

ALABAMA PARTNERS FOR CLEAN AIR

www.alabamacleanair.org

Alabama Partners for Clean Air (APCA) Voluntary Air Quality Program

**Annual Activity Report
October 1, 2020 – September 30, 2021**

This page was intentionally left blank.

APCA Annual Report

October 1, 2020 – September 30, 2021

This document is posted at
<http://alabamacleanair.org>

For further information, please contact
Lisa Smith, CommuteSmart/APCA Program Manager
Regional Planning Commission of Greater Birmingham,
Birmingham, Alabama
Email: lsmith@rpcgb.org

Date Reported: December 2021

Date Adopted: April 2022

This report was prepared as a cooperative effort of the U.S. Department of Transportation (USDOT), Federal Highway Administration (FHWA), the Alabama Department of Transportation (ALDOT), Environmental Protection Agency (EPA), and the Regional Planning Commission of Greater Birmingham (RPCGB), as staff to the MPO, by the requirement of Title 42 USC 7401 et seq., Clean Air Act and 40 CFR Parts 51 and 93, Air Quality Conformity Rules and Regulations. The Contents of this report do not necessarily reflect the official views or policy of the USDOT.

This page was intentionally left blank.

TABLE OF CONTENTS

Executive Summary	1
Section 1: Air Quality Information	3
Table 1: 8-Hour Ozone Design Values (2018-2020)	3
Table 2: Annual PM _{2.5} Design Values (2018-2020)	4
Table 3: 24-Hour PM _{2.5} Design Values (2018-2020).....	4
Table 4: Exceedances of the 8-Hour Ozone Standard	4
Table 5: Exceedances of the 24-Hour PM _{2.5} Standard	5
Section 2: Summary of Air Quality Forecasts and Monitoring Data	7
Table 6: Summary of Alert Days	7
Figure 1: Air Quality Guide	8
Table 7: JCDH FY2021 Budget	8
Section 3: Program Budget Summary	9
Table 8: 2020-2010 Total Budget by Program Area	9
Section 4: Marketing / Public Outreach	11
Table 9: CBS42 Interview Dates and Times	11
Table 10: Good Day Alabama Interview Impressions	12
Figure 2: Alabama Partners for Clean Air Website	13
Table 11: Starnes “Hoover Sun” Digital Ads Email Openings	14
Table 12: Starnes “Homewood Star” Digital Ads Email Openings.....	15
Table 13: Starnes “Village Living” Digital Ads Email Openings	15
Table 14: Starnes “Vestavia Voice” Digital Ads Email Openings	16
Table 15: Starnes “280 Living” Digital Ads Email Openings	16
Table 16: Marketing Campaign Overview	18
Section 5: Employer / Employee Outreach	19
Section 6: Science and Environmental Education Outreach	23
Figure 3: JMG Outreach August 2021	23
Figure 4: JMG Outreach September 2021	24
Figure 5: Vehicle Audits and Compliance Fall 2021	24
Figure 6: UWCA Bicycle Rodeos	25
Section 7: Clean Cities / Alternative Fuels	27
Section 8: Voluntary Emissions Testing Program	29
Figure 7: Information Card for Vehicle Owners	29
Figure 8: Sample Results Printout for Vehicle Owners	30
Table 17: Cumulative Testing Results for FY2021	31
Table 18: Emission System Type and Number of Repairs	32
Figure 9: Map of Test Sites	32
Table 19: Most Common Repairs	33
Figure 10: Typical Emissions Test Events	34
Section 9: Documented Emissions Reductions	35
Table 20: Emission Reductions by Program	35
Appendix A: Alabama Clean Fuel Coalition Annual Report	
Appendix B: Jefferson County Department of Health Annual Report	
Appendix C: Advance Consulting, LLC. Annual Report	
Appendix D: Alabama Clean Fuel Coalition Car Care Annual Report	
Appendix E: Emissions Reductions Worksheets	
Appendix F: United Way of Central Alabama Annual Report	
Appendix G: The Johnson Management Group Annual Report	

This page was intentionally left blank.

EXECUTIVE SUMMARY

This report comprises activities of the Alabama Partners for Clean Air (APCA) program from October 1, 2020 – to September 30, 2021. The 8-hour ozone standard (0.070 ppm) was effective on December 28, 2015. EPA designated Jefferson and Shelby Counties as the attainment of the 8-hour standard and was effective January 16, 2018. The EPA also has the Birmingham area (Jefferson and Shelby Counties and a portion of Walker County) designated as attainment for the 2006 24-hour PM_{2.5} standard (35 µg/m³). Effective April 15, 2015, the EPA designated the Birmingham area as the attainment of the 2013 annual PM_{2.5} standard (12 µg/m³). The Birmingham area is currently designated as the attainment of all of EPA's National Ambient Air Quality Standards through 2020.

A combination of national and state regulatory programs to control emissions and voluntary actions taken by individual citizens and organizations will be required to maintain healthy air quality for the region. While EPA, the Alabama Department of Environmental Management (ADEM), and the Jefferson County Department of Health (JCDH) have the responsibility to establish regulatory programs to reduce air pollution in the Birmingham area, APCA takes the lead in implementing voluntary strategies to improve air quality. While regulatory programs focus on industrial emissions, the APCA program focuses on reducing mobile source emissions.

APCA's strategies include:

- A public awareness media advertising campaign, including survey research
- Technical assistance to forecasting agencies and support for the Birmingham Air Quality website
- Distribution of air quality materials at public events and local companies
- Efforts to get area employers and their employees to take part in pollution reduction activities
- Promoting Idle Free Zones at schools
- Science and environmental education outreach to schools
- Alternative fuels program
- Voluntary emissions testing and car care program

The media outreach included interviews on local radio and television stations in addition to a media buy on local television stations, print, and digital platforms. Media efforts continued to bring awareness to air quality alert days and actions the public could take on air quality alert days.

Expenditures during these 12 months were **\$447,842**. Documented emissions reductions attributable to the APCA program were 35.87 pounds per day of hydrocarbons, 95.71 pounds per day of nitrogen oxides, and 4.72 pounds per day of PM_{2.5}.

This page was intentionally left blank.

SECTION 1

AIR QUALITY INFORMATION

MONITORING DATA

Air Quality Reports were sent out to members of APCA monthly. These reports include daily AQI information for all monitored criteria air pollutants in the Birmingham area, a listing of alerts that were issued, and daily meteorological data. It should be noted that information in these monthly reports was preliminary and was not put through QA/QC procedures.

Below is detailed ozone and fine particulate matter monitoring data that is used to determine compliance with the Environmental Protection Agency's (EPA) National Ambient Air Quality Standards. Air monitoring data shown in this report is only through 2020. This is because air monitoring data is on a calendar year basis (i.e., January 1, 2020 – December 31, 2021), and this report is based on a fiscal year basis (i.e., October 1, 2020 – September 30, 2021).

OZONE STANDARD

Effective December 28, 2015, EPA lowered the 8-hour ozone standard to 70 parts per billion (ppb). Compliance with the 8-hour standard at each site is determined by a design value that is an average of the 4th highest daily 8-hour ozone value at each site over 3 years. The most recent 3-year monitoring period was 2018-2020. The ozone monitoring network consists of 6 monitors in Jefferson County and 1 monitor in Shelby County. The table below displays the design values for ozone at each monitoring site throughout the Birmingham area. For the monitoring period of 2018-2020, no monitors violated the standard.

TABLE 1

8-Hour Ozone Design Values (2018-2020)	
Monitor	Design Value (ppb)
Corner	61
Fairfield	67
Helena	65
Leeds	63
McAdory	66
North Birmingham	66
Tarrant	63*

*Due to not meeting data completeness criteria, the design value is not valid

FINE PARTICULATE MATTER (PM_{2.5})

Effective March 18, 2013, the EPA lowered the annual PM_{2.5} standard to 12 µg/m³. A 3-year average of annual means is compared to the annual standard to determine compliance. The 24-hour PM_{2.5} standard is a 3-year average concentration, based on the 98th percentile for each year, and is set at 35 µg/m³. The most recent 3-year monitoring period was 2018-2020. The fine particulate matter (PM_{2.5}) monitoring network consists of 5 monitors throughout Jefferson County. The tables below display the annual and 24-hour design values for PM_{2.5} at each monitor

throughout Jefferson County. There were no violations of the annual and 24-hour PM_{2.5} standards for 2018-2020.

TABLE 2

Annual PM_{2.5} Design Values (2018-2020)	
Monitor	Design Value (µg/m³)
Arkadelphia	9.8
Leeds	8.6
McAdory	8.5
North Birmingham	10.0
Wylam	8.5

TABLE 3

24-Hour PM_{2.5} Design Values (2018-2020)	
Monitor	Design Value (µg/m³)
Arkadelphia	22
Leeds	17
McAdory	16
North Birmingham	22
Wylam	18

AIR QUALITY EXCEEDANCES

Below are tables showing the exceedances of the 8-hour ozone standard from 2011 through 2020 and exceedances of the 24-hour PM_{2.5} standard from 2011 through 2019. The EPA lowered the 8-hour ozone standard in 2015, so there was a lower threshold to violate the standard. The 2 exceedances of the 24-hour PM_{2.5} standard in 2020 were due to the influence of Saharan dust.

TABLE 4
Exceedances of the 8-Hour Ozone Standard for 2011-2020

Station	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Corner	4	1	1	0	0	1	0	0	1	0
Fairfield	2	5	0	0	2	2	0	1	7	0
Helena	4	4	0	1	2	4	0	1	3	0
Hoover	7	3	0	0	2	2	0			
Leeds	5	4	0	0	0	1	0	1	1	0
McAdory	7	4	0	0	0	2	0	1	5	0
N. Birmingham	5	6	0	0	4	3	1	2	4	0
Pinson	2	3								
Providence	4	2								
Tarrant	9	6	1	0	4	3	1	3	2	1
Total	49	38	2	1	14	18	2	9	23	1

TABLE 5
Exceedances of the 24-Hour Fine Particulate Matter (PM_{2.5}) Standard for 2011-2020

Station	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Arkadelphia				0	0	0	0	0	0	1
Leeds	0	0	0	0	0	0	0	0	0	0
McAdory	0	0	0		0	0	0	0	0	0
N. Birmingham	1	0	0	0	0	0	0	0	0	1
Wylam	2	0	0	0	0	0	0	0	0	0
Total	3	0	0	0	0	0	0	0	0	2

This page was intentionally left blank.

SECTION 2

SUMMARY OF AIR QUALITY FORECASTS AND MONITORED DATA

The chart below shows a summary of “Air Quality Alerts” that were issued for fine particulate matter (PM_{2.5}) and ozone (O₃) during the period October 2020 – September 2021. “Air Quality Alerts” are forecasted one to two days before the date of the alert. JCDH provides PM_{2.5} forecasts year-round, and the Alabama Department of Environmental Management provides O₃ forecasts during the warm season (approximately mid-April to mid-October) every year. The information listed in the column labeled “Actual AQI Color” is from preliminary data and has not been through QA and QC procedures.

TABLE 6
Summary of Alert Days

Date of Alert	Forecast AQI Color	Actual AQI Color	Pollutant
5/24/2021	Orange	Yellow	O ₃

On Air Quality Alert Days, the Regional Planning Commission of Greater Birmingham (RPCGB) staff contacted Birmingham-area media (local television and radio stations and AL.com) to ensure that the message was disseminated to the public. The staff used a combination of emails, faxes, and follow-up telephone calls to ensure the media was informed. The RPCGB also contacted the Alabama Department of Transportation to get the alert information on the highway message boards.

Individuals and organizations receive air quality forecasts directly from the U.S. Environmental Protection Agency (USEPA) through an email system called EnviroFlash. Subscribers define whether they want to receive the forecast every day or only when the forecast is above a certain level on the Air Quality Index (AQI), which follows.

FIGURE 1
AQI Guide

AQI Values	Levels of Health Concern	Colors
<i>When the AQI is in this range:</i>	<i>...air quality conditions are:</i>	<i>...as symbolized by this color:</i>
0 to 50	Good	Green
51 to 100	Moderate	Yellow
101 to 150	Unhealthy for Sensitive Groups	Orange
151 to 200	Unhealthy	Red
201 to 300	Very Unhealthy	Purple
301 to 500	Hazardous	Maroon

Contracts

As part of the larger Memorandum of Agreement between the RPC and JCDH for FY2021 (October 2020 – September 2021), JCDH had two subcontracts as a participating partner of APCA. The Environmental Monitoring for Public Access and Community Tracking (EMPACT) website, which was re-launched in FY2014 as the “Birmingham Air Quality” website, is maintained by the University of Alabama in Huntsville (UAH). The website provides JCDH, the Alabama Department of Environmental Management (ADEM), and the public with near real-time air quality monitoring data for the Birmingham area. Baron Advanced Meteorological Systems (BAMS) provides air quality forecast model data to JCDH and ADEM. Outreach materials were also a part of the FY2021 budget. The details of JCDH’s budget are shown in the table below.

TABLE 7
JCDH FY2021 Budget

	OCT 2020 – SEP 2021
Birmingham Air Quality Website Maintenance by UAH	\$18,200
BAMS Subscription Meteorological Service	\$48,000
Outreach Giveaways	\$5,800
Total	\$72,000

SECTION 3

PROGRAM BUDGET SUMMARY

The APCA Voluntary Air Quality Program is funded primarily with federal Congestion Mitigation-Air Quality (CMAQ) dollars. Federal funds can pay for up to 80 percent of the program expenditures; the remaining 20 percent must be covered with local matching monies.

The Jefferson County Department of Health is a continuing funding partner. The contract partners, which include Alabama Clean Fuels Coalition, Advanced Consulting, LLC., United Way of Central Alabama, and The Johnson Management Group, provide the 20 percent match for their respective programs.

TABLE 8
Air Quality Program Budget Summary for October 2020 – September 2021

Program Area	Total Budget	Amount Invoiced (Includes match \$)
Promotional Items / Print Material-RPC*	\$30,000	\$14,756.04
Media Buy-RPC**	\$41,250	\$40,400.00
Employer/Employee Outreach- Advanced Consulting	\$50,000	\$43,213.80
Idle Free Zones / School Education - Johnson Group	\$71,250	\$49,500.65
Idle Free Zones / School Education – UWCA	\$50,000	\$4,389.70
Clean Cities/Alternative Fuels – ACFC	\$200,000	\$26,365.50
EMPACT/Forecasts – JCDH	\$72,000	\$71,360.61
Diesel Retrofits – ACFC	\$60,000	
Emissions Testing – ACFC	\$110,580	\$39,921.92
Vehicle Repair – ACFC	\$80,000	\$29,428.58
Program Administration – RPC**	\$150,000	\$128,505.02
Contingency – RPC	\$10,000	
Total	\$925,080	\$447,841.92

*Promo/print materials, website, sponsorships, etc.

** Creative Directions & Media Buy

*** All staff time and Public Relations

This page was intentionally left blank.

SECTION 4

MARKETING/PUBLIC OUTREACH

The Alabama Partners for Clean Air 2021 marketing outreach strategy focused on teaching individuals in our community how small changes could impact our air quality. The outreach campaign was launched during Air Quality Awareness Week, May 3-9, 2021. Throughout the week, the Jefferson County Department of Health Meteorologist Matt Lacke, the Alabama Partners for Clean Air spokesperson, was interviewed by local media outlets. The purpose of the interviews was to promote Air Quality Awareness and to educate the public about ways they can help make a difference.

AIR QUALITY AWARENESS WEEK May 3-9, 2021

Air Quality Awareness Week kicked off with an interview on Talk of Alabama, a local community-oriented show from 9 am-10 am on WBMA-TV, ABC33/40. The interview aired on Monday, May 3rd, and reached 17,000 viewers. Here is a link to the segment: <https://abc3340.com/station/talk-of-alabama/talk-of-alabama-alabama-partners-for-clean-air-53?video=18400c50d9b147848b5ceeb5245841cd&jwsourc=cl>

On Tuesday, May 4th, Matt Lacke was interviewed by Will Lochamy on Birmingham Mountain Radio. This local radio station has a high concentration of “environmentally friendly” listeners, a very targeted audience for the air quality awareness message. This interview reached 7,000 listeners.

BIRMINGHAM BARONS

Wednesday, May 5th, was the opening game of the Birmingham Barons Baseball season. Due to the pandemic, the team did not play during the 2020 season, which resulted in a higher-than-normal attendance for the 2021 season. The Alabama Partners for Clean Air had an information table at the entrance of Regions Field to hand out materials and educate visitors about Air Quality Awareness Week. Pledge cards were also provided to help solidify the message.

TELEVISION INTERVIEWS

The Alabama Partners for Clean Air was featured on CBS42’s Living Local segment. CommuteSmart, an APCA partner, was also highlighted in the segment to talk about Bike Month. Reporter Lillian Lalo conducted the interview with Matt Lacke at Railroad Park. The interview segment ran multiple times on CBS42 during Air Quality Awareness Week. In addition to on-air interviews, the segments were housed on CBS42.com’s Living Local section.

