Potential Economic Costs of an Ozone Nonattainment Designation to the Oklahoma City Area

Prepared by the Capital Area Council of Governments
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Executive Summary

This study identifies potential economic costs to the Oklahoma City area if it is designated nonattainment for the ozone (O_3) National Ambient Air Quality Standards (NAAQS). The Clean Air Act requires the U.S. Environmental Protection Agency (EPA) to establish NAAQS to protect public health and welfare, and to designate areas as "nonattainment" if they are violating the NAAQS or contributing to a nearby violation. Once designated nonattainment, an area is subject to a variety of new regulations intended to bring the area into compliance and remain in compliance for at least twenty years after the area is redesignated to "attainment." These regulations can have important implications for regional economic development and transportation planning, and staying in compliance with the NAAQS with important economic benefits in addition to the public health and welfare benefits of being in compliance with the NAAQS. The purpose of this study is to characterize the potential economic costs of a nonattainment designation that the Oklahoma City area can avoid by remaining in compliance with the O_3 NAAQS, and to provide information for decision-makers to weigh the potential benefits of taking action to avoid or mitigate these potential economic impacts.

The Oklahoma City area's ground-level O_3 levels are narrowly in compliance with the current NAAQS, but they can vary significantly year to year and there is a good chance that EPA may tighten the O_3 NAAQS in the future. The region's O_3 "design value" – the three-year statistic used to compare monitoring data to the NAAQS – was 69 parts per billion (ppb) for 2018-2020, while the maximum level allowable is 70 ppb under the 2015 O_3 NAAQS. In one of these three years, the Oklahoma City area's O_3 levels were actually above 70 ppb. And while in December 2020, the EPA decided not to revise the O_3 NAAQS, the new administration ordered a review of that decision, and EPA's Clean Air Scientific Advisory Committee (CASAC) has previously recommended further tightening the O_3 NAAQS to possibly as low as 60 ppb. So, while the area's O_3 levels are currently in compliance with NAAQS, there continues to be a significant risk of a nonattainment designation for either the current or a revised O_3 NAAQS sometime in the coming years.

This study considers the potential costs of a nonattainment over 28-year period: from 2022 to 2050. While it is possible for an area to be designated nonattainment one year and be redesignated as soon as the following year, it will continue to be subject to regulations associated with that designation for at least another 20 years. And since being designated nonattainment even for a short amount of time can be a significant factor in a businesses' decision to locate in or expand within the region, even a brief period of nonattainment can carry a significant opportunity cost for the region for a long period of time.

The hypothetical scenario this report considers would be one in which the eight-county Oklahoma City-Shawnee Combined Statistical Area (CSA) is designated "nonattainment" for the O_3 NAAQS in late 2022 under a "Marginal" classification, subsequently misses is attainment date, and is reclassified to "Moderate." While this specific scenario is not very likely, especially in light of EPA's decision in 2020 to retain the current O3 NAAQS, the scenario illustrates the potential scale and scope of the economic costs the region could face from a nonattainment designation, and these costs would be similar even if a nonattainment designation instead occurred several years in the future. A situation in which an area is initially classified as "Marginal" but misses its attainment date is not far-fetched either: the San Antonio are was the only new nonattainment area designated by EPA following the 2015 O3 NAAQS, and it is facing this exact situation right now. The following table summarizes the total potential costs identified in this study for the full 28-year period.

Table 1. Summary of Potential Economic Costs of a Nonattainment Designation, 2022-2050

Classification	Requirement	Low	High
Marginal	NNSR	$7,209,372,404	$10,141,843,457
Marginal	Transportation Conformity	$306,413,810	$565,441,517
Marginal	General Conformity	$0	$1,230,724,801
Marginal	**Subtotal for Classification**	**$7,515,786,214**	**$11,938,009,775**
Moderate	NNSR	$0	$0
Moderate	15% VOC Reduction	$1,823,456,374	$2,808,066,244
Moderate	NO_X RACT-EGUs	$129,524,608	$172,699,477
Moderate	NO_X RACT-Non-EGUs	$0	$174,235,769
Moderate	I/M Program	$82,952,287	$100,958,177
Moderate	**Subtotal for Classification**	**$2,035,933,269**	**$3,255,959,667**
TOTAL	**TOTAL**	**$9,551,719,483**	**$15,193,969,442**

This analysis is primarily concerned with characterizing the potential costs of a nonattainment designation, rather than speculating as to the probability of each of the various components of this analysis occurring. Decision-makers can use this study and assign their own probabilities to each situation in order to develop "expected costs" of a nonattainment designation to weigh those against the costs of taking various actions to reduce emissions or other wise reduce the economic risks associated with a nonattainment designation, such as coming into attainment of the NAAQS as expeditiously as possible, working towards limiting the geographic scope of a nonattainment area, and using what flexibilities exist under the Clean Air Act to minimize the economic scope of a nonattainment designation while still taking the action that may be needed to come into compliance with the NAAQS.

This study was developed by the Association of Central Oklahoma Governments (ACOG) and a steering committee consisting of [organizations]. ACOG contracted with the Capital Area Council of Governments (CAPCOG) in Austin, Texas, to assist the committee and develop this report. CAPCOG conducted a similar study in 2015, the only other study similar to this was conducted by the Alamo Area Council of Governments (AACOG), and this study was also modeled on CAPCOG's. In 2020, CAPCOG prepared an initial "scoping report." This report provides useful context and information on the regulatory situation that the region would face and should be consulted in order to understand some of these basic assumptions for this study. Following the completion of the scoping report, ACOG retained CAPCOG to complete the project and also contracted with Texas Transportation Institute (TTI) to analyze the costs associated with transportation conformity due to the specialized nature of that component of this study. TTI's report is considered an appendix to this report. Steering committee members and staff from the Greater Oklahoma City Chamber of Commerce, Oklahoma Gas and Electric (OG&E), Tinker Air Force Base, the Environmental Federation of Oklahoma (EFO), and Oklahoma Department of Transportation (ODOT) also provided direct feedback to CAPCOG and ACOG on certain methodologies and assumptions for key sections of the report.

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The first section of the report provides an overview of the study and some of the basic assumptions and methodologies used by ACOG, CAPCOG, and TTI for this project.

The second section of the report estimates the potential costs associated with a nonattainment designation as "Marginal," including nonattainment new source review (NNSR) permitting, which only

applies when the area is designated nonattainment, and transportation and general conformity, which continue to apply for at least another 20 years after an area is redesignated to "attainment" while it is subject to "maintenance" plans.

The third section of the report estimates the potential additional costs associated with a "bump up" in classification from "Marginal" to "Moderate," which would occur if the region failed to attain the NAAQS within three years after its designation. This would result in increased offset requirements for NNSR permitting; requirements for a 15% reduction in VOC emissions; implementation of Reasonably Available Control Technology (RACT) rules on existing major sources of emissions of nitrogen oxides (NOX) and volatile organic compounds (VOC), as well as on smaller sources of VOC covered by a Control Technique Guideline (CTG); a vehicle inspection and maintenance (I/M), and implementation of other Reasonably Available Control Measures (RACM).

The final section summarizes the results, provides a discussion of the various components of the cost analysis, and identifies potential future applications of this study and areas for future research and analysis.

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Introduction

This section provides an overview of the study and explanations of some key assumptions and methodologies used for this study.

Study Area

While there are many different potential geographies that were considered for this study, ACOG selected the eight-county Oklahoma City-Shawnee Combined Statistical Area (CSA), as defined by the Office of Management and Budget (OMB).[1] The CSA area consists of two adjacent Core-Based Statistical Areas (CBSAs):

1. The Oklahoma City Metropolitan Statistical Area (MSA): Canadian, Cleveland, Grady, Lincoln, Logan, McClain, and Oklahoma Counties.
2. The Shawnee Micropolitan Statistical Area (μSA): Pottawatomie County

The use of the CSA as the study area is based on EPA guidance for area designations for the 2015 O_3 NAAQS. In determining whether to designate an area nonattainment and the geographic extent of the area, EPA's guidance calls for the use of a five-factor analysis that considers air quality data, emissions and emissions-related data, meteorology, geography and topography, and jurisdictional boundaries. The first step in the process involves identifying monitors violating the NAAQS. Once it has identified violating monitors, EPA's guidance states that, "for analyzing whether nearby areas contribute to a violating area, the EPA intends to consider information relevant to designations associates with the counties in the Combined Statistical Area (CSA) or, where appropriate, the Core Based Statistical Area (CBSA) in which the violating monitor(s) are located."[2] This means that if any of O_3 monitors located in the Oklahoma City-Shawnee CSA were violating the NAAQS, all eight counties could be included in a nonattainment designation. This includes counties that lack a monitor or that had monitoring data showing attainment of the NAAQS if EPA determined that they were contributing to the violation within the region.

In practice, it is not necessarily likely that all eight counties would be designated nonattainment if there was a violation that occurred within the region. For example, the only newly designated nonattainment area for the 2015 O_3 NAAQS was the San Antonio area, and for that area, EPA limited the geographic scope to just Bexar County where the violating monitors were located, and designated the other seven counties in the San Antonio-New Braunfels MSA attainment/unclassifiable. Elsewhere within EPA Region 6, there were no examples of EPA including a county that was located in the same CSA but outside of the same CBSA (i.e., like Pottawatomie County is) in a nonattainment area. The EPA's policies regarding treating areas of "Indian Country" separately for the purposes of area designations could also have a significant impact on the geographic scope or configuration of any potential nonattainment designation or designations arising from a violation of the O_3 NAAQS within the Oklahoma City area due to the

[1] Available online at https://www2.census.gov/programs-surveys/metro-micro/geographies/reference-files/2020/delineation-files/list1_2020.xls.

[2] Memorandum from Janet McCabe, EPA Acting Assistant Administrator for the Office of Air and Radiation to Regional Administrators. Subject: Area Designations for the 2015 Ozone National Ambient Air Quality Standards. February 25, 2016. Available online at: https://www.epa.gov/sites/default/files/2016-02/documents/ozone-designations-guidance-2015.pdf.

extent to which parts of the CSA are in "Indian Country."[3] Notwithstanding these qualifications, it is important for all regional stakeholders to understand that if even one O_3 monitor in the CSA was violating the O_3 NAAQS by just 1 ppb, all eight counties would face the possibility of being included in a nonattainment area. Area designations are made on case-by-case bases, and are very much a by-product of the administrations in which they occur. Since this study is concerned with characterizing the potential costs of a nonattainment designation rather than assigning probabilities to the different ways an actual nonattainment designation might occur in the future, ACOG and CAPCOG determined that the CSA was the appropriate geographic area for this study.

Study Scenario

This study involves a counterfactual scenario in which the EPA designated the entire 8-county CSA a nonattainment area for the O_3 NAAQS in late 2022 based on its 2019-2021 O_3 "design value." "Design value" is the term EPA uses for the statistics it uses to compare a monitor's and area's air quality monitoring data to the NAAQS. For the O_3 NAAQS, this statistic is based on the 4th-highest Maximum Daily 8-Hour O_3 Average (MDA8), averaged over three years. The design value is calculated for each of the monitoring stations in an area, and the highest design value amongst all of the monitors is considered the area's design value. Therefore, if one area's design value is violating the NAAQS, the entire region is considered in violation of the NAAQS. The following table illustrates the 2018-2020 design value calculations for the Oklahoma City MSA:

Table 2. 2018-2020 O_3 Design Values and 4th Highest MDA8 O_3 for the Oklahoma City Area

Site Name	AQS Site Number	2018 4th Highest MDA8 (ppb)	2019 4th Highest MDA8 (ppb)	2020 4th Highest MDA8 (ppb)	2018-2020 Design Value (3-yr. avg., ppb)
OKC West (Yukon)	400170101	76	65	62	67
Moore Water Tower	400270049	71	64	63	66
Choctaw	401090096	69	65	62	65
OKC North	401091037	72	66	69	69

Since the highest design value of the sites is 69 parts per billion (ppb), the entire MSA's and CSA's design value is considered to be 69 ppb, and therefore in attainment of the 70 ppb NAAQS.

There are two situations that would have made this scenario likely:

1. If EPA had tightened the O_3 NAAQS as part of the periodic review of the O_3 NAAQS that was completed in late 2020, or
2. If the Oklahoma City area's 2019 and 2020 O_3 levels had been somewhat higher, pushing the area's 2018-2020 design value and 2019-2021 design values above 70 ppb.

While it is now unlikely that an actual nonattainment designation would occur within this timeframe, the overall scenario and the timelines developed for this analysis are useful for characterizing the

[3] Memorandum from Stephen D. Page, Director of EPA's Office of Air Quality Planning and Standards to Regional Air Directors. December 20, 2011. Available online at: https://www.epa.gov/sites/default/files/2016-02/documents/indian-country-separate-area.pdf.

potential costs of a nonattainment designation if it were to happen at some point in the future. EPA recently announced that it would be reconsidering the prior administration's decision not to tighten the Particulate Matter NAAQS and the White House has directed EPA to also evaluate whether to reconsider the decision on the O_3 NAAQS as well. Even if EPA did not initiate a reconsideration for the O3 NAAQS, however, the next review of the O_3 NAAQS is now statutorily due by the end of 2025, and if EPA revised the NAAQS at that time, a new round of area designations would be due by the end of 2027. This analysis should still be valid for understanding the potential costs of a nonattainment designation under that scenario too, except shifted by five years into the future.

If an area is designated nonattainment, there are five classifications that it can fall into that each have a defined "attainment date" after the area is designated nonattainment. The lowest classification has the least stringent requirements and the shortest period of time to come into compliance, while the highest classification has the most stringent requirements and the longest period to come into compliance. Traditionally, EPA has classified areas based on the ratio of the area's design value to the NAAQS. For the 2015 O3 NAAQS, the classifications were as follows:

- Marginal: 71 – 80 ppb (up to 115% of the NAAQS) – 3 years from designation
- Moderate: 81 – 92 ppb (115% - 133% of the NAAQS) – 6 years from designation
- Serious: 93 – 105 ppb (133% - 150% of the NAAQS) – 9 years from designation
- Severe: 105 – 163 ppb (150% - 233% of the NAAQS) – 15 or 17 years from designation
- Extreme: 163 ppb+ (more than 233% of the NAAQS) – 20 years from designation

If an area's O_3 levels fail to meet the NAAQS by its attainment date, it is automatically "bumped up" to the next-highest classification, which gives it extra time to come into compliance, but also imposes extra regulatory requirements. For the 1997, 2008, and 2015 O_3 NAAQS, about 80% of all nonattainment areas have initially been classified as "Marginal," though many of them failed to attain the NAAQS within he specified timeframe. This study envisions a scenario in which the Oklahoma City's O_3 levels are exceeding the O_3 NAAQS within the range that EPA would assign a "Marginal" classification, but it then fails to attain the NAAQS within three years and the area is "bumped up" to "Moderate." This is a very plausible scenario: of the 41 areas that EPA designated nonattainment for the 2015 O_3 NAAQS with a "Marginal" classification, 34 failed to meet their attainment date and are now facing a reclassification to "Moderate."

