

2019-2023 Austin-Round Rock-Georgetown MSA Regional Air Quality Plan

December 21, 2018

Prepared by the Capital Area Council of Governments

Executive Summary

The 2019-2023 Austin-Round Rock-Georgetown Metropolitan Statistical Area (MSA) Regional Air Quality Plan is intended as a guide to addressing regional air pollution issues for Bastrop, Caldwell, Hays, Travis, and Williamson Counties over the next five years. The plan is designed to help the region:

- Maintain and improve outdoor air quality within the MSA;
- Reduce the impact of emissions from within the region on air quality issues in nearby areas and elsewhere; and
- Mitigate the health, environmental, economic, and social impacts of the remaining regional air pollution.

The plan identifies regional air quality issues, defines objectives for addressing these issues, establishes strategies for achieving these objectives, lays out actions that will advance these strategies, and identifies roles and responsibilities of the various organizations participation in this plan.

This plan's two key objectives are:

1. Maximizing the probability of compliance with the National Ambient Air Quality Standards (NAAQS) 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 nitrogen oxides (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 ozone (O₃), particulate matter (PM), and nitrogen dioxide (NO₂) when high enough to be considered "moderate" or worse based on the U.S. Environmental Protection Agency's (EPA's) Air Quality Index (AQI);
4. Ambient air monitoring;
5. Other air quality research and planning activities; and
6. Policy advocacy.

The plan was developed by the Capital Area Council of Governments (CAPCOG) Air Quality Program in consultation with the Central Texas Clean Air Coalition (CAC), the CAC Advisory Committee, and other stakeholders throughout 2018, and was adopted by the CAC in December 2018.

From September 2018 – December 2018, members of the CAC adopted commitments to participate in this plan. CAPCOG has prepared a summary of these commitments in an accompanying spreadsheet, which will be updated periodically to reflect changes in membership in the CAC or changes in the commitments by individual organizations. CAPCOG will include any such updates in an annual report that will be distributed in July of each year.

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1 Introduction

This plan is intended to:

1. Identify the air quality issues for the Austin-Round Rock-Georgetown MSA, which consists of Bastrop, Caldwell, Hays, Travis, and Williamson Counties;
2. Identify the objectives established for addressing the MSA's regional air quality issues;
3. Identify the strategies and actions that are being taken to achieve these objectives between 2019 and 2023; and
4. Explain the rationale for the objectives established for this plan, strategies undertaken to achieve these objectives, and actions needed to carry out these strategies.

This plan was developed by the Capital Area Council of Governments (CAPCOG) and adopted by CAPCOG's Central Texas Clean Air Coalition (CAC). CAPCOG is the Regional Planning Commission for State Planning Region 12 (Bastrop, Blanco, Burnet, Caldwell, Fayette, Hays, Lee, Llano, Travis, and Williamson Counties), and is a local political subdivision of the state governed by Texas Local Government Code Chapter 391. The CAC is a voluntary, unincorporated association linked with CAPCOG by a resolution adopted November 13, 2002. The CAC is led by a board of local elected officials from city and county governments that are participating in the region's air quality planning efforts.

As described in the CAC's by-laws, the purposes of the CAC are:

- To develop, adopt, and implement a clean air plan to achieve and maintain compliance with federal ground-level ozone (O₃) standards for Bastrop, Caldwell, Hays, Travis, and Williamson Counties;
- To establish and monitor a regional effort toward the improvement of air quality;
- To develop policies and strategies that will provide guidance for each of its independent governing bodies about actions that will achieve clean air in Central Texas;
- To work cooperatively to achieve clean air standards that will protect public health and yet allow local governments the flexibility to select measures best-suited to each community's needs and resources; and
- To provide CAPCOG's Executive Committee with recommendations for administering funding provided by local sources for the purpose of supporting the regional air quality plan or program implementation, assessment, and improvement activities in Central Texas.

1.1 Regional Air Quality Issues

Consistent with the purposes defined for the CAC in its by-laws to achieve "clean air in Central Texas," this plan addresses the following distinct air quality issues:

1. Regional compliance with the NAAQS;
2. Periodic exposure to "criteria" air pollution concentrations that EPA considers to be "moderate" or worse based on its AQI;
3. Exposure to hazardous air pollutants (HAPs);
4. Exposure to nuisance odors;
5. Environmental justice (EJ) considerations; and
6. The impact of activities within the region on air quality issues elsewhere.

1.2 Regional Air Quality Objectives and Strategies

In order to address the six issues above, this plan has two objectives:

- Primary objective: maximize the probability of compliance with the NAAQS region-wide; and
- Secondary objective: otherwise minimizing the health and environmental impacts of regional air pollution.

This section discusses how pursuit of these two objectives addresses the regional air pollution issues identified above, and what implications the use of these objectives have for guiding actions within the region.

1.2.1 Maximize the Probability of Compliance with the NAAQS Region-Wide

This plan's primary objective is to maximize the probability that all five counties in the MSA remain in compliance with all NAAQS throughout the term of this plan. The EPA is required to set the NAAQS at levels that are necessary to protect public health and the environment, so compliance with the NAAQS is important to advance both of those objectives. However, NAAQS compliance is also important to protect the region's economic growth and flexibility in transportation planning. CAPCOG has estimated that non-compliance with the O₃ NAAQS could cost the MSA's economy billions of dollars over the next 20-30 years.

All five counties in the MSA are currently *designated* "attainment/unclassifiable" for all of EPA's NAAQS, and monitoring data collected by the Texas Commission on Environmental Quality (TCEQ) from within the region through the end of 2017 also indicate that air pollution levels within the region continue to *attain* all of the NAAQS. However, the region's 2015-2017 O₃ levels were 99% of the maximum allowable under the 2015 O₃ NAAQS of 70 parts per billion (ppb), and there is a better than even chance that the region's 2017-2019 O₃ "design value" (the statistic used to compare a region's monitoring data to a NAAQS) will exceed 70 ppb. The region's O₃ levels fall into a range that this plan identifies as "near-nonattainment:" 85-100% of the maximum allowable under a NAAQS.¹ O₃ is the only pollutant for which the region would be considered "near-nonattainment" using this criterion, and is therefore the sole focus of NAAQS compliance efforts in this plan.

There are two important indicators related to compliance with the O₃ NAAQS, both of which are addressed in this plan:

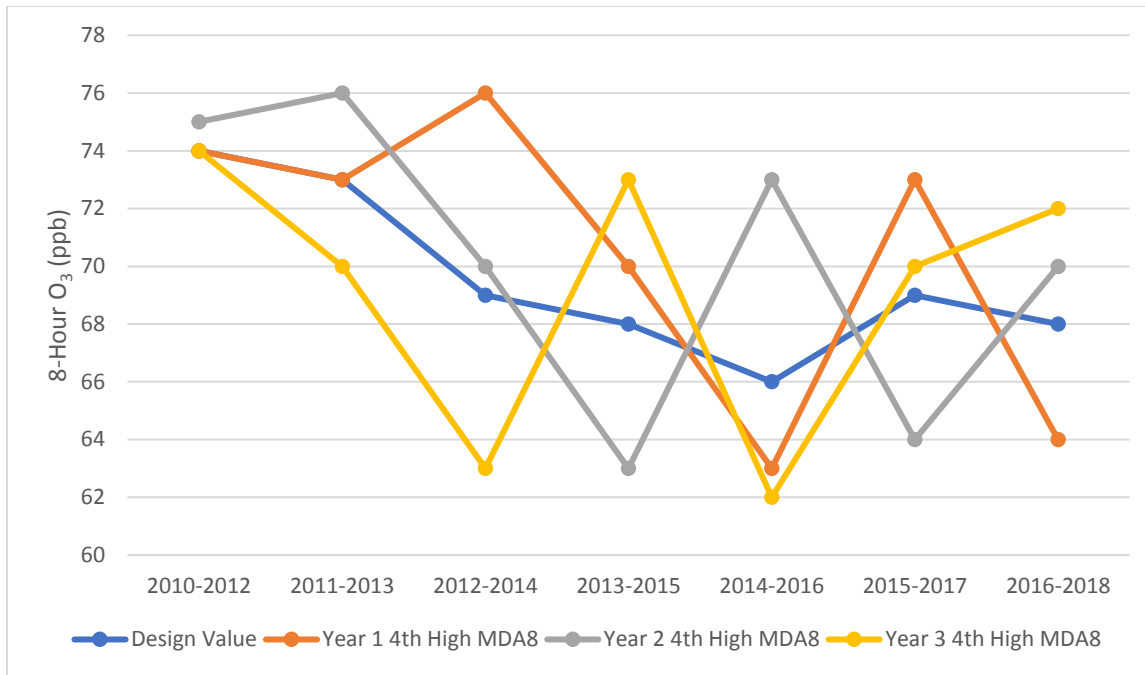
1. The region's 8-hour O₃ design value, calculated as the highest 3-year average of the 4th highest daily maximum 8-hour average (MDA8) O₃ at a federal reference method (FRM) or federal equivalent method (FEM) monitoring station within the MSA; and
2. The region's attainment status for the O₃ NAAQS.

1.2.1.1 Keeping the Region's O₃ Design Value in Compliance

The good news is that the region's certified 2015-2017 O₃ design value of 69 ppb and its preliminary 2016-2018 design value of 68 ppb are both in compliance with the 2015 O₃ NAAQS of 70 ppb. Air quality modeling conducted by EPA, TCEQ, and Alamo Area Council of Governments (AACOG) also all indicate that the region's O₃ design value is expected to continue to decline between 2019 and 2023. However, these projections do not capture the significant variability that has occurred in the region's O₃ levels in recent years, as show in the figure below.

¹ While not defined in state or federal statute or regulations, this plan uses a threshold of a design value \geq 85% of the NAAQS in order to differentiate between an area that's been designated "attainment" that runs a significant risk of violating the NAAQS from an area designated "attainment" with an insignificant risk of violating the NAAQS.

Figure 1-1. Design Value and 4th-High MDA8 O₃ 2012-2018



As these data show, while the region’s design value has remained at or below 70 ppb dating back to 2014, the design value included at least one year in which the 4th-highest MDA8 O₃ was above 70 ppb in each one of those years, and the standard deviation within the 3-year time frame covered by a design value by as much as 6.51 ppb. This variation year-to-year means that there was a 38% chance that region’s 2016-2018 design value would have violated the NAAQS. The 4th-highest values recorded at Continuous Air Monitoring Station (CAMS) 3 in 2017 and 2018 were 70 ppb and 72 ppb, respectively. Based on these measurements, there is a significant chance that the station’s 2017-2019 design value would violate the NAAQS. With the region’s O₃ levels so close to the NAAQS, even minor efforts to control O₃ can have a significant impact on the chances of the region being able to continue to ensure that its design value is meeting the NAAQS.

Controlling emissions of nitrogen oxides (NO_x) from within the region on days that are conducive to high O₃ formation is the primary way that the region can maximize the probability of keeping its design value in compliance with the NAAQS.

- The impact of anthropogenic emissions within the region on its design value is about 12-16 ppb;
- NO_x emissions account for approximately 99% of the impact of regional anthropogenic emissions on its design value, with volatile organic compounds (VOCs) emissions accounting for the remaining 1%;
- NO_x emissions are a by-product of combustion, and can be controlled through pollution control systems that chemically convert NO_x to nitrogen (N₂) and oxygen (O₂), or through reductions in the underlying emissions-generating activity;
- The impact of the NO_x emissions that do occur on peak 8-hour O₃ can also be minimized by accounting for the impact of the timing and location of the emissions on peak O₃:

- O₃ is a seasonal pollutant, and high O₃ days tend to occur most frequently in August and September, so focusing NO_x emissions reductions efforts on these months or shifting emissions-generating activity away from these months can yield significant benefits for O₃ NAAQS compliance;
- Due to emissions-generating activity patterns throughout the week, shifting emissions-generating activities to Sunday can reduce the chances that the activity will contribute to high O₃ concentrations;
- A ton of NO_x emissions in Travis County have about 3 times the impact on the region's design value as a ton of NO_x emissions in any of the other four counties in the MSA due to the proximity of these emissions to TCEQ's regulatory monitors and the higher probability of those emissions impacting O₃ levels within Travis County on any given day; and
- A ton of NO_x emissions reductions occurring between 9 am and 11 am would be expected to have about 3 times the impact of NO_x reductions between 7 am and 9 am or between 11 am and 2 pm.

Air quality modeling conducted by CAPCOG showed that emissions from within the region account for about 12 – 18 ppb of the region's 2017 O₃ design value of 69 ppb. The remaining O₃ is attributable to emissions from outside of the metro area and "background" levels of O₃. Since the region's emissions account for only about 20-25% of the ambient O₃ experienced within the region, it is important to understand the limited ability of the region to take actions to keep its O₃ air pollution levels in compliance with the NAAQS. Therefore, rather than setting a specific target for ambient O₃ levels for the region, the CAC established an O₃ pollution control target of 0.70 – 1.00 ppb for this plan. In practice, this means that this plan is intended to achieve a 0.70 – 1.00 ppb reduction in the region's 4th-highest MDA8 O₃ for each year of the plan compared to what the O₃ concentration would be without the measures identified in the plan.

These pollution reduction targets are substantial enough to potentially make the difference in the region's O₃ NAAQS compliance if its O₃ levels continue to hover near the 2015 O₃ NAAQS level of 70 ppb. While even a 0.1 ppb reduction in O₃ could theoretically make the difference in a region's compliance status, the 0.70 ppb and 1.00 ppb levels are useful benchmarks for this plan because they correspond to the impact thresholds EPA uses to determine whether or not one state's emissions may be "significantly" contributing to air pollution problems in another state. To the extent that the region may find itself needing to make a case to EPA that it is achieving a significant level of NO_x control through existing measures, these impact levels would be useful points of comparison. This level of control would represent about 4-8% of the total impact of local emissions on its own O₃ design value.

The CAC established these as aspirational targets intended to motivate members to go beyond what measures they may be already implementing. Establishing these types of targets defines the degree of risk minimization that the CAC wishes to achieve through pollution reduction measures. It reflects the reality that the CAC does not have the ability to fully determine what the region's design value is year-by-year. This target also is useful in that it can be used regardless of the level at which the NAAQS is set – it would still be the target for pollution reduction from the region even if EPA tightens the O₃ NAAQS in 2020.

CAC members can help the region achieve this target both directly and indirectly:

- Directly by reducing emissions from sources they control (such as fleets and stationary combustion sources);

- Indirectly reducing emissions from sources that they have a significant influence over (such as reducing single-occupancy vehicle commuting from employees or reducing electricity consumption);
- Indirectly reducing emissions through outreach and education efforts that expand the number of people and organizations willing to take actions to reduce emissions or enhance the magnitude of emission reductions achieved by people and organizations already taking action to reduce emissions; and
- Indirectly reducing emissions and O₃ transported into the region through policy advocacy at the local, state, and federal level.

1.2.1.2 Other Efforts Targeted at Avoiding a Nonattainment Designation

The most important factor in determining whether an area is designated nonattainment or not is if it has an FRM or FEM monitor showing a violation of the NAAQS at the time EPA completes its initial round of designations. It is unusual for EPA to designate an area as nonattainment if the area was in compliance with the NAAQS at the time it completed its initial round of designations but subsequently violates the NAAQS. For example, EPA declined to designate the San Antonio area as “nonattainment” for the 2008 O₃ NAAQS in 2013, 2014, 2015, or 2016, despite the area’s 2012, 2013, 2014, and 2015 design value exceeding the NAAQS. Throughout this period, EPA did not designate the area as “nonattainment” despite a lawsuit from environmental groups seeking to force it to do so.² Based on this history, it appears unlikely that EPA would go out of its way on its own accord to designate any of the counties in the MSA as “nonattainment” for the 2015 O₃ NAAQS if the region recorded a violation of the NAAQS for 2017-2019. However, it is important to realize that there is no specific legal protection for the region from a nonattainment designation if that did occur.

Dating back to the region’s participation in EPA’s Early Action Compact (EAC) program, the CAC has taken the stance that in addressing any NAAQS compliance issues, voluntary efforts should first be given the chance to achieve any needed air quality improvements before EPA turns to a nonattainment designation if possible. Due to the significant and long-lasting regulatory impacts of a nonattainment designation, the CAC has made it a priority to support actions that could help all of the counties in the region avoid a nonattainment designation.

Section 107(d)(3) of the Clean Air Act specifies that, “on the basis of air quality data, planning and control considerations, or any other air quality-related considerations the Administrator deems appropriate,” the EPA may initiate a process to redesignate an area from “attainment” to “nonattainment.” Similarly, EPA’s guidance for area designations for the 2015 O₃ NAAQS includes consideration of air quality data, emissions and emissions-related data, meteorology, geography and topography, and jurisdictional boundaries. Ensuring that adequate information is available to inform EPA designation decisions is important to mitigating the risk of any out-of-cycle nonattainment designations for the 2015 O₃ NAAQS and for any potential nonattainment designations for the upcoming 2020 O₃ NAAQS, which would be expected to be finalized in 2022 or 2023.

With this in mind, the following types of activities would be supportive of maximizing the probability of compliance with the NAAQS beyond pollution reduction activities to the extent that “compliance” means avoiding a nonattainment designation:

² The U.S. Court of Appeals for the D.C. Circuit eventually ruled in favor of EPA’s decision in this case.

- Collecting ambient O₃ air quality and meteorological data throughout the region to supplement TCEQ's O₃ monitoring efforts, since these data may show some counties having air quality attaining the NAAQS even if air quality in an adjacent county or region does not;
- Documenting efforts undertaken within the region to control emissions and refining emissions estimates for the region in order to reflect levels of control that are being achieved;
- Conducting data analysis in support of exceptional events demonstrations (which can lead to certain data influenced by events like wildfires being excluded from a design value), assessment of O₃ impacts of control strategies, and assessment of the factors that contribute to high O₃ in the region;
- Conducting on-going planning activities to take advantage of the latest data related to O₃ and emissions for the region, emissions-related trends within and near the MSA, and new plans and information from CAC members; and
- Policy advocacy focused on:
 - Ensuring that the region has adequate resources to undertake such efforts;
 - Rules that would be conducive to allowing flexibility for areas to avoid a nonattainment designation if at all possible; and
 - Persuading EPA to avoid designating any county in the MSA as nonattainment (and persuading TCEQ to avoid recommending that any county in the MSA be designated nonattainment) if any such situation arises.

If these efforts fall short, the CAC has also historically supported efforts to minimize the regulatory burden of a nonattainment designation, including:

- Getting the area redesignated to "attainment" as fast as possible and in particular, avoiding any "bump-up" in classification as a result of failing to attain the NAAQS by the attainment date; and
- Maximizing regulatory flexibility to avoid regulations that may be unnecessary or inefficient at helping the region attain the NAAQS quickly.

1.2.2 Minimizing Health and Environmental Impacts of Air Pollution Generally

This plan calls for actions that help minimize the health and environmental impacts of regional air pollution beyond actions targeted at NAAQS compliance. **As described above, actions that could advance this objective include:**

- Reducing emissions of precursors to criteria air pollutants in order to reduce concentrations of O₃, PM, and NO₂, particularly when they are expected to reach levels considered "moderate" or "unhealthy for sensitive groups;"
- Conducting outreach designed to encourage the public to take actions to help sensitive populations protect themselves from adverse health impacts from O₃, PM, and NO₂ air pollution when it reaches levels considered "moderate" or "unhealthy for sensitive groups;"
- Reducing emissions of acetaldehyde, benzene, carbon tetrachloride, and formaldehyde region-wide in order to reduce cancer risks from ambient levels of these pollutants in the region;
- Studying other issues related to air toxics and nuisance odors, particularly where there may be localized issues;

- Addressing environmental justice considerations by: a) accounting for cumulative exposure to various pollutants within the region, b) using EPA’s EJ screen and similar tools for identifying groups within the region that may be experiencing a disproportionate burden of air pollution, and c) considering factors like the percentage of the population without health insurance that may impact a group’s ability to address health impacts from air pollution when they do occur;
- Supporting efforts to reduce the region’s contribution to criteria air pollution in adjacent areas, visibility impairment in federal Class I areas, and global concentrations of greenhouse gases when they align with efforts to reduce ambient air pollution concentrations within the region; and
- Continue tracking scientific developments and information on all types of air pollution relevant to the region.

1.2.3 Summary of Strategies that Will be Undertaken to Achieve Objectives

While there are a wide array of actions and strategies identified in sections 1.3.1 and 1.3.2 that could help achieve these objectives, this plan focuses on six general strategies:

1. Implementation of NO_x Emissions Control Measures;
2. Outreach, Education, and Technical Support to Enhance NO_x Emission Reductions;
3. Outreach and Education to Reduce Exposure to Ambient O₃, PM, and NO₂ Pollution when Levels are “Moderate” or Worse;
4. Ambient Air Monitoring;
5. Other Air Quality Research and Planning Activities; and
6. Policy Advocacy.

1.3 The Clean Air Coalition

The Central Texas Clean Air Coalition of CAPCOG, otherwise known as the Clean Air Coalition or CAC, is a voluntary, unincorporated association that was formed in association with CAPCOG on November 13, 2002. The purpose of the CAC is:

- To develop, adopt, and implement a clean air plan to achieve and maintain compliance with federal ground-level O₃ standards for Bastrop, Caldwell, Hays, Travis, and Williamson Counties;
- To establish and monitor a regional effort toward the improvement of air quality;
- To develop policies and strategies that will provide guidance for each of its independent governing bodies about actions that will achieve clean air in Central Texas;
- To work cooperatively to achieve clean air standards that will protect public health and yet allow local governments the flexibility to select measures best-suited to each community’s needs and resources; and
- To provide CAPCOG’s Executive Committee with recommendations for administering funding provided by local sources for the purpose of supporting the regional air quality plan or program implementation, assessment, and improvement activities in Central Texas.

The CAC consists of both “general members” and “supporting members.” “General members” are city governments, county governments, and independent school districts that have made a specific commitment to participate in the regional air quality plan and appoint a member of its city council or commissioners’ court to serve as a voting representative on the CAC. “Supporting members” include any

other organization that supports the purpose of the CAC and agrees to report their actions in support of the regional air quality plan to the CAC and CAPCOG. All five county governments and all but two of the home-rule cities in the MSA are general members of the CAC, and a number of other public, private, and non-profit organizations are supporting members.

In September 2018, CAPCOG sent out letters to each current CAC member and a number of other organizations to seek commitments to participate in the new regional air quality plan.

Organizations that have committed to participating in this plan as of December 21, 2018, include:

- All five county governments in the MSA:
 - Bastrop, Caldwell, Hays, Travis, and Williamson Counties;
- All but one of the home-rule cities in the MSA and one additional general-law city:
 - The cities of Austin, Bastrop, Bee Cave, Buda, Cedar Park, Elgin, Georgetown, Hutto, Kyle (new), Lago Vista (new), Lakeway, Leander, Lockhart, Luling, Pflugerville, Round Rock, San Marcos, Sunset Valley, and Taylor;
- Five regional government agencies:
 - CAPCOG, Capital Area Metropolitan Planning Organization (CAMPO), Capital Metropolitan Transportation Authority (CapMetro), Central Texas Regional Mobility Authority (CTRMA), and Lower Colorado River Authority (LCRA);
- Three state agencies:
 - TCEQ, Texas Department of Transportation (TxDOT), and Texas Parks and Wildlife Department (TPWD);
- Two federal agencies:
 - EPA and the Federal Highway Administration (FHWA);
- Four non-profit organizations:
 - CLEAN AIR Force of Central Texas; Lone Star Clean Fuels Alliance (LSCFA), the Lone Star Chapter of the Sierra Club, and the Texas Chapter of Public Citizen;
- Two private sector owners/operators of large point sources:
 - Austin White Lime and Texas Lehigh Cement Company.

