

**ALABAMA
PARTNERS
FOR
CLEAN AIR**

www.alabamacleanair.org

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

**Annual Activity Report
October 1, 2019 – September 30, 2020**

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APCA Annual Report

October 1, 2019 – September 30, 2020

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

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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.

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EXECUTIVE SUMMARY

This report is comprised of activities of the Alabama Partners for Clean Air (APCA) program from October 1, 2019 – September 30, 2020. 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 2019.

A combination of national and state regulatory programs to control emissions and voluntary actions taken by individual citizens and organizations will be required 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 is the reduction of 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 and digital platforms. Media efforts continued to bring awareness to air quality alert days as well as actions the public could take on air quality alert days.

Expenditures during this 12-month period were **\$410,930**. Documented emissions reductions attributable to the APCA program was 9.84 pounds per day of hydrocarbons, 66.49 pounds per day of nitrogen oxides, and 7.29 pounds per day of PM_{2.5}.

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SECTION 1

AIR QUALITY INFORMATION

MONITORING DATA

Air Quality Reports were sent out to members of APCA on a monthly basis. 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 were preliminary and were 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 2019. This is because air monitoring data is on a calendar year basis (i.e., January 1, 2019 – December 31, 2019) and this report is based on a fiscal year basis (i.e., October 1, 2019 – September 30, 2020).

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 a 3-year period. The most recent 3-year monitoring period was 2017-2019. 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 2017-2019, no monitors violated the standard.

TABLE 1

8-Hour Ozone Design Values (2017-2019)	
Monitor	Design Value (ppb)
Corner	62
Fairfield	67
Helena	66
Leeds	64
McAdory	66
North Birmingham	66
Tarrant	66

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 2017-2019. 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 2017-2019.

TABLE 2

Annual PM_{2.5} Design Values (2017-2019)	
Monitor	Design Value (µg/m³)
Arkadelphia	10.0
Leeds	8.8
McAdory	8.8
North Birmingham	10.0
Wylam	9.0

TABLE 3

24-Hour PM_{2.5} Design Values (2017-2019)	
Monitor	Design Value (µg/m³)
Arkadelphia	21
Leeds	18
McAdory	18
North Birmingham	21
Wylam	17

AIR QUALITY EXCEEDANCES

Below are tables showing the exceedances of the 8-hour ozone standard from 2010 thru 2019 and exceedances of the 24-hour PM_{2.5} standard from 2010 thru 2019. Note that the EPA lowered the 8-hour ozone standard in 2015 so there was a lower threshold to violate the standard.

TABLE 4
Exceedances of the 8-Hour Ozone Standard for 2010-2019

Station	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Corner	1	4	1	1	0	0	1	0	0	1
Fairfield	2	2	5	0	0	2	2	0	1	7
Helena	2	4	4	0	1	2	4	0	1	3
Hoover	4	7	3	0	0	2	2	0		
Leeds	2	5	4	0	0	0	1	0	1	1
McAdory	3	7	4	0	0	0	2	0	1	5
N. Birmingham	1	5	6	0	0	4	3	1	2	4

Pinson	3	2	3							
Providence	3	4	2							
Tarrant	8	9	6	1	0	4	3	1	3	2
Total	29	49	38	2	1	14	18	2	9	23

TABLE 5
Exceedances of the 24-Hour Fine Particulate Matter (PM_{2.5}) Standard for 2010-2019

Station	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Arkadelphia					0	0	0	0	0	0
Leeds	0	0	0	0	0	0	0	0	0	0
McAdory	0	0	0	0		0	0	0	0	0
N. Birmingham	0	1	0	0	0	0	0	0	0	0
Wylam	0	2	0	0	0	0	0	0	0	0
Total	0	3	0	0	0	0	0	0	0	0

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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 2019 – September 2020. “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
10/2/2019	Orange	Orange	O ₃
10/3/2019	Orange	Yellow	O ₃
6/20/2020	Orange	Yellow	O ₃
6/27/2020	Orange	Yellow	PM _{2.5}

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 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 FY2020 (October 2019 – September 2020), 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 FY2020 budget. The details of JCDH’s budget are shown in the table below.

**TABLE 7
JCDH FY2020 Budget**

	OCT 2019 – SEP 2020
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 includes Alabama Clean Fuels Coalition, the WRATT Foundation, 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 2019 – September 2020

Program Area	Total Budget	Amount Invoiced (includes match \$)
Promotional Items / Print Material-RPC*	\$30,000	\$432
Media Buy-RPC**	\$41,250	\$41,259
Employer/Employee Outreach- Advanced Consulting	\$50,000	\$22,731
Idle Free Zones / School Education - Johnson Group	\$71,250	\$33,742
Idle Free Zones / School Education – UWCA	\$50,000	\$11,051
Clean Cities/Alternative Fuels – ACFC	\$200,000	\$47,279
EMPACT/Forecasts – JCDH	\$72,000	\$71,994
Diesel Retrofits – ACFC	\$60,000	
Emissions Testing – WRATT	\$110,580	\$25,595
Vehicle Repair – WRATT	\$80,000	\$19,566
Program Administration – RPC**	\$113,750	\$137,281
Contingency – RPC	\$10,000	
Total	\$888,830	\$410,930

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

** Creative Directions & Media Buy

*** All staff time and Public Relations

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SECTION 4

MARKETING/PUBLIC OUTREACH

The global pandemic had an impact on every aspect of life in 2020 including marketing efforts. The Alabama Partners for Clean Air 2020 marketing outreach strategy included an updated message aimed at teaching individuals in our community how small changes could have an impact on the air quality. An updated marketing campaign was launched on July 13th and continued through the end of August. Producer, Mark Hendren, with WIAT-TV created new television messages with 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. The new design was also used in print and digital ads that combined the bright blue and yellow colors to make the ads stand out. The same message and ad design were used across all media platforms.

FIGURE 2
WIAT-TV Marketing Campaign



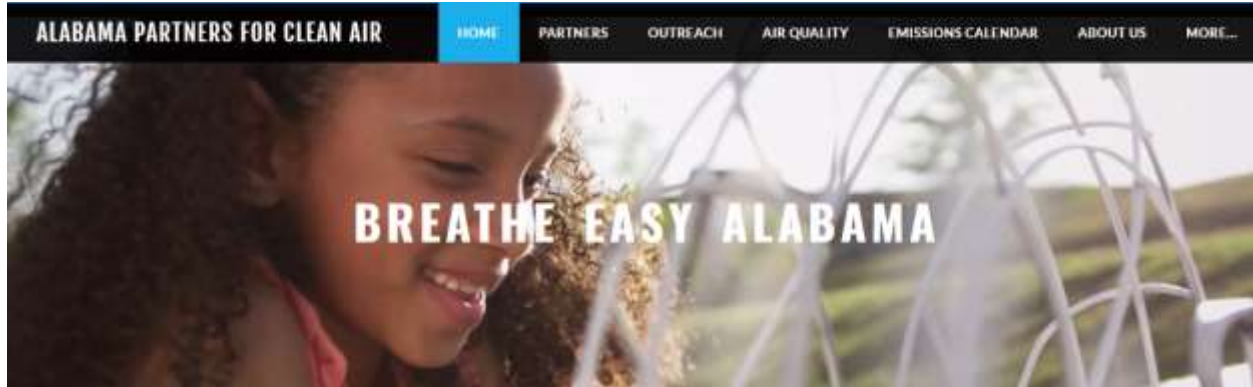
The campaign featured a combination of broadcast television, digital streaming ads, digital email ads and print. Alabama Partners for Clean Air partnered with two broadcast stations including WBRC-TV (FOX-6) and WIAT-TV (CBS42). Over the Top (OTT) streaming messages aired through Hearst Media to target the “environmentally friendly” demographic. The Birmingham Times was included to target the African American community. Starnes Media was also included

which reaches the suburban areas such as Vestavia, Homewood, Hoover, 280 Corridor and downtown Birmingham area.

DIGITAL CAMPAIGN:

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 3
Alabama Partners for Clean Air website



PRINT AND DIGITAL:

The Birmingham Times Media Group, Inc. is a weekly newspaper that is distributed throughout Jefferson County on a weekly basis with a focus on the African American community. A total of 6 quarter page full colors ads ran on 7/16, 7/23, 7/30, 8/6, 8/13 and 8/20. In addition to the discounted rate for the ads, BT Group featured digital ads each week on www.birminghamtimes.com.

Total added value of \$1,200.00

FIGURE 4
Birmingham Times Ad



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 each of these targeted areas. Digital ads were featured throughout the campaign featuring Air Quality Awareness Tips through daily email blasts targeting these specific communities. New ads were created to match the font and look of the television messages. A total of 4 ads were created that provided clean air tips. These ads delivered a total of 49,982 impressions at a cost of .2 cents per impression. APCA was given the non-profit rate which is 50% of rate card for a value of \$1,000.00.

