

2007 Spare the Air/Free Transit Campaign Evaluation



**Metropolitan Transportation Commission
Bay Area Air Quality Management District**

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I. EXECUTIVE SUMMARY

The Metropolitan Transportation Commission (MTC) and the Bay Area Air Quality Management District (Air District) partnered with 29 Bay Area transit operators in 2007 to offer free transit on the first four, non-holiday Spare the Air weekdays of the summertime smog season. The 2007 Spare the Air Campaign (2007 Campaign) began on June 1 and ended on October 12. Transit was free all day on Bay Area buses and light-rail. On BART, Caltrain, the ACE trains and the Golden Gate, Vallejo and Alameda ferries, transit was free until 1:00 p.m. The 2007 Campaign had the highest number of transit partners (29 operators) since free transit began as part of the Spare the Air program in 2004. New to the 2007 program were Marin County Transit, Vallejo Transit and Healdsburg Transit. Funding for the 2007 Campaign was provided by MTC (\$7.5 million) and the Air District (\$1 million) from federal and local air quality funds.



Spare the Air is an episodic campaign and is implemented when ground-level ozone (“smog”) is forecast by the Air District to exceed the national, health-based 8-hour ozone standard. Specifically, Spare the Air days are declared when the Air Quality Index (AQI) is forecast by the Air District to reach 100, the threshold for “unhealthy air for sensitive individuals.” Ground-level ozone is created on hot, stagnant summer days when reactive organic compounds (ROG) react with nitrogen oxides (NO_x) in the presence of heat and strong sunlight.

The partner agencies established five clear goals for the 2007 Campaign:

1. Increase public awareness about the link between transportation choices and air quality,
2. Encourage Bay Area residents to drive less and use public transit more,
3. Build transit ridership regionwide,
4. Reduce emissions to prevent national 8-hour ozone excesses and
5. Encourage longer-term behavioral changes that benefit air quality.

Although funding was provided for four Spare the Air/Free Transit days during the 2007 Campaign, only two Spare the Air days were declared on August 29 and 30, 2007. The two Spare the Air/Free Transit days produced the following key results, compared to baseline conditions.

TRANSIT RIDERSHIP

Each of the 29 transit operators provided baseline counts and collected and verified ridership estimates on each of the two Spare the Air days. The baseline used was typically either the week before or the week after the Spare the Air day, depending on when the school year began in different jurisdictions. In each instance, the baseline data used was deemed the most appropriate by the transit operator for comparative purposes. Methods used to collect ridership data varied amongst the operators, ranging from manual passenger counts to use of automated passenger counters to field sampling of routes and stations. Although not calculated, there is a margin of

error associated with the ridership estimates due to the data collection methods used. Thus, some ridership figures may be under-or over-estimated.

- Transit ridership levels rose by 22 percent regionwide over the two Spare the Air days, adding a total of 665,004 riders to the system or an average of 332,502 additional riders per Spare the Air day. In 2006, there was a 15 percent increase in ridership over the six Spare the Air/Free Transit days, when 225,000 additional riders per day took transit.
- Muni saw the highest absolute ridership gain, with 401,157 additional riders (up 35 percent) over the two Spare the Air days. Muni was followed by:
 - AC Transit with 124,125 additional riders (up 27 percent),
 - VTA bus with 43,746 additional riders (up 26 percent),
 - VTA light-rail with 24,553 additional riders (up 41 percent),
 - Vallejo Transit with 8,671 additional riders (up 66 percent),
 - SamTrans with 7,485 additional riders (up 7 percent),
 - TriDelta Transit with 5,451 additional riders (up 33 percent) and
 - Golden Gate Bus with 4,483 additional riders (up 9 percent).
- Among the smaller bus operators, the highest percentage increases in ridership over the two Spare the Air days include:
 - Sonoma County Transit (including Cloverdale Transit) with a 22 percent increase in ridership (2,516 additional riders),
 - WestCat with a 20 percent increase in ridership (2,137 additional riders),
 - Fairfield/Suisun Transit with a 17 percent increase in ridership (1,270 additional riders) and
 - Santa Rosa CityBus with a 15 percent increase in ridership (3,008 additional riders).
- Ridership levels also rose on rail services over the two Spare the Air days. Rail services were free until 1 p.m.
 - BART had 10,000 additional riders (up one percent),
 - Caltrain drew 13,699 additional riders (up 17 percent) and
 - ACE carried 248 additional riders from the Central Valley into the Bay Area (up 6 percent).
- As in previous years, the most dramatic percentage increases in ridership occurred on the ferry systems over the two Spare the Air days. Ferry systems were free until 1 p.m.
 - The Alameda-Oakland and Alameda Harbor Bay ferries led with an 89 percent increase in ridership, carrying 3,104 additional passengers,
 - The Golden Gate Sausalito Ferry had a 53 percent ridership increase, carrying an additional 1,910 passengers,
 - The Vallejo BayLink Ferry experienced a 33 percent ridership increase, carrying 1,796 additional passengers and
 - The Golden Gate Larkspur Ferry experienced a 16 percent increase in ridership with 1,765 additional passengers.

SURVEYS TO ASSESS RESPONSE TO THE SPARE THE AIR/FREE TRANSIT DAYS

During the 2007 Campaign, surveys were conducted to assist in evaluating the public's response and awareness of the two Spare the Air/Free Transit days, to measure changes in driving and transit behaviors, and to provide data to calculate emission reductions associated with the campaign. The surveys included:

- Telephone surveys to assess driving behavior and other consumer activities that cause air pollution,
- On-board transit passenger surveys to quantify the impact of free transit and
- 511.org customer surveys.

TELEPHONE SURVEYS RESULTS

Driver and Consumer Behavior

True North Research, Inc. (True North) with Eric Schreffler Transportation Consultants were commissioned by the Air District to conduct telephone surveys to gauge the effectiveness of the Spare the Air education and outreach program and to understand the public's attitudes and behavior in response to the 2007 Spare the Air/Free Transit Campaign. Telephone surveys were conducted in the evening on each of the two Spare the Air weekdays of the 2007 ozone season. In total, 753 randomly selected Bay Area drivers participated in the telephone survey. At the 95 percent confidence level, the margin of error for these results is +/-3.6 percent. The key findings are outlined below.

- Nearly ten percent (9.7 percent) of Bay Area drivers reduced at least one trip in response to the 2007 Campaign. This is down slightly from 9.8 percent in 2006.
- Shopping trips, trips to and from work and scheduled appointments were the most common types of trips reduced for air quality reasons on 2007 Spare the Air days. This is identical to the 2006 survey results.
- Eighty percent of Bay Area residents knew about the Spare the Air campaign and correctly identified its purpose. Of those who knew about the campaign, 82 percent held a favorable opinion of the Spare the Air program, 14 percent were neutral and four percent had an unfavorable opinion of the program. These figures are virtually unchanged from 2006.
- The average number of car trips taken on a Spare the Air day in 2007 was 2.35, the same as in 2006.

Recall and Awareness of the Spare the Air Messaging

Based on the True North telephone survey, the following are the key findings related to recall and awareness of the Spare the Air messaging:

- Seventy-three percent (73 percent) of respondents indicated that they recalled being exposed to news stories or public service announcements related to air quality and/or Spare the Air prior to the interview. This is down 3 percentage points from 2006.
- The most commonly mentioned sources of information about Spare the Air included television news, radio and newspaper.
- Nearly two-thirds (65 percent) of respondents were aware that the day of the interview was a Spare the Air day. The 2006 percentage was the same.
- Nearly two-thirds (63 percent) of respondents were also aware that commuters were able to ride public transit for free on the day of the interview (a Spare the Air day). The 2006 figure was 66 percent.
- Four percent (4 percent) of respondents who rode public transit on the survey day indicated that they would not have done so had transit not been free.
- More than 11 percent of Bay Area residents responded to the Spare the Air/Free Transit days by reducing their driving by at least one trip and/or by reducing their use of household equipment and consumer products that are harmful to air quality (such as aerosol products or gas-powered equipment).
- Linking the Spare the Air public education program with an offer of free transit has dramatically increased the recalled exposure to Spare the Air messaging – from 54 percent in 2003 (prior to the free transit program) to more than 73 percent in 2007.

Impact of Spare the Air on Driving and Consumer Behavior

In order to calculate the Spare the Air impact, a “reducer” respondent was defined as a driver who typically used a car as his or her primary mode of transportation, encountered the Spare the Air notification, and reduced at least one trip as a result. In other words, an impacted respondent made a conscious decision to change their travel behavior for air quality reasons by taking transit, walking, and biking, rather than driving their car because it was a Spare the Air day.

- The result of this impact calculation showed that 9.7 percent of the respondents were “impacted.” The 2006 season average was 9.8 percent.

