It All Adds Up to Cleaner Air
Program Implementation Report
2004

Washington State Department of Ecology
and PRR, Inc.

Introduction

Based on the success of the 2003 pilot program, "**Dare to Care About the Air**," the Washington State Department of Ecology (DOE) working with clean air agencies in Washington and Oregon was given an Environmental Protection Agency grant to conduct additional idling reduction pilot programs in 2004 and create a tool kit for others in the country to utilize based on the Washington and Oregon experience. The program followed a similar design from the 2003 pilot with modifications based on feedback and results of the previous project. The schools selected in 2004 were from the following four Washington public school districts – Tacoma, Sedro-Woolley, Toppenish and Issaquah. South Lane County in Oregon was also selected. PRR, a marketing firm located in Seattle, was contracted to help facilitate planning, implementation and evaluation of the program.

Schools were selected to provide a mix of urban, rural and suburban areas, and a district with a high percentage of non-English speaking residents.

Parents, delivery vehicle drivers and school bus drivers were all targeted for idling time reduction. Parents received idling reduction information sent home with students. Idling reduction information was also provided to delivery drivers who serviced the participating schools. These drivers were provided materials by school front-office staff. Bus drivers in participating school districts were provided information via the respective transportation supervisors.

Evaluation was conducted for parent vehicles only. Idling time measurements were logged during morning drop-off and afternoon pick-up times from October 21-27, 2004 at the Washington schools, and October 28-November 3, 2004 in Oregon.

Following is a brief summary of the various phases of the program including recruiting schools and sponsors, preparing materials, measuring idling times, data analysis and results.

Recruiting pilot/control locations

Once again elementary schools were targeted because younger students are most likely to be driven to school by parents or guardians and because of the perceived added benefits of changing behavior to protect these children. Schools representing a cross-section of urban, suburban, non-English speaking and rural communities in both Washington and Oregon were contacted. PRR worked with program representatives to identify communities that would represent a cross-section of profiles. Once target communities were identified, phone calls were made to school district transportation supervisors. The transportation supervisors provided guidance on which elementary schools in their respective districts had a high percentage of parents who drop off and pick up their children from school. In addition, these individuals provided additional insight into how certain districts and schools felt about idling. Based on this information, the team began calling those elementary schools that were identified as having a high number of parents providing transportation and most likely to be interested in participating in the program. Middle and high schools were intentionally excluded from the program because of the small number of parent drop-offs and pick-ups that occur among these schools.

Face-to-face meetings were intentionally avoided during program implementation for both years. This was done to better represent and evaluate potential results for programs done across large geographic areas.

Two schools were recruited in each area. Pilot schools, also referred to here as participating schools, were recruited to participate in the program and control schools were recruited to provide an evaluation comparison.

Recruitment of both participating and control schools were made through phone conversations with school principals, followed by written correspondence that clearly outlined the purpose of the program and what support was being asked of school faculty and staff. Four participating schools were secured in Washington and two in Oregon. However, the schools in the Portland Metro School District withdrew from the program expressing concerns about the collecting of information and how it might be used in legislation for carbon dioxide levels. Though this was not the intention of this program, factors from a previous program caused enough discomfort for the school district that it chose to withdraw. Because of timing and potential budget impacts, it was decided not to replace this district in the program.

Control schools were selected and recruited with the desire to match participating school profiles as closely as possible using criteria such as similar physical layout to the participating school, neighborhood conditions, student body makeup and hours of operation. The control schools did not receive any of the idling reduction materials. Idling times were measured for comparison against the pilot school. No barriers were encountered in recruiting control schools; however, the participating schools in both Issaquah and Sedro-Woolley asked to be switched to control schools based on concerns about potential impacts on staff time. In these cases, the original “control” schools became the “pilot” schools, or participating schools, for the program.

The schools in the Toppenish School District were located on the Yakama Indian Reservation. PRR contacted and worked closely with a representative from the Yakama Nation to facilitate the program in this school district.

