

**ALABAMA  
PARTNERS  
FOR  
CLEAN AIR**

[www.alabamacleanair.org](http://www.alabamacleanair.org)

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

**Annual Activity Report  
October 1, 2018 – September 30, 2019**

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# **APCA Annual Report**

## **October 1, 2018 – September 30, 2019**

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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## TABLE OF CONTENTS

<b>Executive Summary</b> .....	1
<b>Section 1: Air Quality Information</b> .....	3
Table 1: 8-Hour Ozone Design Values (2016-2018) .....	3
Table 2: Annual PM <sub>2.5</sub> Design Values (2016 -2018) .....	4
Table 3: 24-Hour PM <sub>2.5</sub> Design Values (2016 – 2018) .....	4
Table 4: Exceedances of the 8-Hour Ozone Standard .....	4
Table 5: Exceedances of the 24-Hour PM <sub>2.5</sub> Standard .....	5
<b>Section 2: Summary of Air Quality Forecasts and Monitoring Data</b> .....	7
Table 6: Summary of Alert Days .....	7
Figure 1: Air Quality Guide .....	8
Table 7: JCDH FY2019 Budget .....	8
<b>Section 3: Program Budget Summary</b> .....	9
Table 8: 2018-2019 Total Budget by Program Area .....	9
<b>Section 4: Marketing / Public Outreach</b> .....	11
Figure 2: Alabama Partners for Clean Air Website .....	12
Table 9: Air Quality Awareness Week Interviews .....	13
Figure 3: Spokesman Cycle Ads .....	13
Figure 4: Starnes Media Digital Ads .....	15
Figure 5: Starnes Digital Ads Email Openings .....	15
Figure 6: Birmingham Times Printed Ad .....	16
Table 10: Campaign Overview .....	16
<b>Section 5: Employer / Employee Outreach</b> .....	17
<b>Section 6: Science and Environmental Education Outreach</b> .....	25
Figure 7: JMG Outreach Fall 2018 .....	25
Figure 8: JMG Vehicle Audits Fall 2018 .....	26
Figure 9: JMG Outreach January 2019 .....	26
Figure 10: JMG Outreach February 2019 .....	27
Figure 11: JMG Vehicle Audits Spring 2019 .....	27
Figure 12: JMG Outreach Spring 2019 .....	28
Figure 13: JMG Outreach and Vehicle Audits September 2019 .....	28
<b>Section 7: Clean Cities / Alternative Fuels</b> .....	31
<b>Section 8: Voluntary Emissions Testing Program</b> .....	35
Figure 14: Information Card for Vehicle Owners .....	35
Figure 15: Sample Results Printout for Vehicle Owners .....	35
Table 11: 2018-2019 EOC Monthly Emission Testing Report .....	37
Table 12: Emission System Type and Number of Repairs .....	37
Figure 16: Map of Test Sites .....	38
Table 13: Most Common Repairs .....	38
Figure 17: Typical Emissions Test Events .....	39
<b>Section 9: Documented Emissions Reductions</b> .....	41
Table 14: Emission Reductions by Program .....	41
<b>Appendix A: Alabama Clean Fuel Coalition Annual Report</b>	
<b>Appendix B: Jefferson County Department of Health Annual Report</b>	
<b>Appendix C: Advance Consulting, LLC. Annual Report</b>	
<b>Appendix D: WRATT Foundation Annual Report</b>	
<b>Appendix E: Emissions Reductions Worksheets</b>	
<b>Appendix F: United Way of Central Alabama Annual Report</b>	
<b>Appendix G: The Johnson Management Group Annual Report</b>	

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## EXECUTIVE SUMMARY

This report is comprised of activities of the Alabama Partners for Clean Air (APCA) program from October 1, 2018 – September 30, 2019. The 8-hour ozone standard (0.070 ppm) 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<sub>2.5</sub> standard (35 ug/m<sup>3</sup>). Effective April 15, 2015, the EPA designated the Birmingham area as attainment of the 2013 annual PM<sub>2.5</sub> standard (12 µg/m<sup>3</sup>). The Birmingham area is currently designated as attainment of all of EPA's National Ambient Air Quality Standards through 2018.

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 **\$601,556**. Documented emissions reductions attributable to the APCA program was 12.19 pounds per day of hydrocarbons, 81.27 pounds per day of nitrogen oxides, and 7.76 pounds per day of PM<sub>2.5</sub>.

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## SECTION 1

### AIR QUALITY INFORMATION

#### MONITORING DATA

Air Quality Reports were sent out to members of APCA monthly. These reports include daily AQI information for all monitored criteria air pollutants in the Birmingham area, a listing of alerts that were issued, and daily meteorological data. It should be noted that information in these monthly reports 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 2018. This is because air monitoring data is on a calendar year basis (i.e., January 1, 2018 – December 31, 2018) and this report is based on a fiscal year basis (i.e., October 1, 2018 – September 30, 2019).

#### 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 4<sup>th</sup> highest daily 8-hour ozone value at each site over a 3-year period. The most recent 3-year monitoring period was 2016-2018. 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 2016-2018, no monitors violated the standard.

**TABLE 1**

<b>8-Hour Ozone Design Values (2016-2018)</b>	
<b>Monitor</b>	<b>Design Value (ppb)</b>
Corner	64
Fairfield	65
Helena	67
Leeds	66
McAdory	65
North Birmingham	65
Tarrant	67

#### FINE PARTICULATE MATTER (PM<sub>2.5</sub>)

Effective March 18, 2013, the EPA lowered the annual PM<sub>2.5</sub> standard to 12 µg/m<sup>3</sup>. A 3-year average of annual means is compared to the annual standard to determine compliance. The 24-hour PM<sub>2.5</sub> standard is a 3-year average concentration, based on the 98<sup>th</sup> percentile for each year, and is set at 35 µg/m<sup>3</sup>. The most recent 3-year monitoring period was 2016-2018. The fine

particulate matter (PM<sub>2.5</sub>) monitoring network consists of 5 monitors throughout Jefferson County. The tables below display the annual and 24-hour design values for PM<sub>2.5</sub> at each monitor throughout Jefferson County. There were no violations of the annual and 24-hour PM<sub>2.5</sub> standards for 2016-2018.

**TABLE 2**

<b>Annual PM<sub>2.5</sub> Design Values (2016-2018)</b>	
<b>Monitor</b>	<b>Design Value (µg/m<sup>3</sup>)</b>
Arkadelphia	10.5
Leeds	9.1
McAdory	8.7
North Birmingham	10.0
Wylam	9.0

**TABLE 3**

<b>24-Hour PM<sub>2.5</sub> Design Values (2016-2018)</b>	
<b>Monitor</b>	<b>Design Value (µg/m<sup>3</sup>)</b>
Arkadelphia	22
Leeds	18
McAdory	17
North Birmingham	21
Wylam	18

**AIR QUALITY EXCEEDANCES**

Below are tables showing the exceedances of the 8-hour ozone standard from 2009 thru 2018 and exceedances of the 24-hour PM<sub>2.5</sub> standard from 2009 thru 2018. 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 2009-2018**

<b>Station</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
Corner	0	1	4	1	1	0	0	1	0	0
Fairfield	1	2	2	5	0	0	2	2	0	1
Helena	1	2	4	4	0	1	2	4	0	1
Hoover	2	4	7	3	0	0	2	2	0	
Leeds	1	2	5	4	0	0	0	1	0	1
McAdory	1	3	7	4	0	0	0	2	0	1
N. Birmingham	0	1	5	6	0	0	4	3	1	2

Pinson	0	3	2	3						
Providence	0	3	4	2						
Tarrant	1	8	9	6	1	0	4	3	1	3
<b>Total</b>	<b>7</b>	<b>29</b>	<b>49</b>	<b>38</b>	<b>2</b>	<b>1</b>	<b>14</b>	<b>18</b>	<b>2</b>	<b>9</b>

**TABLE 5**  
**Exceedances of the 24-Hour Fine Particulate Matter (PM<sub>2.5</sub>) Standard for 2009-2018**

<b>Station</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
Arkadelphia						0	0	0	0	0
Leeds	0	0	0	0	0	0	0	0	0	0
McAdory	0	0	0	0	0					
N. Birmingham	0	0	1	0	0	0	0	0	0	0
Wylam	0	0	2	0	0	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

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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<sub>2.5</sub>) and ozone (O<sub>3</sub>) during the period October 2018 – September 2019. “Air Quality Alerts” are forecasted one to two days before the date of the alert. JCDH provides PM<sub>2.5</sub> forecasts year-round and the Alabama Department of Environmental Management (ADEM) provides O<sub>3</sub> 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**

<b>Date of Alert</b>	<b>Forecast AQI Color</b>	<b>Actual AQI Color</b>	<b>Pollutant</b>
5/7/2019	Orange	Orange	O <sub>3</sub>
8/16/2019	Orange	Yellow	O <sub>3</sub>
8/17/2019	Orange	Yellow	O <sub>3</sub>
9/9/2019	Orange	Orange	O <sub>3</sub>
9/12/2019	Orange	Orange	O <sub>3</sub>
9/13/2019	Orange	Orange	O <sub>3</sub>
9/16/2019	Orange	Orange	O <sub>3</sub>
9/17/2019	Orange	Orange	O <sub>3</sub>
9/18/2019	Orange	Yellow	O <sub>3</sub>
9/28/2019	Orange	Yellow	O <sub>3</sub>

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**

<b>AQI Values</b>	<b>Levels of Health Concern</b>	<b>Colors</b>
<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 RPCGB and JCDH for FY2019 (October 2018 – September 2019), 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-Huntsville (UAH). The website provides JCDH, ADEM, and the public with near real-time air quality monitoring data for the Birmingham area. The Baron Advance Meteorological Systems (BAMS) provides air quality forecast model information to JCDH and ADEM. Outreach materials for children were also a part of the FY2019 budget. The details of the JCDH’s budget are noted below.

**TABLE 7  
JCDH FY2019 Budget**

	<b>OCT 2018 – SEPT 2019</b>
<b>Birmingham Air Quality Website Maintenance by UAH</b>	\$18,200
<b>BAMS Subscription Meteorological Service</b>	\$48,000
<b>Outreach Giveaways</b>	\$5,800
<b>Total</b>	\$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 2018 – September 2019**

Program Area	Total Budget	Amount Invoiced <i>(includes match \$)</i>
Promotional Items / Print Material-RPC*	\$30,000	\$10,597
Media Buy-RPC**	\$41,250	\$41,241
Employer/Employee Outreach- Advanced Consulting	\$50,000	\$50,085
Idle Free Zones / School Education - Johnson Group	\$68,750	\$68,791
Idle Free Zones / School Education – UWCA	\$50,000	\$28,671
Clean Cities/Alternative Fuels – ACFC	\$200,000	\$45,695
EMPACT/Forecasts – JCDH	\$72,000	\$71,915
Diesel Retrofits – ACFC	\$60,000	\$0
Emissions Testing – WRATT	\$110,580	\$116,212
Vehicle Repair – WRATT	\$80,000	\$35,689
Program Administration – RPC**	\$113,750	\$132,660
Contingency – RPC	\$10,000	\$0
<b>Total</b>	<b>\$886,330</b>	<b>\$601,556</b>

\*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**

Alabama Partners for Clean Air 2019 marketing outreach campaign included a variety of media partners to reach the largest audience with messages about keeping our air clean. “Breathe Easy Alabama” was once again used as the theme of the overall campaign. The media outreach included onsite distribution of pledge cards at local events. A strategic digital campaign that included ads through Starnes Publishing in email blasts from The Hoover Sun, 280 Living, The Homewood Star, Village Living and Vestavia Voice ran throughout Air Quality season. A series of six digital messages were used to offer “Clean Air Tips” to online readers. In addition, online and print ads ran in The Birmingham Times throughout Jefferson and Shelby counties specifically targeting the African American community.

Alabama Partners for Clean Air partnered with local television stations including WBRC-TV (FOX6), WIAT-TV (CBS42) and WVTM-TV (NBC13) to get the message out to the masses through a strong targeted television campaign. Chief Meteorologist, J.P. Dice, featured an Air Quality Forecast in the late news during the campaign on WBRC-TV. In addition, WIAT-TV Chief Meteorologist, Ashley Gann, also featured an Air Quality Forecast in the late news. WVTM-TV provided targeted messages through an “over the top” campaign that targeted cord-cutters and millennials with messages on devices such as laptops, iPad and mobile phones.

A unique advertising tool was utilized called “Spokesman”. A local entrepreneur created a rolling billboard that he transports on a bicycle. These ads were used during local events in the downtown area including Birmingham Barons baseball games, Pepper Place, Sidewalk Film Festival and Restaurant Week.

Local interviews on radio and television were conducted throughout Air Quality Awareness Week to educate the public about ways they can make a difference in the reduction of vehicle emissions. The television messages highlighted people enjoying activities outside in the fresh air. One message focused on recreation with a couple in a canoe on the lake and a family enjoying a picnic at the park. A white fan was featured throughout both messages to provide consistency and a way for viewers to remember the theme and call to action, “Breathe Easy Alabama”. The second message was designed to draw attention to carpooling and focus on the important impact sharing a ride can make on the air quality. This message featured four co-workers meeting in a parking lot and sharing a ride to work.

#### **PLEDGE CARDS:**

Pledge cards were distributed at outreach events throughout Jefferson and Shelby Counties to get people actively involved in the thinking about making positive changes that will make a difference in the quality of the air.

#### **DIGITAL CAMPAIGN:**

The website [alabamacleanair.org](http://alabamacleanair.org) provided 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. The digital campaign provided a click through to the APCA website.

**FIGURE 2**  
**Alabama Partners for Clean Air website**



**Media Release Outreach and Media Interviews:**

On Air Quality Alert Days media releases were sent to local television and radio stations in addition to Al.com. 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**

A series of interviews were done to promote Air Quality Awareness Week on both radio, television and social media. Ashley Gann, Chief Meteorologist at CBS42 produced a series of videos about air quality and offered tips on keeping the air clean. These videos were posted on her social media platforms. In addition, J.P. Dice, Chief Meteorologist at FOX6 conducted an interview with APCA representative Matt Lacke that ran on WBRC-TV's weather podcast.

**TABLE 9**  
**Air Quality Awareness Week Interviews**

<u>Date</u>	<u>Time</u>	<u>Station</u>	<u>Program</u>	<u>Total A18+</u>
4/29/2019	12:00pm- 12:30pm	WIAT-TV	Midday News	19,600
5/1/2019	8:00am-9:00am	Birmingham Mountain Radio	Morning Blend	6,900
5/2/2019	9:00am- 10:00am	WBMA-TV	Talk of Alabama	11,400
5/3/2019	8:00am-8:30am	WZRR	Matt & Aunie Show	13,300
5/4/2019	7:00am-8:00am	WIAT-TV	CBS Morning News	20,000
5/4/2019	7:00am-8:00am	WIAT-TV	CBS Morning News	19,300
			<b>Total Adult impressions</b>	<b>90,500</b>

Source: NSI May 2019-television and Arbitron Spring Book 2019-radio

**Spokesman**

APCA was featured throughout downtown Birmingham during Air Quality Awareness Week with ads on the back of a bicycle. These ads were utilized during high traffic events including Birmingham Barons games, Pepper Place Market, Sidewalk Film Festival and Restaurant Week.

