HIGH BRIDGE ELEMENTARY SCHOOL

ANTI-IDLING PROGRAM

HART

Promoting Sustainable Transportation

Introduction

According to the New Jersey Department of Environmental Protection (NJDEP), transportation represents the largest single source of greenhouse gas emissions in the state of New Jersey. Personal vehicle use accounts for 60% of the emissions generated.

One way to reduce transportation related greenhouse gas emissions is to reduce unnecessary vehicle idling. Vehicle idling, or leaving your car engine running while it is not moving, is extremely inefficient and causes more emissions than driving a vehicle at thirty (30) miles per hour (mph).

New Jersey law prohibits vehicles from idling for more than 3 minutes. (N.J.A.C. 7:27-14,15)

60% of transportation emissions is from personal vehicle use.

~US EPA

Background

HART's free Environmental Education Program explores the connection between transportation choice and impact on the environment. The program is designed to educate students in grades K-12, as well as getting residents involved in sustainable transportation options in their community. All lessons meet NJ Core Curriculum standards.

In early November 2014, HART staff was invited to conduct a lesson to the High Bridge Elementary School Environmental Club (4th grade students). The students learned about how transportation choice can have an impact on the air quality around their school.

As a result of the information presented, the students and Environmental Club instructor became interested in changing the behavior of the parents who idle their vehicles while waiting to pick up their students at the end of the school day. The students decided to conduct an "Anti-Idling" Campaign. The campaign consisted of the parts:

1. (Pre-Campaign) Idling Inventory & Data Analysis
2. Education and Awareness Campaign
3. (Post Campaign) Idling Inventory & Data Analysis

This report provides the results of the High Bridge Elementary School Anti-Idling effort started in the 2014-2015 school year and concluded in the first half of the 2015-2016 school year.

Pre- Campaign Idling Inventory & Analysis

To begin the anti-idling inventory process students were trained to recognize the characteristics of an idling vehicle and how to fill out the inventory forms.

Students counted the number of vehicles in the drop off/pick up zone of the school every day for one week (dates) and, using stop watches, recorded the amount of time that each car idled.

Over the course of the week, students counted an average of forty-eight (48) vehicles each day to pick up students. Of that total, an average of fourteen (14) vehicles idled their vehicles for longer than the three (3) minute NJ law (N.J.A.C. 7:27-15). This represented approximately thirty (30) percent of the total number of vehicles.

Figure 1, below, illustrates that that a majority of vehicles idled between eleven (11) to fifteen (15) minutes with some vehicles idling twenty (20) minutes or longer.

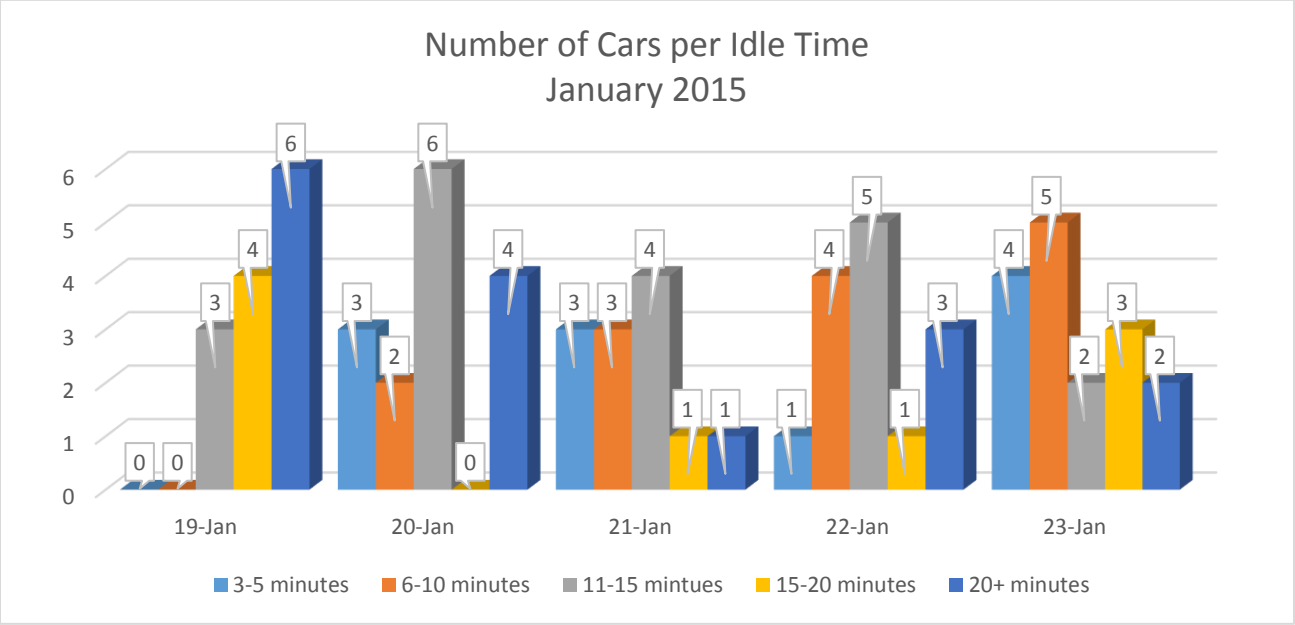


Figure 1: The number of cars separated by the amount of time spent idling on specific days.

