2017 Air Quality Report for the Austin-Round Rock Metropolitan Statistical Area

Prepared by the Capital Area Council of Governments

July 31, 2018

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Executive Summary

This is the annual air quality report for the Austin-Round Rock Metropolitan Statistical Area (MSA) prepared by the Capital Area Council of Governments (CAPCOG) for the members of the Central Texas Clean Air Coalition (CAC), the Texas Commission on Environmental Quality (TCEQ), and the U.S. Environmental Protection Agency (EPA). This report serves as the region's annual "check-in" with EPA as part of the Clean Air Coalition's participation in the Ozone Advance Program (OAP). The report covers January 1, 2017, through December 31, 2017. Under the most recent MSA definitions promulgated by the Office of Management and Budget (OMB) in 2015, the Austin-Round Rock MSA consists of Bastrop, Caldwell, Hays, Travis, and Williamson Counties.

The report is intended to do the following:

- Provide an update on the status of air quality in the Austin-Round Rock MSA through the end of 2017 (Section 1);
- Provide an update on the latest understanding of the contribution of the region's emissions to high ozone (O_3) levels when they occur (Section 2);
- The status of emission reduction measures implemented in the region in 2017 (Section 3);
- Ongoing planning activities in the region (Section 4); and
- Planning for the future (Section 5).

Except for the following organizations, all Clean Air Coalition members provided a report on 2017 activities to CAPCOG:

- Caldwell County
- City of Bastrop
- City of Hutto
- City of Luling
- City of San Marcos
- City of Taylor
- CapMetro

CAPCOG will provide an addendum to this report to Clean Air Coalition members, TCEQ, and EPA if these organizations provide reports after this report has been submitted. Supplemental spreadsheets provide details of each organization's reported activities.

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List of Acronyms

AACOG: Alamo Area Council of Governments
AFFP: Alternative Fueling Facilities Program
AQI: Air Quality Index
CAC: Clean Air Coalition
CACAC: Clean Air Coalition Advisory Committee
CAMPO: Capital Area Metropolitan Planning Organization
CAPCOG: Capital Area Council of Governments
CapMetro: Capital Metropolitan Transit Authority
CAMS: Continuous Air Monitoring Station
CAPP: Clean Air Partners Program
CO: Carbon Monoxide
CSB: Clean School Bus
CTRMA: Central Texas Regional Mobility Authority
CTT: Clean Transportation Triangle
DACM: Drive a Clean Machine
DERI: Diesel Emission Reduction Incentive
DFW: Dallas-Fort Worth
DTIP: Drayage Truck Incentive Program
EAC: Early Action Compact
EE/RE: Energy efficiency and renewable energy
EPA: U.S. Environmental Protection Agency
ERIG: Emission Reduction Incentive Grant Program
I/M: Inspection and maintenance
ILA: Inter-Local Agreement
LCRA: Lower Colorado River Authority
LSCFA: Lone Star Clean Fuels Alliance
LIP: Local Initiative Project
LIRAP: Low-Income Vehicle Repair, Retrofit, and Accelerated Vehicle Retirement Program
MDA8: Maximum Daily 8-Hour Average
$\mu g/m_3$: Micrograms per cubic meter
MOVES: Motor Vehicle Emissions Simulator
MSA: Metropolitan Statistical Area
NAAQS: National Ambient Air Quality Standards
NO_X: Nitrogen oxides
NO_2: Nitrogen dioxide
NTIG: New Technology Implementation Grant
O_3: Ozone
OAD: Ozone Action Day
OAP: Ozone Advance Program
PACE: Property-Assessed Clean Energy

Pb: Lead
$PM_{2.5}$: Particulate matter with a diameter of 2.5 microns or less
PM_{10}: Particulate matter with a diameter of 10 microns or less
PPB: Parts per billion
PPM: Parts per million
SIP: State Implementation Plan
SO_2: Sulfur dioxide
TCEQ: Texas Commission on Environmental Quality
TERP: Texas Emission Reduction Plan
TCFP: Texas Clean Fleet Program
TMRS: Texas Municipal Retirement System
TNGVGP: Texas Natural Gas Vehicle Grant Program
TxDOT: Texas Department of Transportation
TexN: Texas NONROAD Model
VOC: Volatile Organic Compound

1 Air Quality Status

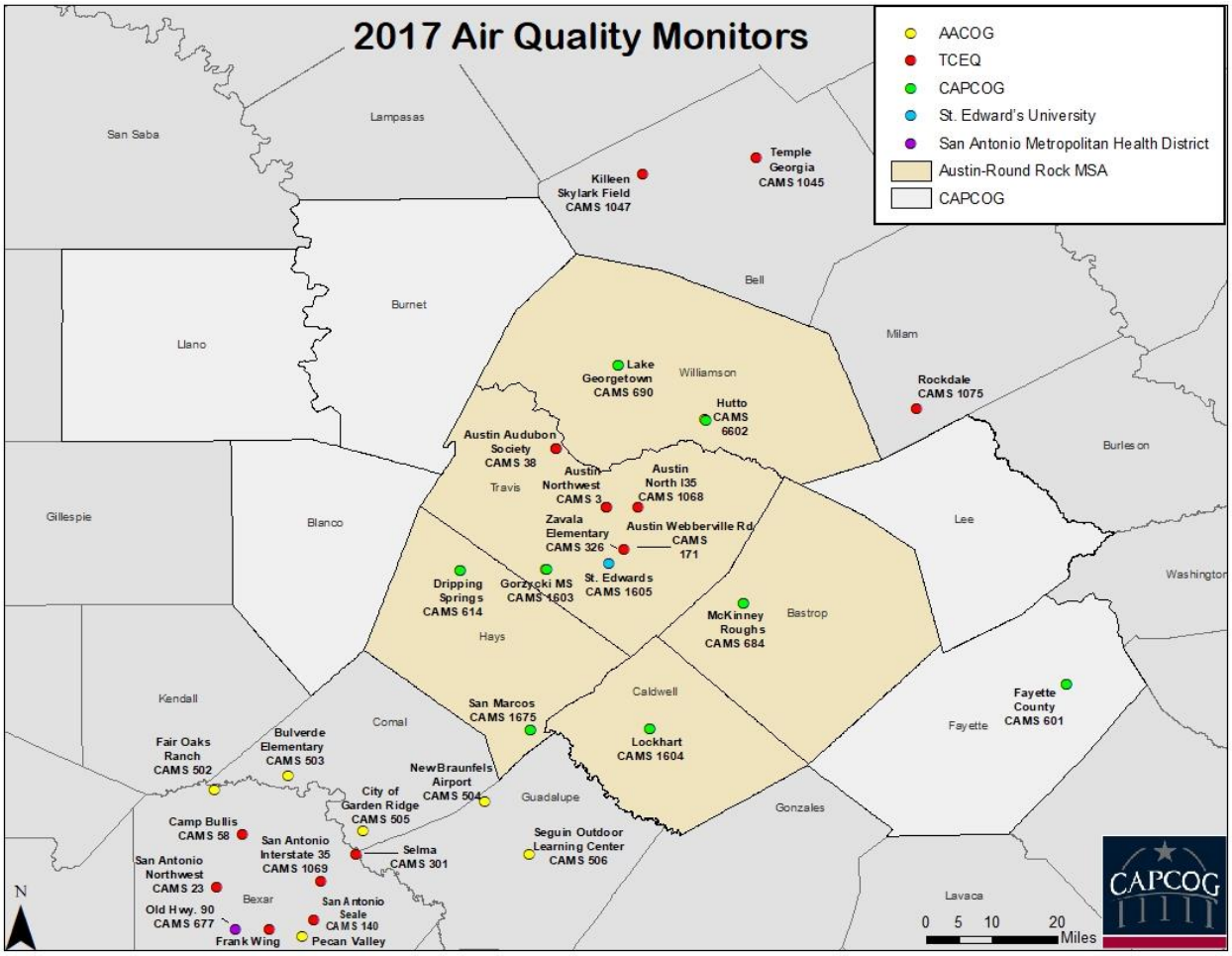
The following bullet points summarize the status of the Austin-Round Rock MSA's air quality status as of the end of 2017:

- Air pollution levels remained in compliance with all National Ambient Air Quality Standards (NAAQS), although the region's 2015-2017 O_3 levels were just 1% below the 2015 O_3 NAAQS
- In November 2017, EPA designated all five of the counties in the Austin-Round Rock MSA as "attainment/unclassifiable" for the 2015 O_3 NAAQS.
- The region recorded seven days when O_3 levels were considered "unhealthy for sensitive groups," as well as an additional 110 days when either NO_2, O_3, or $PM_{2.5}$ levels were considered "moderate," based on EPA's AQI.
- The region's cumulative seasonal O_3 levels were 55% below the levels that EPA considers harmful to vegetation.
- TCEQ's most recent Toxicological evaluation of air toxics monitoring data in the CAPCOG region was released in November 10, 2017, and indicated that the region's 2016 air monitoring data would not be expected to cause adverse health effects or vegetation effects.
- One of TCEQ's two OAD forecasts correctly predicted O_3 levels > 70 ppb, but OAD forecasts were not made for six other instances when O_3 levels exceeded 70 ppb.
- Overall, TCEQ's daily AQI forecasts correctly predicted "moderate" or worse air quality 60% of the time, but they only were able to predict 34% of all days when the AQI levels were "moderate" or worse within the region.

While the region was able to narrowly remain in compliance with the NAAQS through the end of 2017, there were a total of seven days when air pollution levels within the region was considered "unhealthy for sensitive groups," for ground-level O_3.

The following map shows the locations of all of the Continuous Air Monitoring Stations (CAMS) that collect air pollution samples in and near the Austin-Round Rock MSA, including the monitors operated by TCEQ, CAPCOG, St. Edward's University, and the Alamo Area Council of Governments (AACOG).

Figure 1-1. 2017 Air Quality Monitors in the Austin-Round Rock MSA and Nearby Counties



1.1 Compliance with the NAAQS

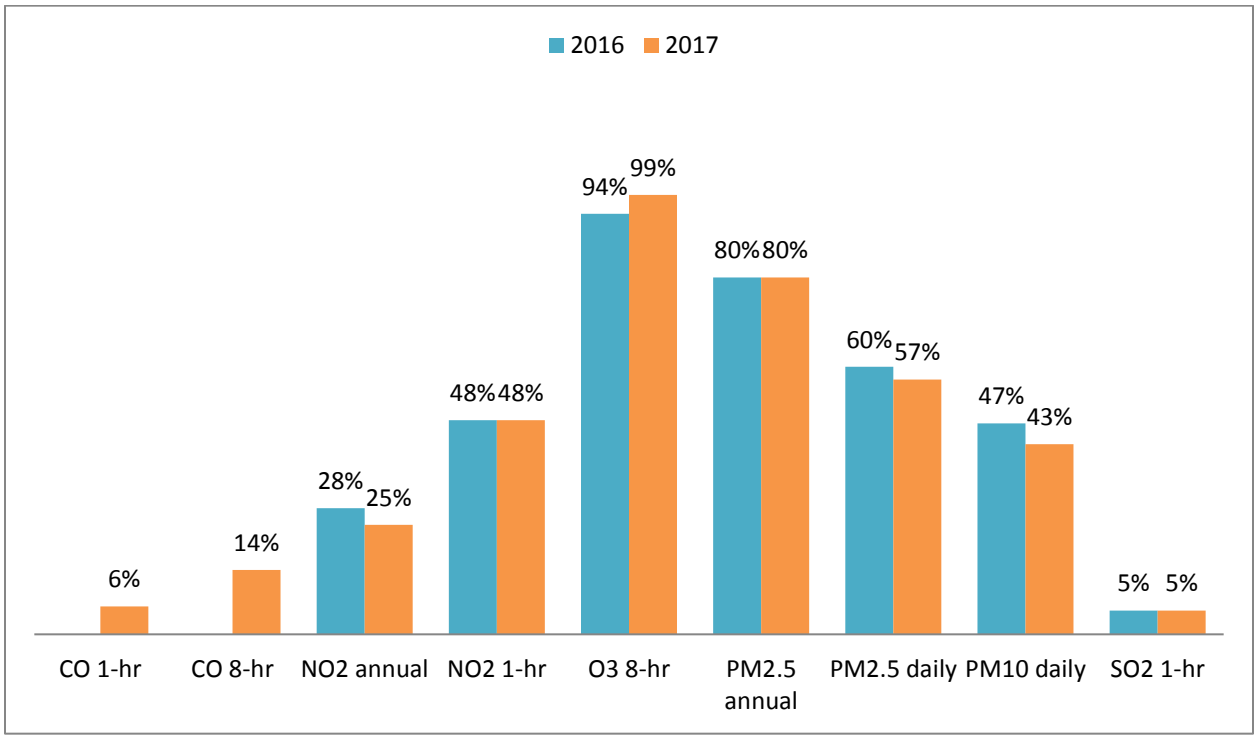
The Austin-Round Rock MSA's 2017 design values for CO, NO_2, O_3, $PM_{2.5}$, PM_{10}, and SO_2 were all in compliance with the applicable NAAQS. Lead is not monitored within the region. There are four "regulatory" monitoring stations in the Austin-Round Rock MSA, all located in Travis County, that reported data to EPA and were used for comparisons to the NAAQS.

Table 1-1. Summary of Criteria Pollutant Measurement Periods at Federal Reference Method (FRM) Monitors in the Austin-Round Rock MSA, 2015-2017

Pollutant	CAMS 3 (AQS Site Number 484530014)	CAMS 38 (AQS Site Number 484530020)	CAMS 171 (AQS Site Number 484530021)	CAMS 1068 (AQS Site Number 484531068)
CO	n/a	n/a	n/a	Dec. 2016 – 2017
NO_2	2015 – 2017	n/a	n/a	2015 – 2017
O_3	2015 – 2017	2015 – 2017	n/a	n/a
$PM_{2.5}$	n/a	2015 – 2017	2015 – 2017	2017
PM_{10}	n/a	2015 – 2017	2015 – 2017	n/a
SO_2	2015 – 2017	n/a	n/a	n/a

The following figure shows the metro area's 2016 and 2017 design values compared to each primary NAAQS. Except for PM_{10}, the design values used for this figure were all obtained from reports on EPA's website at https://www.epa.gov/air-trends/air-quality-design-values.[1]

Figure 1-2. Austin-Round Rock MSA Design Values as a percentage of NAAQS



In addition to having air quality that meets the NAAQS, all five counties in the Austin-Round Rock MSA were formally designated as "attainment/unclassifiable" for the 2015 O_3 NAAQS on November 6, 2017, in "Round 1" of EPA's designations for the NAAQS (82 FR 54232). Despite the region's proximity to Bexar County, which was designated "nonattainment" for the 2015 O_3 NAAQS on July 17, 2018, EPA only considered counties that were adjacent to Bexar County as "nearby" for the purpose of evaluating whether or not a San Antonio nonattainment area needed to extend beyond Bexar County.

1.2 O_3 Design Value Trend

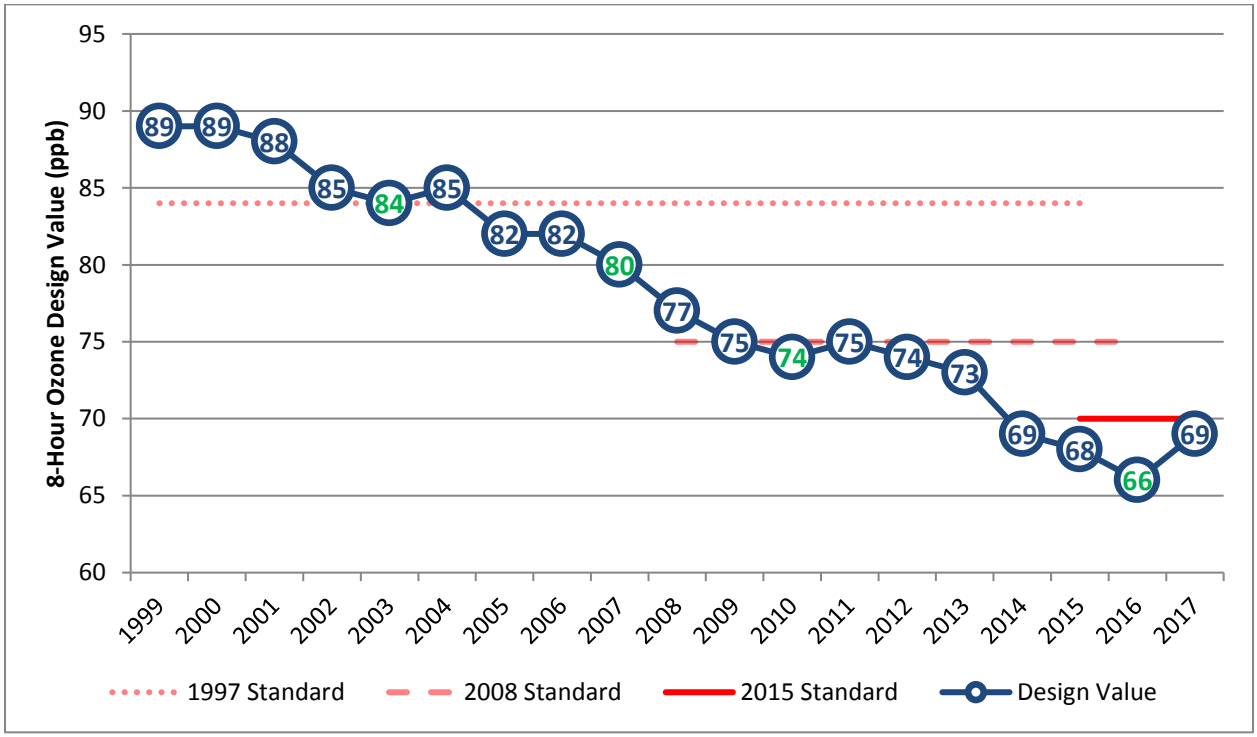
The figure below shows the trend in the Austin-Round Rock MSA's 8-hour O_3 design values from 1999-2017 compared to the 1997, 2008, and 2015 8-hour O_3 NAAQS. Over this time, the region's design value has decreased an average of 1.1 ppb per year. Key design values that were used in the area designation

[1] Note that for PM_{10}, the % of the NAAQS reflects the value of the maximum 4th-highest 24-hour PM_{10} value recorded at a station over a three-year period divided by 150 µg/m^3, which is the level of the PM_{10} NAAQS. The actual form of the PM_{10} NAAQS uses "expected exceedances" (i.e., the avg. number of times per year the PM_{10} levels exceed 150 µg/m^3. In practice, this means that if the 4th highest 24-hour PM_{10} value measured over a 3-year period is over 150 µg/m^3, the monitor is violating the NAAQS.

process for these NAAQS are highlighted in green, and applicable O_3 NAAQS are shown as red horizontal bars:

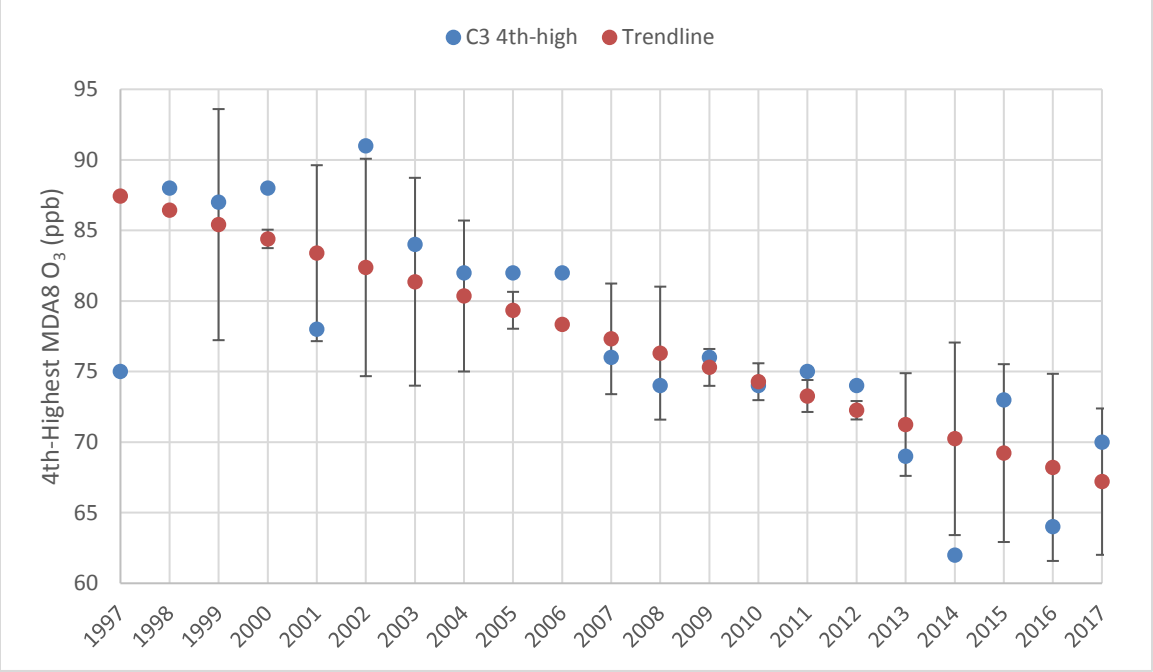
- The region's 2003 design value was used as the basis for the EPA's initial area designation for the 1997 O_3 NAAQS in April 2004, although through the Early Action Compact (EAC) process, final action on this designation was deferred until after 2007.
- The region's 2007 design value was required to be in attainment of the 1997 O_3 NAAQS as part of the EAC.
- The region's 2010 design value was used as the basis for the region's designation for the 2008 O_3 NAAQS following EPA's delay in issuing initial area designations due to its reconsideration of the 2008 O_3 NAAQS.
- The region's 2016 design value was uses as the basis for the region's designation for the 2015 O_3 NAAQS.

Figure 1-3. Austin-Round Rock MSA 8-Hour O_3 Design Value 1999-2017



The 3 ppb increase in the region's design value from 2016 to 2017 raised many concerns among stakeholders, particularly in light of the fact that the region had not seen more than a 1 ppb increase in a design value year-to-year within this timeframe. However, it should be noted that this increase has more to do with the three-year averaging of data. Both 2014 and 2016 had unusually low O_3 levels and 2015 had unusually high O_3 levels, so when the very low O_3 data from 2014 dropped out of the three-year average for 2015-2017, it caused an abnormally large increase in the O_3 design values from 2016 to 2017. As the figure below shows, the 4th-highest MDA8 O_3 value in 2014 was lower than the confidence interval associated with the 2014-2016 three-year average.

