

# Vermont Residential Fuel Assessment for the 2018-2019 Heating Season

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## Highlights

- Just over a third (35%) of Vermont households report using cordwood as a heating source during the 2018-2019 heating season, largely unchanged from reported usage in the 2014-2015 heating season and similar to usage in the 1990s. Heating oil and wood remain the most common sources of heat but the use of heating oil continues to decline over time while usage of propane increases.
- Nearly two-thirds of Vermont households using cordwood rely on it as their primary source of heat while just over one-third use it for supplemental heat. Households using cordwood as their primary source of heat has remained steady since the 1990's and remains far lower than reported usage in the 1980s. Additionally, 4% of Vermont households report "pleasure burning" wood in an open fireplace during the 2018-2019 heating season.
- Results of this survey indicate that Vermont households burned more than 400,000 estimated cords of wood during the 2018-2019 heating season, 18% higher than the estimated total number burned during the 2014-2015 season and higher than any previously reported estimate since 1986. The average household using cordwood as their primary source of heat burned nearly six cords of wood, while households using it for supplementary heat burned just over two cords on average.
- Previous iterations pointed to an intuitive correlation between the severity of the winter heating season and the average number of cords of wood burned, by households which rely on it as their primary source of heat. However, the 2018-2019 season featured fewer heating degree days than average compared to the recent past, indicating a milder winter, but households burning cordwood as their primary source of heat report that they burned more cords than in a typical winter.
- Reported burning of wood pellets in the 2018-2019 heating season is largely unchanged compared to the 2014-2015 season but remains slightly higher than in 2008-2009. About half say they burned wood pellets as their primary source of heat and these households report burning nearly four tons each on average. Those who burn pellets as a supplementary source of heat report burning only one ton on average.
- Among Vermont households which burned cordwood, just over one-third say that they themselves, an immediate family member, or a friend cut the wood personally, slightly fewer than those who reported doing this in 2014-2015. Nearly half purchased the cordwood. Most who purchased cordwood bought it in cut & split form, while one in six purchased it in log lengths. Households burning wood were split evenly on how it was stored: four in ten stored it in a woodshed (or similar roofed structure) or stored it outside covered. Nearly two-thirds stored their wood for less than a year.
- Three in ten Vermont households and more than two-thirds of wood-burning households<sup>1</sup> say they used a woodstove during the 2018-2019 season. Usage of woodstoves is virtually identical to the 2014-2015 season. One in twelve used a wood pellet stove and few say they used a woodstove insert in a fireplace, a wood furnace or boiler, or a combination furnace.

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<sup>1</sup> Households which report burning cordwood, wood pellets, or burning wood in an open fireplace

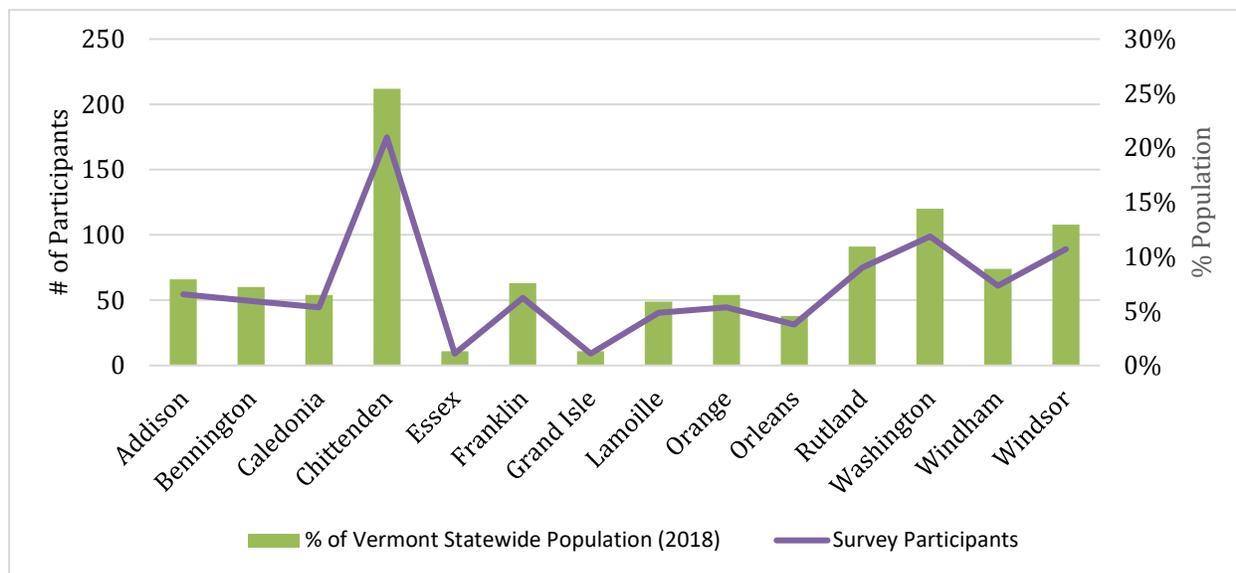
- Just 2% of Vermonters, an estimated 6,055 households, plan to install a new wood or pellet burning appliance for use during the coming heating season, while an estimated 4,072 households plan to install a used wood or pellet burning appliance. The vast majority of the households who plan to install a new or used wood or pellet burning appliance already use at least one wood or pellet appliance and very few who do not already use such an appliance plan to install one.
- Four in five of those who purchased cordwood did not experience any problems doing so, while six in ten of those who purchased wood pellets say the same. The most common problems buyers did experience were an inability to get dry wood or having to burn green wood, among those buying cord wood, and the rationing of wood pellets among pellet buyers. Suppliers going out of business was a problem experienced by a small number of respondents from both groups.

## Introduction

Between August 8 and August 26, 2019, the Vermont Department of Forests, Parks and Recreation (FPR), and their contractor, the University of New Hampshire Survey Center, conducted a random sample telephone survey of five hundred two (502) Vermont households. The margin of sampling error for the survey is +/- 4.4 percent. Figure 1 provides a breakdown of the geographic distribution of the sample in comparison to the percentage of population in each county. Appendix II provides the number of cases from each county as well as margins of error at the 95% confidence level for each county.

FPR and the Vermont Department of Public Service (DPS) developed the survey questions based on previous residential fuel use surveys. The University of New Hampshire Survey Center conducted the telephone survey, analyzed the data, and prepared tabular results.

This survey continues a series of earlier surveys designed to assess residential heating fuel and firewood demand in Vermont. Prior assessments of residential wood fuel demand were conducted for the 1981-82, 1983-84, 1985-86, 1987-88, 1989-90, 1991-92, 1993-94, 1995-96, 1997-98, 2007-2008, and 2014-2015 heating seasons. Copies of previous reports are available from FPR on request. This report includes comparable data from all of the previous surveys. In some cases, the numbers here will differ from what was previously published.<sup>2</sup> The earlier data have been thoroughly examined and corrected as needed (See Appendix II for details).



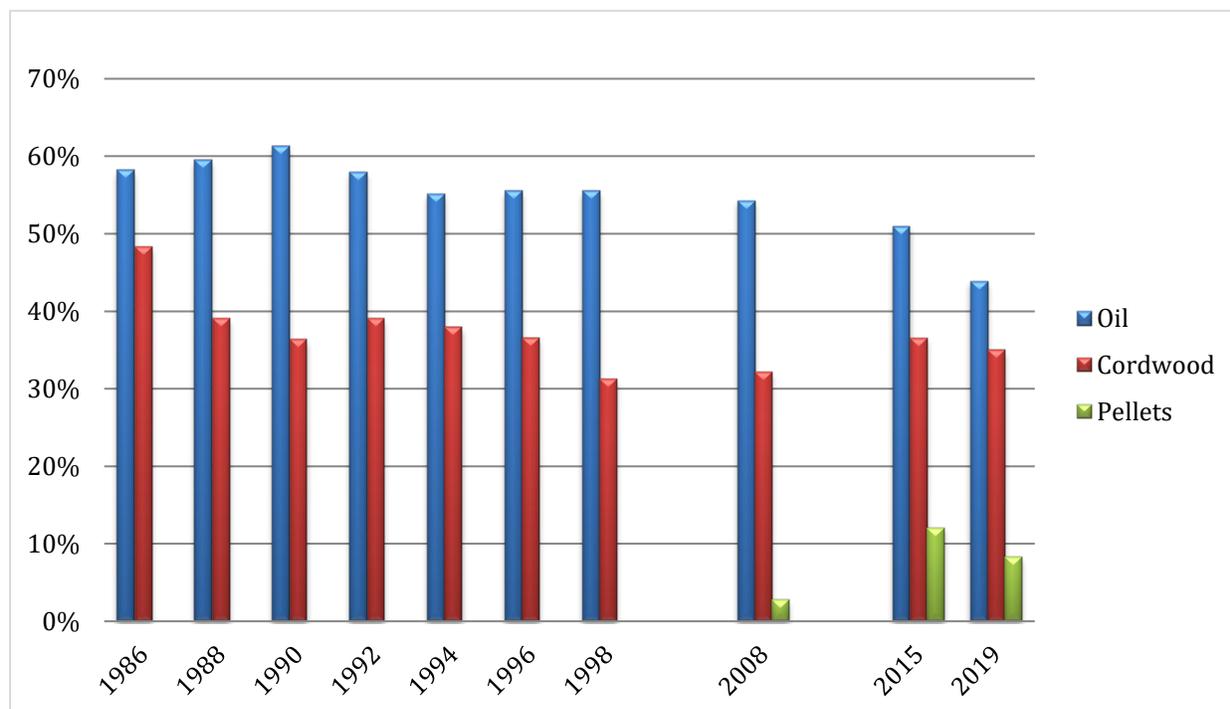
**Figure 1: Geographic Distribution of Survey Sample and Percent of Vermont Population by County**

The work on which this report is based was funded by the Vermont Department of Forests, Parks and Recreation through a grant from the U.S. Forest Service Northeastern Area Wood Education and Resource Center.

<sup>2</sup> The 1997-98 and 2007-08 surveys used an improved methodology which reached households with either a listed or unlisted number. Previous surveys used only listed numbers. For the 2014-15 survey, a probability based, dual-frame landline and cellular telephone sample of Vermont was used. The proportion of cell phone numbers in the sample was increased further due to the precipitous drop in landline ownership of Vermont residents. Small differences between prior surveys may be the result of this change in methodology.

## Fuels for Space Heating

Oil and cordwood remained the most popular fuels used for space heating in Vermont households during the 2018-2019 heating season. When primary and supplemental space heating fuel sources are combined (Appendix I - Table 1) 44% of Vermont households used oil, 35% used cordwood, and 8% used wood pellets (Figure 2).<sup>3</sup>

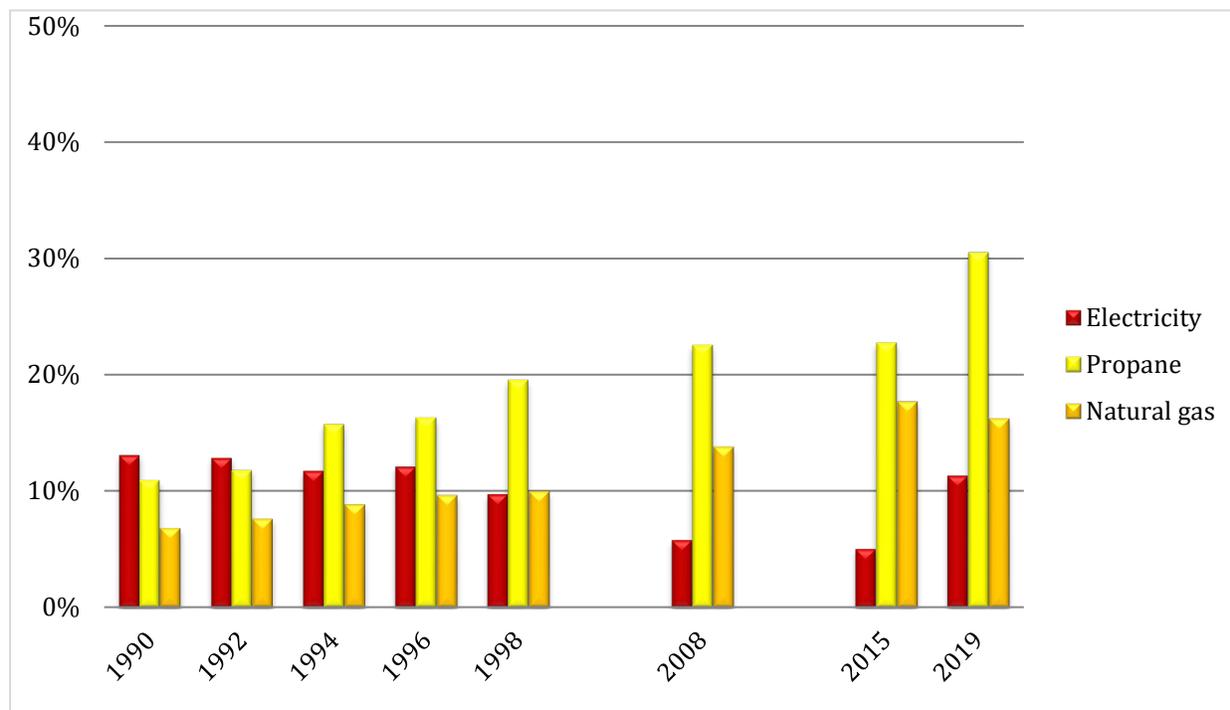


**Figure 2: Percent of Vermont Households Using Oil, Cordwood, and Wood Pellets as Primary or Supplemental Fuels for Space Heat**

The use of heating oil has declined slightly over time and that decline has accelerated in the past few years. For the first time since this survey began, less than half of Vermont households (44%) report using heating oil as their primary or supplemental fuel source. The use of cordwood as a heating source (35%) is largely unchanged since 2015 (37%) and is similar to reported cordwood usage in 1990 (36%) and 1996 (37%). Wood pellet usage (8%) is slightly lower than reported usage in 2015 (12%) but remains higher than usage in 2008 (3%).