Each organization's role and a summary of its participation in this plan are listed in appendices C and D, respectively. CAPCOG has also developed more accompanying detailed spreadsheet listing each organization's specific commitments. CAPCOG will update the list above, appendices C and D, and the related spreadsheet as needed to keep information on participants and participation current.

1.3.1 General CAC Members:

As described in the CAC's by-laws, **General members** are local governments or Independent School Districts within the MSA. The governing boards of general members must ratify the current clean air plan and commit to implementing selected emission reduction measures. Each of the general members appoints an elected official to serve on the CAC's governing board. The five county governments and all of the city governments other than Lago Vista, Sunset Valley, and Taylor are general members of the CAC.

1.3.2 Supporting CAC Members

Supporting members act within their organizations to support the purpose of the CAC and report their actions to the CAC or CAPCOG liaison upon request. The cities of Lago Vista, Sunset Valley, and Taylor are all supporting members of the CAC, as are all of the other organizations participating in this plan.

1.3.3 Staff Liaisons

The governing board or chief administrative officer of each CAC member organization designates a staff point of contact to facilitate communications between CAPCOG and the organization on air quality issues and to report information to CAPCOG on the implementation of air quality measures. CAC members may also designate “backup” staff liaisons. CAPCOG will request the organization’s confirmation of staff liaisons at least once every two years at the time when new terms for general CAC member representatives begin (i.e., at the beginning of each even-numbered year). CAC liaisons are eligible to serve on the CAC Advisory Committee, described below.

1.3.4 CAC Advisory Committee

The CAC Advisory Committee is a committee of CAC staff liaisons to provide policy and technical advice to the CAC. CAPCOG plans to establish the CAC Advisory Committee as a formal CAPCOG Advisory Committee during the 1st half of 2019.

2 Strategy #1: Implementation of NO_x Emissions Control Measures

Implementation of NO_x emission control measures within the MSA supports both of this plan’s objectives. It includes both measures that directly reduce NO_x emissions and measures that indirectly reduce emissions from activities that a CAC member can significantly influence. NO_x controls include measures that reduce the overall mass of NO_x emitted across the year, during O₃ season, or on individual days, but they can also include measures that minimize the impact of the NO_x emissions that do occur on peak O₃ days by changing the timing or location of the emissions. NO_x reductions implemented by CAC members or the public are necessary for reducing the region’s O₃ design value and reaching the 0.70 – 1.00 ppb target for O₃ reductions established by the CAC for this plan. Beyond their benefit for compliance with both the current and any future O₃ NAAQS, NO_x emissions controls also:

- Reduces design values for NO₂, particulate matter smaller than 2.5 microns (PM_{2.5}), and particulate matter smaller than 10 microns (PM₁₀), thereby further reducing the small risks associated with non-compliance with these NAAQS;
- Reduces the number of days when NO₂, O₃, PM_{2.5}, and PM₁₀ concentrations would reach levels considered “moderate” or “unhealthy for sensitive groups;”
- Reduces the peak concentrations of NO₂, O₃, PM_{2.5}, and PM₁₀ when concentrations do reach levels considered “moderate” or “unhealthy for sensitive groups;” and
- Reduces the region’s contribution to health and environmental impacts of NO₂, O₃, PM_{2.5}, and PM₁₀ concentrations in other areas.

Actions taken to reduce NO_x emissions usually also have a number of other co-benefits:

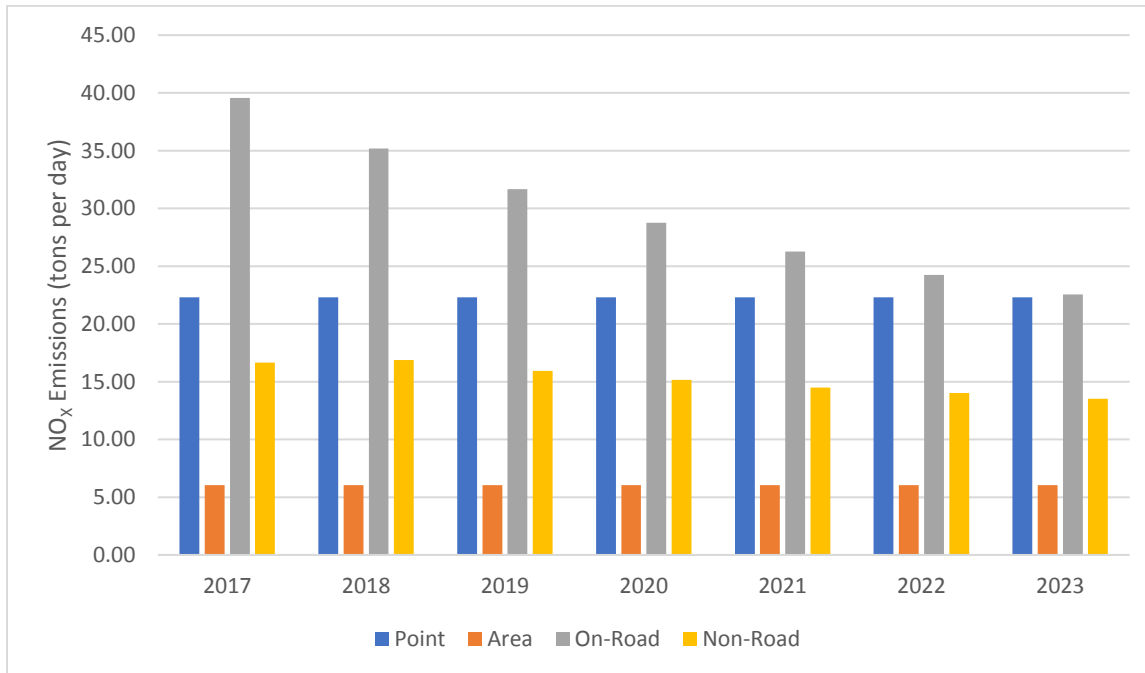
- Actions taken to reduce underlying NO_x emissions-generating activity usually:
 - Reduce fossil fuel consumption and associated environmental impacts from extraction, processing, and transporting these fuels; and
 - Reduce direct emissions of all other combustion-related pollutants, including CO, CO₂, CH₄, NH₃, Pb, PM_{2.5}, PM₁₀, SO₂, and VOC;

- Actions taken to reduce NO_x rates usually reduce emissions of other pollutants, especially if the action involves replacing an older combustion source with a newer combustion source that must meet stricter mobile source standards or new source performance standards (NSPS).

2.1 Sources of NO_x Emissions

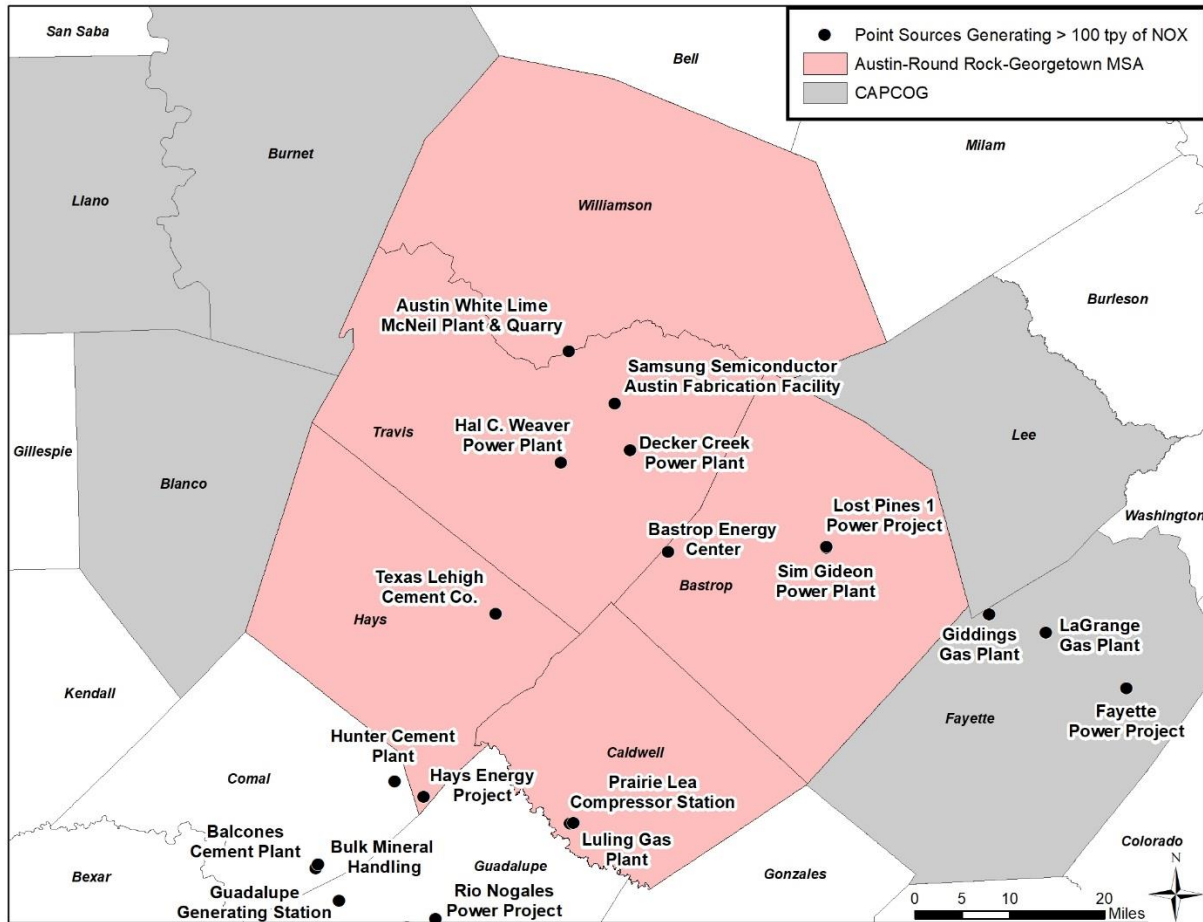
Anthropogenic NO_x emissions are a result of combustion. Within the MSA, on-road sources are the primary source of NO_x emissions. However, by 2023, on-road and point source emissions are expected to be roughly equal due to on-going reductions in mobile source emissions from federal engine standards and fleet turnover.

Figure 2-1. Estimated NO_x Emissions on Peak O₃ Days, 2017-2023



The following map depicts the MSA, and surrounding area along with the location of all “major” point sources of NO_x emissions. For this plan, a “major” point source of NO_x emissions is defined as a facility that reported emitting at least 100 tons per year (tpy) of NO_x in 2016 to TCEQ as part of their annual emissions inventory. The map below excludes the Sandow Power Plant in Milam County due to its closure in early 2018.

Figure 2-2. Major Point Sources of NO_x Emissions in and Near the Austin-Round Rock-Georgetown MSA



One of the unique successes of the planning effort in the MSA over the years has been the participation of owners and operators of major point sources within the region. There are 11 major point sources of NO_x located within the MSA. Seven of them are either owned by CAC members (Austin White Lime, City of Austin: Decker Creek Power Plant, LCRA: Sim Gideon Power Plant and Lost Pines Power Plant, and Texas Lehigh Cement Company) or are participating in the Clean Air Partners Program (Samsung and University of Texas: Hal Weaver Power Plant). These seven point sources account for the vast majority of the MSA’s point source NO_x emissions on average O₃ season days (OSDs). A majority of the population in the region also lives in a city with a municipally-owned power utility, which affords the CAC a broader ability to address NO_x emissions through direct controls on generating assets, onsite renewable energy, energy storage, demand-side management, and energy conservation.

2.2 Continuation of Existing State Controls

This plan counts on the continuation of a number of existing state-level emission reduction and control measures applicable to sources in the MSA that reduce or limit NO_x emissions. Many of these measures have been incorporated into the State Implementation Plan (SIP) as a part of the state’s strategy to attain and maintain compliance with the NAAQS throughout the state, including:

2019-2023 Austin-Round Rock-Georgetown MSA Regional Air Quality Plan

- The vehicle emissions inspection and maintenance (I/M) program in Travis and Williamson Counties (30 TAC Chapter 114, Subchapter C, Division 3);
- Texas Low-Emission Diesel (TxLED) in 110 counties in central and eastern Texas including all five counties in the MSA (30 TAC Chapter 114, Subchapter H, Division 2);
- California standards for large non-road spark-ignition engines (30 TAC Chapter 114, Subchapter E, Division 3);
- Rules allowing for TCEQ to enter into Memoranda of Agreement with local jurisdictions to enforce heavy-duty vehicle idling restrictions (30 TAC Chapter 114, Subchapter J, Division 2);
- The Texas Emission Reduction Plan (TERP) Diesel Emission Reduction Incentive (DERI) grant program, which is available to 42 counties in nine metro areas in the state, including the Austin-Round Rock-Georgetown MSA (30 TAC Chapter 114, Subchapter K, Division 3);
- The TERP Clean School Bus (CSB) program, which is available statewide (30 TAC Chapter 114, Subchapter K, Division 4);
- The TERP Texas Clean Fleet Program (TCFP), which is available to the same 42 counties eligible for the DERI program, as well as 21 additional counties located between the Dallas-Fort Worth (DFW), Houston, and San Antonio metro areas (30 TAC Chapter 114, Subchapter K, Division 5);
- NO_x emission limits at electric generating units (EGUs) in Bastrop and Travis Counties (30 TAC Chapter 117, Subchapter E, Division 1);
- NO_x emission limits at cement kilns in Hays County (30 TAC Chapter 117, Subchapter E, Division 2); and
- NO_x emission limits for new water heaters, small boilers, and process heaters sold statewide after 2004 (30 TAC Chapter 117, Subchapter E, Division 2).

More information on EPA's approved regulations in the Texas SIP is available here:

<https://www.epa.gov/sips-tx/epa-approved-regulations-texas-sip-0>. In some cases, including the rules for the TERP grant programs statutory changes adopted by the Texas Legislature in 2017 may not have been incorporated into the SIP yet.

Perhaps most notable among these rules are the vehicle I/M rules applicable to Travis and Williamson Counties. These rules were adopted by TCEQ as part of the 2004 EAC SIP at the request of each county and its largest city. These are the only two counties in the state that have an I/M program that was not required to have one as a result of a nonattainment designation, and – to CAPCOG's knowledge – are by far the two largest counties in the country that have an I/M program that are not required to have one. An I/M program would have only been required for if the area was classified as a "moderate" or worse O₃ nonattainment area, and even then, the program would only be required to cover the Austin urbanized area as of 1990 if the region was classified as "moderate." This measure therefore not only goes further than what would be required if the region was designated "nonattainment," it goes further even than what would be required if the region was designated "nonattainment" with a "moderate classification." This measure accounts for more than a 10% reduction in NO_x emissions from gasoline vehicles.³

³ Note: in Spring 2018, at the request of several stakeholders, CAPCOG estimated the emission reductions and O₃ impact of expanding the I/M program to Bastrop, Caldwell, and Hays Counties, but found that the incremental O₃

Section 110(l) of the Clean Air Act states that “the [EPA] Administrator shall not approve a revision of a plan if the revision would interfere with any applicable requirement concerning attainment and reasonable further progress, or any other applicable requirement of this chapter.” Given how close the region is to violating the O₃ NAAQS, any loosening or revocation of these regulations for the MSA could interfere with the MSA’s continued attainment of the O₃ NAAQS and put the region’s attainment status at risk. Any reduced funding to TERP programs generally, and the DERI program specifically, or reduced allocation of these funds to projects in the MSA would also increase the risks to the region’s attainment status.

In addition to these rules and programs, there are other state measures that haven’t been incorporated into the SIP, but which can control NO_x emissions within the region. These include:

- Maximum allowable emission rates for NO_x emissions incorporated into prevention of significant deterioration (PSD) and minor source new source review (NSR) point source permits;
- NO_x emissions limits in standard permits and permits-by-rule;
- The TERP Light-Duty Motor Vehicle Purchase or Lease Incentive Program (LDPLIP), which is available statewide (30 TAC Chapter 114, Subchapter K, Division 2);
- The TERP New Technology Implementation Grant (NTIG) program;
- The TERP Texas Natural Gas Vehicle Grant (TNGVGP); and
- The TERP Alternative Fueling Facilities Program (AFFP)

Historically, the TERP programs listed above have not been as cost-effective at reducing NO_x emissions as the DERI program. However, these other programs continue to be funded by the legislature and TCEQ and the MSA continues to receive funding through these programs. Therefore, to the extent that funding continues to be directed to these programs, any reduction in the allocation of funding to the MSA would reduce the amount of NO_x emissions achievable within the region.

2.3 Texas Volkswagen Environmental Mitigation Program

On November 16, 2018, TCEQ finalized its *Beneficiary Mitigation Plan for Texas* for the Volkswagen (VW) Environmental Mitigation Trust.⁴ TCEQ’s goals for the plan include the following:

1. Reduce NO_x Emissions;
2. Reduce the Potential for Exposure of the Public to Pollutants;
3. Prepare for Increased and Sustained Use of Zero Emission Vehicles (ZEV); and
4. Complement Other Incentive Funding Programs.

TCEQ’s plan includes two incentive programs available to the MSA:

- Priority Area Vehicle/Equipment Replacement and Repower Projects (\$16.3 million allocated to the MSA):
 - Class 4-8 Local Freight Truck Replacement/Repower Projects;
 - Class 7-8 Refuse Vehicle Replacement/Repower Projects;

design value benefit of less than 0.1 ppb would not be enough to justify the significant effort that would be required to do so. This information was presented in workshops CAPCOG conducted on May 31 and June 1, 2018.

⁴ TCEQ. *Volkswagen Environmental Mitigation Trust Beneficiary Mitigation Plan for Texas*. November 2018. RG-537. Available online at: https://www.tceq.texas.gov/assets/public/comm_exec/pubs/rg/rg-537.pdf

- Class 4-8 School Bus Replacement/Repower Projects;
- Class 4-8 Transit and Shuttle Bus Replacement/Repower Projects;
- Electric Forklifts and Port Cargo Handling Equipment; and
- Electric Airport Ground Support Equipment.
- Statewide light-duty ZEV supply equipment funding (\$31.2 million)
 - Electric charging infrastructure; and
 - Hydrogen fueling infrastructure.

TCEQ has indicated that it plans to start opening grant rounds for these incentive programs in early 2019. CAPCOG will notify CAC members of these grant opportunities, assist them with applications upon request, and keep track of grant funding awarded through monthly air quality newsletters and the annual air quality report.

2.4 EPA Emission Reduction Grants

In addition to TERP grants and VW grants, EPA also has an emission reduction incentive grant program: Diesel Emission Reduction Act (DERA) grants. These grants are usually made available annually nationwide, and some or all of the counties in the MSA have been identified as priority areas for these grants in the past. For the 2019 grant round, Travis and Williamson Counties are identified as priority areas based on EPA's 2011 National Air Toxics Assessment (NATA).⁵

The most recent request for proposals (RFP) provided \$40 million for exhaust controls, cleaner fuels, engine upgrades, verified idle reduction technologies, verified aerodynamic technologies, low-rolling resistance tires, certified engine replacements, and/or certified vehicle or equipment replacement for the following vehicle and equipment types:

- Class 5-8 heavy-duty highway vehicles
- Marine engines
- Locomotives
- Nonroad engines and vehicles used in construction
- Nonroad engines and vehicles used in handling of cargo (including a port or airport)
- Nonroad engines and vehicles used in agriculture
- Nonroad engines and vehicles used in mining or energy production (including stationary generators and pumps)

CAPCOG will evaluate the 2019 RFP and future RFPs, inform CAC members about the opportunity, and either prepare a regional grant application on behalf of local partners or provide technical assistance to local partners to apply directly to EPA for this funding.

2.5 Regional and Local Measures Implemented by CAC Members

Beyond the O₃ reduction impact of continuing the state-level measures applicable to the region, additional local and regional actions would be needed to achieve the 0.7 – 1.0 ppb reduction in peak O₃ levels. Assuming that the I/M program, TxLED, and TERP programs remain in place and achieved the 0.3

⁵ <https://www.epa.gov/sites/production/files/2018-04/documents/fy18-priority-counties-national.pdf>

– 0.4 ppb O₃ reductions described in the Technical Support Document (TSD), an additional 0.3 – 0.7 ppb reduction in O₃ through measures implemented within the region is needed from 2019 - 2023.

The CAC plans to reach this pollution reduction target through implementation of a number of measures targeting emissions from personal vehicles, commercial vehicles and non-road equipment, power plants, and other stationary sources. Each CAC member has selected measures that it commits to implement during the term of this plan, and will provide annual updates to CAPCOG on the status of these measures.

These measures are grouped into three categories:

- Tier 1 measures: these are low-threshold best practices that should not necessarily require the use of financial resources, but instead involve an organizational focus on air pollution;
- Tier 2 measures: these are also best practices, but go beyond Tier 1 measures and would require some outlay of resources; and
- Other measures: there are a number of other measures that were identified by CAC members that they intend to implement other than the Tier 1 or Tier 2 measures.

2.5.1 Tier 1 Pollution Reduction Measures

The following list identifies the Tier 1 pollution reduction measures for this plan, organized by the source of emissions targeted. Additional details about these measures are available in an emission reduction measure guide that accompanies this plan.

- Measures to reduce air pollution from the use of personal vehicles:
 - Where feasible, encourage employees to telecommute at least once a week and on all O₃ Action Days;
 - When employees are not telecommuting, encourage them to take low-emission modes of transportation, such as carpooling, vanpooling, transit, biking, and walking; and
 - Where flexible schedules are allowed, encourage employees to consider work schedules with start times earlier than 8 am rather than later in the morning due to the higher impact of emissions on O₃ levels later in the morning.
- Measures to reduce air pollution from the use of fleet/commercial vehicles and equipment:
 - Establish and enforce idling restriction policies for use of the organization's vehicles, equipment, and property;
 - Establish fleet management policies that prioritize the use of vehicles and equipment with low NO_x rates;
 - Educate fleet users on driving and equipment operation practices that can reduce NO_x emissions; and
 - Seek funding to accelerate replacement of older, higher-emitting vehicles and equipment with newer, cleaner vehicles and equipment, such as TERP grants.
- Measures to reduce air pollution from power plants and other stationary combustion sources:
 - Conserve energy, particularly on O₃ Action Days; and

- Schedule discretionary emission-generating activities such as engine testing to the afternoon, particularly on O₃ Action Days.

2.5.2 Tier 2 Pollution Reduction Measures

The following list identifies the Tier 2 pollution reduction measures for this plan, organized by the source of emissions targeted. Additional details about these measures are available in an emission reduction measure guide that accompanies this plan.

