2018 Air Quality Report for the Austin-Round Rock-Georgetown Metropolitan Statistical Area

Prepared by the Capital Area Council of Governments

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Executive Summary

This is the annual air quality report for the Austin-Round Rock-Georgetown 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 CAC's participation in the Ozone (O_3) Advance Program (OAP). The report covers January 1, 2018, through December 31, 2018. Under the most recent MSA definitions promulgated by the Office of Management and Budget (OMB) in September of 2018, the Austin-Round Rock-Georgetown MSA consists of Bastrop, Caldwell, Hays, Travis, and Williamson Counties, which are the same five counties that have been participating in regional air quality planning efforts since 2002.

The report is intended to do the following:

- Provide an update to EPA, TCEQ, and local stakeholders on the status of air quality in the Austin-Round Rock-Georgetown MSA through the end of 2018 (Section 1);
- Provide an update on the latest understanding of the contribution of the region's emissions to high O_3 levels when they occur (Section 2);
- Summarize the status of emission reduction measures implemented in the region in 2018 (Section 3);
- Detail ongoing planning activities in the region (Section 4); and
- Identify new issues affecting air quality planning efforts in 2019 and beyond (Section 5).

Some of the highlights of the report are listed below:

- The region's 2018 air pollution levels continued to meet all federal air quality standards, although O_3 levels were high enough to put the region at risk of violating the O_3 standard for 2017-2019 and 2018-2020 if O_3 levels are not lower in 2019 and 2020;
- There were a total of 13 days when monitored air pollution levels were considered "unhealthy for sensitive groups" and another 122 days when air pollution levels were considered "moderate," according to EPA's Air Quality Index (AQI);
- For the first time in a long time, $PM_{2.5}$ levels measured within the region were high enough on a few days to be considered "unhealthy for sensitive groups;"
- While overall emissions of nitrogen oxides (NO_X) continued to trend downward, emissions from regional power plants during the 2018 O_3 season were higher than they were in 2017;
- Emission reduction measures implemented by the state and local partners in 2018 continued to help significantly control regional O_3 levels;
- Research conducted by CAPCOG in spring 2019 indicates that on-road NO_X emissions within the region are likely at least 13% higher than current modeling would indicate due to high gasoline sulfur levels within the region;
- New legislation adopted in spring 2019 should significantly increase the amount of grant funding available for reducing emissions from diesel on-road and non-road sources; and

- The CAC completed the adoption of a new regional air quality plan for 2019-2023 to take the place of the expiring OAP Action Plan.

This report includes information from 20 different CAC member organizations. Another nine CAC member organizations did not provide reports this year. CAPCOG will provide an addendum to this report to CAC members, TCEQ, and EPA, if these organizations provide reports or we receive any updates from any other organization 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

TDM: Travel Demand Management

TERP: Texas Emission Reduction Plan

TCFP: Texas Clean Fleet Program

TNGVGP: Texas Natural Gas Vehicle Grant Program

TxDOT: Texas Department of Transportation

TexN: Texas NONROAD Model

VOC: Volatile Organic Compound

1 Air Quality Status

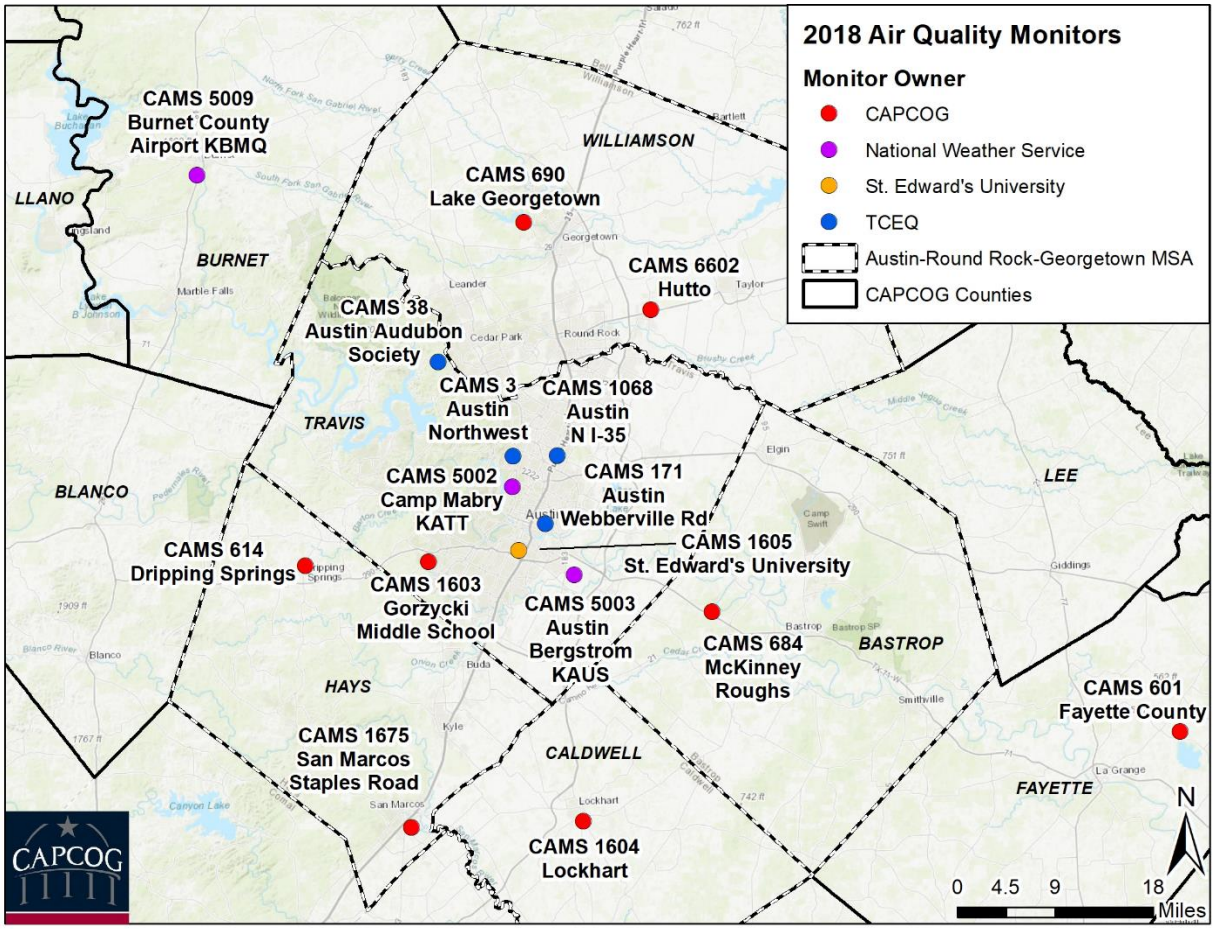
The following bullet points summarize the status of the Austin-Round Rock-Georgetown MSA's air quality status as of the end of 2018:

- Air pollution levels throughout the metro area remained in compliance with all National Ambient Air Quality Standards (NAAQS), although the region's 2016-2018 O_3 levels were just 3% below the 2015 O_3 NAAQS.
- Through the end of 2018, City of Austin is the 2nd-largest in the U.S. with air pollution levels in compliance with all NAAQS, and is the largest city in the U.S. designated "attainment/unclassifiable" for all NAAQS (San Jose, which is the next-largest city, also attaining all NAAQS, but Santa Clara County where it is located, is part of the San Francisco Bay O_3 nonattainment area).
- All five of the counties in the Austin-Round Rock-Georgetown MSA remain designated as "attainment/unclassifiable" for the 2015 O_3 NAAQS and all other NAAQS.
- The region recorded ten days when O_3 levels were considered "unhealthy for sensitive groups," as well as an additional 139 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 has not completed a new review of air toxics data collected at CAMS 171 since 2017, which reflected 2016 data. That review, however, found that all air toxics levels measured were below the levels that would be expected to cause adverse health or environmental impacts.
- Seven out of eight TCEQ OAD forecasts correctly predicted O_3 levels > 70 ppb.
- Overall, TCEQ's daily AQI forecasts correctly predicted "moderate" or worse air quality 70% of the time, but they only were able to predict 59% 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 2018, there were a total of ten 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 and meteorological data in and near the Austin-Round Rock-Georgetown MSA, including the monitors operated by TCEQ, CAPCOG, St. Edward's University, and the National Weather Service.

Figure 1-1. 2018 Air Quality Monitors in the Austin-Round Rock-Georgetown MSA and CAPCOG Counties Cited in the Report



1.1 Compliance with the NAAQS

The Austin-Round Rock-Georgetown MSA's 2018 design values for carbon monoxide (CO), nitrogen dioxide (NO_2), O_3, particulate matter with diameters of 2.5 micrometers or less ($PM_{2.5}$), particulate matter with diameters of 10 micrometers or less (PM_{10}), and sulfur dioxide (SO_2) were all in compliance with the applicable NAAQS. Lead (Pb) is not monitored within the region. Table 1-1 shows all of the NAAQS currently in effect.

Table 1-1. NAAQS Currently in Effect

Pollutant	Standard Type	Averaging Time	Level	Form	Impacts of Violating the NAAQS
CO	Primary	8 hours	9 parts per million (ppm)	Not to be exceeded more than once per year	Neurological and cardiovascular impacts, particularly for individuals who are exercising or under stress
	Primary	1 hour	35 ppm	Not to be exceeded more than once per year	
Pb	Primary and Secondary	Rolling 3-month average	0.15 micrograms per cubic meter ($\mu g/m^3$)	Not to be exceeded	Primarily neurological problems for children and cardiovascular problems for adults, but numerous other health impacts as well; ecological damage from deposition
NO_2	Primary	1 hour	100 parts per billion (ppb)	98^{th} percentile of 1-hour daily maximum concentrations, averaged over 3 years	Respiratory impacts to people with lung disease such as asthma, children and teens, older adults, and people who are active outdoors; contributes to acid rain, visibility impairment, and nutrient pollution in coastal waters
	Primary and Secondary	1 year	53 ppb	Annual mean	
O_3	Primary and Secondary	8 hours	0.070	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years	Respiratory impacts to people with lung disease such as asthma, children and teens, older adults, and people who are active outdoors; impacts on plant growth
$PM_{2.5}$	Primary	1 year	12.0 $\mu g/m^3$	Annual mean, averaged over 3 years	Respiratory and cardiovascular impacts on people with lung or heart disease (respectively), older adults, children, and teenagers; visibility impairment
	Secondary	1 year	15.0 $\mu g/m^3$	Annual mean, averaged over 3 years	
PM_{10}	Primary and Secondary	24 hours	150 $\mu g/m^3$	Not to be exceeded more than once per year on average over 3 years	
SO_2	Primary	1 hour	75 ppb	99^{th} percentile of 1-hour daily maximum concentrations, averaged over 3 years	Respiratory impacts to people with lung disease such as asthma, children and teens, older adults, and people who are active outdoors; impacts plant growth and contributes to acid rain
	Secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year	

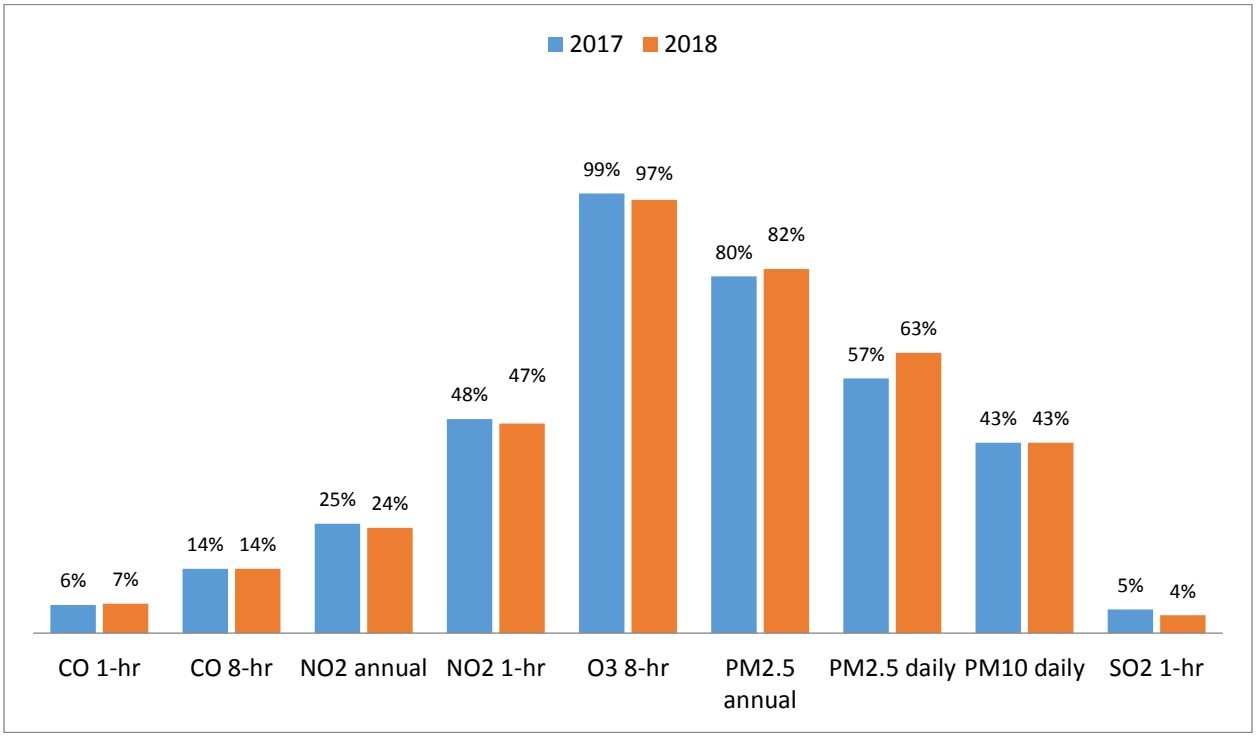
There are four "regulatory" monitoring stations in the Austin-Round Rock-Georgetown MSA, all located in Travis County, that reported data to EPA and were used for comparisons to the NAAQS. Table 1-2 summarizes the Federal Reference Method (FRM) monitors in the region and the years for which data are available from 2016-2018. CAMS 1068 is the region's designated "near-road" monitor.

Table 1-2. Summary of Criteria Pollutant Measurement Periods at Federal Reference Method (FRM) Monitors in the Austin-Round Rock-Georgetown MSA, 2016-2018

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 – 2018
NO_2	2016 – 2018	n/a	n/a	2016 – 2018
O_3	2016 – 2018	2016 – 2018	n/a	n/a
$PM_{2.5}$	2016 – 2018	2016 – 2017	2016 – 2018	n/a
PM_{10}	n/a	2016 – 2018	2016 – 2018	n/a
SO_2	2016 – 2018	n/a	n/a	n/a

Figure 1-2 shows the metro area's 2017 and 2018 design values compared to each primary NAAQS. The 2018 design value for 8-hour O_3 was slightly lower compared to 2017, whereas the design values for $PM_{2.5}$ saw an increase in 2018 compared to 2017.[1]

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



While there is no formal threshold that delineates an area as "near-nonattainment," Appendix D to 40 CFR Part 58 does specify that for certain pollutants, measurements above a certain % of the maximum

[1] Data for all pollutants other than PM_{10} obtained from EPA design value reports posted at: https://www.epa.gov/air-trends/air-quality-design-values. PM_{10} figure calculated as 4th-highest recorded 24-hour PM10 concentration over a 3-year period from data from TCEQ's website.

allowed under the NAAQS trigger additional monitoring requirements. For the O_3 and $PM_{2.5}$ NAAQS, measurements at or above 85% of the NAAQS trigger additional monitoring requirements, while for PM_{10}, "medium concentration" monitoring requirements apply to data exceeding 80% of the NAAQS. If the 85% threshold were used to define an area as "near-nonattainment," then the Austin metro area would only be near-nonattainment for the 2015 O_3 NAAQS, while if the 80% threshold were used, the Austin area would also be near-nonattainment for the 2012 $PM_{2.5}$ annual NAAQS.

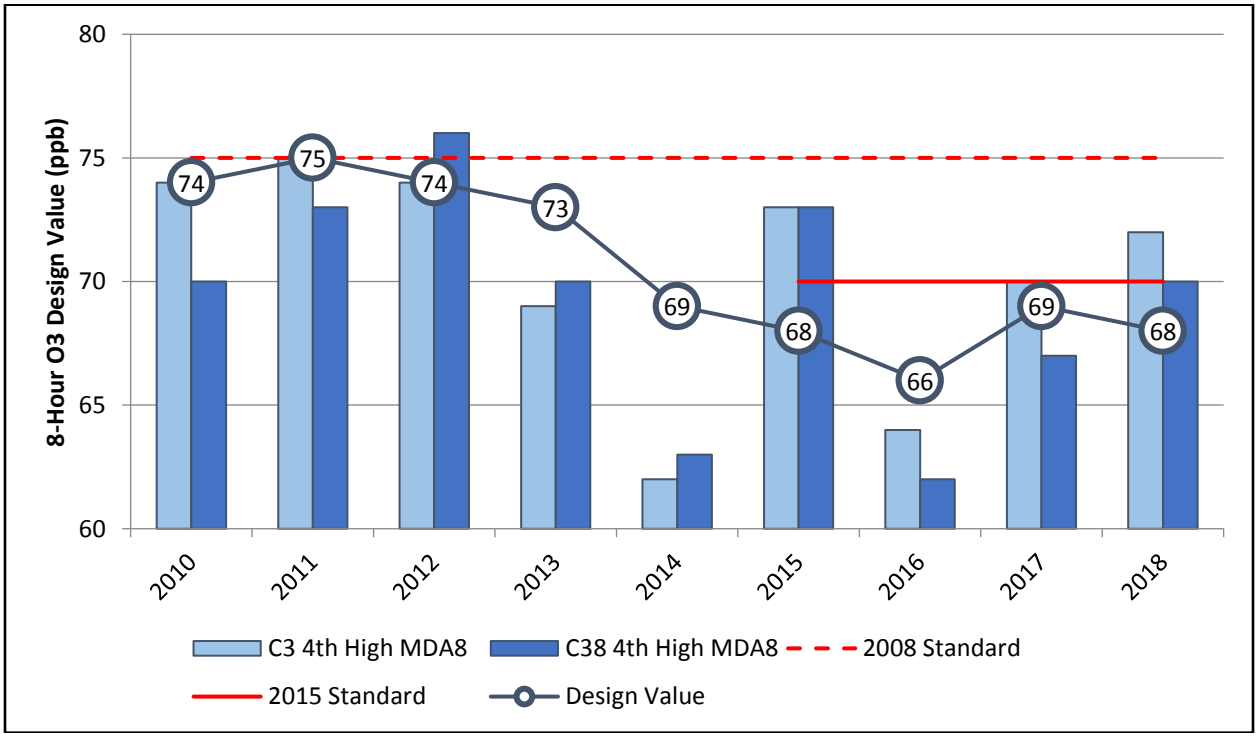
Table 1-3. Comparison of Austin Metro Area O3 and PM Design Values Compared to Potential "Near-Nonattainment" Thresholds

NAAQS	Austin Metro Area 2016-2018 Design Value	Level of NAAQS	"Near-Nonattainment" Design Value if Using 85% Threshold	"Near-Nonattainment" Design Value if Using 80% Threshold
O_3 (8-hour)	68 ppb	70 ppb	60 – 70 ppb	56 – 70 ppb
$PM_{2.5}$ (annual)	9.8 µg/m^3	12.0 µg/m^3	10.2 – 12.0 µg/m^3	9.6 – 12.0 µg/m^3
$PM_{2.5}$ (24-hour)	22 µg/m^3	35 µg/m^3	30 – 35 µg/m^3	28 – 35 µg/m^3
PM_{10} (24-hour)	150 µg/m^3	64 µg/m^3	128 – 150 µg/m^3	120 – 150 µg/m^3

1.2 O_3 Design Value Trend

Figure 1-3 below shows the trend in the Austin-Round Rock-Georgetown MSA's 8-hour O_3 design values from 2010-2018 compared to the 2008 and 2015 8-hour O_3 NAAQS, along with the 4th-highest MDA8 O_3 at each regulatory O_3 station. Over this time, the region's design value has decreased an average of 0.75 ppb per year.

Figure 1-3. Austin-Round Rock-Georgetown MSA 8-Hour O_3 Design Value and 4th-Highest MDA O_3 Trend 2010-2018



After a 3 ppb increase from 2016 to 2017, the region experienced a 1 ppb decrease from 2017 to 2018. The variation in design values between 2016 and 2018 is due to the high O_3 measurements from 2015

dropping out of the three-year average. **Due to the high O_3 levels in 2018, a 4th-highest MDA8 O_3 of 71 ppb or higher at CAMS 3 or 76 ppb or higher at CAMS 38 in 2019 would cause a violation of the 2015 O_3 design value for 2017-2019**. As of July 31, 2019, the 4th-highest MDA8 O_3 values for 2019 at CAMS 3 and 38 were both 62 ppb, but the highest O_3 levels typically occur in August and September.