TABLE 9
CBS42 Interview Dates and Times

DAY	DATE	TIME	NEWSCAST	Total Impressions	VALUE
FRI	5/7/2021	6-7 am	CBS42 Morning News	7,375	\$400.00

FRI	5/7/2021	12-1230pm	CBS42 Noon News	15,875	\$600.00
FRI	5/7/2021	4-6:30 pm	CBS42 Evening News	8,000	\$800.00
SAT	5/8/2021	6-7 am	CBS42 Weekend News	4,375	\$300.00
SUN	5/9/2021	6-7 am	CBS42 Weekend News	3,750	\$300.00
SUN	5/9/2021	10-1035pm	CBS42 Late News	21,250	\$1,000.00
TOTALS				60,625	\$3,400.00

Source: Nielsen May 2021

CBS42 posted the interview segment on the CBS42 Facebook page and is housed on the CBS42.com website. Here is a link to the segment: <https://www.cbs42.com/cbs-42-living-local/alabama-partners-for-clean-air-bring-awareness-to-air-quality-and-biking-during-the-month-of-may/>

On Thursday, May 6th, morning reporter Jeh Jeh Pruitt featured the APCA interview live during Good Day Alabama. During this daily local news segment, Jeh Jeh Pruitt covers local events and issues in the community. A total of four interviews aired on May 6th with an average of 4 minutes per segment. CommuteSmart was also featured in addition to the Alabama Partners for Clean Air. The value of the interviews is based on the average cost of a 30-second message during that period. The interview segments delivered a total of 234,500 impressions.

TABLE 10
Good Day Alabama Interview Impressions

DAY	DATE	TIME	NEWSCAST	Total Impressions	VALUE
THUR	5/6/2021	7:20 am	Good Day Alabama	57,400	\$1,200.00
THUR	5/6/2021	7:50 am	Good Day Alabama	57,400	\$1,200.00
THUR	5/6/2021	8:20 am	Good Day Alabama	63,600	\$1,400.00
THUR	5/6/2021	9:20 am	Good Day Extra	56,100	\$1,000.00
TOTALS				234,500	\$4,800.00

Source: Nielsen May 2021

MARKETING OUTREACH

Overview

The: 15-second television message aired on **WBRC-TV(FOX6)**, **WIAT(CBS42)**, and **WBMA-TV (ABC33/40)** over a 7-week flight during the peak period of Air Quality Season, July 5-August 22, 2021. In addition to the paid messages, APCA received in-kind messages on **WTTO-TV (CW21)**, **WABM-TV (MY68)**, and **BOUNCE-TV**.

Starnes Media provided a digital email campaign that helped reach neighborhoods throughout Jefferson and Shelby Counties.

Birmingham Times ran a series of full-color quarter-page print and digital ads to target the African American community.

Media Release Outreach and Media Interviews:

On Air Quality Alert Days, media releases were sent to local television and radio stations in addition to Al.com. This list of local contacts was updated for accuracy. Media releases are sent the day before an Air Quality Alert is issued. Information on these alerts is provided by the Jefferson County Department of Public Health which monitors air quality daily.

Media Campaign

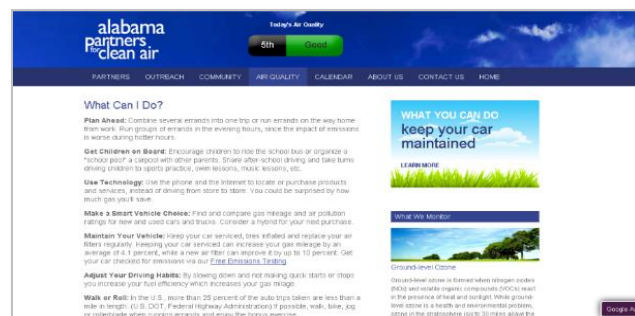
The marketing outreach campaign continued with a television campaign launched on July 5th and continued through August 22, 2021. This period was selected because it falls during the peak season for Air Quality season. The campaign featured television, print, and digital media.

The television messages featured the theme, “Everyone Can Help!”. Two: 15-second messages were produced to provide additional frequency for the messages. These messages provided simple things that everyone can do to help keep the air clean. This theme was also used in print and digital ads that combined bright blue and yellow colors to make the ads stand out. The same message and ad design were used across all media platforms.

DIGITAL:

The website alabamacleanair.org provides information and helpful tips for consumers to help find ways to keep the air clean. Throughout the campaign, the website was promoted through television messages, media interviews, and on the pledge cards.

FIGURE 2
Alabama Partners for Clean Air Website



PRINT AND DIGITAL:

The Birmingham Times Media Group, Inc. The Birmingham Times is a weekly newspaper distributed throughout Jefferson County every week with a focus on the African American community. 6 quarter-page full colors ads ran on 7/8, 7/15, 7/22, 7/29, 8/6, and 8/13. In addition to the discounted rate for the ads, BT Group featured digital ads each week on www.birminghamtimes.com.

The total added value of \$1,200.00

DIGITAL:

Starnes Media produces and distributes publications in local communities throughout Jefferson and Shelby Counties, including Hoover, Homewood, 280 Corridor, Vestavia, and downtown Birmingham. In addition to print Starnes sends out a daily email blast to these targeted areas. Digital ads were featured throughout the campaign featuring Air Quality Awareness Tips through daily email blasts targeting these specific communities. The ads are designed to match the font and look of the television messages. 4 ads ran over a two-month period that provided clean air tips. These ads delivered a total of 75,734 impressions at .2 cents per impression. APCA was given the non-profit rate, which is 50% of the rate card for a value of \$1,000.00.

Total Opens/Views = 75,732 Total Clicks = 194

Total added value - \$1,000.00

APCA Logo featured on NBC13 Weather Cam throughout the campaign.

1,125 logos per week, 4500 total logos per month (Value of \$9,000.00)

Total Added Value = \$10,800.00

TABLE 11
Starnes “Hoover Sun” Digital Ads Email Openings

Hoover Sun	Opens/Views	Clicks
July 5	2002	2
July 7	2119	0
July 12	2048	1
July 14	2134	3
July 16	1937	0
July 18	0	0
July 19	1926	0
August 2	2019	1
August 5	2170	0
August 10	2210	1
August 12	2169	3
August 17	2284	0
August 19	1939	2
August 23	1975	0
TOTAL	26932	13

ABLE 12
Starnes “Homewood Star” Digital Ads Email Openings

Homewood Star	Opens/Views	Clicks
July 6	852	4
July 8	875	4
July 14	778	4
July 16	845	2
July 21	895	4
July 23	862	2
July 28	796	2
August 4	912	2
August 6	869	1
August 11	853	2
August 13	867	3
August 16	902	0
August 18	954	31
August 20	813	1
TOTAL	12073	62

TABLE 13
Starnes “Village Living” Digital Ads Email Openings

Village Living	Opens/Views	Clicks
July 6	119	7
July 8	1035	4
July 12	1047	4
July 16	1073	4
July 20	867	1
July 23	1028	4
July 27	1013	7
August 3	1090	2
August 5	1040	1
August 10	1019	4
August 13	920	1
August 17	1115	3
August 19	1090	2
August 23	868	1
TOTAL	13324	45

TABLE 14
Starnes “Vestavia Voice” Digital Ads Email Openings

Vestavia Voice	Opens/Views	Clicks
July 6	1080	6
July 9	968	5
July 12	886	4
July 15	1054	9
July 20	1039	5
July 23	936	5
July 28	1092	1
August 6	1011	0
August 9	1023	12
August 12	1020	3
August 16	1054	4
August 20	940	3
August 23	1096	2
August 24	918	1
TOTAL	14117	60

TABLE 15
Starnes “280 Living” Digital Ads Email Openings

280 Living	Opens/Views	Clicks
July 6	665	0
July 7	597	1
July 14	747	0
July 15	639	0
July 21	706	0
July 27	638	0
July 28	647	0
August 4	678	0
August 5	684	0
August 10	621	0
August 12	582	0
August 13	762	0
August 18	627	12
August 19	695	1
TOTAL	9288	14

TELEVISION CAMPAIGN

WBRC-TV provided the following:

264 commercials aired in Good Day Alabama, Evening News, Late News, Late Fringe, and weekend

WBRC-TV delivered 7,252,400 impressions with a 96.9 reach and a 6.5 frequency

60 commercials aired on BOUNCE at no charge (Value of \$1,500.00) estimated delivery of 30,000 impressions

60 commercials aired on Circle-TV at no charge (Value of \$1,500.00) estimated delivery of 30,000 impressions

Air Quality Update in late news throughout the campaign (Value of \$5,250.00)

Good Day Alabama live interview segments (Value of \$4,800)

and delivered 234,500 impressions

Total number of impressions delivered = 7,546,900

Total added value = \$13,050.00

WIAT-TV CBS42

180 commercials aired in Early Morning News, Midday News, Evening News, Late News, Weekend News, and Prime Time

26 commercials aired at no charge (Value of \$2,600.00)

Total impressions delivered = 1,577,400

Social Media Post on CBS42's Facebook page that included a link to the news segment (Value of \$500.00)

Interview segment housed on CBS42.com (Value of \$250.00)

The interview segment aired a total of 6 times on CBS42 (Value of \$3,400.00)

Total added value = \$6,750.00

WBMA-TV ABC33/40

127 commercials aired in various dayparts, including Early Morning, Daytime, Primetime, Late Fringe, and Weekend programming.

30 commercials aired on WBMA-TV at no charge (Value of \$2,250)

Total impressions delivered = 1,267,400

30 commercials aired on WTTO-TV at no charge (Value of \$1,200)

Total impressions delivered = 57,500

35 commercials aired on WABM-TV at no charge (Value of \$1,400)

Total impressions delivered = 47,300

Total impressions on WBMA-TV, WTTO-TV, and WABM-TV = 1,372,200

Interview on Talk of Alabama (Value of \$800)

Total added value = \$5,650.00

TABLE 16
Marketing Campaign Overview

STATION	Total # of ads	Impressions	Added Value
WBRC-TV	264	7,606,900	\$10,050.00
BOUNCE	60	30,000	\$1,500.00
Circle TV	60	30,000	\$1,500.00
WBMA-TV	127	1,267,400	\$3,050.00
WTTO-TV	30	57,500	\$1,200.00
WABM-TV	35	47,300	\$1,400.00
WIAT-TV	154	60,625	\$6,750.00
TOTAL TV	730	9,099,725	\$25,450.00
Digital/Print			
The Birmingham Times	6 ¼ page ads	6 ¼ page ads plus digital	\$1,200.00
Starnes Publishing	100 digital ads	75,734	\$1,000.00
Total Digital/Print			\$2,200.00
TOTAL ADDED VALUE		9,175,459	\$27,650.00

SECTION 5

EMPLOYER/EMPLOYEE OUTREACH

Advanced Consulting, LLC., working with the APCA on business and community outreach, developed programs to expand the education on air quality issues in Jefferson and Shelby Counties. This synopsis breaks down many different avenues of outreach and information received from corporations, cities, and other groups.

From October 2020 to September 2021, Advanced Consulting continued to work on keeping and building relationships with current corporations. They also worked on getting the message out to the community through community events and programs.

Advanced Consulting spoke to and attended 3 company and civic events virtually and 68 community events. Advanced Consulting also had 4,140 pledge cards signed through the 71 companies, civic groups, and community events attended.

Company Events:

Total Contacts from Virtual Company Events:

02/16/21	UAB Virtual Health Fair	6
02/17/21	UAB Virtual Health Fair	5
02/18/21	UAB Virtual Health Fair	3

Total Contacts from Company Events: 14

Community Events

2020	Event	Attendees	Pledge Cards
Oct 31	Barking at the Moon/ Fultondale	200	104
Nov 7	Moss Rock Festival	750	76
Nov 8	Moss Rock Festival	750	48
Nov 14	Gopher Hole/ Hueytown	300	48
Dec 5	Christmas Village/Calera	200	58
Dec 5	Winter Festival/AL 4H Center	200	68

2020	Event	Attendees	Pledge Cards
Dec 13	Woodlawn Street Festival	200	72
2021	Event	Attendees	Pledge Cards
Jan 23	Cricket Wireless Pop Up/Bessemer	100	36
Jan 30	Birdsong Farmer's Market/Bham	100	34
Feb 6	The Harvest Center/Center Point	100	43
Mar 6	TG Consignment Pop Up	100	41
Mar 20	OTBP Pop UP	200	68
Mar 27	Craftifinds Community Pop Up	200	33
April 9	Reg Library & Arts Council Spring	150	53
April 10	Reg Library & Arts Council Spring	200	72
April 10	Helena Spring Festival	200	41
April 17	Montevallo HS Festival	300	98
April 17	Pepper Place FM	600	106
April 25	Hoover Day	900	108
April 30	Alabama Folk Fair	200	68
May 1	Alabama Folk Festival	200	82
May 1	MHS Auxiliary Annual Montevallo	200	72
May 4	Barron's Game	500	46
May 8	Cahaba Brewery Mother's Day	500	94
May 15	Creekbank Festival Leeds	300	61
May 15	Off the Beaten Path Pop Up	200	61
May 16	Pepper Place Pop Up	300	86
May 22	Lee Branch FM	200	57

J2021	Event	Attendees	Pledge Cards
June 1	Health Fair/ Irondale Senior Ctr	200	60
June 5	Eastlake Fishing Rodeo	300	78
June 6	Vulcan Birthday Bash	500	112
June 12	Trussville FM	200	74
June 15	West Homewood	200	51
June 19	Bessemer FM	100	31
June 24,	I Love America Night	500	123
June 26	Cahabazaar	500	102
June 26	Liberty Days	300	53
June 29	Trussville Market	100	28
July 3	Valleydale FM	100	48
July 9	Pinson FM	200	41
July 10	Helena FM	200	37
July 10	Trussville FM	200	64
July 12	Montevallo FM	100	24
July 13	West Homewood	200	72
July 17	Bessemer FM	100	43
July 21	Vestavia FM	200	44
July 24	Vincent in the Park	500	82
August 1	Lake Wilborn	200	46
August 2	Montevallo FM	200	36
August 3	West Homewood	200	53
August 3	Trussville Market	100	19

2021	Event	Attendees	Pledge Cards
August 7	Be Well Shelby	200	68
August 11	Vestavia FM	200	41
August 13	Ross Bridge FM	200	67
August 14	Valleydale FM	100	38
August 14	Woodlawn Night Street Fest	500	112
August 14	Alabaster Health Fair	200	39
August 15	Pepper Place Pop Up	200	47
August 26	Gardendale FM	100	38
August 28	Ribbon Awareness/ Breast Cancer	200	49
Sept 10	Fall into Wellness	200	69
Sept 11	Paw Palooza Hueytown	300	56
Sept 17	Pinson FM	200	42
Sept 18	Pepper Place	500	83
Sept 18	Hippie Festival	200	63
Sept 19	Rocky Ridge Market	200	74
Sept 25	Autumn on the Avenue	100	49
Sept 25	Bessemer Farmer's Market	100	36

SECTION 6

SCIENCE AND ENVIRONMENTAL EDUCATION OUTREACH

The Johnson Management Group (JMG), in conjunction with the United Way of Central Alabama's (UWCA) Healthy Communities, works with Alabama Partners for Clean Air on science and environmental education outreach in Jefferson and Shelby County school districts.

JMG conducted 16 audits. The following schools were included: West End, Putnam, Huffman Academy, Huffman Middle, Ephesus Academy, Mitchell, Phillips, Wilkerson, Tuggle, Bush Hills, Robinson, Avondale, Barrett, Brown, Arrington, and Central Park. The audits yielded 1453 pieces of APCA literature being handed out and 366 cars shutting off because of the message of turning the key and being idle free.

APCA handouts and giveaways are distributed after each presentation. For those receiving the virtual presentation, gifts are left at the office of each school for teachers to pick up and distribute. Those receiving in-school presentations are gifted after the presentation.

JMG met with administrators and teachers, following up with session dates and introducing the Air Quality Youth Patrol (AQYP) program. The AQYP program is at the early start stages and is being developed. This program identifies students interested in being on air quality and litter patrol at their school(s).

During the Fall 2021 vehicle audits, JMG shared their "Turn the Key to be Idle Free" message with 1453 parents during August and September.

The following graphs summarize the vehicle audits for Birmingham City Schools (see Figure 1, Figure 2, and Figure 3). During August, JMG conducted 565 with 111 parents in compliance at 5 schools. (See Figure 1) The following month, September, 888 audits were conducted with 249 parents complying at 10 schools. (See Figure 2) Figure 3 displays the total number of vehicle audits and parental compliance for both months.

