Spare the Air Tonight Study

2007-2008 Winter Wood Smoke Season

Conducted for the

Bay Area Air Quality Management District

March 2007

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INTRODUCTION

The Bay Area Air Quality Management District (BAAQMD) was established in 1955 by the California State Legislature as the first multi-county agency in the State to address the problem of air pollution on a regular basis. The BAAQMD's primary regulatory authority covers stationary sources of air pollution such as factories, industrial facilities, manufacturing operations, gasoline stations and dry cleaners. The BAAQMD is also responsible for transportation control measures to reduce emissions from mobile sources of air pollution in its Clean Air Plan.

Serving the counties of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, and the western half of Solano and southern half of Sonoma, one of the BAAQMD's primary charges is to increase public awareness of positive air quality choices. To facilitate this effort, the Spare the Air Program was established by the BAAQMD in 1991 to educate residents about air pollution and to encourage them to modify their behavior to reduce and prevent it. During the summer ozone season (May to October), the BAAQMD conducts episodic public education campaigns designed to encourage the public to reduce their driving and use of certain household products on days that are expected to violate ozone air quality standards. During the winter season (November to February), the focus of the Program shifts to reducing the impact of wood burning on air quality by encouraging the public to *not* burn wood and to replace their wood-burning fireplaces and stoves with cleaner alternatives, such as natural gas fireplaces.

Although today many air quality management districts throughout the country administer similar programs, the Spare the Air program in the Bay Area was the first of its kind.

MOTIVATION FOR STUDY The primary motivation for this study was to better understand the public's attitudes and behavior with respect to burning wood, their awareness of the Spare the Air Tonight Program, as well as the impact that the Program has had on awareness, opinions and behavior relevant to burning wood and air quality. In this respect, this study is quite similar to past surveys conducted for the BAAQMD every year since 2001.

The passage of California Senate Bill 656 to reduce public exposure to particulate matter (PM10 and PM2.5) was another key motivation for the study.[1] SB 656 requires the California Air Resources Board (ARB), in consultation with local air districts, to develop and adopt a list of the most readily available, feasible and cost-effective control measures that could be used to reduce PM10 and PM2.5—with the goal of making progress in the near-term toward attainment of State and Federal PM10 and PM2.5 standards. Although the Bay Area is currently in attainment for the Federal PM10 and PM2.5 standards, like almost every other area in California it does not meet the stricter State standards.

1. Particulate matter (PM) consists of very small liquid and solid particles suspended in the air, and includes particles smaller than 10 microns (PM10) as well as finer particles smaller than 2.5 microns (PM2.5). Ambient PM is made up of particles that are emitted directly—such as soot and fugitive dust—as well as secondary particles that are formed in the atmosphere from reactions involving precursor pollutants such as oxides of nitrogen, sulfer oxides, volatile organic compounds, and ammonia. Exposure to PM is linked to increased frequency and severity of asthma attacks and even premature death in people with pre-existing cardiac or respiratory disease. Infants and children, the elderly, and persons with heart and lung disease are the most sensitive to PM pollution. For more on particulate matter, SB 656 and the BAAQMD's implementation schedule, see the *Particulate Matter Implementation Schedule* staff report prepared by the Planning and Research Division of the BAAQMD, November 9, 2005.

With a greater emphasis placed on reducing particulate matter in the Bay Area, the 2005 survey was the first step in developing a more detailed, up-to-date profile of wood burning behavior in the Bay Area that would allow for statistically reliable estimates within each of the nine member counties. The 2006 and 2007 surveys continued this effort by collecting an additional 988 and 1,200 interviews, respectively, that can be pooled with the 2,625 interviews completed in 2005. Prior to 2005, the most recent inventory was conducted in 1988.[2]

OVERVIEW OF METHODOLOGY A full description of the methodology used for this study is included later in this report (see *Methodology* on page 63). A total of 1,200 randomly selected residents within the District's boundaries participated in the survey on one of thirty-seven interviewing dates between December 14, 2007 and February 10, 2008. Randomly selected respondents were offered the option of participating by telephone or online at a secure, password-protected website hosted by True North. Probability-based sampling techniques and monitoring of the demographics resulted in a sample that is representative of the adult population within the District.

When compared to the past surveys conducted for the District on wood burning and the Spare the Air Tonight Program, there are several methodological changes worth noting at the outset of this report. In the interest of improving the *validity* and *reliability* of select opinion and behavior measures, the 2007 study continued several questionnaire changes that were first implemented in the 2004 season. The most notable of these changes addressed how the questionnaire measured the impacts of the Spare the Air Tonight Program. The changes were made so that the impacts of the winter program on wood burning behavior would be measured using the same basic methodology employed by the BAAQMD—and recommended by CARB and EPA[3]—to measure the impacts of the summer Spare the Air Program on driving behavior.[4]

Based on the 2005 results, several additional refinements were made to the 2006 questionnaire with respect to measuring ownership of wood-burning heating devices and the practice off-season burning. Because these improvements occasionally involved changing the wording, format and/or response options for a particular question, in some cases it is not possible to statistically compare the results of the 2006 or 2007 surveys with previous surveys for select measures. Where such comparisons are possible, however, this report presents the results from past surveys.

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2. *The California Residential Wood Consumption Survey*. Report prepared by Northern California Research Associates for the California Air Resources Board, 1988.
3. The CARB/EPA Method is summarized in the Transportation Research Board's (TRB) journal—*Transportation Research Record*—for 2004 in an article entitled *Development of a Quantification Method for Measuring the Travel and Emissions Impacts of Episodic Ozone Alert Programs* (pages 153-159). It is described in detail in the following air resources guidance report: CARB, "Quantification Method Reference Manual: A Method to Measure Travel and Emissions Impacts of Ozone Action Public Education Programs," April 2003. In addition to Eric Schreffler, Dr. Timothy McLarney and Richard Sarles, the TRB paper and guidance report were co-authored by Joann Lu and Jeff Weir of CARB, as well as Thomas Higgins and Dr. Will Johnson of K.T. Analytics.
4. For a detailed description of the updated CARB/EPA Method and its application to the BAAQMD's summer Spare the Air Program, see the *Spare the Air Study: 2005 Summer Ozone Season* report prepared for the BAAQMD by True North & ESTC.

STATISTICAL SIGNIFICANCE Many of the figures and tables in this report present the results of questions asked in 2007 alongside the results found in prior years for identical questions. In such cases, True North conducted the appropriate tests of statistical significance to identify changes that likely reflect actual changes in public opinion or behavior over time—as opposed to being due to chance associated with selecting two cross-sectional samples independently and at random. Differences between studies are identified as *statistically significant* if we can be 95% confident that the differences reflect an actual change in public opinion or behavior between the two studies. Statistically significant differences within response categories over time are denoted by the † symbol which appears in the figure next to the appropriate response value for 2007.

ORGANIZATION OF REPORT This report is designed to meet the needs of readers who prefer a summary of the findings, as well as those who are interested in the details of the results. For those who seek an overview of the findings, the sections titled *Just the Facts* and *Conclusions* are for you. They provide a summary of the most important factual findings of the survey in bullet-point format and a discussion of their implications. For the interested reader, this section is followed by a more detailed question-by-question discussion of the results from the survey by topic area (see *Table of Contents*), as well as a description of the methodology employed for collecting and analyzing the data. And, for the truly ambitious reader, the questionnaire used for the interviews is contained at the back of this report.

ACKNOWLEDGEMENTS True North thanks Karen Schkolnick, Ralph Borrmann, and Dr. David Fairley of the BAAQMD for their valuable input during the design and reporting stages of this study. Their expertise and insight improved the overall quality of the research presented here.

DISCLAIMER The statements and conclusions in this report are those of the authors, Dr. Timothy McLarney and Richard Sarles at True North Research, Inc. (True North), and not necessarily those of the BAAQMD. Any errors or omissions are the responsibility of the authors.

ABOUT TRUE NORTH True North is a full-service survey research firm that is dedicated to providing public agencies with a clear understanding of the values, perceptions, opinions and behaviors of their residents and customers. Through designing and implementing scientific surveys, focus groups and one-on-one interviews, as well as expert interpretation of the findings, True North helps its clients to move with confidence when making strategic decisions in a variety of areas—such as planning, policy evaluation, performance management, and developing effective public information campaigns.

During their careers, Dr. McLarney (President) and Mr. Sarles (Principal Researcher) have designed and conducted over 400 survey research studies for public agencies—including dozens of studies related to air quality and Spare the Air public education programs.

Just the Facts

The following is an outline of the main factual findings from the 2007 study. For the reader's convenience, we have organized the findings according to the section titles used in the body of this report. Thus, to learn more about a particular finding and how it may compare to findings from prior surveys (where applicable), simply turn to the appropriate report section.

WINTER WOOD BURNING BEHAVIOR

- Forty-nine percent (49%) of respondents reported that their household contained at least one *wood-burning* fireplace, pellet stove or wood stove.
- Twenty-two percent (22%) of households in the District contain at least one fireplace that burns natural gas or propane.
- Among households with a wood-burning fireplace or wood stove, the most commonly used wood was natural wood logs (42%), followed by manufactured logs (22%), and "other" wood (2%). Approximately 1% of respondents indicated that they use pallets or scrap wood, and 6% were not sure of the type of wood they primarily burn.
- Twenty-four percent (24%) of respondents who primarily burn natural wood logs were unable to identify the type of wood that they burn. Of the specific woods mentioned, oak was the most common (70%), followed by pine (9%), almond (6%), and hardwood in general (5%).
- When households that primarily burn natural wood logs were asked how they typically acquire their wood, respondents were split between those who gather their own (42%), those who purchase the wood from a local store (20%), and those who rely on a wood supplier (30%). Five percent (5%) mentioned an alternative source, and 4% were unsure of where their household acquires the wood that they burn.
- Among households that primarily burn natural wood logs, 88% stated that they burn dry, seasoned wood, 6% reported that they typically burn fresh-cut wood, and 6% were not sure.
- Households that burn wood were divided between those who primarily burn for heat (55%) and those who primarily burn for ambiance (40%).
- Eighty percent (80%) of households that contain a wood stove indicated that they would use the device this winter. The rate of use was somewhat lower for natural gas/propane fireplaces (67%), and markedly lower for pellet stoves (56%) and wood-burning fireplaces (55%).
- Overall, 8% of households District-wide reported that they would not use their wood-burning heating device *at all* during the winter due to the campaign.[5]
- Overall, 31% of households with a wood-burning heating device expected to burn wood weekly, 26% expected to burn wood less frequently than once per week, and 43% own a wood-burning heating device but indicated that they do not expect to burn wood this winter.

5. That is, they mentioned air quality and/or health-related reasons for not using the wood-burning device this winter *and* they were aware of the Spare the Air Tonight campaign. Note that this figure does not include households that intend to use their wood-burning device, but did refrain from burning wood on at least one occasion due to the campaign (see Figure 40 on page 37 for figure on full campaign impacts).

- Fifty-four percent (54%) of respondents whose household includes at least one wood-burning fireplace, pellet stove and/or wood stove *and* expected to burn wood during the winter months indicated that they had burned wood during the week prior to the interview. Approximately 27% had burned wood the day prior to the interview.
- On a typical burn day, wood-burning households averaged 4.34 hours of burning time.
- On a typical burn day, wood-burning households consumed an average 5.07 logs.

OUTDOOR & OFF-SEASON BURNING

- Ten percent (10%) of households in the District indicated that they possess an outdoor fireplace, firepit or chiminea *and* they have used the device to burn wood in the past 12 months.
- The vast majority of households (82%) reported that they do *not* burn wood in non-winter months.
- Off-season wood burning was most commonly reported for the months of July and August.
- Among households that reported burning wood in non-winter months, 8% indicated that they burn wood on a weekly basis in the off-season.

CHANGES IN WOOD BURNING BEHAVIOR

- Overall, 59% of households that own a wood-burning heating device and expected to burn wood this season reported that they anticipated burning wood at about the same frequency this season as last.
- Forty-five percent (45%) of respondents who have a wood-burning fireplace, wood stove and/or pellet stove *and* expected to burn wood during the 2007-2008 winter season indicated that—on at least one occasion—they refrained from burning wood.
- When asked *why* they chose not to burn wood on these occasions, 12% specifically mentioned the Spare the Air campaign and an additional 9% offered an air quality or health-related reason.
- Among all households with a wood-burning fireplace, pellet stove or wood stove, nearly 8% chose not to burn *at all* during the winter season because of the Spare the Air Tonight campaign, and an additional 10% refrained from burning on at least one occasion for the same reason.

RECALL AND AWARENESS OF SPARE THE AIR TONIGHT MESSAGING

- Overall, 62% of adults in the Bay Area recalled being exposed to news stories, advertisements or public service announcements related to the Spare the Air Tonight Program during the three months prior to the interview.
- When asked to indicate where they obtained the information about the Spare the Air Tonight Program, the most commonly cited sources were television (52%) and radio (33%).
- Twenty-two percent (22%) of respondents interviewed on the day after a Spare the Air Tonight episode were aware of the advisory for the prior day.

ATTITUDES ABOUT WOOD SMOKE

- Approximately 70% of adults in the Bay Area perceive that there are negative health effects associated with breathing wood smoke.
- When asked in an open-ended manner to identify some of the specific negative health effects associated with breathing wood smoke, most respondents focused on lung disease in general (36%) or made a specific reference to asthma (34%).
- Twenty-one percent (21%) of Bay Area adults perceive that their neighborhood periodically experiences air pollution from wood smoke. Thirteen percent (13%) stated that the problem was a small one, 6% indicated it was a moderate or medium problem, and 2% felt that air pollution due to wood smoke was a big problem in their neighborhood.

CHANGING HEATING DEVICES

- Among individuals who own a wood stove, 44% of respondents thought that their stove was manufactured after 1992 (and therefore EPA certified), whereas 35% indicated that it was manufactured before 1992 and 22% were unsure.
- Among individuals who own a wood stove manufactured *before* 1992, 40% indicated that—*without a financial incentive*—they would be willing to replace their older wood stove with new, cleaner burning stove, whereas 29% indicated that they would not be willing to make the change and 31% stated that they were unsure. Approximately one-third of those who were initially unwilling to convert to a cleaner alternative (31%) were willing to switch with a rebate of $300 or more.
- Approximately half (48%) of respondents whose household contains a wood-burning fireplace indicated that the fireplace does not contain in insert—it is open to the room.
- Among this subgroup, nearly half (49%) stated that they would be willing to switch to a cleaner alternative such as a fireplace insert or a gas fireplace *without a financial incentive*.
- Nine percent (9%) of those who were initially unwilling to replace their open, wood-burning fireplace for a cleaner alternative were willing to do so if a $100 rebate were offered. As the amount of the rebate increased to $200 and $300, the proportion of respondents who indicated that they would participate in the program increased to 14% and 17%, respectively.
- Sixty-one percent (61%) of Bay Area adults support a policy that would require all new housing construction to use only gas fireplaces or EPA certified fireplace inserts, wood stoves or pellet stoves.
- Seventy-six percent (76%) of Bay Area adults support a policy that would prohibit wood burning on nights when air pollution is expected to reach unhealthy levels.
- The proportion of respondents who would support a policy that would prohibit wood burning on nights when air pollution is expected to reach unhealthy levels increases to 84% once informed that households that depend on wood-burning for heat would be exempt from the regulation.
- More than half (54%) of Bay Area adults support a policy that would require older wood stoves to be removed or replaced with a cleaner burning model when a home is sold to a new owner.

- Forty-five percent (45%) of respondents indicated that they would be willing to dial an anonymous hotline to report wood burning in their neighborhood if it occurred on "no burn" days.
- A clear majority of respondents correctly labeled as false the statements *It is okay to burn materials other than firewood in my fireplace* (86% false), *Burning wood is better for the environment than burning natural gas* (81%), and *A fireplace is an efficient source of heat* (66%).
- The percentage who correctly identified as false the following two statements was much lower, with just 51% disagreeing that *All fires in my fireplace should produce visible smoke from the chimney* and 47% disagreeing that *Manufactured logs burn cleaner than seasoned firewood.*

PERCEPTIONS OF ENTITIES

- Prior to taking the survey, 61% of respondents had heard of the Bay Area Air Quality Management District and 59% had heard of the Spare the Air Tonight Program.
- Among respondents who had heard of the BAAQMD, more than half (57%) held a favorable opinion of the agency, whereas 34% held a neutral opinion or were unsure, and just 9% held an unfavorable opinion.
- Among respondents who had heard of the Spare the Air Tonight Program, 74% held a favorable opinion of the Program, whereas 21% held a neutral opinion or weren't sure of their opinion, and 5% held an unfavorable opinion.
- Fifty-one percent (51%) of respondents recalled hearing, reading or seeing a news story, advertisement or public service announcement in the six months prior to taking the interview that pertained to the BAAQMD. The corresponding figure for the Spare the Air Tonight campaign was 70%.

Conclusions

As noted in the *Introduction*, this study was designed to provide a better understanding of the public's attitudes and behavior with respect to burning wood, their awareness of the Spare the Air Tonight Program, as well as the impact that the Program has had on awareness, opinions and behavior relevant to wood burning and air quality. Whereas subsequent sections of this report are devoted to conveying the detailed results of the study, in this section we attempt to 'see the forest through the trees' and note how the collective results answer some of the key questions that motivated the research.

What is the profile of wood burning behavior in the Bay Area?

Overall, 49% of households in the Bay Area own at least one *wood-burning* fireplace, wood stove or pellet stove, and (28%) burned wood in the 2007-2008 winter months. Eighteen percent (18%) of households also reported burning wood in non-winter months. Although the type of wood burned varies considerably, as does the source from which the wood is obtained, the vast majority (88%) of households report that they burn dry, seasoned wood.

Wood burning behavior varies considerably depending on how frequently a household burns. Wood-burning households can easily be divided between the 53% that burn at least once per week (frequent burners) and those that burn less often (infrequent burners). Not only do frequent burners build fires more often, then tend to burn significantly more hours per burn day (5.18 hours on average) and consume more wood per burn day (6.36 logs on average) when compared to infrequent burners. Their reasons for burning wood are also different. Whereas frequent burners primarily build fires for heat, infrequent burners primarily build fires for ambiance.

For more information about wood burning behavior in the Bay Area, see *Winter Wood Burning Behavior* on page 11 and *Outdoor & Off-Season Burning* on page 30.

How effective was the Spare the Air Tonight Campaign during the 2007-2008 winter?

The Spare the Air Tonight campaign seeks to shape public awareness and opinions about the District and air quality issues, as well as change behavior with respect to burning wood. Accordingly, the survey sought to measure the impacts that the campaign had on each of these dimensions.

The BAAQMD followed a remarkably successful 2006-2007 Spare the Air Tonight campaign with an equally impressive 2007-2008 effort. Despite having fewer air quality advisories and thus fewer opportunities to communicate with the public than in the previous season, the 2007-2008 campaign equalled (or bested) the high-water marks set in the 2006-2007 season in terms of awareness and positive attitudes about the Spare the Air campaign. Put simply, more residents were aware of the Spare the Air Tonight program, recalled being exposed to Spare the Air

Tonight messaging during the winter season, and held positive opinions about the Spare the Air Tonight program in 2007 than has been recorded since the study began asking these questions in 2002. Moreover, the magnitude of the positive changes in the past year were often substantial. For example, the proportion of residents who were aware of the Spare the Air Tonight campaign increased by 7% to 59%, and the proportion who recalled hearing, reading or seeing Spare the Air Tonight related stories in the past six months increased by 6% to 70%.

With respect to attitudes about wood smoke, the Program has also succeeded in raising public recognition of the negative health impacts of breathing wood smoke by 22% since 2002. This increased awareness of the health-related problems caused by wood smoke arguably underpins what is broad support for the adoption of new policies designed to improve the air quality in the region. Sixty-one percent (61%) of adults favor requiring all new housing construction to use only gas fireplaces or EPA certified fireplace inserts, wood stoves or pellet stoves, and 84% favor prohibiting wood burning on evenings when air pollution is forecast to reach unhealthy levels provided that there is an exemption for households that are dependent on wood-burning for heat.

So how did these positive changes in attitudes and awareness translate to actual changes in wood burning behavior? Based on the survey data, it is estimated that among all households with a wood-burning fireplace, pellet stove or wood stove, 8% chose not to burn *at all* during the winter season because of the Spare the Air Tonight campaign, and an additional 10% refrained from burning on at least one occasion for the same reason. Collectively, the Spare the Air Tonight campaign influenced more than 18% of eligible households to reduce their wood burning during the 2007-2008 winter season. This represents a dramatic increase of nearly 16% when compared to the comparable figure in 2005 (2.4% impacted).

Are there any opportunities that the Program can take advantage of to be more successful in the future?

As was the case in 2006-2007, the current survey results suggest a clear opportunity for the Program to further reduce air pollution due to wood smoke by helping to establish and promote rebate programs for the replacement of traditional fireplaces and non-EPA certified wood stoves and pellet stoves. Nearly half (49%) of all wood-burning fireplaces in the district do not contain an insert and are open to the room. In addition to being inefficient sources of heat, open fireplaces cause more pollution than other alternatives such as gas fireplaces or fireplace inserts.

The survey results clearly indicate that a large portion of households that contain open, wood-burning fireplaces are willing to switch to a cleaner-burning alternative. Combining residents who are willing to replace their fireplace without a financial incentive with those who require up to a $300 rebate, nearly two-thirds of the target population indicated that they would be receptive to a modest rebate program.

A second opportunity for the program is to increase awareness of specific air quality advisories. Although exposure to Spare the Air Tonight messaging and awareness of specific Spare the Air Tonight advisories both increased significantly in the past year, overall awareness of specific advisories remained modest at 22%.

Finally, the 2007 survey results suggest that residents' understanding and knowledge of wood-burning could be improved in ways that would lead to a decrease in air pollution. Most residents understand that wood-burning fireplaces are inefficient sources of heat, that its better to use natural gas, and that its *not* OK to burn materials other than firewood in a fireplace. Nevertheless, a surprisingly large percentage (53%) of Bay Area residents think that manufactured logs burn cleaner than seasoned firewood, and more than 22% of households that burn wood primarily use manufactured logs. Educating residents on this latter point could lead to signficant reductions in air pollution without requiring a change in the frequency of fireplace use.

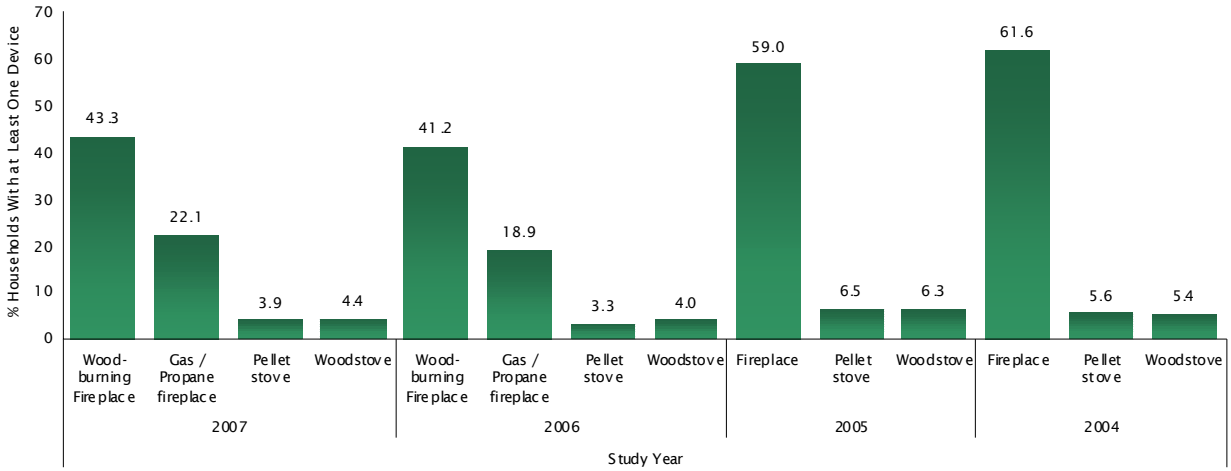
Winter Wood Burning Behavior

One of the key objectives of the survey was to profile respondents' use of wood-burning heating devices, including fireplaces, pellet stoves and wood stoves. Accordingly, the first series of questions in the survey asked respondents about the types of wood-burning heating devices they have in their home, as well as their use of these devices during the 2007-2008 winter months of November through February. Whereas prior to 2005 the surveys did not distinguish between wood-burning fireplaces and those that use natural gas or propane at the outset of the interview, as shown in Figure 1 this distinction was added to Question 1 in the 2006 survey.

HEATING DEVICES The first question in this series simply asked respondents to identify how many wood-burning fireplaces, natural gas/propane burning fireplaces, wood stoves and pellet stoves their household contains. As shown in Figure 1 for 2007, 43% of households contain at least one wood-burning fireplace, 22% contain at least one fireplace that burns natural gas or propane, 4% contain at least one pellet stove, and 4% contain at least one wood stove. Collectively, 49% of respondents reported that their household contained at least one *wood-burning* fireplace, pellet stove or wood stove, whereas 52% of respondents indicated that their household does not contain a wood-burning heating device (see Figure 3 on page 13).[6]

Question 1 *Do you have a _____ in your home? If yes, ask: How many: _____s do you have in your home?*

FIGURE 1 HEATING DEVICES IN HOME: 2004 ~ 2007 (N = 1,200)[7]

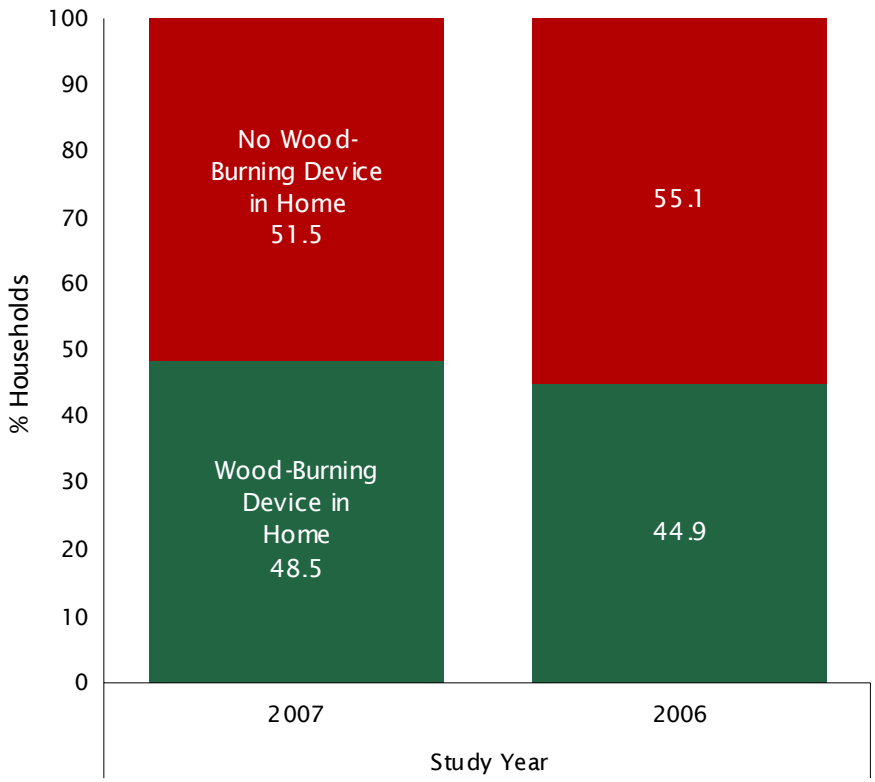


6. Because some households contained more than one type of heating device—e.g., a fireplace *and* a wood stove—one can not simply add the percentages shown in Figure 1 to determine the percentage of households that have at least one type of heating device.
7. The n = 1,200 refers to the number of respondents who received this question. This convention will be followed throughout the report to allow the reader to identify how many respondents are included in each figure.

TABLE 1 NUMBER OF HEATING DEVICES IN HOME: 2004 ~ 2007 (N = 1,200)

		Number of Devices		
		One	Two	Three or more
2007	Wood-burning Fireplace	38.0	4.7	0.6
	Gas / Propane fireplace	18.6	3.0	0.5
	Pellet stove	3.8	0.1	0.0
	Woodstove	4.0	0.3	0.0
2006	Wood-burning Fireplace	35.2	4.8	1.2
	Gas / Propane fireplace	15.0	3.3	0.6
	Pellet stove	2.8	0.0	0.4
	Woodstove	3.9	0.1	0.0
2005	Fireplace	50.5	7.4	1.0
	Pellet stove	5.8	0.2	0.5
	Woodstove	5.6	0.4	0.2
2004	Fireplace	50.4	8.9	2.3
	Pellet stove	4.7	0.6	0.3
	Woodstove	4.9	0.4	0.1

FIGURE 2 WOOD-BURNING DEVICE IN HOME: 2006 & 2007 (N = 1,200)



For the interested reader, the following figures show how the presence of wood-burning fireplaces, wood stoves and pellet stoves varied by county (see Figure 3), home type, and age of home (see Figure 4).