ON-BOARD TRANSIT SURVEYS TO GAUGE THE IMPACT OF FREE TRANSIT

Surveys “on-board” 20 transit systems – including buses, trains and ferries – were conducted by BW Research Partnerships on each of the two Spare the Air/Free Transit days. The surveys, commissioned by MTC, were designed to measure travel behaviors and the possible mode shifts due to a free transit incentive. Transit routes to be surveyed were identified by the BW Research Team, in consultation with MTC and participating transit agencies. The survey instrument was a self-administered questionnaire in English, Spanish, Chinese, and Vietnamese. Surveys were conducted on both of the Spare the Air days of the season, August 29 and 30, 2007. The sampling plan included surveying during both peak and off-peak periods. Surveys were generally distributed between 6:00 a.m. and 9:00 p.m., with the exception of ACE, BART, Caltrain, and all

ferry systems, which ended the free transit promotion at 1:00 p.m. In total, 5,700 passengers were interviewed for this study on-board 20 different transit operators.

The margin of error for the study was +/- 1.3 percent at the 95 percent level of confidence. As an example, the study found that 2.9 percent of riders were classified as “impacted” or “transit reducers.” Factoring in the margin of error yields a potential range of values between 1.6 percent and 4.2 percent if this study were replicated. Key findings from the on-board transit surveys include:

Travel Behavior

- The majority of riders, 52 percent, cited going to or from work as the primary purpose of their trip. Seventeen percent were going to or from school and 19 percent indicated recreation or entertainment (11.3%) or shopping (7.4%) as their main trip purpose.
- When traveling midweek in the Bay Area, 76 percent of riders typically used public transit. Among the different forms of public transit, 37 percent typically rode the bus, 26 percent used BART, seven percent used light-rail, five percent took the train, and one percent rode the ferry. Thirteen percent of riders typically drove their vehicle alone, four percent carpooled, two percent rode a bicycle, and two percent typically walked.
- Forty-eight percent of respondents had access to a car, motorcycle, truck, or other vehicle that they could have used to make their trip. Twenty-four percent of respondents either personally drove to the transit stop prior to boarding and/or would be personally driving a vehicle that was parked at a transit stop or station after exiting public transit.

Use of Public Transit

- Almost three out of every four-survey respondents typically rode public transit three or more times per week. Among riders surveyed, 44 percent transferred to or from another route to complete their trip and 37 percent transferred to or from another form of public transit. Overall, riders estimated that they would travel an average of 25.5 total miles on public transit throughout the day.
- If public transit had not been free, 93 percent of respondents would still have traveled to their destination on the day of the survey. Among those who still would have traveled, 87 percent would have used public transit to reach their destination on that particular day, five percent would have driven alone (4.9%) or ridden a motorcycle (0.4%), and three percent would have carpooled.

Spare the Air Awareness

- Fifty-six percent of transit riders surveyed were aware that it was a Spare the Air day and 55 percent were aware that they could ride public transit for free. When combined, 60 percent of respondents were either aware that it was a Spare the Air Day or that they could ride public transit for free¹.
- Awareness was highest among ferry (73.4%) and rail (62.6%) passengers. Bus and multi-mode passengers reported levels of awareness of 59.7 percent and 58.9 percent, respectively.

¹ The combined percentage is higher than the individual percentages because some respondents answered only one of the questions. The combined percentage represents awareness of “either” question.

- Among those riders who were aware that it was a Spare the Air day or that they could ride transit for free, 44 percent heard the announcement on television, 26 percent from the radio, 21 percent from signs or announcement at the transit stop or station and 18 percent from family, friends, or associates.

Employer Notification of Poor Air Quality Days

- Eighteen percent of employed respondents indicated that their employer notifies them of poor air quality days. A much larger percentage, 32 percent, indicated that their employer encourages them to drive less, carpool, or use public transit on poor air quality days.

IMPACT OF SPARE THE AIR CALCULATED FROM ON-BOARD SURVEYS

In order to calculate the Spare the Air impact, a “transit reducer” or “impacted” respondent was defined as someone who was aware that it was a Spare the Air day or that public transit was free, took public transit as a result, and would have traveled to their destination if transit were not free by either driving alone or riding a motorcycle. In other words, impacted riders made a conscious decision to change their travel behavior by taking public transit rather than driving their car or riding their motorcycle because it was a Spare the Air day.

- The result of this impact calculation revealed that 2.9 percent of riders qualified as “transit reducers” or “impacted riders.”
- Examining the data by mode revealed much higher percentages of transit reducers on the ferry (4.5%) and rail (4.2%) as compared to multi-mode (2.5%) and bus (2.4%) passengers.

EMISSION METHODOLOGIES AND REDUCTIONS

The 2007 Campaign produced a number of impacts by educating the public about transportation-air quality linkages, and encouraging residents to take free transit for their trips instead of driving. The most salient direct result was emissions reduced by increasing transit ridership on the Spare the Air days. Other impacts include emissions reduced by raising awareness and encouraging other types of trip reductions including carpooling, vanpooling, trip linking, biking and walking or eliminating trip(s) altogether. Finally, there were also emissions reductions due to avoiding the use of consumer products such as aerosol hairsprays, lighter fluid for barbeques and gas powered garden equipment on Spare the Air days.

As part of this program evaluation, different methodologies were used to quantify the emission reductions from the 2007 Campaign. The Air District focused on identifying emission reductions from the overall 2007 Campaign including reduced driving, transit usage, reduced use of consumer products that pollute and delaying use of gasoline powered lawn and garden equipment.

MTC focused on quantifying the emissions reductions that were due solely to mode shift from transit. MTC estimates of the emissions benefits from the 2007 Campaign are based on the numeric changes in transit ridership levels as reported by the participating transit operators. The latest California Air Resources Board (CARB) emission factors were used. The emissions benefits from transit trips were discounted if a motor vehicle was involved (i.e., the rider drove and parked at a station or was dropped off at a station).

Presented here are two scenarios for emission reductions/cost effectiveness information. The first is for the overall campaign and includes all behaviors; the second is only for that portion of the campaign that related to mode shift to transit. By definition, the first scenario will have greater emission reductions since it captures both driving and consumer behavior. The second is focused on mode shift to transit only.

Emission Reductions Due to Driving Less, Taking Transit and Consumer Behavior

Using the telephone poll results, the following are the emission reductions due to changes in behavior related to driving, taking transit and reduced use of consumer products that pollute over the two Spare the Air days:

- 4.35 tons of nitrogen oxides (NO_x),
- 4.57 tons of reactive organic gases (ROG),
- 4.53 tons of particulate matter (PM₁₀),
- .86 tons of particulate matter (PM 2.5),
- 46.88 tons of carbon monoxide (CO) and
- 4179.15 tons of carbon dioxide (CO₂)

Emission Reductions Due Solely to a Mode Shift from Driving to Transit

A subset of the emission reductions listed above can be solely attributed to mode-shift to transit. That is, a person chose to take transit for a trip they otherwise would have taken by motor vehicle or motorcycle on a Spare the Air day.

- In total, the Spare the Air/Free Transit Program reduced an estimated 99,919 vehicle trips due to mode-shift to transit, accounting for an estimated 676,876 vehicle miles reduced.
- This translates to the following emission reductions estimates from mode shift to transit for the two Spare the Air/Free Transit days:
 - 0.345 tons of nitrogen oxides (NO_x),
 - 0.308 tons of reactive organic gases (ROG),
 - 0.026 tons of particulate matter (PM-10),
 - 0.015 tons of particulate matter (PM-2.5),
 - 3.7 tons of carbon monoxide (CO) and
 - 348 tons of carbon dioxide (CO₂).

COST-EFFECTIVENESS

The funding allocated for the 2007 Spare the Air/Free Transit campaign was \$8.5 million. Of this, \$4.6 million was spent on media and marketing, on-board surveys, telephone surveys, 511 support and to reimburse transit operators for deferred fare revenue. The following cost-effectiveness figures are based on a program cost of \$4.6 million.

Emission Reductions Due to Driving Less, Taking Transit and Consumer Behavior

- The 2007 program cost is \$4.6 million, and the emission reductions are 4.35 tons of NO_x, 4.57 tons of ROG and 4.53 tons of PM₁₀ due to driving less, taking transit and postponing consumer activities that cause pollution on the two Spare the Air days. Emission reductions totaled 13.45 tons. The cost effectiveness is \$342,007 per weighted ton of emissions reduced. This compares to a 2006 cost effectiveness of \$410,800 per weighted ton of emissions reduced.

- For the 2007 Campaign, emission calculations were also generated for carbon monoxide (CO) and carbon dioxide (CO₂). The two Spare the Air days generated emission reductions of 46.88 tons of CO and 4179.15 tons of CO₂. For all five pollutants (NO_x, ROG, PM₁₀, CO and CO₂), emission reductions totaled 4239.32 tons. Using a more comprehensive set of data that includes emissions of all five pollutants, the cost effectiveness is \$1,085 per ton of emissions reduced.
- Note that PM_{2.5} was not considered in the calculations because PM_{2.5} is included as a subset of the PM₁₀ emissions.

OZONE EXCEEDANCES

The Air District's long-standing Spare the Air campaign is aimed at discouraging polluting behavior on days when weather conditions are conducive to forming high ozone levels. Another goal of the program is to encourage long-term behavior changes that benefit air quality. Because most air pollution is preventable, the Spare the Air campaign focuses on educating and encouraging the public to reduce activities that pollute such as driving less, taking transit, trip-linking, refraining from using gasoline-powered lawn mowers and household products that pollute (like hair spray, bug spray), etc. A concerted effort to partner with Bay Area businesses, schools, government agencies, and members of the public to reduce polluting activities on Spare the Air days may reduce the level and number of ozone exceedances or avert them altogether. For the 2007 ozone season, the Air District issued two Spare the Air advisories and free transit was offered on August 29 and August 30, 2007.