FIGURE 3
JMG Outreach August 2021

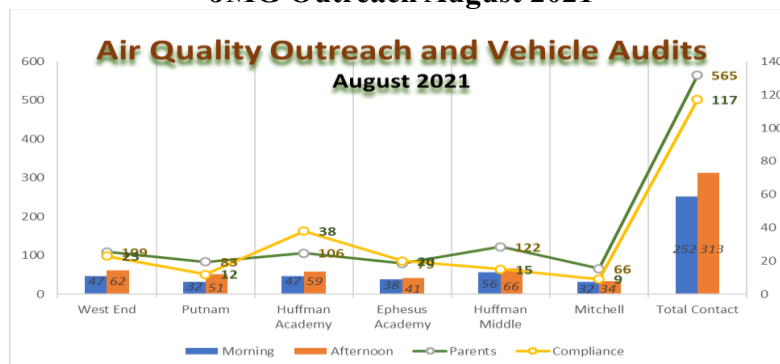


FIGURE 4
JMG Outreach September 2021

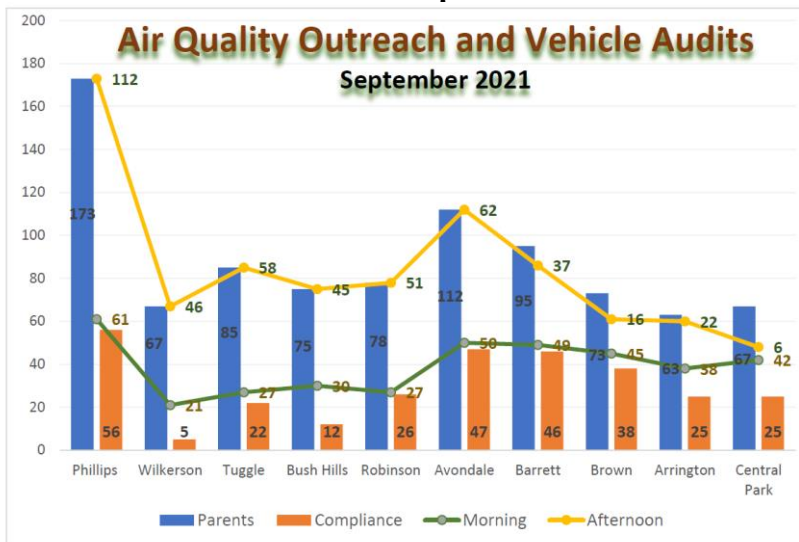
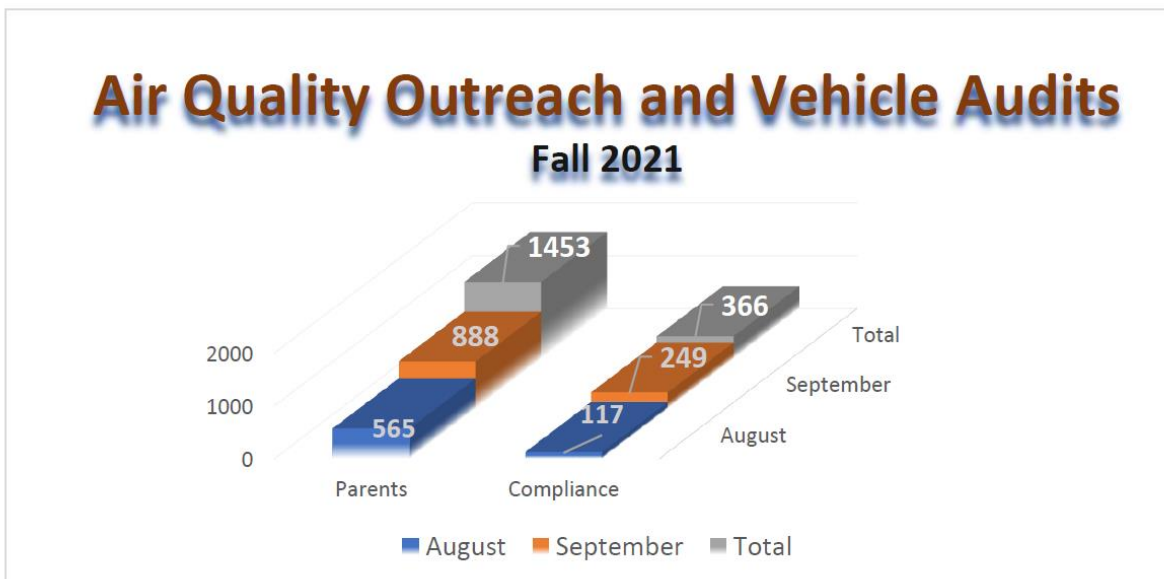


FIGURE 5
JMG Vehicle Audits and Compliance
Fall 2021



United Way of Central Alabama Healthy Communities Annual Report

United Way of Central Alabama's (UWCA) Healthy Communities supports active modes of transportation and safe routes for non-drivers. The UWCA Healthy Communities initiative has undertaken this work because it has numerous benefits, including increasing physical activity, improving air quality, increasing safety, traffic mitigation, and increased community engagement.

Healthy Communities' effort includes a school-oriented program to educate and encourage students on healthy lifestyle choices and working directly with cities to find ways to improve the physical environment to be more conducive for walking and biking. Included in our education and encouragement activities are walk and bicycle events both at the school and in the community. In support of these events, we distribute flyers, which note routes that have supportive active transportation infrastructure, and include information about how transportation-based decisions impact air quality.

In 2020-21, through various community events, Healthy Communities impacted 102 participants through 13 events. UWCA accomplishments include the highlights below:

- Due to COVID, we did not host in-person events during the 2020-21 school year. We did pilot a new online curriculum with Birmingham City Schools but had limited outcomes.
- Plans were to roll out a new, public-at-large online format to teach the ABC Check program (Air, Brakes, and Cranks) along with clean air talking points in Spring 2021. However, program staff resigned in November 2020, and the majority of program activities were put on hold until new staffing was identified.
- During summer 2021, we resumed some in-person educational events. A bike rodeo was conducted at C.J. Donald Elementary summer camp on June 14 in partnership with Alabama Cooperative Extension Services using COVID safety protocols. 29 campers participated and 9 staff/volunteers.
- A bike rodeo was hosted by the Three Rivers District – Greater Alabama Boy Scouts on August 21 at the Shops at Grand River. There were 40 participants in the bike rodeo.

FIGURE 6
UWCA Bicycle Rodeos



This page was intentionally left blank.

SECTION 7

CLEAN CITIES/ALTERNATIVE FUELS

This report summarizes the activities and accomplishments of the Alabama Clean Fuels Coalition, Inc. (ACFC) as a participating partner in the Alabama Partners for Clean Air (APCA) Voluntary Air Quality Program (the Program). The report includes ACFC activities and accomplishments related to alternative fuel, diesel retrofit, and APCA Program support activities during the reporting period for the following program areas:

1. Promoting and facilitating the use of alternative fuels and the installation of alternative fuel infrastructure in Jefferson and Shelby Counties.
2. Managing a regional diesel retrofit program in Jefferson and Shelby Counties.
3. Creating “Clean Corridors” that traverse the Birmingham Region.
4. Participating in the U.S. Department of Energy Clean Cities Program as a designated coalition for the region.
5. Providing the RPC/MPO technical assistance and review of APCA program monitoring and evaluation, compiling data on the allocation of CMAQ funds and expected air quality benefits.
6. Assisting the APCA partnership in the implementation of program goals and objectives, promotions, and activities in various community sectors in Jefferson and Shelby Counties.

During FY20201, alternative fuel usage in Jefferson and Shelby Counties totaled 4,443,036 gallons or GGE’s (gasoline gallon equivalent). This included approximately 134,454 gallons of E85 Ethanol; 45,567 GGE’s of Propane; 1,925,780 GGE’s of CNG; 2,335,236 GGE’s of electricity, representing approximately 19.8 million electric miles driven; and 1,909 GGE’s of electricity from the use of Alabama based Zero RPM idle reduction technologies. These cleaner-burning fuels and idle reduction technologies provided emission reduction benefits to the region. In addition, previously completed ACFC diesel retrofit projects provided ongoing emissions reduction benefits for Jefferson and Shelby Counties during this reporting period.

Transportation-related alternative fuel usage in the region increased approximately 53.4% from FY2020. This increase is primarily attributable to an increase in the use of electricity for transportation fuel and because of having more current and accurate EV registration information for the region. Local fleets using alternative fuels during this reporting period included: the City of Birmingham (E85, Propane, & Idle Reduction Technology), the Alabama Department of Transportation Third Division (E85 Ethanol), the Birmingham-Jefferson County Transit Authority (CNG), the City of Trussville (CNG), Alabama Power Company (Electricity & Idle Reduction Technologies), Veal Convention Services (Propane), Evergreen Transportation (CNG), Regions Bank (Propane & Electricity), Melton Automotive, the University of Alabama at Birmingham (Electricity), Lawson State Community College (CNG), Birmingham City Schools (Propane), Waste Management (CNG), and Spire Alabama - formerly Alabama Gas Corporation (CNG).

During the reporting period, ACFC remained active in promoting the use of retail stations in Jefferson and Shelby counties that offer alternative fuels for sale to the public. E85 Ethanol is

available in Jefferson County at the Dogwood Shell in Vestavia and Shelby County at the Highway 280 Shell near Valleydale Road. CNG also continued to be available at the Birmingham-Jefferson County Transit Authority's public access CNG refueling station in Birmingham, at Evergreen Transportation in Calera, and at the McCullough Oil Chevron in Trussville (until this station was sold during the reporting period and the new owner discontinued CNG fueling for the public). LNG continued to be available throughout the reporting period at the Clean Energy Fuels station on Daniel Payne Drive. However, the company would not provide fuel usage information for this station, which has exceeded 50,000 GGEs in previous years. Although we estimate usage at this station in FY2021 to be like previous years, no LNG volumes have been included in the alternative fuel usage totals reported herein for Jefferson and Shelby Counties. EV charging is available at many public and private charging stations located in the region.

A previously completed ACFC Diesel Retrofit project in Jefferson County reduced approximately 23.175 tons of criteria pollutants during this reporting period (including 4.29 tons of VOCs and 1.65 tons of PM). This project involved the installation of diesel emissions control devices on eleven pieces of medium and heavy-duty off-road equipment operated by three fleets: The City of Homewood, Fritz Enterprises, and Porter Construction. ACFC continued efforts throughout the reporting period to increase alternative fuels use, expand alternative fuel infrastructure, and develop diesel retrofit projects in the region.

ACFC actively assisted the APCA partnership in promoting the program goals and objectives by conducting outreach efforts to community sectors and organizations in Jefferson and Shelby Counties. Due to COVID-19 restrictions, several scheduled outreach events were conducted virtually. These outreach efforts included organizing, planning, and conducting the following: a National Drive Electric Week Event at Pepper Place, an E-School Bus workshop in Shelby County, an alternative fuel informational booth at the Alabama League of Municipalities Annual Meeting, a Drive Electric Earth Day Event at Pepper Place, a Jouley Electric School Bus webinar, an E-School Bus demonstration at Barber's Motorsports Park, and several Tesla owners meet-up events. These efforts also included responding to numerous media and consumer inquiries on alternative fuels and vehicles.

ACFC also attended all APCA Steering Committee meetings during the reporting period and reported on all ACFC projects and activities.

SECTION 8

VOLUNTARY EMISSIONS TESTING PROGRAM

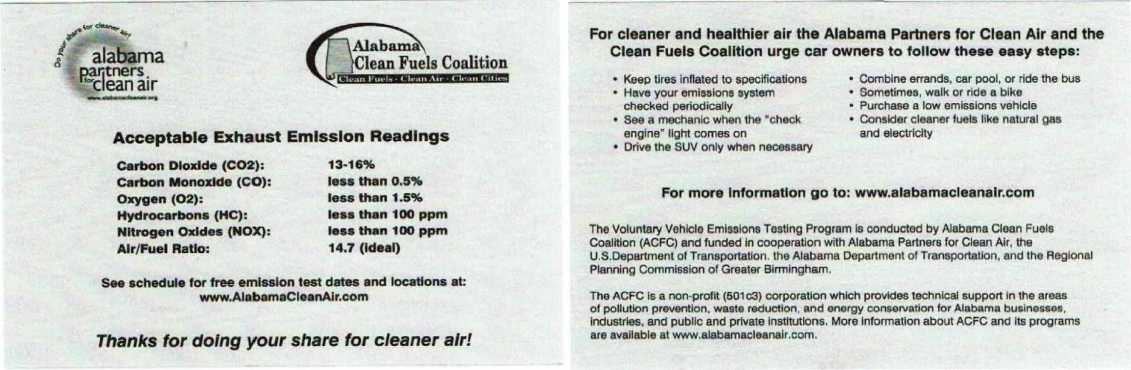
The long-standing APCA Car Care Program began in January of 2008 and has continued annually through 2021.

The program creates public awareness of ground-level ozone pollution by emphasizing the importance of vehicle maintenance primarily for vehicle emission control systems.

Scheduled emissions test dates for FY2020 were suspended at the end of March 2020 due to concern over the CORONA virus pandemic. However, scheduled testing for FY2021 resumed in June 2021. Before June 2021 in place of scheduled emission test dates was the adoption of a “Request and Test” program where Express Oil Change and RPCGB referrals were individually tested and qualified for repair subsidy if indicated.

Testing of vehicle emissions is performed at various Express Oil Change (EOC) locations to identify those vehicles that are contributing to air quality issues in the area. During testing events, vehicle exhaust is analyzed for the regulated pollutants -- unburned hydrocarbons (HC/ppm), carbon monoxide (CO%) and nitrogen oxides (NOx/ppm) -- as well as carbon dioxide (CO2%) and oxygen (O2%) as measures of combustion efficiency. In addition to receiving information from ACFC representatives during testing, owners are given an information card and a copy of the test results for their vehicle. This helps build awareness of the need to control these emissions. Note that acceptable parameters for each gas are listed on the information card and explained to each vehicle owner after the test.

FIGURE 7
Information Card for Vehicle Owners



The image shows a two-page information card for vehicle owners. The left page features logos for 'alabama partners clean air' and 'Alabama Clean Fuels Coalition', a table of acceptable exhaust emission readings, and a website for more information. The right page lists easy steps for cleaner air and provides background on the ACFC program.

Acceptable Exhaust Emission Readings	
Carbon Dioxide (CO ₂):	13-16%
Carbon Monoxide (CO):	less than 0.5%
Oxygen (O ₂):	less than 1.5%
Hydrocarbons (HC):	less than 100 ppm
Nitrogen Oxides (NOX):	less than 100 ppm
Air/Fuel Ratio:	14.7 (ideal)

See schedule for free emission test dates and locations at:
www.AlabamaCleanAir.com

Thanks for doing your share for cleaner air!

For cleaner and healthier air the Alabama Partners for Clean Air and the Clean Fuels Coalition urge car owners to follow these easy steps:

- Keep tires inflated to specifications
- Have your emissions system checked periodically
- See a mechanic when the "check engine" light comes on
- Drive the SUV only when necessary
- Combine errands, car pool, or ride the bus
- Sometimes, walk or ride a bike
- Purchase a low emissions vehicle
- Consider cleaner fuels like natural gas and electricity

For more information go to: www.alabamacleanair.com

The Voluntary Vehicle Emissions Testing Program is conducted by Alabama Clean Fuels Coalition (ACFC) and funded in cooperation with Alabama Partners for Clean Air, the U.S. Department of Transportation, the Alabama Department of Transportation, and the Regional Planning Commission of Greater Birmingham.

The ACFC is a non-profit (501(c)3) corporation which provides technical support in the areas of pollution prevention, waste reduction, and energy conservation for Alabama businesses, industries, and public and private institutions. More information about ACFC and its programs are available at www.alabamacleanair.com.

FIGURE 8

Sample Results Printout for Vehicle Owners

Figure 2 – Sample Results Printout for Vehicle Owners

APCA VEHICLE EXHAUST GAS ANALYSIS
PERFORMED BY ACFC
DATE: _____
VEHICLE: _____
5 GAS RESULTS
CO₂ = 15.1
CO = .01
O₂ = 0.1
HC = 30
NOX = 12

CLEAN

1. For scheduled testing that resumed in June 2021, ACFC used two-man teams working one day per week during the ozone monitoring season from June 2021 through September 2021. One team made measurements using an EMS Model 5002 5-Gas Analyzer and the other used an FGA Model 4000 XDS 5-Gas analyzer. Both analyzers enabled measurement of the vehicles' Air/Fuel ratio as well as the gases listed above. Fifty-foot and 25-ft hoses for probes were used to give team members adequate access to vehicles at all station bays. When appropriate, diagnostic trouble codes (DTC) were read from the vehicle's OBD-II computer with an INNOVA Model 3100 code reader. These codes served to guide the identification of specific emissions control malfunctions.
2. At on-site testing, vehicles identified as having emissions problems were referred to the Car Care Program's repair regimen that may subsidize the repair cost of the vehicle within certain parameters. The goal is to decrease the release of automotive pollutants by encouraging owners to undertake qualified repairs by making these repairs more affordable.