FIGURE 3 WOOD-BURNING DEVICE IN HOME BY COUNTY (N = 1,200)

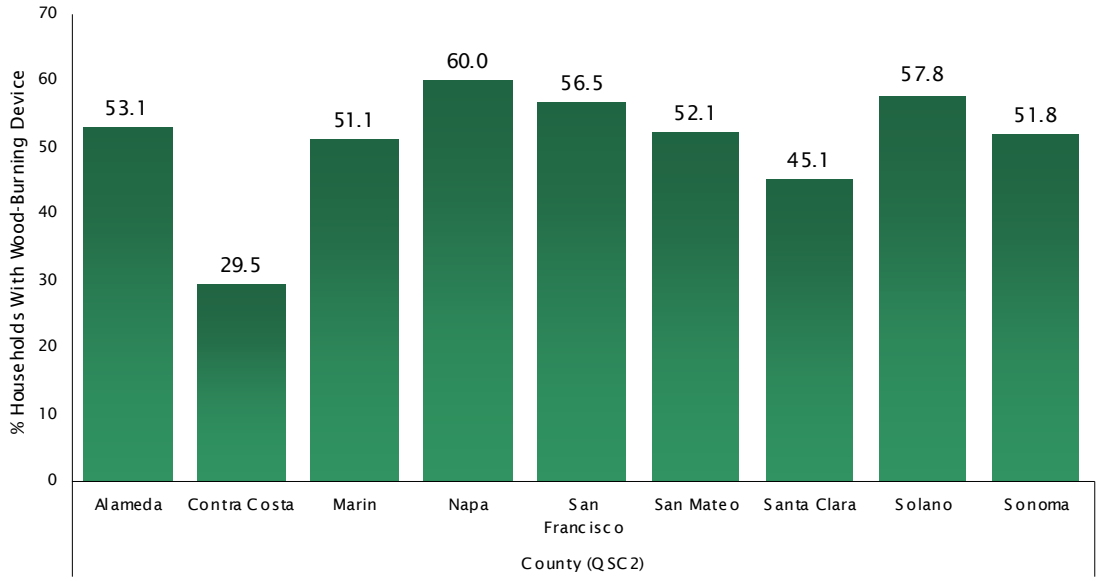
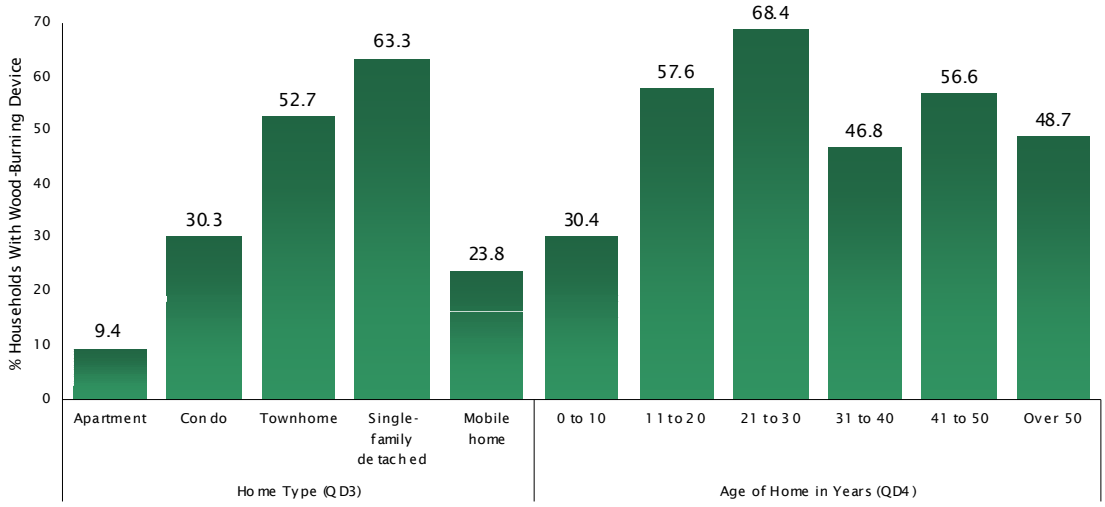


FIGURE 4 WOOD-BURNING DEVICE IN HOME BY HOME TYPE & AGE OF HOME IN YEARS (N = 1,200)



FUEL TYPE & SOURCE For the 49% of respondents who reported that their household contains a wood-burning fireplace or wood stove, the survey next inquired as to the type of wood that they *primarily* use in the fireplace or stove (see Figure 5). The most commonly used wood was natural wood logs (42%), followed by manufactured logs (22%), and "other" wood (2%). Approximately 1% of respondents indicated that they use pallets or scrap wood, 6% were not sure of the type of wood they primarily burn, and 26% volunteered that they never use their wood-burning fireplace or wood stove. Figure 6 on the next page displays how the proportional use of natural wood versus manufactured logs varied by county among *all* households with a wood-burning fireplace.

Question 2 *What type of wood do you primarily use in your wood-burning fireplace or wood stove: natural wood logs, manufactured logs such as Duraflame or Presto, scrap wood, pallets, or some other fuel?*

FIGURE 5 TYPE OF WOOD BURNED: 2006 & 2007 (N = 544)

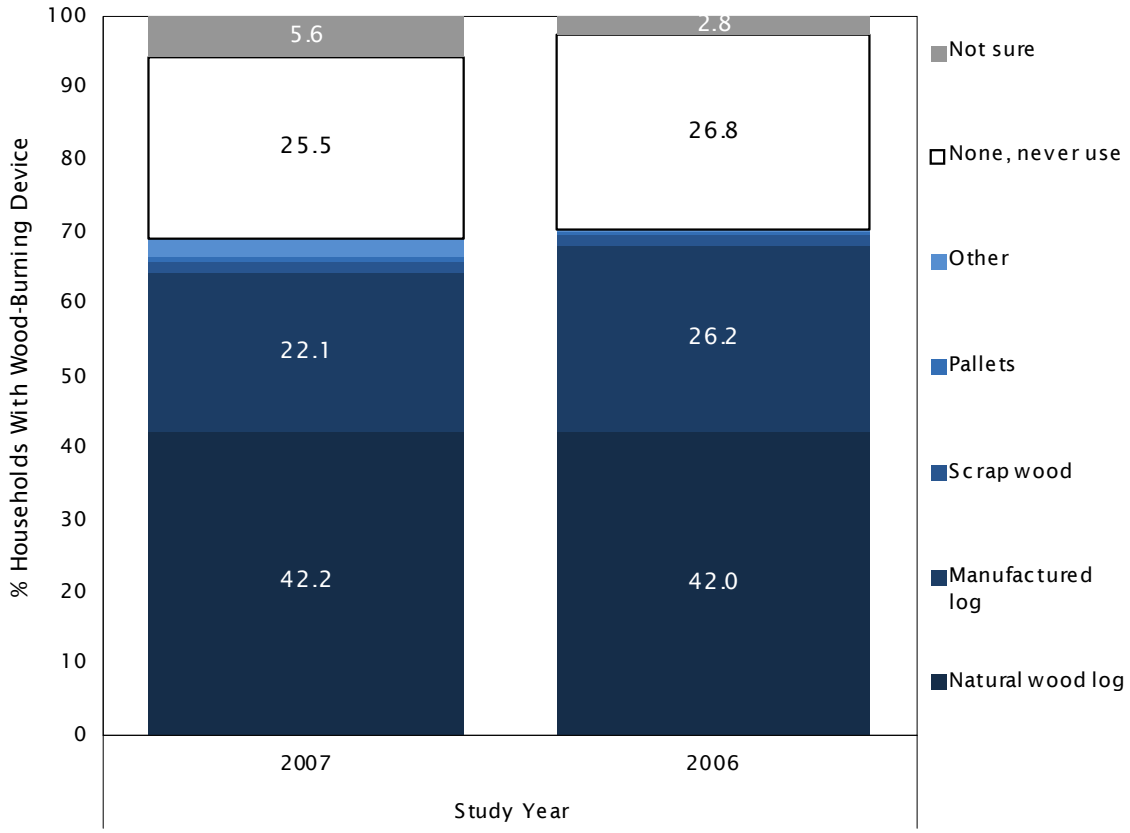
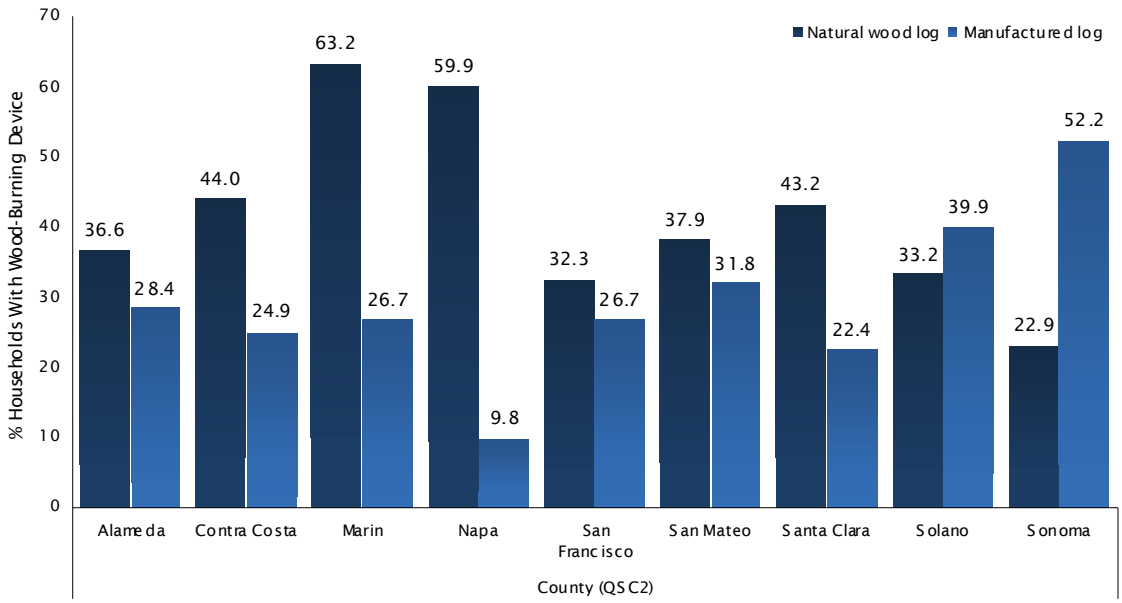
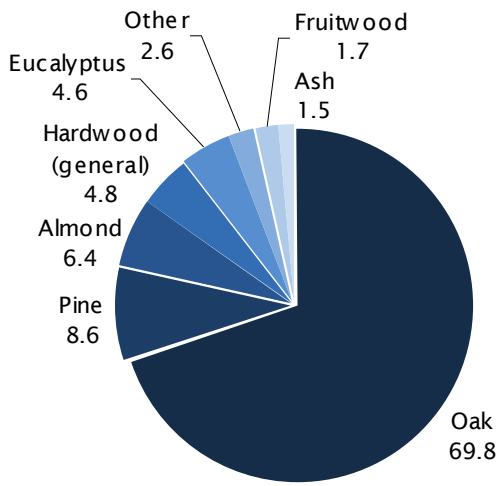


FIGURE 6 TYPE OF WOOD BURNED BY COUNTY (N = 544)



Question 3 *What type of natural wood do you typically burn?*

FIGURE 7 TYPE OF NATURAL WOOD BURNED (N = 230)

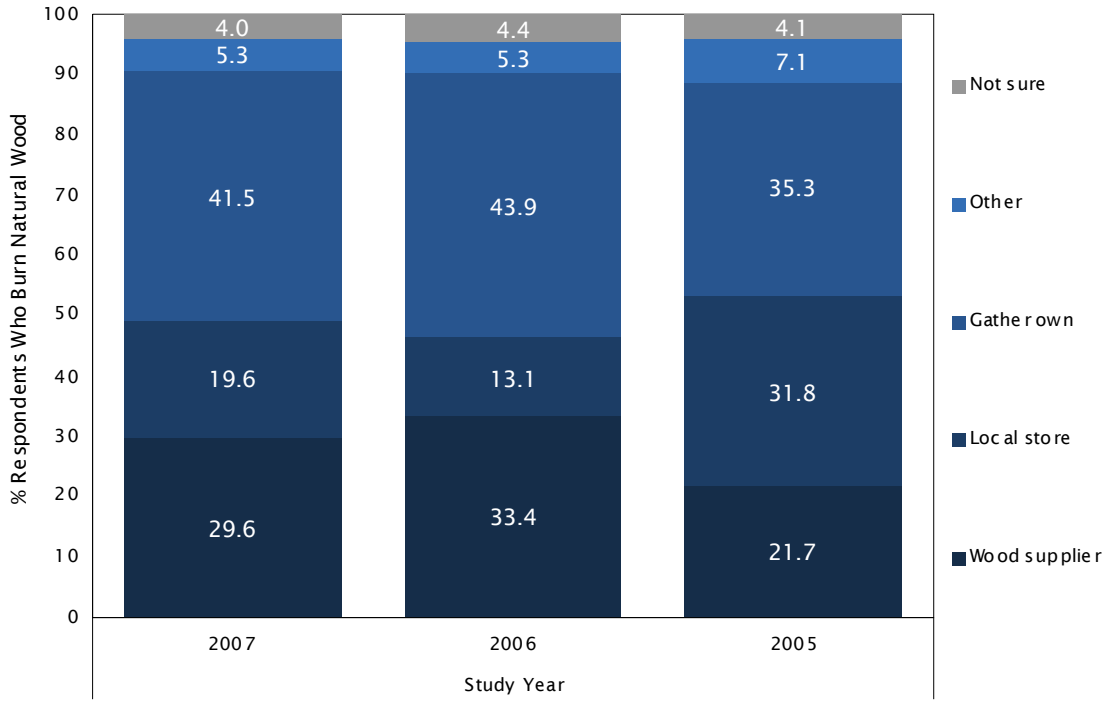


Households that reported they primarily burn natural wood logs were next asked a series of questions about the *type* of natural wood they burn (Question 3), from where they purchase their wood (Question 4), and the state of the wood they burn (Question 5). Approximately 24% of respondents in 2007 were unsure of the type of natural wood they burn. Figure 7 shows that among those who knew the type of wood, oak was the most common (70%), followed by pine (9%), almond (6%), and hardwood in general (5%).

When asked how they typically acquire their wood, respondents were split between those who gather their own (42%), those who purchase the wood from a local store (20%), and those who rely on a wood supplier (30%). Five percent (5%) mentioned an alternative source, and 4% were unsure of where their household acquires the wood that they burn (Figure 8).

Question 4 *Do you typically purchase your wood from a wood supplier, the local store, or do you gather your own wood?*

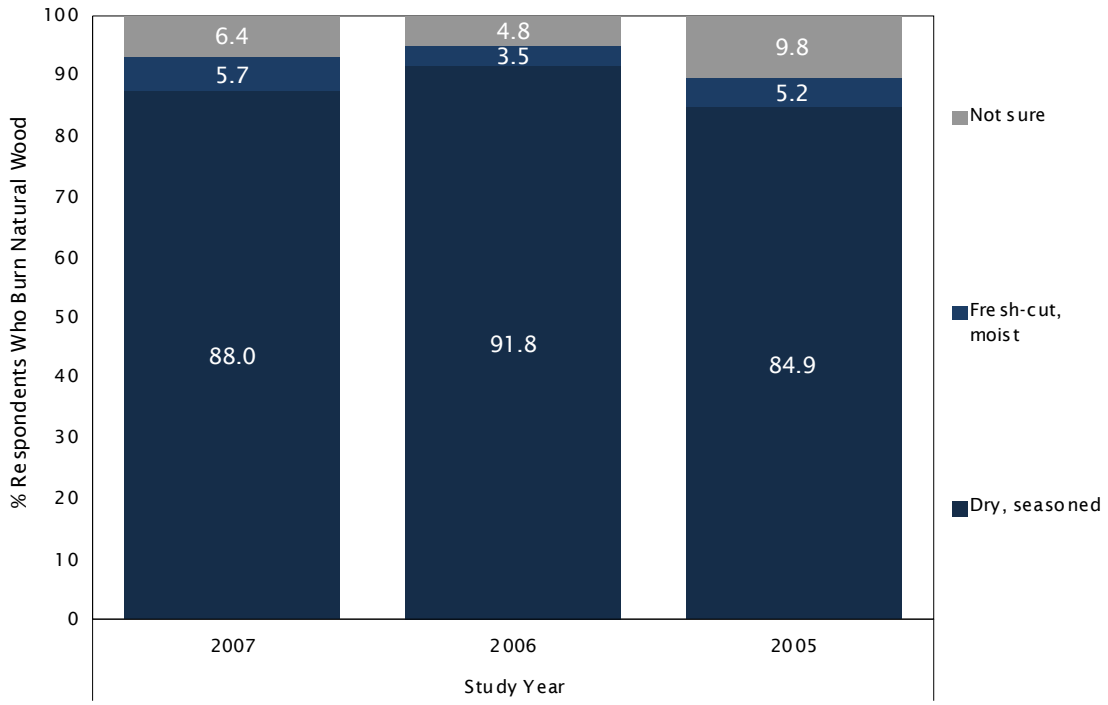
FIGURE 8 SOURCE FOR NATURAL WOOD: 2005 ~ 2007 (N = 230)



The survey next inquired as to whether the respondent typically burns dry, seasoned wood or wood that is fresh-cut and somewhat moist. As shown in Figure 9, 88% of respondents in 2007 stated that they burn dry, seasoned wood, 6% reported that they typically burn fresh-cut wood, and 6% were not sure. The results for 2007 on this question were not significantly different than those found in 2006.

Question 5 *Do you tend to burn dry, seasoned wood or wood that is fresh-cut and somewhat moist?*

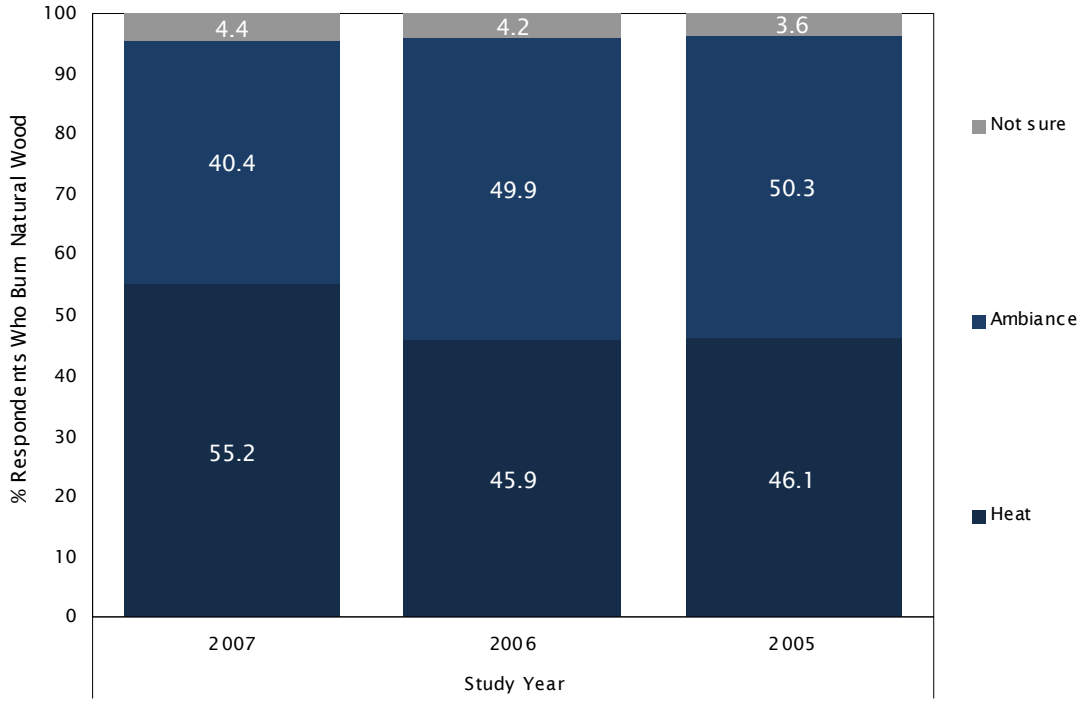
FIGURE 9 CONDITION OF WOOD TYPICALLY BURNED: 2005 ~ 2007 (N = 230)



PRIMARY REASON FOR BURNING WOOD Households that have a wood-burning fireplace or wood stove and expected to use it during the winter were next asked to indicate the *primary* reason for why they use the device—to heat their home, or for the ambiance of having a fire? Figure 10 on page 17 shows that residents, as a whole, were rather evenly divided between those who primarily burn for heat (55%) and those who primarily burn for ambiance (40%). The results for 2007 on this question are statistically similar to those found in 2006.

Question 6 *When you use your fireplace or wood stove, which of the following would you say is the primary reason you do so? For heating your home or for the ambiance of having a fire?*

FIGURE 10 PRIMARY PURPOSE OF WOOD BURNING: 2005 ~ 2007 (N = 230)



USE OF FIREPLACE, WOOD STOVE OR PELLET STOVE

Respondents whose household contained at least one wood-burning fireplace, natural gas/propane fireplace, pellet stove or wood stove were next asked—for each device they own—whether they have or intend to use the device this winter between the months of November through February. As shown in Figure 11 on page 18, 80% of households in 2007 that contain a wood stove indicated that they would use the device this winter. The rate of use was somewhat lower for natural gas/propane fireplaces (67%), and markedly lower for pellet stoves (56%) and wood-burning fireplaces (55%). The results for the 2006, 2005 and 2004 surveys are presented for comparison, but note that wood-burning fireplaces are combined with natural gas/propane devices in the figure for 2005 and 2004.

Figure 12 summarizes the information collected in Question 7 among all households with a wood-burning device—overall and by county. Overall, 58% of households with at least one wood-burning device indicated that they would use the device this winter. The reported rate of expected use in 2007 was highest among households in Solano County (83%) and lowest in Santa Clara County (45%).

Question 7 *Will you use your _____ this winter?*

FIGURE 11 HEATING DEVICE USAGE THIS WINTER: 2004 ~ 2007 (WOOD-BURNING FIREPLACE N = 520; GAS FIREPLACE N = 271; PELLET STOVE N = 47; WOOD STOVE N = 54)

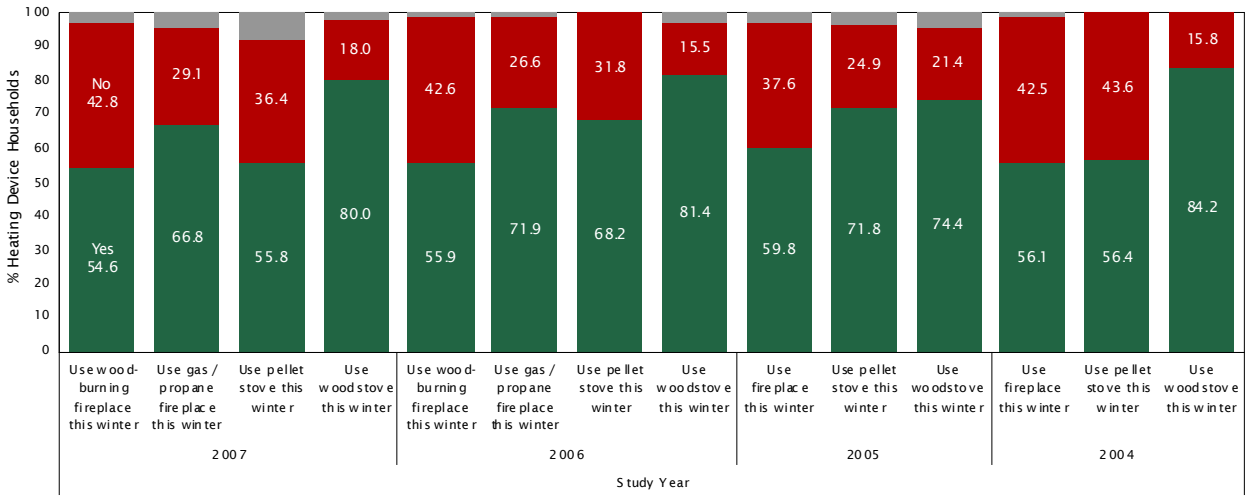


FIGURE 12 OVERALL WOOD-BURNING DEVICE USAGE THIS WINTER BY COUNTY (N = 570)

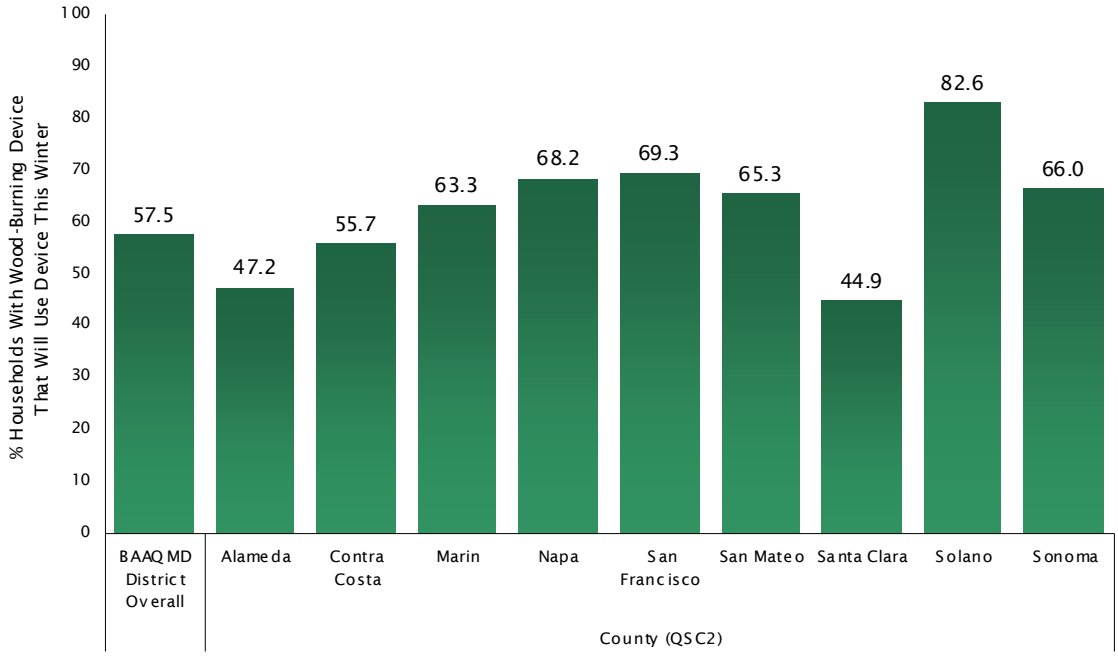
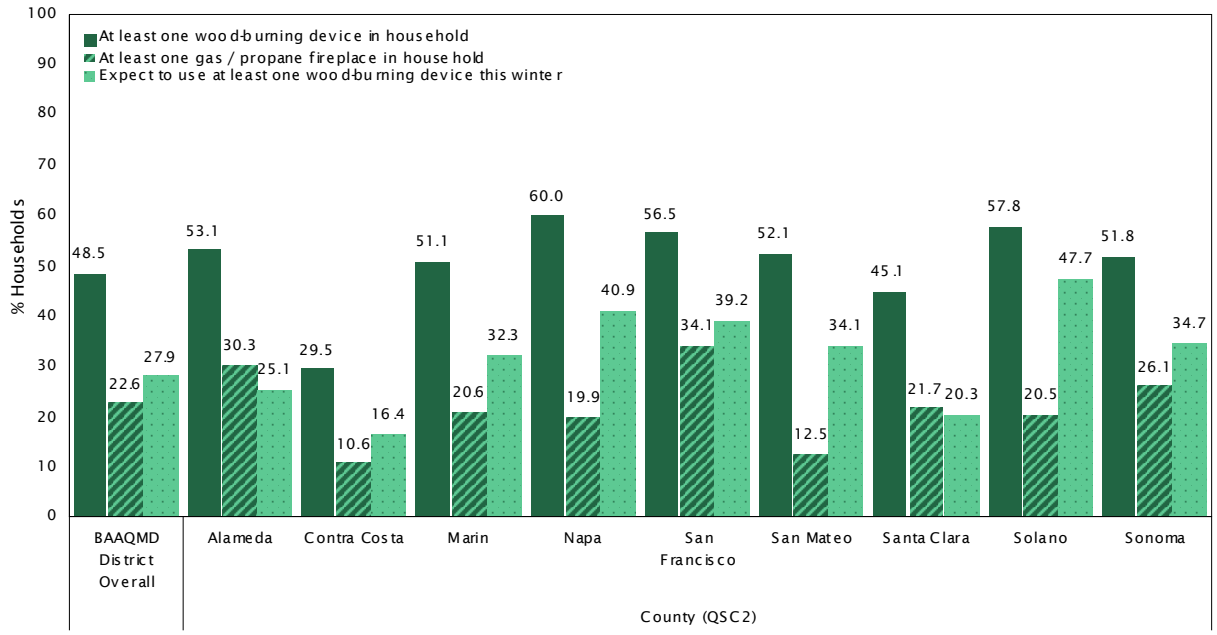


Figure 13 provides a more detailed summary of the presence and expected use of wood-burning heating devices for the District as a whole, as well as by the nine member counties. Among *all* households in the District, 49% own a wood-burning fireplace, pellet stove or wood stove, 23% own a natural gas/propane fireplace, and 28% expected to use their wood-burning device this winter. Ownership (60%) was highest in Napa County, although expected use was highest in Solano County (48%).

FIGURE 13 WOOD-BURNING DEVICE USAGE THIS WINTER BY COUNTY (N = 1,200)



Respondents who indicated that they do not expect to use their fireplace, wood stove or pellet stove this winter in Question 7 were next asked to indicate *why* they do not intend to use the device. Figure 14 summarizes the results of those who offered campaign-related reasons. Approximately 23% of wood-burning fireplace owners who did not intend to use the device this winter offered a reason related to air quality and an additional 26% mentioned a specific health-related reason. Approximately 23% of natural gas/propane fireplace owners mentioned air quality or health-related reasons, whereas the corresponding percentages among pellet stove and wood stove owners were 16% and 11%, respectively. The remaining respondents offered a reason unrelated to air quality or health.

Figure 15 displays the percentage of households that own a wood-burning fireplace, wood stove or pellet stove and indicated that they will not use the device this winter for reasons that can be attributed to the Spare the Air Tonight campaign.[8] Overall, 8% of households District-wide reported that they would not use their wood-burning heating device at all during the winter due to the campaign. Among the nine member counties, Santa Clara had the highest percentage of wood-burning device-owning households that fit this description, whereas San Mateo had the lowest (see Figure 16).

8. That is, they mentioned air quality and/or health-related reasons for not using the wood-burning device this winter *and* they were aware of the Spare the Air Tonight campaign. Note that this figure does not include households that intend to use their wood-burning device, but did refrain from burning wood on at least one occasion due to the campaign (see Figure 40 on page 37 for figure on full campaign impacts).