Figure 1-4. CAMS 3 4th-Highest MDA8 O_3 Values, Trendline, and 95% Confidence Intervals, 1997-2017



As of the date of this report, the region's preliminary 2016-2018 design value is 66 ppb, which is in line with expectations if this trend were to continue. Since the 2015 4th-high MDA8 O_3 was several ppb over 70 ppb, once that data drops out of the three-year average for the 2016-2018 period, a 4th-high of 79 ppb at C3 or 84 ppb at C38 would be needed for the region's 2016-2018 design value to reach 71 ppb. These O_3 levels have not been seen since 2006 and 2000, respectively. Based on the variability year-to-year and projected 2018 MDA8 O_3, CAPCOG estimates that the probability of both C3 and 38 having 2016-2018 averages below 71 ppb is 74%, compared to just 50% for the 2015-2017 design values, and 63% for 2014-2016.

1.3 Maximum Daily 8-Hour O_3 Averages in the Region

While compliance with the O_3 NAAQS is based on readings recorded at "regulatory" Federal Reference Method (FRM) or Federal Equivalent Method (FEM) O_3 samplers, there are also a number of non-regulatory O_3 monitoring stations in the region that can be used to understand regional O_3 levels.

In addition to the two regulatory O_3 monitors that TCEQ operates, CAPCOG collected O_3 data at eight monitoring stations and St. Edwards University collected data at one additional O_3 monitoring station between 2015 and 2017. These monitoring stations use EPA-approved O_3 sampling methods and data collected during this period followed a Quality Assurance Project Plan (QAPP) approved by TCEQ, but were not operated as FRM or FEM monitors, and are not reported to EPA.

The following table summarizes the fourth-highest MDA8 O_3 measurements collected at each monitoring station in the CAPCOG region in 2015, 2016, and 2017, as well as the three-year average for each station. CAMS 3 and 38 are the "regulatory" monitoring stations operated by TCEQ, while CAMS 601, 614, 684, 690, 1603, 1604, 1605, 1675, and 6602 are research monitoring stations operated by CAPCOG. Reports documenting the quality-checks performed at these sites can be found on CAPCOG's website at http://www.capcog.org/divisions/regional-services/aq-reports.

Table 1-2. Fourth-highest MDA8 Measurements at All O_3 Monitoring Stations in the CAPCOG Region, 2015-2017 (ppb)

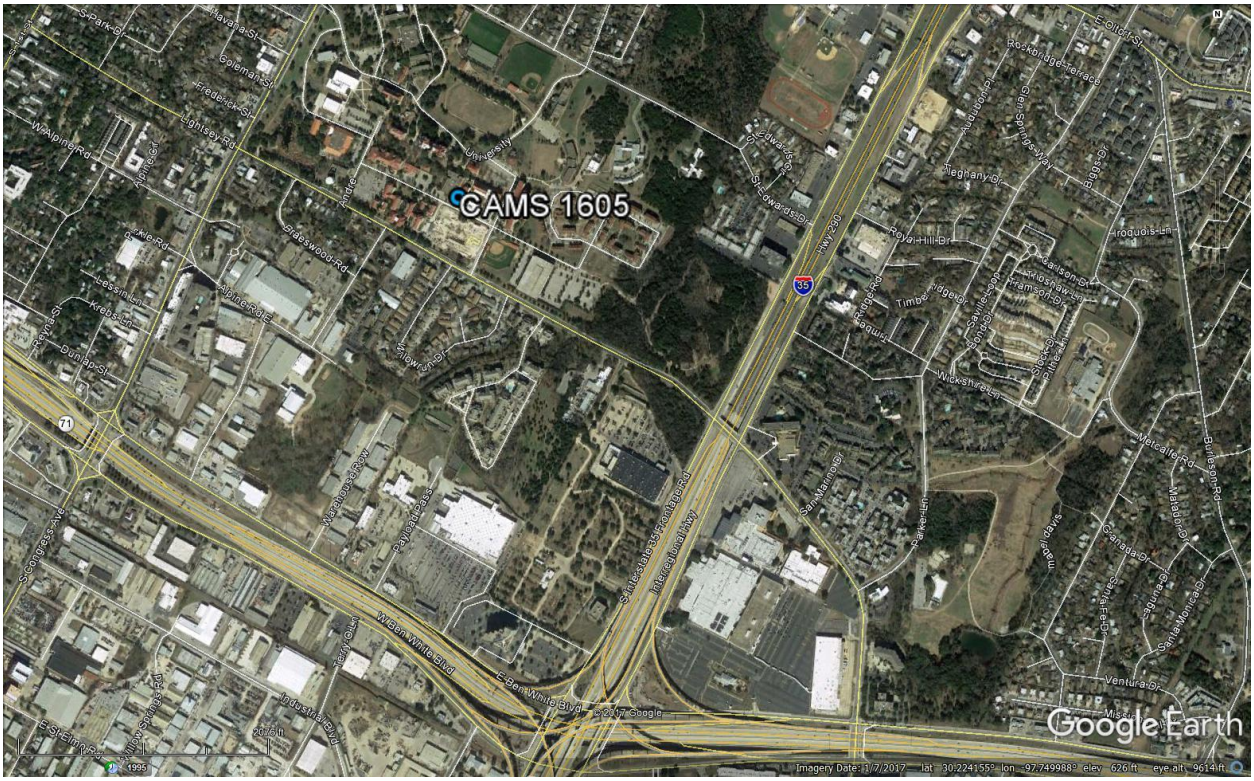
CAMS	AQS Site Number	County	2015	2016	2017	2015-2017 Average	2015-2017 St. Dev.
3	484530014	Travis	73	64	70	69.0	4.6
38	484530020	Travis	73	62	67	67.3	5.5
601	481490601	Fayette	70	59	64	64.3	5.5
614	482090614	Hays	71	65	67	67.7	3.1
684	480210684	Bastrop	69	59	57	61.7	6.4
690	484910690	Williamson	75	61	70	68.7	7.1
1603	484531603	Travis	72	63	59	64.7	6.7
1604	480551604	Caldwell	67	60	67	64.7	4.0
1605	484531605	Travis	N/A	*52	*51	*51.5	0.7
1675	482091675	Hays	70	62	63	65.0	4.4
6602	484916602	Williamson	71	58	65	64.7	6.5

CAMS 1605 was installed by St. Edward's University at their campus in Austin ahead of the 2016 O_3 season in order to support scientific research involving the launching of "ozonesondes" to collect vertical measurements of O_3 on predicted high O_3 days. Throughout the 2016 O_3 season, the monitor recorded lower than expected ambient O_3 measurements for the vicinity based on analysis of modeling data and comparisons to the nearby CAMS 1603 monitor. Following a series of quality-checks, St. Edward's University researchers determined that the O_3 data at CAMS 1605 was accurate and precise, but believed that values were likely lower than expected due to some NO_X titration issues on campus where the monitor is located (less than 1 kilometer from IH-35, U.S.-71, and Congress Avenue, causing a potentially high localized concentration of NO_X on campus).[2] As the table above shows, 2017 O_3 levels were similarly low. The CAMS 1605 data are therefore reliable for ground-level verification of the ozonesonde measurements, but not a good indication of neighborhood-level exposure of O_3 in the vicinity of the monitor.

A Google earth map of CAMS 1605 illustrates the proximity to nearby roadways.

[2] On days in 2016 when at either CAMs 1603 or CAMS 1605 had MDA8 values of 55 ppb or higher, CAMS 1605 had MDA8 values that were, on average, 10.6 ppb lower than CAMS 1603, with a range of 2-19 ppb below the values at CAMS 1603. Modeling results from release 2 of the June 2012 episode available from TCEQ, on the other hand, showed that CAMS 1605 was only 1.1 ppb lower, on average, than CAMS 1603 when either site had MDA8 values of 55 ppb or higher, ranking from 3.5 below to 10.6 ppb above.

Figure 1-5. Map of CAMS 1605 and vicinity



These data generally show that the 2015-2017 three-year average of the fourth highest MDA8 values in the region ranged from 59 ppb – 70 ppb, with two monitors recording fourth-highest MDA8 values at the upper end of that range (C3 and C690).

1.4 Daily Pollution Levels Compared to EPA's AQI

While regulatory compliance is an important indicator of a region's air quality, it is possible for an area to experience numerous exceedances of an air pollution level that exceed the level of the NAAQS multiple times in a given year and still have a compliant design value. A design value also does not directly indicate how frequently a region experienced high pollution levels. Another indicator that can be used to characterize a region's air quality is the number of days a region experiences air pollution levels fall within each of the AQI categories established by EPA. The following table shows the concentrations of NO_2, O_3, and $PM_{2.5}$ that correspond to each AQI level.[3]

[3] There were no days in 2017 when PM_{10}, SO_2, or CO AQIs were above 50, so those values are excluded from this table.

Table 1-3. Summary of AQI for NO_2, O_3, and $PM_{2.5}$

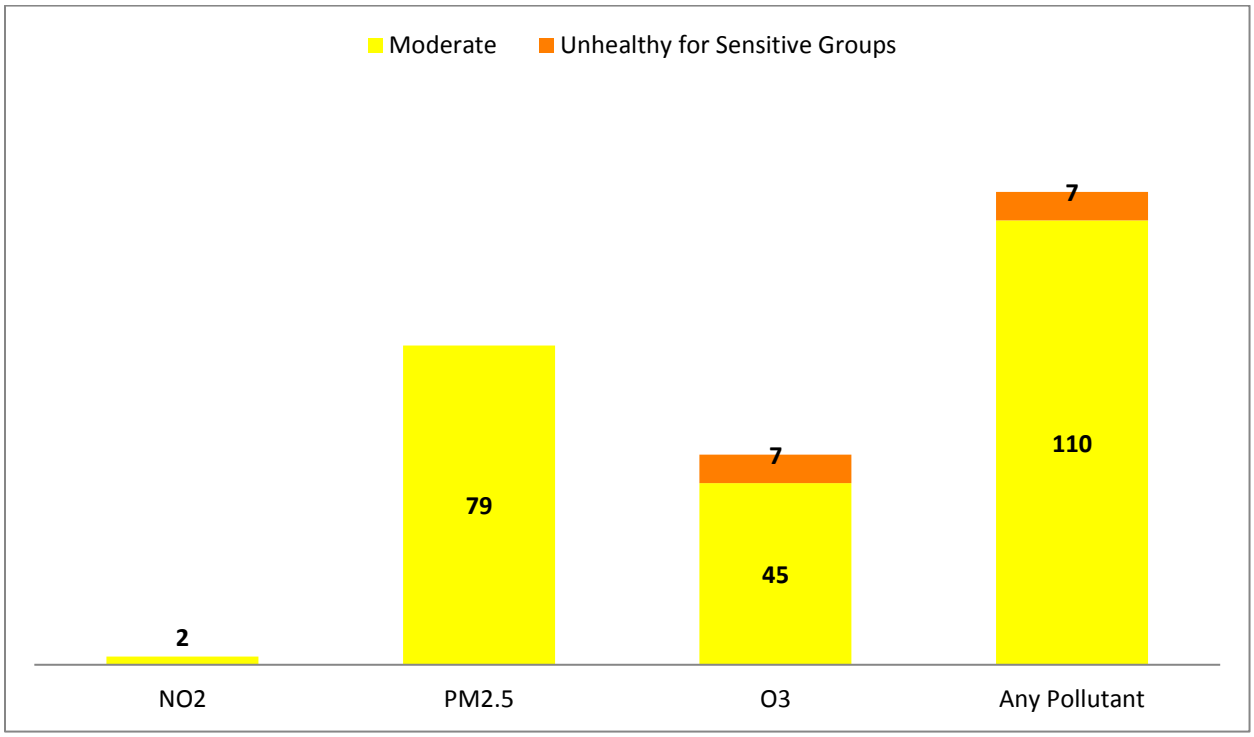
AQI Level	AQI Number	NO_2 (1-Hr., ppb)	O_3 (8-Hr., ppb)	$PM_{2.5}$ (24 hr., µg/m³)
Good	0-50	0-53	0-54	0.0-12.0
Moderate	51-100	54-100	55-70	12.1-35.4
Unhealthy for Sensitive Groups	101-150	101-360	71-85	35.5-55.4
Unhealthy	151-200	361-649	86-105	55.5-150.4
Very Unhealthy	201-300	650-1,249	106-200	150.5-250.4
Hazardous	301-500	1,250-2,049	201-600	250.5-500

This report includes data from all of the air pollution monitoring stations in the region, not just the TCEQ regulatory monitors that are used for formal AQI reporting to TCEQ. Therefore, the number of days in the "moderate" category described below are higher than if only the TCEQ regulatory monitors were used.

1.4.1 High AQI Days by Pollutant

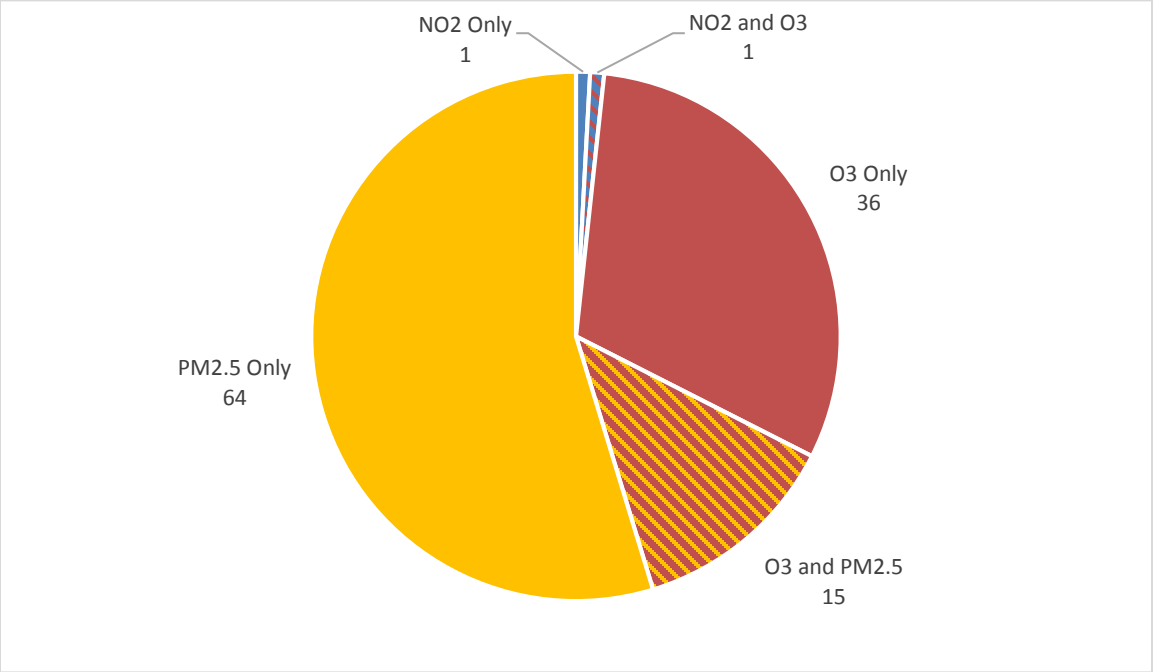
The following figures show the number of days in 2017 when NO_2, $PM_{2.5}$, or O_3 concentrations measured in the CAPCOG region were high enough to be considered "moderate" or "unhealthy for sensitive groups."

Figure 1-6. Number of "Moderate" or "Unhealthy for Sensitive Groups" Air Pollution Days in the CAPCOG Region in 2017 by Pollutant



While high levels of O_3 are responsible for all of the days when the region experienced air pollution levels considered "unhealthy for sensitive groups," high levels of $PM_{2.5}$ were responsible for a majority of the days when air pollution levels were considered at least "moderate," and there was one day when the near-road monitor C1068 recorded a high 1-hour NO_2 measurement when O_3 and $PM_{2.5}$ levels were otherwise considered "good." The following figure shows the distribution of days when air pollution was considered at least "moderate" by pollutant.

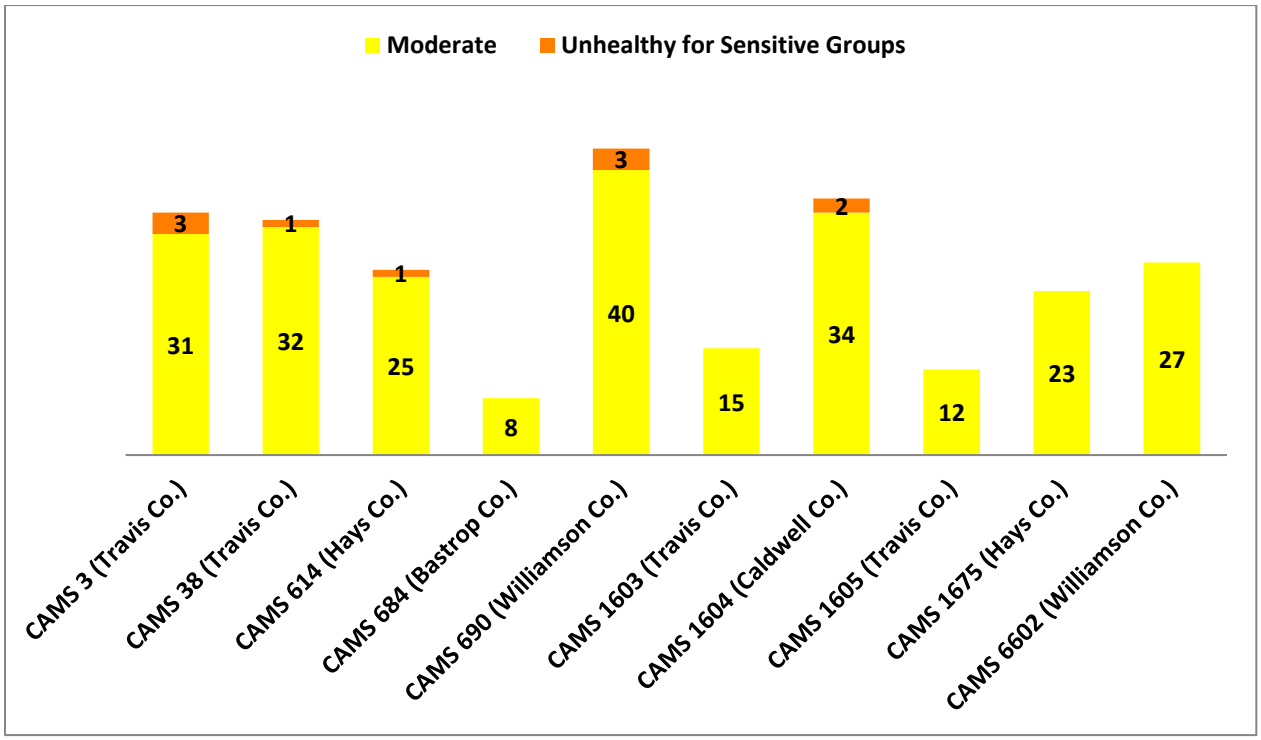
Figure 1-7. Days in 2017 When AQI Levels in the MSA Were "Moderate" or Worse



1.4.2 High O_3 AQI Days by Monitoring Station

The following figures show the number of days when O_3 levels were considered "moderate" or "unhealthy for sensitive groups" at each monitoring station in the region in 2017.

Figure 1-8. Number of Days when O_3 Pollution was "Moderate" or Worse by Monitoring Station and County, 2017

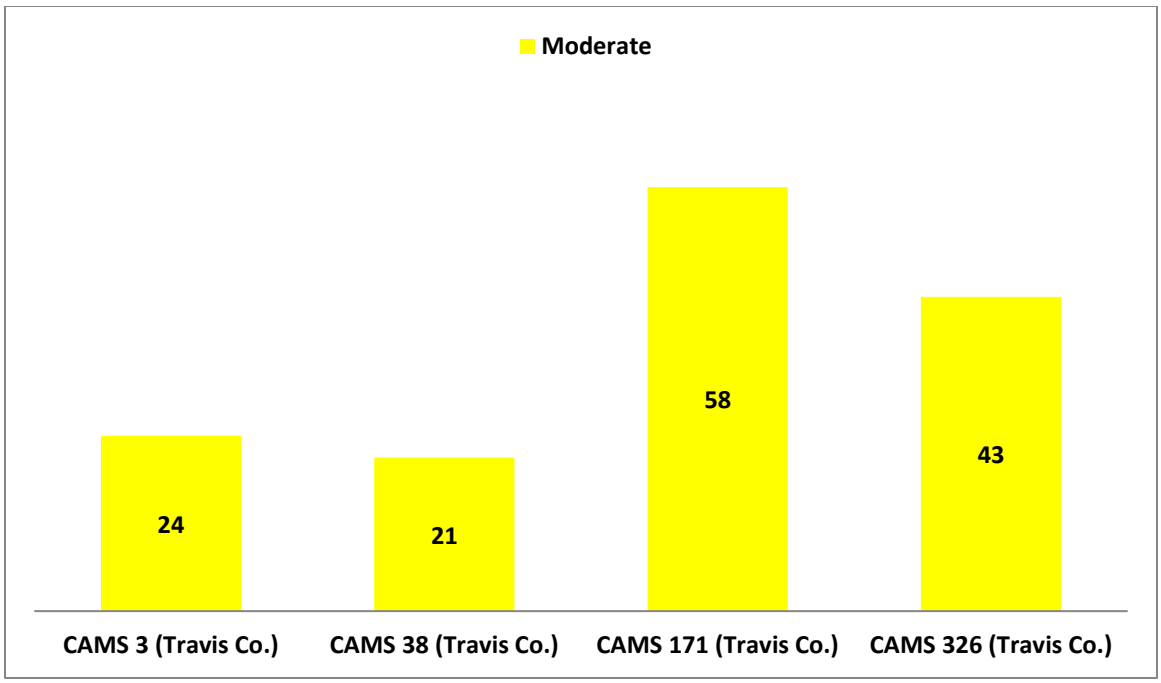


1.4.3 High $PM_{2.5}$ AQI Days by Monitoring Station

The figure below shows the number of days when $PM_{2.5}$ levels were considered "moderate" at each monitoring station. These data are based on daily average $PM_{2.5}$ levels collected from continuous samplers at CAMS 3, 38, 171, and 326.[4]The highest 24-hour $PM_{2.5}$ average in 2015 was 28.8 µg/m^3, which is 82% of the level of the 24-hour $PM_{2.5}$ NAAQS.

[4] Note that CAMS 38's continuous $PM_{2.5}$ monitor only collected daily averages on 318 days during 2017, and none after 11/14/2017, while CAMS 171's continuous $PM_{2.5}$ only collected daily averages on 249 days in 2017, with data collection not beginning until 4/27/2017.