Recruiting local sponsors

Local sponsors were recruited in each school district to contribute incentives for students, bus drivers, delivery drivers, parents and teachers. In each market, a pizza or ice cream establishment was targeted to provide coupons and discounted parties for classrooms meeting the 80% response goal. Initial contacts were made via telephone and were followed by written correspondence explaining the program and detailing what each sponsor would receive in return for providing program support. In each case, the pizza and ice cream restaurants agreed to provide parties for all classrooms that returned more than 80% of their idling reduction pledge forms. They also provided coupon incentives for bus drivers, delivery drivers and parents. Coupons were distributed (in envelopes) along with idling reduction key chains in exchange for a returned signed pledge form by a student, delivery driver or bus driver. Coffee shops were targeted to provide gift cards to teachers whose classrooms met the 80% goal.

Preparing materials for implementation

Materials produced for the program were based on those used for the successful 2003 pilot. Slight editing was done to make the materials more concise and reflect other observations from the previous program.

Each school received a box of materials that was pre-sorted into pouches labeled with the teacher's or staff person's name. Inside each pouch was a simple cover letter explaining the program and outlining what steps the teacher or staff person was asked to take. The packets included pre-stuffed parent letters and pledge forms as well as pre-stuffed thank you notes and incentives for each parent or delivery driver who returned a signed pledge. The pouch also contained a self-addressed stamped envelope for the teacher to use to return all signed pledge forms and unused incentives to PRR.

Each participating school also received two (2) 18" x 24" metal "It All Adds Up To Cleaner Air" signs. These signs were to be placed in the student drop-off/pick-up area at each school. The signs were designed to withstand external elements such as rain, wind and cold.

Although a few teachers did not return any materials at all, the vast majority returned signed forms. Many participating teachers sent positive comments and words of encouragement back with their forms. There were no issues or concerns expressed by participating teachers. The response from delivery drivers was much smaller, with only ten pledge forms returned from all five participating schools.

Pre-stuffed pledge forms, thank you letters and incentives were also mailed to the school bus drivers in each participating district. Although it was not required to have the signed bus driver pledge forms sent back, 59 signed pledge forms were returned from bus drivers across all districts.

Revised collateral & graphics

Based on feedback from the 2003 pilot program and the desire to leverage the national recognition and momentum built by other communities, the program name was changed in 2004 from "Dare to Care About the Air" to "It All Adds Up to Cleaner Air." All program materials were revised to reflect this change.

A larger, more durable rubber keychain using the "It All Adds Up to Cleaner Air" logo was selected over the previous year's design. The keychain was well received and will have a longer shelf life than the previous thin plastic version.

Research staff

The 2003 pilot program had shown it was not easy to recruit volunteers to help with the idling measurements at participating schools. PRR tried briefly contacting ecology clubs at high schools near the participating school locations when planning for 2004. In talking with ecology club leaders it was determined high school volunteers are not a good solution for this project due to transportation and scheduling challenges.

PRR also contacted Parent Teacher Associations (PTA) and/or Parent Teacher Student Association (PTSA) representatives from each participating school. The contact information was difficult to obtain as, for good reason, the schools did not want to divulge an individual's phone number and/or e-mail address. PRR asked for each school to pass on their contact information to the PTA/PTSA representative. Unfortunately, there was little or no response and efforts to have PTA/PTSA members act as volunteers did not work out. The limited response from one PTSA representative indicated members were already too busy with other projects to act as volunteers for this project.

In response to this it was decided that it was more cost-effective and reliable to use paid workers for the data collection portion of the program. Temporary staffing agencies were engaged to provide temp workers and ensure consistency in data gathering and reporting. However, DOE staff and volunteers from Yakama Nation agreed to fill some of the research slots at the Toppenish, Sedro-Woolley and Issaquah locations.

Data collecting materials, including measurement forms, clipboards and stopwatches, were sent to each participating and control school along with detailed instructions for front desk staff and data collectors. Similar instructions were distributed to the temps and volunteers prior to their scheduled shifts.

Compiling and analyzing data

The majority of teachers and staff used the self-addressed stamped envelopes provided to return signed pledge forms in a timely manner. Follow-up with participating school principals over an additional few weeks was necessary and yielded additional returns. Completed idling measurement forms were returned by the assigned deadline at all of the participating schools.

Once all the data was acquired the raw data was entered into spreadsheets. Supplemental data (weather conditions and temperatures) was also obtained via the Internet. Once this process was completed, PRR's research team analyzed the data using SPSS software (Statistical Package for Social Sciences). The information was sorted and categorized, and then regression analyses were conducted.

