

# Breathe Better Program Annual Report 2016 – 2017

## Summary

The Breathe Better (B<sup>2</sup>) Program is an anti-idling, clean air campaign directed primarily toward schools. Businesses and other organizations can also participate in the program by posting “no-idling” signs.

## Breathe Better School Program

The goal of the School Program is to protect the health of students, teachers and faculty by reducing vehicle emissions on school campuses across South Carolina. The program is very flexible by nature and can be easily adapted to the needs of any school. B<sup>2</sup> is a voluntary initiative and there is no cost to participate in the program. The Program provides anti-idling signs, printed materials and, depending on availability, promotional items. Participating schools are asked to adopt an anti-idling policy and post signage on the school campus to reinforce this policy. Beyond this central condition, schools can participate in a variety of ways.

Table 1 provides a quick snapshot of B<sup>2</sup> participation during the 2016-17 school year. Of the fifty-two participating schools, 48% were returning participants, and 40% also participated in the Air Quality Flag Program. Thirty-six schools completed a vehicle counting activity to evaluate the effectiveness of their anti-idling policies. This counting activity showed an overall decrease in the number of idling cars (42.3%) and buses (10.5%). Three additional schools participated in the flag program only.

## Audience Reached

During the 2016-17 school year, the B<sup>2</sup> Program reached fifty-two schools in twelve counties across the state. This roughly equates to:

- 38,361 students and the teachers at their schools
- 3,963 parents (assuming one per vehicle counted)
- 224 bus drivers

This adds up to a total of 42,548 individuals that were reached by the B<sup>2</sup> program through schools.

**Table 1. Summary of 2016 – 17 B<sup>2</sup> School Participation**

Number of Individuals Reached	42,548
Total Number of Schools	52
Number of Continuing Schools	25
Number of New Schools	27
Counties	12
Platinum Level Participants	23
Gold Level Participants	9
Silver Level Participants	7
Bronze Level Participants	13
B <sup>2</sup> Flag Program Participants	21
Vehicle Counting Activity Completed	36
Percent Decrease in Idling Cars	42.3 %
Percent Decrease in Idling Buses	10.5 %

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### Participation Levels

Schools participated in the B<sup>2</sup> program in varying ways. Participation levels are outlined in Table 2, along with the number of participants at each level for the 2016-17 school year. Of these schools, thirty-six reported baseline and final vehicle counts (cars and/or buses) to track the effectiveness of their anti-idling campaign.

**Table 2. Participation Level Descriptions and Counts for 2016 – 17**

Participation Level	Description of Activities		Number of 2016-17 Schools
Platinum	Adopt anti-idling policy, post anti-idling signage, perform vehicle counting activity	and <b>three</b> additional air quality activities	23
Gold	Adopt anti-idling policy, post anti-idling signage, perform vehicle counting activity	and <b>two</b> additional air quality activities	9
Silver	Adopt anti-idling policy, post anti-idling signage, perform vehicle counting activity	and <b>one</b> additional air quality activity	7
Bronze	Adopt anti-idling policy, post anti-idling signage	and <b>one</b> additional air quality activity	13
Flag Program Only	School only participates in the Air Quality Flag Program and does not adopt an anti-idling policy or post signage.		3

Table 3 lists all the participating schools for the 2016 – 17 school year as well as the number of teachers and enrolled students.

**Table 3. B<sup>2</sup> and Flag Program Participating Schools for 2016 – 17**

County	School Name	Students Enrolled	Teachers
Anderson	Wren Elementary School	580	35
Beaufort	Bluffton Elementary School	607	49
Charleston	Cape Romain Environmental Education Charter School	160	17
Charleston	Lowcountry Leadership Charter School	530	31
Florence	Sneed Middle School	927	55
Greenville	A.J. Whittenburg Elementary School of Engineering	555	31
Greenville	Camperdown Academy	121	42
Greenville	Carolina High School and Academy	790	49
Greenville	Christ Church Episcopal School	1,128	111
Greenville	GREEN Charter School	680	32
Greenville	Hillcrest Middle School	1,050	55
Greenville	Northwest Middle School	800	45
Greenville	Oakview Elementary School	990	55
Greenville	Slater Marietta Elementary School	550	33
Greenville	St. Joseph's Catholic School	672	40