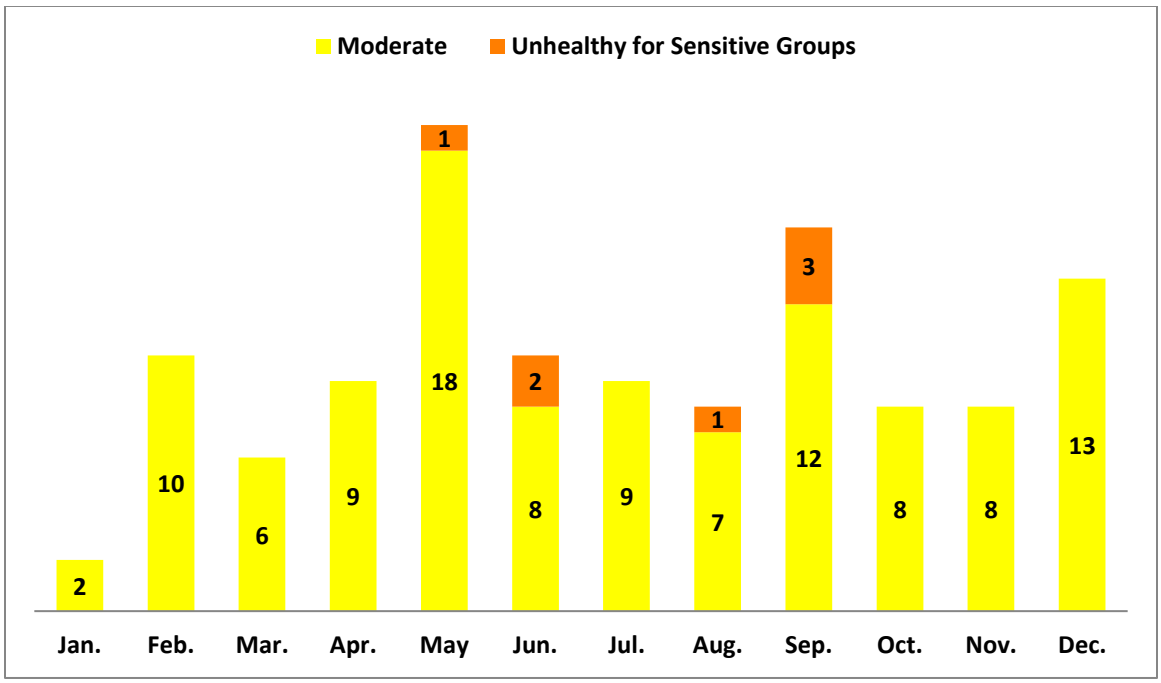
Figure 1-9. Number of Days when $PM_{2.5}$ Pollution was "Moderate" or Worse by Monitoring Station and County, 2017



1.4.4 Distribution of "Moderate" or Worse AQI Days by Month

Air pollution levels vary significantly by month in the CAPCOG region. In 2017, air pollution levels were considered "moderate" or worse on over as much as 61% of the days in May, while air pollution was considered "moderate" or worse on only 6% of the days in January. The following figure shows the number of days when air pollution levels were "moderate" or "unhealthy for sensitive groups" within the region by month.

Figure 1-10. Number of Days when Air Pollution was "Moderate" or Worse in the Austin-Round Rock MSA by Month, 2017

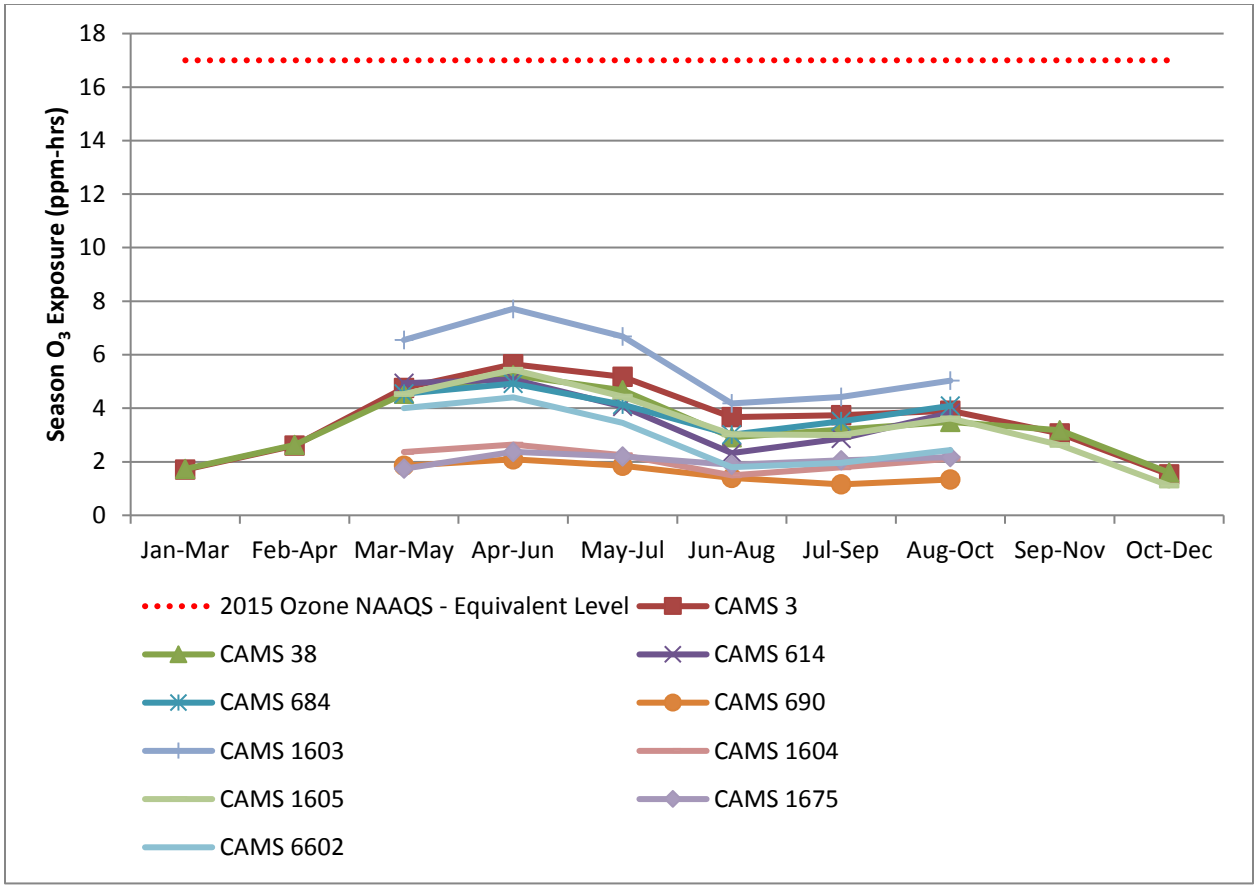


1.5 Seasonal O_3 Exposure

While EPA set the 2015 secondary O_3 standard identical to the 2015 primary O_3 standard, the preamble to the rulemaking states that, "the requisite protection will be provided by a standard that generally limits cumulative seasonal exposure to 17 ppm-hours (ppm-hrs) or lower, in terms of a 3-year W126 index."[5] EPA did not set a separate secondary standard set to protect public welfare, as opposed to public health, because, "such control of cumulative seasonal exposure will be achieved with a standard set at a level of 0.070 ppm, and the same indicator, averaging time, and form as the current standard."[6] The region's peak seasonal O_3 exposure levels were 55-88% below the 17 ppm-hr levels EPA referenced in the final 2015 O_3 NAAQS rulemaking. The figure below shows the 3-month seasonal exposure levels at each monitoring station by month.

[5] 80 FR 65294
[6] Ibid.

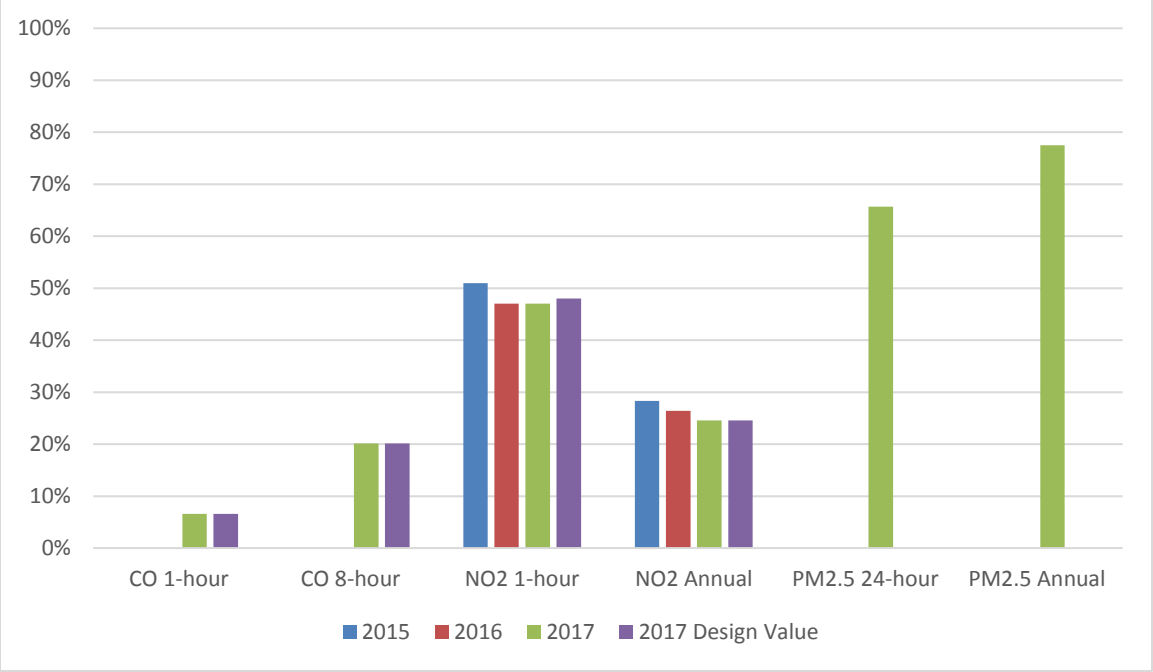
Figure 1-11. Weighted Seasonal O_3 Exposure by Monitoring Station and 3-month period, 2017 (W126 ppm-hrs)



1.6 Near-Road Monitoring

In December 2016, the near-road monitor at CAMS 1068 started sampling CO, and in January 2017, the monitoring station started sampling $PM_{2.5}$. The figure below shows the CO, NO_2, and $PM_{2.5}$ data collected at CAMS 1068 from 2015-2017 compared to the NAAQS. Since the $PM_{2.5}$ NAAQS requires three years of data, there is not a 2017 design value, and will not be one until the end of 2019. As the figure below shows, concentrations of all three pollutants are well below the levels of their respective NAAQS, with the annual $PM_{2.5}$ concentration in 2017 measuring 78% of the 12.0 µg/m^3 level of the annual $PM_{2.5}$ NAAQS.

Figure 1-12. 2015-2017 Near-Road Monitoring Data Compared to NAAQS



1.7 Air Quality Forecasting

One of the factors that influences the risks associated with air pollution is the extent to which air pollution can be accurately and successfully predicted. For the Austin area, there are two types of forecasting tools that can be used to help reduce the exposure of sensitive populations to high air pollution levels –OADs and daily Air Quality Forecasts.

1.7.1 O_3 Action Days

TCEQ issues OADs the afternoon before a day when it believes that O_3 levels may exceed the level of the NAAQS. While the level of the O_3 NAAQS changed on October 1, 2015, states were required to start reporting AQI in terms of the new O_3 NAAQS starting January 1, 2016. Therefore, 2016 was the first year for which the new O_3 AQI thresholds were used. Therefore, it is important to understand that the data analysis in this section includes both forecast data using the 2008 O_3 AQI and forecast data using the 2015 AQI.

There are two ways CAPCOG measures the performance of OAD forecasting for the region over the past several years – accuracy in correctly predicting an OAD, and success in predicting when actual monitored O_3 levels were high enough to be considered "unhealthy for sensitive groups."

Using the new AQI for O_3, CAPCOG calculates these metrics as follows:

$$OAD\ Accuracy\ Rate = \frac{Days\ OAD\ Declared\ When\ Actual\ MDA8 > 70\ ppb}{Days\ OAD\ Declared}$$

$$OAD\ Success\ Rate = \frac{Days\ OAD\ Declared\ When\ Actual\ MDA8 > 70\ ppb}{Days\ When\ Actual\ MDA8 > 70\ ppb}$$

Using these metrics means that TCEQ's OAD forecasting efforts for the region in 2017 were accurate 50% of the time (one out of the two OAD forecasts coincided with an actual MDA8 O_3 value >70 ppb), but OAD forecasting missed 86% of the days when MDA8 O_3 levels actually exceeded 70 ppb (six out of seven). These metrics are only accounting for days when either a forecast was for > 70 ppb or actual O_3 was >70 ppb, and does not account for the other days when TCEQ correctly did not issue an OAD and O_3 did not exceed 70 ppb.

Note that, to the extent that TCEQ's two OADs may prompt individuals in the region to take action to reduce emissions, it is possible that the O_3 AQI levels would have exceeded 100 if not for the OAD. For example, on– April 23, 2016, the highest O_3 MDA8 in the region was 69 ppb, corresponding to an AQI level of 99. It is possible that the action taken by residents of Central Texas on this date accounted for the difference between this day's O_3 levels being 69 ppb and 71 ppb. This is less likely for the "false positive" on May 5, 2017, when the highest MDA8 value recorded in the region was 61 ppb.

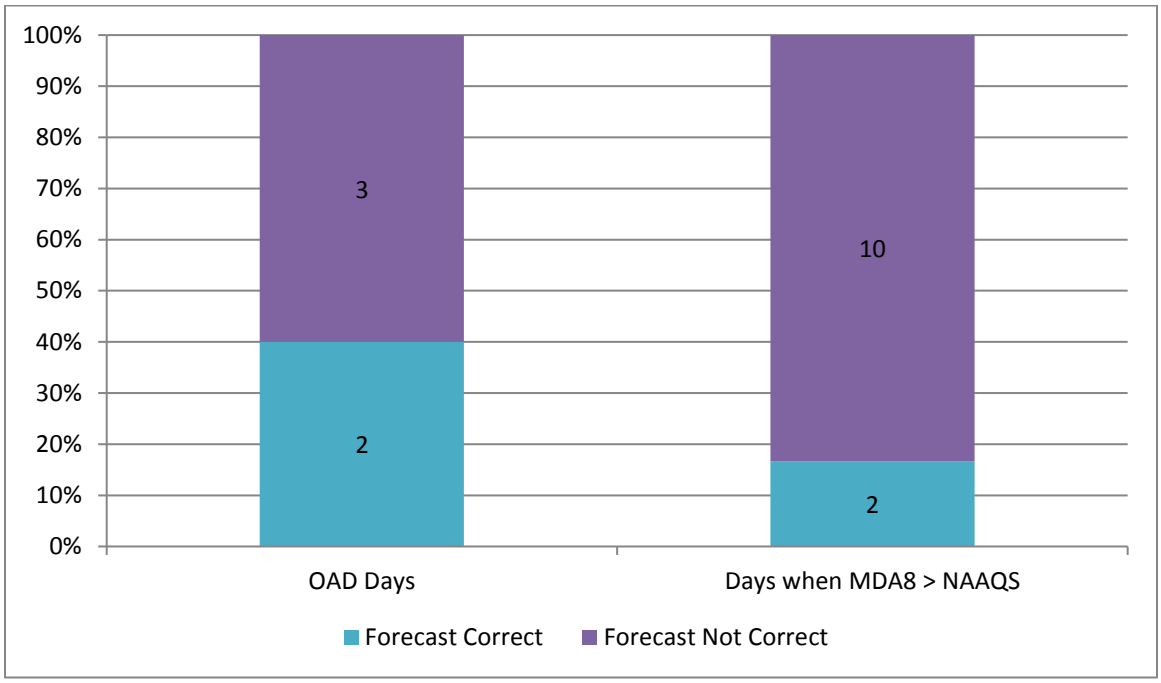
From 2015-2017, TCEQ issued a total of five OAD alerts for the Austin-Round Rock area – one in 2015, two in 2016, and two in 2017. During this time frame, there were a total of 12 days when O_3 levels exceeded the level of the relevant O_3 NAAQS: four in 2015, one in 2016, and seven in 2017. The following table lists each of these dates.

Table 1-4. OAD Dates and Dates when O_3 Exceeded Level of NAAQS, 2015-2017

Date	OAD Issued for this Date?	O_3 NAAQS Level in Effect	Highest O_3 MDA8 Value Recorded in MSA	Station where Highest O_3 MDA8 Value Recorded
8/14/14	Yes	75 ppb	63 ppb	CAMS 614
8/13/15	No	75 ppb	76 ppb	CAMS 3
8/27/15	Yes	75 ppb	82 ppb	CAMS 3
8/28/15	No	75 ppb	85 ppb	CAMS 3
8/29/15	No	75 ppb	83 ppb	CAMS 3
4/23/16	Yes	70 ppb	69 ppb	CAMS 38
5/6/16	Yes	70 ppb	62 ppb	CAMS 1603
10/3/16	No	70 ppb	72 ppb	CAMS 3
6/5/17	No	70 ppb	73 ppb	CAMS 690
6/7/17	No	70 ppb	74 ppb	CAMS 1604
6/8/17	No	70 ppb	75 ppb	CAMS 690
5/5/17	Yes	70 ppb	61 ppb	CAMS 1604
8/1/17	No	70 ppb	72 ppb	CAMS 614
9/1/17	No	70 ppb	71 ppb	CAMS 3
9/12/17	Yes	70 ppb	74 ppb	CAMS 1604
9/13/17	No	70 ppb	73 ppb	CAMS 690

Two of the five OAD forecasts correctly predicted O_3 levels over the applicable NAAQS – a 40% accuracy rate over the three-year period. Conversely, there was a 17% "success rate" in predicting actual MDA8 O_3 levels over the applicable NAAQS from 2015-2017.

Figure 1-13. OAD Forecast Accuracy and Success, 2015-2017



1.7.2 Daily Air Quality Forecasts

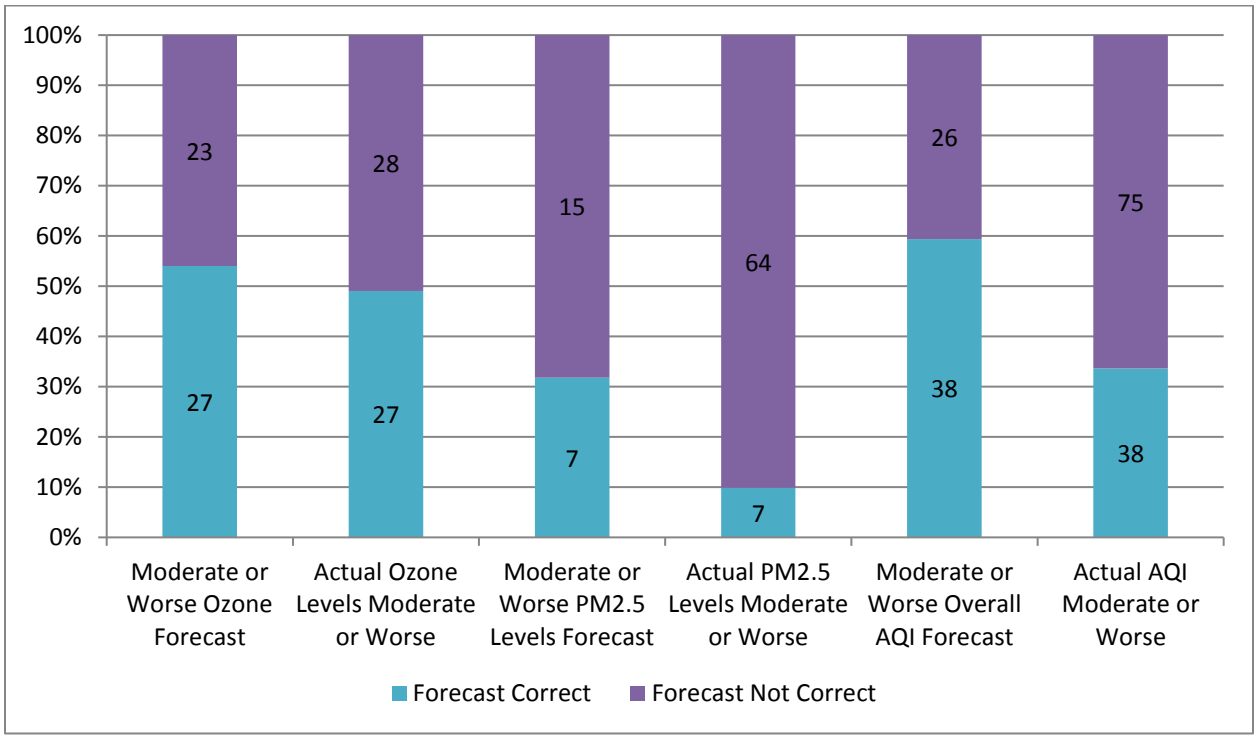
Unlike OADs, which are only issued for days when TCEQ believes O_3 will reach levels considered "unhealthy for sensitive groups;" daily air quality forecasts include forecasts for "good" and "moderate" air pollution levels as well, and include forecasts for pollutants other than O_3. The performance of these forecasts can also be measured using the same type of metrics used above for OADs – accuracy and success. In this case, CAPCOG evaluated the accuracy and success rate in terms of the number of days when air quality was forecast to be "moderate" or worse. The equations below explain these terms in terms of the daily AQI forecast.

$$AQI\ Forecast\ Accuracy\ Rate = \frac{Days\ When\ AQI\ Forecast\ to\ be\ Moderate\ or\ Worse\ and\ was\ Actually\ Moderate\ or\ Worse}{Days\ Forecast\ to\ be\ Moderate\ or\ Worse}$$

$$AQI\ Forecast\ Success\ Rate = \frac{Days\ When\ AQI\ Forecast\ to\ be\ Moderate\ or\ Worse\ and\ was\ Actually\ Moderate\ or\ Worse}{Days\ When\ Actual\ AQI\ Was\ Moderate\ or\ Worse}$$

Since the daily AQI forecasts for the region included forecasts for both O_3 and $PM_{2.5}$, it is possible to analyze these accuracy and success rates by pollutant, as well as for the overall AQI. The figure below shows the results of this analysis for 2017.