**FIGURE 3**  
**Spokesman Cycle Ads**



**TELEVISION CAMPAIGN**

**WBRC-TV**

129 commercials aired in Good Day, Evening News, Late News, Late Fringe and weekend (including \$6,425.00 in added value with discounted rates and no charge spots) 60 commercials aired on Bounce at no charge (Value of \$1,500.00) Air Quality Update in late news throughout the campaign (Value of \$5,250.00) Table at Women’s Expo (Value \$1,200.00)

Interview on J.P. Dice Podcast (Value \$1,000.00)  
Total added value = \$15,375.00

### **WVTM-TV/Hearst Media Over the Top Campaign, OTT**

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 services such as Hulu, Amazon and more. 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 with an average of 2,035 impressions per day. The top delivering platform was Roku with 61% followed by Pluto with 38.5%.

Total added value = \$1,000.00 (including no charge spots on METV and WVTM)

### **WIAT-TV CBS42**

Chief Meteorologist Ashley Gann created a 5-part series on Air Quality that aired on the WIAT-TV Weather page online. (Value of \$1,500.00)

An Air Quality Forecast was included on the late news throughout the campaign. (Value of \$1,500.00)

164 commercials aired in Early Morning News, Midday News, Evening News, Late News and Weekend News

33 bonus spots aired at no charge (Value of \$1,650.00)

Living Local Segment with Lilian Lalo. The station produced and aired a 3-minute segment featuring Matt Lacke from Jefferson County Department of Health and Chip Miller from WRATT discussing emissions testing and clean air tips. This segment aired a total of 3 times during Air Quality Awareness Week and was also featured on CBS42 Living Local Facebook page. (Value of \$3,500.00)

Total added value = \$8,150.00

### **Starnes Media**

Starnes Media produces and distributes publications in local communities throughout Jefferson and Shelby Counties including Hoover, Mountain Brook, 280 Corridor and Vestavia. 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. APCA was given the non-profit rate which is 50% of rate card for a value of \$1,000.00. A total of 59,452 of these emails were opened.

Total added value - \$1,000.00

**FIGURE 4**  
**Starnes Media Digital Ads**



**FIGURE 5**  
**Starnes Media Digital Ads Email Openings**

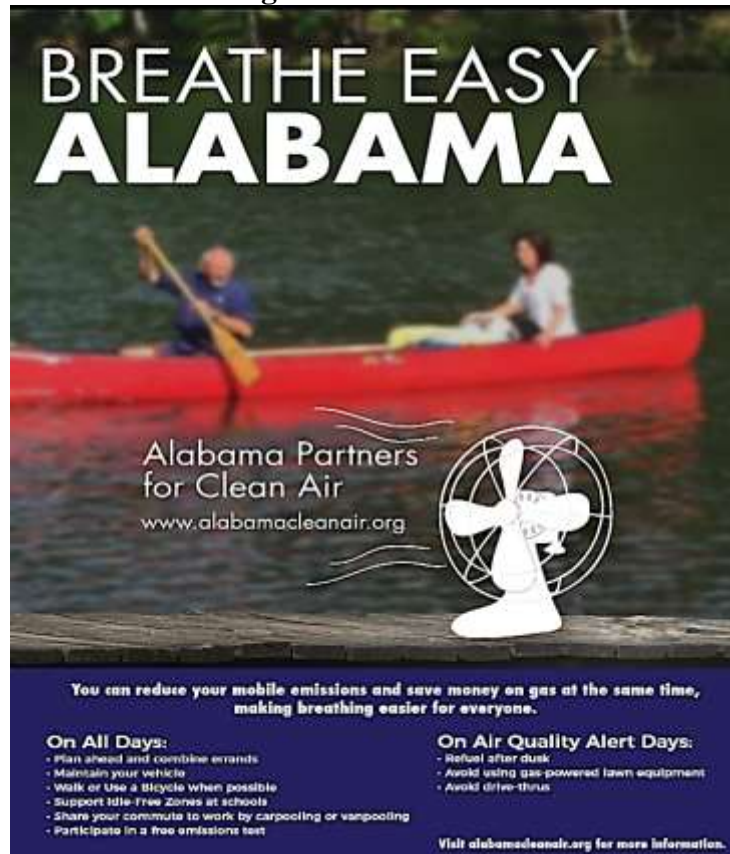
Date	Opened	Date	Opened	Date	Opened	Date	Opened
7/16/2019	1,071	7/19/2019	604	7/16/2019	408	7/16/2019	553
7/17/2019	1,470	7/23/2019	746	7/17/2019	403	7/18/2019	537
7/19/2019	1,075	7/24/2019	774	7/18/2019	411	7/19/2019	434
7/22/2019	1,156	7/25/2019	789	7/19/2019	389	7/23/2019	583
7/23/2019	1,218	7/29/2019	789	7/22/2019	471	7/24/2019	658
7/24/2019	1,155	7/30/2019	750	7/23/2019	394	7/26/2019	565
7/25/2019	1,219	7/31/2019	714	7/25/2019	491	7/29/2019	515
7/29/2019	1,229	8/1/2019	723	7/26/2019	427	7/30/2019	726
7/30/2019	1,245	8/2/2019	723	7/30/2019	372	8/2/2019	741
7/31/2019	1,299	8/5/2019	752	7/31/2019	417	8/5/2019	692
8/1/2019	1,219	8/6/2019	689	8/1/2019	373	8/6/2019	589
8/6/2019	1,232	8/7/2019	651	8/7/2019	395	8/7/2019	701
8/7/2019	1,273	8/8/2019	665	8/8/2019	447	8/9/2019	716
8/8/2019	1,338	8/9/2019	807	8/9/2019	390	8/13/2019	712
8/13/2019	1,232	8/13/2019	706	8/13/2019	366	8/14/2019	734
8/14/2019	1,158	8/14/2019	793	8/14/2019	390	8/15/2019	786
8/15/2019	1,203	8/15/2019	716	8/15/2019	395	8/16/2019	671
8/16/2019	1,114	8/16/2019	697	8/20/2019	392	8/20/2019	583
8/19/2019	1,170	8/22/2019	628	8/21/2019	362	8/21/2019	671
8/22/2019	1,104	8/23/2019	701	8/22/2019	349	8/22/2019	646
<b>TOTALS</b>	<b>24,180</b>		<b>14,417</b>		<b>8,042</b>		<b>12813</b>

**Birmingham Times**

BT Group, The Birmingham Times is a print publication 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 the weeks of 7/18, 7/25, 8/1, 8/8, 8/15 and 8/22. In addition to the

discounted rate for the ads, BT Group featured digital ads each week on [www.birminghamtimes.com](http://www.birminghamtimes.com). A total added value of \$1,200.00

**FIGURE 6**  
**Birmingham Times Printed Ad**



**TABLE 10**  
**Campaign Overview**

STATION	Paid ads	Delivered ads	Added Value
WBRC	129	189	\$15,375.00
WIAT-TV	164	197	\$8,150.00
WVTM/Hearst	74,373 impressions	79,358 impressions	\$1,000.00
<b>TOTAL TV</b>	<b>293</b>	<b>386</b>	<b>\$24,525.00</b>
<b>Digital/Print</b>			
Spokesman	15 hours	15 hours	
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
<b>Total Digital/Print</b>			<b>\$2,200.00</b>
		<b>Total Net Cost</b>	<b>Total Added Value</b>
		<b>\$26,200.00</b>	<b>\$26,725.00</b>

## 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 2018 to September 2019, 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 30 company and civic events and 83 community events. Advanced Consulting also had a total of 7,291 pledge cards signed through the 113 company, civic group, and community events attended.

#### **2018-2019- Children's of Alabama New Employee Orientation Meetings: 1,038**

<b>Dates</b>	<b>Attendees</b>	<b>Pledge Cards</b>
Oct.0 1, 2018	24 attendees	24 pledge cards
Oct 15, 2018	34 attendees	32 pledge cards
Oct. 29, 2018	36 attendees	36 pledge cards
Nov. 12, 2018	19 attendees	19 pledge cards
Nov. 26, 2018	18 attendees	18 pledge cards
Dec. 10, 2018	23 attendees	23 pledge cards
Jan. 07, 2019	40 attendees	40 pledge cards
Jan.21, 2019	46 attendees	46 pledge cards
Feb. 04, 2019	50 attendees	50 pledge cards
Feb. 18, 2019	42 attendees	42 pledge cards
Mar. 04, 2019	25 attendees	25 pledge cards
Mar. 18, 2019	24 attendees	24 pledge cards
April 01, 2019	34 attendees	34 pledge cards

<b>Dates</b>	<b>Attendees</b>	<b>Pledge Cards</b>
April 15, 2019	24 attendees	24 pledge cards
April 29, 2019	27 attendees	27 pledge card
May 13, 2019	57 attendees	57 pledge cards
June 10, 2019	85 attendees	85 pledge cards
June 24, 2019	64 attendees	64 pledge cards
July 08, 2019	80 attendees	80 pledge cards
July 22, 2019	50 attendees	50 pledge cards
Aug 05, 2019	54 attendees	54 pledge cards
Aug 19, 2019	47 attendees	47 pledge cards
Sept 16, 2019	85 attendees	85 pledge cards
Sept 30, 2019	52 attendees	52 pledge card

**Other Company Events:**

**Other Company Events: 6**

**Total Pledge Cards from Other Company Events: 651**

Feb 6, 2019	UAB Health Fair	200 attendees	80 pledge cards
April 23, 2019	Mercedes	150 attendees	38 pledge cards
April 24, 2019	Mercedes	75 attendees	41 pledge cards
May 1, 2019	Jeff County Health Dep.	200 attendees	52 pledge cards
May 16, 2019	Bio-Horizons	150 attendees	54 pledge cards
June 21, 2019	Children's Health Fair	700 attendees	386 pledge cards

**Total Pledge Cards from Children's NEO and Other Company Events: 1,689**



## **Community Events**

<b>2018</b>	<b>Event</b>	<b>Attendees</b>	<b>Pledge Cards</b>
Oct 2	Center Point Night Out	150	40
Oct 6	Homewood Fire and Safety Day	100	23
Oct 6	Bark in the Park Alabaster	300	45
Oct 6	Eastlake Farmer's Market	100	31
Oct 10	Shelby Senior Summit	300	50
Oct 11	Mardi Gras Sen/Health Fair Fairfield.	1000	202
Oct 13	Heritage Festival/ JCA/Irondale	200	80
Oct 18	Community Partners Fair/Bham City	100	34
Oct 21	Barktober Fest/ Helena	200	35
Oct 25	Energy Center Safety & Health Fair	600	141
Oct 27	Helena Fall Craft Bazaar	100	30
Oct 27	Craft Fair Trussville	100	56
Oct 28	Barking at the Moon/ Fultondale	200	83
Nov 10	Harpersville Day	300	120
Nov 17	Day of Transition Ravizzeenation	100	42
Nov 17	Helena Holiday Market	150	50
Dec 2	Woodlawn Street Festival	150	40
Dec 8	Cahabazaar	500	75
Dec 15	Pop Up with a Purpose/ Fairfield	150	91
January 2019	NO COMMUNITY EVENTS		
Feb 8	Mercedes Marathon Expo	400	129

<b>Community Events Continued-2019</b>		<b>Attendees</b>	<b>Pledge Cards</b>
Feb 9	Mercedes Marathon Expo	600	123
Mar 9	Columbiana Market Day	150	28
Mar 19	Be Ready at Samford	150	43
Mar 21	Birmingham City Parent Camp	100	32
April 5	ARC Stories- Botanical Gardens	300	22
April 6	Woodlawn Street Fest	500	76
April 6	Holiday Market/ Helena	300	58
April 10	BCBS Nat Walk at Lunch/Lynn P.	2000	144
April 20	Earth Day Botanical Gardens	300	78
April 23	Barron's Game	1000	48
April 27	Celebrate Hoover Day	3000	80
April 27	Calera Strawberry Festival	200	35
April 27	Pepper Place	500	105
May 2	Shelby County Senior Picnic	750	202
May 4	Alabama Folk Fair/ Bessemer	150	43
May 4	Southside CME Health Fair	150	51
May 11	Shilough Springs Health Fair	150	38
May 18	Weatherfest	500	106
May 18	Pelham Palooza	300	56
May 21	Trussville Tuesday Market	150	41
May 24	Pinson Farmer's Market	100	38
May 25	Eastlake Farmer's Market	100	51

<b>Community Events Continued-2019</b>		<b>Attendees</b>	<b>Pledge Cards</b>
May 29	Shades Valley Farmer's Market	75	28
June 2	Vulcan's Birthday Bash	300	111
June 8	Helena Farmer's Market	150	33
<b>June 8</b>	Eastlake Fishing Rodeo	200	92
June 11	West Homewood FM	200	52
June 15	Dream Big Resource Fair	150	42
June 15	Farmer's Market Trussville.	150	67
June 18	Montevallo Farmers Market	150	28
June 19	Rocky Ridge Farmer's Market	100	43
June 22	Cahabazaar	500	87
June 25	Bessemer Farmer's Market	100	38
June 27	Center Point Farmer's Market	150	30
June 27	I Love America Night	500	81
July 13	Lee Branch Farmer's Market	100	65
July 13	Hueytown Farmer's Market	100	59
July 25	Leeds Thursday Market	100	28
July 26	Pinson Farmer's Market	200	42
July 27	Vincent In the Park	300	132
July 27	Valleydale Farmer's Market	100	29
July 28	Lake Wilborn Farmer's Market	100	31
July 30	Bessemer Farmer's Market	100	28
Aug 1	Leeds Thursday Night market	200	53

<b>Community Events Continued-2019</b>		<b>Attendees</b>	<b>Pledge Cards</b>
Aug 6	West Homewood Farmer's Market	200	57
Aug 10	Woodlawn Street Market	500	136
Aug 12	Montevallo FM	100	39
Aug 16	Fox 6 Woman's Health Fair	500	212
Aug 17	Community Day/ Pratt City	100	45
Aug 17	Bessemer FM	100	43
Aug 21	Rocky Ridge Farmer's Market	100	27
Aug 22	Center Point Farmer's Market	100	31
Aug 23	Fultondale Founder's Weekend	150	51
Aug 24	Fultondale Founder's Weekend	500	102
Aug 24	Lee Branch FM	150	33
Sept 6	Pinson Farmer's Market	100	53
Sept 7	Trussville Farmer's Market	150	42
Sept 7	Eastlake Farmer's Market	150	38
Aug 17	Community Day/ Pratt City	100	45
Aug 17	Bessemer FM	100	43
Aug 21	Rocky Ridge Farmer's Market	100	27
Aug 22	Center Point Farmer's Market	100	31
Aug 23	Fultondale Founder's Weekend	150	51
Aug 24	Fultondale Founder's Weekend	500	102
Aug 24	Lee Branch FM	150	33
Sept 6	Pinson Farmer's Market	100	53