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County	School Name	Students Enrolled	Teachers
Greenville	Taylor's Elementary School	777	46
Horry	Burgess Elementary School	850	50
Horry	North Myrtle Beach Middle School	1,100	65
Horry	Ocean Bay Middle School	1,250	68
Lexington	Deerfield Elementary School	650	38
Lexington	Dutch Fork Elementary	580	42
Lexington	H.E. Corley Elementary Leadership Magnet School	560	44
Lexington	Irmo High School	1,443	114
Lexington	Meadow Glen Middle School ( <i>flag only</i> )	1,200	68
Lexington	Pleasant Hill Elementary School	855	53
Lexington	River Bluff High School	1,955	124
Oconee	Blue Ridge Elementary School	625	55
Pickens	Central Elementary School	384	28
Pickens	D W Daniel High School	1,090	55
Pickens	Pickens Elementary School	560	29
Richland	A.C. Moore Elementary School	419	36
Richland	Bookman Road Elementary	500	37
Richland	L.W. Conder Elementary School	890	63
Richland	Longleaf Middle School	800	49
Spartanburg	Boiling Springs Elementary	748	51
Spartanburg	Boiling Springs Intermediate	580	58
Spartanburg	Carlisle-Foster's Grove Elementary	435	32
Spartanburg	Carver Middle School	589	52
Spartanburg	Chesnee Elementary School	578	36
Spartanburg	Chesnee High School	627	45
Spartanburg	Chesnee Middle School ( <i>flag only</i> )	527	36
Spartanburg	Cleveland Academy	605	41
Spartanburg	Cooley Springs-Fingerville Elementary	315	21
Spartanburg	James H. Hendrix Elementary	666	50
Spartanburg	Jesse Boyd Elementary	490	38
Spartanburg	Mayo Elementary School	280	22
Spartanburg	McCracken Middle School ( <i>flag only</i> )	750	62
Spartanburg	Oakland Elementary School	635	39
Spartanburg	Pine Street Elementary School	689	49
Spartanburg	Shoally Creek Elementary School	580	30
Spartanburg	Spartanburg Preparatory School	400	33
Spartanburg	W.H. Chapman Elementary School	425	31
York	Doby's Bridge Elementary School	756	44
York	Hunter St Elementary School	465	30
York	Springfield Elementary School	650	42
<b>Totals<sup>1</sup>:</b>		<b>35,941</b>	<b>2,420</b>

<sup>1</sup> Table 3 totals do not include flag-only schools

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## Observed Behavior Changes

Thirty-six schools performed baseline and final vehicle counts for personal vehicles/cars and buses – thirty-six useable data sets were provided for cars and thirty-one useable data sets were provided for buses. At each count, the total number of cars and buses are counted as well as the number of cars and buses that are idling. The total tallies of idling cars and buses from all participating schools are listed in Tables 4 and 5, respectively.

**Table 4. Personal Vehicle (Car) Counts**

	Initial	Final
Total # of Cars	3,963	4,003
# of Cars Idling	1,415	824
% of Cars Idling	35.7%	20.6%
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% Decrease in Idling Cars	42.3	
# of Cars that Stopped Idling <sup>2</sup>	599	

**Table 5. Bus Counts**

	Initial	Final
Total # of Buses	224	211
# of Buses Idling	89	75
% of Buses Idling	39.7	35.5
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% Decrease in Idling Buses	10.5	
# of Buses that Stopped Idling	9	

Overall, the percentage of vehicles that were observed to be idling decreased over the course of the school year. At the initial count, 35.7% of car drivers were idling and 39.7% of bus drivers were idling. By the final count, 20.6% of cars and 35.5% of buses were idling. On the whole, idling cars decreased by 42.3% and idling buses decreased by 10.5%.

## Estimated Emissions Reductions and Cost Savings

Emissions reductions due to the decrease in idling vehicles were estimated for the following pollutants: carbon dioxide (CO<sub>2</sub>), volatile organic compounds (VOCs), carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), and particulate matter (PM).

These estimations are simplistic in nature and require several assumptions to provide continuity:

1. Each vehicle that “stopped” idling at school did so on all 180 days of the 2016-17 school year. Idling time for each driver was reduced by 15 minutes per day.
2. All personal vehicles run on gasoline and all school buses run on diesel.
3. Personal vehicles consume fuel at an average rate of 0.375 gallons/hour while idling<sup>3</sup> and school buses consume fuel at a rate of 0.5 gallons/hour while idling.

The emission rates shown in Table 6 on the following page are assumed for personal vehicles and buses.

<sup>2</sup> This number of vehicles that stopped idling is calculated using the initial number of idling vehicles and the percent decrease in idling vehicles.