Restrictions and Limitations for Qualification Under the 2021 Car Care Program (CCP)

- CCP pays 80% of repair costs up to a subsidy limit of \$900. The car owner (not a business or third party) must pay the remaining 20% plus any cost exceeding the \$900 limit
- The car must have fewer than 150,000 miles on its odometer
- The car must be 12 years old or less based on the date (mo/yr) manufactured
- The repair must be directly related to diminished control of vehicle emissions (as indicated by exhaust gas analysis and OBD-II code). For example, replacement of mufflers/repairing exhaust leaks are not qualified repairs under the CCP. Typical repairs have included, but are not necessarily limited to, catalytic converters, O₂ sensors, EVAP systems, EGR systems, MAF, and MAP sensors.
- The car must be registered in Jefferson County or Shelby County, or the car owner must be able to prove residency in either Jefferson or Shelby Counties (e.g., address on driver license, address on a pay stub, rental/lease agreement)
- Car owner has 60 days from the date qualified to repair at a participating Express Oil Change facility
- Only one repair qualification is allowed per vehicle

- Cars currently covered under manufacturer's extended warranties are not eligible, e.g., 8yr/80,000mi emissions control device (catalytic converter) warranty
- Fleet or company-owned vehicles are not eligible
- Vouchers issued for repairs have no intrinsic cash value and are not to be bartered or sold.

OVERVIEW STATISTICS

The following statistics apply to the program during the reporting dates October 1, 2020, through September 30, 2021. These statistics represent fewer emission tests than in previous program years due to the suspension of testing during the 2020 COVID pandemic. There were:

- 20 scheduled testing events at EOC locations each staffed by 2 ACFC technicians
- 238 Vehicles Tested (an average of ca.12 vehicles per event)
- Over 1100 data points recorded on-site
- 28 Vehicles Qualified for Repair (about 4% of those tested) and
- 25 qualified vehicles were repaired.

TABLE 17
Cumulative Testing Results for FY2021

Month	Scheduled Events	Number Tested	Qualified	#Repaired
Begin FY2021				
October 2020	0	1	1	1
November 2020	0	1	0	0
December 2020	0	4	4	4
January 2021	0	2	2	2
Feb 2021	0	2	2	2
Mar2021	0	2	1	1
April 2021	0	0	0	0
May 2021	0	1	1	1
June 2021	5	47	6	5
July 2021	5	55	2	3
August 2021	5	60	5	3
September 2021	5	63	4	3
Totals	20	238	28	25

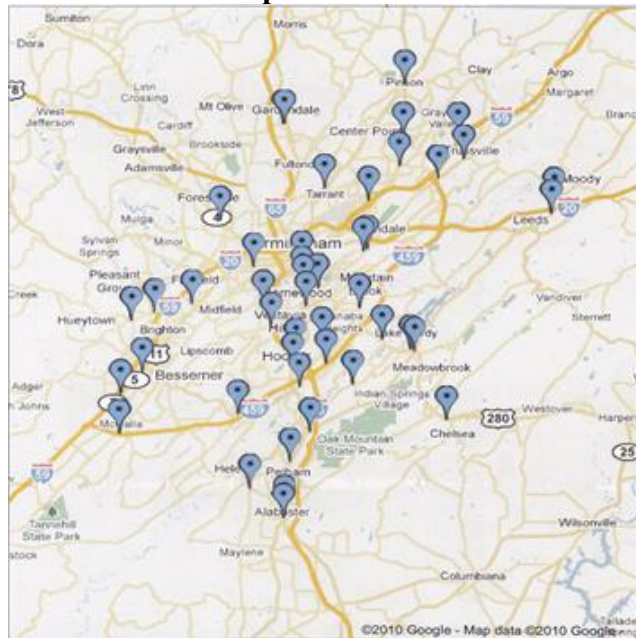
REPAIR STATISTICS

The repairs were performed at various Express Oil Change locations. The average mileage of these vehicles was about 120,000 to 130,000 miles. The total amount of Car Care Program repair expenditures for these vehicles was approximately \$30,000. The average cost per repair was about \$700-\$900 for Car Care. A breakdown of these repairs is shown in Table 18 below (several cars had more than one emissions system repaired during their repair visit):

TABLE 18
Emission System Type and Number of Repairs

Repair	Number Performed
O ₂ Sensor	3
Catalytic Converter	15
EVAP System	6
Other	1
Total	25

FIGURE 9
Map of Test Sites



The map of test sites in Figure 9 above shows the geographic area served by the Car Care Program. The map indicates that the program offered broad and representative coverage of Jefferson and Northern Shelby counties.

AVERAGE COST OF MOST COMMON REPAIRS

Using the vehicles in which only one repair was performed, Table 2. shows the frequency of the three most common emissions repairs and the average cost of these repairs to the Car Care Program (at 80% reimbursement up to \$900) and the total cost of the repair:

TABLE 19
Most Common Repairs

Component	REPAIR	AVG CAR CARE COST	AVG TOTAL COST
Oxygen Sensors	10%	\$300	\$400
Catalytic Converters	60%	\$\$700-\$900	\$1500-\$2000
Evaporative Emission MAP Sensors	25%	\$400	\$500
	<5%	\$500	\$600

CONCLUSION

An important part of the Car Care Program is the education of vehicle owners concerning the need for proper maintenance of their vehicles. A second but equally important step is encouraging owners to repair emissions-related problems when a Fix on Fail (FOF) occurs, i.e., when a malfunction indicator lamp (MIL or Check Engine) is first observed. Prompt attention to these issues can often result in savings on future repairs of more costly items such as O₂ sensors and catalytic converters.

It should be emphasized that the Car Care team is making measurements at idle and not performing an I/M240 (dynamometer) measurement. Vehicles would need to be tested under a “load” (i.e., driving down the interstate or on a dynamometer) to make many problems manifest themselves via exhaust gas analysis alone.

It should also be noted that many states have abandoned the I/M240 test in favor of monitoring the vehicle’s DTC-MIL for certification because it allows a more comprehensive assessment of all functions and interactions of the emissions control system and is much less costly to the car owner. WRATT also makes DTC (OBD-II reads) for confirmation of under-performing emissions control systems. It is important to note that in all cases where repairs were made, the MIL remained off indicating that the emissions problem was successfully mitigated.

FIGURE 10
Typical Emissions Test Events



SECTION 9

DOCUMENTED EMISSIONS REDUCTIONS

Documenting emissions reductions from a voluntary program is dependent upon voluntary reporting or a proxy measurement tool such as a scientific survey. To gauge the emissions impact of the program for 2020 - 2021, RPCGB staff used both methodologies. First, staff calculated emissions reductions based on voluntary reporting of the following activities:

- Decreases in vehicle emission rates due to the different alternative fuel programs.
- Decrease in vehicle miles traveled due to carpooling/vanpooling.

Emissions reductions were also calculated for the public outreach/marketing program based on the results of Air Quality Alert Day surveys. The staff took a very conservative approach to this estimate, calculating only emissions reductions associated with people carpooling in response to an alert day notification.

TABLE 20
- Emission Reductions by Program from October 1, 2020, to September 30, 2021

TIP FY2020 CMAQ Ozone Program Project Potential Emissions Reductions						
#	Project	Emissions, lbs./Day			# of	Note
		VOC	NOx	PM _{2.5}	Days	
1	Marketing/Public Outreach/Surveys including Employer/Employee Outreach, the Policy Exchange Foundation, and Jefferson County Department of Health Air Quality Alert	0.66	2.31	0.09	260	FY 2020
2	Clean Cities/Alternative Fuels-Hoover, Birmingham, Alabaster, Tarrant, BJCTA, ALDOT, Trussville, Alabama Power Company, Alagasco, and other Alternative Fuel Stations	7.14	63.83	7.15	365	Ethanol(E85), Biodiesel B20 & B100, Compressed Natural Gas (CNG), Propane, and Electric
3	Idle Free Zone-UWCA/Johnson Group	1.55	0.26	0.06	180	weekdays
4	Emission Testing/Vehicle Repair- by Alabama Clean Fuels Coalition Car Care Program	0.49	0.08	0.00	365	tested 93 cars in FY 2020 and repaired 20 vehicles
	Maximum Daily Emissions Reductions	9.84	66.49	7.29	365	lbs./day

This page was intentionally left blank.

Appendix A

Alabama Clean Fuel

Coalition Annual Report

This page was intentionally left blank.

**ALABAMA PARTNERS FOR CLEAN AIR
VOLUNTARY AIR QUALITY PROGRAM
CMAQ-NR19, PROJECT # 100070047**

**ALABAMA CLEAN FUELS COALITION, INC.
FY 2021 ANNUAL REPORT
OCTOBER 1, 2020 – SEPTEMBER 30, 2021**

This report summarizes the activities and accomplishments of the Alabama Clean Fuels Coalition, Inc. (ACFC) as a participating partner in the Alabama Partners for Clean Air (APCA) Voluntary Air Quality Program (the Program). The report includes ACFC activities and accomplishments related to alternative fuel, diesel retrofit, and APCA Program support activities during the reporting period for the following program areas:

1. Promoting and facilitating the use of alternative fuels and the installation of alternative fuel infrastructure in Jefferson and Shelby Counties.
2. Managing a regional diesel retrofit program in Jefferson and Shelby Counties.
3. Creating “Clean Corridors” that traverse the Birmingham Region.
4. Participating in the U.S. Department of Energy Clean Cities Program as a designated coalition for the region.
5. Providing the RPC/MPO technical assistance and review of APCA program monitoring and evaluation, compiling data on the allocation of CMAQ funds and expected air quality benefits.
6. Assisting the APCA partnership in the implementation of program goals and objectives, promotions, and activities in various community sectors in Jefferson and Shelby Counties.

During FY2020 alternative fuel usage in Jefferson and Shelby Counties totaled 4,443,036 gallons or GGE’s (gasoline gallon equivalent). This included approximately 134,454 gallons of E85 Ethanol; 45,567 GGE’s of Propane; 1,925,780 GGE’s of CNG; 2,335,236 GGE’s of electricity, representing approximately 19.8 million electric miles driven; and 1,909 GGE’s of electricity from the use of Alabama based Zero RPM idle reduction technologies. These cleaner-burning fuels and idle reduction technologies provided emission reduction benefits to the region. In addition, previously completed ACFC diesel retrofit projects provided ongoing emissions reduction benefits for Jefferson and Shelby Counties during this reporting period.

Transportation-related alternative fuel usage in the region increased approximately 53.4% from FY2020. This increase is primarily attributable to an increase in the use of electricity for transportation fuel and because of having more current and accurate EV registration information for the region. Local fleets using alternative fuels during this reporting period included: the City of Birmingham (E85, Propane, & Idle Reduction Technology), the Alabama Department of Transportation Third Division (E85 Ethanol), the Birmingham-Jefferson County Transit Authority (CNG), the City of Trussville (CNG), Alabama Power Company (Electricity & Idle Reduction Technologies), Veal Convention Services (Propane), Evergreen Transportation (CNG), Regions Bank (Propane & Electricity), Melton Automotive, the University of Alabama at Birmingham

(Electricity), Lawson State Community College (CNG), Birmingham City Schools (Propane), Waste Management (CNG), and Spire Alabama - formerly Alabama Gas Corporation (CNG).

During the reporting period, ACFC remained active in promoting the use of retail stations in Jefferson and Shelby counties that offer alternative fuels for sale to the public. E85 Ethanol is available in Jefferson County at the Dogwood Shell in Vestavia and Shelby County at the Highway 280 Shell near Valleydale Road. CNG also continued to be available at the Birmingham-Jefferson County Transit Authority's public access CNG refueling station in Birmingham, at Evergreen Transportation in Calera, and at the McCullough Oil Chevron in Trussville (until this station was sold during the reporting period and the new owner discontinued CNG fueling for the public). LNG continued to be available throughout the reporting period at the Clean Energy Fuels station on Daniel Payne Drive. However, the company would not provide fuel usage information for this station, which has exceeded 50,000 GGEs in previous years. Although we estimate usage at this station in FY2021 to be like previous years, no LNG volumes have been included in the alternative fuel usage totals reported herein for Jefferson and Shelby Counties. EV charging is available at many public and private charging stations located in the region.

A previously completed ACFC Diesel Retrofit project in Jefferson County reduced approximately 23.175 tons of criteria pollutants during this reporting period (including 4.29 tons of VOCs and 1.65 tons of PM). This project involved the installation of diesel emissions control devices on eleven pieces of medium and heavy-duty off-road equipment operated by three fleets: The City of Homewood, Fritz Enterprises, and Porter Construction. ACFC continued efforts throughout the reporting period to increase alternative fuels use, expand alternative fuel infrastructure, and develop diesel retrofit projects in the region.

ACFC actively assisted the APCA partnership in promoting the program goals and objectives by conducting outreach efforts to community sectors and organizations in Jefferson and Shelby Counties. Due to COVID-19 restrictions, several scheduled outreach events were conducted virtually. These outreach efforts included organizing, planning, and conducting the following: a National Drive Electric Week Event at Pepper Place, an E-School Bus workshop in Shelby County, an alternative fuel informational booth at the Alabama League of Municipalities Annual Meeting, a Drive Electric Earth Day Event at Pepper Place, a Jouley Electric School Bus webinar, an E-School Bus demonstration at Barber's Motorsports Park, and several Tesla owners meet-up events. These efforts also included responding to numerous media and consumer inquiries on alternative fuels and vehicles.

ACFC also attended all APCA Steering Committee meetings during the reporting period and reported on all ACFC projects and activities.

Appendix B
Jefferson County Department of Health
Annual Report

This page was intentionally left blank.

ALABAMA PARTNERS FOR CLEAN AIR ANNUAL PARTNER ACTIVITY REPORT:

JEFFERSON COUNTY DEPARTMENT OF HEALTH



OCTOBER 2020– SEPTEMBER 2021

Introduction

The Jefferson County Department of Health (JCDH) is a contributing partner of the Alabama Partners for Clean Air (APCA). JCDH also actively participates as a member of the APCA Steering Committee. Matt Lacke, the Meteorologist, serves on the Steering Committee, with Dr. Corey Masuca, Principal Air Pollution Engineer, acting as a proxy. This report serves as an annual composition of activities and actions carried out by JCDH to be included in APCA's annual partner activity report.

JCDH's Air Quality Action Program

The "Air Quality Action Program" at JCDH promotes reducing pollution every day of the year, especially on air quality alert days. The program entails outreach in the local community, as well as, encouraging emission-reducing activities internally.

An important goal of JCDH has been to promote air quality action throughout the Birmingham area. Education about air quality to the public is essential because the Birmingham area has historically been designated as non-attainment for one or more of the criteria air pollutants. JCDH does outreach in the local community at various venues and sometimes in conjunction with APCA. Topics included the state of Birmingham's air quality over time, the Air Quality Index, the different types of pollutants, the health effects of pollution, how weather affects pollution, and what actions to take to reduce pollution.

Air Quality Alerts

The chart below shows a summary of "Air Quality Alerts" that were issued for fine particulate matter (PM_{2.5}) and ozone (O₃) during the period October 2020 – September 2021. "Air Quality Alerts" are forecasted one to two days before the date of the alert. JCDH provides PM_{2.5} forecasts year-round, and the Alabama Department of Environmental Management provides O₃ forecasts during the warm season (approximately mid-April to mid-October) every year. The information listed in the column labeled "Actual AQI Color" is from preliminary data and has not been through QA and QC procedures.

Date of Alert	Forecast AQI Color	Actual AQI Color	Pollutant
5/24/2021	Orange	Yellow	O ₃

Contracts

As part of the larger Memorandum of Agreement between the RPC and JCDH for FY2021 (October 2020 – September 2021), JCDH had two subcontracts as a participating partner of APCA. The Environmental Monitoring for Public Access and Community Tracking (EMPACT) website, which was re-launched in FY2014 as the “Birmingham Air Quality” website, is maintained by the University of Alabama in Huntsville (UAH). The website provides JCDH, the Alabama Department of Environmental Management (ADEM), and the public with near real-time air quality monitoring data for the Birmingham area. Baron Advanced Meteorological Systems (BAMS) provides air quality forecast model data to JCDH and ADEM. Outreach materials were also a part of the FY2021 budget. The details of JCDH’s budget are shown in the table below.

	OCT 2020 – SEP 2021
Birmingham Air Quality Website Maintenance by UAH	\$18,200
BAMS Subscription Meteorological Service	\$48,000
Outreach Giveaways	\$5,800
Total	\$72,000

Air Quality Status

The 8-hour ozone standard (0.070 ppm) was effective on December 28, 2015. EPA designated Jefferson and Shelby Counties as attainment of the 8-hour standard and was effective January 16, 2018. The EPA also has the Birmingham area (Jefferson and Shelby Counties and a portion of Walker County) designated as attainment for the 2006 24-hour PM_{2.5} standard (35 µg/m³). Effective April 15, 2015, the EPA designated the Birmingham area as attainment of the 2013 annual PM_{2.5} standard (12 µg/m³). The Birmingham area is currently designated as attainment of all of EPA’s National Ambient Air Quality Standards through 2020.

Monitoring Data

Air Quality Reports were sent out to members of APCA monthly. These reports include daily AQI information for all monitored criteria air pollutants in the Birmingham area, a listing of alerts that were issued, and daily meteorological data. It should be noted that information in these monthly reports was preliminary and was not put through QA/QC procedures.

