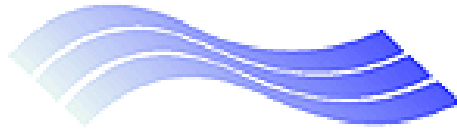


SACRAMENTO METROPOLITAN



AIR QUALITY  
MANAGEMENT DISTRICT

**Sacramento Metropolitan Air Quality District  
2007 WOOD BURN RESEARCH STUDY**

**FINAL REPORT  
MAY, 2007**

**SUBMITTED BY:**

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## 2007 WOOD BURN RESEARCH STUDY

### FINAL REPORT

MAY, 2007

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## EXECUTIVE HIGHLIGHTS (4 PAGES)

### Inventory

- ❖ The vast majority (92%) of Sacramento County residents surveyed heat their home with natural gas (63%) or electricity (29%). Three percent use wood as their primary heat source.
  - There were no respondents who indicated that wood was their sole source of heat.
  - Respondents who use wood as their primary fuel source to heat their home were more likely to own their home, and describe it as a single-family home than those who used other fuel sources.
- ❖ Overall, more than half (54%) of all households have at least one wood-burning device. Half (50%) had an interior device and 9% an exterior one, including the 6% who owned both types. In general, only a third (34%) of low-income respondents owned a wood-burning device, significantly fewer than the general population as a whole.
- ❖ One third (33%) of all respondents in the base study of Sacramento County residents were classified as “burners”: they owned wood or pellet burning devices (either indoors or outdoors), and they burned wood, pellets, or manufactured logs at least once this past winter. Significantly fewer “burners” were identified in the low-income group: approximately one in five (17%) were classified as burners.
  - There were only three demographic characteristics that distinguished burners from non-burners: home ownership (more burners than non-burners were owners rather than renters), type of home (more burners than non-burners lived in single family dwellings), and household income (more burners than non-burners lived in wealthier households). All other demographics did not distinguish burners from non-burners.
- ❖ Last winter, 58% of the general population burners and 68% of the low-income burners lit wood, pellet or manufactured log fires at least once a week.
  - Wood was the most commonly consumed fuel in fireplaces (77%), fireplace inserts (87%), and wood stoves (100%) of the general population households. Additionally, 30% of pellet stove/insert users usually burned wood (instead of pellets) in their pellet stoves. Low-income respondents used similar types of fuel, namely wood.
- ❖ Overall, about six in ten indoor burners (57%) used wood fires more for pleasure than for supplemental heating.
  - However, the reason for burning wood appears to be linked to the type device used: fireplace users were significantly more likely to burn wood for pleasure while wood stove users and pellet stove users were more likely to burn for supplemental heating.
- ❖ On average, burners in the general population used 5 logs to fuel a typical wood fire that lasted almost 4 hours. However, fireplace users who burned artificial logs consumed significantly less fuel than wood burners yet achieved about the same length of burn.
  - Similar results were found among low-income burners: the average burn lasted 3.3 hours and consumed 4.2 logs.
- ❖ Half (50%) of those who owned wood-burning devices said they burned less wood last winter compared to a typical winter.
- ❖ Three in ten interior device owners recalled occasions when they decided not to burn wood when they normally would have, and about half of them attributed their decision

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to air quality or environmental reasons (25%), health reasons (7%) or because they saw or heard a request not to burn (14%).

- When asked specifically about air quality and health reasons, about half said they chose not to burn wood because of air quality (56%) and health reasons (46%). The median number of times that wood burns were avoided for air quality reasons was 4.5 and it was slightly higher (6 times) for health reasons

### Air Quality and PM Pollution Knowledge

- ❖ A third of all respondents rated the quality of air in the area positively, but the majority (two-thirds) felt local air quality was only “poor” or “fair”, indicating a broad recognition of air pollution in Sacramento County.
- ❖ There is much room for educating the general public about the negative effects of residential wood-burning on wintertime air quality: approximately four in ten respondents felt wood-burning was not a serious cause of air pollution.
  - Males were significantly more likely than females to say that residential wood-burning fires were “not at all serious” causes of air pollution (55% vs. 36%).
- ❖ Only 16% of all respondents in the general population said they were “very knowledgeable” about particulate matter pollution. An additional 61% felt “somewhat knowledgeable”. Low-income respondents claimed significantly less knowledge about PM pollution.
  - Wood burners were just as knowledgeable (or not) about particulate matter pollution as non-wood burners.
  - More males than females claimed to be “very” knowledgeable about PM pollution.
  - A higher percentage of respondents who claimed the least knowledge were: poorer, less well educated, not registered to vote, and lacking Internet access than their counterparts.

### Awareness of Summertime Spare The Air

- ❖ Recognition of the summertime Spare the Air Program in Sacramento County is very high among the general population – nearly nine out of ten respondents in the base study were familiar with the voluntary driving reduction program. There was less familiarity among respondents in the low-income group, but it was still relatively high at 80%.

### Baseline Awareness of Wintertime No-Burn Requests

- ❖ Awareness of the requests not to burn wood during the winter of 2006/2007 was the same across the general population, low-income respondents and burners as well as non-burners. It was fairly high, given that there was no paid advertising of the requests this past winter: 59% of the respondents in the general population base survey and 57% of those in the low-income group said they heard the wintertime no burn requests.
  - Older respondents were more likely to have heard the requests not to burn than younger respondents.

### Support for a Voluntary No-Burn Program and Likelihood to Comply

- ❖ The vast majority of all respondents approved of a voluntary no-burn rule (85%) and said they would comply with it (93%) – a strong endorsement for a voluntary measure. However, these figures include respondents who do not own wood-burning devices or burn wood.

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- Although support was slightly lower among the low-income group than among the general population of respondents, the majority (77%) approved of a voluntary no-burn measure and 86% said they would comply with one.
- Perhaps the best reflection of levels of acceptance of a voluntary measure to request that residents not burn wood is between those who burned wood this year versus non-burners. Results indicated that the majority (83%) of those who burned wood this past winter also approved of a voluntary no-burn rule. The highest approval was among respondents who owned wood-burning devices but did not use them (93%). In terms of compliance, there were no differences – the vast majority (over 90%) in all groups said they would comply.

### Actual Voluntary Compliance in Winter of 2006/2007

- ❖ Among those who were aware of the requests not to burn during the past winter, only 34% of the general population base survey respondents, and 41% of low-income respondents actually complied and voluntarily reduced the number of fires they burned.
  - Among the group of burners, of those who heard the no-burn requests, 46% complied and reduced their number of fires. In other words, nearly half of the Sacramento County residents who burned wood reduced the number of fires they burned this past winter, specifically because they heard the requests – but just over half chose to not refrain from burning.
  - A possible explanation is that those burners who did not comply do not believe that residential wood-burning is a serious cause of wintertime air pollution or that there is a problem with the overall quality of air in the area.
- ❖ Further analysis revealed a discrepancy between actual compliance behavior and hypothetical compliance (what respondents said they would do) -- the largest discrepancy occurring in the group of respondents who did not comply with the request not to burn but said they would. Those who did comply and also said they would comply were far more consistent.

### Support for a Mandatory No-Burn Regulation

- ❖ Although approval was significantly lower than for a voluntary no-burn rule, the majority of all respondents (71%) nevertheless approved a mandatory no-burn rule.
  - Those who “strongly” approved of a mandatory no-burn rule did so mainly because of air quality and health concerns.
  - The 20% who “strongly” disapproved of a mandatory no-burn rule did so mainly because they don’t want their freedom limited by government regulation.
  - Approval of a mandatory no-burn rule was about the same in the low-income group as in the general population: 73% either somewhat or strongly approved a mandatory measure.
  - Not surprisingly, approval of a mandatory no-burn rule was significantly lower among burners (56%) than non-burners (78%) in the general population.

### Likelihood to Comply with a Mandatory No-Burn Regulation

- ❖ Among those in the general population of Sacramento County respondents who owned wood-burning devices (whether or not they used them), over three-quarters (78%) said they would likely comply with a mandatory no-burn rule.
  - Respondents were significantly more likely to say they would comply with a mandatory no-burn rule than to approve of it, indicating that prior support may not be a necessary requirement for successful implementation of a mandatory rule. In other words, respondents may not like the regulation but the majority would hypothetically comply with it.

### **Discrepancy between Support for a Mandatory No-Burn Rule and Actual Behavior**

- ❖ Further analysis revealed approximately the same magnitude of discrepancy between what respondents who owned wood-burning devices said they would do voluntarily and what they actually did this past winter (about 60% less), regardless of whether or not they supported a mandatory no-burn rule.
- ❖ However, actual levels of compliance this past winter did vary according to whether or not owners supported a mandatory rule: among those who approved of mandatory measures, 37% actually reduced the number of fires they burned. This was significantly higher than the 24% of respondents who complied but who disapproved of mandatory measures.
  - Nevertheless, because the majority (63%) of even favorably-disposed respondents of a mandatory no-burn rule did not voluntarily reduce the number of fires they burned this past winter, if a mandatory regulation was implemented, it would probably have to be visibly and publicly enforced in order to increase levels of compliance.

### **Communication Strategies**

- ❖ The general news media, such as TV, radio, and newspaper, would be the best way to let residents know whether or not they can burn wood on a particular day.
  - Preference for a recorded telephone message varied by a few demographic features (income, ethnicity, education, Internet access, type of dwelling and wood burn activity). Ethnicity influenced the level of positive ratings of e-mail and text messages.
  - There were no differences by demographics in terms of the positive ratings for the use of general media or posting information on the website.
- ❖ Electronic billboards along the freeway and telephone calls were identified as other effective ways to advise the public about a no-burn day.
  - Eight percent said they would like to receive something in the mail. Although this would obviously not be a way to alert the public about a no-burn request for the next day, a closer look at the verbatim responses implies an opportunity for public education about air quality and no-burn days in general.

These results were based on 401 telephone interviews conducted in April, 2007 with a random sample of Sacramento County residents, representative of the population as a whole. Results are accurate to within +/- 4.9%, 19 times out of 20. A total of 139 interviews were also conducted with a group of low-income (based on federal guidelines) residents.

## **PROJECT BACKGROUND & OBJECTIVES**

The mission of the Sacramento Metropolitan Air Quality Management District (SMAQMD) is to protect public health and the environment through innovative and effective programs that aim to improve air quality in Sacramento County. The District conducts a Spare The Air Program that now has two seasonal components. The summer season runs from May 1 through October 31 and focuses mainly on reducing driving during the hot summer months. The winter season runs from November 1 to April 30 and focuses on reducing the amount of fine particulate matter (PM) pollution that is caused by burning wood in fireplaces, woodstoves, and outside fire pits and chimeneas. [The winter PM voluntary reduction program was not advertised to the general public to the same extent as the summer program in the 2006-07 season: it was advertised mainly through voluntary subscription to AirAlert messages and press releases.] A Spare The Air (STA) day/night is triggered when the air quality index (AQI) reaches or exceeds 127. When a winter STA day/night is called, the No Burn program urges residents to refrain from using their wood-burning devices.

The objectives of the current study were to conduct interviews with a representative sample of Sacramento County residents as well as with a group of low-income (based on federal guidelines) residents in order to assess:

- the current inventory as well as use of wood-burning devices,
- baseline awareness of PM pollution and the District's voluntary No Burn Program,
- effectiveness of the No Burn Program in terms of encouraging residents not to burn wood on specific STA days,
- support for (or opposition to) a voluntary No Burn Program,
- support for (or opposition to) a mandatory No Burn Program, and
- likely compliance with voluntary and mandatory curtailment program.

## **RESEARCH METHODOLOGY**

Aurora Research Group was contracted to conduct this public opinion research study.

For the general population base study, random-digit-dialed (RDD) telephone interviews were completed with a representative sample of 401 Sacramento County residents.

The District was also interested in understanding the opinions and behavior of low-income residents, that is, the households that had earnings of \$20,000 or less.<sup>1</sup> An oversample of 98 additional telephone surveys was therefore conducted, using a sample that specifically targeted the selected population of interest (ZIP codes with a high incidence low-income residents. These interviews were combined with the 41 interviews

<sup>1</sup> Current federal poverty guidelines identify a family unit consisting of 4 persons and earning \$19,350 or less as poor. 2005 HHS Poverty Guidelines. Federal Register, Vol. 70, No. 33, February 18, 2005, pp.8373-8375.(Source: <http://aspe.hhs.gov/poverty/05poverty.shtml>)

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that were obtained in the base study, for a total of 139 completed interviews with low-income residents.

The margin of error for the study as a whole was + or – 4.9%, at the 95% confidence level. In other words, we are 95% sure that the true population parameters lie within +/- 4.9% of the sample statistics. As an example, if a response category to a question were chosen by 50% of respondents, we would be 95% sure that the true population parameters would be between 45.1% and 54.9% (50.0% +/- 4.9%). The margin of error for the subgroup of low-income residents (139 surveys in total) is much larger (+/- 8.3% at the 95% confidence level).

Aurora Research Group designed the questionnaire which addressed the previously-mentioned objectives, and SMAQMD staff approved the final survey. Most of the questions were asked in a closed-ended format, but three questions were asked as open-ended. Verbatim responses were captured and later categorized for quantitative analyses. (Transcripts of all the verbatim responses will be provided in the statistical binder.) The questionnaire was translated into Spanish and 6% of the general base study interviews were conducted in Spanish. The questionnaire was programmed for a CATI system and interviews took approximately 13 minutes on average to administer. Respondents were screened for age (adults at least 18 years old<sup>2</sup>) and to confirm residency in Sacramento County. Interviewing took place between April 7 and April 25, 2007.

### **Methods of Analysis**

Survey results were analyzed using univariate, and multi-variate statistical techniques. The type of analysis depended upon the kind of variable analyzed and the hypotheses that were generated through an examination of the initial results. Unless otherwise noted, frequency percentages cited in this document represent *adjusted* frequencies, meaning that percentages have been adjusted to account for any non-responses (refusals to answer) or non-qualified responses (questions not answered due to answers to previous questions).

Researchers are interested in assessing whether or not the differences in observed percentages between certain groups of individuals are due to chance, or if they represent real differences among the subpopulations. Differences are identified by running statistical analyses and are discussed in the report. Statistical significance within crosstabulation tables was calculated using chi square ( $\chi^2$ ) statistics. Tests of proportion were used to identify differences in responses between questions or groups of respondents. The level of significance was generally set to a p value of .01.

### **Caveat:**

The sole purpose of this report is to provide a collection, categorization and summary of public opinion data. Aurora Research Group intends to neither endorse nor criticize the Sacramento Metropolitan Air Quality Management District; or their policies, products, board of directors or staff. The Client shall be solely responsible for any modifications, revisions, or further disclosure/distribution of this report.

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<sup>2</sup> In order to speak with someone under 18 years of age, by law we would need to get the parents' written permission.

## **RESULTS & CONCLUSIONS**

The survey results are organized and presented as follows: the inventory of wood-burning devices and their use is first presented. Included in this section a subpopulation of “burners” was identified. Within each section of the report, the overall base survey results based on the 401 completed surveys with the general population of Sacramento County residents are first presented. Next, results from a group of low-income respondents are presented (41 surveys from low-income (under \$20,000 per year) households in the base study were combined with an oversample of 98 surveys with low-income residents for a combined total of 139 respondents in the low-income group) and any significant differences from the general population in the base study are discussed. This is followed by results which contrast households which burned wood this past winter (burners) with those who did not (non-burners). Finally, any statistically significant group differences or demographic characteristics (age, income, ethnicity, gender, internet access, the number of people living in the house, home ownership, the age of the dwelling, the type of dwelling, air alert subscription, voter registration, or education<sup>3</sup>) are presented. In other words, up to 13 separate cross-tabulations will have been conducted for each question. If no group results are described, it is an indication that they were not significant differentiators for a particular question. Unless otherwise specified, the reported results exclude responses of “undecided” as well as refusals. The order of topics presented in the report was chosen as the most logical in terms of meeting the information requirement objectives of the study and does not necessarily conform to the order of the questions within the survey.

## **INVENTORY OF HEATING DEVICES**

### **General Population Base Survey**

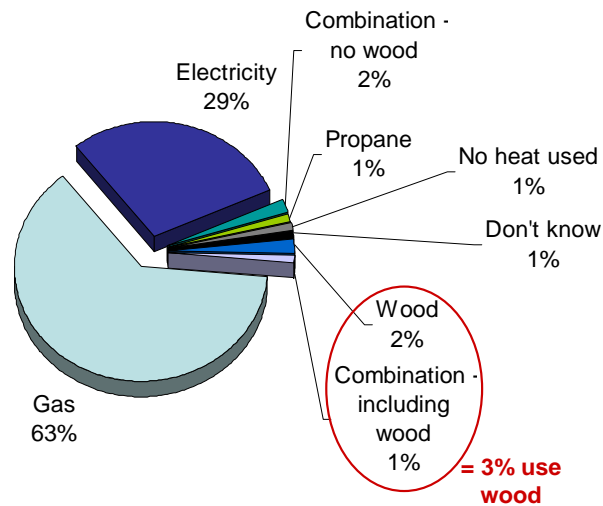
- ❖ **1 The vast majority (92%) of Sacramento County residents surveyed heat their home with natural gas (63%) or electricity (29%). Three percent use wood as their primary heat source, although it was not found to be their sole source of heat.**

All respondents were asked to identify how they primarily heat their home. It can be seen in Figure 1 that natural gas was the fuel used most frequently, mentioned by six in 10 respondents (63%). Twenty-nine

<sup>3</sup> The reader is referred to the demographic characteristics section near the end of this report to see how the demographics were categorized.

percent heat their home with electricity. Other fuels mentioned by fewer than 5% included: wood (2%) or a combination including wood (1%), a combination not including wood (2%), and propane (1%). In other words, 3% use wood as a primary source of heat. One percent said they do not heat their house (but use blankets) and one percent was unsure.

**FIGURE 1 – PRIMARY HEAT SOURCE**  
(AMONG ALL RESPONDENTS)



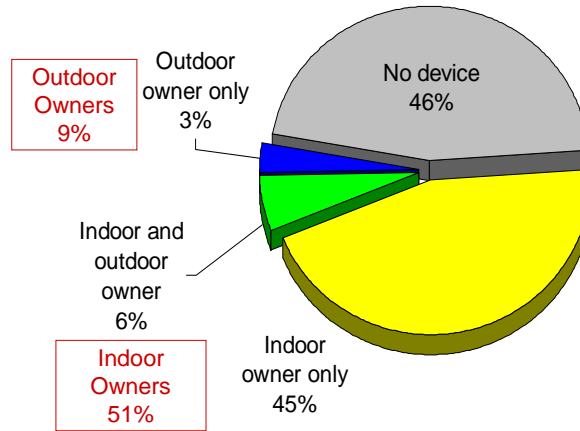
Those who heat their home primarily with wood<sup>4</sup> were asked if wood was the only heat source available in their home or could they heat it by using another means if they preferred. All 6 respondents said their house was equipped with a gas heater that could be used. In other words, there were no households in which the sole source of heat was wood.