Key results from this year's ozone season are as follows:

- Air quality was healthy during the 2007 Spare the Air summertime season due to cooler temperatures and mild weather. The Air District issued two Spare the Air advisories, which is significantly fewer days than the 11 Spare the Air days issued during the 2006 season.
- There were no exceedances of the national 8-hour standard recorded on the two Spare the Air days of August 29 and 30, 2007.
- For the 2007 season, only one exceedance of the national 8-hour standard was recorded on July 5, 2007 at the Livermore air monitoring station.

Compliance with the national 8-hour ozone standard is determined at each monitoring station by calculating the average of the fourth highest ozone readings for the three most recent years. A violation at any monitoring station results in a nonattainment designation for the entire region, since ozone is a regional pollutant. The national 8-hour ozone standard is 80 parts per billion (ppb). A violation of the standard occurs when the three-year average of the fourth highest ozone reading at any air monitoring station reaches 85 parts per billion. Table 1 shows the readings for 2005, 2006 and 2007, and the three year average. Based on the 2005, 2006 and 2007 data, the Bay Area has retained its attainment status for the national 8-hour standard.

Table 1: Attainment Status with the 8-Hour National Standard

Station	Three-year average of 4 th highest reading	2005 4 th highest reading	2006 4 th highest reading	2007 4 th highest reading
Livermore	77	75	89	67
San Martin	76	69	88	70
Concord	74	65	85	71
Bethel Island	73	68	81	71
Los Gatos	69	62	85	59

Source: Air District, 2007

511.ORG

- The “call to action” for the media and advertising campaign was to visit the 511.org Web site for Spare the Air/Free Transit information. The 511.org Web site received 14,444 visits on August 28, 29 and 30, 2007 the day preceding and the days of the Spare the Air episode. For the corresponding period the previous week, there were 1,082 hits on the 511.org Web site. The Spare the Air episode thus recorded a 12-fold increase in visits to the 511.org Web site.

SPARETHEAIR.ORG

- Traffic on the sparetheair.org Web site increased dramatically on August 28, 29 and 30, 2007, the day preceding and days of the Spare the Air episode. There were 19,923 visiting sessions on the sparetheair.org Web site during this period. For the corresponding period during the previous week, there were 2,821 visiting sessions, indicating a seven-fold increase in visits to the sparetheair.org Web site.

AIRALERTS

- Sign-ups for AirAlerts - which automatically send Spare the Air advisories to subscribers - increased by almost 8,500 new registrants since the June 1 start of the Spare the Air/Free Transit campaign, bringing the total registration list to over 55,000 individuals.

MEDIA

- Radio, television and print media coverage of the 2007 Campaign was extensive. There were over 444 press stories specifically mentioning the 2007 Campaign, resulting in an advertising value worth over \$870,000, which is the amount that would have been paid if the comparable television, radio or print advertising had been purchased. In 2006, there were 830 media stories valued at \$1.2 million over six Spare the Air/Free Transit days.

CONCLUSIONS

The 2007 Spare the Air/Free Transit campaign built on and exceeded the success of previous campaigns. Transit ridership increased by 22 percent on the two Spare the Air/Free Transit days

of 2007, the highest percentage increase since free transit was incorporated into the program in 2004. Over 332,000 additional riders took transit on each of the two Spare the Air days, up from 225,000 additional riders per day in 2006. The goal of avoiding exceedances of the national 8-hour ozone standard on Spare the Air days was also achieved, with no exceedances on the two 2007 Spare the Air days of August 29 and August 30. During the 2007 ozone season, there was one excess of the national 8-hour ozone standard, on July 5. A Spare the Air advisory was not issued for that day.

Public response to the program continues to be overwhelmingly positive. Eighty percent of Bay Area adults know the purpose of the Spare the Air program and, of these, 82 percent have a favorable or very favorable opinion of the program. Only four percent of Bay Area adults disapprove of the Spare the Air campaign. Fifteen percent had no opinion.

Twenty-nine transit operators – a record number - also participated in the 2007 campaign, an increase of three transit operators over the 2006 Campaign. Transit operator concerns in 2006 about overcrowding, transit delays and security were successfully addressed in 2007 by limiting free transit on the ferries and on rail to 1 p.m. Implementation of the program by the transit operators was smooth and without incident. In addition, the Spare the Air/Free Transit campaign allowed transit operators to test the limits of their systems, a useful exercise for other applications such as emergency planning.

Public opinion surveys of Bay Area drivers indicate that nearly ten percent (9.7 percent) reduced at least one trip in response to the Spare the Air advisories by taking transit, carpooling, vanpooling or trip linking. The 2007 campaign goals of raising awareness of the link between travel choice and air quality, and encouraging the public to drive less and take transit more, were achieved.

Almost one hundred thousand vehicle trips (99,919) were reduced due to a mode shift to transit on the Spare the Air/Free Transit days, reducing 676,876 vehicles miles. This resulted in a reduction of 4.4 tons of criteria pollutants on the two Spare the Air days (i.e. nitrogen oxides, reactive organic gases, particulate matter and carbon monoxide) and an additional 348 tons of carbon dioxide (CO₂).

Overall, from all behavior changes - including avoiding trips, taking transit, trip linking, walking, biking and avoiding consumer products that pollute - Bay Area residents reduced an estimated 1,076,410 vehicle trips and more than 8 million miles of travel over the two Spare the Air/Free Transit days. Emission reductions for oxides of nitrogen (NO_x), reactive organic gases (ROG) and PM₁₀ totaled 13.45 tons, with a cost-effectiveness of \$342,007 per weighted ton of emissions reduced. This compares favorably with a 2006 cost-effectiveness of \$410,800 per weighted ton of emissions reduced.

Emission reductions were also calculated for carbon monoxide (CO) and carbon dioxide (CO₂). Carbon monoxide emissions were reduced by 46.88 tons and CO₂ emissions were reduced by 4179.15 tons on the two Spare the Air days. For all five pollutants, the emission reductions are 4239.48 tons, with a cost-effectiveness of \$1,085 per ton of emissions reduced. A subset of these factors are emission reductions due solely to mode shift from driving to transit. Total emission reductions of NO_x, ROG and PM₁₀ from mode shift to transit totaled .679 tons.

Finally, as a result of the campaign's "call to action" to visit the 511.org Web site for Spare the Air and transit information, the site experienced a twelve-fold increase (14,444) in visits on the day preceding and the two Spare the Air/Free Transit days. The 2007 Campaign reinforced 511.org as the central location for transit on Spare the Air days. Also, visits to the sparetheair.org Web site increased seven-fold during the corresponding period. AirAlert sign-ups also increased by approximately 8,500 new registrants since the start of the 2007 season, bringing the total to just over 55,000 individuals.

In summary, the 2007 Spare the Air/Free Transit Campaign reached new benchmarks in several areas including increases in transit ridership, number of participating transit operators and visits to the 511.org Web site, and continued with the high level of recognition and positive response by Bay Area residents. The Bay Area also had healthier air, at least in part, as a result of the emission reductions associated with the 2007 Campaign, avoiding excesses of the national air quality standard for ground level ozone on both of the 2007 Spare the Air/Free Transit days.

II. THE 2007 SPARE THE AIR/FREE TRANSIT CAMPAIGN

INTRODUCTION

Ozone levels are usually highest on hot, windless summer afternoons, especially in inland valleys. Concentrations of ozone near the ground level in excess of national health-based air quality standards can be harmful to public health. High ozone levels can aggravate respiratory conditions and damage the tissues in the lung and respiratory tract. Children, seniors and people with respiratory illnesses are most at risk for the adverse health effects of ozone.

Established in 1991, the Air District's Spare the Air outreach campaign is an intermittent, voluntary control program that encourages Bay Area residents, schools, businesses and public agencies to reduce polluting activity on days when weather conditions are conducive to forming ozone levels in excess of national standards. During the summertime ozone season, the Air District conducts public education and outreach activities designed to educate the public about air quality and encourage residents to reduce their driving, the use of certain household products and gasoline powered lawn and garden equipment on days that are expected to exceed the national 8-hour ozone standard.



Spare the Air advisories are declared on days when ground-level ozone is forecast to reach the U.S. Environmental Protection Agency's Air Quality Index (AQI) of 100, which is the "Unhealthy for Sensitive Groups" category. Air District meteorologists make predictions by 1:15 p.m. the day before the actual Spare the Air episode. The Air District then issues Spare the Air advisories to individuals, employers, schools and public agencies, as well as to press and media outlets, by press release, fax and through the AirAlert email notification system. The Air District urges residents to cut back on activities that cause pollution – such as driving, using oil-based paints, gasoline-powered lawn mowers, and household aerosol products like hair spray and bug spray which contain a high volume of ozone precursors.