Regulatory Requirements

The following regulatory requirements apply to Marginal and Moderate O_3 nonattainment areas:

- Marginal:
  - Nonattainment New Source Review (NNSR) permitting for major new sources of nitrogen oxides (NO_X) or volatile organic compounds (VOC) and major modifications of existing sources of NO_X or VOC (only in effect while designated nonattainment);
  - Transportation conformity (in effect while designated nonattainment and during two subsequent 10-year maintenance periods); and
  - General conformity (in effect while designated nonattainment and during two subsequent 10-year maintenance periods).
- Moderate Classification (in addition to all Marginal requirements):

- Increased offset requirements for NNSR permitting;
- 15% reduction in emissions of volatile organic compounds (VOC);
- Reasonably Available Control Technology (RACT) for major sources of VOC, major sources of nitrogen oxides (NO_x), and sources of VOC covered by a control technique guideline (CTG);
- Vehicle inspection and maintenance (I/M) program; and
- Any other Reasonably Available Control Measures (RACM) needed for the area to attain the NAAQS as expeditiously as practicable.

While the rules required for a "moderate" classification don't specifically have to be implemented after an area is classified to "attainment," they must remain in effect until the EPA approves a SIP revision that demonstrates to its satisfaction that removal of the measure will not interfere with continued maintenance of the NAAQS. For the I/M program, there would be additional hurdles to removal of the program as described in applicable federal regulations.[4]

Scenario Timeline

The scenario developed by ACOG and CAPCOG involves the following timeline and milestones.

Table 3. Nonattainment Designation and Reclassification Scenario

Date/Timeframe	Milestone(s)
Late 2022	Area designated nonattainment
Late 2023	Initial transportation conformity determination due
Late 2025	Attainment date for "Marginal" area, based on 2022-2024 O_3 Design Value; area fails to attain
Early to Late 2026	EPA reclassifies the area from "Marginal" to "Moderate" due to failure to attain the NAAQS
January 1, 2027	RACT rules for "Moderate" classification must be implemented
Late 2028	Attainment date for "Moderate" nonattainment area based on 2025-2027 O_3 design value, 15% VOC emission reduction must be achieved, redesignation to attainment
Early to Late 2030	Latest potential date for implementation of an inspection and maintenance (I/M) program (4 years from reclassification to Moderate)[5]
Late 2040	End of 1st ten-year maintenance period
Late 2050	End of 2nd ten-year maintenance period

[4] 40 CFR §51.350(c) states that "All I/M programs shall provide that the program will remain effective, even if the area is redesignated to attainment status or the standard is otherwise rendered no longer applicable, until the State submits and EPA approves a SIP revision which convincingly demonstrates that the area can maintain the relevant standard(s) without the benefit of the emission reductions attributable to the I/M program. The state shall commit to fully implement and enforce the program until such a demonstration can be made and approved by the EPA. At a minimum, for the purposes of SIP approval, legislation authorizing the program shall not sunset prior to the attainment date for the applicable National Ambient Air Quality Standards (NAAQS)."

[5] Based on 40 CFR §51.373 (b): "For areas newly required to implement basic I/M as a result of designation under the 8-hour ozone standard, the required program shall be fully implemented no later than 4 years after the effective date of designation and classification under the 8-hour ozone standard."

Overview of Economic Impact Assumptions and Methodologies

This study identifies potential economic costs to the region based on a comparison of the region's gross domestic product (GDP, or, for regional analysis, sometimes gross regional product/GRP) under a nonattainment designation to the GDP under a "business as usual" scenario in which the region remains designated attainment/unclassifiable for the O_3 NAAQS. There are three important concepts that the reader should keep in mind for understanding and interpreting the results of this analysis:

1. **Economic cost includes opportunity cost**: This report includes analysis not just of situations in which a regulation causes a change in existing patterns of economic activity, but situations in which new economic activity that would be expected to occur under a "business as usual" situation may not occur under a nonattainment designation. The regulations that a nonattainment designation entail constrain businesses and governmental entities from taking certain actions that they may otherwise take, and the region may lose the opportunity for higher economic output under a "business as usual" scenario as a result of a nonattainment designation.
2. **There is a difference between financial cost and economic cost**: Financial cost represents the cost to an individual or business, while economic cost represents diminished economic output for the region. Since financial cost to one party represents revenue to another party, it is important for understanding the potential costs of a nonattainment designation not just the financial cost to a given party (for example, needing to pay for a vehicle inspection), but how that activity causes the region's overall economy to perform differently. There are some situations in which CAPCOG assumed that the financial cost does equal the economic cost, such as requirements to install new pollution control equipment on existing facilities. In these situations, CAPCOG assumed these expenditures were paid out to firms from outside of the region and none of the economic value of those expenditures were retained within the region. While this may not be realistic, it does provide a "worst case scenario" possibility.
3. **Economic activity at a single firm has effects throughout a regional economy**: while financial cost to a firm does not represent the regional economic impact of that expenditure, a firm's growth in employment or sales also does not capture the full impact of that growth on the broader economy. In partnership with the Greater Oklahoma City Chamber of Commerce, CAPCOG used economic modeling software to calculate these broader economic impacts of firm-level decisions. CAPCOG and the Chamber used EMSI's input-output model (2020 input-output year) and its "what if" scenario, as well as information developed by TTI (for transportation conformity) and the U.S. Air Force (for Tinker Air Force Base's regional economic impact) in order to estimate these impacts. The diagram below shows the general conceptual model used for this analysis:

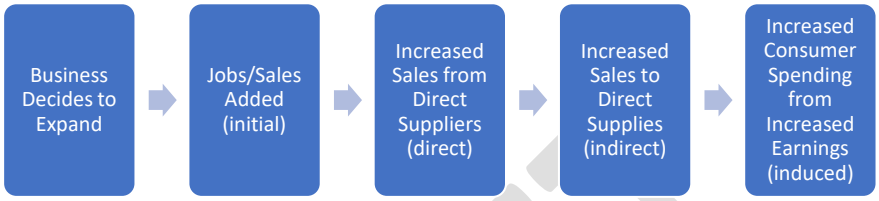


Figure 1. Conceptual Model of Economic Impact Analysis Used for this Report

CAPCOG used EMSI's most recent data on jobs, sales, and GDP by North American Industrial Classification System (NAICS) code for the Oklahoma City-Shawnee CSA to be able to relate jobs and sales if the number of added jobs was available but not the estimate of the number of added sales. CAPCOG then used multipliers from the input-output model specific to the value added to sales and the direct, indirect, and induced impacts.[6] As one example, the following example calculation shows how the impact of an extra 100 jobs in 325998 All Other Miscellaneous Chemical Product and Preparation Manufacturing would be modeled:

- Current Jobs: 135
- Current Sales: $55,846,321
- 0.4205 – value added to sales multiplier
- 0.2097 – direct value added multiplier
- 0.0659 – indirect value added multiplier
- 0.5504 – induced value added multiplier

Sales per job = $55,846,321 in sales /135 jobs = $413,506.96 in sales per job

$413,506.96 sales per job * 100 jobs = $4,135,069.61 in sales

GDP added from sales = $4,135,069.61 * (0.4205 value added to sales + 0.2097 direct value added + 0.0659 indirect value added + 0.5504 induced value added) = $5,154,306.54

[6] In EMSI's model, these were referred to as "Value Added to Sales, "Direct Value Added," "Indirect Value Added," and "Induced Value Added."

In this example, adding 100 jobs in NAICS code 325998 would mean an additional $4.1 million in sales from this sector, but would add $5.2 million per year to the region's GDP. CAPCOG would then multiply this annual amount by a relevant timeframe for this analysis (20 years if it involved construction).

In the case of an expansion, CAPCOG also simulated the short-term impact from the construction phase of the project if the level of capital investment could be identified. This figure would represent sales into the industrial building construction sector (236210), and CAPCOG would perform the same calculation but would omit the "induced" impact multiplier since that represents a broader, permanent expansion of other consumer sectors as a result of sustained higher employment levels within the region, rather than a short-term increase in employment associated with a construction project. This one-time economic impact would then be added to the overall economic impact that the project would be expected to have on the region over the analysis period.

In one of the key analyses of this report that analyzes the potential cost to the region of losing out on an automobile manufacturing plant as a result of a nonattainment designation, CAPCOG and the Greater Oklahoma City Chamber of Commerce could not use local data from the input-output model since there are no auto manufacturing facilities currently in the region. Instead, they used EMSI's "what if" scenario that uses more generalized multipliers to simulate the impact of adding jobs to a particular sector, even if it doesn't already exist within the area. Conceptually, it works the same way as outlined above, but it is using multipliers from a broader geographic area that includes existing automobile manufacturing establishments.

In most of these analyses, CAPCOG presents a range of values (low and high). These are intended to represent the low and high negative economic impact of a nonattainment designation if it occurred and if some of the key assumptions in the relevant section hold true. In some cases, the estimate may be zero if CAPCOG concluded that it is possible that the specific provision may not entail any additional costs. For example, the Clean Air Act requires that a firm building a new major source of emissions obtain offsets for any new emissions from within the same nonattainment area, but this provision is not likely to add any costs to the costs to OG&E if it chooses to build a new power plant in the region in the 2nd half of this decade since their planned closures of several plants would be able to count as the required offsets.

Lastly, it is important for readers to understand that the identification of a potential cost is not the same thing as analyzing the expected cost (i.e., probably of event X times the cost of event X). Decision-makers who wish to use this report to understand the tradeoffs between taking action to reduce emissions now and the potential economic costs of a nonattainment designation in the future should adjust the figures presented in this report based on assessments of the probabilities of these situations occurring. For example, comparing the "expected cost" of losing out on an auto plant to the cost of additional pollution controls should include an assessment of the likelihood that a nonattainment designation would be the deciding factor in a businesses' decision to build and auto plant within the region, and then multiply the potential economic costs by that probability.

The Costs of a Marginal Classification

A Marginal classification is unique among the five classifications in that it does not require that any new emission reduction measures be implemented, but does involve controls on the growth of emissions. States are not required to submit a State Implementation Plan (SIP) showing how the region will attain the NAAQS within three years for Marginal areas. Despite this, NNSR permitting, transportation conformity, and general conformity can have significant and long-lasting economic impacts on a region. NNSR permitting is only in effect while an area is designated nonattainment, but the added burdens associated with this type of permitting that a firm would not have to face if it instead built or expanded in an "attainment" area can cause a firm to make that business decision. Once a business decides to build somewhere else, that means that the region has lost out on that opportunity not just for that year, but for the entire useful life of the facility. And the requirements for "conformity" of federal actions to the SIP under the transportation and general conformity regulations persist for the area long after the area is redesignated to "attainment," since they also apply to the maintenance plans that the area remains subject to for the following 20 years.

Nonattainment New Source Review

NNSR permitting is different from permitting in attainment/unclassifiable areas ("Prevention of Significant Deterioration" or PSD permitting) in three crucial ways:

1. Major new sources of emissions or major modifications of existing sources must achieve the "Lowest Achievable Emissions Rate" (LAER) in nonattainment areas regardless of cost, whereas they are only required to implement "Best Available Control Technology" (BACT), which includes cost considerations, in attainment/unclassifiable areas.
2. Any new emissions added are required to be fully offset by a ratio of more than 1 to 1. For Marginal areas, the offset ratio is 1.1 to 1.
3. A facility's status can change from a minor source in an attainment/unclassifiable area to major in a nonattainment area if it has the potential to emit between 100 tons per year (tpy) and 250 tpy, which would trigger an extra level of federal review of the permit and a longer period for obtaining a permit.

Any of these factors could cause a business to not locate in the region or not to expand within the region. To the extent NNSR permitting affected such decisions, it would represent an economic cost to the region.

Scenario Overview

Automobile manufacturing (NAICS Code 336111) is one of the key sectors that have been targeted for recruitment for economic development in the Oklahoma City area. Due to the processes involved with this type of manufacturing and the scale involved, these types of facilities typically have the potential to emit more than 100 tons per year (tpy) of Volatile Organic Compounds (VOC). This means that they would be considered a "major source" of VOC in an ozone (O_3) nonattainment area, and subject to NNSR permitting. This would hinder a nonattainment area's ability to compete for a new automobile manufacturing relative to an "attainment" area. This does not mean that a firm would definitely not build a facility in the Oklahoma City area if it was designated nonattainment, since companies do build new facilities in nonattainment areas, but it does make an area less competitive for that growth, all other things being equal. For this study, we focuses on evaluating the possibility that a vehicle

manufacturing company decides not to build their plant in the Oklahoma City area as a result of a nonattainment designation.

The Oklahoma City area was in contention for Tesla's new manufacturing facility for pickup trucks that is currently under construction in Austin, and details about their request for proposals (RFP) for economic development incentives and the ultimate economic development incentive deal they secured are publicly available. Their air permit also requested authorization to emit more than 100 tpy of VOC, meaning it would have been subject to NNSR permitting if it was located in a nonattainment area. In its request for proposals (RFPs), Tesla claimed that the facility would create 7,000 jobs, while in the economic development deal reached with Travis County, Texas, it committed to create at least 5,000 jobs, so this range was used by the Chamber of Commerce and CAPCOG to estimate the broader regional economic impact of such a facility. The Chamber of Commerce also received RFPs for two additional companies interested in building an auto manufacturing facility in the region, but those are not publicly available. There are no other RFPs that the Chamber was aware of that would have entailed construction of a facility that would have been subject to NNSR permitting, but there are certainly a wide range of facilities that would also be affected by NNSR permitting, but this scenario appeared to be both the most plausible and the highest-impact of the various hypothetical scenarios contemplated.

EMSI's "What-If" Scenario Tool for Long-Term Impact

Since there is not currently an automobile manufacturing facility in the Oklahoma City area, the Chamber of Commerce used EMSI's "What-if" Scenario Tool to model the economic impact of an automobile manufacturing facility in the area. Tesla's CEO Elon Musk claimed in an interview at one point that the facility could employ as much as 10,000 workers, and the impacts should be linear, so the Chamber of Commerce used the 10,000 job number as the input for the model an then CAPCOG scaled the effects back by 70% and 50% to correspond to the 7,000 and 5,000 jobs numbers that the company was willing to provide more direct backing for in their RFP and economic development deal. The Chamber of Commerce used the Emsi-type model with the 2020 input-output year to model this scenario for the 8-county study area.