Figure 1-4. CAMS 3 4th-Highest MDA8 O_3 Values, Trendline, and 95% Confidence Intervals, 2010-2018

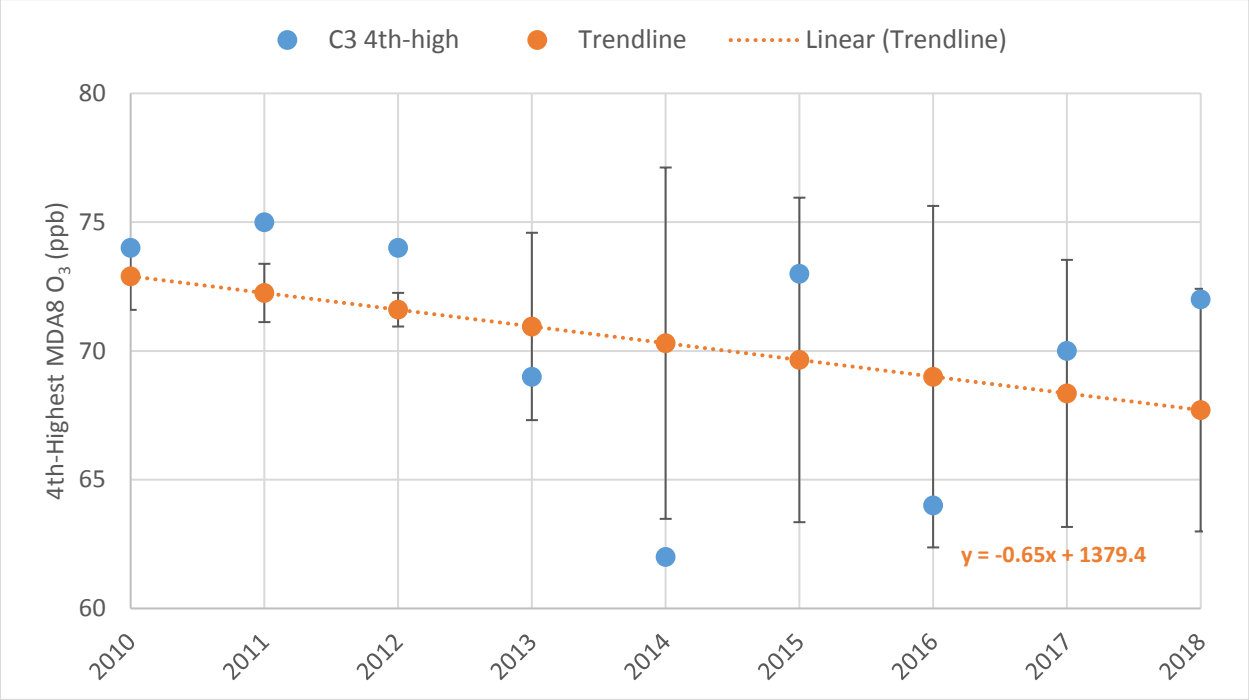


Figure 1-4 above shows the 4th highest MDA8 O_3 values at CAMS 3 since 2010 and compares these values to the trendline and the 95% confidence range[2]. In 2018, the 4th highest value was at the high end of the expected 95% confidence range. The fact that it was on the high side of the range indicated that the region experienced a higher than expected 4th highest MDA8 O_3 values at CAMS 3.

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. Edward's University collected data at one additional O_3 monitoring station between 2016 and 2018. 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.

Table 1-4 summarizes the fourth-highest MDA8 O_3 measurements collected at each monitoring station in the CAPCOG region in 2016, 2017, and 2018, 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,

[2] 95% confidence interval range is based on the standard deviation for the 3-year design value period associated with that year. So, the standard deviation applicable to the 2018 data reflected 2016-2018 data.

1603, 1604, 1675, and 6602 are research monitoring stations operated by CAPCOG. CAMS 1605 is owned and operated by St. Edward's University. Reports documenting the quality-checks performed at CAPCOG's sites can be found on CAPCOG's website at http://www.capcog.org/divisions/regional-services/aq-reports.

Table 1-4. Fourth-highest MDA8 Measurements at All O_3 Monitoring Stations in the CAPCOG Region, 2016-2018 (ppb)

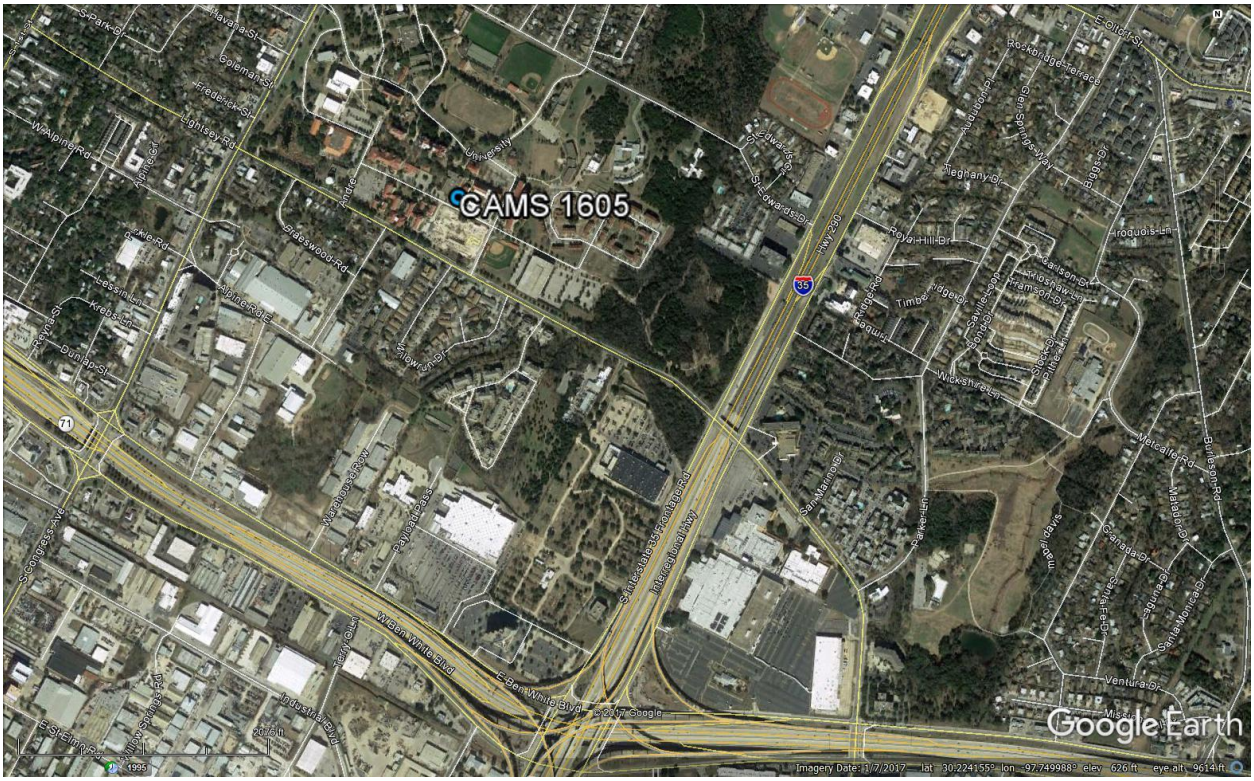
CAMS	AQS Site Number	County	2016	2017	2018	2016-2018 Average	2016-2018 St. Dev.
3	484530014	Travis	64	70	72	68	4.2
38	484530020	Travis	62	67	70	66	4.0
601	481490601	Fayette	59	64	67	63	4.0
614	482090614	Hays	65	67	69	67	2.0
684	480210684	Bastrop	59	57	60	58	1.5
690	484910690	Williamson	61	70	69	66	4.9
1603	484531603	Travis	63	59	73	65	7.2
1604	480551604	Caldwell	60	67	66	64	3.8
1605	484531605	Travis	52	51	66	56	8.4
1675	482091675	Hays	62	63	74	66	6.7
6602	484916602	Williamson	58	65	68	63	5.1

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).[3] As Table 1-4 shows, 2018 O_3 levels were similarly low compared to the other monitors in Travis County. 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.

[3] 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 2016-2018 three-year average of the fourth highest MDA8 values in the region ranged from 56 ppb – 68 ppb, with two monitors recording fourth-highest MDA8 values at the upper end of that range (C3 and C614).

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. Table 1-5 shows the concentrations of NO_2, O_3, and $PM_{2.5}$ that correspond to each AQI level.

Table 1-5. Summary of AQI for NO_2, O_3, $PM_{2.5}$, and PM_{10}

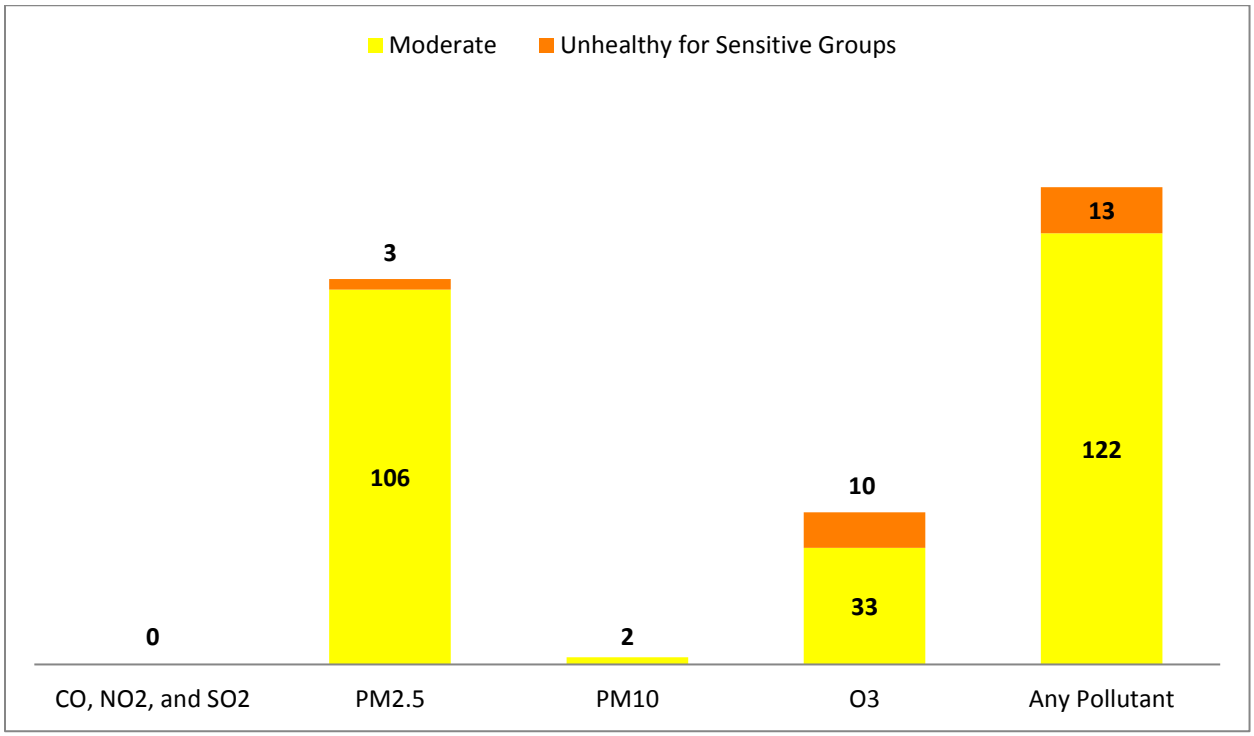
AQI Level	AQI Number	NO_2 (1-Hr., ppb)	O_3 (8-Hr., ppb)	$PM_{2.5}$ (24 hr., µg/m³)	PM_{10} (24 hr., µg/m³)
Good	0-50	0-53	0-54	0.0-12.0	0-54
Moderate	51-100	54-100	55-70	12.1-35.4	55-154
Unhealthy for Sensitive Groups	101-150	101-360	71-85	35.5-55.4	155-254
Unhealthy	151-200	361-649	86-105	55.5-150.4	255-354
Very Unhealthy	201-300	650-1249	106-200	150.5-250.4	355-424
Hazardous	301-500	1250-2049	201-600	250.5-500	425-604

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" and "unhealthy for sensitive groups" categories described below are higher than if only the TCEQ regulatory monitors were used.

1.4.1 High AQI Days by Pollutant

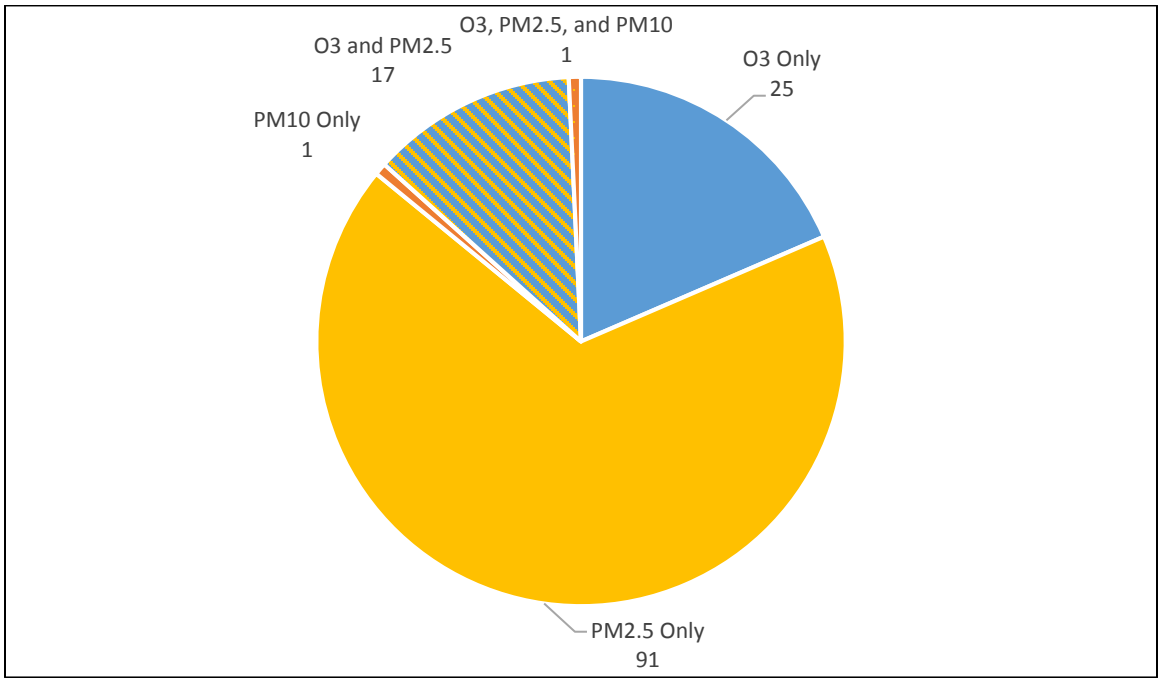
The following figures show the number of days in 2018 when $PM_{2.5}$, PM_{10}, or O_3 concentrations measured in the CAPCOG region were high enough to be considered "moderate" or "unhealthy for sensitive groups." Monitored pollution levels for CO, NO_2, and SO_2 all remained in the "good" range throughout the year. In total, the region experienced moderate or worse air quality on 37% of days in 2018, with 13 of those days reaching "unhealthy for sensitive groups" levels. Note that for PM_{10}, sampling only occurs once every six days. Therefore, while there were two recorded "moderate" PM_{10} days in 2018, there could well have been more, especially during July when $PM_{2.5}$ levels were also high.

Figure 1-6. Number of "Moderate" or "Unhealthy for Sensitive Groups" Air Pollution Days in the CAPCOG Region in 2018 by Pollutant



High levels of O_3 were responsible for the majority of the days when the region experienced air pollution levels considered "unhealthy for sensitive groups". However, high levels of $PM_{2.5}$ were responsible for a majority of the days when air pollution levels were considered "moderate" or worse. Figure 1-7 shows the distribution of days when air pollution was considered at least "moderate" by pollutant.

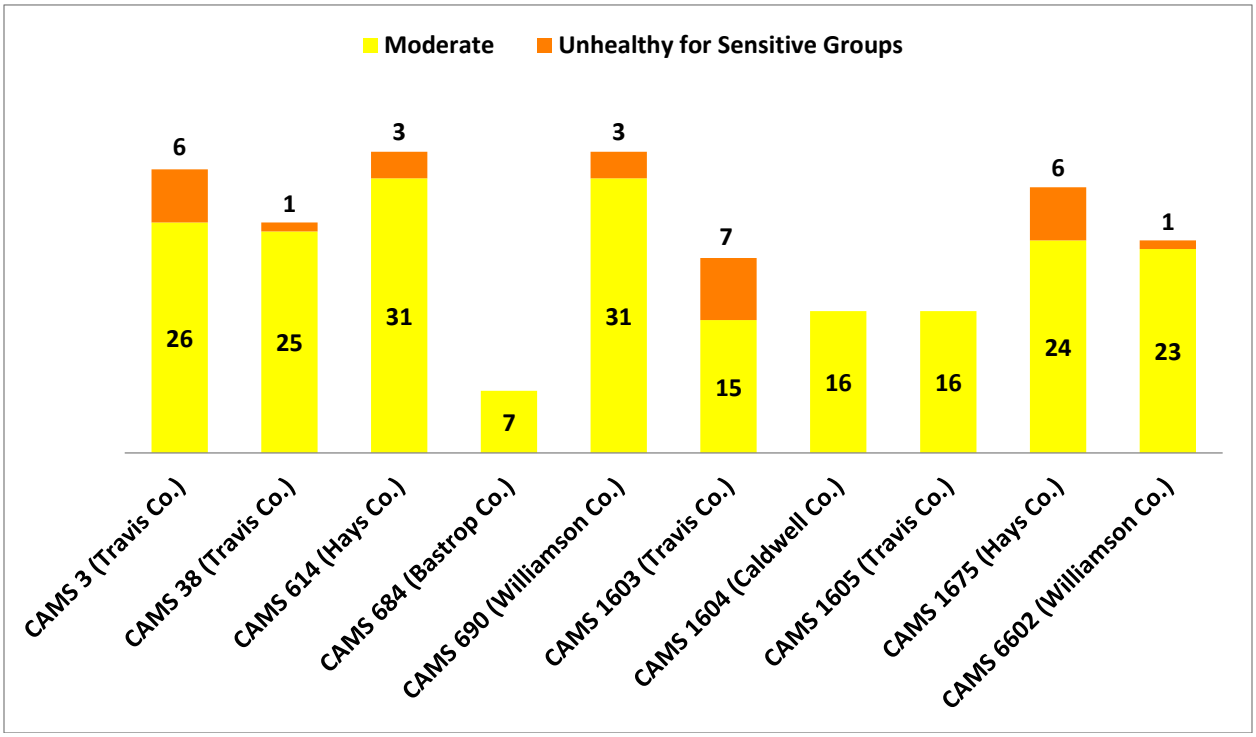
Figure 1-7. Days in 2018 When AQI Levels in the MSA Were "Moderate" or Worse



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 O_3 monitoring station in the region in 2018. CAMS 1603 at Gorzycki Middle School experienced the majority of the "unhealthy for sensitive groups" days in the region. Additionally, CAMS 3 and CAMS 1675 each had 6 days that were "unhealthy for sensitive groups," where all other monitors in the region had 3 or fewer days that were "unhealthy for sensitive groups" due to O_3.

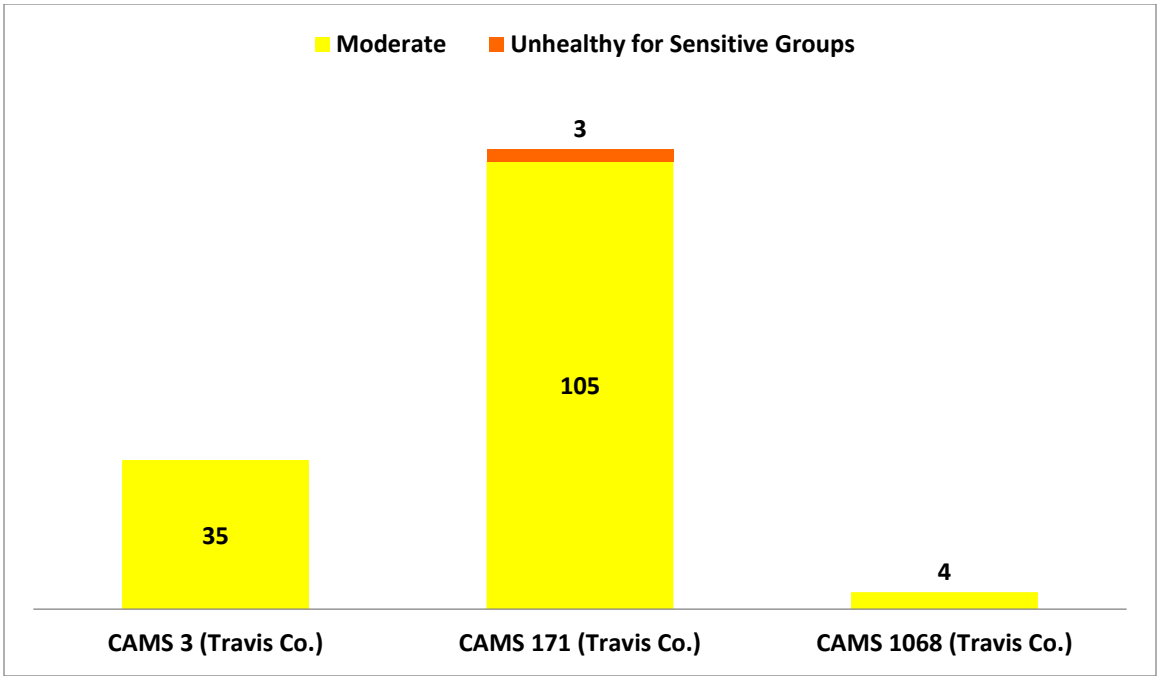
Figure 1-8. Number of Days when O_3 Pollution was "Moderate" or Worse by Monitoring Station and County, 2018



1.4.3 High PM AQI Days by Monitoring Station

Figure 1-9 shows the number of days when $PM_{2.5}$ levels were considered "moderate" or "unhealthy for sensitive groups" at each $PM_{2.5}$ monitoring station in the region in 2018**.** These data are based on daily average $PM_{2.5}$ levels collected from continuous samplers at CAMS 3, 171, and 1068. In July 2018, the region experienced 3 days when $PM_{2.5}$ levels reached "unhealthy for sensitive groups" due to elevated $PM_{2.5}$ levels associated with Saharan dust.