Figure 1-14. Accuracy and Success of AQI Forecasts for 2017

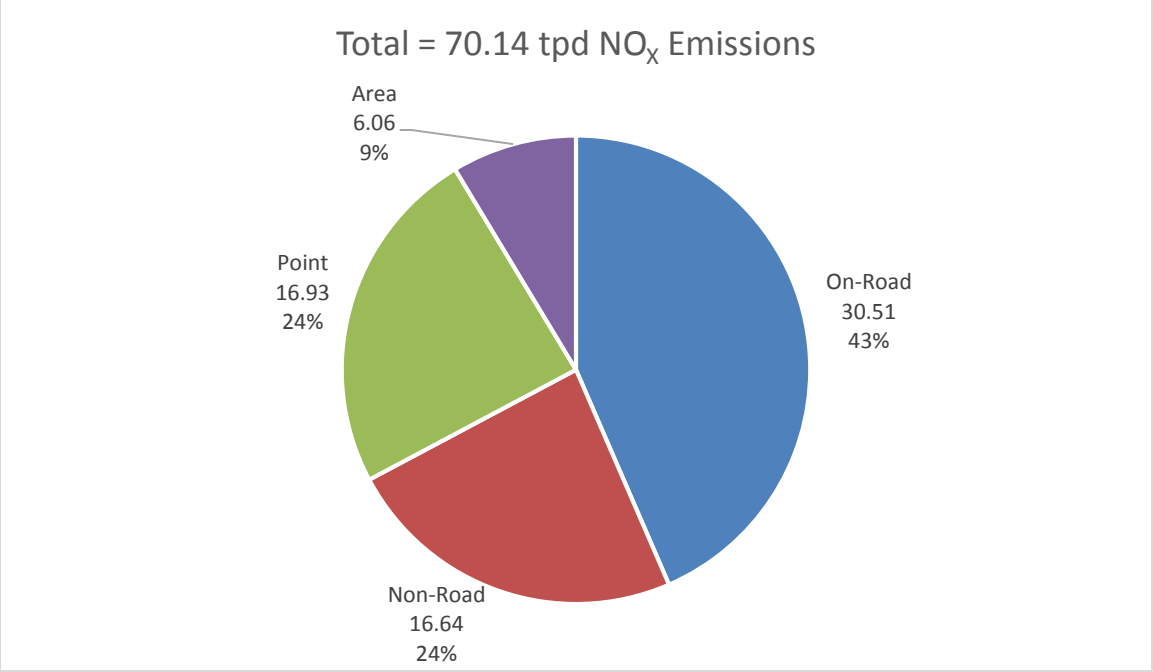


Overall, TCEQ's forecasts for "moderate" or higher O_3 levels were 54% accurate and 49% successful, while forecasts for "moderate" or higher $PM_{2.5}$ forecasting were 39% accurate and 10%. Overall AQI forecasts were 60% accurate and 34% successful.

2 2017 Regional O_3 Season Weekday NO_X Emissions Profile

The following pie chart shows the estimated average 2017 O_3 season weekday anthropogenic NO_X emissions in the region by major source type – on-road mobile, non-road mobile, point source, and area source emissions.

Figure 2-1. 2017 O_3 Season Weekday NO_X Emissions for the Austin-Round Rock MSA (tpd)



2.1 NO_X Emissions by Source Type by County

The following table shows the break-down of the region's NO_X emissions by county and source type.

Table 2-1. 2017 O_3 Season Weekday NO_X Emissions by Source Type and County

County	On-Road	Non-Road	Point	Area	Total
Bastrop	1.90	1.41	3.16	0.37	6.84
Caldwell	1.08	1.1	0.96	1.86	5.00
Hays	4.09	1.33	6.90	0.41	12.73
Travis	16.63	8.57	5.75	2.61	33.56
Williamson	6.81	4.25	0.17	0.81	12.04
TOTAL	**30.51**	**16.64**	**16.93**	**6.06**	**70.14**

2.2 On-Road Sector

The on-road sector includes mobile sources that are registered to operate on public roads. On-road vehicles remain the largest source of NO_X emissions within the region, accounting for 30.51 tons per day (tpd) of NO_X emissions on a typical 2017 O_3 season weekday, based on TCEQ's most recent "trends" emissions inventories. The table below shows the typical 2017 O_3 season weekday NO_X emissions for the region by source use type.

Table 2-2. 2017 Austin-Round Rock O_3 Season Weekday NO_X Emissions by Source Use Type

Source Use Type	NO_X (tpd)
Motorcycle	0.03
Passenger Car	8.85
Passenger Truck	6.15
Light Commercial Truck	1.80
Intercity Bus	0.16
Transit Bus	0.23
School Bus	0.45
Refuse Truck	0.40
Single-Unit Short-Haul Truck	1.92
Single-Unit Long-Haul Truck	0.21
Motor Home	0.20
Combination Short-Haul Truck	3.90
Combination Long-Haul Truck	6.20
TOTAL	**30.51**

Passenger cars and passenger trucks combined to account for 15.00 tpd of NO_X emissions, while commercial trucking accounted for 12.63 tpd NO_X emissions, and the remaining sources accounting for 2.88 tpd NO_X emissions, most of which come from light commercial trucks.

2.3 Non-Road Sources

The non-road sector consists of any mobile source that is not registered to be operated on a public road, including sources such as agricultural equipment, construction and mining equipment, locomotives, aircraft, and drill rigs. Non-road sources made up the 3rd-largest source of NO_X emissions within the region in 2017, accounting for 16.64 tpd of NO_X emissions on a typical O_3 season weekday. The non-road sector includes any mobile source not registered to operate on a public roadway. There are four different TCEQ "trends" data sets from which CAPCOG extracted non-road emissions estimates: equipment modeled in the "Texas NONROAD" (TexN) model, locomotives/rail equipment, aircraft (including ground support equipment), and drill rigs.

Table 2-3. 2017 O_3 Season Weekday Non-Road NO_X Emissions by County (tpd)

County	TexN	Rail	Aircraft	Drill Rigs	Total
Bastrop	0.95	0.46	0.00	0.00	1.41
Caldwell	0.58	0.49	0.01	0.02	1.1
Hays	0.88	0.45	0.00	0.00	1.33
Travis	5.80	0.45	2.32	0.00	8.57
Williamson	3.68	0.55	0.02	0.00	4.25
TOTAL	**11.88**	**2.39**	**2.35**	**0.02**	**16.64**

2.4 Point Sources

The point source sector consists of any stationary source that reports its emissions to TCEQ. The most recent point source data that is publicly available from TCEQ is for 2016. In that year, there were 29 facilities from the Austin-Round Rock MSA that reported their emissions to TCEQ, accounting for a total of 16.65 tpd of NO_X emissions. Since EPA makes data for EGUs available online more quickly than TCEQ publishes the annual emissions data it collects, 2017 EGU data are already available. Substituting the 2017 EGU data from EPA for the 2016 TCEQ emissions data brings the total to 16.93 tpd from point sources. The following table combines the 2016 non-EGU emissions with the 2017 EGU emissions for an estimated 2017 point source emissions estimate by county.

Table 2-4. Estimated 2017 O_3 Season Weekday Point Source NO_X Emissions by County (tpd)

County	EGU	Non-EGU	TOTAL
Bastrop	3.03	0.13	3.16
Caldwell	0.00	0.96	0.96
Hays	0.55	6.35	6.90
Travis	2.04	3.71	5.75
Williamson	0.00	0.17	0.17
TOTAL	**5.61**	**11.31**	**16.93**

The table below shows the 2016 OSD NO_X emissions by facility as reported to TCEQ.

Table 2-5. 2016 O_3 Season Day Point Source Emissions in the Austin-Round Rock MSA from TCEQ EIQs

RN	COMPANY	SITE	COUNTY	NO_X (tpd)
RN102038486	LOWER COLORADO RIVER AUTHORITY	SIM GIDEON POWER PLANT	BASTROP	1.66
RN100212034	MERIDIAN BRICK LLC	ELGIN FACILITY	BASTROP	0.08
RN100225846	ACME BRICK COMPANY	ELGIN PLANT	BASTROP	0.05
RN100723915	GENTEX POWER CORPORATION	LOST PINES 1 POWER PLANT	BASTROP	0.49
RN101056851	BASTROP ENERGY PARTNERS LP	BASTROP ENERGY CENTER	BASTROP	0.93
RN100212018	DAVIS GAS PROCESSING, INC	LULING GAS PLANT	CALDWELL	0.29
RN100220177	OASIS PIPELINE CO TEXAS LP	PRAIRIE LEA COMPRESSOR STATION	CALDWELL	0.66
RN105366934	FLINT HILLS RESOURCES CORPUS CHRISTI LLC	MUSTANG RIDGE TERMINAL	CALDWELL	0.00
RN102597846	TEXAS LEHIGH CEMENT COMPANY LP	TEXAS LEHIGH CEMENT CO	HAYS	6.35
RN100211689	HAYS ENERGY LLC	HAYS ENERGY FACILITY	HAYS	0.64
RN100219872	CITY OF AUSTIN ELECTRIC UTILITY DEPARTMENT DBA AUSTIN ENERGY	DECKER CREEK POWER PLANT	TRAVIS	1.46
RN100214337	AUSTIN WHITE LIME COMPANY	MCNEIL PLANT & QUARRY	TRAVIS	1.11

RN	COMPANY	SITE	COUNTY	NO_X (tpd)
RN105074561	OLDCASTLE MATERIALS TEXAS	AUSTIN HOT MIX	TRAVIS	0.01
RN100843747	NXP USA INC	ED BLUESTEIN SITE	TRAVIS	0.03
RN102533510	UNIVERSITY OF TEXAS AT AUSTIN	HAL C WEAVER POWER PLANT	TRAVIS	1.62
RN100723741	SPANSION LLC	SPANSION AUSTIN FACILITY	TRAVIS	0.02
RN102752763	NXP USA INC	INTEGRATED CIRCUIT MFG OAK HILL FAB	TRAVIS	0.02
RN101957769	AUSTIN AMERICAN STATESMAN	AUSTIN AMERICAN STATESMAN	TRAVIS	0.00
RN100542752	BFI WASTE SYSTEMS OF NORTH AMERICA INC	BFI SUNSET FARMS LANDFILL	TRAVIS	0.07
RN100218692	3M COMPANY	3M AUSTIN CENTER	TRAVIS	0.08
RN101059673	FLINT HILLS RESOURCES CORPUS CHRISTI LLC	AUSTIN TERMINAL	TRAVIS	0.01
RN100215938	WASTE MANAGEMENT OF TEXAS INC	AUSTIN COMMUNITY LANDFILL	TRAVIS	0.12
RN101992246	SUNSET FARMS ENERGY LLC	SUNSET FARMS ENERGY	TRAVIS	0.00
RN100518026	SAMSUNG AUSTIN SEMICONDUCTOR LLC	AUSTIN FABRICATION FACILITY	TRAVIS	0.34
RN100215052	CITY OF AUSTIN ELECTRIC UTILITY DEPARTMENT DBA AUSTIN ENERGY	SAND HILL ENERGY CENTER	TRAVIS	0.35
RN102016698	TEXAS DISPOSAL SYSTEMS LANDFILL INC	TEXAS DISPOSAL SYSTEMS LANDFILL	TRAVIS	0.06
RN100225754	WASTE MANAGEMENT OF NORTH TEXAS	WILLIAMSON COUNTY LANDFILL HUTTO	WILLIAMSON	0.05
RN100725712	SEMINOLE PIPELINE COMPANY LLC	COUPLAND PUMP STATION	WILLIAMSON	0.11
RN100728179	DURCON LABORATORY TOPS INCORPORATED	DURCON LABORATORY TOPS INCORPORATED	WILLIAMSON	0.01
TOTAL	**n/a**	**n/a**	**n/a**	**16.65**

The following table shows the estimated 2017 OSD NO_X emissions for electric generating units in the region. The NO_X emissions for the Decker Creek Power Plant turbines is based on an adjustment to the data reported to EPA due to certain acid rain data defaults that must be used in absence of recent stack tests; the adjustment ensures that the emission rates are consistent with the reported emissions rates in the facilities 2016 EIQ submitted to TCEQ. Non-EGU NO_X sources at these facilities are also based on the 2016 EIQs. The main emissions data comes from 2017 O_3 season NO_X emissions reported to EPA.

Table 2-6. 2017 Austin-Round Rock MSA Electric Generating Unit O_3 Season Day NO_X Emissions by Facility Reporting to AMPD (tpd)

Facility	County	Non-EGU (2016)	EGU (2017)	Combined
Sim Gideon	Bastrop	0.0025	1.8552	1.8576
Lost Pines 1	Bastrop	0.0090	0.5217	0.5307
Bastrop Clean Energy Center	Bastrop	0.0004	0.6373	0.6377
Hays Energy Facility	Hays	0.0071	0.5444	0.5515
Decker Creek	Travis	0.0217	2.0152	2.0369
Sand Hill Energy Center	Travis	0.0036	0.2045	0.2081
TOTAL	**TOTAL**	**0.0444**	**5.7782**	**5.8225**

2.5 Area Sources

CAPCOG estimated the 2017 area sources using EPA's 2017 emissions inventory projections used in recent O_3 modeling for its 2011v6.3 platform.[7]

Table 2-7. 2017 Area Source NO_X Emissions by County and Type (tpd)

County	Agricultural Fires	Non-Point	Non-Point Oil and Gas	Residential Wood Combustion	Total
Bastrop	0.0032	0.1864	0.1822	0.0003	**0.3721**
Caldwell	0.0003	0.0771	1.7803	0.0001	**1.8579**
Hays	0.0000	0.4081	0.0000	0.0006	**0.4087**
Travis	0.0000	2.5864	0.0143	0.0048	**2.6055**
Williamson	0.0000	0.7833	0.0265	0.0020	**0.8117**
TOTAL	**0.0036**	**4.0413**	**2.0033**	**0.0079**	**6.0560**

3 Implementation of O_3 Advance Program Action Plan and Other Measures

This section provides details on emission reduction measures implemented within the Austin-Round Rock MSA in 2017. This includes both measures that had been included in the OAP Action Plan and other measures that were not explicitly committed to in that plan.

3.1 Regional and State-Supported Measures

Regional and state-supported measures involve multi-jurisdictional programs or state involvement in an emission reduction measure within the region. These include:

- The vehicle emissions inspection and maintenance (I/M) program
- The Drive a Clean Machine program
- Texas Emission Reduction Plan (TERP) grants
- The Commute Solutions Program

[7] ftp://ftp.epa.gov/EmisInventory/2011v6/v3platform/reports/2011el_county_monthly_report.xlsx

- The Clean Air Partners Program
- The Clean Cities Program
- Outreach and Education Measures
- Property-Assessed Clean Energy (PACE)
- CAPCOG's Regional Air Quality Grants

3.1.1 Vehicle Emissions Inspection and Maintenance Program

The Austin-Round Rock MSA is home to Travis and Williamson Counties – the two largest "attainment" counties in the Country that have a vehicle emissions inspection and maintenance (I/M) program. The I/M program has been in place since September 1, 2005, and was implemented as part of the region's participation in the Early Action Compact (EAC) program. The program's rules are found in Title 30, Part 1, Texas Administrative Code (TAC) Chapter 114, Subchapter C, Division 3: Early Action Compact Counties. Under the program, all gasoline-powered vehicles (including heavy-duty vehicles but excluding motorcycles) that are 2-24 years old are required to undergo an annual emissions inspection along with their annual safety inspection. Vehicles model year 1995 and older are required to pass a "two-speed idle" (TSI) test, and vehicles model year 1996 and newer are required to pass an "on-board diagnostic" (OBD) test. Up until the end of state fiscal year 2017, the inspection cost $16 per test:

- The station may retain $11.50
- $4.50 is remitted to the state and deposited into the Clean Air Account (Fund 151):
    - $2.50 is for state administration of the I/M program
    - $2.00 is for DACM/LIRAP (no longer collected as of late 2017)

If a vehicle fails an emissions inspection, the owner is required to fix the vehicle as a condition of registration. As described in 37 TAC § 23.52(a), "an emissions testing waiver defers the need for full compliance with vehicle emissions standards of the vehicle emissions inspection and maintenance (I/M) program for a specified period of time after a vehicle fails an emissions test." The following waivers are available in certain circumstances:

- A "low-mileage" waiver if a motorist has paid at least $100 for emissions-related repairs and is driven less than 5,000 per year
- An "individual vehicle" waiver if a motorist has paid at least $600 in emissions-related repairs

Under 37 TAC § 23.53(a), time extensions are also available:

- A "low-income time extension" is available if the motorist has income at or below the federal poverty level and the motorist hadn't previously received a time extension in the same cycle
- A "parts-availability time extension" is available if an applicant can show problems in obtaining the needed parts for repair

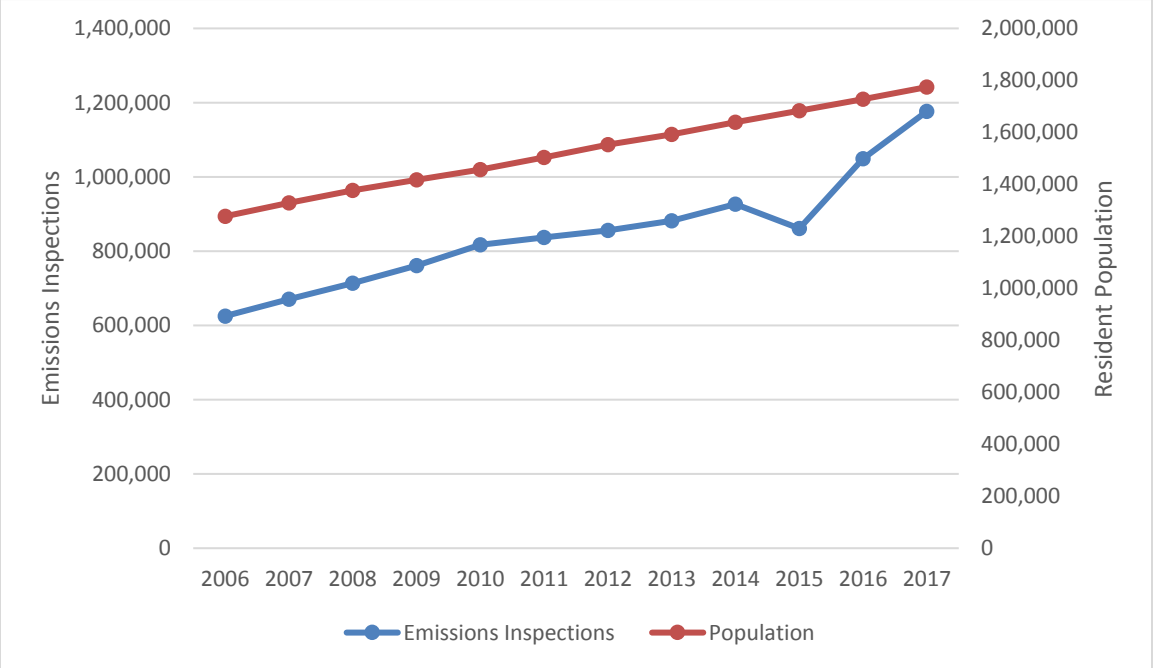
Some of the key metrics for the I/M program year-to-year are the number of emissions inspections and the failure rates. The following table summarizes the number and disposition of emissions inspections in 2017:

Table 3-1. I-M Program Statistics for 2017[8]

Metric	Travis County	Williamson County	Combined
Total Emission Tests	799,048	377,524	1,176,572
Initial Emission Tests	737,791	347,988	1,085,779
Initial Emission Test Failures	38,083	16,863	54,946
Initial Emission Test Failure Rate	5.16%	4.85%	5.06%
Initial Emission Retests	54,933	26,934	81,867
Initial Emission Retest Failures	4,944	1,973	6,917
Initial Emission Retest Failure Rate	9.00%	7.33%	8.45%
Other Emission Retests	6,324	2,602	8,926
Other Emission Retest Failures	1,636	669	2,305
Other Emission Retest Failure Rate	25.87%	25.71%	25.82%

In general, there have been year-over-year increases in the number of emissions inspections tracking with population increases, except for 2015. The difference in 2015 was that, due to a transition period in the state's move from a two-sticker (registration and inspection) system to a one-sticker system, some vehicles were able to skip a cycle of inspections if they had a January 2015 or February 2015 registration renewal deadline. By March 1, 2016, however, all vehicles should have "caught up."