Question 8 *Why do you not expect to use your _____ this winter?*

FIGURE 14 REASON FOR NOT USING HEATING DEVICE THIS WINTER (WOOD-BURNING FIREPLACE N = 232; GAS FIREPLACE N = 79; PELLET STOVE N = 17; WOOD STOVE N = 9)

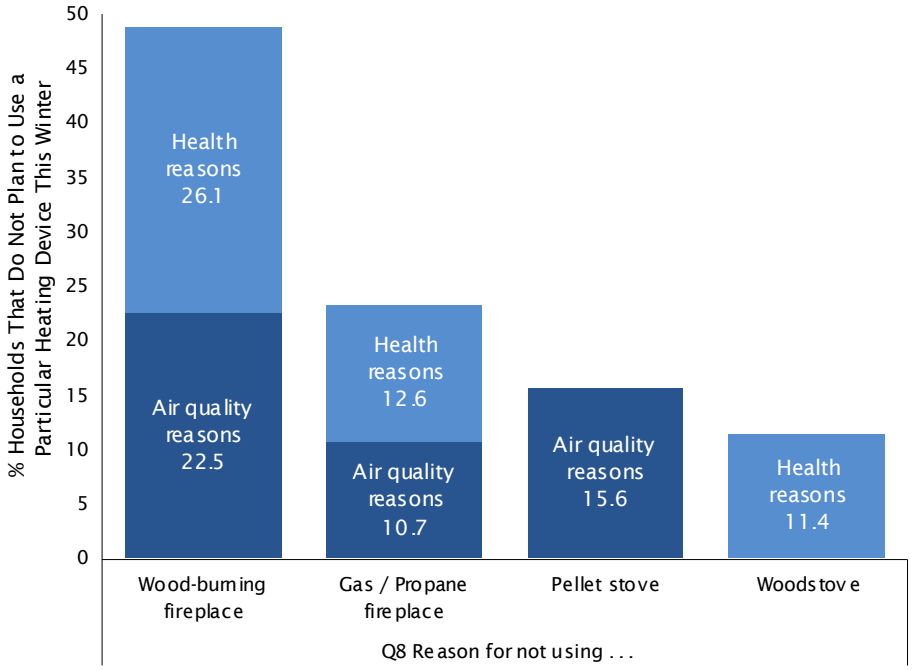


FIGURE 15 NOT BURNING WOOD THIS WINTER BECAUSE OF SPARE THE AIR TONIGHT CAMPAIGN: 2006 & 2007 (N = 570)

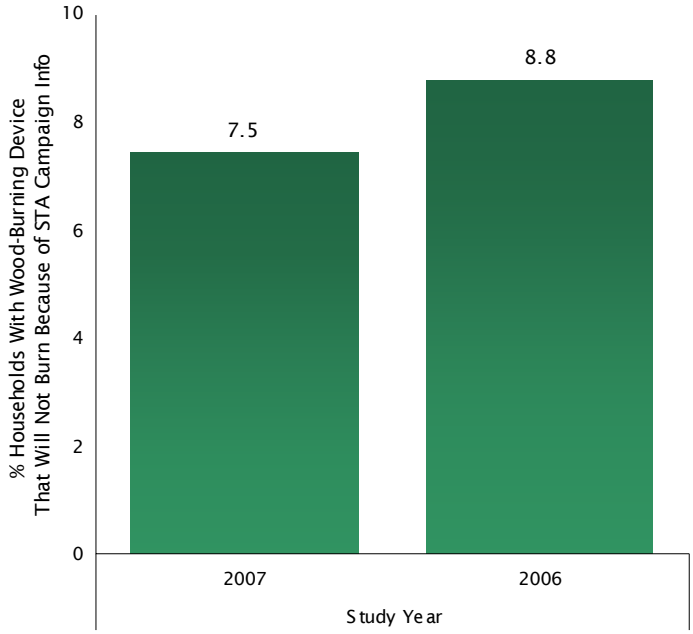
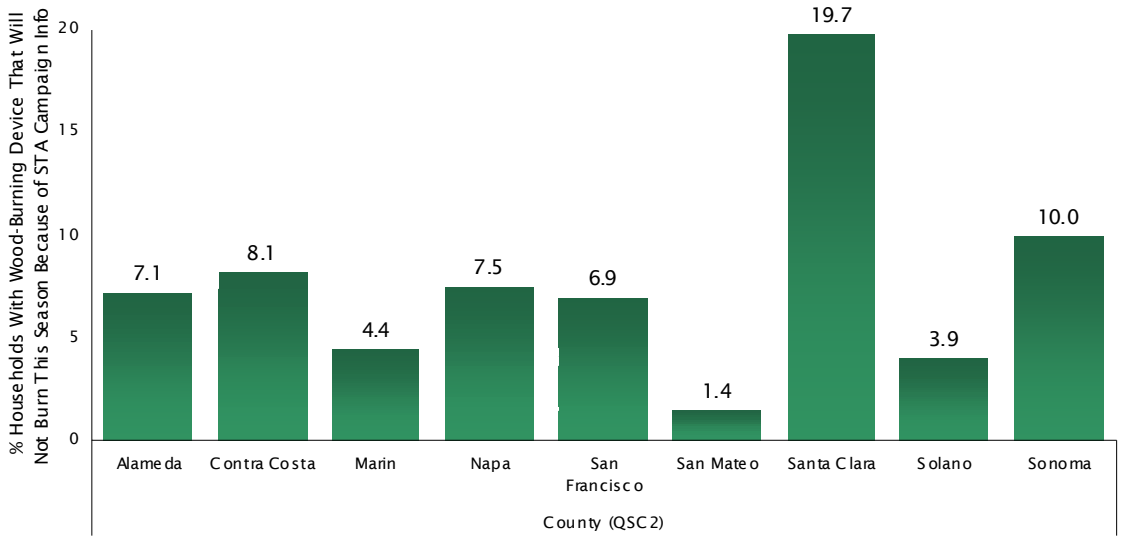


FIGURE 16 NOT BURNING WOOD THIS WINTER BECAUSE OF SPARE THE AIR TONIGHT CAMPAIGN BY COUNTY (N = 570)



SEASONAL WOOD BURNING BEHAVIOR

The next series of questions were only asked of respondents who owned at least one wood-burning fireplace, pellet stove or wood stove *and* indicated that they will burn wood during the 2007-2008 winter months.

The first question (Question 9) asked each respondent how often they expected that they would burn wood this winter—at least once per week or less often? Respondents who indicated that they expected to burn wood less often than once per week were next asked to be more specific as to how often they expected to burn wood—two to three times per month, once per month, or less often than once per month? For respondents who indicated that they expected to burn wood weekly, Question 11 asked how many days they expected to burn wood in a typical winter week. The results to all three questions are combined in Figure 17 on page 22.

Overall, just over half (53%) of respondents indicated that they expected to burn wood on a weekly basis, although most (29%) stated that they would burn wood three days or less per week. Overall, 15% indicated that they expected to burn wood two to three times per month, 18% once per month, and 11% expected to burn wood less often than once per month.

When compared to 2006, there were no statistically significant changes in the expected frequency of wood-burning among households that own a wood-burning device and expected to use it this winter (see Table 2 on page 22).

Question 9 *How often do you expect to burn wood this winter? At least once per week or less often than that?*

Question 10 *Would you say that you will burn wood about two to three times per month, once per month, or less often than once per month?*

Question 11 *In a typical winter week, how many days do you expect to burn wood?*

FIGURE 17 FREQUENCY OF WOOD BURNING THIS WINTER (N = 328)

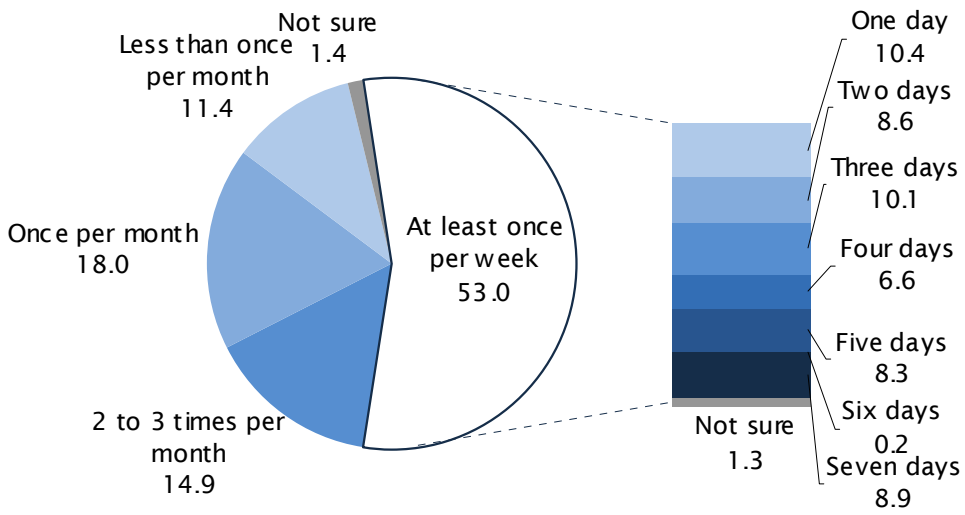


TABLE 2 FREQUENCY OF WOOD BURNING THIS WINTER: 2004 ~ 2007 (N = 328)

	Study Year			
	2007	2006	2005	2004
At least once per week	53.0%	52.9%	48.9%	34.2%
One day	10.4%	10.0%	9.3%	11.2%
Two days	8.6%	17.2%	11.5%	5.6%
Three days	10.1%	8.0%	10.4%	6.1%
Four days	6.6%	3.5%	4.3%	1.0%
Five days	8.3%	3.8%	3.2%	2.6%
Six days	0.2%	1.9%	0.8%	1.5%
Seven days	8.9%	7.2%	7.2%	6.1%
Not sure # of days	1.3%	1.3%	2.2%	0.0%
2 to 3 times per month	14.9%	15.0%	18.5%	28.1%
Once per month	18.0%	15.0%	17.0%	15.8%
Less than once per month	11.4%	16.4%	11.7%	18.4%
Not sure of frequency	1.4%	0.6%	4.0%	3.6%

Figures 18 and 19 provide a useful summary of wood burning behavior among households that own a wood-burning heating device in the District overall, as well as by county. Overall, 31% of households in 2007 expected to burn wood weekly, 26% expected to burn wood less frequently than once per week, and 43% own a wood-burning heating device but indicated that they do not expect to burn wood this winter. These results are nearly identical to those recorded in 2006.

Among the nine member counties, Solano County had the highest percentage of wood-burning device-owning households that expected to burn wood weekly (62%), whereas Contra Costa had the lowest (20%).

FIGURE 18 FREQUENCY OF WOOD BURNING THIS WINTER AMONG ALL WOOD-BURNING DEVICE HOUSEHOLDS: 2006 & 2007 (N = 570)

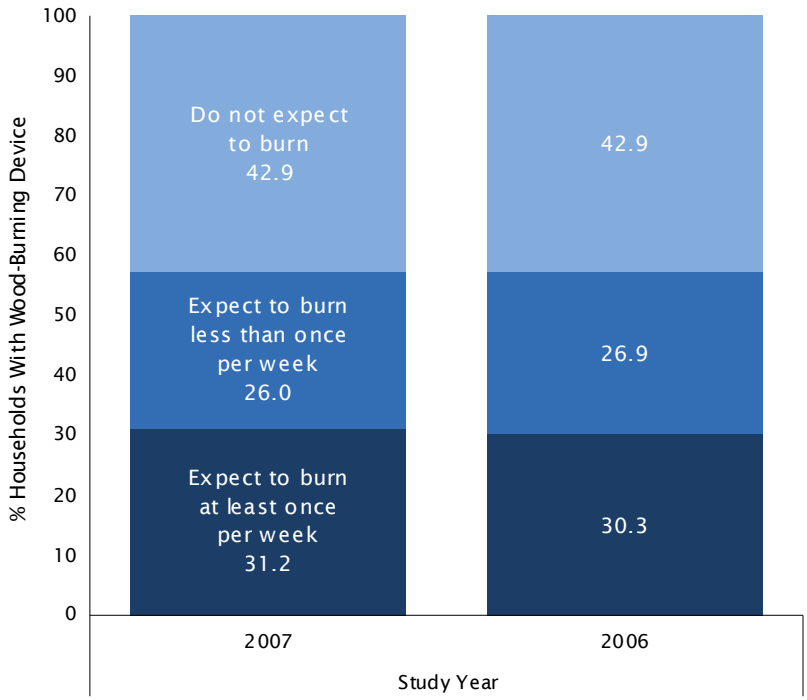
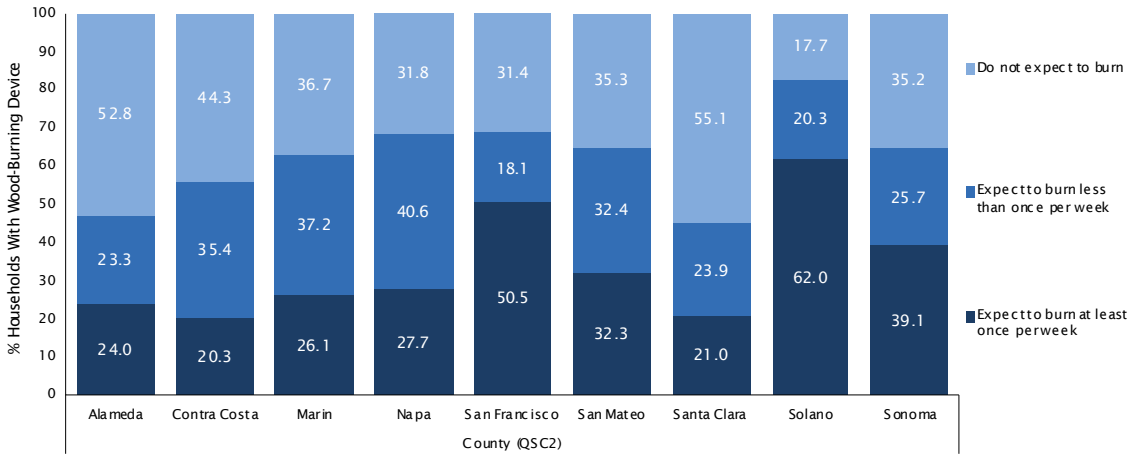


FIGURE 19 FREQUENCY OF WOOD BURNING THIS WINTER AMONG ALL WOOD-BURNING DEVICE HOUSEHOLDS BY COUNTY (N = 570)

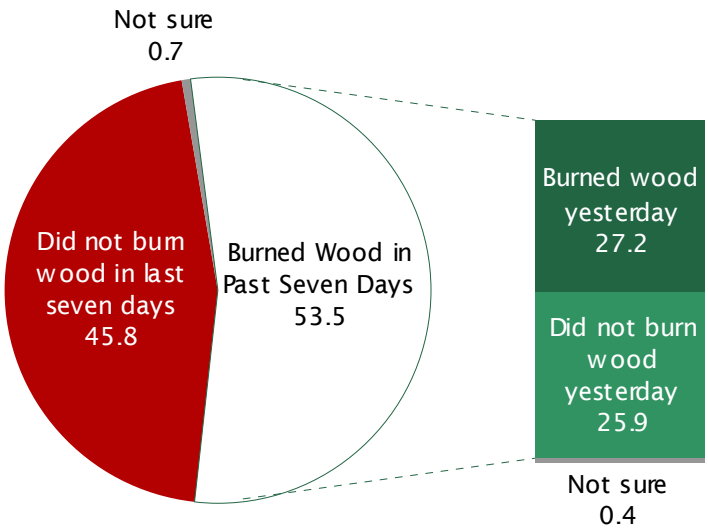


WOOD BURNING BEHAVIOR IN PAST WEEK Respondents were also asked whether they burned wood in the past week and—if yes—if they burned wood the day or evening prior to the interview. The results to these two questions are combined in Figure 20. Fifty-four percent (54%) of respondents whose household includes at least one wood-burning fireplace, pellet stove and/or wood stove *and* expected to burn wood during the winter months indicated that they had burned wood during the week prior to the interview. Moreover, approximately 27% had burned wood the day prior to the interview.

Question 12 *Did you burn wood in the past seven days?*

Question 13 *Did you burn wood yesterday or last night?*

FIGURE 20 BURNED WOOD IN PAST SEVEN DAYS (N = 328)



When compared to the 2006 season, there were no statistically significantly changes in the percentage of households that reported they had burned wood in the week prior to the interview (Table 3).

TABLE 3 BURNED WOOD IN PAST SEVEN DAYS 2004 ~ 2007 (N = 328)

	Study Year			
	2007	2006	2005	2004
Burned wood in past seven days	53.1%	51.0%	43.0%	32.1%
Burned wood yesterday	27.2%	22.3%	21.7%	12.8%
Did not burn wood yesterday	25.9%	28.7%	21.1%	19.4%
Not sure of burning yesterday	0.4%	0.0%	0.2%	0.0%
Did not burn wood in last seven days	45.8%	49.0%	56.6%	67.3%
Not sure of burning in past seven days	0.7%	0.0%	0.4%	0.5%

The following figures show the percentage of wood-burning device-owning households that burned wood in the seven days prior to the interview (Figures 21 & 22) and on the day prior to the interview (Figures 23 & 24) for the District as a whole, as well as by the nine member counties.

FIGURE 21 BURNED WOOD IN PAST SEVEN DAYS AMONG ALL WOOD-BURNING DEVICE HOUSEHOLDS: 2006 & 2007 (N = 570)

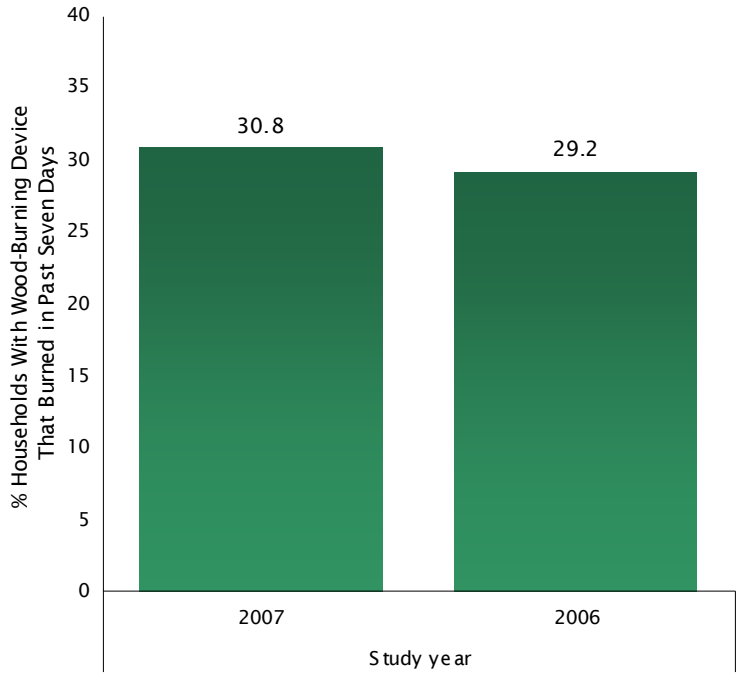


FIGURE 22 BURNED WOOD IN PAST SEVEN DAYS AMONG ALL WOOD-BURNING DEVICE HOUSEHOLDS BY COUNTY (N = 570)

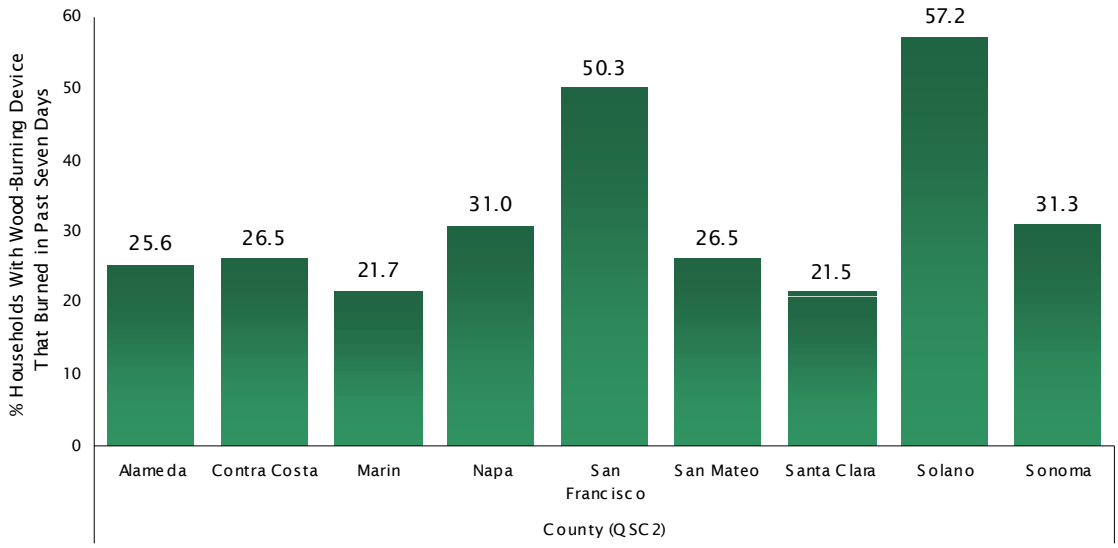


FIGURE 23 BURNED WOOD YESTERDAY AMONG ALL WOOD-BURNING DEVICE HOUSEHOLDS: 2006 & 2007 (N = 570)

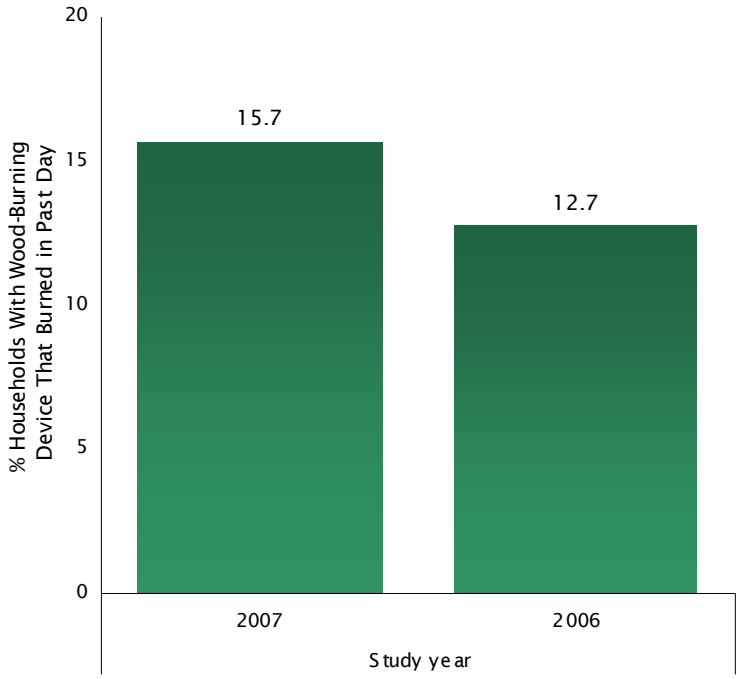
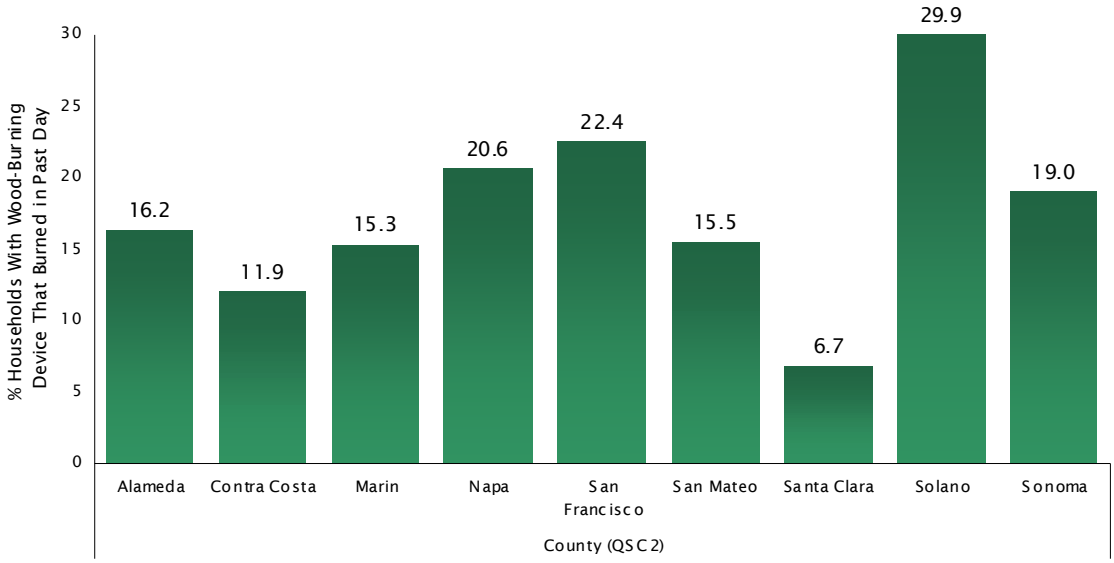


FIGURE 24 BURNED WOOD YESTERDAY AMONG ALL WOOD-BURNING DEVICE HOUSEHOLDS BY COUNTY (N = 570)



DURATION & VOLUME OF WOOD BURNING Questions 14 and 15 asked respondents with wood-burning devices who also expected to use the device this winter to estimate the number of hours they have a fire burning—as well as the number of logs they burn—on a typical day that they burn wood. In terms of hours, respondents were split between those who burn at least four hours on a typical day (45%), those who burn approximately three hours per day (35%), and those who burn less than three hours (20%). The average duration among all respondents who received this question in 2007 was 4.34 hours. Among the nine member counties, respondents from Solano County reported the highest average hours burned per burn day at 6.18 hours (Figure 26). Frequent burners also reported a longer duration (5.18 hours) for a typical burn day when compared to those who burn less than once per week (3.18 hours).

Question 14 *In a typical day that you burn wood, how many hours of the day do you have a fire burning?*

FIGURE 25 DISTRIBUTION AND AVERAGE HOURS OF BURNING IN TYPICAL DAY OF WOOD-BURNING: 2006 & 2007 (N = 316)

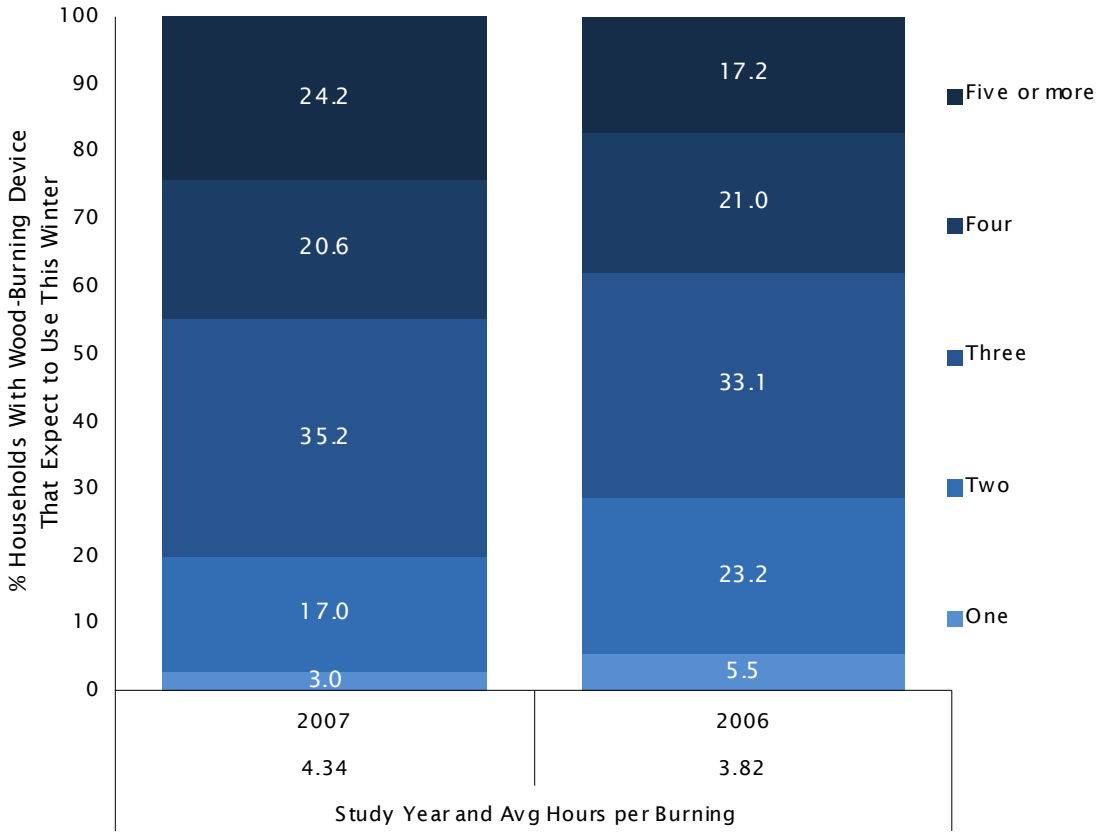
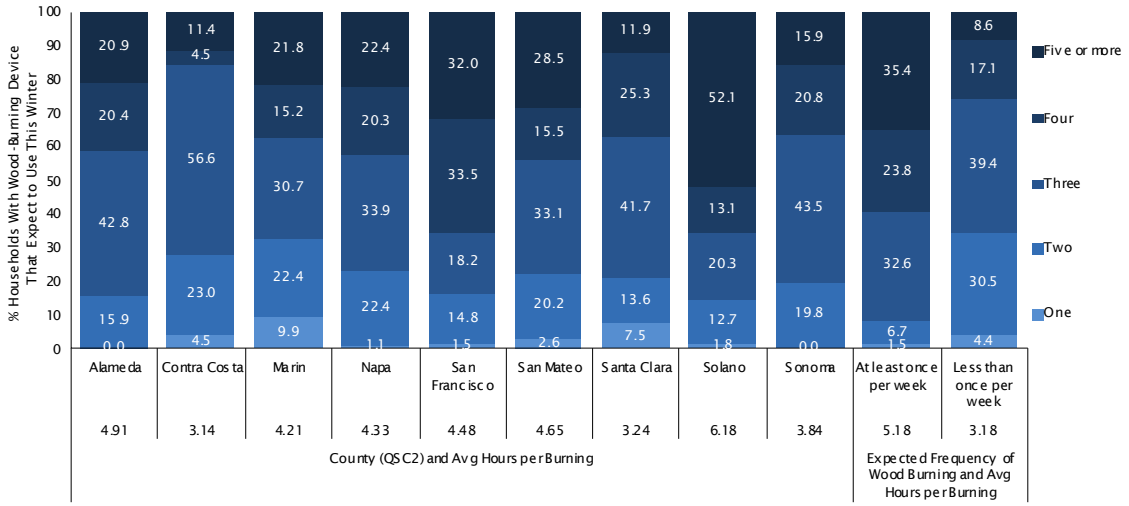


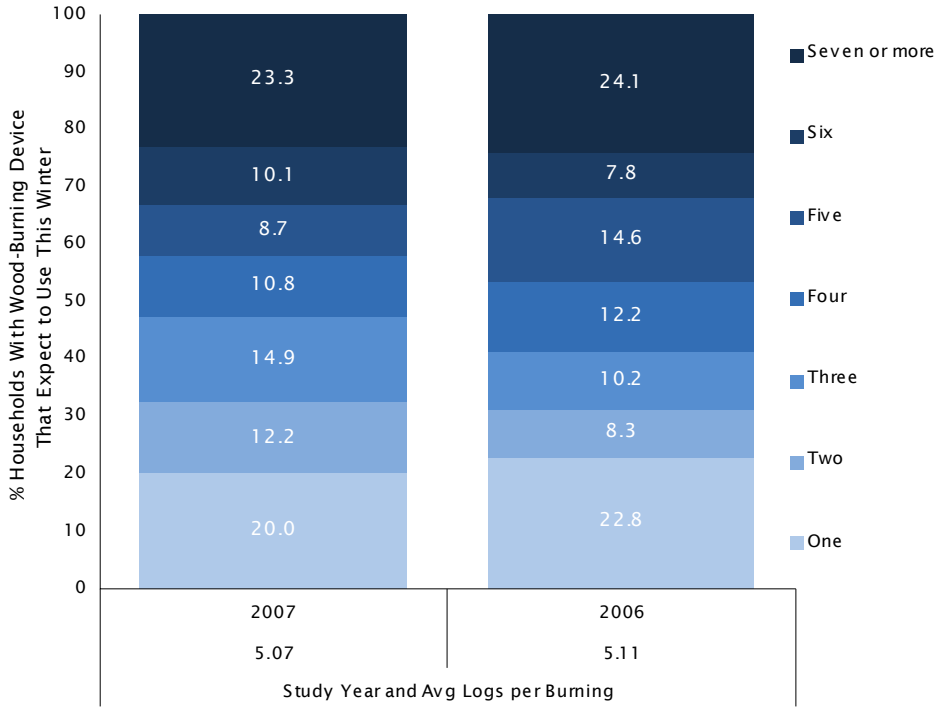
FIGURE 26 DISTRIBUTION AND AVERAGE HOURS OF BURNING IN TYPICAL DAY OF WOOD-BURNING BY COUNTY & EXPECTED FREQUENCY OF WOOD BURNING (N = 316)



In terms of volume, respondents were rather evenly split in 2007 between those who burn one or two logs per typical burn day (32%), those who estimated that they burn three to five logs (34%), and those who reported burning more than five logs per day (33%). The average number of logs reported per burn day in 2007 was 5.07 (Figure 27).