Total added value - \$1,000.00

**FIGURE 5
Starnes Digital Media Ads**



**TABLE 9
Starnes Media Digital Ad Impressions**

Email Newsletters	Impressions
Vestavia Voice	9,264
Hoover Sun	12,882
280 Living	5,614
Iron City Ink	621
Homewood Star	21,601
Total	49,982

TABLE 10
Starnes Digital Ads Email Openings

Date	Vestavia Voice Opened	Date	280 Living Opened	Date	Homewood Star Opened	Date	Hoover Sun Opened	Date	Iron City Ink Opened
7/13/2020	829	7/13/2020	456	7/13/2020	1,541	7/13/2020	922	7/17/2020	131
7/15/2020	798	7/15/2020	556	7/14/2020	1,631	7/15/2020	1,091	7/24/2020	107
7/20/2020	706	7/17/2020	597	7/15/2020	1,796	7/16/2020	1,031	7/31/2020	114
7/22/2020	661	7/20/2020	470	7/20/2020	1,677	7/20/2020	843	8/7/2020	135
7/27/2020	872	7/22/2020	591	7/21/2020	1,734	7/22/2020	895	8/14/2020	134
7/28/2020	714	7/24/2020	484	7/22/2020	1,666	7/23/2020	863		621
7/29/2020	958	7/29/2020	528	7/27/2020	1,564	7/27/2020	884		
8/3/2020	1,105	8/3/2020	452	7/28/2020	1,641	7/29/2020	880		
8/6/2020	769	8/6/2020	498	7/30/2020	1,623	7/30/2020	873		
8/10/2020	896	8/10/2020	500	8/4/2020	1,643	7/31/2020	864		
8/13/2020	956	8/13/2020	482	8/6/2020	1,645	8/4/2020	902		
	9,264		5,614	8/10/2020	1,684	8/10/2020	858		
				8/12/2020	1,756	8/12/2020	1,085		
					21,601	8/14/2020	891		
							12,882		

TELEVISION CAMPAIGN

OVERVIEW:

The :15 second television messages aired on **WBRC-TV(FOX6)** and **WIAT(CBS42)** over a 5 week flight during the peak period of Air Quality Season, July 15-August 16, 2020. In addition to broadcast television the messages were streamed through Hearst Media. METV & BOUNCE-TV, digital television stations were also included to increase frequency.

Media Release Outreach and Media Interviews:

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

Air Quality Awareness Week

Due to the Global Pandemic the Alabama Partners for Clean Air did not pursue media attention with the exception of one local radio interview on Birmingham Mountain Radio. Matt Lacke, Jefferson County Department of Public Health Meteorologist was featured on a phone interview during the Morning Blend program to discuss Air Quality Awareness Week. The interview aired on May 6th in morning drive time and was heard by approximately 7,000 listeners.

In October, APCA was featured in partnership with the United Way of Central Alabama’s “Walktober” campaign to encourage school aged children and their parents to walk. Jeniese Hosey with RPCGB was interviewed and discussed the important benefits of walking. These interviews

aired in weekend morning newscasts on WIAT-TV on the following dates:

TABLE 11
CBS42 Interview Impressions

CBS42 Morning News	October 10, 2020	7500 viewers
CBS42 Morning News	October 11, 2020	5000 viewers
CBS42 Morning News	October 17, 2020	7500 viewers
CBS42 Morning News	October 18, 2020	5000 viewers
	Total impressions	25,000 viewers

WBRC-TV provided the following:

201 commercials aired in Good Day Alabama, Evening News, Late News, Late Fringe, and weekend at reduced rates (Value of \$4,250.00)

9 commercials aired on WBRC-TV at no charge (Value of \$1,350.00)

60 commercials aired on BOUNCE at a reduced rate (Value of \$675.00)

60 commercials aired on BOUNCE at no charge (Value of \$750.00)

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

Total number of impressions delivered = 8,545,300

Total added value = \$8,025.00

FIGURE 6
WBRC-TV Air Quality Alert Screenshot



WIAT-TV CBS42

Production of two :15 second commercials at no charge. (Value of \$5,000.00)

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

53 commercials aired at no charge (Value of \$6,000.00)

Total added value = \$11,000.00

WVTM-TV/Hearst Media Over the Top Campaign

Many viewers are no longer watching traditional broadcast or cable television but instead are watching on demand and on other devices including smart phones and other smart screens through digital streaming services. OTT ads targeted specifically Jefferson and Shelby counties with an emphasis on individuals who are environmental conscious. Hearst Media delivered 79,358 commercials targeting adults 25-54 in Jefferson and Shelby Counties.

OTT Delivery: 75,878 commercials served. OTT Performance: 97.4%.
 180 spots aired on METV at a reduced rate (Value of \$1,800.00)
 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 12
WVTM-TV/Hearst Media Ad Impressions

MONTH	IMPRESSIONS SERVED	VIDEOS COMPLETE	VCR
July-20	40,777	39,234	96.2%
Aug-20	35,101	34,687	98.8%
TOTAL	75,878	73,921	97.5%

FIGURE 7
WVTM-TV Weather Cam Screenshot



TABLE 13
Marketing Campaign Overview

STATION	Paid ads	Delivered ads	Added Value
WBRC	192	222	\$8,025.00
BOUNCE	60	120	Included in WBRC total
WIAT-TV	282	335	\$11,000.00
WVTM/Hearst	74,373 impressions	75,878 impressions	\$10,800.00
METV	180	180	Included in WVTM total
TOTAL TV	714	857	\$29,825.00
Digital/Print			
The Birmingham Times	6 ¼ page ads	6 ¼ page ads plus digital	\$1,200.00
Starnes Publishing	100 digital ads	100 digital ads	\$1,000.00
Total Digital/Print			\$2,200.00
		Total Net Cost	Total Added Value
		\$26,298.50	\$32,050.00

SECTION 5

EMPLOYER/EMPLOYEE OUTREACH

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

From October 2019 to September 2020, Advanced Consulting continued to work on keeping and building relationships with current corporations, but they also worked on getting the message out to the community through community events and programs.

Advanced Consulting spoke to and attended 12 company and civic events and 17 community events. Advanced Consulting also had a total of 2,094 pledge cards signed through the 29 company, civic group, and community events attended.

2019-2020- Children's of Alabama New Employee Orientation Meetings

Dates	Attendees	Pledge Cards
Oct.14, 2019	52 attendees	52 pledge cards
Oct 28, 2019	40 attendees	40 pledge cards
<i>Nov. 11, 2019</i>	27 attendees	27 pledge cards
Nov. 25, 2019	18 attendees	18 pledge cards
Dec. 9, 2019	26 attendees	26 pledge cards
Jan. 06, 2020	50 attendees	50 pledge cards
Jan.20, 2020	33 attendees	33 pledge cards
Feb. 03, 2020	42 attendees	42 pledge cards
Feb. 17, 2020	40 attendees	40 pledge cards
Mar. 02, 2020	40 attendees	40 pledge cards
Total Pledge Cards from Children's NEO:		368

Other Company Events:

Total Pledge Cards from Other Company Events: 302

Oct 24, 2019 Southern Co. Health Fr 600 attendees 189 pledge cards

Feb 5, 2020 UAB Health Fair 200 attendees 113 pledge cards

Total Pledge Cards from Children's NEO and Other Company Events: 670

Community Events

2019	Event	Attendees	Pledge Cards
Oct 1	Center Point Night Out	150	45
Oct 6	Bark in the Park Alabaster	300	51
Oct 10	Mardi Gras Sen/Health Fair	1000	292
Oct 11	Shelby Senior Health Fair	200	72
Oct 12	Shelby Iron Works Fest	300	86
Oct 19	Mt. Zion Health Fair	100	59
Oct 20	Barktober Fest/ Helena	200	83
Oct 22	Bessemer Tuesday Market	100	36
Oct 27	Barking at the Moon/ Fultondale	200	107
Nov 2	Moss Rock Festival	750	96
Nov 3	Moss Rock Festival	750	48
Nov 9	Harpersville Day	300	103
Nov 23	Montevallo Art Stalk	100	20
Dec 7	Christmas Village/Calera	200	77
Dec 8	Woodlawn Street Festival	150	51
Dec 14	Cahabazaar	500	112

January 2020 No community events.

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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.

The Johnson Management Group's focus is to reach out to school boards, principals, and administrators to gain entry into the systems to bring awareness of the idling campaign. 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 their 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 JMG's "turn the key to be idle free" message.

This fiscal year end report summarizes the air quality awareness, education and outreach provided from October 2019 through September 2020. The following figures include detailed information about their positive social impact on Birmingham and the surrounding communities.

