



**Washoe County Health District:  
Air Quality Management Division**

**2015-16 Residential  
Wood Use Survey**

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# 2015-16 RESIDENTIAL WOOD USE SURVEY

## TABLE OF CONTENTS

<b>Objectives and Methodology</b> .....	1
<b>Executive Summary</b> .....	3
<b>Section A – Use of Wood Burning Devices</b>	
Screening for Wood Use to Heat Residence .....	6
Use of Wood Burning Devices .....	7
Types of Wood Burning Devices .....	8
Quantity of Wood/Pellets Used .....	9
Types of Wood/Pellets or Fuel Used .....	10
Month Wood Burning Device Use Started .....	11
Frequency of Wood Burning Device Use .....	12
Time of Day Wood Burning Device Was Started .....	14
<b>Section B – Air Quality Management Division Programs</b>	
Awareness of Burn Code Program .....	15
Behavioral Changes Based on Burn Codes .....	18
Support for Additional Controls to Improve Air Quality .....	19
Rebate Program for Wood Stoves .....	20
<b>Section C – Differences by Type of Residence and Geographic Area</b>	
Type of Residence .....	21
Geographic Area of Residence .....	22

# OBJECTIVES AND METHODOLOGY

## Objectives

The Washoe County Health District: Air Quality Management Division educates the general public about the causes of air pollution and implements clean air solutions. Residential wood combustion is a substantial contributor to air pollution in Washoe County, Nevada. In order to estimate the residential wood combustion contribution to particulate and carbon monoxide (CO) concentrations, area residents have been surveyed periodically over the past two decades regarding their wood use patterns.

The primary objectives of the current 2015-2016 survey were to:

- Identify the percentage of residents who have one or more wood burning devices in their homes and, of those, the percentage who used a wood burning device during the prior winter;
- Identify the types and number of wood burning devices used,
- Identify the types and amount of wood or pellets that were burned, as well as whether potentially harmful materials such as coal, scrap wood, and/or pallets were burned;
- Identify how many days and hours, on average, the wood burning devices were used, the months that they were first started during the prior winter, and the time of day the devices were usually started;
- Identify whether people who have a wood burning device have heard of Washoe County's Burn Code Program and, if yes, whether they either reduced (when "yellow") and/or stopped (when "red") their wood burning during the prior winter,
- Identify whether they would support additional wood burning controls to improve air quality,
- Identify among respondents who have wood stoves, if their wood stove was manufactured or installed prior to 1992 and, if yes, whether they were aware of and/or interested in a rebate program,
- Identify whether there were significant differences between subgroups based on either type of residence or the geographic region of residence; and
- Provide trending over time and comparisons with previous study results where applicable.

## Methodology

InfoSearch International, a full-service research firm located in Reno, Nevada, conducted the survey in 2015-16, as well as in the three previous waves: 2012-13, 2009-10, and 2007-08. Prior to that, MarkeTec conducted seven waves of the survey. The questionnaire for the baseline 1992-1993 survey was designed in partnership with the Washoe County Health District: Air Quality Management Division. Over the 11 study periods to date, the same basic questionnaire has been used, but with some modifications to keep the content current and relevant. For the 2015-16 study, nine questions were deleted and three were added.

At least 400 respondents with wood burning devices in their homes were interviewed in each wave. In 2015-16, the total sample was 1,051 respondents; 400 (38%) had a wood burning device and 221 (21%) used a wood burning device during the prior winter season. Based on a 95% confidence level, the total sample of 1,051 has a confidence interval of  $\pm 3.0\%$ ; the main sample of 400 has a confidence interval of  $\pm 4.9\%$ ; while the sub-sample of 221 wood device users has a confidence interval of  $\pm 6.6\%$ .

In the 2015-16 study, respondents resided in 24 Washoe County zip codes, which were grouped into six geographic areas for the analysis:

Distribution by Geographic Areas	Zip Codes	Population 2016 Estimate (n=450,000)	Total Sample 2015-16 (n=1,051)	Have Wood Burning Device (n=400)
1. Sun Valley, North Valleys	89433, 89506, 89508	16%	18%	17%
2. North, Northwest Reno	89439, 89503, 89512, 89523	20%	19%	17%
3. Central Reno	89501, 89502, 89509, 89519	21%	15%	21%
4. Central, East Sparks	89431, 89434	14%	11%	12%
5. Spanish Springs, Pyramid	89405, 89424, 89436, 89441, 89510	13%	17%	11%
6. So. Reno, Washoe Valley, Incline	89402, 89450, 89451, 89511, 89521, 89704	15%	20%	23%
Total		100%	100%	100%

In 2015-16, InfoSearch sub-contracted with a third party telephone research center, NSON, to conduct the interviews. InfoSearch oversaw and monitored the process to ensure that the interviews were conducted per the specifications of this study. The source was based on a listed sample in combination with a “raised integer” method, by which interviewers added “one” to each base number until an eligible household with a working phone number was reached. As before, the final source included both listed and unlisted numbers. Telephone interviews were conducted on weekdays between 4:00 and 9:00 p.m. and on weekends between 9:00 a.m. and 6:00 p.m.

The study was in the field from April 5 to 30, 2016. On average, the interviews took 5-6 minutes for respondents who had a wood burning device. Results in the current report are for the 2015-16 study, unless otherwise noted. Totals may be affected by rounding (generally  $\pm 1\%$ ).

# EXECUTIVE SUMMARY

## Use of Wood Burning Devices

- In 2015-16, 38% of all respondents had at least one wood burning device in their homes:
  - 12% indicated, unaided, that they burned wood to heat their residence and another 26% were aided in recalling that they have a wood burning device.
  - 21% used a wood burning device in the prior winter, while the other 17% had a wood burning device but did not use it.
- Among the sub-group who had a wood burning device, just over half (55%) reported using it in the prior 2015-16 winter, similar to 53% in 2012-13, 59% in 2009-10, and 55% in 2007-08.
- Among those who used a wood burning device in 2015-16, 59% used a fireplace, 37% used a wood stove or insert, and 19% used a pellet stove, with multiple responses allowed. The percentage that used, specifically, a fireplace increased from the 47-51% range in the prior three waves to 59% this wave (2015-16).
- Over the prior winter season, respondents burned, on average, twice as much wood in a wood stove (1.54 cords) as they did in a fireplace (0.73 cords). Additionally, respondents who used a pellet stove burned, on average, about one ton of pellets (1.08 tons) per device during the winter season.
- Among respondents who used a wood burning device, one out of four (25%) burned hard wood, one out of four (24%) burned soft wood, and one out of three (33%) burned a mixture of hard wood and soft wood; additionally, 5% burned Presto or Durafume logs and 12% burned pellets. Overall, one out of six (17%) also burned potentially detrimental fuels such as scrap wood, pallets, and/or coal.
- In 2015-16, 43% of pellet stove users and 37% of wood stove users started their devices in October or earlier, compared to just 18% of fireplace users. The most common month for starting each type of device was November, and by the end of November, 92% of pellet stove users, 78% of wood stove users, and 65% of fireplace users had started their devices.
- Over the three month period from November 1, 2015 to January 31, 2016, pellet stove users burned wood, on average, three out of every five days (62%), while wood stove users burned wood one out of every two days (50%), and fireplaces users burned wood one out of every four days (23%).
- On average, wood stove users (7.7 hours) and pellet stove users (7.4 hours) burned wood in their devices about twice as long per occasion as did fireplace users (3.9 hours).
- Based on the proportion of devices and differences in usage patterns, half (50%) of all the wood burning hours in Washoe County were generated by wood stoves, while 31% were generated by pellet stoves, and 19% by wood burning fireplaces.

- Nearly three out of four respondents (73%) typically started their wood burning devices in the evening hours, between 5:00 p.m. and midnight. Early morning start times between midnight and 8:00 a.m. were more common among pellet stove users (27%) than either wood stove users (9%) or fireplace users (6%).