<sup>3</sup> The respondent was asked, "During the past heating season, what kind of fuel provided most of the heat for the home you lived in?" If the respondent needed help, the interviewer said, "Most means contributed more heat to the house than any other fuel. If multiple fuels were used, most does not necessarily mean more than 50% of the heat." The fuel specified by the respondent is regarded as the primary fuel for space heat. The respondent was asked if other fuels were used for space heat, and, if so, what those fuels were. Any fuel so specified was regarded as a supplemental fuel for space heat. The sampling frame was respondents whose primary residence was in Vermont in the previous winter. Vacationers and short-term visitors were not included.

The overall use of electricity as a primary or supplemental fuel source, either through electric baseboard heating or heat pumps, increased from only 5% in 2015 to 11% in 2019 among Vermont households. This largely matches the reported usage of electricity in the 1990s after reported usage declined in 2008 and 2015 (Figure 3).<sup>4</sup>



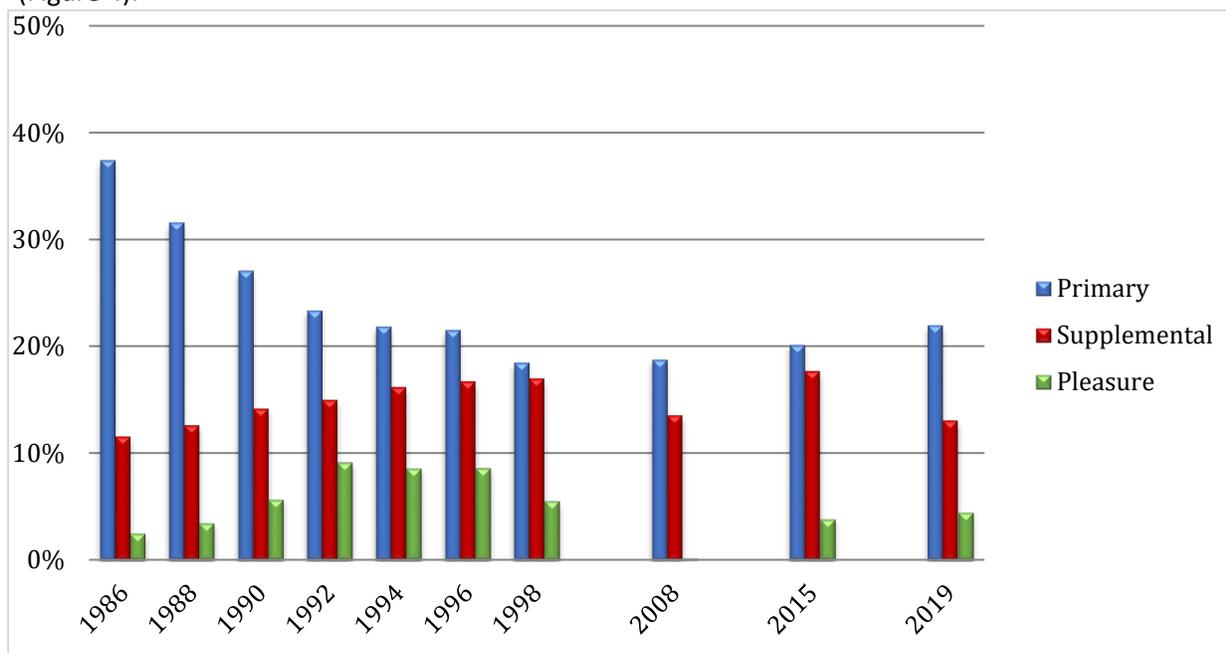
**Figure 3: Percent of Vermont Households Using Electricity, Propane, or Natural Gas as Fuels for Space Heat – 3 year moving averages and 2008, 2015, and 2018 data**

Propane usage as a primary or supplemental fuel source among Vermont households (30%) has increased since 2015 (23%) and dramatically increased since 1990 (11%). Usage of natural gas for heating (16%) is largely unchanged since 2015 (18%) but remains higher than reported usage in the 1990s (Appendix I – Table 1).

<sup>4</sup> Figure 3 include 3 year moving averages for the years prior to 2008. These averages were not computed for the 2008 data since there were multi-year gaps in data collection and were not computed for the 2018 data because only the 2015 data would be able to be included

## Wood for Space Heating

Thirty-five percent of Vermont households, an estimated 90,408 homes, report burning cordwood for primary (22%) or supplemental (13%) space heating during the 2018-2019 heating season, largely unchanged<sup>5</sup> from the 2015 season (37%, 93,976 homes). Among households burning wood, 63% used it as their primary source of space heat while 37% used it as a supplemental source (Appendix I – Table 3) (Figure 4).



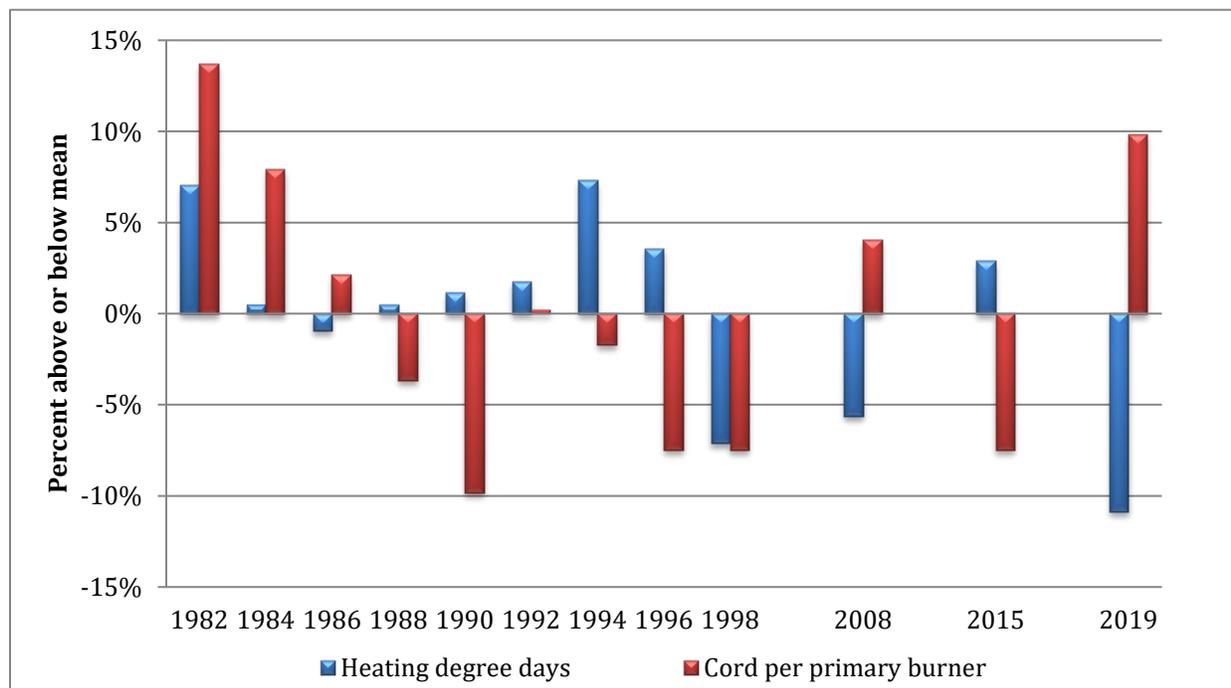
**Figure 4: Percent of Vermont Households Using Wood for Primary or Supplemental Space Heating or for “Pleasure Burning”**

The proportion of households who report using cordwood as their primary space heating source at its highest point since 1992 but remains far lower than reported usage in the 1980s. Four percent of Vermont households report “pleasure burning” of cordwood in an open fireplace during the 2018-2019 heating season. **Overall, 39% of Vermont households, an estimated 101,841 homes, report burning cordwood for at least one purpose in 2019** (Appendix I – Table 4).

**Vermont households burned an estimated total 410,372 cords of wood during the 2018-2019 heating season.** Seventy-eight percent of the cordwood volume was burned as a primary source of space heat, 19% was burned as a supplementary source of space heat, and 2% was burned in an open fireplace. The average household using cordwood as their primary source of space heat burned an estimated 5.7 cords of wood, while the average household using it as their supplemental source burned an estimated 2.3 cords, up from 4.8 cords and 2.1 cords respectively which was reported in the 2014-2015 survey. The total estimated cords of wood burned for space heat by Vermont households (400,417) has increased by 16% since 2015 (344,751) and is at its highest point since 1986 (450,000) (Appendix I – Table 7).

<sup>5</sup> Based on a margin of error of +/- 4.4 percent, this change likely does not indicate a substantial difference from the previous iteration of the survey.

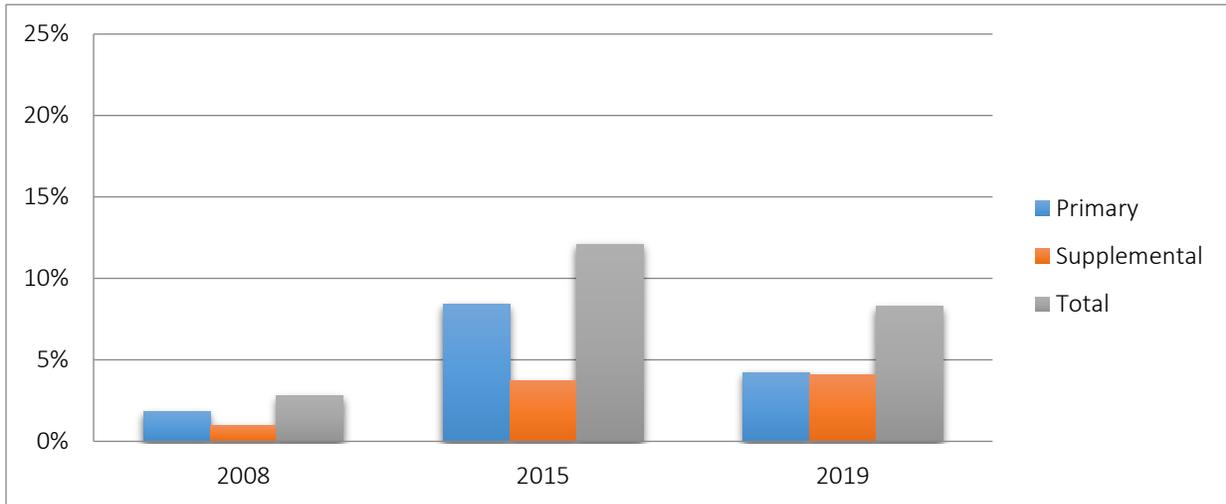
In previous surveys, some of the differences in cordwood consumption were attributed to weather. The 1997-1998 Assessment stated, “Over the years of the Wood Fuel Surveys, there has been a consistent relationship between the number of heating degree days (HDD) and the number of cords burned by primary burners.” However, the last three assessments cast doubt on that assertion. In the 2018-2019 burning season, the average number of cords of wood burned by Vermont as a primary source of space heat (5.7) was 10% higher than the average mean from 1982-2019 (5.2), indicating a high level of demand for heat among Vermont households. However, the number of heating degree days (7,391) was 11% lower than the 1982-2019 average (8,532), indicating a milder winter than many in the recent past. The 2015 assessment shows a more modest divergence, as heating degree days were 3% higher than average while cords burned per household using wood as a primary space heating source was 8% lower than average, and the 2008 assessment had heating degree days 4% higher than average while cords burned per household using wood as a primary space heating source was 8% lower than average (Appendix I – Table 7 & Table 9).



**Figure 5: Heating Degree Days & Cords of Wood Burned per Vermont Household Using Cordwood as Primary Space Heating Source, Percent Above or Below Mean, 1982-2019**

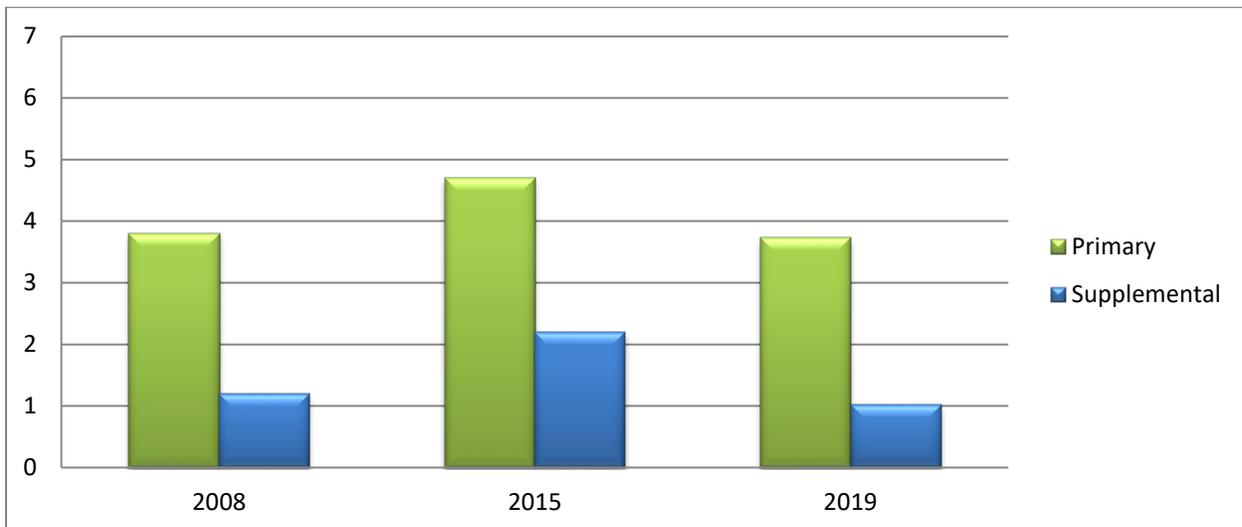
### Wood Pellets for Space Heating

Slightly more than 8% of Vermont households report burning wood pellets for space heat during the 2018-2019 heating season. Fifty-one percent of these households report burning wood pellets as their primary source of space heat, while 49% say pellets are a supplemental source of heat. The percentage of households burning wood pellets for space heat is largely unchanged since 2015 (12%) (Figure 6).