The following table provides a summary of the estimated annual regional impact of these job estimates over a 20-year period.

Table 4. Estimated Regional Impact of a 5,000-job and 7,000-job Automobile Manufacturing Facility

Item	5,000 Jobs	7,000 jobs
Total Jobs Region-Wide	7,642	10,698
Initial Earnings	$7,217,880	$10,105,032
Direct Earnings	$6,725,550	$9,415,770
Indirect Earnings	$4,868,602	$6,816,043
Induced Earnings	$169,898,993	$237,858,591
Local Taxes	$34,252,656	$47,953,719
State Taxes	$16,328,834	$22,860,367
TOTAL Annual	$315,806,703	$442,129,384
TOTAL 20-Years	**$6,316,134,063**	**$12,632,268,127**

CAPCOG and the Chamber of Commerce excluded the $4.8 - $6.9 million per year in federal taxes generated from this facility, since this factor would not be relevant to the impact on the *regional* economy.

The following charts show the impact by occupation and industry. These data help illustrate the wide range of job types and industries that would be affected by such a project.

Table 5. Distribution of Region-Wide Jobs Created from Auto Manufacturing

Occupation	%
Management Occupations	19.4%
Business and Financial Operations Occupations	2.7%
Computer and Mathematical Occupations	0.6%
Architecture and Engineering Occupations	2.1%
Life, Physical, and Social Science Occupations	0.1%
Community and Social Service Occupations	0.4%
Legal Occupations	0.3%
Educational Instruction and Library Occupations	0.8%
Arts, Design, Entertainment, Sports, and Media Occupations	1.1%
Healthcare Practitioners and Technical Occupations	1.8%
Healthcare Support Occupations	1.4%
Protective Service Occupations	0.3%
Food Preparation and Serving Related Occupations	2.9%
Building and Grounds Cleaning and Maintenance Occupations	1.3%
Personal Care and Service Occupations	1.4%
Sales and Related Occupations	6.6%
Office and Administrative Support Occupations	4.9%
Farming, Fishing, and Forestry Occupations	0.0%
Construction and Extraction Occupations	2.0%
Installation, Maintenance, and Repair Occupations	5.0%
Production Occupations	39.7%
Transportation and Material Moving Occupations	5.1%
Military-only occupations	0.0%
Unclassified Occupation	0.1%

Table 6. Regional Jobs from Auto Plant Facility by Industry

NAICS	Industry	%
11	Agriculture, Forestry, Fishing and Hunting	0.04%
21	Mining, Quarrying, and Oil and Gas Extraction	0.11%
22	Utilities	0.11%
23	Construction	1.69%
31	Manufacturing	69.55%
42	Wholesale Trade	2.88%
44	Retail Trade	2.79%
48	Transportation and Warehousing	1.88%
51	Information	0.44%

NAICS	Industry	%
52	Finance and Insurance	1.85%
53	Real Estate and Rental and Leasing	1.53%
54	Professional, Scientific, and Technical Services	2.16%
55	Management of Companies and Enterprises	0.79%
56	Administrative and Support and Waste Management and Remediation Services	2.06%
61	Educational Services	0.71%
62	Health Care and Social Assistance	4.42%
71	Arts, Entertainment, and Recreation	0.74%
72	Accommodation and Food Services	2.96%
81	Other Services (except Public Administration)	2.59%
90	Government	0.71%

One-Time Impact of Capital Investment

Emsi's "what-if" scenario tool considers the annual initial, direct, indirect, and induced economic impacts of adding jobs in a particular sector for a given region over multiple years, but it does not consider the short-term economic impact of the initial capital investment made in building the facility. The Oklahoma City Chamber of Commerce indicated that Tesla's proposal indicated that this would be $1.6 billion, though the investment announced for the Austin plant in summer 2020 was listed at $1.1 billion.

Using these two figures for the range of capital investment, CAPCOG used the regional impact multipliers provided by the Chamber of Commerce for NAICS Code 236210 – Industrial Building Construction in order to estimate the one-time expenditures associated with this investment. Since these are one-time investments, CAPCOG excluded the "induced" impact from consideration.

The multipliers for this sector are the following:

*Value Added to Sales: 0.5325

*Direct Value Added: 0.2122

*Indirect Value Added: 0.0673

*Total Value Added: 0.8120

Total regional economic impact was modeled to be $893,238,340 - $1,299,255,768.

Summary

The following table summarizes the combined economic impact to the region of a 5,000 – 7,000 job automobile manufacturing facility in the region over a 20-year time frame. For this report, the possibility of missing out on this economic growth represents an economic loss to the region's economy.

Table 7. Estimated Regional Impact of a 5,000-job and 7,000-job Automobile Manufacturing Facility

Item	5,000 Jobs	7,000 jobs
TOTAL Annual Impact of Jobs	$315,806,703	$442,129,384
TOTAL 20-Year Impact of Jobs	$6,316,134,063	$8,842,587,689
1-Time Impact of Capital Investment	$893,238,340	$1,299,255,768
TOTAL 20-Year Impact	**$7,209,372,404**	**$10,141,843,457**

Transportation Conformity

"Transportation Conformity" refers to the Clean Air Act requirement that all federal actions related to surface transportation and transit must "conform" to the purpose of the State Implementation Plan (SIP). The rules for transportation conformity are found in 40 CFR Part 93, Subpart A. The transportation conformity rules require conformity of "transportation plans, programs, and projects which are developed, funded, or approved by the United States Department of Transportation (DOT), and by Metropolitan Planning Organizations (MPOs) or other recipients of funds under 23 U.S.C. or Federal Transit Laws (49 U.S.C. Chapter 53)."

In order to estimate the potential costs associated with transportation conformity requirements, ACOG contracted with the Texas Transportation Institute (TTI), which assists MPOs and the Texas Department of Transportation in complying with these requirements. TTI has produced an accompanying report, which is listed as Appendix A in this report. There are five elements to the potential costs identified by TTI:

1. The routine annual costs to the MPO and ODOT to conduct transportation conformity analysis for the region once designated nonattainment;
2. Economic costs associated with routine project delays that arise as a result of the transportation conformity process;
3. Non-routine economic costs associated with delays that could arise as a result of a "lapse" in conformity;
4. Non-routine economic costs associated with the loss of federal funding as a result of a conformity lapse; and
5. Non-routine economic costs associated with project delays associated with the potential loss of federal funding as a result of a conformity lapse.

TTI estimates the total cost over the study period (i.e, out to 2050) as the following:

Table 8. Potential Costs Associated with Transportation Conformity

Element	Low	High
Conducting Conformity Analysis	$4,823,438	$5,602,344
Costs of Routine Delays	$130,054,028	$151,729,699
Cost of Delay due to Lapse	$139,998,564	$269,986,028
Cost of Potential Long-Term Loss of Federal Funding	$29,093,855	$90,271,143
Cost of Project Delay Due to Loss of Federal Funding	$2,443,925	$47,852,303
TOTAL COST	**$306,413,810**	**$565,441,517**

For additional details on this analysis, please refer to Appendix A.

General Conformity

Background

"General Conformity" refers to the Clean Air Act requirement that all federal actions (other than those related to surface transportation or transit, which are handled under "Transportation Conformity") must

"conform" to the purpose of the State Implementation Plan (SIP), the requirements of which are codified in 40 CFR Part 93 Subpart B. This helps ensure that federal activities do not cause or contribute to any new violations of the National Ambient Air Quality Standards (NAAQS), do not worsen existing violations of the NAAQS, and do not cause a delay in the attainment of the NAAQS. Under these rules, "no department, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve any activity which does not conform to an applicable [state] implementation plan," and "a federal agency must make a determination that a Federal action conforms to the applicable implementation plan in accordance with the requirements of this subpart before the action is taken." The key issue in conformity analysis is ensuring that a facility's or activity's emissions remain the same or lower than the emissions the state is planning for from that facility or activity. In the Oklahoma City-Shawnee CSA, Federal action related to Tinker Air Force Base (AFB) would be the most likely to trigger General Conformity regulations.

40 CFR 93.153 establishes applicability thresholds and a list of exempt activities. Federal actions that result in an increase of less than 100 tpy of NO_X and VOC in an ozone (O_3) nonattainment area classified as "moderate" or lower or an O_3 maintenance area are considered "de minimis." 40 CFR 93.153(c) provides a long list of Federal actions that are not considered applicable and are "presumed to conform," including actions that don't involve emissions, actions where the emissions are not reasonably foreseeable (including electric power marketing activities), and actions that implement a conforming program like prescribed burning actions that are consistent with a conforming land management plan.

Unique among the Clean Air Act requirements for nonattainment and maintenance areas, General Conformity requires consideration not only of direct emissions but also indirect emissions. Direct emissions are the "emissions of a criteria pollutant or its precursors that are caused or initiated by the Federal action and originate in a nonattainment or maintenance area and occur at the same time and place as the action and are reasonably foreseeable". Indirect emissions are defined as emissions :

1. That are caused or initiated by the federal action and originate in the same nonattainment or maintenance area but occur at a different time or place as the action;
2. That are reasonably foreseeable;
3. That the agency can practically control; and
4. For which the agency has continuing program responsibility.

There are several different ways that a Federal action can be determined to be conforming to the SIP, including fully offsetting any increase in emissions from the Federal action with emission reductions elsewhere within the same area, and documenting that any emissions increase is within a facility-wide emissions "budget" established by an attainment demonstration, reasonable further progress, or maintenance SIP revision. Such budgets can be established at levels that allow for a certain amount of growth as long as they are consistent with the overall emission reductions needed to attain the NAAQS and make reasonable further progress or the overall emissions levels needed to maintain the NAAQS.

Tinker Air Force Base

For this report, the key Federal action that would be expected to trigger General Conformity requirements would be expansions of Tinker AFB. Tinker AFB is home to the Air Force Sustainment Center, the mission of which is to "Sustain weapon system readiness to 'generate airpower for

America,'" and is the single largest employer in the State of Oklahoma. The Air Force estimated that Tinker AFB accounted for $5.96 billion in economic impacts in fiscal year 2020: [7]

- 25,745 total personnel:
  - 6,286 military
  - 17,463 civilian employees funded through appropriations
  - 1,196 non-appropriated fund and contract civilians
- $3,079,419,508 in total direct impact:
  - $1,650,214,706 in payroll
  - $158,526,487 in construction spending
  - $1,240,101,261 in locally purchased goods and services
  - $27,256,682 in local purchases produced elsewhere
  - $3,320,372 in other spending
- $2,880,763,806 in total indirect impact:
  - $1,781,901,839 in payroll expenditures
  - $143,942,050 in construction
  - $993,363,271 in locally produced goods and services
  - $18,868,680 in local purchases produced elsewhere
  - $2,687,966 in other spending

Analysis of existing emissions levels at Tinker AFB provides insight into the scale of change in activity that would need to occur on a permanent basis to trigger general conformity requirements. The following table summarizes the total NO_X and VOC emissions at Tinker AFB each year from 2015-2020.

Table 9. Tinker AFB NO_X and VOC Emissions Reported to ODEQ, 2015-2019 (tons per year)

Pollutant	2015	2016	2017	2018	2019	2020[8]
NO_X	105.596	109.404	114.812	121.675	132.902	97.641
VOC	486.935	443.527	561.229	467.337	415.614	381.681

Direct emissions include the additional emissions from planes coming and going, engine testing, additional maintenance, and emissions from construction activities needed for expansion. Indirect emissions might include additional passenger and commercial vehicle traffic associated with the expansion, both in the construction phase and on an ongoing basis.

VOC emissions from the facility relate mainly to repairing and maintaining aircraft, including painting aircraft, use of solvents in cleaning operations, and thinning. Manufacturers continue to reduce VOC emissions from these substances and average emissions per unit would be expected to decrease over time. VOC emissions have varied significantly year to year within this six-year timeframe due to changes in work orders of paints and solvents and variation in the degree to which maintenance operations

[7] https://www.tinker.af.mil/Portals/106/Documents/Economic%20Impact/2020%20EIS.pdf?ver=KYgPahtZjzS3_-v0eUj5Hg%3d%3d

[8] Note –Tinker AFB personnel provided these numbers to CAPCOG but they are not yet included in a publicly available summary spreadsheet from ODEQ as the other data were at the time this section was drafted.

require additional painting in any given year. Using the range of VOC emissions for this five-year period, growth of 18-26% would correspond to a 100 tpy increase in annual emissions.

NO_X emissions from the facility come from a variety of sources, including boilers and jet engine testing. Although NO_X emissions increased each year from 2015 – 2019 due to increases in engine testing, they decreased below 100 tpy due to a boiler decentralization project and are expected to continue to remain below 100 tpy moving forward.

Oklahoma Gas and Electric (OG&E) operates a power plant on the premises of the base, but these emissions are not considered part of the facility totals for Tinker AFB, and OG&E holds the permit to this facility. In an August 2, 2021, draft integrated resource plan (IRP), however, OG&E indicated that it planned to retire these units in 2025. Federal action taken to approve any re-activation of these units or construction of new units on-site would likely also trigger general conformity.

In addition to Tinker's analysis, Capital Area Planning Council of Governments (CAPCOG) also reviewed EMSI data for NAICS Code 901200 – Federal Government, Military for the CSA. Data are shown below:

- Jobs: 11,243
- Sales: $4,135,174,401
- GRP: $1,450,482,788
    - Earnings: $565,102,485
    - Property Income: $885,380,303
- Multipliers:
    - Value added to sales: 0.3508
    - Direct value added: 0.3492
    - Indirect value added: 0.1019
    - Induced value added: 0.7592
    - Combined: 1.5612

EMSI shows the following sales, jobs, and GRP data for 2020 for this NAICS code:

The EMSI data appear to significantly under-count the number of employees at Tinker AFB, possibly instead classifying a large portion of them in NAICS Code 901199 (Federal Government, Civilian, Excluding Postal Service). However, using the $4.135 billion in "sales" in conjunction with the multipliers yields an estimated $6.456 billion in broader economic impact from the base, which is close to, though somewhat higher than the Air Force's estimate of $5.96 billion. Due to the availability of a detailed study from the Air Force supporting the $5.96 billion figure and the issues noted above with the employment figures and classifications in EMSI, CAPCOG chose to use the Air Force's estimate for the cost estimates for this section.