- Measures to reduce air pollution from the use of personal vehicles:
 - Provide incentives to employees to avoid single-occupancy vehicle commuting, particularly on O₃ Action Days.
- Measures to reduce air pollution from the use of fleet/commercial vehicles and equipment:
 - Establish low-NO_x purchasing policies for new on-road vehicles, non-road equipment, and stationary equipment;
 - Establish “green” contracting policies to encourage the use of low-NO_x vehicles and equipment and avoid the use of engines during the morning on O₃ Action Days;
 - Purchase higher-grade gasoline with lower sulfur content in August and September; and
 - Enforce vehicle idling restrictions within the community [either through an ordinance if a city or a memorandum of agreement with TCEQ if a county].
- Measures to reduce air pollution from power plants and other stationary combustion sources:
 - Optimize combustion and pollution controls for NO_x reductions, particularly on O₃ Action Days and between 9 am and 3 pm.

2.5.3 Other Pollution Reduction Measures

Other pollution reduction measures implemented by CAC members or planned to be implemented by CAC members. These include:

- Energy demand management measures implemented by local utilities and other organizations:
 - Reductions in electricity consumption;
 - Distributed generation of zero-emission energy; and
 - Purchases of zero-emission energy from the grid.
- Closure of electric generating units (For example, Austin Energy plans to close Decker Creek Power Plant units 1 and 2 in 2020 and 2021).
- Measures that affect commuter decisions:
 - Provision of transit services;
 - Provision of vanpooling services;
 - Allowing flexible work schedules;
 - Allowing compressed work week schedules;
 - Allowing telecommuting;
 - E-government; and

- Direct deposit.
- Transportation system management and infrastructure improvements:
 - Improve traffic signalization;
 - Enhance incident management systems;
 - Intelligent transportation systems;
 - Roadway and congestion pricing (MoPac expressway); and
 - Paving of unpaved roads.
- Using alternative-fueled (not gasoline or diesel) vehicles and non-road equipment:
 - Electric vehicles and equipment; and
 - Propane and natural gas equipment.

These measures were not specifically identified in the “Regional Air Pollution Measure Guide” prepared by CAPCOG and distributed to CAC members in early September, although CAPCOG did request that CAC members identify any measure that they wished to include in their commitments even if it did not fit into the Tier 1/Tier 2 categories. In some cases, CAC members may have made commitments only based on the Tier 1/Tier 2 categories, and may be implementing some of these “other” measures, but did not specifically list them in their commitments. In such cases, annual reporting should reflect these activities.

3 Strategy #2: Outreach, Education, and Technical Support to Enhance NO_x Reductions

Outreach, Education, and Technical Support to Enhance NO_x Reductions helps advance both of the objectives in this plan. This type of outreach is focused on persuading people to take action to reduce emissions or otherwise providing them with the information needed to take action to maximize the amount of NO_x emissions reductions that they can achieve. This strategy includes:

- Outreach to the public to encourage them to drive less, use cleaner vehicles and equipment, and conserving energy;
- Outreach to business and other institutions to encourage them to take action to reduce emissions;
- Providing technical support to CAC members and others to help them maximize the amount of NO_x emissions that they can achieve; and
- Providing technical and logistical support to CAC members and others interested in applying for grant funding for activities that would reduce NO_x emissions.

3.1 Air Central Texas Outreach and Education Campaign

CAPCOG and other members of the CAC conduct region-wide public air quality outreach and education under the banner of “Air Central Texas.”

Figure 3-1. Air Central Texas Logo



AIR CENTRAL TEXAS

CAPCOG maintains a website (www.aircentraltexas.org), social media accounts, conducts in-person outreach throughout the region, and, when funding is available, purchases advertising to promote air quality awareness and encourage the public to take action to reduce emissions. Key messages include general air quality awareness, encouraging residents to drive less, drive cleaner, and conserve.

CAPCOG will continue to support the Air Central Texas program as the public air quality outreach and education campaign with activities and events that support the objectives of this plan. Air Central Texas will, as resources are available:

- Coordinate air quality outreach activities undertaken by individual CAC members across the region;
- Host the annual air quality awards which celebrate the activities by organizations and individuals that have made significant contributions to regional air quality in Central Texas and promote future action on the part of the community to support the objectives of the region's ongoing air quality planning efforts;
- Develop air quality awareness and marketing materials that help our region better understand air quality issues in the region;
- Continue to develop and enhance the Air Central Texas tool kit which is a clearinghouse of air quality outreach, education, and marketing materials;
- Collaborate with partners and stakeholders to hold air quality awareness events like they City of Austin's 2018 Air Quality Awareness Week Press Event and Clean AIR Force's O₃ Season Kick-off event;
- Hold and promote air quality awareness campaigns like the 2017 Air Central Texas 'Test you AQ-IQ' Contest and the 2018 Air Central Texas Commuter Contest;
- Attend community events in-person to better engage with the public or targeted audience;
- Electronic outreach through our website, social media accounts and possibly other medias as they become available; and
- Advertising to the region to increase air quality awareness and increase public action to reduce air pollution and exposure to high levels of air pollution.

3.2 Commute Solutions Program



CAPCOG's Commute Solutions Program is a regional Transportation Demand Management (TDM) initiative that works to reduce single occupancy vehicle use in the CAPCOG region. TDM strategies promoted by the program include, carpool, vanpool, transit, active transportation (bike and walk), telework, compress work schedules, and shifted work schedule to avoid peak traffic congestion. Commute Solutions promotes these activities through social media marketing, paid advertising, incentives and contests, employer outreach, the program website, newsletters, and in-person outreach. The program also operates a ride-matching/trip tracking platform, called myCommuteSolutions (myCommuteSolutions.com), where members of the public can search for people to carpool with and log their trips. The platform also provides data to CAPCOG to measure and report on the performance of the program to stakeholders.

3.3 Business and Institutional Outreach

Outreach to businesses and institutions is particularly important because of the magnitude of potential impact they have in influencing behavior and emissions-generating activity. Getting a single point source owner to take action to reduce emissions can have many times the air quality impact that thousands of people taking action to reduce their personal emissions could achieve. With this in mind, on-going business and institutional outreach will continue to be an important part of the regional air quality plan.

3.3.1 Recruitment of New CAC Members

In September 2018, the Chair and Vice-Chair of the CAC sent letters to a number of organizations requesting that they participate in the new regional air quality plan. These included:

- Owners and operators of point sources that emitted more than 100 tons per year of NO_x within the MSA in 2016;
- Organizations with 2,000 or more employees;
- Electricity, gas, and fuel distributors;
- The Austin Chamber of Commerce;
- Movability (a six-county regional Transportation Management Association);
- Environmental and public health organizations; and
- Home-rule cities in the MSA that had not yet adopted resolutions to participate in the CAC.

One federal agency (FHWA), one state agency (TPWD), one city (Lago Vista), and two environmental groups (Lone Star Chapter of the Sierra Club and Public Citizen) have agreed to participate in the plan. Pedernales Electric Cooperative responded to the letter, but has not clearly indicated that they wish to participate. Although the University of Texas at Austin is a Clean Air Partner, it declined to participate as a supporting member of the CAC.

CAPCOG will conduct ongoing outreach to these organizations in order to try to recruit them to participate in the plan throughout the term of this plan. Any new participants in the annual air quality report will be noted.

3.3.2 Clean Air Partners Program

CAF's Clean Air Partners Program recognizes and encourages local employers to reduce O₃-forming emissions through a variety of voluntary actions such as commuter programs, energy efficiency, and other business activities. Employers within the MSA are eligible to participate, and are encouraged to reduce at least 10% of their O₃-forming emissions within three years. Each partner creates its own emissions baseline to reduce emissions from and carries out voluntary actions to reduce its emissions. Participating organizations report information to CAF online annually, and CAF provides each organization with a report on their estimated emission reductions in order to evaluate whether it achieved its pollution reduction targets.

Private sector partners include:

- 3M
- Applied Materials, Inc.
- Chemical Logic, Inc.
- Emerson Process Management
- EnviroMedia Social Marketing
- HNTB Corporation
- Metropia
- NXP
- Oracle
- Pfizer
- R&R Limousine and Bus
- Samsung Austin Semiconductor
- Spectrum
- St. David's Health Care Partnership
- TECO-Westinghouse
- Tokyo Electron

Non-profit and public sector partners include:

- Zephyr Environmental Corp.
- American Lung Association
- Austin Community College District
- Austin Independent School District
- CAPCOG (also a CAC member)
- CAMPO (also a CAC member)
- CTRMA (also a CAC member)
- City of Austin (also a CAC member)
- Environmental Defense Fund
- LSCFA (also a CAC member)
- LCRA (also a CAC member)
- Seton Healthcare Family
- TxDOT
- Travis County
- UT-Austin
- Williamson County

3.3.3 LSCFA Fleet Outreach

LSFCA is a membership-based 501(c)(3) non-profit organization that is designated as the region's Clean Cities coalition by the Department of Energy (DOE). The DOE's Clean Cities program develops partnerships and provides publications, tools, and other resources to provide technical assistance to fleets implementing alternative and renewable fuels, idle-reduction measures, fuel economy improvements, and emerging transportation technologies. Activities include:

- Building partnerships with local coalitions of public- and private-sector transportation stakeholders;
- Developing unbiased and objective information resources about alternative fuels, advanced vehicles, and other strategies that improve transportation efficiency and reduce costs;

- Advancing interactive, data-driven online tools to help stakeholders evaluate options and achieve goals;
- Collecting and sharing best practices, data, and lessons learned to inform choices and build a strong national network;
- Working with industry partners and fleets to identify and address technology barriers;
- Empowering local decision makers and successfully identify and implement new transportation strategies; and
- Seeding local alternative fuels markets through projects that deploy vehicles and fueling infrastructure.

While the Clean Cities program has somewhat different goals than the region’s air quality plan, its activities are generally in alignment with the types of activities needed to reduce emissions from fleets, which remains one of the biggest opportunities for achieving additional emission reductions in future years. The CAC will continue to rely on the relationships that LSCFA has built with fleet managers over the years and ongoing outreach to fleets that it conducts in order to be the primary point of contact for conducting general air quality outreach as well.

3.4 CAPCOG Technical Assistance to CAC Members

CAPCOG will provide technical assistance to CAC members in their implementation of pollution control measures in order to expand adoption of measures and enhance their performance for the region.

Technical assistance will include:

- Assistance with applications for grants that can reduce NO_x emissions;
- Development of model fleet management policies and other operations policies that can reduce NO_x emissions;
- Hosting workshops to share information amongst CAC members on travel demand management, fleet management practices, and energy demand management measures; and
- Analysis of emission reductions and co-benefits that can be achieved through different options under consideration by CAC members.

4 Strategy #3: Outreach and Education to Reduce Exposure to O₃, PM, and NO₂

While reducing NO_x emissions can help control ambient O₃, PM, and NO₂ concentrations, these pollutants can still reach levels considered “moderate” or “unhealthy for sensitive groups,” based on EPA’s AQI. Over 40% of the region’s population is vulnerable to adverse health impacts from exposure to air pollution when it reaches levels considered “unhealthy for sensitive groups,” which occurred on 7 days in 2017 (all O₃) and 13 days in 2018 (10 days for O₃, and 3 days for PM_{2.5}). A subset of these groups who may be “unusually sensitive” to O₃ or PM_{2.5} concentrations can also suffer health impacts from “moderate” O₃ and PM_{2.5} concentrations. The following table summarizes the groups whose health could be affected by exposure to levels of O₃ and PM_{2.5} considered “unhealthy for sensitive groups.”

Table 4-1. Summary of EPA Air Quality Index Guidance for O₃ and PM_{2.5} Levels Considered “Unhealthy for Sensitive Groups”

| Sensitive Group | O ₃ | PM _{2.5} |
|---------------------------|-------------------------------------|-------------------------------------|
| People with lung disease | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| People with heart disease | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

| Sensitive Group | O ₃ | PM _{2.5} |
|--------------------------------|--|---|
| Older adults | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Children and teenagers | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| People who are active outdoors | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Recommended action | <p>Reduce prolonged or heavy exertion. Take more breaks, do less intense activities. Watch for symptoms such as coughing or shortness of breath. Schedule outdoor activities in the morning when O₃ is lower. People with asthma should follow their asthma plans and keep quick-relief medicine handy.</p> | <p>Reduce prolonged or heavy exertion. It's OK to be active outside, but take more breaks and do less intense activities. Watch for symptoms such as coughing or shortness of breath. People with asthma should follow their asthma action plans and keep quick relief medicine handy. If you have heart disease, symptoms such as heart palpitations, shortness of breath, or unusual fatigue may indicate a serious problem. If you have any of these, contact your health care provider.</p> |

For days when air pollution levels are only “moderate,” which occurred on 110 days in 2017, “some people who may be unusually sensitive” to O₃ or PM_{2.5} pollution could be affected. For these people, EPA advises that they, “consider reducing prolonged or heavy exertion. Watch for symptoms such as coughing or shortness of breath. These are signs to take it easier.” For everyone else, EPA advises that it’s a good day to be active outside. There are a few caveats to this:

- EPA’s 2015 O₃ NAAQS was set above the level that its Clean Air Scientific Advisory Committee (CASAC) had recommended (60-69 ppb), and these levels were within the range of what is currently considered “moderate;” and
- Regarding the PM NAAQS, EPA’s CASAC stated in 2010 that “there is no evidence of a threshold (i.e., a level below which there is no risk for adverse effects).⁶

The CAC intends to pursue the exposure reduction strategy through a combination of region-wide outreach and education efforts, air quality forecasting, provision of real-time air quality data, and outreach by CAC members to their employees and other residents to amplify and expand the reach of these efforts.

⁶ [https://yosemite.epa.gov/sab/sabproduct.nsf/CCF9F4C0500C500F8525779D0073C593/\\$File/EPA-CASAC-10-015-unsigned.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/CCF9F4C0500C500F8525779D0073C593/$File/EPA-CASAC-10-015-unsigned.pdf)

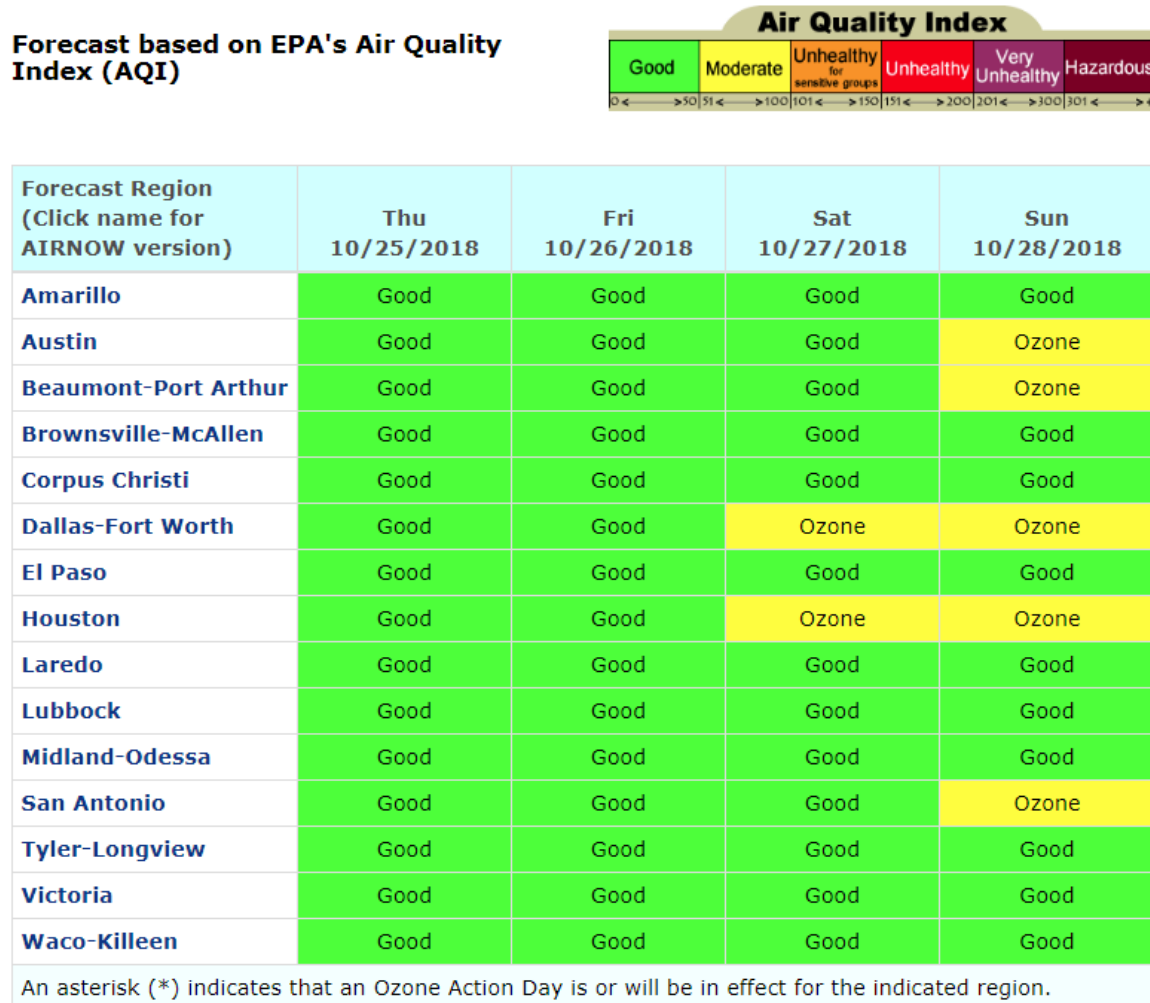
4.1 Air Quality Forecasting and Real-Time Air Quality Data

Air quality forecasting and real-time air quality data are key tools for helping reduce air pollution exposure.

4.1.1 Daily Air Quality Forecasts

'[Today's Texas Air Quality Forecast](#)' from TCEQ is based on EPA's AQI scale for O₃, PM_{2.5}, and PM₁₀, made for 14 forecast regions across the state (Austin, Beaumont-Port Arthur, Brownsville-McAllen, Corpus Christi, Dallas-Fort Worth, El Paso, Houston, Laredo, Lubbock, Midland-Odessa, San Antonio, Tyler-Longview, Victoria, and Waco-Killeen). It is updated daily on normal TCEQ work days and may also be updated on weekends or holidays when air pollution levels are high. The forecast is posted on the [Today's Texas Air Quality Forecast](#) webpage and disseminated via e-mail whenever updates are made. These forecasts provide a more comprehensive forecast of the region's expected air quality will be the next day than O₃ action days.

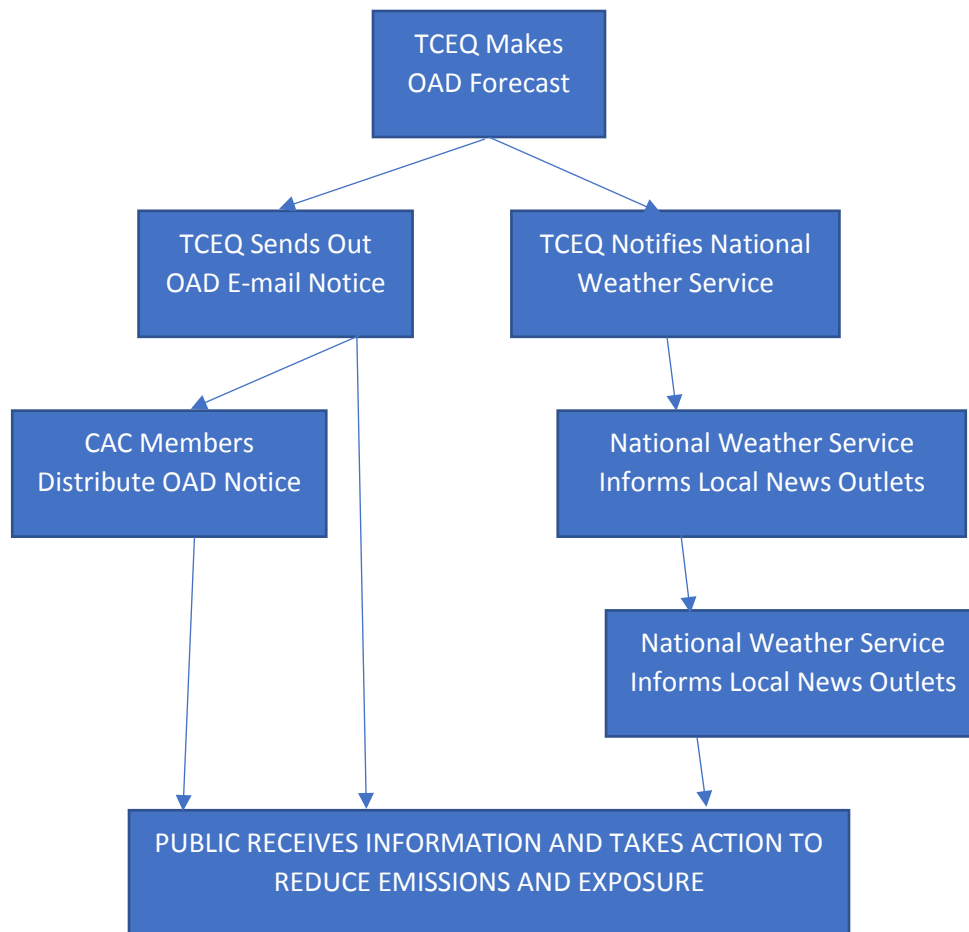
Figure 4-1. Example of TCEQ Air Quality Forecast



As of October 25, 2018, there are 3,710 total subscribers receiving TCEQ's daily air quality forecast e-mail, at least 1,125 of which also are signed up to receive the Austin area's OAD forecast e-mails (just under 1/2 of the number of people who are signed up to receive the OAD alerts for Austin are also signed up for the daily air quality forecasts).

4.1.2 O₃ Action Days

O₃ Action Day forecasts are one of the most important tools for helping mobilize the public to take action to reduce emissions and limit exposure of sensitive populations to high air pollution levels. Each day during the O₃ season (March through November), TCEQ makes O₃ Action Day forecasts for nine participating metropolitan areas including Austin. TCEQ informs the public typically a day in advance when conditions are forecast to be favorable for high O₃ levels (an 8-hour average of 71 ppb or higher or a 1-hour average of 125 ppb or higher) in any of the participating areas so citizens, businesses, and industry can take steps to reduce the pollutants that contribute to O₃ formation. According to TCEQ’s website, TCEQ meteorologists use a set of criteria from historic meteorological data, O₃ measurements, and O₃-prediction models to make these predictions. When they forecast an O₃ Action Day, TCEQ meteorologists contact the National Weather Service, which then broadcasts the information across its “weather wire.” Forecasts are typically made by 2 pm local time for the following day. As of October 25, 2018, there are 2,188 subscribers to TCEQ’s OAD alerts for the Austin area, 281 of which are signed up to receive the alerts via text message, with the remaining 1,907 of whom receive these alerts via e-mail.⁷ CAPCOG, CLEAN AIR Force, and other CAC members often forward TCEQ’s OAD alerts or send their own customized e-mails out to their own e-mail distribution networks, post about the OADs on their websites and social media accounts, and otherwise try to ensure that the word gets out about the OAD within their respective networks. The following diagram illustrates the flow of information when an OAD alert is issued.