### Air Quality Management Division Programs

- Among all respondents with a wood burning device (regardless of use), more had heard of the Green-Yellow-Red Code Program by name (79%) than had heard of the Keep It Clean; Know the Code Program by name (46%).
- Compared to the prior 2012-13 wave, in 2015-16:
  - Awareness of the Green-Yellow-Red Burn Program remained statistically stable among those who had used a wood burning device, but decreased from 84% to 68% among those who had but did not use a wood burning device.
  - Awareness of the Keep It Clean; Know the Code Program increased from 43% to 53% among those who used a wood burning device, but remained statistically stable among those who had but did not use a wood burning device.
  - The percentage who had heard of both programs increased from 37% to 44%, but the percentage who had not heard of either program also increased from 10% to 19%; the remainder had heard of only one of the two programs.
- Among respondents who had heard of at least one of these two programs, seven out of ten (71%) had heard about the program or code on the television, similar to 70% in the prior wave. Additionally, television was the primary source of this information for 64% of fireplaces users, 72% of wood stove users, and 85% of pellet stove users.
- In 2015-16, among those who used a wood burning device and were aware of at least one Burn Code Program:
  - Overall, 73% reduced wood burning during all yellow burn code days in the prior winter and 76% stopped wood burning during all red burn code days. (In 2012-13, when these two questions were combined, 74% reported that they either reduced or stopped wood burning during either yellow or red days.)
  - Overall, 64% reduced wood burning during all yellow days and stopped during all red days, while 11% reduced during yellow but did not stop (or didn't know if they had stopped) during red, 9% stopped during red but did not reduce (or didn't know if they reduced) during yellow, 14% explicitly did not reduce during yellow days nor stop during red days, and 2% did not know whether they reduced or stopped during any of these days.
  - Fireplace users were more likely to reduce on all yellow burn code days (78%) and/or stop on all red burn code days (86%) than were either wood stove users (71% and 70%, respectively) or pellet stove users (64 and 61%).

- Respondents who mentioned, unaided, that they burned wood to heat their residence were more likely to report that they did not stop (or did not know if they stopped) wood burning during all red days (32%) than were those who were aided in recalling that they have a wood burning device (17%); these two groups did not, however, differ significantly in their behavior on yellow days.
- Support for additional wood burning controls to improve air quality increased to 59% this wave, up from 47% in 2012-13 and 52% in 2009-10.
  - Respondents who had but did not use a wood burning device in the prior winter were substantially more likely to support additional controls (72%) than were those who used a wood burning device (48%).
  - Among respondents who used a wood burning device, fireplace users were more likely to support additional controls (56%) than were either pellet stove users (49%) or wood stove users (37%).
  - Respondents who were aided in recalling that they have a wood burning device were more likely to support additional controls (65%) than were respondents who declared, unaided, that they burned wood to heat their residence (46%).
- Among all 104 respondents who had a wood stove, 45 (43%) had an older model that was manufactured or installed prior to 1992. Out of the 45 potentially eligible respondents for the rebate program, 12 were already aware of the program and 13 agreed to be contacted about the rebate program.

### Differences by Type of Residence and Geographic Area

- Nine out of ten respondents (90%) who had a wood burning device resided in a single-family home, similar to 89-90% in the prior three waves. Among respondents with a wood burning device, those who resided in a single-family home were more likely to have used it in the prior winter (56%) than were those who lived in another type of residence (46%).
- Based on the six geographic areas in the study, respondents in the Central Reno area were the most likely to have a wood burning device (51%), while those from the Sun Valley/North Valleys area were the most likely to have used a wood burning device (29%).
- Among the sub-group who used a wood burning device and were aware of the Burn Code Program (by any name), respondents from the Central/East Sparks area were the most likely to reduce wood burning on all yellow days (95%) and to stop on all red days (100%), while those from the Spanish Springs/Pyramid area were the least likely to reduce on all yellow days (53% did) and those from the Sun Valley/North Valleys area were the least likely to stop on all red days (51% did).
- Respondents from the Central Reno area were the most likely to support additional wood burning controls to improve air quality (70%), while those from the Sun Valley/North Valleys area were the least likely to support additional controls (41%).



## DETAILED FINDINGS

### Section A – Use of Wood Burning Devices

#### Screening for Wood Use to Heat Residence

**Question: What types of fuel or energy are used to heat this residence?**  
*(Unaided, multiple responses allowed)*

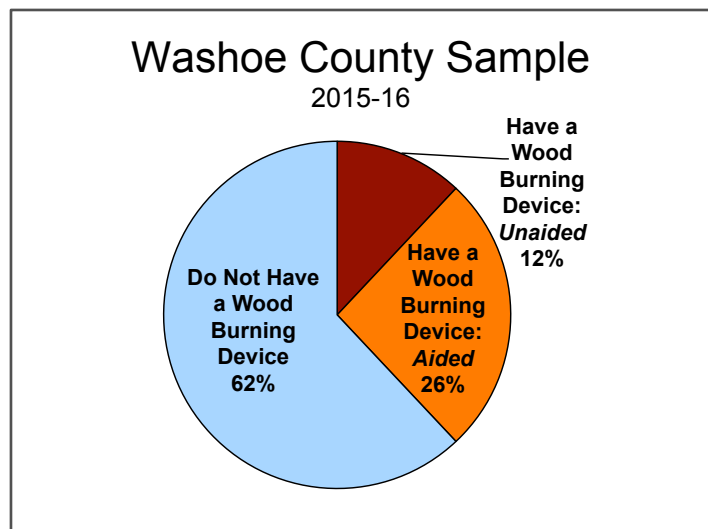
General Energy Usage	1992 -93 (n=1,024)	1994 -95 (n=1,023)	1995 -96 (n=669)	1999 -00 (n=1,131)	2001 -02 (n=1,262)	2003 -04 (n=1,473)	2005 -06 (n=1,241)	2007 -08 (n=1,130)	2009 -10 (n=1,166)	2012 -13 (n=1,130)	2015 -16 (n=1,051)
Natural Gas	64%	65%	67%	75%	75%	67%	75%	77%	72%	70%	<b>69%</b>
Electricity	9%	11%	15%	18%	18%	24%	18%	16%	23%	25%	<b>24%</b>
<b>Wood</b>	<b>7%</b>	<b>2%</b>	<b>8%</b>	<b>6%</b>	<b>4%</b>	<b>6%</b>	<b>6%</b>	<b>9%</b>	<b>11%</b>	<b>12%</b>	<b>12%</b>
Bottled Gas /Propane	3%	3%	5%	5%	6%	6%	7%	5%	5%	7%	<b>8%</b>
Oil	16%	7%	7%	2%	4%	3%	4%	6%	5%	4%	<b>4%</b>

In 2015-16, a total of 131 out of 1,051 respondents (12%) indicated, unaided, that they used wood to heat their residence. With multiple responses allowed, two-thirds (69%) reported that they used natural gas, while 24% used electricity, 8% used bottled gas/propane, and 4% used oil. Just 2% of all respondents, or 16% of those who heat with *only* wood, reported that they heat with *only* wood. The 2015-16 percentages were similar to the results from both the 2012-13 wave and the 2009-10 wave.

**Question: (Aided, if wood was not mentioned above) Do you have any type of wood burning device in your home, such as a fireplace, wood stove, or pellet stove?**

If respondents did not mention wood on the unaided question, they were then asked (aided) if they had any type of wood burning device in their home. An additional 269 respondents (26% of the total sample) reported that they did.

Altogether, 400 respondents, or 38% of the total sample, had a wood burning device in their home. These percentages were statistically stable compared to 2012-13 (35%), 2009-10 (34%), and 2007-08 (37%).