Results

Based on the data, the 2004 program was successful in reducing idling and built on the experiences learned and data collected in 2003. “It All Adds Up to Cleaner Air” received overwhelming responses from students and parents of all five participating schools. Idling times at four of the five participating schools were significantly lower than those at the control locations. The one exception involved the control and participating schools in the Tacoma School District. Grant Elementary, which was the control school, is situated in an urban area. The physical layout of the school has no parking lot or natural “line up/drop-off/pick-up” area. Therefore, many parents who come to drop off and pick up their children park a block or two from the school and then walk up to meet the kids. This had the effect of creating lower idling times at a control school. Had this been known at the time the school was recruited it would have eliminated the school from consideration.

Conversely, Lowell Elementary, the participating school, had two interesting factors which contributed to higher than normal idling times. First, the school is a “magnet” school for the arts. Therefore, an extremely high percentage of parents drive their kids to school. The school’s principal estimates only 10% of the student body rides a bus to school. This creates the situation of a great school in which to influence the behavior of idling; however, it also creates a lot more cars that will be idling (i.e. a larger than normal sample size).

The second factor affecting idling at Lowell involves the school’s physical layout. The drop-off/pick-up area involves a one way “cattle shoot” type of set up via an alley way. Therefore, parents coming to pick up their kids must “line up” and inch forward when they see their child. Both of these factors – a higher than normal percentage of drivers plus a challenging pick-up area contributed to the participating school’s idling times exceeding (just slightly) those of the control school.

Parent participation levels spanned a wide range with some classrooms not reporting any participation and two classrooms attaining 100% participation. Kirkwood Elementary in Toppenish had a response of 304 students (68%). Lowell Elementary in Tacoma had 259 students respond (64%). Sunset Elementary in Issaquah received responses from 403 students (69%). Big Lake Elementary in Sedro-Woolley had a response of 74 students (33%), and Bohemia Elementary in South Lane County, OR received responses from 234 students (53%).

Pizza or ice cream parties were rewarded to classrooms meeting an 80% or higher response rate to the idling reduction pledge forms. This translated into five classrooms in Toppenish (23% of classrooms), five classrooms in Tacoma (28%), nine classrooms in Issaquah (38%), one classroom in Sedro-Woolley (10%) and three classrooms in South Lane County (16%).

Overall, the difference in idling time between drivers at the participating and control locations showed a statistically significant difference with drivers at participating schools idling 205 fewer seconds, or three minutes and 25 seconds less, than control school drivers. This represents a 32% reduction in overall idling time.

Data also continued to validate the results found in 2003 that drivers idle longer in the afternoons (when picking up students) than in mornings (when dropping off). At the control schools afternoon idling times averaged a little over 263 seconds or 4 minutes and 23 seconds; while morning idling times (at control schools) averaged just over 28 seconds. Comparatively, afternoon idling times at pilot schools averaged just over 62 seconds with morning idling times (at pilot schools) just over 33 seconds.

Overall, drivers in the pilot schools idled their vehicles an average of 200 fewer seconds, or three minutes and 20 seconds less in the afternoons than control school drivers. This represents a 76% reduction in idling time in the afternoon. Morning idling times by drivers at the pilot schools were 4.59 seconds less than morning times by control school drivers. This represents a 12% reduction in idling times in the mornings.

Based on regression analysis, the data show that time of day and number of people in the car influence idling behaviors, with people idling longer in the afternoon and/or with more passengers in the car.

Summary and next steps

The 2004 "It All Adds Up to Cleaner Air" program built on the success of the 2003 pilot and continued to change idling behaviors at participating schools. Positive feedback was received from many of the parents signing the pledge forms, including "Thank you! This message should be sent to EVERY American!" from a parent in Issaquah, and "Awesome – I agree. Good cause!" from a parent in Oregon.

PRR will continue to work with the Department of Ecology throughout 2005 to develop a tool kit that will be available to agencies and organizations across the nation to help them implement their own idling reduction programs.

Idling Reduction Initial Top-Line Analysis

Overall results (all the data):

Participating school average idling time: 42.6 seconds
Control school average idling time: 101.3 seconds

This difference in idling time is statistically significant with those in the participating school group being less likely to idle as long as those in the control group.