FIGURE 8
JMG Outreach October 2019- March 2020

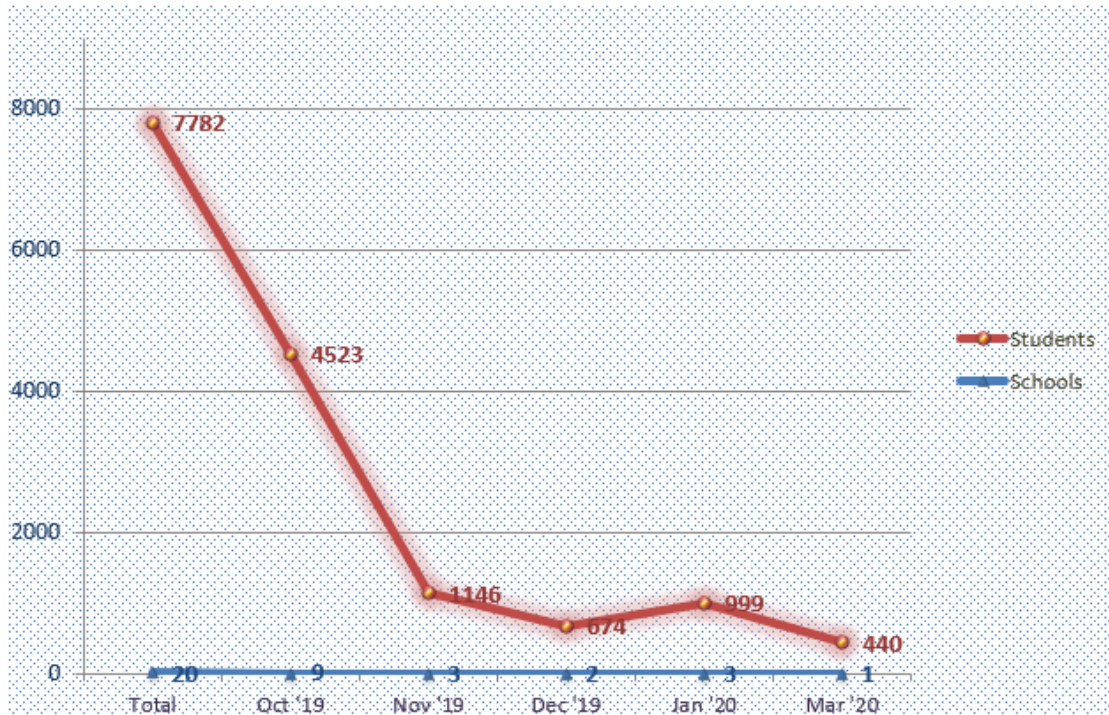
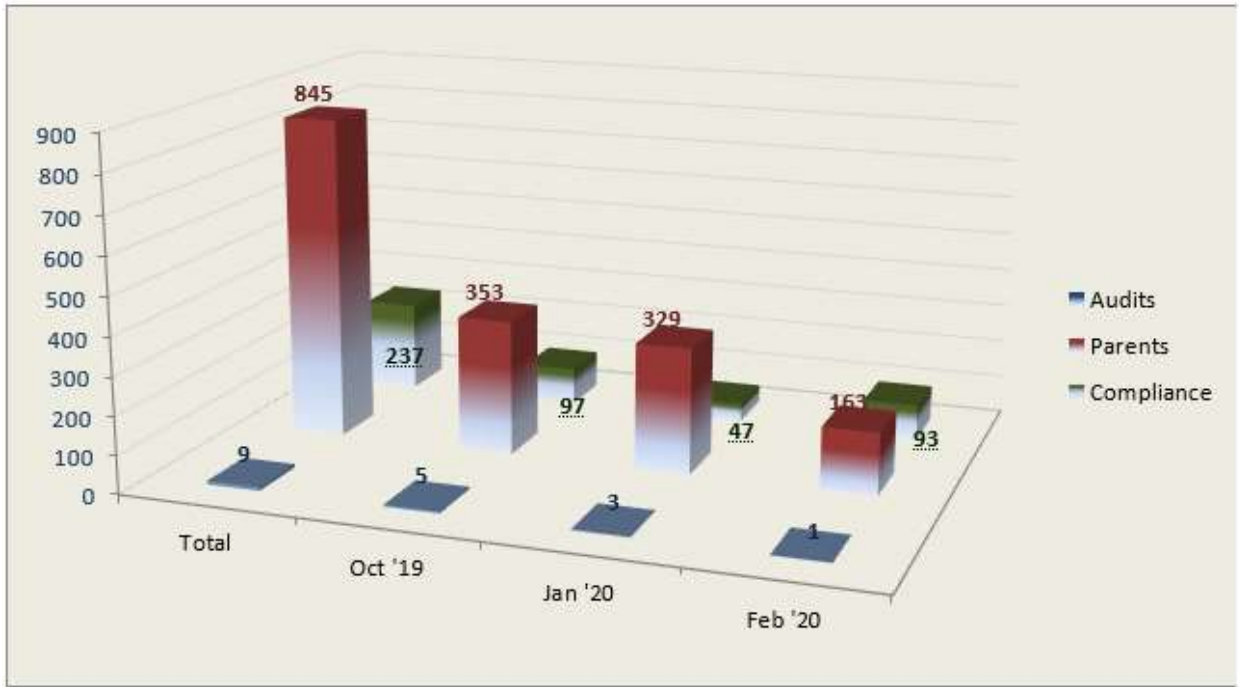


FIGURE 9
JMG Vehicle Audits and Compliance
October 2019 and January-February 2020



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 which have supportive active transportation infrastructure, and include information about how transportation-based decisions impact air quality.

In 2019-20, through various community events, Healthy Communities impacted 1,012 participants. UWCA accomplishments include the highlights below:

- Red Rock Tuesday segment with Jeh Jeh Pruitt on Oct. 1 to promote walking and biking as clean modes of transportation, and resuming of the bike rodeo program.
- PSA on 103.7 the Q promoting National Walk to School Day and AL Partners for Clean Air
- Bluff Park Elementary National Walk to School Day event on Oct. 2 with over 340 participants, media awareness, and education and outreach to all students
- Bicycle Rodeos at Oxmoor Valley Elementary (Oct. 24) 293 students and 12 volunteers, and Irondale Community School (Nov. 14-15) with 269 students and 8 volunteers.
- Due to COVID-19, the spring and summer schedule was cancelled. Events cancelled due to COVID-19:
 - March 13 at West End Academy
 - March 20 at Ephesus
 - March 24 at Birmingham Housing Authority (spring break camp)
 - April 3 at Central Park
 - April 16 at Avondale Elementary
 - May 6 at Bluff Park Elementary for National Bike to School Day
 - May 8 at Barrett Elementary
 - May 22 at Robinson Elementary
 - Summer Camps in June: Better Basics
- In September, UWCA piloted a new online curriculum with Birmingham City Schools with little success.

FIGURE 10
UWCA Bicycle Rodeos



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 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 2,791,297 gallons or GGE’s (gasoline gallon equivalent). This included approximately 177,000 gallons of E85 Ethanol, 2,900 gallons of B20 Biodiesel, 1,300 gallons of B100 Biodiesel, 60,300 GGE’s of Propane, 2,073,000 GGE’s of CNG, 54,000 GGE’s of LNG, 423,000 GGE’s of electricity representing approximately 17.2 million electric miles driven, and 9,000 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 8.1% from FY2019, despite a significant decrease in overall driving in the region as a result of COVID-19 restrictions during 2020. Local fleets using alternative fuels during this reporting period included: the City of Birmingham (E85 & Propane), the City of Alabaster (B20 & B100 Biodiesel), the Alabama Department of Transportation Third Division (E85 Ethanol), the Birmingham-Jefferson County Transit Authority (CNG), the City of Trussville and Trussville Utilities (CNG), Alabama Power Company (Electricity & Idle Reduction Technologies), Birmingham Airport Authority (CNG), Veal Convention Services (Propane), Evergreen Transportation (CNG), Regions Bank (Propane & Electricity), Groome Transportation (Propane), Melton Automotive, 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 in 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, the McCullough Oil Chevron in Trussville and at Evergreen Transportation in Calera. LNG continued to be available at the Clean Energy Fuels station on Daniel Payne Drive. 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 VOC’s 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, to expand alternative fuel infrastructure, and to develop diesel retrofit projects in the region.

In June 2020, FHWA approved the ALDOT submitted nominations for Alternative Fuel Corridor designations in Alabama under Section 1413 of the FAST Act (23 U.S. Code § 151). Four of the following approved “Clean Corridors” traverse the Birmingham Region:

1. I-65 EV Signage Pending
2. I-20 EV Signage Pending
3. I-59 EV Signage Pending
4. I-459 EV Signage Pending
5. I-85 EV Signage Pending
6. I-10 EV Signage Pending
7. I-565 EV Signage Pending

ACFC assisted ALDOT with the preparation of the Alabama corridor nomination submission and the RPC staff assisted ACFC with the preparation of infrastructure maps included in the submission.

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 cancelled and several were conducted virtually. These outreach efforts included organizing, planning, and conducting a site visit to the Waste Management CNG fueling facility in Tarrant and a National Drive Electric Week Event at Pepper Place. In addition, ACFC conducted other similar outreach efforts across the state which included participants from the Birmingham region at a Propane workshop in Montgomery, an EV infrastructure funding workshop in Montgomery, an EV workshop for AMEA members in Montgomery, an EV 1st Responder training webinar, and site visits to the New Flyer Vehicle Innovation Center and transit bus manufacturing facility in Anniston to review CNG and Electric Buses and the University of Alabama to review their participation in the US DOE EcoCAR Mobility Challenge Program. These efforts also included responding to numerous media and consumer inquires 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.