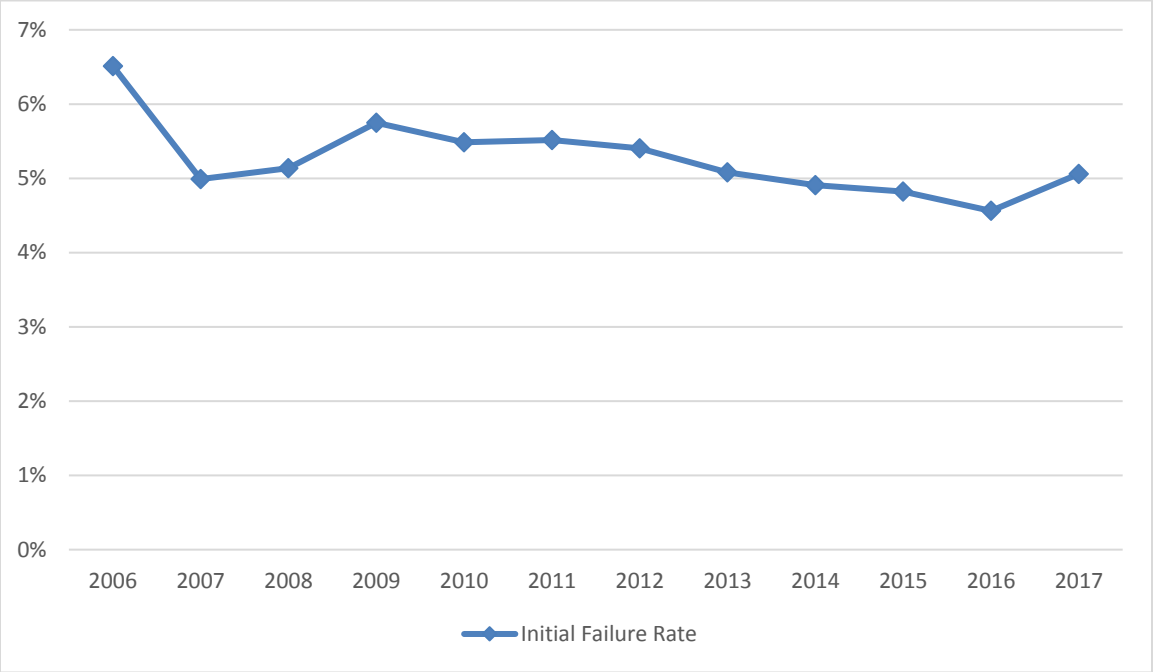
Figure 3-1. Trend in Emissions Inspections Compared to Population in Travis and Williamson Counties 2006-2017



[8] Reports generated 7/10/2018

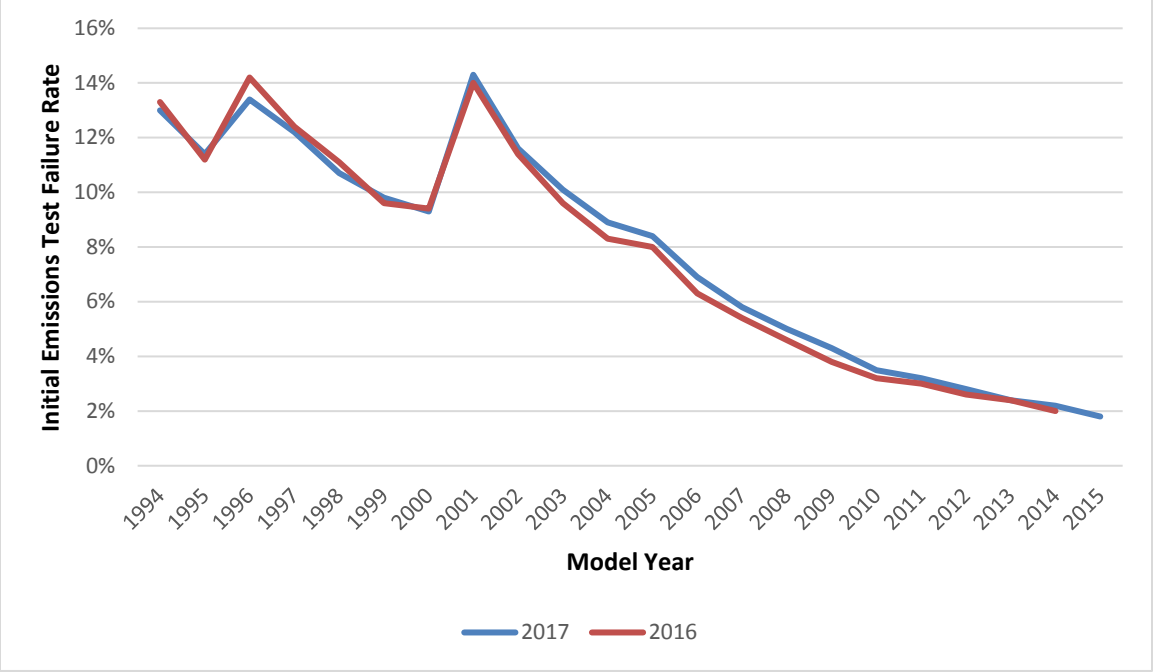
2017 saw an increase in the failure rate from the previous year, increasing from an all-time low of 4.6% in 2016 to 5.1%, which is higher than initial failure rates had been within the region since 2013.

Figure 3-2. Initial Emissions Inspection Failure Rate Trend 2006-2017



The figure below shows the emissions test failure rates of each model year based on tests conducted in 2016 and 2017. As the figure below shows, the chances of older model-year vehicles failing an emissions test are significantly higher than a newer model-year vehicle failing a test. In 2017 for example, 2015 model year vehicles had a rate of only about 1.8%, whereas the rate for model year 2001 vehicles was 14.3%, eight times higher. As the figure shows, the rates for each model year were very similar in 2016 and 2017.

Figure 3-3. Initial Emissions Test Failure Rate by Model Year



Under certain circumstances, a vehicle subject to annual testing requirements is allowed to continue operating under an I/M program waiver. The following table summarizes the waivers issued in 2016 and 2017.

Table 3-2. 2016 and 2017 I-M Program Waivers

Waiver Type	2016	2017
Total Tests	1,025,027	1,093,702
Failing Vehicles	54,935	55,428
Total Waivers	101	113
Total Waiver Rate	0.18%	0.20%
Individual Waivers	55	55
Low Mileage Waivers	14	17
Low Income Time Extensions	32	41
Parts Availability Time Extensions	0	0

3.1.2 Drive a Clean Machine Program

One significant development in the region's air quality plan that occurred in 2017 was the Governor's line-item veto of appropriations for the Drive a Clean Machine (DACM) program for state fiscal years 2018 and 2019 (Sep. 1, 2017 – Aug. 31, 2019). As a result of this veto, the Travis County and Williamson County Commissioners' Courts voted in late 2017 to suspend collection of the $2 surcharge on vehicle inspections associated with the program. Travis County, which has been administering the program on

behalf of both itself and Williamson County since 2016, plans to continue the program up through May 2019 with unspent funds that had already been appropriated to the counties in FY 2016 and 2017.

The Drive a Clean Machine (DACM) program helps support the I/M program in Travis and Williamson Counties by providing funding to "moderate"-income and low-income motorists for:

- Repairing emissions control systems on vehicles that fail an emissions test;
- Replacing a vehicle that fails an emissions test; and
- Replacing a vehicle that is at least 10 years old.

Motorists can receive up to $600 for repairs, $3,000 for a car up to 3 years old, $3,000 for a truck up to 2 years old, or $3,500 for a hybrid or alternative-fueled vehicle up to 3 years old. New vehicles are required to meet Tier 2 bin 5 or Tier 3 bin 160 or cleaner standard. Replacement vehicles cannot have an odometer reading of more than 70,000 miles. Replacement vehicles can only be purchased through a participating dealer and repairs must be performed by a recognized emissions repair facilities for Travis and Williamson Counties.

- There are currently a total of 17 recognized repair facilities in Travis and Williamson Counties (up from 15 last year)[9]
- There are 101 participating dealers in the Austin-Round Rock MSA (down from 104 last year)[10]

The program achieves emission reductions beyond those that would be achieved by implementing an I/M program without DACM in the following ways:

- Increases program compliance by making it more likely that a motorist will bring in their vehicle for a vehicle inspection based on the knowledge that financial assistance is available if they fail the test
- Increases program compliance by reducing low-income time extensions for repairs
- Increases program compliance by replacing older vehicles more likely to fail an emissions test with newer vehicles more likely to pass an emissions test
- Accelerates the benefits of newer vehicle emissions standards by replacing older vehicles with newer vehicles

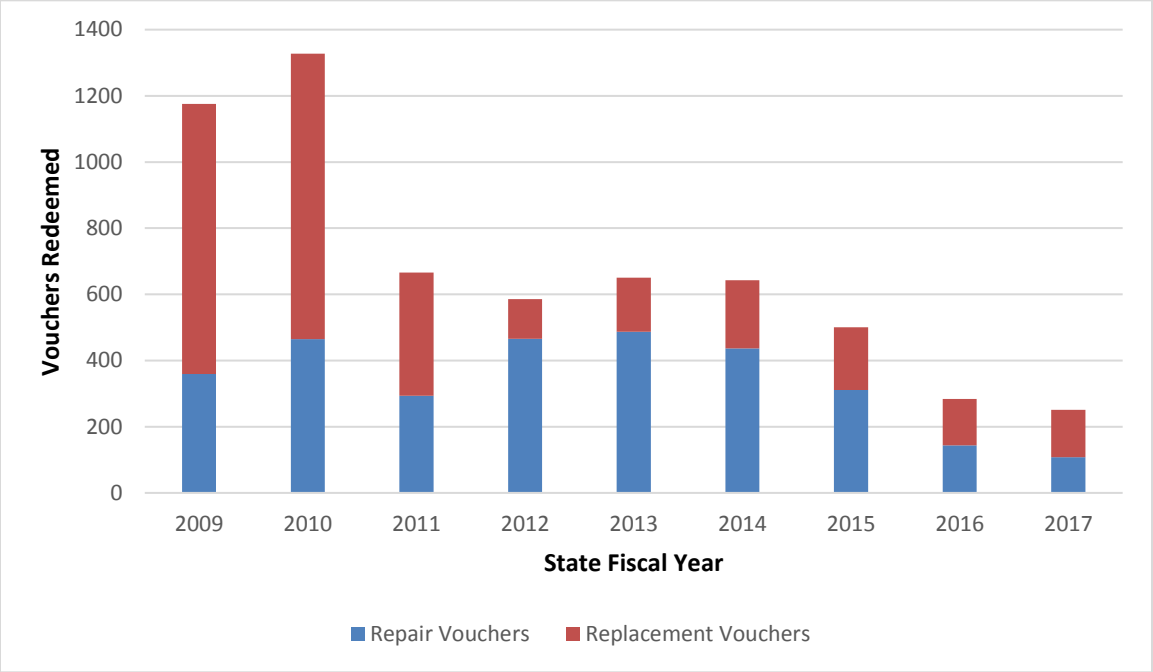
In 2016, Travis County and Williamson County entered into an agreement to jointly administer their DACM programs through Travis County in order to improve the program's administrative efficiency. Starting June 1, 2016, Travis County's DACM staff began accepting applications from Williamson County motorists.

As the figure below shows, the number of vouchers redeemed declined from 2016 to 2017, continuing a trend from 2011 when the program's budget was drastically cut. These data suggest that the reduced

[9] https://www.traviscountytx.gov/images/air_quality/docs/recognized_emission_repair.pdf, accessed 7/10/2018
[10] https://www.traviscountytx.gov/images/air_quality/docs/AutoDealerList.xls, accessed 7/10/2018

participation in the program as a result of that cut had long-lasting impacts even after funding was reinstated in 2013 and 2015.

Figure 3-4. DACM Repair and Replacement Voucher Trends 2009-2017



3.1.3 Texas Emission Reduction Plan Grants

Texas Emission Reduction Plan (TERP) grants provide funding for a variety of types of projects designed to reduce emissions, particularly NO_X. These include:

- The Diesel Emissions Reduction Incentive (DERI) program, designed to achieve emission reductions by incentivizing the early replacement or repowering of older diesel-powered engines with newer engines
    - The Emission Reduction Incentive Grant (ERIG) program is a competitive grant program based on the cost/ton of NO_X reduced
    - The Rebate Grant program is a first-come, first-served grant program based on fixed rebate dollar amounts based on fixed cost/ton of NO_X reduced assumptions
- The Texas Natural Gas Vehicle Grant Program (TNGVGP) incentivizes the replacement of diesel-powered trucks with natural gas vehicle-powered trucks, with the newer engine needing to achieve at least a 25% reduction in emissions compared to the diesel power it is replacing
- The Texas Clean Fleet Program (TCFP) incentivizes owners of large fleets to replace a significant portion of their conventionally-fueled vehicles with alternative-fueled vehicles, achieving emission reductions by replacing the older, dirtier engines with newer, cleaner engines
- The Clean School Bus (CSB) program provides funding for the installation of PM control devices on older buses
- The Drayage Truck Incentive Program (DTIP) provides funding for the early replacement of drayage trucks in port/intermodal facility areas

- The New Technology Implementation Grants (NTIG) program provides funding for new/innovative technology to reduce emissions from stationary sources
- The Clean Transportation Triangle (CTT) provides funding for the construction of natural gas fueling infrastructure in the region between Dallas-Fort Worth, San Antonio, and Houston in order to encourage wider usage of natural gas-fueled vehicles
- The Alternative Fueling Facilities Program (AFFP) provides funding for the construction of a variety of types of alternative fuel infrastructure in nonattainment areas

The table below shows the TERP funding awarded to the Austin-Round Rock MSA in FY 2017, along with any quantified NO_X emissions reductions from those grants.

Table 3-3. FY 2017 TERP Grants Awarded in the Austin Area in FY 2017

Grant Program	Total Funding Awarded	Funding Awarded to the Austin Area	% of Funding Going to MSA	NO_X Emissions Reductions from Grants Awarded to Austin Area (tons)
CTT/AFFP[11]	$4,176,888	$400,000	9.58%	Unquantified
DTIP[12]	$2,264,925	$0	0.00%	0
CSB[13]	$1,545,545	$0	0.00%	0
NTIG[14]	$3,544,145	$0	0.00%	0
TCFP[15]	$19,346,614	$0	0.00%	0
TNGVGP[16]	$6,162,750	$210,000	3.41%	7.71
DERI-Rebate	$16,405,441	$2,749,781	16.76%	225.08

11 https://www.tceq.texas.gov/assets/public/implementation/air/terp/FY17_CTT_AFFP_Applications_Selected_For_Funding_FOR_WEB.pdf, accessed 7/10/2018.

12 https://www.tceq.texas.gov/assets/public/implementation/air/terp/FY17_DTIP_Applications_Selected_For_Funding_FOR_WEB.pdf, accessed 7/10/2018.

13 https://www.tceq.texas.gov/assets/public/implementation/air/terp/FY17_TCSB_Applications_Selected_For_Funding_FOR_WEB.pdf, accessed 7/10/2018

14 https://www.tceq.texas.gov/assets/public/implementation/air/terp/FY17_NTIG_Applications_Selected_For_Funding_FOR_WEB_2.pdf, accessed 7/10/2018

15 https://www.tceq.texas.gov/assets/public/implementation/air/terp/FY17_Clean_Fleet_Applications_Selected_For_Funding_FOR_WEB.pdf, accessed 7/10/2018

16 https://www.tceq.texas.gov/assets/public/implementation/air/terp/FY17_TNGVGP_Applications_Selected_For_Funding_FOR_WEB_101217.pdf and https://www.tceq.texas.gov/assets/public/implementation/air/terp/TNGVGP_Active_Projects_083117_FOR_WEB.pdf, accessed 7/10/2018, reflects FY 2016 and 2017.

Grant Program	Total Funding Awarded	Funding Awarded to the Austin Area	% of Funding Going to MSA	NO_X Emissions Reductions from Grants Awarded to Austin Area (tons)
DERI-ERIG[17]	$58,884,422	$4,344,749	7.38%	508.24
TOTAL	**$112,330,730**	**$7,704,529**	**6.86%**	**741.03**

The NO_X reductions from grants awarded in the Austin in 2017 area translate to 0.2930 tpd of additional NO_X reductions for FY 2017 – 2020, and 0.2854 tpd NO_X reductions for FY 2021 – 2023.

For the projects funded in the Austin area, the average cost/ton of NO_X reduced ratios are shown below:

- TNGVGP: $27,237 per ton of NO_X reduced (statewide: $38,874 per ton)
- DERI – Rebate: $12,217 per ton of NO_X reduced (statewide: $12,379)
- DERI – ERIG: $8,549 per ton of NO_X reduced (statewide: $9,289)

3.1.4 Commute Solutions Program

In 2016, the Capital Area Metropolitan Planning Organization (CAMPO) was not actively staffing the Commute Solutions program, although it did continue to maintain the CommuteSolutions.com website and the MyCommuteSolutions.com ride-sharing platform. Towards the end of 2016, CAPCOG and other stakeholders starting having discussions with CAMPO about possibly moving the program over to CAPCOG. That process culminated in the transfer of the program in March 2017. Since the program was not advertised or otherwise actively promoted in 2016, statistics for 2016 are significantly lower than they were in prior years. CAPCOG started to promote and maintain the program through in-person outreach, electronic outreach, and incentives/contest in April 2017. The table below shows the program participation from the myCommuteSolutions.com platform over the entire 2017 calendar year.

Table 3-4. MyCommuteSolutions.com Data for 2017

Mode/Type	Entries	Distance Miles	Fuel Saved	NO_X Saved (lbs)	VOC Saved (lbs)
Drove Alone[18]	1,576	16,110	n/a	n/a	n/a
Carpool Driver	2,173	32,508	746	11.13	48.57
Carpool Passenger	1,277	17,901	409	5.44	26.43
Vanpool Driver	112	3,226	100	1.58	6.59
Vanpool Passenger	418	10,101	330	5.21	21.76
Bus	4,798	44,291	2,072	32.71	136.7
Rail	1,272	24,046	1,124	17.76	74.22
Bicycle	3,038	11,124	520	8.22	34.33
Walk	1,480	1,014	48	0.75	3.13

[17] https://www.tceq.texas.gov/assets/public/implementation/air/terp/FY17_ERIG_Applications_Selected_For_Funding_FOR_WEB.pdf, accessed 7/10/2018

[18] RideShark does have data on estimated fuel savings and emissions reductions for driving alone if someone is using a vehicle with better-than average fuel consumption/emissions rates, but CAPCOG did not include those data in the totals for this table.

Mode/Type	Entries	Distance Miles	Fuel Saved	NO_x Saved (lbs)	VOC Saved (lbs)
Telework	685	10,744	502	7.93	33.16
Compressed Schedule	253	5,249	245	3.88	16.2
Days Off[19]	449	46	n/a	n/a	n/a
TOTAL	**17,351**	**176,361**	**6,096**	**94.6**	**401.1**

Between Apr. 1 and Nov. 30, 2017, CAPCOG marketed the Commute Solutions program with paid electronic ads, these efforts yielded 2,541,863 gross impressions (GI). Figure 3.7 shows the total gross impressions by advertising delivery method – electronic billboard ads at a Round Rock Express game, social media, "run of site," mobile ads, and desktop ads.[20] Figure 3.8 below shows the engagement that paid advertisements received. CAPCOG measures engagement based on the number of clicks that ads generated. Social media ads generated the most engagement for the program.

Figure 3-5 Commute Solutions Advertisement Graphics

[19] RideShark's platform allows for entries for "days off," but no fuel or emissions reductions savings are included in the subtotal on this table.

[20] "Run of site" impressions are ads that were placed on Emmis' broadcast radio websites rather than being targeted to websites based on location or interest like the Desktop and Mobile ads.

Figure 3-6 Commute Solutions Delivered Gross Impressions by Method

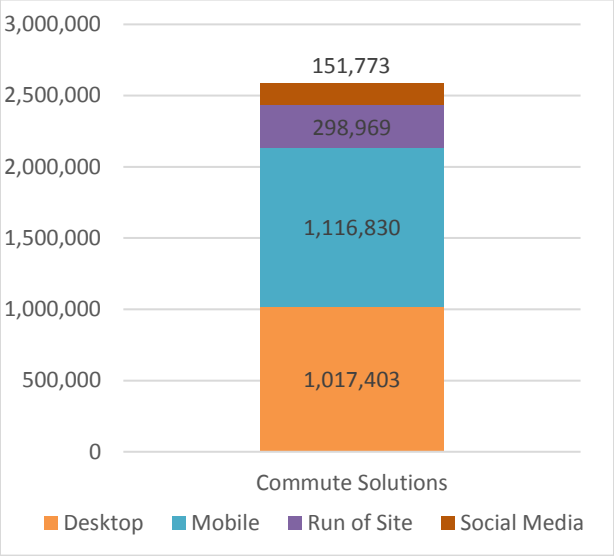
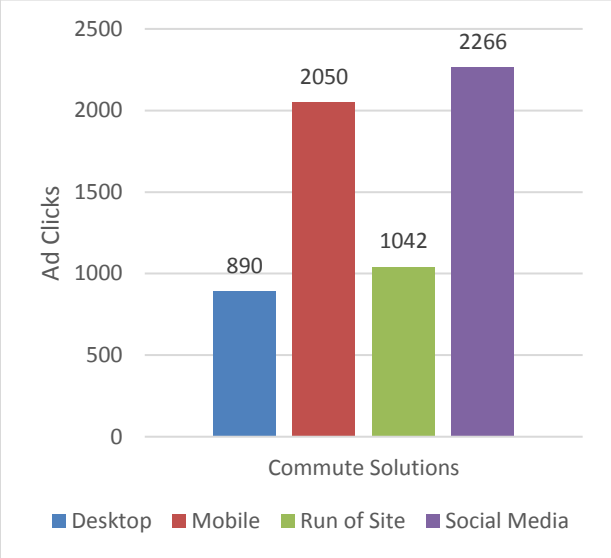
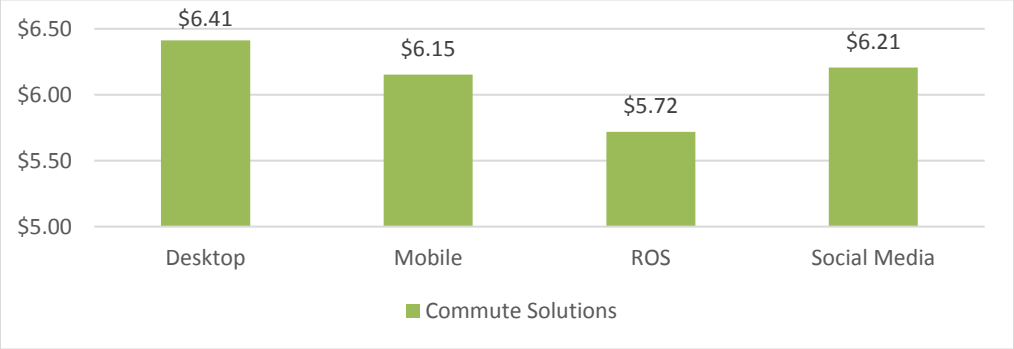


Figure 3-7 Commute Solutions Advertising Engagement by Platform



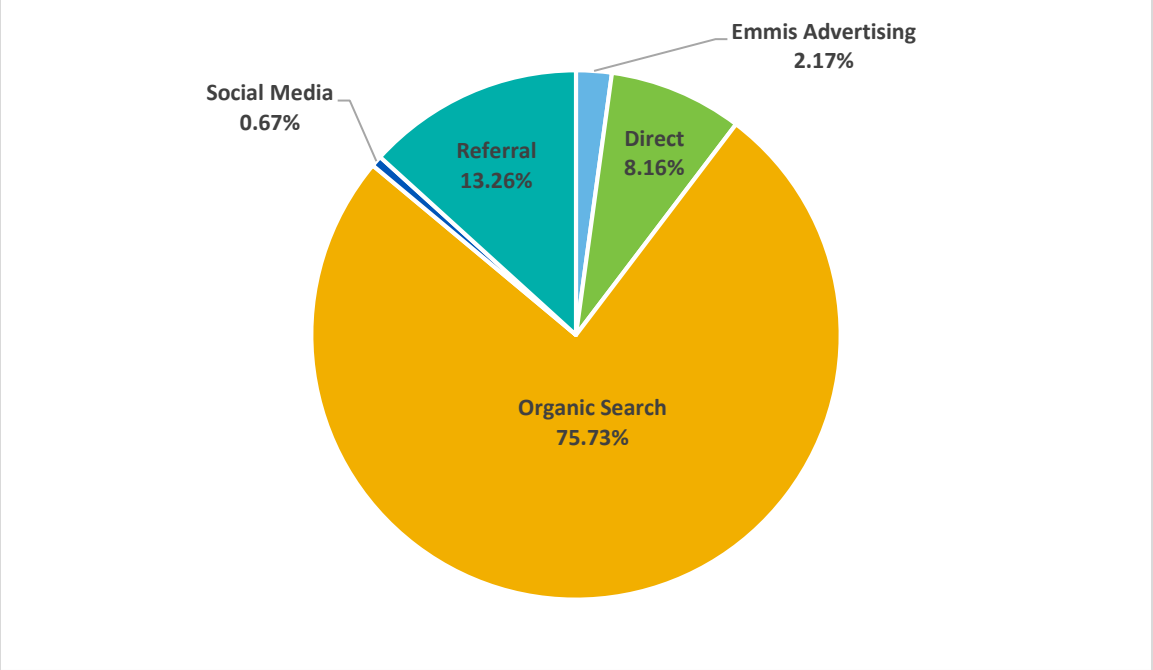
CAPCOG evaluated the cost effectiveness of each advertising method by calculating the cost per 1,000 GI, as shown in the figure below. Desktop ads were the most expensive and when taking into account the desktop ad engagement were the least effect advertising method based on these metrics.