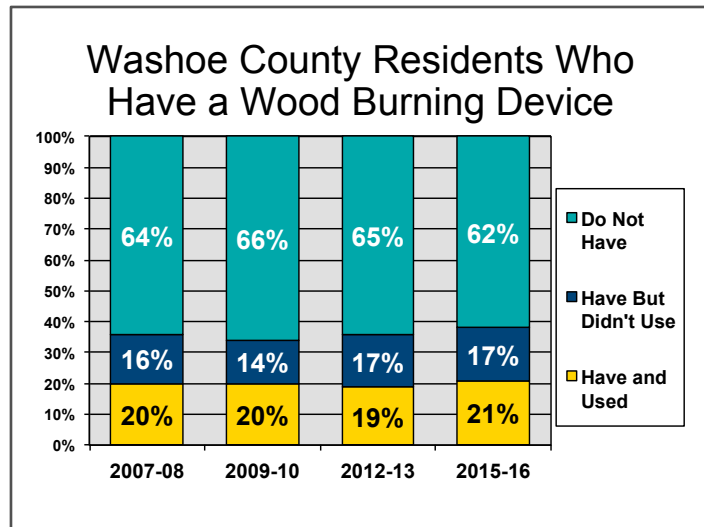




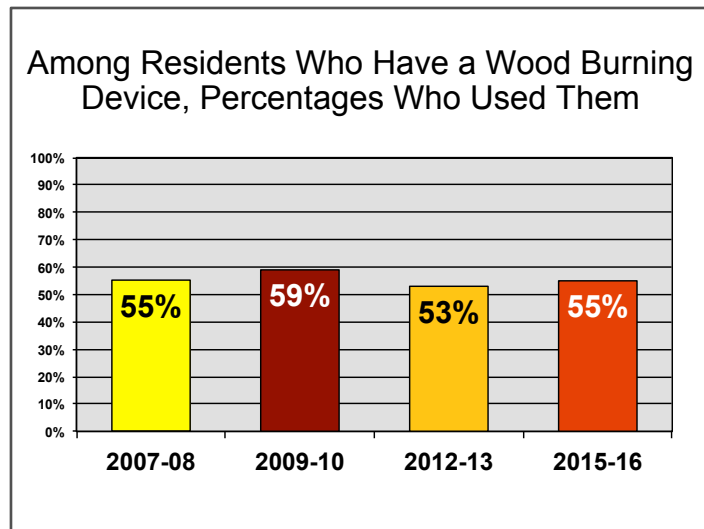
## Use of Wood Burning Devices

### Question: Did you burn any wood or pellets this past winter (2015-16)?

Respondents who had a wood burning device in their home were asked if they had used it over the past winter. Out of the total sample in 2015-16, 21% had used a wood burning device, while 17% had a wood burning device but did not use it. These percentages have been statistically stable over the past four waves, with one out of five total respondents (19-21%) having used a wood burning device in the prior winter, while another 14-17% had but did not use a wood burning device.



More specifically, among the 400 respondents in 2015-16 who had a wood burning device, 221 (55%) used it over the past winter, similar to 53-59% in the prior three waves.



Most but not all (87%) of those who reported, unaided, that they (at least sometimes) used wood to heat their residence also reported that they used a wood burning device in the prior winter. By contrast, just two out of five (40%) of those who were aided in recalling that they have a wood burning device used it in the prior winter. Stated differently, among the sub-group who used a wood burning device in the 2015-16 winter, 52% were unaided, while the other 48% were aided, in recalling that they have a wood burning device.

## Types of Wood Burning Devices

**Question: What types of wood burning devices do you have in your home?**  
*(Multiple responses allowed; asked of all who have a device regardless of use)*

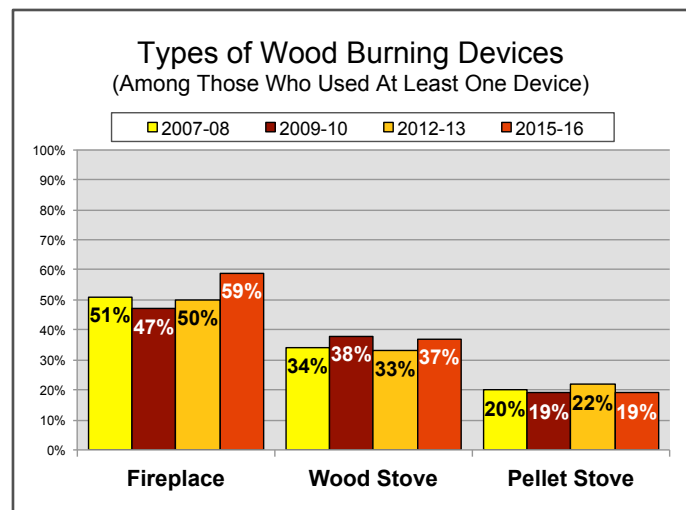
2015-16 Types of Wood Burning Devices (Multiple Responses Allowed)	Total: Have Wood Burning Device (n=395)	Have But Did Not Use (n=174)	Have And Used (n=221)	Out of Those Who Have Device, Percent Who Used It in Prior Winter
Wood burning fireplace	71%	86%	<b>59%</b>	46%
Wood stove or insert	26%	12%	<b>37%</b>	79%
Pellet stove	12%	3%	<b>19%</b>	88%

In 2015-16, among all respondents who have a wood burning device, 71% have a fireplace, 26% have a wood stove, and 12% have a pellet stove. Nine out of ten (90%) have only one of these types of devices, while 9% have two types, and four respondents (1%) have all three types. Among those who have but did not use a wood burning device, 86% have an unused fireplace, 12% have an unused wood stove, and 3% have an unused pellet stove.

In prior waves of this study, this question regarding types of devices was asked only of those who used a wood burning device. Among the sub-group of respondents who used one or more wood burning devices in 2015-16, 59% used a fireplace, 37% used a wood stove, and 19% used a pellet stove. Three respondents (all of whom reside in southwest Reno zip code 89511) used two fireplaces; data for both fireplaces is included in the analysis where applicable.

Stated differently, 88% of those who have a pellet stove used it in the prior winter, while 79% of those who have a wood stove used it, and less than half (46%) of those who have a wood burning fireplace used it.

Among those who used at least one device, the percentages of those who used a wood stove (33-38%) and/or pellet stove (19-22%) have remained statistically stable over the four most recent waves, while the percentage who used a wood burning fireplace increased significantly from the 47-51% range in the prior three waves to 59% in 2015-16.



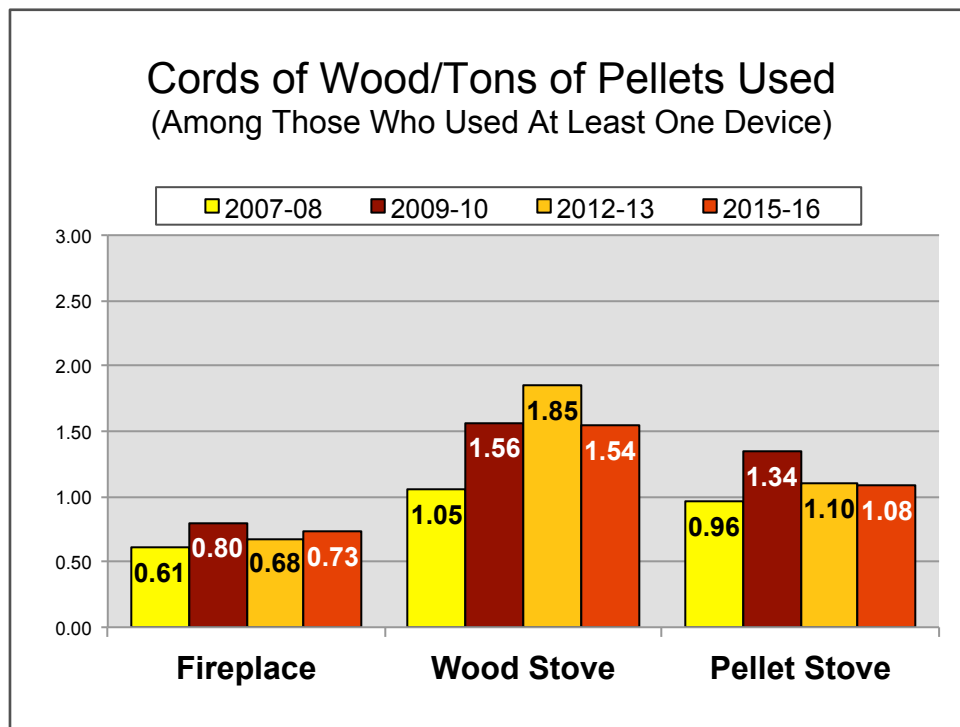
## Quantity of Wood/Pellets Used

**Question: How many cords of wood (or tons of pellets) did you burn during the 2015-16 winter?**

The respondents who had used a wood burning device over the past winter were asked to estimate the amount of wood consumed during the 2015-16 season. Interviewers had a list of designated unit sizes to assist, if needed, in identifying the approximate amount of wood consumption.