⁷ E-mail from Weslee Copeland, TCEQ, to Andrew Hoekzema, CAPCOG, October 25, 2018.

OAD alerts are also useful for focusing attention on air quality generally and motivating people to take action to reduce emissions. In the case of Texas Lehigh and one of the “Tier 1” pollution reduction measures regarding the timing of engine testing, these alerts are also useful for direct control of NO_x emissions on days when O₃ is expected to be high.

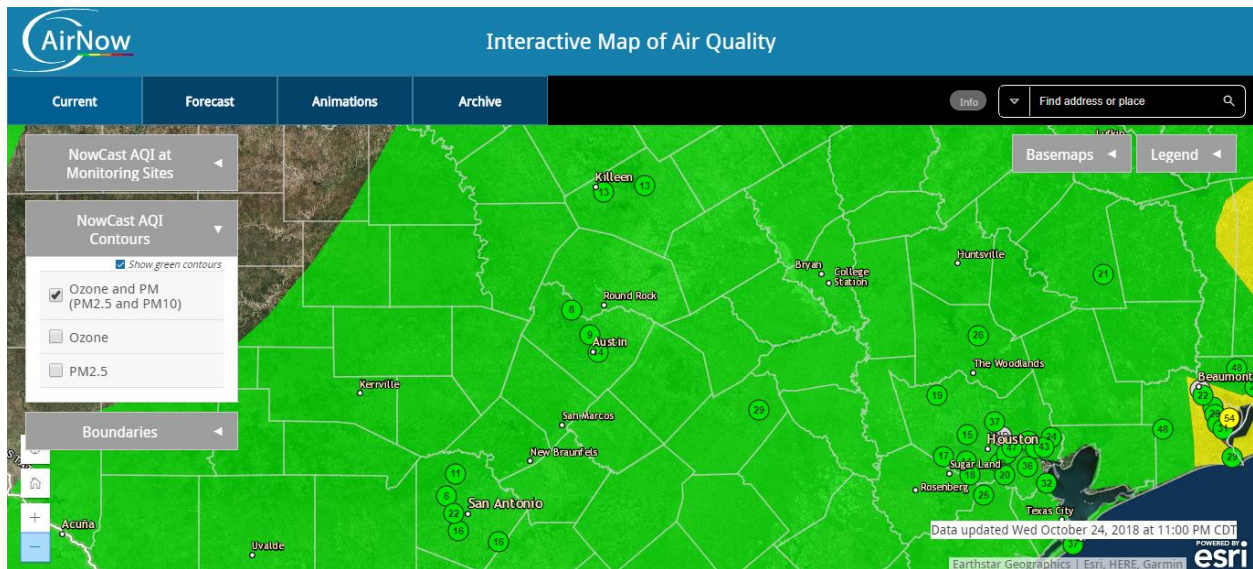
4.1.3 Real-Time Air Quality Data

Real-time air quality data can be a valuable tool in helping advise the public of when air quality conditions within their vicinity are poor in order to assist them in taking pollution-avoiding actions.

4.1.3.1 AirNow

EPA’s AirNow system allows users to enter their city, state, or zip code in order to find out the current air quality conditions within their area based on the AQI. There is both a desktop version and a mobile app for AirNow. Until January 2016, TCEQ was also reporting CAPCOG’s O₃ monitoring data to AirNow, but since then, it has only reported data from its own monitoring stations. The figure below is an example of the data available for the region.

Figure 4-2. Example of AirNow Map for Central Texas

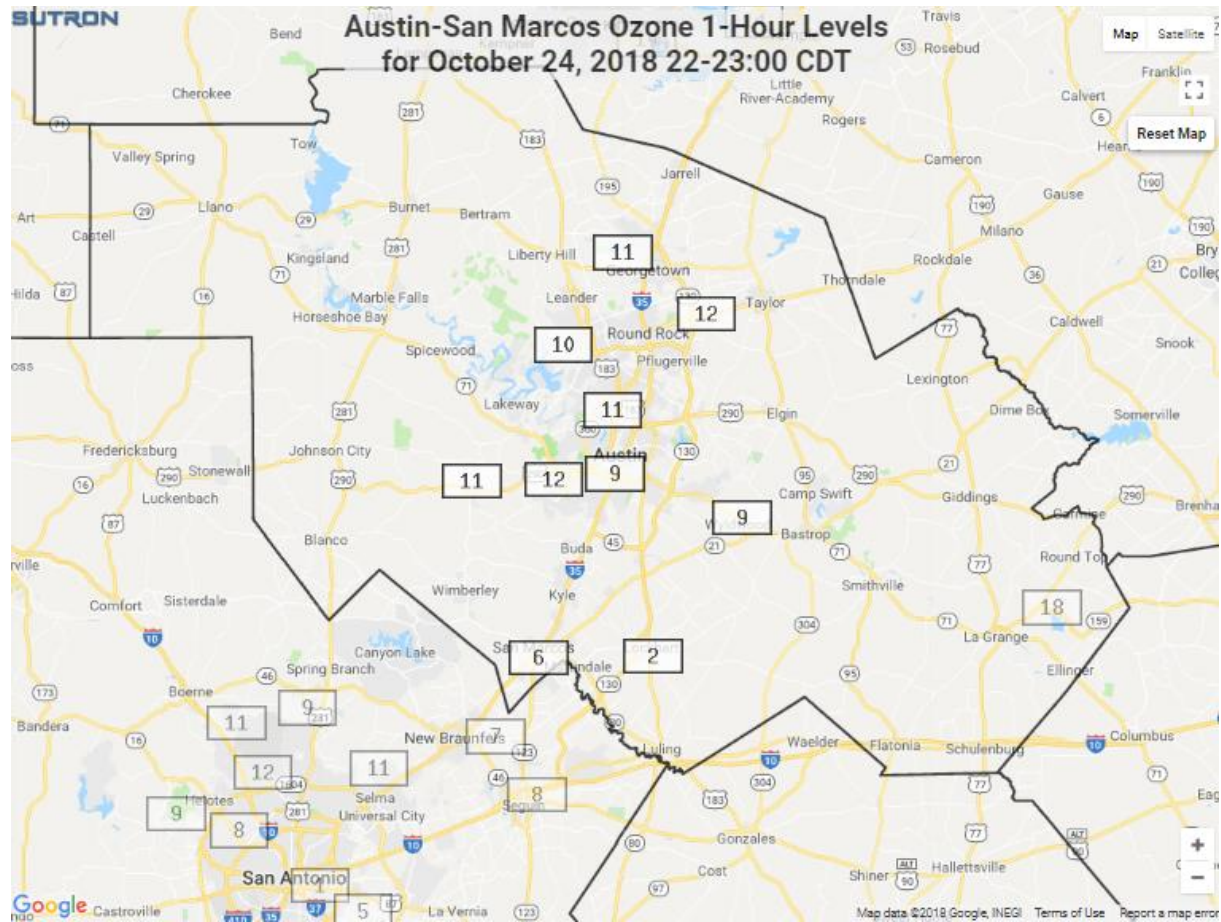


Since one of the reasons for collecting air monitoring data is to provide location-specific information about air quality conditions, and air quality conditions can vary significantly within the region, starting in 2019, CAPCOG plans to start reporting data from its O₃ monitoring stations directly to EPA’s AirNow system. As part of its outreach efforts, CAPCOG plans to promote the use of AirNow by residents and organizations participating in the plan in order to obtain real-time assessments of air quality conditions.

4.1.3.2 TCEQ’s Website

In addition to AirNow, the public can also look up near-real-time O₃ and PM_{2.5} air quality data from TCEQ’s website at https://www.tceq.texas.gov/cgi-bin/compliance/monops/select_curlev.pl and https://www.tceq.texas.gov/cgi-bin/compliance/monops/select_curlev.pl?user_param=88502.

Figure 4-3. Screen Shot of TCEQ "Current Ozone Levels" Page



4.2 Outreach to the Media

Outreach to the media is critical to achieving significant changes in behavior needed to accomplish the objectives of this plan.

4.2.1 O₃ Season Kick-Off Event

Each year towards the beginning of the region’s O₃ season (in April or May), CAF typically hosts an “O₃ season kick-off” event that they invite the press and various local officials to attend and participate in the event. The event is intended to call attention to the start of the region’s O₃ season, the health and environmental impacts of group-level O₃, the economic and regulatory consequences of non-compliance with the O₃ NAAQS, and the need to continue to take action within the region to reduce O₃-forming emissions. These events often receive press coverage and provide a high-profile way to keep regional air quality and the region’s ground-level O₃ issues in front of the public. This event also has benefits for motivating people to take action to reduce emissions.

4.2.2 Outreach to Meteorologists

It is important that the region’s meteorologists stay well-informed on air quality forecasts and issues and regularly include air quality forecasts in their weather forecasts each day. One of the ways that the CAC has helped ensure this high level of awareness among the region’s meteorologists has been events hosted by CAF, in partnership with the City of Austin, targeted at meteorologists. CAPCOG intends to

work with CAF and the City of Austin to ensure that this outreach continues throughout the term of this plan, particularly in light of the fact that most people’s awareness about air quality is as a directly result of hearing information about it from their local news. Similar to all activities that increase overall awareness about air quality, outreach to meteorologists also helps enhance the chances that members of the public and organizations within the region will take action to reduce NO_x emissions.

4.3 Outreach and Education by Individual CAC Members

In addition to the Tier 1 and Tier 2 pollution reduction measures, this plan also includes Tier 1 and Tier 2 outreach measures targeted at promoting awareness of air quality and reduce residents’ exposure when air pollution levels are high.

- Tier 1: Educating employees about regional air quality and encouraging them to sign up for daily air quality forecasts and O₃ Action Day alerts.
- Tier 2: Educating the public about regional air quality and encouraging them to sign up for daily air quality forecasts and O₃ Action Day alerts.

The CAC includes organizations representing tens of thousands of employees and over 2 million residents of the region, and repeated exposure to air quality messages can only enhance the effectiveness of this plan.

5 Strategy #4: Ambient Air Monitoring

Air monitoring is a critical strategy for achieving the region’s air quality objectives. As described in EPA’s ambient monitoring network assessment guidance, there are a variety of purposes for monitoring:

- Assessing regulatory compliance;
- Developing scientific understanding of air quality by supporting other types of assessments or analyses (such as air quality model evaluation or emissions reduction evaluation);
- Understanding historical trends in air quality;
- Characterizing specific geographic locations or emissions sources;
- Tracking the spatial distribution of air pollutants (including characterizing transport of air pollution into and within the region and assisting in air quality forecasting); and
- Evaluating population exposure to air pollutants (including environmental justice and public reporting of the Air Quality Index).

TCEQ is responsible for conducting the monitoring needed to establish regulatory compliance and its network within the MSA meets or exceeds all of EPA’s requirements. The following table summarizes TCEQ’s 2018 annual monitoring network plan for the region and whether TCEQ’s monitoring meets or exceeds the federal requirements.

Table 5-1. TCEQ 2018 Air Monitoring Plan for the Austin-Round Rock-Georgetown MSA Compared to Federal Requirements

| Pollutant | Required | Total Monitors | Meets or Exceeds Federal Requirements |
|-----------------------------|----------|----------------|---------------------------------------|
| Carbon Monoxide (CO) | 1 | 1 | Meets |
| NO₂ | 2 | 2 | Meets |
| O₃ | 2 | 2 | Meets |
| PM_{2.5} | 3 | 5 | Exceeds |
| PM₁₀ | 2-4 | 2 | Meets |

| Pollutant | Required | Total Monitors | Meets or Exceeds Federal Requirements |
|-----------------------------------|----------|----------------|---------------------------------------|
| Sulfur Dioxide (SO ₂) | 0 | 1 | Exceeds |
| VOC | 0 | 1 | Exceeds |

Due to the region’s concerns about compliance with the O₃ NAAQS, CAPCOG will continue to conduct O₃ monitoring within the region to supplement the regulatory O₃ monitoring conducted by TCEQ at CAMS 3 and 38. Data from these monitors can help support both objectives in this plan:

- O₃ data collected throughout the region can demonstrate the extent to which the region is being influenced by air pollution coming from outside the MSA;
- O₃ data collected throughout the region can be used to provide better public information about air pollution levels within each community than relying only on the minimum number required under federal rules;
- O₃ data collected in Bastrop, Caldwell, Hays, or Williamson Counties showing O₃ levels attaining the NAAQS in those counties could help those areas be designated “attainment/unclassifiable” if a regulatory O₃ monitor in Travis County violated the O₃ NAAQS; and
- O₃ data collected at non-regulatory O₃ monitors can indicate the need for additional regulatory monitoring or additional controls needed to ensure that the region’s air pollution levels remain in compliance with the NAAQS.

In support of these objectives, CAPCOG plans to:

- Continue operating CAMS 614 in Dripping Springs (Hays County), CAMS 690 in Georgetown (Williamson County), CAMS 1604 in Lockhart (Hays County), CAMS 1675 in San Marcos (Hays County), and CAMS 6602 in Hutto (Williamson County) from 2019-2023;
- Discontinue monitoring at CAMS 601 in Fayette County and CAMS 684 in Cedar Creek (Bastrop County) and establish new monitoring stations in the cities of Bastrop and Elgin, both of which are located in Bastrop County that will be operated from 2019-2023;
- Continue operating an O₃ station in Travis County from 2019-2023 (CAPCOG may continue operating CAMS 1603 for the 2019 O₃ season while trying to secure a new location in East Austin);
- Continuing to also report the data to TCEQ’s LEADS system in order to maintain continuity in the data hosted on TCEQ’s website; and
- Begin reporting the data directly to EPA’s AirNow system in order to enable EPA and the public to access CAPCOG’s air monitoring data through the AirNow desktop application and mobile app.

6 Strategy #5: Other Air Quality Research and Planning Activities

Ongoing research and planning activities beyond simply collecting air quality data is important for the region’s ability to achieve its air quality objectives. These activities are necessary for continual improvement in reducing emissions, reducing exposure to poor air quality, and working with counterparts at the state and federal level to avoid a nonattainment designation for the region if the area does measure air quality that violates the NAAQS. Throughout the period covered by this plan, CAPCOG will continue to coordinate the region’s on-going planning and air quality research activities.

6.1 Annual Air Quality Report

CAPCOG plans to continue to prepare an annual report that does the following:

1. Summarize the region's current air pollution levels, including compliance with the NAAQS, the number of days in each AQI range, TCEQ toxicological evaluations, EPA's NATA, and nuisance odor complaints files with the TCEQ;
2. Summarize the most current data on regional emissions;
3. Provide an update on state-level measures being implemented within the region;
4. Provide an update on local and regional measures implemented by CAC members and any changes in membership in the CAC or other aspects of participation in the plan;
5. Provide estimates of the magnitude of the impact of these measures on the region's O₃ levels; and
6. Summarize any new research, photochemical modeling, or other information relevant to understanding of emissions, control strategies, or air pollution within the region moving forward.

These reports provide a means of mutual accountability for CAC members, enable CAC members to consider changes to the measures they are implementing, and document the degree of control being achieved through voluntary actions being implemented within the region.

6.2 Emissions and Control Strategy Analysis

CAPCOG will continue to review and conduct analysis of emissions inventory data for the region and emissions control strategies. These activities will help the CAC better understand the level of emissions and level of control being achieved within the region, as well as opportunities for additional reductions. CAPCOG expects to conduct the following activities on an on-going basis throughout the course of this plan:

- Review, analyze, and prepare region-specific summaries of point source emissions data reported to TCEQ and EPA annually;
- Review, analyze, and prepare region-specific summaries of any new "trends" emissions estimates for mobile and area sources produced by TCEQ or EPA;
- Review, analyze, and prepare region-specific summaries of the 2017 and 2020 NEI data;
- Review, analyze, and prepare region-specific summaries of emissions inventory inputs used for any new photochemical modeling conducted by TCEQ, EPA, or others;
- Review and analyze any new category-specific emissions inventory research on mobile source or area source emissions produced by TCEQ or EPA;
- Review and analyze data from any new emissions models, such as EPA's MOVES model or TCEQ's Texas NONROAD model for implications on regional emissions estimates;
- Review and analyze trends in underlying activity data used for emissions inventory estimates (i.e., agricultural equipment counts, mining and quarrying activity, employment data);
- Prepare analyses of the emissions impact, costs, and other considerations for control strategies; and

- Undertake specialized studies to help improve the understanding of particular sources or activities within the region (such as CTRMA’s analysis of emissions and fuel consumption on the MoPac express lanes).

6.3 Other Types of Research Projects

From time to time, depending on funding availability and interest from the CAC, CAPCOG may also undertake other types of studies or research projects that support the region’s on-going air quality planning activities. In the past these have included:

- Conducting phone surveys in order to collect data on levels of air quality awareness, willingness to take action to reduce emissions, and levels of support for various regional emission strategies;
- An analysis of the potential economic impact of an O₃ nonattainment designation;
- A cost/benefit analysis of the region’s air quality planning activities and implementation of emission reduction measures within the region;
- Special air monitoring studies such as:
 - Airborne mobile air monitoring;
 - Ground-level mobile monitoring;
 - Vertical O₃ and meteorological measurements using ozonesondes;
 - Development of region-specific meteorological data using a radar profiler;
 - VOC canister sampling; and
 - Urban air toxics monitoring.

If there is interest among CAC members for CAPCOG other types of research projects along these lines and funding is available, CAPCOG may pursue such special studies in support of the regional air quality planning effort during this timeframe (for example, doing additional analysis on air toxics).

6.4 Ongoing Tracking of Scientific, Legislative, and Regulatory Developments Related to Air Quality

In order for the CAC to stay well-informed about air quality, it is important that CAPCOG continue to track and communicate new information about scientific, legislative, and regulatory developments related to air quality. Often, this new information can impact the decisions that CAC members make related to air quality.

7 Strategy #6: Policy Advocacy

From time to time, the CAC has weighed in on policy matters at the TCEQ, the legislature, and EPA, and within the region because of the potential impact on the region’s air quality, regulations related to air quality, and our ongoing air quality planning efforts. Over the years, a number of principles have been consistently articulated by the CAC in these advocacy efforts. While these principles are not intended to be binding on any CAC member in its own advocacy efforts, they are intended to capture the sense of the CAC and can be helpful in guiding policy advocacy by the CAC or its members in ways that would be consistent with prior CAC comments and this air quality plan.

Since 2014, topics that the CAC or CAPCOG has commented on in recent years have included:

- TCEQ’s annual monitoring network plans and five-year monitoring network assessment (2014, 2015, and 2016);
- The form of the 2015 O₃ NAAQS, its approach to area designations, the timing of SIP submissions for the new NAAQS, and adjusting implementation requirements in newly designated nonattainment areas to account for voluntary emission reduction efforts that have already taken place (2015);
- Support of U.S. Senate Bill 2072 regarding authorization of Early Action Compacts (2015);
- EPA’s update to the Cross-State Air Pollution Rule (CSAPR) for the 2008 O₃ NAAQS in support of stricter air quality impact thresholds for interstate transport, higher cost-per-ton thresholds for assessing emission reduction obligations, expanded consideration of non-EGU sources, and allowing states to submit transport SIPs detailing how they would meet the emission reduction obligations identified by EPA in lieu of the Federal Implementation Plan (FIP) (2016);
- Various aspects of EPA’s implementation of the 2015 O₃ NAAQS, including the use of “unclassifiable” designations, 1-year deferrals of designations, the use of modeling data in conjunction with measurement data in deciding whether to designate an area as “nonattainment,” encouraging the EPA to use more flexible implementation approaches to SIP requirements such as making more extensive use of Section 110 of the Clean Air Act, and the use of “Subpart 1” for O₃ nonattainment areas;
- The timing of the next PM NAAQS review in response to EPA’s PM NAAQS Review Plan (2016)
- TCEQ’s area designation recommendations for the 2015 O₃ NAAQS, and specifically, encouraging the use of the “unclassifiable” designation when an area’s O₃ levels are within the level that could be attributable to measurement uncertainty (2016);
- EPA’s implementation rule for the 2015 O₃ NAAQS (2017);
- Support for legislative action to continue regional air quality planning funding, maximize the NO_x reductions achieved through the TERP program, extending the TERP program to 2025, increased flexibility in the Drive a Clean Machine (DACM) and Local Initiative Project (LIP) programs, considering making the DACM and LIP programs strictly county-based, opposing elimination of revenue being deposited into the Clean Air Fund from motor vehicle safety inspections, and support for improving the clarity and effectiveness of statutes relating to idling (2016 and 2017);
- TCEQ’s allocation of TERP funding among its programs (2017); and
- Comments to the Governor’s office and TCEQ’s regarding the VW settlement and proposed beneficiary mitigation plan for the VW settlement (2017 and 2018).

Throughout these comments, a number of themes and ideas are consistently articulated:

- The CAC believes that maintaining compliance with the NAAQS is good both due to its public health and environmental benefits and because of the potential long-term and adverse impacts non-compliance can have for a region’s economic growth and transportation planning;
- The CAC believes that attention by the state and the federal government should be paid to ensuring that areas that are “near-nonattainment” like Austin do not become “nonattainment areas;”
- The CAC believes that managing air quality is a shared responsibility between the local, regional, state, and federal levels of governments. While regional and local levels of government can take

action to reduce emissions from within the region, the state and federal governments are responsible for ensuring that intrastate and interstate transport of air pollution does not interfere with the region's compliance with the NAAQS;

- The CAC believes that the local and regional efforts to reduce air pollution within the MSA should be given maximum consideration in TCEQ and EPA regulatory decisions regarding each of the county's attainment status for the NAAQS;
- The CAC believes that resources collected by the state and federal government (or otherwise available to the state or federal government) should be equitably distributed among the various areas of the state and country taking into consideration, at a minimum:
 - The region's current and projected air pollution levels, including its design value and number of days with air pollution that reaches the "unhealthy for sensitive groups" level;
 - The region's current and projected population;
 - The region's current and projected economic performance and the potential economic impact of violations (or continued violations) of the NAAQS in each area;
 - The degree to which the region has any other resources that could be brought to bear to address the issue;
 - The relative burden of the use of resources at the local, regional, state, and federal level to address air quality issues within each area; and
- The CAC believes in local and regional leadership in addressing the region's air quality concerns. The CAC encourages TCEQ and EPA to adopt interpretations of laws and regulations that are the least burdensome possible to areas that have taken proactive steps to control air pollution.

CAPCOG will continue to bring issues to the attention of the CAC that it may wish to comment on and will work with the CAC Advisory Committee to develop any such comment letters, resolutions, etc.