- ❖ **2 Overall, more than half (54%) of all households have at least one wood-burning device. Half (50%) had an interior device and 9% an exterior one, including the 6% who owned both types.**

Survey questions were asked to determine the incidence rate of Sacramento homes with indoor and outdoor wood-burning devices. The data were then combined to establish an overall percentage of respondents with at least one wood-burning device, regardless of its location. Results indicated that 54% of respondents had at least one wood-burning device inside or outside their home and the remaining 46% did not own a device that burns wood. More specifically, as shown in Figure 2, half of all respondents have an indoor wood-burning device and 9% owned one outdoors, including the 6% that have both types.

<sup>4</sup> This question was only asked of the 6 respondents who said their primary source of heat was wood and did not include those who said they use a combination of fuels, including wood.

**FIGURE 2 – OWNERSHIP OF WOOD-BURNING DEVICES**  
(AMONG ALL RESPONDENTS)

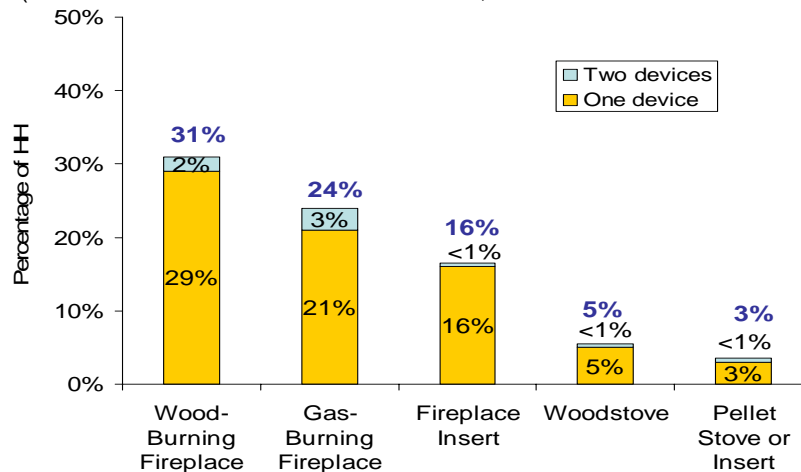


❖ **3 About three in ten residents (31%) have a wood-burning fireplace in their home and a further 16% have a wood-burning fireplace insert.**

Respondents were read a list of various indoor heating devices, including wood- and gas-burning fireplaces, wood- and pellet-burning stoves, and fireplace inserts, and asked whether or not their home had one (or more). The most common indoor heating device found was the wood-burning fireplace, reported to be in 31% of the respondent homes, followed by gas-burning fireplaces (24%) and wood-burning inserts (16%).<sup>5</sup> The less common heating devices included wood stoves (5%) and pellet stoves (or inserts, 3%).

**FIGURE 3 – PERCENTAGE OF SACRAMENTO HOUSEHOLDS WITH INDOOR HEATING DEVICES**

(AMONG ALL BASE STUDY RESPONDENTS, INCLUDING UNDECIDED RESPONSES)



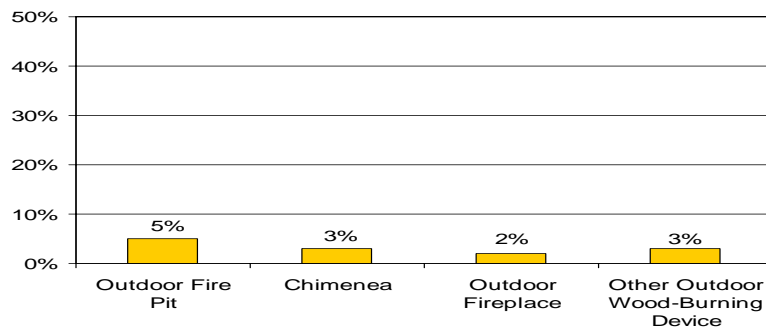
<sup>5</sup> There were 48 respondents in the base study and six in the low-income oversample who said they have a fireplace and a fireplace insert. Based on the assumption that they probably burn wood in the insert and not in the fireplace (without the insert), these records were recoded as fireplace insert users (only).

- ❖ **4 The most commonly-owned outdoor device was the outdoor fire pit – reportedly owned by 5% of respondents.**

Respondents were also asked about any outdoor heating devices, specifically fire pits, chimeneas, outdoor fireplaces or other wood-burning devices. Overall, ownership of outdoor wood-burning devices was less widespread than of indoor wood-burning devices. As shown in the next chart, no more than 5% reported having any one of the outdoor wood-burning devices mentioned, with outdoor fire pits mentioned more frequently – by 5%. Three percent of those surveyed had a chimenea and a similar number (2%) had an outdoor fireplace.

**FIGURE 4 – PERCENTAGE OF SACRAMENTO HOUSEHOLDS WITH OUTDOOR HEATING DEVICES**

(AMONG ALL BASE STUDY RESPONDENTS, INCLUDING UNDECIDED RESPONSES)

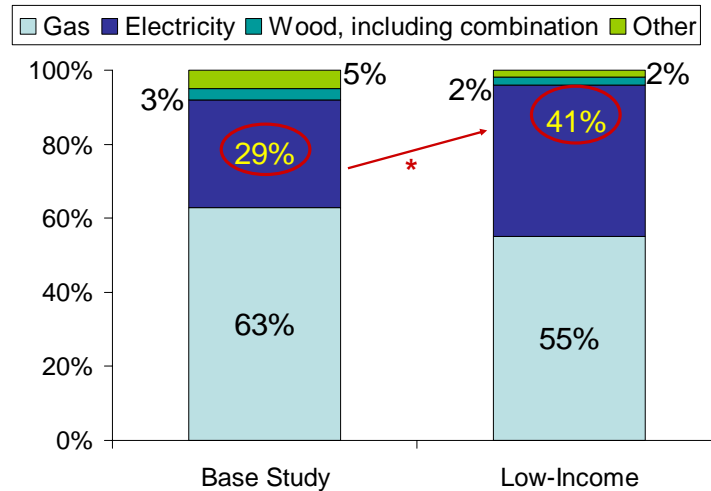


**Low-Income**

- ❖ **5 Like the general population, more than half of low-income respondents also use natural gas (55%) as a primary heat source and very few (2%) use wood. However, low-income respondents were more likely to use electricity (41%) than the general population (29%).**

The base study results were compared with the results of those who were identified as low-income respondents to determine any significant differences in the way they primarily heat their home. Results indicated, as shown in the next figure, that the majority of low-income respondents used natural gas, similar to the general population. However, low-income respondents were more likely to use electricity (41% vs. 29% of the general population). The proportion of residents who used wood as a primary heat source was nearly identical among both populations (3% of the general population and 2% of low-income respondents).

FIGURE 5 – PRIMARY HEAT SOURCE: LOW-INCOME & BASE STUDY RESULTS



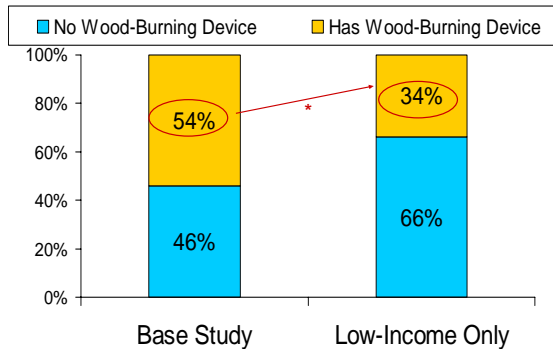
- ❖ **6 In general, only a third (34%) of low-income respondents owned a wood-burning device, significantly fewer than the general population as a whole (54%).**

Analyses were conducted to determine the percentage of low-income respondents that owned at least one wood-burning device, regardless of its location. Overall results indicated that only a third (34%) of low-income respondents had at least one wood-burning device inside or outside their home, and the majority (68%) did not. More specifically, results showed that:

- 29% of respondents have an indoor wood-burning device (only).
- 2% have an outdoor wood-burning device (only).
- 2% have both an outdoor device and an indoor device that burn wood.

As shown in the next chart, the 34% of low-income households with wood-burning devices was almost 20 points lower than the proportion of base study households with wood-burning devices, which was found to be a statistically significant difference.

**FIGURE 6 – OVERALL PERCENTAGE OF HOUSEHOLDS THAT OWN A WOOD-BURNING DEVICE: BASE STUDY VS. LOW-INCOME (INCLUDING UNDECIDED RESPONSES)**

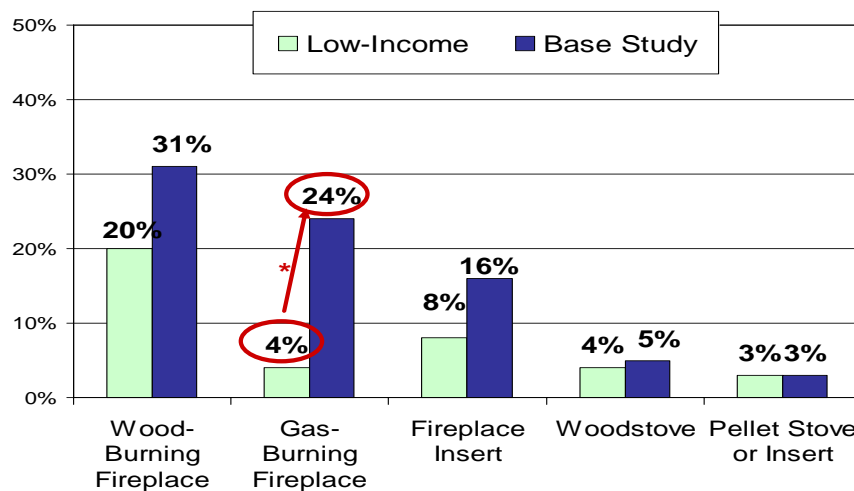


(\* indicates a statistically significant difference)

- ❖ **7 More specifically, low-income respondents were significantly less likely to live in homes with indoor gas-burning fireplaces than the general population.**

In terms of the different types of indoor heating devices discussed, it can be seen in Figure 7 that low-income respondents were significantly less likely to own gas-burning fireplaces than the general population.<sup>6</sup> The differences in ownership of fireplace inserts, wood or pellet stoves were not found to be statistically different.

**FIGURE 7 – OWNERSHIP OF INDOOR HEATING DEVICES (AMONG LOW-INCOME & BASE STUDY HOUSEHOLDS INCLUDING UNDECIDED RESPONSES)**



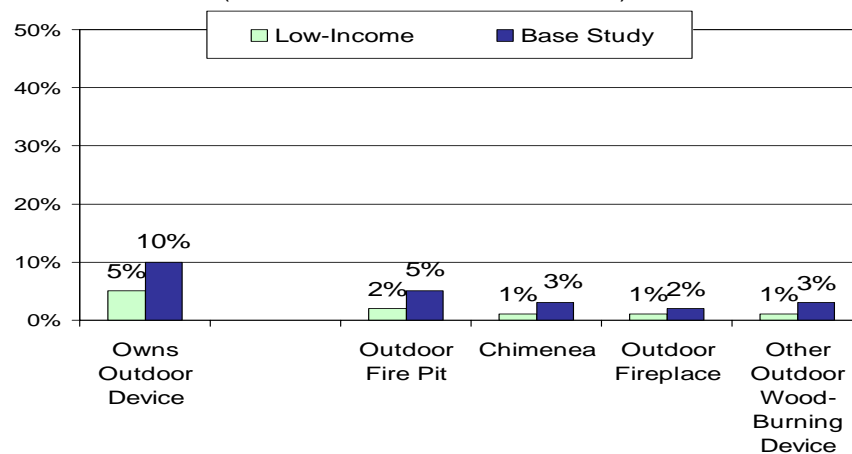
(\* indicates a statistically significant difference)

<sup>6</sup> Although the differences seem large, the percentage of low-income fireplace owners (20%) and fireplace insert owners (8%) were not statistically different those of the base study fireplace owners (31%) and fireplace insert owners (16%).

- ❖ **8 Similar to the general population, 5% of low-income residents owned outdoor heating devices.**

It can be seen in Figure 8 that ownership of outdoor wood-burning devices among low-income respondents did not vary significantly from that of the general population in terms the overall incidence rate or by specific apparatus.

**FIGURE 8 – PERCENTAGE OF LOW-INCOME & BASE STUDY HOUSEHOLDS WITH OUTDOOR HEATING DEVICES (INCLUDING UNDECIDED RESPONSES)**



### Other Group Differences

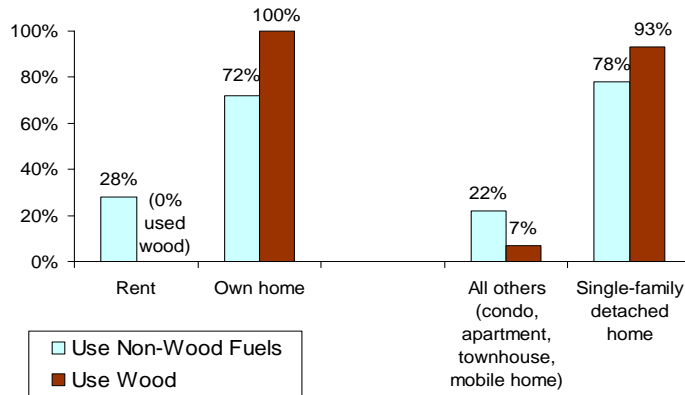
- ❖ **9 Respondents who use wood as their primary fuel source to heat their home were more likely to own their home, and describe it as a single-family home than those who used other fuel sources.**

In order to try and characterize households in Sacramento County that use wood<sup>7</sup> as a primary heat source from those that used other fuel sources, a series of chi-square analyses were conducted on the general population base study results, including all demographic features. Two attributes emerged as statistically important: home ownership and type of home. As shown in Figure 9, all (100%) who heated their home primarily with wood owned their home versus 72% of those who used non-wood sources; and 93% of wood users lived in a single-family home versus 78% of those who used non-wood fuels.

<sup>7</sup> For these analyses, we included the respondents who mentioned wood as primary heat source, alone and in combination with other fuels.

**FIGURE 9 – DISTINCTIVE DEMOGRAPHIC CHARACTERISTICS OF THOSE WHO PRIMARILY USE WOOD VS. OTHER FUELS FOR HEAT:**

GENERAL POPULATION BASE STUDY ONLY

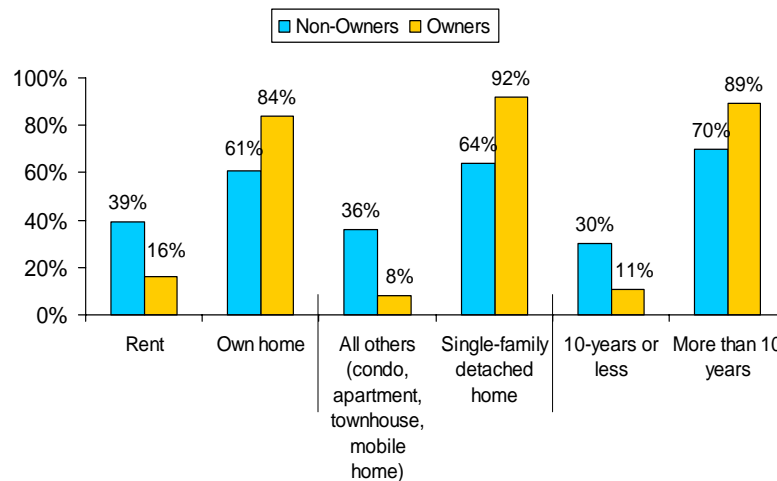


- ❖ **10 Those who owned indoor wood-burning devices were more likely than non-owners to own their home, and describe it as a single-family home that was built more than 10 years ago.**

Additional chi-square analyses were also conducted on the general population base study results to differentiate households in Sacramento County that were equipped with indoor wood-burning devices from those that were not. Results indicated that only three of the twelve characteristics were significant: home ownership, type of dwelling and age of the structure. In other words, those who owned an indoor wood-burning device were more likely to own their home, and describe it as a single-family home that was built more than 10 years ago. No other demographic characteristics were significant.

**FIGURE 10 – DISTINCTIVE DEMOGRAPHIC CHARACTERISTICS OF INDOOR DEVICE “OWNERS” VS. NON-OWNERS:**

GENERAL POPULATION BASE STUDY ONLY



There were no demographic characteristics that distinguished outdoor device owners from non-owners. In other words, outdoor device ownership was independent of respondents' ethnicity, gender, age, income, education, number of household members, homeownership, type of home, and age of home.

## “BURNERS” VS. “NON-BURNERS”

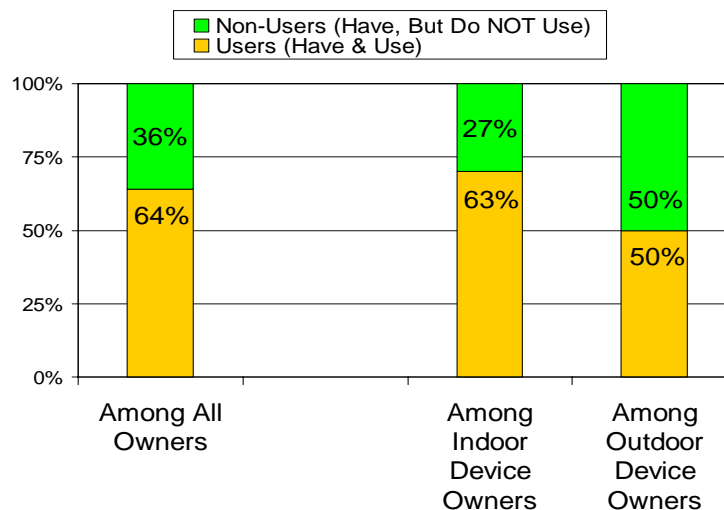
### Incidence Rate

- ❖ **11 Overall, 64% of wood-burning device owners lit a wood fire last winter. More specifically, 63% of indoor device owners and 50% of outdoor device owners were classified as “burners.”**

The criterion used to classify a “burner” was that respondents had to have either an interior or an outdoor wood or pellet-burning device, and had to have used it at least once this past winter. Multiple questions<sup>8</sup> were used in order to insure the accuracy of this dichotomy.<sup>9</sup> Results indicated that the majority (64%) of wood-burning device owners burned wood last winter.

The survey data were analyzed by type of device (indoor versus outdoor) and results indicated that at least half of the owners were also users or “burners.” Usage was slightly higher (63%) among indoor device owners than among outdoor users; however, the difference was not found to be statistically significant.

**FIGURE 11 – USAGE AMONG BASE STUDY OWNERS**  
(INCLUDING UNDECIDED RESPONSES)



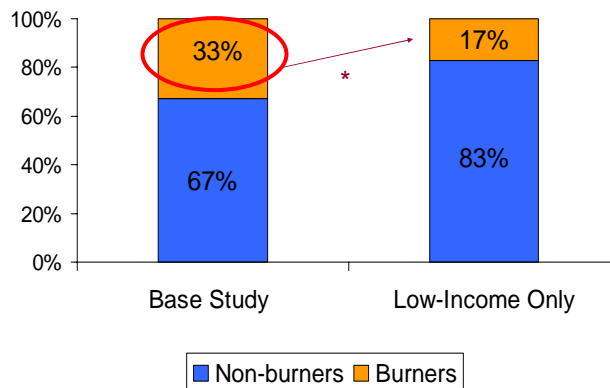
<sup>8</sup> This includes questions about the type of fuel (questions 2.5a-d), the reason for burning (questions 2.6a-d), the frequency of use (questions 2.7 and 3.2) and the length of the burn (questions 2.8 and 2.9).