Below is detailed ozone and fine particulate matter monitoring data that is used to determine compliance with the Environmental Protection Agency’s (EPA) National Ambient Air Quality Standards. Air monitoring data shown in this report is only through 2020. This is because air

monitoring data is on a calendar year basis (i.e., January 1, 2020 – December 31, 2021) and this report is based on a fiscal year basis (i.e., October 1, 2020 – September 30, 2021).

Ozone

Effective December 28, 2015, EPA lowered the 8-hour ozone standard to 70 parts per billion (ppb). Compliance with the 8-hour standard at each site is determined by a design value that is an average of the 4th highest daily 8-hour ozone value at each site over 3 years. The most recent 3-year monitoring period was 2018-2020. The ozone monitoring network consists of 6 monitors in Jefferson County and 1 monitor in Shelby County. The table below displays the design values for ozone at each monitoring site throughout the Birmingham area. For the monitoring period of 2018-2020, no monitors violated the standard.

8-Hour Ozone Design Values (2018-2020)	
Monitor	Design Value (ppb)
Corner	61
Fairfield	67
Helena	65
Leeds	63
McAdory	66
North Birmingham	66
Tarrant	63*

*Due to not meeting data completeness criteria, the design value is not valid

Fine Particulate Matter (PM_{2.5})

Effective March 18, 2013, the EPA lowered the annual PM_{2.5} standard to 12 µg/m³. A 3-year average of annual means is compared to the annual standard to determine compliance. The 24-hour PM_{2.5} standard is a 3-year average concentration, based on the 98th percentile for each year, and is set at 35 µg/m³. The most recent 3-year monitoring period was 2018-2020. The fine particulate matter (PM_{2.5}) monitoring network consists of 5 monitors throughout Jefferson County. The tables below display the annual and 24-hour design values for PM_{2.5} at each monitor throughout Jefferson County. There were no violations of the annual and 24-hour PM_{2.5} standards for 2018-2020.

Annual PM_{2.5} Design Values (2018-2020)	
Monitor	Design Value (µg/m³)
Arkadelphia	9.8
Leeds	8.6
McAdory	8.5
North Birmingham	10.0
Wylam	8.5

24-Hour PM_{2.5} Design Values (2018-2020)	
Monitor	Design Value (µg/m³)
Arkadelphia	22
Leeds	17

McAdory	16
North Birmingham	22
Wylam	18

Air Quality Exceedances

Below are tables showing the exceedances of the 8-hour ozone standard from 2011 through 2020 and exceedances of the 24-hour PM_{2.5} standard from 2011 through 2019. Note that the EPA lowered the 8-hour ozone standard in 2015 so there was a lower threshold to violate the standard. The 2 exceedances of the 24-hour PM_{2.5} standard in 2020 were due to the influence of Saharan dust.

Exceedances of the 8-Hour Ozone Standard for 2011-2020

Station	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Corner	4	1	1	0	0	1	0	0	1	0
Fairfield	2	5	0	0	2	2	0	1	7	0
Helena	4	4	0	1	2	4	0	1	3	0
Hoover	7	3	0	0	2	2	0			
Leeds	5	4	0	0	0	1	0	1	1	0
McAdory	7	4	0	0	0	2	0	1	5	0
N. Birmingham	5	6	0	0	4	3	1	2	4	0
Pinson	2	3								
Providence	4	2								
Tarrant	9	6	1	0	4	3	1	3	2	1
Total	49	38	2	1	14	18	2	9	23	1

Exceedances of the 24-Hour Fine Particulate Matter (PM_{2.5}) Standard for 2011-2020

Station	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Arkadelphia				0	0	0	0	0	0	1
Leeds	0	0	0	0	0	0	0	0	0	0
McAdory	0	0	0		0	0	0	0	0	0
N. Birmingham	1	0	0	0	0	0	0	0	0	1
Wylam	2	0	0	0	0	0	0	0	0	0
Total	3	0	0	0	0	0	0	0	0	2

This page was intentionally left blank.

Appendix C

Advance Consulting, LLC. Annual Report

This page was intentionally left blank.

Advanced Consulting Annual Report

October 1, 2020 – September 30, 2021

Company Events (Virtual)-	3	
Community Events-	68	
Total Events-	71	
Total Contacts from Virtual Company Events:		14
Total Pledge Cards from Community Events:		4,126
Total Pledge Cards/ Company and Community Events-	4,140	

Company Events:

Total Contacts from Virtual Company Events:

02/16/21	UAB Virtual Health Fair	6
02/17/21	UAB Virtual Health Fair	5
02/18/21	UAB Virtual Health Fair	3

Total Contacts from Company Events: 14

Community Events

2020	Event	Attendees	Pledge Cards
Oct 31	Barking at the Moon/ Fultondale	200	104
Nov 7	Moss Rock Festival	750	76
Nov 8	Moss Rock Festival	750	48
Nov 14	Gopher Hole/ Hueytown	300	48
Dec 5	Christmas Village/Calera	200	58
Dec 5	Winter Festival/AL 4H Center	200	68
Dec 13	Woodlawn Street Festival	200	72

January 2021

Jan 23	Cricket Wireless Pop Up/Bessemer	100	36
--------	----------------------------------	-----	----

Jan 30	Birdsong Farmer's Market/Bham	100	34
February 2021			
02/06/21	The Harvest Center/Center Point	100	43
March 2021			
Mar 6	TG Consignment Pop Up	100	41
Mar 20	OTBP Pop UP	200	68
Mar 27	Craftifinds Community Pop Up	200	33
April 2021			
April 9	Reg Library & Arts Council Spring	150	53
April 10	Reg Library & Arts Council Spring	200	72
April 10	Helena Spring Festival	200	41
April 17	Montevallo HS Festival	300	98
April 17	Pepper Place FM	600	106
April 25	Hoover Day	900	108
April 30	Alabama Folk Fair	200	68
May 2021			
May 1	Alabama Folk Festival	200	82
May 1	MHS Auxiliary Annual Montevallo	200	72
May 4	Barron's Game	500	46
May 8	Cahaba Brewery Mother's Day	500	94
May 15	Creekbank Festival Leeds	300	61
May 15	Off the Beaten Path Pop Up	200	61
May 16	Pepper Place Pop Up	300	86

May 22	Lee Branch FM	200	57
June 2021			
June 1	Health Fair/ Irondale Senior Ctr	200	60
June 5	Eastlake Fishing Rodeo	300	78
June 6	Vulcan Birthday Bash	500	112
June 12	Trussville FM	200	74
June 15	West Homewood	200	51
June 19	Bessemer FM	100	31
June 24,	I Love America Night	500	123
June 26	Cahabazaar	500	102
June 26	Liberty Days	300	53
June 29	Trussville Market	100	28
July 2021			
July 3	Valleydale FM	100	48
July 9	Pinson FM	200	41
July 10	Helena FM	200	37
July 10	Trussville FM	200	64
July 12	Montevallo FM	100	24
July 13	West Homewood	200	72
July 1 7	Bessemer FM	100	43
July 21	Vestavia FM	200	44
July 24	Vincent in the Park	500	82

August 2021

August 1	Lake Wilborn	200	46
August 2	Montevallo FM	200	36
August 3	West Homewood	200	53
August 3	Trussville Market	100	19
August 7	Be Well Shelby	200	68
August 11	Vestavia FM	200	41
August 13	Ross Bridge FM	200	67
August 14	Valleydale FM	100	38
August 14	Woodlawn Night Street Fest	500	112
August 14	Alabaster Health Fair	200	39
August 15	Pepper Place Pop Up	200	47
August 26	Gardendale FM	100	38
August 28	Ribbon Awareness/ Breast Cancer	200	49

September 2021

September 10	Fall into Wellness	200	69
September 11	Paw Palooza Hueytown	300	56
September 17	Pinson FM	200	42
September 18	Pepper Place	500	83
September 18	Hippie Festival	200	63
September 19	Rocky Ridge Market	200	74
September 25	Autumn on the Avenue	100	49
September 25	Bessemer Farmer's Market	100	36

Appendix D

Alabama Clean Fuels Coalition Car Care Annual Report

This page was intentionally left blank.

Alabama Partners for Clean Air

Car Care Program Final Report

October 1, 2020-September 30, 2021

Administered by:

Alabama Clean Fuels Coalition
For the Regional Planning Commission of Greater
Birmingham



200 Century Park South
Birmingham, Alabama
35226

Contact:
Dr. Chip Miller Project Manager
Mr. Wesley Speed Assistant Project Manager
October 30, 2020

This page was intentionally left blank.

PROGRAM DESCRIPTION

The long-standing APCA Car Care Program began in January of 2008 and has continued annually through 2021.

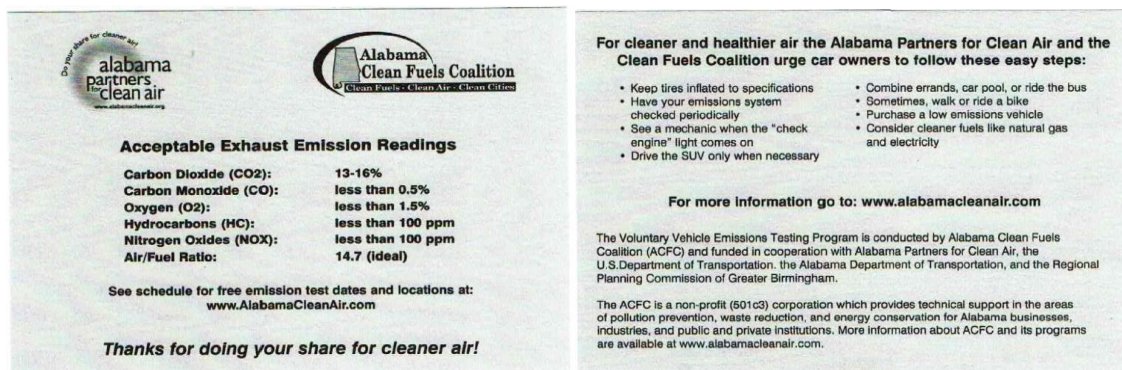
However, scheduled emissions test dates for FY2020 were suspended at the end of March 2020 due to concern over the CORONA virus pandemic. However, scheduled testing for FY2021 resumed in June 2021. Before June 2021 in place of scheduled emission test dates was the adoption of a “Request and Test” program where Express Oil Change and RPCGB referrals were individually tested and qualified for repair subsidy if indicated.

PROGRAM SCOPE

The overall program scope is intended to create public awareness of ground-level ozone pollution by emphasizing the importance of vehicle maintenance primarily for vehicle emission control systems.

Testing of vehicle emissions is performed at various Express Oil Change (EOC) locations to identify those vehicles that are contributing to air quality issues in the Jefferson-Shelby area. During testing events, vehicle exhaust is analyzed for the regulated pollutants -- unburned hydrocarbons (HC/ppm), carbon monoxide (CO%) and nitrogen oxides (NOx/ppm) -- as well as carbon dioxide (CO2%) and oxygen (O2%) as measures of combustion efficiency. In addition to receiving information from ACFC representatives during testing, owners are given an information card and a copy of the test results for their vehicle. This helps build awareness of the need to control these emissions. Note that acceptable parameters for each gas are listed on the information card and explained to each vehicle owner after the test.

Figure 1 – Information Card for Vehicle Owners



The image shows a two-page information card for vehicle owners. The left page features logos for 'alabama partners clean air' and 'Alabama Clean Fuels Coalition'. It lists 'Acceptable Exhaust Emission Readings' for Carbon Dioxide (CO2), Carbon Monoxide (CO), Oxygen (O2), Hydrocarbons (HC), Nitrogen Oxides (NOX), and Air/Fuel Ratio. It also provides a website for scheduling free emission tests and a thank-you message. The right page has a heading about cleaner air and lists easy steps for car owners to follow, such as keeping tires inflated, checking emissions, and combining errands. It also provides the website for more information and a brief description of the ACFC's role.

alabama partners clean air
www.alabamacleanair.org

Alabama Clean Fuels Coalition
Clean Fuels • Clean Air • Clean Engines

Acceptable Exhaust Emission Readings

Carbon Dioxide (CO ₂):	13-16%
Carbon Monoxide (CO):	less than 0.5%
Oxygen (O ₂):	less than 1.5%
Hydrocarbons (HC):	less than 100 ppm
Nitrogen Oxides (NO _x):	less than 100 ppm
Air/Fuel Ratio:	14.7 (ideal)

See schedule for free emission test dates and locations at:
www.AlabamaCleanAir.com

Thanks for doing your share for cleaner air!

For cleaner and healthier air the Alabama Partners for Clean Air and the Clean Fuels Coalition urge car owners to follow these easy steps:

- Keep tires inflated to specifications
- Have your emissions system checked periodically
- See a mechanic when the "check engine" light comes on
- Drive the SUV only when necessary
- Combine errands, car pool, or ride the bus
- Sometimes, walk or ride a bike
- Purchase a low emissions vehicle
- Consider cleaner fuels like natural gas and electricity

For more information go to: www.alabamacleanair.com

The Voluntary Vehicle Emissions Testing Program is conducted by Alabama Clean Fuels Coalition (ACFC) and funded in cooperation with Alabama Partners for Clean Air, the U.S. Department of Transportation, the Alabama Department of Transportation, and the Regional Planning Commission of Greater Birmingham.

The ACFC is a non-profit (501(c)(3)) corporation which provides technical support in the areas of pollution prevention, waste reduction, and energy conservation for Alabama businesses, industries, and public and private institutions. More information about ACFC and its programs are available at www.alabamacleanair.com.

Figure 2 – Sample Results Printout for Vehicle Owners

APCA VEHICLE EXHAUST GAS ANALYSIS
PERFORMED BY WRATT FOUNDATION

DATE: _____

VEHICLE: _____

5 GAS RESULTS

CO₂ = 15.1
CO = .01
O₂ = 0.1
HC = 30
NOX = 12

CLEAN

3. For scheduled testing that resumed in June 2021, ACFC used two-man teams working one day per week during the ozone monitoring season from June 2021 through September 2021. One team made measurements using an EMS Model 5002 5-Gas Analyzer and the other used an FGA Model 4000 XDS 5-Gas analyzer. Both analyzers enabled measurement of the vehicles' Air/Fuel ratio as well as the gases listed above. Fifty-foot and 25-ft hoses for probes were used to give team members adequate access to vehicles at all station bays. When appropriate, diagnostic trouble codes (DTC) were read from the vehicle's OBD-II computer with an INNOVA Model 3100 code reader. These codes served to guide the identification of specific emissions control malfunctions.
4. At on-site testing, vehicles identified as having emissions problems were referred to the Car Care Program's repair regimen that may subsidize the repair cost of the vehicle within certain parameters. The goal is to decrease the release of automotive pollutants by encouraging owners to undertake qualified repairs by making these repairs more affordable.

Restrictions and Limitations for Qualification Under the Car Care Program (CCP)

- CCP pays 80% of repair costs up to a subsidy limit of \$900. The car owner (not a business or third party) must pay the remaining 20% plus any cost exceeding the \$900 limit
- The car must have fewer than 150,000 miles on its odometer
- The car must be 12 years old or less based on the date (mo/yr) manufactured
- The repair must be directly related to diminished control of vehicle emissions (as indicated by exhaust gas analysis and OBD-II code). For example, replacement of mufflers/repairing exhaust leaks are not qualified repairs under the CCP. Typical repairs have included, but are not necessarily limited to, catalytic converters, O₂ sensors, EVAP systems, EGR systems, MAF, and MAP sensors.
- The car must be registered in Jefferson County or Shelby County, or the car owner must be able to prove residency in either Jefferson or Shelby Counties (e.g., address on driver license, address on a pay stub, rental/lease agreement)
- Car owner has 60 days from the date qualified to repair at a participating Express Oil Change facility
- Only one repair qualification is allowed per vehicle
- Cars currently covered under manufacturer's extended warranties are not eligible, e.g., 8yr/80,000mi emissions control device (catalytic converter) warranty

- Fleet or company-owned vehicles are not eligible
- Vouchers issued for repairs have no intrinsic cash value and are not to be bartered or sold.

OVERVIEW STATISTICS

The following statistics apply to the program during the reporting dates October 1, 2020, through September 30, 2021. These statistics represent fewer emission tests than in previous program years due to the suspension of testing during the 2020 COVID pandemic. There were:

- 20 scheduled testing events at EOC locations each staffed by 2 ACFC technicians
- 238 Vehicles Tested (an average of ca.12 vehicles per event)
- Over 1100 data points recorded on-site
- 28 Vehicles Qualified for Repair (about 4% of those tested) and
- 25 qualified vehicles were repaired.