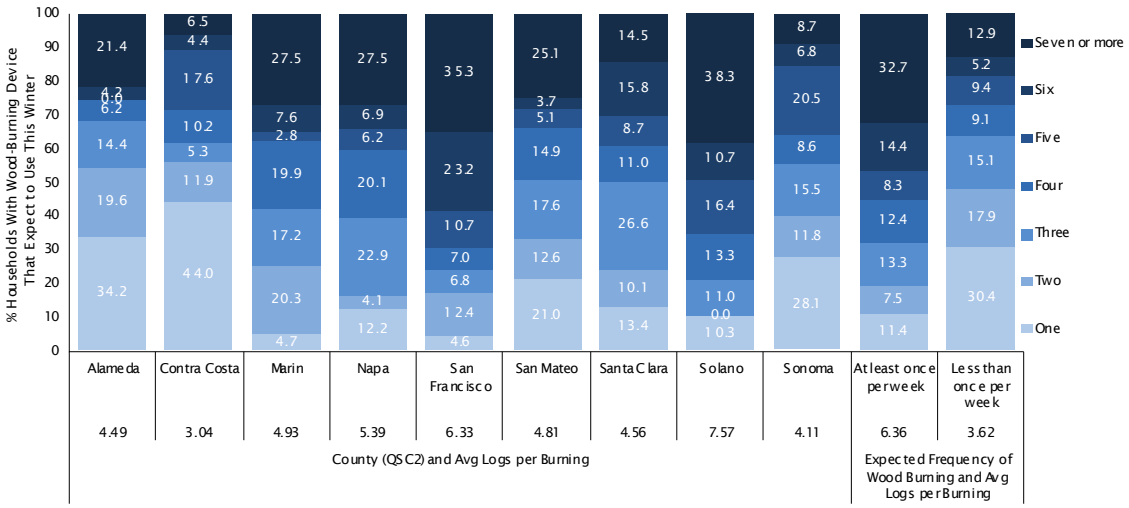
Question 15 *In a typical day that you burn wood, how many logs do you burn throughout the entire day?*

FIGURE 27 DISTRIBUTION AND AVERAGE NUMBER OF LOGS BURNED IN TYPICAL DAY OF WOOD-BURNING: 2006 & 2007 (N = 276)



As shown in Figure 28, counties that reported longer than average burn durations on a typical burn day also tended to report higher than average volumes of logs burned per burn day. Frequent burners also reported a higher number of logs burned (6.36) per burn day when compared to their counterparts (3.62) who burn less frequently than once per week.

FIGURE 28 DISTRIBUTION AND AVERAGE NUMBER OF LOGS BURNED IN TYPICAL DAY OF WOOD-BURNING BY COUNTY & EXPECTED FREQUENCY OF WOOD BURNING (N = 276)



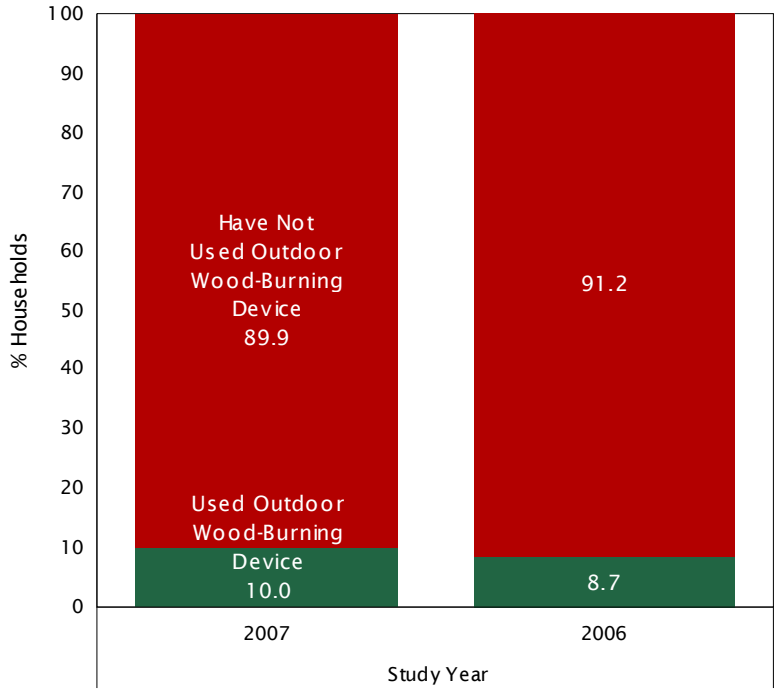
Outdoor & Off-Season Burning

Whereas the bulk of the questions on wood burning focused on indoor wood burning during the winter season, respondents were also asked about their wood burning behavior during non-winter months and in outdoor settings. This line of inquiry was administered to *all* respondents—not just those with a heating device in the home—in order to capture wood burning that occurs at campfires and beaches, in chimineas, and at other locations in addition to their home.

OUTDOOR FIREPLACE, FIREPIT OR CHIMINEA The first question in this series simply asked respondents if they possess an outdoor fireplace, firepit or chiminea that they have used to burn wood in the past 12 months. Overall, 10% of respondents answered Question 42 in the affirmative (Figure 29).

Question 42 *Do you have an outdoor fireplace, firepit or chiminea that you've used to burn wood in the past 12 months?*

FIGURE 29 OUTDOOR WOOD-BURNING DEVICE USED IN PAST 12 MONTHS: 2006 & 2007 (N = 1,200)



When compared to their respective counterparts in 2007, ownership and use of an outdoor fireplace, firepit or chiminea was most commonly reported by residents in Solano County (Figure 30), those who reside in homes that were built at least 50 years ago, and households that earn between $150,000 and $199,999 per year (see Figures 30 & 31).

FIGURE 30 OUTDOOR WOOD-BURNING DEVICE USED IN PAST 12 MONTHS BY COUNTY (N = 1,200)

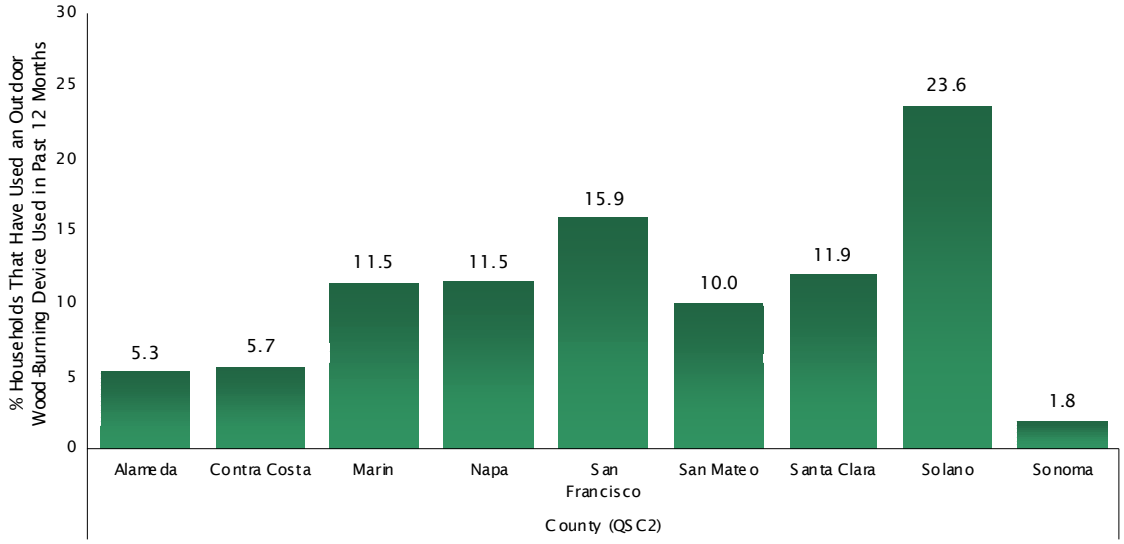
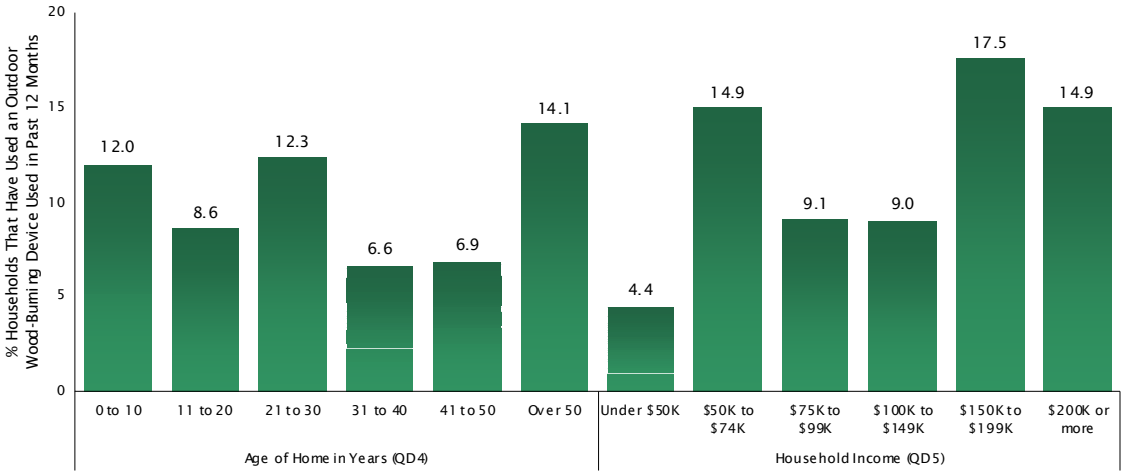


FIGURE 31 OUTDOOR WOOD-BURNING DEVICE USED IN PAST 12 MONTHS BY AGE OF HOME IN YEARS & HOUSEHOLD INCOME (N = 1,200)



OFF-SEASON BURNING The vast majority of households (82%) reported that they do *not* burn wood in non-winter months. Figure 32 also displays the percentage of respondents that indicated they do burn wood in each non-winter month overall. The percentage of households that reported burning wood in non-winter months was highest in Solano County (30%), and lowest in Sonoma County (6%), as shown in Figure 33 on page 32.

Question 43 *Do you ever burn wood indoors or outdoors in non-winter months, between March and October?*

FIGURE 32 NON-WINTER WOOD BURNING (N = 1,200)

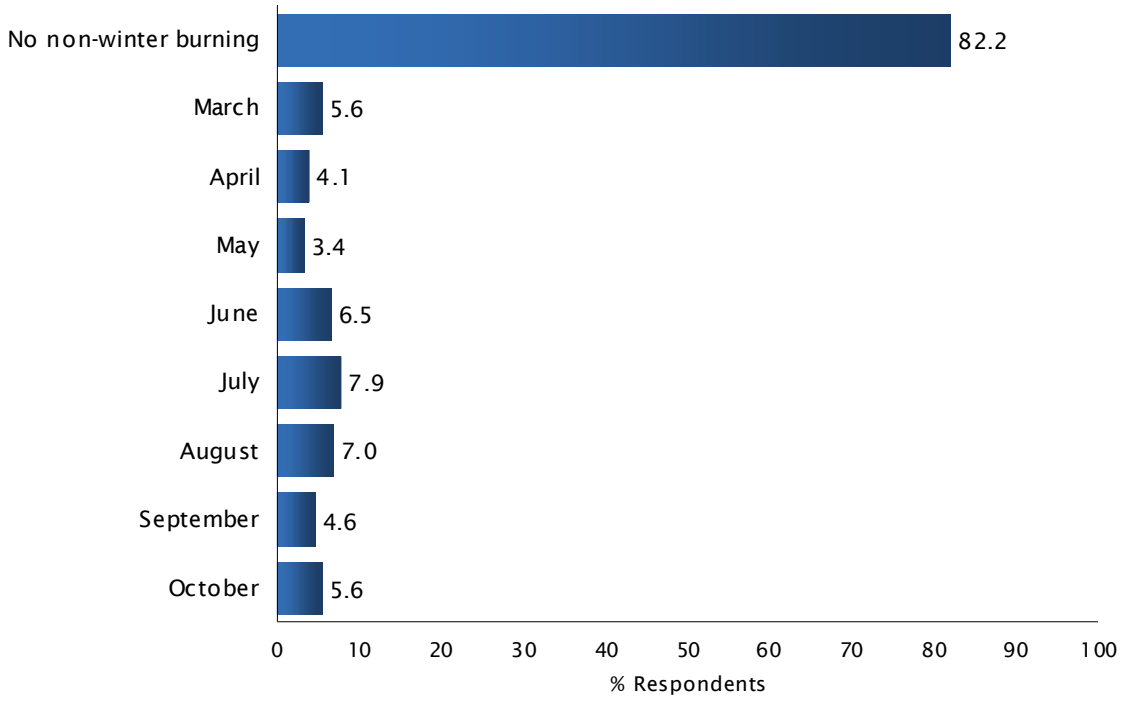
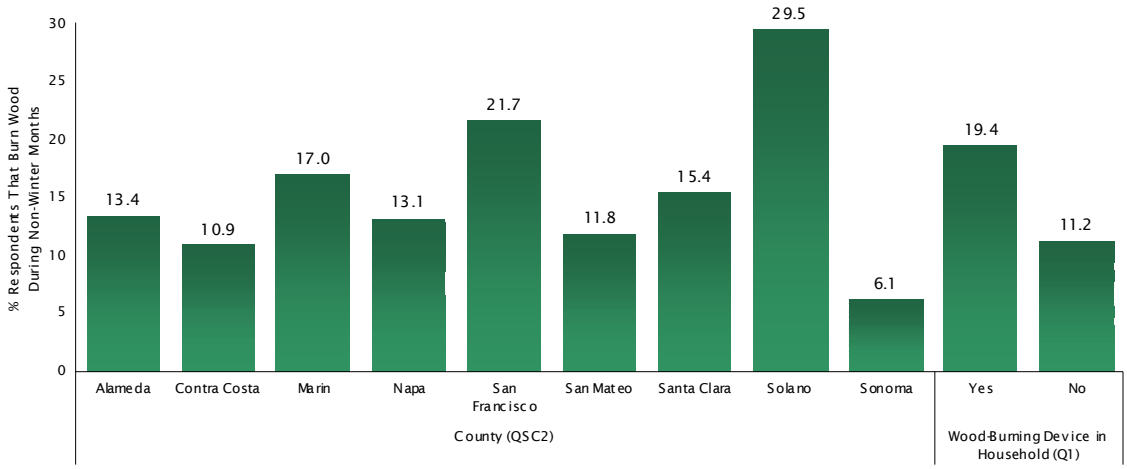


FIGURE 33 NON-WINTER WOOD BURNING BY COUNTY & WOOD-BURNING DEVICE IN HOUSEHOLD (N = 1,200)



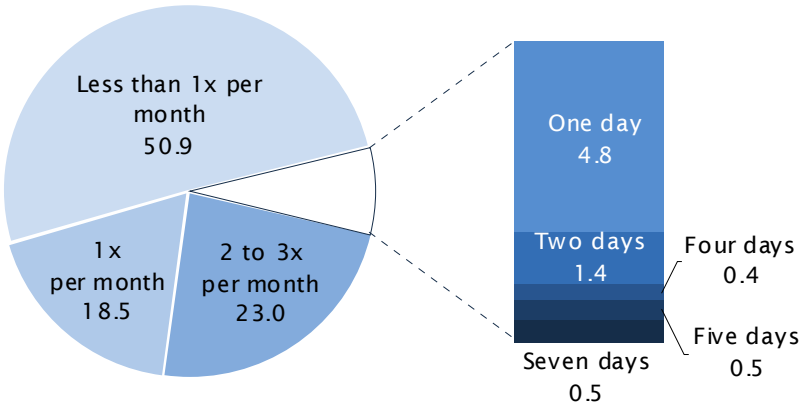
The next series of questions were only asked of respondents who indicated that they burn wood during non-winter months. The first question (Question 44) asked each respondent how often they burn wood in non-winter months—at least once per week or less often? Respondents who indicated that they burn wood less often than once per week were next asked to be more specific as to how often they burn wood in non-winter months—two to three times per month, once per month, or less often than once per month? For respondents who indicated that they burn wood weekly during non-winter months, Question 46 asked how many days they burn wood in a typical non-winter week. The results to all three questions are combined in Figure 34.

Question 44 *How often do you burn wood in non-winter months? At least once per week or less often than that?*

Question 45 *In non-winter months, would you say that you burn wood about two to three times per month, once per month, or less often than once per month?*

Question 46 *In a typical week during non-winter months, how many days do you expect to burn wood?*

FIGURE 34 FREQUENCY OF WOOD BURNING DURING NON-WINTER MONTHS (N = 130)



Among households that reported burning wood in non-winter months, 8% indicated that they burn wood on a weekly basis, although most (6%) of these respondents stated that they typically burn wood two days or less per week in non-winter months. Overall, 23% indicated that they burn wood two to three times per month, 19% once per month, and 51% burn wood less often than once per month in the off-season.

Changes in Wood Burning Behavior

Having measured respondents' basic wood burning behavior, the survey next focused on whether respondents had made changes in their wood burning behavior during the 2007-2008 winter season in response to the Spare the Air Tonight campaign or other factors such as the high cost of natural gas and propane this season.

SEASONAL CHANGES IN WOOD BURNING BEHAVIOR The first question in this series simply asked the respondent if they expected that they would burn wood more frequently, less frequently, or at about the same frequency as the prior winter season. Overall, 59% of households that own a wood-burning heating device and expected to burn wood this season reported that they anticipated burning wood at about the same frequency this season as last (Figure 35). Approximately 18% expected to burn less often this season, whereas 21% expected to burn more frequently. Among the nine member counties, Santa Clara contained the highest proportion of households that expected to burn more frequently this season, whereas Contra Costa contained the largest percentage who expected to burn less frequently (see Figure 36 on page 35).

Question 16 *This winter, do you expect that you will burn wood more often, less often, or about the same frequency as you did last winter?*

FIGURE 35 EXPECTED FREQUENCY OF WOOD BURNING THIS WINTER COMPARED TO LAST WINTER: 2005 ~ 2007 (N = 328)

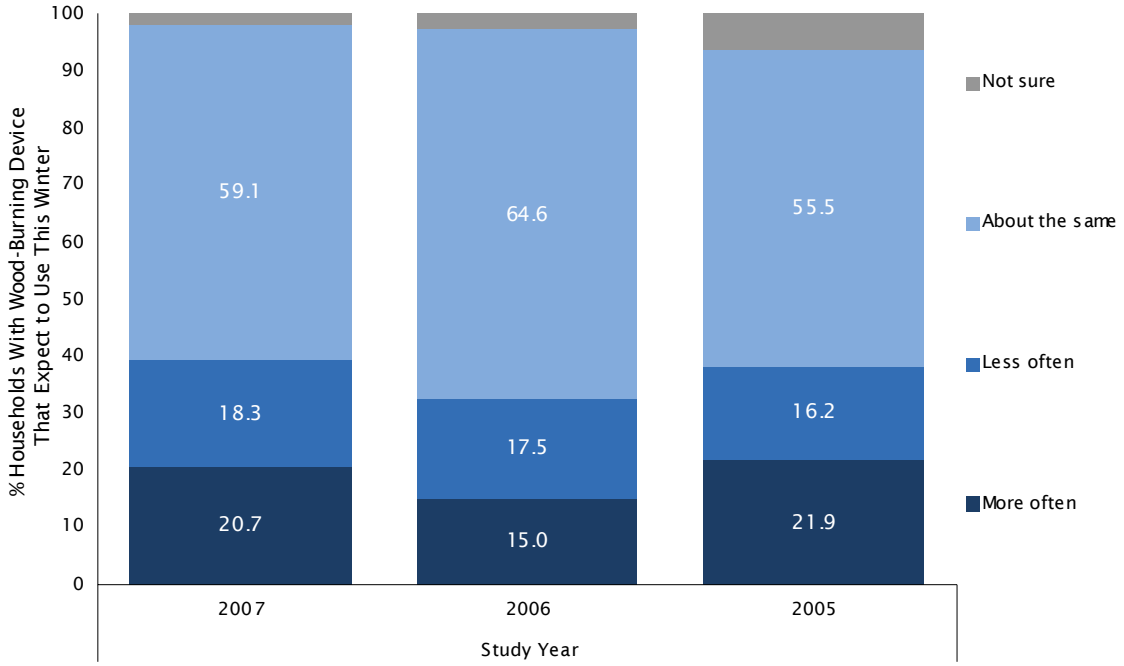
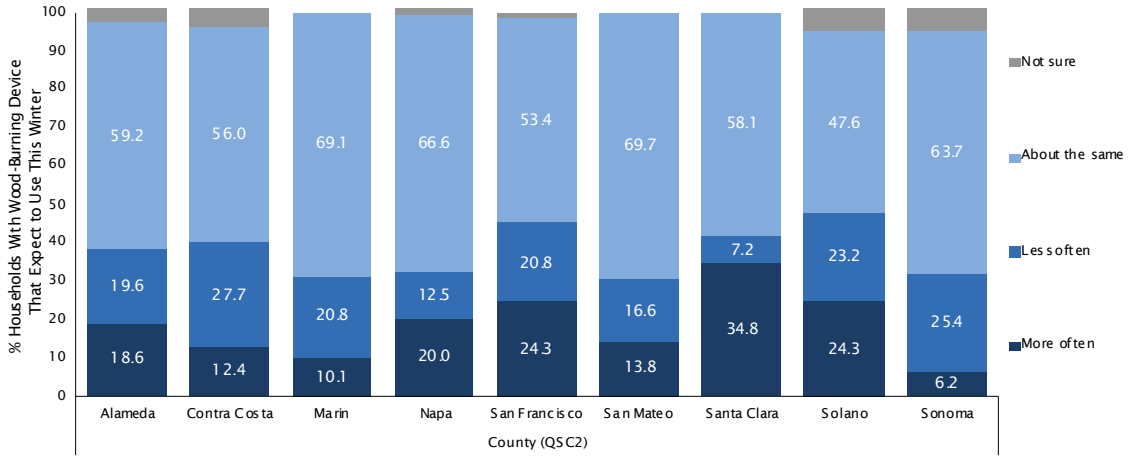


FIGURE 36 EXPECTED FREQUENCY OF WOOD BURNING THIS WINTER COMPARED TO LAST WINTER BY COUNTY (N = 328)



EPISODIC CHANGES IN WOOD BURNING BEHAVIOR Households that burned wood this winter (or anticipated doing so) were next asked whether there were occasions when they normally would have burned wood, but refrained from doing so. For those who answered in the affirmative, the survey next asked in an open-ended manner *why* they decided not to burn wood on these occasions.

The manner in which these questions were asked, as well as their placement in the survey relative to specific questions about the Spare the Air Tonight Campaign, was changed in 2004 from prior surveys. Previous surveys first introduced the Spare the Air Tonight Program and then asked if individuals responded to the Program by reducing the amount of wood they burned. Asking the question in this manner is likely to prompt a *socially desirable* response from some respondents that they had reduced their wood burning even if they had not—which leads to artificially high estimates of the campaign's impact. To more accurately measure reductions in wood burning that can be attributed to the campaign, the 2004, 2005, 2006 and 2007 surveys employed an indirect approach similar to that used in the CARB/EPA Method for estimating reductions in driving due to the summer Spare the Air Campaign.

As shown in Figure 37, 45% of respondents who have a wood-burning fireplace, wood stove and/or pellet stove *and* expected to burn wood during the 2007-2008 winter season indicated that—on at least one occasion—they refrained from burning wood. When asked *why* they chose not to burn wood on these occasions, 12% specifically mentioned the Spare the Air campaign and an additional 9% offered an air quality or health-related reason (see Figure 38).[9] For the interested reader, the proportion of respondents who mentioned the campaign or air quality and/or health reasons as a reason for not burning wood at least once this winter is shown by county in Figure 39 on page 37.

9. Among those who refrained from burning wood due to Spare the Air Tonight, air quality and/or health-related reasons, the average number of occasions they refrained from burning wood during the season prior to taking the interview was 2.79.

Question 17 *Were there occasions this winter when you normally would have burned wood, but decided not to?*

Question 18 *Why did you decide not to burn wood on these occasions?*

FIGURE 37 CHOSE NOT TO BURN THIS WINTER (N = 328)

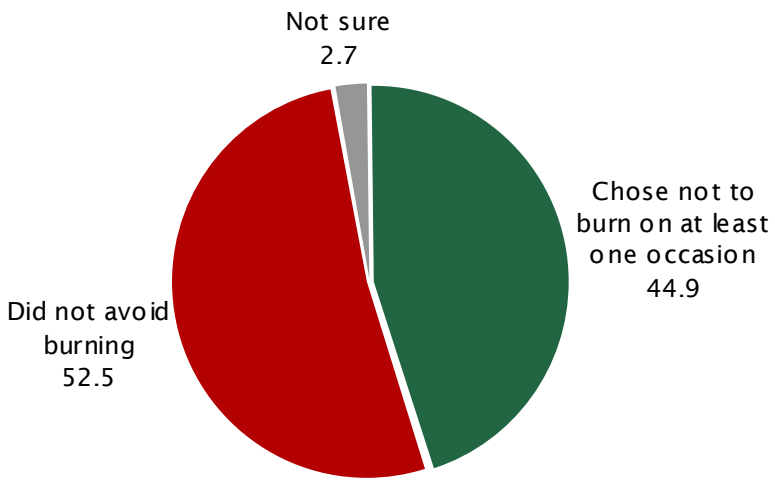


FIGURE 38 CHOSE NOT TO BURN THIS WINTER BECAUSE OF SPARE THE AIR TONIGHT CAMPAIGN INFO OR AIR QUALITY / HEALTH CONCERNS: 2006 & 2007 (N = 328)

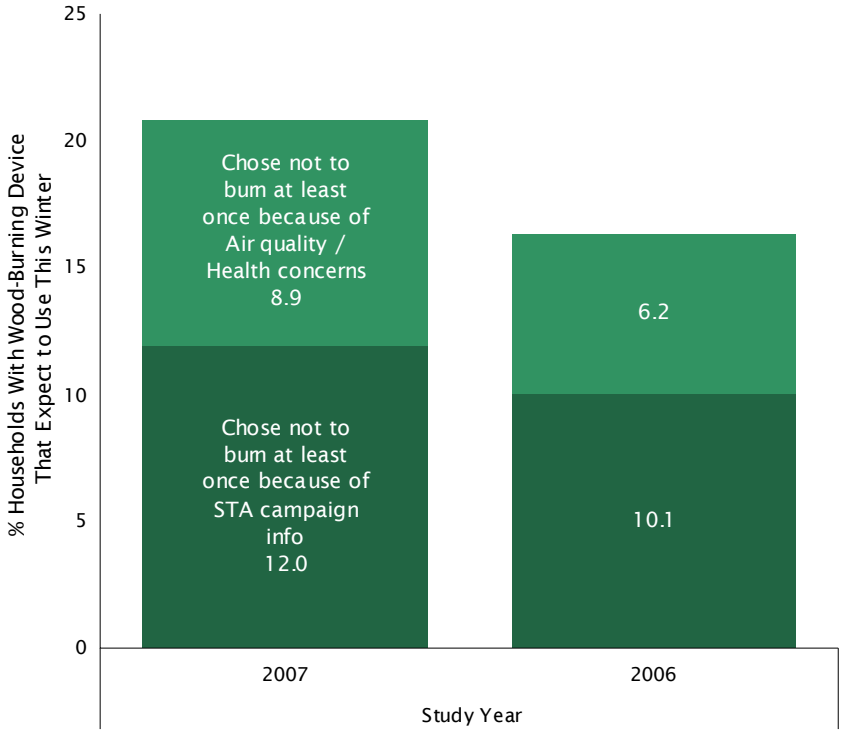
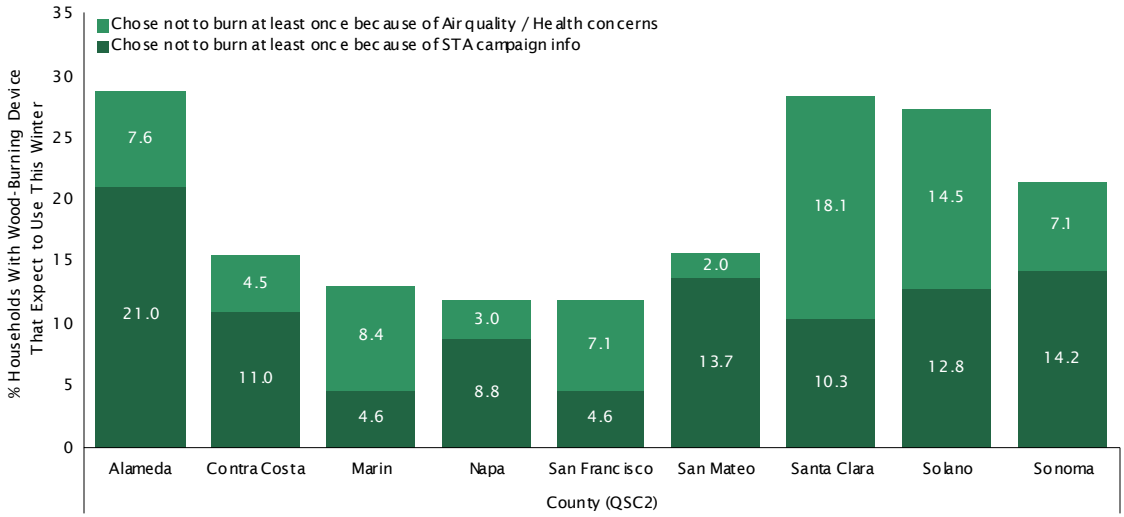
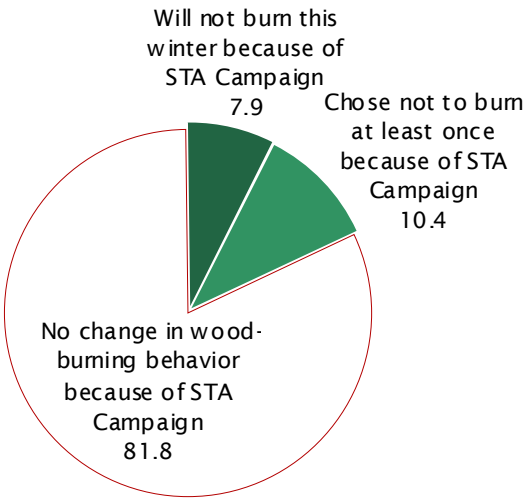


FIGURE 39 CHOSE NOT TO BURN THIS WINTER BECAUSE OF SPARE THE AIR TONIGHT CAMPAIGN INFO OR AIR QUALITY / HEALTH CONCERNS BY COUNTY (N = 328)



CAMPAIGN IMPACTS ON WOOD BURNING To estimate the proportion of adults in the District who reduced the amount of wood that they burned during the winter season in response to the campaign, one must combine the responses from several questions in the survey. Naturally, respondents who do not live in a household that contains a wood-burning fireplace, wood stove or pellet stove (Question 1) should not be included in the analysis since they could not respond to the campaign by reducing their wood burning behavior. Respondents who chose not to burn wood *at all* during the winter (Question 7), did so because of air quality or health related reasons (Question 8), *and* were aware of the Spare the Air Tonight Program (Question 39) can be considered a Spare the Air (STA) reducer. So too can respondents who indicated that although they did burn wood, they refrained from doing so on occasion (Question 17), did so because of the campaign and/or for air quality/health reasons (Question 18), *and* were aware of the Spare the Air Tonight Program (Question 39).