Since its inception, the Spare the Air campaign has been successful in its public education efforts. The campaign was elevated to new heights in 2004 when it became directly linked to free transit on Spare the Air days. A 2004 pilot program offered free morning commutes on the first five Spare the Air weekdays on BART and the Livermore Amador Valley Transit Authority (LAVTA). For the two Spare the Air days of the 2004 ozone season, BART reported carrying an additional 16,000 riders on the first Spare the Air day (September 7) and some 24,000 additional riders on the second Spare the Air day (September 8). Based on the pilot program's success, the 2005 campaign continued to offer free morning commutes on the first five Spare the Air weekdays but was expanded to include 20 transit operators. Ridership increased by seven percent (21,035 trips) for the single Spare the Air day of the 2005 ozone season (July 26). In 2006, 26 transit operators offered free all-day transit, initially on the first three Spare the Air days and ultimately on the first six Spare the Air weekdays (excluding holidays) of the summer. Transit ridership rose 15 percent on the six free transit days, carrying a total of over 1.3 million additional riders.

The 2007 Spare the Air/Free Transit Campaign (2007 Campaign) sought not only to raise public awareness about the link between transportation choices and air quality, but also to encourage Bay Area residents to change their travel behavior on high pollution days by providing an incentive to take transit. MTC provided \$7.5 million and the Air District provided \$1.0 million for the 2007 Campaign, totaling \$8.5 million.

Free transit was offered in 2007 all day on Bay Area buses and light-rail and until 1 p.m. on ferries and trains including BART, Caltrain, the ACE train and the Alameda Harbor Bay, Golden Gate and Vallejo ferries for the first four Spare the Air non-holiday weekdays. Twenty-nine transit operators participated, the highest number since the free transit was integrated into the campaign. Free transit was offered until 1 p.m. on rail and the ferries to address issues of overcrowding, service delays and security associated with the 2006 Campaign, particularly on the ferries and on rail. The free transit program continued to give commuters the opportunity to take transit from home to work and vice versa, and accommodated other work-related, school, medical, shopping, and recreation trips that occurred throughout the day.

The results anticipated from the 2007 Campaign included driving less by taking transit, carpooling, vanpooling, biking, or walking; reducing the use of consumer products that pollute like hairsprays, bug sprays and barbeque lighter fluid; and delaying the use of gasoline-powered gardening equipment, such as lawn mowers, until the Spare the Air advisory was over. The 2007 Campaign was comprehensive in nature and included transportation-air quality outreach, consumer product outreach and ozone education, in addition to the free transit promotion.

A. PROGRAM GOALS

The 2007 Spare the Air/Free Transit Campaign was an episodic air quality program developed specifically for implementation on days when air quality was forecasted to be unhealthy in the Bay Area. MTC and the Air District, along with the partner agencies, established five clear goals for the 2007 Campaign:

1. Increase public awareness about the link between transportation choices and air quality,
2. Encourage Bay Area residents to drive less and use public transit more,
3. Build transit ridership region wide,
4. Reduce emissions to prevent national 8-hour ozone excesses and
5. Encourage longer-term behavioral changes that benefit air quality and reduce greenhouse gases.

Offering free fares on 29 bus, rail, and ferry systems encouraged more Bay Area residents to take transit. At least some of the additional riders are expected to become regular transit users by virtue of the exposure and experience they received on the free transit days. Longer-term behavioral changes that benefit air quality was another goal of the 2007 Campaign. The Air District will be tracking a sampling of these new transit riders who were identified by surveys conducted on-board transit providers on the two Spare the Air days of 2007.

In addition, Spare the Air messaging continues to emphasize other emission reduction efforts individuals can take including reducing the use of gasoline-powered lawn and garden equipment and avoiding polluting household products. In total, the emission reductions realized from all

these pollution reduction activities may either avert or minimize the number of exceedance of the national 8-hour ozone standard. On the two Spare the Air days of 2007, in fact, the Bay Area did not exceed the national ozone standard, at least partially due to the 330,000 additional riders on transit each day in addition to the other activities that the public took to reduce air pollution.

B. PARTICIPATING TRANSIT OPERATORS

Twenty-nine Bay Area transit operators participated in this year's Spare the Air/Free Transit Campaign, as shown below. Starting in March 2007, MTC, the Air District and transit operators staff formed a "Working Group" and collaborated closely to develop a comprehensive regional marketing strategy, as well as individual operator ridership monitoring and operations plans. Three new transit systems - Vallejo Transit/BayLink Ferry, Healdsburg Transit and Marin County Transit – joined the program this year.

- AC Transit
- Alameda-Harbor Bay Ferry
- Alameda-Oakland Ferry
- Altamont Commuter Express (ACE)
- American Canyon Transit
- BART
- Benicia Breeze
- Caltrain
- County Connection (CCCTA)
- Cloverdale Transit
- Dumbarton Express
- Fairfield/Suisun Transit
- Golden Gate Ferry and Bus (GGBHTD)
- Healdsburg Transit
- LAVTA/Wheels
- Marin County Transit
- Muni
- Petaluma Transit
- Port of Oakland (AirBART)
- Rio Vista Delta Breeze
- St. Helena Shuttle
- SamTrans
- Santa Rosa CityBus
- Sonoma County Transit
- TriDelta Transit (ECCTA)
- Union City Transit
- Vacaville City Coach
- Vallejo BayLink Ferry
- Vallejo Transit
- VTA Bus and Light Rail
- VINE
- Yountville Shuttle
- WestCAT

C. SPARE THE AIR EPISODES

The 2007 summer ozone season started on June 1, 2007 and ended on October 12, 2007. The Air District issued two Spare the Air advisories for the 2007 season, in contrast to the 2006 Campaign when there were 11 Spare the Air days. The Spare the Air days of 2007 were Wednesday, August 29 and Thursday, August 30. The decrease in the number of Spare the Air days was due in part to cooler summer weather, which resulted in conditions that were less likely to trigger the formation of ground-level ozone. Excesses of the national 8-hour ozone standard of 80 parts per billion (ppb) were avoided on both Spare the Air days. It should be noted that there was one excess of the national 8-hour ozone standard in 2007 on Thursday, July 5. The Air District did not issue a Spare the Air advisory for the July 5 episode.

III. PROGRAM EVALUATION

A. PURPOSE

The purpose of this program evaluation is to quantify the results and effectiveness of offering free transit on the two Spare the Air weekdays of the 2007 Campaign. Key elements addressed in this program evaluation are as follows:

1. Determine the number of additional riders carried on the two Spare the Air/Free Transit days in comparison to baseline conditions,
2. Understand the travel behavior of people who responded to the campaign,
3. Assess the overall public awareness and recall of Spare the Air messaging,
4. Estimate the amount of emissions reduced for the two ozone precursors (reactive organic compounds (ROG) and nitrogen oxides (NO_x), PM 10, PM 2.5, carbon monoxide (CO) and carbon dioxide (CO₂), and
5. Track transit behavior associated with new riders in 2007 over the longer-term.



B. METHODOLOGY

MTC and the Air District utilized the following methods to quantify the effects that the 2007 Campaign had on transit ridership levels, travel behavior, Spare the Air awareness, and emission reductions.

- Participating Bay Area transit operators collected and verified ridership estimates for each of the two Spare the Air days, and provided the baseline conditions, which represent the ridership counts for comparable days.
- True North Research and Eric N. Schreffler, Transportation Consultants (ESTC) conducted a random digit dial telephone survey of Bay Area drivers on the evenings of the two Spare the Air days in August to quantify the effects that the Spare the Air public education program had on driving behavior, the use of selected household products, and emissions reductions that resulted from the 2007 Campaign.
- BW Research Partnership with Nichols Research conducted on-board passenger surveys during peak and off-peak commute periods on both Spare the Air days to quantify the direct impacts of offering free fares on transit user behavior. The survey administration also included identifying “new” transit riders to track over the longer term to assess longer-term behavior change.

- MTC posted an online customer survey on the special Spare the Air/Free Transit page on 511.org to determine the effectiveness of Spare the Air messaging and how people received and accessed information about the 2007 Campaign.
- Emission reduction estimates for the 2007 Campaign are based on the reported trip reductions from the True North Research and ESTC telephone survey using California Air Resources Board (CARB) and U.S. Environmental Protection Agency (EPA) emission factors and methodology. Furthermore, the cost-effectiveness of the campaign was also computed.

C. KEY RESULTS

TRANSIT RIDERSHIP

Participating Bay Area transit operators collected and verified ridership estimates for each of the two Spare the Air days, and provided appropriate baseline data. Methods used to collect ridership data varied amongst the operators, ranging from manual passenger counts to use of automated passenger counters to field sampling of routes and stations. Note that there is a margin of error associated with the ridership estimates due to the data collection methods used. Thus, some ridership figures may be under- or over-estimated.