Figure 1-9. Number of Days when $PM_{2.5}$ Pollution was "Moderate" or Worse by Monitoring Station and County, 2018

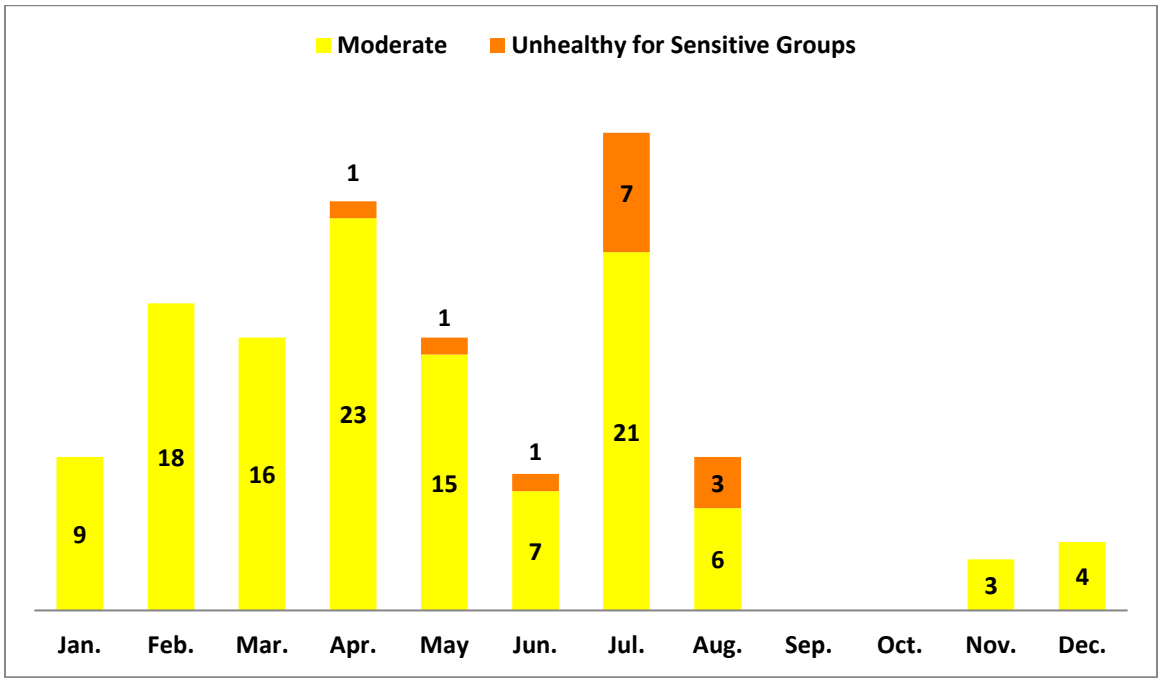


PM_{10} levels recorded at CAMS 3 and 171 reached "moderate" levels on July 1, 2018, when both monitoring stations also recorded high $PM_{2.5}$ levels ("moderate" at CAMS 38 and "unhealthy for sensitive groups" at CAMS 171). There was also one day (December 22, 2018) when PM_{10} levels were "moderate" at CAMS 38, but AQI levels for all other pollutants were in the "good" range region-wide.

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

Air pollution levels vary significantly by month in the CAPCOG region. Figure 1-10 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-Georgetown MSA by Month, 2018



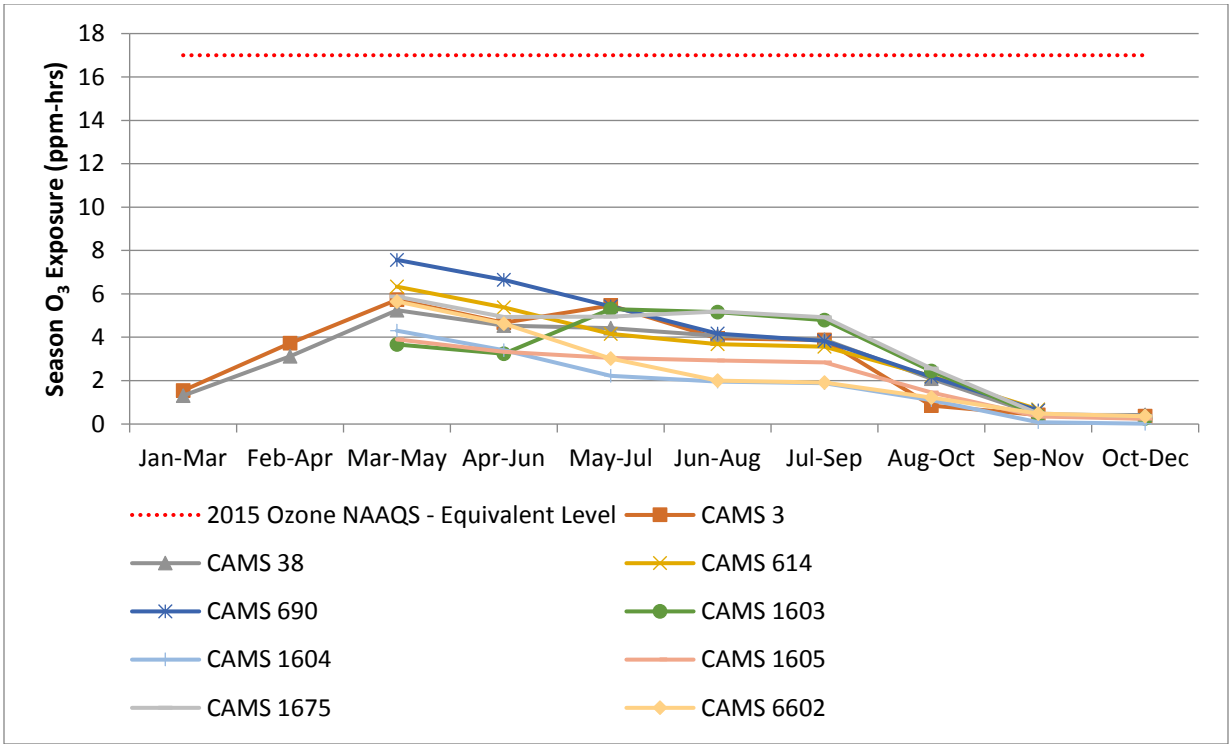
The absence of any days with "moderate" or worse air pollution during September and October was highly unusual, as was the very high number of days when the region experienced poor air quality in July.

1.4.5 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."[4] 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."[5] The region's peak seasonal O_3 exposure levels were 55-70% below the 17 ppm-hr levels EPA referenced in the final 2015 O_3 NAAQS rulemaking. Figure 1-11 shows the 3-month seasonal exposure levels at each monitoring station by month.

[4] 80 FR 65294
[5] Ibid.

Figure 1-11. Weighted Seasonal O_3 Exposure by Monitoring Station and 3-month period, 2018 (W126 ppm-hrs)



1.5 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.

1.5.1 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.

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 2018 were accurate 87.5% of the time, but OAD forecasting missed 30% of the days when MDA8 O_3 levels actually exceeded 70 ppb (three out of eight). 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.

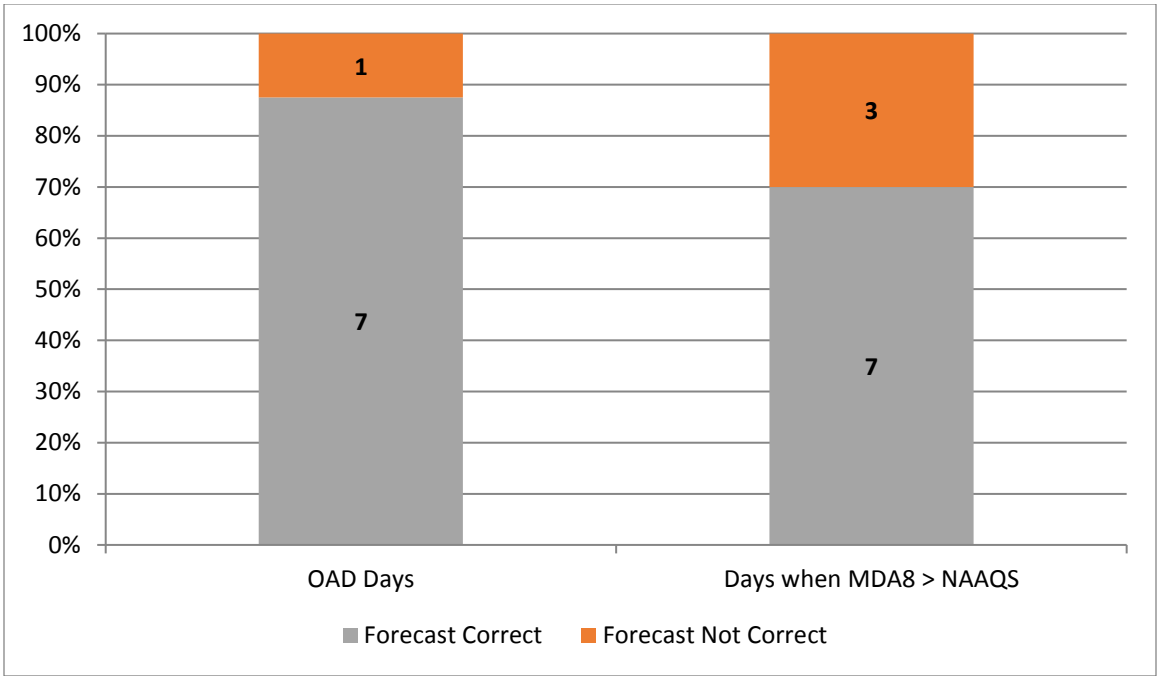
From 2016-2018, TCEQ issued a total of 12 OAD alerts for the Austin-Round Rock-Georgetown area – two in 2016, two in 2017, and eight in 2018. During this time frame, there were a total of 18 days when O_3 levels exceeded the level of the relevant O_3 NAAQS: one in 2016, seven in 2017, and ten in 2018. Table 1-6 lists each of these dates.

Table 1-6. OAD Dates and Dates when O_3 Exceeded Level of NAAQS, 2016-2018

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
4/23/2016	Yes	70 ppb	69 ppb	CAMS 38
5/6/2016	Yes	70 ppb	62 ppb	CAMS 1603
10/3/2016	No	70 ppb	72 ppb	CAMS 3
6/5/2017	No	70 ppb	73 ppb	CAMS 690
6/7/2017	No	70 ppb	74 ppb	CAMS 1604
6/8/2017	No	70 ppb	75 ppb	CAMS 690
5/5/2017	Yes	70 ppb	61 ppb	CAMS 1604
8/1/2017	No	70 ppb	72 ppb	CAMS 614
9/1/2017	No	70 ppb	71 ppb	CAMS 3
9/12/2017	Yes	70 ppb	74 ppb	CAMS 1604
9/13/2017	No	70 ppb	73 ppb	CAMS 690
4/28/2018	Yes	70 ppb	73 ppb	CAMS 690
5/7/2018	Yes	70 ppb	77 ppb	CAMS 690
5/28/2018	Yes	70 ppb	59 ppb	CAMS 1675
7/23/2018	No	70 ppb	72 ppb	CAMS 1675
7/25/2018	No	70 ppb	74 ppb	CAMS 3/1603
7/26/2018	Yes	70 ppb	74 ppb	CAMS 1675
7/27/2018	Yes	70 ppb	71 ppb	CAMS 3
7/31/2018	No	70 ppb	80 ppb	CAMS 1603
8/1/2018	Yes	70 ppb	84 ppb	CAMS 1675
8/2/2018	Yes	70 ppb	82 ppb	CAMS 1675
8/3/2018	Yes	70 ppb	75 ppb	CAMS 601

Seven of the eight OAD forecasts correctly predicted O_3 levels over the applicable NAAQS – a 87.5% accuracy rate over the three-year period. Conversely, there was a 70% "success rate" in predicting actual MDA8 O_3 levels over the applicable NAAQS from 2016-2018.

Figure 1-12. OAD Forecast Accuracy and Success, 2016-2018



1.5.2 Daily Air Quality Forecasts

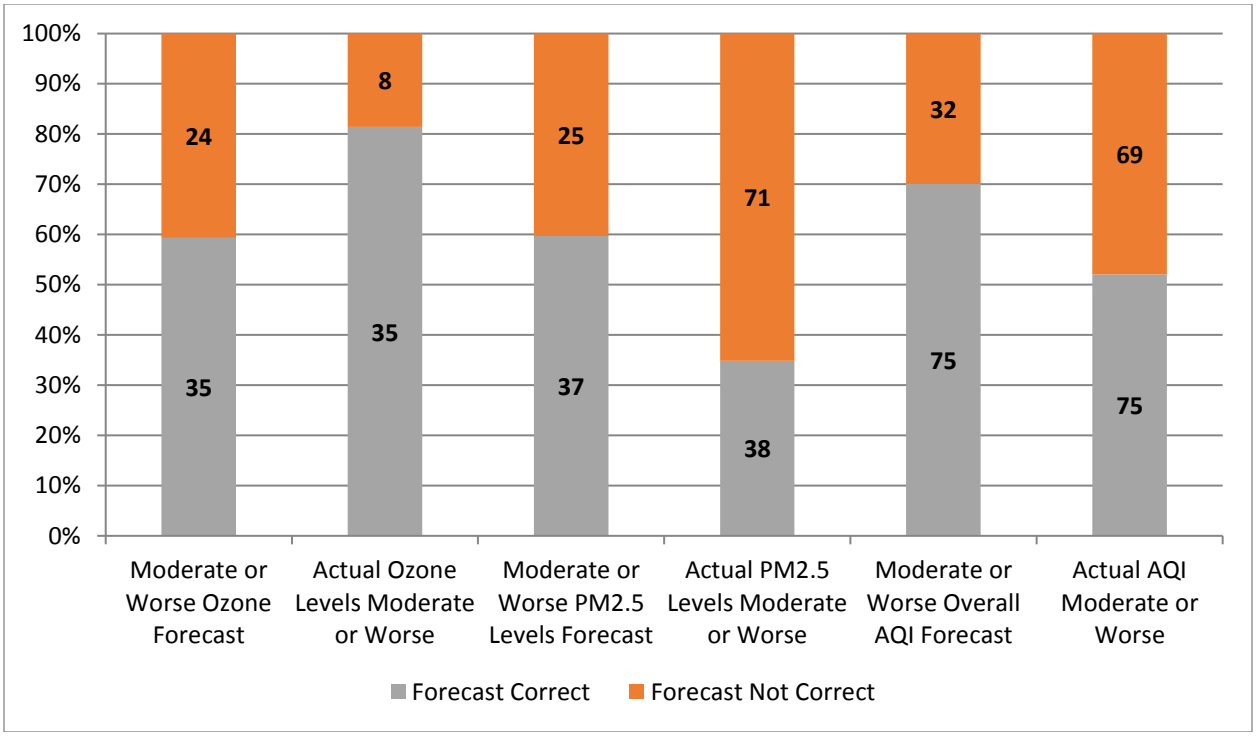
Unlike OADs, which are only issued for days when TCEQ believes O_3 will reach levels considered "unhealthy for sensitive groups;" daily air quality forecasts include forecasts for "good" and "moderate" air pollution levels as well, and include forecasts for pollutants other than O_3. The performance 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. Figure 1-13 shows the results of this analysis for 2018.

Figure 1-13. Accuracy and Success of AQI Forecasts for 2018

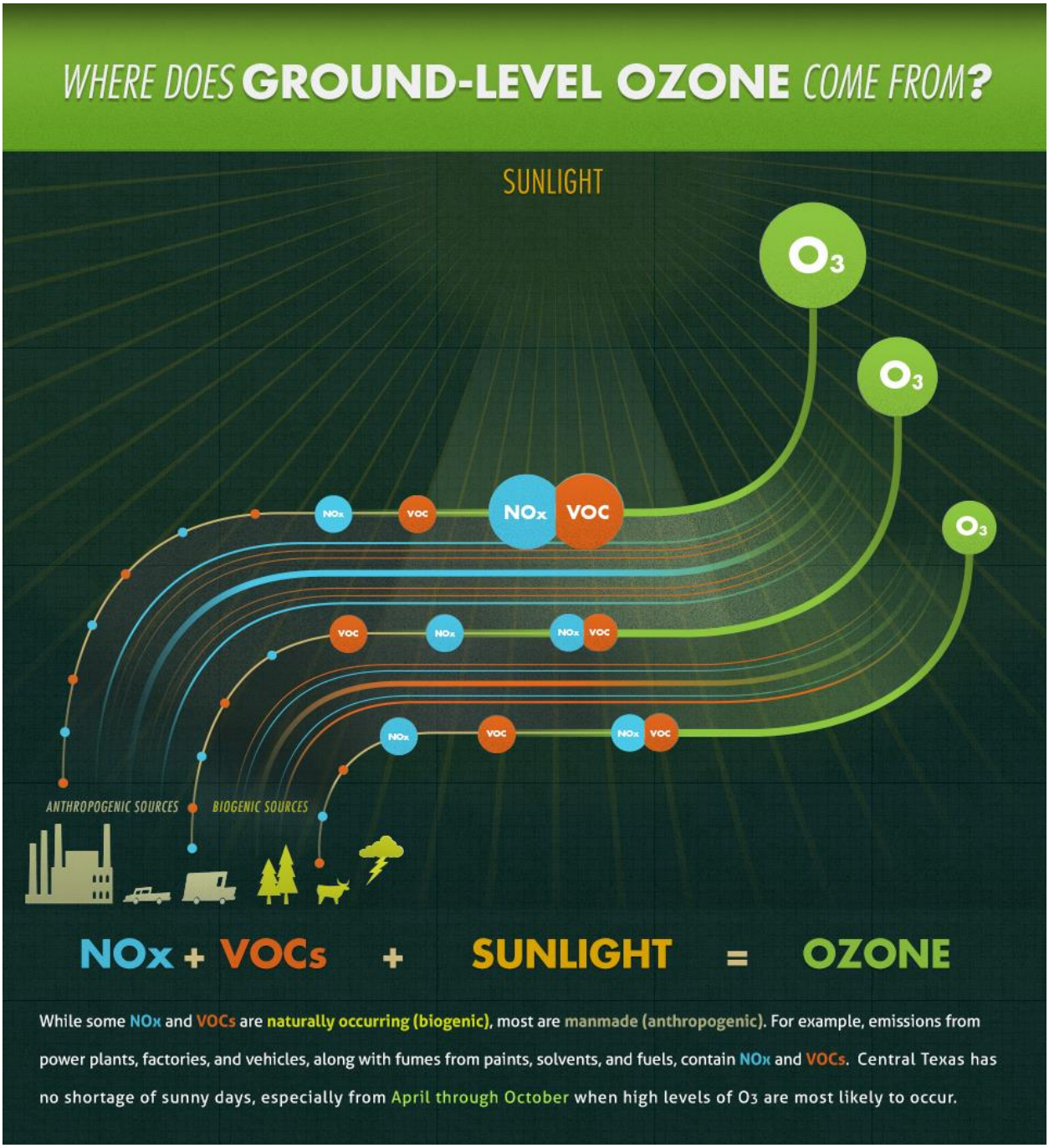


Overall, TCEQ's forecasts for "moderate" or higher O_3 levels were 59% accurate and 81% successful. Whereas, forecasts for "moderate" or higher $PM_{2.5}$ forecasting were 60% accurate and 35% successful. Overall AQI forecasts were 70% accurate and 52% successful.