FIGURE 40 SPARE THE AIR REDUCERS (N = 570)



Among all households with a wood-burning fireplace, pellet stove or wood stove, nearly 8% chose not to burn *at all* during the winter season because of the Spare the Air Tonight campaign, and an additional 10% refrained from burning on at least one occasion for the same reason. Collectively, the Spare the Air Tonight campaign influenced more than 18% of households with a wood-burning fireplace, pellet stove or wood stove to reduce their wood burning during the 2007-2008 winter season (Figure 40).

Table 4 shows that of the 570 respondents in the survey who were eligible to respond to the campaign, 104 (18.2%) reduced their wood burning behavior on at least one occasion during the 2007-2008 winter in response to the Spare the Air Tonight Program.[10] This represents 214,957 households out of the estimated 1,178,492 households with a wood-burning heating device. In terms of the reliability of the estimate, we can be 95% confident that the actual proportion of Spare the Air Tonight reducer households this season was between 15.07% and 21.41%.

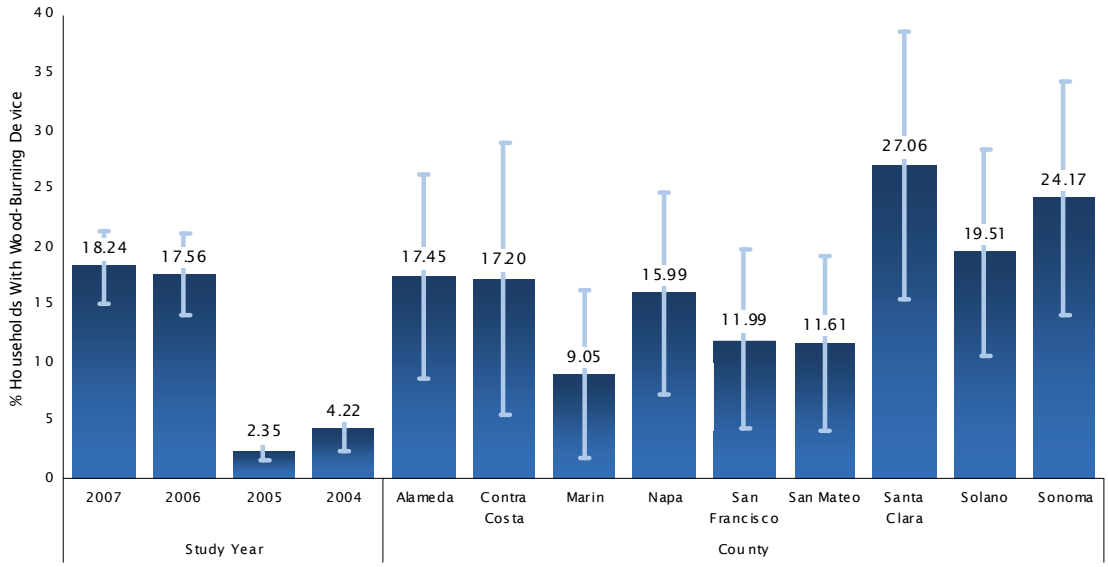
TABLE 4 SPARE THE AIR REDUCERS: CONFIDENCE INTERVAL

Winter Spare the Air Tonight Reducers		
Universe Estimate (households with heating device)		1,178,492
Sample Size (surveyed households with heating device)		570
STA Reducers		104
Non-STA Reducers		466
Proportion of STA Reducers		18.24%
Proportion of Non-STA Reducers		81.76%
Maximum Margin of Error (95% confidence)		3.17%
Confidence Interval for Proportion of Winter STA Reducers	Lower Bound	15.07%
	Upper Bound	21.41%

Figure 41 displays the estimated percentage of wood-burning fireplace, wood stove and pellet stove owning households that reduced their wood burning on at least one occasion due to the Spare the Air Tonight Program by study year (2007, 2006, 2005 and 2004), as well as by county for 2007. For reference, the confidence intervals are also shown to provide a sense for the reliability of the estimates.[11] The most striking result in the figure is the dramatically larger impact that the Spare the Air Tonight campaign had in 2006 and 2007 when compared to the prior two years. Whereas 2.35% and 4.22% of eligible households reduced their wood burning in response to the campaign in 2005 and 2004, respectively, the corresponding values in 2006 and 2007 were 17.6% and 18.2%, respectively.

10. The survey included a follow-up question (Question 19) which asked respondents who refrained from burning wood for campaign-related reasons (Question 18) how many times they refrained from burning wood for air quality or health-related reasons during the winter season. The average response was 2.79 times, although the small sample size for this question means that the statistical margins of error around the estimate are large. Moreover, respondents who did not burn wood at all during the winter were not asked this question, so the figure represents the average reduction among individuals who normally burn wood.
11. The confidence intervals indicate the range within which one can be 95% confident that the true value exists.

FIGURE 41 SPARE THE AIR REDUCERS BY STUDY YEAR & COUNTY SHOWING CONFIDENCE INTERVALS (N = 570)



Recall and Awareness of Spare the Air Tonight Messaging

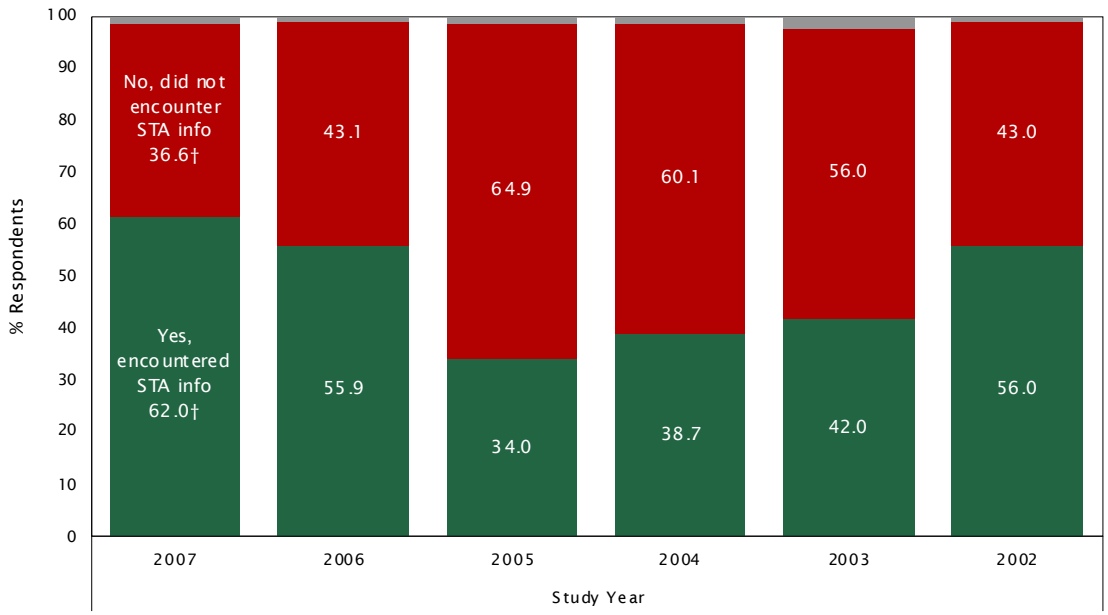
Although the ultimate goal of the Spare the Air Tonight Campaign is to persuade individuals to reduce the amount of wood that they burn and to replace wood-burning devices with cleaner alternatives, there are a series of related objectives which must be met in order for this to occur. For example, regardless of how compelling the message may be, if the message does not reach the target audience then the campaign can not succeed in its primary goal. Thus, an instrumental objective of the campaign is to simply increase awareness of the Spare the Air Tonight Program and related events.

RECALL EXPOSURE TO SPARE THE AIR MESSAGING Accordingly, a series of questions was asked of respondents about their recall of Spare the Air Tonight messaging. The first of these questions asked: *During this winter, have you heard, read, or seen any new stories, advertisements or public service announcements about Spare the Air Tonight, poor air quality, or requests not to use your fireplace, pellet stove or wood stove?*

Figure 42 presents the results to this question for the study years 2002 through 2007. In 2007, 62% of respondents recalled being exposed to news stories, advertisements or public service announcements related to the Spare the Air Tonight Program during the winter months. Recalled exposure was significantly higher in 2007 when compared to recent prior winters.

Question 20 *During this winter, have you heard, read, or seen any news stories, advertisements, or public service announcements about Spare the Air Tonight, poor air quality, or requests not to use your fireplace, pellet stove, or wood stove?*

FIGURE 42 ENCOUNTERED SPARE THE AIR TONIGHT INFORMATION: 2002 ~ 2007 (N = 1,200)



† Statistically significant change ($p < 0.05$) between the 2006 and 2007 studies.

For the interested reader, Figures 43 and 44 display the percentage of respondents who recalled being exposed to news stories, advertisements or public service announcements related to the Spare the Air Tonight Program during the 2007 winter months by county, gender, age and household income. When compared to their respective counterparts, those who reside in San Mateo County, females, those 45 years of age or older, and those who enjoy annual family incomes of $100,000 to $199,999 were the most likely to recall being exposed to the Spare the Air Tonight Program.

FIGURE 43 ENCOUNTERED SPARE THE AIR TONIGHT INFORMATION BY COUNTY (N = 1,200)

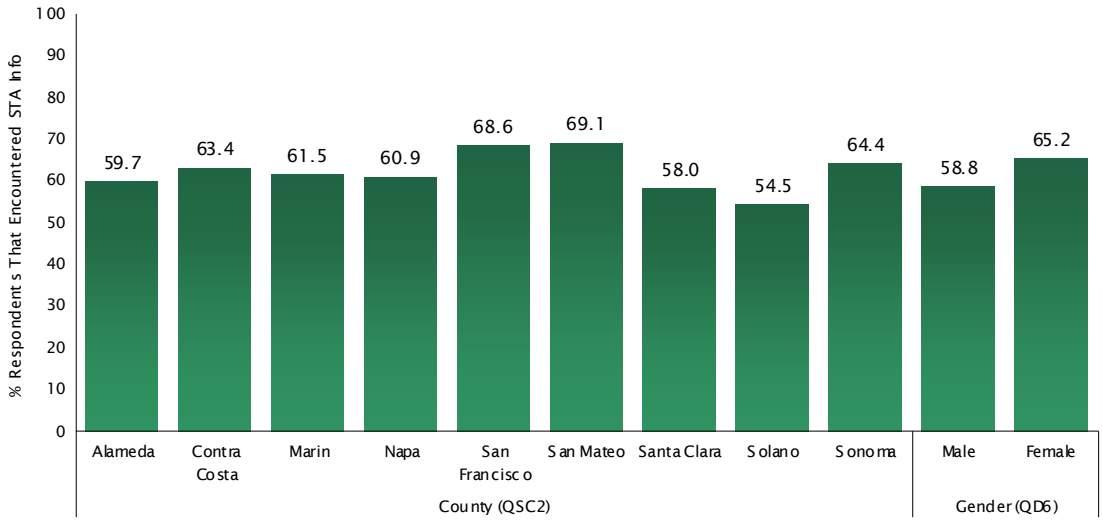
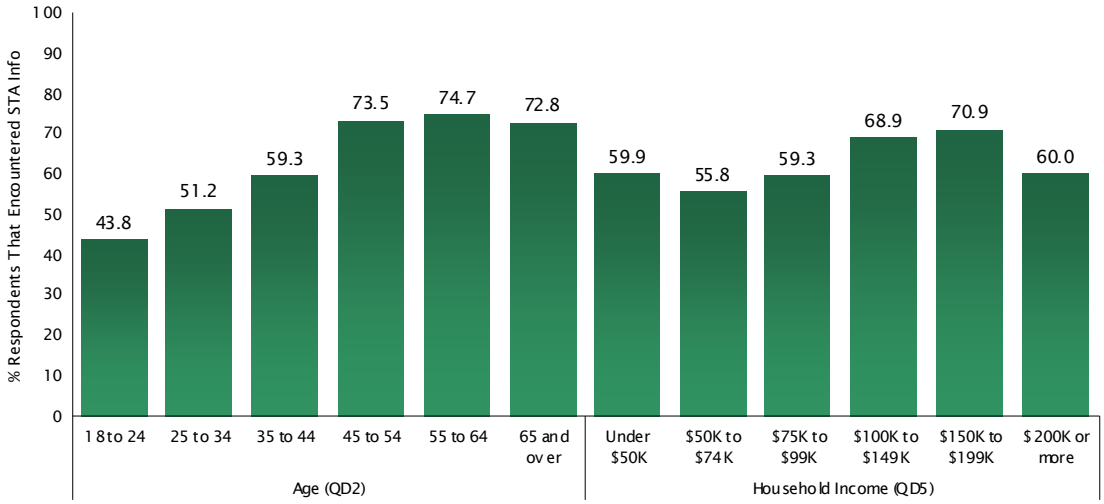


FIGURE 44 ENCOUNTERED SPARE THE AIR TONIGHT INFORMATION BY AGE & HOUSEHOLD INCOME (N = 1,200)

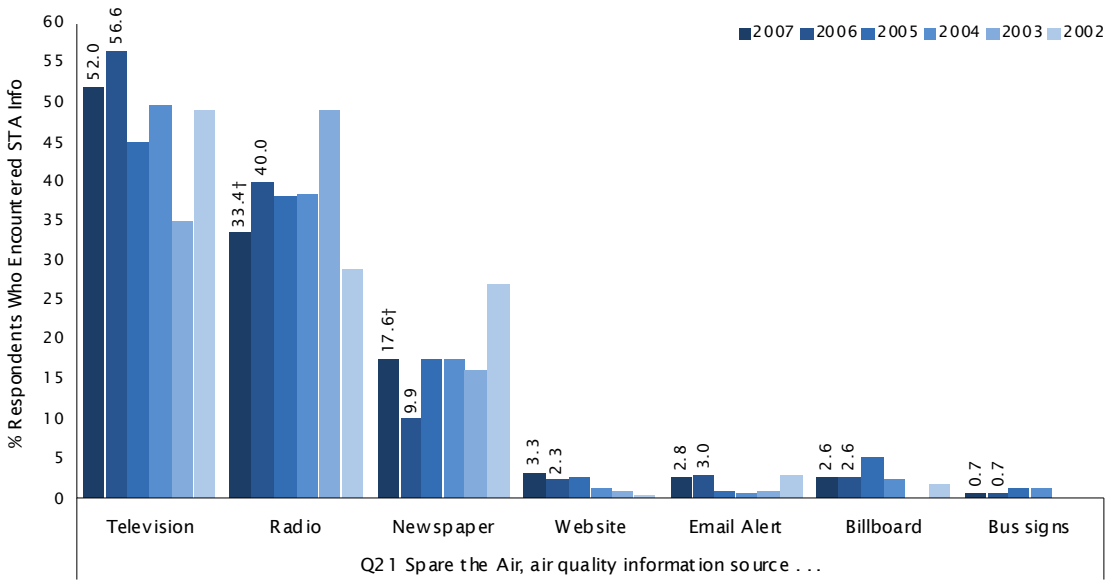


INFORMATION SOURCE Those who indicated that they recalled hearing, reading, or seeing Spare the Air Tonight related information during the winter were next asked where they obtained the information. Multiple responses to the question were allowed, so the percentages shown in Figure 45 represent the percentage of respondents who mentioned a particular source and thus add to more than 100%. Because this question was asked in an identical manner in past surveys dating back to 2002, the results from these surveys are also included in Figure 45 for comparison.

As in the previous surveys, the most popular methods of obtaining information related to Spare the Air Tonight and air quality during the winter of 2007-2008 were television (52%) and radio (33%). There was a significant trend away from radio in 2007, however, and a significant increase in the proportion of respondents who cited newspapers (18%) as their source for Spare the Air Tonight related messages. No other single sources were mentioned by at least 5% of respondents, respectively.

Question 21 *Where did you see or hear the news story, advertisement or public service announcement?*

FIGURE 45 SOURCE FOR SPARE THE AIR TONIGHT INFORMATION: 2002 ~ 2007 (N = 552)

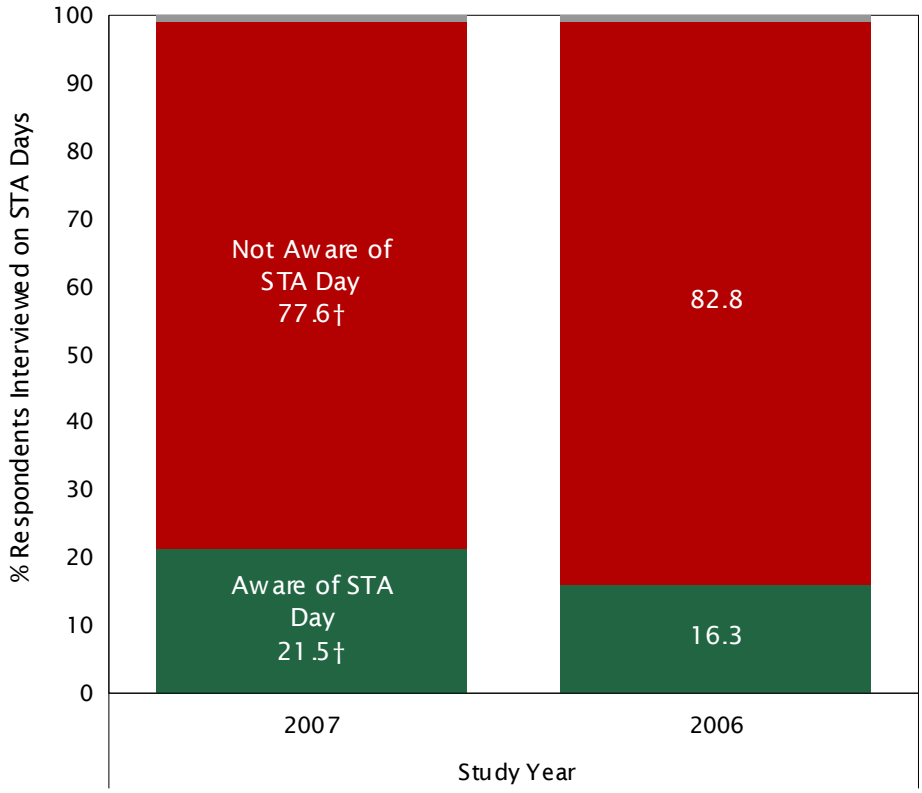


† Statistically significant change ($p < 0.05$) between the 2006 and 2007 studies.

AWARE OF SPARE THE AIR DAY The final question in this series asked all respondents who received the interview on the day after a Spare the Air Tonight episode if, prior to taking the survey, they were aware that a Spare the Air Tonight advisory had been issued the day before. As shown in Figure 46 on page 43, 22% of respondents in 2007 answered this question in the affirmative, which is significantly higher than the proportion found in 2006. When compared to their respective counterparts, awareness was highest among Napa and San Mateo County residents, males, seniors, and individuals whose households earn between $100,000 and $149,999 annually (see Figures 47 and 48).

Question 22 *Prior to taking this survey, were you aware that there was a "Spare the Air Tonight" advisory yesterday?*

FIGURE 46 AWARE OF SPARE THE AIR TONIGHT ADVISORY (N = 349)



† Statistically significant change ($p < 0.05$) between the 2006 and 2007 studies.

FIGURE 47 AWARE OF SPARE THE AIR TONIGHT ADVISORY BY COUNTY & GENDER (N = 349)

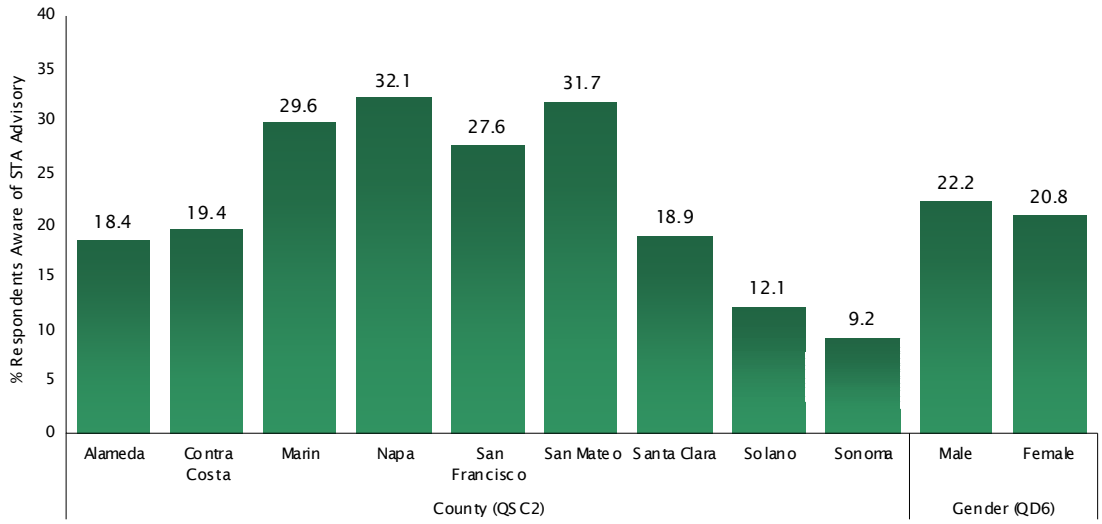
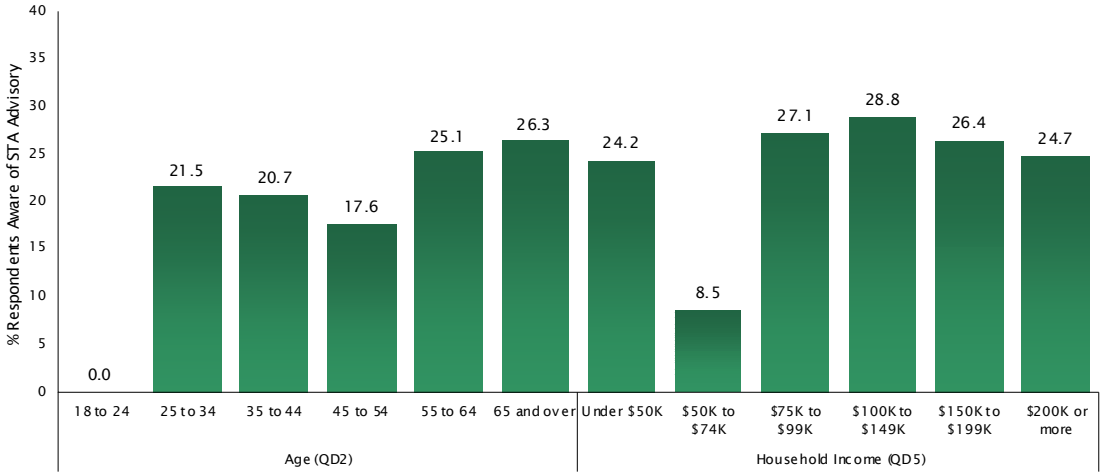


FIGURE 48 AWARE OF SPARE THE AIR TONIGHT ADVISORY BY AGE & HOUSEHOLD INCOME (N = 349)



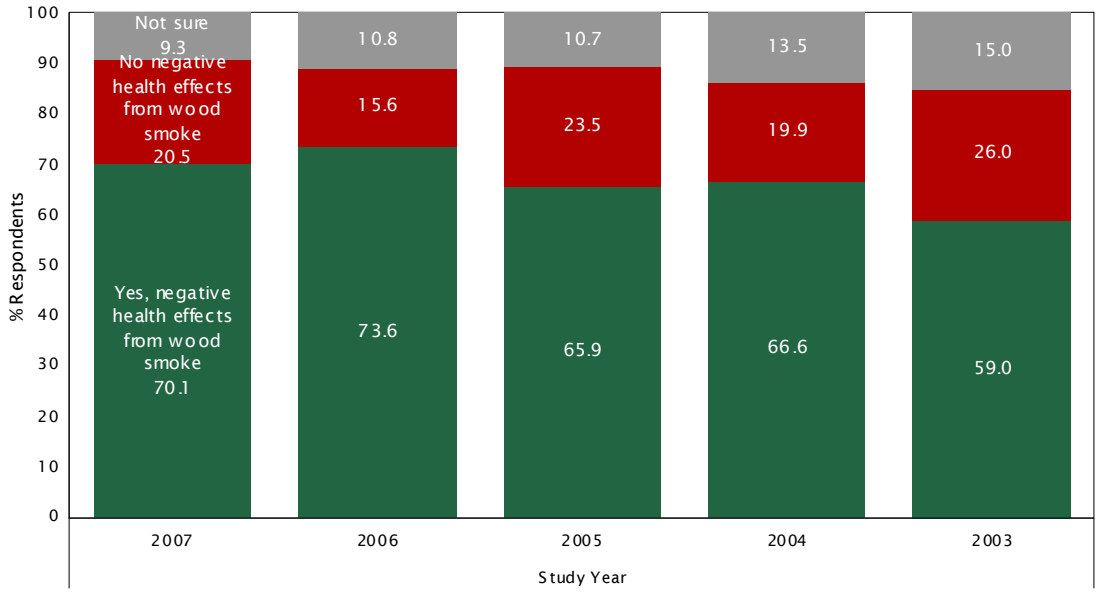
Attitudes about Wood Smoke

In addition to changing wood burning behavior, one of the goals of the Spare the Air Tonight Program is to change how residents think about wood smoke and its impact on public health. To track how effective the Program has been in achieving this goal, the survey included several measures of residents' opinions and perceptions about wood smoke.

The first of these questions simply asked the respondent whether they think there are any negative health effects associated with breathing wood smoke. As shown in Figure 49, approximately 70% of adults in the Bay Area do perceive wood smoke to have negative health impacts. Moreover, public opinion on this matter has changed substantially in the past five years—in part due to the Spare the Air Tonight Program. The proportion of adults that perceive wood smoke to have negative health impacts has increased by 11% since 2003.

Question 23 *Do you think there are any negative health effects associated with breathing wood smoke?*

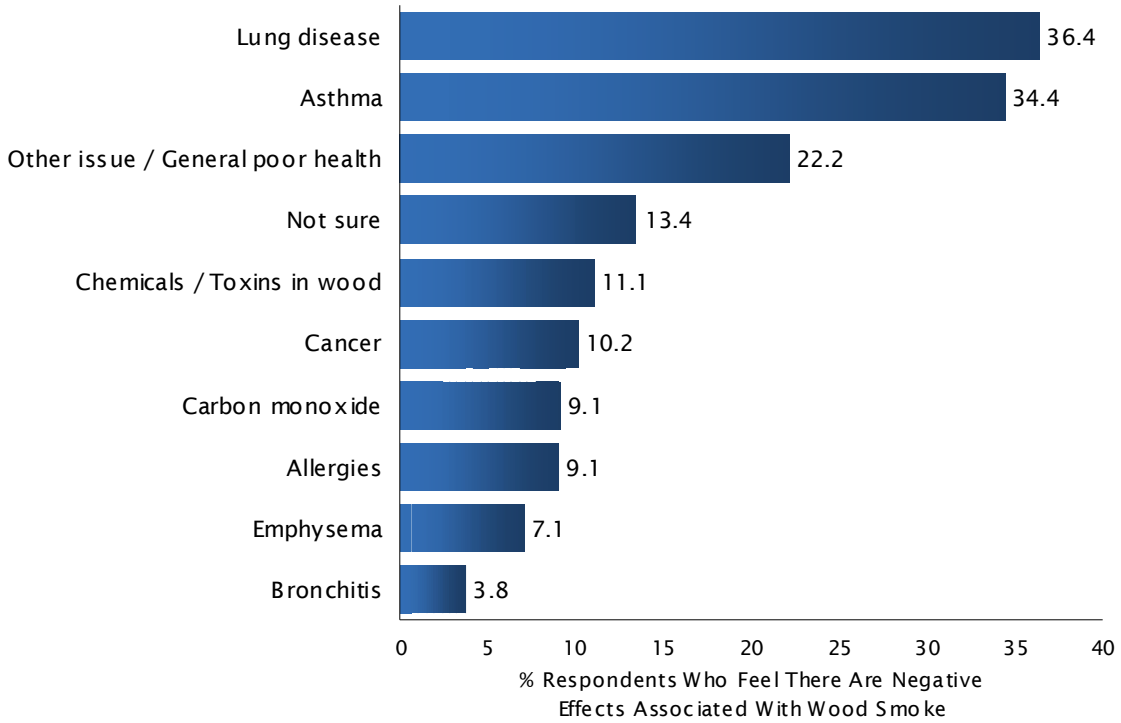
FIGURE 49 PERCEIVE NEGATIVE HEALTH EFFECTS ASSOCIATED WITH WOOD SMOKE: 2002 ~ 2007 (N = 1,200)



Respondents who perceived wood smoke to have negative health impacts (Question 23) were next asked to identify what the specific health effects are of breathing wood smoke. This question was asked in an open-ended manner which allowed respondents to mention any health impact that came to mind without being prompted by—or restricted to—a particular list of options. Multiple responses were also allowed for this question, so the percentages shown in Figure 50 represent the percentage of respondents who mentioned a particular health effect. The most common response (36%) was a general reference to lung disease, followed by a specific reference to asthma (34%). Approximately 22% of respondents mentioned some other general health impact, and 11% mentioned properties of wood—chemicals, carcinogens and toxins—that are released when burned. Overall, 13% of those who perceived that wood smoke had negative health impacts could not name a specific impact.

Question 24 *What are the negative health effects associated with breathing wood smoke?*

FIGURE 50 PERCEIVED NEGATIVE HEALTH EFFECTS ASSOCIATED WITH WOOD SMOKE (N = 842)



WOOD SMOKE A NEIGHBORHOOD PROBLEM? Most adults recognize that there are negative health impacts due to wood smoke. But do they think that *their* neighborhood has a wood smoke problem? To answer this question, the survey first informed respondents that different neighborhoods in the Bay Area experience different levels of air pollution from wood smoke. Respondents were then asked to indicate whether, in their opinion, their neighborhood periodically experiences air pollution from wood smoke. Those who perceived their neighborhood to have an occasional wood smoke problem were asked in a follow-up question to identify the magnitude of the problem. The answers to both of these questions are combined in Figure 51 on page 47.