<sup>9</sup> For example, some respondents owned wood-burning appliances and said they burned wood, but in fact had never done so this past winter and so were re-classified as non-burners; respondents who did not have interior wood-burning appliances but had used outdoor wood-burning equipment were classified as burners; etc.

- ❖ **12 One third (33%) of all respondents in the base study of Sacramento County residents were classified as “burners”: they owned wood- or pellet-burning devices (either indoors or outdoors), and they burned wood, pellets, or manufactured logs at least once this past winter. Significantly fewer “burners” were identified in the low-income group: approximately one in five (17%) were classified as burners.**

Figure 12 indicates that, in the base study, 33% of all respondents surveyed in Sacramento County were classified as burners, and the remaining 67% were non-burners. In the low-income only group, a significantly lower percentage of respondents at 17%, were classified as burners. This latter finding was interesting because the study design, which called for an oversample of low-income households to be studied separately, was based on the hypothesis that lower-income residents might be more likely to burn wood than other residents, perhaps due to the cost of other heating sources among other reasons. This analysis indicates that this was not found to be true – respondents in the low-income group were less likely to burn wood.

**FIGURE 12 – CLASSIFICATION OF “BURNERS” VS. NON-BURNERS:**  
GENERAL POPULATION BASE STUDY VS. LOW-INCOME GROUPS



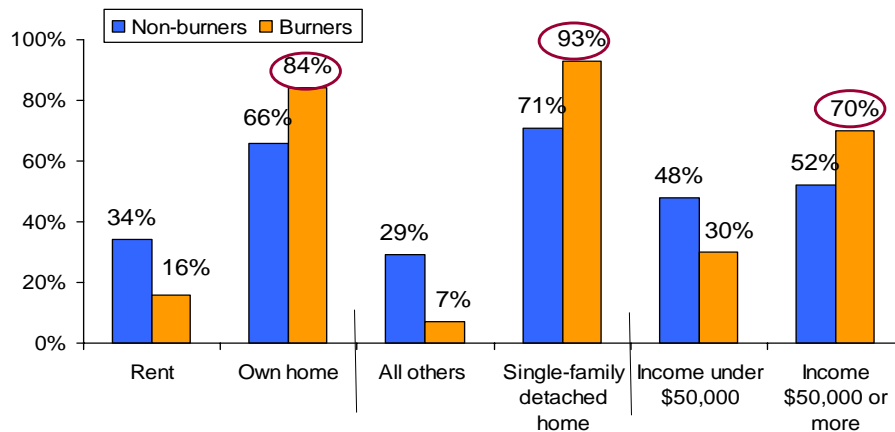
**Distinctive Characteristics**

- ❖ **13 There were only three demographic characteristics that distinguished burners from non-burners: home ownership (more burners than non-burners were owners rather than renters), type of home (more burners than non-burners lived in single-family dwellings), and household income (more burners than non-burners lived in wealthier households). All other demographics did not distinguish burners from non-burners.**

In order to try and characterize “burner” households in Sacramento County from those that did not burn wood, a series of chi-square analyses were conducted on the general population base study results, including all

demographic features. Results indicated that only three of the twelve characteristics were significant: home ownership, type of dwelling and income.<sup>10</sup> It can be seen in the next chart (Figure 13) that 84% of burners owned their own homes versus 66% of non-burners; 93% of burners lived in single-family detached homes versus 71% of non-burners; and 70% of burners reported household incomes of \$50,000 or more versus 52% of non-burners. No other demographic characteristics distinguished burners from non-burners: neither gender, ethnicity, education, age, internet access, the number of people living in the house, the age of the house, air alert subscription nor voter registration were significant. In other words, males and females were just as likely to be burners as non-burners, as were older and younger residents, better educated and less-educated residents, etc.

**FIGURE 13 – DISTINCTIVE DEMOGRAPHIC CHARACTERISTICS OF “BURNERS” VS. NON-BURNERS**  
(GENERAL POPULATION BASE STUDY ONLY)



## WOOD-BURNING ACTIVITY

### Frequency

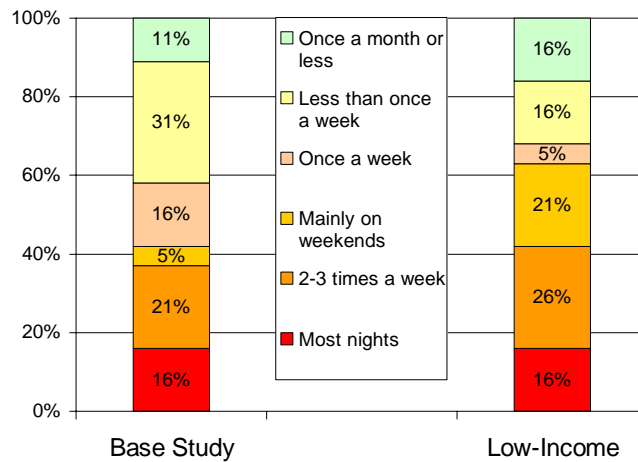
- ❖ **14** Last winter, 58% of the general population burners and 68% of the low-income burners lit wood, pellet or manufactured log fires at least once a week.

Wood-burning device owners were asked to quantify how often they burned wood last winter using the following categories: most days, 2 or 3 times a week, about once a week, less than once a week, mainly on weekends, or

<sup>10</sup> For the purpose of this analysis, household income was dichotomized, using \$50,000 as the split point.

something else.<sup>11</sup> Results among indoor burners for both the general population and low-income groups are shown in Figure 14. Among indoor burners, the frequency of burning wood was comparable: more than half of the general population (58%) and the low-income group (68%) reported burning wood at least once a week.

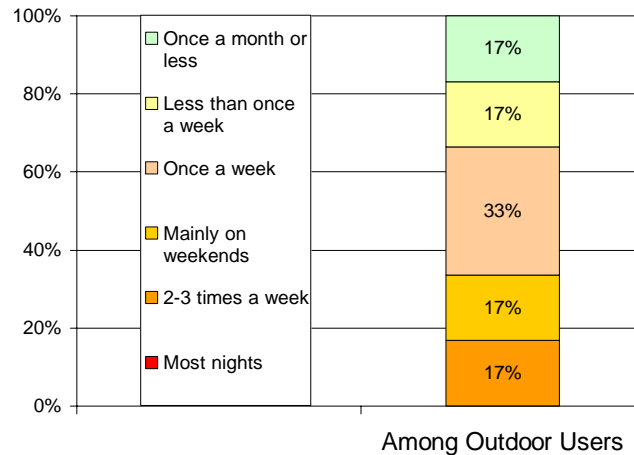
**FIGURE 14 – FREQUENCY OF INDOOR WOOD-BURNING**  
(AMONG BASE STUDY & LOW-INCOME BURNERS EXCLUDING UNDECIDED RESPONSES)



The frequency of use was similar among outdoor burners, with 67% of the general population saying they had a wood fire outdoors at least once a week. It is interesting to note that 16% of indoor burners said they burn wood on most nights, while no outdoor burners said they burned wood outside that often. However, due to the small sample size of outdoor burners, this figure was not found to be statistically significant.

<sup>11</sup> Responses to the frequency of wood-burning questions (2.7 and 3.2) were compared with the responses to other wood-burning activity questions for consistency in “do not use” responses. In most cases, the 15% of indoor device owners and the 58% of outdoor device owners who volunteered they “never” use their wood-burning device were categorized as “owners who do not use” as well as grouped with the “non-burners.”

**FIGURE 15 – FREQUENCY OF OUTDOOR WOOD-BURNING**  
(AMONG BASE STUDY BURNERS EXCLUDING UNDECIDED RESPONSES)



Of the two low-income respondents who were outdoor burners, one reported burning mainly on the weekends and the other said it was less than once a month.

### Reason for Use

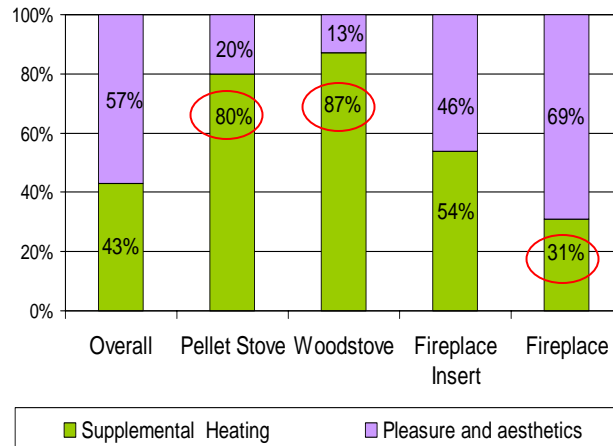
- ❖ **15 Overall, about six in ten indoor burners (57%) used wood fires more for pleasure and ambiance than for supplemental heating.**

Respondents who burn wood, manufactured logs, or pellets were asked to categorize why they burn wood: more for pleasure and ambiance or more for supplemental heating. The same question was asked about each type of indoor wood-burning apparatus owned. The combined overall results indicated that the majority (57%) of those who burn wood do so more for pleasure than for warmth (43%).

- ❖ **16 However, the reason for burning wood appears to be linked to the type device used: fireplace users were significantly more likely to burn wood for pleasure while wood stove users and pellet stove users were more likely to burn for supplemental heating.**

Results by indoor device type are shown in the next chart (Figure 16). It can be seen that the majority of wood stove users (80%) and pellet stove users (87%) burned wood for supplemental heating, which is a significantly higher percentage than the 31% of fireplace users. In other words, the majority of fireplace users (69%) were more likely to burn wood for pleasure than for warmth. (Due to the small sample size, the proportion of respondents who have and use fireplace inserts was not found to be statistically different from the other groups.)

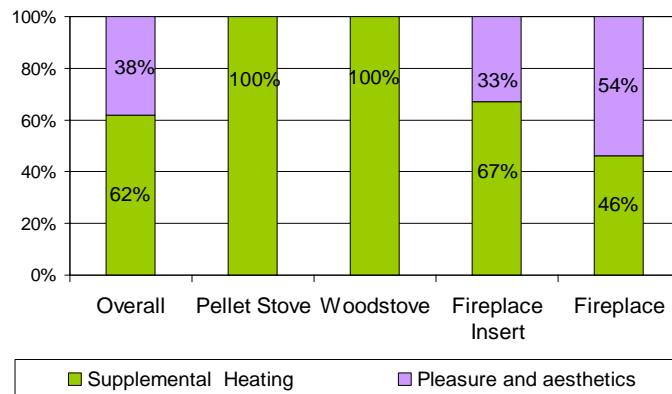
**FIGURE 16 - REASON FOR BURNING WOOD INDOORS**  
(AMONG GENERAL POPULATION INDOOR BURNERS EXCLUDING UNDECIDED RESPONSES)



❖ **17 Low-income respondents tended to burn wood for the same reasons as the general population.**

Results of the reasons for burning wood by indoor device among the low-income burners are shown in the next chart. However, due to the fact that there were fewer low-income burners, the differences were not found to be statistically significant.

**FIGURE 17 - REASON FOR BURNING WOOD INDOORS**  
(AMONG LOW-INCOME BURNERS EXCLUDING UNDECIDED RESPONSES)

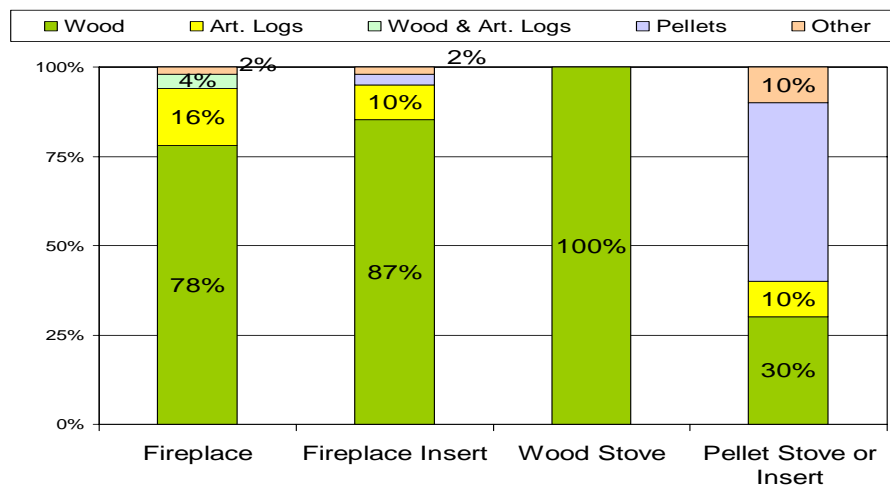


**Type of Fuel**

❖ **18 Wood was the most commonly consumed fuel in fireplaces (78%), fireplace inserts (87%), and wood stoves (100%) in the general population households. Additionally, 30% of pellet stove/insert users usually burned wood (instead of pellets) in their pellet stoves. Low-income respondents used similar types of fuel, which mainly involved wood.**

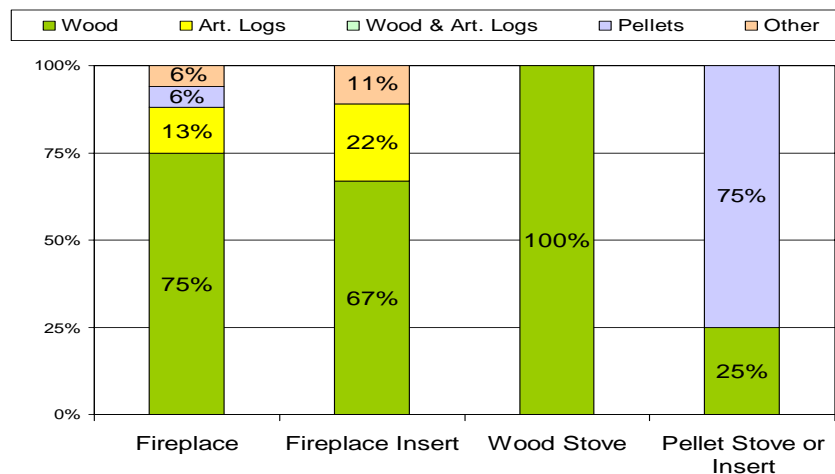
Respondents who owned indoor wood-burning devices were asked to specify the kind of fuel they usually burned in each of their wood-burning appliances: wood, pellets, artificial manufactured logs, or something else. Results among the general population of burners are shown in Figure 18. It can be seen that wood was the most frequently consumed fuel in fireplaces (78%), fireplace inserts (87%), and wood stoves (100%). As one might expect, pellets were the most commonly used fuel (46%) among pellet stove (and insert) users, although 30% said they usually burn wood.

**FIGURE 18 – TYPE OF FUEL USED FOR INDOOR WOOD-BURNING DEVICES**  
(AMONG BASE STUDY USERS EXCLUDING UNDECIDED RESPONSES)



Among the low-income group, wood was also the most commonly consumed fuel, as shown in the next chart.

**FIGURE 19 – TYPE OF FUEL USED FOR INDOOR WOOD-BURNING DEVICES**  
(AMONG LOW-INCOME USERS EXCLUDING UNDECIDED RESPONSES)



**Length of Burn**

- ❖ **19** *On average, burners in the general population used 5 logs to fuel a typical wood fire that lasted almost 4 hours. However, fireplace users who burned artificial logs consumed significantly less fuel than wood burners yet achieved about the same length of burn. Similar results were found among low-income burners: the average fire lasted 3.3 hours and consumed 4.2 logs.*

Those who burned wood or artificial logs were asked to quantify an average wood burn in terms of the number of hours as well as the number of pieces of wood (or manufactured logs) burned. Overall, wood burns ranged from 1 to 15 hours, with a mean (or average) of 3.9 hours. In terms of fuel usage, users burned 1 to 16 logs of fuel, with an average of 5.1 logs.

We conducted additional analyses on fireplace users in order to determine any differences in the length of burn by the type of fuel used.<sup>12</sup> It can be seen in Figure 20 that fireplace users who burned artificial logs enjoyed a fire for about the same amount of time; however, they used significantly less fuel than wood-burning fireplace users (an average of 1.3 logs versus 5.75 logs).

Additional analyses were conducted on the low-income burners to see if the length of their burns were more or less than the general population. As shown in the next table, the average burn among low-income burners lasted 3.3 hours and consumed 4.2 logs. While these figures are slightly lower than the results of the base study, the differences were not found to be statistically significant.

**FIGURE 20 – LENGTH OF BURN BY HOURS & LOAD  
AMONG BASE STUDY DEVICE USERS WHO BURN WOOD OR ART. LOGS  
(EXCLUDING UNDECIDED RESPONSES)**

DESCRIPTION	AVERAGE # OF HOURS	RANGE	AVERAGE # OF LOGS	RANGE
Overall Burners	3.9 hours	1 – 15 hrs.	5.1 logs	1 – 16 logs
Fireplace Wood Burners	3.9 hours	1 – 15 hrs.	5.7 logs	1 – 16 logs
Fireplace Artificial Log Burners	3.0 hours	2 – 4 hrs.	1.3 logs	1 – 3 logs
Low-Income Burners	3.3 hours	2 – 6 hrs.	4.2 logs	1 – 8 logs

**Reduced Usage**

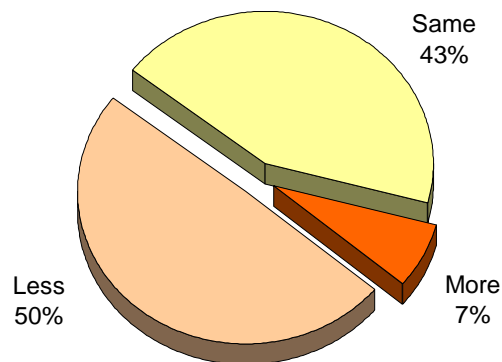
- ❖ **20** *Half of those who owned wood-burning devices (50%) said they burned less wood last winter compared to a typical winter.*

All owners (regardless of usage) were asked to evaluate last winter’s usage in terms of being more, less or the same as a typical winter. Nine percent of

<sup>12</sup> Fireplace users were analyzed because it was the most common wood-burning device used, which provide more data for our analyses.

wood-burning device owners were unable to decide if their wood-burning activity changed last winter. These results were excluded from the data and the percentages were recalculated and are shown in Figure 21. Half (50%) of the owners said they burned less this past winter, while 7% said they burned more. The remaining 43% felt last winter's wood-burning activity was similar to a typical winter.

**FIGURE 21 – WOOD-BURNING ACTIVITY LAST WINTER  
COMPARED WITH A TYPICAL WINTER**  
(AMONG BASE STUDY USERS EXCLUDING UNDECIDED RESPONSES)



When asked to compare last winter's wood-burning with that of a typical year, activity among low-income owners was similar to that of the general population: 45% burned less, half (50%) burned the same and 5% said they burned more last winter than a typical year.

