature, extent, quantity, or degree of air contaminants or other pollution which any article, machine, equipment, or other contrivance will produce, which any air pollution control district or air quality management district, or any other state or local agency or district, requires any applicant to provide before the applicant builds, erects, alters, replaces, operates, sells, rents, or uses the article, machine, equipment, or other contrivance, are public records.

(b) All air or other pollution monitoring data, including data compiled from stationary sources, are public records.

(c) All records of notices and orders directed to the owner of any building of violations of housing or building codes, ordinances, statutes, or regulations which constitute violations of standards provided in Section 1941.1 of the Civil Code, and records of subsequent action with respect to those notices and orders, are public records.

(d) Except as otherwise provided in subdivision (e) and Chapter 3 (commencing with Section 99150) of Part 65 of the Education Code, trade secrets are not public records under this section. "Trade secrets," as used in this section, may include, but are not limited to, any formula, plan, pattern, process, tool, mechanism, compound, procedure, production data, or compilation of information which is not patented, which is known only to certain individuals within a commercial concern who are using it to fabricate, produce, or compound an article of trade or a service having commercial value and which gives its user an opportunity to obtain a business advantage over competitors who do not know or use it.

(e) Notwithstanding any other provision of law, all air pollution emission data, including those emission data which constitute trade secrets as defined in subdivision (d), are public records. Data used to calculate emission data are not emission data for the purposes of this subdivision and data which constitute trade secrets and which are used to calculate emission data are not public records.

(f) Data used to calculate the costs of obtaining emissions offsets are not public records. At the time that an air pollution control district or air quality management district issues a permit to construct to an applicant who is required to obtain offsets pursuant to district rules and regulations, data obtained from the applicant consisting of the year the offset transaction occurred, the amount of offsets purchased, by pollutant, and the total cost, by pollutant, of the offsets purchased is a public record. If an application is denied, the data shall not be a public record.

**APPENDIX B
REPORTING FORM AND INSTRUCTIONS**

**ANNUAL EMISSION REDUCTION CREDIT TRANSACTION REPORT
INSTRUCTIONS**

General:

One transaction record per pollutant should be filled out for each transaction that takes place in the district between two or more parties.

Transactions should be reported in the year in which the final transaction occurs and money, or barter agreements are exchanged.

The annual report should be submitted to ARB no later than January 15 of each year. The ARB will compile all data from the districts and publish a statewide report on the cost of offsets.

For cases of offset transactions that occur across district boundaries, transactions should be reported in the district in which the offsets are credited. This is the district that will most likely have access to the transaction cost information necessary for reporting.

ANNUAL EMISSION REDUCTION CREDIT TRANSACTION REPORT FOR 2017 TRANSACTIONS

<u>POLLUTANT</u>		<u>CREDIT SOURCE</u>	
NOx SOx CO HC PM10 Other		STATIONARY	QUANTITY of POLLUTANT (TONS/YEAR)
		MOBILE	
		AGRICULTURAL	
		OTHER	PRICE PAID (\$/TON)
<u>ANNUAL or QUARTER?</u>		BARTER TRANSACTION?	
<u>Q1</u>	<u>Q2</u>	<u>Q3</u>	<u>Q4</u>
		SUBSIDIARY TRANSACTION?	
		LENGTH OF LIFE/LEASE	

1. **District ID #:** The district ID # should be in the format:

AAYYXXX

Where AA is a two letter district code (a list of district codes is attached), YY is a two digit year (in which the transaction occurs) identifier (e.g. 13 for 2013), and XXX is a three-digit transaction number from 001 to 999. This ID number will only be used to track the origin of data and for data validation. The assignment of a transaction number will ensure quality control of data transfer between the district and the Air Resources Board. Individual transactions will not be identified in Air Resources Board summary reports.

2. **Pollutant:** Please check one pollutant per transaction. If trade involved more than one pollutant, use separate transaction records for each pollutant traded. HC is equivalent to other acronyms used for hydrocarbons such as POC, ROC, ROG and VOC.
3. **Credit Source:** Please indicate the source of emission reduction credits (ERC). This information will aid in the analysis of ERC prices paid. Stationary source credits typically do not have a finite useful life, whereas mobile and agricultural source ERCs have specific limiting conditions that limit useful life. It is important that a distinction be made between these kinds of offsets when analyzing the cost of offsets.
4. **Annual/Quarter:** Please indicate if credits are valid on an annual basis or quarterly. Additionally, if credits are valid quarterly, indicate in which quarter they can be used. This applies to seasonal credits or credits that are only valid in a specific quarter.
5. **Quantity of Pollutant:** Regardless of district recording practices or the transaction agreement, please provide the quantity of pollutant in tons/year.