Overall, 21% of adults surveyed indicated that their neighborhood periodically experiences air pollution from wood smoke. Thirteen percent (13%) stated that the problem was a small one, 6% indicated it was a moderate or medium problem, and 2% felt that air pollution due to wood smoke was a big problem in their neighborhood. When compared to 2006, there was only one statistically significant change in the perceived magnitude of their neighborhoods' woodsmoke problem (see Figure 52), with the proportion who identified the problem as being "big" declining in the past year.

Question 25 *Different neighborhoods in the Bay Area experience different levels of air pollution from wood smoke. In your opinion, does your neighborhood periodically experience air pollution from wood smoke?*

Question 26 *Would you say that periodic air pollution from wood smoke in your neighborhood is a big problem, medium problem, or a small problem?*

FIGURE 51 PERCEPTION OF PERIODIC WOOD SMOKE PROBLEM IN NEIGHBORHOOD (N = 1,200)

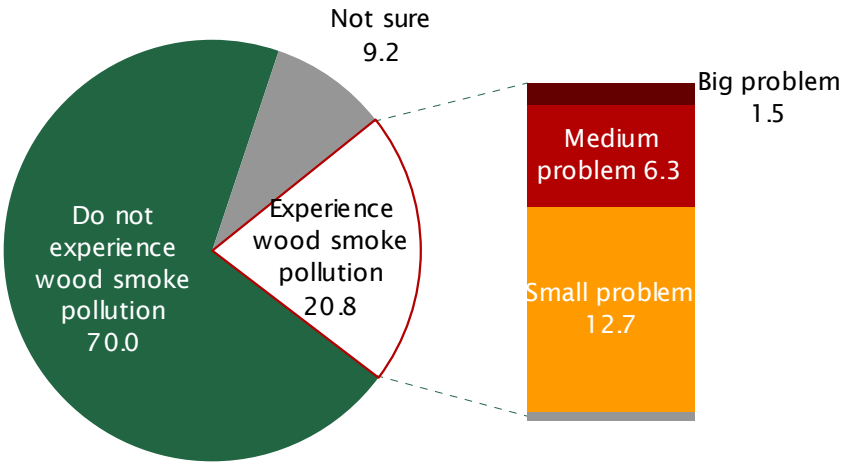
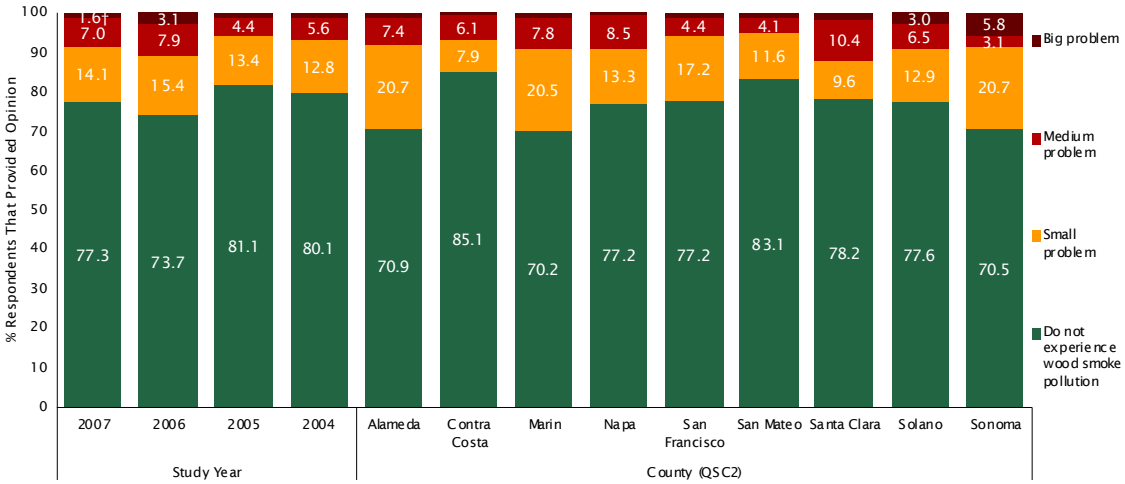


FIGURE 52 PERCEPTION OF PERIODIC WOOD SMOKE PROBLEM IN NEIGHBORHOOD BY STUDY YEAR & COUNTY (N = 1,200)



† Statistically significant change ($p < 0.05$) between the 2006 and 2007 studies.

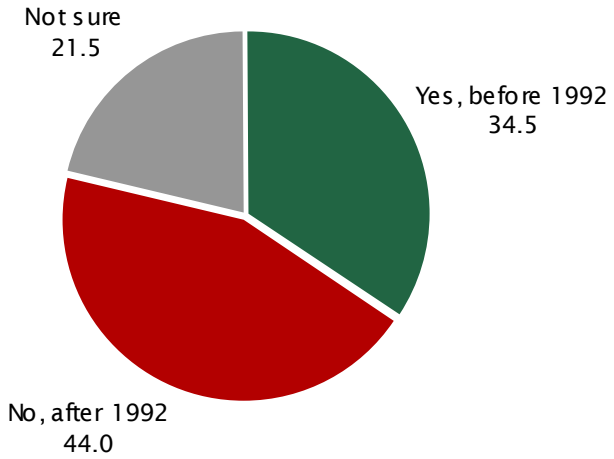
Changing Heating Devices

Reducing the amount of air pollution caused by wood burning is the ultimate goal of the Spare the Air Tonight Program. Toward this end, the Program adopts both direct and indirect strategies. Direct strategies encourage individuals to simply not use their fireplace, wood stove or pellet stove—or to use it less frequently. For respondents who depend on their fireplace or stove for heat, however, this strategy may not be practical or effective. For these and other individuals, the Program also employs strategies to reduce wood smoke pollutants indirectly—that is, by changing the type of fuel burned and/or the efficiency of the heating device, rather than the frequency of burning.

To understand the potential impact that these indirect strategies may have on air pollution from wood smoke, the first task is to develop a profile of the specific type of heating devices that are owned by Bay Area residents. In addition to understanding the *number* of fireplaces, wood stoves and pellet stoves that are owned by respondents (see *Heating Devices* on page 11) and the type of fuel that they burn (see *Fuel Type & Source* on page 13), respondents with wood stoves were also asked to identify whether their stove was manufactured before or after 1992, as more recent stoves will be EPA certified. Figure 53 shows that in 2007 44% of respondents thought that their stove was manufactured after 1992, whereas 35% indicated that it was manufactured before 1992 and 22% were unsure.

Question 27 *Was your wood stove manufactured before 1992?*

Figure 53 Households With wood stoves Manufactured Before 1992 (n = 52)

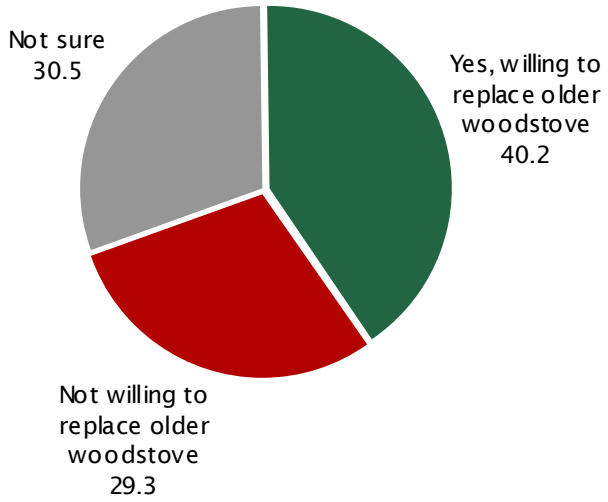


For respondents who owned a wood stove manufactured before 1992, the survey next inquired as to whether the respondent would be willing to replace their current device with a new, cleaner-burning wood stove (Question 28). Among this subgroup, 40% indicated that they would be willing to replace their older wood stove with new, cleaner burning stove, whereas 29% indicated that they would not be willing to make the change and 31% stated that they were unsure (see Figure 54).[12]

12. Respondents who initially indicated that they would *not* be willing to change their wood stove were subsequently asked in Question 29 whether they would be willing to make the change if they received a rebate of between $300 and $600. Approximately one-third (31%) were willing to switch with a rebate of $300 or more. Because only 11 respondents received Question 29, however, the results are not shown in graphic form as the statistical margins of error will be unacceptably high.

Question 28 *New wood stoves burn much cleaner and are less polluting than wood stoves manufactured prior to 1992. Would you be willing to replace your older wood stove with a new, cleaner burning stove?*

FIGURE 54 WILLING TO REPLACE OLDER WOOD STOVE (N = 18)



WILLINGNESS TO CHANGE FIREPLACE

In a manner similar to that described above for wood stoves, respondents who own a wood-burning fireplace were asked a background question to establish whether their fireplace contains an insert and—for those that don't—the respondent's willingness to change the device for a cleaner burning alternative. Figure 55 shows that approximately half (48%) of respondents whose household contains a wood-burning fireplace indicated that the fireplace is open to the room. For the interested reader, Figures 56 and 57 show how this pattern varies by county, home type, and age of the home.

Question 30 *Is your wood-burning fireplace open to the room, or does it have a fitted insert that contains the fire behind a glass door?*

FIGURE 55 TYPE OF WOOD-BURNING FIREPLACE (N = 520)

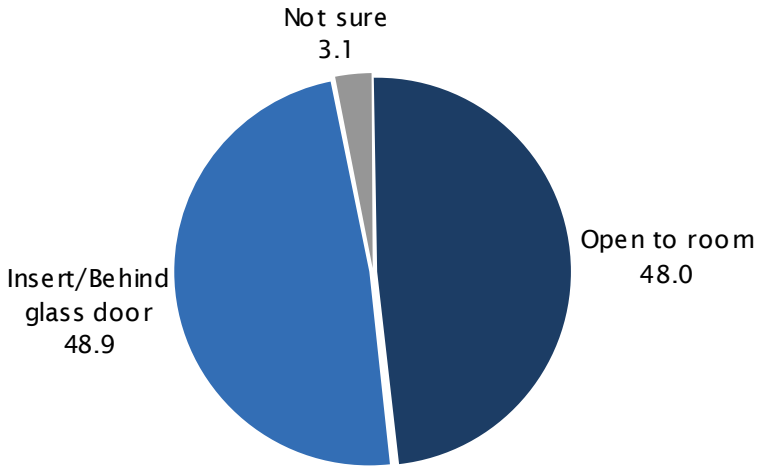


FIGURE 56 TYPE OF WOOD-BURNING FIREPLACE BY COUNTY (N = 520)

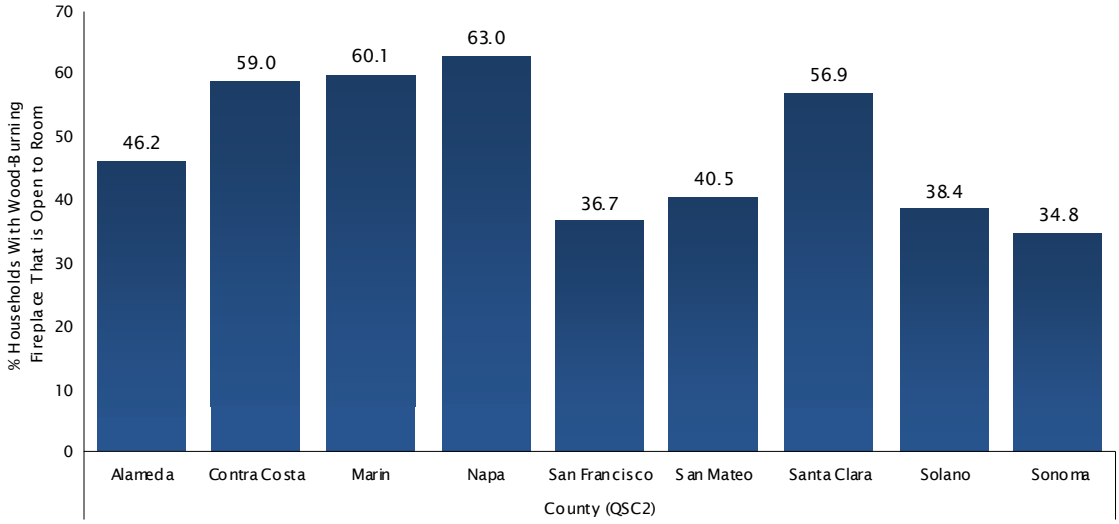
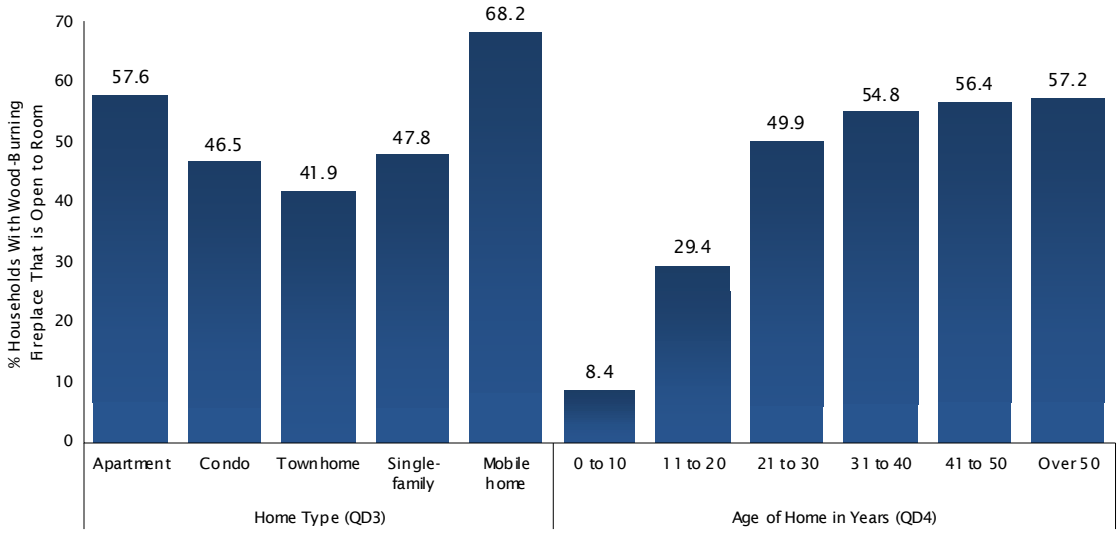


FIGURE 57 TYPE OF WOOD-BURNING FIREPLACE BY HOME TYPE & AGE OF HOME IN YEARS (N = 520)



Traditional fireplaces that are open to the room are not efficient at heating a room, and they also cause more pollution than other alternatives. After informing respondents of this fact, those who reported that their fireplace is open to the room were asked if they would be willing to switch to a cleaner burning alternative, such as a fireplace insert or a gas fireplace. Among this subgroup, nearly half (49%) stated that they would be willing to switch to a cleaner alternative (see Figure 58). When compared to their respective counterparts, willingness to switch to a cleaner alternative was highest among households in Alameda and San Francisco counties, as well as those with homes over 50 years in age (see Figure 59).

Question 31 *Traditional fireplaces that are open to the room are not efficient at heating a room, and they also cause more pollution than other alternatives. Would you be willing to switch your wood burning fireplace to a cleaner burning alternative, such as a fireplace insert that contains the fire behind a glass door, or converting to a gas fireplace?*

FIGURE 58 WILLINGNESS TO REPLACE OPEN-ROOM FIREPLACE (N = 250)

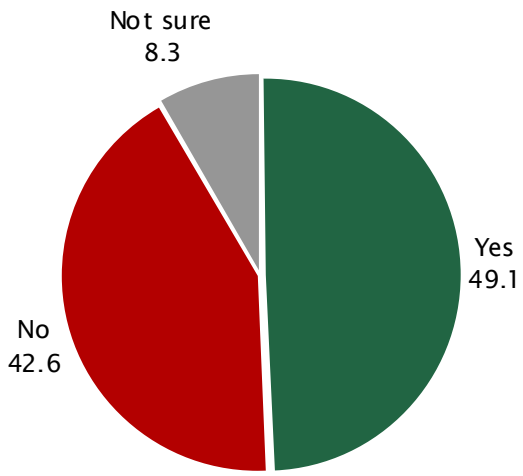
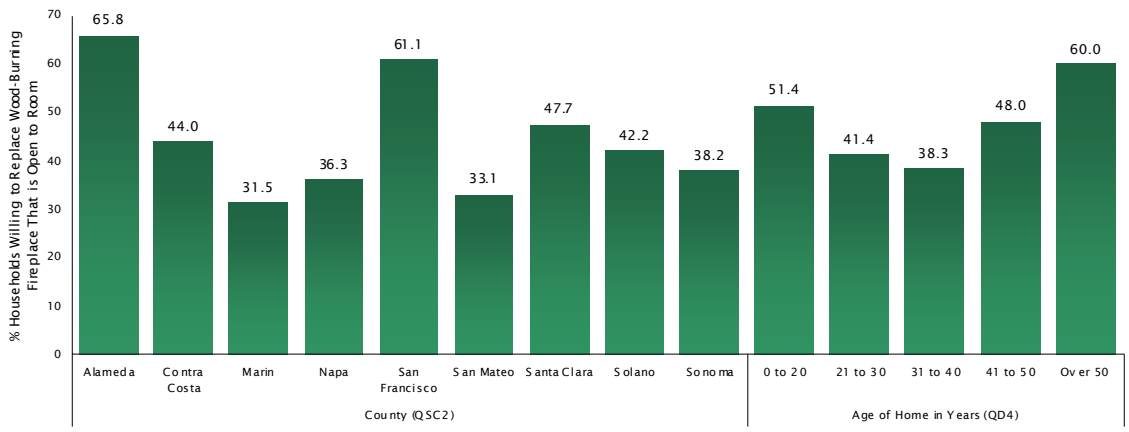


FIGURE 59 WILLINGNESS TO VOLUNTARILY REPLACE OPEN-ROOM FIREPLACE BY COUNTY & AGE OF HOME IN YEARS (N = 250)



Question 31 measured respondents' willingness to replace their current open, wood-burning fireplace *in the absence* of a financial incentive to do so. For those respondents who were unwilling to replace their current device in this context, the survey next inquired as to whether they would do so if they were offered a financial incentive.

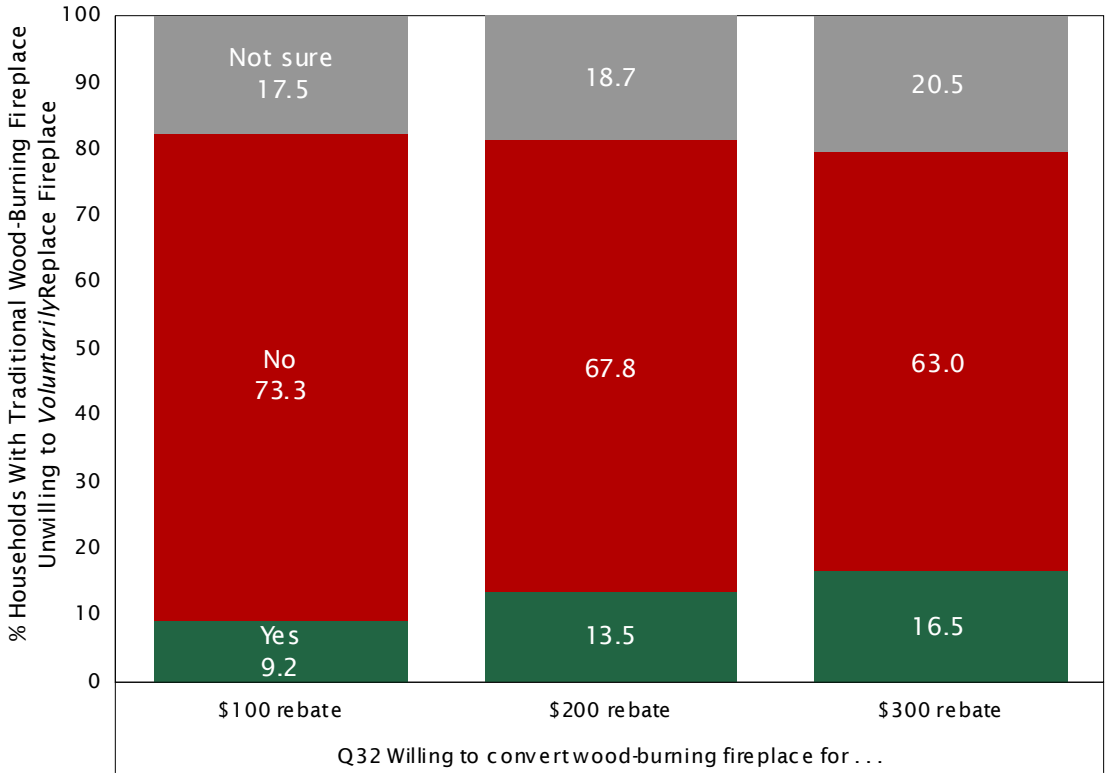
In Question 32, respondents who indicated that they were unwilling to replace their open, wood-burning fireplace for a cleaner alternative were first informed that there is a government sponsored program that offers rebates to residents who replace their traditional fireplaces with a cleaner alternative. They were then asked if they would participate in this program knowing that

they would receive a $100 rebate. For those who remained unwilling at $100, rates of $200 and $300 were tested in sequential order.

As shown in Figure 60, 9% of those who were initially unwilling to replace their open, wood-burning fireplace for a cleaner alternative were willing to do so if a $100 rebate were offered. As the amount of the rebate increased to $200 and $300, the proportion of respondents who indicated that they would participate in the program increased to 14% and 17%, respectively. Combining residents who are willing to replace their fireplace without a financial incentive (see Figure 58) with those who require $300 suggests that nearly two-thirds of the target population would be receptive to a modest rebate program.

Question 32 *There is a government sponsored program that offers rebates to residents who convert their open wood burning fireplaces to a cleaner burning alternative. If you knew that you could receive a rebate of _____ dollars, would you participate in this program?*

FIGURE 60 WILLINGNESS TO REPLACE OPEN-ROOM FIREPLACE WITH REBATE INCENTIVE (N = 127)



Policy Attitudes & Knowledge

Although the focus of the study was on measuring wood-burning behavior, the survey also sought to measure residents' attitudes as they relate to wood-burning policies, as well as their knowledge of basic wood-burning facts.

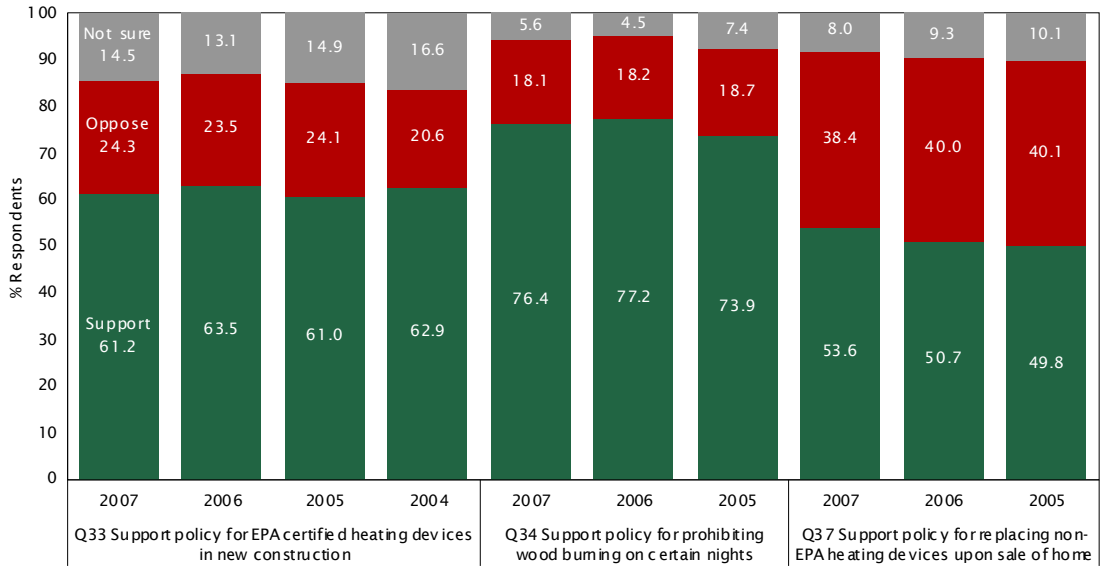
POLICY ATTITUDES The first three questions in this series measured residents' support for several policy changes designed to improve the air quality in the region. In Question 33, all respondents were asked whether they would support a local policy that would require all new housing construction to use only gas fireplaces or EPA certified fireplace inserts, wood stoves or pellet stoves. Question 34 measured respondent support for a local policy that prohibits wood burning on nights when air pollution is expected to reach unhealthy levels. Finally, Question 37 inquired as to residents' willingness to support a policy that would require older wood stoves to be removed or replaced with a less polluting model when a home is sold to a new owner. The answers to all three questions have been combined in Figure 61.

Question 33 *Local governments throughout the Bay Area are considering a policy that would require all new housing construction to use only gas fireplaces or EPA certified fireplace inserts, wood stoves or pellet stoves. Would you support or oppose this policy?*

Question 34 *In some areas, local governments have a policy that prohibits wood burning on nights when air pollution is expected to reach unhealthy levels. Would you support or oppose a policy like this in your area?*

Question 37 *some areas, local governments require that when a home that contains an older wood stove is sold to a new owner, the stove must be removed-or replaced with a new stove or fireplace that causes less pollution. Would you support or oppose a policy like this in your area?*

FIGURE 61 SUPPORT FOR PROPOSED POLICY CHANGES: 2004 ~ 2007 (N = 1,200)



For each of the policies tested, the predominant position was one of support for the policy. Sixty-one percent (61%) supported requiring all new housing construction to use only gas or EPA certified models, 76% favored prohibiting wood burning on nights when air pollution is expected to reach unhealthy levels, and 54% favored requiring the replacement of older wood stoves with a cleaner burning model when a home is sold to a new owner (see Figure 61). The public's support for these policies has not changed significantly since 2006. For the interested reader, Figures 62-64 display how support for each policy varied by county, age, and household income.

FIGURE 62 SUPPORT FOR PROPOSED POLICY CHANGES BY COUNTY (N = 1,200)

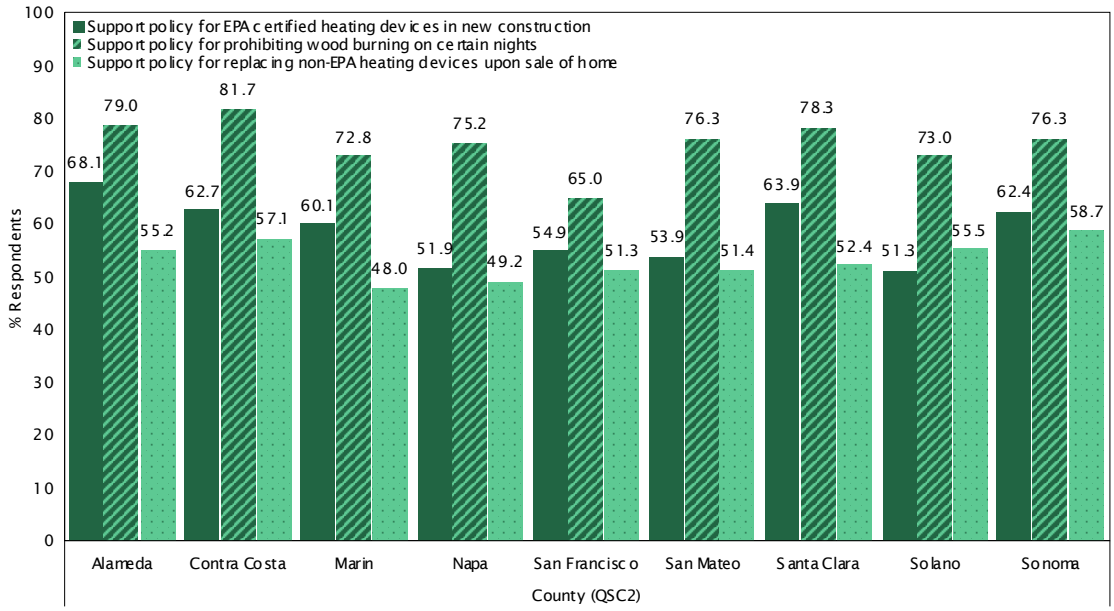


FIGURE 63 SUPPORT FOR PROPOSED POLICY CHANGES BY AGE (N = 1,200)

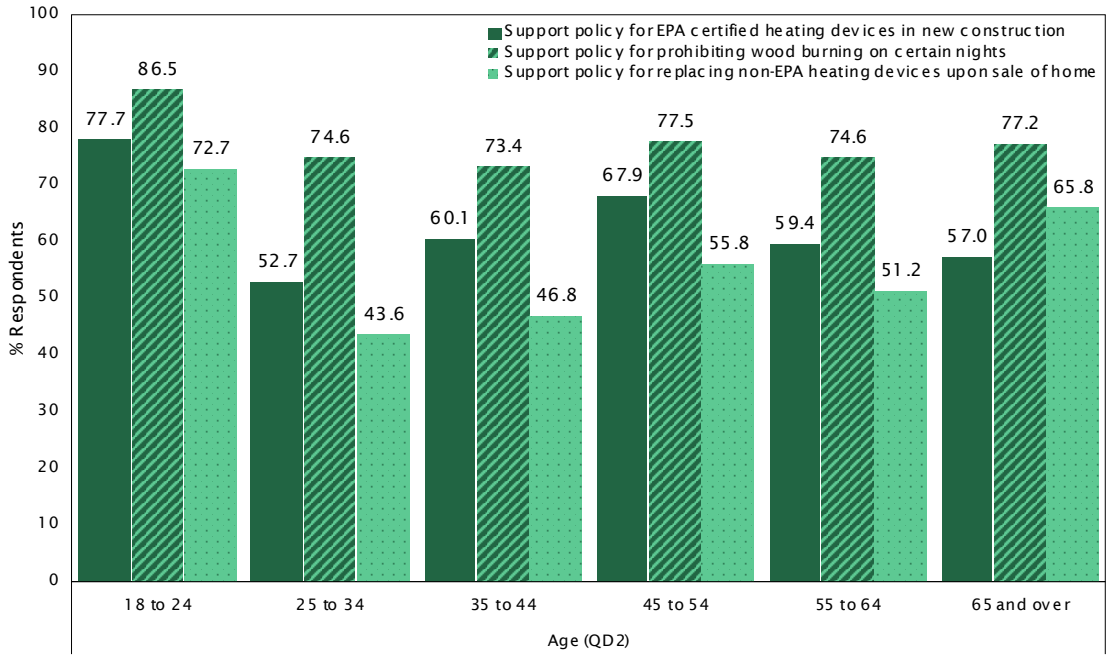
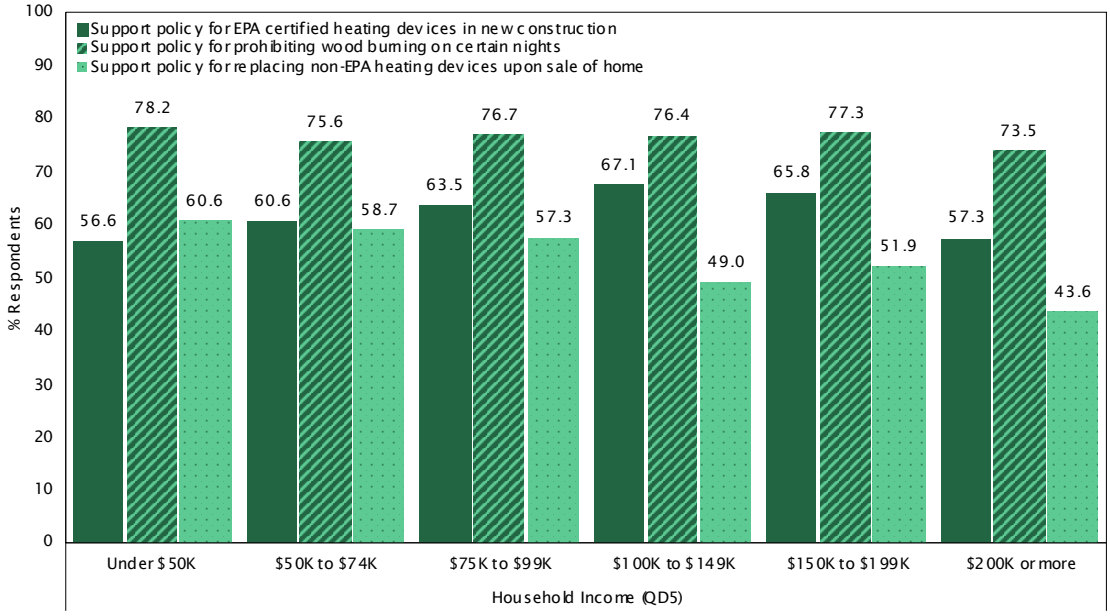


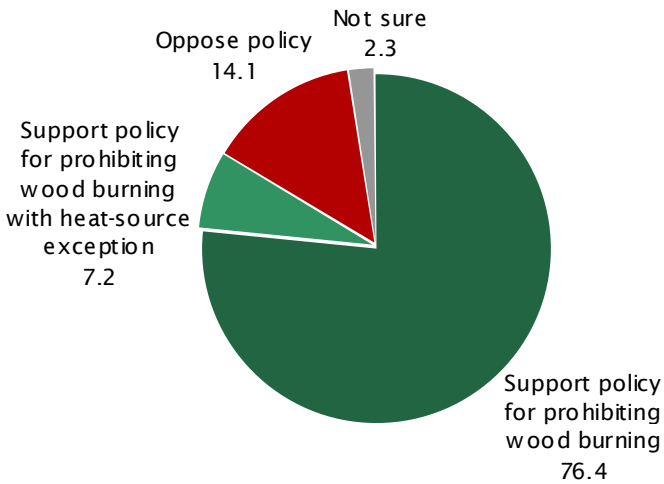
FIGURE 64 SUPPORT FOR PROPOSED POLICY CHANGES BY HOUSEHOLD INCOME (N = 1,200)



The minority of respondents who initially opposed (or were unsure of their position regarding) the policy to prohibit wood burning on nights when air pollution is expected to reach unhealthy levels in Question 34 were subsequently asked if their position would change if they knew that the policy would not apply to homes for which wood-burning is their only source of heat (Question 35). Figure 65 combines the answers to both questions to show that in addition to the 76% of respondents who initially supported the policy in Question 34, an additional 7% indicated that they would support the policy upon learning of the exemption for wood-burning dependent homes. Less than 15% of respondents continued to oppose the policy.