The following table provides a summary of the emissions test statistics for FY2021:

**Table 1. Monthly Cumulative Results:
Monthly & Cumulative Testing Results for FY2021**

Month	Scheduled Events	Number Tested	Qualified	#Repaired
Begin FY2021				
October 2020	0	1	1	1
November 2020	0	1	0	0
December 2020	0	4	4	4
January 2021	0	2	2	2
Feb 2021	0	2	2	2
Mar2021	0	2	1	1
April 2021	0	0	0	0
May 2021	0	1	1	1
June 2021	5	47	6	5
July 2021	5	55	2	3
August 2021	5	60	5	3
September 2021	5	63	4	3
Totals	20	238	28	25

REPAIR STATISTICS

The repairs were performed at various Express Oil Change locations. The average mileage of these vehicles was about 120,000 to 130,000 miles. The total amount of Car Care Program repair expenditures for these vehicles was approximately \$30,000. The average cost per repair

was about \$700-\$900 for Car Care. A breakdown of these repairs is shown in Table 2. below (several cars had more than one emissions system repaired during their repair visit):

TABLE 18
ACFC Repairs

Repair	Number Performed
O ₂ Sensor	3
Catalytic Converter	15
EVAP System	6
Other	1
Total	25

Geographic Area for Emissions Testing

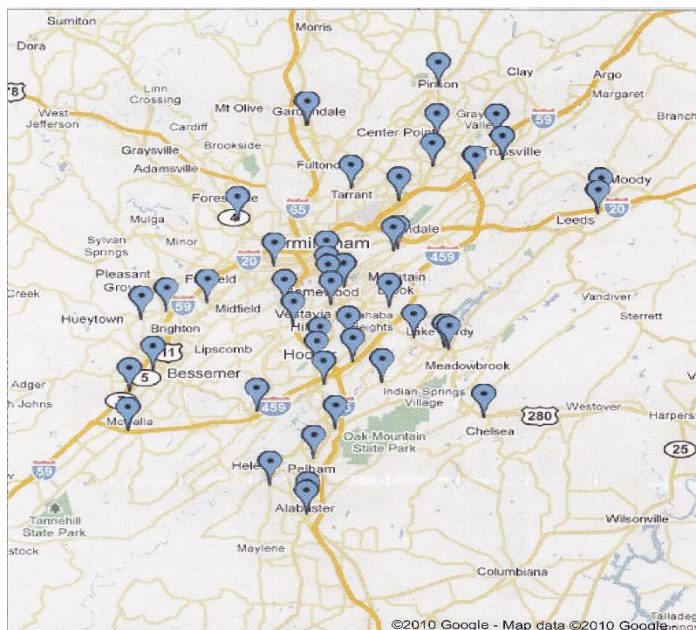


Figure 3. The map of test sites in the figure above shows the geographic area served by the Car Care Program. The map indicates that the program offered broad and representative coverage of Jefferson and Northern Shelby counties.

AVERAGE COST OF MOST COMMON REPAIRS

Using the vehicles in which only one repair was performed, Table 2. shows the frequency of the three most common emissions repairs and the average cost of these repairs to the Car Care Program (at 80% reimbursement up to \$900) and the total cost of the repair:

Table 2 – Approximate Cost of Most Common Repairs

Component	<u>REPAIR</u>	<u>AVG CAR CARE COST</u>	<u>AVG TOTAL COST</u>
Oxygen Sensors	10%	\$300	\$400
Catalytic Converters	60%	\$700-\$900	\$1500-\$2000
Evaporative Emission	25%	\$400	\$500
MAP Sensors	<5%	\$500	\$600

CONCLUSION

An important part of the Car Care Program is the education of vehicle owners concerning the need for proper maintenance of their vehicles. A second but equally important step is encouraging owners to repair emissions-related problems when a Fix on Fail (FOF) occurs, i.e., when a malfunction indicator lamp (MIL or Check Engine) is first observed. Prompt attention to these issues can often result in savings on future repairs of more costly items such as O₂ sensors and catalytic converters.

It should be emphasized that the Car Care team is making measurements at idle and not performing an I/M240 (dynamometer) measurement. Vehicles would need to be tested under a “load” (i.e., driving down the interstate or on a dynamometer) to make many problems manifest themselves via exhaust gas analysis alone.

It should also be noted that many states have abandoned the I/M240 test in favor of monitoring the vehicle’s DTC-MIL for certification because it allows a more comprehensive assessment of all functions and interactions of the emissions control system and is much less costly to the car owner. WRATT also makes DTC (OBD-II reads) for confirmation of under-performing emissions control systems. It is important to note that in all cases where repairs were made, the MIL remained off indicating that the emissions problem was successfully mitigated.

Typical Emissions Test Events



Appendix E

Emissions Reductions Worksheets

This page was intentionally left blank.

Emission Reductions by Ozone Awareness Program from October 1, 2020, to September 30, 2021

TIP FY2021 CMAQ Ozone Program Project Potential Emissions Reductions						
#	Project	Emissions, lbs./Day			# of	Note
		VOC	NOx	PM _{2.5}	Days	
1	Marketing/Public Outreach/Surveys including Employer/Employee Outreach, the Policy Exchange Foundation, and Jefferson County Department of Health Air Quality Alert	1.06	0.68	3.12	260	FY 2021
2	Clean Cities/Alternative Fuels-Hoover, Birmingham, Alabaster, Tarrant, BJCTA, ALDOT, Trussville, Alabama Power Company, Alagasco, and other Alternative Fuel Stations	33.27	93.73	1.55	365	Ethanol(E85), Biodiesel B20 & B100, Compressed Natural Gas (CNG), Propane, and Electric
3	Idle Free Zone-UWCA/Johnson Group	1.11	1.21	0.05	180	weekdays
4	Emission Testing/Vehicle Repair- by Alabama Clean Fuels Coalition Car Care Program	0.43	0.09	0.00	365	tested 238 cars in FY 2021 and repaired 25 vehicles
	Maximum Daily Emissions Reductions	35.87	95.71	4.72	365	lbs./day

This page was intentionally left blank

#1 - VOC, NOx, and PM 2.5 Potential Emission Reduction Worksheet for Project 241, Marketing/Public Outreach/Survey						
on Alert Days for October 1, 2020 - September 30, 2021						1/10/2022
Description	Assumption	Units				
Jefferson County						
Estimated commuters to work[1]	288,229	persons				
Assuming at least two trip reductions per person	2	trips per day				
Number Affected days by Air Quality Campaign/Alert days for FY 2021 season [2]	7	days (weekdays)				
Average trip length for Jefferson County	24.2	miles per trip				
Percentage of people knowing Ozone Alert days[3]	35.29%	%				
Percentage of taking actions among people knowing Out Reach Campaign/Ozone Alert days	57.02%	%				
Percentage out of the 57.02% people taking carpool/bus/telecommuting due to Ozone Awareness	4.62%	%				
Shelby County						
Estimated commuters to work	98,986	persons				
Assuming at least two trip reductions per person	2	trips per day				
Average trip length for Shelby county	15.9	miles per trip				
Percentage of people knowing Ozone Alert day[3]	25.71%	%				
Percentage of taking actions among people knowing Out Reach Campaign/Ozone Alert days	51.85%	%				
Percentage out of the 51.85% people taking carpool/telecommuting due to Ozone Awareness	7.14%	%				
Vehicle trips reduced in Jefferson County per day during Ozone Season [4]	37,513	Vehicle trips/Ozone Season				
Vehicle trips reduced in Shelby County per day during Ozone Season	13,190	Vehicle trips/Ozone Season				
Weekdays per year (D)	260	days/year				
Average daily vehicles in Jefferson County participating	144	vehicles/day				
Average daily vehicles in Shelby County participating	51	vehicles/day				
VOC reduced in Jefferson County[5]	0.370	kg/day				
NOx reduced in Jefferson County	0.251	kg/day				
PM 2.5 reduced in Jefferson County	1.133	kg/day				
VOC reduced in Shelby County[5]	0.110	kg/day				
NOx reduced in Shelby County	0.059	kg/day				
PM 2.5 reduced in Shelby County	0.284	kg/day				
Total VOC reduced (VOCd)[6]	0.480	kg/day				
Total NOx reduced (NOxd)	0.310	kg/day				
Total PM 2.5 Direct emission reduced (PM2.5d)	1.417	kg/day				
Total VOC reduced [6]	1.058	lbs./day				
Total NOx reduced	0.683	lbs./day				
Total PM 2.5 Direct emission reduced	3.124	lbs./day				
Cost Effectiveness = (Annualized Cost) / (Annual Emissions Reduction) --the lower number, the better						
Project life expectancy (n)	1	years				
Discount rate (i)	1%	used by ALDOT				
Capital recover factor (CRF) = $(1+i)^n * i / ((1+i)^n - 1)$	1.01000	capital recovery factor				
Project funding amount, C	\$238,032	capital cost				
Project annual cost (AC) = (C)*(CRF)	\$240,412	\$ per year				
Cost Effectiveness for VOC = (AC) / ((VOCd)*(D))	\$1,926	\$ per kilogram per year				
Cost Effectiveness for NOx = (AC) / ((NOxd)*(D))	\$2,983	\$ per kilogram per year				
Cost Effectiveness for VOC & NOx = (AC) / (((VOCd)+(NOxd))*(D))	\$1,170	\$ per kilogram per year				
Cost Effectiveness for PM 2.5 Direct = (AC)/((PM2.5d)*(D))	\$653	\$ per kilogram per year				
Note: For benefit of emission reductions, Marketing/public outreach, Jefferson County Department of Health EMPACT/Forecast, and the Advanced Consulting/United Way Employer/Employee Outreach are considered as one program.						
[1] 2018 5-year American Community Survey (ACS) Report - Commuters						
[2] There is one alert day in FY 2021 and five days of out reach campaign for air quality awareness. Assuming these days of one day before, the alert day, and two days after will be affected (weekends excluded).						
[3] A Survey of Jefferson and Shelby County Resident Attitudes and Actions, submitted by Connections, Inc.						
[4] Emission reductions due to vehicle trips reduced based on carpool emissions reductions of FHWA CMAQ Emissions Calculator Toolkit for 2021, see below for details.						
[5] Emissions calculated for Jefferson county and Shelby County separately.						

Emissions Reductions in kilograms per day based on FHWA CMAQ Emissions Calculator Toolkit

In Jefferson County

Carpooling

This calculator will estimate the reduction in emissions resulting from carpooling.

Navigator

Carpooling

Vanpooling

INPUT

(1) What is your project evaluation year? [Reset to Default](#)

(2) Are the pick-up/drop-off locations centralized? ☐ Yes

(2a) What is the average round-trip distance participants drive to the central locations? [Enter as roundtrip mileage](#)

(3) Please choose one of the following questions to answer:

(3a) What is the population of commuting workers? ☒ [Input as a percentage](#)

(3b) What is the number of vehicles participating in the carpool program? ☐ [Driver not included](#)

(4) What share of commuters participate in pool? [Enter as roundtrip mileage](#)

(5) On average, how many passengers are there per carpool vehicle?

(6) What is the average commute distance?

Default values based on national averages

OUTPUT [Calculate Output](#)

EMISSION REDUCTIONS

Pollutant	Total (kg/day)
Carbon Monoxide (CO)	15.517
Nitrogen Oxide (NOx)	0.251
Particulate Matter <10 µm (PM ₁₀)	0.061
Particulate Matter <2.5 µm (PM _{2.5})	1.133
Volatile Organic Compounds (VOC)	0.370
Carbon Dioxide Equivalence (CO ₂ e)	2325.502
Total Energy Consumption (MMBTU)	30.574

In Shelby County

Carpooling

This calculator will estimate the reduction in emissions resulting from carpooling.

Navigator

Carpooling

Vanpooling

INPUT

(1) What is your project evaluation year? [Reset to Default](#)

(2) Are the pick-up/drop-off locations centralized? ☐ Yes

(2a) What is the average round-trip distance participants drive to the central locations? [Enter as roundtrip mileage](#)

(3) Please choose one of the following questions to answer:

(3a) What is the population of commuting workers? ☒ [Input as a percentage](#)

(3b) What is the number of vehicles participating in the carpool program? ☐ [Driver not included](#)

(4) What share of commuters participate in pool? [Enter as roundtrip mileage](#)

(5) On average, how many passengers are there per carpool vehicle?

(6) What is the average commute distance?

Default values based on national averages

OUTPUT [Calculate Output](#)

EMISSION REDUCTIONS

Pollutant	Total (kg/day)
Carbon Monoxide (CO)	3.837
Nitrogen Oxide (NOx)	0.059
Particulate Matter <10 µm (PM ₁₀)	0.014
Particulate Matter <2.5 µm (PM _{2.5})	0.284
Volatile Organic Compounds (VOC)	0.110
Carbon Dioxide Equivalence (CO ₂ e)	544.842
Total Energy Consumption (MMBTU)	7.158

70

#2 - VOC, NOx, and PM 2.5 Potential Reduction Worksheet for Project 241Clean Cities/Alternative Fuels			
Jefferson and Shelby Counties Alternative Fuels from October 1, 2020 to September 30, 2021			1/10/2022
Description	Assumption	Note	
(1) Gasoline gallon equivalent of ethanol E85[1]	134,454	gallons for fiscal year 2021	
Gasoline gallon equivalent of biodiesel B20	0	gallons for fiscal year 2021	
Gasoline gallon equivalent of biodiesel B100	0	gallons for fiscal year 2021	
Gasoline gallon equivalent of Hydrogen	0	gallons for fiscal year 2021	
Gasoline gallon equivalent of Compressed Natural Gas (CNG) for Transit bus	802,425	gallons for fiscal year 2021	
Gasoline gallon equivalent of CNG for other bus/truck	1,123,355	gallons for fiscal year 2021	
Gasoline gallon equivalent of Liquefied petroleum gas (LPG)	45,567	gallons for fiscal year 2021	
Gasoline gallon equivalent of all Electric Car and Plug in Hybrid (see VMT below)	854,998	gallons for fiscal year 2021	
(2) Estimated vehicle miles traveled and vehicle trips			
Assuming average vehicle miles per gallon for Transit bus	6.0	miles per gallon	
Assuming average vehicle miles per gallon for truck	7.8	miles per gallon	
Assuming average vehicle miles per gallon for passenger vehicles	23.6	miles per gallon	
Average trips distance for Transit Bus	10.0	miles per trip	
Average travel distance for passenger vehicle trip	19.1	miles per trip	
Average trip distance for truck in the MPO area (for one-way trip)	38.1	miles per trip	
Estimated bus miles traveled (VMTcngbus) based on CNG [2]	4,814,550	vehicle miles per year	
Estimated vehicle (truck) miles traveled (VMTcngv) based on CNG	8,762,169	vehicle miles per year	
Estimated vehicle (truck) miles traveled (VMTlpgv) based on LPG	355,423	vehicle miles per year	
Estimated passenger vehicle miles traveled(VMTe85) based on ethanol (E85)	3,173,114	vehicle miles per year	
Estimated passenger vehicle miles traveled (VMTelectric) based on electric cars and plug in Hybrid [1]	19,350,280	vehicle miles per year	
Operating days per year	365	days/year	
Vehicle trips of Transit Buses (301 days per year including Saturday services)	1,600	trips/working day	
Bus service hours per day	15	hours/day	
Numbers of Transit Buses in operation (CNG)	101	buses	
Vehicle trips of trucks (CNG, 260 working days)	885	trips/working day	
Equivalent numbers of Trucks (CNG), 2 trips per day per vehicle	442	trucks	
Vehicle trips of trucks (LPG, 260 working days)	36	trips/working day	
Equivalent numbers of Trucks (LPG), 2 trips per day per vehicle	18	trucks	
Vehicle trips of ethanol vehicles	455	trips/day	
Equivalent numbers of Vehicles (Ethanol), 2 trips per day per vehicle	228	vehicles	
Total vehicle trips of electric cars	2,776	trips/day	
Equivalent numbers of Electric cars, 2 trips per day per vehicle	1,388	vehicles	
(3) Total daily Vehicle Mile Traveled reductions	0	vehicle miles per year	
(4) Potential Emission Reductions: alternative fuel			
(a) Diesel & CNG bus emissions [3]			
Bus VOC emission difference after converting Diesel to CNG, VOCbus	-0.142	kilograms/day (2021)	
Bus NOx emission difference after converting from Diesel to CNG, Noxbus	2.267	kilograms/day (2021)	
Bus PM 2.5 emission difference after converting from Diesel to CNG, PM25bus	0.339	kilograms/day (2021)	
(b) Estimated emissions reduction for CNG trucks			
Truck VOC emission difference using CNG, VOCt	0.000	kilograms/day (2021)	
Truck NOx emission difference using CNG, Noxt	16.760	kilograms/day (2021)	
Truck PM 2.5 emission difference using CNG, PM25t	0.000	kilograms/day (2021)	
(c) Estimated emissions reduction for LPG trucks			
Truck VOC emission difference using LPG, VOCt	0.000	kilograms/day (2021)	
Truck NOx emission difference using LPG, Noxt	0.000	kilograms/day (2021)	
Truck PM 2.5 emission difference using LPG, PM25t	0.000	kilograms/day (2021)	