8 Updates to the Plan

Throughout this plan, the CAC will rely on annual air quality reports developed by CAPCOG to update this plan as needed to account for any changes in participation and measures being implemented within the region or nearby areas. CAPCOG will also keep the CAC updated on developments that may warrant consideration of a more significant update to the plan, which would include:

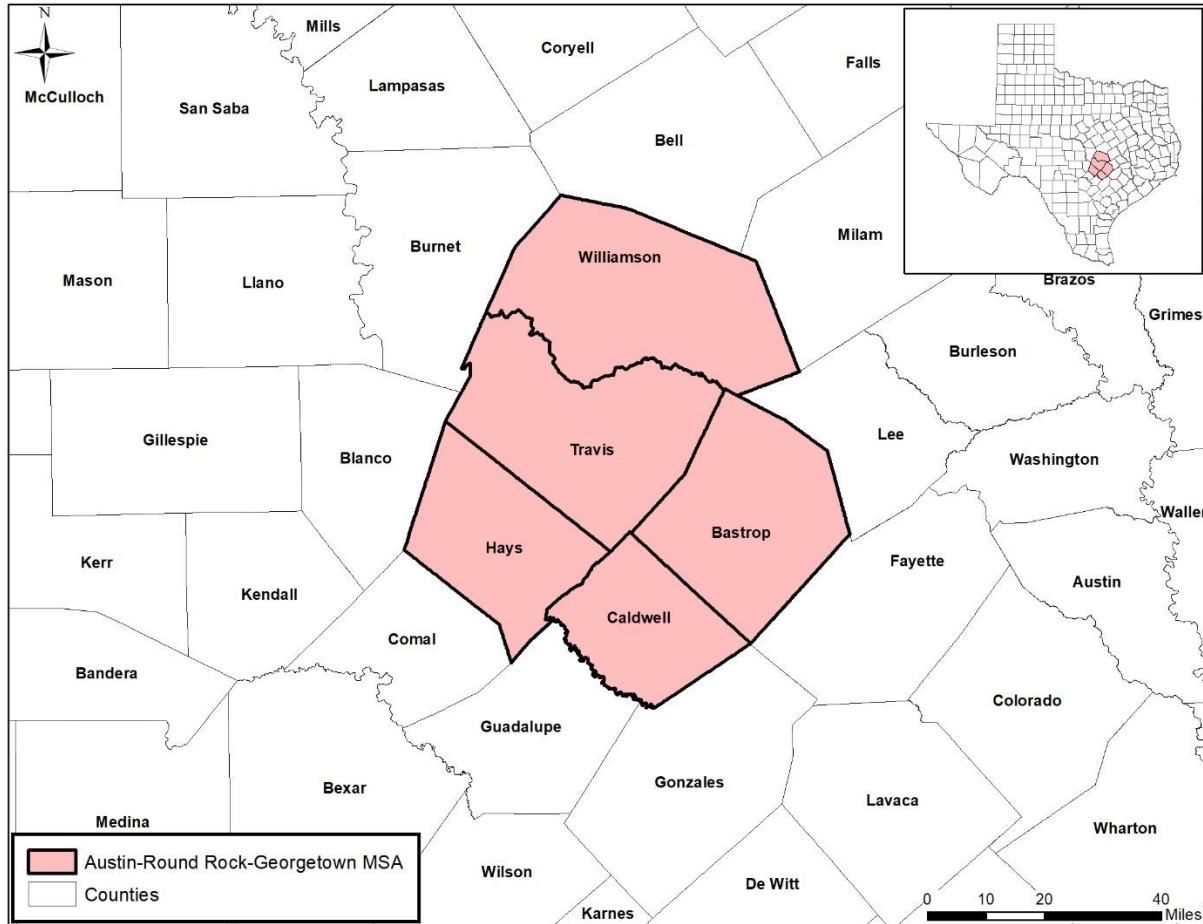
- A change to the geographic area covered by the plan;
- A change to the time frame covered by the plan; and
- A change to the plan's objectives.

Changes to these aspects of the plan will require approval by the CAC. Towards the end of 2022, CAPCOG will prompt the CAC to consider whether to: a) approve an extension of the current plan beyond December 31, 2023, b) initiate a process to develop a new plan, or c) allow the plan to expire at the end of 2023 without replacing it. At any time, the CAC may also request that CAPCOG initiate a revision or update to this plan for other reasons.

9 Appendix A: The Austin-Round Rock-Georgetown MSA

The Austin-Round Rock-Georgetown MSA is the core-based statistical area (CBSA) for the Austin urbanized area, and includes Bastrop, Caldwell, Hays, Travis, and Williamson Counties.⁸ A map of the MSA and surrounding area is shown below.

Figure 9-1. Map of the Austin-Round Rock-Georgetown MSA and Surrounding Area



⁸ Office of Management and Budget (OMB). “Memorandum to the Heads of Executive Departments and Establishments: Revised Delineations of Metropolitan Statistical Areas, Micropolitan Statistical Areas, and Combined Statistical Areas, and Guidance on Uses of the Delineations of These Areas.” OMB Bulletin No. 18-04. September 14, 2018. Available online at: <https://www.whitehouse.gov/wp-content/uploads/2018/09/Bulletin-18-04.pdf>

9.1 Basic Facts about the MSA

The following table summarizes some basic facts about the MSA.

Table 9-1. Basic Facts about the Austin-Round Rock-Georgetown MSA

| Statistic | Value |
|--|---|
| Urbanized Area ⁹ | Austin |
| Principal Cities ¹⁰ | Austin, Round Rock, Georgetown and San Marcos |
| Central Counties ¹¹ | Hays, Travis, and Williamson |
| Outlying Counties ¹² | Bastrop and Caldwell |
| Total Population, July 1, 2017 ¹³ | 2,115,827 |
| Population Growth, 2016-2017 ¹⁴ | 55,269 |
| Population Growth Rate, 2016-2017 ¹⁵ | 2.7% |
| MSA Total Population Rank ¹⁶ | 31 |
| MSA Population Growth Rank ¹⁷ | 9 |
| MSA Population Growth Rate Rank ¹⁸ | 9 |
| Growth Rate Rank, MSAs with Pop. > 1 million ¹⁹ | 1 |
| Land Area (square miles) ²⁰ | 4,219.89 |
| Density (persons/square mile) | 501.39 |
| Current Adult Asthma Rate, 2016 ²¹ | 8.6% |
| Adult Cardiovascular Disease Rate, 2016 ²² | 6.7% |
| Cancer Rate, 2016 ²³ | 11.6% |
| Gross Regional Product (GRP), 2017 ²⁴ | \$148,750,000,000 |

⁹ Office of Management and Budget (OMB). "Memorandum to the Heads of Executive Departments and Establishments: Revised Delineations of Metropolitan Statistical Areas, Micropolitan Statistical Areas, and Combined Statistical Areas, and Guidance on Uses of the Delineations of These Areas." OMB Bulletin No. 18-04. September 14, 2018. Available online at: <https://www.whitehouse.gov/wp-content/uploads/2018/09/Bulletin-18-04.pdf>. Accessed November 8, 2018.

¹⁰ Ibid

¹¹ Ibid

¹² Ibid

¹³ U.S. Census Bureau. Estimates of the Resident Population Change and Rankings: July 1, 2016 to July 2017: Metropolitan and Micropolitan Statistical Areas. Available online at: <https://factfinder.census.gov/bkmk/table/1.0/en/PEP/2017/PEPANNCHG.US24PR>. Accessed November 8, 2018.

¹⁴ Ibid

¹⁵ Ibid

¹⁶ Ibid

¹⁷ Ibid

¹⁸ Ibid

¹⁹ Ibid

²⁰ U.S. Census Bureau. Quick Facts. Accessed November 8, 2018.

²¹ Texas Department of State Health Services. Texas Behavioral Risk Factor Surveillance System (BRFSS) Data Table Builder. Accessed November 8, 2018.

²² Ibid

²³ Ibid

²⁴ U. S. Bureau of Economic Analysis. Gross Domestic Product by Metropolitan Area, 2017. Accessed November 8, 2018. Available online at: <https://www.bea.gov/data/gdp/gdp-metropolitan-area>.

| Statistic | Value |
|--|------------------|
| GRP Rank, 2017 ²⁵ | 24 |
| GRP Growth 2016-2017 ²⁶ | \$12,814,000,000 |
| GRP Growth Rate 2016-2017 ²⁷ | 9.4% |
| GRP Growth Rate Rank for 2016-2017 ²⁸ | 12 |

9.2 Basic Facts about Counties within the MSA

The Austin-Round Rock-Georgetown MSA includes counties with populations ranging from below 43,000 to over 1.2 million, with densities of below 80 persons per square mile to over 1,200 per square mile. The table below summarizes some of key data points for each county.

Table 9-2. Information on Bastrop, Caldwell, Hays, Travis, and Williamson Counties²⁹

| County | Population, 2017 | Land Area (sq. miles) | Density, 2017 (persons/sq. mile) | % Without Health Insurance, 2012-2016 |
|--------------|------------------|-----------------------|----------------------------------|---------------------------------------|
| Bastrop | 84,761 | 888.15 | 95.44 | 21.1% |
| Caldwell | 42,338 | 545.26 | 77.65 | 20.9% |
| Hays | 214,485 | 677.98 | 316.36 | 15.6% |
| Travis | 1,226,698 | 990.20 | 1,238.84 | 15.2% |
| Williamson | 547,545 | 1,118.30 | 489.62 | 10.9% |
| TOTAL | 2,115,827 | 4,219.89 | 501.39 | 14.5% |

9.3 Other Areas Nearby

The Austin-Round Rock-Georgetown MSA is located within State Planning Region 12 (CAPCOG), and the Austin-Waco Intrastate Air Quality Control Region Air Quality Control Region (AQCR).³⁰ It is also located within the Capital Area Metropolitan Planning Area (MPO), which also includes Burnet County. The following map shows the MSA situated in each one of these geographic areas.

²⁵ Ibid

²⁶ Ibid

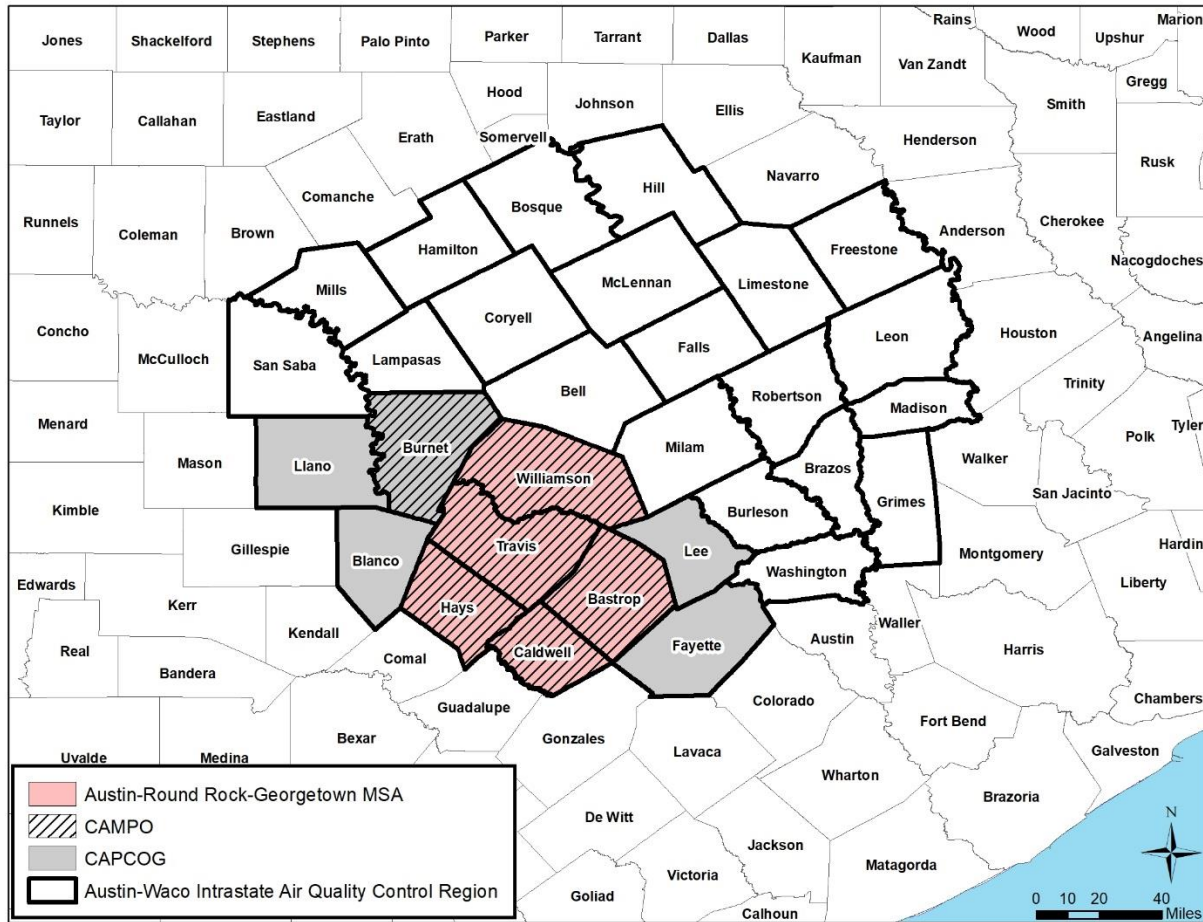
²⁷ Ibid

²⁸ Ibid

²⁹ U.S. Census Bureau. Quick Facts. Accessed November 8, 2018.

³⁰ AQCR #212, as defined in 40 CFR 81.134

Figure 9-2. Austin-Round Rock-Georgetown MSA and Related Planning Regions



The Austin-Round Rock-Georgetown MSA is adjacent to Killeen-Temple MSA³¹ to the north and the San Antonio-New Braunfels-Pearsall MSA³² to the south. These MSAs are located in the Alamo Area Council of Governments (AACOG) and Central Texas Council of Governments (CTCOG) state planning regions; and in the Austin-Waco Intrastate AQCR and Metropolitan San Antonio AQCR,³³ respectively. Apart from the San Antonio-New Braunfels-Pearsall MSA and the Killeen-Temple MSAs, the Austin-Round Rock-Georgetown MSA is also adjacent to Blanco, Burnet, Fayette, Gonzales, Lee, and Milam Counties.

³¹ The Killeen-Temple MSA includes Bell, Coryell, and Lampasas Counties as of September 2018.

³² The San Antonio-New Braunfels-Pearsall MSA includes Atascosa, Bandera, Bexar, Comal, Guadalupe, Kendall, Medina, and Wilson Counties as of September 2018.

³³ AQCR #217, as defined in 40 CFR 81.040

10 Appendix B: Identification and Analysis of Regional Air Quality Issues

As described in the CAC's by-laws, the CAC is charged with helping the region "achieve clean air." At its broadest level, this would mean that the MSA had perfect air quality that caused no adverse impacts on human health and the environment across the entire region. From a planning perspective, it is important to keep this ideal in mind up in order to identify obstacles that would need to be overcome in order to reach that ideal state. It is also important to understand the practical difficulty with using the ideal vision of air quality described above for regional air quality planning purposes.

- While our scientific understanding of the impact of air pollutants on human health and the environment continues to be refined, it will always be incomplete. Our understanding requires some kind of point of reference for evaluating these impacts (such as an estimate for naturally-occurring background levels or "policy-relevant background" (PBR)).
- For some pollutants such as O₃, PM_{2.5}, and most HAPs, there is no evidence of a threshold below which there would be no health or environmental impacts (or a threshold may be well below the level of the current standard).
- Ambient air pollution within the MSA is the result of a combination of "background" air pollution concentrations that would occur without any human activity, emissions from outside of the MSA, and emissions from within the MSA. This means that activities within the MSA will only have a limited ability to impact these air pollution levels.

It is also important to define what we mean by "regional" air quality. For the purpose of this plan, a "regional" air quality issue is an issue which could affect one or more locations within the MSA or the MSA as a whole but may not affect adjacent areas at the same time. For this reason, air quality issues that are at a larger geographic scale such as regional haze in national parks, monuments, and wilderness areas; the contribution of greenhouse gases to global climate change; and the depletion of the O₃ layer are not considered "regional" issues per se, although emissions from the region do impact these phenomena.

Finally, it's important that we define several terms that are important for characterizing regional air quality issues:

- "Criteria" air pollutants:
 - Air pollutants, emissions of which EPA has found "cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare" and "the presence of which in the ambient air results from numerous or diverse mobile or stationary sources;"³⁴
 - Include CO, lead (Pb), NO_x, ground-level O₃, PM, and sulfur oxides (SO_x);
 - Include both "primary pollutants" (i.e., pollutants that are directly emitted, such as CO, Pb, NO_x, PM_{2.5}, PM₁₀, and SO_x) and "secondary pollutants" (i.e., pollutants that are formed in the atmosphere through combinations and reactions of primary pollutants, such as NO_x, O₃, and PM_{2.5});

³⁴ 42 U.S. Code §7408(a)(1)

- NAAQS:
 - Ambient air quality standards, the attainment and maintenance of which the EPA has determined are “requisite to protect public health” (primary standards) or are “requisite to protect public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air” (secondary standards);³⁵
 - Used to regulate ambient air pollution levels for criteria pollutants;
 - Are applied uniformly across the country;
 - Include an indicator (i.e., the specific air pollutant being measured to control for a category of pollutants), a maximum allowable concentration, an averaging time, and a statistical form used to assess compliance;
 - Air quality “design values” are calculated each year based on ambient air quality monitoring data in order to compare the location’s ambient air pollution levels to the NAAQS and determine whether the air meets or does not meet the NAAQS
- “Nonattainment” areas:
 - Are areas designated by EPA as not meeting or contributing to ambient air quality in a nearby area that does not meet the NAAQS;³⁶
 - Are subject to specific planning requirements and mandatory pollution controls under the U.S. Clean Air Act;³⁷
- The “AQI”:
 - Is an index for reporting daily air quality used to inform the public how clean or polluted the air is and what associated health effects might be a concern for different populations;
 - Categories include “good,” “moderate,” “unhealthy for sensitive groups,” “unhealthy,” “very unhealthy,” and “hazardous;”
 - Are established by EPA for O₃, PM_{2.5}, PM₁₀, CO, SO₂, and NO₂ based on short-term exposure (one day or less) and use values that correspond to the NAAQS that differentiate air pollution levels considered “good” and “moderate” from levels considered “unhealthy for sensitive groups or worse;”
- HAPs:
 - Are air pollutants that present “a threat of adverse effects (including, but not limited to, substances which are known to be carcinogenic, mutagenic, teratogenic, neurotoxic, which cause reproductive dysfunction, or which are acutely or chronically toxic) or adverse environmental effects whether through ambient concentrations, bioaccumulation, deposition, or otherwise;”³⁸

³⁵ 42 U.S. Code §7409(b)

³⁶ 42 U.S. Code §7407(d)

³⁷ 42 U.S. Code §7501 - §7515

³⁸ 42 U.S.C. §7407(b)(2)

- Include 187 of substances such as benzene, formaldehyde, mercury, and others but, except for lead, are mutually exclusive from the list of “criteria” pollutants³⁹
- Are regulated by EPA through technology-based standards required to achieve the “maximum degree of reduction in emissions” achievable, taking into account the cost of achieving such reductions;⁴⁰
- Nuisance odors:
 - Are defined by TCEQ rules as air contaminants that “may tend to be injurious or to adversely affect human health or welfare, animal life, vegetation, property, or as to interfere with the normal use and enjoyment of animal life, vegetation, or property;”⁴¹ and
 - Are regulated through complaint investigations and enforcement by the TCEQ or municipalities or through civil action.

10.1 Issue #1: Regional Compliance with the NAAQS

The EPA establishes NAAQS at levels that are “requisite” for the protection of public health and public welfare. The term “requisite” in this context suggests that it is necessary to keep air pollution levels at or below the level of the NAAQS in order to reach “clean” levels of air quality. It does not mean that attainment of the NAAQS is sufficient to do so. For example, since many NAAQS are based on three-year averages of data, an area can experience air pollution levels that may cause problems for sensitive populations on certain days within a given year while still having air quality that meets the standards over the course of three years.

Nevertheless, since EPA has determined that a region would be experiencing adverse health or environmental impacts if it had air pollution levels exceeding the NAAQS, attaining and maintaining compliance with the NAAQS is important for public health and welfare. EPA requires the siting of monitors within metropolitan areas that are expected to measure the region’s highest concentrations.⁴² The monitoring station with the highest “design value” is used by EPA to assess if the entire metro area is meeting the NAAQS or not. The following figure shows a comparison of the design values for the MSA compared to the maximum allowable design value under each NAAQS (other than lead, for which there are no monitors in the region).

³⁹ <https://www.epa.gov/haps/initial-list-hazardous-air-pollutants-modifications>

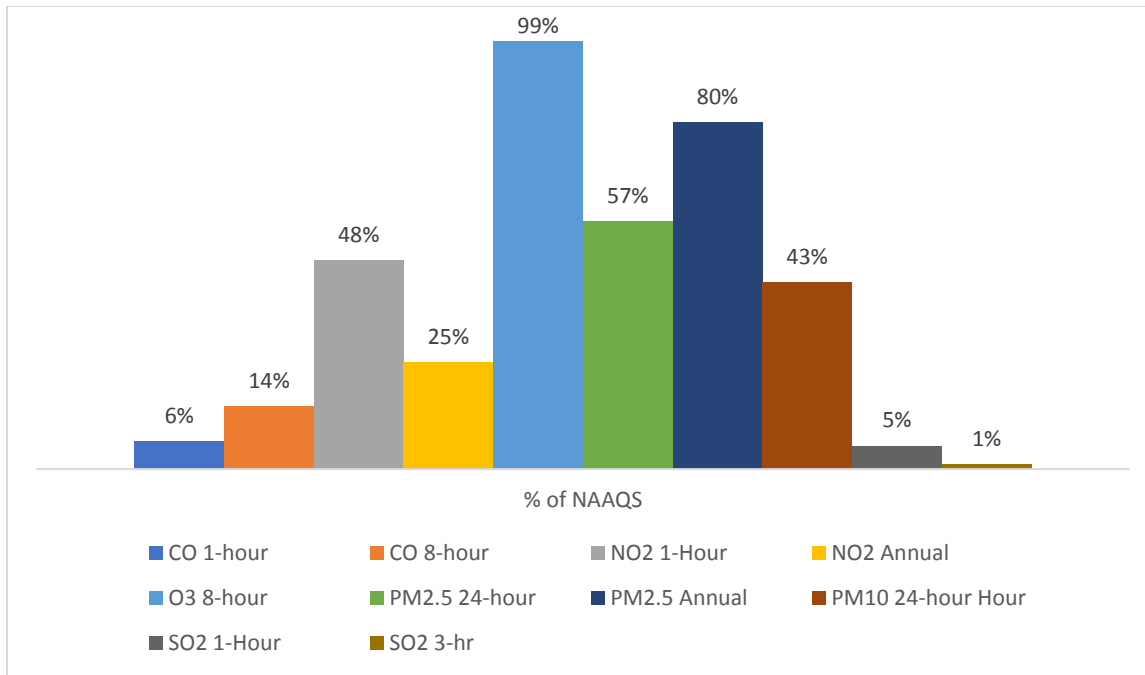
⁴⁰ 42 U.S.C. §7407(d)(1)

⁴¹ 30 TAC §101.4

⁴² 40 CFR, Appendix D to Part 58 – Network Design Criteria for Ambient Air Quality Monitoring

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Figure 10-1. Austin-Round Rock-Georgetown MSA 2017 Design Values Compared to NAAQS⁴³



As the figure above shows, the MSA’s most recent certified air pollution measurements meet all of the NAAQS. However, having a design value that meets the NAAQS in one year is no guarantee that the region will also have a design value that meets the NAAQS in the following year. Therefore, it is important for “near-nonattainment” areas with air pollution levels close to the NAAQS to remain vigilant in controlling air pollution levels.