2 2018 Regional O_3 Season Weekday NO_X Emissions Profile

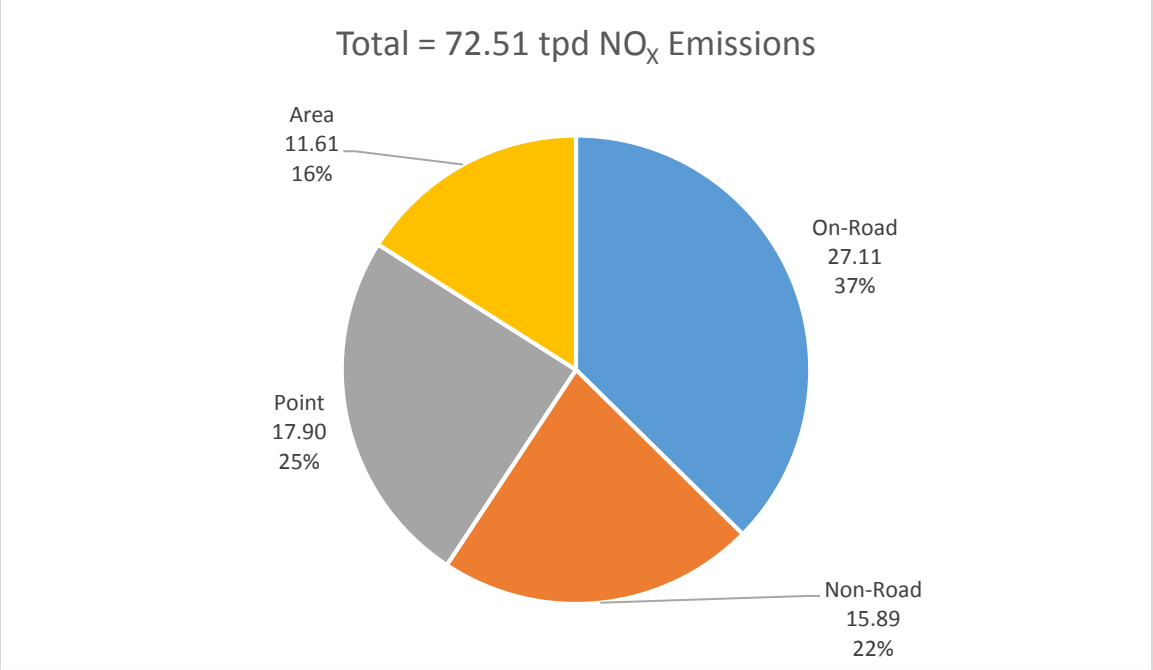
NO_X emissions react with volatile organic compounds (VOC) in the presence of sunlight to form ground-level O_3. Depending on local conditions, an area's O_3 problems can be influenced more by NO_X emissions or VOC emissions. In the Austin metro area, NO_X emissions account for about 99% of all locally-generated O_3. Therefore, understanding the contribution of different sources of NO_X emissions to the region's typical daily NO_X emissions during ozone season helps understand the relative importance of these sources to O_3 formation.

Figure 2-1. Ozone Formation



The following pie chart shows the estimated average 2018 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 2-2. 2018 O_3 Season Weekday NO_X Emissions for the Austin-Round Rock-Georgetown MSA (tpd)



2.1 NO_X Emissions by Source Type by County

Table 2-1 shows the break-down of the region's ozone season day (OSD) weekday NO_X emissions by county and source type.

Table 2-1. 2018 OSD Weekday NO_X Emissions by Source Type and County (tons per day)

County	On-Road	Non-Road	Point	Area	Total
Bastrop	1.69	1.43	3.94	0.46	7.52
Caldwell	0.96	1.11	0.80	1.89	4.76
Hays	3.68	1.29	6.75	0.80	12.52
Travis	14.70	7.96	6.26	6.47	35.39
Williamson	6.09	4.11	0.15	1.99	12.34
TOTAL	**27.11**	**15.89**	**17.90**	**11.61**	**72.51**

2.2 On-Road Sources

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 27.11 tons per day (tpd) of NO_X emissions on a typical 2018 OSD weekday, based on TCEQ's most recent "trends" emissions inventories.[6] Table 2-2 shows the typical 2018 O_3 season weekday NO_X emissions for the region by source use type.

[6] Produced by TTI in August 2015. Available online at: ftp://amdaftp.tceq.texas.gov/pub/EI/onroad/mvs14_trends/.

Table 2-2. 2018 Austin-Round Rock-Georgetown OSD Weekday NO_X Emissions by Source Use Type (tpd)

Source Use Type	NO_X
Motorcycle	0.03
Passenger Car	7.88
Passenger Truck	5.52
Light Commercial Truck	1.62
Intercity Bus	0.15
Transit Bus	0.22
School Bus	0.42
Refuse Truck	0.35
Single-Unit Short-Haul Truck	1.72
Single-Unit Long-Haul Truck	0.18
Motor Home	0.17
Combination Short-Haul Truck	3.38
Combination Long-Haul Truck	5.48
TOTAL	**27.11**

Passenger cars and passenger trucks combined to account for 13.41 tpd of NO_X emissions, while commercial trucking accounted for 11.10 tpd NO_X emissions, and the remaining sources accounted for 2.61 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 2018, accounting for 15.89 tpd of NO_X emissions on a typical O_3 season weekday. There are four different types of non-road data sets: equipment modeled in the MOVES2014b and TexNv2 models, locomotives/rail equipment, aircraft (including ground support equipment), and drill rigs.

Table 2-3. 2018 O_3 Season Weekday Non-Road OSD Weekday NO_X Emissions by County (tpd)

County	MOVES2014b	Rail	Aircraft	Drill Rigs	Total
Bastrop	0.98	0.45	0.00	0.00	1.43
Caldwell	0.59	0.47	0.02	0.02	1.11
Hays	0.85	0.44	0.00	0.00	1.29
Travis	5.26	0.44	2.26	0.00	7.96
Williamson	3.55	0.54	0.02	0.00	4.11
TOTAL	**11.23**	**2.34**	**2.30**	**0.02**	**15.89**

- For MOVES2014b sources, CAPCOG used the 2017 OSD estimates prepared by TCEQ for the AERR,[7] then adjusted the totals four each SCC and county based on the ratio for 2018/2017 ratio for the SCC and county in TCEQ's "trends" emissions inventory.[8]

[7] Available online here: ftp://amdaftp.tceq.texas.gov/pub/EI/nonroad/aerr/2017/for_EPA/
[8] Available online here: ftp://amdaftp.tceq.texas.gov/pub/EI/nonroad/trends/

- For Aircraft, CAPCOG interpolated the 2018 data using ERG's estimated O_3 season daily 2017 and 2020.[9]
- For locomotives and drill rigs, CAPCOG used the existing trends inventories.[10]

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 2017. In that year, there were 28 facilities in the Austin-Round Rock-Georgetown MSA that reported emissions to TCEQ.[11] Data specific to 2018 are also available for each electric generating unit (EGU) that reports to EPA, the Hal Weaver Power Plant, Austin White Lime, and Texas Lehigh Cement Company. CAPCOG estimated an average of 17.90 tpd NO_X emissions from point sources in the MSA in 2018:

- Except for the turbines at Decker Creek Power Plant, CAPCOG used the average daily NO_X emissions reported to EPA for May 1, 2018 – September 30, 2018 for all EGUs that report emissions to EPA,[12] (7.86 tpd);
- For the eight turbine units at Decker Creek Power Plant, CAPCOG used the average daily NO_X emissions reported to EPA for May 1, 2018 – September 30, 2018, adjusted to reflect the ratio between the average OSD NO_X emissions reported in TCEQ's EIQ for 2017 to the average OSD (May 1 – September 30) NO_X emissions reported to EPA for 2017[13] (0.15 tpd);
- For Austin White Lime and Texas Lehigh Cement company, CAPCOG used the average 2018 OSD NO_X emissions reported to CAPCOG for this report (7.19 tpd);
- For the Hal Weaver Power Plant, its 2017 EIQ did not include an OSD estimate, and monthly fuel consumption data is available from EIA for both 2017 and 2018,[14] so CAPCOG estimated the 2018 OSD NO_X emissions by using the May 1, 2017 – September 30, 2017, and May 1, 2018 – September 30, 2018 fuel consumption data relative to the annual 2017 fuel consumption total (0.81 tpd);
- For all other sources of NO_X emissions, CAPCOG used the OSD NO_X emissions reported in the facility's 2017 EIQ (1.90 tpd).

Table 2-4 shows the estimated OSD NO_X emissions by county for EGU and non-EGU sources.

Table 2-4. Estimated 2018 Point Source OSD NO_X Emissions by County (tpd)

County	EGU	Non-EGU	TOTAL
Bastrop	3.78	0.15	3.94
Caldwell	0.00	0.80	0.80
Hays	0.73	6.02	6.75

[9] E-mail from Roger Chang, ERG, to Andrew Hoekzema, CAPCOG, on July 26, 2019.
[10] Available online here: ftp://amdaftp.tceq.texas.gov/pub/EI/offroad/locomotive/trends/ and ftp://amdaftp.tceq.texas.gov/pub/EI/oil_gas/drilling/.
[11] "State Summary" file available online here: https://www.tceq.texas.gov/assets/public/implementation/air/ie/pseisums/2013thru2017statesum.xlsx
[12] Accessible online here: https://ampd.epa.gov/ampd/
[13] The adjustment for the Decker Turbines is due to a known issue with data substitution required for reporting data to EPA that does not apply to the annual EIQs.
[14] EIA. Form EIA-923 detailed data with previous form data (EIA-906/920). Available online at: https://www.eia.gov/electricity/data/eia923/

County	EGU	Non-EGU	TOTAL
Travis	3.49	2.77	6.26
Williamson	0.00	0.15	0.15
TOTAL	**8.00**	**9.89**	**17.90**

Table 2-5 shows the facility-level OSD NO_X emissions estimates.

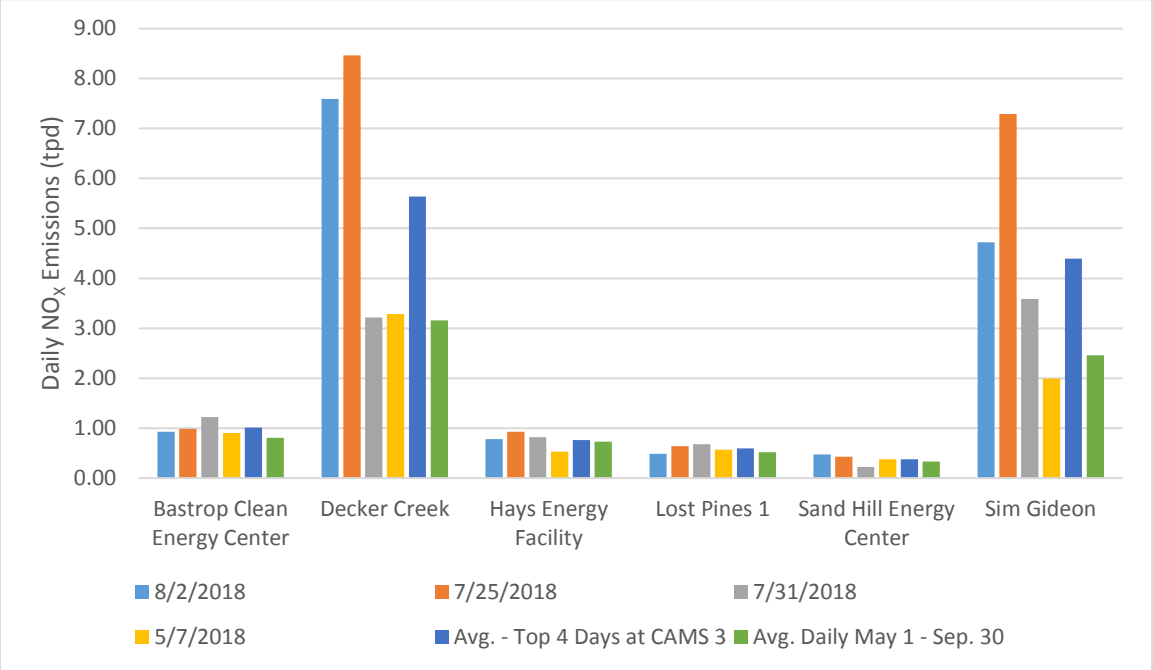
Table 2-5. Estimated Average 2018 OSD Point Source Emissions in the Austin-Round Rock-Georgetown MSA (tpd)

RN	COMPANY	SITE	COUNTY	NO_X
RN102038486	LOWER COLORADO RIVER AUTHORITY	SIM GIDEON POWER PLANT	BASTROP	2.46
RN100212034	MERIDIAN BRICK LLC	ELGIN FACILITY	BASTROP	0.08
RN100225846	ACME BRICK COMPANY	ELGIN PLANT	BASTROP	0.07
RN100723915	GENTEX POWER CORPORATION	LOST PINES 1 POWER PLANT	BASTROP	0.52
RN101056851	BASTROP ENERGY PARTNERS LP	BASTROP ENERGY CENTER	BASTROP	0.81
RN100212018	DAVIS GAS PROCESSING, INC	LULING GAS PLANT	CALDWELL	0.00
RN100220187	OASIS PIPELINE CO TEXAS LP	PRAIRIE LEA COMPRESSOR STATION	CALDWELL	0.80
RN105366934	FLINT HILLS RESOURCES CORPUS CHRISTI LLC	MUSTANG RIDGE TERMINAL	CALDWELL	0.00
RN102597846	TEXAS LEHIGH CEMENT COMPANY LP	TEXAS LEHIGH CEMENT CO	HAYS	6.01
RN100211689	HAYS ENERGY LLC	HAYS ENERGY FACILITY	HAYS	0.74
RN100219872	CITY OF AUSTIN ELECTRIC UTILITY DEPARTMENT DBA AUSTIN ENERGY	DECKER CREEK POWER PLANT	TRAVIS	3.18
RN100214337	AUSTIN WHITE LIME COMPANY	MCNEIL PLANT & QUARRY	TRAVIS	1.18
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	0.81
RN100723741	SPANSION LLC	SPANSION AUSTIN FACILITY	TRAVIS	0.02
RN102752763	NXP USA INC	INTEGRATED CIRCUIT MFG OAK HILL FAB	TRAVIS	0.02
RN100542752	BFI WASTE SYSTEMS OF NORTH AMERICA INC	BFI SUNSET FARMS LANDFILL	TRAVIS	0.08
RN100218692	3M COMPANY	3M AUSTIN CENTER	TRAVIS	0.07
RN101059673	FLINT HILLS RESOURCES CORPUS CHRISTI LLC	AUSTIN TERMINAL	TRAVIS	0.01

RN	COMPANY	SITE	COUNTY	NO_X
RN100215938	WASTE MANAGEMENT OF TEXAS INC	AUSTIN COMMUNITY LANDFILL	TRAVIS	0.11
RN101992246	SUNSET FARMS ENERGY LLC	SUNSET FARMS ENERGY	TRAVIS	0.00
RN100518026	SAMSUNG AUSTIN SEMICONDUCTOR LLC	AUSTIN FABRICATION FACILITY	TRAVIS	0.38
RN100215052	CITY OF AUSTIN ELECTRIC UTILITY DEPARTMENT DBA AUSTIN ENERGY	SAND HILL ENERGY CENTER	TRAVIS	0.33
RN102016698	TEXAS DISPOSAL SYSTEMS LANDFILL INC	TEXAS DISPOSAL SYSTEMS LANDFILL	TRAVIS	0.03
RN100225754	WASTE MANAGEMENT OF NORTH TEXAS	WILLIAMSON COUNTY LANDFILL HUTTO	WILLIAMSON	0.05
RN100725712	SEMINOLE PIPELINE COMPANY LLC	COUPLAND PUMP STATION	WILLIAMSON	0.09
RN100728179	DURCON LABORATORY TOPS INCORPORATED	DURCON LABORATORY TOPS INCORPORATED	WILLIAMSON	0.01
TOTAL	**n/a**	**n/a**	**n/a**	**17.90**

Since EPA data for EGUs are available at the daily level, CAPCOG also analyzed the NO_X emissions on the top four O_3 days at CAMS 3, since these four days would affect NAAQS compliance. On these days, EGU NO_X emissions averaged 12.78 tpd, which is 60% higher than the May 1 – September 30 daily average. This suggests that point sources generally, and EGUs specifically, contributed more to O_3 formation on those top four days than the OSD estimate would suggest.

Figure 2-3. Comparison of EGU NO_X Emissions on Top 4 O_3 Days at CAMS 3 Compared to Average Daily NO_X Emissions May 1 – September 30, 2018



2.5 Area Sources

CAPCOG estimated the 2018 area sources using TCEQ's 2017 summer weekday NO_X emissions from its 2017 National Emissions Inventory submission.[15]

Table 2-6. Area Source OSD Weekday NO_X Emissions by County and Source Type (tpd)

County	Industrial Combustion	Commercial and Institutional Combustion	Residential Combustion	Oil and Gas	Other	TOTAL
Bastrop	0.10	0.10	0.00	0.16	0.09	0.46
Caldwell	0.09	0.04	0.00	1.73	0.02	1.89
Hays	0.31	0.35	0.00	0.00	0.13	0.80
Travis	2.34	4.04	0.02	0.01	0.05	6.47
Williamson	0.89	1.03	0.01	0.03	0.03	1.99
TOTAL	**3.74**	**5.57**	**0.04**	**1.94**	**0.33**	**11.61**

[15] E-mailed from Matthew Southard, TCEQ, to Andrew Hoekzema, CAPCOG, on July 26, 2019.

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-Georgetown MSA in 2018. 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;
- Volkswagen Environmental Mitigation Trust Beneficiary Mitigation Plan for Texas;
- The Commute Solutions Program;
- The Clean Air Partners Program;
- The Clean Cities Program;
- Outreach and Education Measures; and
- Property-Assessed Clean Energy (PACE).

3.1.1 Vehicle Emissions Inspection and Maintenance Program

The Austin-Round Rock-Georgetown 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 2018, 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 2018)

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. Table 3-1 summarizes the number and disposition of emissions inspections in 2018:

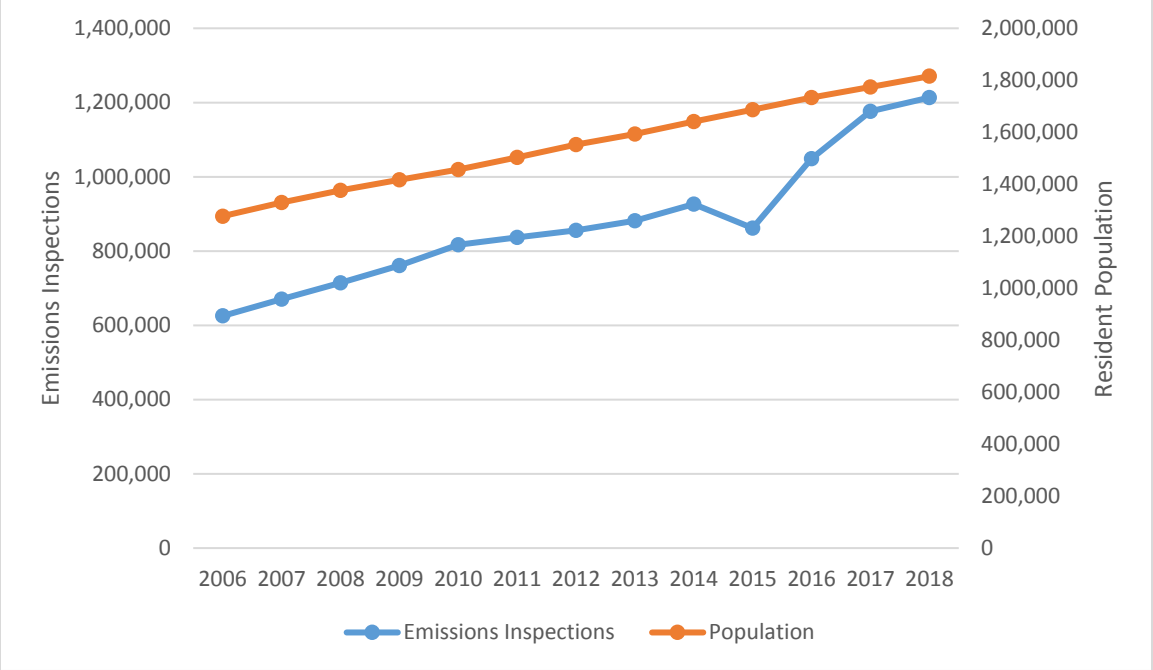
Table 3-1. I-M Program Statistics for 2018[16]

Metric	Travis County	Williamson County	Combined
Total Emission Tests	824,019	389,324	1,213,343
Initial Emission Tests	765,552	360,579	1,126,131
Initial Emission Test Failures	38,502	16,827	55,329
Initial Emission Test Failure Rate	5.03%	4.67%	4.91%
Initial Emission Retests	52,364	25,907	78,271
Initial Emission Retest Failures	4,887	2,214	7,101
Initial Emission Retest Failure Rate	9.33%	8.55%	9.07%
Other Emission Retests	6,103	2,838	8,941
Other Emission Retest Failures	1,586	735	2,321
Other Emission Retest Failure Rate	25.99%	25.90%	25.96%

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." In 2018, there were approximately 0.67 emissions inspections per capita in Travis and Williamson Counties, compared to 0.49 emissions per capita in 2006, meaning that growth in emissions inspections is outpacing population growth in these counties.