<b>Community Events Continued-2019</b>		<b>Attendees</b>	<b>Pledge Cards</b>
Sept 7	Trussville Farmer's Market	150	42
Sept 7	Eastlake Farmer's Market	150	38
Sept 12	Gardendale	100	29
Sept 17	Bessemer FM	100	35
Sept 20	Health & Senior Resource Expo	500	304
Sept 21	Pepper Place Farmer's Market	500	89
Sept 28	Whistle Stop	1000	142
<b>Total Pledge Cards for Community Events:</b>			<b>5,602</b>

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## SECTION 6

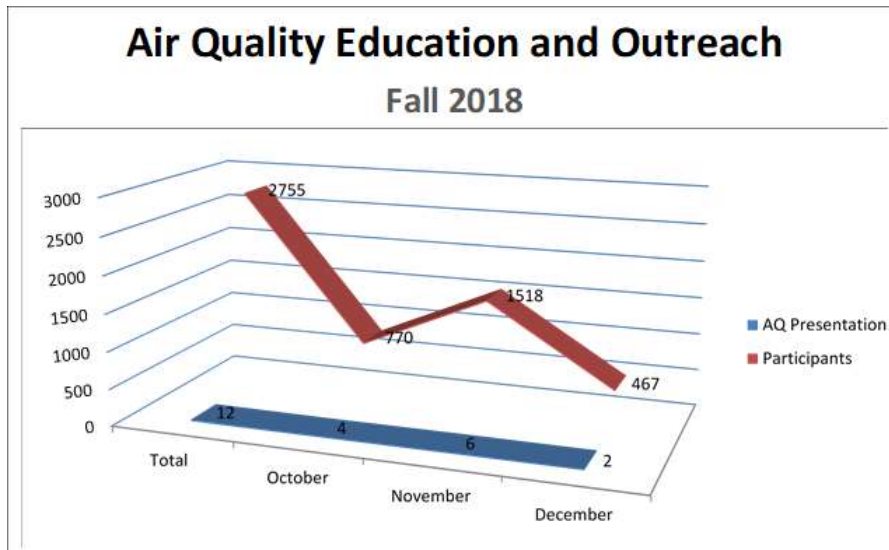
### SCIENCE AND ENVIRONMENTAL EDUCATION OUTREACH

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.

This fiscal year end report summarizes the air quality awareness, education and outreach provided from October 2018 through September 2019. The following figures include detailed information about their positive social impact on Birmingham and the surrounding communities.

**FIGURE 7**  
**JMG Outreach – Fall 2018**



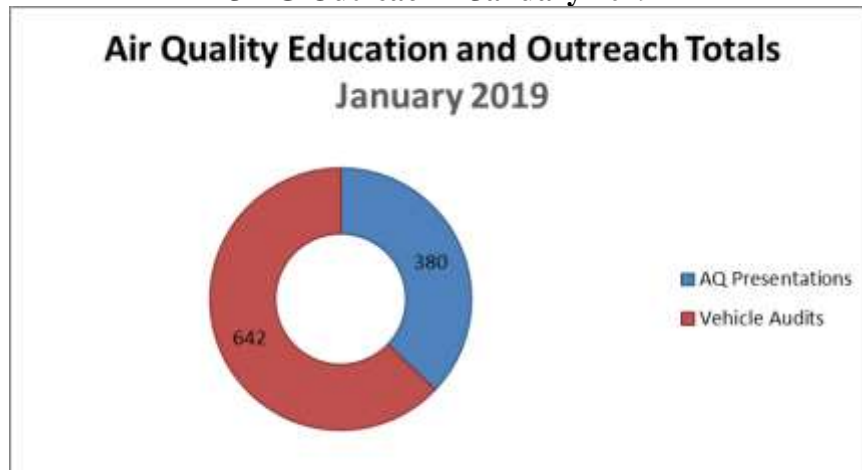
During the month of October, we conducted 4 presentations, reaching 770 students at the following schools: Putnam, Midfield, and Ossie Mitchell. The following month, we conducted 6 presentations reaching a total of 1518 individuals consisting of students at Hayes, West End and Jones Valley as well as parents and conference attendees at Civitan Club and ASHPED. In December, we conducted 2 presentations, reaching 467 students at the following schools: Central Park (402) and St. Vincent's (65).

**FIGURE 8**  
**JMG Vehicle Audits – Fall 2018**



During the month of October, two audits were conducted where we provided air quality awareness and education to a total of 257 parents in carpool lines at the following schools: Smith Middle (115) and Midfield (142). The following month, three audits were conducted where we provided air quality awareness and education to a total of 310 parents in carpool lines at the following schools: Robinson (103), Jones Valley (105), and Barrett (102). In December, two audits were conducted where we spoke to a total of 215 parents in carpool lines at the following schools: Central Park (113) and Arrington (102). Information was provided to 1,773 students and 982 adults with over 200 of the adult contact occurring at the Alabama State Association for Health, PE, Recreation and Dance (ASAHPEd) Conference.

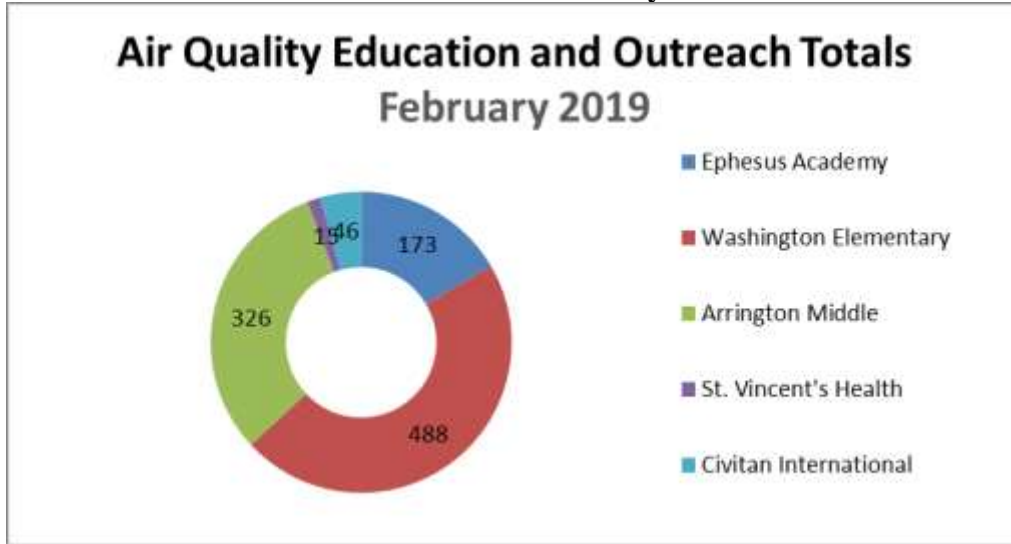
**FIGURE 9**  
**JMG Outreach – January 2019**



JMG held several presentations to include 2 school sessions reaching 380 students. We held 6 audits with total parental touch of 642 parents and delivered pieces of literature during carpools.

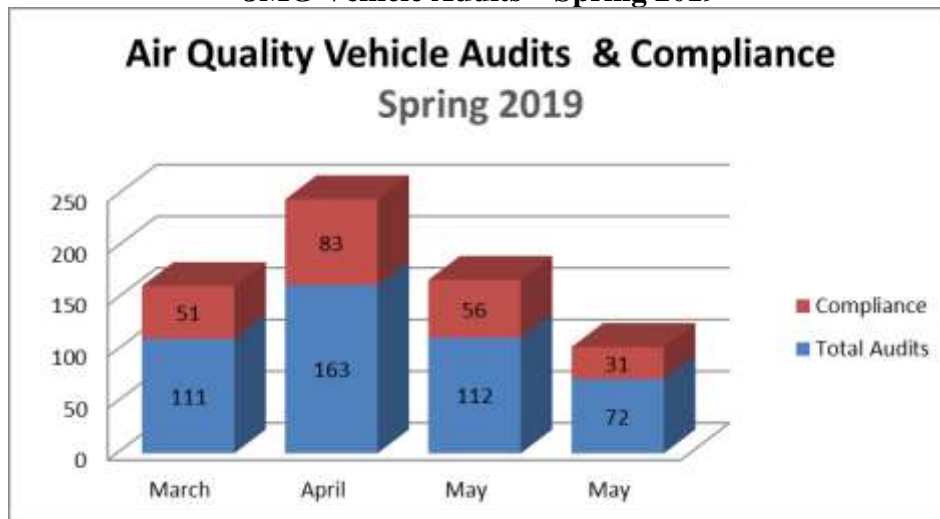


**FIGURE 10**  
**JMG Outreach – February 2019**



Feb - Johnson Management Group had several planning sessions and meetings. We participated in 2 career days, Ephesus Academy (173) students and Washington Elementary (488) students during February. We held 1 AQ day at Arrington Middle (326) students and spoke to two civic groups St Vincent's Health (15) staffers and Civitan (46) attendees. We touched a total of 1,048 with the clean air message and distributed the same in brochures and giveaways.

**FIGURE 11**  
**JMG Vehicle Audits – Spring 2019**

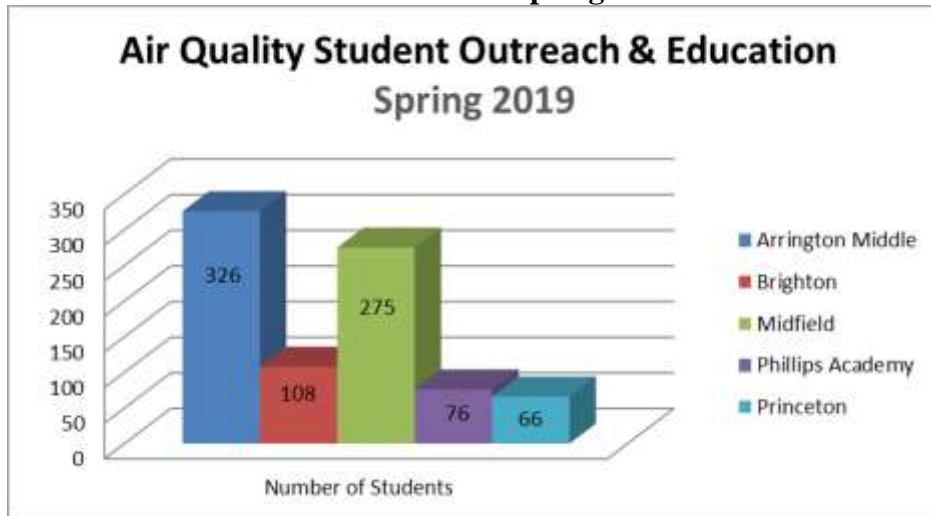


March - We had 1 audit handing out 111 pieces of literature, of the 111 vehicles 51 complied with request to shut down engines while idling.

April - We conducted 2 audits handing out 163 pieces of literature, of the 163 vehicles 83 complied with request to shut down engines while idling and were rewarded with an air quality gift.

May - JMG held several meeting and presentations. A total of 2 audits were held, 112 cars at Avondale with 56 turning off the engines and 72 at Central Park with 31 turning off their engines.

**FIGURE 12**  
**JMG Outreach – Spring 2019**

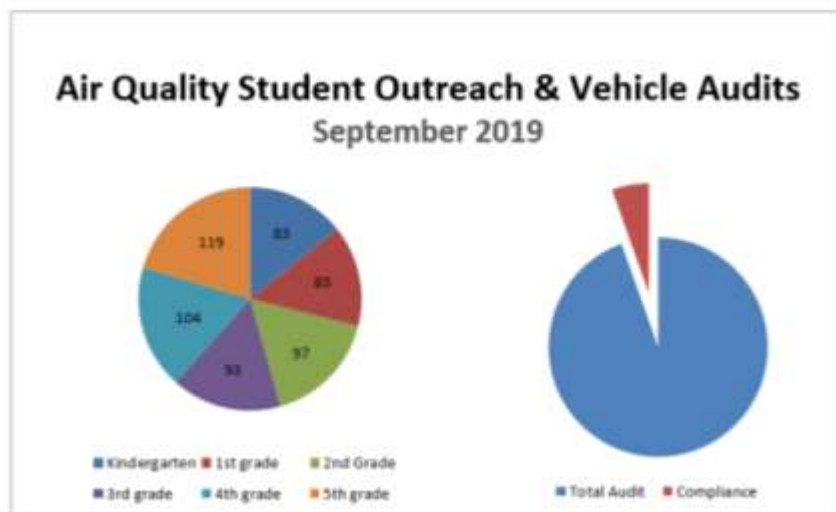


February - We held 1 AQ day at Arrington Middle (326).

April - We conducted 3 presentations at Brighton and Midfield Schools. 108 @ Brighton and 275 at Midfield totaling 383 students being air quality educated. This coupled with the awareness provided to parents, gives a grand total educated of 546 for April.

May - During presentations we had 76 pledge cards signed by Phillips students and 66 pledge cards signed by the students of Princeton School.

**FIGURE 13**  
**JMG Outreach & Vehicle Audits – September 2019**



Sept - We conducted 1 presentation, reaching 581 students 83 kindergarteners, 85 1<sup>st</sup> graders, 97 2<sup>nd</sup> graders, 93 3<sup>rd</sup> graders, 104 4<sup>th</sup> graders and 119 5<sup>th</sup> graders. One audit at Clay Elementary was conducted. We spoke to 104 parents in carpool lines and 6 shut off their engines.

## 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 2018-19, through various community events, Healthy Communities impacted 2,831 participants and 193 volunteers. In addition to events and education, our outreach efforts included information via the United Way of Central Alabama website, and a radio PSA. Other accomplishments include the highlights below:

- UWCA worked with Washington K8 to coordinate a National Walk to School Day event in partnership with Children's of Alabama. The Walk was preceded with education to students, and a presentation to Birmingham City Council to inform them of the Washington K8 School Travel Plan. Washington K8 School officially adopted the plan in August 2018. The plan was the culmination of a year-long effort to survey existing conditions, receive community input, and create recommended solutions to increase safety and walkability in the area.
- UWCA partnered with JCCEO to conduct a pedestrian awareness project and art contest at 18 different head start locations.
- UWCA participated in Red Rock Tuesday with Jeh Jeh Pruitt (FOX 6 Good Day Alabama) at Barrett Elementary in partnership with Freshwater Land Trust as part of our education and awareness efforts.
- UWCA replaced the stolen bicycle trailer and resumed its bicycle rodeo program in late 2019. Three bicycle rodeos were held, and eight are already scheduled spring 2020.