- ❖ **21 Among those who owned indoor devices, three in ten recalled occasions when they decided not to burn wood when they normally would have.**

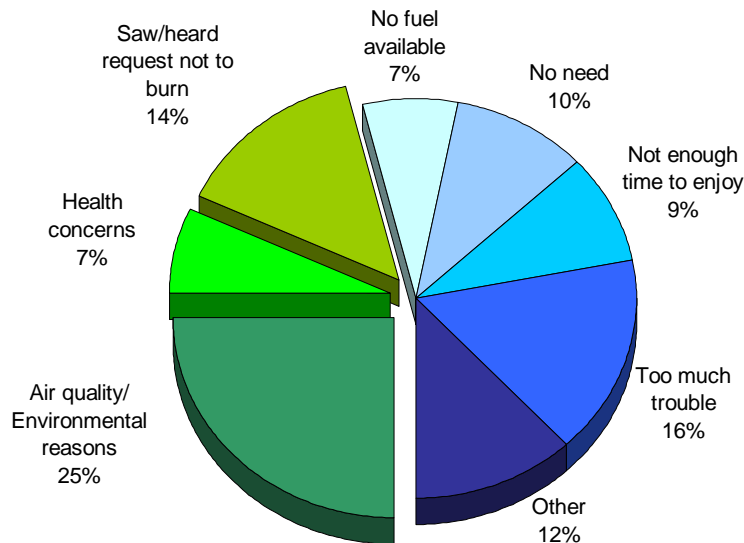
Respondents were asked if there were occasions last winter when they normally would have burned wood, pellets, or manufactured logs but decided not to. About three in ten (29%) owners said yes, while the majority said no (66%) or were unsure (5%). Among low-income respondents results were similar: 33% said there had been days they decided not to burn wood. Sixty-three percent said there were none and 4% were undecided.

- ❖ **22 About half who decided not to burn attributed their decision to air quality or environmental reasons (25%), health reasons (7%) or because they saw or heard a request not to burn (14%).**

Those who decided to not burn on certain occasions were asked, in an open-ended format, to explain the main reason why they chose to not burn wood, pellets or manufactured logs on those occasions. Verbatim responses were captured and then later categorized for quantitative analysis. Air quality and environmental concerns was the most common

reason given, mentioned by 25% of these respondents. Seven percent mentioned health reason and 14% recalled hearing or seeing a request not to burn wood. Categorized reasons are shown in the following chart. Verbatim comments will be presented in the statistical report.

**FIGURE 22 – REASON FOR NOT BURNING WOOD ON CERTAIN OCCASIONS LAST WINTER**  
(AMONG BASE STUDY USERS WHO CHOSE NOT TO BURN EXCLUDING UNDECIDED RESPONSES)



Among the 15 low-income respondents that decided not to burn wood last winter on certain occasions, 2 respondents said it was for air quality reasons, 1 person did it for health reasons, and 1 person saw or heard a request not to burn. Two claimed not have any fuel that day, 1 person said it was too inconvenient, and 3 people said they did not have a need. Five others gave responses that did not fit into the categories chosen. Once again, all verbatim responses will be presented in the statistical binder.

- ❖ **23** *When asked specifically about air quality and health reasons, about half said they chose not to burn wood because of air quality (56%) and health reasons (46%). The median number of times that wood burns were avoided for air quality reasons was 4.5 and it was slightly higher (6 times) for health reasons.*

Respondents were then asked to quantify the number of times they had decided not to burn wood, pellets, or manufactured logs last winter for air quality reasons and for health reasons. About half said air quality (56%) and health reasons (46%) had been part of their decisions not to burn on certain

occasions and the other half said they had not (0 times). Results among those who had made a choice not to burn wood for air quality and health reasons are shown in the following table (Figure 23). It can be seen that those who chose not to burn on certain days for air quality reasons refrained from doing so a median of 4.5 days. Those who did not burn wood for health reasons chose not to burn wood a median 6 times

**FIGURE 23 – FREQUENCY OF CHOOSING NOT TO BURN WOOD FOR AIR QUALITY & HEALTH REASONS**  
(AMONG BASE STUDY USERS WHO CHOSE NOT TO BURN EXCLUDING UNDECIDED RESPONSES)

REASON	RANGE	MEDIAN
Air Quality	1 – 50 times	4.5 times
Health	1 – 30 times	6 times

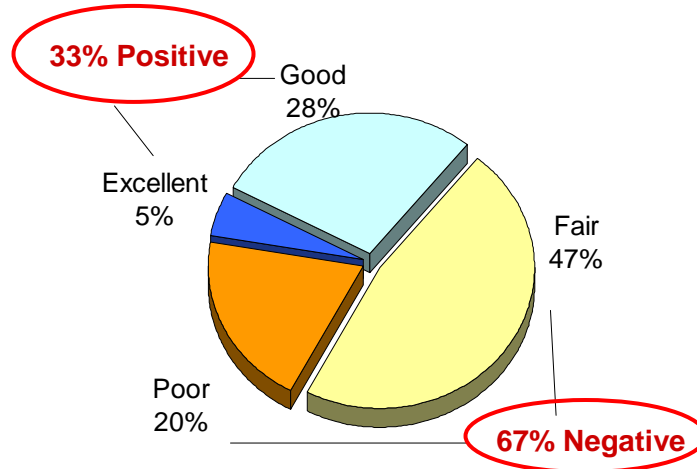
## AIR QUALITY ISSUES

### General Population Base Survey

- ❖ **24** *A third of Sacramento County respondents rated the quality of air in the area positively, but the majority (two-thirds) of respondents felt local air quality was only “poor” or “fair.”*

In the telephone interview, respondents were first asked to rate the overall quality of air in Sacramento County, using a four-point scale: poor, fair, good, or excellent. As can be seen in the next figure, only 5% rated the quality of air as “excellent,” and a further 28% rated it at “good,” indicating that a combined total of 33% were positive in their evaluations. The majority (67%) gave negative evaluations: nearly half (47%) rated the overall quality of air in the area as “fair” and a fifth (20%) said it was “poor.” This indicates that the majority of the general population recognizes and accepts that air pollution in the Sacramento area is a fact.

**FIGURE 24 – OVERALL ASSESSMENT OF SACRAMENTO AREA AIR QUALITY**  
(BASE STUDY RESPONDENTS EXCLUDING UNDECIDED RESPONSES)



- ❖ **25** *There is much room for educating the general public about the negative effects of residential wood-burning on wintertime air quality: approximately four in ten respondents felt wood-burning was not a serious cause of air pollution. That being said, the fact that nearly the same proportion of respondents said that traffic was a very serious contributor to air pollution is an indication of the success of public education programs in general, and possibly of the effectiveness of the long-running Sacramento region summertime Spare the Air public education campaign.*

Respondents were next asked to rate how serious they thought various causes of wintertime pollution were as contributors to air pollution in Sacramento County. Results, including responses of undecided/don't know<sup>13</sup>, are presented in Figure 25. It can be seen, first of all, that traffic was considered to be the **most** serious cause of wintertime air pollution: nearly four in ten respondents (38%) said it was a "very" serious problem. Only 18% of all respondents felt that industry was to blame and 15% felt that agricultural burning was responsible. Residential wood-burning fireplaces were seen as the **least** serious causes of wintertime air pollution: only one in ten respondents (13%) rated wood-burning as "very" serious.

This indicates that further public education about the causes of wintertime air pollution is warranted. It also attests to the ability of successful public education campaigns to influence public perceptions, insofar as the

<sup>13</sup> Typically, in attitudinal surveys, the percentage of undecided/don't know responses is low (between 0% and 4%). We chose to present the percentage of undecided/don't know responses in Figure 2 because three questions resulted in a relatively high percentages (7% and 10%) of respondents saying they did not know, a volunteered response rather than an actual response category. **These indicate specific areas where more public education on the causes of wintertime air pollution (industry, agricultural burning, and residential wood-burning) could be beneficial.**

**Sacramento Metropolitan Air Quality Management District**

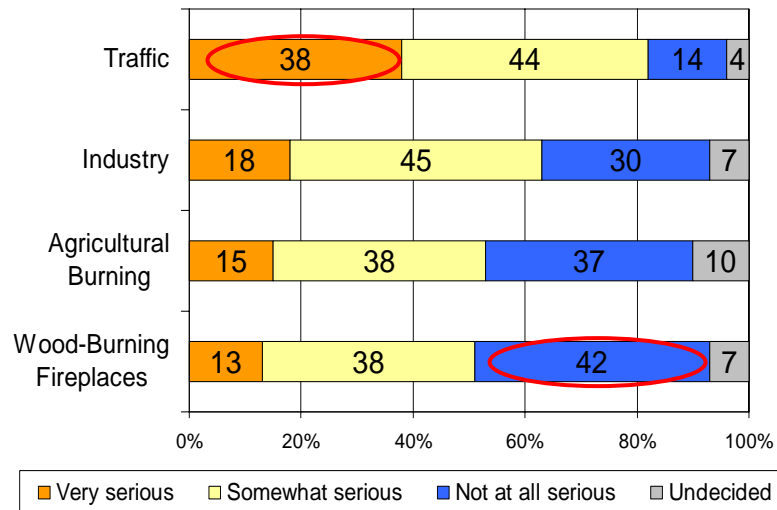
2007 Residential Wood Burn Research Study

Final Results Report

May, 2007

seriousness of traffic in causing air pollution (regardless of the season) is now well-entrenched. In the Sacramento area, the summertime Spare the Air program has been in effect for 12 years and, although it is not the only source of education, it is now highly recognizable among the local population in general.<sup>14</sup>

**FIGURE 25 – SERIOUSNESS: SOURCE OF WINTERTIME AIR POLLUTION**  
(BASE STUDY RESPONDENTS INCLUDING UNDECIDED RESPONSES)



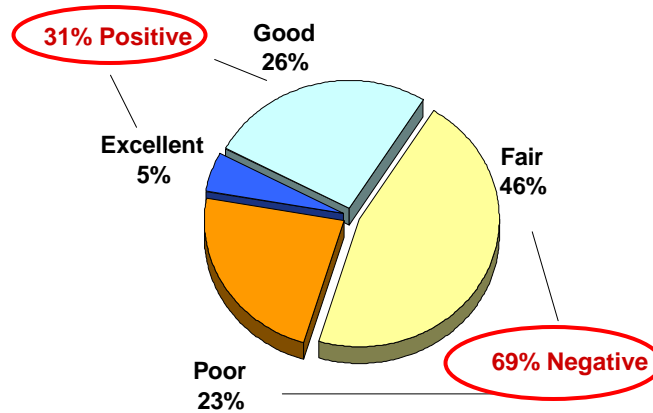
**Low-Income Group**

- ❖ **26 Low-income respondents evaluated the quality of air in the area similarly to the general population: the majority (69%) felt local air quality was only “poor” or “fair.”**

Results of the evaluation of air quality in the area by the low-income group of respondents are presented in Figure 26. It can be seen that results are very similar to those of the general population in Sacramento County: 31% rated the quality of air as “excellent” or “good,” and the majority (69%) gave negative evaluations.

<sup>14</sup> See: SMAQMD 2006 Air Quality & Transportation Telephone Tracking Survey, Aurora Research Group, January 2007: two thirds (66%) of all respondents were familiar with the summertime Spare the Air program.

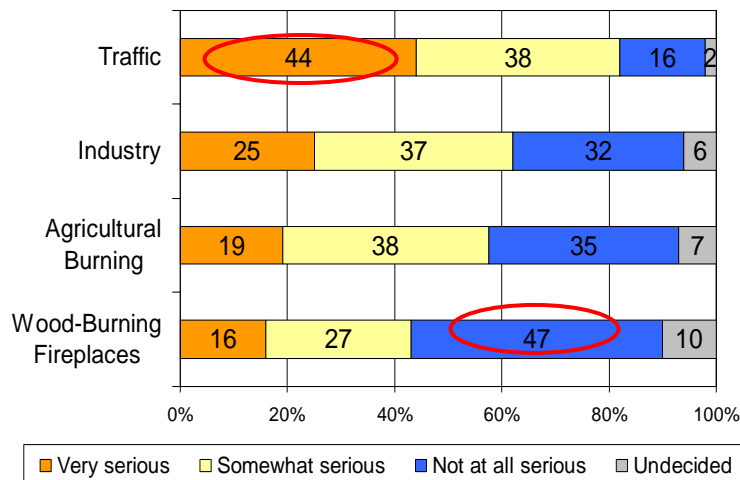
**FIGURE 26 – OVERALL ASSESSMENT OF SACRAMENTO AREA AIR QUALITY**  
(LOW-INCOME RESPONDENTS ONLY EXCLUDING UNDECIDED RESPONSES)



- ❖ **27 Low-income respondents were also similar to the general population in terms of how they rated the seriousness of the various causes of winter air pollution: traffic was viewed as the most serious contributor and residential wood-burning the least serious.**

It can be seen in Figure 27 that the low-income group of respondents felt that traffic was the most serious cause of winter air pollution in Sacramento County: 44% rated it as a “very” serious contributor. This was followed by industry (25% rating it “very” serious) and agricultural burning (19%). Only 16% of low-income respondents felt that residential wood-burning was a “very” serious contributor to wintertime air pollution – in fact, nearly half (47%) said it was “not at all” serious.

**FIGURE 27 – SERIOUSNESS: SOURCE OF WINTERTIME AIR POLLUTION**  
(LOW-INCOME ONLY RESPONDENTS INCLUDING UNDECIDED RESPONSES)



### Other Group Differences

- ❖ **28 Registered voters were significantly more likely to rate the quality of air in the region accurately (that is, negatively); as were those aged between 35 and 54 years. The youngest respondents were the least accurate in their assessments. No other demographic characteristics emerged – evaluations of air quality did not depend on gender, ethnicity, education, income, etc.**

To see if there were any features that distinguished those respondents who gave negative evaluations of air quality from those who gave positive evaluations, results were dichotomized (percent “poor + fair” versus percent “good + excellent”), and a series of chi-square analyses was conducted. Variables included in the analyses included: age, income, education, gender, ethnicity, home ownership, type of dwelling, age of dwelling, number of people in household, access to the internet, voter registration, air alert subscription, and whether the household was a wood burner or not.

Only two features showed significant differences: voter registration and age. Significantly more respondents who were registered to vote evaluated the quality of air negatively (71%) than those not registered to vote (55%). Younger respondents (aged between 18 and 34 years) were the least likely to assess the quality of air in the region negatively (52%) – those between the ages of 35 to 54 were more accurate in their assessment (73% said the air quality was poor or fair), as were the oldest respondents (68% negative.) **A public education program about the air quality in the region that could target the younger adult population in particular could be useful.**

Further chi-square analyses (52 in total (4 questions x 13 demographic features) were run on each of the causes of wintertime air pollution to see if there were distinguishing demographic features as to the seriousness of each cause. There were only 4 analyses that yielded significant differences:

- females were significantly more likely than males to say that traffic was a “very serious” cause of wintertime air pollution (46% vs. 32%),
- **males were significantly more likely than females to say that residential wood-burning fires were “not at all serious” causes of air pollution (55% vs. 36%),**
- renters were more likely than owners to say that industry was a “very serious” cause of air pollution (31% vs. 14%), and
- renters were also more likely than owners to say that agricultural burning was a “very serious” cause (25% vs. 13%).

**In short, because there were so few demographic differences, a public education campaign about the sources and seriousness of wintertime air pollution that is designed to target residents of all descriptions in Sacramento County should be effective. However, if there were a way of educating males in particular about the pollution problems associated with**

wood-burning, there could be added benefits, as they demonstrated a significant information gap.

## AWARENESS OF SUMMERTIME SPARE THE AIR

### General Population and Low-Income Groups

- ❖ **29 Recognition of the summertime Spare the Air Program in Sacramento County is very high among the general population – nearly nine in ten respondents in the base study were familiar with the voluntary program. There is less familiarity among the low-income group, but it is still relatively high at 80%.**

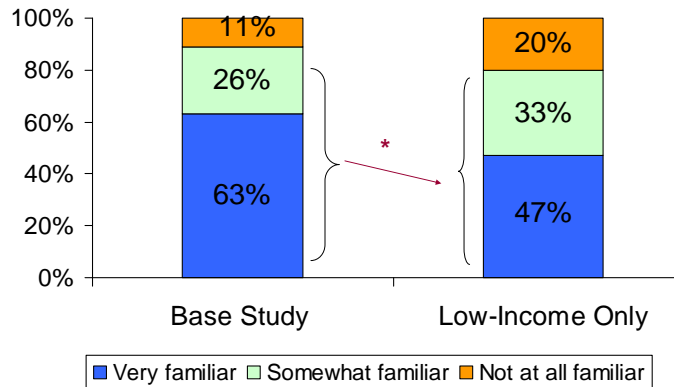
Respondents were next asked how familiar they were with the voluntary driving reduction program called Spare the Air during the summer months.<sup>15</sup> Figure 28 shows the results from both the general population base study and the low-income group of respondents. It can be seen, first of all, that among the general population in Sacramento County, the summertime program is highly recognizable: 63% of respondents said they were “very” familiar with the program and an additional 26% said they were “somewhat” familiar with it, indicating that a combined total of 89% of all respondents were familiar with summertime Spare The Air. (It is interesting to note that the 63% of respondents who were “very” familiar with the program is identical to the level of general awareness of Spare The Air among Sacramento County residents during the summer of 2006.<sup>16</sup>) Although fewer than half of the low-income respondents were “very” familiar with Spare The Air (47%), an additional 33% said they were “somewhat” familiar with the program for a combined total of 80% aware. This is a significantly lower percentage than in the general population, but it is still quite high.

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<sup>15</sup> The exact wording of the question was: “During the summer months, that is, from May through October, you may have heard about a voluntary driving reduction program called Spare The Air, which is aimed at reducing the amount of ozone in the air caused by vehicles during particularly hot days with poor air quality. Does this sound not at all familiar, somewhat familiar, or very familiar to you?”

<sup>16</sup> See “SMAQMD Final Report – Awareness of the 2006 Spare The Air Campaign”, Naomi E. Holobow, November 2006.

**FIGURE 28 – FAMILIARITY WITH SUMMERTIME SPARE THE AIR DRIVING REDUCTION PROGRAM**  
(BASE STUDY VS. LOW-INCOME GROUPS EXCLUDING UNDECIDED RESPONSES)



\* indicates a statistically significant difference

### Other Group Differences

- ❖ **30 Recognition of the summertime Spare the Air Program in Sacramento County varied by a few demographic features (age, income, ethnicity, education, Internet access and home ownership).**

Further chi-square analyses were conducted to determine if there were any statistically significant differences in terms of demographic characteristics between respondents who were familiar with the summertime Spare The Air program and those who were not. Results can be described as follows:

Respondents familiar (both somewhat and very) with the summertime Spare The Air program were significantly more likely to:

- be homeowners (94% vs. renters, 75%);
- be registered voters (93% vs. not registered, 71%);
- have access to the Internet (93% vs. no access, 78%);
- have at least a college education (96% vs. less than college, 83%);
- be Caucasian (94% vs. other ethnicities, 75%)
- have household incomes of \$50,000 or more (92% vs. less than \$50,000, 84%); and
- be older than 35 years of age (93% vs. 18 to 34 years, 71%).

No other significant differences were found – **burners were just as familiar with Spare The Air as non-burners**, males as familiar as females, etc.