**Figure 6: Percent of Vermont Households Using Wood Pellets for Space Heat, 2008-2019**

An estimated 51,550 tons of wood pellets were burned by Vermont households during the 2018-2019 heating season, 40,736 by those who rely on wood pellets as their primary space heating source and 10,813 by those who use it as a supplementary heating source. Those who use wood pellets as a primary source of space heat report burning an average of 3.7 tons of pellets, while those who use them as a supplemental source report burning 1 ton each on average (Appendix I – Table 5).

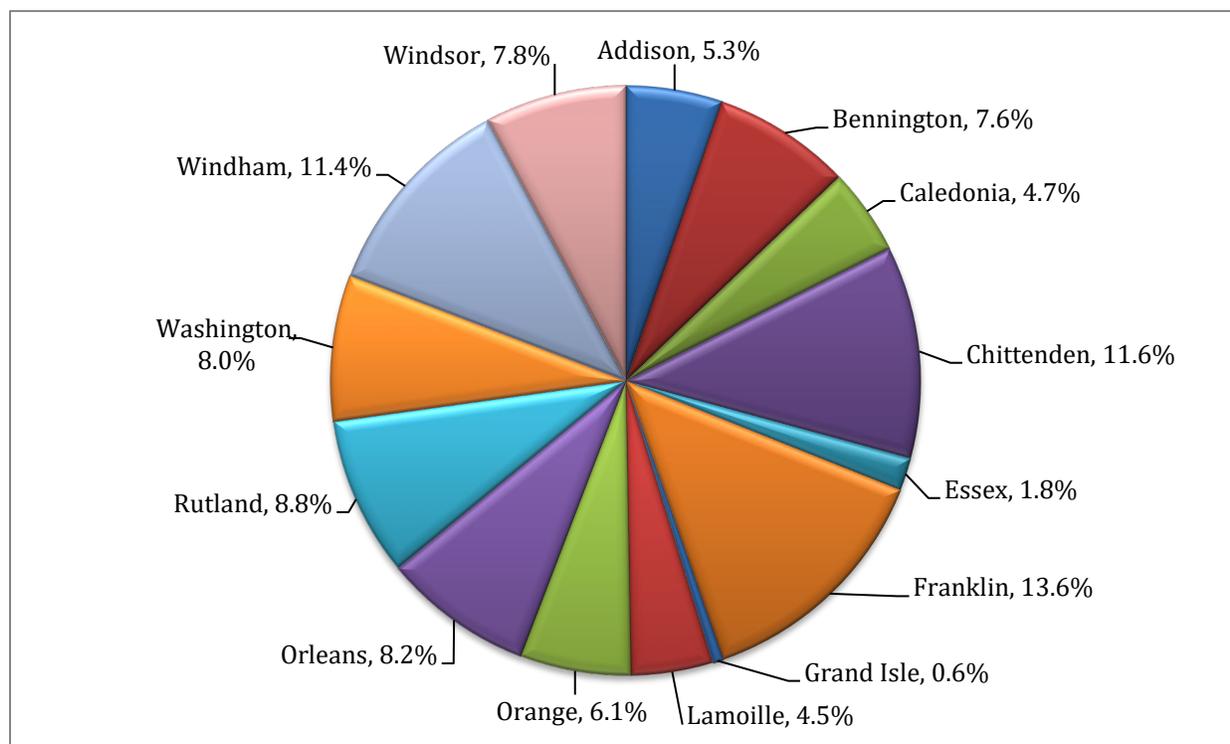


**Figure 7: Mean Tons of Pellets Burned Among Vermont Households Using Wood Pellets for Space Heat, 2008-2019**

### Geography of Wood Burning

County-level information is provided for consistency with previous surveys but should be used with caution. County-level estimates of wood burning are much less reliable than state-level data due to the small number of respondents when separated by county.

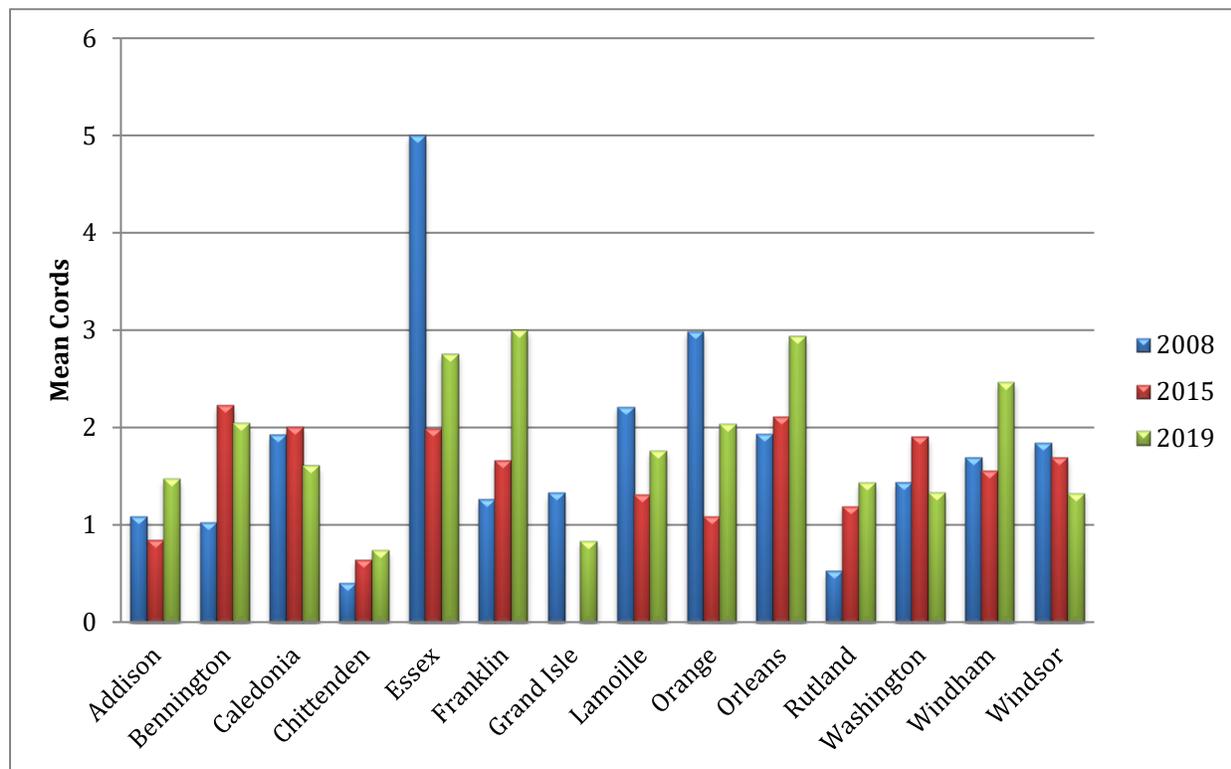
Franklin (13.6%), Chittenden (11.6%), and Windham (11.4%) counties burned the most estimated cords of wood in the 2018-2019 heating season, while Grand Isle (.6%) and Essex (1.8%) burned the fewest (Figure 8).



**Figure 8: Estimated Percent of Total Cords of Wood Burned by Vermont Households by County, 2018-2019**

Vermont households burned an estimated 51,550 tons of wood pellets during the 2018-2019 heating season, or about .2 tons per household. Pellet burning was highest in Essex (.75 tons per household), Orleans (.67 tons), and Orange (.47 tons) counties (Appendix I – Table 14).

As would be expected, counties with larger populations tended to burn more cordwood than those with fewer residents. However, Chittenden County, despite containing a quarter of the Vermont population, accounted for only 12% of estimated cords of wood burned, while Franklin County, which contains only 7% of the Vermont population, burned 14% of the total estimated cords of wood burned in the state (Appendix I – Table 14). Bennington, Essex, Franklin, Orange, Orleans, and Windham counties all burned on average more than two cords of wood per household, while Chittenden and Grand Isle burned less than one cord per household.



**Figure 9: Mean Cords Burned per Household by County - 2008-2019**

### Characteristics of Wood Fuel

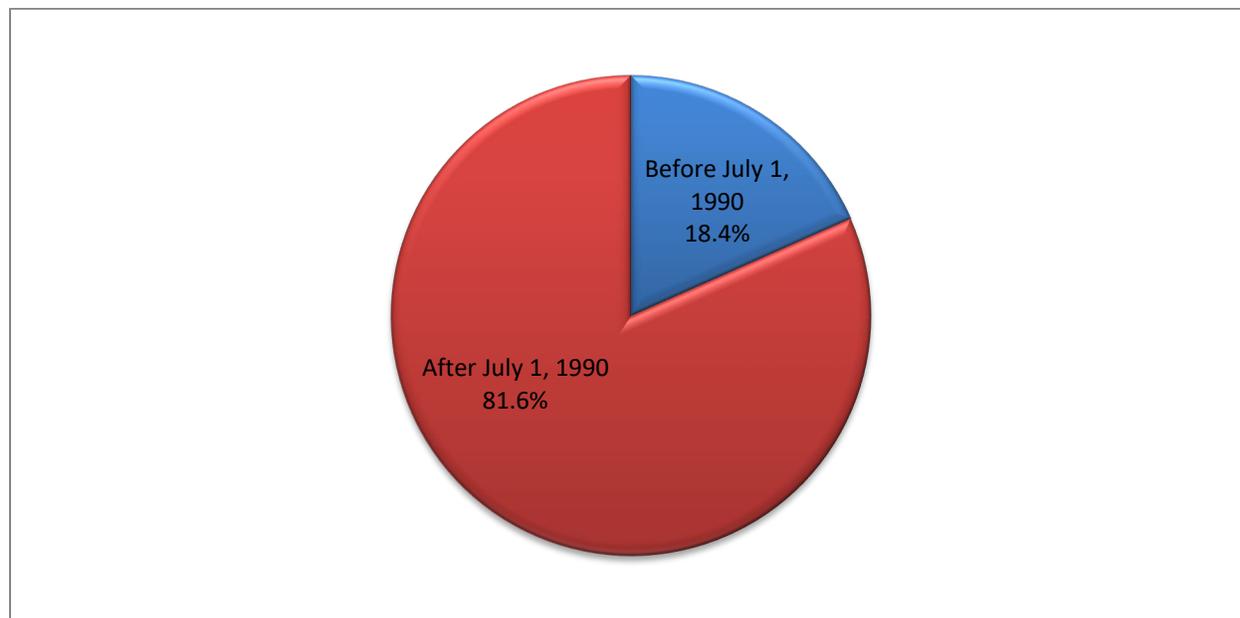
Thirty-seven percent of Vermont households which burned cordwood in the 2018-2019 heating season report that the wood was cut by themselves, an immediate family member, or a friend, down from 46% in 2015. Nearly half (48%) purchased the cordwood and 12% used some of each. Eighty-five percent of households who purchased cordwood purchased it in cut & split form, 2% purchased unsplit blocks, and 16% purchased log lengths (Appendix I – Table 10 & 11).

Four in ten households who burned cordwood (40%) stored their wood in a woodshed or similar roofed structure, another 40% stored it outside covered, 13% stored in it a basement, and 6% stored it outside uncovered. Thirty-seven percent stored their wood for six months or less, 27% stored it for six to twelve months, 22% stored it for twelve to eighteen months, and 13% stored it for more than 18 months (Appendix I – Table 12 & 13).

## Wood Burning Appliances

Three in ten Vermont households, an estimated 77,988 homes, and more than two-thirds of wood-burning households (69%),<sup>6</sup> say that they used at least one woodstove in their home during the 2018-2019 heating season. Of those households who report having purchased their woodstove when it was new, 82% say they purchased it after July 1, 1990, the date when wood stoves were required to be EPA Certified (Figure 9).<sup>7</sup>

The estimated number of Vermont households using a woodstove during the 2018-2019 heating season (77,988) is nearly identical to the estimated number using them in the 2014-2015 season (77,957).



**Figure 9: Percent of Wood Stoves Purchased Before and After July 1, 1990, 2018-2019**

Eight percent of Vermont households and 18% of wood-burning Vermont households, an estimated 20,490 homes, say that they used a wood pellet stove during the 2018-2019 heating season. Very few (.4%) Vermont households report using a pellet furnace or boiler, largely unchanged since 2014-2015 (2%).

Five percent of Vermont households, an estimated 11,896 homes, used a woodstove insert in a fireplace, nearly identical to the percentage of Vermonters who reported using one during the 2014-2015 season (4%). Similarly, few Vermonters report using an open fireplace (4%), a wood furnace or boiler (8%), or a combination furnace (2%) during 2018-2019 heating season, all largely unchanged compared to the 2014-2015 season. More than two-thirds of wood furnaces or boilers (69%) are reportedly located indoors and the vast majority (88%) of combination furnaces are located indoors (Appendix I – Tables 16-18).

<sup>6</sup> Households which report burning cordwood, wood pellets, or burning wood in an open fireplace

<sup>7</sup> Survey respondents were asked if their stove was purchased after July 1, 1990. After this day, all woodstoves sold at retail were required to be EPA certified. All pre-1990 woodstoves therefore are assumed to be uncertified. Surveys prior to that completed for the 2007-2008 heating season asked respondents to classify their appliance as: Air Tight Stove (non-EPA Approved), Non Air Tight Stove, EPA Approved Stove, Wood Furnace, Combination Furnace, and Open Fireplace

Just two percent of Vermonters, an estimated 6,055 households, plan to install a new cordwood or pellet burning appliance for use during the coming heating season, while an estimated 4,072 households plan to install a used cordwood or pellet burning appliance. The vast majority of those who plan to install a new or used wood or pellet burning appliance indicate that they already own at least one wood or pellet burning appliance; only about a thousand households who currently don't own a wood or pellet burning appliance plan to install or a new or used one (Appendix I – Table 19).