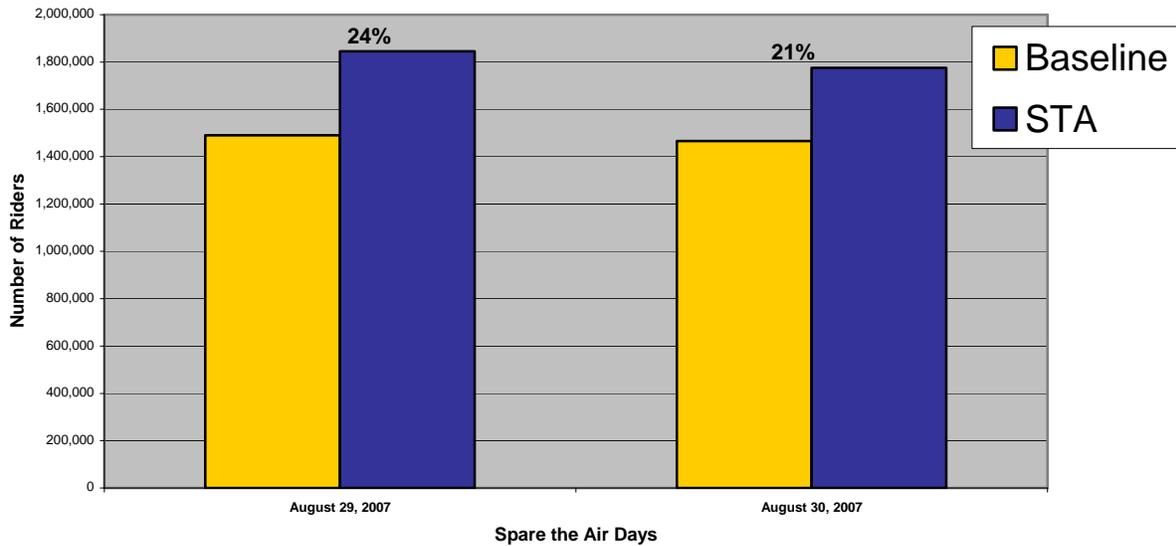
Overall, the 2007 Spare the Air/Free Transit Campaign produced significant gains in transit ridership. Table 2 presents the ridership counts for Spare the Air weekdays compared to the baseline day by operator for each of the two Spare the Air days, and Figure 1 represents the regional totals in percentages. On-board survey results presented in the subsequent section should be referenced to determine the impact of offering free fares to encourage people to use transit on Spare the Air days who otherwise would have used a private vehicle for the trip.

- Transit ridership levels rose by approximately 22 percent regionwide on the two Spare the Air days, adding a total of 665,004 riders. This equates to an average of an additional 332,502 riders per Spare the Air day. In 2006, the average ridership was 225,030 and there was an overall 15 percent increase in ridership over six Spare the Air/Free Transit days.
- Muni saw the highest absolute ridership gain, with 401,157 additional riders (up 35 percent) compared to the baseline on its system over the two Spare the Air days. Muni was followed by AC Transit, which had 124,125 additional riders (up 27 percent), VTA bus with 43,746 additional riders (up 26 percent), and VTA light rail with 24,553 additional riders (up 41 percent).
- Other transit operators also saw substantial absolute ridership gains over the two Spare the Air days. Caltrain carried 13,669 additional riders (up 17 percent) compared to the baseline. BART carried 10,000 additional riders (up 1 percent), SamTrans had 7,485 additional riders (up 7 percent) and Golden Gate Bus had 4,483 additional riders (up 9 percent). Smaller suburban bus operators who also experienced substantial ridership increases include Vallejo Transit with 8,671 additional riders (up 66 percent), TriDelta

with 5,451 additional riders (up 33 percent) and WestCat with 2,137 additional riders (up 20 percent).

- Ridership on Bay Area ferry systems was also strong. The Alameda Ferries led the way with an 89 percent increase over the two Spare the Air days, going from an average of 1,744 ferry riders per day to 3,296. The Golden Gate Sausalito Ferry also fared well, with ridership climbing 53 percent from an average of 1,792 ferry riders per day to 2,747 riders per day. The Vallejo BayLink Ferry – new to the program this year - experienced a 33 percent ridership gain, going from an average of 2,717 ferry riders per day to 3,615 ferry riders per day.

Figure 1: Ridership on Spare the Air Days



2007 Spare the Air/Free Transit Campaign Evaluation

Table 2. Ridership Counts on Spare the Air/Free Transit Days (August 29 & 30, totals and percentages)

Transit Operator	Wed				Thursday				Total 2		Total 2	
	29-Aug	Baseline	Numeric Change	Percent Change	30-Aug	Baseline	Numeric Change	Percent Change	STA	Baseline	Numeric Change	Percent Change
AC Transit	288,857	226,732	62,125	27%	288,732	226,732	62,000	27%	577,589	453,464	124,125	27%
ACE	3,366	3,196	170	5%	3,350	3,123	227	7%	6,716	6,319	397	6%
Alameda Ferries	3,195	1,659	1536	93%	3,397	1,829	1,568	86%	6,592	3,488	3,104	89%
BART	362,200	355,500	6,700	2%	355,700	352,400	3,300	1%	717,900	707,900	10,000	1%
AirBART	1,486	1,490	-4	0%	1,624	1,669	-45	-3%	3,110	3,159	-49	-2%
American Canyon Transit	41	44	-3	-1%	64	52	12	23%	105	96	9	9%
Benicia Breeze	751	640	111	17%	826	629	197	31%	1,577	1,269	308	24%
Caltrain	47,435	43,100	4,335	10%	47,265	37,901	9,364	25%	94,700	81,001	13,699	17%
County Connection (CCCTA)	17,959	18,041	-82	0%	18,170	16,323	1,847	11%	36,129	34,364	1,765	5%
Dumbarton Express	979	873	106	12%	846	873	-27	-3%	1,825	1,746	79	5%
Fairfield/Suisun Transit	4,228	3,680	548	15%	4,356	3,634	722	20%	8,584	7,314	1,270	17%
Golden Gate Bus	26,869	25,497	1,372	5%	28,210	25,099	3,111	12%	55,079	50,596	4,483	9%
Golden Gate Ferry Sausalito	2,704	2,033	671	33%	2,789	1,550	1,239	80%	5,493	3,583	1,910	53%
Golden Gate Ferry Larkspur	6,708	5,606	1102	20%	6,044	5,381	663	12%	12,752	10,987	1,765	16%
Healdsburg Transit	66	51	15	29%	61	51	10	20%	127	102	25	25%
LAVTA/ Wheels	8,870	8,621	249	3%	8,955	8,810	145	2%	17,825	17,431	394	2%
Marin County Transit	368	272	96	35%	344	287	57	20%	712	559	153	27%
MUNI	804,612	573,814	230,798	40%	744,173	573,814	170,359	30%	1,548,785	1,147,628	401,157	35%
Petaluma Transit	778	563	215	38%	624	660	-36	-5%	1,402	1,223	179	15%
Rio Vista Delta Breeze	16	10	6	63%	14	9	5	56%	30	19	11	58%
St. Helena Shuttle	32	25	7	28%	38	37	1	3%	70	62	8	13%
SamTrans	57,848	53,259	4,589	9%	55,393	52,497	2,896	6%	113,241	105,756	7,485	7%
Santa Rosa CityBus	11,915	9,912	2,003	20%	10,917	9,912	1,005	10%	22,832	19,824	3,008	15%
Sonoma County Transit/ Cloverdale Transit	6,621	5,745	876	15%	7,164	5,524	1,640	30%	13,785	11,269	2,516	22%
TriDelta Transit	10,705	8,580	2,125	25%	11,437	8,111	3,326	41%	22,142	16,691	5,451	33%
Union City Transit	1,870	1,600	270	17%	2,020	1,600	420	26%	3,890	3,200	690	22%
Vacaville City Coach	973	916	57	6%	1,098	806	292	36%	2,071	1,722	349	20%
Vallejo BayLink Ferry	3,732	2,700	1,032	38%	3,498	2,734	764	28%	7,230	5,434	1,796	33%
Vallejo Transit	10,892	6,644	4,248	64%	10,904	6,481	4,423	68%	21,796	13,125	8,671	66%
VTA Bus	107,459	87,582	19,877	23%	107,292	83,423	23,869	29%	214,751	171,005	43,746	26%
VTA Light Rail	43,312	33,842	9,470	28%	40,876	25,793	15,083	58%	84,188	59,635	24,553	41%

2007 Spare the Air/Free Transit Campaign Evaluation

Transit Operator	Wed		Numeric		Percent		Thursday		Numeric		Percent		Total 2	Total 2	Numeric	Percent
	29-Aug	Baseline	Change	Change	30-Aug	Baseline	Change	Change	STA	Baseline	Change	Change				
VINE	2,702	2,969	-267	-9%	2,702	2,619	83	3%	5,404	5,588	-184	-3%				
Yountville Shuttle	61	66	-5	-8%	12	13	-1	-8%	73	79	-6	-8%				
WestCat	6,252	5,182	1,070	21%	6,526	5,459	1,067	20%	12,778	10,641	2,137	20%				
REGIONAL TOTAL	1,845,862	1,490,444	355,418	24%	1,775,421	1,465,835	309,586	21%	3,621,283	2,956,279	665,004	22%				

- Notes:
1. Baseline numbers are generally the same day of the week preceding or following the Spare the Air days, depending on the status of when school started in local communities. Baseline numbers were judged most appropriate by the transit operators.
 2. Transit ridership reflects all day numbers, including those transit systems where the promotion ended at 1 p.m. (i.e. ACT train, Alameda Ferries, BART, AirBart, Caltrain, Golden Gate Ferries and the Vallejo BayLink Ferry).