[16] Data e-mailed from David Serrins, TCEQ, to Andrew Hoekzema, CAPCOG, 7/30/2019.

Figure 3-1. Trend in Emissions Inspections Compared to Population in Travis and Williamson Counties 2006-2018



2018 saw a slight decline in the initial failure rate from the previous year, decreasing to 4.9%.

Figure 3-2. Initial Emissions Inspection Failure Rate Trend 2006-2018

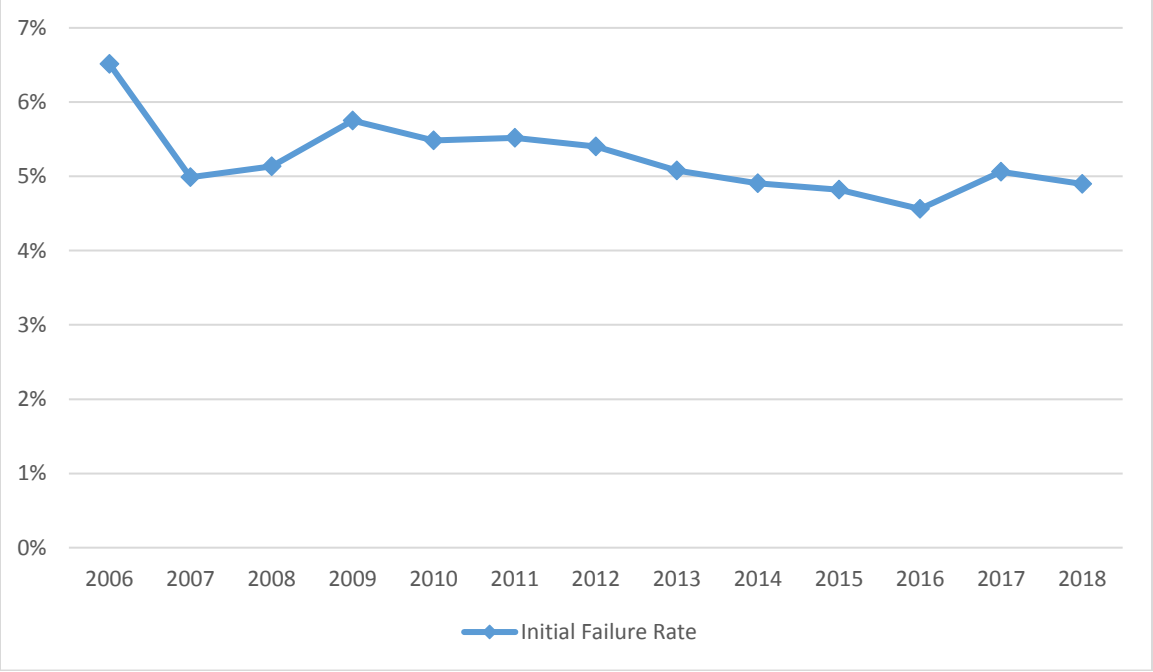
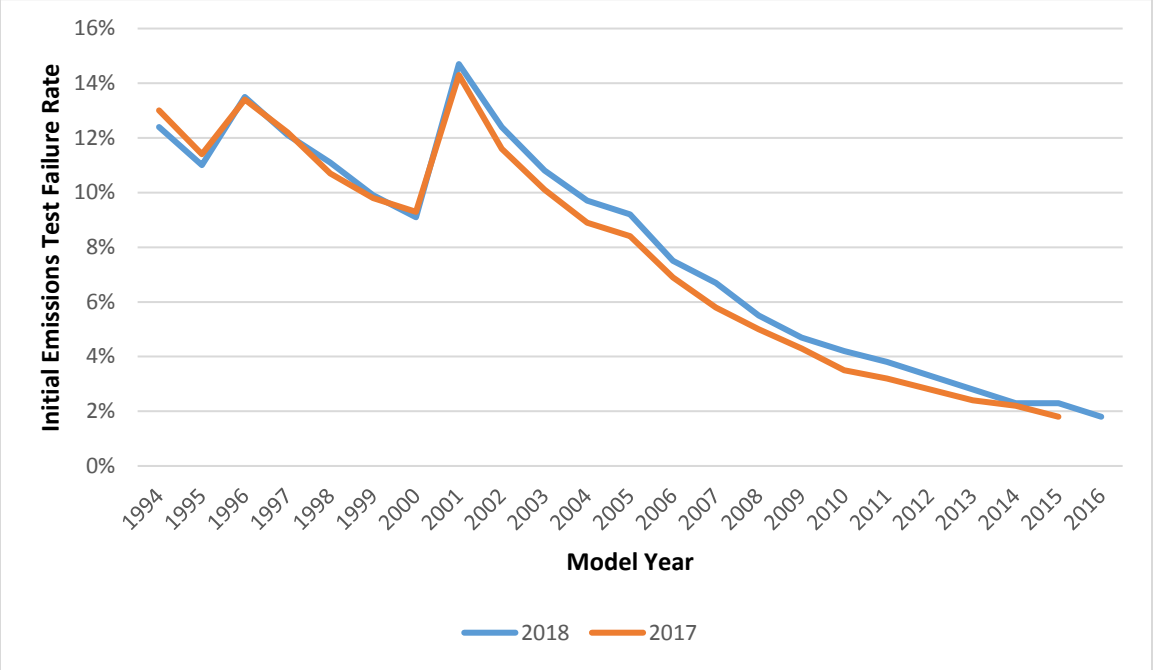


Figure 3-3 shows the emissions test failure rates of each model year based on tests conducted in 2017 and 2018. As the figure below shows, the chances of older model-year vehicles failing an emissions test

are significantly higher than a newer model-year vehicle failing a test. In 2018 for example, 2016 model year vehicles had a rate of only about 1.8%, whereas the rate for model year 2001 vehicles was 13.8%, eight times higher. As the figure shows, the failure rates for each model year were very similar in 2017 and 2018.

Figure 3-3. Emissions Test Failure Rate by Model Year, 2017 and 2018



As described above, under certain circumstances, a vehicle subject to annual testing requirements is allowed to continue operating under an I/M program waiver. Table 3-2 summarizes the waivers issued in 2017 and 2018.

Table 3-2. 2017 and 2018 I-M Program Waivers

Waiver Type	2017	2018
Total Tests	1,093,702	1,126,143
Failing Vehicles	55,428	55,341
Total Waivers	113	106
Total Waiver Rate	0.20%	0.19%
Individual Waivers	55	44
Low Mileage Waivers	17	27
Low Income Time Extensions	41	34
Parts Availability Time Extensions	0	0
Other (Special Test)	0	1

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, continued administering 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 helped support the I/M program in Travis and Williamson Counties by providing funding to moderate-income and low-income motorists for:

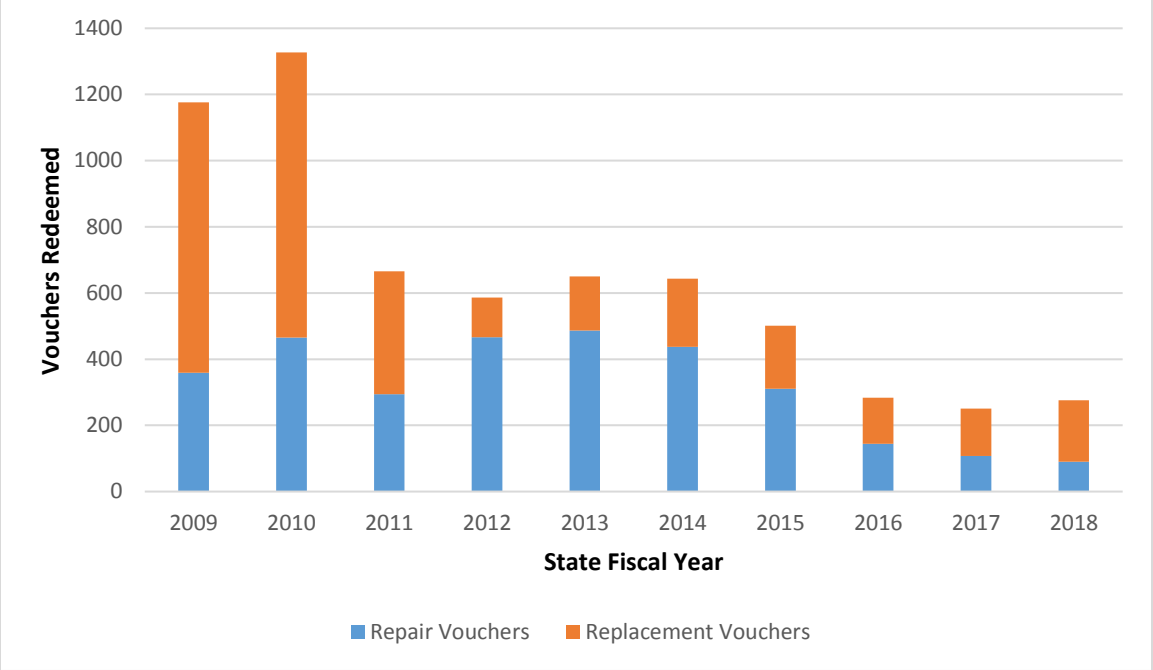
- Repairing emissions control systems on vehicles that fail an emissions test;
- Replacing a vehicle that fails an emissions test; and
- Replacing a vehicle that is at least 10 years old.

Motorists could 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 were required to meet Tier 2 bin 5 or Tier 3 bin 160 or cleaner standard. Replacement vehicles could not have an odometer reading of more than 70,000 miles. Replacement vehicles could only be purchased through a participating dealer and repairs must be performed by a recognized emissions repair facilities for Travis and Williamson Counties. DACM achieved emission reductions beyond those that would be achieved by implementing an I/M program in the following ways:

- It increased I/M program compliance by making it more likely that a motorist brought in their vehicle for a vehicle inspection based on the knowledge that financial assistance was available if they failed the test;
- It increased I/M program compliance by reducing the need for low-income time extensions for repairs;
- It increased I/M program compliance by replacing older vehicles that were more likely to fail an emissions test with newer vehicles that were more likely to pass; and
- It accelerated the benefits of newer vehicle emissions standards by replacing older vehicles with newer vehicles.

As Figure 3-4 shows, the number of vouchers redeemed slightly increased from FY 2017 to FY 2018, although participation was still much lower than it had been in 2009 and 2010, prior to large program budget cuts. These data suggest that the reduced participation in the program as a result of those cuts may have had long-lasting impacts even after funding was reinstated in 2013 and 2015.

Figure 3-4. DACM Repair and Replacement Voucher Trends 2009-2018



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 retrofit and replacement of older school buses;
- The Light Duty Motor Vehicle Purchase or Lease Incentive Program (LDPLIP) provides rebate incentives statewide to purchase or lease an eligible new light-duty motor vehicle powered by natural gas, propane, hydrogen fuel cell, or electric drive;

- The New Technology Implementation Grants (NTIG) program provides funding for new/innovative technology to reduce emissions from stationary sources; and
- The Alternative Fueling Facilities Program (AFFP) provides funding for the construction of a variety of types of alternative fuel infrastructure in nonattainment areas;
- The Seaport and Rail Yard Areas Emission Reduction (SPRY) Program provides funding for the early replacement of drayage trucks and equipment at eligible in ports and class I railyards in nonattainment areas (this program was formerly known as the Drayage Truck Incentive Program or DTIP). The Austin area is not eligible for this program.

Notable program changes mandated by the statutory changes adopted by the 2017 Texas legislative session included:

- Consolidation of the Clean Transportation Triangle (CTT) and AFFP programs;
- Allowing school bus replacements to be funded under the CSB;
- Reinstatement of the LDPLIP, and;
- New allocations of funding among the various programs.

TCEQ posted a series of reports on their program website in October 2018 that summarizes the estimated OSD weekday NO_X emission reductions being achieved by each program for 2018 – 2021 based on grants awarded through August 31, 2018. Table 3-3 summarizes these data for the Austin area.[17]

Table 3-3. Quantified OSD Weekday NO_X Emissions from TERP Grants by Program from Grants Awarded through August 31, 2018 (tpd)

Program	2018	2019	2020	2021
DERI[18]	2.57	2.25	1.99	2.00
TCFP[19]	0.04	0.04	0.01	0.01
TNGVGP[20]	0.07	0.07	0.02	0.02
TCSB[21]	0.00	0.00	0.00	<0.01
TOTAL	**2.68**	**2.36**	**2.02**	**2.04**

[17] It is CAPCOG's understanding that TCEQ develops OSD weekday NO_X emission reduction estimates by dividing the annual NO_X reductions by 260, which corresponds roughly to the number of weekdays in a year.
[18] TCEQ. "Diesel Emission Reduction Incentive (DERI) Program Projects by Area 2001 through August 31, 2018." Prepared by Implementation Grants Section, 10/17/2018. Available online at: https://www.tceq.texas.gov/assets/public/implementation/air/project_summaries/DERI_Area.pdf. Accessed 7/29/2019.
[19] TCEQ. "Texas Clean Fleet Program Projects by Area 2010 through August 31, 2018." Prepared by Implementation Grants Section, 10/17/2018. Available online at: https://www.tceq.texas.gov/assets/public/implementation/air/project_summaries/TCFP_Areas.pdf. Accessed 7/29/2019.
[20] TCEQ. "Texas Natural Gas Vehicle Grant Program (TNGVGP) Projects by Area 2010 through August 31, 2018." Prepared by Implementation Grants Section, 10/17/2018. Available online at: https://www.tceq.texas.gov/assets/public/implementation/air/project_summaries/TNGVGP_Areas.pdf. Accessed 7/29/2019.
[21] TCEQ. "Texas Clean School Bus (TCSB) Program Replacement Projects by Area 2017 through August 31, 2018." Prepared by Implementation Grants Section, 10/17/2018. Available online at: https://www.tceq.texas.gov/assets/public/implementation/air/project_summaries/TCSB_Replacement_Projects_Areas.pdf. Accessed 7/29/2019.

TCEQ does not provide NO_X estimates for funding awarded for the NTIG, AFFP, or LDPLIP grant programs.

Table 3-4 shows the TERP funding awarded to the Austin-Round Rock-Georgetown MSA in FY 2018, along with any quantified NO_X emissions reductions from those grants. The LDPLIP program is not included due to the lack of a project list available online that would enable identification of the amount awarded in grants in FY 2018 as opposed to prior years. A total of $771,665 was awarded statewide in FY 2018.[22]

Table 3-4. TERP Grants Awarded in the Austin Area in FY 2018

Grant Program	Total Funding Awarded	Funding Awarded to the Austin Area	% of Funding Going to MSA	Austin Area NO_X Emissions Reductions (tons)	Cost Per Ton of NO_X Emissions Reductions in Austin Area
AFFP[23]	$6,015,614	$1,208,694	20.09%	Unquantified	Unquantified
SPRY[24]	$0	$0	n/a	n/a	n/a
CSB[25]	$2,976,000	478500	16.08%	3.8	$125,921
NTIG[26]	1,000,000	$0	0.00%	0.00	n/a
TCFP[27]	$0	$0	n/a	0	n/a
TNGVGP[28]	$1,039,378	$836,962	80.53%	11.81	$70.869

[22] Based on the differences in the total amounts awarded identified in 2016 and 2018 TERP reports to the legislature.

[23] TCEQ. "Texas Alternative Fueling Facilities Program (AFFP) Project List 2012 through August 31, 2018." Prepared by Implementation Grants Section, 10/17/2018. https://www.tceq.texas.gov/assets/public/implementation/air/project_summaries/AFFP_Projects.pdf, accessed 7/29/2019.

[24] TCEQ. "Seaport and Rail Yard Areas Emission Reduction (SPRY) Program Project List 2015 through August 31, 2018." Prepared by Implementation Grants Section, 10/17/2018. https://www.tceq.texas.gov/assets/public/implementation/air/project_summaries/SPRYP_Projects.pdf, accessed 7/29/2019.

[25] TCEQ. "Texas Clean School Bus (TCSB) Program Replacement Project List 2017 through August 31, 2018." Prepared by Implementation Grants Section, 10/17/2018. https://www.tceq.texas.gov/assets/public/implementation/air/project_summaries/TCSB_Replacement_Projects.pdf, accessed 7/29/2019.

[26] TCEQ. "New Technology Implementation Grants (NTIG) Project List 2010 through August 31, 2018." Prepared by Implementation Grants Section, 10/17/2018. https://www.tceq.texas.gov/assets/public/implementation/air/project_summaries/NTIG_Projects.pdf, accessed 7/29/2019.

[27] TCEQ. "Texas Clean Fleet Program (TCFP) Project List 2010 through August 31, 2018." Prepared by Implementation Grants Section, 10/17/2018. https://www.tceq.texas.gov/assets/public/implementation/air/project_summaries/TCFP_Projects.pdf, accessed 7/29/2019.

[28] TCEQ. "Texas Natural Gas Vehicle Grant Program (TNGVGP) Project List 2010 through August 31, 2018." Prepared by Implementation Grants Section, 10/17/2018. https://www.tceq.texas.gov/assets/public/implementation/air/project_summaries/TNGVGP_Projects.pdf, accessed 7/29/2019.

Grant Program	Total Funding Awarded	Funding Awarded to the Austin Area	% of Funding Going to MSA	Austin Area NO_X Emissions Reductions (tons)	Cost Per Ton of NO_X Emissions Reductions in Austin Area
DERI-Rebate[29]	$23,551,910	$1,693,225	7.19%	96.73	$17,505
DERI-ERIG[30]	$0	$0	n/a	0	n/a
TOTAL	**$34,582,902**	**$4,217,381**	**12.19%**	**112.34**	**$37,541**

The NO_X reductions from grants awarded in the Austin in 2018 area translate to 0.05 tpd of additional NO_X reductions for at least 2019-2022.

The $4,217,381 in funding awarded to the Austin area was significantly less than the $7,704,529 that TCEQ awarded to the Austin area the prior year. However, the FY 2018 totals do not include ERIG grants solicited at the end of FY 2018, which were not awarded until mid-FY 2019.

3.1.4 Texas Volkswagen Environmental Mitigation Program (TxVEMP)

While the TCEQ initially proposed not to award any funding from the Volkswagen settlement earmarked for vehicle and equipment replacement to the Austin area, the final version of their Beneficiary Mitigation Plan wound up identifying the Austin metro area as a "priority" area and allocated $16,297,602 of the $169,548,522 total available funds to the Austin-Round Rock-Georgetown MSA. The funds are for the replacement or repower of diesel vehicles and equipment to new diesel, alternative fuel (compressed natural gas, propane, or hybrid electric), or all-electric vehicles and equipment. TCEQ opened their first grant round for the Texas Volkswagen Environmental Mitigation Program in spring of 2019. The Beneficiary Mitigation Plan for Texas and information about the grants can be found at www.TexasVWFund.org.

3.1.5 Commute Solutions Program

The Commute Solutions program is the region-wide Travel Demand Management (TDM) program that promotes activities to increase the efficiency and use of existing roadways by encouraging shifts from less efficient travel behaviors like, single occupant vehicle use, vehicle use during peak congestion hours, and travel on high-congestion roadways, to more efficient behaviors like, the use of public transit, carpools, vanpools, walking, biking, teleworking, alterative work schedules, and travel on less congested roadways. Due to the importance of these types of activities as part of the region's air quality plan, CAPCOG leveraged the local air quality funding in order to support this activity. Apart from air quality, other benefits of the program and other TDM activities include:

- Improved regional mobility;

[29] TCEQ. "Diesel Emission Reduction Incentive (DERI) Program Project List 2001 through August 31, 2018." Prepared by Implementation Grants Section, 10/17/2018. https://www.tceq.texas.gov/assets/public/implementation/air/project_summaries/DERI_Projects.pdf, accessed 7/29/2019.

[30] TCEQ. "Diesel Emission Reduction Incentive (DERI) Program Project List 2001 through August 31, 2018." Prepared by Implementation Grants Section, 10/17/2018. https://www.tceq.texas.gov/assets/public/implementation/air/project_summaries/DERI_Projects.pdf, accessed 7/29/2019.

- Improved safety outcomes;
- Reduced fuel consumption;
- Reduced time wasted in traffic;
- Improved workforce and economic development outcomes;
- Improved public quality of life; and
- Reduced space needed to service the transportation system

In October 2018, Commute Solutions introduced a regional emergency ride home program to provide commuters who use a mode of commuting other than single-occupancy vehicles a free or reduced-cost ride home from work when an unexpected event occurs that necessitate the commuter to use another mode to get home. In addition, the program's logo and branding were updated to provide a fresh and updated look.

The Commute Solutions website provides the public with information about central Texas mobility options and encourages the public to shift from single occupant vehicle use to a more efficient mode. In 2018, CAPCOG maintained and updated the Commute Solutions website; the following summarizes key statistics during this period.