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## 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 FY2019, alternative fuel usage in Jefferson and Shelby Counties totaled 2,582,267 gallons or GGE’s (gasoline gallon equivalent). This included approximately 211,000 gallons of E85 Ethanol, 3,300 gallons of B20 Biodiese, 1,900 gallons of B100 Biodiesel, 50,700 GGE’s of Propane, 1,841,000 GGE’s of CNG, 50,000 GGE of LNG, 419,000 GGE’s of electricity representing approximately 22 million electric miles driven, and 4500 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 9.2% from FY 2018. 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), Veal Convention Services (Propane), Evergreen Transportation (CNG), Regions Bank (Propane & Electricity), Groome Transportation (Propane), Adkins On-Time Service (Propane), Melton Automotive (CNG), JNB Logistics (Propane), 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 April 2019, FHWA approved the ALDOT submitted nominations for Alternative Fuel Corridor designations in Alabama under Section 1413 of the FAST Act. Four of the following approved "Clean Corridors" traverse the Birmingham Region:

1. I-65 AL/TN Border to Montgomery Propane - Signage Ready
2. I-65 Montgomery to Mobile Propane - Signage Pending
3. I-59 Propane - Signage Ready
4. I-20 Propane – Signage Ready
5. I-85 Propane – Signage Ready
6. U.S. 280 Propane – Signage Ready

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 is a partner on a project that was awarded \$4.6 million from the US DOE in 2017 for the Southeast Alternative Fuels Deployment Project. In April 2019 a slow-fill CNG fueling station was opened as part of this project in Tarrant for the Waste Management refuse truck fleet operating in the region.

ACFC actively assisted the APCA partnership in promoting the program goals and objectives by conducting outreach efforts to community sectors and organizations in Jefferson and Shelby Counties. These outreach efforts included organizing, planning, and conducting a Biodiesel Workshop at Lawson State Community College, an EV/CommuteSmart Expo at Regions Bank, an EV Earth Day event at the Birmingham Botanical Gardens, a National Drive Electric Week Event at Pepper Place, manning an alternative fuel informational booth at the Alabama League of Municipalities Annual Meeting in Mobile, and a site visit to the Waste Management CNG fueling facility in Tarrant. In addition, ACFC conducted other similar outreach efforts across the state

which included participants from the Birmingham region at Biodiesel and Propane workshops in Montgomery, the Alabama Student Transportation Association Conference, and site visits to: the Busworx service facility in Montgomery to review their Propane School Bus, the New Flyer Vehicle Innovation Center and Manufacturing facility in Anniston to review CNG and Electric Busses, and the University of Alabama to review their participation in the US DOE EcoCAR Mobility Challenge Program. These efforts also included: participating in numerous alternative fuels and APCA media events and 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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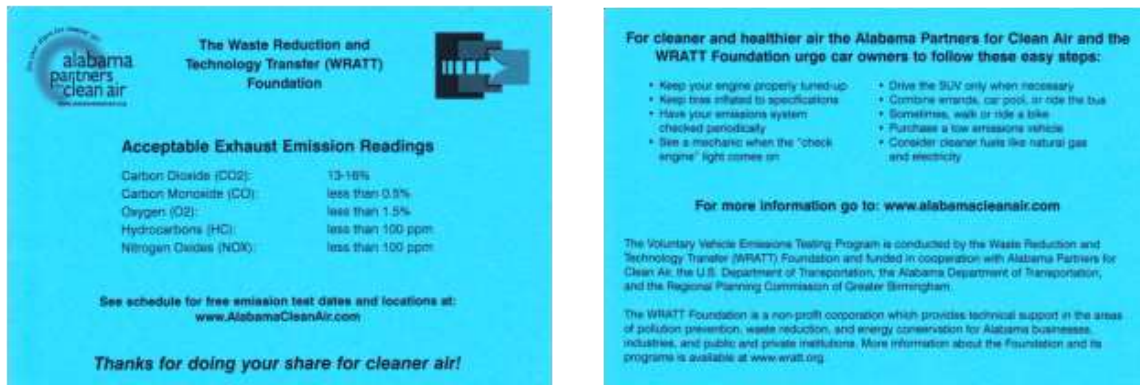
## SECTION 8

### VOLUNTARY EMISSIONS TESTING PROGRAM

The current Car Care Program began in January of 2008 and has continued annually through 2019. 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 WRATT 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 14 – Information Card for Vehicle Owners**



**FIGURE 15 – Sample Results Printout for Vehicle Owners**

APCA VEHICLE EXHAUST GAS ANALYSIS  
PERFORMED BY WRATT FOUNDATION

DATE: \_\_\_\_\_

VEHICLE: \_\_\_\_\_

5 GAS RESULTS

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

**CLEAN**

1. WRATT used two two-man teams working two to three days per week during ozone monitoring season from March 2019 through September 2019. One team made measurements using an EMS Model 5002 5-Gas Analyzer and the other used an FGA Model 4000 XDS 5-Gas analyzer. Both analyzers enabled measurement of the vehicles' Air/Fuel ratio as well as the gases listed above. Fifty-foot and 25-ft hoses for probes were used to give team members adequate access to vehicles at all station bays. When appropriate, diagnostic trouble codes (DTC) were read from the vehicle's OBD-II computer with an INNOVA Model 3100 code reader.
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 2019 Car Care Program (CCP)**

- CCP pays 80% of repair costs up to a subsidy limit of \$700. The car owner (not a business or third party) must pay the remaining 20% plus any cost exceeding the \$700 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 OBD-II code). For example, replacement of mufflers/repairing exhaust leaks are not qualified repairs under the CCP. Typical repairs have included, but are not necessarily limited to, catalytic converters, O<sub>2</sub> 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, 2018 through September 30, 2019. There were:

- 126 testing events at EOC locations each staffed by 2 WRATT technicians;
- 2408 Vehicles Tested (an average of ca. 20 vehicles per event);
- Over 20,000 data points recorded on-site;
- 69 Vehicles Qualified for Repair (about 3% of those tested); and

- 38 qualified vehicles were repaired (about 55% of those qualified)

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

**TABLE 11-EOC Monthly Emissions Testing Report**

Month	Events	Number Tested	Qualified	#Repaired
October 2018	0	0	0	1
November 2018	0	0	0	1
December 2018	0	0	0	0
January 2019	0	0	0	0
February 2019	1	1	1	1
March 2019	20	433	10	2
April 2019	21	383	15	9
May 2019	18	380	13	10
June 2019	18	335	5	3
July 2019	17	305	8	5
August 2019	20	375	7	4
September 2019	11	196	10	2
<b>2019 Year's Totals</b>	126	2408	69	38

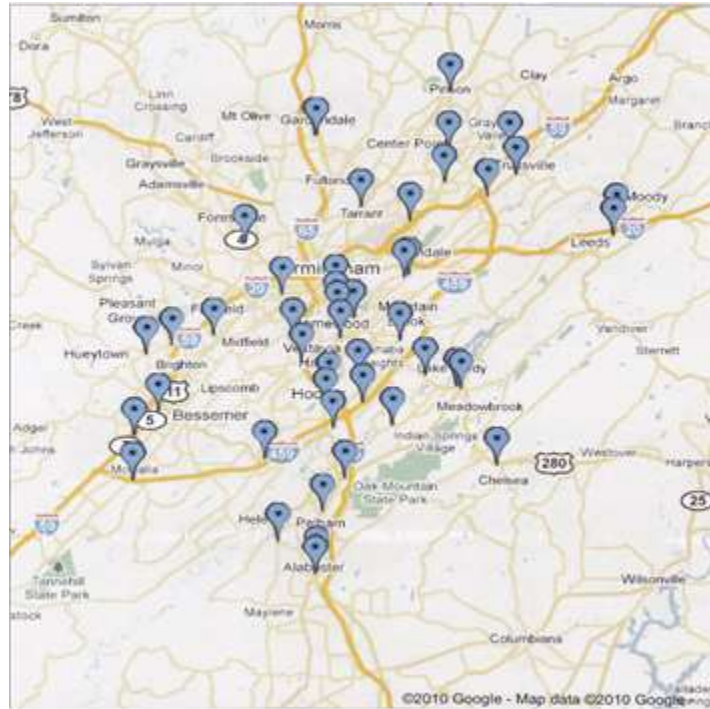
**REPAIR STATISTICS**

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 \$35,000. Total 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 12 -Emission System Type and Number of Repairs**

Repair	Number Performed
O <sub>2</sub> Sensor	3
Catalytic Converter	23
EVAP System	12
Other	1
<b>Total</b>	<b>39</b>

**FIGURE 16 - 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 \$700) and total cost of the repair:

**TABLE 13 – Most Common Repairs**

<b>Component</b>	<b>REPAIR</b>	<b>AVG CAR CARE COST</b>	<b>AVG TOTAL COST</b>
<b>Oxygen Sensors</b>	<b>10%</b>	<b>\$300</b>	<b>\$500</b>
<b>Catalytic Converters</b>	<b>60%</b>	<b>\$800</b>	<b>\$900</b>
<b>Evaporative Emission</b>	<b>30%</b>	<b>\$400</b>	<b>\$500</b>

## 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 O<sub>2</sub> sensors and catalytic converters.

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

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

**FIGURE 17 - 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 2018 - 2019, 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 14 - Emission Reductions by Program from October 1, 2018 to September 30, 2019**

<b>TIP FY2019 CMAQ Ozone Program Project Potential Emissions Reductions</b>						
#	Project	Emissions, lbs./Day			# of	Note
		VOC	NOx	PM <sub>2.5</sub>	Days	
1	Marketing/Public Outreach/Surveys including Employer/Employee Outreach, the Policy Exchange Foundation, and Jefferson County Department of Health Air Quality Alert	1.94	6.93	0.27	260	FY 2018
2	Clean Cities/Alternative Fuels-Hoover, Birmingham, Alabaster, Tarrant, BJCTA, ALDOT, Trussville, Alabama Power Company, Alagasco, and other Alternative Fuel Stations	7.21	73.81	7.43	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- WRATT	1.49	0.27	0.00	365	tested 2408 cars in FY 2019 and repaired 38 vehicles
	Maximum Daily Emissions Reductions	12.19	81.27	7.76	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 2019 ANNUAL REPORT  
OCTOBER 1, 2018 – SEPTEMBER 30, 2019**

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:

7. Promoting and facilitating the use of alternative fuels and the installation of alternative fuel infrastructure in Jefferson and Shelby Counties.
8. Managing a regional diesel retrofit program in Jefferson and Shelby Counties.
9. Creating “Clean Corridors” that traverse the Birmingham Region.
10. Participating in the U.S. Department of Energy Clean Cities Program as a designated coalition for the region.
11. 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.
12. 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 FY2019, alternative fuel usage in Jefferson and Shelby Counties totaled 2,582,267 gallons or GGE’s (gasoline gallon equivalent). This included approximately 211,000 gallons of E85 Ethanol, 3,300 gallons of B20 Biodiese, 1,900 gallons of B100 Biodiesel, 50,700 GGE’s of Propane, 1,841,000 GGE’s of CNG, 50,000 GGE of LNG, 419,000 GGE’s of electricity representing approximately 22 million electric miles driven, and 4500 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 9.2% from FY 2018. 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), Veal Convention Services (Propane), Evergreen Transportation (CNG), Regions Bank (Propane & Electricity), Groome Transportation (Propane), Adkins On-Time Service (Propane), Melton Automotive (CNG), JNB Logistics (Propane), 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 April 2019, FHWA approved the ALDOT submitted nominations for Alternative Fuel Corridor designations in Alabama under Section 1413 of the FAST Act. Four of the following approved "Clean Corridors" traverse the Birmingham Region:

7. I-65 AL/TN Border to Montgomery Propane - Signage Ready
8. I-65 Montgomery to Mobile Propane - Signage Pending
9. I-59 Propane - Signage Ready
10. I-20 Propane – Signage Ready
11. I-85 Propane – Signage Ready
12. U.S. 280 Propane – Signage Ready

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 is a partner on a project that was awarded \$4.6 million from the US DOE in 2017 for the Southeast Alternative Fuels Deployment Project. In April 2019 a slow-fill CNG fueling station was opened as part of this project in Tarrant for the Waste Management refuse truck fleet operating in the region.

ACFC actively assisted the APCA partnership in promoting the program goals and objectives by conducting outreach efforts to community sectors and organizations in Jefferson and Shelby Counties. These outreach efforts included organizing, planning, and conducting a Biodiesel Workshop at Lawson State Community College, an EV/CommuteSmart Expo at Regions Bank, an EV Earth Day event at the Birmingham Botanical Gardens, a National Drive Electric Week

Event at Pepper Place, manning an alternative fuel informational booth at the Alabama League of Municipalities Annual Meeting in Mobile, and a site visit to the Waste Management CNG fueling facility in Tarrant. In addition, ACFC conducted other similar outreach efforts across the state which included participants from the Birmingham region at Biodiesel and Propane workshops in Montgomery, the Alabama Student Transportation Association Conference, and site visits to: the Busworx service facility in Montgomery to review their Propane School Bus, the New Flyer Vehicle Innovation Center and Manufacturing facility in Anniston to review CNG and Electric Busses, and the University of Alabama to review their participation in the US DOE EcoCAR Mobility Challenge Program. These efforts also included: participating in numerous alternative fuels and APCA media events and 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 2018 – SEPTEMBER 2019**

## 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<sub>2.5</sub>) and ozone (O<sub>3</sub>) during the period October 2018 – September 2019. “Air Quality Alerts” are forecasted one to two days before the date of the alert. JCDH provides PM<sub>2.5</sub> forecasts year-round and the Alabama Department of Environmental Management provides O<sub>3</sub> 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.

<b>Date of Alert</b>	<b>Forecast AQI Color</b>	<b>Actual AQI Color</b>	<b>Pollutant</b>
5/7/2019	Orange	Orange	O <sub>3</sub>
8/16/2019	Orange	Yellow	O <sub>3</sub>
8/17/2019	Orange	Yellow	O <sub>3</sub>
9/9/2019	Orange	Orange	O <sub>3</sub>
9/12/2019	Orange	Orange	O <sub>3</sub>

9/13/2019	Orange	Orange	O <sub>3</sub>
9/16/2019	Orange	Orange	O <sub>3</sub>
9/17/2019	Orange	Orange	O <sub>3</sub>
9/18/2019	Orange	Yellow	O <sub>3</sub>
9/28/2019	Orange	Yellow	O <sub>3</sub>

### **Contracts**

As part of the larger Memorandum of Agreement between the RPC and JCDH for FY2019 (October 2018 – September 2019), 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-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. The Baron Advance Meteorological Systems (BAMS) provides air quality forecast model information to JCDH and ADEM. Outreach materials were also a part of the FY2019 budget. The details of the JCDH’s budget are noted below.