### Wood Fuel Availability

Seventy-nine percent of those who purchased cordwood say they did not experience any problems while doing so. However, 10% say they experienced delays in delivery, 8% each were unable to get dry wood or had to burn green wood, and 2% each say their regular supplier went out of business or that their regular supplier was unable to supply them (Appendix I – Table 21).

Among those who purchased wood pellets, 17% say their regular supplier went out of business, 12% experienced rationing of wood pellets, and 2% experienced delays in delivery. Just over six in ten (61%) however, say that they did not experience any problems. The percentage of those purchasing cordwood or wood pellets who report experiencing no problems doing so is slightly higher than in 2015 (Appendix I – Table 22).

## Appendix I - Tables

**Table 1: Fuels Used for Space Heating in Vermont, 2018-2019**

<b>Fuel</b>	<b>Estimated Primary Households</b>	<b>Percent of State</b>	<b>Estimated Supplemental Households</b>	<b>Percent of State</b>	<b>Total Households</b>	<b>Percent of State</b>
<b>Oil</b>	88,704	34.3%	24,723	9.6%	113,427	43.9%
<b>Bioheat</b>	669	0.3%	0	0.0%	669	0.3%
<b>Cordwood</b>	56,753	22.0%	33,655	13.0%	90,408	35.0%
<b>Electricity</b>	8,178	3.2%	21,059	8.1%	29,237	11.3%
<b>Propane</b>	43,630	16.9%	35,065	13.6%	78,695	30.4%
<b>Natural Gas</b>	37,245	14.4%	4,569	1.8%	41,814	16.2%
<b>Kerosene</b>	7,066	2.7%	3,128	1.2%	10,194	3.9%
<b>Coal</b>	529	0.2%	402	0.2%	931	0.4%
<b>Wood Pellets</b>	10,906	4.2%	10,542	4.1%	21,448	8.3%
<b>Solar</b>	369	0.1%	2,209	0.9%	2,578	1.0%
<b>Other</b>	2,670	1.0%	6,911	2.7%	9,582	3.7%
<b>Don't know</b>	1,815	0.7%	0	0.0%	1,815	0.7%
<b>Total</b>	<b>258,535</b>	<b>100.0%</b>	<b>142,263</b>	<b>55.03%</b>		

**Table 2: Estimated Vermont Households Using Each Fuel for Primary of Supplementary Space Heat<sup>8</sup>**

Fuel	1985-1986	1987-1988	1989-1990	1991-1992	1993-1994	1995-1996	1997-1998	2007-2008	2014-2015	2018-2019
<b>Oil</b>	116,300	117,300	125,650	123,255	119,759	122,412	124,045	136,244	131,011	113,427
	58.2%	59.5%	61.2%	58.0%	55.1%	55.5%	55.5%	54.3%	51.0%	43.9%
<b>Cordwood</b>	96,600	78,000	74,552	84,141	82,339	81,402	70,083	80,744	93,976	90,408
	48.3%	39.1%	34.9%	39.1%	37.9%	36.6%	31.3%	32.2%	36.6%	35.0%
<b>Propane</b>	15,300	16,800	34,310	21,861	43,624	40,689	44,521	56,538	58,395	78,695
	7.7%	8.3%	17.0%	10.3%	20.1%	18.5%	20.0%	22.5%	22.7%	30.4%
<b>Natural Gas</b>	13,200	10,100	18,070	19,232	18,880	24,744	21,884	34,502	45,322	41,814
	6.6%	5.0%	8.9%	9.0%	8.7%	11.2%	10.0%	13.8%	17.6%	16.2%
<b>Electricity</b>	31,100	30,000	17,831	31,575	25,288	21,522	17,200	14,564	12,952	29,237
	15.5%	14.9%	7.0%	14.8%	11.6%	9.8%	7.7%	5.8%	5.0%	11.3%
<b>Kerosene</b>	11,800	26,000	10,078	15,854	13,332	14,425	20,051	20,210	13,912	10,194
	5.9%	12.9%	4.8%	7.5%	6.1%	6.5%	9.0%	8.1%	5.4%	3.9%
<b>Coal</b>	4,800	4,400	1,799	513	3,069	2,319	215	2,476	544	931
	2.4%	2.2%	2.6%	0.2%	1.4%	1.1%	0.1%	1.0%	0.2%	0.4%
<b>Wood Pellets</b>								6,988	31,051	21,448
								2.8%	12.1%	8.3%

<sup>8</sup> Does not include wood pleasure burners

**Table 3: Estimated Cordwood Burning by Vermont Households, 2018-2019<sup>9</sup>**

Type of Use	Estimated Number of Households	Percent of All Households	Percent of Wood Space Heating Households	Estimated Cords Burned	Mean Cords per Household
Primary	56,753	22.0%	62.8%	321,625	5.7
Supplemental	33,655	13.0%	37.2%	78,792	2.3
<b>Total Space Heating</b>	90,408	35.0%	100.0%	400,417	4.4
<b>Fireplace Only</b>	11,433	4.4%		9,955	0.9
<b>Total<sup>10</sup></b>	101,841	39.4%		410,372	4.0

**Table 4: Estimated Vermont Households by Classification of Cordwood Burning<sup>11</sup>**

	1981-1982	1983-1984	1985-1986	1987-1988	1989-1990	1991-1992	1993-1994	1995-1996	1997-1998	2007-2008	2014-2015	2018-2019
<b>Non Cordwood Burning Households</b>	79,400	100,100	100,900	110,300	112,234	104,087	123,861	119,048	148,349	169,688	150,415	156,694
	43.1%	52.4%	50.5%	54.6%	54.8%	49.0%	57.0%	54.0%	66.3%	67.6%	58.5%	60.6%
<b>Total Cordwood Burning Households<sup>12</sup></b>	104,700	91,000	98,800	91,756	92,574	108,543	93,495	101,331	75,367	81,183	106,589	101,841
	56.9%	47.6%	49.5%	45.4%	45.2%	51.0%	43.0%	46.0%	33.7%	32.4%	41.5%	39.4%
<b>1. Pleasure Burner Only</b>	7,329	4,550	2,200	13,700	18,185	24,402	11,156	19,929	5,284	439	9,638	11,433
	4.0%	2.4%	1.1%	6.8%	8.9%	11.5%	5.1%	9.0%	2.4%	0.2%	3.8%	4.4%
<b>2. Burners for Space Heat</b>	97,371	86,450	96,600	78,000	74,389	84,141	82,339	81,402	70,083	80,744	96,951	90,408
	52.9%	45.2%	48.4%	38.6%	36.3%	39.6%	37.9%	36.9%	31.3%	32.2%	37.7%	35.0%
<b>A. Primary Burner</b>	77,478	63,700	73,000	49,800	40,648	53,974	44,176	41,434	36,490	46,951	51,764	56,753
	42.1%	33.3%	36.6%	24.7%	19.8%	25.4%	20.3%	18.8%	16.3%	18.7%	20.1%	22.0%
<b>B. Supplemental Burner</b>	19,893	22,750	23,600	28,200	33,741	30,167	38,163	39,968	33,593	33,793	45,187	33,655
	10.8%	11.9%	11.8%	14.0%	16.5%	14.2%	17.6%	18.1%	15.0%	13.5%	17.6%	13.0%
<b>Total Households</b>	184,100	191,100	199,700	202,000	204,808	212,630	217,356	220,379	223,716	250,871	257,004	258,535
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

<sup>9</sup> The number of cords burned is an estimate calculated by using the frequency count of reported number of cords burned and the estimated number of Vermont households. This total is not the same as the total calculated by multiplying the mean number of cords by the number of wood-burning households.

<sup>10</sup> Total is sum of total space heating households and fireplace only households.

<sup>11</sup> Tabulations for 1983-1984 were produced using revised total numbers of households from the 1987-1988 report along with percentages published in the 1983-1984 report.

<sup>12</sup> Households which report burning cordwood. Does not include those who indicate they burn only wood pellets.

**Table 5: Estimated Wood Pellet Burning Vermont Households for Space Heating, 2018-2019**

Type of Use	Estimated Number of Households	Percent of All Households	Percent of Wood Space Heating Households	Estimated Tons of Pellets Burned	Estimated Mean Tons per Household
Primary	10,906	4.2%	50.8%	40,736	3.7
Supplemental	10,542	4.1%	49.2%	10,813	1.0
<b>Total Space Heating</b>	<b>21,448</b>	<b>8.3%</b>	<b>100.0%</b>	<b>51,550</b>	<b>2.4</b>

**Table 6: Estimated Vermont Households by Wood Pellet Burning Status**

	2014-2015	2018-2019
<b>Not a Wood Pellet Burner</b>	225,953	237,420
	87.9%	91.8%
<b>Total Wood Pellet Burning Households</b>	31,051	21,115
	12.1%	8.2%
<b>A. Primary Burner</b>	21,614	10,815
	8.4%	4.2%
<b>B. Supplemental Burner</b>	9,437	10,300
	3.7%	4.0%
<b>Total Households</b>	257,004	258,535
	<b>100.0%</b>	<b>100.0%</b>

**Table 7: Estimated Cords of Wood Burned by Vermont Households**

	1981-1982	1983-1984	1985-1986	1987-1988	1989-1990	1991-1992	1993-1994	1995-1996	1997-1998	2007-2008	2014-2015	2018-2019
<b>Estimated Total Cords Burned</b>	519,000	424,000	451,000	322,000	277,129	352,112	330,006	295,409	249,873	314,233	347,530	410,372
<b>Estimated Cords Burned by Primary Burners</b>	456,720	356,160	386,000	251,000	191,771	279,503	225,711	198,993	178,495	245,630	249,669	321,625
<b>Cords/Primary Burner</b>	5.9	5.6	5.3	5.0	4.7	5.2	5.1	4.8	4.8	5.4	4.8	5.7
<b>Cords Burned by Supplemental Burners</b>			64,000	61,000	74,042	64,521	96,946	87,321	70,027	67,724	95,082	78,792
<b>Cords/Supplemental Burner</b>	2.7	2.8	2.7	2.2	2.2	2.1	2.5	2.2	2.1	2.3	2.1	2.3
<b>Estimated Total Cords Burned for Space Heating</b>	513,810	419,760	450,000	312,000	265,813	344,024	322,657	286,314	248,522	313,354	344,751	400,417
<b>Cords Burned in Open Fireplace</b>	5,190	4,240	1,000	10,000	11,316	8,088	7,349	9,094	1,351	878	2,780	9,955
<b>Cords/Open Fireplace Burner</b>	1	0.9	0.4	0.7	0.6	0.3	0.7	0.5	0.3	2.0	0.3	0.9

**Table 8: Tons of Wood Pellets Burned by Vermont Households**

	2014-2015	2018-2019
<b>Total Wood Pellets Burned (Tons)</b>	126,156	51,550
<b>Tons Wood Pellets Burned by Primary Burners</b>	94,838	40,736
<b>Wood Pellets/Primary Burner</b>	4.4	3.7
<b>Wood Pellets Burned by Supplemental Burners</b>	31,318	10,813
<b>Wood Pellets/Supplemental Burner</b>	3.3	1.0

**Table 9: Heating Degree Days, July 1-June 30, Burlington, Vermont<sup>13</sup>**

	1981-1982	1983-1984	1985-1986	1987-1988	1989-1990	1991-1992	1993-1994	1995-1996	1997-1998	2007-2008	2014-2015	2018-2019	Mean
<b>Heating Degree Days (HDD)</b>	8,877	8,333	8,216	8,334	8,390	8,437	8,900	8,591	7,705	7,826	8,532	7,391	8,294
<b>Percent Above (Below) Mean HDD</b>	7.0%	0.5%	-0.9%	0.5%	1.2%	1.7%	7.3%	3.6%	-7.1%	-5.6%	2.9%	10.9%	-
<b>Cords per Primary Burner (CPB)</b>	5.9	5.6	5.3	5	4.7	5.2	5.1	4.8	4.8	5.4	4.8	5.7	5.2
<b>Percent Above (Below) Mean CPB</b>	13.7%	7.9%	2.1%	-3.6%	-9.4%	0.2%	-1.7%	-7.5%	-7.5%	4.1%	-7.5%	9.2%	

**Table 10: Method of Obtaining Firewood among Vermont Households which Burned Cordwood**

	2014-2015	2018-2019
<b>Cut by yourself or an immediate family member</b>	42.6%	33.8%
<b>Cut by friend</b>	3.8%	3.4%
<b>Purchased by Respondent</b>	40.2%	48.0%
<b>Some of each</b>	13.3%	12.4%
<b>Don't know</b>		2.3%

**Table 11: Form of Wood Purchased among Vermont Households Which Purchased Wood (Select all that apply)**

	2014-2015	2018-2019
<b>Cut &amp; Split</b>	73.1%	85.1%
<b>Unsplit Blocks</b>	1.2%	1.9%
<b>Log Length</b>	16.8%	15.5%
<b>Some other form</b>	1.0%	0.6%
<b>Don't know</b>	0.8%	0.7%

<sup>13</sup> Heating Degree Days higher than the mean indicates a colder heating season than the mean. 2019 data collected from National Weather Service, <https://w2.weather.gov/climate/xmacis.php?wfo=btv>

**Table 12: Wood Storage Location among Vermont Households which Burned Cordwood**

	2014-2015	2018-2019
<b>Woodshed or similar roofed structure</b>	40.8%	39.9%
<b>Basement</b>	13.3%	13.4%
<b>Outside covered</b>	36.8%	39.7%
<b>Outside uncovered</b>	9.0%	6.1%
<b>Don't know</b>		0.4%

**Table 13: Length of Time Wood Stored Prior to Burning among Vermont Households which Burned Cordwood**

	2014-2015	2018-2019
<b>6 months or less</b>	32.8%	36.9%
<b>6 to 12 months</b>	40.2%	26.7%
<b>12 to 18 months</b>	17.8%	22.1%
<b>More than 18 months</b>	9.2%	12.6%
<b>Don't know</b>		1.8%

**Table 14: Estimated Wood Fuel Burned for Space Heat and Wood Burning Appliances by Vermont Counties, 2018-2019**

County	Estimated Cords Burned per Year for Space Heat, 2018-2019 <sup>14</sup>	Mean Cords Burned per Household per Year, 2018-2019 <sup>15</sup>	Percent of Households with One or More Wood or Pellet Burning Appliances, 2018-2019 <sup>16</sup>	Percent of Households with One or More Wood Burning Appliances, 2018-2019 <sup>17</sup>	Percent of Households with One or More Pellet Burning Appliances, 2018-2019 <sup>18</sup>	Tons of Pellets Burned per Year for Space Heat, 2018-2019 <sup>19</sup>	Mean Tons of Pellets Burned per Household per Year, 2018-2019 <sup>20</sup>
Addison	21,627	1.47	50%	47%	3%	2,042	0.14
Bennington	31,171	2.04	44%	44%	0%	0	0.00
Caledonia	19,420	1.61	36%	36%	0%	0	0.00
Chittenden	47,656	0.73	25%	20%	5%	4,898	0.08
Essex	7,480	2.75	83%	50%	33%	2,040	0.75
Franklin	55,947	3.00	53%	38%	19%	7,419	0.40
Grand Isle	2,453	0.83	44%	33%	11%	820	0.28
Lamoille	18,306	1.76	56%	52%	8%	3,328	0.32
Orange	24,966	2.03	64%	57%	11%	5,752	0.47
Orleans	33,727	2.93	67%	53%	13%	7,665	0.67
Rutland	36,025	1.43	45%	42%	3%	2,287	0.09
Washington	32,817	1.33	51%	39%	15%	5,866	0.24
Windham	46,864	2.46	56%	53%	6%	4,447	0.23
Windsor	31,912	1.32	48%	35%	13%	4,985	0.21
<b>Vermont</b>	<b>410,372</b>	<b>1.59</b>	<b>45%</b>	<b>38%</b>	<b>8%</b>	<b>51,550</b>	<b>0.20</b>

<sup>14</sup> The number of cords burned is an estimate calculated by using the frequency count of reported number of cords burned and the estimated number of Vermont households.

