



Fact Sheet – EPA’s New Ozone Standard and How it Affects Central Texas

On October 1, 2015, the U.S. Environmental Protection Agency (EPA) finalized new, more stringent National Ambient Air Quality Standards (NAAQS) for ground-level ozone. This fact sheet is designed as a resource for Central Texas local governments, businesses, media, and non-profit organizations, as well as the general public, to better understand these new air quality standards and how their implementation may affect the region. If you have any questions about this fact sheet or other issues related to regional air quality, contact CAPCOG’s Air Quality Program Manager Andrew Hoekzema at (512) 916-6043 or ahoekzema@capcog.org.

What’s in the EPA’s new 70 part per billion ozone standard?

- The primary standard, which is intended to protect human health, was set at **70 parts per billion (ppb)**, down from the 2008 standard of **75 ppb**;
- The secondary standard to protect public welfare, including effects on vegetation, was set identical to the primary standard;
- Compliance is based on a three-year average of the 4th highest daily peak 8-hour ozone average measured within a region, a statistic known as a “**design value**,” and
- The EPA revised the “Air Quality Index” (AQI) for ozone as follows:

AQI Category	Index Values	8-Hour Ozone Concentration (2008 standard)	8-Hour Ozone Concentration (2015 standard)
Good	0-50	0-59 ppb	0-54 ppb
Moderate	51-100	60-75 ppb	55-70 ppb
Unhealthy for Sensitive Groups	100-150	76-95 ppb	71-85 ppb
Unhealthy	151-200	96-115 ppb	86-105 ppb
Very Unhealthy	201-300	116-374 ppb	106-200 ppb
Hazardous	301-500	375-600 ppb	201-600 ppb

- The official “ozone season” for Central Texas was extended by 1 month:
 - “Ozone season” = months when high ozone levels occur and states must collect ozone data
 - New ozone season for Central Texas = March – November
 - Old ozone season = March – October

For more details on the EPA’s new standard, go to:

<http://www.epa.gov/air/ozonepollution/actions.html>

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What are the health and environmental effects of high ozone?

EPA’s research indicates that breathing high levels of ground-level ozone can result in a number of health effects including:

- Respiratory symptoms such as:
 - Coughing
 - Throat irritation
 - Pain, burning, or discomfort in the chest when taking a deep breath
 - Chest tightness, wheezing, or shortness of breath
- Decrements in lung function
- Inflammation of airways
- Increased asthma attacks
 - Make asthma symptoms worse
 - Increase sensitivity to asthma triggers
- Increased hospital admissions
- Increased daily mortality, and
- Other markers of morbidity.

<http://www.epa.gov/apti/ozonehealth/population.html>

EPA’s research also indicates that high ozone levels can also have effects on the natural environment including:

- Biomass loss for trees and crops and associated ecological impacts
- Visible foliar injury

<http://www3.epa.gov/ttn/naaqs/standards/ozone/data/20140131welfarerecover.pdf>

How many Central Texans are impacted by high ozone?

Approximately 82% of the population of the Austin-Round Rock Metropolitan Statistical Area (MSA), which consists of Bastrop, Caldwell, Hays, Travis, and Williamson Counties, would be expected to benefit from lower ozone levels within the region:

- Children (<18): 27%
- Seniors (65+): 8%
- Adults (18-64) with asthma: 7%
- Adults (18-64) without asthma who have seasonal allergies: 40%

So far in 2015, the region has measured 9 days above 70 ppb. Implementation of the new NAAQS should decrease regional ozone levels in Central Texas quicker than they would otherwise have decreased under the 2008 ozone standard.

Based on EPA’s data, CAPCOG estimates that a 1 ppb reduction in peak ozone levels could prevent 2-3 deaths per year within the region.

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What are the current and projected ozone levels in Central Texas?

Within the Austin-Round Rock MSA, there are a total of nine ozone monitoring stations:

- Bastrop County: 1 (McKinney Roughts Nature Preserve)
- Caldwell County: 1 (Lockhart Police/EMS Station)
- Hays County: 2 (Dripping Springs and San Marcos)
- Travis County: 3 (Murchison Middle School, Austin Audubon Society, Gorzycki Middle School)
- Williamson County: 2 (Lake Georgetown and Hutto)

Two of the ozone monitoring stations in Travis County are operated by the Texas Commission on Environment (TCEQ) and are used to assess compliance with the ozone NAAQS, and the remaining seven ozone monitors are used for research purposes and are operated by CAPCOG. The highest design value calculated for TCEQ’s two ozone monitoring stations is used as the design value for the entire region.