<b>Cords of Wood/Tons of Pellets Used (2015-16)</b>	<b>Fireplace (n=116)</b>	<b>Wood Stove (n=68)</b>	<b>Pellet Stove (n=37)</b>
Under 0.5 cord/ton	46%	15%	35%
0.5 to under 1.0 cord/ton	24%	12%	8%
1.0 to under 2.0 cords/tons	21%	38%	35%
2.0 or more cords/tons	10%	35%	22%
<b>Average by Device</b>	<b>0.73 Cords</b>	<b>1.54 Cords</b>	<b>1.08 Tons</b>

In the 2015-16 season, respondents who used a wood stove burned, on average, more cords of wood (1.54 cords) during the season than did those who used a wood burning fireplace (0.73 cords). Respondents who used a pellet stove burned, on average, about one ton of pellets (1.08 tons) during the season. With relatively small sample sizes, these estimated figures were similar to the average amounts burned per device in prior waves.



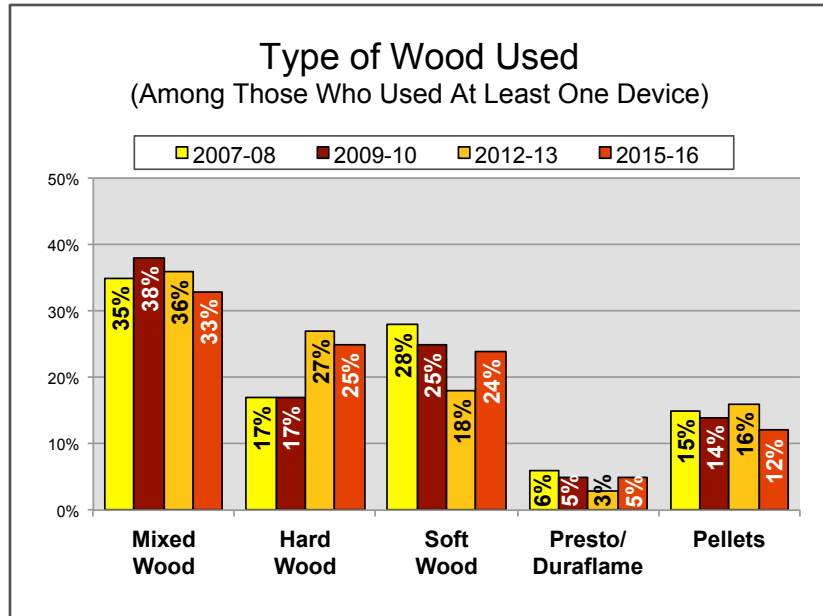
## Types of Wood/Pellets or Fuel Used

### Question: What kind of wood (or pellets) did you burn?

Among respondents who used a wood burning device, one-quarter (25%) burned hard wood such as oak or fruitwood, while another quarter (24%) burned soft wood such as fir or pine. Additionally one out of three (33%) burned a mixture of hard and soft wood, while 5% burned Presto or Durafume logs, and 12% burned pellets (of any kind).

The types of wood burned were similar for fireplace users and wood stove users.

The percentage who burned soft wood increased from 18% in 2012-13 to 24% in 2015-16; this was similar to the 25% who burned soft wood in 2009-10.



### Question: Did you burn coal, scrap wood, or pallets in your fireplace (or wood stove or pellet stove) during the 2015-16 winter? (Multiple responses allowed.)

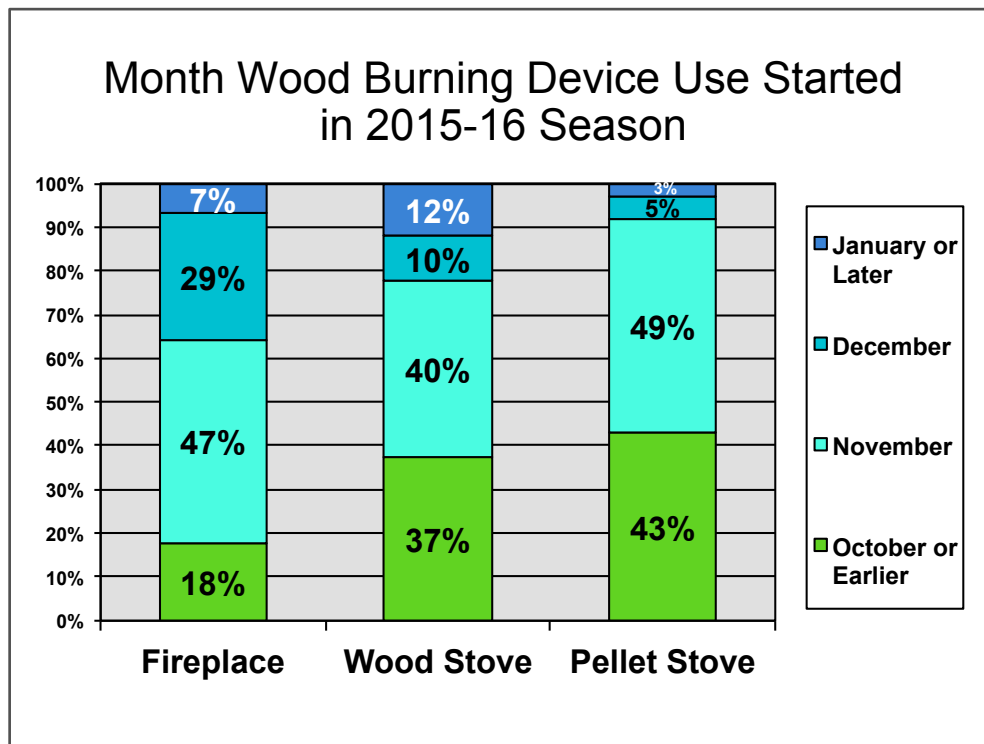
In the 2015-16 study, 38 out of 221 respondents (17%) who used a wood burning device also burned fuels other than wood. More specifically, 12% burned scrap wood, 7% burned pallets, and one respondent (<1%) burned coal. These findings include two wood stove users who burned both scrap wood and pallets, as well as one wood stove user who burned both scrap wood and coal. Wood stove users were more likely to burn scrap wood (23%) than were either fireplace users (11%) or pellet stove users (2%). Overall, the percentages who have burned these items have remained statistically stable over the four most recent waves.

Burned Other Fuels	2007-08	2009-10	2012-13	2015-16
Burned scrap wood	7%	11%	11%	12%
Burned pallets	10%	4%	8%	7%
Burned coal	0%	0%	<1%	<1%

## Month Wood Burning Device Use Started

**Question: What month did you use your fireplace (or wood stove or pellet stove) for the first time during the 2015-16 winter?**

In 2015-16, 43% of pellet stove users and 37% of wood stove users started their devices in October or earlier, compared to just 18% of wood burning fireplace users. The most common month for starting each type of device was November. Additionally, by the end of November, 92% of pellet stove users, 78% of wood stove users, and 65% of fireplace users had used their devices at least once.



The months when fireplaces and pellet stoves were first started have remained statistically stable over time. In the last wave (2012-13), the percentage who started a wood stove in October or earlier was unusually high at 50%; this percentage was in the 36-41% range in the prior two waves before that (2007-8 and 2009-10) and it fell within that range (37%) again in 2015-16.

## Frequency of Wood Burning Device Use

**Question: How many days did you burn wood or other items in your fireplace (or wood stove or pellet stove) during this past winter in November? ... in December? ... and in January?**

Over the 92-day period from November 1, 2015 to January 31, 2016, respondents with pellet stoves burned wood on more days (57 days, on average) than did those with wood stoves (46 days) who, in turn, burned wood on more days than did those with fireplaces (21 days).

On average throughout this three-month period, pellet stove users burned wood three out of every five days (62%), while wood stove users burned wood once every two days (50%), and wood burning fireplaces users burned wood once every four days (23%).

<b>Average Number of Days of Use by Month (2015-16)</b>	<b>Fireplace (n=116)</b>	<b>Wood Stove (n=61)</b>	<b>Pellet Stove (n=34)</b>
November 2015 (30 Days)	5 Days	13 Days	16 Days
December 2015 (31 Days)	8 Days	17 Days	20 Days
January 2016 (31 Days)	8 Days	16 Days	21 Days
<b>3-Month Total (92 Days)</b>	<b>21 Days</b>	<b>46 Days</b>	<b>57 Days</b>
Percentage of Days Burned	<b>23%</b>	<b>50%</b>	<b>62%</b>

In prior waves of the study, respondents were not asked about usage during each of these three months but were instead asked how many total days they used their device during the prior winter season, with up to 180 days (roughly, October through March) allowed in the response. While the results for number of days is no longer directly comparable, the overall pattern of average use was similar. For example, in the prior three waves, respondents with pellet stoves burned wood on more days (92-125 days on average) than did those with wood stoves (58-88 days) who, in turn, burned wood on more days than did those with fireplaces (32-34 days).