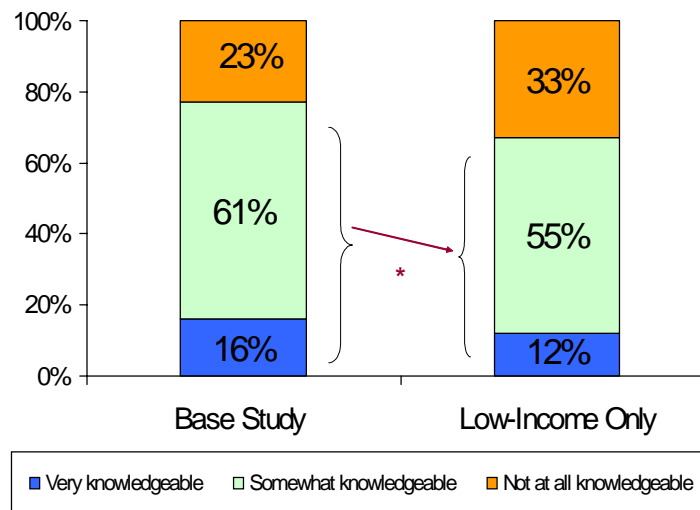
## KNOWLEDGE OF PARTICULATE MATTER

### General Population and Low-Income Groups

- ❖ **31 Only 16% of all respondents in the general population said they were “very knowledgeable” about particulate matter pollution, but an additional 61% felt “somewhat knowledgeable.” Low-income respondents claimed significantly less knowledge about PM pollution.**

Next, respondents were asked to rate how knowledgeable they considered themselves to be about particulate matter or particle pollution. Results from the general population base study as well as the low-income group are presented in the next figure. It can be seen, first of all, that few respondents in either group claim to be “very” knowledgeable about PM (16% in the general population and 12% in the low-income group), **indicating that there is a good opportunity for a public information program to educate its residents about PM pollution.** Secondly, although a substantial proportion in both groups claims to be somewhat knowledgeable, the fact that 23% and 33% claim no knowledge at all about PM pollution is an indication that the causes of wintertime air pollution need to be put more in the public eye.

**FIGURE 29 – LEVEL OF KNOWLEDGE ABOUT PARTICULATE MATTER OR PARTICLE POLLUTION:**  
 (BASE STUDY VS. LOW-INCOME GROUPS EXCLUDING UNDECIDED RESPONSES)



\* indicates a statistically significant difference

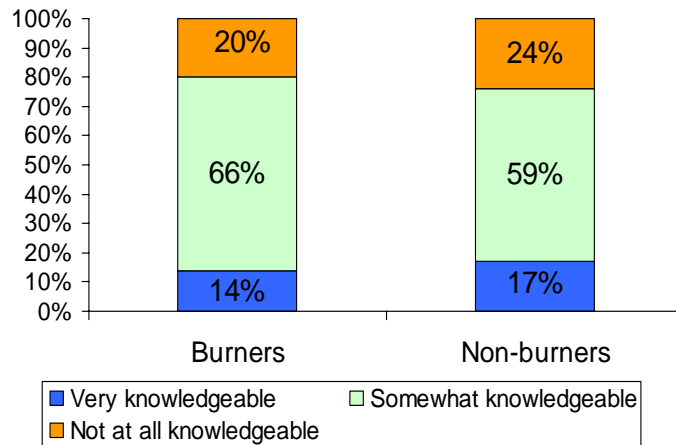
**Burners vs. Non-Burners**

- ❖ **32 Wood burners were just as knowledgeable (or not) about particulate matter pollution as non-wood burners.**

The self-reported level of knowledge about PM pollution from burners and non-burners in the general population base study are presented in the next figure. There were no significant differences between the two groups of respondents. Among burners, 20% said they were “not at all” knowledgeable. Two thirds (66%) claimed to be “somewhat” knowledgeable and only 14% claimed to be “very” knowledgeable about PM pollution.

One possible interpretation of the results could be to speculate that because only 14% of burners claimed to be “very” knowledgeable (and thus were willfully ignoring what they “knew” when they decided to burn wood this past winter anyway), the majority of burners (the remaining 86%) were not as knowledgeable and could therefore benefit from learning more about the effects of wood-burning on air pollution.

**FIGURE 30 – LEVEL OF KNOWLEDGE ABOUT PARTICULATE MATTER OR PARTICLE POLLUTION:**  
(BURNERS VS. NON-BURNERS EXCLUDING UNDECIDED RESPONSES)



**Other Group Differences**

- ❖ **33 More males than females claimed to be “very” knowledgeable about PM pollution. A higher percentage of respondents who claimed the least knowledge were: poorer, less well educated, not registered to vote, and lacking Internet access than their counterparts.**

Further chi square analyses revealed that:

- more males said they were “very” knowledgeable compared to females (21% vs. females, 11%);

- those not registered to vote were more likely to say they were “not at all” knowledgeable about PM pollution (41% vs. registered, 18%);
- less educated respondents were more likely to say they were “not at all” knowledgeable (31% vs. college degree or higher, 12%);
- more of those without Internet access said they were “not at all knowledgeable” (36% vs. have Internet access, 18%); and
- more of those with household incomes of less than \$50,000 were “not at all” knowledgeable (31% vs. \$50,000 or more, 14%).

## AWARENESS OF WINTERTIME NO-BURN REQUESTS

- ❖ **34 Awareness of the requests not to burn wood during the winter of 2006/2007 was the same across the general population, low-income respondents and burners as well as non-burners. It was fairly high, given that there was no paid advertising of the requests this past winter: 59% of the respondents in the general population base survey and 57% of those in the low-income group said they heard the wintertime no burn requests. (Some of this could possibly be due to a carry-over of awareness from the summertime Spare The Air program.) Levels of awareness should increase when the full residential no-burn public education program is launched with full media buy.**

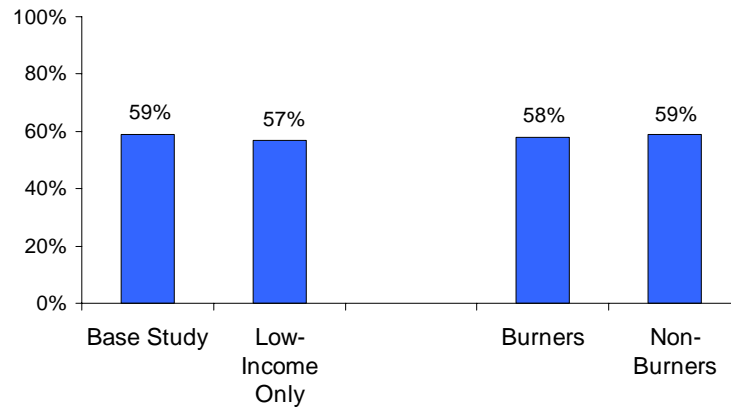
Although there was no paid advertising to announce the nights throughout the 2006/2007 winter when particulate matter pollution was forecast to reach 127 on the Air Quality Index (AQI) -- the “unhealthy for sensitive groups“ level -- there were several news stories on both television and radio as well as in the Sacramento Bee weather page that asked residents in the Sacramento area to refrain from using their wood-burning fireplaces and outdoor fire pits on certain nights. In addition, Air Alerts for Spare the Air nights were issued to those approximately 3,050 Sacramento County residents<sup>17</sup> who had registered to receive them for the summer Spare The Air season. Survey respondents were asked:

“During this past winter, did you hear, read, or see any news stories, advertisements, or public service announcements about particulate matter pollution or poor air quality, and requests not to use wood-burning fireplaces and outdoor fire pits?”

Excluding the respondents who were undecided or did not know, results indicated that 59% (+ / - 4.9%) of all respondents in the general population base survey and about the same percentage (57%) of those in the low-income group were aware of the requests not to burn during the past winter. Considering that there was no media buy this past winter, these are quite high levels of awareness. The next graph shows these two groups, and in addition plots the level of awareness among burners and non-burners in the base study. There were no significant differences among any of the groups.

<sup>17</sup> Per an e-mail from Lori Kobza, of the Communications Office of Sacramento Metropolitan Air Quality Management District, there are a total of 5,512 Air Alert subscribers, 55% of which live in Sacramento County (3048 subscribers).

**FIGURE 31 – PERCENT AWARE OF REQUEST NOT TO BURN THIS PAST WINTER**  
 (BASE STUDY, LOW-INCOME GROUPS, BURNERS AND  
 NON-BURNERS EXCLUDING UNDECIDED RESPONSES)



Another factor to consider when assessing levels of awareness of a public education campaign is that some survey respondents might have a tendency to give the most socially-acceptable responses (that is, the assessed level of awareness could be an overestimate). The difficulty is to predict how many respondents this could represent. The evaluation of the summertime Spare The Air campaign<sup>18</sup> has always included a Control group of respondents, that is, residents who are interviewed about non-Spare the Air days but are asked whether they recently heard a Spare The Air advisory asking them not to drive. The percent of respondents who say “yes” (and were therefore wrong) are then used as a correction factor and subtracted from results when emission reduction estimates are conducted. Our experience with the 2006 summer evaluation showed that the percentage of Control day respondents in Sacramento County who erroneously thought they heard a STA advisory ranged between 4% and 24%, depending on the specific wording of the question. It is quite possible that the 59% of respondents who said they heard the wintertime no-burn requests is an overestimate, but without control-day interviewing, we cannot measure this extent of this effect.

❖ **35 Older respondents were more likely to have seen or heard the requests not to burn than younger respondents.**

Of the thirteen chi-square analyses, only one significant difference emerged: age was the only demographic feature that distinguished those who heard or saw the wintertime request not to use wood-burning fireplaces and outdoor fire pits. Of

<sup>18</sup> Aurora Research Group has conducted annual evaluations of the summertime Spare The Air campaign in the Sacramento Region for many years.

those respondents 55 years of age and older, 69% were aware, versus 53% of those aged between 35 – 54 years. The youngest group (aged between 18 and 34 years) was the least likely to have seen the announcements: only 46% of these respondents were aware.

## WINTER 2006/2007 ACTUAL COMPLIANCE WITH VOLUNTARY NO-BURN REQUESTS

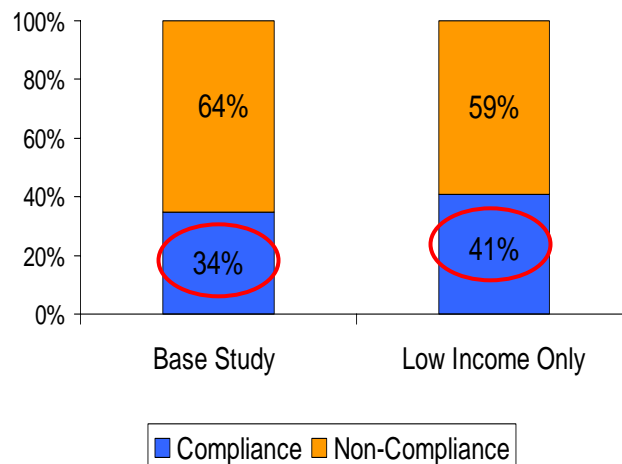
### General Population and Low-Income Groups

- ❖ **36** Among those who were aware of the requests not to burn during the past winter, only 34% of the general population base survey respondents, and 41% of low-income respondents actually complied and voluntarily reduced the number of fires they burned.

Respondents who indicated they had seen or heard requests not to use wood-burning fireplaces (59% of the general population of respondents and 57% of the low-income group) were then asked if they actually reduced the number of fires they burned during the winter because of the requests. Results, presented in the next chart, indicate that voluntary compliance was quite low. In the general population of respondents in Sacramento County, only about a third (34%) of these respondents reduced the number of fires burned. In the low-income group, 41% complied, a percentage which is not statistically significantly different from the general population results.

**FIGURE 32 – COMPLIANCE WITH VOLUNTARY REQUEST NOT TO BURN**

(AMONG THOSE WHO HEARD THE NO BURN REQUESTS:  
GENERAL POPULATION BASE STUDY VS. LOW-INCOME GROUPS)



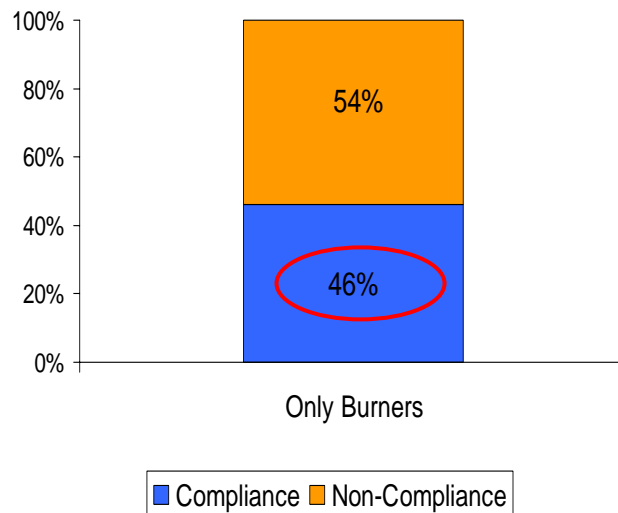
No statistically significant difference between the groups.

**Burners Only**

- ❖ **37 Actual compliance with voluntary no-burn messages was only approximately 50-50 among burners: of those who heard the no-burn requests, 46% complied and reduced their number of fires. In other words, nearly half of the Sacramento County residents who burned wood reduced the number of fires they burned this past winter, specifically because they heard the requests – but just over half chose not to refrain from burning.**

We next looked at just the subpopulation of those who were classified as “burners” in the general population base study, that is, those who owned wood or pellet burning devices (either indoors or outdoors), and burned wood, pellets, or manufactured logs at least once this past winter. It has already been reported above that 58% of these respondents were aware of the requests not to burn wood. The next chart shows the compliance results among those who were aware of the announcements. It can be seen that nearly half, 46%, actually reduced the number of fires they burned last winter because they heard the requests. That being said, it also means that just over half of those who heard the requests actually did not reduce the number of fires they burned.

**FIGURE 33 – COMPLIANCE WITH VOLUNTARY REQUEST NOT TO BURN**  
(AMONG THOSE WHO HEARD THE NO BURN REQUESTS: ONLY BURNERS)



- ❖ **38 Among burners, there were no significant demographic features that could be used to characterize voluntary compliers from non-compliers.**

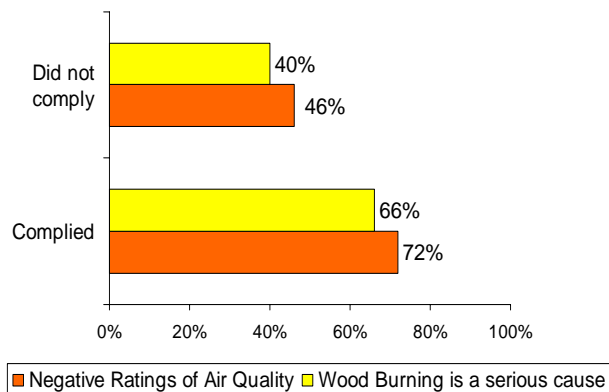
In order to see whether there were any demographic features that could distinguish burners who complied with the voluntary no-burn notices from those who did not comply, a series of chi-square analyses were run on just the subpopulation of burners. Results indicated that there were no significant identifiers that could be used to characterize compliers from non-compliers:

not gender, age, income, ethnicity, education, home ownership, age of neighborhood, or Internet access were significant. In other words, burners who complied with the voluntary measures had the same demographic profile as burners who did not comply.

- ❖ **39 A possible explanation is that those burners who did not comply do not believe that residential wood-burning is a serious cause of wintertime air pollution or that there is a problem with the overall quality of air in the area.**

In an effort to try and understand why some burners actually complied with the no-burn request they heard while others did not, we re-examined burners' responses to the questions of overall air quality in the area and how they rated the seriousness of air pollution caused by residential wood-burning. Results, presented in the next figure, indicated that those who complied and reduced the number of fires this past winter were significantly more likely to rate the quality of air in the region negatively (72% gave ratings of "fair" or "poor") and to say that residential wood-burning is a serious cause of air pollution (66% said "somewhat" or "very") than were non-compliers (46% and 40%, respectively). **In other words, there is an information credibility gap – and therefore an opportunity for a public education program to correct this disbelief.**

**FIGURE 34 – ACTUAL 2007 COMPLIANCE BY RATINGS OF AIR QUALITY & SERIOUSNESS OF RESIDENTIAL WOOD-BURNING: (BURNERS ONLY)**



## SUPPORT FOR VOLUNTARY NO-BURN RULE AND HYPOTHETICAL COMPLIANCE

### General Population

- ❖ **40 The vast majority of all respondents approved of a voluntary no-burn rule (85%) and said they would comply with it (93%) – a strong endorsement for a voluntary measure. However, these figures include respondents who do not own wood-burning devices or burn wood.**

All respondents were asked whether they generally approved or disapproved of asking residents to voluntarily suspend non-essential woodstove and fireplace burning while there is poor air quality in the area where they live. They were then asked how likely they would be to comply if such a request were made.<sup>19</sup> Results from the general population base study are presented in Figure 35. It can be seen, first of all, that the majority of all respondents approved of a voluntary no-burn rule: 59% “strongly” approved and a further 26% “somewhat” approved. Only 15% of all respondents disapproved – either “somewhat” (7%) or “strongly” (8%). Secondly, it can be seen that the vast majority of respondents in the general population claim they would comply with a voluntary request: nearly three quarters (74%) said they would be “very likely” to comply (significantly higher than the 59% who strongly approved), and a further 19% said they would be “somewhat likely” to comply. Although representative of the attitudes of the entire population of residents in Sacramento County in general, these figures include respondents who do not own wood-burning devices or burn wood and who therefore would have no difficulty approving and complying with any voluntary measure.

**FIGURE 35 – SUPPORT FOR VOLUNTARY NO-BURN RULE AND LIKELIHOOD TO COMPLY**  
(BASE STUDY GROUP EXCLUDING UNDECIDED RESPONSES)

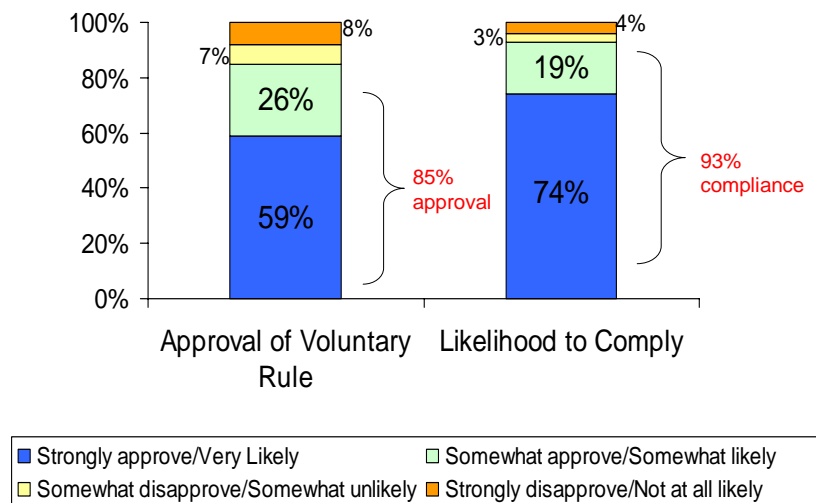
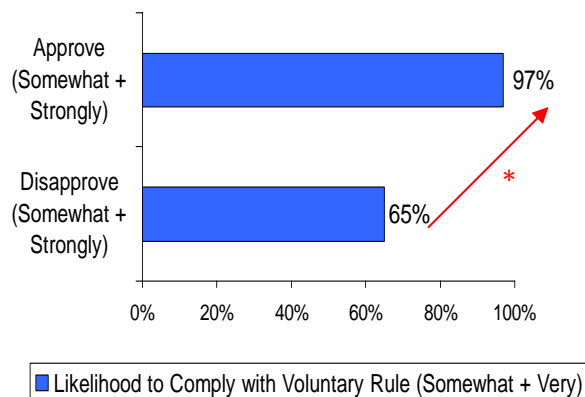


Figure 36 shows the proportion of respondents who said they would be likely to comply with a voluntary no-burn rule according to whether or not they approve of a voluntary program. It can be seen that among the general

<sup>19</sup> The exact wording of the latter question was: “And when residents are asked to voluntarily suspend non-essential woodstove and fireplace burning because of poor air quality, how likely are you to comply? Would you would you say not at all likely, somewhat unlikely, somewhat likely or very likely?”

population study of respondents, 97% of those who said they “somewhat” or “strongly” approved of a voluntary no-burn rule also said they would be “somewhat” or “likely” to comply with it. Among those who did not approve of the voluntary measure (only 15% of the general population), hypothetical compliance was significantly lower, at 65%.