Further analysis provided information on the amount of gasoline burned per day during the idling as well as the emissions generated. Looking at figures 2 & 3 below we can see that over just a week of data collection over twenty (20) gallons of gasoline was burned and four hundred (400) pounds of Carbon Dioxide (CO_2) was released into the atmosphere.

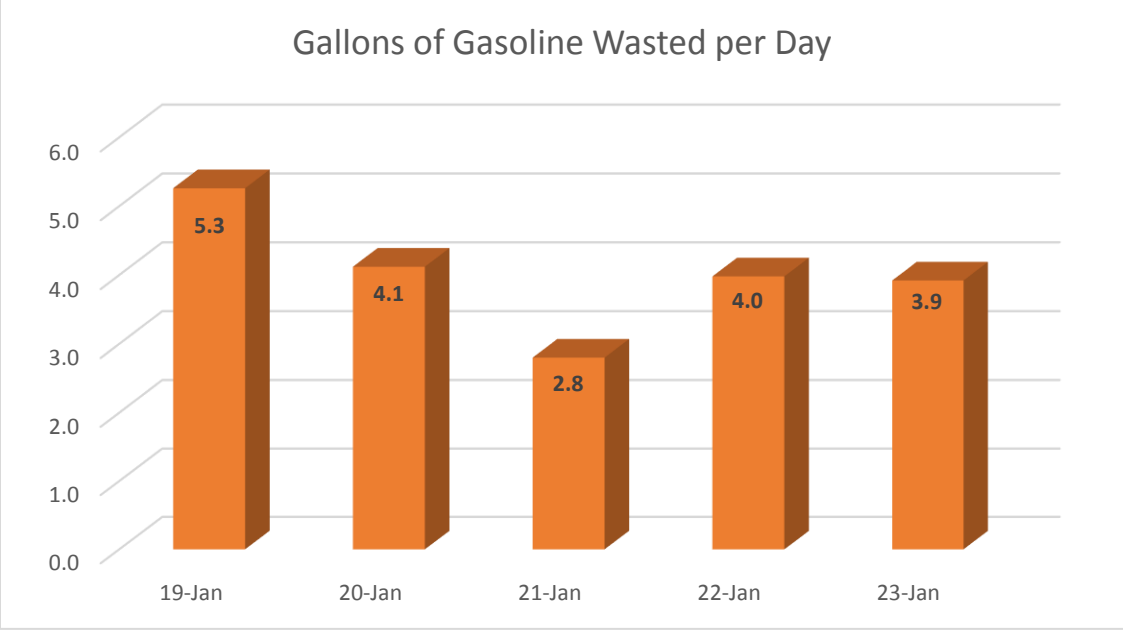


Figure 2: Total number of gallons of gasoline burned per day during the January 2015 initial idling inventory at High Bridge Elementary School.

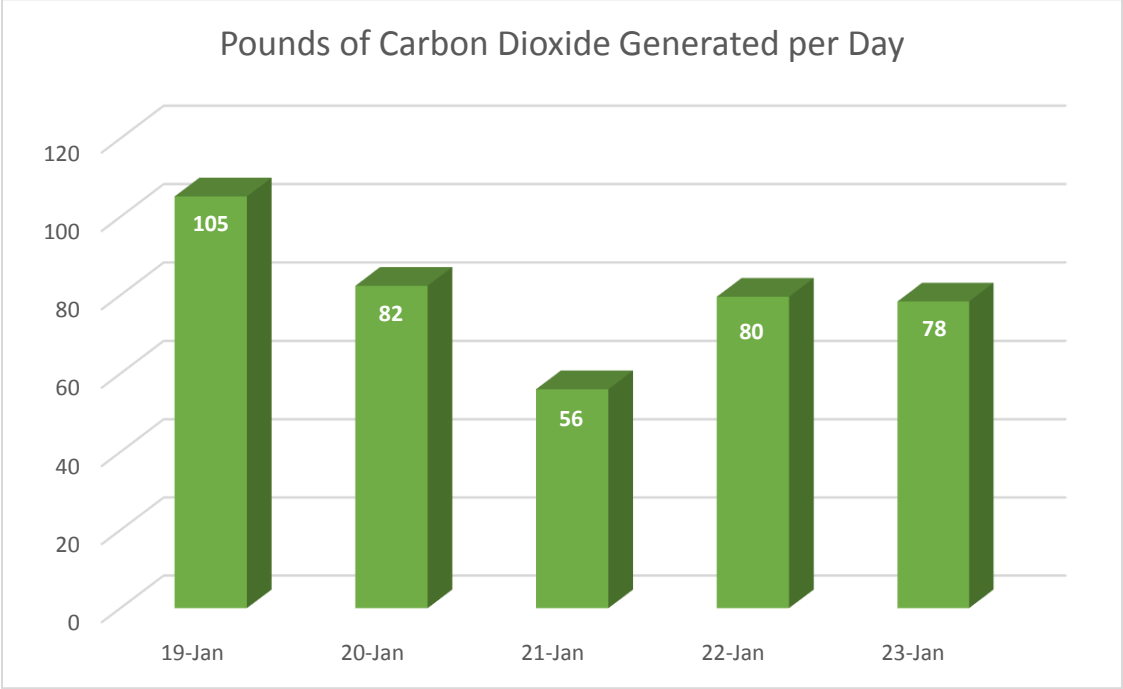


Figure 3: Total amount of carbon dioxide contributed to the atmosphere per day during the January 2015 initial idling inventory at High Bridge Elementary School.