Source: Bay Area Transit Operators, 2007

ON-BOARD PASSENGER SURVEY RESULTS

MTC commissioned the team of BW Research Partnership, True North Research, Eric Schreffler Transportation Consultants (ESTC) and Nichols Research to conduct on-board passenger surveys to quantify the impact of offering free transit during Spare the Air weekdays and the resulting trip, vehicle miles traveled (VMT) and emission reductions that can be attributed to the 2007 Campaign.

Transit routes to be surveyed were identified by the BW Research Team, in consultation with MTC and participating transit agencies. Methodically, the study sampled more transit providers and routes than previous years and included both peak and off-peak periods in the sampling design. The data were also weighted to reflect system-wide ridership by mode and agency within mode. The instrument was self-administered surveys in English, Spanish, Chinese, and Vietnamese. Surveys were conducted on both Spare the Air days, August 29 and 30, 2007. Surveys were generally distributed between 6:00 a.m. and 9:00 p.m., with the exception of ACE, BART, Caltrain, and all ferry systems, which ended the free transit promotion at 1:00 p.m. In total, 5,700 passengers were interviewed for this study on-board 20 different transit operators. The margin of error for the study was +/- 1.3 percent at the 95 percent level of confidence.

KEY FINDINGS

Trip Purpose

- The majority of riders, 52 percent, cited going to or from work as the primary purpose of their trip. Seventeen percent were going to or from school and 19 percent indicated recreation or entertainment (11.3%) or shopping (7.4%) as their main trip purpose.

Typical Mode of Transportation

- When traveling midweek in the Bay Area, 76 percent of riders typically used public transit. Among the different forms of public transit, 37 percent typically rode the bus, 26 percent used BART, seven percent used light rail, five percent took the train, and one percent rode the ferry. Thirteen percent of riders typically drove their vehicle alone, four percent carpooled, two percent rode a bicycle and two percent typically walked.

Auto Access

- Forty-eight percent of respondents had access to a car, motorcycle, truck, or other vehicle that they could have used to make their trip. Twenty-four percent of respondents either personally drove to the transit stop prior to boarding and/or would be personally driving a vehicle that was parked at a transit stop or station after exiting public transit.

Use of Public Transit

- Almost three out of every four survey respondents typically rode public transit three or more times per week. Among riders surveyed, 44 percent transferred to or from another route to complete their trip and 37 percent transferred to or from another form of public transit. Overall, riders estimated that they would travel an average of 25.5 total miles on public transit throughout the day.

Free Transit Incentive

- If public transit had not been free, 93 percent of respondents would have still traveled to their destination on the day of the survey. Among those who still would have traveled, 87 percent would have used public transit to reach their destination on that particular day, five percent would have driven alone (4.9%) or ridden a motorcycle (0.4%) and three percent would have carpooled.

Spare the Air Awareness

- Fifty-six percent of transit riders surveyed were aware that it was a Spare the Air day and 55 percent were aware that they could ride public transit for free.
- When combined, 60 percent of respondents were either aware that it was a Spare the Air day or that they could ride public transit for free².
- Awareness was highest among ferry (73.4%) and rail (62.6%) passengers. Bus and multi-mode passengers reported comparable levels of awareness at 59.7 percent and 58.9 percent, respectively.
- Among those riders who were aware that it was a Spare the Air day or that they could ride transit for free, 44 percent heard the announcement on television, 26 percent from the radio, 21 percent from signs or announcement at a transit stop or station, and 18 percent from family, friends, or associates.

Employer Notification of Spare the Air Days

- Eighteen percent of employed respondents indicated that their employer notifies them of poor air quality days. A much larger percentage, 32 percent, indicated that their employer encourages them to drive less, carpool, or use public transit on poor air quality days.

Demographics

- Forty-nine percent of transit riders were employed full time, 18 percent were students, 16 percent were employed part-time, seven percent were retired, six percent were in-between jobs, and four percent were homemakers.
- Fifty-four percent of survey respondents were female and forty-six percent were male.

Impact of Spare the Air from Mode Shift to Transit

In order to calculate the Spare the Air impact, a “transit reducer” or “impacted” respondent was defined as someone who was aware that it was a Spare the Air day or that public transit was free, took public transit as a result, and would have traveled to their destination if transit were not free by either driving alone or riding a motorcycle. In other words, an impacted rider made a conscious decision to change his or her travel behavior by taking public transit rather than driving a car or riding their motorcycle because it was a Spare the Air day. The margin of error for the study was +/- 1.3 percent at the 95 percent level of confidence.

- The result of this impact calculation revealed that 2.9 percent of riders qualified as “transit reducers” or “impacted riders.”
- Examining the data by mode revealed much higher percentages of transit reducers on the ferry (4.5%) and rail (4.2%) as compared to multi-mode (2.5%) and bus (2.4%) passengers.

² The combined percentage is higher than the individual percentages because some respondents answered only one of the questions. The combined percentage represents awareness of “either” question.

Emission Reductions From Mode Shift to Transit

The Spare the Air/Free Transit Campaign produced emission reductions through prompting a variety of behavior changes among Bay Area residents, including reduced driving through transit use, carpooling or vanpooling, trip linking, foregoing trips, as well as walking and biking. The following are the episodic emission reductions that can be attributed to the 2007 Campaign that are due solely to mode-shift to transit. That is, a person chose to take transit for a trip they otherwise would have taken by auto on a Spare the Air day.

The following table shows the numbers of vehicle trips, vehicle miles traveled (VMT), and tons of pollution reduced by a mode-shift from a motor vehicle to transit for the 2007 Spare the Air season. In total, the Spare the Air/Free Transit Program reduced an estimated 99,919 vehicle trips due to mode-shift to transit, accounting for an estimated 676,876 vehicle miles reduced. This translates to an estimated 0.345 tons of nitrogen oxides (NOx), 0.308 tons of reactive organic gases (ROG), 0.368 tons of particulate matter (PM-10), 0.072 tons of particulate matter (PM-2.5), 3.7 tons of carbon monoxide (CO), and 348 tons of carbon dioxide (CO2) reduced due to mode-shift to transit on the two Spare the Air days in 2007.

Table 3: Emissions Reductions from Mode Shift from Driving to Transit

Trips, VMT & Emissions Reduced by Transit Mode					
	Rail	Bus	MUNI	Ferry	Total
Trips	35,029	27,009	36,972	910	99,919
VMT	453,975	134,235	74,313	14,353	676,876
NOX	0.221	0.070	0.047	0.007	0.345
ROG	0.188	0.065	0.050	0.006	0.308
PM10	0.247	0.073	0.041	0.008	0.368
PM2.5	0.048	0.014	0.008	0.002	0.072
CO	2.360	0.757	0.510	0.073	3.700
CO2	231.870	69.414	39.757	7.309	348.350

TELEPHONE SURVEY RESULTS

True North Research was commissioned by the Air District to conduct telephone surveys to gauge the effectiveness of the Spare the Air program in order to understand the public’s attitudes and behavior in response to the 2007 Spare the Air/Free Transit Campaign. Telephone surveys were conducted in the evening on each of the two Spare the Air weekdays of the 2007 ozone season. In total, 753 randomly selected drivers within the Air District’s boundaries participated in the telephone survey. The key findings are outlined below.

- Nearly ten percent (9.7 percent) of Bay Area drivers reduced at least one trip in response to the 2007 summer season Spare the Air campaign.
- Shopping trips, trips to and from work, and scheduled appointments were the most common types of trip reduced for air quality reasons in 2007.
- The average number of car trips taken on a Spare the Air day in 2007 was 2.34.

Recall and Awareness of Spare the Air Messaging

Based on the True North telephone survey, the following are the key findings related to recall and awareness of the Spare the Air messaging:

- Seventy-three percent (73 percent) of respondents indicated that they recalled being exposed to news stories or public service announcements related to air quality and/or Spare the Air prior to the interview.
- The most commonly mentioned sources of information about Spare the Air included television news, radio and newspaper.
- Nearly two-thirds (65 percent) of respondents were aware that the day of the interview was a Spare the Air day.
- Nearly two-thirds (63 percent) of respondents were also aware that commuters were able to ride public transit for free on the day of the interview (Spare the Air day).
- Four percent (4 percent) of respondents who rode public transit on the survey date indicated that they would not have done so had transit not been free.

Linking the Spare the Air public education program with the free transit offered has dramatically increased the recall exposure to Spare the Air messaging – from 54 percent in 2003 (prior to the free transit program) to more than 73 percent in 2007.

Product Usage on Spare the Air Days

- Of the household products and equipment tested that are harmful to air quality, the most commonly used were household cleaner sprays, cologne or perfume, and air fresheners.
- Overall, 2.6 percent of Bay Area drivers reduced their use of at least one product due to the Spare the Air campaign in 2007.
- In terms of products that respondents normally use but choose not to for air quality reasons in response to the Spare the Air campaign, aerosol products were the most frequently mentioned.