Growth

The facility's growth projections suggest that it could trigger general conformity requirements at some point within the study timeframe due to projected growth. While base personnel interviewed for this report didn't have any specific projects in mind that they believed would trigger general conformity requirements, the estimated growth in personnel from the current level of about 25,000 in 2020 to 30,000 through 2030 (20%growth) along with additions of 1.2 million square feet for hangars, ancillary support facilities, more engine testing, and engine runs that would go along with this growth strongly

suggests that the base's expansion within the timeframe of this study could trigger general conformity requirements. This growth falls within the range of growth in VOC emissions that would trigger general conformity requirements, and construction-phase activities could also trigger general conformity requirements.

Estimated Offset Costs

In order to calculate the cost to offset the increase in emissions associated with 24% - 40% growth in base activities, CAPCOG multiplied the assumed increase in VOC emissions by an average cost/ton ratio of $15,000. This figure is about midway between the values used in the 2015 O_3 NAAQS RIA ($15,275.73 in the 70 ppb analysis and $14,696.68 in the 65 ppb analysis), and corresponds with the value cited by base personnel as to expected costs for thermal oxidation or an activated carbon capture system. While General Conformity requirements allow NO_X emission reductions to offset VOC emission increases, there would not be sufficient NO_X emission reduction offsets from within the base to account for this growth and it is uncertain whether there would be any NO_X reduction offsets that could be obtained from elsewhere within the region at a cost lower than what would be available for VOC emission reduction offsets. Calculations for assumed VOC emissions increases:

- Minimum:
  - 100 tpy VOC * $15,000 per ton = $1,500,000 per year
- Maximum:
  - 25,000 employees / 25,000 employees = 120% growth factor
  - 561.229 tpy VOC (maximum annual amount reported 2015-2020)* 20% growth * 1.15 offset * $15,000 per ton VOC = $1,936,240 per year

Assuming a 20-year timeframe for these emissions reductions (2030-2050), the total cost would be expected to be $30,000,000 - $38,724,801. For the purpose of this report, this would be considered an economic loss if these costs had to be paid for out of the base's existing appropriations based on the assumption that outside vendors would need to be brought into the region to supply, install, and maintain the equipment, and the money used for that purpose had to come out of the base's existing budget. In discussing this issue with base personnel, however, it appears the Air Force's most likely response to this requirement would be to increase the appropriations to the base to cover these added expenses.

Potential Delays in Construction

Much more significant than the cost of offsets, the potential delay that the General Conformity process might cause in an expansion project could result in an economic loss due to the delay in the economic activity that would occur from expanded base operations. For example, a one-year delay in completion of an expansion project that enabled the base to expand from 25,000 employees to 30,000 employees would postpone the regional economic gains that could have been achieved by adding those additional 5,000 employees. While there is no real risk that the Air Force would chose to expand at some other facility instead as a result of a nonattainment designation and they can take steps to minimize the disruption and delay that General Conformity requirements might entail, it is still possible for these requirements to cause such delays.

Using the 20% growth projections provided by base personnel, the total regional economic impact of the base once expansion was complete would be expected to be $7.15 billion per year if using the Air

Force's $5.96 billion as a baseline. If there was a one-year delay in the expansion, the difference between the one-year regional economic impact of an expanded base and the current base would represent the opportunity cost of a one-year delay in expansion of the base, and could therefore estimated to be $1.19 billion. This figure could be adjusted as needed to reflect estimated delay time for an expansion or different scales of expansion.

Summary

General Conformity requirements would be expected to affect the Air Force's ability to expand operations at Tinker Air Force base within the time frame covered by this study. The direct cost of VOC emission reduction offsets that would be expected to be needed for expansion at the levels discussed with base personnel would likely cost approximately $30 million - $39 million, and may or may not represent an economic cost to the region depending on if the money needed to be diverted from other base expenditures or if the Air Force increased appropriations to the base.

Of more concern for the regional economy would be that General Conformity requirements could slow down or delay expected expansions at the facility, which would likewise postpone the increased economic impact of that expansion. While the expansion would be expected to be incremental rather than all at once, the one-year difference in economic impact from the base as currently staffed versus expanded operations would be $1.19 billion. The range of potential costs would then be $0 (if expansion doesn't trigger any offsets or cause any delays) up to $1,230,724,801 (if $38,724,801 in offsets need to be paid for out of the base's budget and if there is a year of delay in the base's expansion.

The Costs of a Moderate Classification

In addition to the costs associated with a Marginal classification, the region would face significant additional economic costs if it failed to meet its 3-year attainment date. The Marginal classification basically relies on the momentum of existing measures such as fleet turnover causing the replacement of older, dirtier vehicles and equipment with newer, cleaner models that meet federal mobile source standards. However, once an area is classified as "Moderate," a whole new array of very strict regulations will go into effect. These include:

- An across-the-board 15% reduction in VOC emissions;
- Implementation of Reasonably Available Control Technology (RACT) on all existing major sources of NO_X and VOC, and any other sources of VOC covered by one of 48 EPA Control Technique Guideline (CTG) documents;
- An inspection and maintenance (I/M) program;
- Increased offsets for the NNSR program;
- Reasonably Available Control Measures (RACM); and
- Increased offsets for NNSR permitting.

The shift from a Marginal classification to a Moderate classification basically entails a shift from passive control of growth in emissions to active reductions in emissions from existing sources. While it is possible for areas to avoid or mitigate some of these requirements if they are able to reach attainment between when they are bumped up and when the measures are required to be implemented, this no sure thing, and the added costs of a Moderate classification beyond what is triggered by a Marginal classification should provide a powerful incentive for decision-makers to reduce emissions early to ensure that even if the area is designated nonattainment, that it doesn't risk crossing the threshold into being reclassified to "Moderate" as a result of failing to attain the NAAQS on-time.

15% VOC Reduction

Background

Section 182(b)(1) of the Clean Air Act required O_3 nonattainment areas classified as "Moderate" to achieve a 15% reduction in VOC emissions from a 1990 baseline by 1996. Areas classified as "Serious" or higher were required to achieve additional emission reductions equivalent to 3% of 1990 baseline emission levels for each additional year needed to attain the NAAQS, though they could substitute NO_X reductions for VOC reductions once the 15% VOC reduction was achieved. This requirement is known as "Reasonable Further Progress" (RFP) or "Rate of Progress" (ROP). For the 2015 O_3 NAAQS, EPA has interpreted this provision as meaning that any newly designated "Moderate" nonattainment area must reduce VOC emissions by 15% reduction from a "baseline" year corresponding with the most recent triennial National Emissions Inventory before designation, or the year of the effective date of a nonattainment designation, with the reductions needing to occur within six years of the baseline year.

If the Oklahoma City area were designated a "Marginal" nonattainment area in fall 2022 and failed to attain the O_3 NAAQS in 2025 based on its 2022-2024 design value, it would then get reclassified to "Moderate," and would have a new attainment in fall 2028, based on the region's 2025-2027 design value, and would be required to demonstrate that it would achieve this 15% reduction. CAPCOG is

assuming that Oklahoma City would use 2022 as its baseline year in order to give it the maximum time possible to implement these measures, and this would mean that the region's 2028 VOC emissions would need to be at least 15% lower than its 2022 emissions.

The actual amount of emission reductions relative to a "business as usual" scenario for 2028 is affected by growth and emission reductions that would be occurring anyway as a result of nation-wide VOC emission reductions from mobile sources due to federal engine standards and fleet turnover. In general, the emission reductions from these sources have been able to more than offset growth in emissions from stationary sources in most urban areas such that the general trend is towards lower VOC emissions in urban areas. These reductions would count towards the RFP requirement, but if the "business as usual" scenario does not reduce VOC emissions enough to reach the 15% mark, the area would need to achieve additional VOC emission reductions.

Section 182 of the Clean Air Act also includes three additional provisions for "Moderate" nonattainment areas that would also reduce VOC emissions:

1. "Reasonably Available Control Technology" (RACT) for sources of VOC covered by any of EPA's 45 Control Technique Guideline (CTG)[9] even if not considered a "major" source ((§182(b)(2)(A) and (B)); and
2. "Reasonably Available Control Technology" (RACT) for "major" sources of VOC (potential to emit at least 100 tpy of VOC) even if not covered by a CTG (§182(b)(2)(C));
3. A "Basic" vehicle inspection and maintenance (I/M) program ((§182(b)(4)).

The VOC emission reductions achieved through implementing these provisions count towards the 15% reduction requirement, but if they do not collectively enable a 15% reduction in baseline emissions, the region would need to implement additional VOC reductions in order to fulfill this requirement. Depending on the extent to which the region's emissions would change under a "business as usual" case and as a result of implementing these three provisions, this provision either entail an additional cost of a nonattainment designation or not.

Example 1: If the region's base year emissions inventory was 100 tons per day (tpd) of VOC, then it would need to reduce it's VOC emissions to 85 tpd or less within six years (a 15 tpd reduction). The following is a potential way that the area could meet this requirement:

- 4 tpd reduction from "business as usual" projection as a result of federal engine standards;
- 3 tpd reduction from CTG RACT from business as usual projection
- 2 tpd reduction from Major Source RACT from business as usual projection
- 1 tpd reduction from the I/M program from business as usual projection

These reductions would account for a total of 10 tpd VOC reductions, meaning the area would need to achieve an additional 5 tpd of VOC reductions. The cost of achieving these emission reductions could be assigned exclusively to the RFP requirement if they were not needed for the region to attain the NAAQS (for example, if the region's O_3 levels were NO_X-controlled).

[9] https://www.epa.gov/ground-level-ozone-pollution/control-techniques-guidelines-and-alternative-control-techniques

Example 2: It is also possible for these independent requirements to result in more VOC emission reductions that are needed to meet the 15% requirement. For example, using the same 100 tpd baseline scenario, the following emission reductions would constitute more than the required 15 tpd reduction:

- 6 tpd reduction from "business as usual" projection as a result of federal engine standards;
- 5 tpd reduction from CTG RACT from business as usual projection
- 4 tpd reduction from Major Source RACT from business as usual projection
- 3 tpd reduction from the I/M program from business as usual projection

These reductions would total 18 tpd, exceeding the 15 tpd required for RFP. In this case, there would not be any added cost associated with achieving the RFP requirements.

However, due to the complexity and difficult of itemizing the emission reductions and costs associated with implementing VOC RACT independent of the 15% VOC reduction requirement, CAPCOG will assume that the situation that he Oklahoma City region might face if designated nonattainment would be much more likely to be Scenario 1.

Estimating Baseline and "Business as Usual Emissions

CAPCOG assembled summer weekday VOC emissions estimates from EPA's 2016v1 air quality modeling platform. CAPCOG used the following spreadsheets:[10]

- 2016fh_county_sector_average_summer_weekday_NOX_VOC_22jan2020.xlsx
- 2023fh_county_sector_average_summer_weekday_NOX_VOC.xlsx
- 2028fh_county_sector_average_summer_weekday_NOX_VOC.xlsx

EPA requires the baseline inventory for an RFP plan to be "the emissions inventory for the most recent calendar year for which a complete triennial inventory is required to be submitted to EPA." In the scenario under consideration, the area would be designated nonattainment in 2022, so the default baseline emissions inventory year would be 2020. States are allowed to use an alternative baseline year if the year selected corresponds with the year of the effective date of designation as nonattainment (i.e., 2022 in this case) (40 CFR §51.1310(b)).

Below is the general timeline being considered.

- 2022: Area designated nonattainment, based on 2019-2021 O_3 levels
- 2025: Attainment date, based on 2022-2014 O_3 levels
- 2028: Attainment date, based on 2025-2027 O_3 levels

EPA's implementation rules requires that the 15% VOC reduction be achieved within 6 years from the baseline year (40 CFR §51.1310(a)(4)). If a 2020 base year was used, this would mean the 15% VOC reduction would need to be achieved by 2026, two years before the 2028 attainment date, and a year before the final O_3 season that would be used to determine if the area was attaining the NAAQS.

In order to estimate the 2020 and 2026 emissions, CAPCOG first calculated the total anthropogenic VOC for 2016, 2023, and 2028 using the spreadsheets EPA produced. Next, CAPCOG calculated the 2020 emissions by interpolating the 2016 and 2023 emissions (i.e., calculating the average annual change in

[10] Available here: https://gaftp.epa.gov/Air/emismod/2016/v1/reports/

emissions, multiplying that by four years, and adding the result to 2016 emissions). Then, CAPCOG calculated the 2026 emissions by interpolating the 2023 and 2028 emissions (i.e., calculating the average annual change in emissions, multiplying that by three years, and that to the 2023 emissions). Finally, CAPCOG compared the 2026 emissions estimate to the 2020 emissions and calculated the VOC reduction "deficit" that would need to be achieved through implementing additional VOC reductions.

- 2022 VOC emissions: 175.23 tpd
- 15% of 2022 VOC emissions: 26.28 tpd
- 2028 VOC emissions: 170.55 tpd
- 2022 – 2028 Change- in VOC emissions: -4.68 tpd

I/M Program VOC Reductions

Emission reductions from the I/M program required for "Moderate" areas count towards the required 15% reduction in VOC, and therefore should be subtracted from the amount of VOC emission reductions the region would need to attain through implementation of other measures, since the costs of the I/M program are calculated separately in this report. In order to do this, CAPCOG calculated the share of on-road VOC emissions attributable to light-duty vehicles in EPA's 2016 modeling platform.[11]

CAPCOG calculated the following percentages:

- 2016: 87.15% of on-road VOC emissions are from light-duty vehicles
- 2023: 85.38% of on-road VOC emissions are from light-duty vehicles
- 2028: 83.77% of on-road VOC emissions are from light-duty vehicles

Since the I/M scenario being used for this study would apply only to Canadian, Cleveland, and Oklahoma, CAPCOG calculated the on-road VOC emissions from these three counties for 2028 and then applied the 83.77% adjustment to estimate the light-duty vehicle VOC emissions from these counties:

- 11.59 tons per day (tpd) on-road emissions in 2028 * 83.77% on-road emissions from light-duty vehicles = 9.71 tpd

A 2010 analysis ERG conducted for Texas estimated I/M program benefits of 2018 (the latest year for which data was available) ranging from 10.8% - 12.3% depending on the area.[12] This corresponds to a 1.05 tpd – 1.19 tpd I/M program benefit. A 2020 I/M program benefit analysis for the Houston and Dallas-Fort Worth areas indicated a 10% - 12% VOC reduction benefit, consistent with these levels.[13] Using the 2020 data, CAPCOG calculated benefits of 0.97 tpd – 1.16 tpd VOC. Since the 2020 data and represented real-world program data, CAPCOG decided to use this range to represent the I/M VOC program benefit.