Question 35 *If you knew that the policy would not apply to homes for which wood-burning is their only source of heat, would you support or oppose a policy that prohibits wood burning on nights when air pollution is expected to reach unhealthy levels?*

FIGURE 65 SUPPORT FOR POLICY PROHIBITING WOOD BURNING ON STA NIGHTS AMONG HOMES WITH OTHER HEAT SOURCES (N = 1,200)



Regardless of their position on the policy that restricts wood-burning under certain conditions, all respondents were next asked if they would be willing to dial an anonymous hotline to report someone in their neighborhood if they were burning wood on a designated "no burn" day. Overall, 45% of respondents indicated that they would be willing to report such activity, whereas 43% stated they would not dial a hotline and 12% were unsure (Figure 66). When compared to their respective counterparts, those in Contra Costa County, those under the age of 25, and females were the most willing to dial a hotline to report prohibited wood burning in their neighborhood (see Figures 67 & 68).

Question 36 *If someone in your neighborhood was burning wood even though it was a designated "no burn" day, would you be willing to dial an anonymous hotline so the person could be notified to stop burning?*

FIGURE 66 WILLING TO DIAL ANONYMOUS HOTLINE TO REPORT BURNING (N = 1,200)

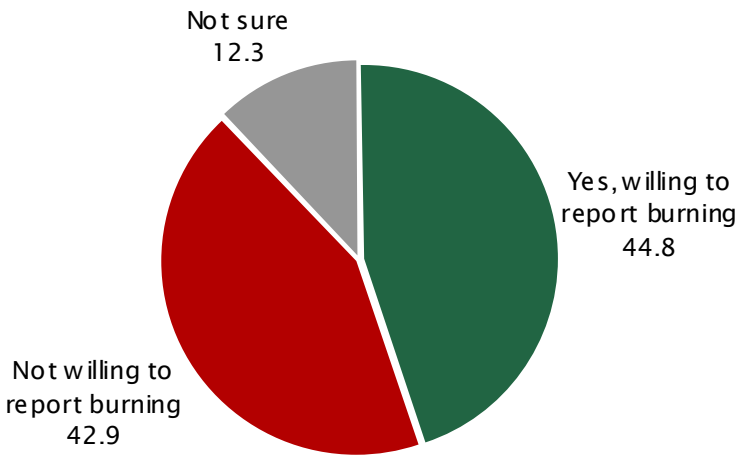


FIGURE 67 WILLING TO DIAL ANONYMOUS HOTLINE TO REPORT BURNING BY COUNTY (N = 1,200)

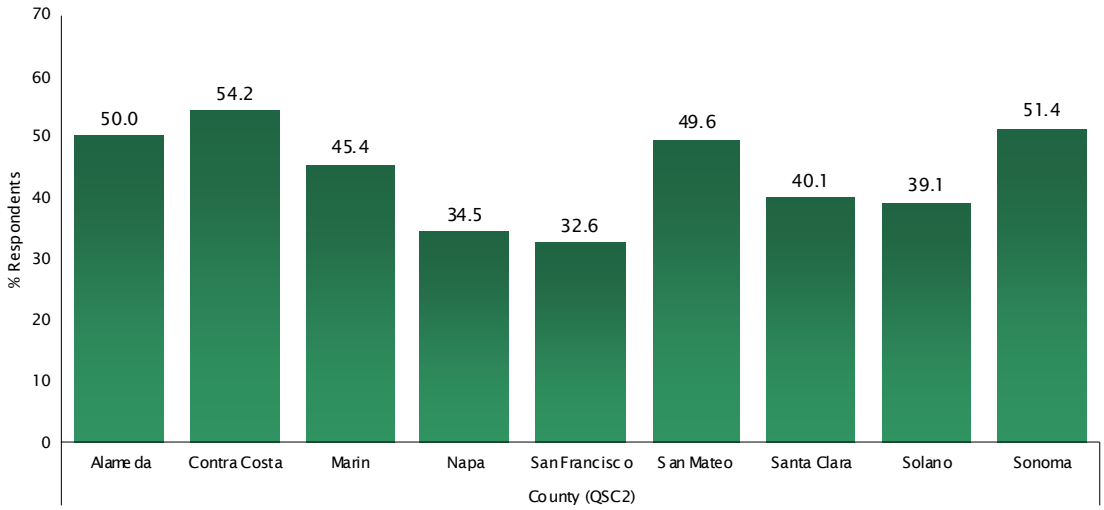
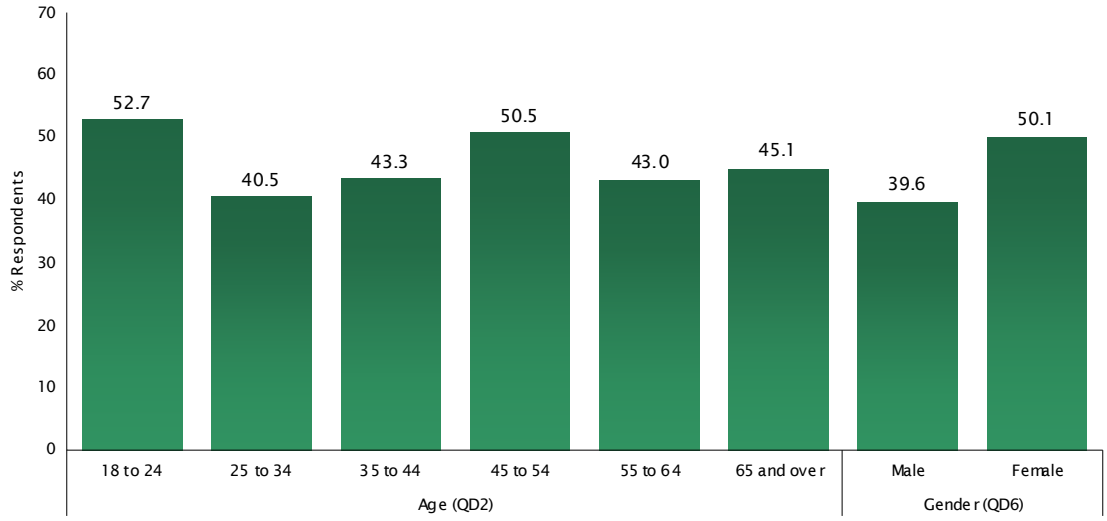


FIGURE 68 WILLING TO DIAL ANONYMOUS HOTLINE TO REPORT BURNING BY AGE & GENDER (N = 1,200)

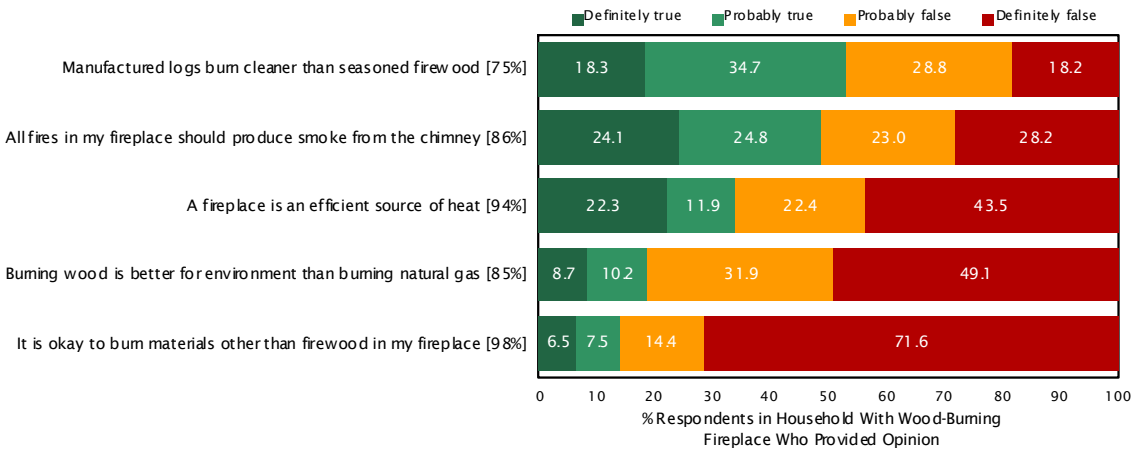


KNOWLEDGE ABOUT WOOD-BURNING The final question in this series (Question 38) was designed to test respondents' knowledge of basic wood-burning facts. For each of the statements shown to the left of Figure 69, respondents were simply asked to indicate whether they thought the statement was true or false. To avoid a systematic position bias, the statements were administered in random order for each respondent.

A clear majority of respondents correctly labeled as false the statements *It is okay to burn materials other than firewood in my fireplace* (86% false), *Burning wood is better for the environment than burning natural gas* (81%), and *A fireplace is an efficient source of heat* (66%). The percentage who correctly identified as false the final two statements was much lower, however, with just 51% disagreeing that *All fires in my fireplace should produce visible smoke from the chimney* and 47% disagreeing that *Manufactured logs burn cleaner than seasoned firewood.*

Question 38 *Next, I'm going to read a series of statements. For each statement, I'd like to know whether you think the statement is true or false.*

FIGURE 69 STATEMENTS ABOUT FIREPLACES & POLLUTION (N = 520)



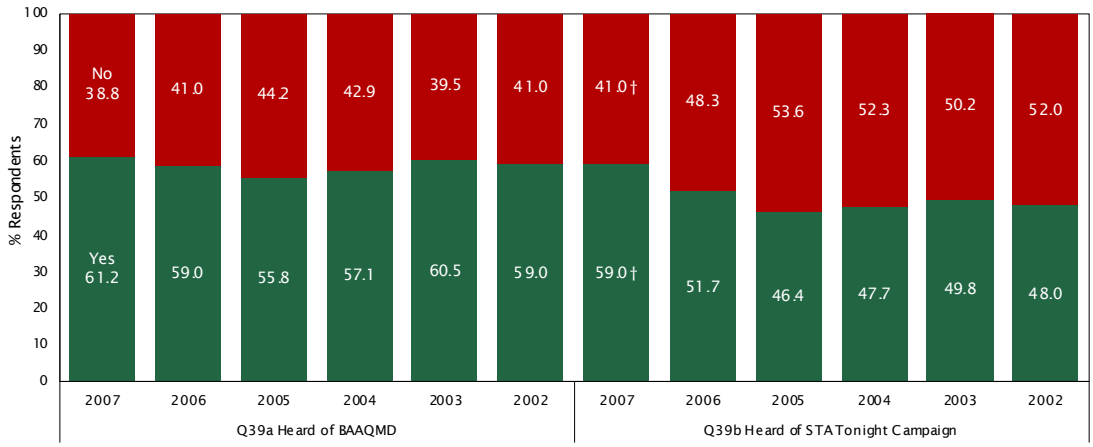
Perceptions of Entities

To identify and track perceptions of the BAAQMD and the Spare the Air Tonight Campaign, a series of three questions was presented to respondents to measure their awareness and opinions of the agency and the program, as well their recent exposure to information about each. Because these questions were asked in an identical manner in past winter surveys dating back to 2002, the results from these studies are also shown for comparison.

AWARENESS Figure 70 shows that awareness of the BAAQMD (61%) remained statistically similar to awareness of the agency in prior years, although awareness of the Spare the Air Tonight Campaign (59%) increased significantly in the past year.

Question 39 *Let's change gears a bit. Have you ever heard of the _____?*

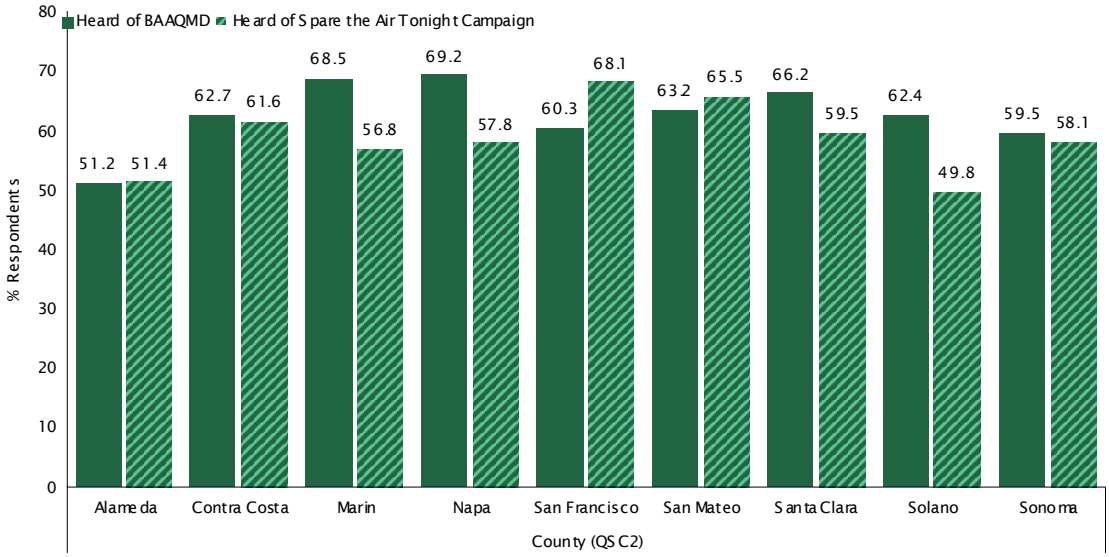
FIGURE 70 AWARENESS OF BAAQMD & SPARE THE AIR TONIGHT CAMPAIGN: 2002 ~ 2007 (N = 1,200)



† Statistically significant change ($p < 0.05$) between the 2006 and 2007 studies.

Across the nine member counties, awareness of the BAAQMD was highest in Napa (69%) and Marin (69%) counties in 2007, and lowest in Alameda County (51%). Awareness of the Spare the Air Tonight Program, on the other hand, ranged from a high of 68% in San Francisco County to a low of 50% in Solano County (see Figure 71).

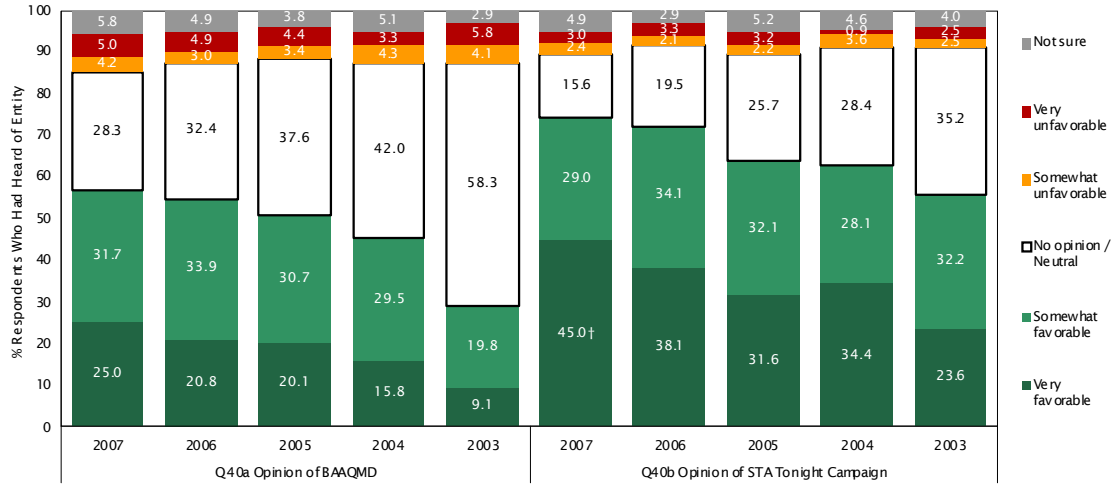
FIGURE 71 AWARENESS OF BAAQMD & SPARE THE AIR TONIGHT CAMPAIGN BY COUNTY (N = 1,200)



OPINIONS Respondents who had heard of an entity were next asked whether their opinion of the entity was favorable, unfavorable, or neutral. Figure 72 displays the findings of these questions in 2007, as well as the findings from the 2006, 2005, 2004 and 2003 studies.[13]

Question 40 *Generally speaking, would you say you have a favorable or unfavorable opinion of the _____, or do you have no opinion either way?*

FIGURE 72 OPINIONS OF BAAQMD & SPARE THE AIR TONIGHT CAMPAIGN: 2003 ~ 2007 (BAAQMD N = 734; STA TONIGHT CAMPAIGN N = 708)



† Statistically significant change ($p < 0.05$) between the 2006 and 2007 studies.

13. The response options for these questions were more limited in the 2002 study, so comparisons are not provided in Figure 72.

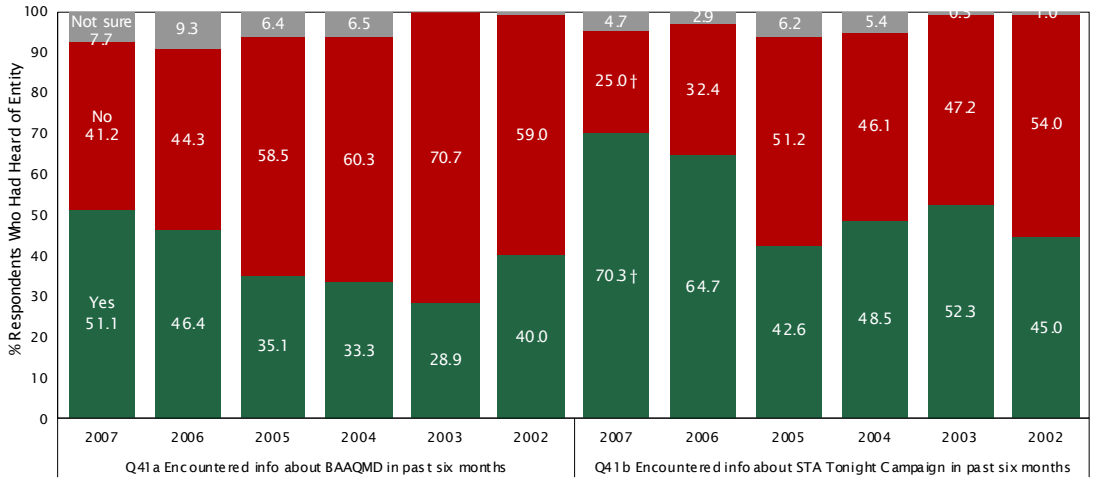
Of the individuals who received the question in 2007, more than half (57%) held a favorable opinion of the BAAQMD, whereas 28% held a neutral opinion and just 9% held an unfavorable opinion. When compared to the opinions recorded in the previous studies, opinions of the BAAQMD have become increasingly favorable—from 29% favorable in 2003 to 57% favorable in 2007.

The same is also true of public opinion regarding the Spare the Air Tonight Campaign, although the trend is less pronounced. Whereas 56% of respondents who had heard of the campaign held a favorable opinion of it in 2003, the corresponding percentage for 2007 was substantially higher at 74%. It should be noted, moreover, that the percentage who reported that they had a *very* favorable opinion of the Program increased significantly in the past year, from 38% to 45%.

EXPOSURE TO INFORMATION The last question in this series asked respondents whether they recalled hearing, reading or seeing any news stories, advertisements or public service announcements about the BAAQMD and/or the Spare the Air Tonight Program in the six months prior to the interview. As shown in Figure 73, the proportion of respondents who recalled being exposed to information about the BAAQMD during this period was 51%, up from 46% in 2006. The proportion of respondents who recalled exposure to the Spare the Air Tonight Program was also significantly higher in 2007 (70%) when compared to 2006 (65%).

Question 41 *In the past six months, have you heard, read, or seen any news stories, advertisements, or public service announcements about the _____?*

FIGURE 73 ENCOUNTERED INFORMATION ABOUT BAAQMD & SPARE THE AIR TONIGHT CAMPAIGN IN PAST SIX MONTHS: 2002 ~ 2007 (BAAQMD N = 734; STA TONIGHT CAMPAIGN N = 708)



† Statistically significant change ($p < 0.05$) between the 2006 and 2007 studies.

For the interested reader, Figures 74 and 75 display the percentage of *all* respondents who recalled hearing, reading or seeing information about the BAAQMD and the Spare the Air Tonight Program—not just among those who had heard of the agency or program as shown in Figure 73. Among all respondents, recalled exposure was greatest for the agency among San Francisco County residents, those with wood-burning heating devices in the home, and respondents between the ages of 55 and 64. Recalled exposure to information about the Spare the Air Tonight program was also highest among San Francisco County residents, those with wood-burning heating devices in the home, and respondents between the ages of 55 and 64.

FIGURE 74 ENCOUNTERED INFORMATION ABOUT BAAQMD & SPARE THE AIR TONIGHT CAMPAIGN IN PAST SIX MONTHS BY COUNTY (N = 1,200)

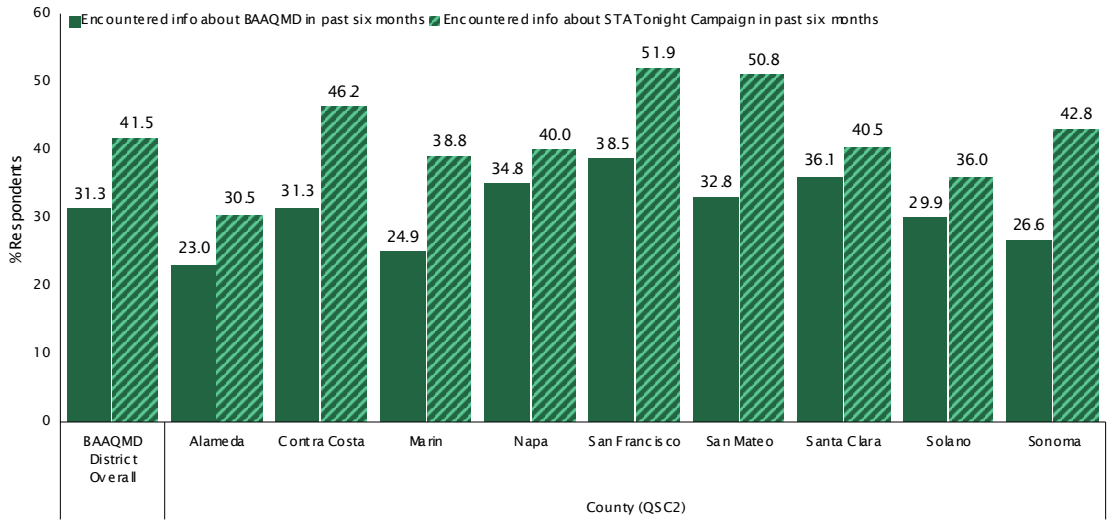
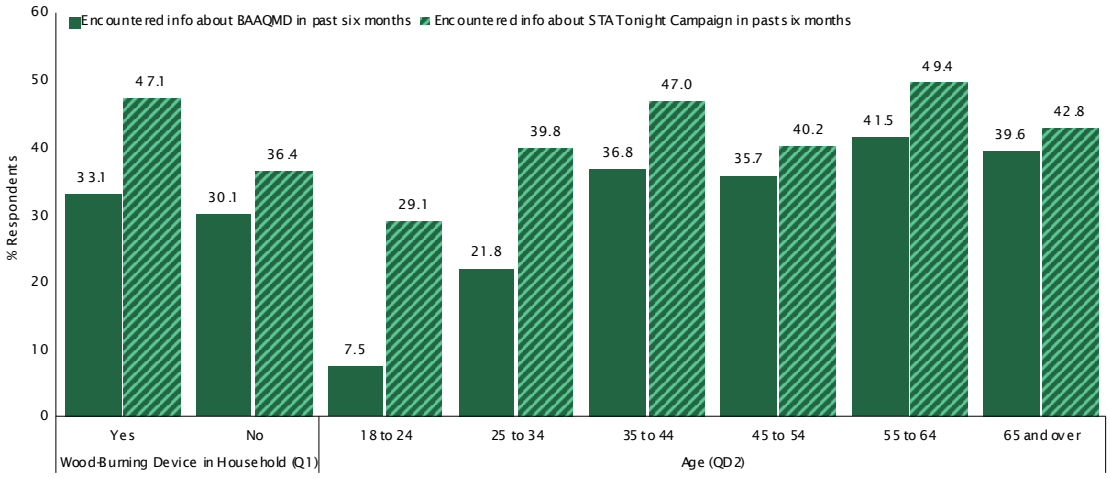


FIGURE 75 ENCOUNTERED INFORMATION ABOUT BAAQMD & SPARE THE AIR TONIGHT CAMPAIGN IN PAST SIX MONTHS BY WOOD-BURNING DEVICE IN HOUSEHOLD & AGE (N = 1,200)



Background & Demographics

Table 5 Demographics of Sample

	Study Year					
	2007	2006	2005	2004	2003	2002
Total Respondents	*1,200*	*988*	*2,625*	*700*	*400*	*400*
Drivers in Household	%	%	%	%	%	%
Zero to one	29	27	27	27	31	32
Two to three	62	63	64	65	59	60
Four or more	8	8	7	7	10	8
Refused	2	2	2	2	1	1
Age						
18 to 29	19	19	20	11	16	15
30 to 39	21	25	22	19	19	18
40 to 49	20	18	20	23	21	18
50 to 64	19	21	19	18	25	27
65 and over	15	14	14	21	13	18
Refused	6	3	5	8	7	5
Home Type						
Apartment	20	20	21	20	21	16
Condo	6	5	6	4	5	2
Town home	6	7	8	8	5	4
Single-family detached	63	63	60	63	66	73
Mobile home	2	3	2	2	2	4
Refused	3	2	4	3	3	1
Age of Home						
0 to 10 years	13	12	11	10	14	20
11 to 20 years	12	10	14	10	9	18
21 to 30 years	14	12	13	12	14	20
31 to 40 years	16	15	13	13	15	10
41 to 50 years	10	13	10	11	14	8
Over 50 years	26	28	27	30	18	10
Not sure / Refused	11	11	13	14	16	15
Household Income						
Under $50,000	20	20	21	22	24	33
$50,000 to $74,999	16	16	16	18	17	20
$75,000 to $99,999	12	15	15	16	16	13
$100,000 to $149,999	17	16	17	14	15	9
$150,000 to $199,999	8	7	6	6	3	3
$200,000 or more	7	8	7	4	6	2
Not sure / Refused	19	18	18	19	20	21
Gender						
Male	50	52	48	43	45	44
Female	50	48	52	57	55	56
County						
Alameda	21	21	21	23	22	-
Contra Costa	14	13	14	15	14	-
Marin	4	4	4	4	4	-
Napa	3	2	2	2	2	-
San Francisco	12	13	13	14	14	-
San Mateo	10	11	11	10	11	-
Santa Clara	24	24	24	23	23	-
Solano	5	6	6	3	5	-
Sonoma	5	6	5	5	6	-

Table 5 displays the demographic and background information collected during the survey. The demographic and background information was used to monitor the sample during data collection, as well as provide insight into how the results of the substantive questions of the survey vary across important subgroups of adults.

Methodology

This section of the report outlines the methodology and protocols used when conducting this study, as well as the motivation for employing certain techniques.

QUESTIONNAIRE With the questionnaire used in 2006 as a starting point, Dr. McLarney of True North Research worked closely with the BAAQMD to develop and refine an improved survey instrument for the 2007 study. In the interest of improving the *validity* and *reliability* of select opinion and behavior measures, the 2007 study continued several questionnaire changes that were first implemented in the 2004 season. The most notable of these changes addressed how the questionnaire measured the impacts of the Spare the Air Tonight Program. The changes were made so that the impacts of the winter program on wood burning behavior would be measured using the same basic methodology employed by the BAAQMD—and recommended by CARB and EPA[14]—to measure the impacts of the summer Spare the Air Program on driving behavior.[15]

Several questions were also added to the 2007 questionnaire with respect to policy attitudes, reporting behavior, and knowledge of wood-burning facts.