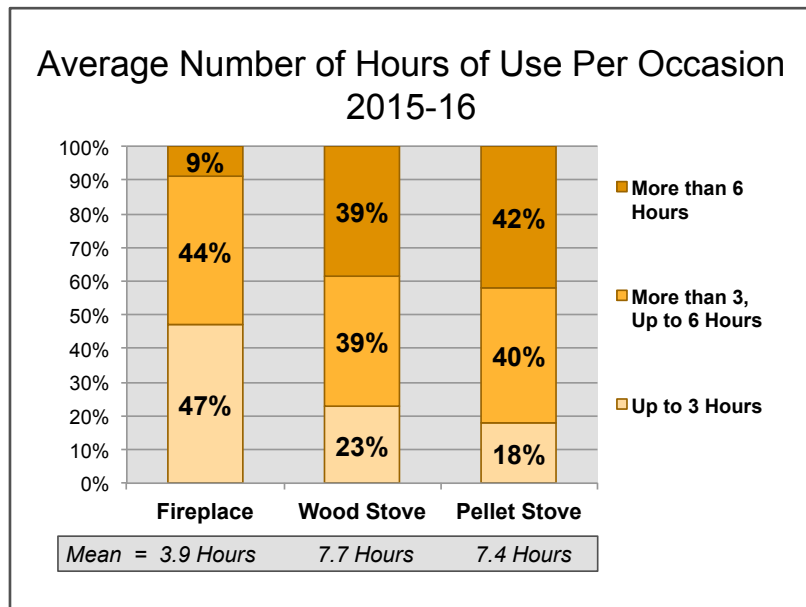
**Question: How many hours, on average, did you use your fireplace (or wood stove or pellet stove) per occasion? (New question in 2012-13.)**

Two out of five pellet stove users (42%) and wood stove users (39%) used the device for more than 6 hours per occasion, compared to just 9% of fireplace users. On average, pellet stove users (7.4 hours) and wood stove users (7.7 hours) used their devices about twice as long per occasion as did fireplace users (3.9 hours).

Compared to 2012-13, which was the first wave that this question was asked, the average length of use per occasion declined slightly for both fireplace users (from 4.8 to 3.9 hours) and wood stove users (from 8.9 to 7.7 hours), and declined even more substantially for pellet stove users (from 12.6 to 7.4 hours).

In the three-month period of November 2015 through January 2016, half (50%) of all wood burning hours in Washoe County were generated by wood stoves, while 31% were generated by pellet stoves, and 19% by

wood burning fireplaces. Even though the majority of users had wood burning fireplaces, the fireplaces were used substantially less frequently and for fewer hours per occasion than were either wood stoves or pellet stoves, and thus fireplaces only accounted for one out of five wood burning hours overall.



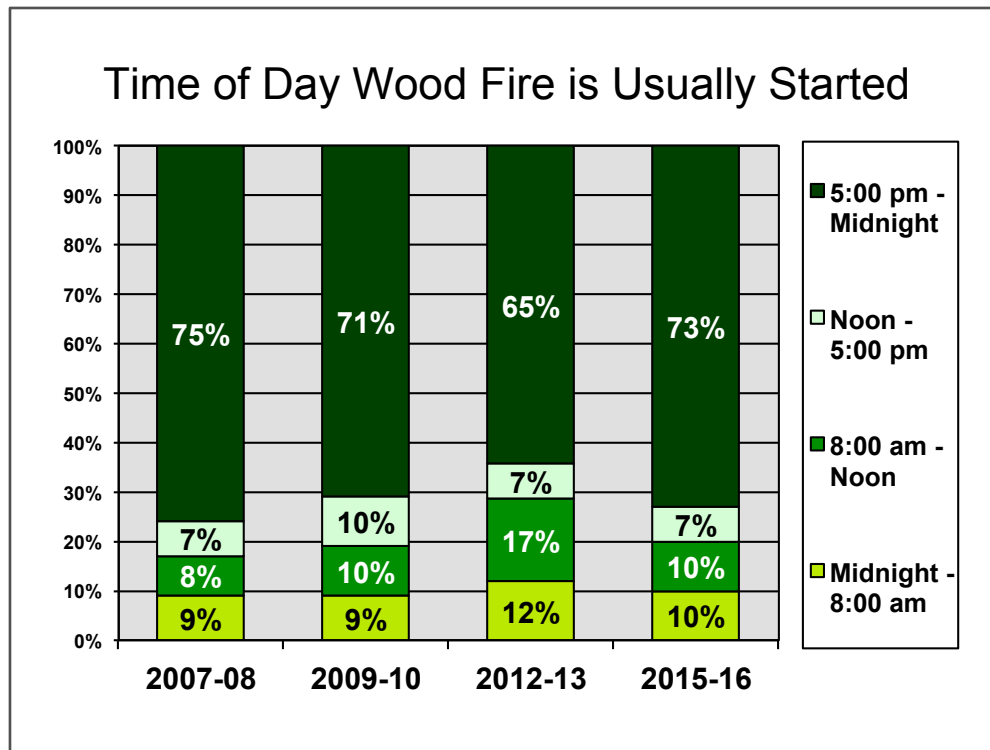
Type of Device	Percentage of All Wood Burners Who Used Type of Device (Multiple Responses Allowed)	Average Number of Days Device Was Used in 3 Months	Average Number of Hours Device Burned Per Day	Proportion of All Wood Burning Hours in County
Wood Stove	37%	46 Days	7.7 Hours	50%
Pellet Stove	19%	57 Days	7.4 Hours	31%
Fireplace	59%	21 Days	3.9 Hours	19%
Total				100%



## Time of Day Wood Burning Device Was Started

**Question: What best describes the time of day you usually started your fire (or pellet stove)?**

In 2015-16, nearly three out of four respondents (73%) usually started using their wood burning devices in the evening hours, between 5:00 p.m. and midnight.



Although early morning start times (between midnight and 8:00 a.m.) were relatively uncommon, they were more common among respondents who used a pellet stove (27%) than for those who used either a wood stove (9%) or fireplace (6%).

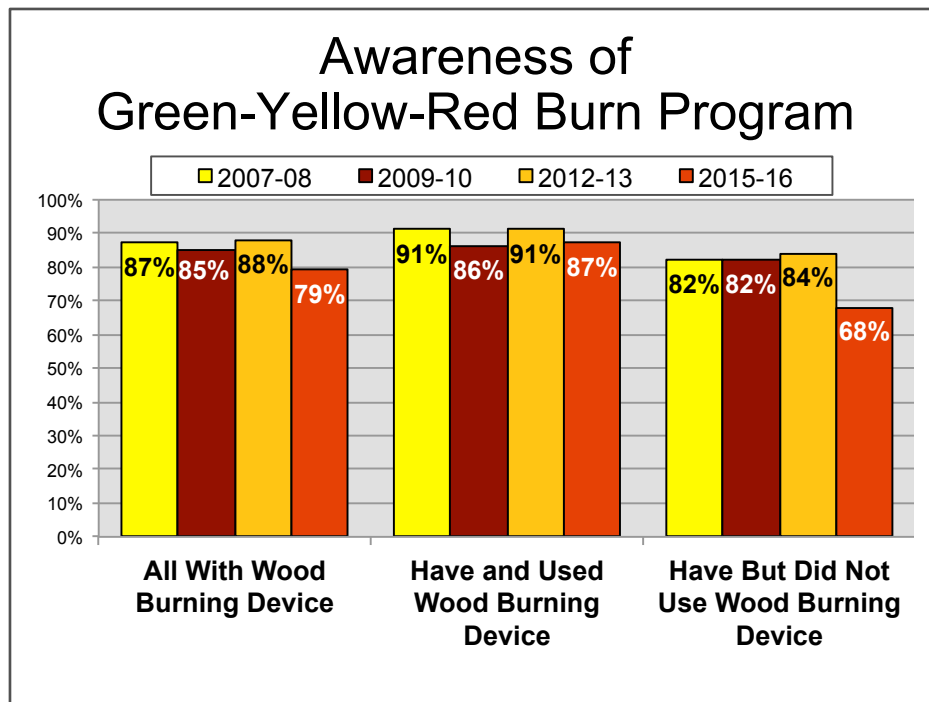
## Section B – Air Quality Management Division Programs