Figure 3-8 Cost per 1,000 Impressions by Platform Target



In 2017, 67,274 unique users visited the Commute Solutions website. The figure below shows that the majority of the users found the website through organic search. CAPCOG contracted with a vendor, Presley Design, to fix a number of bugs discovered on the Commute Solutions website when the program was transferred from the Capital Area Metropolitan Planning Organization (CAMPO) to CAPCOG. In addition, the website was also enhanced to include the ability to manually translate it into Spanish and CAPCOG completed this translation in 2018.

Figure 3-9 Commute Solutions Website Acquisition by Method, 2017



In 2017, Commute Solutions distributed two newsletter to myCommuteSolutions users. CAPCOG also held 17 myCommuteSolutions Contest and distributed 41 prizes to users.

Table 3-5. Commute Solution Newsletter Distribution

Newsletter	Date Sent	# of Recipients
October Commute Solutions Newsletter	10/16/2017	2,771
November Commute Solutions Newsletter	11/17/2017	2,546
Total	**n/a**	**5,317**

Table 3-6 Summary of myCommuteSolutions Contest/Incentives

Contest	Date	Prize	# of Winners	# of Entries
Bike Month Commuter Challenge	5/8/17 – 5/31/17	Two 2 Hour Bike Rental Gift Certificates from Rocket Electrics Austin	1	87
June Commuter Challenge	6/1/17 – 6/3/17	31-Day Pass for Capital Metro	1	84
Car2Go - Win a $50 Voucher to use Car2Go	7/10/17-8/6/17	$50 Voucher to use Car2Go	4	318
Win a $25 Alamo Draft House Gift Card	7/10/17-8/7/17	$25 Alamo Draft House Gift Card	4	3,201

Contest	Date	Prize	# of Winners	# of Entries
Capital Metro - Win a 31 Day Commuter Pass ($96.25 value)	7/16/17 – 8/19/17	31 Day Commuter Pass	2	155
Thinkery Austin - Parent Plus Membership ($75 Value)	8/1/17 - 8/31/17	Thinkery Austin - Parent Plus Membership	1	364
Blanton Museum of Art - Individual Plus Membership ($65 value)	7/1/17 – 7/31/17	Blanton Museum of Art - Individual Plus Membership	1	493
Typhoon Texas - Win 4 General Admission Tickets to Typhoon Texas ($140 value)	7/16/17 – 8/7/17	4 General Admission Tickets to Typhoon Texas	1	242
Typhoon Texas - Win 2 General Admission Tickets to Typhoon Texas ($70 value)	7/16/17 – 8/7/17	2 General Admission Tickets to Typhoon Texas	1	230
Zilker Park Boat Rentals - Win a $15 Gift card to Zilker Park Boat Rentals	7/16/17 – 8/12/17	$15 Gift Card to Zilker Park Boat Rentals	4	283
Austin B-Cycle Annual Membership ($80 Value)	8/14/17 – 9/15/17	Austin B-Cycle Annual Membership	2	256
Amazon.com Gift Card ($25 Value)	9/18/17 – 10/20/17	$25 Amazon.com Gift Card	4	819
Hopdoddy Gift Card ($25 Value)	9/25/17 – 11/3/17	$25 Hopdoddy Gift Card	4	716
Starbucks Gift Card ($10 Value)	11/5/17- 12/2/17	$10 Starbucks Gift Card	4	204
Amy's Ice Cream	11/5/17 – 11/25/17	$15 Amy's Ice Cream Gift Card	4	184
Ticket(s) to the Nutcracker by Ballet Austin ($130 Value)	11/5/17- 11/24/17	Ticket(s) to the Nutcracker by Ballet Austin	1	167
Tiff's Treats Gift Card ($20 Value)	11/19/17 – 12/15/2017	$20 Tiff's Treats Gift Card	3	186
Total	**n/a**	**$2,231.39**	**41**	**8,303**

3.1.5 Clean Air Partners Program

CLEAN AIR Force's Clean Air Partners Program includes reporting from a number of organizations outside of the CAC. These include:

1. 3M
2. Applied Materials
3. Austin Community College
4. Austin Independent School District
5. Chemical Logic, Inc.
6. Emerson Automation Solutions
7. Environmental Defense Fund

8. HNTB Corporation
9. ICU Medical
10. Metropia
11. NXP
12. Oracle
13. R&R Limousine and Bus
14. Samsung Austin Semiconductor
15. Seton Healthcare Family
16. Spectrum
17. St. David's Healthcare
18. Tokyo Electron
19. University of Texas at Austin
20. Zephyr Environmental Corporation

In addition, there are several CAC members who also participate in the Clean Air Partners Program:

1. CAPCOG
2. City of Austin
3. Central Texas Regional Mobility Authority (CTRMA)
4. Capital Area Metropolitan Planning Organization (CAMPO)
5. Lone Star Clean Fuels Alliance (LSCFA)
6. Lower Colorado River Authority (LCRA)
7. Travis County
8. TxDOT Headquarters
9. TxDOT Austin District
10. Williamson County

3.1.6 Outreach and Education Measures

In 2017, CAPCOG focused its outreach and education measures on Air Central Texas website enhancements, electronic outreach, in-person outreach, and the Air Central Texas Awards.

CAPCOG enhanced and updated the Air Central Texas (ACT) website in an effort to improve the visibility and discovery of information on the website, to improve the user experience and to become a more robust source of information about air quality for the region. Website enhancements completed under this ILA include adding:

- An ACT Tool Kit page, including anti-idling materials (http://aircentraltexas.org/en/resources/air-central-toolkit);
- An ACT Event Calendar (http://aircentraltexas.org/en/calendar);
- A search feature; and
- Pages to celebrate Air Quality Awareness Week 2017 (http://aircentraltexas.org/en/regional-air-quality/2017-air-quality-awareness-week).

The tool kit currently consists of air quality outreach materials also well as an air quality contact list that is password protected, however, CAPCOG plans to continually update the toolkit over time. The event

calendar and the search feature were developed by BrightLeaf Design and should help users find key information on the website. The Air Quality Awareness Week pages were created to support the national awareness campaign and were included in an Air Quality promotion held in May were people tested their Air Quality IQ with a quiz for prizes.

As **Error! Reference source not found.** shows, the bulk of the ACT website visits came from paid Emmis advertisements. Visitors also found the site directly by entering the URL or clinking a link in an email. People that found the website via search engine by typing things like '*air central texas represents'*, 'air pollution emissions texas' and '*ambient air quality in texas'*. Referrals were from links on other websites like the CAPCOG website and the City of Austin website, which were the top referral websites.

Figure 3-10 Air Central Texas Website Acquisition Method, 2017

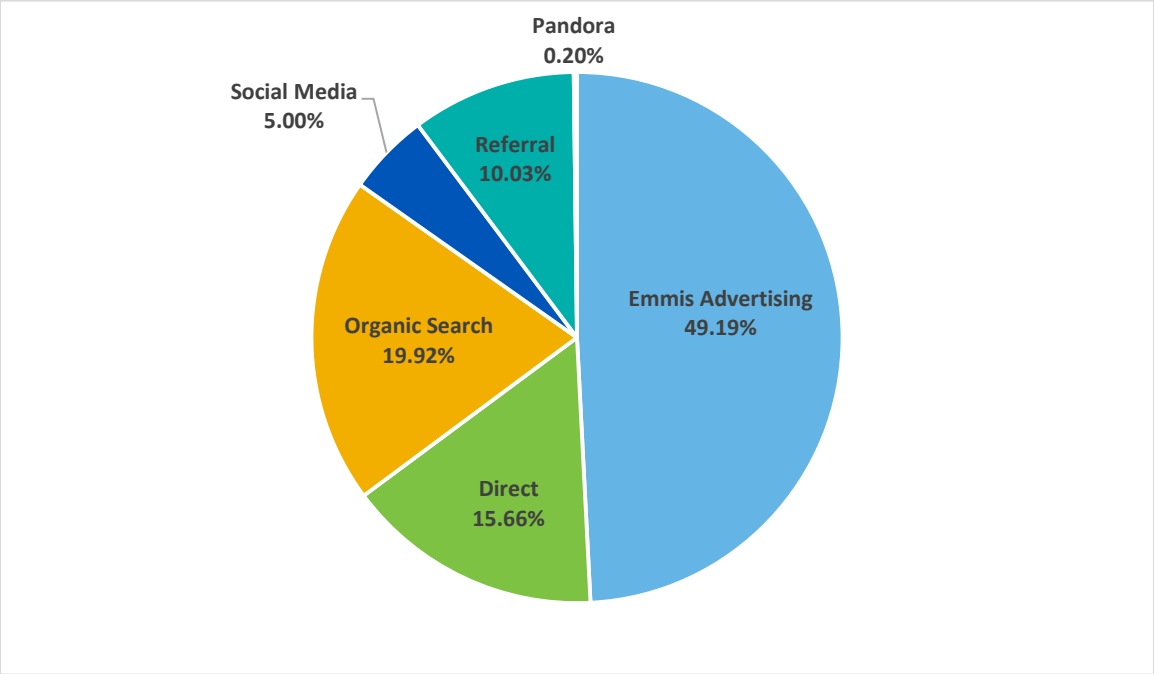


Table 3.8 shows the top 5 ACT webpages viewed in 2017. The homepage is where digital ads clicks were sent, so it is not surprising that it received the most page views. The ACT Awards were held in November and CAPCOG sent a newsletter and a press release that sent readers to the ACT Awards webpage that is likely the reason for this webpage rank 3rd in page views during this period. Overall there were 5,040 unique visits to the Air Central Texas website and 7,878 unique page views.

Table 3-7 Top 5 Air Central Texas Website Pages by Page views, 2017

#	Page Name	Page views
1	Home Page	4,475
2	What is Ground-Level Ozone	318
3	2017 Air Central Texas Awards	350
4	How is the Air in Central Texas?	202

#	Page Name	Page views
5	Emissions Calculator	194

Between Apr. 1 and Nov. 30, 2017, CAPCOG marketed the Air Central Texas program with paid electronic ads, these efforts yielded 1,769,286 gross impressions (GI). **Error! Reference source not found.**.13 shows the total gross impressions by advertising delivery method – electronic billboard ads at a Round Rock Express game, social media, "run of site," mobile ads, and desktop ads. Figure 3.14 below shows the engagement that paid advertisements received. CAPCOG measures engagement based on the number of clicks that ads generated. Unlike Commute Solutions advertisements, where social media ads generated the most engagement for the program, mobile generated the most clicks for the Air Central Texas program. This may have been due to CAPCOG using more social media for the Commute Solutions program than the Air Central Texas program.

Figure 3-11 Air Central Texas Advertisement Graphics

Figure 3-12 Air Central Texas Delivered Gross Impressions by Method, 2017

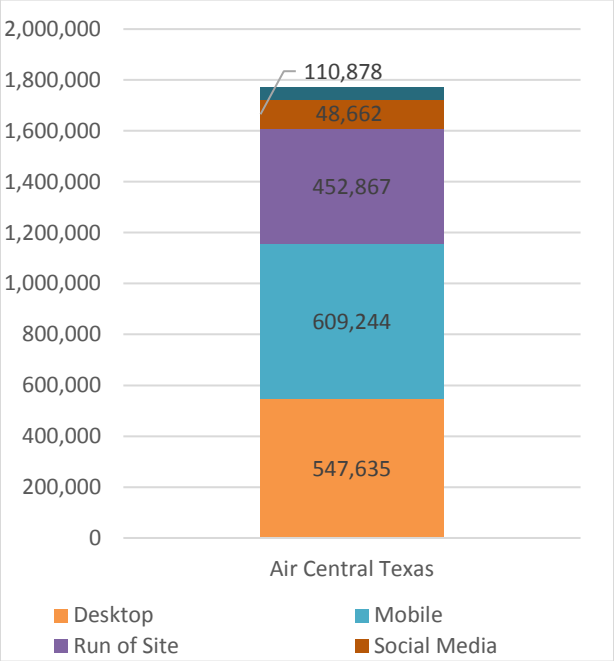
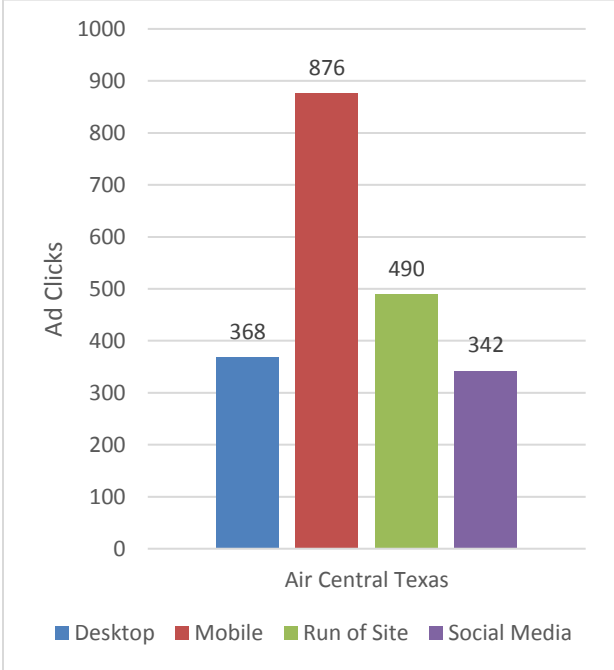


Figure 3-13 Air Central Texas Advertising Engagement by Platform, 2017



CAPCOG evaluated the cost effectiveness of each advertising method by calculating the cost per 1,000 GI, as show in figure 3.15. Similar to Commute Solutions advisements, desktop ads were the most expensive and when taking into account the desktop ad engagement were the least effect advertising method based on these metrics.

Figure 3-14. Cost per 1,000 Impressions by Platform Target

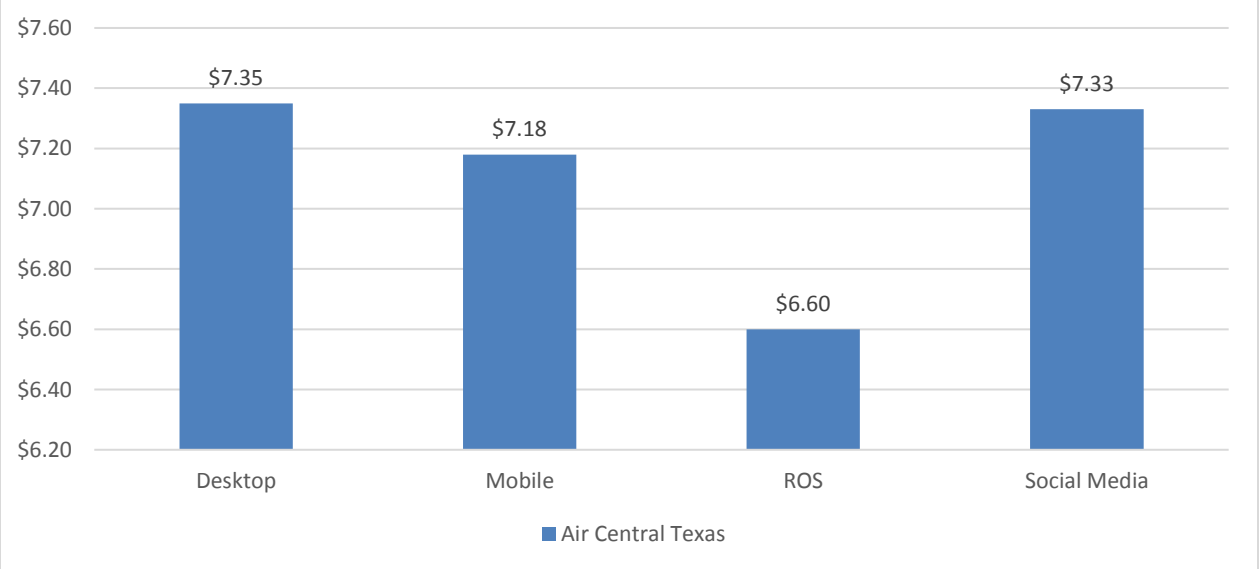


Table 3-8 Air Central Texas Newsletter Distribution Summary, 2017

Newsletter	Date Sent	# of Recipients
Air Central Texas May Newsletter	5/25/2017	96
September Air Central Texas Newsletter	9/20/2017	100
2017 Air Central Texas Award Recipients	11/16/2017	1,036
November Air Central Texas Newsletter	11/17/2017	97
Total	**n/a**	**1,329**

CAPCOG decreased in person outreach in 2017 compared to 2016, largely due to a loss of state funding and larger focus on electronic outreach. In 2017 CAPCOG conducted and coordinated the following regional in-person outreach and education strategies and metrics;

- 14 events were staffed, down from 29 events in 2016
- 69.5 total staff hours at events, down from 154.5 in 2016
- 2,569 individuals contacted, down from 4,255 in 2016
- Average contact rate: 36.96 contacts/hour, up from 27.5 contacts/hour in 2016

CAPCOG held the 2017 Air Central Texas Awards at Green Pastures on November 15, 2017. The nomination period for ACT Awards were announced on August 8, 2017. In total, CAPCOG received 10 nomination listed below with the final 2017 recipients in bold.

Table 3-9 2017 Air Central Texas Nominees and Recipients

Public Sector Award	**Private/Non-Profit Sector Award**	**Media Sector Award**	**Bill Gill Leadership Award**
City of Austin Smart Commute Program	Endeavor Real Estate Group	CBS News Weather Team	**Cathy Stephens – Travis County**
City of Round Rock	Silicon Labs	**Kathy Good – Emmis Austin**	David Allen – University of Texas at Austin
Constable Suits	**Movability Austin**	---	---

CAPCOG provided a plated lunch with a dessert for all guest that attended the ceremony, trophies for the 2017 award recipients, and created programs for the ceremony. Texas Commission on Environmental Quality (TCEQ) Chairman Bryan Shaw delivered the awards ceremony's keynote speech. Feedback from award ceremony is being included to consider for future award ceremonies, feedback from the 2017 Air Central Texas Awards included:

- Creating name tags of name tents so that people in attendance could see who was also in there.
- Separate the non-profit/private sector awards into two different awards since the objective of these organizations can vary greatly.
- Work to include more rural organizations.
- Set a date earlier so that the event is scheduled and on people's calendar earlier in the year.

3.1.7 Property-Assessed Clean Energy (PACE) Program

The Property-Assessed Clean Energy (PACE) program provides an innovative mechanism for financing renewable energy and energy-efficiency improvements to industrial, commercial, multi-family residential, and non-profit buildings in participating jurisdictions. In order to address pay-back periods for energy efficiency and renewable energy (EE/RE) projects that may not align properly with a private property owner, the PACE program enables jurisdictions to put a property tax lien on a piece of property where an EE/RE improvement is made using private financing until the loan for the project has been paid back. PACE is authorized under state law in Section 399 of the Texas Local Government Code Chapter 399.[21] Projects include:

- HVAC modification or replacement
- Light fixture modifications such as LED
- Solar panels
- High-efficiency windows or doors
- Automated energy control systems
- Insulation, caulking, weather-stripping or air sealing
- Water-use efficiency improvements
- Energy- or water-efficient manufacturing processes and/or equipment
- Solar hot water
- Gray water reuse
- Rainwater collection systems

In 2016, both Travis and Williamson Counties participated in PACE. Travis County joined the PACE program on March 24, 2015[22], and Williamson County joined on March 22, 2016[23]. Hays County joined on January 22, 2017.

The first PACE project in Texas was in Travis County and was announced on February 24, 2016 at Temple Beth-Israel in Austin. The first solar PACE project in Texas was also in Travis County – a $262,000 investment at Family Eldercare in Travis County. On October 3, 2016, three projects in Travis and Williamson Counties were initiated with Simon Property Group totaling $3 million in investments.

As of July 10, 2018, six of the 13 completed PACE projects in the state were in Hays, Travis and Williamson Counties. These are the same six projects that were summarized in last year's annual air quality report. The table below summarizes some key data for each county.

[21] http://www.statutes.legis.state.tx.us/Docs/LG/htm/LG.399.htm
[22] https://www.traviscountytx.gov/images/commissioners_court/Doc/04-2015-resolution-pace.pdf
[23] https://agenda.wilco.org/docs/2016/COM/20160308_1211/14757_2016%200227%20Williamson%20County%20Resolution%20of%20Intent%20%28030116%29.pdf

Table 3-10. PACE Project Summary for Austin-Round Rock MSA as of July 10, 2018

Data Point	Hays County	Travis County	Williamson County	TOTAL – Austin-Round Rock MSA
Projects	1	3	2	**6**
Investments	$1,800,000	$1,954,889	$1,767,982	**$5,522,871**
Jobs Created	10	18	14	**42**
CO_2 Reduced (tonnes/yr)	429	763	1,018	**2,210**
Water Saved (gallons/yr)	3,139,000	658,000	1,780,000	**5,577,000**
Energy Saved (kWh/yr)	824,903	1,436,986	1,956,657	**4,218,546**

For more information on PACE, visit http://www.texaspaceauthority.org/.