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SECTION 8

VOLUNTARY EMISSIONS TESTING PROGRAM

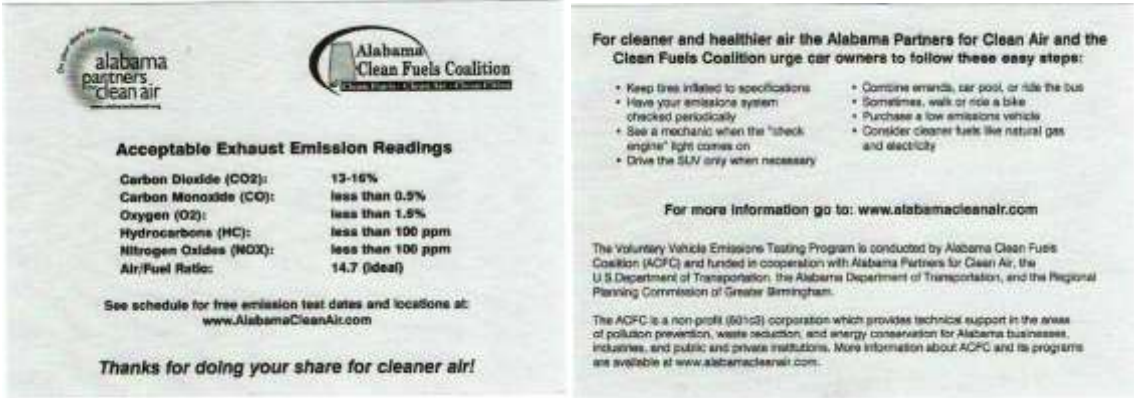
The current Car Care Program began in January of 2008 and has continued annually through 2020. This program was initially managed via the Waste Reduction and Technology Transfer (WRATT) Foundation, however in FY2020 these program responsibilities were assumed by Alabama Clean Fuels Coalition, Inc. (ACFC)

The program is comprised of four major functions:

1. The program creates public awareness of ground-level ozone pollution by emphasizing the importance of vehicle maintenance primarily for vehicle emission control systems.
2. 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.

Scheduled emissions test dates for FY2020 were suspended at the end of March 2020 due to concern over the COVID-19 pandemic. Taking the place of scheduled emission test dates was adoption of a “Request and Test” program where Express Oil Change and the Regional Planning Commission of Greater Birmingham (RPCGB) referrals were individually tested and qualified for repair subsidy if indicated.

FIGURE 11
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. The right page provides 'easy steps' for cleaner air, such as keeping tires inflated, checking the emissions system, and using cleaner fuels. It also includes contact information for the Alabama Clean Fuels Coalition (ACFC) and a website link.

Acceptable Exhaust Emission Readings	
Carbon Dioxide (CO2):	13-16%
Carbon Monoxide (CO):	less than 0.5%
Oxygen (O2):	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 12
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



1. For scheduled testing in March ACFC used two-man teams working two days per week during ozone monitoring season from March 2020 through September 2020. 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 (OTC) were read from the vehicle's OBD-11 computer with an INNOVA Model 3100 code reader.
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 release of automotive pollutants by encouraging owners to undertake qualified repairs by making these repairs more affordable.

Restrictions and Limitations for Qualification
Under the 2020 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 date (mo/yr.) manufactured.
- The repair must be directly related to diminished control of vehicle emissions (as indicated by exhaust gas analysis and 080-11 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 or Shelby Counties or car owner must be able to prove residency in either Jefferson or Shelby Counties (e.g., address on driver license, address on pay stub, rental/lease agreement).
- Car owner has 60 days from the date qualified to make the repair at a participating Express Oil Change facility.

- Only one repair qualification is allowed per vehicle.
- Cars currently covered under manufacturers or 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, 2019 through September 30, 2020. These statistics represent fewer emission tests than in previous program years due to the suspension of testing during the 2020 COVID pandemic. There were:

- 11 testing events at EOC locations each staffed by 2 ACFC technicians.
- 93 Vehicles Tested (an average of ca. 9 vehicles per event)
- Over 400 data points recorded on-site.
- 22 Vehicles Qualified for Repair (about 24% of those tested); and
- 20 qualified vehicles were repaired (about 91% of those qualified)

The following table provides a summary of the emissions test statistics for FY20:

TABLE 14
Express Oil Change Monthly Emissions Testing Report

Month	Events	Number Tested	Qualified	#Repaired
Begin FY2020				
October 2019	0	1	1	3
November 2019	0	1	1	3
December 2019	0	1	1	1
January 2020	0	2	2	2
February 2020	0	0	0	0
March 2020	11	77	8	3
April 2020	0	3	1	0
May 2020	0	1	1	1
June 2020	0	1	1	1
July 2020	0	2	2	2
August 2020	0	3	3	3
September 2020	0	1	1	1
FY2020 Year's Totals	11	93	22	20

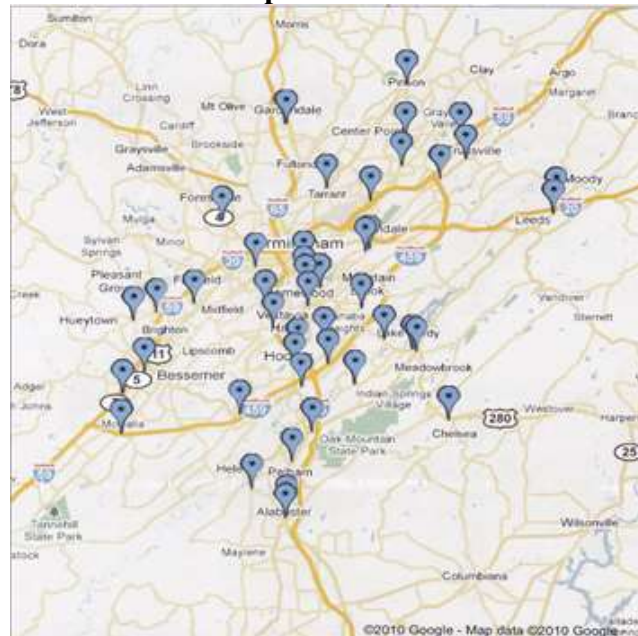
REPAIR STATISTICS

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 about \$18,000. Total EOC repair cost was approximately \$44,000. The average cost per repair was about \$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 15
ACFC Repairs

Repair	Number Performed
O ₂ Sensor	4
Catalytic Converter	12
EVAP System	12
Other	3
Total	20

FIGURE 13
Map of Test Sites



The map of test sites in Figure 3 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 3 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 total cost of the repair:

TABLE 16
Most Common Repairs

Component	<u>REPAIR</u>	<u>AVG CAR CARE COST</u>	<u>AVG TOTAL COST</u>
Oxygen Sensors	10%	\$300	\$500
Catalytic Converters	60%	\$900	\$1500
Evaporative Emission	30%	\$400	\$500

CONCLUSION

An important part of the Car Care Program is 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 OTC-MIL for certification because it allows 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 OTC (OBD-11 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 14
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 2019 - 2020, 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 17 - Emission Reductions by Program from October 1, 2019 to September 30, 2020

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 Coaliton 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

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Appendix A
Alabama Clean Fuel
Coalition Annual Report

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**ALABAMA PARTNERS FOR CLEAN AIR
VOLUNTARY AIR QUALITY PROGRAM
CMAQ 3715 PROJECT # 100064488**

**ALABAMA CLEAN FUELS COALITION, INC.
FY 2020 ANNUAL REPORT
OCTOBER 1, 2019 – SEPTEMBER 30, 2020**

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.
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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 in 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, the McCullough Oil Chevron in Trussville and at Evergreen Transportation in Calera. LNG continued to be available at the Clean Energy Fuels station on Daniel Payne Drive. EV charging is available at many public and private charging stations located in the region.

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3. I-59 EV Signage Pending
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7. I-565 EV Signage Pending

ACFC assisted ALDOT with the preparation of the Alabama corridor nomination submission and the RPC staff assisted ACFC with the preparation of infrastructure maps included in the submission.

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 cancelled and several were conducted virtually. These outreach efforts included organizing, planning, and conducting a site visit to the Waste Management CNG fueling facility in Tarrant and a National Drive Electric Week Event at Pepper Place. In addition, ACFC conducted other similar outreach efforts across the state which included participants from the Birmingham region at a Propane workshop in Montgomery, an EV infrastructure funding workshop in Montgomery, an EV workshop for AMEA members in Montgomery, an EV 1st Responder training webinar, and site

visits to the New Flyer Vehicle Innovation Center and transit bus manufacturing facility in Anniston to review CNG and Electric Buses and the University of Alabama to review their participation in the US DOE EcoCAR Mobility Challenge Program. 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.