	<b>OCT 2018 – SEP 2019</b>
<b>Birmingham Air Quality Website Maintenance by UAH</b>	\$18,200
<b>BAMS Subscription Meteorological Service</b>	\$48,000
<b>Outreach Giveaways</b>	\$5,800
<b>Total</b>	\$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<sub>2.5</sub> standard (35 µg/m<sup>3</sup>). Effective April 15, 2015, the EPA designated the Birmingham area as attainment of the 2013 annual PM<sub>2.5</sub> standard (12 µg/m<sup>3</sup>). The Birmingham area is currently designated as attainment of all of EPA’s National Ambient Air Quality Standards through 2018.

## **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 2018. This is because air monitoring data is on a calendar year basis (i.e., January 1, 2018 – December 31, 2018) and this report is based on a fiscal year basis (i.e., October 1, 2018 – September 30, 2019).

### ***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 4<sup>th</sup> highest daily 8-hour ozone value at each site over a 3-year period. The most recent 3-year monitoring period was 2016-2018. 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 2016-2018, no monitors violated the standard.

<b>8-Hour Ozone Design Values (2016-2018)</b>	
<b>Monitor</b>	<b>Design Value (ppb)</b>
Corner	63
Fairfield	65
Helena	67
Leeds	66
McAdory	65
North Birmingham	65
Tarrant	67

### ***Fine Particulate Matter (PM<sub>2.5</sub>)***

Effective March 18, 2013, the EPA lowered the annual PM<sub>2.5</sub> standard to 12 µg/m<sup>3</sup>. A 3-year average of annual means is compared to the annual standard to determine compliance. The 24-hour PM<sub>2.5</sub> standard is a 3-year average concentration, based on the 98<sup>th</sup> percentile for each year, and is set at 35 µg/m<sup>3</sup>. The most recent 3-year monitoring period was 2016-2018. The fine particulate matter (PM<sub>2.5</sub>) monitoring network consists of 5 monitors throughout Jefferson County. The tables below display the annual and 24-hour design values for PM<sub>2.5</sub> at each monitor throughout Jefferson County. There were no violations of the annual and 24-hour PM<sub>2.5</sub> standards for 2016-2018.

<b>Annual PM<sub>2.5</sub> Design Values (2016-2018)</b>	
<b>Monitor</b>	<b>Design Value (µg/m<sup>3</sup>)</b>
Arkadelphia	10.5
Leeds	9.1
McAdory	8.7
North Birmingham	10.0
Wylam	9.0

<b>24-Hour PM<sub>2.5</sub> Design Values (2016-2018)</b>	
<b>Monitor</b>	<b>Design Value (µg/m<sup>3</sup>)</b>
Arkadelphia	22
Leeds	18
McAdory	17
North Birmingham	21
Wylam	18

### **Air Quality Exceedances**

Below are tables showing the exceedances of the 8-hour ozone standard from 2009 thru 2018 and exceedances of the 24-hour PM<sub>2.5</sub> standard from 2009 thru 2018. 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 2009-2018**

<b>Station</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
Corner	0	1	4	1	1	0	0	1	0	0
Fairfield	1	2	2	5	0	0	2	2	0	1
Helena	1	2	4	4	0	1	2	4	0	1
Hoover	2	4	7	3	0	0	2	2	0	
Leeds	1	2	5	4	0	0	0	1	0	1
McAdory	1	3	7	4	0	0	0	2	0	1
N. Birmingham	0	1	5	6	0	0	4	3	1	2
Pinson	0	3	2	3						
Providence	0	3	4	2						
Tarrant	1	8	9	6	1	0	4	3	1	3
<b>Total</b>	<b>7</b>	<b>29</b>	<b>49</b>	<b>38</b>	<b>2</b>	<b>1</b>	<b>14</b>	<b>18</b>	<b>2</b>	<b>9</b>

**Exceedances of the 24-Hour Fine Particulate Matter (PM<sub>2.5</sub>) Standard  
for 2009 - 2018**

<b>Station</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
Arkadelphia						0	0	0	0	0
Leeds	0	0	0	0	0	0	0	0	0	0
McAdory	0	0	0	0	0					
N. Birmingham	0	0	1	0	0	0	0	0	0	0
Wylam	0	0	2	0	0	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

# **Appendix C**

## **Advance Consulting, LLC. Annual Report**

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## **Advanced Consulting Annual Report**

### **October 1, 2018 – September 30, 2019**

Company Events-     **30**  
Community Events-   **83**  
Total Events-         **113**

Total Pledge Cards from Company Events: **1,689**

Total Pledge Cards from Community Events: **5,602**

**Total Pledge Cards/ Company and Community Events- 7,291**

### **2018-2019- Children's of Alabama New Employee Orientation Meetings: 1,038**

<b>Children NEO Events:</b>		<b>Pledge Cards:</b>
Oct.0 1, 2018	24 attendees	24 pledge cards
Oct 15, 2018	34 attendees	32 pledge cards
Oct. 29, 2018	36 attendees	36 pledge cards
Nov. 12, 2018	19 attendees	19 pledge cards
Nov. 26, 2018	18 attendees	18 pledge cards
Dec. 10, 2018	23 attendees	23 pledge cards
Jan. 07, 2019	40 attendees	40 pledge cards
Jan.21, 2019	46 attendees	46 pledge cards
Feb. 04, 2019	50 attendees	50 pledge cards
Feb. 18, 2019	42 attendees	42 pledge cards
Mar. 04, 2019	25 attendees	25 pledge cards
Mar. 18, 2019	24 attendees	24 pledge cards
April 01, 2019	34 attendees	34 pledge cards

April 15, 2019	24 attendees	24 pledge cards
April 29, 2019	27 attendees	27 pledge card
May 13, 2019	57 attendees	57 pledge cards
June 10, 2019	85 attendees	85 pledge cards
June 24, 2019	64 attendees	64 pledge cards
July 08, 2019	80 attendees	80 pledge cards
July 22, 2019	50 attendees	50 pledge cards
Aug 05, 2019	54 attendees	54 pledge cards
Aug 19, 2019	47 attendees	47 pledge cards
Sept 16, 2019	85 attendees	85 pledge cards
Sept 30, 2019	52 attendees	52 pledge card

**Other Company Events:**

**Other Company Events: 6**

**Total Pledge Cards from Other Company Events: 651**

Feb 6, 2019	UAB Health Fair	200 attendees	80 pledge cards
April 23, 2019	Mercedes	150 attendees	38 pledge cards
April 24, 2019	Mercedes	75 attendees	41 pledge cards
May 1, 2019	Jeff County Health Dep.	200 attendees	52 pledge cards
May 16, 2019	Bio-Horizons	150 attendees	54 pledge cards
June 21, 2019	Children's Health Fair	700 attendees	386 pledge cards

**Total Pledge Cards from Children's NEO and Other Company Events: 1,689**

## **Community Events**

<b>2018</b>	<b>Event</b>	<b>Attendees</b>	<b>Pledge Cards</b>
Oct 2	Center Point Night Out	150	40
Oct 6	Homewood Fire and Safety Day	100	23
Oct 6	Bark in the Park Alabaster	300	45
Oct 6	Eastlake Farmer's Market	100	31
Oct 10	Shelby Senior Summit	300	50
Oct 11	Mardi Gras Sen/Health Fair Fairfield.	1000	202
Oct 13	Heritage Festival/ JCA/Irondale	200	80
Oct 18	Community Partners Fair/Bham City	100	34
Oct 21	Barktober Fest/ Helena	200	35
Oct 25	Energy Center Safety & Health Fair	600	141
Oct 27	Helena Fall Craft Bazaar	100	30
Oct 27	Craft Fair Trussville	100	56
Oct 28	Barking at the Moon/ Fultondale	200	83
Nov 10	Harpersville Day	300	120
Nov 17	Day of Transition Ravizzeenation	100	42
Nov 17	Helena Holiday Market	150	50
Dec 2	Woodlawn Street Festival	150	40
Dec 8	Cahabazaar	500	75
Dec 15	Pop Up with a Purpose/ Fairfield	150	91
January 2019	NO COMMUNITY EVENTS		
Feb 8	Mercedes Marathon Expo	400	129

<b>Community Events Continued-2019</b>		<b>Attendees</b>	<b>Pledge Cards</b>
Feb 9	Mercedes Marathon Expo	600	123
Mar 9	Columbiana Market Day	150	28
Mar 19	Be Ready at Samford	150	43
Mar 21	Birmingham City Parent Camp	100	32
April 5	ARC Stories- Botanical Gardens	300	22
April 6	Woodlawn Street Fest	500	76
April 6	Holiday Market/ Helena	300	58
April 10	BCBS Nat Walk at Lunch/Lynn P.	2000	144
April 20	Earth Day Botanical Gardens	300	78
April 23	Barron's Game	1000	48
April 27	Celebrate Hoover Day	3000	80
April 27	Calera Strawberry Festival	200	35
April 27	Pepper Place	500	105
May 2	Shelby County Senior Picnic	750	202
May 4	Alabama Folk Fair/ Bessemer	150	43
May 4	Southside CME Health Fair	150	51
May 11	Shilough Springs Health Fair	150	38
May 18	Weatherfest	500	106
May 18	Pelham Palooza	300	56
May 21	Trussville Tuesday Market	150	41
May 24	Pinson Farmer's Market	100	38
May 25	Eastlake Farmer's Market	100	51

<b>Community Events Continued-2019</b>		<b>Attendees</b>	<b>Pledge Cards</b>
May 29	Shades Valley Farmer's Market	75	28
June 2	Vulcan's Birthday Bash	300	111
June 8	Helena Farmer's Market	150	33
<b>June 8</b>	Eastlake Fishing Rodeo	200	92
June 11	West Homewood FM	200	52
June 15	Dream Big Resource Fair	150	42
June 15	Farmer's Market Trussville.	150	67
June 18	Montevallo Farmers Market	150	28
June 19	Rocky Ridge Farmer's Market	100	43
June 22	Cahabazaar	500	87
June 25	Bessemer Farmer's Market	100	38
June 27	Center Point Farmer's Market	150	30
June 27	I Love America Night	500	81
July 13	Lee Branch Farmer's Market	100	65
July 13	Hueytown Farmer's Market	100	59
July 25	Leeds Thursday Market	100	28
July 26	Pinson Farmer's Market	200	42
July 27	Vincent In the Park	300	132
July 27	Valleydale Farmer's Market	100	29
July 28	Lake Wilborn Farmer's Market	100	31
July 30	Bessemer Farmer's Market	100	28
Aug 1	Leeds Thursday Night market	200	53

<b>Community Events Continued-2019</b>		<b>Attendees</b>	<b>Pledge Cards</b>
Aug 6	West Homewood Farmer's Market	200	57
Aug 10	Woodlawn Street Market	500	136
Aug 12	Montevallo FM	100	39
Aug 16	Fox 6 Woman's Health Fair	500	212
Aug 17	Community Day/ Pratt City	100	45
Aug 17	Bessemer FM	100	43
Aug 21	Rocky Ridge Farmer's Market	100	27
Aug 22	Center Point Farmer's Market	100	31
Aug 23	Fultondale Founder's Weekend	150	51
Aug 24	Fultondale Founder's Weekend	500	102
Aug 24	Lee Branch FM	150	33
Sept 6	Pinson Farmer's Market	100	53
Sept 7	Trussville Farmer's Market	150	42
Sept 7	Eastlake Farmer's Market	150	38
Aug 17	Community Day/ Pratt City	100	45
Aug 17	Bessemer FM	100	43
Aug 21	Rocky Ridge Farmer's Market	100	27
Aug 22	Center Point Farmer's Market	100	31
Aug 23	Fultondale Founder's Weekend	150	51
Aug 24	Fultondale Founder's Weekend	500	102
Aug 24	Lee Branch FM	150	33
Sept 6	Pinson Farmer's Market	100	53

<b>Community Events Continued-2019</b>		<b>Attendees</b>	<b>Pledge Cards</b>
Sept 7	Trussville Farmer's Market	150	42
Sept 7	Eastlake Farmer's Market	150	38
Sept 12	Gardendale	100	29
Sept 17	Bessemer FM	100	35
Sept 20	Health & Senior Resource Expo	500	304
Sept 21	Pepper Place Farmer's Market	500	89
Sept 28	Whistle Stop	1000	142
<b>Total Pledge Cards for Community Events:</b>			<b>5,602</b>

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# **Appendix D**

## **WRATT Foundation Annual Report**

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**Alabama Partners for Clean Air  
Car Care Program Final Report**

**October 1, 2018 – September 30, 2019**

**Administered by:**



**200 Century Park South  
Birmingham, Alabama 35226**

**Contact:**

**Dr. Chip Miller  
Project Manager**

**Mr. Wesley Speed  
Assistant Project Manager**

**December 30, 2019**

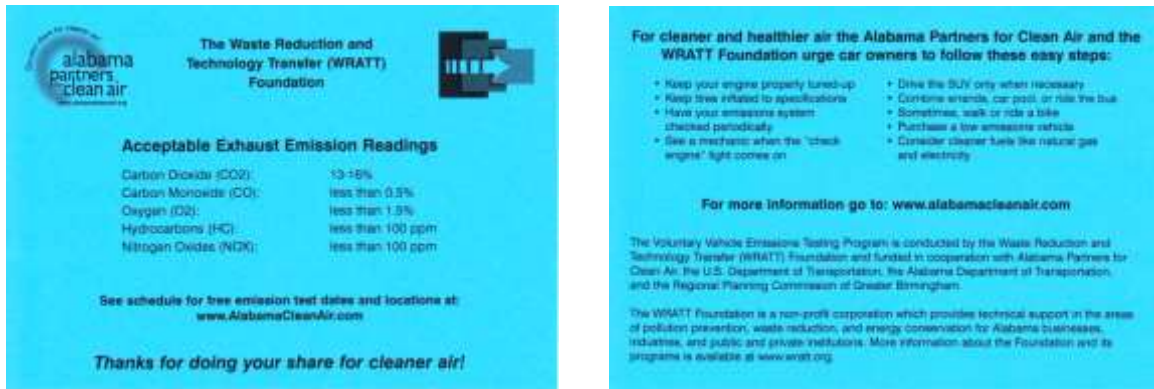
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## PROGRAM DESCRIPTION

The current Car Care Program began in January of 2008 and has continued annually through 2019. The program is comprised of four major functions:

3. The program creates public awareness of ground-level ozone pollution by emphasizing the importance of vehicle maintenance primarily for vehicle emission control systems.
4. Testing of vehicle emissions is performed at various Express Oil Change (EOC) locations in an effort 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 (CO<sub>2</sub>%) and oxygen (O<sub>2</sub>%) as measures of combustion efficiency. In addition to receiving information from WRATT 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**