Calculation of Remaining VOC Reductions

The following estimates represent the VOC emissions reductions that would be needed to achieve the 15% RFP reduction once the I/M program benefits are considered.

- VOC Reductions needed for 15% reduction: 21.60 tpd

[11] 2016v1_201471_2011v63_country-SCC_summary_17-Oct-2019.xlsx
[12] https://www.tceq.texas.gov/assets/public/implementation/air/ms/IM/2010ElimTailTstRpt.pdf
[13] https://www.tceq.texas.gov/assets/public/implementation/air/ms/IM/2020%20IM%20Program%20Eval.pdf

- 2028 VOC I/M program benefit: 0.97 tpd – 1.16 tpd
- Additional VOC reductions needed: 20.44 tpd – 20.63 tpd

On an annual basis, this represents 5,314 – 7,531 tpy VOC reductions, assuming that the summer weekday tpd figures translated into tpy by multiplying them by either 260 days (weekdays) or 365 days.

Cost Per Ton of VOC Reductions

CAPCOG used EPA's Regulatory Impact Analysis (RIA) for the 2015 O_3 NAAQS in order to estimate the cost per ton of VOC reductions.[14] Using data from Tables 3A-9, 3A-11, 4A-2, and 4A-4, CAPCOG calculated an average cost per ton of $12,906 - $13,415 in 2011 dollars.[15]

Using Bureau of Labor Statistic's Consumer Price Index Inflation Calculator, CAPCOG calculated a +13.87% inflation factor for the 2011 dollars based on July 2011 and July 2021 buying power. This translates into $15,596.12 - $16,210.61 per ton of VOC.

Total Cost Calculation

Using the annual tpy VOC estimates and cost per ton estimates, CAPCOG calculated the following annual costs of VOC emission reductions that would be needed starting to achieve the 15% VOC reduction:

- Low: $83 million per year
- High: $122 million per year

The expected timeframe for these emission reductions would be from 2027 or 2028 (either the "attainment year" that the area's attainment of the O_3 would be based on as a "moderate" area or the year in which the 15% VOC reductions would need to be implemented by if they had not occurred already) through 2049 (the expected end of two, ten-year maintenance periods that would follow attainment and redesignation). Over the course of this 22 – 23 year period, this would translate into costs of $1.8 - $2.8 billion.

Reasonably Available Control Technology (RACT)

Moderate O_3 nonattainment areas are required to implement RACT rules for three types of sources:

- Major sources of VOC;
- Major sources of NO_X;
- Non-major sources of VOC covered by a Control Technique Guideline (CTG).

As with NNSR, the term "major source" for RACT means a source with the potential to emit at least 100 tpy of either VOC or NO_X.

As described in the 15% VOC reduction section, this study assumes that all of the VOC RACT rules are accounted for in the cost assessment for the 15% VOC reduction. It is technically possible, however, that these rules could result in costs beyond those included in the 15% VOC reduction to the extent that the RACT rules may result in area-wide emission reductions of more than 15%, and therefore could result in costs beyond what is accounted for in the 15% VOC reduction section. ACOG and CAPCOG elected not to evaluate that possibility due to resource limitations and the low likelihood of such a situation occurring.

[14] https://www.epa.gov/sites/production/files/2016-02/documents/20151001ria.pdf
[15] https://www.bls.gov/data/inflation_calculator.htm, based on July 2021/July 2011 buying power ratio

Therefore, the key RACT rules that could result in added costs would be NO_X RACT rules. Using the Oklahoma Department of Environmental Quality (ODEQ) annual point source emissions inventory summary for 2019, CAPCOG identified the following facilities most likely to be subject to NO_X RACT rules as a result of emitting at least 100 tpy NO_X in at least one of these years.

Table 10. Facilities Emitting > 100 tpy NO_X in 2019

Facility ID	Facility Name	Company Name	County	SIC Code	NO_X 2019 (tpy)
1021	CHITWOOD GAS PLANT	DCP OPERATING CO LP	GRADY	1321	489.051
1205	MUSTANG ENERGY CENTER	OG AND E	CANADIAN	4911	449.665
1208	HORSESHOE LAKE GENERATING STATION	OG AND E	OKLAHOMA	4911	1,174.528
1226	WEST EDMOND STATION	ONEOK GAS STORAGE LLC	LOGAN	4922	323.455
1407	FRONTIER GENERATING STATION	OG AND E	OKLAHOMA	3999	149.91
1518	MIDWEST CITY AIR DEPOT	TINKER AFB LOGISTICS CTR	OKLAHOMA	9711	132.902
1565	COX CITY PROCESSING PLANT	ENABLE PRODUCTS LLC	GRADY	1321	123.791
1566	CRESCENT GAS PLANT	ETC TEXAS PIPELINE LTD	LOGAN	1321	242.809
1763	EDMOND COMPRESSOR STATION	SOUTHERN STAR CTL GAS PIPELINE INC	OKLAHOMA	4922	272.143
2134	PINK CMPSR STA	ENABLE OKLAHOMA INTRASTATE TRANSMISSION LLC	POTTAWATOMIE	4922	156.71
3694	MCCLAIN ENERGY FACILITY	OG AND E	MCCLAIN	4911	294.253
4240	REDBUD POWER PLANT	OG AND E	OKLAHOMA	4911	287.624
SUM	**n/a**	**n/a**	**n/a**	**n/a**	**4,096.841**

Six of the eight counties in the region are host to at least one of these 12 major sources of NO_X – only Cleveland and Lincoln Counties do not have a point source of NO_X emissions that emitted more than 100 tpy. All of these sources fall into the following SIC codes:

- 1321: Natural Gas Liquids
- 4911: Electric Services
- 4922: Natural Gas Transmission
- 9711: National Security

The sum of all NO_X emissions from facilities reported in the 2019 point source inventory was 15,638.33 tpy NO_X, so these 12 facilities represent about 26% of all NO_X emissions from facilities reporting to the point source emissions inventory. Since it is possible for sources to be considered "major" even if they emit less than 100 tpy due to having a potential to emit of greater than 100 tpy, it is also possible that there are other facilities that would be subject to NO_X RACT rules.

- 90-100 tpy:
  - 3 facilities, 278.005 tpy total
- 80-90 tpy:
  - 4 facilities, 323.967 tpy total
- 70-80 tpy:
  - 14 facilities, 1,039.087 tpy total
- 60-70 tpy:
  - 10 facilities, 633.609 tpy total
- 50-60 tpy
  - 17 facilities, 931.618 tpy total
- 40-50 tpy
  - 25 facilities, 1,118.169 tpy total
- 30-40 tpy
  - 40 facilities, 1,377.383 tpy total
- 20-30 tpy
  - 51 facilities, 1,271.986 tpy total
- 10-20 tpy
  - 100 facilities, 1,475.295 tpy total
- 0-10 tpy
  - 1,515 facilities, 3,092.37 tpy total

The vast majority (86% of the facilities and 94% of the NO_X emissions) of the sources with at least some NO_X emissions but < 100 tpy reported in this summary from 2019 are from three SIC codes:

- 1311: Crude Petroleum and Natural Gas
- 1321: Natural Gas Liquids
- 4922: Natural Gas Transmission

Going down to 50 tpy, there are only two other facilities that have SIC codes outside of these three:

- The Heating and Cooling Plant at Vicinity Energy Oklahoma City Inc., in Oklahoma County (77.827 tpy NO_X), SIC Code 4961, in Oklahoma County, and
- The University of Oklahoma in Cleveland County (82.236 tpy NO_X), SIC Code 4488.

Electric Generating Units

There are a total of seven power plants in the Oklahoma City-Shawnee CSA that report emissions to EPA's Air Markets Data Program. These include:

- Frontier Generating Station (1 combined cycle unit) – OG&E
- Horseshoe Lake (3 boiler units, 2 combustion turbine units) – OG&E
- McClain Energy Facility (2 combined cycle units) – OG&E

- Mustang (7 combustion turbines) – OG&E
- Tinker Turbines (4 combustion turbines) – OG&E, located on Tinker Air Force Base
- Redbud Power Plant (4 combined cycle units) – OG&E
- Spring Creek Power Plant (4 combustion turbines) – Evergy

Although many of these units have controls already, it is reasonable to expect that EPA would require that Oklahoma mandate selective catalytic reduction (SCR) on existing utility boilers and SCR plus either steam or water injection at gas turbines, which would require retrofits of all units except for the units at Redbud, which already have SCR and dry low NO_X burners. These technologies are widely available and RACT rules elsewhere (such as Texas) account for emission rates consistent with the use of SCR. CAPCOG used EPA's "Menu of Control Measures" to estimate the cost of retrofitting power plants within the region with NO_X controls. Several units already are equipped with steam injection, water injection, or low-NO_X burners. For these units, CAPCOG estimated the incremental cost of adding SCR by using the following equation:

- Incremental cost of SCR = (cost per ton SCR + extra control) * (control efficiency of SCR + extra control) * (uncontrolled emissions) – (cost of extra control) * (control efficiency of extra control) * (uncontrolled emissions)
- Uncontrolled emissions = controlled emissions * (1/control efficiency of extra control)

EPA's "Menu of Control Measures" provides a standardized set of tools for estimating the costs of implementing various emission control measures that CAPCOG used for this analysis. Costs in the Menu of control measures are listed in 2006 dollars:

Utility Boiler – Oil-Gas/Tangential or Wall: Selective Catalytic Reduction (applicable to Horseshoe Lake units 6 and 8) (80% NO_X reduction):

- Capital costs per kW: $72.49 * (200/Capacity (MW))^(0.35) 25 MW – 500 MW; $52.60 per kW above 500 MW
- Fixed O&M Costs per year: $1.07 * (200/Capacity (MW))^(0.35) 25 MW – 500 MW; $0.78 per kW above 500 MW
- Variable O&M Costs: 0.12 mills per kWh

Utility Boiler – Oil-Gas/Tangential: Selective Non-Catalytic Reduction (SNCR) (applicable to Horseshoe Lake Unit 7[16]) (50% reduction):

- Capital costs per kW: $11.5 * (200/Capacity (MW))^(0.577) 25 MW – 500 MW; $6.78 per kW above 500 MW
- Fixed O&M Costs: $0.18 * (200/Capacity (MW))^(0.577) 25 MW – 500 MW; $0.11 per kW above 500 MW
- Variable O&M Costs: 0.12 mills per kWh

[16] Brian McQuown, Environmental Regulatory Manager at OG&E indicated in an e-mail to CAPCOG that unit 7 is in fact a boiler, even though it is listed in EPA's AMPD as a combined cycle unit. He also indicated that SCR is not compatible with Horseshoe Lake Unit 7: "SNCR would be a more appropriate NOx control method for Horseshoe 7 – SCR is not compatible with the design of the unit because SCR inlet temperatures from the boiler would be too low for proper catalyst performance"

SCR with steam injection (applicable to Frontier unit CC01 and Tinker Turbines units 5A-1, 5A-2, 5B-1, and 5B-2) (95% NO_X reduction):

- $1,348 per ton of NO_X reduced (relative to uncontrolled)

SCR with water injection (applicable to Horseshoe Lake units 9 and 10 and Mustang units T6, T7, T8, T9, T10, T11, and T12) (95% NO_X reduction)[17]:

- $4,382 per ton of NO_X reduced (relative to uncontrolled)

Non-EGU combustion turbines: SCR with dry low-NO_X burners (applicable to McClain Energy Center units CT1 and CT2 and Spring Creek Power Plant Units CT-01, CT-02, CT-03, and CT-04) (94% NO_X reduction)[18i]:

- $4,125 per ton of NO_X reduced (relative to uncontrolled)

CAPCOG assumed costs were spread out over 20 years for calculating total costs.

Table 11. Fossil Fuel Power Plant NO_X RACT Cost Estimates for Existing Sources as of 2020

Facility Name	Combined Nameplate Output[19]	2020 Output (MW-hr)	Annual Cost Related to RACT	Total Cost Related to RACT over 20 Years
Frontier Generating Station	120.00	222,608.62	$170,497.85	$3,409,957.04
Horseshoe Lake	870.00	1,088,355.78	$7,622,236.67	$152,44,733.44
McClain Energy Facility	378.00	2,019,659.58	$1,560,749.64	$31,214,992.78
Mustang	401.00	1,086,266.80	$5,402,390.45	$108,047,809.00
Tinker Turbines[20]	82.00	4,072.78	$44,469.99	$889,399.77
Redbud Power Plant	616.00	6,064,366.30	$0.00	$0.00
Spring Creek Power Plant	338.00	60,856.96	$150,386.07	$3,007,721.40
TOTAL	**2,467.00**	**10,546,186.82**	**$14,800,344.60**	**$296,006,892.02**

OG&E's recent filing (August 2, 2021) of its draft triennial Integrated Resource Plan (IRP) with the Oklahoma Corporation Commission and the Arkansas Public Service Commission reaffirms the

[17] Note – all of these turbines are already equipped with water injection, so this analysis estimates incremental cost of adding SCR

[18] Note –these turbines are dry low-NO_X burners, so this analysis estimates incremental cost of adding SCR

[19] Unit capacities based on Security and Exchanges Commission (SEC) Annual Report form 10-K from OG&E, except for Tinker Turbines, which is based on data from EIA Form 860.

[20] Listed as "Mustang" Units 5A-1, 5A-2, 5B-1, and 5B-2 in EPA's AMPD database and on OG&E's integrated resource plan, Listed as "Tinker" plan units 5A and 5B on EIA's Form 860 Reports.

retirement of Horseshoe 6 in 2023, and also plans to retire Horseshoe 7 and the Tinker turbines in 2025 and Horseshoe 8 in 2027.[21] The IRP regulatory process will be finalized in October 2021.

Since this study assumes that RACT rules would need to be in effect by either the beginning of 2027 or 2028, it appears likely that these retirements would negate any costs that could be assigned to installing pollution control systems on these plants. The following table, therefore, shows adjusted totals by facility to reflect only the units expected to still be in service at the time the RACT rules will be in effect.