**FIGURE 36– LIKELIHOOD TO COMPLY WITH VOLUNTARY NO-BURN RULE BY LEVEL OF APPROVAL**  
(GENERAL POPULATION BASE STUDY)



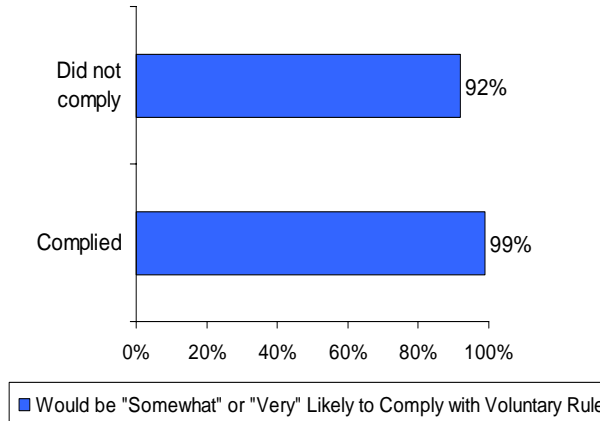
\* indicates a statistically significant difference between the groups

### *Consistency between Actual Compliance Behavior and Hypothetical Compliance*

- ❖ **41 Further analysis revealed a discrepancy between actual compliance behavior and hypothetical compliance (what respondents said they would do) – the largest discrepancy occurring in the group of respondents who did not comply with the request not to burn but said they would. Those who did comply and said they would be likely to comply were far more consistent.**

One final analysis of the general population base study compared actual compliance behavior with what respondents hypothetically said they would do. Figure 37 indicates that the **largest discrepancy** between actual compliance behavior and hypothetical compliance occurred in the group who did not comply with the request not to burn (even though they said they had heard the requests not to burn): 92% of them said they would be likely (either “somewhat” or “very”) to comply with a voluntary no-burn rule -- only 8% (10 respondents) of those who actually did not reduce the number of fires they burned (125 respondents in total) said they would not comply with a voluntary rule. There was much more consistency among the (albeit) smaller group of 70 respondents who actually complied by reducing the number of fires they burned in the winter of 2006/2007: all but one of them (99%) said they would be likely to comply with a voluntary no-burn rule and did.

**FIGURE 37 – ACTUAL 2007 COMPLIANCE BEHAVIOR BY HYPOTHETICAL BEHAVIOR:**  
(RESPONDENTS IN BASE STUDY GROUP WHO HEARD REQUEST NOT TO BURN EXCLUDING UNDECIDED RESPONSES)

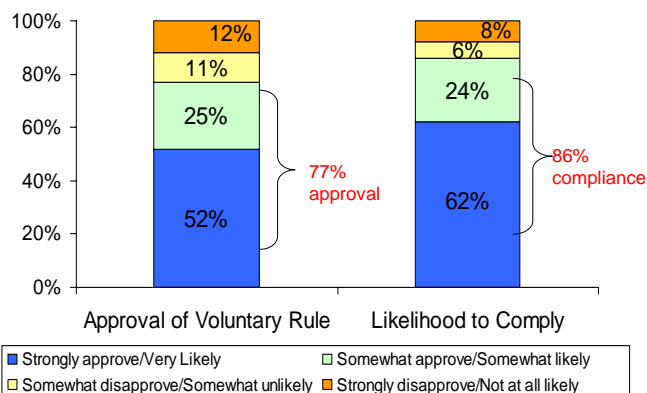


**Low-Income Group**

- ❖ **42** *Although support was slightly lower among the low-income group than among the general population of respondents, the majority (77%) approved of a voluntary no-burn measure and 86% said they would comply with one.*

Results of approval for and likelihood to comply with a voluntary no-burn rule among just the low-income group of respondents are presented in the next figure. It can be seen that 77% of these respondents approved of a voluntary measure and a combined total of 86% said they would comply with it.

**FIGURE 38 – SUPPORT FOR VOLUNTARY NO-BURN RULE AND LIKELIHOOD TO COMPLY**  
(LOW-INCOME GROUP EXCLUDING UNDECIDED RESPONSES)

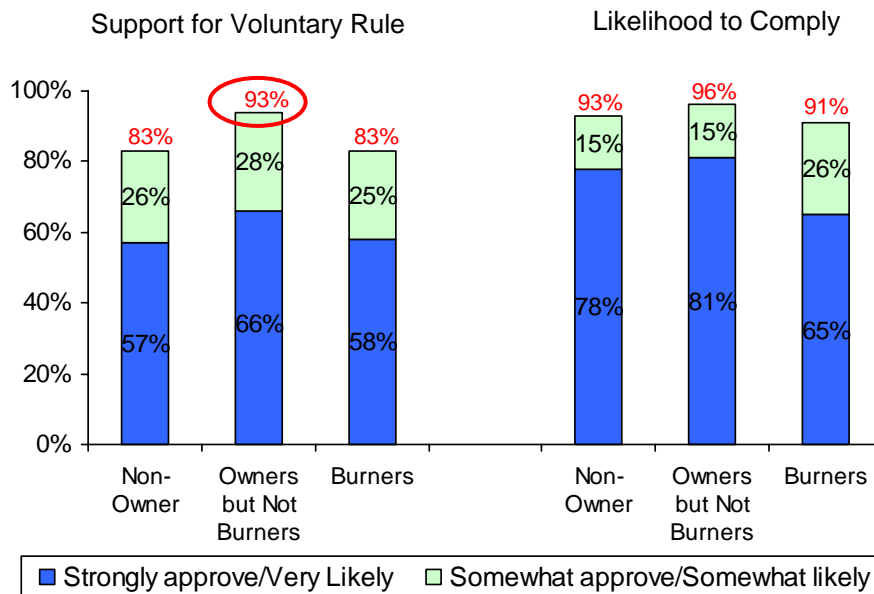


**Burners vs. Non-Burners**

- ❖ **43 Perhaps the best reflection of levels of acceptance of a voluntary measure to request that residents not burn wood is between those who burned wood this year versus non-burners. Results indicated that the majority (83%) of those who burned wood this past winter also approved of a voluntary no-burn rule. The highest approval was among respondents who owned wood-burning devices but did not use them (93%). In terms of compliance, there were no differences – the vast majority (over 90%) in all groups said they would comply.**

For the purpose of this analysis, the non-burner group was separated into two: those who actually owned wood-burning devices but never used them, and those who did not own wood-burning devices. Results of the approval for and the likelihood of complying with a voluntary no-burn rule among three groups of respondents (burners, owners but not burners, and non-owners) are shown in Figure 39.

**FIGURE 39—SUPPORT FOR VOLUNTARY NO-BURN RULE AND LIKELIHOOD TO COMPLY**  
(NON-OWNERS, OWNERS BUT NOT USERS, & BURNERS,  
EXCLUDING UNDECIDED RESPONSES)



It is interesting to note, first of all, that support and hypothetical compliance among those respondents who do not own wood-burning devices is not 100% -- (17% did not approve and 7% would not comply), meaning that some of the residents who cannot burn wood, would, if they could.

Secondly, although levels of approval and levels of hypothetical compliance within each group are not statistically different from one another, the very fact that there are differences at all indicates that there is a small number of individuals in each group who disapprove of the rule but say they would comply. Similarly there is a small number of individuals who approve of the rule but say they would not comply. In attitudinal survey research this is not an uncommon finding.

Closer examination of a couple of the discrepancies within just the **burner** group revealed that among the 17% of respondents who did not support a voluntary no-burn rule (22 individuals said they “somewhat” or “strongly” disapproved), half of them said they would comply, and in fact 9 individuals heard the requests not to burn this past winter and of these, 2 respondents reduced the number of fires they burned. Among the 9% of burners (or 12 individuals) who said they would not comply with a voluntary reduction, nearly half (5 individuals, or 42%) said they approved of a voluntary rule, 7 of them (or 58%) heard the no-burn requests this past winter, and 1 respondent actually reduced the number of fires because of the request. In other words, there were gaps between some respondents’ attitudes, what they said they would do, and how they actually behaved. Fortunately, for the most part, these discrepancies were apparent within only a relatively small number of respondents.

## SUPPORT FOR MANDATORY NO-BURN RULE

### General Population

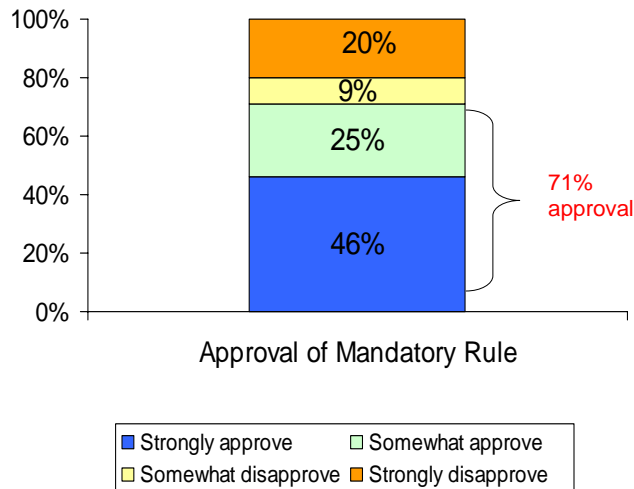
- ❖ **44** *Although approval was significantly lower (than for a voluntary no-burn rule), the majority of respondents (71%) nevertheless approved a mandatory no-burn rule.*

All respondents were read a description<sup>20</sup> of a mandatory no-burn rule which some counties have already adopted, and were asked whether they approved or disapproved of it. Results, presented in the next figure, indicate that 46% “strongly” approved of a mandatory measure, and a further 25% of all respondents “somewhat” approved of it, for a combined approval rating of 71%. This is significantly lower than the 85% who approved of a voluntary rule, but still indicates that the majority of the general public would approve of a mandatory no-burn rule. That being said, there is also a fairly large polarized group of 20% of all respondents who were “strongly” opposed to mandatory legislation who could be quite vocal in their opposition.

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<sup>20</sup> “Some counties in California have already adopted mandatory NO-Burn regulations for specific days during the winter when particulate matter is predicted to be unhealthy. A local agency is also considering adopting a mandatory No-Burn rule. However, gas fireplaces and residents whose only source of heating is wood-burning would be exempt from the regulation.”

**FIGURE 40 – SUPPORT FOR MANDATORY NO-BURN RULE**  
(BASE STUDY GROUP EXCLUDING UNDECIDED RESPONSES)

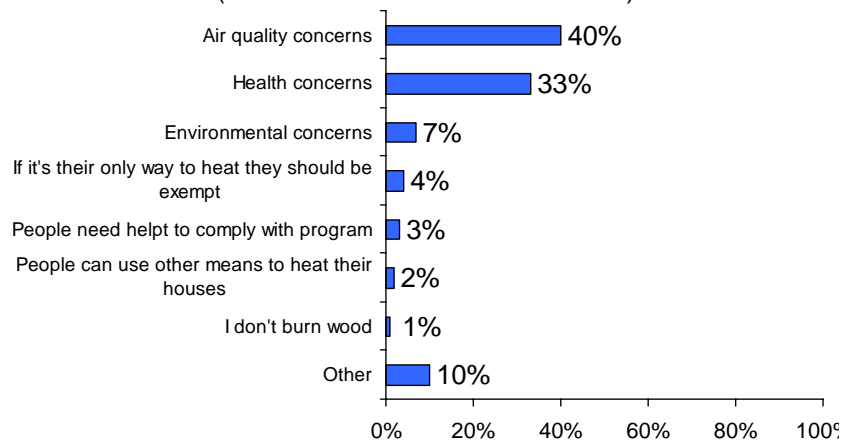


***Main Reasons For Strongly Approving a Mandatory No-Burn Rule***

- ❖ **45 Those who “strongly” approved of a mandatory no-burn rule did so mainly because of air quality and health concerns.**

All respondents were then asked to give their main reasons for approving or disapproving of a mandatory measure. All responses were content-analyzed and categorized and the full verbatim transcripts will be presented in the statistical binder. Among the 46% of respondent who “strongly” approved, it can be seen in the next figure that the main reasons for approving a mandatory no-burn regulation were for air quality reasons and health concerns.

**FIGURE 41 – MAIN REASONS FOR “STRONGLY APPROVING” A MANDATORY NO-BURN RULE**  
(GENERAL POPULATION BASE STUDY)



To give a sense of the actual words respondents used, a few examples are included. First, some of the comments having to do with **air quality concerns** were:

- *"Anything that is better for the air is good.*
- *Because of the smog and everything in the air. I think we need to have cleaner air than we do now.*
- *Because we have to reduce air pollution.*
- *Because we can't ignore the air quality in the valley, it continues to get worse and the things we know are contributing to the air quality should be addressed such as wood-burning fireplaces and fire pits.*
- *Because wood-burning worsens our atmosphere and burning wood is NOT necessary.*
- *Because you have to stop the pollution and if you stop it will help.*
- *I am pro nature. Like to improve the air quality.*
- *I feel that everyone has an opportunity to help improve our air quality therefore any individual effort such as not burning a fireplace that is not needed for heat should not be.*
- *I like to breathe clean air, and I spend quite a bit of time outside, it is very evident when the air quality in Sacramento is poor. I am particularly irritated when I feel that people burn trash in their fireplaces.*
- *I think the air quality is bad, and we need to look at what is making the air quality bad. If the only way to increase the awareness is to have this become mandatory, then they should do it.*
- *It would help clean up the air.*
- *I think that it is important to have good air quality and some days I don't want to and don't go outside due to the poor air quality.*
- *If it's going to reduce particulate matter in the air and make it better I don't see why we can't all work together on it.*
- *To reduce pollution. There is a need for it.*
- *Just the air quality -- it's not getting better if we aren't helping to get it better. If you don't need a fireplace for your primary source of heat it is a luxury that is damaging the rest of us.*
- *That there's probably too much air particulate -and it needs to be stopped.*
- *The less you burn, the less air pollution there will be.*
- *The poor quality of air to breathe and things can only get worse. We've come to a point where we have to do something as stringent as this.*
- *To keep the pollution and particulate matter out of the air.*
- *We have to get pollution under control and I think voluntary programs won't work.*
- *Whatever we have to do for air quality is what we need to do unless you are an exception.*
- *We need to do something about all the pollution."*

A few of the supportive comments of mandatory legislation that had to do with **health concerns** included:

- *"Because I have asthma.*
- *Because I don't have any health issues and it wouldn't be fair of me not to think of people who do have those health problems.*

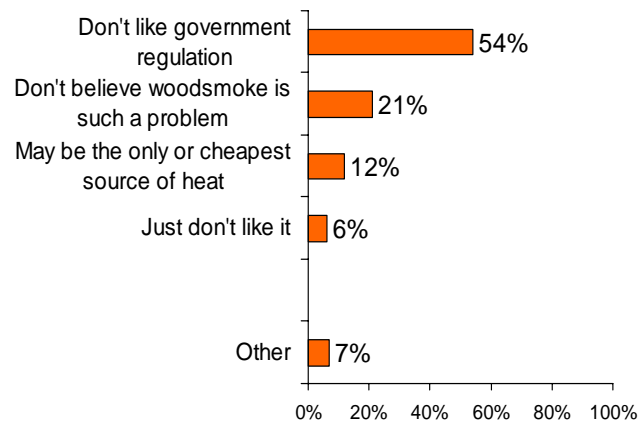
- Because my father has 25% lung capacity and he is on oxygen 100% of the time because of his emphysema. We monitor the air quality reports and he has to stay in on days when the air quality is bad.
- For the purpose of everybody breathing, I would agree that they should regulate it. That is why we have rules, I have elderly parents and I know that My mother-in-law has lung problems.
- I'm thinking of the children. And we want a healthy population. Without breathing this stuff in.
- I go outside and smell smoke, and I'm prone to lung problems, so I approve.
- I have two daughters who are asthmatic, and I think that we should do what is best for everybody.
- I only have one set of lungs and pair of eyes, I have allergies and pollution irritates every one of these things.
- I think everybody should be able to breath. I think wood-burning is a luxury and if we can't afford the luxury because of the damage it causes than giving up wood-burning stoves and fireplaces is a small thing to ask.
- I understand the health risks to this. I'm healthy and I know that there are many people who are not. So just to have compassion for others.
- It's not good for the people that have a problem breathing.
- My wife died of pulmonary problems.
- Not only from my own asthma, but as a teacher I see many children with breathing problems.
- Well because of the whole particulate matter pollution and there are a lot kids now getting asthma from the wood-burning.
- Well personally I believe there is quite a bit of particulate matter in the air. I personally have an allergy or sinus related issues and it basically only happens since I moved here and I attribute it to the particulate matter in the air.
- When I go out and wood-burning stoves are on and fireplaces are going it really does get to me in my lungs.”

### ***Main Reasons For Strongly Disapproving of a Mandatory No-Burn Rule***

- ❖ **46 The 20% who “strongly” disapproved of a mandatory no-burn rule did so mainly because they don’t want their freedom limited by government regulation.**

The next figure indicates that the most frequently given reason for “strongly” disapproving a mandatory no-burn rule is that respondents do not like government regulation (54% of responses), followed by a belief that wood smoke is not such a problem (21%).