(d) E85 emissions of passenger vehicles [4]			
VOC emissions for gasoline passenger vehicles		2.150	kilograms/day (2021)
NOx emissions for gasoline passenger vehicles		3.315	kilograms/day (2021)
PM 2.5 emissions for gasoline passenger vehicles		0.067	kilograms/day (2021)
VOC emissions for E85 passenger vehicles		0.041	kilograms/day (2021)
NOx emissions for E85 passenger vehicles		0.053	kilograms/day (2021)
PM 2.5 emissions for E85 gasoline passenger vehicles		0.000	kilograms/day (2021)
VOC Emissions reductions from E85 over gasoline passenger vehicles, VOCe		2.109	kilograms/day (2021)
NOx Emissions reductions from E85 over gasoline passenger vehicles, Noxe		3.262	kilograms/day (2021)
PM 2.5 Emissions reductions from E85 over gasoline passenger vehicles, PM2.5e		0.067	kilograms/day (2021)
(e) Electric car emissions and regular gas passenger vehicles [5]			
VOC emissions for gasoline passenger vehicles		13.122	kilograms/day (2021)
NOx emissions for gasoline passenger vehicles		20.225	kilograms/day (2021)
PM 2.5 emissions for gasoline passenger vehicles		0.417	kilograms/day (2021)
Electric car emissions, VOC		0.000	kilograms/day (2021)
Electric car emissions, NOx		0.000	kilograms/day (2021)
Electric car emissions, PM 2.5		0.120	kilograms/day (2021)
VOC Emissions reductions from electric car over gasoline passenger vehicles, VOCae		13.122	kilograms/day (2021)
NOx Emissions reductions from electric car over gasoline passenger vehicles, Noxae		20.225	kilograms/day (2021)
PM 2.5 Emissions reductions from electric car over gasoline passenger vehicles, PM2.5ae		0.297	kilograms/day (2021)
(5) VOC emissions reduced		15.089	kilograms per day
NOx emissions reduced		42.514	kilograms per day
PM 2.5 Direct emissions reduced		0.703	kilograms per day
VOC emissions reduced in lbs. per day, 1 kilogram = 2.2046 lbs.		33.27	lbs. per day
NOx emissions reduced in lbs. per day		93.73	lbs. per day
PM 2.5 Direct emissions reduced in lbs. per day		1.55	lbs. per day
(4) Cost Effectiveness = (Annualized Cost) / (Annual Emission Reduction)---the lower number, the better			
Project life expectancy (n)		1	years
Discount rate (i)		1%	used by ALDOT
Capital recover factor (CRF) = $(1+i)^n * i / ((1+i)^n - 1)$		1.01000	capital recovery factor
Project funding amount [6]		\$447,842	capital cost
Project annual cost (AC) = (C)*(CRF)		\$452,320	\$ per year
Number of days project affected (D)	1	365	days for 1 year
Cost Effectiveness for VOC = $(AC) / ((VOC)*(D))$		\$82.13	\$ per kilogram per year
Cost Effectiveness for NOx = $(AC) / ((NOx)*(D))$		\$29.15	\$ per kilogram per year
Cost Effectiveness for VOC & NOx = $(AC) / (((VOC)+(NOx))*(D))$		\$21.51	\$ per kilogram per year
Cost Effectiveness for PM 2.5 = $(AC) / ((PM2.5)*(D))$		\$1,762.78	\$ per kilogram per year
Source: Alabama Partners for Clean Air (APCA), Annual Activity report October 1, 2020 to September 30, 2021.			
[1] APCA Alternative Fuel Summary 2021			
[2] (Estimated Vehicle Miles Traveled) = (Gasoline gallon equivalent) x (Miles per gallon)			
[3] FHWA CMAQ Emissions Calculator Toolkit			
[4] & [5] The emission inventory of each fuel group based on MOVES3 project level runs.			
[6] Total project cost = Federal funds + local matches if needed			

Emissions Reductions of Alternative Fuel for CNG Buses based on FHWA CMAQ Emissions Calculator Toolkit

This calculator will estimate the reduction in emissions resulting from the replacement of a transit bus. It does not consider lifecycle emissions, particularly any emissions outside of vehicle operations.

INPUT

User Guide

(1) What is your project evaluation year? [Reset to Default Values](#)

(2a) What activity data do you have?
Note: You must enter at least one value for transit bus activity

☒ Fleet Activity
☒ Vehicle Miles Traveled (VMT)
☐ Vehicle Population

(2b) Input the annual activity for the total number of transit buses to be replaced
 Annual Total Vehicle Miles Traveled
 Annual Transit Bus Population

(3) What is the model year of the transit buses you are replacing?

(4) Which fuel are you replacing?

(5) What is the model year of the replacement transit buses?

(6) What fuel will the replacement transit buses use?

OUTPUT

Calculate Output

FLEET PERFORMANCE

Last Updated: 2/8/2022 11:35:43 AM

Annual Activity for Replacement Transit Buses

Annual Total Vehicle Miles Traveled
 Annual Transit Bus Population
 Annual Miles Traveled per Vehicle

EMISSION REDUCTIONS

Pollutant	Total kg/day
Carbon Monoxide (CO)	-37.432
Particulate Matter <2.5 µm (PM _{2.5})	0.339
Particulate Matter <10 µm (PM ₁₀)	0.368
Nitrogen Oxide (NOx)	2.267
Volatile Organic Compounds (VOC)	-0.142
Carbon Dioxide Equivalence (CO ₂ e)	2,545.239
Total Energy Consumption (TEC)	-7.799

Emissions Reductions of Alternative Fuel for CNG Trucks based on FHWA CMAQ Emissions Calculator Toolkit

CMAQ Emissions Calculator Toolkit

Unrestricted Access Alternative Fuel Infrastructure

This calculator will estimate the reduction in emissions resulting from developing alternative fuel infrastructure with unrestricted access. The calculator does not consider lifecycle emissions, particularly it refrains from estimating any emissions that may occur outside of vehicle operations. Note that this calculator does not apply to transit buses, which are included in a separate tool.

Navigator

- On-Road Alternative Fuel Vehicle Purchase
- Restricted Infrastructure
- Unrestricted Infrastructure

INPUT

User Guide

(1) What is your project evaluation year? [Reset Inputs](#)

(2) Please input the estimated number of vehicles in your study area

(3) Which alternative fuel will be supplied at this new infrastructure?

(4) Please enter the projected market share of replacement alternative fuel vehicles after construction of the new infrastructure
 %

(5) Please unselect below any vehicle source type(s) that will not have alternative fuel vehicle purchases and then click the button to fill the table with default estimates for populations and activity per vehicle

[Fill Table](#)

Vehicle Source Type	Average Annual Miles Traveled Per Vehicle	Number of Existing Conventional Fuel Vehicles	Number of Replacement Alternative Fuel Vehicles Projected
<input type="checkbox"/> Passenger Car	0	0	0
<input type="checkbox"/> Passenger Truck	0	0	0
<input type="checkbox"/> Light Commercial Truck	0	0	0
<input type="checkbox"/> School Bus	0	0	0
<input checked="" type="checkbox"/> Refuse Truck	22794	361	18
<input checked="" type="checkbox"/> Single Unit Short-Haul Truck	14666	8241	402
<input checked="" type="checkbox"/> Single Unit Long-Haul Truck	21796	459	22
<input type="checkbox"/> Combination Short-Haul Truck	0	0	0
<input type="checkbox"/> Combination Long-Haul Truck	0	0	0
TOTAL		9061	442

Note: users may overwrite default values in the table with local estimates where applicable

OUTPUT

Calculate Output

EMISSION REDUCTIONS

Pollutant	Total kg/day
Carbon Monoxide (CO)	-175.158
Nitrogen Oxide (NOx)	16.760
Particulate Matter <2.5 µm (PM _{2.5})	0.000
Particulate Matter <10 µm (PM ₁₀)	0.000
Volatile Organic Compounds (VOC)	0.000

Unrestricted Access Alternative Fuel Infrastructure

This calculator will estimate the reduction in emissions resulting from developing alternative fuel infrastructure with unrestricted access. The calculator does not consider lifecycle emissions, particularly it refrains from estimating any emissions that may occur outside of vehicle operations. Note that this calculator does not apply to transit buses, which are included in a separate tool.

Navigator

- On-Road Alternative Fuel Vehicle Purchase
- Restricted Infrastructure
- Unrestricted Infrastructure

INPUT

(1) What is your project evaluation year?
2021

(2) Please input the estimated number of vehicles in your study area
3,061

(3) Which alternative fuel will be supplied at this new infrastructure?
Propane (LPG)

(4) Please enter the projected market share of replacement alternative fuel vehicles after construction of the new infrastructure
0.20 %

(5) Please unselect below any vehicle source type(s) that will not have alternative fuel vehicle purchases and then click the button to fill the table with default estimates for populations and activity per vehicle

Vehicle Source Type	Average Annual Miles Traveled Per	Number of Existing Conventional Fuel Vehicles	Number of Replacement Alternative Fuel
<input type="checkbox"/> Passenger Car	0	0	0
<input type="checkbox"/> Passenger Truck	0	0	0
<input checked="" type="checkbox"/> Light Commercial Truck	12038	7239	14
<input type="checkbox"/> School Bus	0	0	0
<input type="checkbox"/> Refuse Truck	0	0	0
<input checked="" type="checkbox"/> Single Unit Short-Haul Truck	14666	1822	4
<input type="checkbox"/> Single Unit Long-Haul Truck	0	0	0
<input type="checkbox"/> Combination Short-Haul Truck	0	0	0
<input type="checkbox"/> Combination Long-Haul Truck	0	0	0
TOTAL		9061	18

ote: users may overwrite default values in the table with local estimates where applicab

OUTPUT

EMISSION REDUCTIONS

Pollutant	Total kg/day
Carbon Monoxide (CO)	0.000
Nitrogen Oxide (NOx)	0.000
Particulate Matter <2.5 µm (PM _{2.5})	0.000
Particulate Matter <10 µm (PM ₁₀)	0.000
Volatile Organic Compounds (VOC)	0.000

The emission inventory of Ethanol and Electric cars based on MOVES3 project level runs.

There are 0.6 mile CBD non-freeway at the average speed 15.8mph with 3 signalized intersections, 14.1 mile freeway fat 65.6mph, and 3.4 mile nonfreeway at 29.2mph with 2 signalized intersection. Operating mode option is 108 for starts, 12 for approaching/departing in CBD, and 22 for approaching/departing in other nonfreeway.

455 Regular Passenger vehicles for all Links

Road	NOx	Total_PM25	Brake_PM25	Tire_PM25	VOC
1	315	9	0	0	469
4	2325	30	2	6	575
5	675	9	7	4	1106

VOC	2.15 kilograms
Nox	3.315 kilograms
PM 2.5	0.067 kilograms

455 Ethanol cars for all Links

Road	NOx	Total_PM25	Brake_PM25	Tire_PM25	VOC
1	5	0	0	0	9
4	38	0	0	0	7
5	10	0	0	0	25

VOC	0.041 kilograms
Nox	0.053 kilograms
PM 2.5	0 kilograms

2776 Regular cars for all Links.

Road	NOx	Total_PM25	Brake_PM25	Tire_PM25	VOC
1	315	9	0	0	469
4	2325	30	2	6	575
5	675	9	7	4	1106

VOC	13.122 kilograms
Nox	20.225 kilograms
PM 2.5	0.417 kilograms

2776 Electric cars for all Links.

Only brake and tire PM 2.5 emissions and no other eimissions, no emissions when starts.

VOC	0 kilograms
Nox	0 kilograms
PM 2.5	0.12 kilograms

#3 - VOC, NOx, and PM 2.5 Potential Reduction Worksheet for Project 241: Idle Free Zones			
Encouraging parents sit in idling car in pick up waiting zone to turn off engines by UWCA/Johnson Group			1/10/2022
1. Criteria & Assumptions			
	Description	Assumption	Note
(1) Data collection and assumptions			
# of Schools involved		29	
Total # of Carpools (C) ^[1]		700	cars
Target % of carpools will be switched to shutting off engine (P) ^[2]		88%	%
Total # of cars whose engine shut off due to program (TV) = (C) x (P)		613	vehicles
Average waiting time (T)		0.70	hour
# of picking up per day (DP)		1	times per day per vehicle
VOC idling emissions (Rvoc) ^[3]		1113.0	grams/idle hour
NOx idling emissions (Rnox)		1440.0	grams/idle hour
PM 2.5 idling emissions (PMf)		40.2	grams/idle hour
VOC start up emissions (Svoc)		274.0	grams/starts
NOx start up emissions (Snox)		457.0	grams/starts
PM 2.5 start up emissions (PMs)		6.6	grams/starts
(2) Emission reduction calculations			
VOC emissions reduced per day (VOC r) = ((T) x (Rvoc) - (Svoc)) x (DP)/1,000		0.505	kilograms/day
NOx emissions reduced per day (NOx r) = ((T) x (Rnox) - (Snox)) x (DP)/1,000		0.551	kilograms/day
PM 2.5 emissions reduced (PM) = (TV) x ((T) x (PMf) - (PMs)) x (DP)/1,000		0.022	kilograms/day
VOC emissions reduced per day (VOC r) in lbs., 1kilogram = 2.2046lbs.		1.114	lbs./day
NOx emissions reduced per day (NOx r) in lbs.		1.215	lbs./day
PM 2.5 emissions reduced (PM) in lbs.		0.048	lbs./day
(3) VMT reductions		0.00	vehicle miles/day
(4) Cost Effectiveness = (annualized cost) / (annual emission reduction)-- the lower number, the better			
Project life expectancy (n)		1	years
Discount rate (i)		1%	used by ALDOT
Capital recover factor (CRF) = $(1+i)^n * (i) / ((1+i)^n - 1)$		1.01000	capital recovery factor
Project funding amount (C)		\$75,576	capital cost
Project annual cost (AC) = (C)*(CRF)		\$76,332	\$ per year
Number of days project affected per year (Day)		180	days per year
Cost Effectiveness for VOC = (AC) / ((VOC r)*(Day))		\$840	\$ per kilogram per year
Cost Effectiveness for NOx = (AC) / ((NOx r)*(Day))		\$770	\$ per kilogram per year
Cost Effectiveness for total of VOC & NOx = (AC) / (((VOCr)+(NOxr))*(Day))		\$402	\$ per kilogram per year
Cost Effectiveness for PM 2.5 = (AC) / ((PM)*(Day))		\$19,681	\$ per kilogram per year
Note: Assumptions and Methodology are based on A Guide for Estimating the emission Effects and Cost-Effectiveness of projects Proposed for CMAQ Funding			
Prepared for Birmingham Regional Planning Commission, Prepared by ICF Consulting, August 9, 2002			
[1]: Source: estimates based on the participants			
[2]: Estimated target after program			
[3]: Estimated passenger vehicle idle emissions and start emissions for parking 60 minutes or less, based on project level emissions of MOVES3			
(turn off engine, park car, pick up child from school, and restart car. Assume average time is about 42 minutes. Emissions is given for a weekday of April 2021)			

Emission Reductions in Grams from MOVES3 Project Level Emission Analysis

Header

Body

Decode

Road	NOx	Total_PM25	VOC
1	457	5	274
5	1440	40	1113

Links input file for MOVES3 Project Level Emission Analysis

linkID	countyID	zoneID	roadTypeID	linkLength	linkVolume	linkAvgSpeed	linkDescription	linkAvgGrade
1	1073	10730	5	0	613	0	Idle Link	0
2	1073	10730	1	0	613	0	off-network start	0

Link Source Types input file for MOVES3 Project Level Emission Analysis

linkID	sourceTypeID	sourceTypeHourFractio
1	21	0.59
1	31	0.41

Off-Network input file for MOVES3 Project Level Emission Analysis

zoneID	sourceTypeID	vehiclePopulation	startFraction	extendedId	parkedVehicleFraction
10730	21	362	1	0	0
10730	31	251	1	0	0

Operating Mode Distribution input file for MOVES3 Project Level Emission Analysis

sourceType	hourDayID	linkID	polProcessID	opModelID	opModeFractio
21	165	2	302	103	1
21	165	2	316	103	1
21	165	2	8702	103	1
21	165	2	8716	103	1
21	165	2	11002	103	1
21	165	2	11016	103	1
31	165	2	302	103	1
31	165	2	316	103	1
31	165	2	8702	103	1
31	165	2	8716	103	1
31	165	2	11002	103	1
31	165	2	11016	103	1

Run Spec Summary input file for MOVES3 Project Level Emission Analysis

Output Database Name: MOVES3_Out_241_03Proj_Idle_Start_20220118

Time Spans:

Aggregate By: Hour

Hours

Years: 2021

Months: April

Days: Weekdays

Hours: Begin Hour: 15:00 - 15:59

End Hour: 15:00 - 15:59

Geographic Bounds:

LINK geography

Selection: Jefferson County, AL (01073)

On Road Vehicles:

Passenger Car - Diesel Fuel

Passenger Car - Electricity

Passenger Car - Ethanol (E-85)