3.1.8 CAPCOG Regional Air Quality Grants

CAPCOG received about $240,000 in air quality funding for the 2016-2017 biennium beyond what it had initially sought and decided to use these funds to provide air quality grants within the region. Through two rounds of grant applications, CAPCOG ultimately awarded five grants:

- A grant to Austin Community College to help pay for the installation of solar panels on their Highland Campus buildings
- A grant to the City of Austin to support a pilot alternative commuting project at the City of Austin for its employees
- A grant to Travis County to incentivize the use of Capital Metropolitan Transit Authority (CapMetro) vanpool services
- A grant to Austin White Lime to replace several light-duty trucks used on the premises with smaller, cleaner off-road vehicles to perform the same work
- A grant to Austin White Lime to install an "electric ear" to improve the energy efficiency of one of their kilns when burning coal

Contracts for these grants ended on 9/30/2017, although grant recipients are still obligated to provide quarterly reports for an additional year. The following table summarizes the NO_X emission reductions estimated for each grant through 9/30/2017.

Table 3-11. Summary of CAPCOG Regional Air Quality Grant Emission Reductions through 9/30/2017

Grant Recipient	Project	Expected NO_X Reductions (lbs)	Actual NO_X Reductions (lbs)
ACC	Solar Panels	55	2
Austin White Lime	Electric Ear	5,992	4,628
Austin White Lime	Vehicle Replacement	340	340

Grant Recipient	Project	Expected NO_X Reductions (lbs)	Actual NO_X Reductions (lbs)
City of Austin	Smart Commute Rewards[24]	1,892	798
Travis County	Vanpool Subsidy	100	24
TOTAL	**n/a**	**8,379**	**5,792**

The smaller than expected emission reductions for the ACC project, Austin White Lime Electric Ear project, and the City of Austin project is in large measure due to delays in the projects getting started. The ACC project and Austin White Lime Electric ear project in particular should produce significantly more NOX emission reductions moving forward, since these projects funded capital investments with approximately 15-20 year useful lives.

CAPCOG expects to prepare a follow-up report in late 2018 using the additional year of reporting information. Reports on these grants are available at: http://www.capcog.org/divisions/regional-services/aq-reports

3.2 Organization-Specific Measures and Updates

This section provides updates on measures implemented by CAC members. Supplemental electronic files provide detailed, measure-by-measure, organization-by-organization details, while this section of the report provides an overview of these measures, a stand-alone section for Texas Lehigh Cement Company's NO_X emission reduction program is detailed here. These measures are based on reports collected from CAC members in May and June 2018. Organizations that did not report as of the date of this report include:

- Caldwell County
- City of Bastrop
- City of Hutto
- City of Luling
- City of San Marcos
- City of Taylor
- CapMetro

If these organizations provide data subsequent to this report, CAPCOG will provide an updated version.

Many jurisdictions provided detailed operational data. CAPCOG intends to use this in a subsequent technical report analyzing the emissions reduction impact of various OAP Action Plan measures.

3.2.1 Texas Lehigh Cement Company

The Texas Lehigh Cement Company in Buda (Hays County) voluntarily implements a NO_X emission reduction program on days when TCEQ forecasts "moderate" or higher O_3 levels in the region. The facility, which is the largest point source of NO_X emissions within the Austin-Round Rock MSA, is

[24] http://www.austintexas.gov/smartcommute

equipped with a selective non-catalytic reduction (SNCR) system that it operates as needed to maintain compliance with permit requirements. On days when TCEQ predicts that O_3 levels in the region will be "moderate" or higher, Texas Lehigh will increase the NO_X reduction efficiency of the system between the key hours of 9 am – 3 pm, which prior modeling had shown were the most important hours for the facility to reduce NO_X emissions in order to reduce its contribution to high O_3 levels within the region.

In 2017, Texas Lehigh implemented this measure on 19 days, with an additional 20 days when it intended to implement the measure but ultimately didn't:

- 12 days when O_3 levels were "moderate" or higher
    - 63% of the days when O_3 levels were "moderate" or higher
    - 16% of the days that were in the top 4 for CAMS 3 and CAMS 38
    - 12 days when O_3 levels were forecast to be "moderate" or higher
- 7 days when O_3 levels were "good"
    - 4 days when O_3 levels were forecast to be "moderate" or higher
    - 3 days when O_3 levels were forecast to be "good"
- 6 days when there was a delayed start due to a late TCEQ forecast or other issues
- 3 days when Texas Lehigh intended to participate but couldn't due to process issues
- 11 days not implemented due to other issues

Texas Lehigh noted the following days in their 2017 report.

Table 3-12. Days Texas Lehigh Highlighted on its 2017 Report

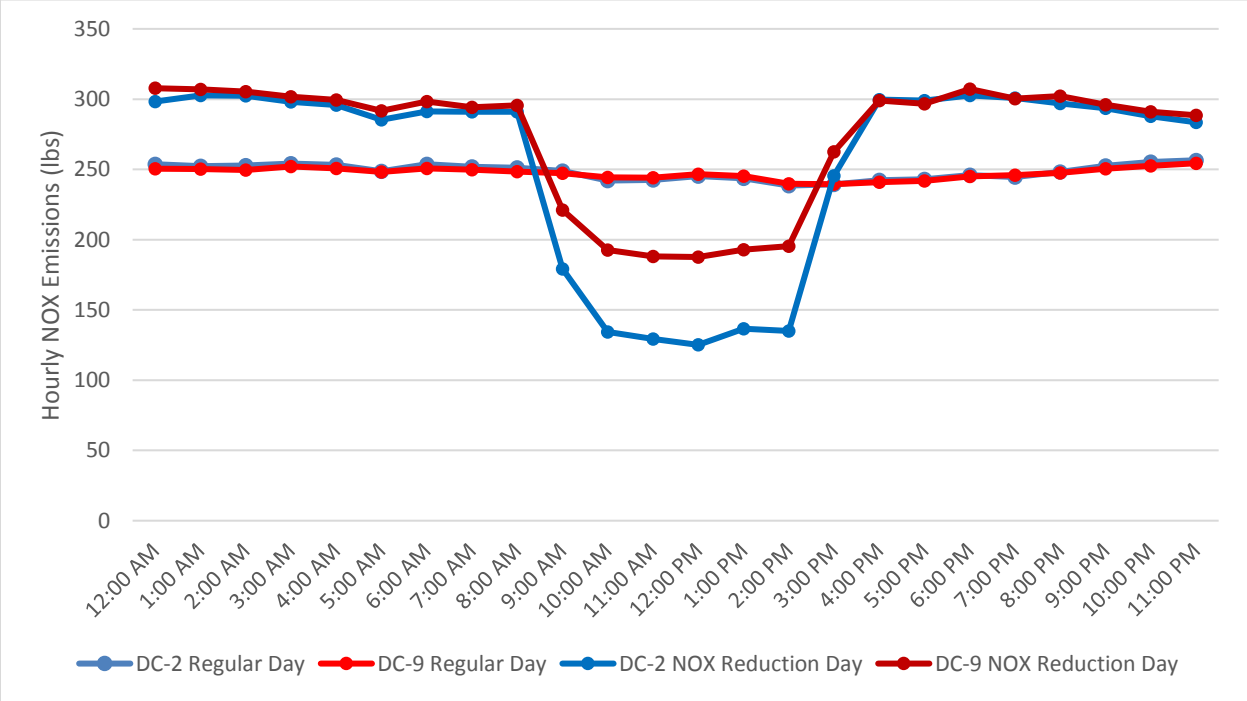
Date	Note	Most Recent O_3 AQI Forecast	Actual MSA Max MDA8 O_3 (ppb)	Actual O_3 AQI
2/23/2017	Didn't Participate	Good	61	Moderate
4/4/2017	Annual Turn-Around (TA)[25]	Good	62	Moderate
4/6/2017	Annual TA	Moderate	59	Moderate
4/7/2017	Annual TA	Moderate	69	Moderate
4/24/2017	Late TCEQ Notice	Moderate	65	Moderate
5/1/2017	Late TCEQ Notice	Moderate	68	Moderate
5/2/2017		Moderate	67	Moderate
5/5/2017		Moderate	61	Moderate
5/6/2017		Unhealthy for Sensitive Groups	73	Unhealthy for Sensitive Groups
5/7/2017		Moderate	70	Moderate
5/13/2017		Moderate	65	Moderate
5/14/2017		Moderate	68	Moderate
5/15/2017		Moderate	61	Moderate
5/24/2017	Late Start	Moderate	55	Moderate
5/25/2017		Moderate	63	Moderate
5/30/2017	Didn't Participate	Good	55	Moderate
6/7/2017	Didn't Participate	Moderate	74	Unhealthy for Sensitive Groups
6/8/2017	Didn't Participate	Moderate	75	Unhealthy for Sensitive Groups
6/9/2017	Didn't Participate	Moderate	67	Moderate
6/20/2017		Moderate	55	Moderate
6/22/2017		Good	49	Good
7/29/2017		Moderate	49	Good
7/30/2017		Moderate	51	Good
7/31/2017		Moderate	63	Moderate
8/1/2017	Didn't Participate	Moderate	72	Unhealthy for Sensitive Groups
8/3/2017	Didn't Participate	Moderate	58	Moderate
8/4/2017	Didn't Participate	Good	67	Moderate
8/23/2017		Good	54	Good
9/5/2017	Late TCEQ Notice	Moderate	49	Good
9/13/2017		Unhealthy for Sensitive Groups	73	Unhealthy for Sensitive Groups
9/14/2017		Moderate	62	Moderate

[25] Annual Turnaround (TA) indicates that the cement kiln was not operating at the time.

Date	Note	Most Recent O_3 AQI Forecast	Actual MSA Max MDA8 O_3 (ppb)	Actual O_3 AQI
10/2/2017	Process Issues	Good	50	Good
10/6/2017		Moderate	53	Good
10/7/2017	Process Issues	Moderate	48	Good
10/18/2017	Late TCEQ Notice	Moderate	64	Moderate
10/19/2017	Late TCEQ Notice	Good	46	Good
10/25/2017		Good	44	Good
10/26/2017	Process Issues	Good	55	Moderate
10/29/2017		Moderate	47	Good

Texas Lehigh also provided CAPCOG with hourly NO_X emissions data for each of its two stacks: DC-2 and DC-9. The figure below shows a comparison of the average hourly NO_X emissions for each stack on days when the NO_X reduction measure was implemented versus when it was not. As the figure shows, on days when the measure was implemented, NO_X emissions are slightly higher between 12 am-9 am and 3 pm-12 am on NO_X reduction days than on normal days. However, emissions are much lower between 9 am-3 pm on days when the NO_X reduction measure was implemented.

Figure 3-15. Texas Lehigh NO_X Emissions by Hour on NO_X Reduction Days and Regular Days, 2017



A 2015 report by CAPCOG showed that this measure could reduce peak 8-hour O_3 concentrations at regional O_3 monitors by as much as 0.7-0.8 ppb in some locations.

Some other data reported by Texas Lehigh for 2017 includes the following:

- Total 2017 O_3-Forming Emissions Reported to TCEQ:

  - NO_X: 2,200 tpy, 12,441 pounds per O_3 season day
  - VOC: 183 tpy, 1,004 pounds per O_3 season day
- Total 2017 kiln fuel input:
  - Coal: 3,615,776 MMBtu (78%)
  - Petroleum Coke: 925,525 MMBtu (20%)
  - Natural Gas: 114,433 MMBtu (2%)
- Other Operational Data for 2017:
  - 148 employees
  - 111,657,000 CF natural gas consumed for non-kiln purposes
  - 168,581 kWh electricity consumed
  - 351,484 gallons of diesel consumed
  - 4,495 gallons of gasoline consumed
  - 2,394 gallons of liquefied petroleum gas (LPG) consumed
  - 43.9748 million gallons of water consumed

3.2.2 Commuter Programs

CAC members implemented a number of commuter programs in 2017. These include:

- Providing alternative commuting infrastructure: 4 organizations
- Allowing employees to work compressed work weeks: 9 organizations
- Allowing employees to work flexible work schedules: 8 organizations
- Carpool or other alternative transportation programs: 7 organizations
- Transit pass subsidized by employer: 3 organizations
- Part-time teleworking: 8 organizations
- Full-time teleworking: 2 organizations
- Implementing internal employer commute reduction programs: 4 organizations
- Incentivizing alternative commuting among organization's own employees: 4 organizations
- Encouraging alternative commuting within the community: 6 organizations

3.2.3 Development Measures

Development measures implemented in 2017 included:

- Access management: 2 organizations
- Expedited permitting for mixed use, transit-oriented development, or in-fill development: 1 organization
- Tree planting programs: 10 organizations
- Tree maintenance programs: 7 organizations
- Development policies to improve energy and resource efficiency in new buildings: 6 organizations
- Codes and ordinances that encourage a more pedestrian-friendly environment: 1 organization

3.2.4 Energy and Resource Conservation

Energy and Resource Conservation measures implemented in 2017 included:

- Resource conservation: 4 organizations
- Energy efficiency programs: 5 organizations

- Renewable energy programs: 4 organizations
- Electric vehicle programs: 1 organization
- Water conservation programs: 6 organizations
- Resource recovery and recycling programs: 4 organizations

3.2.5 Fleet and Fuel Efficiency Measures

Fleet and Fuel Efficiency Measures included:

- Alternative fuel vehicles: 4 organizations
- Business evaluation of fleet usage, including operations and right-sizing: 8 organizations
- Fueling of vehicles in the evening: 6 organizations
- Low-emission vehicles: 6 organizations
- Texas Low-Emission Diesel Equivalent for Fleets: 5 organizations
- Vehicle maintenance by manufacturer specifications: 7 organizations
- Prioritize purchasing of low-emission light-duty vehicles: 2 organizations
- Prioritize purchasing of alternative-fueled vehicles and equipment: 1 organization
- Prioritize purchasing of hybrid vehicles: 2 organizations
- Increase fuel efficiency: 4 organizations
- Increase substitution of conventional fuels with alternative fuels: 1 organization
- Idling limits for vehicles and equipment: 7 organizations
- Pursue replacement/repower/retrofit of old diesel-powered vehicles and equipment through TERP and/or DERA funding: 3 organizations
- Employee training on alternative fuels and fuel efficiency: 2 organization
- Vapor Recovery on Pumps: 1 organization

3.2.6 Outreach and Awareness

Outreach and Awareness measures implemented by individual CAC members in 2017 included:

- Employee education program: 8 organizations
- Public education: 7 organizations
- OAD notification program: 8 organizations
- OAD response programs: 6 organizations
- Programs to improve awareness of and compliance with air quality rules: 5 organizations

3.2.7 Regulation and Enforcement

Regulation and enforcement measures implemented by individual CAC members in 2017 included:

- Open burning restrictions: 5 organizations
- Special event emission reduction policies: 1 organization

The following jurisdictions implement idling restrictions, either with a local ordinance, through a memorandum of agreement (MOA) with TCEQ, or both.

Table 3-13. Jurisdictions Implementing Idling Restrictions in the Austin-Round Rock MSA

Jurisdiction	Local Ordinance	TCEQ MOA
City of Austin	☒	☒
City of Bastrop	☒	☐

City of Elgin	☒	☐
City of Georgetown	☒	☒
City of Hutto	☒	☐
City of Lockhart	☒	☐
City of Round Rock	☒	☐
City of San Marcos	☒	☐
Bastrop County	☐	☒
Travis County	☐	☒

These idling restrictions are "passive' controls in that the jurisdictions will respond to complaints when they are made, but don't devote dedicated resources to idling restriction enforcement. None of the jurisdictions reported any citations being issued for idling in 2017.

3.2.8 Sustainable Procurement and Design

Sustainable procurement and design measures implemented by individual CAC members in 2017 included:

- Direct deposit: 11 organizations
- Restrictions on use of organization's drive-through facilities on OAD: 1 organizations
- E-government and/or remote locations: 8 organizations
- Landscaping voluntary start at noon on OAD: 2 organizations
- Low VOC asphalt: 3 organization
- Low VOC roadway striping material: 3 organizations
- Shaded parking: 3 organizations
- Clean landscaping contracting: 1 organization
- Clean construction contracting: 1 organization
- Local sourcing of materials: 1 organization

4 Ongoing Planning Activities

This section documents notable air quality planning milestones and activities completed in 2017.

4.1 Clean Air Coalition Meetings

During 2017, there were a total of six Clean Air Coalition meetings:

- February 8, 2017
- March 30, 2017 (joint meeting with AACOG's AIR Executive Committee)
- May 10, 2017
- June 28, 2017
- August 9, 2017
- November 8, 2017

Significant policy-related actions taken by the CAC in 2017 included:

- A comment letter to the Governor's office regarding the VW mitigation fund
- A comment letter to EPA on the proposed 2015 O_3 NAAQS implementation rule
- A joint position letter with AACOG's AIR Executive Committee on air quality-related legislation during the 2017 state legislative session
- A comment letter to TCEQ on their 2017 Annual Monitoring Network Plan
- Endorsement of a proposal by CAPCOG to seek funding from local governments for air quality funding following the veto of Rider 7 funding by the Governor's office
- Endorsement of priority ranking of CAPCOG monitoring stations for 2018
- A comment letter to TCEQ on TERP allocations

The Clean Air Coalition Advisory Committee (CACAC) met five times:

- January 26, 2017
- March 21, 2017 (joint with AACOG's AIR Advisory and Technical Committees)
- April 27, 2017
- July 27, 2017
- October 26, 2017

The CACAC Outreach and Education Subcommittee met a total of 8 times in 2017:

- February 1, 2017
- March 1, 2017
- April 6, 2017
- June 7, 2017
- August 2, 2017
- September 6, 2017
- October 4, 2017
- December 6, 2017

4.2 CLEAN AIR Force Meetings

CLEAN AIR Force's Board and Executive Committee met a number of times throughout the year.

Executive Committee Meetings:

- February 1, 2017
- March 3, 2017
- April 5, 2017
- May 3, 2017
- June 14, 2017
- July 13, 2017
- August 16, 2017
- September 6, 2017

- October 4, 2017
- November 1, 2017
- December 4, 2017

Board Meetings:

- February 1, 2017
- May 3, 2017
- August 16, 2017
- November 1, 2017

4.3 Lone Star Clean Fuels Alliance (LSCFA)

The Lone Star Clean Fuels Alliance held a number of meetings and workshops throughout 2017.

Board Meetings:

- January 4, 2017
- April 5, 2017
- July 5, 2017
- October 4, 2017

Workshops:

- Alternative Fuel Vehicle and Fuel Safety Training in Temple, Texas – February 1, 2017
- Legislative Luncheon – March 2, 2017
- Clean Air Force O_3 Season Kickoff Breakfast – May 1, 2017
- Fleet Day at the Track at the Circuit of the Americas – June 22, 2017
- First Responder Train the Trainer Workshops – July 25 and 26, 2017
- Fleet Managers Brown Bag Luncheon – December 14, 2017

4.4 Regional Air Quality Technical Research Activities

CAPCOG completed a number of air quality technical research activities in 2017 including:

- Monitoring projects:
    - Continued O_3 and meteorological data collection at eight CAPCOG-owned monitoring stations in the region to supplement the two TCEQ O_3 monitors in the region
    - Support for an O_3 monitor at St. Edward's University (CAMS 1605)
    - Vertical measurement of O_3 levels using balloons through a contract with St. Edward's University (St. Edward's conducted a total of 25 launches)
    - Monitoring network analysis for 2018
- Modeling and data analysis projects:
    - An analysis of 2016 air quality and meteorological monitoring data
    - A performance evaluation for TCEQ's 2012 photochemical modeling platform
    - Source apportionment modeling at the county, regional, and national scales
    - Sensitivity and control strategy modeling of O3 impact of Decker Creek Power Plant, TERP grants, and use of hourly NO_X data at Texas Lehigh rather than OSD data

- An statistical analysis of CAPCOG's 2016 regional air quality phone survey data

Reports and data from these projects can be found at http://www.capcog.org/divisions/regional-services/aq-reports.

4.5 Statewide Collaborative Initiatives

CAPCOG participates in several statewide air quality-related initiatives in 2017, which are listed below.

4.5.1 Regional Air Quality Planning Group

CAPCOG participated in meetings with the other 11 regional air quality planning groups across the state on the following dates:

- January 31, 2017
- March 23, 2017
- June 9, 2017
- June 13, 2017 (emergency meeting to discuss Governor's veto of Rider 7 funding)
- June 23, 2017

4.5.2 Texas Clean Air Working Group

CAPCOG participated in two Texas Clean Air Working Group (TCAWG) meetings in 2017, as well as a number of TCAWG subcommittees on TERP and the Volkswagen (VW) Settlement issues during this time.

- General TCAWG Meetings
  - January 19, 2017
  - February 13, 2017
- VW Settlement Subcommittee Meetings and Conference Calls
  - January 5, 2017
  - January 10, 2017
  - February 8, 2017
  - April 3, 2017
  - May 9, 2017
  - June 13, 2017
  - July 11, 2017
  - September 21, 2017
  - December 13, 2017

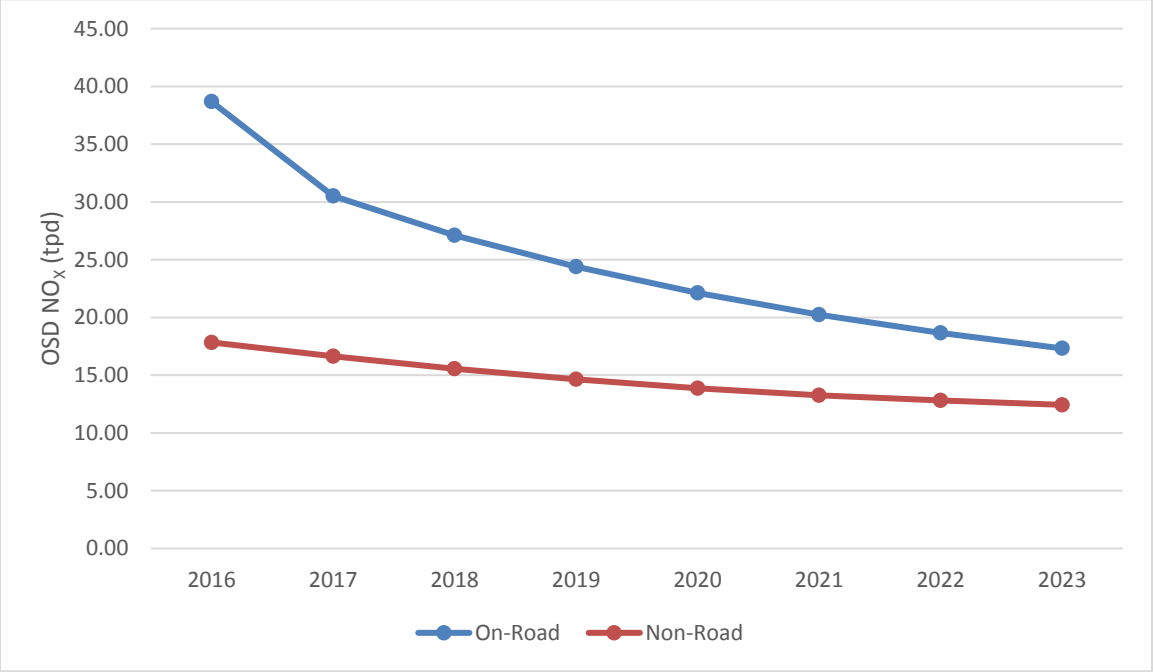
5 Planning for the Future

This section details some important issues to note for the region's air quality plan moving forward, including new issues that have arisen between the end of 2017 and the completion of this report.