Education and Awareness Campaign

Design-a-Sign

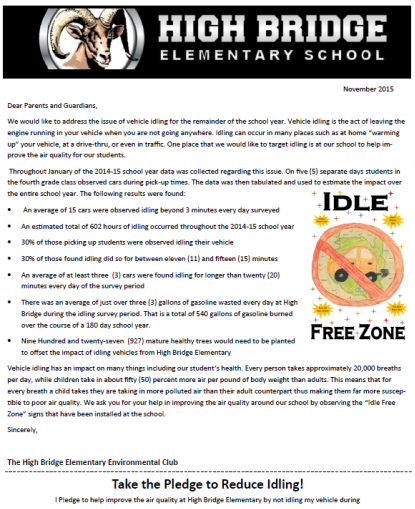
High Bridge Elementary School took advantage of HART's "Design-a-Sign" program, offered as part of the Environmental Education Program, as a way to kick start the awareness and education component of the campaign.

After a lesson on idling and a presentation on the idling inventory, students in the 4th grade were invited to design signs with an "anti-idling" message. The designs were voted upon by the entire student body. The winning design was transformed into a permanent metal sign and was hung in the pick/up drop off area.

There are two (2) signs that have been installed on either end of the parking lot and are easily seen from the vehicles waiting to pick up their students.

Parent Education

At the start of the 2014-2015 school year, a letter and informational materials about idling was sent home to parents. The information included how idling impacts children's health and the environment. A short worksheet was also provided to show parents how much money was wasted through idling their vehicle for just five (5) minutes a day throughout an entire year. The letter also referenced new idling restrictions on school property.



HIGH BRIDGE
ELEMENTARY SCHOOL

November 2015

Dear Parents and Guardians,

We would like to address the issue of vehicle idling for the remainder of the school year. Vehicle idling is the act of leaving the engine running in your vehicle when you are not going anywhere. Idling can occur in many places such as at home "warming up" your vehicle, at a drive-thru, or even in traffic. One place that we would like to target idling is at our school to help improve the air quality for our students.

Throughout January of the 2014-15 school year data was collected regarding this issue. On five (5) separate days students in the fourth grade class observed cars during pick-up times. The data was then tabulated and used to estimate the impact over the entire school year. The following results were found:

- An average of 15 cars were observed idling beyond 3 minutes every day surveyed
- An estimated total of 602 hours of idling occurred throughout the 2014-15 school year
- 30% of those picking up students were observed idling their vehicle
- 30% of those found idling did so for between eleven (11) and fifteen (15) minutes
- An average of at least three (3) cars were found idling for longer than twenty (20) minutes every day of the survey period
- There was an average of just over three (3) gallons of gasoline wasted every day at High Bridge during the idling survey period. That is a total of 540 gallons of gasoline burned over the course of a 180 day school year.
- Nine Hundred and twenty-seven (927) mature healthy trees would need to be planted to offset the impact of idling vehicles from High Bridge Elementary

IDLE
FREE ZONE

Vehicle idling has an impact on many things including our student's health. Every person takes approximately 20,000 breaths per day, while children take in about fifty (50) percent more air per pound of body weight than adults. This means that for every breath a child takes they are taking in more polluted air than their adult counterpart thus making them far more susceptible to poor air quality. We ask you for your help in improving the air quality around our school by observing the "Idle Free Zone" signs that have been installed at the school.

Sincerely,

The High Bridge Elementary Environmental Club

Take the Pledge to Reduce Idling!

I Pledge to help improve the air quality at High Bridge Elementary by not idling my vehicle during

Enforcement

The High Bridge Police Department sent officers to the school for two weeks, once following the initial idling data collection and once just prior to the final collection, to hand out warning tickets to parents who were caught idling their vehicles for over the three (3) minute New Jersey law.

Each warning ticket explained the many issues with idling and warned parents about the penalties an actual ticket carries ($250 fine for a first offense). Officers made sure to let everyone who received a warning know that this was only a warning, for educational purposes and to inform those who might not know of the law that has been in place for many years.

Post Campaign Idling Inventory & Analysis

During the week of December 14th, 2015 the High Bridge Environmental Club conducted a follow-up assessment of the idling post campaign.

Working in teams of two students were again provided with clipboards, stopwatches, and idling inventory worksheets to aide in their collection of data. Other students recorded the weather and the total number of cars that came to the drop off zone while the inventory was taking place.

The initial data taken on Monday December 14th, 2015 showed a decrease in overall idling vehicles. However, the students felt that more could be done to reduce idling. On Tuesday, December 15, 2015, the students, with the assistance of local law enforcement officers handed out idling information sheets again to continue the education from previous weeks and to target specific offenders. Throughout the week students handed out information to those who were idling. The results are shown in the figure below.