Since 1999, the region’s ozone design value has dropped from 89 ppb to 69 ppb in 2014, a 22% decrease. Based on current ozone levels, expected growth, typical weather conditions, and existing controls, CAPCOG expects the following ozone design value levels for the Austin-Round Rock MSA over the next several years.

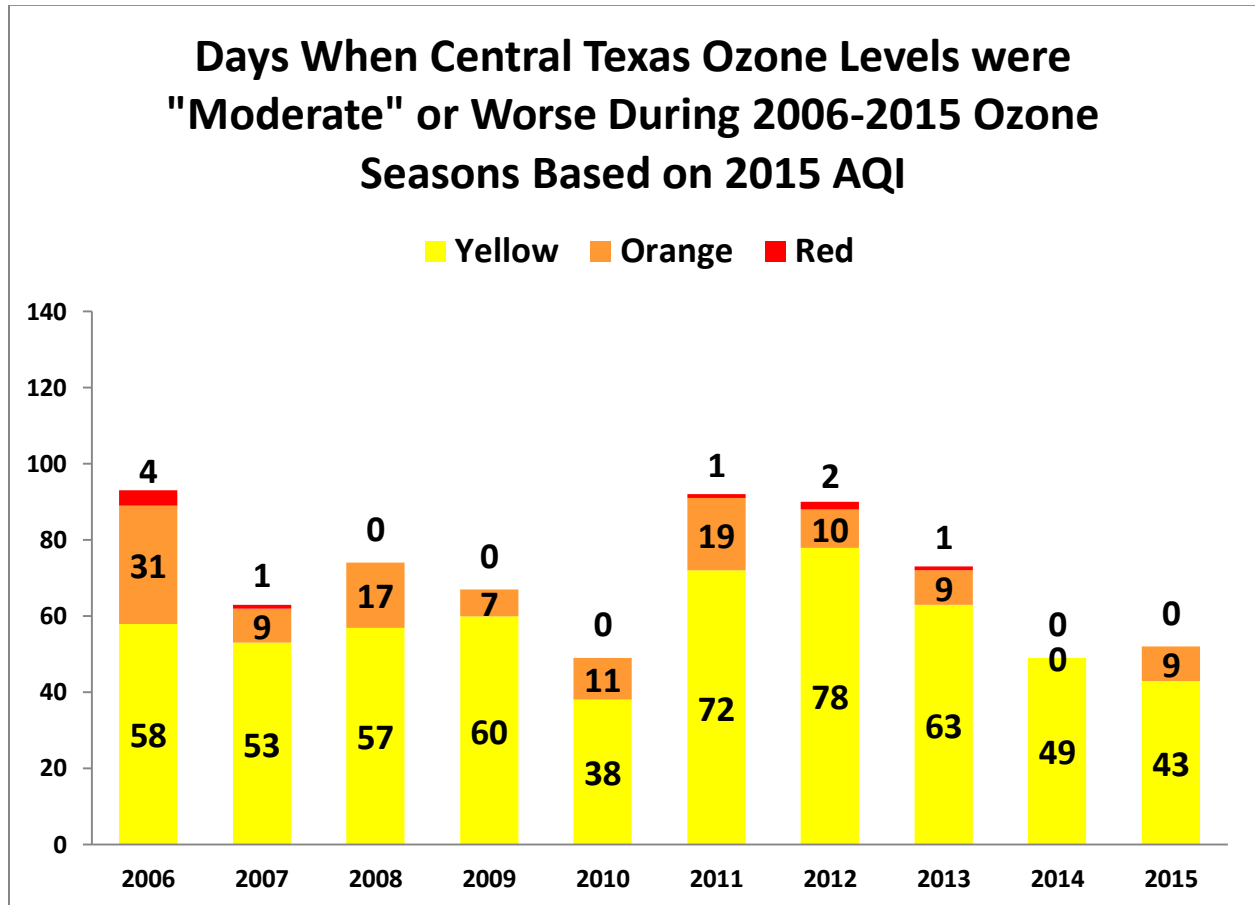
- 2013-2015 ozone design value: 68-69 ppb;
- 2014-2016 ozone design value: 67-68 ppb;
- 2015-2017 ozone design value: 65-67 ppb;
- 2016-2018 ozone design value: 64-67 ppb;
- 2017-2019 ozone design value: 64-66 ppb;
- 2018-2020 ozone design value: 64-66 ppb; and
- 2019-2021 ozone design value: 63-65 ppb.