<sup>15</sup> Mean cords burned per household was calculated by dividing the total cords burned in each county by the total number of households in that county.

<sup>16</sup> Percent of households with one or more wood or pellet burning appliance was calculated by dividing the number of households reporting one or more wood or pellet burning appliance by the total number of households in the county.

<sup>17</sup> Percent of households with one or more wood burning appliance was calculated by dividing the number of households reporting one or more wood burning appliance by the total number of households in the county.

<sup>18</sup> Percent of households with one or more pellet burning appliance was calculated by dividing the number of households reporting one or more pellet burning appliance by the total number of households in the county.

<sup>19</sup> Tons of pellets burned per year by county was calculated as a weighted sum of respondents' answers to number of tons burned.

<sup>20</sup> Mean tons of pellets burned per household was calculated by dividing the total tons burned in each county by the total number of households in that county.

**Table 15: Estimated Cordwood Burned for Space Heat by Vermont Counties, 1989-2019**

County	Estimated Cords Burned 2018-2019	Mean Cords Burned per Household 2018-2019	Rank, 2018-2019	Estimated Cords Burned 2014-2015	Mean Cords Burned per Household 2014-2015	Rank, 2014-2015	Estimated Cords Burned 2007-2008	Mean Cords Burned per Household 2007-2008	Rank, 2007-2008	Estimated Cords Burned 1989-1998 <sup>21</sup>	Mean Cords Burned per Household 1989-1998	Rank, 1989-1998
<b>Addison</b>	21,627	1.47	9	11,946	0.84	12	14,594	1.08	11	19,784	1.64	7
<b>Bennington</b>	31,171	2.04	5	34,509	2.23	1	15,652	1.02	12	17,674	1.28	11
<b>Caledonia</b>	19,420	1.61	8	25,139	2.01	3	23,234	1.92	5	22,949	2.04	3
<b>Chittenden</b>	47,656	0.73	14	40,156	0.64	13	23,415	0.40	13	28,546	0.57	14
<b>Essex</b>	7,480	2.75	3	5,500	1.98	4	10,285	5.00	1	5,461	2.22	2
<b>Franklin</b>	55,947	3.00	1	30,939	1.66	7	22,841	1.26	10	14,581	0.98	12
<b>Grand Isle</b>	2,453	0.83	13	*	*	14	4,915	1.33	9	1,802	0.77	13
<b>Lamoille</b>	18,306	1.76	7	13,200	1.31	9	22,264	2.21	3	10,976	1.38	9
<b>Orange</b>	24,966	2.03	6	12,926	1.08	11	34,536	2.99	2	19,076	1.94	4
<b>Orleans</b>	33,727	2.93	2	23,280	2.11	2	19,053	1.93	4	22,291	2.35	1
<b>Rutland</b>	36,025	1.43	10	30,747	1.19	10	13,077	0.52	14	36,268	1.50	8
<b>Washington</b>	32,817	1.33	11	46,766	1.90	5	33,600	1.43	8	30,005	1.36	10
<b>Windham</b>	46,864	2.46	4	30,149	1.55	8	30,109	1.69	7	31,954	1.89	5
<b>Windsor</b>	31,912	1.32	12	42,223	1.69	6	45,747	1.84	6	39,540	1.72	6
<b>Vermont</b>	410,372	1.59		347,480	1.35		313,322	1.53		300,907	1.55	

<sup>21</sup> Average reported cords burned from 1989-1998 iterations of the survey.

**Table 16: Types of Wood Burning Appliances Used in Vermont Households, 2018-2019<sup>22</sup>**

Type of Appliance	Estimated Households Using at Least One	Percent of all Households Using at Least One	Percent of Wood Burning Households <sup>23</sup> Using at Least One
<b>Wood Stoves</b>	<b>77,988</b>	<b>30.17%</b>	<b>68.78%</b>
Stoves Purchased before 7-1 1990	8,882	3.44%	7.83%
Stoves Purchased 7-1 1990 or Later	39,494	15.28%	34.83%
Purchased Used	15,720	6.08%	13.86%
Catalytic Stoves	21,366	8.26%	18.84%
Non-Catalytic Stoves	49,153	19.01%	43.35%
<b>Wood Pellet Stove</b>	<b>20,490</b>	<b>7.93%</b>	<b>18.07%</b>
<b>Pellet Furnace or Boiler</b>	<b>931</b>	<b>0.36%</b>	<b>0.82%</b>
<b>Wood Stove Insert in Fireplace</b>	<b>11,896</b>	<b>4.60%</b>	<b>10.49%</b>
Inserts Purchased before 7-1 1990	0	0.00%	0.00%
Inserts Purchased 1990 or Later	7,949	3.07%	7.01%
Purchased Used	2,339	0.90%	2.06%
Catalytic Inserts	4,651	1.80%	4.10%
Non-Catalytic Inserts	5,838	2.26%	5.15%

<sup>22</sup> Estimates about when these appliances were purchased and whether they are catalytic will not equal overall total due to respondents who don't know when their appliance was purchased or whether it is catalytic or not.

<sup>23</sup> Households which report burning cordwood, wood pellets, or burning wood in an open fireplace

**Table 17: Types of Wood Burning Appliances Used in Vermont Households, 2018-2019<sup>24</sup>**

Type of Appliance	Estimated Households Using at Least One	Percent of all Households Using at Least One	Percent of Wood Burning Households <sup>25</sup> Using at Least One
<b>Open Fireplace</b>	<b>11,433</b>	<b>4.42%</b>	<b>10.08%</b>
<b>Wood Furnace or Boiler</b>	<b>20,933</b>	<b>8.10%</b>	<b>18.46%</b>
Indoor Wood Furnace	14,489	5.60%	12.78%
Outdoor Wood Furnace	6,444	2.49%	5.68%
Purchased before 10-1 2009 <sup>26</sup>	2,898	1.12%	2.56%
Purchased after 10-1 2009	1,195	0.46%	1.05%
<b>Combination Furnace</b>	<b>5,929</b>	<b>2.29%</b>	<b>5.23%</b>
Indoor Wood Furnace	5,193	2.01%	4.58%
Outdoor Wood Furnace	735	0.28%	0.65%
Purchased before 10-1 2009 <sup>27</sup>	369	0.14%	0.33%
Purchased after 10-1 2009	0	0.00%	0.00%

<sup>24</sup> Estimates about when these appliances were purchased and whether they are indoors or outdoors will not equal overall total due to respondents who don't know when their appliance was purchased or refused to answer where it is located.

<sup>25</sup> Households which report burning cordwood, wood pellets, or burning wood in an open fireplace

<sup>26</sup> Only those who said their wood furnace or boiler was located outdoors were asked when they purchased their combination furnace

<sup>27</sup> Only those who said their combination furnace was located outdoors were asked when they purchased their combination furnace

**Table 18: Types of Wood Burning Appliances Used in Vermont Households**

Type of Appliance		2014-2015	2018-2019
<b>Wood Stoves</b>	Estimated Households Using at Least One	77,957	77,988
	Percent of all Households Using at Least One	30.33%	30.17%
	Percent of Wood Burning Households Using at Least One	63.49%	68.78%
<b>Wood Pellet Stove</b>	Estimated Households Using at Least One	27,040	20,490
	Percent of all Households Using at Least One	10.52%	7.93%
	Percent of Wood Burning Households Using at Least One	22.02%	18.07%
<b>Pellet Furnace or Boiler</b>	Estimated Households Using at Least One	4,943	931
	Percent of all Households Using at Least One	1.92%	0.36%
	Percent of Wood Burning Households Using at Least One	4.03%	0.82%
<b>Wood Stove Insert in Fireplace</b>	Estimated Households Using at Least One	11,143	11,896
	Percent of all Households Using at Least One	4.34%	4.60%
	Percent of Wood Burning Households Using at Least One	9.07%	10.49%
<b>Open Fireplace</b>	Estimated Households Using at Least One	9,638	11,433
	Percent of all Households Using at Least One	3.75%	4.42%
	Percent of Wood Burning Households Using at Least One	7.85%	10.08%
<b>Wood Furnace or Boiler</b>	Estimated Households Using at Least One	16,440	20,933
	Percent of all Households Using at Least One	6.40%	8.10%
	Percent of Wood Burning Households Using at Least One	13.39%	18.46%
<b>Combination Furnace</b>	Estimated Households Using at Least One	2,868	5,929
	Percent of all Households Using at Least One	1.12%	2.29%
	Percent of Wood Burning Households Using at Least One	2.34%	5.23%

**Table 19: Vermont Households Planning to Install New or Used Wood or Pellet Burning Appliances by Appliance Ownership**

	1981-1982	1983-1984	1985-1986	1987-1988	1989-1990	1991-1992	1993-1994	1995-1996	1997-1998	2007-2008		2014-2015		2018-2019	
										New	Used	New	Used	New	Used
<b>All Households</b>	9,851	13,157	5,000	3,500	1,686	2,122	1,292	1,697	7,452	15,017	3,025	8,472	1,345	6,055	4,072
<b>Percent of all Households</b>	5.4%	6.9%	2.5%	1.7%	0.8%	1.0%	0.6%	0.8%	3.3%	6.0%	1.2%	3.3%	.5%	2.3%	1.6%
<b>Wood or Pellet Appliance Owners<sup>28</sup></b>										6,083	2,586	5,151	885	5,322	3,633
<b>Percent of all Households</b>										2.4%	1.0%	2.0%	0.3%	2.1%	1.4%
<b>Wood Appliance Owners</b>										6,083	2,586	4,175	885	4,953	2,096
<b>Percent of all Households</b>										2.4%	1.0%	1.6%	0.3%	1.9%	0.8%
<b>Pellet Appliance Owners</b>										668	0	1,420	0	1,481	2,067
<b>Percent of all Households</b>										0.3%	0.0%	0.6%	0.0%	0.6%	0.8%
<b>Do not own Wood/Pellet Appliance</b>										8,934	439	3,321	460	733	438
<b>Percent of all Households</b>										3.6%	0.2%	1.3%	0.2%	0.3%	0.2%

<sup>28</sup> The number of wood or pellet appliance owners is larger than the sum of “Wood Appliance Owners” and “Pellet Appliance Owners” because some households report owning both types of appliances.

**Table 20: Estimated Vermont Households Planning to Install New Heating System or Heating Appliance, 2018-2019**

<b>Appliance Type</b>	<b>Estimated Number of Vermont Households</b>	<b>Percent among Those who Plan to Install New Heating Systems or Appliances</b>
<b>Wood Stove</b>	3,214	19.8%
<b>Pellet Stove</b>	2,635	16.2%
<b>Indoor Wood Furnace or Boiler</b>	1,498	9.2%
<b>Outdoor Wood Furnace or Boiler</b>	0	0.0%
<b>Pellet Furnace or Boiler</b>	0	0.0%
<b>Cold Climate Heat Pump</b>	1,924	11.9%
<b>Electric Baseboard Heat</b>	1,038	6.4%
<b>Oil Fired Furnace</b>	1,021	6.3%
<b>Oil Fired Boiler</b>	762	4.7%
<b>Propane Furnace</b>	2,880	17.7%
<b>Natural Gas Furnace</b>	0	0.0%
<b>Natural Gas Boiler</b>	0	0.0%
<b>Natural Gas Stove</b>	669	4.1%
<b>Coal Furnace</b>	0	0.0%
<b>Coal Boiler</b>	366	2.3%
<b>Coal Stove</b>	0	0.0%

**Table 21: Reported Negative Experiences Encountered among Vermonters when Purchasing Cordwood, 2018-2019**

Negative Experience	Percent who Purchased Wood	Percent Overall	Estimated Households
Regular supplier out of business	2.3%	0.5%	1,347
Regular supplier unable to supply	2.3%	0.5%	1,340
Delays in delivery	9.5%	2.2%	5,588
Unable to get dry wood	7.9%	1.8%	4,619
Had to burn green wood	7.6%	1.7%	4,456
Other	2.9%	0.7%	1,683
Did not experience any of these	78.7%	17.9%	46,234

**Table 22: Reported Negative Experiences Encountered among Vermonters when Purchasing Wood Pellets, 2018-2019**

Negative Experience	Percent who Purchased Wood	Percent Overall	Estimated Households
Regular supplier out of business	16.8%	1.4%	3,542
Rationing of wood pellets	12.3%	1.0%	2,607
Delays in delivery	1.7%	0.1%	369
Other	10.6%	0.9%	2,231
Did not experience any of these	61.4%	5.0%	12,964

## Appendix II – Survey Procedures

### 2018-2019 Assessment

The University of New Hampshire Survey Center conducted the 2018-2019 Vermont Residential Fuel Assessment Survey on behalf of the Vermont Department of Forest, Parks and Recreation (FPR). The survey is intended to track residential fueling trends in the state of Vermont (details on previous surveys conducted can be found in Appendix IV).