Figure 3-5. Commute Solutions Website Traffic, 2018

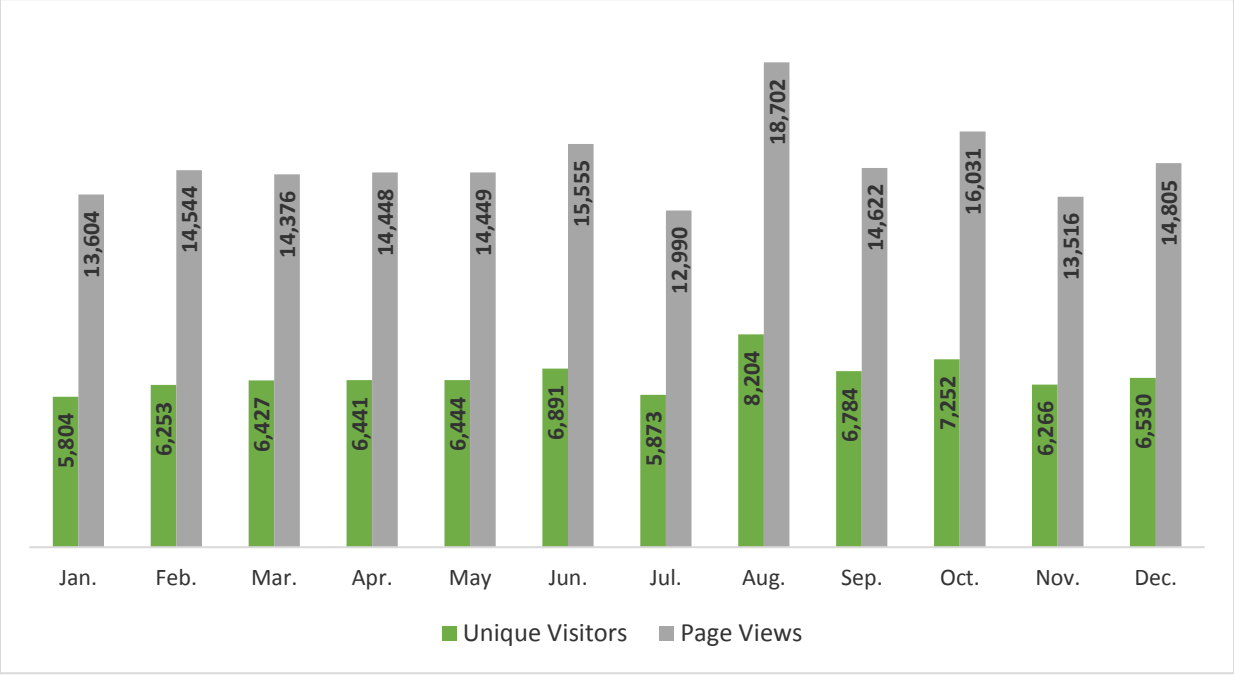
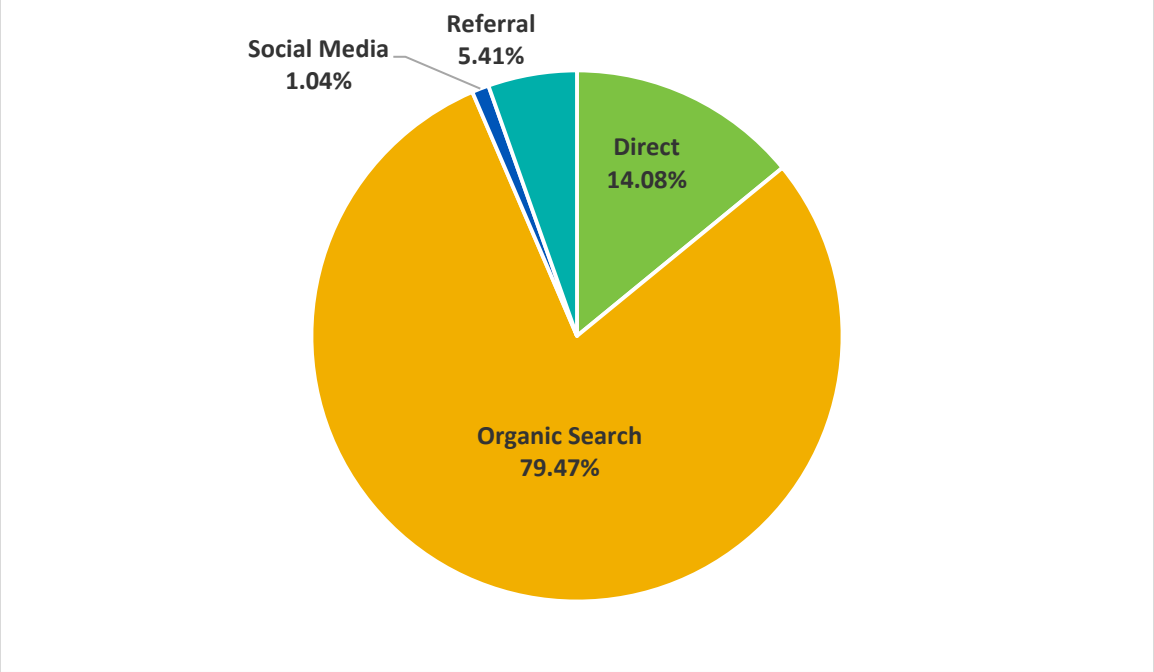


Figure 3-6. Commute Solutions Website Acquisition Method, 2018



The top 10 Commute Solutions webpages viewed in 2018 are listed below.

Table 3-5. Top 10 Commute Solutions Website Pages by Pageviews, 2018

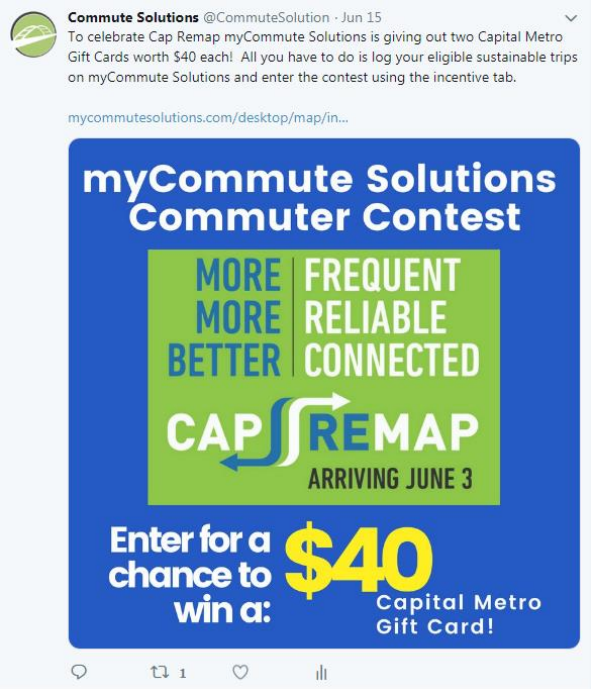
#	Page Name	Page Views
1	Commute Cost Calculator	147,552
2	Alternative Work Schedules	7,354
3	Home Page	5024
4	Carpool	3624
5	Commuter Resources	1,447
6	Bus and Trains	1,364
7	Vanpool	1,040
8	Park and Rides	1,020
9	Transit for users with Disabilities	817
10	Parking Management	940

CAPCOG maintains a Commute Solutions Facebook account with 788 followers and a Twitter account with 330 followers. The table below shows data from the Commute Solutions Twitter account, the high number of impressions and engagement in November 2018 is from paid advertising that occurred during this period. A sample social media post is shown in Figure 3-7.

Table 3-6. Commute Solutions Twitter Metrics, 2018

Month	Number of Post	Impressions[31]	Engagements[32]
January	7	2,336	76
February	4	978	12
March	12	3,013	499
April	12	4,740	59
May	7	2,387	18
June	6	2,580	29
July	9	3,472	56
August	6	2635	30
September	5	1,800	23
October	7	2,421	32
November	8	3,998	74
December	9	1,522	39
Total	**92**	**31,882**	**947**

Figure 3-7. Commute Solution Twitter Post Example



The Commute Solutions newsletter provides the public with relevant TDM news, events, tips, and info on myCommute Solutions promotions.

[31] The number of times the users saw the tweet on Twitter

[32] Total number of times that a user interacts with a tweet. This includes all clicks anywhere on the tweet (including hashtags, links, avatar, username, and Tweet expansion), retweets, replies, follows, and likes.

Table 3-7. Commute Solutions Newsletters Campaign Summary, 2018

Campaign Name	Send Date	Total Recipients	Opens	Clicks	Bounces	Unsubscriptions
Mar/April 2018 Commute Solutions Newsletter	28-Mar-18	2,723	636	113	260	32
May Commute Solutions Newsletter	15-May-18	2,667	448	70	247	31
June Commute Solutions Newsletter	25-Jun-18	2,623	502	67	191	24
July Commute Solutions Newsletter	19-Jul-18	2,565	491	80	167	25
August Commute Solution Newsletter	22-Aug-18	2,417	621	116	59	21
October Commute Solutions Newsletter	1-Oct-18	2,376	448	55	50	16
Win a Starbucks Gift Card from Commute Solutions	24-Oct-18	2,343	438	113	37	4
Total	**n/a**	**17,714**	**3,584**	**614**	**1,011**	**153**

Figure 3-8. Example Commute Solutions Newsletter Article from the March/April 2018 Newsletter

Commute Inspiration - Featured Commuter: Carrie D.

Learn how Carrie commutes smarter, helping our region reduce traffic congestion and vehicle emissions!

Carrie carpooling with her husband Andy

With no public transportation options between downtown and our home in western Travis County, my husband and I aim to carpool four days a week in an electric vehicle (Nissan Leaf), dropping off and picking up our kid at daycare together. Although my time in the car is slightly longer compared to driving myself, it gives us over an hour to discuss our week's plans and priorities, so we never feel like time is wasted if we hit a traffic jam. If we run out of topics of conversation, I am lucky to be the only family member who doesn't get carsick when reading, so as a passenger I can always use my phone to: get a head start on the work day by checking emails; download a book or magazine from the library for myself; or find interesting news items, and read them out loud for discussion. One of our challenges is also a benefit: we have to be much more organized in the mornings to ensure none of us are late, a goal we are mostly successful at despite none of us being morning-people. I'm so glad we've pushed ourselves to do this more often, thanks in large part to the City of Austin's rewards for more frequent alternative commutes. - Carrie D.

CAPCOG staff coordinated and collaborated from regional partners via the Regional TDM Coordinating Committee, formerly known as the Commute Solutions Steering Committee. This committee met twelve in 2018. In addition, CAPCOG staff has partnered with the City of Austin to provide an Emergency Ride Home Program, updated the program's branding and marketing materials, and host a Commute

Solutions event; this work is expected to be completed in FY 2019. The table below shows the program participation from the myCommuteSolutions.com platform over the entire 2018 calendar year.

Table 3-8. myCommuteSolutions Data, 2018

Mode/Type	Entries	Distance Miles	Fuel Saved (gal)
Drove Alone[33]	1,632	15,574	n/a
Carpool Driver	1,164	22,706	586
Carpool Passenger	698	7,372	175
Vanpool Driver	26	1,562	54
Vanpool Passenger	362	6,400	221
Bus	3,944	46,148	2,158
Rail	298	4,955	232
Bicycle	1,746	7,945	372
Walk	889	630	29
Telework	850	n/a	612
Compressed Schedule	253	n/a	96
Days Off[34]	294	n/a	n/a
TOTAL	**17,351**	**176,361**	**6,096**

3.1.6 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: corporation

- 3M;
- American Lung Association;
- Applied Materials;
- Austin Community College District;
- Austin Independent School District (AISD);
- Chemical Logic, Inc.;
- Emerson Process Management;
- EnviroMedia Social Marketing;
- Environmental Defense Fund;
- HNTB Corporation;
- Metropia;
- NXP;
- Oracle;

[33] RideShark does have data on estimated fuel savings 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.
[34] RideShark's platform allows for entries for "days off," but no fuel savings are included in the subtotal on this table.

- Pfizer;
- R&R Limousine and Bus;
- Samsung Austin Semiconductor;
- Seton Healthcare Family;
- Spectrum;
- St. David's Healthcare;
- TECO-Westinghouse;
- Tokyo Electron;
- University of Texas at Austin; and
- 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. CAMPO;
5. Lone Star Clean Fuels Alliance (LSCFA);
6. Lower Colorado River Authority (LCRA);
7. Travis County;
8. TxDOT Headquarters;
9. TxDOT Austin District; and
10. Williamson County

3.1.7 Outreach and Education Measures

Continued outreach and education is essential to achieving CAC goals. 2018 outreach and education activities are organized into six tasks:

1. Electronic Outreach;
2. In-person Outreach;
3. Development of Air Quality Educational Materials;
4. Air Quality Outreach and Education Coordination and Collaboration;
5. Air Quality Outreach Activities Milestones; and
6. Commute Solutions Outreach Program.

One of the primary ways CAPCOG staff accomplished outreach goals during this period was through electronic outreach. Electronic outreach allows the program to provide air quality information to a large audience with limited resources. Electronic outreach completed during this period was carried out through the Air Central Texas (ACT) website, social media accounts, and ACT newsletters.

The ACT website (www.aircentraltexas.org) provides the public with information about central Texas air quality, supports existing air quality programs, and promotes activities to protect local air quality, all to motivate everyone to make decisions that are "Air Aware." In 2018, CAPCOG continued to maintain and update the ACT website. Figure 3-9 shows the number of new unique visitors and page views for each month. The increase in website visits during the summer is likely a combination of an increased number of OADs and paid advertising from the City of Austin directing to the ACT website during the summer.

Figure 3-9. Air Central Texas Website Traffic, 2018

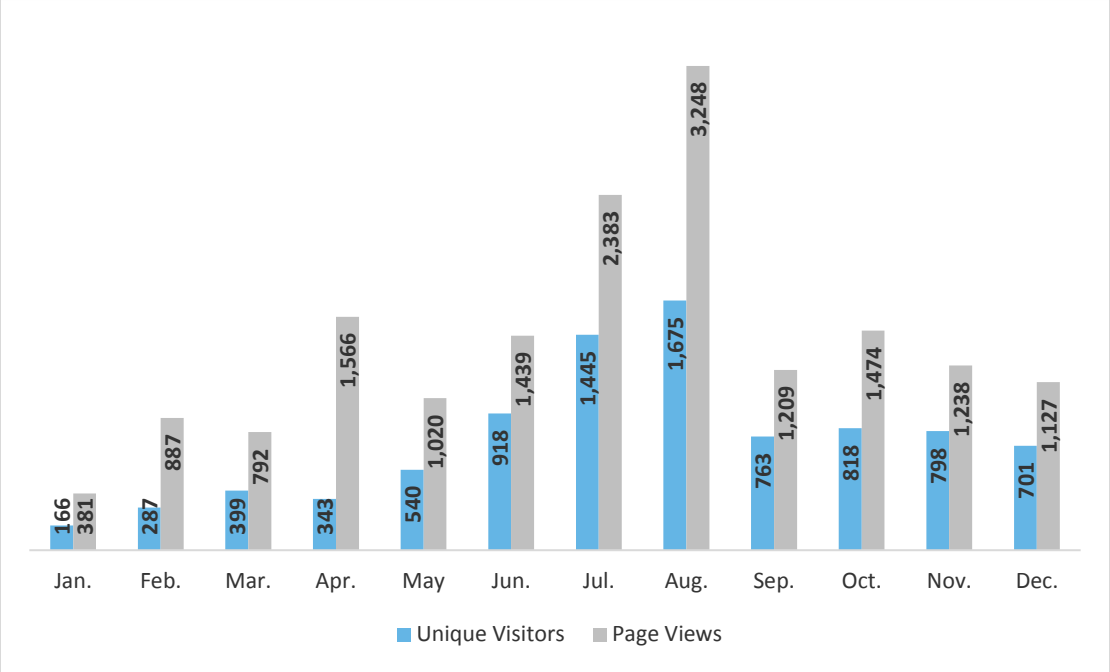
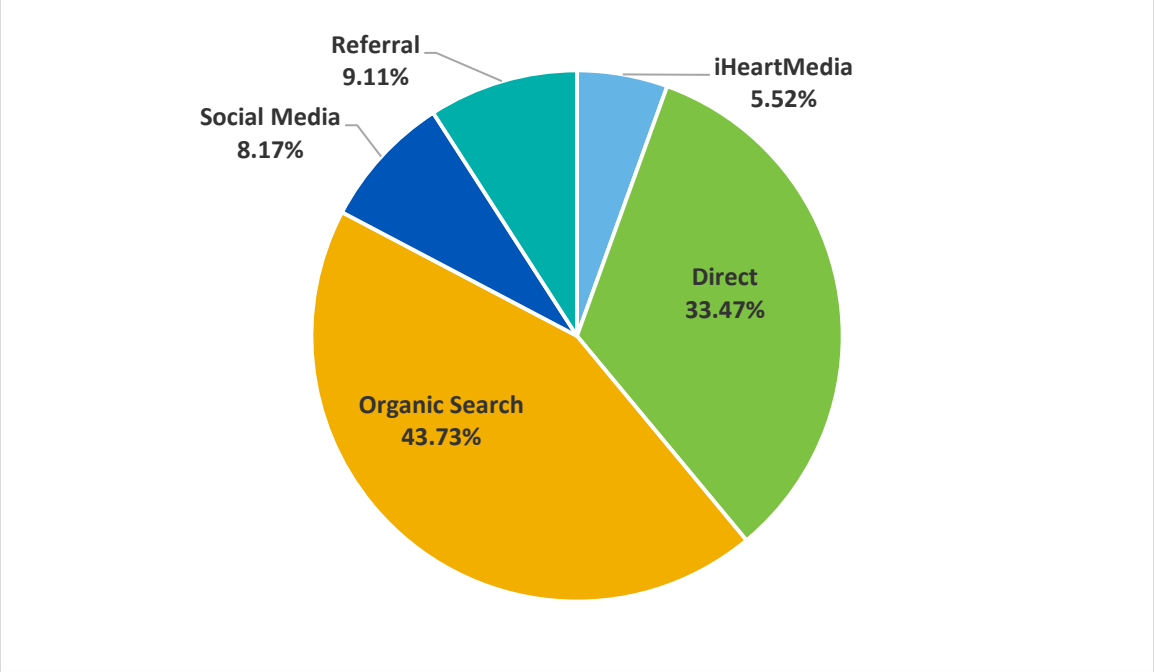


Figure 3-10 shows where website visitors came from. Around two-thirds of all visitors either found the website from an organic search of terms in a search engine (Google, Bing) or used a direct web search in which the users typed in an ACT URL or were directed from an email or newsletter. Visitors also found the site through iHeartMedia paid advertising, social media links, and referrals from other websites – mainly the City of Austin and CAPCOG websites.

Figure 3-10. Air Central Texas Website Acquisition Method, 2018



The top 10 ACT Webpages viewed between in 2018, are listed below. The homepage is where digital ads clicks are being sent, so it is not surprising that it received the most page views. Other pages that received the highest number of views were also referenced in the City of Austin digital ads and newsletter links. It is notable that two of the top ten pages, #4 and #7, are in Spanish.

Table 3-9. Top 10 Air Central Texas Website Pages by Pageviews, 2018

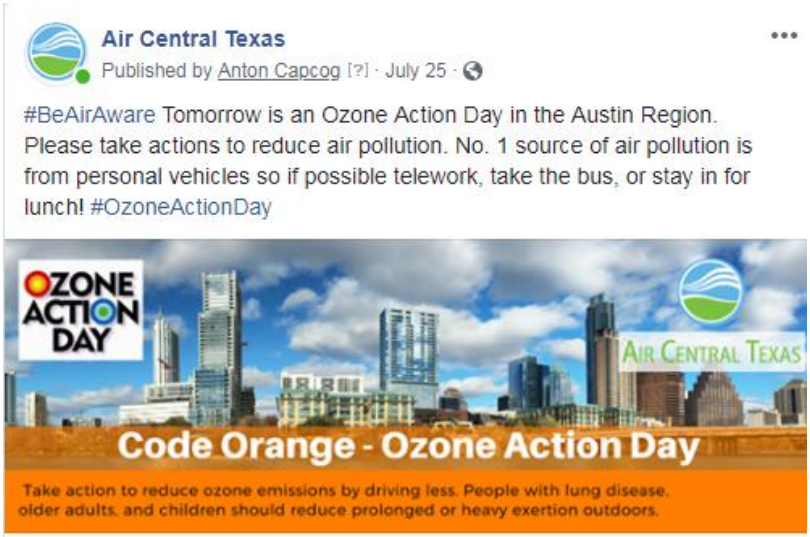
#	Page Name	Page Views
1	Home Page	5,630
2	What is Ground-Level Ozone?	1,922
3	Conserve	627
4	¿Qué Es El Ozono Troposférico?	576
5	Central Texas Air Quality	515
6	Air Central Texas Toolkit	290
7	Quien Está En Riesgo	269
8	Air Central Texas Awards	171
9	About Air Central Texas	166
10	Regional Air Quality	152

CAPCOG maintains an ACT Facebook account with 336 followers and a Twitter account with 66 followers. Table 3-10 shows data from the ACT Facebook Account, the high number of people reached, and gained impressions is from paid advertising that occurred during this period. Figure 3-11 shows an example of a social media post.