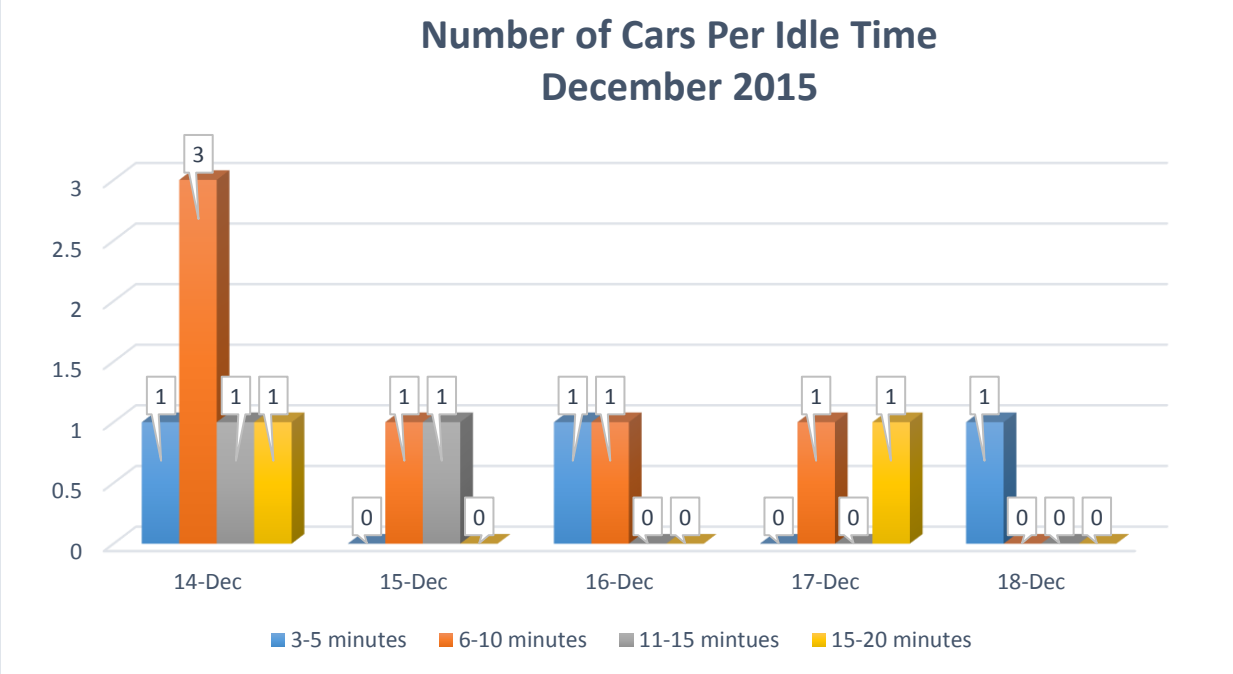


Figure 4: The total number of cars caught idling on specific days separated into different time allotments.

Looking at figure 4, above we can see that the total number of idling vehicles declined throughout the week. This likely had to do with the students issuing warning flyers to those parents who were caught idling. During this second inventory we saw a change in behavior as those parents who were caught early on in the week turned their vehicles off when they got to the school, even those who were there for longer

than thirty (30) minutes. Throughout the entire week, as shown in figures 5 & 6 below, less than two gallons of gasoline was wasted due to idling vehicles and fifty pounds of CO_2 was generated.

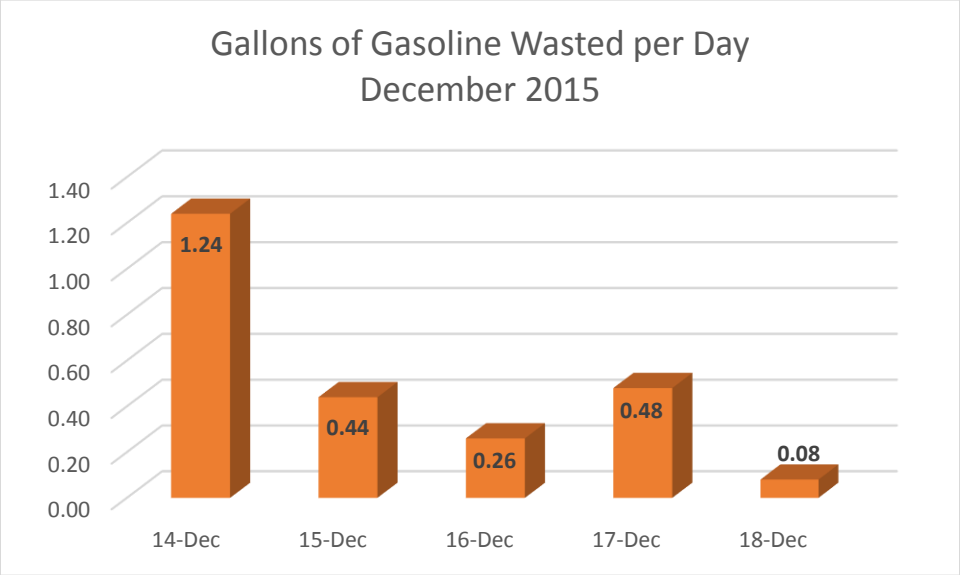


Figure 5: Total number of gallons of gasoline wasted each day during the December 2015 idling inventory at High Bridge Elementary School.