**Figure 2 – Sample Results Printout for Vehicle Owners**

APCA VEHICLE EXHAUST GAS ANALYSIS  
PERFORMED BY WRATT FOUNDATION

DATE: \_\_\_\_\_

VEHICLE: \_\_\_\_\_

5 GAS RESULTS

CO<sub>2</sub> = 15.1  
CO = .01  
O<sub>2</sub> = 0.1  
HC = 30  
NOX = 12

**CLEAN**

5. WRATT used two two-man teams working two to three days per week during ozone monitoring season from March 2019 through September 2019. One team made measurements using an EMS Model 5002 5-Gas Analyzer and the other used an FGA Model 4000 XDS 5-Gas analyzer. Both analyzers enabled measurement of the vehicles' Air/Fuel ratio as well as the gases listed above. Fifty-foot and 25-ft hoses for probes were used to give team members adequate access to vehicles at all station bays. When appropriate, diagnostic trouble codes (DTC) were read from the vehicle's OBD-II computer with an INNOVA Model 3100 code reader.
6. 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 2017 Car Care Program (CCP)**

- CCP pays 80% of repair costs up to a subsidy limit of \$700. The car owner (not a business or third party) must pay the remaining 20% plus any cost exceeding the \$700 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 OBD-II code). For example, replacement of mufflers/repairing exhaust leaks are not qualified repairs under the CCP. Typical repairs have included, but are not necessarily limited to, catalytic converters, O<sub>2</sub> 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, 2018 through September 30, 2019. There were:

- 126 testing events at EOC locations each staffed by 2 WRATT technicians;

- 2408 Vehicles Tested (an average of ca. 20 vehicles per event);
- Over 20,000 data points recorded on-site;
- 69 Vehicles Qualified for Repair (about 3% of those tested); and
- 38 qualified vehicles were repaired (about 55% of those qualified)

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

Month	Events	Number Tested	Qualified	#Repaired
October 2018	0	0	0	1
November 2018	0	0	0	1
December 2018	0	0	0	0
January 2019	0	0	0	0
February 2019	1	1	1	1
March 2019	20	433	10	2
April 2019	21	383	15	9
May 2019	18	380	13	10
June 2019	18	335	5	3
July 2019	17	305	8	5
August 2019	20	375	7	4
September 2019	11	196	10	2
<b>2019 Year's Totals</b>	126	2408	69	38

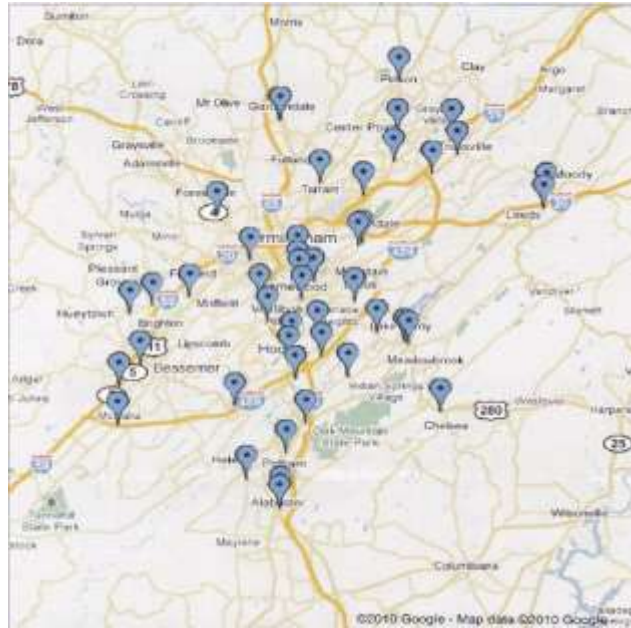
### **REPAIR STATISTICS**

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 \$35,000. Total 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 <sub>2</sub> Sensor	3
Catalytic Converter	23
EVAP System	12
Other	1
<b>Total</b>	<b>39</b>

**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 \$700) and total cost of the repair:

**Table 3 – Approximate Cost of Most Common Repairs**

<b>Component</b>	<b><u>REPAIR</u></b>	<b><u>AVG CAR CARE COST</u></b>	<b><u>AVG TOTAL COST</u></b>
<b>Oxygen Sensors</b>	<b>10%</b>	<b>\$300</b>	<b>\$500</b>
<b>Catalytic Converters</b>	<b>60%</b>	<b>\$800</b>	<b>\$900</b>
<b>Evaporative Emission</b>	<b>30%</b>	<b>\$400</b>	<b>\$500</b>



## **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 O<sub>2</sub> sensors and catalytic converters.

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

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

### **Typical Emissions Test Events**











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# **Appendix E**

## **Emissions Reductions Worksheets**

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## Emission Reductions by Ozone Awareness Program from October 1, 2018 to September 30, 2019

<b>TIP FY2019 CMAQ Ozone Program Project Potential Emissions Reductions</b>						
#	Project	Emissions, lbs./Day			# of	Note
		VOC	NOx	PM <sub>2.5</sub>	Days	
1	Marketing/Public Outreach/Surveys including Employer/Employee Outreach, the Policy Exchange Foundation, and Jefferson County Department of Health Air Quality Alert	1.94	6.93	0.27	260	FY 2018
2	Clean Cities/Alternative Fuels-Hoover, Birmingham, Alabaster, Tarrant, BJCTA, ALDOT, Trussville, Alabama Power Company, Alagasco, and other Alternative Fuel Stations	7.21	73.81	7.43	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- WRATT	1.49	0.27	0.00	365	tested 2408 cars in FY 2019 and repaired 38 vehicles
<b>Maximum Daily Emissions Reductions</b>		<b>12.19</b>	<b>81.27</b>	<b>7.76</b>	<b>365</b>	<b>lbs./day</b>

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

on Alert Days for October 1, 2018 - September 30, 2019 2/3/2020

Description	Assumption	Units
<b>Jefferson County</b>		
Estimated commuters to work in year 2018 [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 2019 season [2]	19	days (weekdays)
Average trip length for Jefferson County	24.2	miles per trip
Percentage of people knowing Ozone Alert days[3]	35.29%	%
Percentage of taking actions among people knowing Ozone Alert days	57.02%	%
Percentage out of the 57.02% people taking carpool/bus/telecommuting due to Ozone Aw	4.62%	%
<b>Shelby County</b>		
Estimated commuters to work in year 2018	98,986	persons
Assuming at least two trip reductions per person	2	trips per day
Average trip length for Shelby county	15.9	miles per trip
Percentage of people knowing Ozone Alert day[3]	25.71%	%
Percentage of taking actions among people knowing Ozone Alert days	51.85%	%
Percentage out of the 51.85% people taking carpool/telecommuting due to Ozone Awaren	7.14%	%
VMT reduced per day during Ozone Season [4]	159,741	veh-miles per day
VOC emission rate [5]	0.075504	grams/mile (2019)
NOx emission rate	0.269340	grams/mile (2019)
PM 2.5 Direct emission rate	0.010491	grams/mile (2019)

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 10 alert days in FY 2019. Assuming these days of one day before, the alert day, and two days after will be affected (weekends excluded).  
The commuting travel pattern could be affected in these 19 weekdays.

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

[4]: 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.

[5] 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 peak hours.

**Emission Reductions and Cost Effectiveness**

VOC_d Reductions = (VMT Reduced) x (VOC per mile emissions rate)		VOC Convert to 260 days
= (VMT reduced) x 0.243 g/mile		229,161 grams per year
229,161 grams for total of 19 weekdays affected		<b>0.88</b> kilograms/day (for 260days)
12,061 grams per day affected		1.94 lbs/day (for 260 days)
26.6 lbs per Alert day, 1 kilogram = 2.2046 lbs.		
NOx_d Reductions = (VMT Reduced) x (NOx per mile emissions rate)		NOx Convert to 260 days
= (VMT reduced) x 1.082 g/mile		817,468 grams per year
817,468 grams for total of 19 weekdays affected		<b>3.14</b> kilograms/day (for 260days)
43,025 grams per day affected		6.93 lbs/day (for 260 days)
94.8 lbs per Alert day		
PM 2.5 Direct Reductions = (VMT Reduced) x (PM per mile emissions rate)		PM 2.5 Convert to 260 days
= (VMT reduced) x 0.0188 g/mile		31,841 grams per year
31,841 grams for total of 19 weekdays affected		<b>0.12</b> kilograms/day (for 260days)
<b>1,676</b> grams per day affected		0.27 lbs/day (for 260 days)
3.7 lbs per Alert day		

Cost Effectiveness = (Annualized Cost) / (Annual Emissions Reduction)---the lower number, the better

Project life expectancy (n)	1	years
Discount rate (i)	1%	used by ALDOT
Capital recover factor (CRF) = $(1+i)^n * i / ((1+i)^n - 1)$	1.01000	capital recovery factor
Project funding amount <sup>[4]</sup>	\$324,572	capital cost
Project annual cost (AC) = (C)*CRF	\$327,818	\$ per year
Number of days project affected during Ozone Season per year (D)	2	Alert days per year
Cost Effectiveness for VOC = (AC) / ((VOCd)*(D))	\$1,431	\$ per kilogram per year
Cost Effectiveness for NOx = (AC) / ((NOxd)*(D))	\$401	\$ per kilogram per year
Cost Effectiveness for VOC & NOx = (AC) / (((VOCd)+(NOxd))*(D))	\$313	\$ per kilogram per year
Cost Effectiveness for PM 2.5 Direct = (AC)/((PM2.5)*(D))	\$10,295	\$ 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, 2018 to September 30, 2019			2/7/2020
Description	Assumption	Note	
(1) Gasoline gallon equivalent of ethanol E85 [1]	210,737	gallons for fiscal year 2019	
Gasoline gallon equivalent of biodiesel B20	3,300	gallons for fiscal year 2019	
Gasoline gallon equivalent of biodiesel B100	1,870	gallons for fiscal year 2019	
Gasoline gallon equivalent of Hydrogen	0	gallons for fiscal year 2019	
Gasoline gallon equivalent of Compressed Natural Gas (CNG) for bus	1,096,871	gallons for fiscal year 2019	
Gasoline gallon equivalent of CNG for non-bus and Liquefied Nature Gas (LNG)	794,951	gallons for fiscal year 2019	
Gasoline gallon equivalent of Propane. Liquefied petroleum gas	50,738	gallons for fiscal year 2019	
Gasoline gallon equivalent of Electric Car	423,800	gallons for fiscal year 2019	
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]	6,581,226	vehicle miles per year	
Estimated vehicle (light truck) miles traveled (VMTcngv) based on CNG	6,200,618	vehicle miles per year	
Estimated vehicle miles traveled(VMTe85) based on ethanol (E85)	4,214,740	vehicle miles per year	
Estimated vehicle miles traveled (VMTb20) based on Biodiesel (B20 and B100)	103,400	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	1,014,760	vehicle miles per year	
Estimated vehicle miles traveled (VMTelectric) based on electric car	10,001,680	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 (2019)	
NOx emission rate for Diesel Bus, Noxbux	3.80900	grams/mile (2019)	
PM 2.5 emission rate for Diesel Bus	0.17955	grams/mile (2019)	
VOC emission rate for CNG Bus	0.34113	grams/mile (2018-2019)	
NOx emission rate for CNG Bus	2.39051	grams/mile (2018-2019)	
PM 2.5 emission rate for CNG Bus	0.07032	grams/mile (2018-2019)	
Bus VOC emission rate deference after converting Diesel to CNG, VOCbus	0.03472	grams/mile (2019)	
Bus NOx emission rate difference after converting from Diesel to CNG, Noxbux	1.41849	grams/mile (2019)	
Bus PM 2.5 emission rate difference after converting from Diesel to CNG, PM25bus	0.10924	grams/mile (2019)	
(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 (2019)	
NOx emission rate for light weight vehicles, diesel	1.08981	grams/mile (2019)	
PM 2.5 emission rate for light weight vehicles, diesel	0.05515	grams/mile (2019)	
CNG VOC emission rate difference for CNG vehicles, VOCav	0.01563	grams/mile (2019)	
CNG NOx emission rate difference for CNG vehicles, Noxav	0.00000	grams/mile (2019)	
CNG PM 2.5 emission rate difference for CNG vehicles, PM25v	0.03355	grams/mile (2019)	
(c ) E85 passenger vehicle at 20mph for non freeway & 50mph for freeway urban			
VOC emission rate for gasoline passenger vehicles	0.06107	grams/mile (2019)	
NOx emission rate for gasoline passenger vehicles	0.24603	grams/mile (2019)	
PM 2.5 emission rate for gasoline passenger vehicles	0.01298	grams/mile (2019)	
VOC emission rate for E85 passenger vehicles	0.01365	grams/mile (2019)	
NOx emission rate for E85 passenger vehicles	0.07299	grams/mile (2019)	
PM 2.5 emission rate for E85 gasoline passenger vehicles	0.01016	grams/mile (2019)	
E85 VOC emission rate difference for passenger vehicles, VOCEa	0.04742	grams/mile (2019)	
E85 NOx emission rate difference for passenger vehicles, Noxea	0.17304	grams/mile (2019)	
E85 PM 2.5 emission rate difference for passenger vehicles, PM25ea	0.00282	grams/mile (2019)	
(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 (2019)
NOx emission rate for gasoline passenger vehicles	0.24603	grams/mile (2019)
PM 2.5 emission rate for gasoline passenger vehicles	0.01298	grams/mile (2019)
B20 & B100 VOC emission rate difference for passenger vehicles, VOCabv	0.01289	grams/mile (2019)
B20 & B100 NOx emission rate difference for passenger vehicles, Noxabv	0.00000	grams/mile (2019)
B20 & B100 PM 2.5 emission rate difference for passenger vehicles, PM25abv	0.00131	grams/mile (2019)
(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 (2019)
NOx emission rate for Diesel Bus	3.94285	grams/mile (2019)
PM 2.5 emission rate for Diesel Bus	0.18610	grams/mile (2019)
Hydrogen VOC emission rate difference, VOCah	0.46554	grams/mile (2019)
Hydrogen NOx emission rate difference, Noxah	3.94285	grams/mile (2019)
Hydrogen PM 2.5 emission rate difference, PM25ah	0.09305	grams/mile (2019)
(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 (2019)
NOx emission rate for gasoline passenger vehicles	0.24603	grams/mile (2019)
PM 2.5 emission rate for gasoline passenger vehicles	0.01298	grams/mile (2019)
Propane VOC emission rate difference for passenger vehicles, VOCap	0.05497	grams/mile (2019)
Propane NOx emission rate difference for passenger vehicles, Noxap	0.22143	grams/mile (2019)
Propane PM 2.5 emission rate difference for passenger vehicles, PM25ap	0.00649	grams/mile (2019)
(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 (2019)
Electric Car emissions rate NOx	0.000000	grams/mile (2019)
Electric Car emissions rate PM 2.5	0.003312	grams/mile (2019)
VOC emission rate for gasoline passenger vehicles	0.06107	grams/mile (2019)
NOx emission rate for gasoline passenger vehicles	0.24603	grams/mile (2019)
PM 2.5 emission rate for gasoline passenger vehicles	0.01298	grams/mile (2019)
Electric car VOC emission rate difference for passenger vehicles, VOCae	0.06107	grams/mile (2019)
Electric car NOx emission rate difference for passenger vehicles, Noxae	0.24603	grams/mile (2019)
Electric car PM 2.5 emission rate difference for passenger vehicles, PM25ae	0.009669	grams/mile (2019)
(5) VOC emission reduced [4]	<b>3.269</b>	kilograms per day
NOx emission reduced	<b>33.481</b>	kilograms per day
PM 2.5 Direct emission reduced	<b>3.371</b>	kilograms per day
VOC emission reduced in lbs. per day, 1 kilogram = 2.2046 lbs.	7.21	lbs. per day
NOx emission reduced in lbs. per day	73.81	lbs. per day
PM 2.5 Direct emission reduced in lbs. per day	7.43	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]	\$45,695	capital cost
Project annual cost (AC) = (C)*(CRF)	\$46,152	\$ per year
Number of days project affected (D)	365	days for 1 year
Cost Effectiveness for VOC = $(AC) / ((VOC)*(D))$	\$38.68	\$ per kilogram per year
Cost Effectiveness for NOx = $(AC) / ((NOx)*(D))$	\$3.78	\$ per kilogram per year
Cost Effectiveness for VOC & NOx = $(AC) / (((VOC)+(NOx))*(D))$	\$3.44	\$ per kilogram per year
Cost Effectiveness for PM 2.5 = $(AC) / ((PM2.5)*(D))$	\$37.51	\$ per kilogram per year
Source: Regional Planning Commission Market Area, Alternative Fuels - Gallons or GGE's Dispensed, October 1, 2018 to September 30, 2019.		
[1] APCA Alternative Fuel Summary 2019		
[2] (Estimated Vehicle Miles Traveled) = (Gasoline gallon equivalent) x (Miles per gallon)		
[3] (Emissions rate changes) = (Emissions rates with regular fuel) - (Emission Rates with 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: <b>Idle Free Zones</b>			
Encouraging parents sit in idling car in pick up waiting zone to turn off engines by UWCA/Johnson Group			2/11/2020
1. Criteria & Assumptions			
Description	Assumption	Note	
<b>(1) Data collection and assumptions</b>			
# of Schools involved	29		
Total # of Carpools ( C ) <sup>[1]</sup>	700	cars	
Target % of carpools will be switched to shutting off engine (P) <sup>[2]</sup>	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) <sup>[3]</sup>	2.18074	grams/idle hour (2019)	
NOx idling emission rate (Rnox)	0.96207	grams/idle hour (2019)	
PM 2.5 idling emission rates (PMf)	0.06639	grams/idle hour (2019)	
VOC start up emission rate per car (Svoc)	0.37930	grams/veh-start (2019)	
NOx start up emission rate per car (Snox)	0.48383	grams/veh-start (2019)	
PM 2.5 start up emission rate per car (PMs)	0.00482	grams/veh-start (2019)	
<b>(2) Emission reduction calculations</b>			
VOC emissions reduced per day (VOC r) = (TV) x ((T) x (Rvoc) - (DP) x (Svoc))/1,000	<b>0.70</b>	kilograms/day	
NOx emissions reduced per day (NOx r) = (TV) x ((T) x (Rnox) - (DP) x (Snox))/1,000	<b>0.12</b>	kilograms/day	
PM 2.5 emissions reduced (PM) = (TV) x ((T) x (PMf) - (DP) x (PMs))/1,000	<b>0.03</b>	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	
<b>(3) VMT reductions</b>	<b>0.00</b>	<b>vehicle miles/day</b>	
<b>(4) Cost Effectiveness = (annualized cost) / (annual emission reduction)--the lower number, the better</b>			
Project life expectancy (n)	1	years	
Discount rate (i)	1%	used by ALDOT	
Capital recover factor (CRF) = $(1+i)^n * i / ((1+i)^n - 1)$	1.01000	capital recovery factor	
Project funding amount (C)	\$97,462	capital cost	
Project annual cost (AC) = ( C )*(CRF)	\$98,437	\$ per year	
Number of days project affected per year (Day)	180	days per year	
Cost Effectiveness for VOC = (AC) / ((VOC r)*(Day))	\$778	\$ per kilogram per year	
Cost Effectiveness for NOx = (AC) / ((NOx r)*(Day))	\$4,709	\$ per kilogram per year	
Cost Effectiveness for total of VOC & NOx = (AC) / (((VOCr)+(NOxr))*(Day))	\$668	\$ per kilogram per year	
Cost Effectiveness for PM 2.5 = (AC) / ((PM)*(Day))	\$21,434	\$ 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**  
 Waste Reduction And Technology Transfer (WRATT) Foundation: Testing car's emission and repairing the emission fault