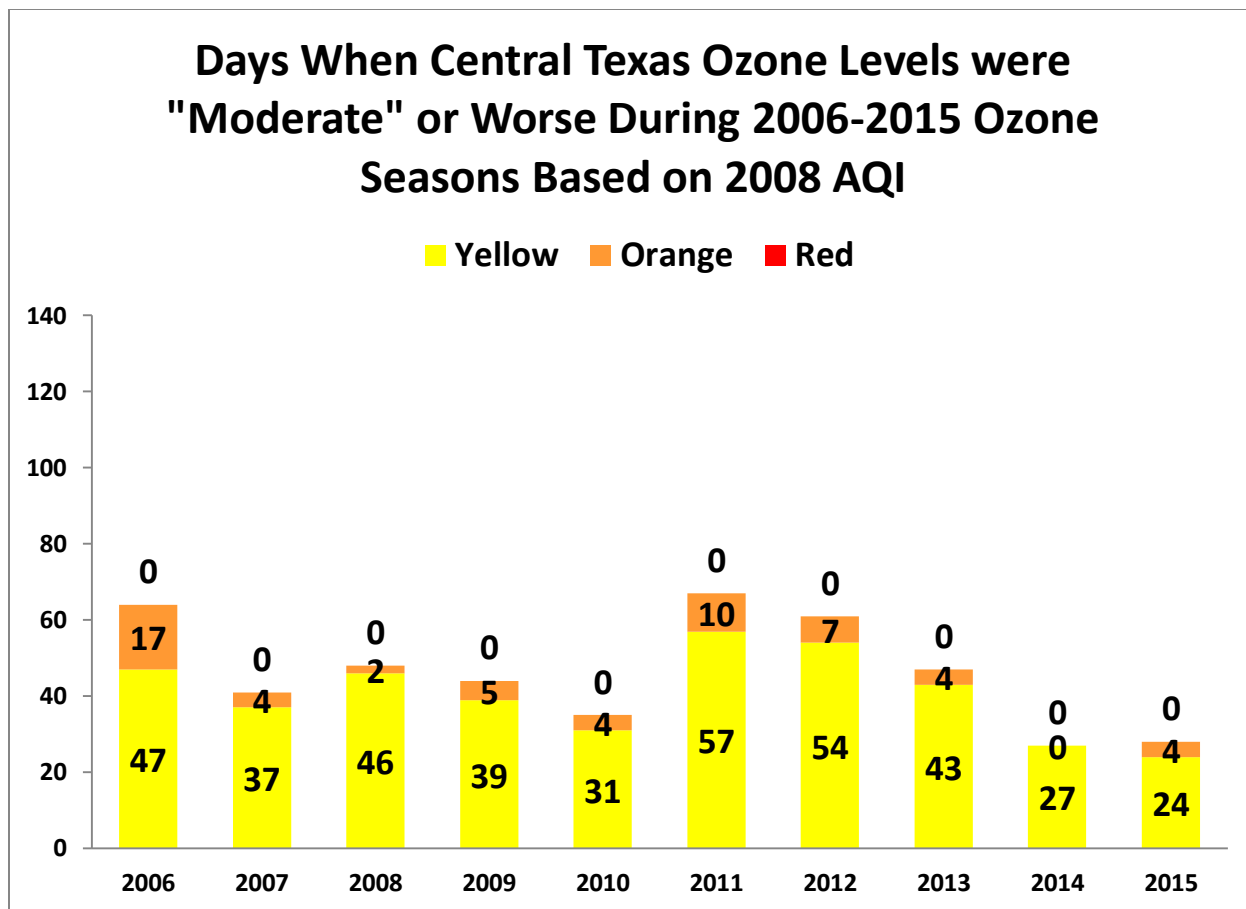
How many high ozone days per ozone season are there in Central Texas?