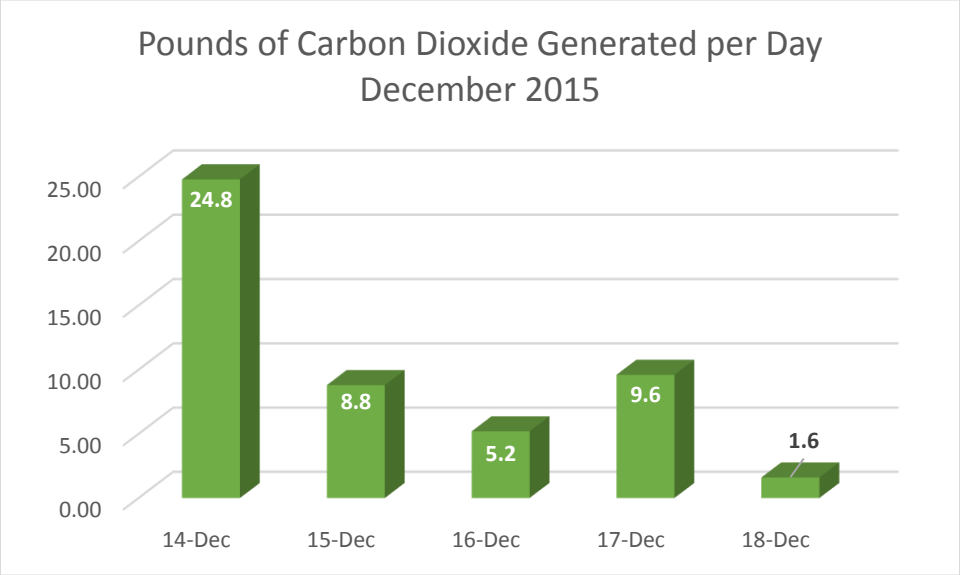


Figure 6: Pounds of Carbon Dioxide contributed to the atmosphere during the December 2015 anti-idling inventory at High Bridge Elementary School..

Pre and Post Campaign Data Comparison

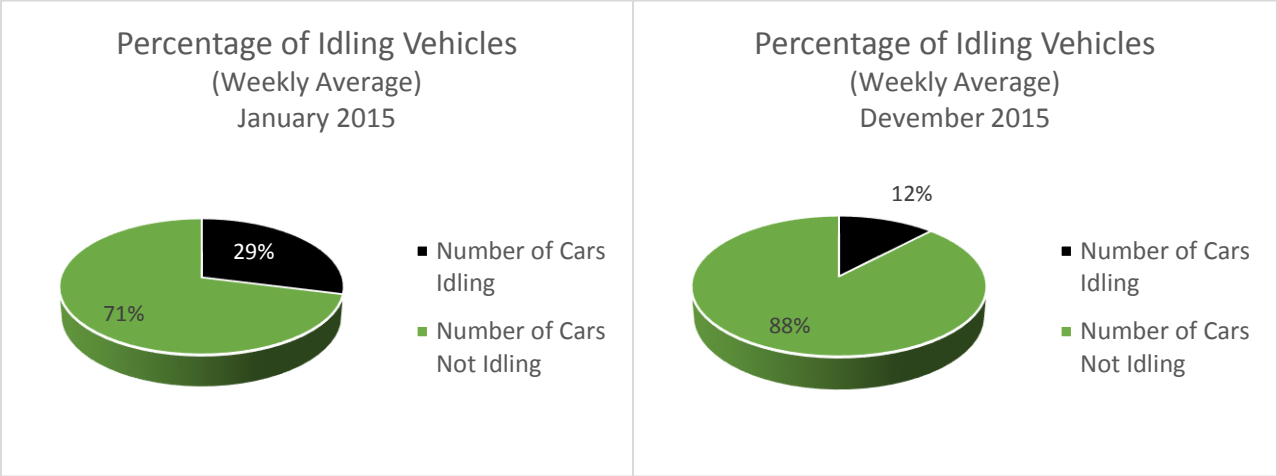


Figure 7: Comparison between the percentage of idling vs. non-idling vehicles during the initial inventory in January 2015 and the final inventory in December 2015 at High Bridge Elementary School.

The charts in figure 7, above reflect the success of the campaign. The percentage of idling vehicles during the observation weeks significantly decreased. The number of cars observed idling was reduced from 29% to 12% which is a decrease of more than forty percent.

Figure 8 below shows that there was a significant change from the initial survey in that every day in January 2015 there was at least one (1) car that idled for more than twenty (20) minutes for a total of sixteen (16), while in December 2015 there were no vehicles idling for this length of time throughout the entire week. We can also see that every category was decreased by more than fifty percent and overall by nearly ninety percent.