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Appendix B
Jefferson County Department of Health
Annual Report

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**ALABAMA PARTNERS FOR CLEAN AIR
ANNUAL PARTNER ACTIVITY REPORT:**

**JEFFERSON COUNTY
DEPARTMENT OF HEALTH**



OCTOBER 2019– SEPTEMBER 2020

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, Meteorologist, serves on the Steering Committee, with Dr. Corey Masuca, Principal Air Pollution Engineer, acting as 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 did outreach into 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 2019 – September 2020. “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
10/2/2019	Orange	Orange	O ₃
10/3/2019	Orange	Yellow	O ₃
6/20/2020	Orange	Yellow	O ₃
6/27/2020	Orange	Yellow	PM _{2.5}

Contracts

As part of the larger Memorandum of Agreement between the RPC and JCDH for FY2020 (October 2019 – September 2020), 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 FY2020 budget. The details of JCDH’s budget are shown in the table below.

	OCT 2019 – SEP 2020
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 2019.

Monitoring Data

Air Quality Reports were sent out to members of APCA on a monthly basis. 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 were preliminary and were 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 2019. This is because air

monitoring data is on a calendar year basis (i.e., January 1, 2019 – December 31, 2019) and this report is based on a fiscal year basis (i.e., October 1, 2019 – September 30, 2020).

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 a 3-year period. The most recent 3-year monitoring period was 2017-2019. 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 2017-2019, no monitors violated the standard.

8-Hour Ozone Design Values (2017-2019)	
Monitor	Design Value (ppb)
Corner	62
Fairfield	67
Helena	66
Leeds	64
McAdory	66
North Birmingham	66
Tarrant	66

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 2017-2019. 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 2017-2019.

Annual PM_{2.5} Design Values (2017-2019)	
Monitor	Design Value (µg/m³)
Arkadelphia	10.0
Leeds	8.8
McAdory	8.8
North Birmingham	10.0
Wylam	9.0

24-Hour PM_{2.5} Design Values (2017-2019)	
Monitor	Design Value (µg/m³)
Arkadelphia	21

Leeds	18
McAdory	18
North Birmingham	21
Wylam	17

Air Quality Exceedances

Below are tables showing the exceedances of the 8-hour ozone standard from 2010 thru 2019 and exceedances of the 24-hour PM_{2.5} standard from 2010 thru 2019. Note that the EPA lowered the 8-hour ozone standard in 2015 so there was a lower threshold to violate the standard.

Exceedances of the 8-Hour Ozone Standard for 2010-2019

Station	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Corner	1	4	1	1	0	0	1	0	0	1
Fairfield	2	2	5	0	0	2	2	0	1	7
Helena	2	4	4	0	1	2	4	0	1	3
Hoover	4	7	3	0	0	2	2	0		
Leeds	2	5	4	0	0	0	1	0	1	1
McAdory	3	7	4	0	0	0	2	0	1	5
N. Birmingham	1	5	6	0	0	4	3	1	2	4
Pinson	3	2	3							
Providence	3	4	2							
Tarrant	8	9	6	1	0	4	3	1	3	2
Total	29	49	38	2	1	14	18	2	9	23

Exceedances of the 24-Hour Fine Particulate Matter (PM_{2.5}) Standard for 2010-2019

Station	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Arkadelphia					0	0	0	0	0	0
Leeds	0	0	0	0	0	0	0	0	0	0
McAdory	0	0	0	0		0	0	0	0	0
N. Birmingham	0	1	0	0	0	0	0	0	0	0
Wylam	0	2	0	0	0	0	0	0	0	0
Total	0	3	0	0	0	0	0	0	0	0

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Appendix C

Advance Consulting, LLC. Annual Report

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Advanced Consulting Annual Report

October 1, 2019 – September 30, 2020

Company Events- **12**

Community Events- **17**

Total Events- **29**

Total Pledge Cards from Company Events: **670**

Total Pledge Cards from Community Events: **1,424**

Total Pledge Cards/ Company and Community Events- 2,094

2018-2019- Children's of Alabama New Employee Orientation Meetings:

Children NEO Events :		Pledge Cards
Oct.14, 2019	52 attendees	52 pledge cards
Oct 28, 2019	40 attendees	40 pledge cards
Nov. 11, 2019	27 attendees	27 pledge cards
Nov. 25, 2019	18 attendees	18 pledge cards
Dec. 9, 2019	26 attendees	26 pledge cards
Jan. 06, 2020	50 attendees	50 pledge cards
Jan.20, 2020	33 attendees	33 pledge cards
Feb. 03, 2020	42 attendees	42 pledge cards
Feb. 17, 2020	40 attendees	40 pledge cards
Mar. 02, 2020	40 attendees	40 pledge cards

Total Pledge Cards from Children's NEO: 368

Other Company Events :

Total Pledge Cards from Other Company Events: 302

Oct 24, 2019	Southern Co. Health Fr	600 attendees	189 pledge cards
Feb 5, 2020	UAB Health Fair	200 attendees	113 pledge cards

Total Pledge Cards from Children's NEO and Other Company Events: 670

Community Events

2019 Cards	Event	Attendees	Pledge
Oct 1	Center Point Night Out	150	45
Oct 6	Bark in the Park Alabaster	300	51
Oct 10	Mardi Gras Sen/Health Fair	1000	292
Oct 11	Shelby Senior Health Fair	200	72
Oct 12	Shelby Iron Works Fest	300	86
Oct 19	Mt. Zion Health Fair	100	59
Oct 20	Barktober Fest/ Helena	200	83
Oct 22	Bessemer Tuesday Market	100	36
Oct 27	Barking at the Moon/ Fultondale	200	107
Nov 2	Moss Rock Festival	750	96
Nov 3	Moss Rock Festival	750	48
Nov 9	Harpersville Day	300	103
Nov 23	Montevallo Art Stalk	100	20
Dec 7	Christmas Village/Calera	200	77
Dec 8	Woodlawn Street Festival	150	51
Dec 14	Cahabazaar	500	112

January 2020 No community events.

February 2020 No community events

Community Events Continued- 2020 Cards	Attendees	Pledge
---	------------------	---------------

March 2020

March 5 Living a Better Life While Aging	90	86
--	----	----

***ALL EVENTS SCHEDULED FROM END OF MARCH
THROUGH SEPTEMBER 2020 EITHER CANCELLED BY
VENDOR OR RPC.**

Total Pledge Cards for Community Events:		1,424
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Appendix D

Alabama Clean Fuels Coalition Car Care Annual Report

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Alabama Partners for Clean Air

Car Care Program Final Report

October 1, 2019-September 30, 2020

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

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PROGRAM DESCRIPTION

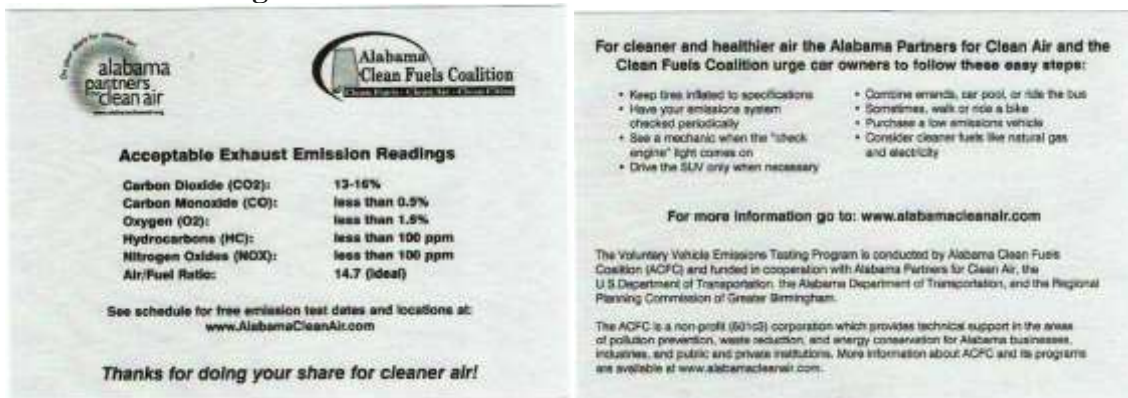
The long-standing APCA Car Care Program began in January of 2008 and has continued annually through 2020. Initially the emissions testing program was handled through Waste Reduction and Technology Transfer (WRATT), however in FY20 the WRATT board of directors decided to dissolve the organization and henceforth, Alabama Clean Fuels Coalition, Inc. (ACFC) began implementing the car care testing program.

Scheduled emissions test dates for FY2020 were suspended at the end of March 2020 due to concern over the COVID-19 pandemic. Taking the place of scheduled emission test dates was adoption of a "Request and Test" program where Express Oil Change and RPCGB referrals were individually tested and qualified for repair subsidy if indicated.

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 test dates and locations and a thank-you message. The right page contains a message from the Alabama Partners for Clean Air and Clean Fuels Coalition urging car owners to follow easy steps for cleaner air, such as keeping tires inflated, checking the emissions system, and considering cleaner fuels. It also provides the website for more information and a brief description of the ACFC's role.