CATI & PRE-TEST Before fielding the survey, the questionnaire was CATI (Computer Assisted Telephone Interviewing) programmed to assist the live interviewers when conducting the interviews. The CATI program automatically navigates the skip patterns, randomizes the appropriate question items, and alerts the interviewer to certain types of keypunching mistakes should they happen during the interview. The integrity of the questionnaire was pre-tested internally by True North and by dialing into random homes within the District prior to formally beginning the survey. Two training sessions were conducted to familiarize interviewers with the study and to answer questions and clarify details of the study.

SAMPLE & WEIGHTING Because the primary focus of the study was to gather information from adults who reside within the District, households were chosen for this study using a random digit dial (RDD) sampling method. An RDD sample is drawn by first selecting all of the active phone exchanges (first three digits in a seven digit phone number) and working blocks that service the area. After estimating the number of listed households within each phone exchange that are located within the area, a sample of randomly selected phone numbers is generated with the number of phone numbers per exchange being proportional to the estimated number of households within each exchange in the area. This method ensures that both listed and unlisted households are included in the sample. It also ensures that new residents and new

14. The CARB/EPA Method is summarized in the Transportation Research Board's (TRB) journal—*Transportation Research Record*—for 2004 in an article entitled *Development of a Quantification Method for Measuring the Travel and Emissions Impacts of Episodic Ozone Alert Programs* (pages 153-159). It is described in detail in the following air resources guidance report: CARB, "Quantification Method Reference Manual: A Method to Measure Travel and Emissions Impacts of Ozone Action Public Education Programs," April 2003. In addition to Eric Schreffler, Dr. Timothy McLarney and Richard Sarles, the TRB paper and guidance report were co-authored by Joann Lu and Jeff Weir of CARB, as well as Thomas Higgins and Dr. Will Johnson of K.T. Analytics.
15. For a detailed description of the updated CARB/EPA Method and its application to the BAAQMD's summer Spare the Air Program, see the *Spare the Air Study: 2007 Summer Ozone Season* report prepared for the BAAQMD by True North & ESTC.

developments have an opportunity to participate in the study, which is not true if the sample were based on a telephone directory.

Although the RDD method is widely used for local and regional surveys, the method also has several known limitations that must be adjusted for to ensure representative data. Research has shown, for example, that individuals with certain demographic profiles (e.g., older women) are more likely to be at home and are more likely to answer the phone even when other members of the household are available. If this tendency is not adjusted for, the RDD sampling method will produce a survey that is biased in favor of women—particularly older women. To adjust for this behavioral tendency, the survey included a screening question which initially asked to speak to the youngest male adult available in the home. If a male adult was not available, then the interviewer was instructed to speak to the youngest female adult currently available. This protocol was followed—to the extent needed—to ensure a representative sample of adults. In addition to following this protocol, the sample demographics were monitored as the interviewing proceeded to make sure they were within certain tolerances. Because the District is composed of seven complete counties and two partial counties, respondents were initially asked the ZIP code of their residence so that only those within the District's boundaries were included in the study.

The final raw data were weighted by age groups within each county to exactly match updated demographic projections for 2007 based on Census and California Department of Finance estimates. The results presented in this report are the weighted results, which are representative at the District-wide level, as well as within the nine member counties.

MARGIN OF ERROR By using an RDD probability-based sample and monitoring the sample characteristics as data collection proceeded, True North ensured that the sample was representative of adults and households in the District. The results of the sample can thus be used to estimate the opinions of *all* adults—and characteristics of *all* households—in the District. Because not every adult or household in the District participated, however, the results have what is known as a statistical margin of error due to sampling. For household characteristics, the margin of error refers to the difference between what was found in the survey of 1,200 households for a particular question and what would have been found if all of the estimated 2,432,147 households in the District had been interviewed.

For example, in estimating the percentage of households who have an outdoor fireplace, firepit or chiminea that they have used in the past 12 months, the margin of error can be calculated if one knows the number of households in the District, the size of the sample, a chosen confidence level, and the distribution of responses to the question. The appropriate equation for estimating the margin of error, in this case, is shown below.

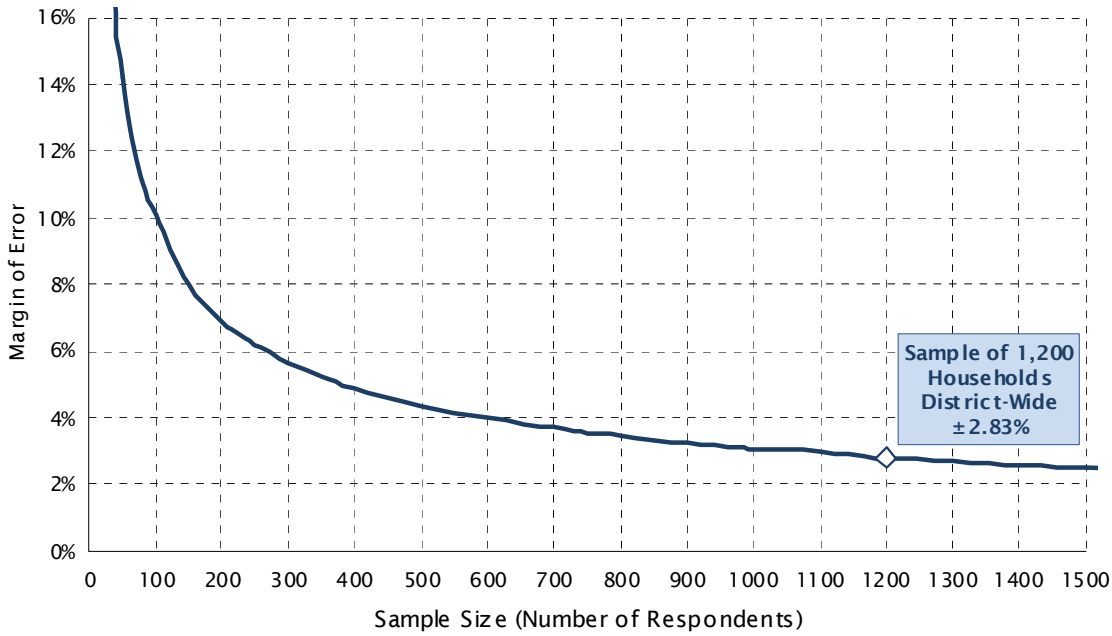
$$\hat{p} \pm t\sqrt{\left(\frac{N-n}{N}\right)\frac{\hat{p}(1-\hat{p})}{n-1}}$$

where $\hat{p}$ is the proportion of households that indicated that they possess and have used their outdoor fireplace, firepit or chiminea during this period (0.10 for 10% in this example), N is the total number of households in the District (2,432,147), n is the sample size that received the question (1,200), and t is the upper $\alpha/2$ point for the t-distribution with $n-1$ degrees of free-

dom (1.96 for a 95% confidence interval). Solving this equation using these values reveals a margin of error of ± 1.70%. This means that with 10% of sampled households indicating they own and have used an outdoor fireplace, firepit, or chiminea in the past 12 months, one can be 95 percent confident that the actual percentage is between 8% and 12%.

Figure 76 provides a graphic plot of the *maximum* margin of error in this study. The maximum margin of error for a dichotomous percentage result occurs when the answers are evenly split such that 50% provide one response and 50% provide the alternative response (i.e., $\hat{p}$ = 0.5). For this survey, the maximum margin of error is 2.83% for District-wide estimates.

FIGURE 76 MAXIMUM MARGIN OF ERROR PLOT



Within this report, figures and tables show how responses to certain questions varied by county, as well as by demographic characteristics such as presence of a heating device, respondent age, etc. Because the margin of error grows exponentially as the sample size decreases (see the left side of Figure 76), the reader should use caution when generalizing and interpreting the results of questions received by only a small percentage of the sample or when comparing results within subgroups of respondents.

DATA COLLECTION Interviews were conducted via telephone during weekday evenings (5:30PM to 9PM) and on weekends (10AM to 5PM) between December 14, 2007 and February 10, 2008. Interviews were conducted on randomly selected evenings (n = 843), as well as targeted for Spare the Air Tonight episodes throughout the season (n = 357). It is standard practice not to call during the day on weekdays because most working adults are unavailable and thus calling during those hours would bias the sample.

DATA PROCESSING Data processing consisted of checking the data for errors or inconsistencies, coding and recoding responses, categorizing open-end responses, and preparing frequency analyses and crosstabulations. Because the research objectives involved comparing the 2007 results with those of prior studies, where appropriate, True North also accessed and processed data from the 2006, 2005, 2004, 2003 and 2002 winter season surveys to allow for meaningful comparisons.

STATISTICAL SIGNIFICANCE Many of the figures and tables in this report present the results of questions asked in 2007 alongside the results found in prior years for identical questions. In such cases, True North conducted the appropriate tests of statistical significance to identify changes that likely reflect actual changes in public opinion or behavior over time—as opposed to being due to chance associated with selecting two cross-sectional samples independently and at random. Differences between studies are identified as *statistically significant* if we can be 95% confident that the differences reflect an actual change in public opinion or behavior between the two studies. Statistically significant differences within response categories over time are denoted by the † symbol which appears in the figure next to the appropriate response value for 2007.

ROUNDING Numbers that end in 0.5 or higher are rounded up to the nearest whole number, whereas numbers that end in 0.4 or lower are rounded down to the nearest whole number. These same rounding rules are also applied, when needed, to arrive at numbers that include a decimal place in constructing figures and charts. Occasionally, these rounding rules lead to small discrepancies in the first decimal place when comparing tables and pie charts for a given question.

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Winter 07-08 Spare the Air Survey
Designed by True North Research
Final Toplines
1,200 Respondents

Section 1: Introduction to Study			
Hi, my name is _____ and I'm calling on behalf of TNR, a public opinion research firm. We're conducting a survey concerning issues of importance to residents in the Bay Area region and we'd like to get your opinions.			
If needed: This is only a survey about important issues in the Bay Area—I'm NOT trying to sell anything. *If needed:* The survey should take no more than 15 minutes to complete. *If needed:* If now is not a convenient time, can you let me know a better time so I can call back? *If the person says they are an elected official or is somehow associated with the survey, politely explain that this survey is designed to the measure the opinions of those not closely associated with the study, thank them for their time, and terminate the interview.*			
SC1	To begin, what is the ZIP code of your residence? *Read zip code back to respondent to confirm before submitting. Terminate those that fall outside District.*		
	Record 5-digit ZIP code		Data on file
SC2	What county do you live in? [1,200]		
	1	Alameda	21%
	2	Contra Costa	14%
	3	Marin	4%
	4	Napa	3%
	5	San Francisco	12%
	6	San Mateo	10%
	7	Santa Clara	24%
	8	Solano	5%
	9	Sonoma	5%

Section 3: Heating Device Use		
I'd like to begin by asking you a few questions about heating devices that you may have in your home.		
Q1	Do you have a _____ in your home? *If yes, ask:* How many: _____s do you have in your home?	
A	Wood-burning fireplace* [1,200]	
	None	57%
	One	38%
	Two	5%
	Three or more	1%
B	Natural gas or propane fireplace [1,200]	
	None	77%
	One	19%
	Two	3%
	Three or more	0%
C	Pellet stove* [1,200]	
	None	96%
	One	4%
	Two	0%
	Three or more	0%
D	Woodstove* [1,200]	
	None	96%
	One	4%
	Two	0%
	Three or more	0%
If Q1.1a, Q1.1b, Q1.1c AND Q1.1d = (2, 98), skip to Q20.		
Only ask Q2 if Q1.1a = 1 OR Q1.1d = 1, otherwise skip to instruction preceding Q3.		

*48% of households reported at least one wood-burning device.

Q2	What type of wood do you primarily use in your wood-burning fireplace or woodstove: natural wood logs, manufactured logs such as Duraflame or Presto, scrap wood, pallets, or some other fuel? *If 'other', ask*: what type? [544]			
	1	Natural wood log	42%	*Ask Q3*
	2	Manufactured log/Duraflame/Presto	22%	*Skip to Q7*
	3	Scrap wood	1%	*Skip to Q7*
	4	Pallets (not pellets)	1%	*Skip to Q7*
	5	Never use fireplace	25%	*Skip to Q7*
	6	Other	2%	*Skip to Q7*
	98	Not sure	4%	*Skip to Q7*
	99	Refused	2%	*Skip to Q7*
Only ask Q3 if (Q1.1a = 1 and Q2 = 1) OR (Q1.1d = 1 and Q2 = 1), otherwise skip to Q7.				
Q3	What type of natural wood do you typically burn? [230]			
	1	Ash	1%	
	2	Eucalyptus	3%	
	3	Oak	51%	
	4	Pine (Cedar)	6%	
	6	Almond	4%	
	7	Fruitwood	1%	
	5	Other	8%	
	98	Not sure	24%	
	99	Refused	1%	
Q4	Do you typically purchase your wood from a wood supplier, the local store, or do you gather your own wood? [230]			
	1	Wood supplier	30%	
	2	Local store	20%	
	3	Gather own wood	42%	
	4	Other	5%	
	98	Not sure	3%	
	99	Refused	1%	

Q5	Do you tend to burn dry, seasoned wood or wood that is fresh-cut and somewhat moist? [230]		
	1	Dry, seasoned wood	88%
	2	Fresh-cut & moist	6%
	98	Not sure	5%
	99	Refused	1%
Q6	When you use your fireplace or woodstove, which of the following would you say is the primary reason you do so? For heating your home or for the ambiance of having a fire? [230]		
	1	Heat	55%
	2	Ambiance	40%
	98	Not sure	4%
	99	Refused	1%

For the next series of questions, when I refer to "winter" I mean the months of November through February.

Only ask Q7 for each appliance where Q1.1 = 1.

Q7	Will you use your _____ this winter?				
Do Not Randomize		Yes	No	Not Sure	Refused
A	Wood-burning fireplace [520]	55%	43%	3%	0%
B	Natural gas or propane fireplace [271]	67%	29%	4%	0%
C	Pellet stove [47]	56%	36%	2%	6%
D	Woodstove [54]	80%	18%	2%	0%

Only ask Q8 for each appliance where Q7 = 2.

Q8	Why do you not expect to use your _____ this winter? *Do Not Read Responses. Multiple Responses OK.*				
Do Not Randomize		Air Quality Reasons	Too Much Hassle	Heath Reasons	Other
A	Wood-burning fireplace [222]	23%	26%	8%	55%
B	Natural gas or propane fireplace [79]	11%	13%	6%	73%
C	Pellet stove [17]	16%	0%	0%	84%
D	Woodstove [9]	0%	11%	10%	78%

Read the following instruction if Q1.1c = 1.

For the remainder of this interview, when I refer to "burning wood" I mean burning any type of wood product, including wood pellets for a pellet stove.				
Only ask Q9 if Q7a = 1, Q7c = 1 or Q7d = 1. Otherwise, skip to Q20.				
Q9	How often do you expect to burn wood this winter? At least once per week or less often than that? *If unsure, ask them to estimate.* [328]			
	1	At least once per week	54%	*Skip to Q11*
	2	Less often than once per week	45%	*Ask Q10*
	98	Not sure / Refused	1%	*Skip to Q12*
Q10	Would you say that you will burn wood about two to three times per month, once per month, or less often than once per month? *If unsure, ask them to estimate.* [147]			
	1	Two to three times per month	33%	*Skip to Q12*
	2	Once per month	40%	*Skip to Q12*
	3	Less often than once per month	25%	*Skip to Q12*
	98	Not sure	1%	*Skip to Q12*
	99	Refused	0%	*Skip to Q12*
Q11	In a typical winter week, how many days do you expect to burn wood? *If unsure, ask them to estimate.* [177]			
	1	One day	19%	
	2	Two days	16%	
	3	Three days	19%	
	4	Four days	12%	
	5	Five days	15%	
	6	Six days	0%	
	7	Seven days	16%	
	98	Not sure	1%	
	99	Refused	0%	
Q12	Did you burn wood in the past seven days? [328]			
	1	Yes	49%	*Ask Q13*
	2	No	51%	*Skip to Q14*
	98	Not sure	1%	*Skip to Q14*
	99	Refused	0%	*Skip to Q14*

Q13	Did you burn wood yesterday or last night? [175]		
	1	Yes	51%
	2	No	48%
	98	Not sure	1%
	99	Refused	0%
Q14	In a typical day that you burn wood, how many hours of the day do you have a fire burning? *If unsure, ask them to estimate.* [328]		
	One		3%
	Two		16%
	Three		34%
	Four		20%
	Five or more		23%
	Not sure		4%
Only ask Q15 if Q7a = 1 or Q7d = 1.			
Q15	In a typical day that you burn wood, how many logs do you burn throughout the entire day? *If unsure, ask them to estimate.* [310]		
	One		18%
	Two		11%
	Three		13%
	Four		10%
	Five		8%
	Six		9%
	Seven or more		21%
	Not sure		11%

Section 4: Changes in Wood Burning Behavior			
Only ask Q16 if Q7a = 1, Q7c = 1 or Q7d = 1. Otherwise, skip to Q20.			
Q16	This winter, do you expect that you will burn wood more often, less often, or about the same frequency as you did last winter? [328]		
	1	More often	21%
	2	Less often	18%
	3	About the same	59%
	98	Not sure	2%
	99	Refused	0%

Q17	Were there occasions this winter when you normally would have burned wood, but decided not to? [328]			
	1	Yes	45%	*Ask Q18*
	2	No	52%	*Skip to Q20*
	98	Not sure	2%	*Skip to Q20*
	99	Refused	0%	*Skip to Q20*
Q18	Why did you decide not to burn wood on these occasions? *Do NOT Read Response Options. Multiple Responses OK.* [147]			
	1	Spare the Air Tonight campaign/ advertisements asking people not to burn wood/Don't Light the Night campaign	27%	*Ask Q19*
	2	Air quality reason/health reason	20%	*Ask Q19*
	3	Other	54%	*Skip to Q20*
	98	Not sure	6%	*Skip to Q20*
	99	Refused	0%	*Skip to Q20*
Q19	So far this winter, how many times did you choose not to burn wood because of air quality or health-related reasons? *If respondent is unsure, ask them to estimate.* [63]			
	One		18%	
	Two		39%	
	Three		14%	
	Four		4%	
	Five or more		25%	

18.2% of households with at least one wood-burning device reported not burning wood this winter (Q7) or a reduction in burning wood this winter (Q17) because of STA Campaign / Air quality info, or because of health concerns paired with encountering STA Campaign / Air quality info.

Section 5: Awareness of Campaign				
Q20	During this winter, have you heard, read, or seen any news stories, advertisements, or public service announcements about Spare the Air Tonight, poor air quality, or requests not to use your fireplace, pellet stove, or woodstove? [1,200]			
	1	Yes	62%	*Ask Q21*
	2	No	37%	*Skip to Q22*
	98	Not sure	1%	*Skip to Q22*
	99	Refused	0%	*Skip to Q22*

Q21	Where did you see or hear the news story, advertisement or public service announcement? *Don't read choices. Multiple responses OK.* [745]		
	1	Television	52%
	2	Radio	33%
	3	Newspaper	18%
	4	Website	3%
	5	Billboard	3%
	6	E-mail/E-mail Air Alert	3%
	7	Fax/Fax Alert	0%
	8	Bus signs	1%
	9	Other	5%
	98	Not sure	5%
	99	Refused	0%
Only ask Q22 if interviewing the day after a Spare the Air event. Otherwise, skip to Q23.			
Q22	Prior to taking this survey, were you aware that there was a "Spare the Air Tonight" advisory yesterday? [350]		
	1	Yes	21%
	2	No	78%
	98	Not sure	1%
	99	Refused	0%

Section 6: Attitudes about Wood Smoke				
Q23	Do you think there are any negative health effects associated with breathing wood smoke? [1,200]			
	1	Yes	70%	*Ask Q24*
	2	No	21%	*Skip to Q25*
	98	Not sure	9%	*Skip to Q25*
	99	Refused	0%	*Skip to Q25*

Q24	What are the negative health effects associated with breathing wood smoke? *Don't read options. Multiple response OK.* [842]			
	1	Lung Disease (general reference)	36%	
	2	Asthma	34%	
	3	Allergies	9%	
	4	Bronchitis	4%	
	5	Cancer	10%	
	6	Emphysema	7%	
	7	Chemicals/Carcinogens/Toxins in wood	11%	
	8	Carbon monoxide	9%	
	9	Other health issue	22%	
	98	Not sure	13%	
	99	Refused	0%	
Q25	Different neighborhoods in the Bay Area experience different levels of air pollution from wood smoke. In your opinion, does your neighborhood periodically experience air pollution from wood smoke? [1,200]			
	1	Yes	21%	*Ask Q26*
	2	No	70%	*Skip to Q27*
	98	Not sure	9%	*Skip to Q27*
	99	Refused	0%	*Skip to Q27*
Q26	Would you say that periodic air pollution from wood smoke in your neighborhood is a big problem, medium problem, or a small problem? [250]			
	1	Big problem	7%	
	2	Medium problem	30%	
	3	Small problem	61%	
	98	Not sure	2%	
	99	Refused	0%	

Section 7: Willingness to Change Heating Device				
Only ask Q27 if Q1.1 d= 1. Otherwise, skip to instruction preceding Q30.				
Q27	Was your woodstove manufactured before 1992? *If unsure, ask them to take an educated guess.* [52]			
	1	Yes, before 1992	35%	*Go to Q28*
	2	No, after 1992	44%	*Skip to Q30*
	98	Not sure	21%	*Skip to Q30*
	99	Refused	0%	*Skip to Q30*

Q28	New woodstoves burn much cleaner and are less polluting than woodstoves manufactured prior to 1992. Would you be willing to replace your older woodstove with a new, cleaner burning stove? [18]			
	1	Yes	40%	*Skip to Q30*
	2	No	29%	*Ask Q29*
	98	Not sure	31%	*Ask Q29*
	99	Refused	0%	*Ask Q29*
Q29	There is a government sponsored program that offers rebates to residents who replace their old woodstove with a new, cleaner burning model. If you knew that you could receive a rebate of _____ dollars, would you participate in this program?			
If respondent says 'yes', record 'yes' for all higher dollar amounts and skip to Q30.				

Do Not Randomize		Yes	No	Not sure	Refused
A	300 [11]	31%	37%	32%	0%
B	400 [11]	31%	37%	32%	0%
C	500 [11]	31%	37%	32%	0%
D	600 [11]	31%	37%	32%	0%

Only ask Q30 if Q1.1a = 1. Otherwise, skip to Q33.

Q30	Is your wood-burning fireplace open to the room, or does it have a fitted insert that contains the fire behind a glass door? [520]			
	1	Open to room	48%	*Ask Q31*
	2	Insert/behind glass door	49%	*Skip to Q33*
	98	Not sure	3%	*Skip to Q33*
	99	Refused	0%	*Skip to Q33*
Q31	Traditional fireplaces that are open to the room are not efficient at heating a room, and they also cause more pollution than other alternatives. Would you be willing to switch your wood burning fireplace to a cleaner burning alternative, such as a fireplace insert that contains the fire behind a glass door, or converting to a gas fireplace? [250]			
	1	Yes	49%	*Skip to Q33*
	2	No	43%	*Ask Q32*
	98	Not sure	8%	*Ask Q32*
	99	Refused	0%	*Ask Q32*

Q32	There is a government sponsored program that offers rebates to residents who convert their open wood burning fireplaces to a cleaner burning alternative. If you knew that you could receive a rebate of _____ dollars, would you participate in this program? [66]				
	If respondent says 'yes', record 'yes' for all higher dollar amounts and skip to Q33.				
Do Not Randomize		Yes	No	Not sure	Refused
A	100 [127]	9%	73%	18%	0%
B	200 [127]	13%	68%	19%	0%
C	300 [127]	16%	63%	20%	0%

Section 8: Policy Attitude				
Q33	Local governments throughout the Bay Area are considering a policy that would require all new housing construction to use only gas fireplaces or EPA certified fireplace inserts, woodstoves or pellet stoves. Would you support or oppose this policy? [1,200]			
	1	Support	61%	
	2	Oppose	24%	
	98	Not sure	14%	
	99	Refused	0%	
Q34	In some areas, local governments have a policy that prohibits wood burning on nights when air pollution is expected to reach unhealthy levels. Would you support or oppose a policy like this in your area? [1,200]			
	1	Support	76%	*Skip to Q36*
	2	Oppose	18%	*Ask Q35*
	98	Not sure	6%	*Ask Q35*
	99	Refused	0%	*Ask Q35*
Q35	If you knew that the policy would not apply to homes for which wood-burning is their only source of heat, would you support or oppose a policy that prohibits wood burning on nights when air pollution is expected to reach unhealthy levels? [284]			
	1	Support	31%	
	2	Oppose	60%	
	98	Not sure	10%	
	99	Refused	0%	

Q36	If someone in your neighborhood was burning wood even though it was a designated "no burn" day, would you be willing to dial an anonymous hotline so the person could be notified to stop burning? [1,200]		
	1	Yes	45%
	2	No	43%
	98	Not sure	12%
	99	Refused	1%
Q37	In some areas, local governments require that when a home that contains an older woodstove is sold to a new owner, the stove must be removed, or replaced with a new stove or fireplace that causes less pollution. Would you support or oppose a policy like this in your area? [1,200]		
	1	Support	54%
	2	Oppose	38%
	98	Not sure	8%
	99	Refused	0%

Section 9: Fireplace & Pollution Knowledge

Only ask Q38 if Q1.1a = 1. Otherwise, skip to Q39.

Q38 Next, I'm going to read a series of statements. For each statement, I'd like to know whether you think the statement is true or false. Here is the first one: _____. Do you think this statement is true or false? Would that be definitely (true/false) or probably (true/false)? [520]

	Randomize	Definitely True	Probably True	Probably False	Definitely False	Not sure	Refused
A	A fireplace is an efficient source of heat	21%	11%	21%	41%	5%	1%
B	All fires in my fireplace should produce visible smoke from the chimney	21%	21%	20%	24%	13%	1%
C	It is okay to burn materials other than firewood in my fireplace	6%	7%	14%	70%	2%	0%
D	Burning wood is better for the environment than burning natural gas	7%	9%	27%	42%	14%	1%
E	Manufactured logs burn cleaner than seasoned firewood	14%	26%	21%	14%	24%	1%

Section 10: BAAQMD and Spare the Air Tonight Name Recognition			
Q39	Let's change gears a bit. Have you ever heard of the _____? *Code 'Not sure' as 'No'.*		
Randomize		Yes	No
A	Bay Area Air Quality Management District [1,200]	61%	39%
B	Spare the Air Tonight Campaign [1,200]	59%	41%

Only ask Q40 and Q41 for each item in Q39 that respondent had heard of (ask if Q39 = 1).

Q40	Generally speaking, would you say you have a favorable or unfavorable opinion of the _____, or do you have no opinion either way? *Get answer and ask:* Would that be very or somewhat favorable / unfavorable?						
		Very Favorable	Somewhat Favorable	Neutral/ No Opinion Either Way	Somewhat Unfavorable	Very Unfavorable	Not sure
A	Bay Area Air Quality Management District [734]	25%	32%	28%	4%	5%	6%
B	Spare the Air Tonight Campaign [708]	45%	29%	16%	2%	3%	5%

Q41	In the past six months, have you heard, read, or seen any news stories, advertisements, or public service announcements about the _____?			
		Yes	No	Not sure
A	Bay Area Air Quality Management District [734]	51%	41%	8%
B	Spare the Air Tonight Campaign [708]	70%	25%	5%

Section 11: Off-Season Burning			
Q42	Do you have an outdoor fireplace, firepit or chiminea (chim-uh-nay-uh) that you've used to burn wood in the past 12 months? [1,200]		
	1	Yes	10%
	2	No	90%
	99	Refused	0%

Q43	Do you ever burn wood indoors or outdoors in non-winter months, between March and October? *If no, record. If yes, ask:* Which months during this period to you tend to burn wood? *Check all months that apply.* [1,200]			
	1	March	6%	*Ask Q44*
	2	April	4%	*Ask Q44*
	3	May	3%	*Ask Q44*
	4	June	7%	*Ask Q44*
	5	July	8%	*Ask Q44*
	6	August	7%	*Ask Q44*
	7	September	5%	*Ask Q44*
	8	October	6%	*Ask Q44*
	9	No non-winter burning	82%	*Skip to D1*
	98	Not sure	3%	*Skip to D1*
	99	Refused	0%	*Skip to D1*
Q44	How often do you burn wood in non-winter months? At least once per week or less often than that? *If unsure, ask them to estimate.* [175]			
	1	At least once per week	9%	*Skip to Q46*
	2	Less often than once per week	88%	*Ask Q45*
	98	Not sure	1%	*Skip to D1*
	99	Refused	2%	*Skip to D1*
Q45	In non-winter months, would you say that you burn wood about two to three times per month, once per month, or less often than once per month? *If unsure, ask them to estimate.* [154]			
	1	Two to three times per month	24%	*Skip to D1*
	2	Once per month	19%	*Skip to D1*
	3	Less often than once per month	53%	*Skip to D1*
	98	Not sure	3%	*Skip to D1*
	99	Refused	1%	*Skip to D1*

Q46	In a typical week during non-winter months, how many days do you expect to burn wood? *If unsure, ask them to estimate.* [14]		
	1	One day	56%
	2	Two days	16%
	3	Three days	0%
	4	Four days	5%
	5	Five days	6%
	6	Six days	0%
	7	Seven days	6%
	98	Not sure	8%
	99	Refused	4%

Section 11: Background & Demographics		
Thank you so much for your participation. I have just a few background questions for statistical purposes.		
D1	Including yourself, how many licensed drivers live in your household? [1,200]	
	None	2%
	One	27%
	Two	48%
	Three or more	14%
	Refused	8%
D2	In what year where you born? Recoded into age below. [1,200]	
	18 to 24	11%
	25 to 34	20%
	35 to 44	21%
	45 to 54	17%
	55 to 64	10%
	65 and over	14%
	Refused	6%

D3	Do you live in an apartment, condo, townhome, single-family detached home, or mobile home? [1,200]		
	1	Apartment	20%
	2	Condo	6%
	3	Townhome	6%
	4	Single-family detached home	63%
	5	Mobile home	2%
	99	Refused	3%
D4	Approximately how many years ago was your home built? [1,200]		
	1	0 to 10 years	13%
	2	11 to 20 years	12%
	3	21 to 30 years	14%
	4	31 to 40 years	16%
	5	41 to 50 years	10%
	6	Over 50 years	26%
	98	Not sure	9%
	99	Refused	1%
D5	This last question is for statistical purposes only. As I read the following income categories, please stop me when I reach the category that best represents your household's total annual income before taxes. [1,200]		
	1	Under $50,000	20%
	2	$50,000 to $74,999	16%
	3	$75,000 to $99,999	12%
	4	$100,000 to $149,999	17%
	5	$150,000 to $199,999	8%
	6	$200,000 or more	7%
	7	Not sure / Refused	19%
Those are all of the questions that I have for you! Thanks very much for participating. This survey is sponsored by the Bay Area Air Quality Management District.			
Post-Interview Items			
D6	Gender [1,200]		
	1	Male	50%
	2	Female	50%

D7	Month of Interview [1,200]		
	11	November	4%
	12	December	37%
	1	January	41%
	2	February	18%