### Awareness of Burn Code Program

#### Question: Have you ever heard of the Green-Yellow-Red Burn Program?

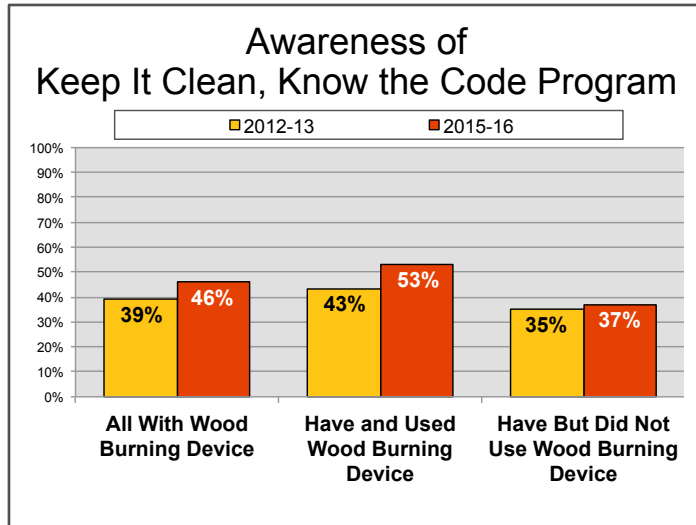
All respondents who had wood burning devices – whether they used them or not – were asked if they had heard of the Green-Yellow-Red Burn Program initiated by the Washoe County Health Department: Air Quality Management Division. The Burn Code Program is designed to reduce emissions from wood burning devices when the Air Quality Index is at a moderate range or higher.

In 2015-16, 79% of all respondents with a wood burning device had heard of the Green-Yellow-Red Burn Program, down significantly from 85-88% in the prior three waves. The decline in overall awareness was driven primarily by those who have but did not use a wood burning device; among this group, only 68% reported that they had heard of the Green-Yellow-Red Burn Program, down significantly from 82-84% in the prior three waves. Conversely, among those who used a wood burning device in the prior winter, 87% had heard of the Green-Yellow-Red Burn Program, which is similar to the percentages found (86-91%) in the prior three waves.



**Question: Have you ever heard of the Keep It Clean; Know the Code Program? (New question in 2012-13.)**

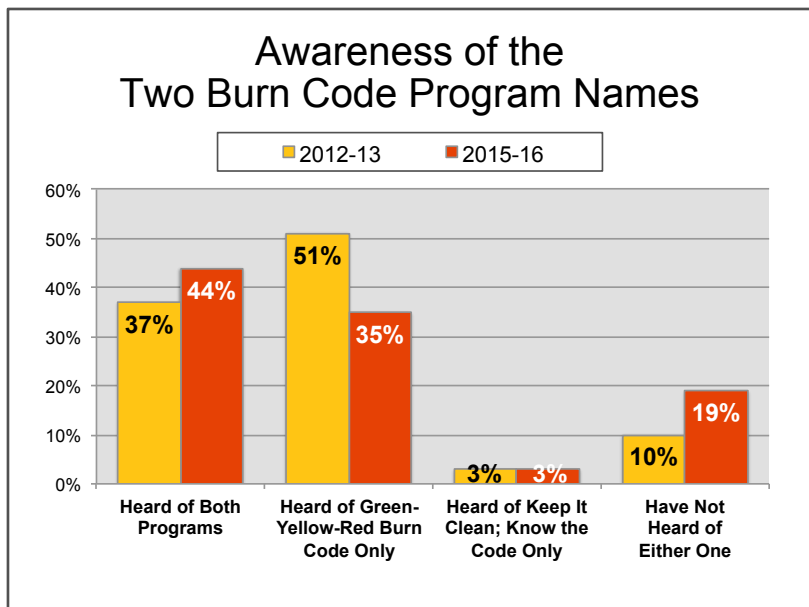
In 2015-16, almost half (46%) of all respondents with a wood burning device had heard of the Keep It Clean; Know the Code Program, up from 39% in 2012-13, but still substantially less than those who had heard of the Green-Yellow-Red Burn Program (79%),



Over half (53%) of those who used a wood burning device had heard of the Keep It Clean; Know the Code Program, up significantly from 43% in the prior wave. By contrast, just 37% of those who had a wood burning device but did not use it had heard of this program, similar to 35% in the prior wave.

Out of all respondents with wood burning devices:

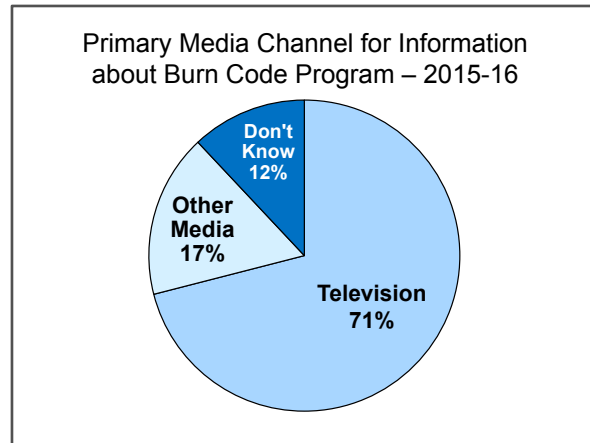
- 44% had heard of both the Green-Yellow-Red Burn Code Program and the Keep It Clean; Know the Code Program (up from 37% last wave),
- 35% had heard of the Green-Yellow-Red Burn Code Program but not the Keep It Clean; Know the Code Program (down from 51% last wave),
- 3% had heard of the Keep It Clean; Know the Code Program but not the Green-Yellow-Red Burn Code Program (the same percentage as the last wave), and
- 19% had not heard of either program (up from 10% last wave).
- In summary, while the percentage of respondents who had heard of both programs increased, the percentage of respondents who had not heard of either program also increased.



**Question:** *(Among those who had heard of one or both programs) Through which one media channel did you most often hear about the “Keep It Clean; Know the Code Program” this past winter? (If needed, interviewers clarified that this program is the same as the Green-Yellow-Red Burn Program.)*

The respondents who were aware of at least one of these two programs by name were asked their primary media source for information about the Burn Code Program. Overall, seven out of ten (71%) indicated that they most often heard about the code or program on television, similar to 70% in the prior 2012-13 wave.

In 2015-16, other media sources for the burn code information included newspapers (7%), radio (5%), social media (3%), AQMD’s Enviroflash emails (1%), and AQMD’s website (1%), with 12% indicating that they did not know the media source (including those who reported that they had heard about the program or code only from other people).



Television was the primary source regarding the Burn Code Program for 72% of those who had used a wood burning device and, similarly, for 69% of those who had but did not use a wood burning device. Additionally, television was the primary source for 64% of fireplaces users, 72% of wood stove users, and 85% of pellet stove users.

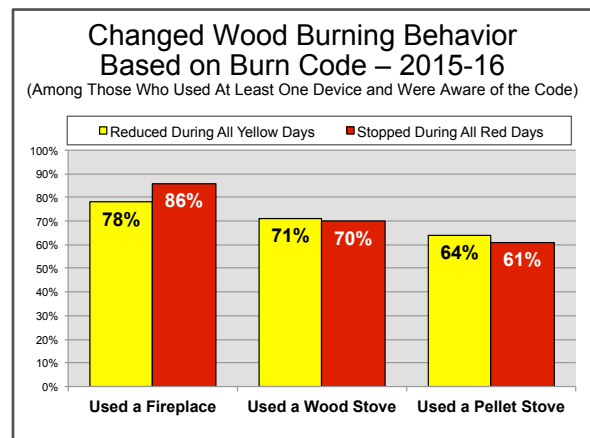
## Behavioral Changes Based on Burn Codes

**Question:** *(If used a wood burning device and were aware of a Burn Code Program) Did you reduce your wood burning during all yellow burn code days this past winter? ... Did you stop your wood burning during all red burn code days this past winter?*

In 2015-16, among those who used a wood burning device and were aware of at least one of the Burn Code Programs mentioned, 73% reported that they reduced their wood burning during all yellow burn code days this past winter, while 21% explicitly did not reduce, and another 6% did not know. Additionally, 76% reported that they stopped their wood burning during all red burn code days, while 21% did not stop, and 3% did not know.