- **In 2015 (through September 30), Central Texas has measured 9 days when ozone levels were considered “unhealthy for sensitive groups” (71-85 ppb), and 53 days when ozone levels were “moderate” or worse based on the new AQI.**
- The figures below shows a comparison the number of days when at least one ozone monitor in the region measured 8-hour ozone averages that are now considered “moderate,” “unhealthy for sensitive groups,” and “unhealthy” during the ozone seasons (March – November) from 2006-2015 based on the new AQI, and for comparison, the number of days within these categories based on the old AQI. Since the AQI thresholds have been lowered, the number of days that meet the criteria for these AQI categories has increased.

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- While there is no specific regulatory consequence for the number of days a region measures within each AQI range, this metric provides an alternative way to explain local air quality than using the “design value” that may better communicates how frequently the region’s residents experience high ozone levels.
- **The number of days when local ozone concentrations reach levels that are considered “unhealthy for sensitive groups” or worse based on the new AQI has decreased from 35 in 2006 to 9 in 2015, a 74% decrease over 10 years.** Based on the old AQI, the number of days would have declined by 76% (17 in 2006 to 4 in 2015).





What is the EPA’s process for area designations?

- Under the Clean Air Act (CAA), within 2 years of finalizing a new or revised standard, the EPA is required to designate area as:
 - “nonattainment” if the area does not meet a NAAQS or contributes to poor air quality in an area that does not meet that standard
 - “attainment” if the area meets a NAAQS and does not contribute to poor air quality in an area that does not meet the standard; and
 - “unclassifiable” if the EPA cannot determine if the area should be designated as “attainment” or “nonattainment” based on existing information;
- The process for area designations involves the states and the EPA, and the public has several opportunity to provide comments throughout this process:
 - TCEQ will make a recommendation to the governor (approximately June 2016);
 - The governor will make a recommendation to the EPA (approximately Sep. 2016)
 - The EPA will issue notices of any proposed changes to the governor’s recommendations (approximately June 2017);
 - States and the public will have opportunities to provide additional information up through August 2017;
 - EPA will likely finalize initial designations by October 2017;

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- The EPA must use the most recent monitoring data to make designations:
 - If designations occur after May 1, 2017, they would be required to use 2014-2016 ozone design values;
 - EPA has indicated that it would only use the two regulatory ozone monitors located in Travis County as the basis for evaluating whether the region was “not attaining” the standard;
- It is very likely that Travis County’s 2014-2016 ozone monitoring data will show ozone levels that are in attainment of the new standard.
 - The area’s current 2013-2015 design value is 68 ppb.
 - The area’s design value has declined by over 1 ppb per year, on average, over the last 15 years.
 - **The area’s 4th-highest eight-hour ozone averages would have to be 76-77 ppb in 2016 (depending on the monitoring station) in order to have a 2014-2016 design value that would be considered “not attaining” the standard.**
- There is a small possibility that some of the counties in the Austin-Round Rock MSA could be added to a San Antonio nonattainment area, since its current design value is at 78 ppb and the Austin-Round Rock MSA can sometimes contribute to high ozone levels at monitors in San Antonio.
- Redesignation to attainment:
 - An area remains designated nonattainment until it comes into compliance with the NAAQS and the EPA approves a “maintenance plan” for the area.

What factors will the EPA consider in the designation process?

- Based on current guidance, if either of the two regulatory ozone monitors operated by TCEQ in Travis County have 2014-2016 ozone design values above the standard, the EPA’s default boundaries for a nonattainment area associated with those monitors would be Bastrop, Caldwell, Hays, Travis, and Williamson Counties, which make up the Austin-Round Rock MSA as defined in 2013.
- The EPA also considers the following nine factors in deciding whether to add or remove counties from the default boundaries of the nonattainment area:
 - Air quality data;
 - Emissions data (location of sources and contribution to ozone concentrations);
 - Population density and degree of urbanization (including commercial development);
 - Traffic and commuting patterns;
 - Growth rates and patterns;
 - Meteorology (weather/transport patterns);
 - Geography/topography (mountain ranges or other air basin boundaries);
 - Jurisdictional boundaries (e.g., counties, air districts, existing nonattainment areas, Reservations, metropolitan planning organizations (MPOs)); and
 - Level of control of emissions sources.

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What happens if the area is designated nonattainment?