updated 2/11/2020

(1) October 1, 2018 to September 30 2019[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	23	0.46	0.06	0.40	0.13	0.03	0.10	17,383	159.92	39.98
Oxygen Sensor (O2)	3	0.44	0.02	0.42	0.10	0.00	0.10	17,383	21.90	5.21
Exhaust Gas Recirculation (EGR)	0	0.65	0.03	0.62	0.00	0.01	-0.01	17,383	0.00	0.00
Evaporative Emission System	12	0.31	0.00	0.31	0.00	0.00	0.00	17,383	64.66	0.00
Other qualified repairs	1	0.00	0.00	0.00	0.00	0.00	0.00	17,383	0.00	0.00
Total reductions by kilos per year after repair									<b>246.49</b>	<b>45.20</b>
Total reductions by kilos/day after repair, 365 days									<b>0.68</b>	<b>0.12</b>
Total reductions by lbs./day after repair, 1 kilogram = 2.2046 lbs.									<b>1.49</b>	<b>0.27</b>

(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)	\$151,901	capital cost
Project annual cost (AC) = (C)*(CRF)	\$153,420	\$ per year
Number of days project affected per year (Day)	365	days per year
Cost Effectiveness for VOC = (AC) / ((VOC r)*(Day))	<b>\$934</b>	\$ per kilogram per year
Cost Effectiveness for NOx = (AC) / ((NOx r)*(Day))	<b>\$5,092</b>	\$ per kilogram per year
Cost Effectiveness for total of VOC & NOx = (AC) / (((VOCr)+(NOxr))*(Day))	<b>\$789</b>	\$ per kilogram per year
PM 2.5 Cost Effectiveness for PM = (AC) / ((PMr)*(Day))	<b>NA</b>	\$ per kilogram per year

[1]: Alabama Partners for Clean Air Car Care Program Report, October 1, 2018 - September 30, 2019.

#5 - Potential Emission Reduction for VOC, NOx, PM 2.5, and CO2 Equivalent			
for project 228: <b>Employer/Employee Outreach CommuteSmart - Rideshare program</b>		2/19/2020	
Including Vanpool program (average 31 vans from October 1, 2018 to September 30, 2019) and Carpool program			
Description	Assumption	Note	
(1) Number of Vanpool vans (V)	33	vehicles (monthly average)	
Average van occupancy(VO)	6.60	people per van	
Percent of vanpoolers previously took carpools (P)	9.00	(% default)	
Vehicle Trips Eliminated(PT)	79,333	trips/year	
Van Passenger Vehicle Miles eliminated(PL)	4,164,601	miles/year	
Van trips (VT)	16,698	trips/year	
Estimated Van miles (VL)	743,679	miles/year	
Passenger trip length per trip (one way per van)	44.54	miles per trip	
Number of days project affected per year (D)	253	days per year	
Average auto occupancy(A)	1.09	people per car	
(2) Carpool Vehicle Miles Traveled Reduction (CM) 10/1/2016 to 9/30/2017	8,400,978	miles per year	
(3) Vehicle trips reduced (VTR) = (PT)/(A)	72,783	trips per year	
(4) VMT reductions of Vanpool =(PL)/(A)*(1-(P))	3,476,869	vehicle miles per year	
(5) Emission Rate			
Auto VOC emission rate at 50 mph for freeway and 20mph for non-freeway(VOCa)[1]	0.08914	grams/mile (2019)	
Auto NOx emission rate at 50 mph for freeway and 20mph for non-freeway(NOxa)	0.17861	grams/mile (2019)	
Auto PM 2.5 emission rate at 50 mph for freeway and 20mph for non-freeway, (PMa)	0.01172	grams/mile (2019)	
Auto CO2 equivalent emission rate at 50 mph for freeway and 20 mph for non-freeway (CO2a)	326.84304	grams/mile (2019)	
Van VOC emission rate at 50 mph for freeway and 20mph for non-freeway (VOCv) [2]	0.21056	grams/mile (2019)	
Van NOx emission rate at 50 mph for freeway and 20mph for non-freeway(NOxv)	0.46058	grams/mile (2019)	
Van PM 2.5 emission rate at 50 mph for freeway and 20mph for non-freeway, (PMv)	0.01536	grams/mile (2019)	
Van CO2 equivalent emission rate at 50 mph for freeway and 20 mph for non-freeway (CO2v)	431.59056	grams/mile (2019)	
(6) VOC reduced(AVOC)=((PL)/(A)*(1-(P))*(VOCa) - (VL)*(VOCv))/(D)+(CM)*(VOCa)	<b>3.57</b>	kilograms/day	
NOx reduced(ANox)=((PL)/(A)*(1-(P))*(NOxa)-(VL)*(Noxv))/(D)+(CM)*(NOxa)	<b>7.03</b>	kilograms/day	
PM 2.5 reduced(PM)=((PL)/(A)*(1-(P))*(PMa) - (VL)*(VOCv))/(D)+(CM)*(PMa)	<b>0.51</b>	kilograms/day	
CO2 Equivalent reduced(PM)=((PL)/(A)*(1-(P))*(CO2a) - (VL)*(CO2v))/(D)+(CM)*(PMa)	14,076.00	kilograms/day	
VOC emission reduced in lbs. per day, 1 kilogram = 2.2046lbs.	7.86	lbs./day	
NOx emission reduced in lbs. per day	15.50	lbs./day	
PM 2.5 PM reduced(PM) in lbs. per day	1.11	lbs./day	
CO2 equivalent reduced in lbs. per day	31,031.94	lbs./day	
VOC emission reduced in kilograms/year, (AVOC)	902	kilograms/year	
NOx emission reduced in kilograms/year, (ANox)	1,779	kilograms/year	
PM 2.5 PM reduced(PM) in kilograms/year, (APM)	128	kilograms/year	
CO2 Equivalent reduced in kilograms/year, (ACO2)	3,561,227	kilograms/year	
(7) 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) <sup>n</sup> * (i) / ((1+i) <sup>n</sup> - 1)	1.0100	capital recovery factor	
Project funding amount (C)	\$1,126,978	capital cost	
Project annual cost (AC) = (C)*(CRF)	\$1,138,248	\$ per year	
Cost Effectiveness for VOC = (AC) / (AVOC)	\$1,262	\$ per kilogram per year	
Cost Effectiveness for NOx = (AC) / (ANox)	\$640	\$ per kilogram per year	
Cost Effectiveness for total of VOC & NOx = (AC) / (AVOC)+(ANox)	\$425	\$ per kilogram per year	
PM 2.5 Cost Effectiveness = (AC) / (APM)	\$8,909	\$ per kilogram per year	
CO2 Equivalent Cost Effectiveness = (AC) / (ACO2)	\$0.32	\$ 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] Running emission rate 48% on freeway at average speed 50mph and 52% on non-freeway at 20mph for passenger cars based on MOVES2014b model runs 2019			
[2] Running emission rate 48% on freeway at average speed 50mph and 52% on non-freeway at 20mph for van based on MOVES2014b model runs 2019			

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# **Appendix F**

## **United Way of Central Alabama Annual Report**

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## 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 2018-19, through various community events, Healthy Communities impacted 2,831 participants and 193 volunteers. In addition to events and education, our outreach efforts included information via the United Way of Central Alabama website, and a radio PSA. Other accomplishments include the highlights below:

- UWCA worked with Washington K8 to coordinate a National Walk to School Day event in partnership with Children's of Alabama. The Walk was preceded with education to students, and a presentation to Birmingham City Council to inform them of the Washington K8 School Travel Plan. Washington K8 School officially adopted the plan in August 2018. The plan was the culmination of a year-long effort to survey existing conditions, receive community input, and create recommended solutions to increase safety and walkability in the area.
- UWCA partnered with JCCEO to conduct a pedestrian awareness project and art contest at 18 different head start locations.
- UWCA participated in Red Rock Tuesday with Jeh Jeh Pruitt (FOX 6 Good Day Alabama) at Barrett Elementary in partnership with Freshwater Land Trust as part of our education and awareness efforts.
- UWCA replaced the stolen bicycle trailer and resumed its bicycle rodeo program in late 2019. Three bicycle rodeos were held, and eight are already scheduled spring 2020.