While the MSA has often been referred to as a “near-nonattainment” area, that term is not defined in either statute or regulations at the state or federal level. For the purposes of this plan, the CAC uses a threshold of ≥85% of the NAAQS for determining whether an area is considered “near-nonattainment” or not. This helps differentiate between pollutants that the region needs to focus on controlling for compliance purposes.

An 85% threshold is consistent with the level at which EPA requires additional monitoring of O₃ and PM_{2.5} in metro areas, as shown in the tables below.

Table 10-1. Table D-2 of Appendix D to 40 CFR Part 58 - SLAMS Minimum O₃ Monitoring Requirements

| MSA Population | Most Recent 3-Year Design Value Concentrations ≥ 85% of any O ₃ NAAQS | Most Recent 3-Year Design Value Concentrations < 85% of any O ₃ NAAQS |
|-----------------------|--|--|
| > 10 million | 4 | 2 |
| 4 – 10 million | 3 | 1 |
| 350,000 - < 4 million | 2 | 1 |
| 50,000 - < 350,000 | 1 | 0 |

⁴³ With the exception of PM₁₀, data for which were obtained from TCEQ’s Texas Air Monitoring Information System (TAMIS) - <https://www17.tceq.texas.gov/tamis/index.cfm?fuseaction=home.welcome>, all design values were obtained from EPA’s design value site at <https://www.epa.gov/air-trends/air-quality-design-values>

Table 10-2. Table D-5 of Appendix D to 40 CFR Part 58 - SLAMS Minimum PM_{2.5} Monitoring Requirements

| MSA Population | Most Recent 3-Year Design Value Concentrations ≥ 85% of any O ₃ NAAS | Most Recent 3-Year Design Value Concentrations < 85% of any O ₃ NAAS |
|---------------------|---|---|
| > 1,000,000 | 3 | 2 |
| 500,000 – 1,000,000 | 2 | 1 |
| 50,000 - < 500,000 | 1 | 0 |

An 85% threshold would correspond to the most stringent levels of the O₃ and PM NAAQS that EPA considered in their most recent NAAQS reviews for these pollutants:

- 2015 O₃ NAAQS:
 - CASAC recommended a NAAQS at 60-69 ppb (86% - 99% of the final 70 ppb NAAQS);
- 2012 PM_{2.5} NAAQS:
 - CASAC recommended an annual NAAQS at 11-13 µg/m³ (92 – 108% of the final 12 µg/m³ NAAQS); and
 - CASAC recommended a PM_{2.5} NAAQS at 30-35 µg/m³ (86 – 100% of the final 35 µg/m³ NAAQS).

Using this 85% threshold, the MSA would be considered a “near-nonattainment” area only for O₃.

Ensuring compliance with the O₃ NAAQS remains the top priority for this regional air quality plan:

1. The region’s O₃ levels are very close to exceeding the levels considered “necessary” to protect human health;
2. Non-compliance can have substantial impacts on transportation planning and economic growth (CAPCOG has estimated that a nonattainment designation for O₃ could cost the region billions of dollars in lost economic growth over a 20-30 year period);
3. Planning for O₃ NAAQS compliance is the very first identified purpose for the CAC in its by-laws; and
4. The NAAQS must be reviewed every five years, ensuring compliance with the O₃ NAAQS compliance remains the top priority for this regional air quality plan.

Beyond just reviewing air quality data to determine if an area’s air quality is attaining or not attaining the NAAQS, the EPA is also required to designate all areas of the country as “nonattainment,” “attainment,” or “unclassifiable.” Designations are based both on: 1) whether the area has air quality that is violating the NAAQS and 2) whether the area is contributing to violations of the NAAQS nearby.

After an area is initially designated “attainment” or “nonattainment,” there are four different situations it can be in:

- An area is initially designated “attainment,” and air quality measurements continue to show “attainment” (such as the MSA with respect to the 2015 O₃ NAAQS)

- An area is initially designated “attainment,” but air quality measurements subsequently show a violation of the NAAQS (such as the San Antonio metro area with respect to the 2008 O₃ NAAQS);
- An area is initially designated as “nonattainment,” and continues to have air quality measurements that show violations of the NAAQS (such as the Dallas-Fort Worth metro area for the 2008 and 2015 O₃ NAAQS); and
- An area is initially designated as “nonattainment,” but air quality improves and measurements subsequently show attainment of the NAAQS (such as the Beaumont-Port Arthur area for the 1997 O₃ NAAQS).

For the MSA, the situation of most immediate concern is being an area designated as “attainment,” that subsequently violates the NAAQS. Clearly, the EPA has the authority under the Clean Air Act to redesignate an area to “nonattainment” almost immediately upon certification of data that shows a violation. However, since such “out-of-cycle” designations are discretionary, unlike the initial area designations, an area can also violate the NAAQS for several years after an initial “attainment” designation getting redesignated to “nonattainment.” This situation occurred for several years in San Antonio and some other areas following EPA’s initial area designations for the 2008 O₃ NAAQS.

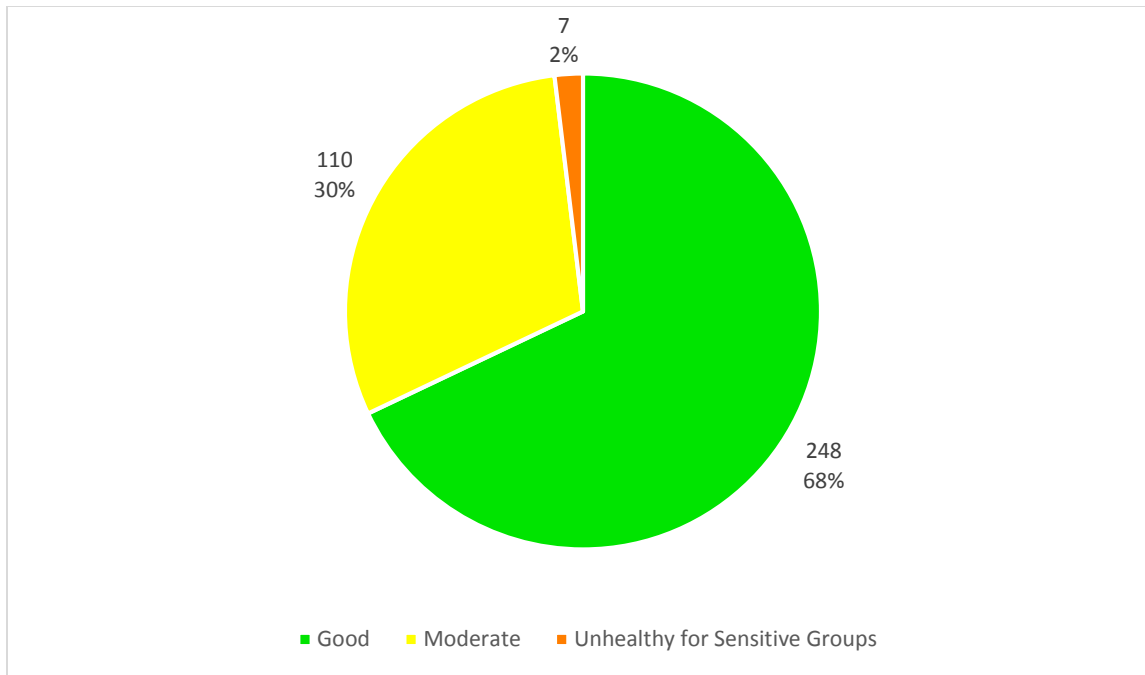
It is also important to consider that individual counties can be designated as “nonattainment” due to their impact on violations nearby even if their own air quality is meeting the NAAQS. There are many factors that EPA considers when determining an area’s designation for the NAAQS or whether to redesignate an area from “attainment” to “nonattainment” or vice-versa beyond simply whether the area’s air pollution levels are violating the NAAQS. Therefore, even if the region’s design value or the design value in a nearby area exceeds the O₃ NAAQS, it is important for the region to continue to use all available legal avenues to persuade EPA to not designate the region (or any of the individual counties in the region) as “nonattainment” based on its contribution to NAAQS violations.

10.2 Issue #2: Periodic Exposure to Air Pollution Considered “Moderate” or “Unhealthy for Sensitive Groups” Based on EPA’s AQI

As mentioned above, while compliance with the NAAQS is necessary to protect human health and the environment from air pollution, but it may not be sufficient to achieve this goal. Indeed, in 2017, air pollution reached levels considered by EPA to be “moderate” or “unhealthy for sensitive groups on one out of every three days. Exposure to these levels of air pollution can have adverse impacts on human health and the environment. The figure below shows the percentage of days in the region that fell into each AQI categories in 2017, based on the highest AQI level recorded within the region for the day.

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Figure 10-2. Days with Air Quality Considered "Good," "Moderate," and "Unhealthy for Sensitive Groups" in the MSA, 2017



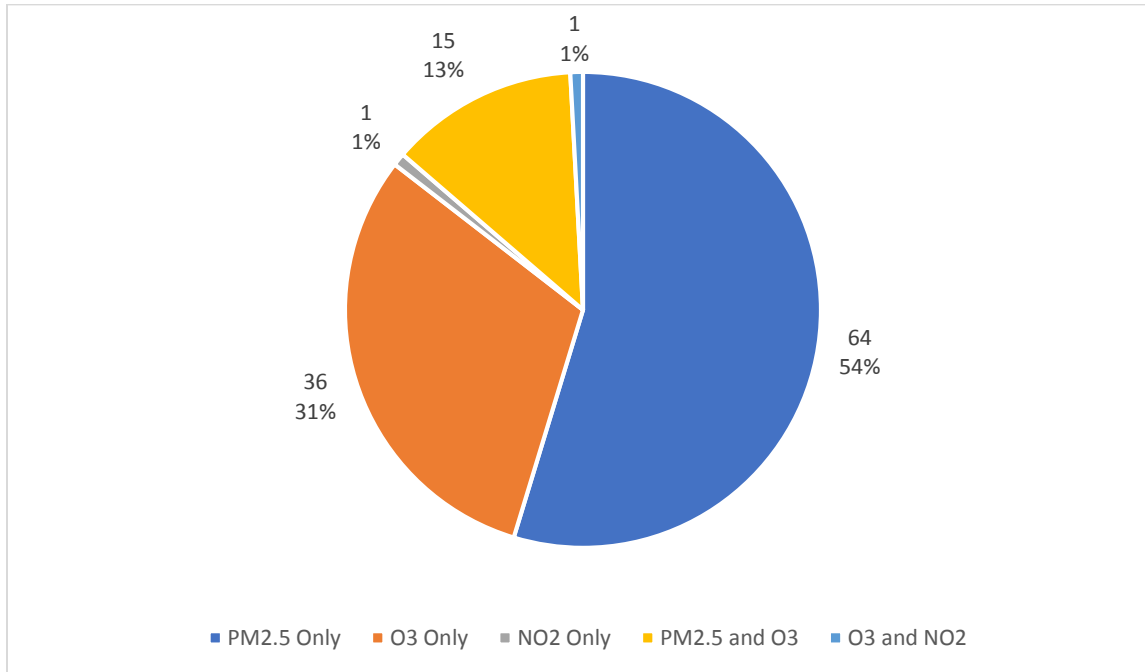
These data highlight the fact air quality that is attaining the NAAQS is not necessarily “clean air” in its ideal sense, and does not imply that additional reductions in pollution levels or reduction in exposure to high air pollution when it does occur would not be beneficial. Indeed, in its review of EPA’s 2nd External Review Draft of its Policy Assessment for the PM NAAQS in 2010, the CASAC stated with respect to PM_{2.5} that, “although there is increasing uncertainty at lower levels, there is no evidence of a threshold (i.e. a level below which there is no risk for adverse health effects).”⁴⁴ Likewise, in the Federal Register notice for the final 2015 O₃ NAAQS, EPA states, “there is a smooth dose-response curve without evidence of a threshold for exposures between 40 and 120 ppb O₃.” EPA’s 2013 Integrated Science Assessment (ISA) for the O₃ NAAQS Review stated that there were clear benefits of reducing prolonged exposures to down to 60 ppb in healthy, young adult subjects performing moderate exercise. These analyses suggest that there are public health benefits that can be achieved by any degree of reduction in O₃ and PM_{2.5} concentrations below current levels. Furthermore, there are public health benefits that can be achieved by reducing the exposure of sensitive populations to elevated O₃ and PM_{2.5} concentrations when they do occur even though the area is attaining the NAAQS for these pollutants.

Even though O₃ is the only pollutant for which the faces a significant NAAQS compliance challenge, most of the public health benefits EPA estimates from efforts to control O₃ are actually attributable to co-benefits from reduced ambient PM_{2.5}. Approximately 65-75% of the quantified public health benefits associated with emission reductions needed for attainment of the 2015 O₃ NAAQS were actually attributable to reduced PM_{2.5} concentrations, since NO_x emissions are a precursor for both O₃ and

⁴⁴ Dr. Jonathan M. Samet, Chair, Clean Air Scientific Advisory Committee. “Letter to Lisa Jackson, Administrator of the U.S. Environmental Protection Agency; Subject: CASAC Review of Policy Assessment for the Review of the PM NAAQS – Second External Review Draft.” September 10, 2010. EPA-CASAC-10-015. Available at: [https://yosemite.epa.gov/sab/sabproduct.nsf/CCF9F4C0500C500F8525779D0073C593/\\$File/EPA-CASAC-10-015-unsigned.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/CCF9F4C0500C500F8525779D0073C593/$File/EPA-CASAC-10-015-unsigned.pdf)

PM_{2.5}.⁴⁵ And while O₃ is the main pollutant of concern for NAAQS compliance, of the 117 days when air pollution levels were “moderate” or worse, more than half were attributable to high PM_{2.5} only. The following figure shows the distribution of these days by pollutant.

Figure 10-3. Share of Days When AQI Was “Moderate” or Worse by Pollutant



These data suggest that, while it is possible to focus only on O₃ for the purpose of NAAQS compliance, addressing only O₃ NAAQS could result in missing the other important public health implications of air pollution levels that periodically are “moderate” or “unhealthy for sensitive groups” It’s also the case that there are periodically times when air quality can be significantly impacted by an “exceptional event” such as a wild fire that causes major health problems but which can be excluded from consideration as part of the NAAQS. Therefore, while compliance with the O₃ NAAQS remains the highest-priority air quality issue for the region, going beyond compliance to address elevated levels of O₃ and PM_{2.5} through either additional pollution reduction measures or outreach to promote exposure reduction would be valuable.

10.2.1 Health and Environmental Effects of Exposure to O₃

When the region experiences air pollution levels considered “unhealthy for sensitive groups” as opposed to just “moderate,” the vast majority of such instances are as a result of high ground-level O₃. According to EPA, O₃ can cause the muscles in the airways to constrict, leading to wheezing and shortness of breath. Potential impacts of O₃ exposure include:⁴⁶

- Making it more difficult to breathe deeply and vigorously;

⁴⁵ EPA. *Regulatory Impact Analysis of the Final Revisions to the National Ambient Air Quality Standards for Ground-Level Ozone*. EPA-452/R-15-007. September 2015. Available online at: <https://www3.epa.gov/ttnecas1/docs/20151001ria.pdf> See table 6-1.

⁴⁶ EPA. “Health Effects of Ozone.” Available online at: <https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution>. Accessed November 8, 2018.

- Causing shortness of breath, and pain when taking a deep breath;
- Causing coughing and sore or scratchy throat;
- Inflaming and damage the airways;
- Aggravating lung diseases such as asthma, emphysema, and chronic bronchitis;
- Increasing the frequency of asthma attacks;
- Making lungs more susceptible to infection;
- Continuing to damage the lungs even when the symptoms have disappeared;
- Causing chronic obstructive pulmonary disease (COPD);
- Contributing to asthma development;
- Permanent lung damage (such as abnormal lung development in children);
- Increased school absences;
- Increased medication use;
- Visits to doctors and emergency rooms;
- Hospital admissions; and
- Deaths from respiratory causes.

Individuals most at risk from exposure to O₃ include those with asthma, children, older adults, people who are active outdoors (especially outdoor workers), people with certain genetic characteristics, and people with reduced intake of certain nutrients, such as vitamins C and E. Children are at the greatest risk from exposure to O₃ because their lungs are still developing and they are more likely to be active outdoors when O₃ levels are high. Children are also more likely than adults to have asthma.

O₃ exposure also impacts vegetation and ecosystems. ⁴⁷According to EPA, when sufficient O₃ enters the leaves of a sensitive plant, it can:

- Reduce photosynthesis, which is the process that plants use to convert sunlight to energy to live and grow;
- Slow the plant's growth; and
- Increase sensitive plants' risk of disease, damage from insects, effects of other pollutants, and harm from extreme weather.

The effects on individual plants can also have broader effects on an ecosystem, including:

- The loss of species diversity (less variety of plants, animals, insects, and fish);
- Changes to the specific assortment of plants present in a forest;
- Changes to habitat quality; and
- Changes to water and nutrient cycles.

⁴⁷ EPA. Ecosystem Effects of Ozone Pollution. Available online at: <https://www.epa.gov/ground-level-ozone-pollution/ecosystem-effects-ozone-pollution>. Accessed 11/9/2018.

The O₃ levels measured within the region are typically well below levels that EPA considers to be “requisite” to attain in order to avoid impacts on vegetation. However, there is not necessarily a clear threshold below which there are no such impacts.

In addition to the indirect impact that these vegetation and ecosystem impacts could have on climate change, EPA also states that, “ozone in the atmosphere warms the climate,” so reductions in O₃ can also help address climate change.⁴⁸

10.2.2 Health and Environmental Effects of Particulate Matter

On most of the days when air quality is not “good” in the region, it is as a result of PM_{2.5} concentrations reaching levels EPA considers “moderate.” While it had been many years since PM concentrations had previously reached levels considered “unhealthy for sensitive groups,” the region had at least three such days in 2018 as a result of Saharan dust events, and previously experienced some acute short-term issues as a result of wildfires.

EPA states that exposure to PM₁₀ and PM_{2.5} can cause significant health problems because they get deep into the lungs. Numerous scientific studies have linked particle pollution to a variety of health problems, including:

- Premature death in people with heart or lung disease;
- Nonfatal heart attacks;
- Irregular heartbeat;
- Aggravated asthma;
- Decreased lung function; and
- Increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing.

People with heart or lung diseases, children, and older adults are the most likely to be affected by particle pollution.

PM_{2.5} also can also have a number of other environmental impacts, including:

- Visibility impairment;
- Making lakes and streams acidic;
- Changing the nutrient balance in coastal waters and large river basins;
- Depleting the nutrients in soil;
- Damaging sensitive forests and farm crops;
- Affecting the diversity of biosystems;
- Contributing to acid rain effects; and
- Stain and damage stone and other materials, including culturally important objects such as statutes and monuments.

⁴⁸ EPA. Air Quality and Climate Change. <https://www.epa.gov/air-research/air-quality-and-climate-change-research>. Accessed 11/9/2018.

PM can also impact climate, although the impacts can vary based on the type of PM. For example, black carbon, which is a pollutant from combustion, contributes to warming, while particulate sulfates cool the atmosphere.⁴⁹

10.2.3 Health and Environmental Effects of NO₂ Exposure

There are a few instances in which 1-hour NO₂ concentrations at the near-road air monitor located along IH-35 in Austin just north of its intersection with U.S. 183 have reached “moderate” levels based on the AQI. According to EPA, breathing air with high concentrations of NO₂ can irritate airways in the human respiratory system, which can aggravate respiratory diseases such as asthma, leading to respiratory symptoms (such as coughing, wheezing, or difficulty breathing), hospital admissions and visits to emergency rooms. Ambient NO₂ and other NO_x react with other chemicals in the atmosphere to form both PM and O₃. People with asthma, as well as children and the elderly are generally at greater risk for the health effects of NO₂. NO₂ and other NO_x also contribute to visibility impairment, acid rain, and nutrient pollution in coastal waters.

10.3 Issue #3: Exposure to Hazardous Air Pollutants

As noted earlier, there are some 187 different pollutants that EPA considers HAPs.⁵⁰ Monitoring data is far more limited for HAPs, although TCEQ does collect and analyze data on 84 different VOCs through 24-hour canister sampling every six days at monitoring station located in East Austin. TCEQ’s Toxicology Division reviews these data each year and conducts an assessment for their potential to cause health effects, odor effects, or vegetation effects. TCEQ uses acute and chronic inhalation reference values and inhalation unit risk factors to assess the potential for exposure to the measured concentrations to impair human health. For “welfare” effects, TCEQ uses odor and vegetation “effects screening levels” (ESLs). These are not designed as comprehensive assessments of individual health risks, but can indicate if there is a problem that warrants further evaluation at a particular site.⁵¹ TCEQ’s evaluations for data from the Austin area have consistently indicated that the ambient air quality measured at this site, “would not be expected to cause adverse health effects or vegetation effects.”

Every three years, EPA conducts a “National Air Toxics Assessment” as a screening tool for state, local, and tribal agencies to identify which pollutants, emissions sources, and places they may wish to study further to better understand any possible risks to public health from air toxics. This assessment includes estimates of the increased risk of cancer and various non-cancer risks as a result of exposure to HAPs.

While risk assessments are available down to the census tract level, EPA cautions that, “NATA results are best applied to larger areas – counties, states, and the nation. Results for smaller areas, such as a census tract, are best used to guide follow-up local studies.”⁵² EPA further states that the data can be used to:

- Prioritize pollutants and emission source types;
- Identify places of interest for further study;
- Getting a starting point for local assessments;
- Focus community efforts; and

⁴⁹ Ibid

⁵⁰ EPA. Initial List of Hazardous Air Pollutants with Modifications. Available online at: <https://www.epa.gov/haps/initial-list-hazardous-air-pollutants-modifications>. Accessed 11/9/2018.

⁵¹ TCEQ. Toxicological Evaluations of Ambient Air Monitoring Data. Available at: <https://www.tceq.texas.gov/toxicology/regmemo>

⁵² EPA. NATA Overview. Available online at: <https://www.epa.gov/national-air-toxics-assessment/nata-overview>. Accessed 11/9/2018.

- Inform monitoring programs.

However, EPA cautions that the data should not be used in the following ways:

- To pinpoint specific risk values in small areas such as a census tract;
- To characterize or compare risks at local levels (such as neighborhoods);
- To characterize or compare risks between states;
- To compare trends from one NATA year to another;
- As the sole basis for risk reduction plans or regulations;
- To control specific sources or pollutants; and
- To quantify benefits of reduced toxics emissions.