- There are five classifications the area could fall into based on the area’s ozone levels at the time it is designated nonattainment:
 - Marginal (three years to attain the standard)
 - Moderate (six years to attain the standard)
 - Serious (nine years to attain the standard)
 - Severe (fifteen to seventeen years to attain the standard)
 - Extreme (twenty years to attain the standard)
- If the Austin-Round Rock MSA area was designated nonattainment it would very likely be classified as Marginal
- If the area doesn’t meet the standard by the end of 2019, it would not have attained the standard by the October 2020 attainment deadline for Marginal areas and could be “bumped up” to a Moderate classification
- A Marginal classification involves:
 - new permitting requirements for power plants, factories, and other large emission sources;
 - restrictions on federal approvals and funding for road construction, transit expansion, rail relocation, airport expansion, and several other types of projects that last for an additional 20 years after the area is redesignated to attainment while subject to a “maintenance” plan; and
- Moderate and higher classifications involve another 51-59 specific regulatory requirements.
- In a recent report, CAPCOG estimated that a nonattainment designation could cost the regional economy \$24-42 billion over the next thirty years.
http://www.capcog.org/documents/airquality/reports/2015/Potential_Costs_of_a_Non_attainment_Designation_09-17-15.pdf

What is the expected timeline for implementation of the new ozone NAAQS?

If the EPA implements the new ozone standard the same way it has implemented the 2008 ozone NAAQS, the following would be the expected timeline, assuming EPA did not extend the designation process out to 2018.

Date	Milestones
By October 1, 2015	EPA finalizes (signs) new ozone NAAQS
Late October 2015	New ozone NAAQS published in Federal Register
Late January 2016	EPA issues new guidance on initial area designations for ozone NAAQS
Late June 2016	TCEQ makes designation recommendations to the Governor
By October 1, 2016	Designation recommendations from Governors due to EPA EPA proposes implementation rule for ozone NAAQS

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Date	Milestones
By May 1, 2017	States certify 2016 ozone monitoring data
By June 1, 2017	EPA issues “120 day” notices with proposed designations
July 1, 2017	Deadline for exceptional event flagging of 2016 data
By August 1, 2017	States submit additional information for EPA to consider regarding designations
By October 1, 2017	EPA finalizes initial area designations and implementation rule
By October 1, 2018	Initial transportation conformity determinations due to EPA States required to submit “infrastructure” and “transport” SIPs
By October 1, 2019	States required to submit emissions inventories, emissions statements, and RACT SIP revisions within 2 years of designation
By December 31, 2019	Marginal areas must measure attainment by end of 2019 in order to meet the area’s attainment deadline
By October 1, 2020	Marginal area attainment deadline for 2015 ozone NAAQS NNSR SIP due RFP and Attainment Demonstration SIPs for Moderate areas due EPA required to complete next ozone NAAQS review
By October 1, 2021	Additional RFP SIP and attainment demonstration for serious and higher classifications due
By October 1, 2022	EPA required to complete next ozone NAAQS designation process
By October 1, 2023	Moderate area attainment deadline for 2015 ozone NAAQS I/M program SIP due for Moderate areas
By October 1, 2026	Serious area attainment deadline for 2015 ozone NAAQS I/M program SIP due for Serious areas
By October 1, 2032	Severe-15 area attainment deadline for 2015 ozone NAAQS I/M program SIP due for Severe-15 areas
By October 1, 2034	Severe-17 area attainment deadline for 2015 ozone NAAQS I/M program SIP due for Severe-17 areas
By October 1, 2037	Extreme area attainment deadline for 2015 ozone NAAQS I/M program SIP due for Extreme areas

What meteorological factors contribute to high ozone formation?

The following analysis reflects 2006-2014 data.

- **Sunlight:** ozone forms through reactions that occur in the presence of sunlight
- **Low wind speeds:** 95% of days >70 ppb have avg. wind speeds of less than 6.1 mph
- **Low humidity:** 95% of days > 70 ppb have relative humidity of 39.9% or less at 2 pm
- **Temperature:**
 - 95% of days > 70 ppb had peak 1-hour temp. over 82.8 degrees Fahrenheit (F)

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- 95% of days > 70 ppb had > 23.8 deg. F difference between daily low and high temp.
- **Wind direction:**
 - Highest ozone levels in Austin typically occur when winds are out of the south-southeast or northeast
 - Highest ozone levels in the region outside of Austin typically occur if the area is downwind of Austin on that day

When do high ozone levels typically occur within the region?

- Elevated ozone levels can occur as early as the beginning of March and as late as early November.
- The highest ozone levels typically occur in May/June and August/September timeframes.
- High ozone days occur most frequently on Fridays and Saturdays and least frequently on Sundays.
- The highest ozone concentrations typically occur between 12 pm and 4 pm.