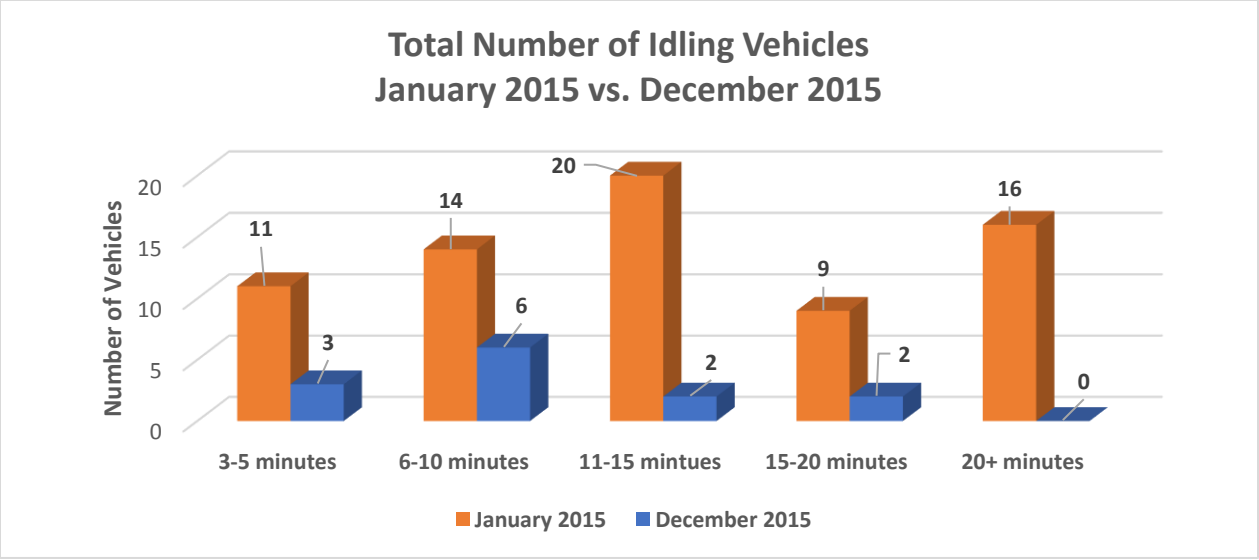


Figure 8: Comparison between the total number of idling vehicles over an entire week for specific amounts of time.

Figure 9, below shows a decrease in the average time spent idling every day of the two inventory periods. In January the average number of cars caught idling was fourteen (14) per day, while in December that number was only three (3), which is a decrease of nearly eighty (80) percent.

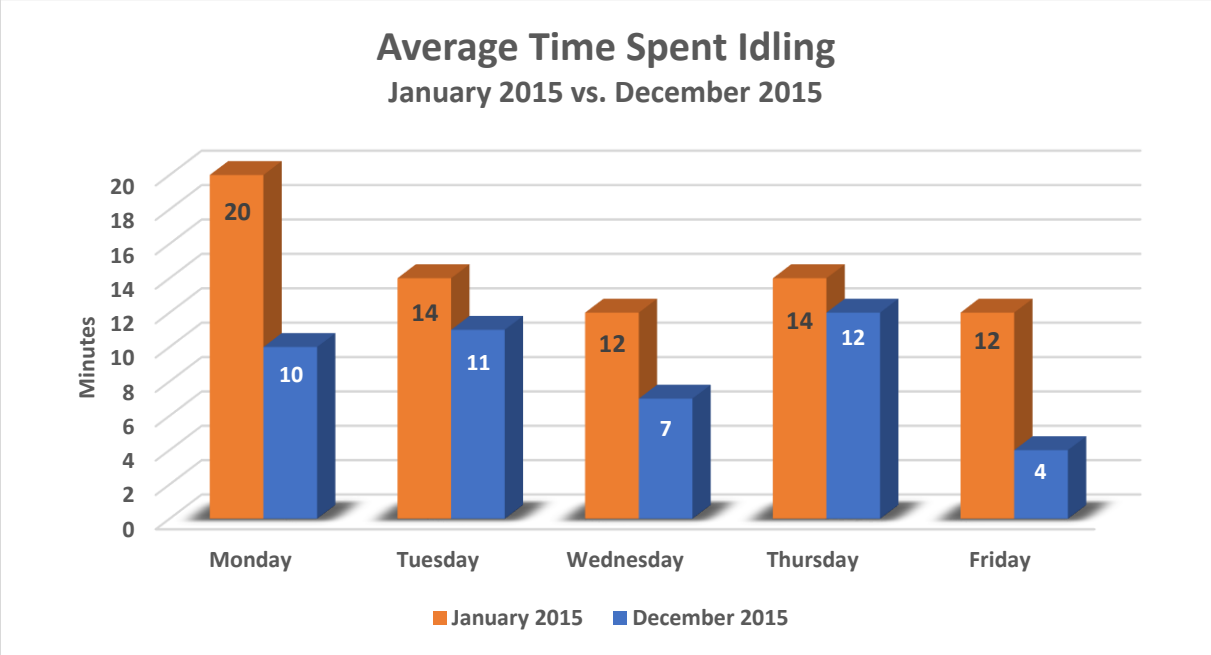


Figure 9: Comparison of the total number of vehicles idling on days of the week in January versus December.

The amount of gasoline burned as well as the number of pounds of Carbon Dioxide generated were also lower as we can see when comparing Figures # & # from the initial inventory in January 2015 to Figures # & # from the follow-up inventory conducted in December. With an average of 0.4 gallons of gasoline and eight (8) pounds of Carbon Dioxide (CO_2) generated per day in December versus the average of 3.3 gallons of gasoline and sixty-seven (67) pounds of CO2 generated during the initial inventory in January it is easy to see how much of an impact the overall campaign has had on the amount of pollution generated.