5.1 Mobile Source Emissions Trends

Between 2016 and 2023, mobile source NO_X emissions in the Austin-Round Rock MSA are projected to decrease from 56.51 tpd to 29.75 tpd, a 47% reduction. During this period, on-road emissions are projected to decline faster than non-road emissions, with on-road emissions making up 58% of mobile source NO_X emissions in 2023, compared to 68% of mobile source NOX emissions in 2016.

Figure 5-1. Mobile Source NO_X Emissions Trends (tpd)



One of the uncertainties in these projections for the Austin-Round Rock MSA, however, is that the on-road projections are based on an assumption that local gasoline would have sulfur content of just 10 ppm starting in 2017 consistent with EPA's tier 3 light-duty vehicle and fuel standards. However, fuel sampling within the Austin TxDOT district in 2017 showed that gasoline sulfur levels averaged about 30 ppm.[26] This finding makes the region again the region with the highest gasoline sulfur levels in the state, consistent with results from the prior sampling studies conducted in 2014 and 2011. Statewide, the fuel sulfur levels in 2017 averaged 20 ppm. All of EPA's and TCEQ's on-road emissions modeling and related photochemical modeling assume 10 ppm sulfur levels nation-wide, which could mean that these on-road projections are overly optimistic in terms of NO_X reductions from 2016 levels. CAPCOG will be conducting additional detailed analysis of this issue in 2018.

[26] ERG. 2017 Summer Fuel Field Study. Prepared for Mr. Michael Regan, TCEQ. August 31, 2017. Available online at: https://www.tceq.texas.gov/assets/public/implementation/air/am/contracts/reports/ei/582177149010-20170831-ergi-2017SummerFuelFieldStuday.pdf

5.2 Luminant Plant and Mine Closures

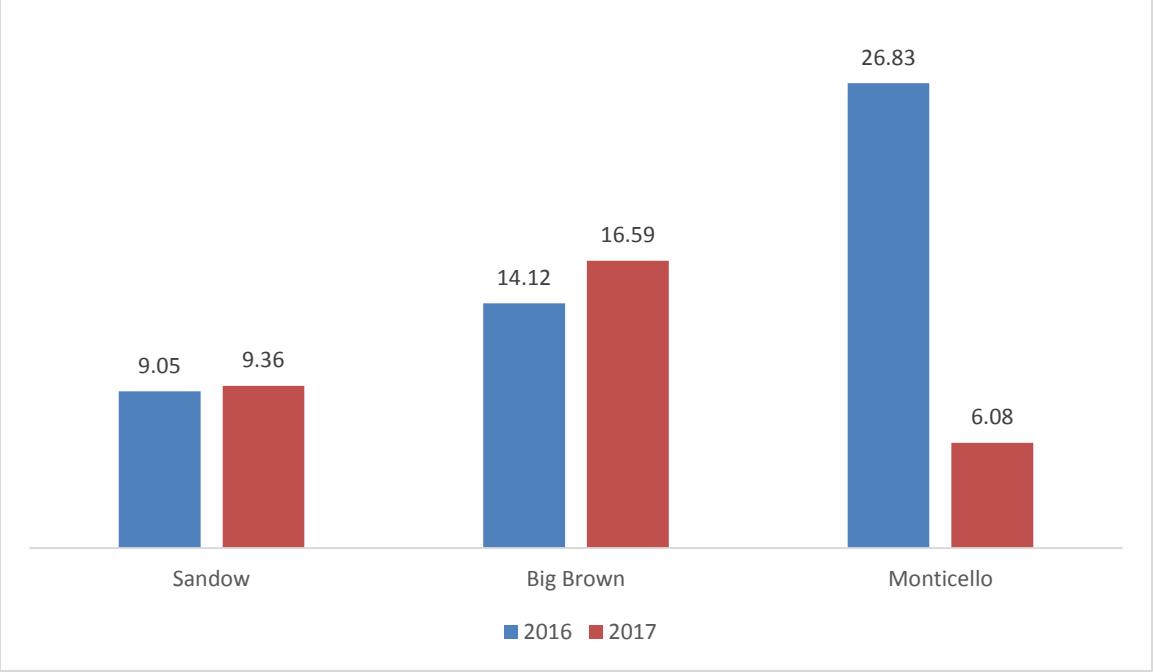
On October 6, 2017, Luminant Energy announced the closure of its 1,800 MW coal-fired Monticello Power Plant in Northeast Texas, planning to stop operations on January 4, 2018.[27] The following week, Luminant also announced the decision to close its Big Brown coal power plant in Freestone County on February 12, 2018, and to close its Sandow coal power plant in Milam County, directly to the northeast of the Austin-Round Rock MSA, on January 11, 2018. Collectively, these two plants account for 2,300 MW of generating capacity. Luminant also announced the closure of the two coal mines supporting the Big Brown and Sandow Plants; the Three Oaks Mine, which supports Sandow, is located in Bastrop and Lee Counties. The Three Oaks Mine is a significant source of NO_X emissions in its own right – over 1 tpd. The figure below shows the location of each of these facilities relative to the Austin-Round Rock MSA. As the figure shows, this series of closures should have an impact on high O_3 levels in the Austin-Round Rock MSA when winds are out of the northeast.

Figure 5-2. Luminant Facility Closures Announced October 2017 and Austin-Round Rock MSA

Due to the proximity of Sandow plant and Three Oaks Mine to the Austin-Round Rock MSA, these closures are estimated to have the largest impact. The following figure shows the 2016 and 2017 NO_X emissions for each of the power plants.

[27] Luminant. "Luminant Announces Decision to Retire Its Monticello Power Plant." October 6, 2017. Available online at: https://www.luminant.com/luminant-announces-decision-retire-monticello-power-plant/

Figure 5-3. 2016 and 2017 OSD NO_X Emissions at Closing Luminant Power Plants



The following table summarizes the potential impacts of these plant closures based on the 2017 OSD NO_X emissions and the 2017 source apportionment modeling completed by CAPCOG and AACOG for the region in early 2017.

Table 5-1. Estimated Impact of Closing Sandow, Big Brown, and Monticello on C3 Based on 2017 Source Apportionment Modeling (ppb)[28]

Source	2017 OSD NO_X (tpd)	Estimated Impact from 2006 Model (ppb)	Estimated Impact from 2012 Model (ppb)	Estimated Impact Avg. 2006 and 2012 models (ppb)
Sandow	9.36	0.0627	0.3127	0.1877
Big Brown	16.59	0.1244	0.3306	0.2275
Monticello	6.08	0.0295	0.0295	0.0295
TOTAL	**32.03**	**0.2166**	**0.6728**	**0.4447**

Using other modeling conducted by U.T. in 2009[29] and 2012[30] suggests that the impact from Sandow's 2017 OSD NO_X emissions on CAMS 3's design value would range from 0.0948 ppb - 0.5845 ppb.

[28] http://www.capcog.org/documents/airquality/reports/2017/6.1.2-CAPCOG_Source_Apportionment_Modeling_Report.pdf
[29] http://www.capcog.org/documents/airquality/reports/2015/Photochemical_Modeling_Analysis_Report_2015-09-04_Final_Combined.pdf
[30] http://www.capcog.org/documents/airquality/reports/2013/Task_8.3-Precursor_Response_Runs_Final.pdf

The load from these plants will need to shift to other plants across the network, including to plants in the Austin-Round Rock MSA. Collectively, these facilities accounted for an average of 86,778 MW-hrs per day of electricity generation between May 1, 2017, and September 30, 2017. The other plants that report to EPA's AMPD averaged 992,023 MW-hrs/day over this same period, meaning that these plants would need to increase their output by an average of 8.75% in order to compensate for these plants closing. This increase will mitigate the O_3 impact of these closures to some extent.

5.3 Implications of Veto of Regional Air Quality Planning Funding

On June 12, 2017, Governor Abbott line-item vetoed Rider 7 to TCEQ's 2018-2019 budget, which was the grant program that CAPCOG and a number of other "near-nonattainment areas" across the state have relied on to fund regional air quality planning efforts for the past 20 years.[31] This funding would have provided $6 million out of the state's Clean Air Account to fund planning efforts in the Austin, Beaumont-Port Arthur, Corpus Christi, El Paso, Granbury, Killeen-Temple, San Antonio-New Braunfels, Tyler-Longview-Marshall, Victoria, and Waco areas. CAPCOG had expected $1.26 million from this funding for the biennium to fund planning activities for the Austin area. This grant had made up 76% of the funding for CAPCOG's air quality program between 2010 and 2017, including 94% of its staffing costs.

At a June 28, 2017, emergency meeting of the CAC, CAPCOG explained the situation and laid out various options for proceeding. The CAC unanimously endorsed a course of action that would involve CAPCOG submitting funding requests totaling $287,000 to each of the jurisdictions in the CAC, with the request to each jurisdiction based on population. An additional $150,000 left over from CAPCOG's FY 2016-2017 Rider 7 grant was also used for the FY 2018 fiscal year, but CAPCOG was only able to continue to use these funds up through June 30, 2018, bringing the total funding to $437,000/year.

In March 2018, following consultation with the CAC and other stakeholders, CAPCOG send out funding request letters to all CAC members seeking funding for FY 2019, identifying a "baseline" option consistent with the same $287,000 raised for FY 2018, but would constitute a reduction in overall funding from FY 2018 levels, as well as a "supplemental" request that would keep funding in FY 2019 consistent with FY 2018 levels. As of the date of this report, CAPCOG believes that it is likely to receive at least $415,000 in funding for FY 2019. It remains to be seen whether the legislature reinstates any funding for regional air quality planning and, if not, to what extent local governments will be willing to fund CAPCOG's program beyond FY 2019.

5.4 Implications of Veto of Drive a Clean Machine and Local Initiative Project Funding

As mentioned earlier, in addition to the line-item veto of the Rider 7 air quality planning grants, Governor Abbott also line-item vetoed Rider 24 to TCEQ's FY 2018-2019 budget, which appropriated $97 million in funding out of the state's Clean Air Account for the state's Low-Income Vehicle Repair Assistance, Retrofit, and Accelerated Vehicle Retirement Program (LIRAP), also known as the "Drive a Clean Machine" or DACM program, and Local Initiative Projects (LIP) program. Travis County and Williamson County have ended fee collections, but will continue to implement the program through

[31] https://gov.texas.gov/uploads/files/press/06122017_BudgetAndLineItemVetos.pdf

May 2019 using leftover FY 2016-2017 funding. While the program is related to the I/M program, neither county's commissioners' court has made any moves towards requesting that the I/M program be rescinded.

5.5 Texas Emission Reduction Plan

One of the more significant pieces of air quality-related legislation that passed during the 85th Texas Legislative Session was Senate Bill (SB) 1731, which extended the TERP grant programs and made a number of adjustments to the statutory authorizations for those programs found in Texas Health and Safety Code (THSC). Overall, these changes resulted in an $81.5 million reduction in funding in FY 2018-2019 compared to FY 2016-2017, a 34% reduction, with most of the reduction coming from the most cost-effective DERI program. In addition, $31.0 million in TERP funding that had been appropriated for FY 2016-2017 was rescinded due to lack of demand for the Texas Natural Gas Vehicle Grant Program and restrictions on using unspent funding for that program on other TERP programs. SB 1731 eliminated those restrictions.

In May 2018, the LBB provided an update to the legislature on TERP revenues and expenditures. The table below summarizes key info from this report.[32] According to this report, as of August 31, 2017, the TERP fund balance was $1.4224 billion, which is projected to increase to $1.7443 billion.

Table 5-2. May 2018 LBB TERP Data

Item	FY 2018	FY 2019	Combined
Revenue	$242.5	$244.3	$486.8
Expenditures	$77.4	$77.4	$154.8
Difference	$165.1	$166.9	$332.0
% Expended	31.92%	31.68%	31.80%

For a more extensive review of the implications of the 2017 TERP bill and the allocation of the funding among programs, please see last year's annual air quality report.

5.6 Commute Solutions Program

In late 2017, CAPCOG submitted an application to CAMPO for FY19-22 funding for the Commute Solutions Program. This application included activities recommended by stakeholders at a Nov. 14, 2017, Commute Solutions Planning Workshop. Tasks included in this application included:

- Marketing, Outreach, and Education Activities to regional employers, school and the general public
- Conduct and Maintain Commuting Programs
- Partner with other programs and organizations
- Regional Commuting Survey
- Local/sub-regional TDM Grants

[32] Texas Legislative Budget Board. Overview of the Texas Emissions Reduction Plan (TERP) Account. Presented to the House Appropriations Committee. May 24, 2018. LBB ID: 5266. Available online at: http://www.lbb.state.tx.us/Documents/Publications/Presentation/5266_HAC_TERP.pdf

- Administrative Activities

In May 2018, CAPCOG was awarded FY19 funding from the application submitted to CAMPO. This funding is expected to become available to use on the program in early 2019. In June 2017, CAPCOG invite regional stakeholders to join the Regional Transportation Demand Management Coordinating Committee which is created to coordinate TDM activities within the CAPCOG region and to assist, advise, and, if appropriate, provide material support for the CAPCOG Commute Solutions program. This Committee will continue to meet and provide CAPCOG input on CAMPO funding for the Commute Solutions program. In July 2018, CAPCOG received Commute Solutions Program funding from the City of Austin to pilot an Emergency-Ride-Home program, rebrand the program's logo and colors, enhance the website, develop marketing materials, and hold Commute Solutions events. This will allow the program to further establish itself after being transferred from CAMPO to CAPCOG in March 2017.

5.7 VW Mitigation Plan

On December 4, 2017, the TCEQ announced an open public comment period for the VW mitigation plan. As of July 19, 2018, the TCEQ had received 127 comment letters following this comment period, and an additional 9 comments before that. In a comment letter that CAPCOG and the Clean Air Coalition submitted, they proposed that:

1. Funding be allocated to each COG region based on the # of violating vehicles
    a. the CAPCOG region had a disproportionate number of these vehicles compared to population
    b. The Austin-Round Rock MSA had 12.49% of the violating vehicles, compared to
2. COGs should have the opportunity to help prioritize and administer mitigation funding within their regions
3. Funding should be prioritized for government fleets, since there is an opportunity for 100% reimbursement for such projects, which is not available for the TERP grants

Table 5-3. Austin-Round Rock Population and Violating VW Vehicles Comparison

Area	Population	Violating Vehicles	Violating Vehicles/1,000 People
Bastrop County	84,761	181	2.14
Caldwell County	42,338	65	1.54
Hays County	214,485	456	2.13
Travis County	1,226,698	3,155	2.57
Williamson County	547,545	1,195	2.18
Austin-Round Rock MSA	2,115,827	5,052	2.39
Texas	28,304,596	40,444	1.43

A proportionate share of the $209,000,000 settlement for Texas would be $26,106,913 to the Austin-Round Rock MSA based on the # of violating vehicles.

As of the date of this report, TCEQ has not yet released its proposed mitigation plan, but they expect to start awarding funding by the end of 2018.

5.8 May 9, 2018, EPA NAAQS Review Memo

On May 9, 2018, EPA Administrator Scott Pruitt signed a memo on the NAAQS review process that has significant implications for air quality planning for the Austin-Round Rock MSA.[33] Among other things, this memo required that the EPA complete its review of the O_3 NAAQS no later than October 1, 2020, complete its review of the PM NAAQS no later than December 31, 2020, and ensure moving forward that it completes these reviews within the statutory five-year timeframe required by the Clean Air Act. Despite this requirement, the EPA has typically taken about 7-10 years to complete reviews of the NAAQS. EPA's 2016 planning document for the review of the PM NAAQS called for completing that review by 2022 – ten years after the last review of the PM NAAQS that was completed in December 2012,[34] and EPA has not yet begun its process to review the O_3 NAAQS. The May 9, 2018, memo would mean that EPA would need to complete both the O_3 and the PM NAAQS by the end of 2020. This, in turn, would mean that they would need to complete area designations for any revised O_3 and PM NAAQS by the end of 2022, based on 2019-2021 air monitoring data, unless they exercised the option to extend the designation deadline by 1 year, in which case they could use 2020-2022 data instead (similar to the approach EPA used for the San Antonio 2015 O_3 NAAQS nonattainment area designation, which relied on 2015-2017 data).

On its face, this memo would seem to increase the risk of one or more counties in the Austin-Round Rock MSA being designated "nonattainment" for the O_3 or PM NAAQS in 2022 or 2023. Among other things:

- The 70 ppb O_3 level set for the 2015 O_3 NAAQS was above the 60 – 69 ppb level recommended by its Clean Air Scientific Advisory Committee
- Most other industrialized countries have 8-hour O_3 standards below 70 ppb
- The Austin-Round Rock MSA's projected 2021 design value is above 65 ppb, the "alternative" NAAQS level considered by EPA in the RIA for the 2015 O_3 NAAQS
- EPA's CASAC had recommended consideration of lower levels for the annual and 24-hour $PM_{2.5}$ NAAQS (as low as 11 $\mu g/m^3$ for the annual NAAQS and 30 $\mu g/m^3$ for the 24-hour NAAQS) and both lower levels and a different form for the 24-hour PM_{10} standard in its 2010 recommendations (a 65-75 $\mu g/m^3$ level, based on the three-year average of the 98th percentile measurement)
- EPA's CASAC indicated that for $PM_{2.5}$, there is, "no evidence of a threshold (i.e., a level below which there is no risk for adverse health effects)."
- Between 2016 and 2018, 2,894 publications on "air pollution and human health" have appeared in "PubMed" since 2016, and, according to an EPA official, about ¼ of all peer-reviewed papers

[33] https://www.epa.gov/sites/production/files/2018-05/documents/image2018-05-09-173219.pdf
[34] https://www3.epa.gov/ttn/naaqs/standards/pm/data/201612-final-integrated-review-plan.pdf

that have ever been published on air pollution and public health information have published since 2013, and EPA must use the latest information in establishing NAAQS.
- EPA is prohibited from considering the cost of attainment in establishing the NAAQS.

Despite these factors, there are also reasons to think that this step may actually reduce the risk of a nonattainment designation for the Austin-Round Rock MSA in 2022 or 2023:

- Regardless of the advice of the CASAC, the current administration has made rolling back regulations a priority, and since adherence to this memo would mean that it would be the current administration completing the reviews of the O_3 and PM NAAQS, it is somewhat less likely that the EPA will actually revise the O_3 or PM NAAQS in 2020
- If EPA kept the current O_3 in place in 2020, there is no specific statutory timeframe for EPA to designate areas as "nonattainment" for a NAAQS after initial designations must be completed when EPA promulgates a "new" or "revised" NAAQS, and courts have previously given EPA discretion in not moving forward with nonattainment designations "out of cycle" if an area's air pollution levels violate a NAAQS after it has already been initially designated "attainment/unclassifiable" (ex: San Antonio area's violations of the 2008 O_3 NAAQS after initial designation of "attainment/unclassifiable.") Therefore, even if the Austin-Round Rock MSA's 2019-2021 design value is over 70 ppb, it may not mean that EPA would designate the area nonattainment.

5.9 New Regional Air Quality Plan

The Austin-Round Rock MSA's Advance Program Action Plan is set to expire on December 31, 2018. In late 2017, CAPCOG and the CAC began planning for a new regional air quality plan. In May 2018, the CAC endorsed several major elements of a new plan:

- Time frame: 2019-2023
- Area: Austin-Round Rock MSA
- Primary Goal: maximize the probability of compliance with the NAAQS region-wide
- Secondary Goal: minimize the health and environmental impacts of regional air pollution
- Pollution Reduction Target: 0.70 ppb – 1.00 ppb reduction in region's O_3 design value through emission reduction measures identified in the plan
- Continue O_3 monitoring at C614, 690, 1604, 1675, and 6602
- End O_3 monitoring at C601, 684, and 1603
- Establish new O_3 monitoring sites in Bastrop, Elgin, and East Austin

In August 2018, CAPCOG will start reaching out to existing CAC members to make commitments that will be included in the plan, and reaching out to other organizations to recruit them to participate in the plan. CAPCOG expects the CAC to approve the new plan in November 2018. CAPCOG will keep EPA and TCEQ informed of progress in the development of the new plan moving forward.

6 Conclusion

In many ways, 2017 was a disappointing year for air quality in the Austin-Round Rock MSA. The region's air quality pollution levels were considered "unhealthy for sensitive groups" seven times throughout the year, with almost a third of all days in 2017 recording air pollution levels that were "moderate" or worse. The region's O_3 design value jumped from 66 ppb in 2016 to 69 ppb in 2017, just 1% below the maximum allowable in 2017. ERG's 2017 fuel sampling study also called into question whether the region and the state will really be achieving the steep declines in on-road NO_X emissions previously forecast for 2017 and beyond.

Moreover, there have been setbacks for many of the region's most valuable tools over the years for addressing, including:

- the veto of the regional air quality planning grants that the region has relied on to fund our regional air quality activities for the last 20 years,
- the veto of funding for the drive a clean machine (DACM) program, which could result in reduced compliance with the I/M program and slower progress in getting older cars off of the road
- the reduction in appropriations for the TERP program and decision to allocate a smaller share of TERP funding to the most cost-effective DERI program

However, there were also several reasons for hope and things to celebrate on the air quality front in 2017 including:

- The designation of all five counties in the MSA as "attainment/unclassifiable" for the 2015 O_3 NAAQS
- Better-than expected NO_X reductions from CAPCOG's 2016-2017 regional air quality grants
- Continued commitment by the CAC to continue implementing emission reduction measures
- The CAC's endorsement of pursuing a new 2019-2023 air quality plan
- The CAC's willingness to provide local funding to CAPCOG support the implementation of the region's air quality plan
- The re-start of the Commute Solutions program
- Austin Energy's updated resource generation plan, adopted in late 2017, which calls for the closure of Decker unit 1 after the 2020 summer peak, and Decker unit 2 after the 2021 summer peak