Top three car types used:

41.0% cars
27.0% SUVs
12.3% trucks

Sedro-Woolley:

Participating school average idling time: 43.7 seconds
Control school average idling time: 143.2 seconds

This difference in idling time is statistically significant with those in the participating school group being less likely to idle as long as those in the control group.

Top three car types used:

36.0% cars
28.0% SUVs
16.0% minivans

Toppenish:

Participating school average idling time: 49.8 seconds
Control school average idling time: 57.4 seconds

This difference in idling time is statistically significant with those in the participating school group being less likely to idle as long as those in the control group. However, the effect size for this group is .05 which means that this relationship is very weak.

Top three car types used:

48.0% cars
24.0% SUVs
13.0% trucks

Issaquah:

Participating school average idling time: 30.3 seconds
Control school average idling time: 130.7 seconds

This difference in idling time is statistically significant with those in the participating school group being less likely to idle as long as those in the control group. The effect size for this test is .30 meaning the difference between these groups is definitely substantial as well as statistically significant.

Top three car types used:

43.0% SUVs
37.0s% cars
9.0% minivans

Tacoma:

Participating school average idling time: 87.5 seconds
Control school average idling time: 57.3 seconds

This difference in idling time is statistically significant with those in the control group being less likely to idle as long as those in the participating school group. This is an unexpected finding, but is also a weak relationship.

Top three car types used:

51.0% cars
21.0% SUVs
13.0% vans

South Lane County:

Participating school average idling time: 26.5 seconds
Control school average idling time: 74.2 seconds

This difference in idling time is statistically significant with those in the participating school group being less likely to idle as long as those in the control group.

Top three car types used:

39.0% cars
19.0% SUVs
18.0% trucks

Idling reduction pilot study: Final Results

Overall (n = 4,612 observations)
23.5% in Sedro-Woolley
20.1% in Issaquah
15.3% in Toppenish
14.2% in Tacoma
26.9% in South Lane County

44.6% in participating school study
55.4% in control group

71.0% are in the morning
29.0% are in the afternoon

75.0% are female
25.0% are male

2.14 people is the average per car

Top four vehicle types:
41.0% are cars
27.0% are SUVs
12.3% are trucks
10.3% are minivans

50.2% idling on cloudy day
19.5% idling on rainy day
11.4% idling on cold day
8.7% idling on sunny day
6.1% on partly cloudy day
2.3% on overcast day
1.9% on foggy and cold day

Idling times

	Average Idling Times
Overall	75.1 seconds
Pilot Group	42.6 seconds
Control Group	101.3 seconds
In the a.m.	36.5 seconds
In the p.m.	169.4 seconds
Partly cloudy	50.0 seconds
Cloudy	70.0 seconds
Foggy and cold	30.2 seconds
Sunny	115.4 seconds

Rainy	74.8 seconds
Cold	93.3 seconds
Overcast	49.9 seconds
Male	62.2 seconds
Female	81.6 seconds

The difference in idling time between the participating school group and the control group is statistically significant with an average difference in idling of 58.7 seconds across all cities. In others words, those in the participating school group are less likely to idle compared to those in the control group.

The difference in idling time between those dropping off their kids in the morning and those picking them up in the afternoon is also statistically significant, with an average difference in idling of 132.9 seconds across all cities. People are more likely to idle longer in the afternoon.

Other important findings:

- The more people waiting in the car, the longer people idle.
- People idle longer on sunny or cold days.
- Gender is not related to length of idling.
- Type of vehicle is not related to length of idling.

Predictors of length of idling (in order of descending influence on length of idling) based on regression analysis:

1. Picking kids up in the afternoon.
2. Being in the control group.
3. Having more people in the car.
4. Having female drivers (however, this has a very weak impact).