Passenger Car - Gasoline

Passenger Truck - Diesel Fuel

Passenger Truck - Electricity

Passenger Truck - Ethanol (E-85)

Passenger Truck - Gasoline

Road Types:

Off-Network

Urban Unrestricted Access

Pollutants and Processes:

Running Exhaust (idle)

Start Exhaust

#4 - VOC & NOx Emission Reduction Worksheet For Project 241, Voluntary Emission Testing/Vehicle Repair Program										
Alabama Clean Fuels Coaliton Car Care Program: Testing car's emission and repairing the emission fault										
									updated 1/12/2022	
(1) October 1, 2020 to September 30 2021[1]										
Car Repair Type[2]	# of Repair Type	Average VOC Emission Factor (g/mile)		Difference VOC (g/mile)	Average NOx Emission Factor (g/mile)		Difference NOx (g/mile)	Average Mileages Traveled of Vehicles after repaired	Sub_Total VOC (kilo/ year)	Sub_Total NOx (kilo/ year)
		Before Repair	After Repair		Before Repair	After Repair				
Catalytic Converter	15	0.46	0.06	0.40	0.13	0.03	0.10	17,383	104.30	26.07
Oxygen Sensor (O2)	3	0.44	0.02	0.42	0.10	0.00	0.10	17,383	21.90	5.21
Exhaust Gas Recirculation (EGR)	0	0.65	0.03	0.62	0.00	0.01	-0.01	17,383	0.00	0.00
Evaporative Emission System	6	0.31	0.00	0.31	0.00	0.00	0.00	17,383	32.33	0.00
Other qualified repairs	1	0.00	0.00	0.00	0.00	0.00	0.00	17,383	0.00	0.00
					Total reductions by kilos per year after repair				158.53	31.29
					Total reductions by kilos/day after repair, 365 days				0.43	0.09
					Total reductions by lbs./day after repair, 1 kilogram = 2.2046 lbs.				0.96	0.19
(2) Cost Effectiveness = (Annualized Cost) / (Annual Emissions Reduction)---the lower number, the better										
Project life expectancy (n)								1	years	
Discount rate (i)								1%	used by ALDOT	
Capital recover factor (CRF) = (1+i) ⁿ *(i) / ((1+i) ⁿ - 1)								1.01000	capital recovery factor	
Project funding amount (C)								\$97,258	capital cost	
Project annual cost (AC) = (C)*(CRF)								\$98,231	\$ per year	
Number of days project affected per year (Day)								365	days per year	
Cost Effectiveness for VOC = (AC) / ((VOC r)*(Day))								\$929	\$ per kilogram per year	
Cost Effectiveness for NOx = (AC) / ((NOx r)*(Day))								\$4,709	\$ per kilogram per year	
Cost Effectiveness for total of VOC & NOx = (AC) / (((VOCr)+(NOxr))*(Day))								\$776	\$ per kilogram per year	
PM 2.5 Cost Effectiveness for PM = (AC) / ((PMr)*(Day))								NA	\$ per kilogram per year	
[1]: Alabama Partners for Clean Air Car Care Program Report, October 1, 2020 - September 30, 2021.										

This page was intentionally left blank

Appendix F

United Way of Central Alabama Annual Report

This page was intentionally left blank.

United Way of Central Alabama Healthy Communities Annual Report

United Way of Central Alabama's (UWCA) Healthy Communities supports active modes of transportation and safe routes for non-drivers. The UWCA Healthy Communities initiative has undertaken this work because it has numerous benefits, including increasing physical activity, improving air quality, increasing safety, traffic mitigation, and increased community engagement.

Healthy Communities' effort includes a school-oriented program to educate and encourage students on healthy lifestyle choices and working directly with cities to find ways to improve the physical environment to be more conducive for walking and biking. Included in our education and encouragement activities are walk and bicycle events both at the school and in the community. In support of these events, we distribute flyers, which note routes that have supportive active transportation infrastructure, and include information about how transportation-based decisions impact air quality.

In 2020-21, through various community events, Healthy Communities impacted 102 participants through 13 events. UWCA accomplishments include the highlights below:

- Due to COVID, we did not host in-person events during the 2020-21 school year. We did pilot a new online curriculum with Birmingham City Schools but had limited outcomes.
- Plans were to roll out a new, public-at-large online format to teach the ABC Check program (Air, Brakes, and Cranks) along with clean air talking points in Spring 2021. However, program staff resigned in November 2020 and the majority of program activities were put on hold until new staffing was identified.
- During summer 2021, we resumed some in-person educational events. A bike rodeo was conducted at C.J. Donald Elementary summer camp on June 14 in partnership with Alabama Cooperative Extension Services using COVID safety protocols. 29 campers participated and 9 staff/volunteers.
- A bike rodeo was hosted by the Three Rivers District – Greater Alabama Boy Scouts on August 21 at the Shops at Grand River. There were 40 participants in the bike rodeo.

FIGURE 6
UWCA Bicycle Rodeos



This page was intentionally left blank.

Appendix G

The Johnson Management Group Annual Report

This page was intentionally left blank.

**The Johnson Management Group, LLC
P.O. Box 59005
Birmingham, Al 35259
205-370-7805**

Annual Report 2020/2021

DATE: December 08, 2021

TO: **Lisa Smith, Regional Planning Commission of Greater Birmingham
Ashley Ward, Regional Planning Commission of Greater Birmingham**

FROM: Valton Johnson, JMG, LLC

RE: Annual Report of 2020/2021

This annual report shows activities from October 2020- to September 2021. The support shown by the Birmingham City Schools Board of Education, led by Dr. Mark Sullivan has been outstanding. We have been supported in our efforts to conduct both virtual and in-person presentations of the air quality message. We have had great success with students and with parents during the audits.

JMG conducted 16 audits. The following schools were included: West End, Putnam, Huffman Academy, Huffman Middle, Ephesus Academy, Mitchell, Phillips, Wilkerson, Tuggle, Bush Hills, Robinson, Avondale, Barrett, Brown, Arrington, and Central Park. The audits yielded 1453 pieces of APCA literature being handed out and a total of 366 cars shutting off because of the message of turning the key and being idle free.

APCA handouts and giveaways are distributed after each presentation. For those receiving the virtual presentation, gifts are left at the office of each school for teachers to pick up and distribute. Those receiving in-school presentations are gifted after the presentation.

JMG met with administrators and teachers, following up with session dates and the introduction of the AQYP program. The AQYP program is at the early start stages and being developed. This program identifies students that are interested in being on air quality and litter patrol at their school(s).

Support is strong from the superintendent's office and among the schools. The air quality education is received well, and changes are being noted.

This page was intentionally left blank.

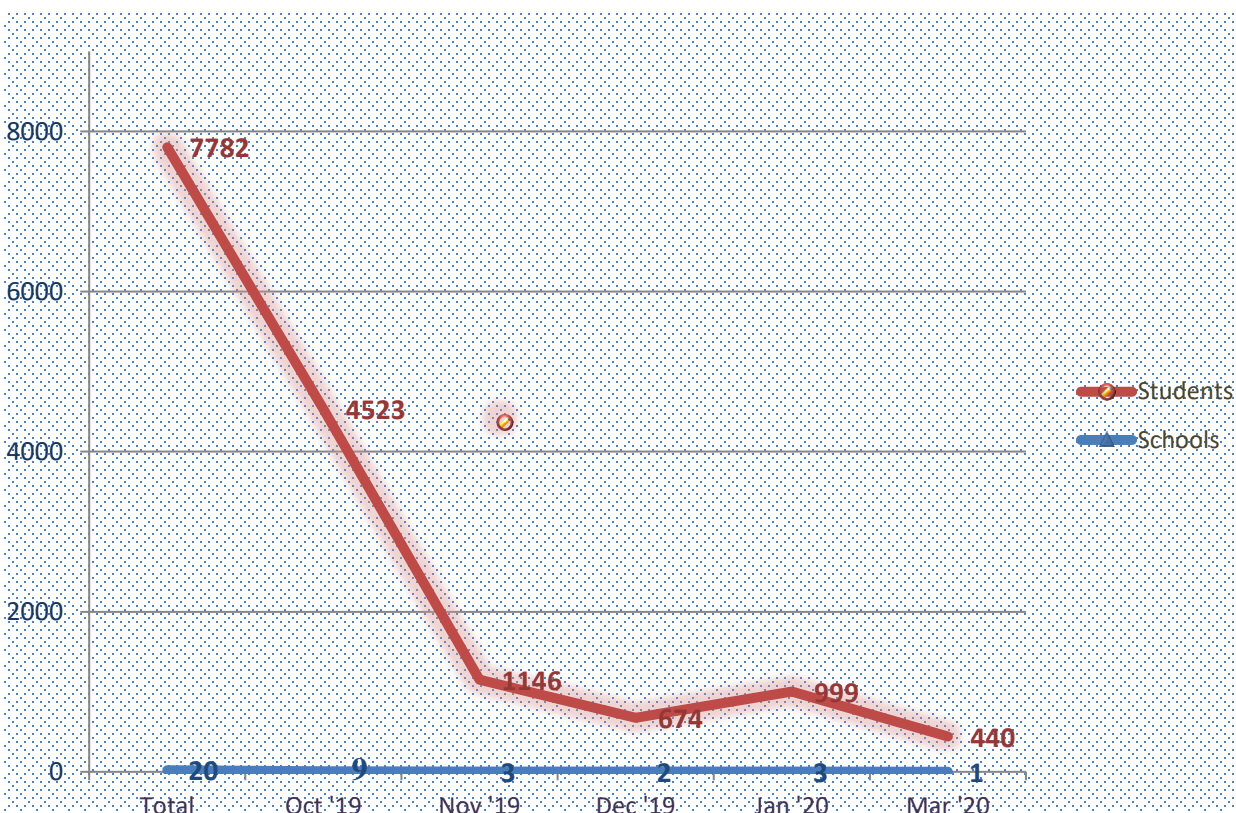
Johnson Management Group Air Quality Report

FY October 2019 – September 2020 (Addendum)

During the reported fiscal year, Johnson Management Group (JMG) successfully managed to be in 117 schools across 7 school districts. JMG delivered the clean air message to schools via classroom sessions, assembly-styled settings, and health fairs at 20 schools. As part of our outreach efforts, JMG conducted presentations to 7782 students, provided awareness to 845 parents/citizens, and successfully distributed 7,953 pieces of air quality literature. During 9 car audits, 237 parents were impacted and complied with our “turn the key to be idle-free” message.

Air Quality Student Outreach & Education

October 2019 – March 2020



Johnson Management Group Vehicle Audit Report

BIRMINGHAM CITY SCHOOLS VEHICLE AUDITS

Fall 2021

During our Fall 2021 vehicle audits, we shared our “turn the key to be idle-free” message with 1453 parents during August and September.

The following graphs summarize the vehicle audits for Birmingham City Schools (see Figure 1, Figure 2, and Figure 3). During August, JMG conducted 565 with 111 parents in compliance at 5 schools. (See Figure 1) The next month, September, 888 audits were conducted with 249 parents complying at 10 schools. (See Figure 2) Figure 3 displays the total number of vehicle audits and parental compliance for both months.

Figure 1

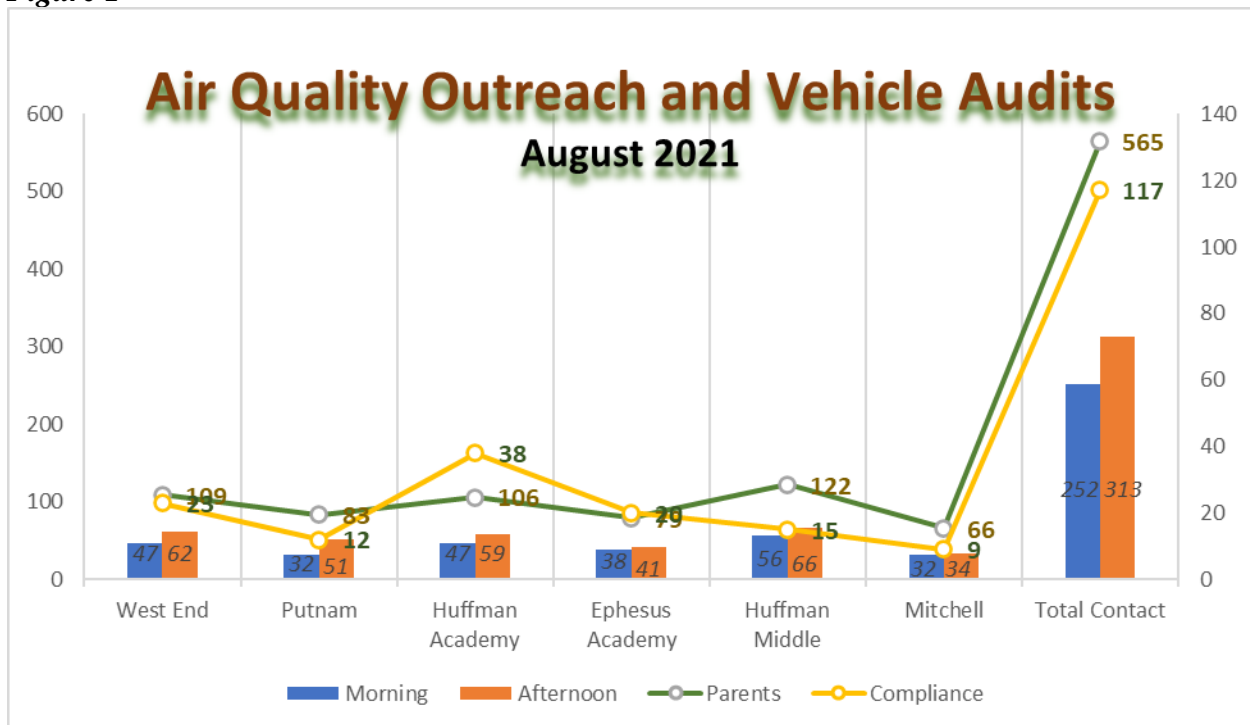


Figure 2

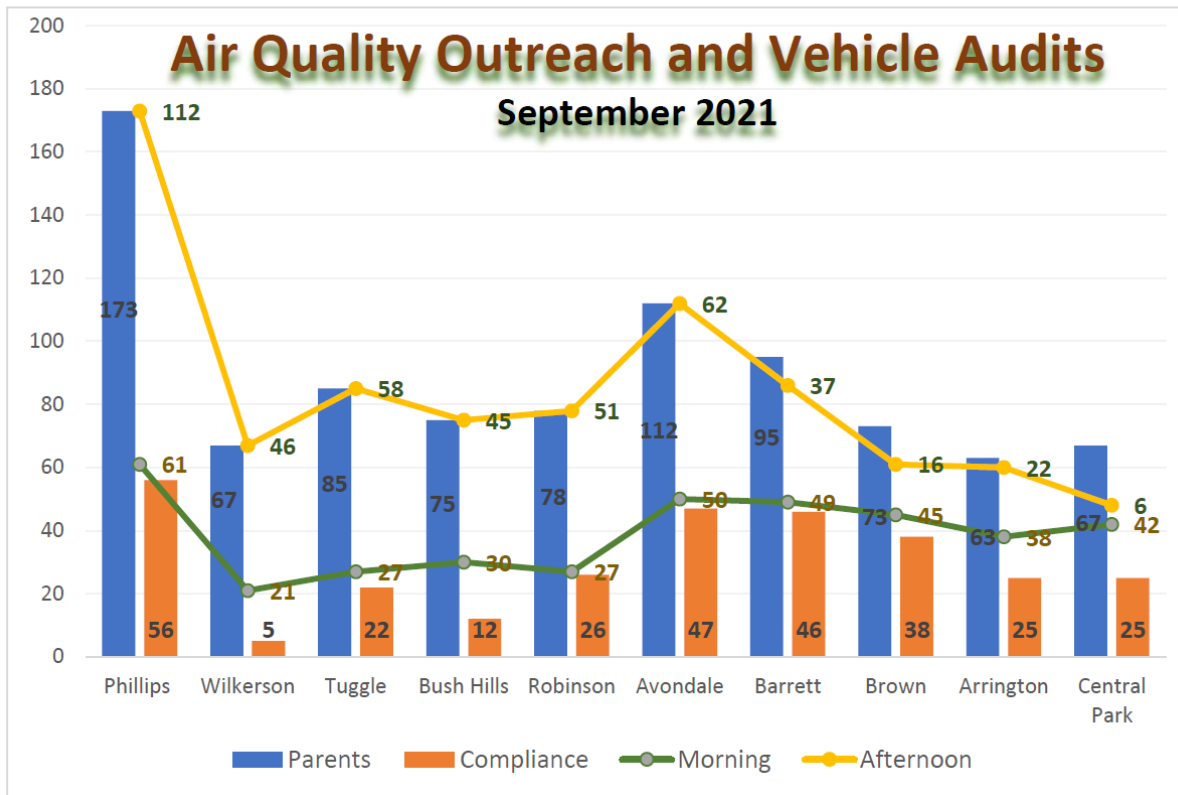


Figure 3