In prior waves, these two questions were combined rather than separated. Although not directly comparable, the results were similar in 2012-13 when 74% reported that they either reduced or stopped their wood burning during yellow or red days, while 19% did not, and 7% did not know.

Fireplace users were more likely to reduce on all yellow days (78%) and/or stop on all red days (86%) than were either wood stove users (71% and 70%, respectively) or pellet stove users (64% and 61%).



Overall, among respondents who used a wood burning device and were aware of the burn code:

- 64% reduced during yellow days and stopped during red days,
- 11% reduced during yellow days but either did not stop or didn't know if they had stopped during red days,
- 9% stopped during red days but either did not reduce or didn't know if they had reduced during yellow days,
- 14% explicitly did not reduce during yellow days nor stop during red days, and
- 2% did not know about either reducing or stopping during these codes.

Additionally, 32% who mentioned, unaided, that they used wood to heat their residence reported that they either did not stop (30%) or did not know if they stopped (2%) wood burning during all red burn code days. By contrast, just 17% of those who were aided in recalling that they have a wood burning device reported that they either did not stop (13%) or did not know if they stopped (4%) wood burning during all red burn code days. There were, however, no significant differences between the unaided and aided groups in terms of wood burning behavior changes on yellow days.

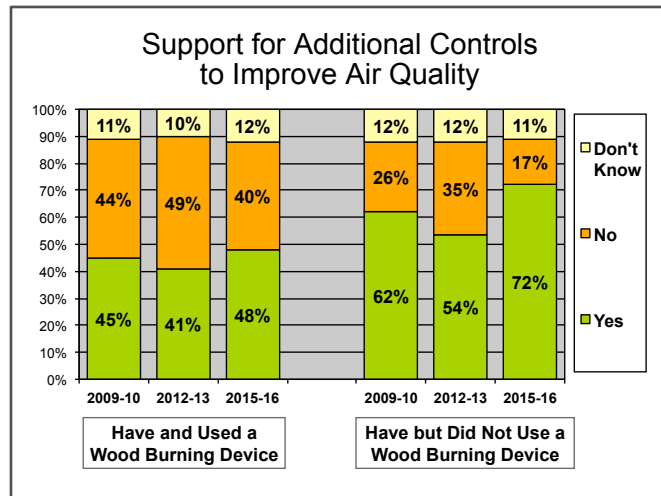
There were no significant differences based on which specific program(s) they had heard of and whether they reduced or stopped wood burning based on the code.

## Support for Additional Controls to Improve Air Quality

**Question: In general, would you support additional wood burning controls to improve air quality?**

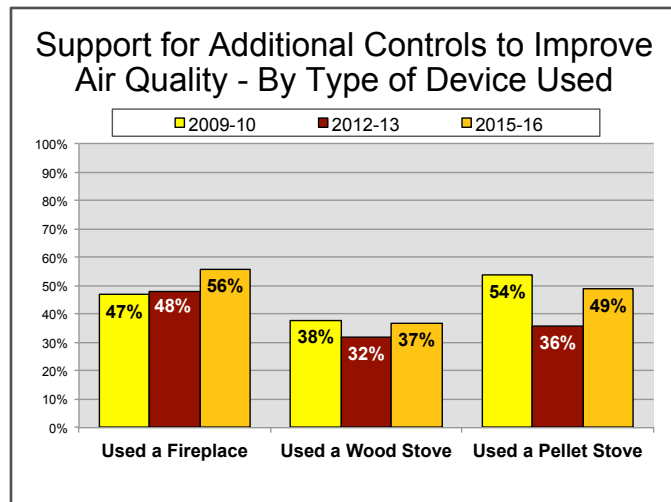
In 2015-16, three out of five respondents (59%) who had a wood burning device indicated that they would support additional wood burning controls to improve air quality, while 30% would not support additional controls, and 11% did not know if they would.

Support for additional wood burning controls to improve air quality increased to 59% this wave, up from 47% in 2012-13 and 52% in 2009-10. (Results from the 2007-08 wave are not directly comparable because that question asked about support for additional restrictions to reduce air pollution rather than additional controls to improve air quality.)



In 2015-16, nearly three out of four respondents (72%) who had but did not use a wood burning device would support additional controls to improve air quality, compared to less than half (48%) of those who used a wood burning device in the prior winter.

Fireplace users were more likely to support additional controls (56%) than were either pellet stove users (49%) or wood stove users (37%); in general, wood stove users have consistently been the least likely to support additional controls.



In 2015-16, two out of three respondents (65%) who were aided in recalling that they have a wood burning device would support additional controls, compared to less than half (46%) of those who reported, unaided, that they used wood to heat their residences.

## Rebate Program for Wood Stoves

The Washoe County Health District: Air Quality Management Division partnered with the University of Nevada, Reno's Business Environmental Program to create a rebate program targeted, in part, at Washoe County residents who have pre-1992 models of wood stoves. The rebate program enables qualifying participants to earn financial incentives when they change out an old wood stove for a cleaner, more efficient model.

**Question: Was your wood stove or insert manufactured or installed prior to 1992?** *(Asked of all who had a wood stove, regardless of use)*

Among all 104 respondents who had wood stoves in their homes, 45 (43%) indicated that they had a wood stove that was manufactured or installed prior to 1992, while 39% had a newer wood stove, and 17% did not know the age of their device.

**Question: (If yes to prior to 1992) Are you aware of the current Wood Stove Rebate Program? ... Would you like someone to contact you about the Rebate Program?**

Among the 45 respondents who had a wood stove that was manufactured or installed prior to 1992, 29 had used the device in the past winter, while the other 16 had not.

- Of the 29 who had used the pre-1992 wood stove, 10 (35%) were aware of the rebate program and 7 (24%) indicated that they would like to be contacted.
- Of the 16 who did not use their pre-1992 wood stove, only 2 (13%) were aware of the rebate program, while 6 (38%) indicated that they would like to be contacted.

In total, 12 of the 45 potentially eligible respondents (27%) were aware of the rebate program and 13 (29%) indicated that they would like to be contacted about the rebate program. The contact information for these 13 individuals was provided in a separate document for follow-up.



## **Section C – Differences by Type of Residence & Geographic Area**

### **Type of Residence**

**Question: Which [description] best describes the building in which you live?**  
*(Asked only of those who have a wood burning device in 2015-16)*

Past research has shown that residents who lived in a single-family home were more likely than were others to have a wood burning device. For example, in the 2012-13 study, two out of five residents (41%) who lived in a single-family home had a wood burning device, compared to those who lived in a mobile home (24%), condo, duplex, triplex, or four-plex (25%), or an apartment with 5 or more units (9%).

In 2015-16, the question about type of building was asked only of those who have a wood burning device. Nine out of ten respondents (90%) who had a wood burning device resided in a single-family home, while 4% resided in an apartment complex, 3% in a mobile home, and another 3% in a condo, duplex, triplex, or four-plex. This finding is consistent with the prior three waves when, similarly, nine out of ten respondents (89-90%) who had a wood burning device resided in a single-family home.

<b>Type of Residence – If Have Wood Burning Device</b>	<b>2007-08 (n=413)</b>	<b>2009-10 (n=402)</b>	<b>2012-13 (n=400)</b>	<b>2015-16 (n=398)</b>
Single-family, free-standing	90%	89%	89%	90%
Apartment complex 5+ units	3%	5%	5%	4%
Mobile home	1%	1%	3%	3%
Condo, duplex, triplex, 4-plex	5%	5%	4%	3%
Other	<1%	<1%	0%	<1%

In 2015-16, among those who had a wood burning device, respondents who lived in a single-family home were more likely to have used it in the prior winter (56%) than were those who resided in another type of residence (46%). A similar pattern was found in 2012-13; among those who had a wood burning device, those who lived in a single-family home were more likely to have used it in the prior winter (54%) than were those who resided in another type of residence (42%).