Sedro-Woolley (n = 1,075 observations)

70.5% in participating school study
29.5% in control group

70.7% are in the morning
29.3% are in the afternoon

78.6% are female
21.4% are male

2.06 people is the average per car

Top four vehicle types:
36.0% are cars
27.9% are SUVs
16.0% are minivans
14.7% are trucks

39.2% idling on cloudy day
18.6% idling on rainy day
18.2% idling on cold day
9.7% idling on sunny day
9.5% on partly cloudy day
4.7% on foggy and cold day

Idling times

	Average Idling Times
Overall	113.9 seconds
Pilot Group	43.8 seconds
Control Group	143.2 seconds
In the a.m.	27.3 seconds
In the p.m.	323.3 seconds
Partly cloudy	31.2 seconds
Cloudy	125.3 seconds
Foggy and cold	22.9 seconds
Sunny	272.0 seconds
Rainy	90.7 seconds
Cold	96.2 seconds
Male	71.4 seconds
Female	125.4 seconds

The difference in idling time between the participating school group and the control group is statistically significant with an average difference in idling of 99.4 seconds. In others words, those in the participating school group are less likely to idle compared to those in the control group.

The difference in idling time between those dropping off their kids in the morning and those picking them up in the afternoon is also statistically significant, with an average difference in idling of 296.0 seconds. People are more likely to idle longer in the afternoon.

Other important findings:

- The more people waiting in the car, the longer the idling time.
- People idle longer on sunny or cloudy days.
- Females idle longer than males.
- Type of vehicle is not related to length of idling.

Predictors of length of idling (in order of descending influence on length of idling) based on regression analysis:

1. Picking kids up in the afternoon.
2. Being in the control group.
3. Having more people in the car.

Toppenish (n = 698 observations)

41.3% in pilot study
58.7% in control group

75.2% are in the morning
24.8% are in the afternoon

68.9% are female
31.1% are male

2.43 people is the average per car

Top four vehicle types:
48.4% are cars
24.1% are SUVs
12.9% are trucks
10.9% are vans

31.7% idling on cloudy day
13.8% idling on rainy day
12.0% idling on cold day
21.1% idling on sunny day
21.5% on partly cloudy day

Idling times

	Average Idling Times
Overall	54.3 seconds
Pilot Group	49.8 seconds
Control Group	57.9 seconds
In the a.m.	44.7 seconds
In the p.m.	83.5 seconds
Partly cloudy	58.2 seconds
Cloudy	66.6 seconds
Sunny	46.2 seconds
Rainy	34.6 seconds
Cold	52.1 seconds
Male	55.6 seconds
Female	54.1 seconds

The difference in idling time between the participating school group and the control group is statistically significant with an average difference in idling of 7.7 seconds. In

others words, those in the participating school group are less likely to idle compared to those in the control group.

The difference in idling time between those dropping off their kids in the morning and those picking them up in the afternoon is also statistically significant, with an average difference in idling of 38.5 seconds. People are more likely to idle longer in the afternoon.

Other important findings:

- The more people waiting in the car, the longer people idle.
- People idle longer on cloudy and partly cloudy days.
- Those in trucks idle shorter lengths of time.
- Gender is not related to length of idling.

Predictors of length of idling (in order of descending influence on length of idling) based on regression analysis:

1. Picking kids up in the afternoon.
2. Being in the control group.
3. Having more people in the car.

Issaquah (n = 922 observations)

44.5% in pilot study
55.5% in control group

69.7% are in the morning
30.3% are in the afternoon

74.9% are female
25.1% are male

1.99 people is the average per car

Top four vehicle types:
42.7% are SUVs
36.6% are cars
9.1% are minivans
7.9% are vans

44.9% idling on cloudy day
20.5% idling on cold day
18.1% idling on rainy day
7.3% on overcast day
5.5% idling on sunny day
3.7% on foggy and cold day

Idling times

	Average Idling Times
Overall	85.9 seconds
Pilot Group	30.4 seconds
Control Group	130.7 seconds
In the a.m.	36.7 seconds
In the p.m.	200.1 seconds
Cloudy	76.7 seconds
Foggy and cold	41.2 seconds
Sunny	113.7 seconds
Rainy	81.4 seconds
Cold	122.4 seconds
Overcast	52.6 seconds
Male	80.8 seconds
Female	105.0 seconds

The difference in idling time between the participating school group and the control group is statistically significant with an average difference in idling of 100.3 seconds. In others words, those in the participating school group are less likely to idle compared to those in the control group.

The difference in idling time between those dropping off their kids in the morning and those picking them up in the afternoon is also statistically significant, with an average difference in idling of 163.4 seconds. People are more likely to idle longer in the afternoon.