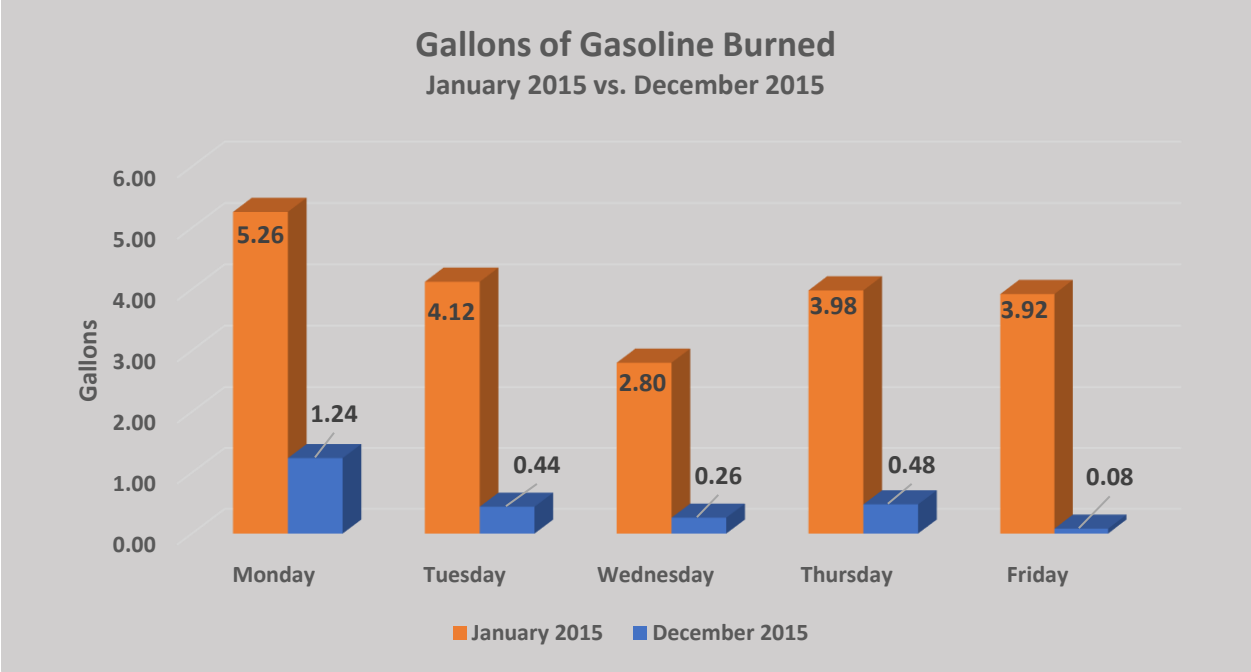


Figure 10: Comparison between the amounts of gasoline burned per day during the two monitoring periods in January and December.

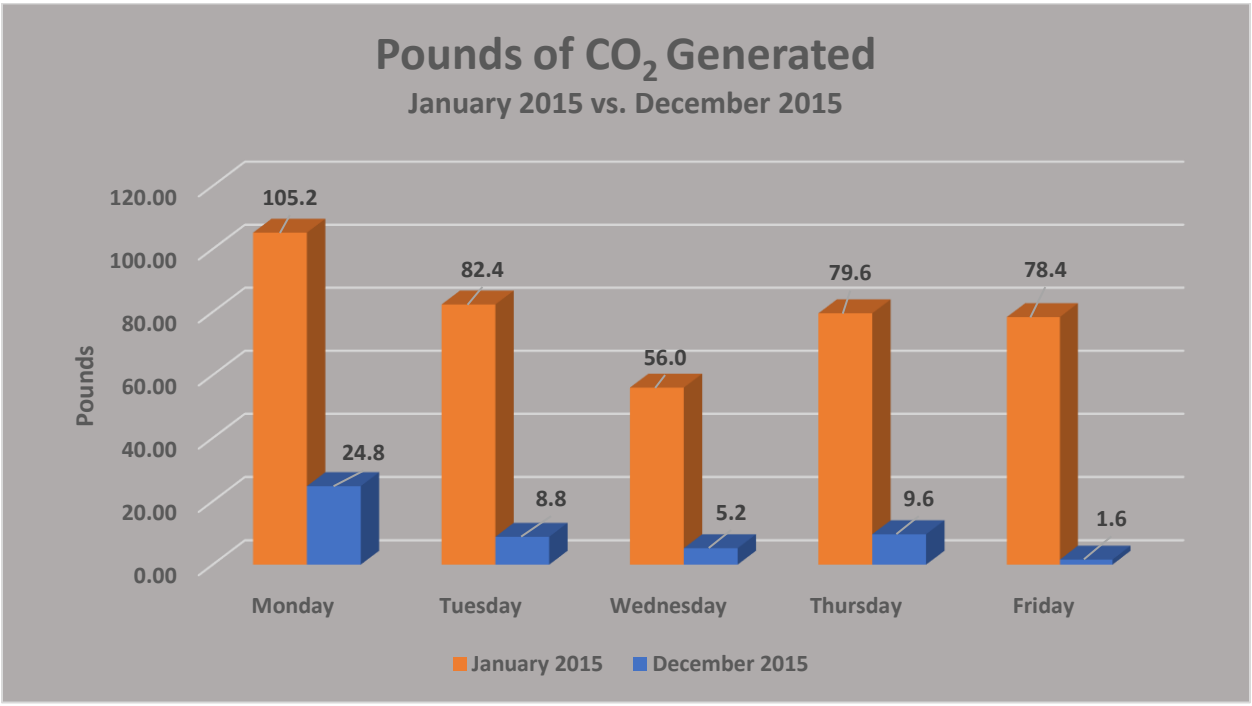


Figure 11: Comparison between the amounts of CO_s generated due to idling during the two monitoring periods in January and December.