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# **Appendix G**

## **The Johnson Management Group Annual Report**

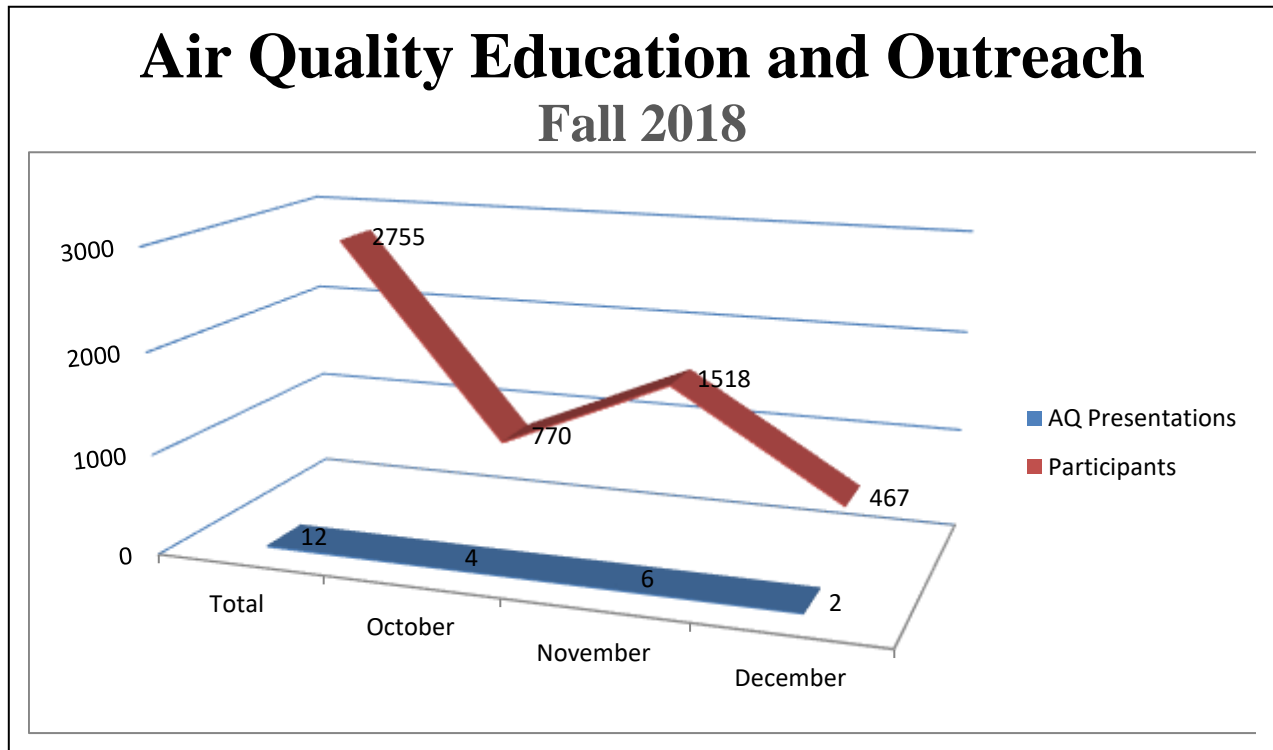
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# Johnson Management Group Air Quality Report

## FY October 2018 – September 2019

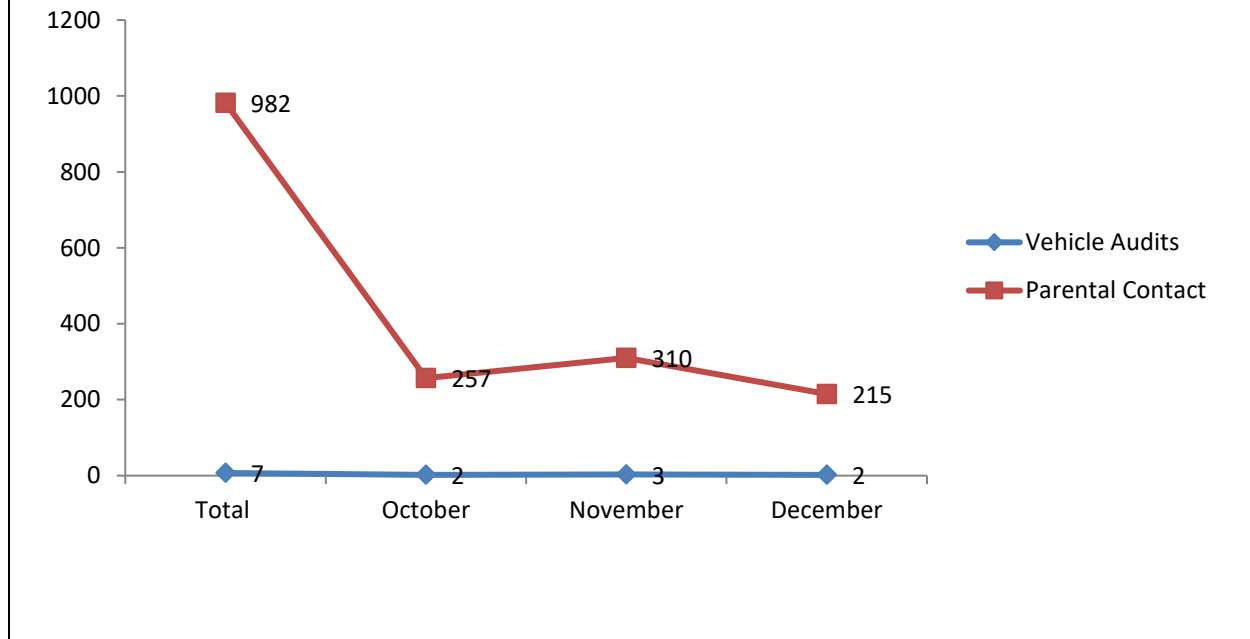
This fiscal year end report summarizes the air quality awareness, education and outreach provided from October 2018 through September 2019. The following tables and graphs include detailed information about our positive social impact on Birmingham and the surrounding communities.

### October - November - December 2018



During the month of October, we conducted 4 presentations, reaching 770 students at the following schools: Putnam, Midfield, and Ossie Mitchell. The following month, we conducted 6 presentations reaching a total of 1518 individuals consisting of students at Hayes, West End and Jones Valley as well as parents and conference attendees at Civitan Club and ASHPED. In December, we conducted 2 presentations, reaching 467 students at the following schools: Central Park (402) and St. Vincent's (65).

## Air Quality Vehicle Audits Fall 2018

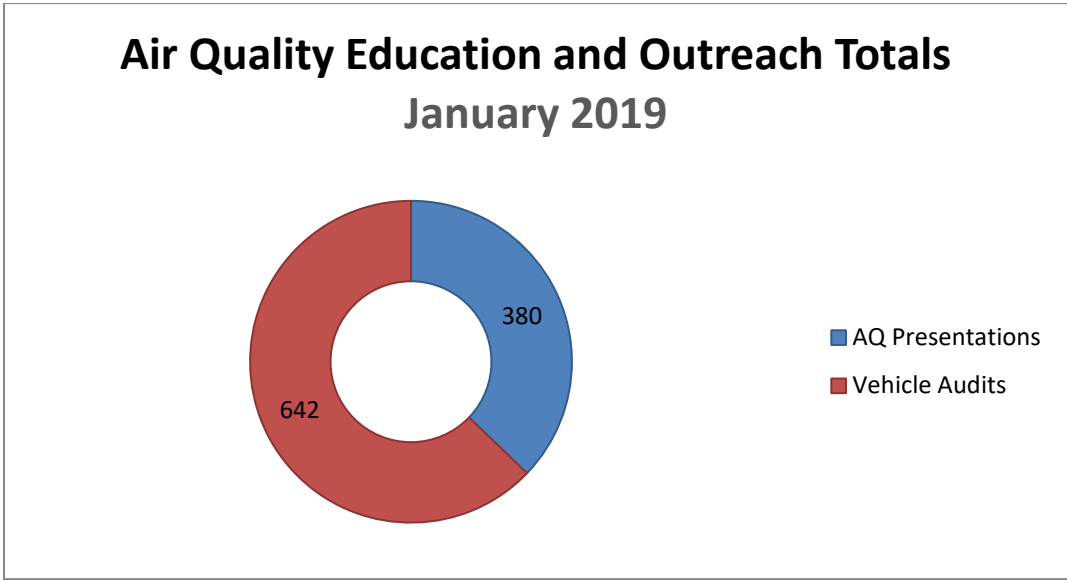


During the month of October, two audits were conducted where we provided air quality awareness and education to a total of 257 parents in carpool lines at the following schools: Smith Middle (115) and Midfield (142). The following month, three audits were conducted where we provided air quality awareness and education to a total of 310 parents in carpool lines at the following schools: Robinson (103), Jones Valley (105), and Barrett (102). In December, two audits were conducted where we spoke to a total of 215 parents in carpool lines at the following schools: Central Park (113) and Arrington (102).

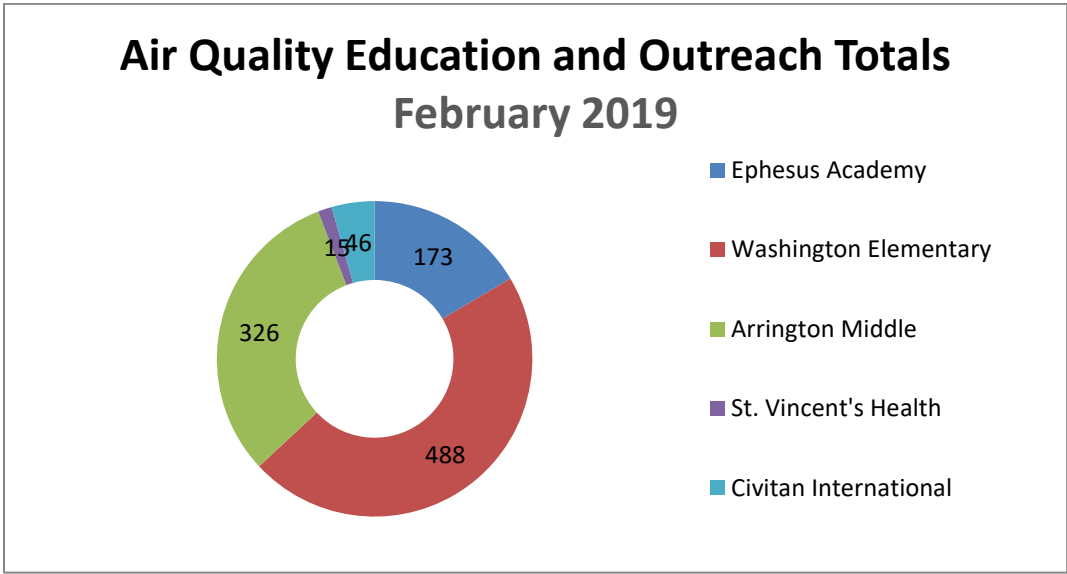
Information was provided to 1,773 students and 982 adults with over 200 of the adult contact occurring at the ASHPED Conference.



## .. .. Winter - Spring - Fall 2019 .. ..

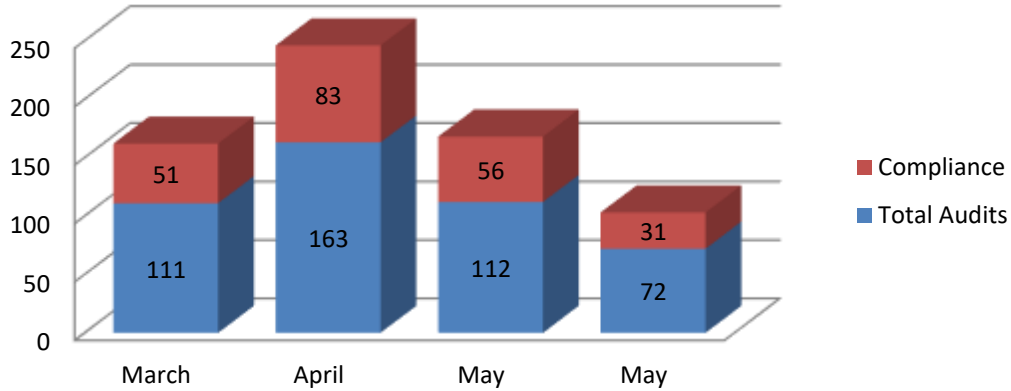


JMG held several presentations to include 2 school sessions reaching 380 students. We held 6 audits with total parental touch of 642 parents and delivered pieces of literature during carpools.



Feb - Johnson Management Group had several planning sessions and meetings. We participated in 2 career days, Ephesus Academy (173) students and Washington Elementary (488) students during February. We held 1 AQ day at Arrington Middle (326) students and spoke to two civic groups St Vincent's Health (15) staffers and Civitan (46) attendees. We touched a total of 1,048 with the clean air message and distributed the same in brochures and giveaways.

## Air Quality Vehicle Audits & Compliance Spring 2019

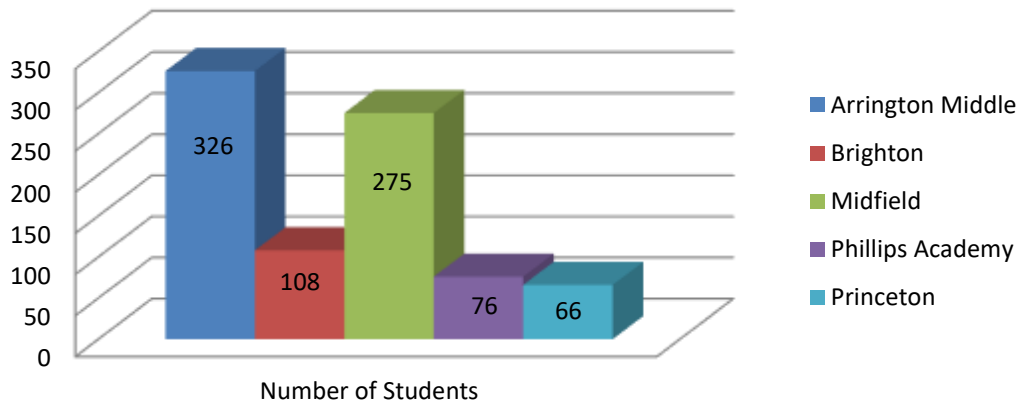


March - We had 1 audit handing out 111 pieces of literature, of the 111 vehicles 51 complied with request to shut down engines while idling.

April - We conducted 2 audits handing out 163 pieces of literature, of the 163 vehicles 83 complied with request to shut down engines while idling and were rewarded with an air quality gift.

May - JMG held several meeting and presentations. A total of 2 audits were held, 112 cars at Avondale with 56 turning off the engines and 72 at Central Park with 31 turning off their engines.

## Air Quality Student Outreach & Education Spring 2019

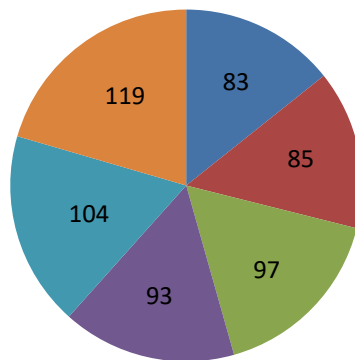


February - We held 1 AQ day at Arrington Middle (326).

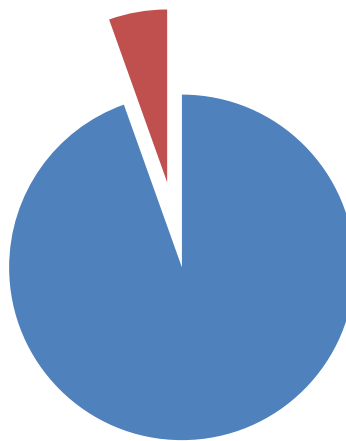
April - We conducted 3 presentations at Brighton and Midfield Schools. 108 @ Brighton and 275 at Midfield totaling 383 students being air quality educated. This coupled with the awareness provided to parents, gives a grand total educated of 546 for April.

May - During presentations we had 76 pledge cards signed by Phillips students and 66 pledge cards signed by the students of Princeton School.

## Air Quality Student Outreach & Vehicle Audits September 2019



■ Kindergarten ■ 1st grade ■ 2nd Grade  
■ 3rd grade ■ 4th grade ■ 5th grade



■ Total Audit ■ Compliance

Sept - We conducted 1 presentation, reaching 581 students 83 kindergarteners, 85 1<sup>st</sup> graders, 97 2<sup>nd</sup> graders, 93 3<sup>rd</sup> graders, 104 4<sup>th</sup> graders and 119 5<sup>th</sup> graders. One audit at Clay Elementary was conducted. We spoke to 104 parents in carpool lines and 6 shut off their engines.