Table 3-10. ACT Facebook Metrics, 2018

Month	Number of Posts	Page Views	Reach[35]	Impressions[36]
January	6	44	111	215
February	4	30	63	110
March	10	48	339	571
April	10	27	105	205
May	18	49	387	717
June	12	38	196	341
July	14	42	197	558
August	15	30	416	1,384
September	9	21	123	197
October	7	30	412	551
November	4	13	79	100
December	2	20	119	152
Total	**111**	**392**	**2,547**	**5,101**

Figure 3-11. Air Central Texas Facebook Post Example



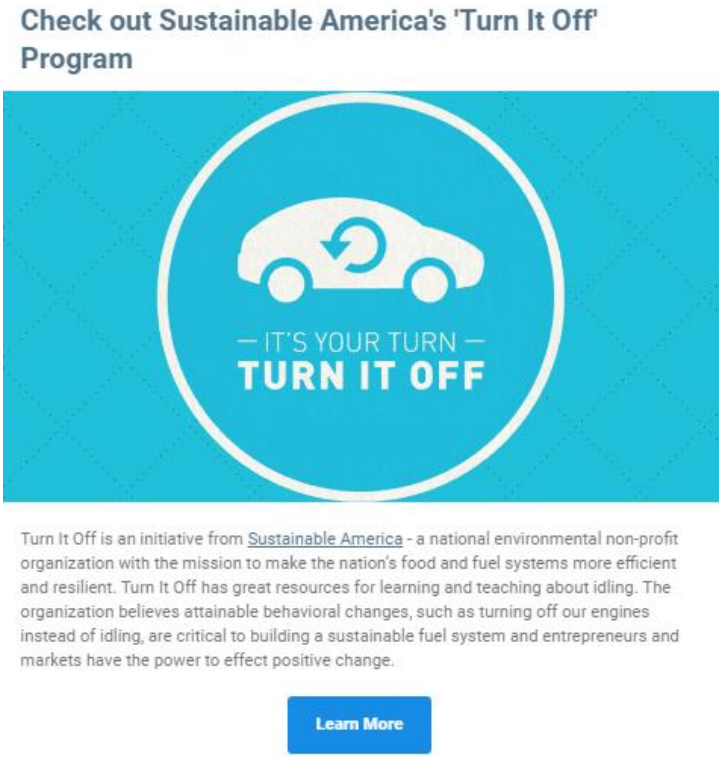
The ACT newsletter is CAPCOG's public facing air quality newsletter and provides the public with relevant air quality news, events, tips, and AQI data. Table 3-11 shows the data associated with each newsletter.

[35] The number of people who had any content from ACT or About ACT enter their screen. This includes posts, check-ins, ads, social information from people who interact with your Page and more. (Unique Users)
[36] The number of times any content from ACT or About ACT entered a person's screen. This includes posts, check-ins, ads, social information from people who interact with your Page and more. (Total Count)

Table 3-11. Air Central Texas Newsletters Campaign Summary, 2018

Campaign Name	Send Date	Total Recipients	Opens	Clicks	Bounces	Unsubscriptions
January Air Central Texas Newsletter	25-Jan-18	98	30	3	3	-
March/April Air Central Texas Newsletter	28-Mar-18	96	23	3	5	-
May Air Central Texas Newsletter	10-May-18	96	23	7	2	-
June Air Central Texas Newsletter	25-Jun-18	94	31	7	-	-
July Air Central Texas Newsletter	19-Jul-18	94	30	9	-	-
August Air Central Texas Newsletter	22-Aug-18	94	30	11	1	1
September Air Central Texas Newsletter	24-Sep-18	94	27	8	1	-
October Air Central Texas Newsletter	18-Oct-18	94	25	8	1	-
2018 Air Central Texas Awards Recipients	14-Dec-18	1,021	213	8	25	2
Total	**n/a**	**1,781**	**432**	**64**	**38**	**3**

Figure 3-12. Sample Newsletter Article from the August 2018 ACT Newsletter



In addition to electronic outreach, CAPCOG staff continued to engage the public in-person at community events and hosted one event, the 2018 Air Central Texas Awards. As Table 3-12 shows, CAPCOG reached a total of 1,292 individuals at events in three of the five CAC counties in 2018. CAPCOG staff did not attend events in Caldwell and Hays counties as the events that we previously attended were either cancelled or downscaled to remove tabling vendors. A greater effort will be required to find new suitable events to attend in the future.

Table 3-12. In-person Outreach Performance Metrics, 2018

Event Name	Date	City	County	Event Hr.	Individuals Reached	Ratio[37]
Smithville Green Expo	10-Feb-18	Smithville	Bastrop	4	49	12.25
Dell's Earth Day Celebration	18-Apr-18	Round Rock	Williamson	4	177	44.25
Merck Earth Day	19-Apr-18	Austin	Travis	2	15	7.50
Earth Day ATX	29-Apr-18	Austin	Travis	7	287	41.00
Bike to Work Day	18-May-18	Austin	Travis	3.5	104	29.71
Austin Safety Expo	26-Jun-18	Austin	Travis	7	331	47.29
AMD Wellness Expo	25-Sep-18	Austin	Travis	5	197	39.40
National Night Out	29-Sep-18	Austin	Travis	3	181	60.33
Total	**n/a**	**n/a**	**n/a**	**31.5**	**1,292**	**40.02**

[37] Number of individuals reached per hour

The 2018 ACT Awards were awarded at CAPCOG's General Assembly Meeting on December 12, 2018.

Figure 3-13. 2018 ACT Awards Graphic

In total, CAPCOG received 5 nominations listed below with the final 2018 recipients noted.

Table 3-13. Air Central Texas Nominees and Recipients

Outstanding Organization Award	**Bill Gill Leadership Award**
Leander and Eanes ISD - Recipient	Phar Andrews - Recipient
City of Round Rock	Scheleen Walker
---	Scott Johnson

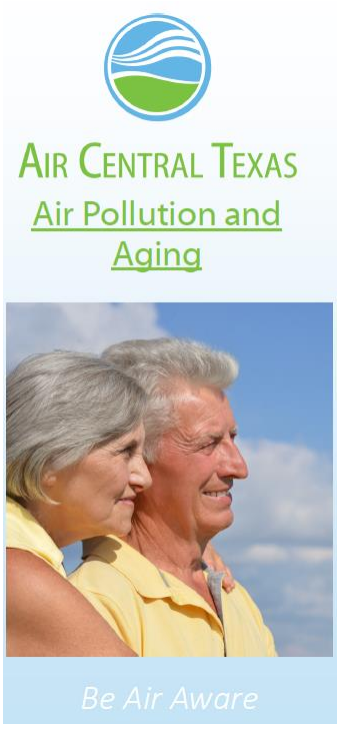
CAPCOG staff updated and developed air quality outreach materials for CAPCOG and the CAC to use to promote regional air quality. The materials updated or developed in 2018 include:

- Updated existing materials to newest available information and data
    - Children and Air Quality
    - Aging and Air Quality
    - EPA AQI for O_3 Guide
- New Educational Materials Developed
    - Air Central Texas Guide to the AQI
    - Air Central Texas Meteorologist Toolkit
    - NO_X Emissions by Source infographic
    - Properly Inflated Tires graphic
    - 2-minutes Idling graphic

Examples of ACT materials are below.

Figure 3-14. Properly Inflated Tires ACT Graphic

Figure 3-15. Air Pollution and Aging ACT Graphic



3.1.8 PACE Program

The 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.[38] 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; and
- Rainwater collection systems.

In 2018, Bastrop, Hays, Travis, and Williamson Counties participated in PACE. Travis County and Williamson County adopted PACE in 2016. Hays County adopted it in 2017. Lastly, Bastrop County adopted PACE on September 24, 2018.

As of July 17, 2019, eight of the seventeen completed PACE projects in the state were in Bastrop, Hays, Travis, and Williamson Counties. Table 3-14 summarizes key data from the projects for each county.

Table 3-14. PACE Project Summary for Austin-Round Rock-Georgetown MSA as of July 17, 2019

Data Point	Bastrop County	Hays County	Travis County	Williamson County	TOTAL – Austin-Round Rock-Georgetown MSA
Projects	1	1	4	2	**8**
Investments	$120,000.00	$1,800,000	$2,245,935.00	$1,767,982	**$5,933,917.00**
Jobs Created	2	10	22	14	**48**
CO_2 Reduced (tons/yr.)	49	429	861	1,018	**2,357**

[38] http://www.statutes.legis.state.tx.us/Docs/LG/htm/LG.399.htm

Data Point	Bastrop County	Hays County	Travis County	Williamson County	TOTAL – Austin-Round Rock-Georgetown MSA
SO_X Reduced (tons/yr.)	0.08	0.23	0.52	0.54	**1.37**
NO_X Reduced (tons/yr.)	0.03	0.72	1.25	0.96	**2.96**
Water Saved (gallons/yr.)	n/a	3,139,000	658,000	1,780,000	**5,577,000**
Energy Saved (kWh/yr.)	94,081	824,903	1,625,845	1,956,657	**4,501,486**

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

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 provided a report to CAPCOG included:

1 Austin White Lime Company;
2 Bastrop County;
3 Caldwell County;
4 Capital Metropolitan Transportation Authority (CapMetro);
5 City of Austin;
6 City of Cedar Park;
7 City of Hutto;
8 City of Kyle;
9 City of Lakeway;
10 City of Lockhart;
11 City of Round Rock;
12 City of San Marcos;
13 City of Taylor;
14 Central Texas Regional Mobility Authority (CTRMA);
15 Lower Colorado River Authority (LCRA);

16 TCEQ;
17 Travis County;
18 Texas Department of Transportation (TxDOT);
19 Texas Parks and Wildlife Department (TPWD);
20 Williamson County.

Organizations that did not report as of the date of this report included:

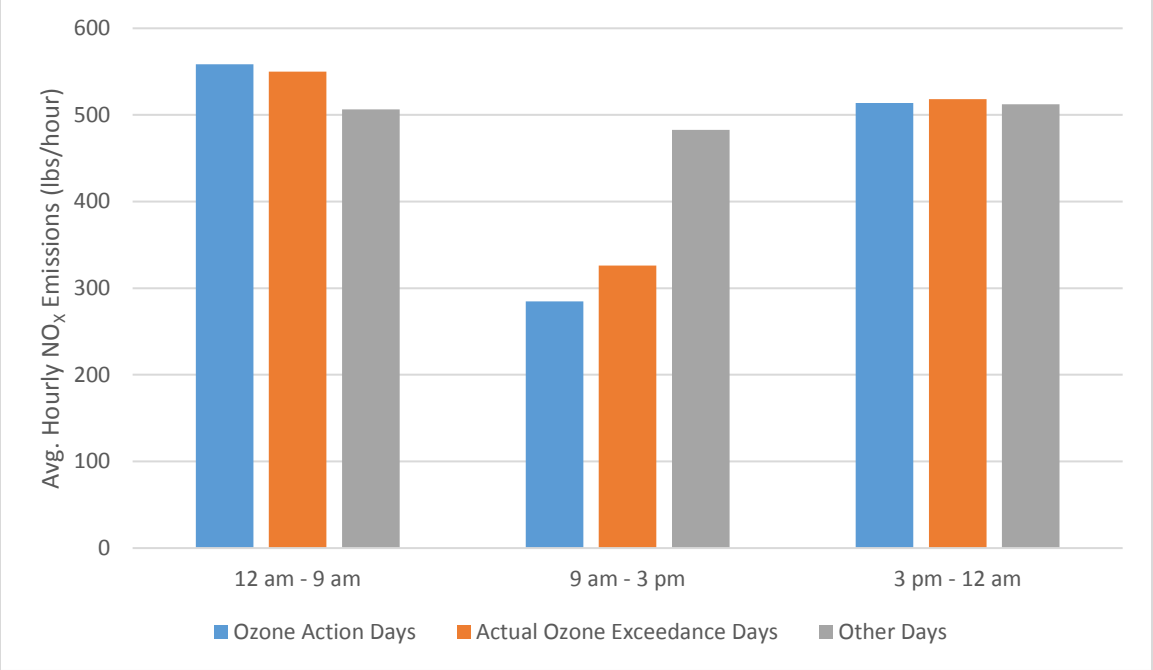
1 CAMPO;
2 City of Bastrop;
3 City of Buda;
4 City of Georgetown;
5 City of Leander;
6 City of Luling;
7 City of Pflugerville;
8 CLEAN Air Force; and
9 Hays County.

If these organizations provide data subsequent to this report, CAPCOG will provide an updated version of this report. 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. Organization-specific information is available in three accompanying spreadsheets.

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-Georgetown MSA, is 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. Previous annual reports illustrate the NO_x reductions that can be achieved on high forecasted O_3 days. Also, 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. While Texas Lehigh provided their hourly NO_x data for 2018, they did not provide any notes on their implementation of this measure in 2018, but the data for OADs and O_3 exceedances indicates that this measure was clearly implemented on these key days. The average for the "other" days also includes days with "moderate" O_3 forecast, which explains why the average hourly emissions from 9 am – 3 pm for these days was lower than the other hours.

Figure 3-16. Hourly NO_X Emissions at Texas Lehigh on OADs and Actual O_3 Exceedance Days compared to Other Days



3.2.2 Commuter Programs

CAC members implemented a number of commuter programs in 2018. These include:

- Providing alternative commuting infrastructure: 3 organizations;
- Allowing employees to work compressed work weeks: 9 organizations;
- Allowing employees to work flexible work schedules: 13 organizations;
- Carpool or other alternative transportation programs: 7 organizations;
- Transit pass subsidized by employer: 3 organizations;
- Part-time teleworking: 9 organizations;
- Full-time teleworking: 3 organizations;
- Implementing internal employer commute reduction programs: 3 organizations;
- Incentivizing alternative commuting among organization's own employees: 4 organizations; and
- Encouraging alternative commuting within the community: 5 organizations.

3.2.3 Development Measures

Development measures implemented in 2018 included:

- Access management: 2 organizations;
- Expedited permitting for mixed use, transit-oriented development, or in-fill development: 1 organization;
- Tree planting programs: 12 organizations;

- Tree maintenance programs: 5 organizations;
- Development policies to improve energy and resource efficiency in new buildings: 8 organizations; and
- Codes and ordinances that encourage a more pedestrian-friendly environment: 3 organization.

3.2.4 Energy and Resource Conservation

Energy and Resource Conservation measures implemented in 2018 included:

- Resource conservation: 11 organizations;
- Energy efficiency programs: 8 organizations;
- Renewable energy programs: 5 organizations;
- Electric vehicle programs: 4 organization;
- Water conservation programs: 8 organizations; and
- Resource recovery and recycling programs: 7 organizations.

3.2.5 Fleet and Fuel Efficiency Measures

Fleet and Fuel Efficiency Measures included:

- Alternative fuel vehicles: 7 organizations;
- Business evaluation of fleet usage, including operations and right-sizing: 10 organizations;
- Fueling of vehicles in the evening: 9 organizations;
- Low-emission vehicles: 8 organizations;
- Texas Low-Emission Diesel Equivalent for Fleets: 6 organizations;
- Vehicle maintenance by manufacturer specifications: 11 organizations;
- Prioritize purchasing of low-emission light-duty vehicles: 4 organizations;
- Prioritize purchasing of alternative-fueled vehicles and equipment: 3 organizations;
- Prioritize purchasing of hybrid vehicles: 2 organizations;
- Increase fuel efficiency: 5 organizations;
- Increase substitution of conventional fuels with alternative fuels: 3 organizations;
- Idling limits for vehicles and equipment: 8 organizations;
- Pursue replacement/repower/retrofit of old diesel-powered vehicles and equipment through TERP and/or DERA funding: 4 organizations;
- Employee training on alternative fuels and fuel efficiency: 2 organizations; and
- Vapor Recovery on Pumps: 1 organization.

3.2.6 Outreach and Awareness

Outreach and Awareness measures implemented by individual CAC members in 2018 included:

- Employee education program: 13 organizations;
- Public education: 12 organizations;
- OAD notification program: 12 organizations;
- OAD response programs: 8 organizations; and
- Programs to improve awareness of and compliance with air quality rules: 6 organizations.

3.2.7 Regulation and Enforcement

Regulation and enforcement measures implemented by individual CAC members in 2018 included:

- Open burning restrictions: 4 organizations

- Special event emission reduction policies: 2 organization

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

Table 3-15. Jurisdictions Implementing Idling Restrictions in the Austin-Round Rock-Georgetown 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.

3.2.8 Sustainable Procurement and Design

Sustainable procurement and design measures implemented by individual CAC members in 2018 included:

- Contractor Provisions for High O_3 Days: 1 organization;
- Direct deposit: 16 organizations;
- Restrictions on use of organization's drive-through facilities on OAD: 0 organizations;
- E-government and/or remote locations: 8 organizations;
- Landscaping voluntary start at noon on OAD: 2 organizations;
- Low VOC asphalt: 5 organizations;
- Low VOC roadway striping material: 4 organizations;
- Shaded parking: 4 organizations;
- Clean landscaping contracting: 1 organization;
- Clean construction contracting: 1 organization; and
- Local sourcing of materials: 3 organizations.

3.2.9 Other Notable Distinctions for Local Communities

In response to the 2017 annual air quality report, EPA suggested referencing some of the other distinctions local communities have received, such as the "STAR Communities" program. This section identifies a number of these types of distinctions that local communities have received.

- STAR Communities:

  - The STAR Community Rating System provides a comprehensive framework and certification program for evaluating local sustainability, encompassing economic, environmental, and social performance measures since its release in 2012.
  - City of Austin is a 4-Star Certified Community, the highest rating of any city in Texas, receiving this designation in 2014: https://reporting.starcommunities.org/communities/5-austin-texas

- SolSmart:
  - Recognizes cities, counties, and regional organizations for making it faster, easier, and more affordable to go solar.
  - The City of Austin is designated as a "Gold"-level designee and the City of Smithville (in Bastrop County) is designated as a "Bronze"-level designate: http://www.solsmart.org/our-communities/designee-map/

- Climate Mayors:
  - A bipartisan, peer-to-peer network of U.S. mayors working to demonstrate leadership on climate change through meaningful actions in their communities.
  - City of Austin, City of San Marcos, and City of Smithville are all members: http://climatemayors.org/about/members/
  - City of Austin also participates in a collaborative electric vehicle purchasing initiative through the Climate Mayors: https://driveevfleets.org/what-is-the-collaborative/

4 Ongoing Planning Activities

This section documents notable air quality planning milestones and activities completed in 2018.

4.1 Clean Air Coalition Meetings

During 2018, there were a total of four Clean Air Coalition meetings:

- February 14, 2018;
- May 9, 2018;
- August 8, 2018; and
- November 14, 2018.

Significant policy-related actions taken by the CAC in 2018 included:

- Endorsement of CAPCOG Air Quality Program for 2019-2023 and FY 2019 Funding Request;
- Endorsement of CAPCOG Air Monitoring Plan for 2019-2023;
- A Resolution in Support of CAPCOG's Application to CAMPO for Transportation Development Credits (TDCs) for the Commute Solutions Program;
- Legislative Recommendations on Air Quality Planning Funding and Other Air Quality Issues;
- A comment letter to TCEQ regarding the draft VW Beneficiary Mitigation Plan for Texas;

- Approval of the 2019 – 2023 Austin-Round Rock-Georgetown MSA Regional Air Quality Plan; and
- Creation of a Subcommittee to Make Recommendations on Future CAPCOG Local Air Quality Funding Requests.

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

- February 2, 2018;
- April 26, 2018;
- July 26, 2018;
- November 1, 2018; and
- December 10, 2018.

The CACAC Outreach and Education Subcommittee met a total of 10 times in 2018:

- March 8, 2018;
- April 6, 2018;
- May 3, 2018;
- June 7, 2018;
- July 2, 2018;
- August 2, 2018; and
- September 9, 2018.

In addition, CAPCOG staff also collaborated with the City of Austin to hold an Air Quality Awareness Week Press Event, the CLEAN AIR Force of Central Texas to hold their Air Quality Awareness Week Kick-off Event, and the CACAC outreach and education committee to create the ACT Meteorologist Toolkit.

4.2 LSCFA

The LSCFA held a number of meetings and workshops throughout 2018.

Board Meetings:

- January 10, 2018;
- April 11, 2018;
- July 11, 2018; and
- December 12, 2018.

Workshops:

- Texas Clean Cities Planning: May 23, 2018
- Alternative Fuel School Bus Roundtable for Fleet Managers: June 18, 2018

- Clean Cities Heavy Duty Electric Vehicle Workshop for VW Mitigation Plan: June 21, 2018
- Transportation and Clean Air: June 21, 2018
- 100 Best Fleets Program at The University of Texas: July 18, 2018
- Education and Planning with the Texas Natural Gas Vehicle Alliance: September 25, 2018
- Propane School Buses: September 27, 2019

4.3 Regional Air Quality Technical Research Activities

CAPCOG completed a number of air quality technical research activities in 2018 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;
    - 2018 Air Quality Monitoring Report;
    - 2019-2023 O_3 Monitoring Network Review Report;
- Modeling and data analysis projects:
    - An analysis of 2017 air quality and meteorological monitoring data;
    - Secondary Analysis of Photochemical Modeling Data Report;
    - Local and Voluntary Emission Reduction Quantification Report;
- Emissions inventory projects:
    - Emissions Inventory Spatial Surrogates Review and Updates; and
    - Non-Road Emissions Inventory Projections.