EPA presents cancer risks in the NATA in terms of the increased chance of contracting cancer over a lifetime as a result of exposure to modeled air toxics concentrations (in terms of # of people per 1 million). EPA presents respiratory, neurological, liver, kidney, and immunological hazards based on a “hazard index.” The NATA uses the following criteria for determining if a particular pollutant is a “regional cancer driver,” a “regional cancer contributor,” or a “regional noncancer driver” based on the individual health risk for cancer, the hazard index for non-cancer health effects, and the minimum number of people exposed.⁵³

Table 10-3. EPA 2014 NATA Criteria for Establishing Regional Drivers and Contributors of Health Effects for Risk Characterization

| Risk Characterization Category | Individual Health Risk or Hazard Index Exceeds | Minimum Number of People Exposed |
|--|--|----------------------------------|
| Regional Cancer Driver (alt. 1) | 10 in a million | 1 million |
| Regional Cancer Driver (alt. 2) | 100 in a million | 10,000 |
| Regional Cancer Contributor | 1 in a million | 1 million |
| Regional Noncancer Driver | Hazard Index of 1 | 10,000 |

The following table summarizes key data from the 2014 NATA for Bastrop, Caldwell, Hays, Travis, and Williamson Counties and the state as a whole.

Table 10-4. Summary of Risk Data from 2014 NATA for the MSA and State

| Area | Total Individual Cancer Risk (out of 1 million) | Maximum Individual Cancer Risk from Single Pollutant | Maximum Individual Cancer Risk for Individual Tract | Maximum Tract-Level-Noncancer Hazard Index |
|-----------------------|---|--|---|--|
| Bastrop Co. | 29 | 21 | 30 | 0.37 |
| Caldwell Co. | 29 | 20 | 30 | 0.36 |
| Hays Co. | 30 | 21 | 33 | 0.45 |
| Travis Co. | 32 | 22 | 37 | 0.47 |
| Williamson Co. | 31 | 21 | 33 | 0.43 |
| MSA | 32 | 21 | 37 | 0.47 |

⁵³ EPA. 2014 National Air Toxics Assessment Technical Support Document. August 2018. Available online at: https://www.epa.gov/sites/production/files/2018-09/documents/2014_nata_technical_support_document.pdf

| Area | Total Individual Cancer Risk (out of 1 million) | Maximum Individual Cancer Risk from Single Pollutant | Maximum Individual Cancer Risk for Individual Tract | Maximum Tract-Level-Noncancer Hazard Index |
|-------|---|--|---|--|
| Texas | 35 | 21 | 348 | 1.48 |

For the MSA and each of the counties in the region, there are four pollutants that could be classified as a regional cancer driver or regional cancer contributor, but none that could be classified as a regional non-cancer driver:

Table 10-5. HAPS that can be classified as regional cancer drivers or contributors

| Pollutant | Total Cancer Risk for Region | Max Cancer Risk at Tract Level | 2014 Population Exposed to Risk > 1 in 1 million | 2014 Population Exposed to Risk > 10 in 1 million |
|----------------------|------------------------------|--------------------------------|--|---|
| Acetaldehyde | 2.5640 | 2.7181 | 1,716,289 | 0 |
| Benzene | 1.9547 | 2.7474 | 1,716,289 | 0 |
| Carbon Tetrachloride | 3.1192 | 3.1275 | 1,716,289 | 0 |
| Formaldehyde | 21.3170 | 22.6153 | 1,716,289 | 1,716,289 |

These data suggest that reducing emissions of these compounds could be established as a region-wide priority for reducing cancer risks associated with regional air pollution.

There are also three HAPS that had individual risk levels above 1 in one or more individual tracts within the region but where this risk level was not as widespread. These are shown in the table below.

Table 10-6. Other HAPS with an individual cancer risk of 1 out of a million or more in at least one Census Tract

| Pollutant | Total Cancer Risk for Region | Max Cancer Risk at Tract Level | 2014 Population Exposed to Risk > 1 in 1 million |
|--------------------------|------------------------------|--------------------------------|--|
| Arsenic Compounds | 0.2404 | 1.7083 | 14,890 |
| Chromium VI (Hexavalent) | 0.0927 | 3.0636 | 9,735 |
| Napthalene | 0.7457 | 1.1389 | 253,424 |

Aside from CAPCOG's participation in an Urban Air Toxics monitoring initiative by EPA in 2005 and bus retrofit initiatives, HAPs have not been an air quality focus for the region. TCEQ and EPA take different approaches to characterizing these risks. TCEQ compares ambient air monitoring data to specific thresholds for various compounds and determines whether the measured concentrations exceed those thresholds. EPA's approach involves modeling and cumulative risk assessment.

TCEQ's evaluation suggests that exposure to concentration of HAPs measured in East Austin would not be expected to cause adverse impacts to health or vegetation or cause odor issues. However, EPA's assessment indicates that there are several HAPs that are likely to have high enough concentrations across the MSA to be considered regional drivers or contributors to cancer. EPA's analysis also indicates that are several other HAPs that may be problematic in more limited areas.

A precautionary approach to interpreting EPA's data would suggest that actions taken to reduce emissions of acetaldehyde, benzene, carbon tetrachloride, and formaldehyde could be warranted, while

an approach relying on TCEQ’s evaluations would suggest that such actions may not be necessary. **Due to the uncertainties surrounding HAPs, the best approach for the region may be to keep individual CAC members informed about these issues to enable them to address issues within their own organizations rather than undertaking a region-wide effort to control emissions of these pollutants. CAPCOG will continue keep abreast of information on air toxics and communicate this information to the CAC.**

10.4 Issue #4: Exposure to Nuisance Odors

Nuisance odor complaints are one of the most common complaints TCEQ receives. One measure of the degree to which nuisance odors interfere with “clean air” is the number of nuisance odor reports TCEQ receives. These numbers can be queried by county, and can be compared to each county’s population as an indication of the average number of complaints per capita per year.

Table 10-7. Information on Bastrop, Caldwell, Hays, Travis, and Williamson Counties⁵⁴

| County | Population, 2017 | Complaints | Complaint Rate (complaints/10,000) |
|--------------|------------------|------------|------------------------------------|
| Bastrop | 84,761 | 51 | 6.0 |
| Caldwell | 42,338 | 13 | 3.1 |
| Hays | 214,485 | 44 | 2.1 |
| Travis | 1,226,698 | 262 | 2.1 |
| Williamson | 547,545 | 105 | 1.9 |
| TOTAL | 2,115,827 | 475 | 2.2 |

Statewide, the rate for 2017 was 3.4 complaints per 10,000 persons. These data suggest that Bastrop County may be experiencing a disproportionate nuisance odor burden.

10.5 Issue #5: Environmental Justice (EJ) Considerations

EPA defines “Environmental Justice” as, “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.” EPA considers “fair treatment” to mean, “no group of people should bear a disproportionate share of negative environmental consequences resulting from industrial, governmental, and commercial operations or policies.”

To some extent, the NAAQS program itself is intended to address EJ considerations on a pollutant-by-pollutant level. Unlike air quality standards in some other countries, which may differentiate between the goals for industrialized and rural areas, EPA’s NAAQS are applicable nation-wide. EPA is required to set the primary, health-based NAAQS at levels that are not only protective of the average member of the public, but also protective of “sensitive populations” like seniors, children, individuals with respiratory problems, and people who are active outdoors. EPA’s monitoring requirements for pollutants regulated by a NAAQS also require that states locate monitors in areas where pollutant concentrations are expected to be the highest, and an entire area’s compliance with the NAAQS is based on the worst air pollution levels measured within the region. Therefore, ensuring an area’s compliance with the NAAQS ensures that no population in the region is exposed to air pollution levels EPA has deemed to be unhealthy over a sustained period of time.

However, this perspective misses several important points:

⁵⁴ U.S. Census Bureau. Quick Facts. Accessed November 8, 2018.

- Impacts from air pollution exposure may not have a very clear threshold in the ranges experienced within the region even below the NAAQS;
- Impacts from multiple different types of air pollution can have a cumulative effect on public health that pollutant-by-pollutant analyses may miss; and
- These impacts may be geographically distributed in such a way as to cause a particular group to bear a disproportionate burden from air pollution.

EPA's EJ Screen⁵⁵ and similar tools can be used to identify groups and areas within the region that may be experiencing a disproportionate burden of air pollution, which can in turn help focus local or regional efforts to improve equity in environmental outcomes.

10.6 Issue #6: The Impact of Activities within the Region on Air Quality Issues Elsewhere

Ambient concentrations of greenhouse gases and O₃ layer depletion are important air quality issues at a global scale, and emissions from within the region and indirectly caused by activities undertaken within the region certainly contribute to these issues. While these issues are not specific to the region, they are air quality issues that several CAC members have made a priority in recent years. Additionally, a number of CAC members are affected directly by federal greenhouse gas regulations, particularly in the electric utility sector.

It is also true that there are important linkages between global climate change and regional air pollution. As EPA states, "atmospheric warming associated with climate change has the potential to increase ground-level ozone in many regions, which may present challenges for compliance with ozone standards in the future. The impact of climate change on other air pollutants, such as particulate matter, is less certain, but research is underway to address these uncertainties."⁵⁶ Due to the impact that changes in the climate may have on regional air pollution, the region should keep track of how such changes may impact the region's plan for maintaining compliance with air quality standards or otherwise minimizing air pollution from O₃ and other pollutants. Another area where there is overlap between these concerns is that combustion is the primary activity that would need to be controlled in order to reduce both NO_x emissions and CO₂ emissions. Efforts to reduce combustion of fossil fuels within the MSA would therefore be expected to have beneficial impacts on both regional air pollution and climate change.

CAC members have varying degrees of interest in controlling greenhouse gas emissions, as indicated in the stakeholder workshops CAPCOG conducted earlier in 2018. On one end of the spectrum, the City of Austin has adopted a series of plans to reduce greenhouse gas emissions attributable to activity within the City and Travis County, as identified in its 2015 Community Climate Protection Plan. In contrast, several stakeholders that participated in the workshops for the development of this plan indicated that this plan should not address greenhouse gases at all. Due to the ancillary consequences for regional air quality and the regulatory requirements that apply to CAC members related to greenhouse gases, it is important to at least keep track of scientific and regulatory developments in this area. To the extent that the CAC can help ensure that efforts by its members to address greenhouse gas emissions also helps address other pollutants, efforts undertaken within the region for the purpose of reducing greenhouse gas emissions can also yield significant regional air pollution benefits.

⁵⁵ <https://www.epa.gov/ejscreen>

⁵⁶ EPA. Air Quality and Climate Change Research. November 9, 2018.

11 Appendix C: Descriptions of Organizations, Roles, and Responsibilities

This appendix outlines the roles and responsibilities of each organization participating in this plan, and may be updated as needed by CAPCOG to reflect new information. This appendix is current as of December 21, 2018.

11.1 CAPCOG

The CAPCOG is the regional planning commission for state planning region 12, which includes Bastrop, Blanco, Burnet, Caldwell, Fayette, Hays, Lee, Llano, Travis, and Williamson Counties. CAPCOG is a political subdivision of the state and subject to Texas Local Government Code Chapter 391 (“Regional Planning Commissions”). As described in its by-laws, CAPCOG is, “a voluntary organization of local governments through which its members seek, by mutual agreement and closer cooperation, solutions to mutual problems for their mutual benefit.” CAPCOG’s goal is to, “combine the total resources of its members for regional planning beyond the capabilities of its individual members.” CAPCOG is one of the few COGs in the country that has an MPO within its boundaries that is not incorporated into the COG.

CAPCOG’s governing body is its Executive Committee, which consists of city and county elected officials from throughout its 10-county planning region. CAPCOG also has a General Assembly that includes a broader array of individuals and organizations from around the region that approves the members of the Executive Committee, CAPCOG’s by-laws, and CAPCOG’s annual budget.

CAPCOG’s air quality program provides key leadership and support for the region’s air quality planning efforts. Its activities include:

- Staff support for the Clean Air Coalition;
- The development of air quality plans;
- The preparation of annual air quality plans;
- Serve as a liaison with TCEQ and EPA on regional air quality issues;
- Participation in statewide air quality groups like the Texas Clean Air Working Group (TCAWG) and the Technical Working Group (TWG) on behalf of the region;
- Tracking legislation, regulations, and litigation related to air quality and keeping CAC members informed about their implications for the region’s air quality planning efforts;
- Technical assistance on air quality issues and implementation of air quality measures;
- Conducting outreach and education to promote general air quality awareness, promote actions that will reduce regional air pollution, recruit new participants in the regional air quality plan, and promote actions that can help reduce exposure to high air pollution levels when they occur;
- Conducting air pollution monitoring throughout the region to collect data to supplement data collected from TCEQ’s air monitoring stations within the region;
- Analyzing regional air pollution data and communicating the implications of the data on regional air quality planning to local stakeholders;
- Estimating and analyzing emissions from key sources of air pollution within the region and from sources outside of the region that impact regional air pollution concentrations;
- Analyzing and quantifying the benefits and costs of implementing air pollution control measures;

- When resources are available, awarding and administering air quality-related grants within the region; and
- Other scientific, technical, and planning activities in support of the region’s air quality planning efforts.

CAPCOG staff developed and drafted this plan in consultation with the CAC, CACAC, and other stakeholders, and will track the implementation of the plan through annual reports.

CAPCOG also administers the region’s Commute Solutions program, which is the regional TDM program. The Commute Solutions program is managed separately from the air quality program. However, the program helps improve regional air pollution by reducing emissions-generating activity associated with personal vehicle usage within the region. There is significant overlap between CAPCOG’s outreach activities for the Commute Solutions program and air quality program. The Commute Solutions program is discussed in Section 3.2 of this plan.

Up until 2018, CAPCOG’s air quality program had been primarily funded through a local air quality planning grant provided by the State of Texas through TCEQ to 10 “near-nonattainment” areas. For the 2016-2017 biennium, this amount totaled \$1.247 million for CAPCOG, or about \$624,000 per year. In June 2017, the Governor vetoed this funding. Subsequently, the city and county governments participating in the Clean Air Coalition stepped in to fund CAPCOG’s air quality program using local funding. For FY 2019, CAPCOG’s annual air quality budget totaled \$437,000, with county governments contributing about 41% and city governments contributing 59%, with each local government contributing a pro-rata share based on population and local government type. CAPCOG will continue to pursue state and federal funding opportunities to support these activities, in order to reduce the financial burden on local governments. Until such time as CAPCOG is able to secure such funding, CAPCOG will continue to rely on local government contributions to support the regional air quality program. CAPCOG will consult with the Clean Air Coalition in January and February each year on a proposed scope of work and funding request prior in advance of submitting funding requests to local governments for consideration for the following fiscal year.

11.2 City Governments

The CAC includes 18 of the 19 home-rule cities located in the MSA and 1 general-law city. Home rule cities are cities with a population of at least 5,000 in which the citizens have adopted a home-rule charter. Under state law, actions undertaken by a home-rule city are presumed to be interest and are permissible unless they are specifically prohibited by state statute or the state constitution. (Texas Local Government Code Title 2, Subtitle A, Chapter 9: Home-Rule Municipality).

The 19 cities in the CAC represent a collective population of 1,559,212 in 2017, constituting 74% of the MSA’s population. Cities can help achieve emission reductions both directly – through controlling emissions from its own sources, and indirectly – through its municipal activities and utilities. The list of cities and their populations, along with selected utilities the cities operate, are shown in the table below.

2019-2023 Austin-Round Rock-Georgetown MSA Regional Air Quality Plan

Table 11-1. City CAC Members

| City | 2017 Population | Electric Utility | Solid Waste Utility | Water Utility | Airport |
|---------------|------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| Austin | 950,715 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Bastrop | 8,802 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Bee Cave | 6,739 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Buda | 16,163 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Cedar Park | 75,704 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Elgin | 9,701 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Georgetown | 70,685 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Hutto | 25,367 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Kyle | 43,480 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Lago Vista | 6,815 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Lakeway | 15,154 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Leander | 49,234 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Lockhart | 13,788 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Luling | 5,903 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Pflugerville | 63,359 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Round Rock | 123,678 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| San Marcos | 63,071 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Sunset Valley | 687 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Taylor | 16,982 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| TOTAL | 1,566,027 | 6 | 16 | 17 | 6 |

The Cities of Kyle and Lago Vista are new CAC members for this plan.

The following table summarizes 2017 electricity data for the municipal electric utilities in the region that reported data to the Energy Information Administration (EIA), including megawatt-hours (MWh) sold, total revenue, and average price per kilowatt-hour (kWh).⁵⁷

Table 11-2. Municipal Electric Utility Data for 2017 Reported to EIA

| Utility | Customers | Sales (MWh) | Revenue (\$1,000) | Avg. Price (cents/kWh) |
|--------------------|----------------|-------------------|---------------------|------------------------|
| Austin Energy | 475,744 | 12,905,561 | 1,179,480.0 | 9.14 |
| City of Georgetown | 25,460 | 621,464 | 65,001.4 | 10.46 |
| City of Lockhart | 5,383 | 103,836 | 10,726.2 | 10.33 |
| City of San Marcos | 24,118 | 609,867 | 65,404.0 | 10.72 |
| TOTAL | 530,705 | 14,240,728 | 1,320,611.60 | 9.27 |

⁵⁷ Energy Information Administration. Revenue from retail sales of electricity to ultimate customers: Annual, by State and Utility, tables 6-10. Data from forms EIA-861 – schedules 4A & 4D and EIA-861S. Release date: 11/6/2017. Accessed 10/17/2018.

These utilities accounted for 3.6% of the 394,822,046 MWh of electricity sold at retail in 2017. The Electric Reliability Council of Texas’s (ERCOT’s) average emissions rate for 2017 was 0.42885 lbs NO_x/MWh,⁵⁸ meaning that the electricity sold from these four utilities accounted for approximately 3,054 tons of NO_x emissions across the ERCOT grid, (may not account for transmission losses). The most recent available transmission losses averaged 2.1355%, from 10/17/2018, while distribution losses averaged 2.4594% for ONCOR.

Among the municipal utilities in the region, Austin Energy is unique: in addition to being a retailer service provider and a manager of electricity distribution infrastructure, it also owns and operates generating assets, including two point sources located within the MSA: the Decker Creek Power Plant and the Sand Hill Power plant.

Cities can also have a significant influence over emissions within their communities through indirect means, including:

- Establishing and enforcing building codes that promote energy efficiency and renewable energy;
- Using development codes that help reduce vehicle miles traveled;
- Managing transportation systems in ways that reduce on-road emissions; and
- Adopting and enforcing vehicle idling restrictions.

11.3 County Governments

County governments are much more restricted in their authority than home-rule cities. Under Texas law, counties only have the authority to under take activities explicitly granted to them by the state constitution or statutes. However, counties still have significant influence on emissions-generating activities. Due to their participation in the DACM/LIRAP and LIP programs, Travis and Williamson Counties also have had a significant role in these air quality programs. Currently, Travis County administers the LIRAP program on behalf of both counties. However, as a result of the Governor’s veto of appropriations for the LIRAP program for the FY 2018-2019 biennium, both counties have adopted resolutions to suspend LIRAP revenue collection and expect the program to wind down in May 2019. County law enforcement officials can also undertake enforcement actions related to the vehicle emissions inspection and maintenance program and – if the county has entered into an MOA with TCEQ – can enforce extended idling restrictions.

Table 11-3. County Populations 2017

| County | MSA County Type | 2017 Population |
|-------------------|-----------------|------------------|
| Bastrop | Outlying | 84,761 |
| Caldwell | Outlying | 42,338 |
| Hays | Central | 214,485 |
| Travis | Central | 1,226,698 |
| Williamson | Central | 547,545 |
| TOTAL | n/a | 2,115,827 |

11.4 CAMPO

CAMPO is the Metropolitan Planning Organization (MPO) for the Capital Area Metropolitan Planning Area (MPA), which consists of Bastrop, Burnet, Caldwell, Hays, Travis, and Williamson Counties. The

⁵⁸

http://www.ercot.com/content/wcm/landing_pages/89278/2017_Renewable_Content_Calculator_EFLWorkbook_v1.xlsx

Capital Area MPA is the MPA associated with the Austin urbanized area. CAMPO is responsible for the development of the MPA’s long-range (20+ year) Regional Transportation Plan (RTP) and a short-range (4-year) Transportation Improvement Program (TIP). If any of the counties in the Capital Area MPA were to be designated “nonattainment” for any NAAQS, CAMPO’s planning efforts would be constrained by federal transportation conformity requirements. CAMPO would be responsible for awarding any federal Congestion Mitigation for Air Quality (CMAQ) funding that would be available to the region.

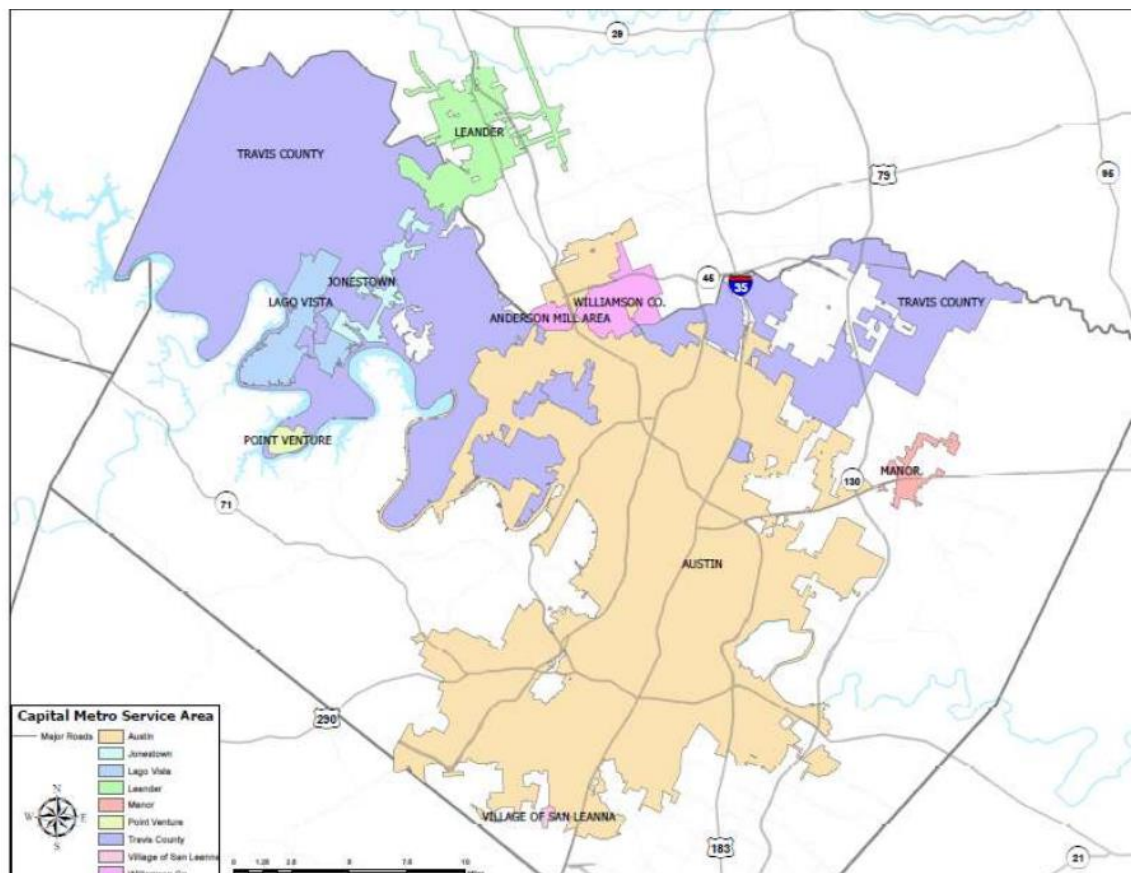
CAMPO is governed by a Transportation Policy Board (TPB). Voting members include elected officials from each county government, elected officials from each city with a population of more than 50,000, a representative from TxDOT, and a representative from CapMetro. CAMPO also has a Technical Advisory Committee comprised of staff from local jurisdictions and organizations throughout the region to provide technical expertise and recommendations to inform the TPB in its decision-making process.