## Geographic Area of Residence

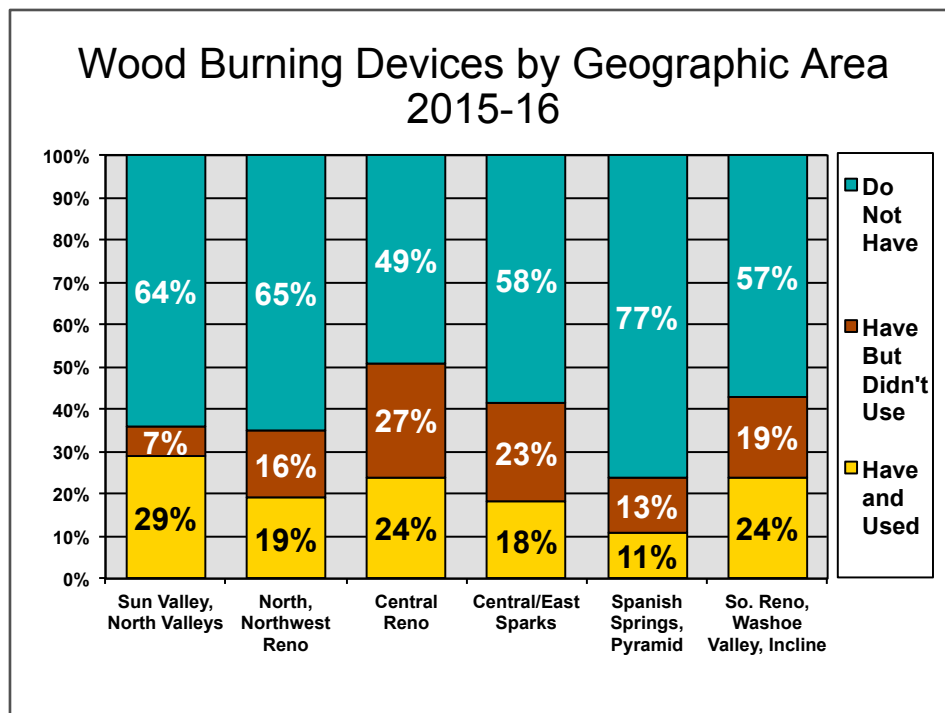
**Question: What is your home zip code? (Asked during screening questions.)**

In 2015-16, respondents were grouped into six geographic areas for this analysis, as described in the Methodology section on page 2 of this report.

Among all respondents – including those that did not have a wood burning device – respondents from the Sun Valley/North Valleys area (21%) and the South Reno/Washoe Valley/Incline Village area (17%) were more likely to report, unaided, that they used wood to heat their residence than were respondents from the other four geographic areas (6-11% range).

Overall, half (51%) of the respondents who resided within the Central Reno area had a wood burning device in their homes, compared to just one-quarter (24%) of those in the Spanish Springs/Pyramid area.

Respondents in the Sun Valley/North Valleys area were the most likely to have used a wood burning device (29%), while those in the Spanish Springs/Pyramid area were the least likely (11%). Respondents in the Central Reno area were the most likely to have an unused wood burning device (27%), while those in the Sun Valley/North Valleys area were the least likely to have an unused device (7%).



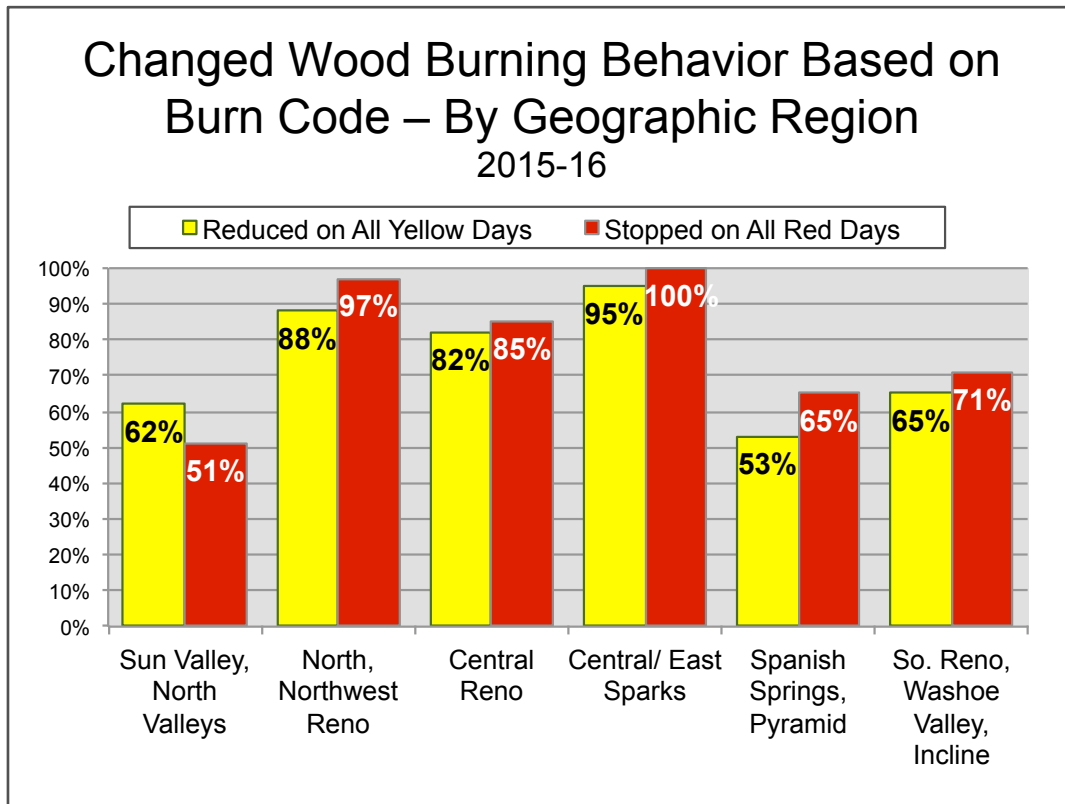
<b>If Have a Wood Burning Device, Type in Home 2015-16 (n=400) (Multiple responses allowed)</b>	<b>Sun Valley, North Valleys</b>	<b>North, NW Reno</b>	<b>Central Reno</b>	<b>Central, East Sparks</b>	<b>Spanish Springs, Pyramid</b>	<b>So. Reno, Washoe Valley, Incline</b>
Fireplace	32%	<b>91%</b>	<b>91%</b>	<b>79%</b>	<b>62%</b>	<b>66%</b>
Wood stove or insert	<b>52%</b>	13%	12%	25%	19%	33%
Pellet stove	29%	7%	4%	8%	19%	10%

Among all respondents who had any type of wood burning device, the primary type was a fireplace, although the primary type within the Sun Valley/North Valleys area was a wood stove (52%).

<b>If Have a Wood Burning Device, Type Used 2015-16 (n=400) (Multiple responses allowed)</b>	<b>Sun Valley, North Valleys</b>	<b>North, NW Reno</b>	<b>Central Reno</b>	<b>Central, East Sparks</b>	<b>Spanish Springs, Pyramid</b>	<b>So. Reno, Washoe Valley, Incline</b>
Fireplace	19%	<b>45%</b>	<b>39%</b>	<b>33%</b>	14%	<b>27%</b>
Wood stove or insert	<b>44%</b>	12%	9%	10%	12%	22%
Pellet stove	26%	4%	4%	4%	<b>19%</b>	8%

Among all respondents who had any type of wood burning device, a fireplace was the most common type used in North/Northwest Reno (45%), Central Reno (39%), Central/East Sparks (33%), and South Reno/Washoe Valley/Incline Village (27%), while a wood stove was the most common type used in the Sun Valley/North Valleys area (44%), and a pellet stove was the most common type used in the Spanish Springs/Pyramid area (19%).

Among those who used wood burning devices and were aware of the Burn Code Program, respondents from the Central/East Sparks area were the most likely to report that they reduced wood burning on all yellow burn code days (95%) and/or stopped on all red burn code days (100%). Respondents from the Spanish Springs/Pyramid area were the least likely of the six geographic areas to reduce wood burning on all yellow days (53%), while those from the Sun Valley/North Valleys area were the least likely to stop on all red days (51%).



Among all respondents who have a wood burning device, those from the Central Reno area were the most likely to support additional wood burning controls to improve air quality (70%), while those from the Sun Valley/North Valleys area were the least likely (41%).

Similarly, among respondents who used a wood burning device, respondents from the Central Reno area were the most likely to support additional wood burning controls to improve air quality (61%), while those from the Sun Valley/North Valleys area were the least likely (33%).

Among respondents who have but did not use a wood burning device, respondents from the North/Northwest Reno area were the most likely to support additional wood burning controls (84%), while those from the South Reno/Washoe Valley/Incline Village area were the least likely (60%).