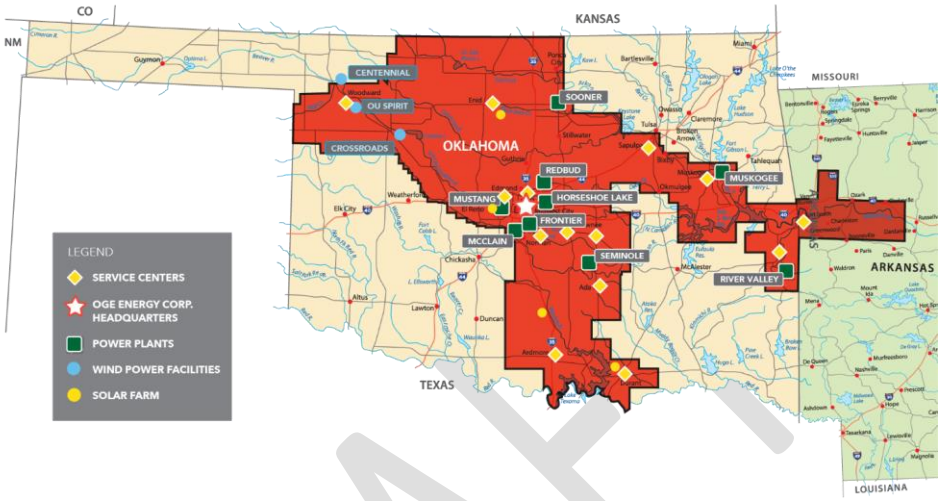
Table 12. Power Plant NO_X RACT Cost Estimates for Existing Sources as of 2020 Projected to be in Service in the 2027 and 2028 O_3 Seasons

Facility Name	Combined Nameplate Output	2020 Output (MW-hr)	Annual Cost Related to RACT	Total Cost Related to RACT over 20 Years
Frontier Generating Station	120.00	222,608.62	$173,395.08	$3,467,901.68
Horseshoe Lake	88.00	197,742.44	$1,227,174.06	$24,543,481.22
McClain Energy Facility	378.00	2,019,659.58	$1,587,271.11	$31,745,422.16
Mustang	401.00	1,086,266.80	$5,494,192.06	$109,883,841.24
Redbud Power Plant	616.00	6,064,366.30	$0.00	$0.00
Spring Creek Power Plant	338.00	60,856.96	$152,941.55	$3,058,830.94
TOTAL	**1,941.00**	**9,590,843.74**	**$8,634,973.86**	**$172,699,477.23**

Due to the nature of the various markets in which the electricity sector operates, it is difficult to assess how the costs of implementing NO_X RACT at power plants within the region would affect the regional economy within the Oklahoma City-Shawnee CSA. CAPCOG and ACOG interviewed OG&E, which owns and operates 6 of the 7 plants. OG&E has a service area that includes most but not all of the Oklahoma City-Shawnee CSA, and which extends across the state and into Arkansas. The added costs of operating the power plants in the region would be passed on to customers in the form of higher electricity costs, although the extent to which that would be concentrated in the Oklahoma City-Shawnee CSA is unknown.

[21] OG&E Draft Integrated Resource Plan, Filed August 2, 2021. Available online at: https://ogeenergy.gcs-web.com/static-files/6fd094d7-f7d6-4dae-8ec9-7482d0071a34. See note on pg. 6 and 7.

Figure 2. OG&E Service Area



CAPCOG reviewed the data available from the Energy Information Administration (EIA) on OG&E's customer counts.[22] The following table shows the number of residential, commercial, and industrial customers in Oklahoma and Arkansas as of July 2020. This month matches the most recent county-level housing count data from the U.S. Census Bureau.

Table 13. OG&E Retail Customers by State and Type, July 2020

Customer Type	Oklahoma	Arkansas	Total
Residential	681,011	56,906	**737,917**
Commercial	106,111	11,011	**117,122**
Industrial	9,343	409	**9,752**
TOTAL	**796,465**	**68,326**	**864,791**

The total number of housing units in the 8-county region was 618,309 as of July 1, 2020, which – if all of these housing units were located within the OG&E Service Area, would represent 84% of OG&E's residential customers. There are in fact other electricity providers in the region, including Canadian Valley Electric Cooperative, City of Stroud, Edmund Electric, Kingfisher Public Works Authority, Oklahoma Electric Cooperative, Public Service Company of Oklahoma, and Stillwater Electric Utility.[23] In order to account for these other providers, for the purposes of this report, CAPCOG will assume that customers within the Oklahoma City-Shawnee CSA would need to bear roughly 75% - 100% of these

[22] https://www.eia.gov/electricity/data/eia861m/
[23] https://www.greateroklahomacity.com/subdoingbusiness/infrastructure

pollution controls. These expenses would be expected to be paid out to external firms, representing a simple loss to the regional economy.

All factors above considered, CAPCOG estimates the total estimated economic cost of EGU NO_X RACT to the region could be $129,524,608 - $172,699,477 - through 2050. This accounts for NO_X RACT rules applying to all units except for Horseshoe Lake Units 6, 7, and 8, and the Tinker turbines, with the region paying for 75% - 100% of the costs of the pollution control systems.

This estimate does not account for any business growth that might not occur as a result of higher electricity prices, which could also occur. The added costs result in electric bills in the Oklahoma City area and beyond going up somewhat to cover these added costs. Based on 2020 output of the units projected to still be in service in 2027 and 2028, this would be equivalent to $0.00088 per kWh of output. Compared to the average cost of $0.057 per kWh, this would be equivalent to a 1.6% increase in electric bills across the service area. While electric costs would still be much lower than many other areas, the higher electricity costs would be a factor that businesses considered in assessing whether to locate or expand within the region.

Non-EGUs

With the exception of Tinker Air Force base, all of the non-EGU point sources of NO_X emissions that emitted more than 100 tpy in 2019 were gas plants or compressor stations. The combined total NO_X emissions from these seven facilities was 1,607.959 tpy NO_X in 2019. As discussed elsewhere in the report, total NO_X emissions at Tinker AFB are now below 100 tpy and expected to remain below 100 tpy moving forward, so CAPCOG is assuming that there would be no NO_X RACT rules that would apply to the AFB.

EPA's Menu of Control Measures identifies selective catalytic reduction (SCR) as a NO_X control for compressor stations, with the following control efficiencies and costs:

- 80% control efficiency
- $4,444 per ton of NOX reduced for NO_X <1 tpd; $855 per ton of NO_X reduced for NO_X > 1 tpd ($2006)

All of the compressors within the region have NO_X emissions of less than 1 tpd, so the $4,444 per ton of NO_X was used for this analysis, adjusted to $5,962 in 2021 dollars.

For natural gas internal combustion engines, which would be the source of most NO_X emissions at a natural gas processing facility, there are four technologies identified in the menu of control measures, all of which are listed in terms of 2006 dollars:

- Low-emissions combustion (low speed):
  - 87% removal efficiency
  - $2,696 per ton of NO_X removed for < 1 tpd and $1,011 for NO_X > 1 tpd
- Low-emissions combustion (medium speed)
  - 87% removal efficiency
  - $610 per ton of NO_X removed
- Non-selective catalytic reduction (NSCR):
  - 90% removal efficiency
  - $628-$836 per ton of NO_X removed

- SCR:
  - 90% removal efficiency
  - $4,444 per ton of NO_X removed.

Since low-emissions combustion (medium speed) and NSCR are each more cost-effective than the other technologies that achieve the same degrees of control, respectively, CAPCOG assumes that one of these two technologies would be used as the basis for any NO_X RACT rules applicable to these types of internal combustion engines, so the cost range would be $610 - $836 per ton of NOX in 2006 dollars, and $818 - $1,122 in 2021 dollars.

Based on these technologies being applied to these sources, assuming none of them are controlled, the estimated total annual cost would be $4,197,269 - $4,451,756 per year. Over a 20-year timeframe, this would translate to $83,945,388 - $89,035,125. This translates into 1,346 – 1,372 tpy NO_X reductions.

This assumes that these facilities had no existing controls on them, which may not be a good assumption based on CAPCOG's interview with Bud Grounds from the Environmental Federation of Oklahoma. EPA has New Source Performance Standards (NSPS) for Spark-Ignition engines rated at over 500 HP that require NSCR that were manufactured after July 1, 2007, and for engines rates 25 – 500 HP that were manufactured after July 1, 2008.[24] At least some of these facilities may already have these controls installed. Therefore, at the low end of the range for the cost associated with this requirement, it is possible that the cost would be $0.

CAPCOG assumes that these financial costs would be simply represent a net economic loss to the region if required, and did not apply any multipliers to these figures.

A report produced by the EIA on gas processing plant capacities indicated that gas processing plants operated at approximately 66% of capacity.[25] This suggests that a typical gas processing plant emitting 70 tpy NO_X would be more likely than not to have a potential to emit of at least 100 tpy. CAPCOG assumed a similar operating capacity for the other sources in the 70 – 100 tpy range, and used an 80% control efficiency and an average $3,245 per ton of NOX reduced cost for all sources within this range, representing the higher of the two average cost/ton for the six sources that emitted more than 100 tpy. This translated into an additional 1,313 tpy of NO_X emission reductions at a total 20-year cost of $85,200,644. Even if these reductions were not required as a result of RACT, it is possible that they would be required anyhow as "necessary to attain"

The total cost range for non-EGU NO_X RACT for the 20-year period is therefore $0 - $174,235,769.

Inspection and Maintenance Program

Summary of Requirements

Under the Clean Air Act, ozone (O_3) nonattainment areas classified as "Moderate" are required to implement a "basic" vehicle emissions inspection and maintenance (I/M) program (42 U.S.C. §7511a(b)(4)). EPA's rules implementing this provision are in 40 CFR §§51.350 - 51.373. If the region was designated nonattainment and classified as "Marginal" and subsequently reclassified to "Moderate," this would mean annual on-board diagnostic testing of light-duty vehicles (≤ 8,500 lbs Gross Vehicle

[24] https://www.govinfo.gov/content/pkg/FR-2008-01-18/pdf/E7-25394.pdf
[25] https://www.eia.gov/todayinenergy/detail.php?id=38592

Weight Rating (GVWR)) in Oklahoma, Cleveland, and Canadian Counties within 3-4 years of the reclassification to "Moderate." CAPCOG used other I/M programs in EPA region 6 in order to estimate the costs to motorists of an I/M program and then regional economic multipliers for the industries that would be directly affected in order to estimate the regional economic impact of those expenditures. Then, CAPCOG compared those regional economic impacts to a "business as usual" scenario in which those expenditures were directed elsewhere in the regional economy.

CAPCOG's analysis indicates that from 2028 - 2050, an I/M program would cost motorists in the region $549 - $809 million, although the impact on the regional economy would be a loss of $90 - $110 million over this time frame as a result of the redirection of this spending away from consumer spending and into spending on fees and repairs that would go to vehicle maintenance stations and state and local governments.

I/M Programs in EPA Region 6

Since there are no vehicle safety inspection or emissions inspection programs already in place anywhere in Oklahoma currently, an analysis of the potential economic impact of an I/M program must be based on programs in place elsewhere. Since EPA's regional offices are responsible for approving State Implementation Plan (SIP) revisions, including any SIP revision that Oklahoma might need to submit for an I/M program, CAPCOG reviewed I/M programs elsewhere in EPA Region 6, which also includes Arkansas, Louisiana, New Mexico, and Texas. According to EPA's documentation for the MOVES3 model, within EPA Region 6, there are I/M programs in Louisiana, New Mexico, and Texas:

- Louisiana:
  - Baton Rouge area: 5 counties
- New Mexico:
  - Albuquerque area: 1 county
- Texas:
  - Houston area: 5 counties
  - Dallas-Fort Worth area: 9 counties
  - Austin area: 2 counties
  - El Paso area: 1 county

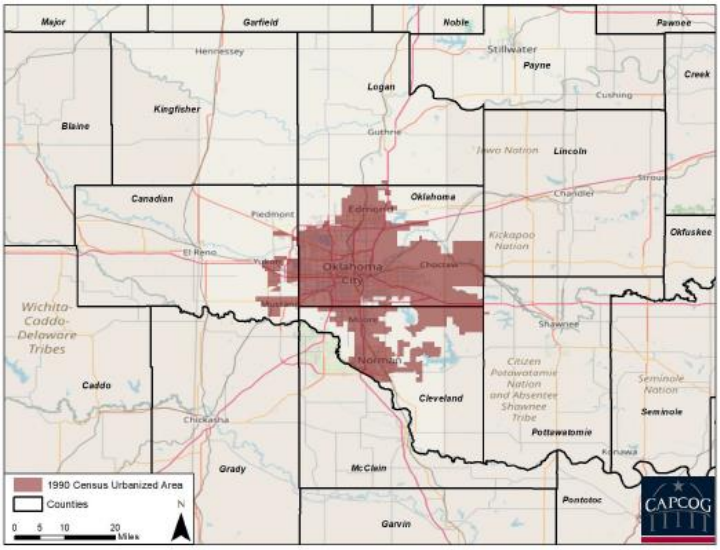
Geographic Applicability

Staff from ACOG and CAPCOG have previously agreed that this study should evaluate a possible I/M program covering Canadian, Cleveland, and Oklahoma County. This analysis was based on EPA's rules for the I/M program are detailed in 40 CFR Subpart S. As detailed in the scoping report, 40 CFR §51.350 specifies applicability, and the following provisions are significant for this study:

- §51.350(a)(8) requires that if a marginal O_3 nonattainment area is reclassified to moderate, a basic I/M program is required in the 1990 Census-defined urbanized area or areas with a population of 200,000 or more.
- §51.350(b)(2) specifies that programs for O_3 nonattainment areas outside of the northeast are required to "nominally cover at least the entire urbanized area, based on the 1990 census." Exclusion of some urban population is allowed as long as an equal number of non-urban residents of the Metropolitan Statistical Area containing the urbanized area are included to compensate for the exclusion.

The map showing the extent of the 1990 Oklahoma City Urbanized Area from the scoping report is shown below. This shows that the Oklahoma City Urbanized Area includes parts of Canadian, Cleveland, Logan, and Oklahoma Counties.