Full School Year Calculations

Over an entire school year, using the data found in figure 5 and figure 6 as a typical or average week, we can estimate that approximately six hundred and one (601) gallons of gasoline were wasted and over fourteen thousand pounds of CO_2 was generated due to idling alone. To put this into perspective the amount of CO_2 that is generated by a single person through ALL daily activities in a year is around 8,000 pounds. Thereby changing a single behavior could help prevent almost 6 tons of CO_2 from making it to the atmosphere.

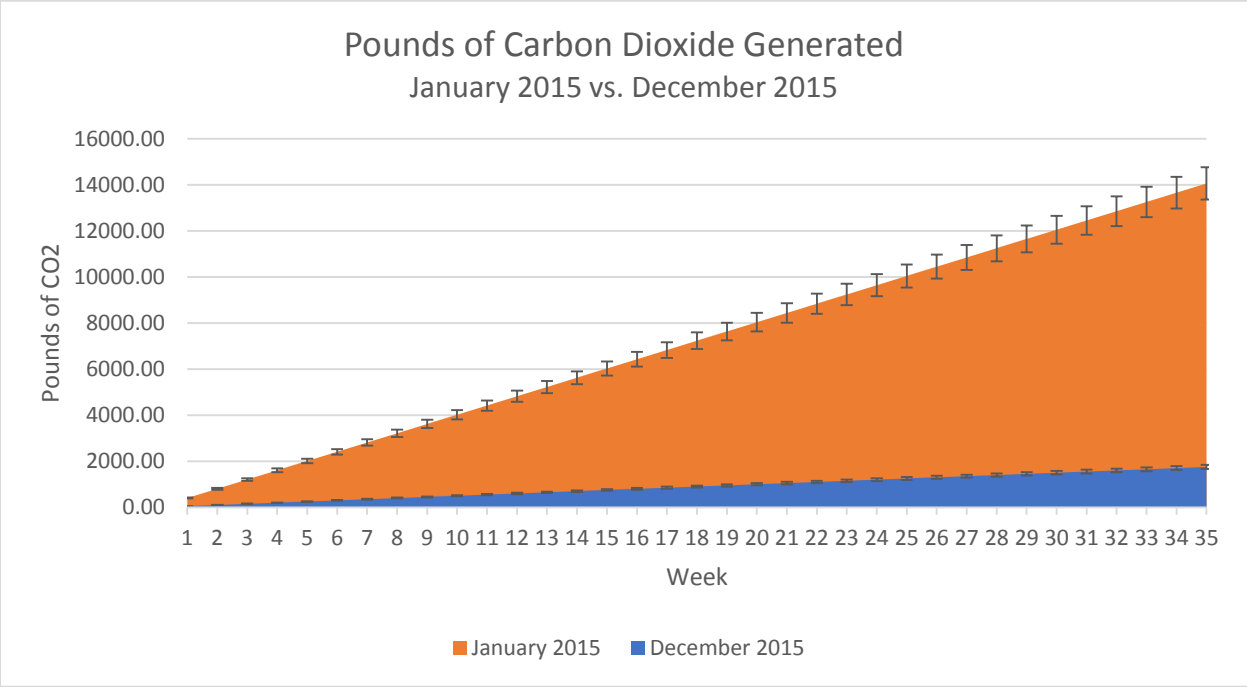


Figure 12 shows how much CO_2 was generated over an entire school year comparing data gathered from January to data gathered in December. Standard Deviation of 5%

As we can see from figure 12 above, throughout an entire school year the total amount of pollution increases drastically utilizing the data collected during January 2015. With this type of idling behavior as the model for an entire school year there was eight (8) times more pollution generated than when using the December 2015 data as the model. Using any of the environmental metrics each graph has a similar shape to it with the January 2015 model far exceeding that of the December 2015. If we were to plug in the gasoline data we would find that seven hundred (700) gallons of gasoline would be wasted throughout an entire school year utilizing the January 2015 data, while the December 2015 data would yield eighty-five (85) gallons, which is again a difference of eight (8) times the amount.

It is important to remember that this is not actual data, but a model utilizing data collected from a single week as an average to show the impact that this type of behavior can have. However, even with a standard deviation of plus or minus five (5) percent we still see that the total number of idling vehicles using the January 2015 data would far exceed the number of idling vehicles utilizing the December 2015 data.

Conclusions

Vehicle idling is one of the most preventable forms of transportation related air pollution. Yet, there appears to be very little public awareness of the impact of idling and the related laws.

Through this campaign, we can see that significant impacts to transportation related air pollution can be achieved through public education and encouragement to help modify behavior.

As a result of their efforts, a small group of High Bridge Elementary School decreased the yearly CO_2 emissions generated at their school due to idling vehicles by over ten thousand pounds, proving that a relatively small change can make an enormous difference.

1Students involved in the High Bridge Elementary Environmental Club 2014-15. This group of students is responsible for generating the initial January 2015 data.

Students involved in the High Bridge Elementary Environmental Club 2015-16. This group of students is responsible for generating the December 2015 follow-up data.