Other important findings:

- The more people waiting in the car, the longer people idle.
- People idle longer on sunny or cold days.
- Gender is not related to length of idling.
- Type of vehicle is not related to length of idling.

Predictors of length of idling (in order of descending influence on length of idling), based on regression analysis:

1. Picking kids up in the afternoon.
2. Being in the control group.

Tacoma (n = 650 observations)

48.2% in pilot study
51.8% in control group

70.3% are in the morning
29.7% are in the afternoon

72.2% are female
27.8% are male

1.96 people is the average per car

Top four vehicle types:
50.8% are cars
20.6% are SUVs
12.8% are vans
8.2% are trucks

44.6% idling on cloudy day
36.0% idling on rainy day
7.8% idling on cold day
6.2% on overcast day
4.6% idling on sunny day
0.8% on partly cloudy day

Idling times

	Average Idling Times
Overall	71.8 seconds
Pilot Group	87.5 seconds
Control Group	57.3 seconds
In the a.m.	53.6 seconds
In the p.m.	114.8 seconds
Partly cloudy	72.2 seconds
Cloudy	82.0 seconds
Sunny	114.2 seconds
Rainy	64.7 seconds
Cold	42.2 seconds
Overcast	45.2 seconds
Male	69.6 seconds
Female	75.0 seconds

The difference in idling time between the participating school group and the control group is statistically significant with an average difference in idling of 30.4 seconds. However, those in the participating school group are *more* likely to idle compared to those in the control group.

The difference in idling time between those dropping off their kids in the morning and those picking them up in the afternoon is also statistically significant, with an average difference in idling of 61.2 seconds. People are more likely to idle longer in the afternoon.

Other important findings:

- The more people waiting in the car, the longer people idle.
- People idle longer on sunny or partly cloudy days.
- Those in minivans and trucks idle longer.
- Gender is not related to length of idling.

Predictors of length of idling (in order of descending influence on length of idling) based on regression analysis:

1. Picking kids up in the afternoon.
2. Being in the participating school group.
3. Having more people in the car.

South Lane County (n = 1,231 observations)

58.1% in pilot study
41.9% in control group

70.0% are in the morning
30.0% are in the afternoon

76.8% are female
23.2% are male

2.24 people is the average per car

Top four vehicle types:
39.4% are cars
19.5% are SUVs
18.4% are trucks
11.5% are minivans

77.1% idling on cloudy day
15.7% idling on rainy day
5.4% idling on sunny day
1.8% on partly cloudy day

Idling times

	Average Idling Times
Overall	46.5 seconds
Pilot Group	26.3 seconds
Control Group	74.2 seconds
In the a.m.	30.5 seconds
In the p.m.	83.8 seconds
Partly cloudy	76.1 seconds
Cloudy	39.5 seconds
Sunny	25.0 seconds
Rainy	84.9 seconds
Male	44.4 seconds
Female	47.2 seconds

The difference in idling time between the participating school group and the control group is statistically significant with an average difference in idling of 47.9 seconds. In others words, those in the participating school group are less likely to idle compared to those in the control group.

The difference in idling time between those dropping off their kids in the morning and those picking them up in the afternoon is also statistically significant, with an average difference in idling of 53.3 seconds. People are more likely to idle longer in the afternoon.

Other important findings:

- The more people waiting in the car, the longer people idle.
- People idle longer on rainy or partly cloudy days.
- Those in vans idle longer.
- Gender is not related to length of idling.

Predictors of length of idling (in order of descending influence on length of idling) based on regression analysis:

1. Picking kids up in the afternoon.
2. Being in the control group.

Sample notes

Because the results were consistent across the five cities of study and between participating school and control groups we can feel fairly confident that the results presented are valid. However, these sample issues should be noted when reviewing these results:

- An in-service day in Toppenish resulted in no data being collected on one of the afternoons during the pilot program.
- The sample sizes in Toppenish and Tacoma are considerably smaller than in the other cities.
- Layout of the control school in Toppenish lead to an environment that is not conducive to idling. The school was located in a residential area and had no drop-off zone. Parents would park their cars, turn them off and get out to pick up their kids. This may result in the lower idling levels at the control school.

Because of these sample concerns we are not confident conducting analysis that would compare differences between the cities, thus no such results are provided. Even though there may be some apparent differences in results between the cities, these results cannot be assumed as statistically significant.