Spare the Air Emission Reductions from All Activities

The True North survey assessed emission reductions from all activities including driving less, mode shift to transit, avoiding consumer products that pollute and postponing the use of gasoline lawn and garden equipment. The following are the emission reductions due to the compilation of these activities.

- 4.35 tons of nitrogen oxides (NO_x),
- 4.57 tons of reactive organic gases (ROG),
- 4.53 tons of particulate matter (PM₁₀),
- .86 tons of particulate matter (PM 2.5),
- 46.88 tons of carbon monoxide (CO) and
- 4179.15 tons of carbon dioxide (CO₂)

511.ORG CUSTOMER SURVEY RESULTS

MTC's 511.org Web site experienced a 12-fold increase in visits on August 28, 29 and 30, the day preceding and the two days of the Spare the Air/Free Transit episode. There were 14,444 visits to 511.org during the three days, compared to 1,082 visits on the corresponding three days the previous week. MTC's 511-traveler information service provided the public with details on the 2007 Campaign and transit trip planning. Floodgate messages were featured on the 511 phones to alert users of the Spare the Air advisories and the free transit promotion. Callers were instructed to visit 511.org for more information or to plan their trip on transit. Additionally, the 511.org Web site hosted a special page linked from a "promo" box on the home page that provided information in both English and Spanish about the 2007 Campaign, as well as links to the Air District and transit operators Web sites. This special page also featured an online user survey to gauge Spare the Air awareness and behavior.

Announcements about the program and Spare the Air advisories were also placed on the 511.org Traffic and Transit pages. These announcements were linked to the special page for detailed information. Notably, the Air District's sparetheair.org Web site, as well as the participating transit operators' sites, also provided information about the campaign. Special online banners in English and Spanish were created for transit operators to use on their Web sites to link to the special page on 511.org.

A special promo box for users was also posted on 511.org during and after the two Spare the Air/Free Transit days with a customer survey about the free transit promotion. Eighty-one (81) users responded to the online survey, a number too small to be statistically valid. The key results are as follows:

Information Sources

- Television (26 percent), radio (26 percent), and signs/announcements (31 percent) were the primary ways that respondents heard about the Spare the Air/Free Transit announcement. Twenty percent heard about the campaign through word of mouth, 11 percent from 511 phone or 511.org and 16 percent from sparetheair.org.
- When searching for the 2007 Spare the Air/Free Transit Campaign on the Internet, almost two-thirds of the respondents visited 511.org (63 percent), while 22 percent visited sparetheair.org.

511.org Experience

- While viewing the Spare the Air/Free Transit page on 511.org, respondents indicated that the main reason for visiting this page was to get an overview of the free transit promotion (32 percent), followed by a list of participating transit operators (17 percent), transit trip planning (12 percent), and general information about traffic, transit, ridesharing and bicycling (11 percent).
- Eighty-four percent of the respondents reported being satisfied with their overall experience when seeking the free transit information on 511.org.

AirAlerts

- When asked about the Air District's AirAlerts, 37 percent indicated that they signed up for this free service, which automatically sends Spare the Air advisories to subscribers. The most common alert method chosen was email (97 percent), followed by pager (3 percent).

ADVERTISING, MEDIA AND EMPLOYER PROGRAM RESULTS

Advertising

The Air District led the advertising, media and employer program efforts. The 2007 Spare the Air/Free Transit Campaign officially launched via a television commercial featuring the Air District's Executive Officer encouraging the public to ride transit on Spare the Air days. This commercial aired 1,513 times on KPIX, KTVU, KDTV (ethnic), Comcast Cable, KTSF (ethnic), and KRON networks during the summer season. The television ad also aired on 131 movie screens throughout the Bay Area reaching an estimated audience of 1,083,814 individuals. In addition, 230 radio ads aired on KCBS, KGO, KNBR and KSJO. Finally, fourteen wrapped buses and three wrapped BART cars served as rolling advertisements for the 2007 Campaign.

Media Relations

Broadcast, print and Internet coverage of the 2007 Campaign was excellent. During the Spare the Air season, over 250 print and online articles, over 170 television stories, and 24 radio pieces aired during the campaign. The advertising value of the news stories was approximately \$870,000, which is the amount that would have been paid if the comparable television, radio or print advertising had been purchased. In 2006, there were 830 media stories valued at \$1.2 million over six Spare the Air/Free Transit days.

Employer Program

To build upon the success of the Spare the Air Employer Program, the District reconvened the Employer Leadership Committee during the 2007 Campaign. The committee consists of 12 businesses that collaborate with the Air District to expand the scope and impact of the Spare the Air campaign at Bay Area workplaces. Committee members include 511 Contra Costa, Agilent Technologies, Autodesk, Chevron, CCSF Department of the Environment, Genentech, Hacienda Business Park, Lockheed Martin Space Systems Company, Peet's Coffee, Safeway, Wells Fargo and Yahoo!

In consultation with the committee, the Spare the Air Employer Program team hosted a summit titled "Building on Success" on October 2. The Summit was held at Genentech and was attended by representatives from over 50 public and private employers across the Bay Area. A panel of five Bay Area employers of various sizes shared how they have implemented clean air policies and practices at their workplaces. Panelists addressed topics including how they overcame challenges, the benefits to their businesses, employees and clients, and sustainable workplace behaviors to help keep the air clean and protect the climate. Attendees were also invited to submit feedback about the Employer Program by participating in an online survey effort.

EMISSION METHODOLOGIES AND REDUCTIONS

The 2007 Campaign produced a number of favorable results by educating the public about transportation-air quality linkages, and encouraging residents to take free transit for their trips instead of driving. The most salient direct result is emissions reduced by increasing transit ridership on the Spare the Air days. Other results include emissions reduced by raising awareness and encouraging other types of trip reductions including carpooling, vanpooling, trip linking, biking and walking or eliminating trip(s) altogether. Finally, there are also emissions reductions due to avoiding the use of consumer products such as aerosol hairsprays, lighter fluid for barbeques and gas powered garden equipment on Spare the Air days.

As part of this program evaluation, different methodologies were used to quantify the emission reductions from the 2007 Campaign. The Air District focused on identifying emission reductions from the overall 2007 Campaign including reduced driving, transit usage, reduced use of consumer products that pollute and delaying use of gasoline powered lawn and garden equipment.

Overall, the 2007 Campaign reduced 4.35 tons of nitrogen oxides (NO_x), 4.57 tons of reactive organic gases (ROG), 4.53 tons of particulate matter (PM-10), 0.86 tons of particulate matter (PM-2.5), 46.88 tons of carbon monoxide (CO) and 4179.15 tons of carbon dioxide (CO₂) on the two Spare the Air days.

MTC focused on quantifying the emissions reductions that were due solely due to mode shift to transit. MTC estimates of the emissions benefits from the 2007 Campaign are based on the numeric changes in transit ridership levels as reported by the participating transit operators. The latest California Air Resources Board (CARB) emission factors were used. The emissions benefits from transit trips were discounted if a motor vehicle was involved (i.e., rider drove and parked at a station or was dropped off at a station).

The emission reductions due solely to a mode shift from driving to transit include an estimated 0.345 tons of nitrogen oxides (NO_x), 0.308 tons of reactive organic gases (ROG), 0.368 tons of particulate matter (PM-10), 0.072 tons of particulate matter (PM-2.5), 3.7 tons of carbon monoxide (CO) and 348 tons of carbon dioxide (CO₂) on the two Spare the Air days.

OZONE EXCEEDANCES

The Air District's long-standing Spare the Air campaign is an episodic measure aimed at discouraging polluting behavior on days when weather conditions are conducive to high ozone levels. Because most air pollution is preventable, the Spare the Air campaign focuses on educating and encouraging the public to engage in pollution reducing activities such as driving less, taking transit, trip-linking, avoiding consumer products that pollute, gasoline powered garden equipment and barbeque lighter fluid. A concerted effort by Bay Area businesses, government agencies, and members of the public to reduce polluting activities on Spare the Air days may in turn help to reduce the level and number of ozone exceedances or avert them altogether.

For the 2007 ozone season, the Air District issued two Spare the Air advisories, on August 29 and 30. On both days, free transit was offered on 29 participating transit systems. There were no exceedances of the national 8-hour standard on either August 29 or August 30. Only one exceedance of the national 8-hour

standard was recorded for the entire 2007 season, and it took place on July 5 at the Air District's Livermore monitoring station.

Table 4: Exceedances of the National 8-Hour Ozone for 2007

Station Location	Maximum 8-hour Concentration in ppb	Total National 8-hour Exceedances	July 5, 2007
Northern Counties			
Napa	65	0	
San Rafael	58	0	
Santa Rosa	60	0	
Vallejo	67	0	
Coast & Central Bay			
San Francisco-Arkansas	53	0	
San Pablo	51	0	
Eastern District			
Bethel Island	78	0	
Concord	81	0	
Fairfield	67	0	
Livermore	91	1	91
Pittsburg	74	0	
South Central Bay			
Fremont	68	0	
Hayward	61	0	
Redwood City	69	0	
San Leandro	55	0	
Santa Clara Valley			
Gilroy	70	0	
Los Gatos	65	0	
San Jose-Central	67	0	
San Martin	73	0	
Sunnyvale	68	0	
Station Totals		1	1
Total Days		1	1

Source: Air District, 2007

Compliance with the national 8-hour ozone standard is determined at each monitoring station by calculating the average of the fourth highest ozone readings for the three most recent years. A violation at any monitoring station results in a nonattainment designation for the entire region, since ozone is a regional pollutant. Table 5 shows the readings for 2005, 2006 and 2007 at several key monitoring stations, and the average of the ozone readings for the three most recent years.