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

4.4 Statewide Collaborative Initiatives

CAPCOG participates in several statewide air quality-related initiatives in 2018, which are listed below.

4.4.1 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:

- February 21, 2018; and
- May 22, 2018.

4.4.2 Texas Clean Air Working Group

CAPCOG participated in Texas Clean Air Working Group (TCAWG) meetings in 2018, as well as a number of TCAWG subcommittees on TERP, Idling, and the Volkswagen (VW) Settlement issues during this time.

- General TCAWG Meetings
    - January 29, 2018; and
    - September 18, 2018.

- TERP, Idling, and VW Settlement Subcommittee Meetings and Conference Calls
  - January 17, 2018;
  - January 29, 2018;
  - February 14, 2018;
  - June 21, 2018;
  - October 22, 2018; and
  - November 19, 2018.

4.4.3 Technical Working Group for Mobile Source Emissions

CAPCOG participated in the Technical Working Group for Mobile Source Emissions (TWG) meetings in 2018. The TWG meets to discuss Texas transportation issues regarding on-road mobile source emission inventories and transportation policy. CAPCOG attended the meetings on the following dates:

- February 1, 2018;
- September 6, 2018; and
- December 6, 2018.

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 2018 and the completion of this report.

5.1 Texas Emission Reduction Plan

TCEQ had not yet awarded all of the TERP funding appropriated for the 2018-2019 biennium by the end of 2018. Most notably, TCEQ had not yet awarded funding for any of the ERIG grant applications that had been submitted in late summer 2018. The RFGA for the TCFP program also closed in February 2019, and TCEQ continued to accept applications for the TNGVGP and LDPLIP programs up through the end of May 2019.

Table 5-1. FY 2019 ERIG Grant Data Available as of 7/30/2019

Item	ERIG
Total Funding Awarded	$52,249,272
Austin Area Funding Awarded	$6,738,247
Austin Area % of Total Funding Awarded	12.90%
Austin Area Tons of NO_X Reduced	589.04
Cost/Ton NO_X Reduced in Austin Area	$11,439
Avg. Activity Life for Austin Area (years)	6.95
Avg. Weekday NO_X Reduction (tpd)	0.23

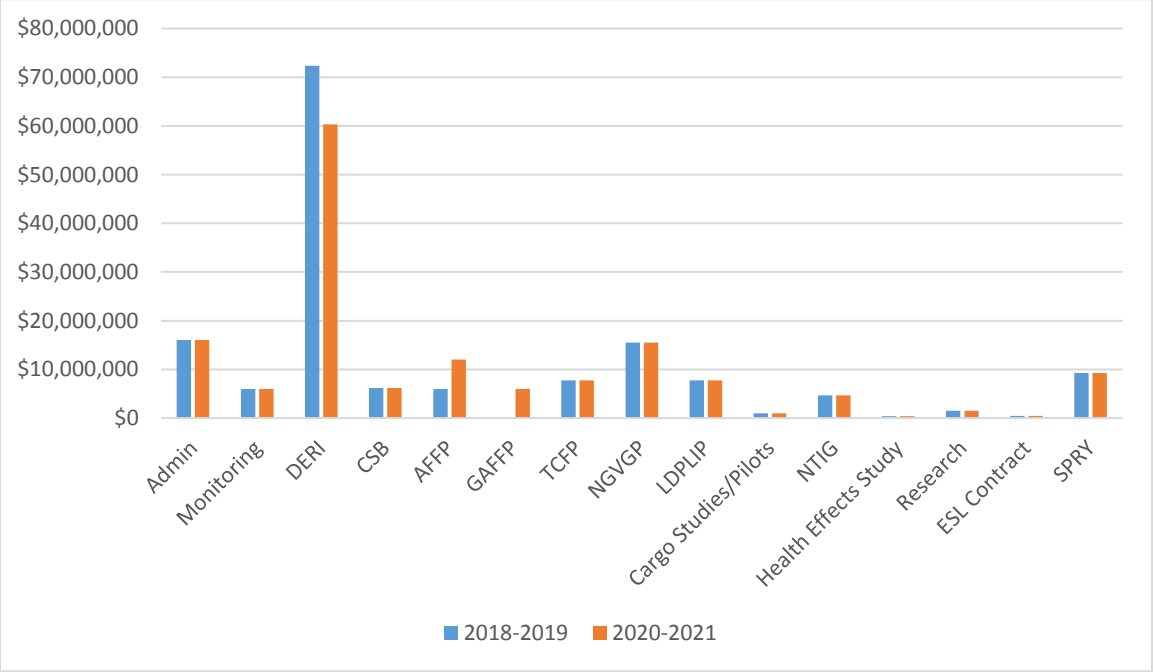
- For the TCFP, a total of $20,010,413.78 was available, with funding requests from the Austin area accounting for $3,751,347 (18.75%). This included funding requests from CapMetro, Eanes ISD, and Georgetown ISD. Grant awards have not yet been publicly announced as of 7/30/2019.
- For the TNGVGP, while only $1,039,378 in funding had been awarded as of October 2018, by July 1, 2019, an additional $13,891,137 in funding had been awarded to reduce 189.2175 tons of

NO_X ($73,414 per ton) with an additional $498,084 in funding requests still under review. It is not clear from the data available online as of 7/30/2019 how much of this funding or the associated emission reductions are for the Austin area.

- TCEQ also made $5 million available for DERI rebate grants for small businesses but has not yet announced information about grant awards. A total of $7,895,796.89 was requested.

The 86th Texas Legislature appropriated the same $155 million for the TERP program for 2020-2021 as it did for 2018-2019, although the allocation among the various authorized uses of TERP changed. Specifically, the amount appropriated for the DERI program decreased by $12 million (a 17% decrease) for the biennium, while funding for the AFFP increased by $6 million (a 100% increase) and the previously unfunded Government Alternative Fuel Fleet Program (GAFFP) was appropriated $6 million. This change in appropriations among programs results in the DERI program receiving 39% of the total funding appropriated for 2020-2021, down from 47%, while the share of funding appropriated for the various alternative fuel programs (AFFP, GAFFP, TCFP, NGVGP, and LDPLIP) increasing from 24% to 32%. Due to the relatively higher cost per ton ratios for the alternative fuel programs compared to DERI, this change in appropriations would be expected to diminish the amount of emission reductions that the programs could achieve in the Austin area from grants awarded in the next biennium compared to the current biennium.

Figure 5-1. TERP Funding Appropriated by Authorized Use, 2018-2019 and 2020-2021



The Legislature also passed landmark TERP legislation (HB 3745) that will address the continued growth of the TERP account due to under-appropriation of funds for grants ($155 million for 2020-2021) relative to the revenues collected (over $550 million for the 2020-2021 biennium), which has resulted in a fund balance approaching $2 billion that has accumulated since 2001. The legislation extended all TERP revenue provisions until all areas of the state are designated "attainment" for all O_3 NAAQS, coinciding with when the authorization for awarding grants would end, and would establish a new "TERP Fund" that would receive all TERP revenue collected after August 31, 2021, and enable TCEQ to award funds

out of the fund without needing to go through the appropriations process. This will dramatically increase the amount of funding available for the TERP program starting in FY 2022.

5.2 TxVEMP

In May 2019, TCEQ began rolling out the first in a series of VW grant opportunities, starting with transit buses. TCEQ allocated a total of $5,704,161 for this grant round to the Austin area, and as of 7/25/2019, a total of $6,855,278 in funding from the Austin area had been requested. This included $4,297,580 from CapMetro for 20 electric buses as part of its fleet-wide effort to start transitioning from diesel to electric. TCEQ has announced that the next round of grants will open in fall 2019 for refuse trucks.

5.3 New Regional Air Quality Plan

The Austin-Round Rock-Georgetown MSA's Advance Program Action Plan expired on December 31, 2018. Throughout 2018, CAPCOG worked with the CAC to develop a new plan. The 2019-2023 Austin-Round Rock-Georgetown MSA Regional Air Quality Plan was finalized on December 21, 2018. For the purposes of the region's participation in EPA's Advance Program, this new plan constitutes a new "Path Forward," and covers more than just O_3. The plan is available at http://www.capcog.org/divisions/regional-services/regional-air-quality-plan.

This plan's two key goals are:

1. Maximizing the probability of compliance with the National Ambient Air Quality Standards region-wide; and
2. Otherwise minimizing health and environmental impacts of regional air pollution.

In order to achieve these objectives, this plan calls for:

1. Implementation of controls on the emissions of NO_X;
2. Outreach, education, and technical support to enhance NO_X emission reductions;
3. Outreach and education to reduce public exposure to ambient ground-level O_3, PM, and NO_2 when high enough to be considered "moderate" or worse based on the EPA's AQI;
4. Ambient air monitoring;
5. Other air quality research and planning activities; and
6. Policy advocacy.

5.4 Relocation of Monitoring Stations in 2019

In 2018, CAPCOG developed and received approval from the CAC for a 2019-2023 monitoring plan, which called for the closure of three of its eight monitoring stations (CAMS 601 in Fayette County, CAMS 684 in Bastrop County, and CAMS 1603 in Southwest Austin) and opening of three new monitoring stations within the region – one in Elgin, one in Bastrop, and one in East Austin.[39] Ahead of the 2019 O_3

[39] CAPCOG. "2019-2023 Ozone Monitoring Network Review Report." May 31, 2018. Available online at: http://www.capcog.org/documents/airquality/reports/2018/5.2.3_O3_Monitoring_Network_Review_for_2019-2023_final.pdf

season, CAPCOG was able to complete the closure of CAMS 601 and 684 and the opening of new sites in Bastrop (CAMS 1612) and Elgin (CAMS 1613) but was not able to relocate CAMS 1603 yet. CAPCOG is in talks with City of Austin to find a suitable location in East Austin and hopes to complete the relocation of CAMS 1603 sometime in late 2020.

TCEQ's 2019 Annual Monitoring Network Plan (AMNP) calls for the relocation of CAMS 3, the region's key regulatory O_3 monitoring station, by May 2020 due to construction occurring at Murchison Middle School where the monitoring station is located.[40] TCEQ is working with Austin Independent School District (AISD) to find another location at the campus to relocate the station to if possible, and will seek to find another site within 1 mile of the current location if possible in order to ensure data continuity.

5.5 Funding for Future TDM Efforts

In May 2018, the CAMPO board awarded about $500K to three TDM programs for FY 2019 and used another $300K to conduct a regional TDM study, which has not yet been finalized. It also set aside an additional $500K for additional TDM projects in the future, which it has indicated it plans to award in September 2019. CAMPO staff have announced that they do not plan to conduct a call for projects for the 2021-2024 TIP due to the Policy Board's decision in May 2019 to commit of all uncommitted STBG funds for 2020-2029 to three roadway projects. CAMPO expects the next project call to occur in late 2021 for the 2023-2026 TIP. This means that the $500K set aside by the Policy Board in May 2018 for TDM projects is the only federal funding that will likely be available for these projects for 2020-2022.

5.6 Reinstatement of Local Air Quality Planning Grant Funding

The 86th Texas Legislature reinstated local air quality planning funding for "near-nonattainment" areas for the 2020-2021 biennium, although their use will be restricted to monitoring and emissions inventory work. As of July 31, TCEQ staff is still deciding on how to proceed with this and expects to call a meeting with the various areas in the near future. TCEQ did indicate that it expected the Austin area to receive the minimum of $281,250 for the biennium, rather than the approximately $960,000 that would have been allocated to the Austin area if the seven "attainment" counties in the San Antonio metro area had been treated as a single "area" rather than seven separate "areas."

Due to the restrictions on the use of the funding, the main impact of this funding would be to reduce the amount of funding needed from local governments to support CAPCOG's air quality program for 2020-2021, but it would not be expected to actually increase the amount of funding spent on the program over this period. Since the funding can't be used for outreach, and it's unclear at this stage exactly what other activities would be eligible for funding, CAPCOG expects to still continue to need to rely on as much as $578,750 in local funds over the 2020-2021 biennium to support the program (an average of $289,375 per year).

5.7 CapMetro Bus Electrification Initiative

As part of its long-term planning efforts, CapMetro has begun the process of converting significant parts of its fleet form diesel to electric. On July 25, 2019, staff from CapMetro announced that it will be receiving funding from several different grant applications it submitted in recent months, including the Federal Transit Administration (FTA) Low and No Emission Bus Program, TCEQ's Clean Fleet Program, and the Texas VW Environmental Mitigation Program.

[40] TCEQ. "Annual Monitoring Network Plan." July 3, 2019. Available online at: https://www.tceq.texas.gov/assets/public/compliance/monops/air/annual_review/historical/2019-AMNP.pdf

5.8 DERA Grant Applications

In spring 2019, CAPCOG submitted three Diesel Emission Reduction Act (DERA) grant applications to EPA. One application included projects identified by CapMetro and Austin White Lime, while the other two would have provided for region-wide rebates or a region-specific competitive grant process. CAPCOG received notification from EPA recently that these projects were not funded, but CAPCOG plans to continue to pursue these grant opportunities in collaboration with the CAC in the future.

5.9 EPA Travel Efficiency Assessment Method Technical Assistance Project

In early 2019, CAPCOG applied to EPA for technical assistance through its Travel Efficiency Assessment Method (TEAM) initiative and was one of two organizations selected by EPA for this round of projects. CAPCOG has been working with local partners to select strategies that EPA's contractor will evaluate and has recently completed the preparation of data for this effort. Strategies that will be modeled include:

1 Improved transit service along a key corridor in Austin;

2 Improved transit service region-wide;

3 Subsidized transit passes for government employees; and

4 Vehicle miles traveled (VMT) pricing.

Results should be available later in 2019.

5.10 Gasoline Sulfur Levels and Impacts on On-Road NO_X

One area of uncertainty regarding the estimated on-road NO_X emissions relates to gasoline sulfur levels. Fuel sampling conducted by Eastern Research Group (ERG) for TCEQ in 2017[41] showed that the Austin area continued to have the highest gasoline sulfur levels in the state – a weighted average of 30 ppm, compared to the statewide average of 19.85 ppm. These levels were both significantly higher than the 10 ppm modeling assumption for all counties for 2017 and beyond used in TCEQ's "trends" inventory, which was based on Tier 3 fuel standards. These findings were consistent with ERG's fuel sampling studies in 2014[42] and 2011[43], which also showed that the Austin area's gasoline levels were the highest in the state, coming in at 13.83 ppm and 16.17 ppm above the statewide averages, respectively.

In January 2019, CAPCOG analyzed on-road emissions modeling results that varied the gasoline fuel sulfur input from 10 ppm up to 90 ppm. 95 ppm is the down-stream per-gallon cap in the Tier 3 regulations, while 10 ppm is the annual average level that refineries are supposed to achieve for product at the "refinery gate." These results suggested that regional NO_X emissions from gasoline vehicles in

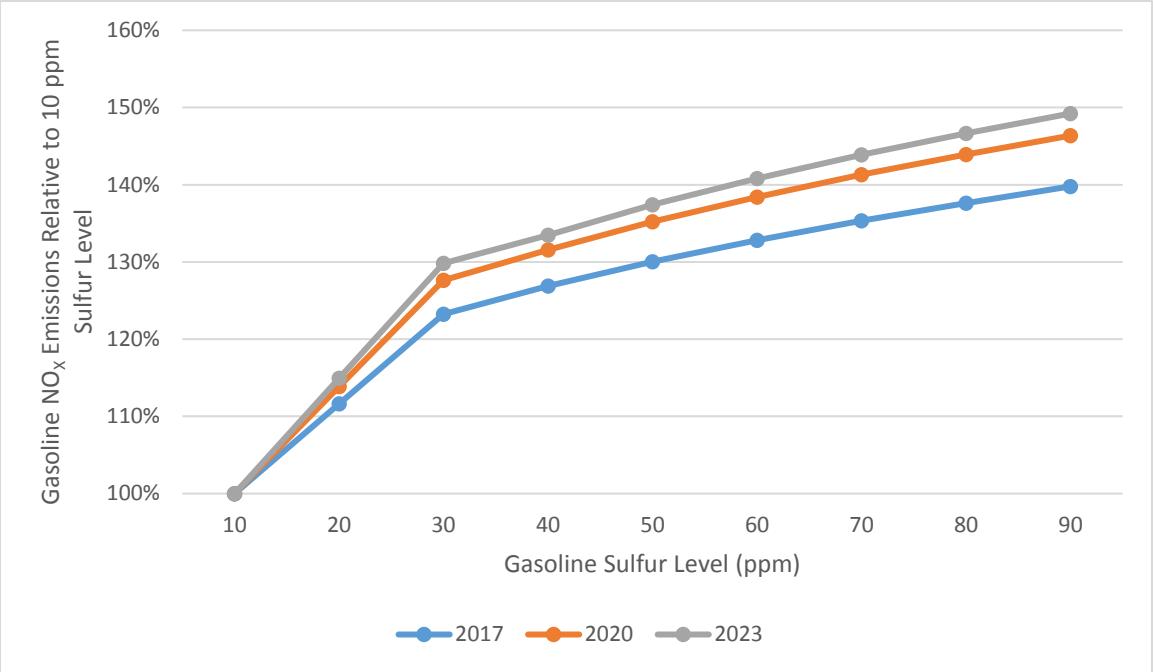
[41] ERG. *2017 Summer Fuel Field Study*. Prepared for TCEQ. August 31, 2017. ERG No. 0345.00.012.006. Available online at: https://www.tceq.texas.gov/assets/public/implementation/air/am/contracts/reports/ei/582177149010-20170831-ergi-2017SummerFuelFieldStuday.pdf. Accessed 7/31/2019.

[42] ERG. *2014 Summer Fuel Field Study (Revised)*. Prepared for TCEQ. August 15, 2014, Revised January 2015. ERG No. 0292.03.020. Available online at https://www.tceq.texas.gov/assets/public/implementation/air/am/contracts/reports/mob/5821199776FY1420-20140815-ergi-summer_2014_fuels.pdf. Accessed 7/31/2019.

[43] ERG. *2011 Summer Fuel Field Study (Revised)*. Prepared for TCEQ. August 31, 2011, Revised March 2015. ERG No. 0292.00.003. Available online at https://www.tceq.texas.gov/assets/public/implementation/air/am/contracts/reports/mob/5821199776FY1103-20110831-ergi-summer_2011_fuels.pdf. Accessed 7/31/2019.

2017 were actually approximately 23% higher than what the TCEQ "trends" emissions inventories would have accounted for. Overall, this means that on-road emissions would be about 13% higher than what would have been expected when including diesel vehicles as well. The relative difference becomes larger in future years as the projected emissions rates for newer vehicles increasingly depend on the lower gasoline sulfur levels anticipated by the Tier 3 standards.

Figure 5-2. Gasoline NO_X Emissions at 10 – 90 ppm Gasoline Sulfur in 2017, 2020, and 2023 Relative to 10 ppm Sulfur Levels



It is unknown whether gasoline sulfur levels in the Austin area continued to be elevated in 2018 compared to other parts of the state, and since TCEQ is unlikely to conduct any new fuel sampling studies until 2020, it is also unlikely that Austin levels in 2019 can be confidently assessed either.

6 Conclusion

Unfortunately, air pollution levels in the Austin metro area were worse in 2018 than in 2017, and O3 levels were high enough to put the region at risk of recording a violation of the O_3 NAAQS for 2017-2019. The increased O_3 air pollution levels were within the range that could be expected based on year-to-year variation, but data reported from local power plants to EPA indicate that regional EGU NO_X emissions were significantly higher on key high O_3 days in 2018 than they were in 2017, particularly the Decker Creek and Sim Gideon Power Plants. 2018 represented the first year when the Sandow Power Plant in southern Milam County was closed, and part the increase in NO_X emissions from power plants in the MSA may be as a result of the load shift.

The region's O_3 levels in 2017 and 2018 are high enough that the region is at significant risk of violating the 2015 O_3 NAAQS by the end of 2019, although it's doubtful that EPA would initiate an "out-of-cycle" nonattainment designation for the region even if there was a violation for 2017-2019. Moving forward, a number of steps taken at the state and regional level in 2018 and 2019 will help control air pollution levels within the region over the next few years.

- The CAC continued to implement measures committed to in the O_3 Advance Program Action Plan in its final year;
- The CAC re-committed to continuing to pursue air quality improvements by adopted a new five-year air quality plan for 2019-2023;
- The CAMPO Policy Board awarded approximately $500K for regional TDM initiatives;
- TCEQ allocated over $16 million in VW mitigation funds specifically for the Austin area; and
- TCEQ awarded at least $4.2 million in TERP funds to the Austin area in 2018 and at least another $6.7 million in TERP ERIG funds to the Austin area in early 2019.