A probability based, dual-frame landline and cellular telephone sample of Vermont was used. A dual-frame sample was first instituted in the 2014-15 survey to compensate for households without landline telephones and roughly 30% of the completed surveys were done on a cell phone. Due to the precipitous drop in landline ownership (approximately 61% of Vermont residents do not own a landline and 83% use a cellphone at least some of the time)<sup>29</sup>, the makeup of the sample was changed to 70% cell phones and 30% landlines.

The sample was conducted using a procedure called Random Digit Dialing (RDD) of both landline and cellular telephones. The way this works is as follows. First, with the aid of a computer, one of the three-digit telephone exchanges that are currently used in the state (e.g., 772) is randomly selected. The computer then randomly selects one of the "working blocks"--the first two of the last four numbers in a telephone number (e.g., 64)--and attaches it to the randomly selected exchange. Finally, the computer program then generates a two-digit random number between 00 and 99 (e.g., 57) which is attached to the previously selected prefix (772), and the previously selected working block (64) resulting in a complete telephone number, i.e., 772 6457. This procedure is then repeated numerous times by the computer to generate more random numbers, so that we have a sufficient quantity to conduct the survey. The end result is that each household in the area in which there is a telephone has an equally likely chance of being selected into the sample. This procedure is done for both land line and cellular exchanges.

The random sample used was purchased from Scientific Telephone Samples (STS), Rancho Santa Margarita, CA. STS screens each selected telephone number to eliminate non-working numbers, disconnected numbers, and business numbers to improve the efficiency of the sample, reducing the amount of time interviewers spend calling non-usable numbers.

Interviewers were instructed to speak with the adult (age 18 years of age or older) in a private residence who was most familiar with how the house was heated during the past heating season (October 1, 2018 to April 30, 2019). Those whose primary residence was not in Vermont during the past heating seasons were screened out of the survey. Vermont residents were contacted via telephone between August 9 and August 26, 2019. Overall, five hundred two (502) completed the survey. The margin of sampling error for this survey is 4.4%. The 502 interviews were weighted to the 2017 U.S. Census American Community Survey population projections of the number of households in each Vermont county.

The 2018-2019 written report attempted to replicate as many as possible of the existing approaches and features of previous Fuel Assessment Survey reports. The UNH Survey Center relied upon the material provided by the Castleton Polling Institute that was used to generate many previous elements of earlier reports. Accordingly, results from earlier iterations derive from previous years' reports and their veracity

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<sup>29</sup> [https://www.cdc.gov/nchs/data/nhis/earlyrelease/Wireless\\_state\\_201903.pdf](https://www.cdc.gov/nchs/data/nhis/earlyrelease/Wireless_state_201903.pdf)

cannot be independently verified by the UNH Survey Center. In some cases, information on how to generate certain elements of the report was incomplete, unavailable, not readily able to be followed, or unwise to replicate. In these cases, elements have been altered or omitted as needed to provide as accurate and consistent analysis as possible.

Following previous reports, many results are presented as an estimate of Vermont households, based upon the 2017 U.S. Census American Community Survey estimate of 258,535 Vermont households. However, these estimates are subject to large changes based on small movements in respondents' answers. Therefore, definitive conclusions based upon this year's household estimates as well as differences between results in this survey and previous iterations should be noted with caution. County-level estimates are also provided with some results for consistency with previous surveys. However, these should be interpreted with extreme caution, particularly in Vermont counties with small populations, because results are likely to vary considerably and be of questionable accuracy when based upon such a small number of respondents. The number of completed surveys and margin of sampling error at the county level are provided below.

<b>County</b>	<b>Number of Cases 2018-2019</b>	<b>Margin of Error (+/-)</b>
Addison	29	18.2%
Bennington	30	17.9%
Caledonia	23	20.4%
Chittenden	126	8.7%
Essex	5	43.8%
Franklin	36	16.3%
Grand Isle	6	40.0%
Lamoille	20	21.9%
Orange	24	20.0%
Orleans	22	20.9%
Rutland	49	14.0%
Washington	48	14.1%
Windham	37	16.1%
Windsor	47	14.3%
OVERALL	502	4.4%

Estimates for totals such as the number of cords of wood burned were generated using a method which relies upon multiplying a question's frequency table of results by the number of estimated households. This method was employed in order to ensure consistency with methodology in previous reports but should also be interpreted with caution, as survey data is subject to certain limitations (such as sampling error), and therefore cannot guarantee the level of precision that a household estimate would appear to provide.

The questionnaire was provided by FPR to the UNH Survey Center. Please see Appendix III for the full survey instrument.

## Appendix III – Survey Instrument

### 2019 Vermont Residential Fuel Assessment Survey

#### Intro1.

"Good afternoon / evening. My name is \_\_\_\_\_ and I'm calling from the University of New Hampshire Survey Center on behalf of the Vermont Department of Forests, Parks, and Recreation to conduct a brief survey on energy use in Vermont. We're calling Vermont residents to find out how people heated their homes during the last heating season."

"Are you the person in this household who is most familiar with how your house was heated during the past heating season (October 1st to April 30th)?"

IF NO: "May I speak to the person in your household who does?"

1 CONTINUE

2 NOT A VT RESIDENT – "Thank you very much, we are only interviewing Vermont residents."

3 APPOINTMENT - TERMINATE

99 REFUSAL - TERMINATE

#### CELL1.

"First, to confirm, have I reached you on your cell phone or a land line?"

1 CELL PHONE

2 LAND LINE

99 REFUSED

#### CELL2.

"Are you doing any activity that requires your full attention, such as driving a car?"

IF YES: "Would you like to continue with the survey now or would you like me to call back at a better time?"

1 CONTINUE

2 SET APPOINTMENT TO CALL BACK

99 REFUSED

#### AGE18.

"And are you 18 years old or older?"

1 YES

2 NO

99 REFUSED

#### [IF INTRO1=3] INT2.

"Hi, may I please speak to %ID%?:

"Hello, my name is \_\_\_\_\_. I'm calling on behalf of the Vermont Department of Forests, Parks, and Recreation to conduct a brief survey on energy use in Vermont. We're calling Vermont residents to find out how people heated their homes last winter. Are you the person in this household who is most familiar with how your house was heated during the past heating season (October 1st to April 30th)?"

1 YES

2 APPOINTMENT

99 REFUSED

**ELIG1.**

Is this a private residence?

[PROMPT IF NEEDED: "As opposed to a business or commercial property?"]

[PROMPT IF NEEDED: "A private residence may be rented or owned."]

- 1 Yes
- 2 No [GO TO NONQUAL]
- 3 DON'T KNOW [GO TO NONQUAL]
- 4 REFUSED [GO TO NONQUAL]

**ELIG2.**

During the past heating season, October 1, 2018 to April 30, 2019, was your primary residence in Vermont?

- 1 Yes [GO TO INFO]
- 2 No [GO TO NONQUAL]
- 3 DON'T KNOW [GO TO NONQUAL]
- 4 REFUSED [GO TO NONQUAL]

**INFO.**

"Thank you very much for helping us with this important study."

"Your telephone number was randomly selected from all families in Vermont. This call may be monitored for quality assurance."

"Participation is voluntary. If you decide to participate, you may decline to answer any question or end the interview at any time."

IF ASKED - "This survey will take about 10 minutes to complete."

**NonQual.**

"Thank you very much, but we are only interviewing people who spent the last heating season in a private Vermont residence. Thank you very much for your time, and have a good evening."

**County.**

What county did you reside in during the past heating season (October 1, 2018 - April 30, 2019)?

- 1 ADDISON COUNTY
- 2 BENNINGTONCOUNTY
- 3 CALEDONIA COUNTY
- 4 CHITTENDEN COUNTY
- 5 ESSEX COUNTY
- 6 FRANKLIN COUNTY
- 7 GRAND ISLE COUNTY
- 8 LAMOILLE COUNTY
- 9 ORANGE COUNTY
- 10 ORLEANS COUNTY
- 11 RUTLAND COUNTY
- 12 WASHINGTON COUNTY
- 13 WINDHAM COUNTY
- 14 WINDSOR COUNTY
- 15 DON'T KNOW
- 16 REFUSED

**INTRO3.**

Is the house you live in now the same house that you lived in during the past heating season?

- 1 Yes
- 2 No
- 3 DON'T KNOW
- 4 REFUSED

**A1.**

During the past heating season, what kind of fuel provided most of the heat for the home you lived in?

By the past heating season, I mean any date between October 1, 2018 and April 30, 2019.

[PROMPT IF NEEDED: "Most means contributed more heat to the house than any other fuel. If multiple fuels were used, most does not necessarily mean more than 50% of the heat."]

[PROMPT IF NEEDED: "What kind of fuel did you use as your primary source of heat during the last heating season?"]

- 1 Fuel oil
- 2 Bio-Heat (alternative to traditional fuel oil made by replacing a percentage of the fossil fuel by blending in processed vegetable oil, known as biodiesel)
- 3 Wood
- 4 Wood Pellets (cylindrical pellets [about ¼ inch in diameter and 1 inch long] made from recycled sawdust)
- 5 Propane (also called bottled or tank gas)
- 6 Natural gas (from underground pipes serving the neighborhood)
- 7 Electricity- Baseboard
- 8 Electricity- Heat Pump
- 9 Kerosene
- 10 Coal
- 11 Solar
- 12 Other Fuel (SPECIFY)
- 13 DON'T KNOW
- 14 REFUSED

[ONLY IF A1=2] **A1a.**

What is the percentage of "Bio" in the Bio-heat blend (for example, a 2% addition of Bio mixed with regular fuel oil would be "2%")?

[FOR "DON'T KNOW" ENTER 8888]

[FOR "REFUSED TO ANSWER" ENTER 9999]

**A1c.**

Was [INSERT PRIMARY FUEL FROM A1] used during the last heating season to fuel any of the following appliances in addition to heating?

[PROMPT IF NEEDED: "Domestic water means water that is used for a respondent's hot water tank to heat the water for their faucets and showers. This does not include water used for any space heating purposes."]

**A1c\_1. A Domestic Water Heater**

- 1 Yes
- 2 No
- 3 DON'T KNOW
- 4 REFUSED

**A1c\_2.** A Kitchen Range or Cook Stove

- 1 Yes
- 2 No
- 3 DON'T KNOW
- 4 REFUSED

**A1c\_3.** A Clothes Dryer

- 1 Yes
- 2 No
- 3 DON'T KNOW
- 4 REFUSED

**A1c\_4.** Another Appliance (specify)

- 1 Yes
- 2 No
- 3 DON'T KNOW
- 4 REFUSED

[ONLY ASKED IF A1=1] **A2a.**

Approximately how much Fuel Oil did you use during the past heating season?

[INTERVIEWER: FOR THIS SECTION, ONLY RECORD A DOLLAR AMOUNT IF THE RESPONDENT CANNOT GIVE YOU A UNIT AMOUNT.]

- 1 Gallons \_\_\_\_\_
- 2 Dollar Amount \_\_\_\_\_
- 3 DON'T KNOW
- 4 REFUSED

[ONLY ASKED IF A1=3] **A2b.**

Overall, approximately how many standard cords of wood did you burn during the past heating season for heat as a primary heating fuel that you used to heat your home? This would include any wood you may have burned in your fireplace for heating purposes. The unit of measure for wood use is a standard cord, which is a volume of wood 4 feet by 4 feet by 8 feet.

[INTERVIEWER: if the respondent says they used wood "runs," ask what that would be in cords.]

[INTERVIEWER: FOR THIS SECTION, ONLY RECORD A DOLLAR AMOUNT IF THE RESPONDENT CANNOT GIVE YOU A UNIT AMOUNT.]

- 1 Cords \_\_\_\_\_
- 2 Runs \_\_\_\_\_
- 3 Dollar Amount \_\_\_\_\_
- 4 Other \_\_\_\_\_
- 5 DON'T KNOW
- 6 REFUSED

[ONLY ASKED IF A1=2] **A2bio.**

Approximately how much bio-heat did you use LAST winter?

[INTERVIEWER: FOR THIS SECTION, ONLY RECORD A DOLLAR AMOUNT IF THE RESPONDENT CANNOT GIVE YOU A UNIT AMOUNT.]

- 1 Gallons \_\_\_\_\_
- 2 Dollar amount \_\_\_\_\_
- 3 DON'T KNOW
- 4 REFUSED

[ONLY ASKED IF A1=4] **A2c.**

Approximately how much wood pellets did you use LAST winter?

[INTERVIEWER: FOR THIS SECTION, ONLY RECORD A DOLLAR AMOUNT IF THE RESPONDENT CANNOT GIVE YOU A UNIT AMOUNT.]

- 1 Bags \_\_\_\_\_
- 2 Tons \_\_\_\_\_
- 3 Dollar Amount \_\_\_\_\_
- 4 Other \_\_\_\_\_
- 5 DON'T KNOW
- 6 REFUSED

[ONLY ASKED IF A1=5] **A2d.**

Approximately how much propane did you use during the past heating season?

[INTERVIEWER: FOR THIS SECTION, ONLY RECORD A DOLLAR AMOUNT IF THE RESPONDENT CANNOT GIVE YOU A UNIT AMOUNT.]