Where is the region’s ozone air pollution coming from?

- International transport and naturally-occurring levels account for about 20 ppb.
- Areas outside of Texas account for another 20 ppb.
- Other parts of Texas account for another 20 ppb.
- **Austin-Round Rock MSA emissions account for about 10-15 ppb.**

What are the most important local sources of emissions?

- Ozone forms through reactions between nitrogen oxides (NO_x) and volatile organic compounds (VOC) emissions.
- There are both naturally occurring (biogenic) NO_x and VOC emissions and emissions caused by human activity (anthropogenic).
- The last year for which a complete emissions inventory exists is 2011.
- Total MSA NO_x emissions in 2011: 47,713 tons
 - Biogenic: 3,933 (8% of total)
 - Vegetation & soil: 1,945 tons (49% of biogenic)
 - Wildfires: 1,988 tons (51% of biogenic)
 - Anthropogenic: 43,764 tons (92% of total)
 - Light-duty vehicles: 15,780 tons (36% of anthropogenic)
 - Heavy-duty vehicles: 10,266 tons (23% of anthropogenic)
 - Non-road mobile sources: 8,882 tons (20% of anthropogenic)
 - Manufacturing: 3,934 tons (9% of anthropogenic)
 - Power plants: 2,185 tons (5% of anthropogenic)
 - Oil and gas production: 981 tons (2% of anthropogenic)

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- All other sources: 1,751 tons (4% of anthropogenic)
- Total MSA VOC emissions in 2011: 180,310 tons
 - Biogenic: 138,175 tons (77% of total)
 - Vegetation & soil: 108,462 tons (78% of biogenic)
 - Wildfires: 29,713 tons (22% of biogenic)
 - Anthropogenic: 42,135 tons (23% of total)
 - Solvent usage: 13,462 tons (32% of anthropogenic)
 - Light-duty vehicles: 11,110 tons (26% of anthropogenic)
 - Oil & gas production: 6,309 tons (15% of anthropogenic)
 - Non-road mobile sources: 4,510 tons (11% of anthropogenic)
 - Gas stations: 2,872 tons (7% of anthropogenic)
 - Heavy-duty vehicles: 998 tons (2% of anthropogenic)
 - All other sources: 2,873 tons (7% of anthropogenic)
- **A 1 ton per day reduction in anthropogenic NO_x achieves 54-167 times the ozone reductions that a 1 ton per day reduction in anthropogenic VOC would achieve.**

What is being done to reduce high ozone levels?

- Nationally, the EPA has set very stringent emissions standards for vehicles that will continue to reduce ozone for many years to come.
 - The EPA’s new Tier 3 standards for light-duty vehicles and fuel takes effect in 2017.
 - On-road NO_x emissions are projected to decrease by 70% between 2015 and 2030 nationwide due to EPA’s heavy-duty and light-duty engine standards.
- The EPA also sets nationwide emissions standards for various new types of non-road equipment and stationary sources.
- Texas makes tens of millions of dollars available each year through the Texas Emission Reduction Plan (TERP) program to incentivize voluntary emission reductions.
- A number of emission reduction standards applicable to power plants, gas stations, and fuel, apply to a large area of East Texas including all five counties in the Austin-Round Rock MSA.
- At the local area’s request, a number of state regulations were adopted applicable to one or more of the counties in the MSA, including:
 - the vehicle emissions inspection and maintenance program in Travis and Williamson Counties;
 - more stringent requirements for gas stations;
 - restrictions on the use of high-VOC asphalt;
 - restrictions on degreasing operations; and
- City and county governments, regional and state agencies, private firms, and non-profit groups and institutions have made hundreds of other emission reduction measure comments through the region’s Ozone Advance Program Action Plan;
 - The region recently won Clean Air Excellence Awards from the EPA in both 2014 and 2015 for this and prior efforts.

Which organizations are participating in the region’s Ozone Advance Program Action Plan?

A total of 54 organizations participate in the OAP Action Plan, either directly through a commitment described explicitly in the plan, or through CLEAN AIR Force’s Clean Air Partners Program (36 total, including 24 who do not have an explicit commitment under the OAP Action Plan).