Figure 3. 1990 Oklahoma City Urbanized Area

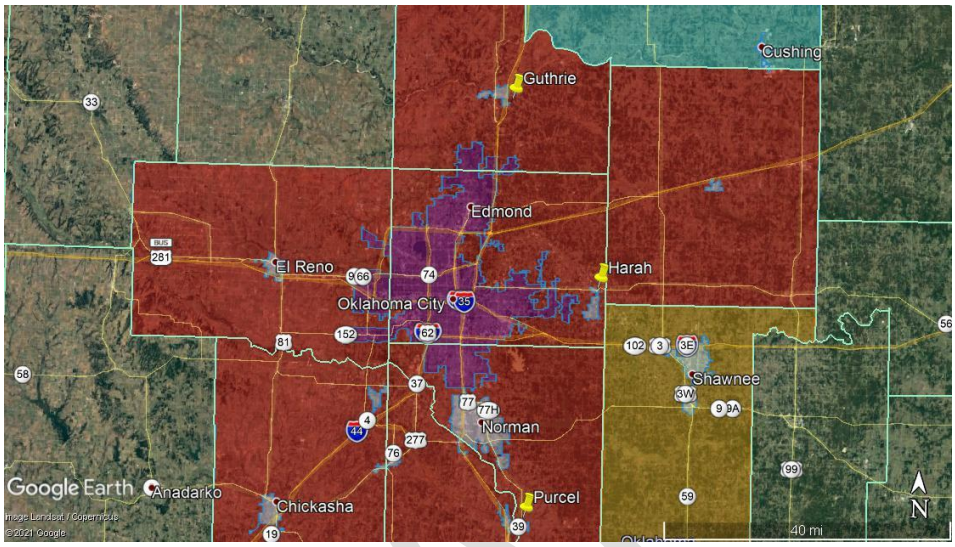


CAPCOG is assuming that an I/M program for the Oklahoma City area would include all of Canadian, Cleveland, and Oklahoma Counties, but would not include Logan County despite there being a part of the 1990 urbanized area located in Logan County based on the provision allowing substitution of populations from Canadian, Cleveland, and Oklahoma counties to cover the population living in Logan County's portion of the 1990 Census Urbanized Area.

Since the most recent population data (which would currently be July 1, 2019, population estimates from the Census Bureau) would need to be used for this analysis despite the geography being the 1990 Urbanized Area, it would be very resource-intensive to try to estimate the exact current populations living in or out of the 1990 Urbanized Area boundaries in each county. However, analysis of the data that is available strongly suggests that Logan County could be excluded from an I/M program if the program applied to all three of the other counties, and it would be impractical for the I/M program to only cover portions of these counties.

An analysis of the 2010 Urbanized Area populations can help in identifying portions of these counties that were at the time definitively outside of the 1990 Oklahoma City Urbanized Area boundaries. The following map shows these areas along with the current Oklahoma City MSA and Shawnee µSA boundaries.

Figure 4. 2010 Urbanized Areas in OKC Area



The six 2010 urban areas that cover a portion of these four counties: El Reno, Guthrie, Harah, Norman, Oklahoma City, and Purcel – these urban areas account for the "urban" population of these counties. The following table shows the total population, urban population, and the percentage of the population living in an urban area.

Table 14. 2010 County Urban/Rural Populations[26]

County	2010 Population	2010 Urban Population	% Urban
Canadian	115,541	89,535	64.45
Cleveland	255,755	21,2574	82.31
Logan	41,848	18,675	25.05
Oklahoma	718,633	673,536	93.18
Total	**1,131,777**	**994,320**	**87.85%**

While the 2010 urban area boundaries separate the Norman and Harah urban areas from the Oklahoma City urban areas, much of these two 2010 urban areas were included in the 1990 Oklahoma City urban area. However, the El Reno urban cluster in Canadian County, Guthrie urban cluster in Logan County, and the Purcel urban cluster in Cleveland County are all entirely outside of the 1990 Oklahoma City Urbanized Area boundary. Using the 2010 county and urban area population data, it's possible to approximate the populations in each county living in areas that were included in the 1990 Urban Area

[26] https://www.census.gov/programs-surveys/geography/guidance/geo-areas/urban-rural.html

boundary. The table below shows the share of each county's population living inside and outside of these areas.

Table 15. 2010 Urbanized Area Analysis

County	2010 Population	2010 Population in Oklahoma City, Norman, and Harah Urban Areas	2010 Population Outside of Oklahoma City, Norman, and Harah Urban Clusters
Canadian	115,541	74,466	41,075
Cleveland	255,755	205,697	50,058
Logan	41,848	10,484	31,364
Oklahoma	718,633	673,536	45,097
Total	**1,131,777**	**964,183**	**167,594**

As this table shows, exclusion of Logan County would only mean that there would need to be an additional 11,000 people added from Canadian, Cleveland, or Oklahoma Counties in order to meet the requirements of §51.350(b)(2), and each of these counties has more than enough population outside of the 1990 Urbanized Area boundaries to meet this requirement.

It is also possible using these data to potentially exclude Canadian County if the program covered all of Cleveland and Oklahoma Counties. There is no way that this requirement could be met without including most, if not all, these two counties. These two counties collectively had a 2010 population of 974,388, which exceeds the target of 964,183 that accounts for the population in the four counties being analyzed living in the 2010 Oklahoma City, Norman, and Harah urban areas.

However, between 2010 and 2019, the population of Canadian County has grew much faster (28%) than any of the other three counties (11-15%), and much of this population is located in the eastern part of the county that was included in the 1990 Oklahoma City Urbanized Area, so it might not be possible to make up for this population in Cleveland and Oklahoma Counties. The release of the 2020 Census data this year and new urbanized area delineations will enable an updated analysis of this issue.

Eastern Research Group (ERG) conducted a similar analysis for the San Antonio area since that is available on TCEQ's website at: https://www.tceq.texas.gov/assets/public/implementation/air/ms/IM/2020%20Bexar%20County%20IM%20Prog%20Study%20Report.pdf.

Reference Case: Texas On-Board Diagnostic (OBD) Inspections

The reference case that will be used for this project is Texas's requirement for gasoline vehicles 2-24 years old (except for motorcycles) to pass an on-board diagnostic (OBD) test each year. More information on the program can be found here: https://www.tceq.texas.gov/airquality/mobilesource/im.html#:~:text=The%20I%2FM%20program%20requires,X%2C%20VOC%2C%20and%20CO. One notable deviation from the Texas program is that CAPCOG will assume that the program only applies to light-duty vehicles (vehicles with gross vehicle weight ratings of 8,500 or less). While Texas's program includes heavy-duty gasoline vehicles, this is not required for a "basic" I/M program as defined under 40 CFR §51.352.

Estimates of Average Costs for Motorists

ERG has produced other reports available on TCEQ's website at https://www.tceq.texas.gov/airquality/mobilesource/vim/im_rules_links.html. Using the 2020 Fee Analysis and 2020 Inspection and Maintenance Program Evaluation reports, CAPCOG identified the following per-unit costs that can be used in conjunction with population data to estimate the likely annual costs to motorists of an I/M program in the Oklahoma City area if it was similar to the program in Texas. There are three basic components to these costs:

1. A per-test inspection fee paid to inspection stations;
2. A per-test administrative fee paid to the state government; and
3. Repair costs to enable a vehicle to pass an inspection.

ERG recommended a single per-test emissions inspection fee of $18 - $22 for all areas of the state, corresponding to the break-even price they calculated for 50% of all stations. Their survey indicated that station operators themselves indicated that an average fee of $29.15 was needed to cover costs. CAPCOG used $18.00 and $29.15 for the low and high values, respectively. This does not include the $7.00 fee assessed for safety inspections statewide.

The other areas in EPA Region 6 with an I/M program have comparable fees:

- In the Albuquerque area, emission fees range from $15 - $25 per test, depending on the station, not including tax.
- In the Baton Rouge area, the incremental cost of an emissions test is $8 per test above the $10 per test fee for safety inspections.

Currently, Texas assesses a $2.50 per test administrative fee. The 7.88% sales tax applicable to Albuquerque corresponds to $1.18 - $1.97.

ERG's fee analysis report also showed that stations reported receiving an average of $100 - $200 per failed test, depending on area. Their performance report showed an average cost of $184.06 for 2018 and $176.32 for 2019. CAPCOG used these two values for the high and low average repair cost per test failure.

Estimate of Total Annual Cost to Motorists

Using the population data from the Oklahoma City area and I/M program data from the metro areas in EPA Region 6 with I/M programs)Albuquerque, Austin, Baton Rouge, Dallas-Fort Worth, El Paso, and Houston), CAPCOG calculated the estimated total annual cost to motorists for the I/M program.

Testing Fees

CAPCOG used the population and testing volume of the Austin, Texas area as the reference case for a program for the Oklahoma City area. The population of the two counties in the Austin metro area with an I/M program (Travis and Williamson) totaled 1,864,505 on July 1, 2019, based on the Census Bureau's 2019 Vintage County-Level Population Estimates, while the combined population of Canadian, Cleveland, and Oklahoma Counties was 1,229,754 (65.96% of the population of Travis and Williamson Counties).

In 2020, there were a total of 1,114,299 emission tests in the Austin area, based on a "waiver report" from 2020. This would translate into 734,948 tests in 2020.

Using the low end of ERG analysis's recommended fee range of $18 - $22 for emission fees and a high of $29.15 (the amount survey respondents indicated would be needed to cover costs):

- A low of $13,229,059 paid to inspection stations; and
- A high of $21,243,725 paid to inspection stations.

Using the $1.17 per test administrative fee assessed in Albuquerque and the $2.50 per test administrative fee assessed in Texas, CAPCOG estimates the following:

- A low of $867,238 in administrative fees paid to the state and/or local government;
- A high of $1,837,369 in administrative fees paid to the state and/or local government.

Combining the portion of the fees that would go to inspection stations with the administrative fee, total **annual fees for motorists would be $14,096,297 - $23,261,095 in 2020**.

Emissions Repairs

An I/M program requires vehicles that fail an emissions test to repair the failing components in order to pass the test and be in compliance with the program's rules. In the Austin area, there were 50,273 failing vehicles in 2020, which would translate into **33,158 failing vehicles** in Oklahoma City area in 2020 if the failure rates were proportionate to population.

Using the average repair cost data from ERG's most recent report for Texas (an average of $176.32 per repair in 2019 and an average of $184.06 in 2018), CAPCOG calculated that repairing these 33,158 would cost **$5,846,374 - $6,102,977** per year based on 2020 data.

Total Costs to Motorists

The following table shows the low and high estimates of the total costs to motorists and the disposition of those costs.

Table 16. Costs to Motorists of an I/M Program in 2020

Item	Low	High
Inspection Fees – to Inspection Stations	$13,229,059	$21,423,725
Inspection Fees – Administrative	$867,238	$1,837,369
Repair Costs – to Inspection Stations	$5,846,374	$6,102,977
SUBTOTAL – to Inspection Stations	$19,075,433	$27,526,702
TOTAL COSTS TO MOTORISTS	$19,942,671	$29,364,071

Calculation of Impact to Regional Economy

The costs to motorists only represent one side of the transactions involved in a regional economy that would be affected by an I/M program, with vehicle maintenance businesses and state or local government receiving increased revenues in order to carry out the work involved with the program. The regional economic impact of this change would be the difference in the region's GRP with and without the I/M program and the shift of the $20- $29 million from motorists to inspection stations and state or local government.

Impact from Increased Revenue to Vehicle Maintenance Industry

In order to estimate the impact of increases in revenues to the vehicle maintenance industry, CAPCOG used the costs for inspections and repairs as inputs to the EMSI economic input-output model in the related vehicle maintenance sectors and the costs for administrative fees as an input in the state and local government sectors. These are represented as increased "sales" in these sectors and will be multiplied by the NAICS-specific GRP multipliers. The following table shows some of the key data for the vehicle maintenance industry that would see increased revenue as a result of the I/M program.

Table 17. Data for Vehicle Maintenance Industry

NAICS	Description	Sales	% of Sales	GRP Multiplier
811111	General Automotive Repair	$263,499,038	84.64%	1.201895
811112	Automotive Exhaust System Repair	$4,830,213	1.55%	1.213121
811191	Automotive Oil Change and Lubrication Shops	$35,899,366	11.53%	1.205583
811198	All Other Automotive Repair and Maintenance	$7,073,979	2.27%	1.240469
Total	**TOTAL**	**$311,302,597**	**100.00%**	**1.203371**

Using the weighted GRP multiplier of 1.203371 with the $19,075,433 - $27,526,702 in new revenue into these sectors yields the **estimated regional economic impact of $22,954,831 - $33,124,847 for inspections and repairs**.

Impact from Increased State or Local Government Revenue

The administrative fees paid by motorists for the I/M program would be expected to be directed to either state or local government, depending on how the program was structured. Any fees paid to local governments to run such a program would obviously constitute an increase in local government revenues (i.e., "sales"), but fees to the state government would also generate local economic activity since Oklahoma City serves as the state's capital city.

Table 18. Data for State and Local Government

NAICS	Description	Sales	GRP Multiplier
902999	State Government, Excluding Education and Hospitals	$14,439,360,545	2.4886233
903999	Local Government, Excluding Education and Hospitals	$5,184,568,601	2.3987406

Using the GRP multipliers from each and the $867,238 - $1,837,369 in administrative fees, CAPCOG calculated an estimated **$2,080,280 - $4,572,520 in GRP from these fees**.

Impact from Reduced Consumer Spending

Under the "business as usual" scenario in which the region did not have to implement an I/M program, the $20 - $29 million in fees and repair costs that motorists would have to pay could instead be spent elsewhere in the economy. For this analysis, CAPCOG used data from NAICS codes 44-45 (retail), 71 (arts, entertainment, and recreation), 72 (accommodation and food services), and 81 (other services except public administration). CAPCOG excluded NAICS for which there were $0 sales 712190: Nature

Parks and Other Similar Institutions and 721120: Casino Hotels. “Casinos” and “Hotels” are both accounted for elsewhere in this list, and zoos are accounted for in a different NAICS code.

There were a total of 153 six-digit NAICS codes used for this analysis. GRP multipliers ranged from a low of 0.8328 (Funeral Homes and Funeral Services) to a high of 1.7906 (Religious Organizations). Using sales as the weighting factor, the weighted average across all of these sectors was **1.419331**. The weighted averages for each 2-digit subsector are shown below:

- 44-45 (Retail): 1.390783
- 71 (Arts, Entertainment, and Recreation): 1.437699
- 72 (Accommodation and Food Services) : 1.469012
- 81 (Other Services Except Public Administration): 1.408445

Using the low and high estimates of the total shift in motorist spending with the weighted average GRP impact across these sectors, CAPCOG estimated a GRP loss of **$28,305,244 - $41,677,326** associated with the consumer spending that would otherwise need to be used for the I/M program.

Calculation of Net Impact

The net economic impact of the I/M program equals the added GRP from the vehicle inspection fees and repair costs that would occur under an I/M program minus the GRP from consumer spending with the same amount of money under the “business as usual” case. The following table summarizes these amounts.

Table 19. Net Economic Impact of I/M Program, 2020

Comparisons	Low	High
Business as Usual	$28,305,244	$41,677,326
I/M	$25,035,111	$37,697,367
Net Impact	**($3,270,134)**	**($3,979,959)**

Note – CAPCOG did not make CPI adjustments to these estimates since the data from the cost estimates are from much closer in time (2018 and 2019 data) than the other analyses that were using 2006 and 2011 dollars. The cost estimates for repairs also use a combination of 2018 and 2019 data, making it less obvious how to reconcile the costs. For reference the July 2021/July 2019 CPI ratio is 1.064045 and the July 2021/July 2018 CPI ratio is 1.083319.