- 1 Gallons \_\_\_\_\_
- 2 Dollar amount \_\_\_\_\_
- 3 DON'T KNOW
- 4 REFUSED

[ONLY ASKED IF A1=6] **A2e.**

Approximately how much natural gas did you use during the past heating season?

[INTERVIEWER: FOR THIS SECTION, ONLY RECORD A DOLLAR AMOUNT IF THE RESPONDENT CANNOT GIVE YOU A UNIT AMOUNT.]

- 1 Cubic feet \_\_\_\_\_
- 2 Dollar Amount \_\_\_\_\_
- 3 DON'T KNOW
- 4 REFUSED

[ONLY ASKED IF A1=7 or 8] **A2f.**

Approximately how much electricity did you use during the past heating season?

[INTERVIEWER: FOR THIS SECTION, ONLY RECORD A DOLLAR AMOUNT IF THE RESPONDENT CANNOT GIVE YOU A UNIT AMOUNT.]

- 1 Kilowatt-hours of electricity \_\_\_\_\_
- 2 Dollar amount \_\_\_\_\_
- 3 DON'T KNOW
- 4 REFUSED

[ONLY ASKED IF A1=9] **A2g.**

Approximately how much kerosene did you use during the past heating season?

[INTERVIEWER: FOR THIS SECTION, ONLY RECORD A DOLLAR AMOUNT IF THE RESPONDENT CANNOT GIVE YOU A UNIT AMOUNT.]

- 1 Gallons \_\_\_\_\_
- 2 Dollar Amount \_\_\_\_\_
- 3 DON'T KNOW
- 4 REFUSED

[ONLY ASKED IF A1=10] **A2h.**

Approximately how much coal did you use during the past heating season?

[INTERVIEWER: FOR THIS SECTION, ONLY RECORD A DOLLAR AMOUNT IF THE RESPONDENT CANNOT GIVE YOU A UNIT AMOUNT.]

- 1 Pounds \_\_\_\_\_
- 2 bags \_\_\_\_\_
- 3 tons \_\_\_\_\_
- 4 Dollar Amount \_\_\_\_\_
- 5 DON'T KNOW
- 6 REFUSED

[ONLY ASKED IF A1=12] **A2j.**

Approximately how much of that fuel did you use during the past heating season?

[INTERVIEWER: FOR THIS SECTION, ONLY RECORD A DOLLAR AMOUNT IF THE RESPONDENT CANNOT GIVE YOU A UNIT AMOUNT.]

- 1 Amount \_\_\_\_\_
- 2 Dollar Amount \_\_\_\_\_
- 3 DON'T KNOW
- 4 REFUSED

**A3.**

How old is your primary heating system?

[INTERVIEWER: DO NOT READ LIST UNLESS RESPONDENT NEEDS PROMPTING.]

- 1 LESS THAN ONE-YEAR-OLD
- 2 1 to 4 years old
- 3 5 to 9 years old
- 4 10 to 14 years old
- 5 15 to 19 years old
- 6 20 years old or older
- 7 DON'T KNOW
- 8 REFUSED

**BIntro.**

Now, I'll ask you a few questions about any secondary fuel you may have used during the past heating season which includes any time between October 1st, 2018 and April 30th, 2019. This would include any heating fuel you used as secondary or supplemental fuel to your primary heating fuel, which we have already discussed.

**B1.**

Were any other fuels used to heat your home during the past heating season besides your primary heating fuel which we have already discussed? These would include fuels that you used to supplement your primary heating fuel for your home during the past heating season.

- 1 Yes
- 2 No [GO TO B3]
- 3 DON'T KNOW [GO TO B3]
- 4 REFUSED [GO TO B3]

**B2.**

What other fuels were used during the past heating season as supplemental fuel to heat your home? [CHECK ALL THAT APPLY]

[INTERVIEWER: ONLY READ IF NEEDED.]

- 1 FUEL OIL
- 2 BIO-HEAT
- 3 WOOD
- 4 WOOD PELLETS
- 5 PROPANE
- 6 NATURAL GAS
- 7 ELECTRICITY-BASEBOARD
- 8 ELECTRICITY-HEAT PUMP
- 9 KEROSENE
- 10 COAL
- 11 SOLAR
- 12 OTHER (specify)
- 13 DON'T KNOW
- 14 REFUSED

[ONLY ASKED IF B2=2] B2a.

What is the percentage of "Bio" in the Bio-heat blend (for example, a 2% addition of Bio mixed with regular fuel oil would be "2%")?

[FOR "DON'T KNOW" ENTER 8888]

[FOR "REFUSED TO ANSWER" ENTER 9999]

**B2b.**

Was [SECONDARY FUEL] used during the last heating season to fuel any of the following appliances in addition to heating?

[PROMPT IF NEEDED: "Domestic water means water that is used for a respondent's hot water tank to heat the water for their faucets and showers. This does not include water used for any space heating purposes."]

**B2B\_1.** A Domestic Water Heater

- 1 Yes
- 2 No
- 3 DON'T KNOW
- 4 REFUSED

**B2B\_2.** A Kitchen Range or Cook Stove

- 1 Yes
- 2 No
- 3 DON'T KNOW
- 4 REFUSED

**B2B\_3. A Clothes Dryer**

- 1 Yes
- 2 No
- 3 DON'T KNOW
- 4 REFUSED

**B2B\_4. Another Appliance (specify)**

- 1 Yes
- 2 No
- 3 DON'T KNOW
- 4 REFUSED

[IF A1=3 OR B2=3 OR A1=4 OR B2=4 GO TO B4] **B3.**

During the past heating season, did you burn any wood for space heating?

[IF NEEDED: THIS INCLUDES WOOD PELLETS.]

[IF NEEDED, SPACE HEATING IS USING A FUEL DEVICE TO HEAT A SPACE (USUALLY AN ENCLOSED SPACE) WITHIN YOUR HOME.]

- 1 Yes
- 2 No [GO TO EINTRO]
- 3 DON'T KNOW [GO TO EINTRO]
- 4 REFUSED [GO TO EINTRO]

**[ONLY ASKED IF A1=3 OR A1=4 OR B2=3 OR B2=4 B3=1] B4.**

During the past heating season, did you burn cordwood, wood pellets or some of each?

[INTERVIEWER: if needed, cordwood is also known as firewood and is measured and sold in units called cords. A "full" cord measures 4x4x8 ft. and is the official, standard firewood measure.]

- 1 Cordwood
- 2 Pellets
- 3 Some of each
- 4 DON'T KNOW
- 5 REFUSED

**[ASKED ONLY IF B2=3 OR B4=1 OR B4=3 AND A1 ≠ 3] B4CWD.**

The next questions pertain to the amount of cord wood burned during the past heating season for heat as a supplement to the primary heating fuel that you used to heat your home. Overall, how many standard cords of wood did you burn during the past heating season for heat as a supplement to the primary heating fuel that you used to heat your home? This would include any wood you may have burned in your fireplace for heating purposes. The unit of measure for wood use is a standard cord, which is 4 feet x 4 feet x 8 feet.

[INTERVIEWER: IF RESPONDENT SAYS THEY USED WOOD "RUNS," ASK RESPONDENT WHAT THAT WOULD BE IN CORDS.]

[INTERVIEWER: FOR THIS SECTION, ONLY RECORD A DOLLAR AMOUNT IF THE RESPONDENT CANNOT GIVE YOU A UNIT AMOUNT.]

- 1 Cords \_\_\_\_\_
- 2 Runs \_\_\_\_\_
- 3 Dollar amount \_\_\_\_\_

- 4 OTHER (SPECIFY) \_\_\_\_\_
- 5 DON'T KNOW
- 6 REFUSED

[ASKED ONLY IF B2=4 OR B4=2 OR B4=3 AND A1 ≠ 4] **B4Pel.**

Last heating season, how many bags or tons of wood pellets did you burn for heat as a supplement to the primary heating fuel that you used to heat your home?

[INTERVIEWER: IF NEEDED, RESIDENTIAL USERS TYPICALLY PURCHASE PELLETS BY THE BAG (STANDARD 40 POUND BAGS) OR BY THE TON (2000 POUNDS OR 50 BAGS).

[INTERVIEWER: FOR THIS SECTION, ONLY RECORD A DOLLAR AMOUNT IF THE RESPONDENT CANNOT GIVE YOU A UNIT AMOUNT.]

- 1 Bags \_\_\_\_\_
- 2 Tons \_\_\_\_\_
- 3 Dollar amount \_\_\_\_\_
- 4 Other \_\_\_\_\_
- 5 DON'T KNOW
- 6 REFUSED

[ONLY ASKED IF A1=3 OR A1=4 OR B2=3 OR B2=4 OR B4=1 OR B4=2 OR B4=3, OTHERWISE GO TO EINTRO] **CIntro.**

Now, I'll ask you about the types of wood burning appliances you may have used during the past heating season which includes any time between October 1, 2018 and April 30, 2019. Please tell me which of the following wood burning appliances you burned wood in last winter.

[IF B4=2 GO TO C1\_2] **C1\_1.**

Last heating season, did you burn wood in a wood stove?

- 1 Yes
- 2 No
- 3 DON'T KNOW
- 4 REFUSED

[IF B4=1 GO TO C1\_3] **C1\_2.**

Last heating season, did you burn wood pellets in a pellet stove?

[INTERVIEWER: IF NEEDED, A PELLETT STOVE IS A SPACE HEATER INTENDED TO HEAT A SPACE DIRECTLY.]

- 1 Yes
- 2 No
- 3 DON'T KNOW
- 4 REFUSED

[IF B4=1 GO TO C1\_4] **C1\_3.**

Last winter, did you burn wood pellets in a pellet furnace or boiler?

[INTERVIEWER: IF NEEDED, A PELLETT FURNACE OR BOILER IS A CENTRAL HEATING SYSTEM WHICH USES A NETWORK OF AIR DUCTS OR WATER PIPES TO DISTRIBUTE HEAT TO ALL ROOMS OF A HOUSE.]

- 1 Yes
- 2 No
- 3 DON'T KNOW
- 4 REFUSED

[IF B4=2 GO TO C1\_8] **C1\_4.**

Last heating season, did you burn wood in a wood stove insert in a fire place?

[INTERVIEWER: IF NEEDED, INSERTS ARE USED TO CONVERT MASONRY FIREPLACES INTO EFFECTIVE HEATING SYSTEMS. AN INSERT CONSISTS OF A FIREBOX SURROUNDED BY A STEEL SHELL.]

- 1 Yes
- 2 No
- 3 DON'T KNOW
- 4 REFUSED

**C1\_5.**

Last heating season, did you burn wood in a wood furnace or boiler?

[INTERVIEWER: IF NEEDED, WOOD FURNACE OR BOILER IS A CENTRAL HEATING SYSTEM WHICH USES A NETWORK OF AIR DUCTS OR WATER PIPES TO DISTRIBUTE HEAT TO ALL ROOMS OF THE HOUSE. WOOD IS USED AS THE FUEL, AND HEATING AIR IS FORCED THROUGH DUCTS WITH A FAN FOR THE FURNACE AND THROUGH WATER PIPE FOR THE BOILER.]

- 1 Yes
- 2 No [GO TO C1\_6]
- 3 DON'T KNOW [GO TO C1\_6]
- 4 REFUSED [GO TO C1\_6]

**C1\_5a.**

Was the wood furnace or boiler you used during the past heating season used inside or outside of your house?

- 1 Inside the house
- 2 Outside the house
- 3 Both inside and outside the house
- 4 DON'T KNOW
- 5 REFUSED

**C1\_6.**

Last heating season, did you burn wood in an open fireplace, that is a fireplace without a wood stove insert?

[IF NEEDED: A FIREPLACE WITHOUT A STOVE INSERT IS USED MOSTLY FOR VIEWING RATHER THAN HEATING. IT HAS NOT BEEN MODIFIED BY ITS MANUFACTURER TO INCLUDE AN INSERT CONSISTING OF A FIREBOX SURROUNDED BY A STEEL SHELL TO IMPROVE THE HEATING PROCESS.]

- 1 Yes
- 2 No [GO TO C1\_7]
- 3 DON'T KNOW [GO TO C1\_7]
- 4 REFUSED [GO TO C1\_7]

**C1\_6a.**

Now, thinking only about wood burned in your open fireplace for pleasure burning, not for heating purposes: How many standard cords of wood did you burn in that fireplace during the last heating season?

- 1 Cords\_\_\_\_\_
- 2 Runs\_\_\_\_\_
- 3 Dollar Amount\_\_\_\_\_
- 4 OTHER\_\_\_\_\_
- 5 DON'T KNOW
- 6 REFUSED

**C1\_7.**

Last heating season, did you burn wood in a combination furnace or boiler that can burn wood or other fuels?

[INTERVIEWER: IF NEEDED, A COMBINATION FURNACE OR BOILER IS NORMALLY DESIGNED TO BURN EITHER WOOD OR OIL IN THE SAME UNIT.]

- 1 Yes
- 2 No [GO TO C1\_8]
- 3 DON'T KNOW [GO TO C1\_8]
- 4 REFUSED [GO TO C1\_8]

**C1\_7a.**

Was the combination furnace or boiler you used during the past heating season used inside or outside of your house?

- 1 Inside the house
- 2 Outside the house
- 3 Both inside and outside the house
- 4 DON'T KNOW
- 5 REFUSED

[ONLY ASKED IF B4 <> 1] **C1\_8.**

During the past heating season, did you burn wood pellets in another appliance that I have not mentioned?

- 1 Yes (specify) \_\_\_\_\_
- 2 No
- 3 DON'T KNOW
- 4 REFUSED

[ONLY ASKED IF C1\_7A=2 OR C1\_5A=2] **C1\_9.**

Was the wood furnace/boiler or combination furnace/boiler that you used during the past heating season purchased and installed before or after October 1 2009?

- 1 Before October 1, 2009
- 2 After October 1, 2009
- 3 DON'T KNOW
- 4 REFUSED

[ONLY ASKED IF C1\_1=1 OR C1\_4=1 ALL OTHERS GO TO C\_BUY] **C2.**

Was the stove or fireplace insert you used during the past heating season purchased new from a store or manufacturer or was it purchased used?