**FIGURE 42 – MAIN REASONS FOR “STRONGLY DISAPPROVING”  
A MANDATORY NO-BURN RULE  
(GENERAL POPULATION BASE STUDY)**



A few examples of respondents who did **not like government regulation** include:

- *“A person should be able to do what he wants to do in his house.*
- *Government intrusion. In general I don't see the Government needing to be involved in a matter like this that's not so serious.*
- *I'm just a little bit tired of busybodies trying to tell people how to live.*
- *I believe that people should be able to warm their houses however they like.*
- *I don't like being nailed into something that can be turned out to bite me in the ass. What sounds good on Monday doesn't always sound so good on Tuesday.*
- *I don't like the government telling me what I "HAVE" to do in my personal life. It is just too much. I believe in the volunteer method.*
- *I don't think the government should tell you when and what you can burn.*
- *I don't think we should be forced to comply.*
- *I still think there should still be a bit of a choice in there. It's that "No you can't that bothers me".*
- *I think governments are getting too much control.*
- *It's a political sham the majority of people have a fireplace you can burn wood in, now we are told when we can burn and when we can't. This is what happens when you have a state controlled by Democrats.*
- *It is up to the people themselves, not have a regulatory commission dictate to them.*
- *I don't think they should regulate that.*
- *You have people out there who have wood-burning fireplaces and they should be allowed to use their property. If they want to adopt new building regulations for wood-burning but pre-existing homes with wood fireplaces should be exempt.*
- *I don't want the government regulating my life.*
- *I don't like any more regulation. I think it should be voluntary.*

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- *They are infringing on people's rights.*
- *Whatever people want to do is their own business.*
- *They have no right telling me I can't have a fire. If I'm trying to save money on my monthly bill you bet I'm going to light a fire. I don't see anybody paying my bills.*

And finally, a few examples from respondents who **do not believe wood smoke is a problem**:

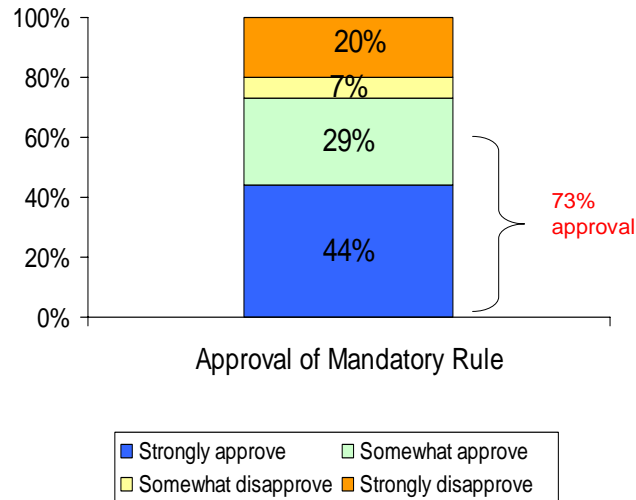
- *"Because I believe the so called threat is over-exaggerated and not substantiated.*
- *I don't see people driving less, which is the real cause of pollution.*
- *I don't think that it is a major cause of air pollution. It's a very minimal cause, and for the few times I burn it's a negligible cause.*
- *I haven't seen enough information to tell me that this is the primary cause of the high particulate matter in the winter. Equally, I don't see enough evidence that there are restrictions on industry and vehicles.*
- *There are not enough wood-burning fireplaces to really make a difference. When they allow the farmers to burn thousands and thousands of acres of rice fields, and put tons of particulate matter into the air, my fireplace seems inconsequential.*
- *We say burning furnaces causes more pollution than fireplaces.*
- *There are other areas be focused on, such as auto exhaust and municipal diesel buses.*
- *People need to conserve energy. There are other sources to be concerned about."*

### **Low-Income Group**

- ❖ **47 Approval of a mandatory no-burn rule was about the same in the low-income group as in the general population: 73% either somewhat or strongly approved a mandatory measure.**

The levels of approval of a mandatory no-burn measure among low-income respondents are presented in Figure 43. Results were generally the same as those obtained in the base study, with approximately 73% of low-income respondents approving mandatory measures and the remaining 27% disapproving.

**FIGURE 43 – SUPPORT FOR MANDATORY NO-BURN RULE**  
(LOW-INCOME GROUP EXCLUDING UNDECIDED RESPONSES)

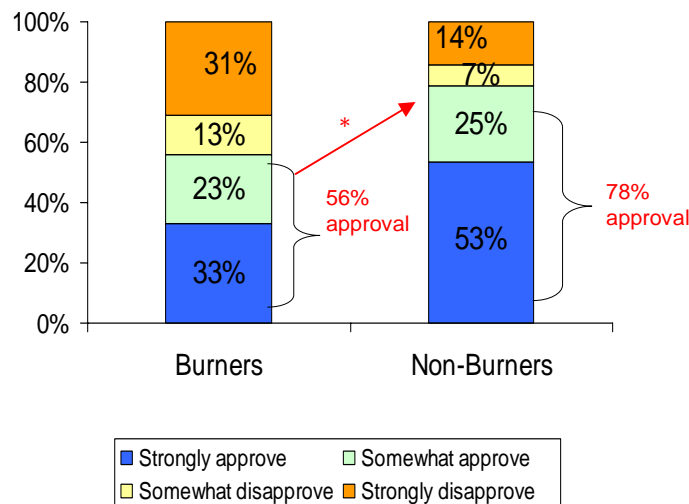


**Burners vs. Non-Burners**

- ❖ **48** *Not surprisingly, approval of a mandatory no-burn rule was significantly lower among burners (56%) than non-burners (78%) in the general population.*

Figure 44 shows the levels of approval of a mandatory no-burn measure among burners and compares them with non-burners in the general population. Results indicated that burners were significantly less likely than non-burners to approve of mandatory measures – only 33% “strongly” approved and another 23 “somewhat” approved, for a combined total of 56% approval. This contrasts with 78% of non-burners who approved of a mandatory no-burn rule.

**FIGURE 44 – SUPPORT FOR MANDATORY NO-BURN RULE**  
(BURNERS VS. NON-BURNERS GROUP EXCLUDING UNDECIDED RESPONSES)



\* indicates a statistically significant difference between the groups

### Other Group Differences

- ❖ **49** *There were no other demographic features (than burners vs. non-burners) that distinguished respondents who approved mandatory no-burn measures from those who did not.*

The series of 13 chi-square analyses which were run to determine whether certain demographic features distinguished those who approved of a mandatory no-burn rule from those who disapproved did not yield any significant differences – the same proportion of males as females both approved and disapproved; as did respondents in older neighborhoods as well as newer neighborhoods; owners as well as renters; wealthier households as well as poorer households; etc.

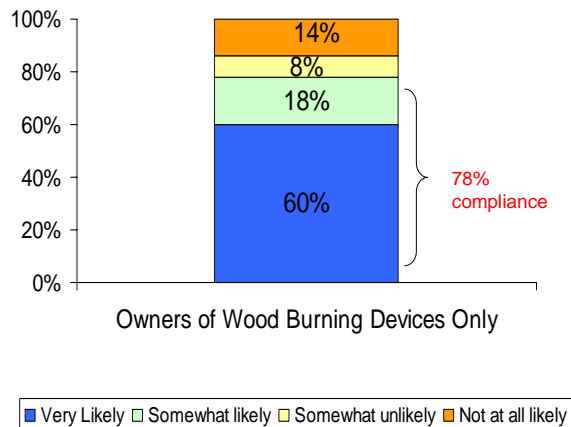
## LIKELIHOOD TO COMPLY WITH A MANDATORY NO-BURN RULE

### Owners of Wood-burning Devices

- ❖ **50** *Among those in the general population of Sacramento County respondents who owned wood-burning devices (whether or not they used them), over three-quarters (78%) said they would likely comply with a mandatory no-burn rule.*

In order to get as accurate a description as possible about projected levels of the likelihood of compliance with mandatory wintertime no-burn measures, only those respondents who owned wood-burning devices and thus had the capability of burning wood (whether or not they actually used them during the past winter) were asked to speculate on how likely they would be to comply with a mandatory no-burn rule if it were implemented in the Sacramento area. Just over half of the general population was owners (this included the 134 respondents who burned wood and the 82 respondents who owned, but did not burn wood this past winter) and just under half were non-owners of wood-burning devices. Of the 54% of owners (216 in total), 60% said they would be “very” likely to comply with any mandatory no-burn regulation, and a further 18% said they would be “somewhat” likely to comply. In other words, among the group of respondents who have the capability to burn wood, 78% said they would comply with a mandatory no-burn measure.

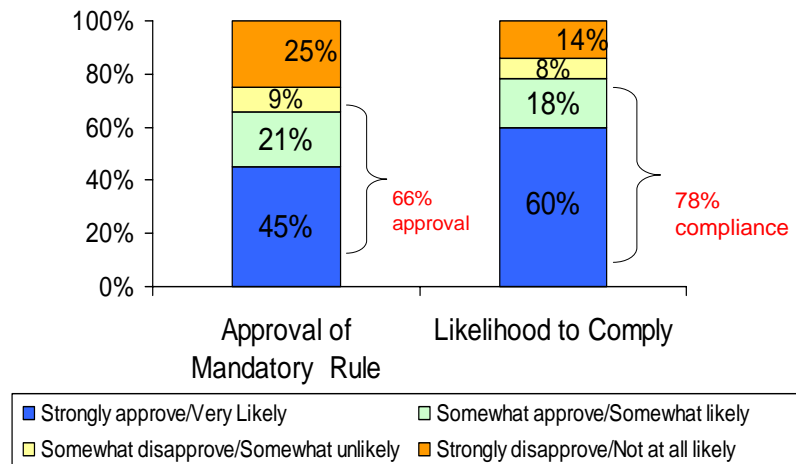
**FIGURE 45 – LIKELIHOOD TO COMPLY WITH MANDATORY NO-BURN RULE**  
(OWNERS OF WOOD-BURNING DEVICES ONLY EXCLUDING UNDECIDED RESPONSES)



- ❖ **51 Respondents who owned wood-burning devices were significantly more likely to say they would comply with a mandatory no-burn rule than to approve of it, indicating that prior support may not be a necessary requirement for successful implementation of a mandatory rule. In other words, respondents may not like the regulation but the majority would hypothetically comply with it.**

In order to show levels of approval of a mandatory no-burn measure in the same graph as respondents' likelihood to comply with it, we re-calculated levels of mandatory support by including only those respondents who were asked the compliance question – namely, those who owned wood-burning devices. Results are shown in the next figure, along with the just-reported levels of compliance. It can be seen that respondents who owned wood-burning devices were significantly more likely to comply with a mandatory no-burn rule (78%) than approve of it (66%).

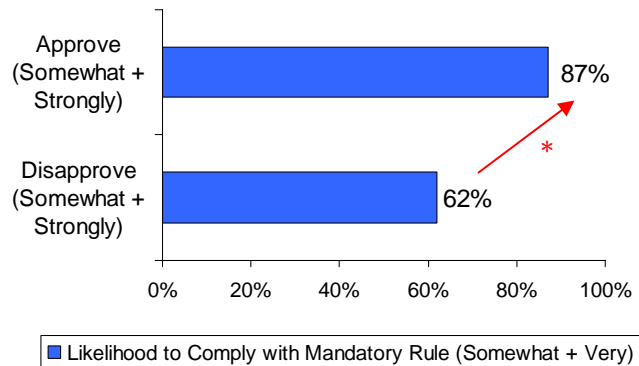
**FIGURE 46 – SUPPORT FOR MANDATORY NO-BURN RULE AND LIKELIHOOD TO COMPLY (OWNERS OF WOOD-BURNING DEVICES ONLY)**



- ❖ **52 Crosstabulations indicated that the majority of owners who approved of mandatory measures also said they would be likely to comply with them (87%). Significantly fewer owners who disapproved of mandatory measures would be likely to comply (62%).**

In order to see if the same discrepancies between attitudes and behavior that were found in the responses to voluntary no-burn measures also occurred in reactions to mandatory measures, we examined the fit between support for mandatory measures and likelihood to comply with them for the subgroup of respondents who were capable of burning wood (i.e. the same population of owners as just described above). Results, shown Figure 47, indicate that, among those who (“somewhat” or “strongly”) approved of a mandatory no-burn rule, 87% said they would likely comply (“somewhat” or “very likely”) with it. Significantly fewer owners who disapproved of mandatory measures would be likely to comply (62%). In other words, and similar to what was found in the voluntary rule analysis, there was a small percentage of individuals who approved of mandatory measures but who said they would not comply with them (13%); and there was a larger percentage of respondents who disapproved of mandatory measures but nevertheless said they would comply with them (62%).

**FIGURE 47 – LIKELIHOOD TO COMPLY WITH MANDATORY NO-BURN RULE BY LEVEL OF APPROVAL OF MANDATORY MEASURE (OWNERS OF WOOD-BURNING DEVICES ONLY)**



\* indicates a statistically significant difference between the groups

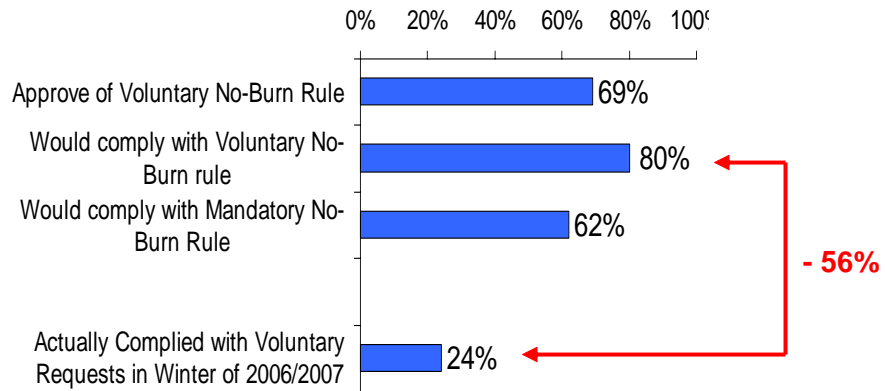
***Consistency: Support, Hypothetical Compliance and Actual Compliance***

- ❖ **53 Further analysis revealed that, although the extent of the discrepancy between what respondents said they would do voluntarily and what they actually did was similar between those who approved of mandatory measures and those who disapproved of mandatory measures; compliance this past winter was significantly higher among those who approved of mandatory measures (37%) than among those who disapproved (24%).**
- ❖ **54 However, because the majority (63%) of even favorably-disposed respondents of a mandatory no-burn rule did not voluntarily reduce the number of fires they burned this past winter, if a mandatory no-burn regulation were implemented, it would probably have to be visibly and publicly enforced in order to increase levels of compliance.**

In order to assess the levels of consistency between attitudes, hypothetical behavior and actual behavior, we separated those owners of wood-burning devices who did not support a mandatory no-burn rule from those who approved of it and within each of these two groups, examined their prior responses. The next two figures show the results of this analysis.

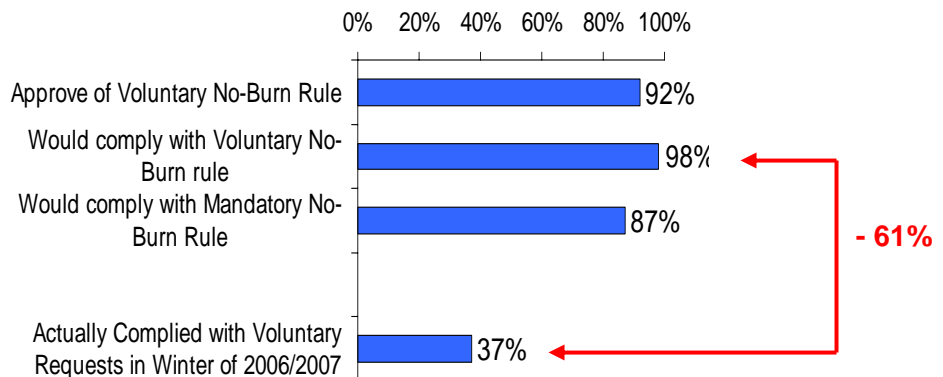
It can be seen in figure 48 that among the group who disapproved of a mandatory no-burn rule, the majority (69%) of owner respondents approved of a voluntary measure, and an even greater percentage (80%) said they would comply with a voluntary rule; however, only a quarter (24%) actually did reduce the number of fires they burned this past winter after hearing the voluntary requests. In other words, there was a fairly large gap between what these respondents said they would do and what they did (56% difference).

**FIGURE 48 – OWNERS WHO DID NOT APPROVE OF A MANDATORY NO-BURN RULE: VOLUNTARY SUPPORT, HYPOTHETICAL COMPLIANCE AND ACTUAL COMPLIANCE**



In terms of the group of respondents who approved of a mandatory no-burn regulation, the vast majority (92%) likewise approved of voluntary measures and nearly all (98%) said they would comply with a voluntary rule; however, only 37% of these respondents actually did reduce the number of fires they burned this past winter after hearing the voluntary requests. In other words, although support and predicted compliance was much higher among this group of owners, there was still a gap between what this otherwise favorably-disposed group of respondents said they would do voluntarily and what they actually did (61%).

**FIGURE 49 – OWNERS WHO APPROVED OF A MANDATORY NO-BURN RULE: VOLUNTARY SUPPORT, HYPOTHETICAL COMPLIANCE AND ACTUAL COMPLIANCE**

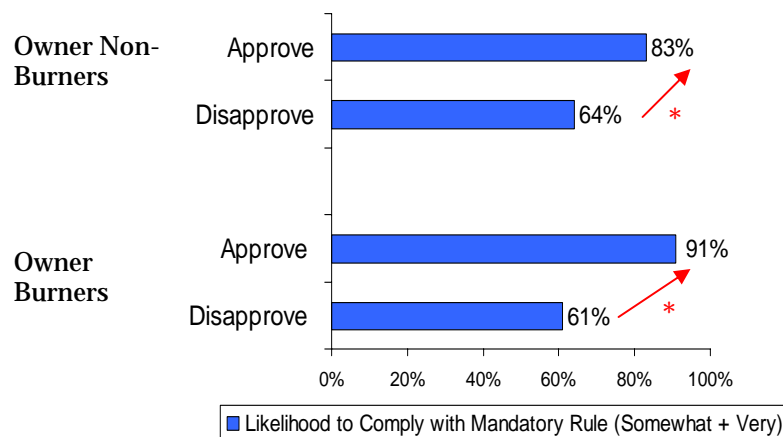


**Owner Burners vs. Owner Non-Burners**

- ❖ **55 Among owners of wood-burning devices, although levels of approval of mandatory measures were significantly different for burners and non-burners, levels of hypothetical compliance were the same.**

Significantly fewer owners of wood-burning devices who burned wood this past winter approved of mandatory measures (56%) than owners who did not burn wood (83%). That being said, Figure 50 shows that, regardless of whether or not they approved, the same percentage of burners as non-burners<sup>21</sup> would be likely to comply with a mandatory restriction – among those who approved of mandatory measures, 83% of non-burners said they would likely comply with mandatory measures. This is not significantly different from the 91% of burners who approved and said they would comply. Similarly, among those who disapproved of mandatory restrictions, 64% of non-burners would nevertheless comply and 61% of burners said they would comply.