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 2 – 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



1. For scheduled testing in March ACFC used two-man teams working two days per week during ozone monitoring season from March 2020 through September 2020. 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 (OTC) were read from the vehicle's OBD-11 computer with an INNOVA Model 3100 code reader.
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 release of automotive pollutants by encouraging owners to undertake qualified repairs by making these repairs more affordable.

Restrictions and Limitations for Qualification

Under the 2020 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 date (mo/yr.) manufactured.
- The repair must be directly related to diminished control of vehicle emissions (as indicated by exhaust gas analysis and 080-11 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 or Shelby Counties or car owner must be able to prove residency in either Jefferson or Shelby Counties (e.g., address on driver license, address on pay stub, rental/lease agreement).

- Car owner has 60 days from the date qualified to make the repair at a participating Express Oil Change facility.
- Only one repair qualification is allowed per vehicle.
- Cars currently covered under manufacturer's or 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, 2019 through September 30, 2020. These statistics represent fewer emission tests than in previous program years due to the suspension of testing during the 2020 COVID pandemic. There were:

- 11 testing events at EOC locations each staffed by 2 ACFC technicians.
- 93 Vehicles Tested (an average of ca. 9 vehicles per event).
- Over 400 data points recorded on-site.
- 22 Vehicles Qualified for Repair (about 24% of those tested); and
- 20 qualified vehicles were repaired (about 91% of those qualified)

The following table provides a summary of the emissions test statistics for FY19:

Month	Events	Number Tested	Qualified	#Repaired
Begin FY2020				
October 2019	0	1	1	3
November 2019	0	1	1	3
December 2019	0	1	1	1
January 2020	0	2	2	2
February 2020	0	0	0	0
March 2020	11	77	8	3
April 2020	0	3	1	0
May 2020	0	1	1	1
June 2020	0	1	1	1
July 2020	0	2	2	2
August 2020	0	3	3	3
September 2020	0	1	1	1
FY2020 Year's Totals	11	93	22	20

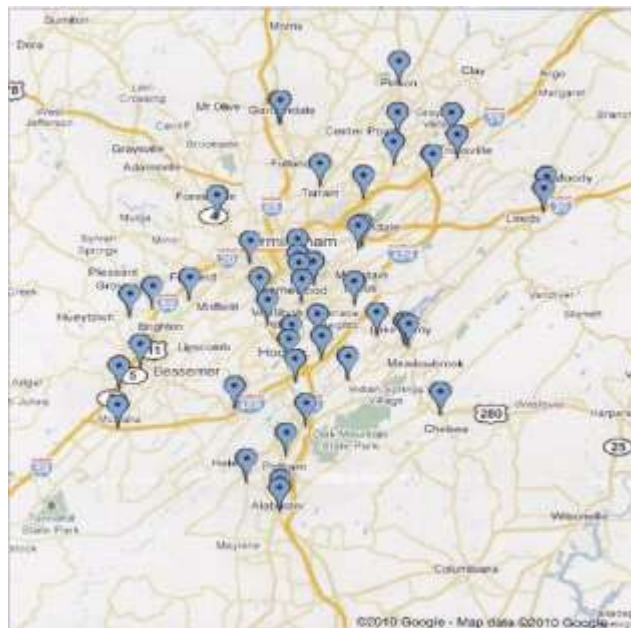
REPAIR STATISTICS

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 about \$18,000. Total EOC repair cost was approximately \$44,000. The average cost per repair was about \$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 2 – Emission System Type and Number of Repairs

Repair	Number Performed
O ₂ Sensor	1
Catalytic Converter	12
EVAP System	4
Other	3
Total	20

Figure 3. Map of Test Sites



The map of test sites in Figure 3 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. Other events were held at Alabama Power Company, and Jefferson County Department of Health, along with a live TV demonstration. These events resulted in the testing of an additional 15 vehicles.

AVERAGE COST OF MOST COMMON REPAIRS

Using the vehicles in which only one repair was performed, Table 3 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 total cost of the repair:

Table 3 – 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	\$500
Catalytic Converters	60%	\$900	\$1500
Evaporative Emission	30%	\$400	\$500

CONCLUSION

An important part of the Car Care Program is 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 OTC-MIL for certification because it allows 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 OTC (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

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Emission Reductions by Ozone Awareness Program from October 1, 2019 to September 30, 2020

TIP FY2020 CMAQ Ozone Program Project Potential Emissions Reductions						
#	Project	Emissions, lbs./Day			# of Days	Note
		VOC	NOx	PM _{2.5}		
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

#1 - VOC, NOx, and PM 2.5 Potential Emission Reduction Worksheet for Project 241, **Marketing/Public Outreach/Survey**

on Alert Days for October 1, 2019 - September 30, 2020 2/10/2021

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 Alert days for FY 2020 season [2]	8	days (weekdays)
Adjusted percentage of work trips due to COVID-19 pandemic in June 2020 [3] (CDR)	80%	
Average trip length for Jefferson County	24.2	miles per trip
Percentage of people knowing Ozone Alert days[4]	35.29%	%
Percentage of taking actions among people knowing 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[4]	25.71%	%
Percentage of taking actions among people knowing Ozone Alert days	51.85%	%
Percentage out of the 51.85% people taking carpool/telecommuting due to Ozone Awareness	7.14%	%
VMT reduced per day during Ozone Season [5]	159,741	veh-miles per day
VOC emission rate [6]	0.075504	grams/mile
NOx emission rate	0.269340	grams/mile
PM 2.5 Direct emission rate	0.010491	grams/mile

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 are 4 alert days in FY 2020. Assuming these days of one day before, the alert day, and two days after will be affected (weekends excluded). 4 of them in October 2019 and 4 of them in June 2020. The commuting travel pattern could be affected in these 8 weekdays.

[3] In June 2020, traffic decreases average 10% and there are 41% remote work due to COVID-19 pandemic.

[4]: A Survey of Jefferson and Shelby County Resident Attitudes and Actions, submitted by Connections, Inc.

[5]: Passenger automobile running emission rates, grams per mile based on rpegb's MOVES2014b run for July of 2019; VOC= Volatile Organic Compounds, NOx=Oxides of Nitrogen
PM = Particulate Matters; PM 2.5 Direct = PM 2.5 total + PM 2.5 Brakewear + PM 2.5 Tirewear.

[6] Passenger cars are 59% and passenger truck are 41%. All vehicles are at 48% freeway and 52% non-freeway, Average speed 55.4mph on freeway and 29.2mph on non-freeway in the

Emission Reductions and Cost Effectiveness

VOC_d Reductions = (VMT Reduced) x (VOC per mile emissions rate)

= (VMT reduced) x 0.075504 g/mile x (CDR)

76,709 grams for total of weekdays affected

9,589 grams per day affected

21.1 lbs per Alert day, 1 kilogram = 2.2046 lbs.

NOx_d Reductions = (VMT Reduced) x (NOx per mile emissions rate)

= (VMT reduced) x 0.26934 g/mile x (CDR)

273,637 grams for total of weekdays affected

34,205 grams per day affected

75.3 lbs per Alert day

PM 2.5 Direct Reductions = (VMT Reduced) x (PM per mile emissions rate)

= (VMT reduced) x 0.010491 g/mile x (CDR)

10,658 grams for total of weekdays affected

1,332 grams per day affected

2.9 lbs per Alert day

VOC Convert to 260 days

76,709 grams per year

0.30 kilograms/day (for 260days)

0.65 lbs/day (for 260 days)

NOx Convert to 260 days

273,637 grams per year

1.05 kilograms/day (for 260days)

2.32 lbs/day (for 260 days)

PM 2.5 Convert to 260 days

10,658 grams per year

0.04 kilograms/day (for 260days)

0.09 lbs/day (for 260 days)

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

\$136,416

capital cost

Project annual cost (AC) = (C)*(CRF)

\$137,780

\$ per year

Cost Effectiveness for VOC = (AC) / ((VOCd)*(D))

\$1,796

\$ per kilogram per year

Cost Effectiveness for NOx = (AC) / ((NOxd)*(D))

\$504

\$ per kilogram per year

Cost Effectiveness for VOC & NOx = (AC) / (((VOCd)+(NOxd))*(D))

\$393

\$ per kilogram per year

Cost Effectiveness for PM 2.5 Direct = (AC)/((PM2.5)*(D))