Table 5: Attainment Status of the 8-Hour National Standard

Station	2005 4 th Highest	2006 4 th Highest	2007 4 th Highest	3-year average
Livermore	75	89	67	77
San Martin	69	88	70	76
Concord	65	85	71	74
Bethel Island	68	81	71	73
Los Gatos	62	85	59	69

Source: Air District, 2007

When compared to other major California air basins, the number of 8-hour exceedances and peak 8-hour concentrations for the Bay Area are significantly lower than those recorded for the San Joaquin and South Coast (Los Angeles) air basins.

Table 6: 2007 Ozone Exceedances in Major California Air Basins*

Air Basin	National 8-Hour Exceedances	Maximum 8-Hour Concentration in ppb
Bay Area	1	91
Ventura	6	102
San Diego	8	94
Sacramento	18	122
San Joaquin	64	110
South Coast	78	138

*Preliminary data through October 1, 2007

Source: California Air Resources Board, 2007

SUPPLEMENTAL INFORMATION - BRIDGE TRAFFIC VOLUMES

Bridge traffic volumes are provided in Table 7 to determine if there was any impact of free transit on bridge traffic. Note that changes in traffic volume on Bay Area toll bridges on any given day may be influenced by a number of factors, including sporting events and social attractions that may draw auto travel across the bridges. Because of the slight fluctuations in bridge volumes (ranging from zero percent to a four percent increase/decrease), no conclusions are being drawn about the correlation between free transit and bridge traffic. The key trends are highlighted below:

- Traffic volumes decreased on six of the eight Bay Area bridges on the two Spare the Air/Free Transit days of 2007 compared to the same day the previous week. Fourteen thousand and seventy eight (14,078) fewer motor vehicles crossed the bridges on August 29 and 5,621 fewer motor vehicles crossed the bridge on August 30. Overall, traffic volume decreased 2.2 percent, with 19,245 fewer motor vehicles crossing Bay Area bridges on the two Spare the Air days.

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- Traffic to San Francisco across the Bay Bridge and Golden Gate Bridge registered the largest declines with 12,072 and 4,558 fewer motor vehicles, respectively, on the two Spare the Air/Free Transit days of 2007 compared to the same day from the previous week.
- Traffic increased on the Benicia and Dumbarton bridges with 4,265 and 355 additional motor vehicles, respectively, crossing these bridges on the two Spare the Air/Free Transit days.

Table 7: Bridge Traffic on August 29 and 30 Compared to Baseline

	Wed 08/29/07	Baseline	Numeric Change	Percent Change	Thurs 08/30/07	Baseline	Numeric Change	Percent Change	Total 2 STA Days	Total 2 Baselines	Numeric Change	Percent Change
SFO - Oakland Bay Bridge	126,006	134,312	-8,306	-6.2%	130,891	134,657	-3,766	-2.8%	256,897	268,969	-12,072	-4.5%
Antioch	7,486	7,792	-306	-3.9%	7,875	8,188	-313	-3.8%	15,361	15,980	-619	-3.9%
Richmond	36,379	37,919	-1,540	-4.1%	37,651	37,700	-49	-0.1%	74,030	75,619	-1,589	-2.1%
San Mateo	49,697	51,012	-1,315	-2.6%	51,556	51,223	333	0.7%	101,253	102,235	-982	-1.0%
Dumbarton	34,986	34,324	662	1.9%	34,499	34,806	-307	-0.9%	69,485	69,130	355	0.5%
Carquinez	62,215	64,344	-2,129	-3.3%	65,014	66,930	-1,916	-2.9%	127,229	131,274	-4,045	-3.1%
Benicia	53,853	52,448	1,405	2.7%	56,939	54,533	2,406	4.4%	110,246	105,981	4,265	4.0%
Golden Gate	57,509	60,058	-2,539	-4.3%	58,242	60,251	-2,009	-3.3%	115,751	120,309	-4,558	3.8%
Total	428,131	442,209	-14,078	-3.2%	442,667	448,288	-5,621	-1.3%	870,252	889,497	-19,245	-2.2%

Baseline = Same Day Previous Week
(August 22 and 23, 2007)

PROJECT IMPLEMENTATION – TRANSIT OPERATORS

Transit security and passenger safety were key priorities for all the transit operators given the increased number of passengers expected on any single bus, train, or ferry boat. To avoid the overcrowding and security issues that arose due to heavy passenger loads during the 2006 Campaign, free transit on BART, the ACE train and Caltrain and on the Golden Gate, Vallejo and Alameda ferries ended at 1 p.m.

- Transit operators reported that implementation was smooth. No complaints of overcrowding and/or delays were logged by customer service or police staff at the transit agencies, in marked contrast to the 2006 Campaign.
- Transit operators were able to expose their transit services to a new customer base, attracting new riders to use the system on a regular basis.
- Transit operators execution of the free transit offer allowed them to identify the true capacity of their systems. This information is useful in planning for emergency response.

IV. CONCLUSIONS

The 2007 Spare the Air/Free Transit campaign built on and exceeded the success of previous campaigns. Transit ridership increased 22 percent on the two Spare the Air/Free Transit days of 2007, the highest increase since free transit was incorporated into the program in 2004. Over 330,000 additional riders took transit each of the two Spare the Air days, up from 225,000 additional riders per day in 2006.

The goal of avoiding exceedances of the national 8-hour ozone standard on Spare the Air days was also achieved, with no excesses of national air quality standards on the two Spare the Air days. During the 2007 ozone season, there was one excess of the national 8-hour ozone standard, on July 5th. A Spare the Air advisory was not issued for that day.

Public response to the program continues to be overwhelmingly positive. Eighty percent of Bay Area adults know the purpose of the Spare the Air program and, of these, 82 percent have a favorable or very favorable opinion of the program. Only four percent of Bay Area adults disapprove of the Spare the Air campaign.

Twenty-nine-transit operators – a record number - participated in the 2007 campaign, an increase of three transit operators over the 2006 program. Transit operator concerns in 2006 about overcrowding, transit delays and security were successfully addressed in 2007 by limiting free transit on the ferries and on rail to 1 p.m. Implementation of the program by the transit operators was smooth and without incident. In addition, the Spare the Air/Free Transit program allowed transit operators to test the limits of their systems, a useful exercise for emergency planning.

Public opinion surveys of Bay Area drivers indicate that nearly ten percent (9.7 percent) reduced at least one trip in response to the Spare the Air advisories by taking transit, carpooling, vanpooling or trip linking. The 2007 campaign goals of raising awareness of the link between travel choice and air quality, and encouraging the public to drive less and take transit more, were achieved.

Finally, as a result of messaging driving residents to the 511.org Web site for Spare the Air and transit information, the site experienced a twelve fold increase (14,444) in visits on the day preceding and the two Spare the Air/Free Transit days. 511.org has become the central location for transit information on Spare the Air days. Also, visits to the sparetheair.org Web site increased seven-fold during the corresponding time period. AirAlert sign-ups increased by approximately 8,500 new registrants since the start of the season, bringing the total to just over 55,000 registered individuals.

In summary, the 2007 Spare the Air/Free Transit Campaign reached new benchmarks in several areas including transit ridership and visits to the 511.org Web site, and continued with the high level of recognition and positive response by Bay Area residents. The Bay Area also had healthier air at least in part as a result of the 2007 Campaign, avoiding excesses of the national air quality standard for ground level ozone on both of the 2007 Spare the Air days.

IDEAS FOR NEXT YEAR'S PROGRAM

The form and structure of a 2008 Spare the Air/Free Transit campaign is still under consideration by MTC and the Air District. Based on the 2007 experience, however, the following should be considered:

- Transit operators were very satisfied with the hours that free transit was offered during the 2007 Campaign, that is, transit was free all day on buses and light-rail, and free until 1 p.m. on trains and ferries. It is recommended that if free transit is offered in 2008, these parameters continue.
- The Working Group of transit partners, MTC and the Air District meets only for preparation for-and during the Spare the Air season. A year-round Working Group would bring more cohesion to the program, provide for more partnering opportunities and allow adequate time to develop program concepts, marketing and implementation plans.
- Planning for a 2008 campaign should begin earlier in the year (January vs. March) to allow time to develop a more robust and effective campaign.
- Other private partnerships to promote the program and provide “thank you” rewards to transit riders (particularly monthly pass holders) need to be planned in the fall preceding the summer season. Experience has shown that at least nine or 10 months is necessary for larger partnerships.

- As part of the funding decision for the 2007 Campaign, MTC, with support from the Partnership, proceeded to use federal air quality funds. However, future funding for the program was to be through corporate sponsorships pursued by the Air District. A funding decision for a possible 2008 campaign should be made soon.