As mentioned above, CAMPO is one of the few MPOs for a major metropolitan areas in the country that is not combined with the COG that covers that region. However, CAMPO participates in the regional air quality planning effort through a staff liaison that participates in the CAC Advisory Committee.

11.5 CapMetro

CapMetro is the primary regional transit provider for the Austin urbanized area, and therefore, it plays an important role in the region’s air quality plan. Its service area covers 534 square miles and 1 million residents, and includes the City of Austin, the City of Jonestown, the City of Lago Vista, the City of Leander, the City of Point Venture, the Village of San Leanna, Travis County Precinct 2, and the Anderson Mill area of Williamson County.

Figure 11-1. CapMetro Service Area



CapMetro also operates a significant fleet of vehicles, and has taken steps and will continue to take steps to control and reduce emissions from its operations throughout the course of this plan. Its fleet includes:⁵⁹

- 368 “MetroBuses” and 55 “MetroRapid” vehicles operating a total of 95 fixed routes, which averaged 103,308 riders on weekdays in September 2018;
- 10 Diesel-electric trains, which averaged 2,968 riders on weekdays in September 2018;
- 243 Vanpools; and
- 117 Paratransit vehicles.

CapMetro also offers a number of other services including the following:

- CapMetro staffs an “Office of Mobility Management” (OMM) in partnership with the Capital Area Rural Transportation System (CARTS). OMM helps residents get around the region without single-occupancy vehicle commuting;
- CapMetro operates a number of special-event services to help provide transportation alternatives during the many special events that occur within the region throughout the year; and
- CapMetro also has started to form partnerships with jurisdictions outside of its service area that are within the Austin urbanized area to assist them in making transit services available to these communities. These partnerships include the Cities of Georgetown, Pflugerville, and Round Rock.

11.6 CTRMA

CTRMA is an independent government agency created in 2002 to improve the transportation system in Williamson and Travis counties. The agency’s mission is to implement innovative, multi-modal transportation solutions that reduce congestion and create transportation choices that enhance quality of life and economic vitality. The Mobility Authority was created and operates under the Texas Transportation Code Chapter 370. It is authorized under state law to implement a wide range of transportation systems including roadways, airports, seaports and transit services. Among its activities within the region in recent and coming years include:

- The MoPac improvement project;
- US 183 South;
- SH 45 Southwest;
- US 183 North;
- US 290/SH 130 flyovers;
- MoPac South;
- 183A;
- US 290 East toll road;

⁵⁹ <https://www.capmetro.org/facts/#!>

- SH 71 East toll road; and
- The HERO project.

CTRMA participates in a number of green initiatives, including the “Green Mobility Challenge,” shared use paths, the commute solutions program, and voluntary emission reduction measure implementation by its construction contractors. CTRMA also conducts and participates in a variety of emissions analyses, including an emissions analysis of 183A in 2009 and an upcoming analysis of the MoPac expressway in 2019.

11.7 LCRA

The LCRA is a regional agency that manages surface water in the Lower Colorado River area and provides public power to organizations throughout the region. Within the MSA, LCRA owns two power plants: the Sim Gideon Power Plant (which it also operates), and the Lost Pines Power Plant (which is operated by GenTex). As a wholesale power supplier, LCRA also owns and operates transmission lines across the region, and operates a series of dams that generate small quantities of electric power. LCRA also owns and operates a gas compressor station located in Bastrop County that is required to provide annual emissions inventory reports to TCEQ. The LCRA is also a large regional employer.

11.8 EPA

EPA is responsible for promulgating the NAAQS, promulgating rules and guidance needed to implement the NAAQS, designating areas as “nonattainment,” “attainment,” or “unclassifiable” for the NAAQS. EPA also is charged with promulgating rules governing the emissions of air toxics, O₃-depleting substances, and, more recently, greenhouse gas emissions. EPA also directly establishes nation-wide standards for new mobile source engines, fuels, and stationary sources. EPA is responsible for reviewing and approving SIPs or otherwise promulgating FIPs if it does not approve the SIPs, approving a state’s air monitoring plans, and conducting oversight of the state’s air quality planning efforts in carrying out the requirements of the Clean Air Act.

EPA also provides support for local efforts to address air pollution through the National Clean Diesel/DERA grant funding, the Advance Program, the NATA, the Environmental Justice Screen (EJ Screen) tool, and many other technical resources. EPA also maintains the AirNow site that provides nation-wide data and information on air quality. Any changes to the Texas SIP applicable to the region or the regulatory monitoring network within the region are subject to EPA approval.

The very first Strategic Measure included in EPA’s 2018-2022 Strategic Plan is to reduce the number of nonattainment areas from 166 as of October 1, 2017, to 101 by September 30, 2022. This strategic plan and associated measure overlap with the time period covered by this plan, and the primary goal of this plan to maximize the probability of compliance with the NAAQS region-wide helps advance this strategic national measure. EPA’s ongoing partnership and support in keeping the Austin-Round Rock-Georgetown MSA in attainment of the NAAQS will help both EPA and the region achieve its goals.

11.9 FHWA

FHWA is a division of the United States Department of Transportation that specializes in highway transportation. FHWA plays a major role in transportation and mobility in the region through funding for roadway improvements projects. The FHWA is a new CAC member.

11.10 TCEQ

TCEQ is the state’s environmental agency and is tasked by the Texas Legislature with enforcing the NAAQS within the state. As part of this responsibility, TCEQ:

- Conducts daily air quality forecasts for the MSA and the rest of the state;

- Prepares revisions to the SIP;
- Adopts rules regulating emissions within the state;
- Issues permits to owners and operators of stationary sources of emissions that limit the facility's emissions, monitors for compliance, and enforces permit conditions and other rules;
- Administers an emissions banking and trading program;
- Administers the state's program for providing property tax exemptions for pollution abatement equipment;
- Conducts inspections and enforces rules and permit conditions;
- Owns and operates air quality monitoring stations required by EPA;
- Enters into memoranda of agreement (MOAs) with local governments to carry out local enforcement of heavy-duty idling restrictions;
- Established motor vehicle emissions budgets (MVEBs) and participates in interagency consultation regarding federal transportation and general conformity requirements;
- Prepares any exceptional events demonstrations for any air quality data collected in the state;
- Administers air quality-related grant programs, including the various TERP grant programs and the VW settlement beneficiary mitigation plan;
- Oversees any air quality-related Supplemental Environmental Projects (SEPs) funded by individuals and organizations as an alternative to paying an administrative penalty as a result of a violation of TCEQ rules;
- Conducts toxicological assessments of ambient air quality data collected within the state;
- Conducts scientific research into emissions, meteorology, and other air pollution issues; and
- Interacts with local and regional governments on air quality issues.

Any changes to the state's emission rules applicable to the region, the regulatory monitoring stations located with the region, the SIP, or programs applicable to the region would require approval by the TCEQ. TCEQ could also undertake changes to each of these items on their own initiative.

In the past, TCEQ also played an indirect role in the region's air quality planning efforts in its capacity as the agency tasked with overseeing and administering the region's local air quality planning grant that funded CAPCOG's air quality program. Now that this grant program is no longer in existence, TCEQ's role in this regard has also ceased. However, if state funding for these types of activities were to be reinstated in the future, it is likely that TCEQ would resume this role.

As the country's second-largest environmental agency, with its primary offices located within the region, TCEQ also participates in the region's air quality plan through efforts to control emissions associated with its own operations. Details on these efforts are provided later in this plan.

11.11 Texas Department of Public Safety

The Texas Department of Public Safety administers the state's vehicle inspection program, which includes an emissions testing requirement for Travis and Williamson Counties. Many of the emissions I/M program rules are found in Title 30 of the Texas Administrative Code, Part 1, Chapter 114, Subchapter C, which TCEQ's for the emissions I/M program. However, rules promulgated by DPS for the I/M program are listed in Title 23, TAC, Part 1, Chapter 23. These include:

- Vehicle inspection station certification;
- General requirements for all vehicle inspection stations;
- Requirements for vehicle emissions inspections;
- Exemptions and time extension waivers for the emissions inspection tests;
- Requirements for repair technicians and facilities to be considered “recognized;” and
- Specifications how violations will be handled.

DPS also has a high-emitter program that involves remote-sensing of emissions data long roadways in counties with an I/M program. Vehicles that are detecting emitting higher than specified levels are required to conduct and pass an “off-cycle” inspection within 30 days of receiving a notice from the Department. DPS has in the past implemented this program in Travis and Williamson Counties at TCEQ’s request, but currently only implements the program in the Dallas-Fort Worth and Houston areas as requested by TCEQ.

11.12 TPWD

TPWD is a Texas state agency that oversees and protects wildlife and their habitats. In addition, the agency is responsible for managing the state's parks and historical areas. Its mission is to manage and conserve the natural and cultural resources of Texas for the use and enjoyment of present and future generations. TPWD is a new CAC member.

11.13 TxDOT

TxDOT plays several roles in support of the region’s air quality plan. TxDOT’s headquarters are located in Austin, and it also has a district office located in Austin and several facilities throughout the region. TxDOT takes a number of steps to reduce emissions from its own operations and employees and is both a CAC member and a Clean Air Partner.

TxDOT is also responsible for administering transportation funding awarded to CAPCOG, CapMetro, and City of Austin for TDM projects that were awarded for the 2019-2022 TIP. If the region were ever designated nonattainment, TxDOT would be involved in the transportation and general conformity processes.

11.14 Austin White Lime

Austin White Lime is a lime manufacturing company that operates a lime manufacturing facility located in northern Travis County and a lime quarry located in Williamson County. Austin White Lime’s manufacturing facility emitted a total of 420 tons of NO_x emissions in 2016, making it the 2nd-largest point source of NO_x emissions within the MSA that year, behind Texas Lehigh Cement Company. Austin White Lime joined the CAC in August 2016, and although it has not made any specific emission reduction measure commitments, it has worked with CAPCOG to implement various emission reduction measures, including replacement of older trucks and equipment used by the company and the installation of equipment that improved the fuel efficiency at the largest of its manufacturing facility’s three kilns, thereby reducing NO_x emissions.

EPA has at various times suggested that lime kilns may be able to install low-NO_x burners, selective non-catalytic reduction (SNCR), or selective catalytic reduction (SCR) as a means of reducing a lime kiln’s NO_x emissions. For example, these measures are included in EPA’s most recent “Menu of Control Measures”

for NAAQS implementation.⁶⁰ However, based on CAPCOG’s review of publicly available information and discussions with Austin White Lime, it appears that no lime plant in the country has installed any such equipment due to the impact these types of controls would have on product quality. Furthermore, EPA’s approval of Texas’s Reasonably Available Control Technology (RACT) demonstration for the Dallas-Fort Worth (DFW) 2008 O₃ NAAQS nonattainment area in 2017 suggests that EPA does not at this time consider these technologies to be “reasonably available controls” for lime kilns. Austin White Lime’s primary opportunities for NO_x reductions stem from reducing emissions from heavy-duty diesel equipment used on-site and from combustion optimization at the kilns, both of which Austin White Lime has pursued in recent years.

11.15 Texas Lehigh Cement Company

Texas Lehigh Cement Company operates a cement plant in Buda, which is located in Hays County. In 2016, this facility emitted 2,257 tons of NO_x, making it the largest point source of NO_x emissions within the MSA, and the 2nd-largest source of NO_x emissions among the 11 cement plants that submit annual emissions data to TCEQ. Texas Lehigh has been a CAC member since 2013, and also participated in the region’s air quality planning efforts in 2009 during “The Big Push.” Texas Lehigh’s facility is equipped with SNCR controls in order to keep the facility’s NO_x emissions within permitted limits. However, Texas Lehigh maximizes the NO_x reduction efficiency of the control equipment between 9 am and 3 pm on days when TCEQ predicts high O₃ in either the Austin-Round Rock-Georgetown MSA or the San Antonio-New Braunfels-Pearsall MSA. This measure significantly reduces the facility’s NO_x emissions during this key time of day when its emissions would be most likely to contribute to the MDA8 O₃, thereby minimizing its impact on ambient O₃ air pollution concentrations on those days. This unique measure enables highly cost-effective reductions in ambient O₃ by leveraging TCEQ’s air quality forecasting and the facility’s existing control systems. Texas Lehigh has indicated that it intends to continue implementing this measure during the course of this plan. The company has also previously received TERP grants.

11.16 CAF

The CAF is a 501(c)(3) non-profit organization that promotes air quality within the MSA.

- Inform Central Texans when O₃ season begins and of days when the region’s air quality is likely to reach harmful levels;
- Educate the public on air quality issues and new regulations in Central Texas, as well as ways citizens can help reduce harmful emissions to protect themselves and their families;
- Provide businesses and citizens the opportunity to stay abreast of the latest air quality developments;
- Research emerging air quality issues in the region;
- Facilitate and participate in regional collaborative problem-solving with other agencies, elected officials, university students, industry leaders, and administration officials and the public;
- Provide a public forum for the exchange of information and ideas on air quality issues; and
- Present information on the health and economic impacts of air pollution to schools, governments, civic organizations, and businesses.

⁶⁰ EPA. Menu of Control Measures. Updated 4/12/2012. Available online at: <https://www.epa.gov/air-quality-implementation-plans/menu-control-measures-naaqs-implementation>.

The CAF manages the Clean Air Partners Program, which works with local employers in the MSA to implement company-specific emission reduction strategies. Partners implement these programs and report their emission reductions annually. The Clean Air Partners Program won an EPA Clean Air Excellence Award in 2015.

11.17 LSCFA

The LSCFA is the Austin-area Clean Cities Coalition constituted as a membership-based 501(c)(3) non-profit organization. The Clean Cities program advances the nation's economic, environmental, and energy security by supporting local actions to reduce petroleum consumption in transportation. The LSCFA brings together stakeholders in the public and private sectors to deploy alternative and renewable fuels, idle-reduction measures, fuel economy improvements, and emerging transportation technologies.

11.18 Public Citizen

Public Citizen is a nonprofit consumer advocacy organization that champions the public's interest. Public Citizen's Texas office advocates for emission reductions, clean and sustainable energy, advancing energy efficiency in Texas, and more. Public Citizen has 400,000 members and supporters throughout the country. Public Citizen is a new CAC member

11.19 Sierra Club – Lone Star Chapter

The Sierra Club's Lone Star Chapter advocates for clean air and water, smart energy solutions, responsible transportation choices and for natural resources to be protected so that current and future generations may enjoy them. The Chapter values diversity and promotes environmental education and environmental justice in their efforts to explore, enjoy, and protect Texas' natural heritage and to protect public health. As of December 2018, the Lone Star Chapter has 26,850 members statewide.

12 Appendix D: Summary of Plan Commitments by Organization

The following table summarizes the commitments made by CAC members specifically for this plan as of December 21, 2018. A more detailed listing of commitments is provided in an accompanying spreadsheet. All CAC members are expected to annually report whatever measures they do implement to CAPCOG. CAPCOG is authorized to update this appendix table and the related spreadsheet as organizations are added and commitments are updated without this plan needing direct approval by the CAC.

Table 12-1. Summary of 2019-2023 Austin-Round Rock-Georgetown MSA Regional Air Quality Plan Commitments

| Organization | Commits to Implement Some Tier 1 Measures | Commits to Implement All Applicable Tier 1 Measures | Commits to Implementing Applicable Tier 2 Measures | Commits to Implementing All Applicable Tier 2 Measures | Commits to Implementing Other Measures |
|-----------------------|---|---|--|--|--|
| Bastrop County | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Caldwell County | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Hays County | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Travis County | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Williamson County | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| City of Austin | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| City o Bastrop | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| City of Bee Cave | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| City of Buda | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| City of Cedar Park | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| City of Elgin | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| City of Georgetown | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| City of Hutto | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| City of Kyle | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| City of Lago Vista | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| City of Lakeway | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| City of Leander | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| City of Lockhart | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| City of Luling | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| City of Pflugerville | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| City of Round Rock | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| City of San Marcos | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| City of Sunset Valley | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| City of Taylor | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| CAPCOG | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| CAMPO | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| CapMetro | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| CTRMA | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| LCRA | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| FHWA | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

| Organization | Commits to Implement Some Tier 1 Measures | Commits to Implement All Applicable Tier 1 Measures | Commits to Implementing Applicable Tier 2 Measures | Commits to Implementing All Applicable Tier 2 Measures | Commits to Implementing Other Measures |
|-------------------|---|---|--|--|--|
| TCEQ | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| TPWD | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| TxDOT | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Austin White Lime | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Texas Lehigh | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| CAF | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| LSCFA | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Public Citizen | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Sierra Club | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

“Tier 2 participants” are organizations that have committed to implement all Tier 1 measures and at least one Tier 2 measure. These organizations include:

- Bastrop County
- Travis County
- City of Austin
- City of Cedar Park
- City of Kyle
- City of Pflugerville
- CAPCOG

“Tier 1 participants” are organizations that have committed to implement all Tier 1 measures, but did not commit to implement any of the Tier 2 measures. These organizations include:

- City of Bee Cave
- LCRA
- Lone Star Chapter of the Sierra Club

“Other participants” include any other organization participating in the air quality plan. Several of these organizations have made substantial emission reduction commitments (including some Tier 1 and 2 measures), while others have committed to report whatever measures they do implement, but haven’t made a commitment to implement any specific measure. This list also includes any CAC member that has not provided any specific list of commitments as of December 21, 2018. These list of “other participants” includes:

- Caldwell County
- Hays County
- Williamson County

- City of Bastrop
- City of Buda
- City of Elgin
- City of Georgetown
- City of Hutto
- City of Lago Vista
- City of Lockhart
- City of Luling
- City of Round Rock
- City of San Marcos
- City of Sunset Valley
- City of Taylor
- CAMPO
- CapMetro
- CTRMA
- FHWA
- TCEQ
- TPWD
- TxDOT
- Austin White Lime
- Texas Lehigh Cement Company
- CAF
- LSCFA
- Public Citizen

13 Appendix E: Glossary

AACOG: Alamo Area Council of Governments

AFFP: Alternative Fueling Facilities Program

AQCR: Air Quality Control Region

AQI: Air Quality Index

BRFSS: Behavioral Risk Factor Surveillance System

CAC: Central Texas Clean Air Coalition of the Capital Area Council of Governments

CACAC: Clean Air Coalition Advisory Committee

CAF: CLEAN AIR Force of Central Texas

CAMPO: Capital Area Metropolitan Planning Organization

CAMS: Continuous Air Monitoring Station

CAPCOG: Capital Area Council of Governments

CapMetro: Capital Metropolitan Transportation Authority

CARTS: Capital Area Rural Transportation System

CASAC: Clean Air Scientific Advisory Committee

CBSA: Core-Based Statistical Area

CFR: Code of Federal Regulations

CH₄: Methane

CMAQ: Congestion Mitigation for Air Quality

CO: Carbon monoxide

CO₂: Carbon dioxide

COPD: Chronic obstructive pulmonary disease

CTCOG: Central Texas Council of Governments

CSAPR: Cross-State Air Pollution Rule

CSB: Clean school bus

CTRMA: Central Texas Regional Mobility Authority

DACM: Drive a Clean Machine

DERA: Diesel Emission Reduction Act

DERI: Diesel Emission Reduction Incentive (grant program)

DOE: Department of Energy

DFW: Dallas-Fort Worth

EAC: Early Action Compact

EIA: Energy Information Administration

EGU: Electric generating unit
EJ: Environmental Justice
EPA: U.S. Environmental Protection Agency
ERCOT: Electric Reliability Council of Texas
ESL: Effects Screening Level
FEM: Federal equivalent method
FIP: Federal Implementation Plan
FHWA: Federal Highway Administration
FRM: Federal reference method
GRP: Gross Regional Product
HAPs: Hazardous Air Pollutants
I/M: Inspection and maintenance
ISA: Integrated science assessment
kWH: Kilowatt-hour
LCRA: Lower Colorado River Authority
LDPLIP: Light-Duty Motor Vehicle Purchase or Lease Incentive Program
LSCFA: Lone Star Clean Fuels Alliance
MDA8: Maximum daily 8-hour average
MOA: Memorandum of Agreement
MPA: Metropolitan Planning Area
MPO: Metropolitan Planning Organization
MSA: Metropolitan Statistical Area
 $\mu\text{g}/\text{m}^3$: micrograms per cubic meter
MWh: Megawatt-hour
MVEB: Motor Vehicle Emissions Budget
NAAQS: National Ambient Air Quality Standards
NATA: National Air Toxics Assessment
 NH_3 : Ammonia
 N_2 : Nitrogen
NO: Nitrogen oxide
 NO_2 : Nitrogen dioxide
 NO_x : Nitrogen oxides
NSPS: New source performance standards

NSR: New source review

NTIG: New Technology Implementation Grant

O₂: Oxygen

O₃: Ozone

OMB: Office of Management and Budget

OMM: Office of Mobility Management

OSD: Ozone season day

Pb: Lead

PBR: Policy-relevant background

PM: Particulate matter

PM_{2.5}: Particulate matter with a diameter of 2.5 micrometers or less (a.k.a. “fine particulate matter”)

PM₁₀: Particulate matter with a diameter of 10 micrometers or less

Ppb: Parts per billion

Ppm: Parts per million

PSD: Prevention of significant deterioration

RACT: Reasonably Available Control Technology

RFP: Request for proposals

SCR: Selective catalytic reduction

SEP: Supplemental Environmental Project

SIP: State Implementation Plan

SNCR: Selective non-catalytic reduction

SO₂: Sulfur dioxide

SO_x: Sulfur oxides

TAC: Texas Administrative Code

TAMIS: Texas Air Monitoring Information System

TCEQ: Texas Commission on Environmental Quality

TCFP: Texas Clean Fleet Program

TDM: Transportation demand management

TERP: Texas Emission Reduction Plan

TIP: Transportation Improvement Program

TNGVGP: Texas Natural Gas Vehicle Grant Program

TPB: Transportation Policy Board

Tpd: Tons per day

TPWD: Texas Parks and Wildlife Department

Tpy: Tons per year

TxLED: Texas low-emission diesel

TxDOT: Texas Department of Transportation

U.S.C.: United States Code

VOC: Volatile organic compound

VW: Volkswagen

TSD: Technical support document

ZEV: Zero-emission vehicle