**FIGURE 50 – LIKELIHOOD TO COMPLY WITH MANDATORY NO-BURN RULE BY LEVEL OF APPROVAL OF MANDATORY MEASURE: (OWNER NON-BURNERS VS. OWNER BURNERS)**



\* indicates a statistically significant difference between the groups

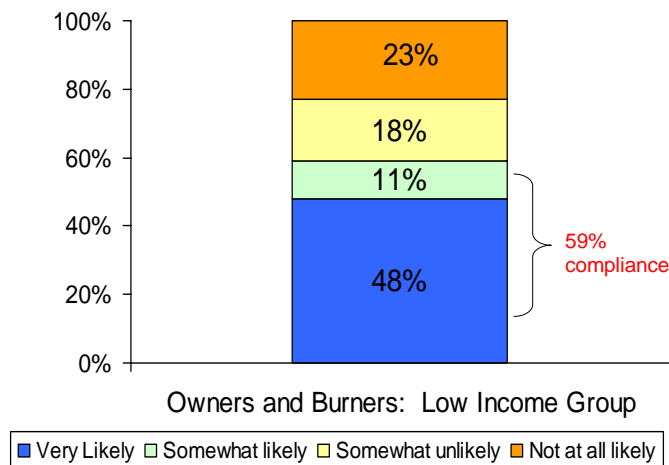
**Low-Income Group**

- ❖ **56 Owners of wood-burning devices in the low-income group were not as likely to comply with a mandatory no-burn rule.**

<sup>21</sup> This particular analysis of burners vs. non-burners is among owners of wood-burning devices only (i.e. those who were asked the mandatory compliance question). Previous analyses of burners vs. non-burners were based on a larger number of respondents as they included as non-burners the subset of the general population (185 respondents) who did not own any wood-burning devices and therefore did not burn wood this past winter.

The next figure shows the levels of hypothetical compliance with a mandatory no-burn rule among low-income respondents who owned wood-burning devices. It can be seen that only 59% of these respondents would be somewhat or very likely to comply with mandatory regulation, compared with 78% of owners in the general population. (It should be kept in mind, however, that the number of owners in the low-income group is relatively small – this analysis includes only 44 respondents.)

**FIGURE 51 - LIKELIHOOD TO COMPLY WITH MANDATORY NO-BURN RULE**  
 (OWNERS OF WOOD-BURNING DEVICES ONLY: LOW-INCOME GROUP  
 EXCLUDING UNDECIDED RESPONSES)



### Other Group Differences

- ❖ **57** *There were no demographic features that distinguished respondents who said they were likely to comply with mandatory no-burn measures from those who were not.*

The series of 13 chi-square analyses which were run on owners of wood-burning devices to determine whether certain demographic features distinguished those who were likely to comply with a mandatory no-burn rule from those who were not likely to comply did not yield any significant differences – the same proportion of males as females would comply as would not, as would owners as well as renters, those from wealthier homes and poorer homes, better educated respondents as well as less educated respondents; etc. **In other words, a public education campaign about PM pollution does not need to target specific demographics -- a broad outreach to all residents in Sacramento County should have an impact.**

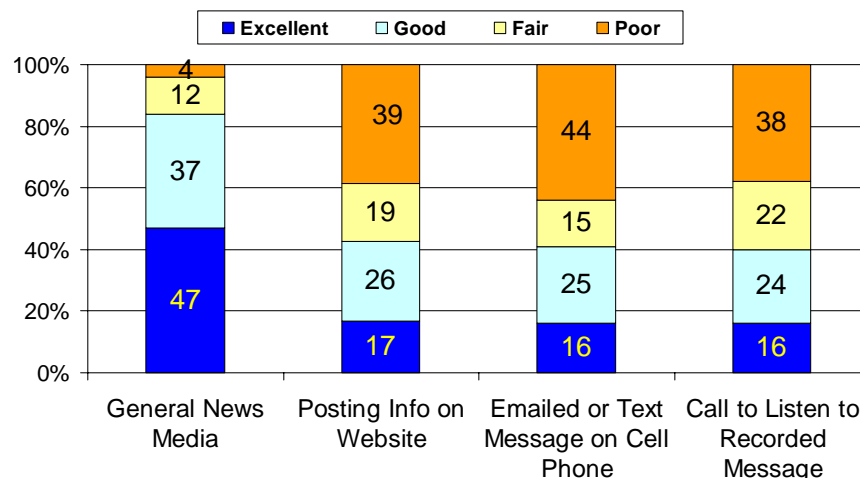
## COMMUNICATION STRATEGIES

### General Population

- ❖ **58** *The general news media, such as TV, radio, and newspaper, would be the best way to let residents know whether or not they can burn wood on a particular day.*

Respondents were read a list of possible ways that residents could find out about the air quality on a particular day and whether or not they could burn wood in the event that a mandatory no-burn rule was adopted. They were asked to rate each one in terms of how effective it would be for them personally, using a four-point scale: poor, fair, good, or excellent. As shown in Figure 52, the general news media was considered to be the most effective, with nearly half of those surveyed considering the TV, radio, or newspaper to be an “excellent” way to alert the public of a No-Burn Day. A further 37% said it would be a “good” way to reach them, for a combined total of 84% who held positive opinions about this communication strategy. This figure was found to be statistically significantly higher than the combined positive ratings towards the three other options mentioned: posting info on the website, 43%; emailed or text message on cell phone, 41%; or call to listen to a recorded message, 40%.

**FIGURE 52 - EFFECTIVENESS RATINGS OF COMMUNICATION STRATEGIES FOR NO-BURN DAYS**  
(AMONG BASE STUDY EXCLUDING UNDECIDED RESPONSES)



- ❖ **59** *Electronic billboards along the freeway and telephone calls were identified as other effective ways to advise the public about a No-Burn Day. Additionally, 8% suggested air quality information be sent via the mail.*

Respondents were asked to identify any other way they would prefer to receive information about the air quality to keep them informed about whether or not it is

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okay to burn wood on a particular day. Responses were captured in an open-ended format, cleaned and categorized for quantitative analysis. The majority of those surveyed (73%) offered no suggestions. Some respondents reiterated communication channels that had already been discussed (newspaper, 2%); TV, 2%; radio, 1%; and general media, 1%). Other ideas were more creative and included:

Eight percent said they would like to **receive something in the mail**.

Although this would obviously **not** be a way to alert the public about a no-burn request for the next day, a closer look at the verbatim responses implies an **opportunity for public education about air quality and no-burn days** in general.

- Several people who mentioned receiving information in the form of utility bill inserts said:
  - “A newsletter. Maybe something similar to a schedule.
  - By mail from PGE.
  - Inserts in utilities bills
  - The monthly utility bill could add some air quality information.
  - By mail through utility services.”
- Other comments were more generic and included:
  - “Direct mail of all the dates and I would post on my refrigerator.
  - Door to door flyers mail drops
  - I didn't know this was such a big problem, so send it in the mail.
  - In the mail which is on paper which is a wood product.
  - Information with electric or gas bills would be a better way to inform me
  - Mail flyers. Have a place to sign the flyer, show that they read it, and mail it back and get like \$5 for reading it.
  - Maybe a flyer or a postcard.
  - Memorandum by mail or by email.
  - Pamphlet.
  - Possibly a flyer or something sent in the mail.”

Several respondents (3%) would like to **receive a telephone call**. Comments included:

- “A phone message or a call on those days.
- A telephone blast.
- Automated phone book where you could call people to alert people. Generated by a computer. Look people up in the phone book to call them.
- Call me.
- Give me a phone call.
- Recorded announcement for my phone.
- They could call me.
- They need to call me on the phone.
- To call the people of the county.
- Voluntary automated phone calls to people who have signed up.”

A few people (3%) thought **electronic billboards along the freeway** would be effective. Comments included:

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- “Amber signs posted.
- Billboards over the freeway, electronic billboards, like the ones used for construction, one will automatically read it when passing by one.
- Billboards.
- Displays on the highway.
- Electronic billboards.
- Highway signs.
- Signs on freeway, flashing saying it is a no burn day.
- Signs on the freeway like the Amber alerts to let people know.
- The Amber Alert sign on the highway.
- To do sign boards like the Amber Alert or all along the freeway.”

Other suggestions for communicating No-Burn Days that were unique and could not be grouped into the same category included:

- “A helicopter with a loudspeaker, but that would cause pollution itself.
- A reminder that you will be notified about no burn days in the next three months.
- By helicopter warnings.
- E-mail on the computer; not just through the phone e-mail.
- Flying a blimp, or signs on the buses.
- Have a flag on capitol building - like city hall.
- I would consider a pop-up on the internet service. A flag system also, something like what they used to have at the fire stations.
- I would like to see it come through your thermostat on my house. A smart thermostat with display to show no wood-burning.
- New year blimp
- Notify people at work.
- People who would carry signs around to let people know.
- Posters.
- Put up a tower and put lights on the top of it where green if you can burn and red when you can't.
- Register homeowners with fireplaces.
- Reverse 911 system to be used in emergencies.
- Streaming news would be helpful.
- Supermarket alert in supermarket or gas pump. Places we frequent a lot. Schools. A hot air balloon.
- The internet is the best way.
- They should give us a schedule in our area as to when we can burn wood or not burn it.
- Through community groups.
- Warning signal like an air raid signal.
- You would have to send a no-burn officer to the door in order to contact me.”

## **Low-Income Results**

- ❖ **60 Communication preferences among low-income respondents were very similar to those of the general population, with the general news media ranking the highest (82% gave favorable ratings).**

Eight in ten said that the general news media would be a “good” (37%) or “excellent” (45%) way of communicating information about air quality and no-burn days. A third of low-income respondents felt that posting on a website (34%) and sending an e-mail or text message (35%) were favorable options. About half (50%) favored a telephone number which they could call to hear a recorded message.

### **Group Differences**

- ❖ **61 Preference for a recorded telephone message varied by a few demographic features (income, ethnicity, education, Internet access, type of dwelling and wood burn activity). Ethnicity influenced the level of those favoring e-mail and text messages.**

The series of 13 chi-square analyses that were run on the general population to determine whether certain demographic features distinguished those who gave positive evaluations of the various communication strategies from those who gave negative ratings did not yield any significant differences the use of general media or posting information on a website.

Those who gave positive ratings (“good” or “excellent”) for receiving e-mailed messages or text messages on a cell phone to alert them about no-burn days were more likely to:

- identify their ethnic background as African American or Hispanic or Latino (both 63%) than Caucasian (35%).

Those who gave positive ratings for a telephone number with a recorded telephone message in terms of being an effective communication tool were more likely to:

- live in an apartment, condo, townhome, or mobile home (54% vs. a single-family home, 36%),
- have less formal education (46% vs. have a college degree, 32%),
- not currently access the Internet (54% vs. those who do, 35%),
- have lower incomes (52% vs. 33% of those earning \$50,000 or more),
- not burn wood (45% vs. 30% of the burners),
- identify their ethnic background as African American (56%) and Hispanic or Latino (65%) versus Caucasian (37%).

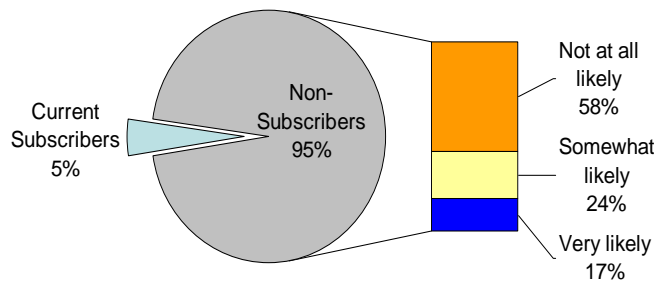
### **AIR ALERT SUBSCRIPTIONS**

- ❖ **62 Five percent of those surveyed said they currently subscribe to Air Alert. Among the non-subscribers, about four-in-ten said they would be likely to do so in the future, with 17% saying they would be “very” likely.**

Respondents were asked whether or not they subscribed to the District’s Air Alert notification system and 5% said they did. The 95% who were not

current subscribers were asked: “How likely would you be to sign up for an e-mail notification that would alert you to no-burn days?” As shown in the next figure, 17% would be “very” likely and an additional 24% would be “somewhat” likely. In other words, four-in-ten respondents said they would be likely to sign up for Air Alerts. The other 58% were not interested in the program.

**FIGURE 53 – SUBSCRIPTION TO AIR ALERT NOTIFICATIONS**  
(AMONG BASE STUDY EXCLUDING UNDECIDED RESPONSES)



### Group Differences

- ❖ **63** *Two demographic characteristics distinguished current non-subscribers who would be likely to sign up for Air Alert from those who would not: access to the Internet and age of home. Likelihood to subscribe was independent of other respondent demographics, including age, education, income and burner vs. non-burner, etc.*

The series of chi-square analyses were run to try to distinguish those who would be (“somewhat” or “very”) likely to sign up for Air Alert from those who would not among current non-subscribers. Results yielded two statistically significant differences. Those who were more likely to become Air Alert subscribers:

- had access to the Internet (51% vs. not access it, 18%), and
- live in homes that are less than 30 years old (50% vs. older homes, 28%).

### **DEMOGRAPHICS**

- ❖ **64** *The plurality of Sacramento base study respondents: were Caucasian, between the ages of 35 and 64, held a college degree, and had household earnings of at least \$50,000. They were homeowners, living in single-family homes that were built at least 20 years ago, with at least one other person, and were registered to vote.*

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The tables on the following pages indicate the demographic characteristics of the Sacramento base study residents and the group of low-income respondents who responded to the survey. While the percentages of non-responses by refusal are included in these tables, they were usually excluded from the analyses, unless otherwise stated. Within the base study column, pluralities are indicated in bold.

The “other” responses given for type of occupation, ethnicity, and party affiliation can be found in the statistical binder.

**FIGURE 54: DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS**

<b>GENDER</b>	<b>PERCENT OF BASE RESPONDENTS</b>	<b>PERCENT OF LOW-INCOME RESPONDENTS</b>
Female	50%	59%
Male	50%	41%
Total	100%	100%
<b>AGE</b>	<b>PERCENT OF BASE RESPONDENTS</b>	<b>PERCENT OF LOW-INCOME RESPONDENTS</b>
18 – 24	3%	6%
25 – 34	13%	13%
35 – 44	<b>18%</b>	11%
45 – 54	<b>21%</b>	12%
55 – 64	<b>19%</b>	10%
65 or older	23%	47%
<i>Non-response (Refused)</i>	3%	1%
Total	100%	100%
<b>EDUCATION</b>	<b>PERCENT OF BASE RESPONDENTS</b>	<b>PERCENT OF LOW-INCOME RESPONDENTS</b>
High school or less	24%	56%
Some college	30%	24%
Trade/Vocational – No college	2%	4%
College degree	<b>26%</b>	12%
Post-graduate degree	<b>17%</b>	3%
<i>Non-response (Refused)</i>	1%	1%
<b>Total</b>	<b>100%</b>	<b>100%</b>

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ETHNICITY	PERCENT OF BASE RESPONDENTS	PERCENT OF LOW-INCOME RESPONDENTS
African-American	6%	11%
Asian/Pacific Islander	5%	3%
Caucasian	<b>65%</b>	51%
Hispanic/Latino	13%	24%
Something else	6%	8%
<i>Non-response (Refused)</i>	5%	3%
Total	100%	100%
VOTER REGISTRATION	PERCENT OF BASE RESPONDENTS	PERCENT OF LOW-INCOME RESPONDENTS
Registered	<b>78%</b>	64%
Not registered	21%	34%
<i>Non-response (Refused)</i>	1%	2%
Total	100%	100%
INTERNET ACCESS	PERCENT OF BASE RESPONDENTS	PERCENT OF LOW-INCOME RESPONDENTS
None	27%	67%
Yes	<b>72%</b>	33%
<i>Non-response (Refused)</i>	1%	0%
Total	100%	100%
TYPE OF DWELLING	PERCENT OF BASE RESPONDENTS	PERCENT OF LOW-INCOME RESPONDENTS
Apartment	15%	35%
Condo	2%	3%
Townhome	2%	4%
Single-family detached home	<b>77%</b>	48%
Mobile home	2%	9%
<i>Non-response (Refused)</i>	2%	1%
<b>Total</b>	<b>100%</b>	<b>100%</b>

**Sacramento Metropolitan Air Quality Management District**

2007 Residential Wood Burn Research Study

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HOME OWNERSHIP	PERCENT OF BASE RESPONDENTS	PERCENT OF LOW-INCOME RESPONDENTS
Rent or Lease	27%	51%
Own	<b>71%</b>	47%
Live with others	1%	0%
<i>Non-response (Refused)</i>	1%	2%
<b>Total</b>	<b>100%</b>	<b>100%</b>
AGE OF HOME	PERCENT OF BASE RESPONDENTS	PERCENT OF LOW-INCOME RESPONDENTS
10 years or less	18%	3%
11 – 20 years	<b>8%</b>	9%
21 – 30 years	<b>15%</b>	3%
31 – 40 years	<b>16%</b>	16%
41 – 50 years	<b>14%</b>	21%
More than 50 years	<b>14%</b>	32%
<i>Non-response (Refused)</i>	5%	15%
<b>Total</b>	<b>100%</b>	<b>100%</b>
# OF HOUSEHOLD MEMBERS	PERCENT OF BASE RESPONDENTS	PERCENT OF LOW-INCOME RESPONDENTS
Live alone	<b>21%</b>	44%
Two	<b>35%</b>	21%
Three	16%	7%
Four	14%	11%
Five or more	13%	16%
<i>Non-response (Refused)</i>	2%	1%
<b>Total</b>	<b>100%</b>	<b>100%</b>
HOUSEHOLD INCOME	PERCENT OF BASE RESPONDENTS	PERCENT OF LOW-INCOME RESPONDENTS
Under \$20,000	10%	100%
\$20,000 to less than \$50,000	25%	0%
\$50,000 to less than \$100,000	<b>32%</b>	0%
\$100,000 or more	<b>19%</b>	0%
<i>Non-response (Refused)</i>	14%	0%
<b>Total</b>	<b>100%</b>	<b>100%</b>

## SUMMARY CONCLUSIONS AND RECOMMENDATIONS

*There is still much room for educating the general public about the negative effects of residential wood-burning on wintertime air quality: approximately four in ten respondents in Sacramento County felt wood-burning was not a serious cause of air pollution.*

*One third (33%) of all respondents in the base study were classified as “burners”: they owned wood or pellet burning devices (either indoors or outdoors), and they burned wood, pellets, or manufactured logs at least once this past winter. Burners were significantly more likely than non-burners to:*

- be home owners (rather than renters,)*
- live in single family dwellings, and*
- be wealthier (have household incomes greater than \$50,000).*

*Although the majority of respondents in the general population supported mandatory curtailment restrictions, about one fifth (20%) said they “strongly” disapproved of mandatory regulation. The main reason given for the disapproval was an active dislike of being told what to do by the government.*

*Respondents who owned wood-burning devices were significantly more likely to say they would comply with a mandatory no-burn rule than to approve of it, indicating that prior support may not be a necessary requirement for successful implementation of a mandatory rule. In other words, respondents may not like the regulation but the majority would hypothetically comply with it.*

*That being said, there was some discrepancy between attitudes and actual behavior. Among owners of wood-burning devices who approved of mandatory measures, 37% actually voluntarily reduced the number of fires they burned this past winter. This was significantly higher than the 24% of respondents who complied but who disapproved of mandatory measures.*

*However, because the majority (63%) of even favorably-disposed respondents of a mandatory no-burn rule did not voluntarily reduce the number of fires they burned this past winter, if a mandatory restriction were to be implemented, it would probably have to be visibly and publicly enforced in order to increase levels of compliance.*

*The best way to let residents know whether or not they can burn wood on a particular day is via the general news media, such as TV, radio, and newspaper.*

*These results were based on 401 telephone interviews conducted in April, 2007 with a random sample of Sacramento County residents, representative of the population as a whole. Results are accurate to within +/- 4.9%, 19 times out of 20. A total of 139 interviews were also conducted with a group of low-income (based on federal guidelines) residents.*