Projections

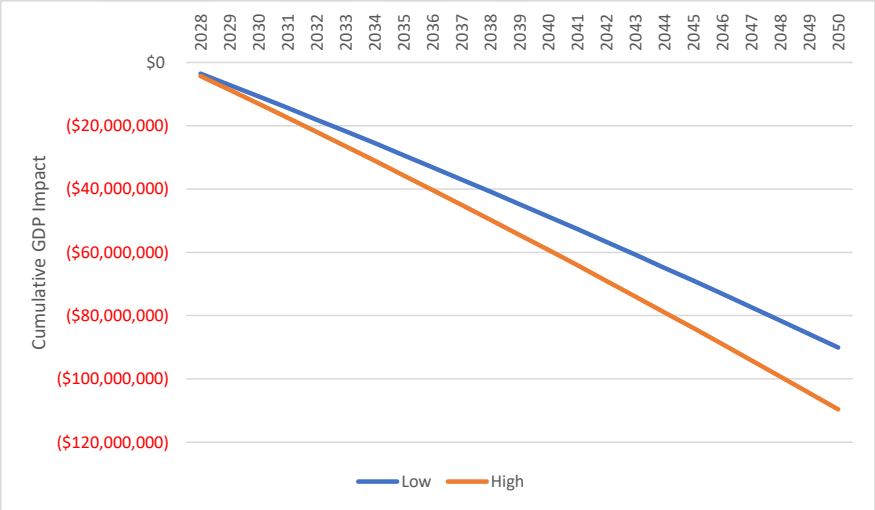
The scenario under consideration in which the area was designated a “Marginal” nonattainment area in 2022, missed its 2025 attainment date, and was reclassified to “Moderate” would result in the implementation of an I/M program by as soon as 2027 if the program was going to be used to achieve emission reductions in the final O_3 season that would be used to determine attainment of the NAAQS by the 2028 deadline for a “moderate area.” 40 CFR §51.372(b)(2) requires submission of a SIP revision accounting for the I/M program no later than the deadline for submitting an attainment demonstration SIP revision. Assuming a 12-18 month timeframe for completing the reclassification after a late 2025 attainment date, that would be expected to occur between fall 2026 and summer 2027. The SIP revision would likely be due approximately 1 year after that date, so fall 2027 to summer 2028. The actual

implementation date for I/M program could theoretically be as late as 2029/2020, although it would need to be implemented no later than the beginning of 2028 in order to be "creditable" towards the area's 15% VOC reduction required for a "Moderate" area, and conversations that CAPCOG has had with TCEQ and EPA Region 6 as it relates to the potential timing of an I/M program that may be needed for Bexar County suggests that despite the very short time frame for implementation, it is likely that an I/M program would indeed be required to be implemented no later than the beginning of 2028. Therefore, this study will use 2028 to as the "start year" for this analysis and 2050 as the final year, corresponding to the end of the "maintenance" plan following redesignation to attainment.

The scenario contemplated in this study assumes that all controls other than nonattainment new source review (NNSR) permitting remain in place out to the final year of the 2nd maintenance plan due to the "noninterference" requirements in Section 110(l) of the Clean Air Act. This section prohibits EPA from approving SIP revisions "if the revision would interfere with any applicable requirement concerning attainment and reasonable further progress…or any other applicable requirement of this chapter," which would include maintenance of the NAAQS. While states can remove existing measures, the burden is high and uncertain, but removal of I/M programs faces the added burden of 40 CFR §51.350(c), which specifies that "All I/M programs shall provide that the program will remain effective, even if the area is redesignated to attainment status or the standard is otherwise rendered no longer applicable, until the State submits and EPA approves a SIP revision which convincingly demonstrates that the area can maintain the relevant standard(s) without benefit of the emission reductions attributable to the I/M program. The State shall commit to fully implement and enforce the program until such a demonstration can be made and is approved by the EPA."

The following chart shows the range of the estimated *cumulative* impact on the regional GDP over time from 2028-2050 based on population projections that ACOG provided that were used for their long-range transportation plan.

Figure 5. Cumulative Economic Impact of an I/M Program 2028-2050



If an I/M program were only to be required starting in 2030, the cumulative cost through 2050 would be $82,952,287

If an I/M program were only to be required starting in 2030, the cumulative cost through 2050 would be $82,952,287, while if it were implemented in 2028, the cumulative cost would be $100,958,177.

Attainment Demonstration, Reasonably Available Control Measures, and Increases in Offset Requirements

There are three sets of requirements that would apply to a "Moderate" area beyond what is required for a "Marginal" area that CAPCOG did not develop estimates for a variety of reasons:

1. The requirement in Section 172 of the Clean Air Act for an "attainment demonstration" SIP revision;
2. The requirement to implement "Reasonably Available Control Measures" (RACM) as expeditiously as practicable under Section 172(c)(1); and
3. An increase in the NNSR offset ratio from 110% to 115%.

While it is certainly true that the state would incur additional costs to develop attainment demonstration SIP revisions that would be needed to fulfill this requirement, it is not clear that this added obligation would represent an economic cost to the regional economy. As the capital city for the state, ODEQ's offices are located within the region, and any additional staff that might need to be hired to carry out this work would almost certainly also be located within the region. Some specialized work involved with these plans, such as photochemical modeling, may require contracting with consultants, which could represent a net cost to the state, but since the funds used for paying for such contracts would likely come out of the agency's statewide budget, it is not obvious that these costs either would represent a real cost to the regional economy, and it would be difficult to characterize these as such. It would be useful, however, for ODEQ to consult with their fellow state agencies in the region to assess what those resource requirements likely would be in the event Oklahoma City was designated nonattainment so that they could ensure that they were prepared for such an eventuality.

The requirement for RACM has been a bit difficult to pin down over the years, but it has variously meant:

- Operational controls (rather than technological controls) on point sources within the nonattainment area;
- Mobile source emissions reduction measures other than I/M programs within the nonattainment area;
- Measures that could be implemented sooner than the deadline for RACT implementation; or
- Measures implemented outside of the nonattainment area that would achieve O_3 benefits within the nonattainment area.

In practice, this requirement really amounts to the need for the state to demonstrate that it has considered implementing measures beyond those explicitly required by statute and explain why it is or is not implementing any such additional measures. While they may exist, CAPCOG is not aware of any situation in which EPA has disapproved a state's SIP submission on the basis of RACM alone. Therefore, it is not necessarily the case that the requirement for RACM would actually mean that any additional

measures would need to be implemented, CAPCOG did not include an analysis of potential costs associated with this requirement.

There is a provision of Section 172 of the Act that seems to go further: Section 172(c)(6) does require "Such plan provisions shall include enforceable emissions limitations, and other control measures, means or techniques (including economic incentives such as fees, marketable permits, and auctions of emissions rights), as well as schedules and timetables for compliance, as may be necessary or appropriate to provide for attainment of such standard in such area by the applicable attainment date specified in this part." This could theoretically mean that if, after implementing measures considered RACT and RACM, the state was not able to bring the area into attainment, that it would have to implement any additional measure that may not meet one of those two definitions as may be necessary. In practice, though, it is not clear what types of measures might fall into that category, if any do.

Lastly, Section 182(b)(5) requires that NNSR offsets increase from 110% to 115% when an area is reclassified from Marginal to Moderate. While this increase certainly would mean some added cost to a firm if it decided to build a new major source or initiate a major expansion of an existing source and it had to obtain offsets from another firm within the region, the offset requirement can achieved internal to a company that owns multiple facilities within a region. The only identified scenario in which a new major facility would be built within the timeframe in which the area might be designated nonattainment would be OG&E possibly building a new power plant within the region after 2025 (although it would not necessarily even be considering building this plant within the region). If OG&E did proceed with building a new plant in the region, the NNSR regulations would allow them to use the emission reductions associated with the planned closures of Horseshoe Lake units 6, 7, and 8 and the Tinker turbines to offset the emissions from the new facility. Since any new facility would be expected to be equipped with SCR pollution controls due to this being now considered BACT in almost all cases for new facilities, the amount of emissions offsets that would be needed would likely be quite small, and the emissions reductions from the facilities that are expected to be closing would be more than enough to cover this requirement. Therefore, the extra requirement for a 115% offset rather than a 110% offset would increase the amount of "credit" consumed, but would not be expected to have an impact on the regional economy. Likewise, the availability of this pool of credits from OG&E's planned closures would likely mean that any other firm that needed to obtain offsets would likely be able to obtain them from this pool, meaning funds would just be transferred from one firm to another within the region, but would not necessarily cost the region as a whole anything. Therefore, the increase in offset costs associated with a Moderate classification is assumed to not add to the overall economic cost to the region.

Conclusion and Recommendations

This report estimates that a nonattainment designation could cost the Oklahoma City area's economy $9.6 - $15.2 billion through 2050. Averaged over the 28-year time frame covered by this study, that averages $341 - $542 million per year. Compared to a GDP of approximately $78 billion, this would represent about 0.4% - 0.7% of total economic output for the region.

Most of the cost of a nonattainment designation would be associated with NNSR permitting and the potential lost opportunity for an automobile manufacturing plant. This single item represents between 67% and 75% of the total potential cost of a nonattainment designation identified in this report. One unique aspect of NNSR among all of the regulatory requirements analyzed in this report is that it is the only one that would only be in effect during the few years that the area would be expected to be actually designated nonattainment – as soon as it was redesignated to "attainment," PSD permitting rules are immediately back in effect. So the scenario envisioned in this report is really focused on one in which a company is making a decision about locating a plant in the 8-county region between 2022 and 2028. The best way to avoid that cost entirely is obviously therefore to avoid a nonattainment designation entirely as well, but short of that, every year that it can accelerate its attainment of the NAAQS is a year less that it is at risk of this situation occurring. Taking early action and positioning itself to come into attainment quickly if designated nonattainment could therefore have very significant benefits for ensure that a nonattainment designation does not cause it to lose an opportunity.

Table 20. Summary of Potential Economic Costs of a Nonattainment Designation, 2022-2050

Classification	Requirement	Low	High
Marginal	NNSR	$7,209,372,404	$10,141,843,457
Marginal	Transportation Conformity	$306,413,810	$565,441,517
Marginal	General Conformity	$0	$1,230,724,801
Marginal	**Subtotal for Classification**	**$7,515,786,214**	**$11,938,009,775**
Moderate	NNSR	$0	$0
Moderate	15% VOC Reduction	$1,823,456,374	$2,808,066,244
Moderate	NO_X RACT-EGUs	$129,524,608	$172,699,477
Moderate	NO_X RACT-Non-EGUs	$0	$174,235,769
Moderate	I/M Program	$82,952,287	$100,958,177
Moderate	**Subtotal for Classification**	**$2,035,933,269**	**$3,255,959,667**
TOTAL	**TOTAL**	**$9,551,719,483**	**$15,193,969,442**

The next-largest potential cost of a nonattainment designation is the 15% VOC reduction requirement. This requirement would carry with it a very hefty pricetag without necessarily providing much in the way of an O_3 reduction benefit. It would also be the requirement most likely to have the broadest economic impact in that it could result in new regulations on a lot of small businesses since there would be no other way to achieve such a large reduction in VOC emissions. This requirement is specific to the "Subpart 2" implementation scheme for O_3 nonattainment areas, however, and there is a possibility that EPA could be persuaded to consider using the more general "Subpart 1" implementation scheme for newly designated nonattainment areas in the future, and this could help the region significantly limit the economic impact of a nonattainment designation. Due to the complexity of these sources, future research into the actual emission reductions that might be achievable through implementation of VOC

RACT within the region, which companies would likely be affected, and what costs those would entail would be valuable.

A nonattainment designation would also be expected to cost the region hundreds of millions of dollars in economic output associated with transportation conformity, NO_X RACT rules, and an Inspection and Maintenance (I/M) program. It is possible that general conformity requirements may not result in any economic cost the region, although if they caused a delay in the expansion of Tinker Air Force base compared to a "business as usual" scenario, these requirements could represent a significant economic impact to the region as well.

The large jump in economic impact associated with going from a "Marginal" to "Moderate" classification could be particularly painful if the timeframes for implementing all of the various "Moderate" area requirements is compressed as the result of a reclassification. While "Marginal" areas are not required to have contingency measures in place, "Moderate" areas are, and these measures are supposed to go into effect immediately upon reclassification. If the area was designated nonattainment and classified as "Marginal," one option the state and region may wish to consider would be adopting the RACT and I/M rules on a contingency basis so that they would go into effect automatically if the area was reclassified. This could improve the planning and implementation of any such rules, provide the area with the maximum benefit of the emissions reduction as soon as possible, and also providing a powerful incentive for the region to take action as soon as possible in order to avoid a reclassification altogether.

If EPA does initiate a process of designating a part of the region as nonattainment, the region should also consider both the benefits and costs associated with a smaller or larger nonattainment area. A larger nonattainment area provides a wider base of emissions reductions that could be used for offsets and to meet the 15% VOC emission reduction requirement, but would also expand the risks and potential costs of a nonattainment designation. As a general rule of thumb, it would be in the region's interest to limit the geographic scope of a potential nonattainment area to as few counties as possible. One of the factors EPA will consider in evaluating whether to include a given county in a nonattainment area or not is the extent of control of emissions already in place in those areas. In this way, each county within the region should have an incentive to take action to control emissions so that if they ever face such a situation, they will be able to credibly say to EPA that emissions within their county are well-controlled.

Similarly, the Oklahoma City area has some unique opportunities to take advantage of EPA's policy towards separate treatment of Indian Country when it comes to area designations. While EPA's default is to consider an entire CSA when evaluating the boundaries of a potential nonattainment area, it can treat any parts of the CSA that are within what is considered Indian Country (which is beyond just reservations) as separate from the areas that are outside of Indian Country. This could mean that large parts of the CSA could be excluded from a nonattainment designation if the tribes in the region petitioned EPA to do so. This could be a valuable strategy for the Tribes, the State, and the region alike to minimize the potential economic and social costs of a nonattainment designation and maximize the opportunities for development within the CSA even if some parts are designated nonattainment.

This report shows significant potential costs to the region's economy of a nonattainment designation, and hopefully helps convey the extent to which it is in the region's interests to remain in attainment of the O_3 NAAQS even beyond the public health benefits of doing so.

Appendix: Texas Transportation Institute Report on Transportation Conformity Costs