\$12,927

\$ per kilogram per year

#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, 2019 to September 30, 2020			2/10/2021
Description	Assumption	Note	
(1) Gasoline gallon equivalent of ethanol E85[1]	176,566	gallons for fiscal year 2020	
Gasoline gallon equivalent of biodiesel B20	2,860	gallons for fiscal year 2020	
Gasoline gallon equivalent of biodiesel B100	1,347	gallons for fiscal year 2020	
Gasoline gallon equivalent of Hydrogen	0	gallons for fiscal year 2020	
Gasoline gallon equivalent of Compressed Natural Gas (CNG) for bus	902,124	gallons for fiscal year 2020	
Gasoline gallon equivalent of CNG for non-bus and Liquefied Nature Gas (LNG)	1,225,079	gallons for fiscal year 2020	
Gasoline gallon equivalent of Propane. Liquefied petroleum gas	60,315	gallons for fiscal year 2020	
Gasoline gallon equivalent of Electric Car	423,006	gallons for fiscal year 2020	
Assuming average vehicle miles per gallon for bus, CNG	6.0	miles per gallon	
Assuming average vehicle miles per gallon for CNG,ethanol and propane based vehicles	20.0	miles per gallon	
Assuming average vehicle miles per gallon for light commercial truck biodiesel	7.8	miles per gallon	
Assuming average vehicle miles per gallon for passenger vehicles	23.6	miles per gallon	
Estimated bus miles traveled (VMTcngbus) based on CNG [2]	5,412,744	vehicle miles per year	
Estimated vehicle (light truck) miles traveled (VMTcngv) based on CNG	9,555,616	vehicle miles per year	
Estimated vehicle miles traveled(VMTe85) based on ethanol (E85)	3,531,320	vehicle miles per year	
Estimated vehicle miles traveled (VMTb20) based on Biodiesel (B20 and B100)	84,140	vehicle miles per year	
Estimated vehicle miles traveled (VMTh) based on Hydrogen	0	vehicle miles per year	
Estimated vehicle miles traveled (VMTpropane) based on Propane	1,206,300	vehicle miles per year	
Estimated vehicle miles traveled (VMTelectric) based on electric car	9,982,942	vehicle miles per year	
(2) Total daily Vehicle Mile Traveled reductions	0	vehicle miles per year	
(3) Potential Emission Reductions: alternative fuel vs Gasoline [3]			
(a) Diesel & CNG bus emission rate at a average speed 10 mph			
VOC emission rate for Diesel Bus	0.37585	grams/mile	
NOx emission rate for Diesel Bus, Noxbbox	3.80900	grams/mile	
PM 2.5 emission rate for Diesel Bus	0.17955	grams/mile	
VOC emission rate for CNG Bus	0.34113	grams/mile	
NOx emission rate for CNG Bus	2.39051	grams/mile	
PM 2.5 emission rate for CNG Bus	0.07032	grams/mile	
Bus VOC emission rate deference after converting Diesel to CNG, VOCbus	0.03472	grams/mile	
Bus NOx emission rate difference after converting from Diesel to CNG, Noxbux	1.41849	grams/mile	
Bus PM 2.5 emission rate difference after converting from Diesel to CNG, PM25bus	0.10924	grams/mile	
(b) Estimated emissions reduction for CNG other vehicles (light commercial truck diesel at 20mph for non freeway urban-50mph freeway)			
CNG other vehicle percentage reduction of VOC	9.2	% of reduction	
CNG other vehicle percentage reduction of NOx	0.0	% of reduction	
CNG other vehicle percentage reduction of PM 2.5	60.8	% of reduction	
VOC emission rate for light weight vehicles, diesel	0.16921	grams/mile	
NOx emission rate for light weight vehicles, diesel	1.08981	grams/mile	
PM 2.5 emission rate for light weight vehicles, diesel	0.05515	grams/mile	
CNG VOC emission rate difference for CNG vehicles, VOCav	0.01563	grams/mile	
CNG NOx emission rate difference for CNG vehicles, Noxav	0.00000	grams/mile	
CNG PM 2.5 emission rate difference for CNG vehicles, PM25v	0.03355	grams/mile	
(c) E85 passenger vehicle at 20mph for non freeway & 50mph for freeway urban			
VOC emission rate for gasoline passenger vehicles	0.06107	grams/mile	
NOx emission rate for gasoline passenger vehicles	0.24603	grams/mile	
PM 2.5 emission rate for gasoline passenger vehicles	0.01298	grams/mile	
VOC emission rate for E85 passenger vehicles	0.01365	grams/mile	
NOx emission rate for E85 passenger vehicles	0.07299	grams/mile	
PM 2.5 emission rate for E85 gasoline passenger vehicles	0.01016	grams/mile	
E85 VOC emission rate difference for passenger vehicles, VOCea	0.04742	grams/mile	
E85 NOx emission rate difference for passenger vehicles, Noxea	0.17304	grams/mile	
E85 PM 2.5 emission rate difference for passenger vehicles, PM25ea	0.00282	grams/mile	

(d) B20 & B100 emissions rate reduction for passenger vehicle at 20mph for non freeway and 50mph for freeway urban		
B20 & B100 percentage reduction of VOC	21.1	% of reduction
B20 & B100 percentage reduction of Nox	0.0	% of increase
B20 & B100 percentage reduction of PM 2.5	10.1	% of reduction
VOC emission rate for gasoline passenger vehicles	0.06107	grams/mile
NOx emission rate for gasoline passenger vehicles	0.24603	grams/mile
PM 2.5 emission rate for gasoline passenger vehicles	0.01298	grams/mile
B20 & B100 VOC emission rate difference for passenger vehicles, VOCabv	0.01289	grams/mile
B20 & B100 NOx emission rate difference for passenger vehicles, Noxabv	0.00000	grams/mile
B20 & B100 PM 2.5 emission rate difference for passenger vehicles, PM25abv	0.00131	grams/mile
(e) Hydrogen emissions rate reduction for bus		
Hydrogen percentage reduction of VOC	100.0	% of reduction
Hydrogen percentage reduction of Nox	100.0	% of increase
Hydrogen percentage reduction of PM 2.5	50.0	% of reduction
VOC emission rate for Diesel Bus	0.46554	grams/mile
NOx emission rate for Diesel Bus	3.94285	grams/mile
PM 2.5 emission rate for Diesel Bus	0.18610	grams/mile
Hydrogen VOC emission rate difference, VOCah	0.46554	grams/mile
Hydrogen NOx emission rate difference, Noxah	3.94285	grams/mile
Hydrogen PM 2.5 emission rate difference, PM25ah	0.09305	grams/mile
(f) Propane emissions rate reduction for passenger vehicle at 20mph for non freeway and 50mph for freeway urban		
Propane percentage reduction of VOC	90.0	% of reduction
Propane percentage reduction of NOx	90.0	% of reduction
Propane percentage reduction of PM 2.5	50.0	% of reduction
VOC emission rate for gasoline passenger vehicles	0.06107	grams/mile
NOx emission rate for gasoline passenger vehicles	0.24603	grams/mile
PM 2.5 emission rate for gasoline passenger vehicles	0.01298	grams/mile
Propane VOC emission rate difference for passenger vehicles, VOCap	0.05497	grams/mile
Propane NOx emission rate difference for passenger vehicles, Noxap	0.22143	grams/mile
Propane PM 2.5 emission rate difference for passenger vehicles, PM25ap	0.00649	grams/mile
(g) Electric Car emissions rate reduction for passenger vehicle at 20mph for non freeway and 50mph for freeway urban		
Electric Car emissions rate VOC	0.000000	grams/mile
Electric Car emissions rate NOx	0.000000	grams/mile
Electric Car emissions rate PM 2.5	0.003312	grams/mile
VOC emission rate for gasoline passenger vehicles	0.06107	grams/mile
NOx emission rate for gasoline passenger vehicles	0.24603	grams/mile
PM 2.5 emission rate for gasoline passenger vehicles	0.01298	grams/mile
Electric car VOC emission rate difference for passenger vehicles, VOCae	0.06107	grams/mile
Electric car NOx emission rate difference for passenger vehicles, Noxae	0.24603	grams/mile
Electric car PM 2.5 emission rate difference for passenger vehicles, PM25ae	0.009669	grams/mile
(5) VOC emission reduced [4]	3.238	kilograms per day
NOx emission reduced	28.955	kilograms per day
PM 2.5 Direct emission reduced	3.243	kilograms per day
VOC emission reduced in lbs. per day, 1 kilogram = 2.2046 lbs.	7.14	lbs. per day
NOx emission reduced in lbs. per day	63.83	lbs. per day
PM 2.5 Direct emission reduced in lbs. per day	7.15	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 [5]	\$47,279	capital cost
Project annual cost (AC) = (C)*(CRF)	\$47,752	\$ per year
Number of days project affected (D)	365	days for 1 year
Cost Effectiveness for VOC = (AC) / ((VOC)*(D))	\$40.40	\$ per kilogram per year
Cost Effectiveness for NOx = (AC) / ((NOx)*(D))	\$4.52	\$ per kilogram per year
Cost Effectiveness for VOC & NOx = (AC) / (((VOC)+(NOx))*(D))	\$4.06	\$ per kilogram per year
Cost Effectiveness for PM 2.5 = (AC) / ((PM2.5)*(D))	\$40.34	\$ per kilogram per year
Source: Regional Planning Commission Market Area, Alternative Fuels - Gallons or GGE's Dispensed, October 1, 2019 to September 30, 2020.		
[1] APCA Alternative Fuel Summary 2020		
[2] (Estimated Vehicle Miles Traveled) = (Gasoline gallon equivalent) x (Miles per gallon)		
[3] (Emissions rate changes) =(Emissions rates w ith regular fuel) - (Emission Rates w ith alternative fuels), emission rate is based on rpcgb's MOVES2014b run		
[4] (Emissions reduced) =Total of ((Estimated VMT) x (Emission rate difference))		
[5] Total project cost = Federal funds + local matches if needed		