<sup>3</sup><http://www.fueleconomy.gov/feg/driveHabits.jsp>

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**Table 6. Emission Rates Assumptions**

	Personal Vehicles	Buses
CO <sub>2</sub> emission <sup>4</sup>	19.6 lb/gal	22.4 lb/gal
VOC emission <sup>5,6</sup>	3.61 g/hr	4.97 g/hr
NO <sub>x</sub> emission	3.89 g/hr	43.51 g/hr
CO emission	72.25 g/hr	25.63 g/hr
PM <sub>10</sub> emission	-- <sup>7</sup>	1.52 g/hr
PM <sub>2.5</sub> emission	-- <sup>6</sup>	1.40 g/hr

Using the stated assumptions, the following values have been calculated for the number of vehicles that stopped idling during the 2016-17 school year:

**Table 7. Emissions, Fuel Waste and Idling Time Avoided**

	Single Personal Vehicle	All Personal Vehicles	Single Bus	All Buses	Total
Hours of Idling Avoided	45	26,955	45	405	27,360
Gallons of Fuel Saved	16.9	10,108	22.5	202.5	10,310.6
CO <sub>2</sub> Emission Avoided (tons)	0.2	99.1	0.25	2.3	101.3
VOC Emission Avoided (lbs)	0.36	214.8	0.06	.5	215.3
NO <sub>x</sub> Emission Avoided (lbs)	0.39	231.3	0.50	4.4	235.7
CO Emission Avoided (lbs)	7.17	4,293.6	0.29	2.6	4,296.2
PM <sub>10</sub> Emission Avoided (lbs)	--	--	.02	.15	.15
PM <sub>2.5</sub> Emission Avoided (lbs)	--	--	.02	.14	.14

Assuming an average gas price of \$2.21 and an average diesel price of \$2.24<sup>8</sup>, the savings in fuel cost from reduced idling throughout the school year would be \$37.35 per passenger vehicle and \$50.40 per school bus. For all vehicles that stopped idling, this equates to a savings of \$22,792 over the school year.

## **Breathe Better Business Program**

The goal of the Business Program is to protect the health of employees and customers by reducing vehicle emissions at businesses across South Carolina. The program is very flexible by nature and can be easily adapted to the needs of any business. B<sup>2</sup> is a voluntary initiative and there is no cost to participate in the program.

<sup>4</sup> U.S. Energy Information Administration. <http://www.eia.gov/tools/faqs/faq.cfm?id=307&t=9>

<sup>5</sup> Emission rates for personal vehicle VOC, NO<sub>x</sub>, and CO are calculated as a weighted average of emission rates for idling light-duty gasoline vehicles and light-duty gasoline trucks. Weighted average calculated using 2013 vehicle numbers from: <http://cta.ornl.gov/data/index.shtml>. Emission rates from: US Environmental Protection Agency, *Idling Vehicle Emissions for Passenger Cars, Light Duty Trucks and Heavy-Duty Trucks*, 2008.

<sup>6</sup> Values for bus VOC, NO<sub>x</sub>, and CO emission rates come from: US Environmental Protection Agency, *Average In-Use Emissions from Urban Buses and School Buses*, 2008.

<sup>7</sup> PM emissions from gasoline powered personal vehicles are negligible.

<sup>8</sup> U.S. Energy Information Administration, [https://www.eia.gov/dnav/pet/pet\\_pri\\_gnd\\_dcus\\_r1z\\_a.htm](https://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_r1z_a.htm)

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Participating businesses are asked to adopt an anti-idling policy and post signage at the business to reinforce this policy. Sign locations may include the loading docks, customer parking areas, and employee parking areas.

Table 8, below, provides a summary of business participation in the B<sup>2</sup> program. Three businesses have joined thus far in 2017, the second year for the program. Through the B<sup>2</sup> business program an additional 800 people each day are exposed to the “no-idling” message.

**Table 8: Summary of 2016-17 B<sup>2</sup> Business Participation**

<b>Organization</b>	<b>Address</b>	<b>City</b>	<b>Member Since</b>	<b>Estimated Daily Views</b>
Aiken County Government	1930 University Parkway, Suite 3400	Aiken	2016	500
Central Midlands Council of Governments	236 Stoneridge Drive	Columbia	2017	20
Environmental Discovery Center	1110 Ben Gause Road	Coward	2016	250
Rosewood Market and Deli	2803 Rosewood Drive	Columbia	2016	50