- City Governments (Clean Air Coalition members):
 - City of Austin
 - City of Bastrop
 - City of Buda
 - City of Cedar Park
 - City of Elgin
 - City of Georgetown
 - City of Hutto
 - City of Lockhart
 - City of Luling
 - City of Pflugerville
 - City of Round Rock
 - City of San Marcos
 - City of Sunset Valley
- County Governments (Clean Air Coalition members):
 - Bastrop County
 - Caldwell County
 - Hays County
 - Travis County
 - Williamson County
- Regional and State Government Agencies:
 - Capital Area Council of Governments (CAPCOG)
 - Capital Area Metropolitan Planning Organization (CAMPO)
 - Capital Area Metropolitan Transit Agency (CapMetro)
 - Central Texas Regional Transportation Authority (CTRMA)
 - CLEAN AIR Force of Central Texas (CAF)
 - Lone Star Clean Fuels Alliance (LSCFA)
 - Lower Colorado River Authority (LCRA)
 - Texas Commission on Environmental Quality (TCEQ)
 - Texas Department of Transportation (TxDOT) Austin District
 - TxDOT Headquarters
- Businesses, Trade Associations, Institutions, and Other Organizations:
 - Texas Lehigh Cement Company
 - Texas Nursery and Landscaping Association

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- Clean Air Partners Program (other than organizations listed above):
 - 3M
 - AMD
 - American Lung Association
 - Applied Materials
 - Austin Community College
 - Chemical Logic, Inc.
 - Emerson Process Management
 - EnviroMedia Social Marketing
 - Environmental Defense Fund
 - Farmers Insurance
 - Freescale Semiconductor
 - HNTB Corporation
 - Hospira
 - Metropia
 - Oracle
 - R&R Limousine and Bus
 - Samsung Semiconductor
 - Seton Healthcare Family
 - St. David’s Healthcare
 - TECO-Westinghouse
 - Time Warner Cable
 - Tokyo Electron
 - University of Texas at Austin
 - Zephyr Environmental Corporation

What can I do to help improve air quality?

- As a resident:
 - Replace older cars (particularly any cars that are 10+ years old) with newer, cleaner cars;
 - Replace older lawn-mowers and generators with newer lawnmowers and generators;
 - Make sure your tires are properly inflated;
 - Make sure you are up-to-date on your emissions inspection;
 - Sign up for a carpool through www.mycommutesolutions.com.
 - Take mass transit to work;
 - Bike or walk to work (although, if you have asthma, avoid prolonged exposure on high ozone days);
 - Telecommute;
 - Sign up for flexible work hours or compressed work week schedules;

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- Plan discretionary driving, lawn-mowing, or any other use of engine-powered vehicles or equipment for times when it is least likely to impact high ozone (after 6 pm or on weekends, or on a day other than an ozone action day);
- Avoid idling;
- Conserve water; and
- Reduce electricity and energy consumption, particularly on predicted high ozone days.
- As a business, government agency, or institution:
 - Replace, repower, or retrofit older vehicles and equipment
 - TCEQ’s TERP program provides a variety of grants that can help pay for these types of projects: <http://www.tceq.state.tx.us/airquality/terp>
 - EPA’s clean diesel program also provides similar grants: <http://www2.epa.gov/cleandiesel>
 - Incorporate emission reduction objectives in procurement decisions (for example, purchasing the lowest emission engine available for a given application or awarding points for a light-duty vehicle being certified to a higher level than average);
 - Include provisions in professional services contracts such as construction or lawn care that involve engine-powered equipment to require or encourage the use of the lowest emission equipment available;
 - Include contract provisions that prohibit or discourage emissions-generating activities to occur early in the day on high ozone days;
 - If possible, schedule emissions-generating activities outside of periods most likely to cause ozone exceedances (8 am – 6 pm, Monday-Friday, May-September);
 - Avoid testing backup generators on predicted high ozone days;
 - Increase energy efficiency;
 - Reduce water consumption;
 - Install solar power;
 - Offer flexible work schedules, telecommuting, and compressed work week options;
 - Organize programs to reduce single-occupancy vehicle commuting, such as carpool matching programs, preferred parking for carpools, subsidized transit passes, etc.;
 - Provide back-up services such as a guaranteed ride home if an employee has an emergency, or misses a bus or carpool;
 - Provide ample on-site services such as day care or cafeterias to decrease the perceived need for employees to use personal vehicles; and
 - Design new facilities to be energy and water efficient.