IF PURCHASED NEW: Was it purchased prior to July 1, 1990, between July 1, 1990 and May 15, 2015, or after May 15, 2015?

- 1 Prior to July 1, 1990
- 2 Between July 1, 1990 and May 15, 2015
- 3 After May, 15 2015
- 4 Unit was purchased used
- 5 DON'T KNOW
- 6 REFUSED

**C3.**

Was the stove or fireplace insert you used last heating season a catalytic wood stove?

[INTERVIEWER: IF NEEDED, IN CATALYTIC STOVES, THE SMOKY EXHAUST IS PASSED THROUGH A COATED CERAMIC HONEYCOMB INSIDE THE STOVE WHERE THE SMOKE AND GASES AND PARTICLES IGNITE AND BURN.

- 1 Yes
- 2 No [GOT TO C\_BUY]
- 3 DON'T KNOW [GO TO C\_BUY]
- 4 REFUSED [GO TO C\_BUY]

**C3a.**

Has the catalyst in the stove ever been replaced?

- 1 Yes
- 2 No
- 3 DON'T KNOW
- 4 REFUSED

[ONLY ASKED OF THOSE WHO BURN CORD WOOD OR PELLETS OTHERWISE GO TO EINTRO]  
[THOSE WHO ONLY BURN PELLETS SKIP TO C5A]

**C\_Buy.**

Now, I'll ask you some questions about the cord wood that you burned during the past heating season regardless of when you actually purchased or got the wood.

**C\_Buy1.**

How did you get the wood you burned during the previous heating season?

- 1 Cut by yourself or a member inside your immediate family
- 2 Cut by friend
- 3 Purchased (by respondent) [GO TO C\_BUY1B2]
- 4 Some of each
- 5 DON'T KNOW [GO TO EINTRO]
- 6 REFUSED [GO TO EINTRO]

**C\_Buy1a.**

For wood cut by yourself, a family member or friend: what town was the wood cut in?

[ONLY ASKED IF C\_BUY1=3 OR 4. OTHERWISE SKIPTO C4A] **C\_Buy1b2.**

For wood that you purchased: In what town and state is your firewood dealer's business located?

Town:  
State:

**C\_Buy2.**

In what form was the purchased wood bought? Was it...[CHECK ALL THAT APPLY]

- 1 Cut& Split
- 2 Unsplit blocks
- 3 Log Length
- 4 Or some other form (specify) \_\_\_\_\_
- 5 DON'T KNOW
- 6 REFUSED

**C\_Buy2a.**

How much did you pay per cord for the wood you burned during the previous heating?

[FOR "DON'T KNOW" ENTER 8888]

[FOR "REFUSED TO ANSWER" ENTER 9999]

[ONLY ASKED IF C\_BUY1=3 OR C\_BUY1=4] **C\_Buy2b.**

Did you experience any of the following when purchasing the wood you burned during the previous heating season? [SELECT MULTIPLE RESPONSES]

- 1 Regular supplier was out of business
- 2 Regular supplier was unable to supply
- 3 Delays in delivery
- 4 Unable to get dry wood
- 5 Had to burn green wood
- 6 Other (specify)
- 7 DID NOT EXPERINCE ANY OF THESE
- 8 DON'T KNOW
- 9 REFUSED

**C4a.**

How do you store your wood prior to burning?

- 1 Woodshed or similar roofed structure
- 2 Basement
- 3 Outside covered
- 4 Outside uncovered
- 5 DON'T KNOW
- 6 REFUSED

**C4b.**

How long is your wood stored before being burned?

- 1 6 months or less
- 2 6 to 12 months
- 3 12 to 18 months
- 4 More than 18 months
- 5 DON'T KNOW
- 6 REFUSED

[ONLY ASKED IF BURN PELLETS OTHERWISE GO TO EINTRO 1] **C5a.**

On average, how much did you pay per ton or per bag for the wood pellets you burned during the previous heating season?

- 1 \$ PER TON \_\_\_\_\_
- 2 \$ PER STANDARD 40 POUND BAG \_\_\_\_\_
- 3 DON'T KNOW
- 4 REFUSED

**C5b.**

Did you experience any of the following when purchasing the wood pellets you burned during the previous heating season?

[CHECK ALL THAT APPLY.]

- 1 Regular supplier was out or ran out of wood pellets
- 2 Rationing of wood pellets
- 3 Delays in delivery
- 4 Or something else (specify)
- 5 DID NOT EXPERIENCE ANY OF THESE
- 6 DON'T KNOW
- 7 REFUSED

**C5c.**

How do you store your supply of wood pellets?

- 1 Outside in bags (this would include sheds or garages)
- 2 Inside in bags (this would include the basement)
- 3 Bulk storage outside in a silo or similar structure
- 4 Bulk storage inside (most likely in the basement)
- 5 DON'T KNOW
- 6 REFUSED

**EIntro.**

Now, I will ask you a few questions about your experiences with your current heating systems and your plans for the future.

**EIntro1.**

How long have you been using [PRIMARY FUEL] for heating this residence?

- 1 Less than 1 year (# OF MONTHS)
- 2 1 year or more (# OF YEARS)
- 3 DON'T KNOW
- 4 REFUSED

[ONLY ASKED IF B1=1 OTHERWISE GO TO E1] **EIntro2.**

How long have you been using [SECONDARY FUEL] for heating this residence?

- 1 Less than 1 year (# OF MONTHS)
- 2 1 year or more (# OF YEARS)
- 3 DON'T KNOW
- 4 REFUSED

**E1.**

During the coming heating season do you plan to burn any cord wood?

[INTERVIEWER: IF NEEDED, CORDWOOD IS ALSO KNOWN AS FIREWOOD AND IS MEASURED AND SOLD IN UNITS CALLED CORDS. A FULL CORD MEASURES 4ft. x 4ft. x 8ft. AND IS THE OFFICIAL STANDARD FIREWOOD MEASURE.]

- 1 Yes
- 2 No
- 3 DON'T KNOW
- 4 REFUSED

**E2.**

During the coming heating season do you plan to burn any wood pellets?

[IF NEEDED, WOOD PELLETS ARE CYLINDRICAL PELLETS (ABOUT 1/4 INCH IN DIAMETER AND 1 INCH LONG) MADE FROM RECYCLED SAWDUST.]

- 1 Yes
- 2 No
- 3 DON'T KNOW
- 4 REFUSED

**E3.**

Do you plan to purchase or install a new heating system or heating appliance such as a stove, boiler, furnace, or fireplace for use during the coming heating season (October 1, 2019 - April 30, 2020)?

[INTERVIEWER: IF NEEDED, NEW MEANS PURCHASED FROM A STORE OR MANUFACTURER.]

- 1 Yes
- 2 No [GO TO E4]
- 3 DON'T KNOW [GO TO E4]
- 4 REFUSED [GO TO E4]

**E3\_1.**

Which of the following do you plan on purchasing or installing? A... [CHECK ALL THAT APPLY]

- 1 Wood Stove
- 2 Pellet Stove
- 3 Indoor Wood Furnace or Boiler
- 4 Outdoor Wood Furnace or Boiler
- 5 Pellet Furnace or Boiler
- 6 Cold Climate Heat Pump (electric)
- 7 Electric Baseboard Heat
- 8 Oil Fired Furnace (force hot air)
- 9 Oil Fired Boiler (hot water)
- 10 Propane Furnace
- 11 Natural Gas Furnace
- 12 Natural Gas Boiler
- 13 Natural Gas Stove
- 14 Coal Furnace
- 15 Coal Boiler
- 16 Coal Stove
- 17 I do not plan to purchase or install any of these
- 18 DON'T KNOW
- 19 REFUSED

**E4.**

Do you plan to purchase or install a used or previously owned wood burning appliance such as a wood stove, pellet stove or fireplace for use during the coming heating season?

- 1 Yes
- 2 No [GO TO CELLPHONE]
- 3 DON'T KNOW [GO TO CELLPHONE]
- 4 REFUSED [GO TO CELLPHONE]

**E4\_1.**

Do you plan on purchasing a used or previously owned: [CHECK ALL THAT APPLY]

- 1 Wood Stove
- 2 Pellet Stove
- 3 Indoor Wood Furnace or Boiler
- 4 Outdoor Wood Furnace or Boiler
- 5 Pellet Furnace or Boiler
- 6 DON'T KNOW
- 7 REFUSED

[ASKED ONLY OF THOSE CONTACTED ON A LANDLINE] **Cellphone.**

Do you have a cellphone that you use for personal use?

[INTERVIEWER: IF NEEDED, ASSURE THEM THAT WE WILL NOT BE ASKING FOR THEIR NUMBER OR CONTACTING THEM ON THEIR CELLPHONE. THIS IS FOR DEMOGRAPHIC PURPOSES ONLY.]

- 1 Yes
- 2 No
- 3 DON'T KNOW
- 4 REFUSED

[ASKED ONLY OF THOSE CONTACTED ON A CELLPHONE] **Landline.**

Do you have also have a landline telephone?

[INTERVIEWER: IF NEEDED, ASSURE THEM THAT WE WILL NOT BE ASKING FOR THEIR NUMBER OR CONTACTING THEM ON THEIR LANDLINE. THIS IS FOR DEMOGRAPHIC PURPOSES ONLY.]

- 1 Yes
- 2 No
- 3 DON'T KNOW
- 4 REFUSED

**Income.**

Is your annual household income from all sources...

[INTERVIEWER: READ LIST UNTIL RESPONDENT GIVES YOU AN ANSWER.]

INTERVIEWER: IF NEEDED, REMIND RESPONDENT THAT ALL THEIR RESPONSES ARE KEPT COMPLETELY CONFIDENTIAL.

- 1 Less than \$15,000
- 2 \$15,000 to \$25,000
- 3 \$25,001 to \$35,000
- 4 \$35,001 to \$50,000
- 5 \$50,001 to \$75,000
- 6 \$75,001 to \$100,000
- 7 More than \$100,000
- 8 DON'T KNOW
- 9 REFUSED

**DEM\_TOWN.**

What town do you live in?

**ZIPCODE.**

What is your ZIP Code?

**Outro.**

Those were all the questions I had for you. Thank you very much for your time, and have a good day.

## Appendix IV – Previous Survey Procedures

### 2014-2015 Assessment

Castleton Polling Institute at Castleton University was contracted by the Vermont Department of Forests, Parks and Recreation (FPR) to conduct the 2014-2015 Vermont Residential Fuel Assessment Survey. The survey was intended to further track residential fueling trends in the state of Vermont. The survey was last conducted in 2009 by another contractor on behalf of FPR.

The questionnaire was provided by FPR to the Polling Institute. The survey was conducted in English over the telephone. Please see Appendix III for the full survey instrument.

A probability based, dual-frame landline and cellular telephone sample of Vermont was used. The goal was to complete 30% of the surveys utilizing the cell phone sample to increase the coverage of the survey by including households without landline telephones. The sample was proportionally stratified by county. The sample was purchased from ASDE Survey Sampler, Inc. Appendix IV provides additional details from ASDE on the procedures utilized to generate the sample of telephone numbers. Interviewers were instructed to speak with the adult (age 18 years of age or older) in a private residence who was most familiar with how the house was heated during the past heating season (October 1, 2014 to April 30, 2015). Those whose primary residence was not in Vermont during the past heating seasons were screened out of the survey. A total of 509 interviews (153 from the cell phone sample) were completed between July 30, 2015 and August 17, 2015.

The 509 interviews were weighted to the 2013 U.S. Census American Community Survey population projections of the number of households in each Vermont county to adjust for the base probability of selection and nonresponse. None of the sampling errors or statistical tests were adjusted for the design effects due to weighting or clustering. The estimated sampling error (without adjusting for a design effect) for the total number of completed interviews (N=509), at a 95% confidence level with an assumed 50/50 response is (+/-) 4.34. This margin of error is based on the estimated total number of households (N=257,004) in Vermont. Any analysis utilizing a sub-group (i.e., comparing across counties or fuel types) will be much less precise and have a greater margin of error. As a reference for users of the 2014-2015 data, Figure 1 displays the margin of error at the 95% confidence level with an assumed 50/50 response for each Vermont county (without adjusting for design effect).

### 2007-2008 Assessment

The 2007-2008 Vermont Residential Fuel Assessment is based on a telephone survey of Vermont households whose primary residence in the preceding winter was in Vermont. The sample was drawn by Random Digit Dial (RDD) to ensure that both listed and unlisted numbers were included. The frame was all qualifying Vermont households with telephones found in blocks of telephone numbers which have at least one listed residential number. The sample was a proportionate, stratified sample: it was selected so that the number of respondents in a county was proportional to the estimated number of households in the county.

Interviewers asked to speak with the person who was most familiar with how the house was heated last winter. If that person was not available, the respondent was asked for a good time to call back to reach that person. Standard survey protocols applied. The contractor called at different times of the day and

different days of the week. Up to six attempts were made to reach the appropriate person in the household. Up to three attempts were made to convert soft refusals. The sample size of 482 allows a 95% confidence interval with plus or minus 4.48% width for tabulations using the whole sample.

ICF Macro conducted the survey during March, 2009.

### **Prior Year Surveys**

Previous iterations of the survey were conducted by other contractors. Prior year surveys for which the raw data are still available, 1989-1990 through 1995-1996, were previously cleaned by other contractors using standard consistency checks. For the 1995-1996 survey, the data was weighted to compensate for a telephone book sampling frame in which some areas of the state appeared in more than one book. For these reasons, the tabulations here of prior year surveys do not always match the findings published previously. In spite of the data cleaning, data irregularities may exist. Specifically, data from the 1989-1990 and 1991-1992 surveys is possibly inaccurate. In the previous survey, three year averages were used to help show trends where these data abnormalities exist. In assessments since 2018 however, three year averages have been discarded due to inconsistent gaps in data collection and relatively few recent iterations of data to which we can compare