Example 1: For Data Given as a Single Quarter Transactions

$$1 \frac{lb}{quarter} = 1 \frac{lb}{quarter} \times 4 \frac{quarters}{year} \times \frac{1}{2000} \frac{ton}{lbs} = 0.0020 \frac{tons}{year}$$

Example 2: For Data Provided as an Annual Transactions

$$1 \frac{lb}{day} = 1 \frac{lb}{day} \times 365 \frac{days}{year} \times \frac{1}{2000} \frac{ton}{lbs} = 0.1825 \frac{tons}{year}$$

Example 3: For Quarterly Credits Used to Offset Annual Sources

$$(Q_1 + Q_2 + Q_3 + Q_4) = \frac{lbs}{year} \quad 34$$

Convert to tons per year

6. **Price Paid:** This is the bottom line price paid by the purchaser to the owner of the credit. Government Code Section 6254.7 authorizes the district to obtain this information from applicants. Net present value should not be calculated for lease transactions. If price is given in dollars per pound, please convert to dollars per ton by multiplying by 2000 lb/ton.

7. **Barter and Subsidiary Transactions:** If barter was involved and/or no money was exchanged for the offsets, the district should request the applicant to calculate a dollars/ton value for the credit transaction. Barter can include one company (A) placing controls on another (B) to generate credits. The price paid should then reflect what company A paid to install equipment at company B and any additional fees paid to company B as part of the agreement. The price paid for offsets should be the value of the offset at the time of the transaction.

If a transaction occurred between two subsidiaries of the same parent company, check the subsidiary transaction box. This also applies to transactions that occur between agencies of the same governmental system for example between two agencies of the county. Since the price charged in barter and subsidiary transactions may not reflect the market value of credits, this information will be helpful in analyzing prices paid for credits.

8. **Length of Use/Lease:** Please indicate the valid length of credit life for this transaction. This applies to stationary source credits that are sold as a limited life lease agreement, or to other types of credit that have a finite useful life. If no limit is placed on the useful life, leave this box blank.

DISTRICT TWO-LETTER CODES

AM	Amador County APCD
AV	Antelope County APCD
BA	Bay Area AQMD
BT	Butte County APCD
CA	Calaveras County APCD
CO	Colusa County APCD
ED	El Dorado County APCD
FR	Feather River AQMD
GL	Glenn County APCD
GB	Great Basin Unified APCD
IM	Imperial County APCD
KE	Kern County APCD
LA	Lake County AQMD
LS	Lassen County APCD
MA	Mariposa County APCD
ME	Mendocino County AQMD
MO	Modoc County APCD
MD	Mojave Desert AQMD
MB	Monterey Bay Air Resources District
NC	North Coast Unified AQMD
NO	Northern Sierra AQMD
NS	Northern Sonoma County APCD
PL	Placer County APCD
SM	Sacramento Metropolitan AQMD
SD	San Diego County APCD
SJ	San Joaquin Valley APCD
SL	San Luis Obispo APCD
SB	Santa Barbara County APCD
SH	Shasta County AQMD
SI	Siskiyou County APCD
SC	South Coast AQMD
TE	Tehama County APCD
TU	Tuolumne County APCD
VE	Ventura County APCD
YS	Yolo-Solano AQMD

APPENDIX C

GLOSSARY OF TERMS

Agricultural Source: Source of air pollution used in the production of crops, or the raising of fowl or animals located on contiguous property under common ownership.

Barter: To trade without using money.

Leased: A legal agreement that lets someone use an asset for a period of time in return for payment.

Mobile source: Sources of air pollution such as automobiles, motorcycles, trucks, off-road vehicles, boats and airplanes.

Stationary source: Non-mobile sources such as power plants, refineries and manufacturing facilities which emit air pollutants.

Subsidiary: Serving to assist or supplement.