#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			2/10/2021
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 engine running times while waiting (T)	0.70	hours	
# of picking up per day (DP)	1	times per day per vehicle	
VOC idling emission rate per car (Rvoc) ^[3]	2.18074	grams/idle hour	
NOx idling emission rate (Rnox)	0.96207	grams/idle hour	
PM 2.5 idling emission rates (PMf)	0.06639	grams/idle hour	
VOC start up emission rate per car (Svoc)	0.37930	grams/idle hour	
NOx start up emission rate per car (Snox)	0.48383	grams/idle hour	
PM 2.5 start up emission rate per car (PMs)	0.00482	grams/idle hour	
(2) Emission reduction calculations			
VOC emissions reduced per day (VOC r) = (TV) x ((T) x (Rvoc) - (DP) x (Svoc)) / 1,000	0.70	kilograms/day	
NOx emissions reduced per day (NOx r) = (TV) x ((T) x (Rnox) - (DP) x (Snox)) / 1,000	0.12	kilograms/day	
PM 2.5 emissions reduced (PM) = (TV) x ((T) x (PMf) - (DP) x (PMs)) / 1,000	0.03	kilograms/day	
VOC emissions reduced per day (VOC r) in lbs., 1kilogram = 2.2046lbs.	1.55	lbs./day	
NOx emissions reduced per day (NOx r) in lbs.	0.26	lbs./day	
PM 2.5 emissions reduced (PM) in lbs.	0.06	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)	\$44,793	capital cost	
Project annual cost (AC) = (C) * (CRF)	\$45,241	\$ per year	
Number of days project affected per year (Day)	180	days per year	
Cost Effectiveness for VOC = (AC) / ((VOC r) * (Day))	\$358	\$ per kilogram per year	
Cost Effectiveness for NOx = (AC) / ((NOx r) * (Day))	\$2,164	\$ per kilogram per year	
Cost Effectiveness for total of VOC & NOx = (AC) / (((VOC r) + (NOx r)) * (Day))	\$307	\$ per kilogram per year	
Cost Effectiveness for PM 2.5 = (AC) / ((PM) * (Day))	\$9,851	\$ 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 car idling emission rate, grams per hour and car start up emissions for parking 30 minutes or less, based on project level emissions of MOVES2014b (turn off engine, park car , pick up child from school, and restart car. Assume average time is about 30 minutes. Emissions is given for a weekday of January 2019)			

#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 3/12/2021

(1) October 1, 2019 to September 30 2020[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	12	0.46	0.06	0.40	0.13	0.03	0.10	17,383	83.44	20.86
Oxygen Sensor (O2)	4	0.44	0.02	0.42	0.10	0.00	0.10	17,383	29.20	6.95
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	12	0.31	0.00	0.31	0.00	0.00	0.00	17,383	64.66	0.00
Other qualified repairs	3	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									177.31	27.81
Total reductions by kilos/day after repair, 365 days									0.49	0.08
Total reductions by lbs./day after repair, 1 kilogram = 2.2046 lbs.									1.07	0.17
(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)								\$45,161	capital cost	
Project annual cost (AC) = (C)*(CRF)								\$45,613	\$ per year	
Number of days project affected per year (Day)								365	days per year	
Cost Effectiveness for VOC = (AC) / ((VOC r)*(Day))								\$386	\$ per kilogram per year	
Cost Effectiveness for NOx = (AC) / ((NOx r)*(Day))								\$2,460	\$ per kilogram per year	
Cost Effectiveness for total of VOC & NOx = (AC) / (((VOCr)+(NOxr))*(Day))								\$334	\$ 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, 2019 - September 30, 2020.

Appendix F

United Way of Central Alabama Annual Report

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**United Way of Central Alabama Healthy Communities Annual Report
FY 2020 Annual Report (October 1, 2019 – Sept 30, 2020)
Numbers served: 1,012.**

- Red Rock Tuesday segment with Jeh Jeh Pruitt on Oct. 1 to promote walking and biking as clean modes of transportation, and resuming of the bike rodeo program.
- PSA on 103.7 the Q promoting National Walk to School Day and AL Partners for Clean Air
- Bluff Park Elementary National Walk to School Day event on Oct. 2 with over 340 participants, media awareness, and education and outreach to all students
- Bicycle Rodeos at Oxmoor Valley Elementary (Oct. 24) 293 students and 12 volunteers, and Irondale Community School (Nov. 14-15) with 269 students and 8 volunteers.
- Due to COVID-19, the spring and summer schedule was cancelled. Events cancelled due to COVID-19:
 - March 13 at West End Academy
 - March 20 at Ephesus
 - March 24 at Birmingham Housing Authority (spring break camp)
 - April 3 at Central Park
 - April 16 at Avondale Elementary
 - May 6 at Bluff Park Elementary for National Bike to School Day
 - May 8 at Barrett Elementary
 - May 22 at Robinson Elementary
 - Summer Camps in June: Better Basics
- In September, we piloted a new online curriculum with Birmingham City Schools with little success. We will be rolling out a new, public at-large online format to teach the ABC Check program (Air, Brakes and Cranks) along with a clean air talking points in Spring 2021.



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Appendix G

The Johnson Management Group Annual Report

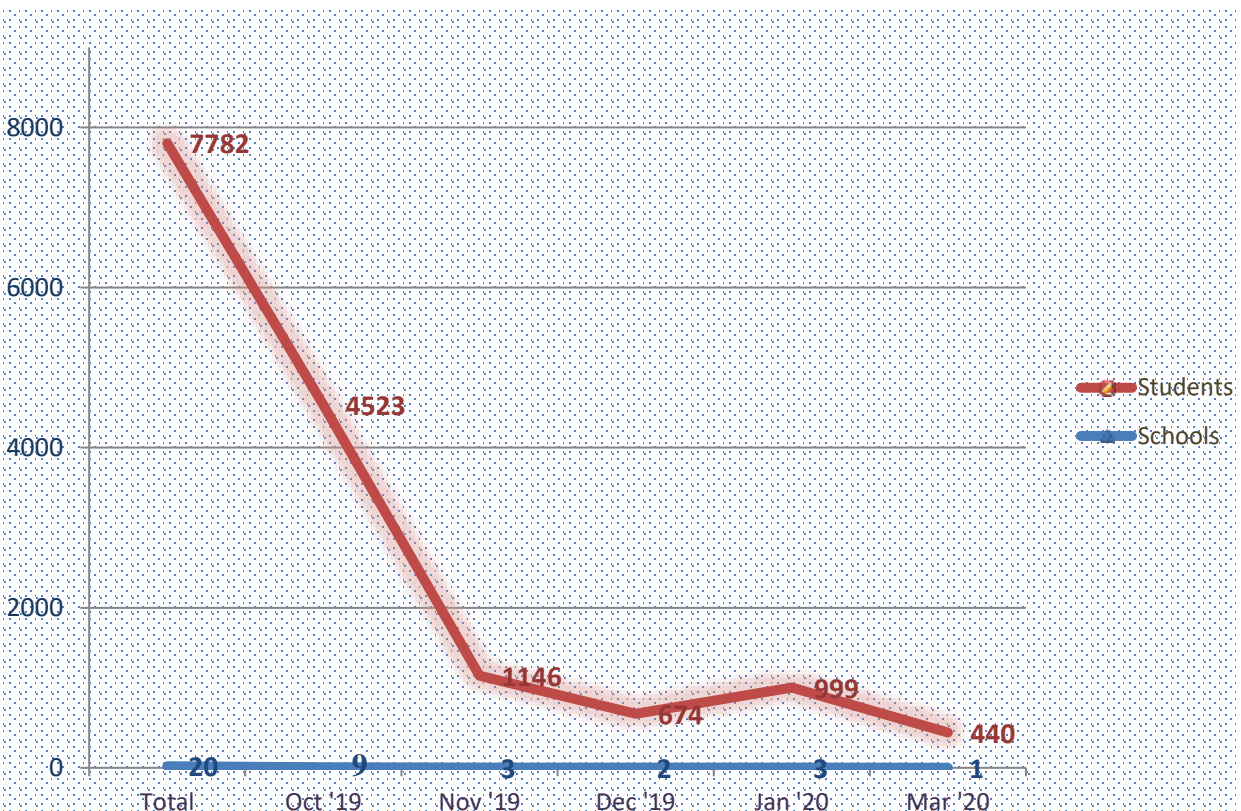
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Johnson Management Group Air Quality Report

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



Air Quality Vehicle Audits and Compliance

October 2019 and January 2020

